Appendix E

Geotechnical and Paleontological Resources Documentation

E-1 Geotechnical Investigation

Geotechnologies, Inc.
Consulting Geotechnical Engineers
439 Western Avenue
Glendale, California 91201-2837
818.240.9600 • Fax 818.240.9675

Celebrating 50 YEARS OF SERVICE 1971-2021

September 13, 2022
File Number: 21578

Hilton Los Angeles/Universal City
555 Universal Hollywood Drive
Los Angeles, California 91608

Attention: Mark Davis

Subject: Updated Geotechnical Engineering Investigation
Proposed Hilton Los Angeles/Universal City Expansion
555 Universal Hollywood Drive, Los Angeles, California

References: *Report by Geotechnologies, Inc.:*
Geotechnical Engineering Investigation, dated October 16, 2018;
Updated Geotechnical Engineering Investigation, updated November 20, 2020.

Reports by Geotechnologies, Inc., (File No 21062):
Geotechnical Engineering Investigation dated December 17, 2015,
Revised February 12, 2016.
Response to City of Los Angeles Geology and Soils Report Correction Letter
dated January 31, 2017.

City of Los Angeles Correspondence (File No. 21062):
Geology and Soils Report Correction Letter, Log # 95877
dated December 21, 2016.
Geology and Soils Report Approval Letter, Log # 95877-01
dated February 23, 2017.

Dear Mr. Davis:

This updated report presents the results of the geotechnical engineering investigation for the proposed expansion project located at 555 Universal Hollywood Drive, Los Angeles, hereinafter referred to as the Subject Site. This report, prepared by Geotechnologies, Inc., provides geotechnical recommendations for the development of the Subject Site which includes earthwork, seismic design, retaining walls, excavations, shoring, and foundation design. Engineering for the proposed project should not begin until approval of the geotechnical investigation is granted by the local building official. Significant changes in the geotechnical recommendations may result because of the building department review process.

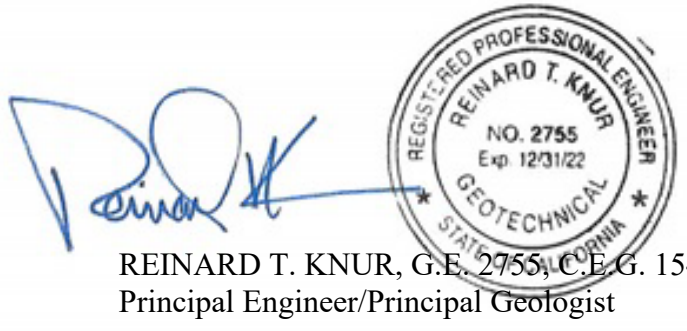
This report has been updated to reflect changes in the proposed hotel tower expansion, deepening changes to the proposed subterranean parking level, and additional details for the proposed chiller/boiler room. The proposed parking area on the east side of the site will remain the same.

September 13, 2022
File No. 21578

The validity of the recommendations presented herein is dependent upon n review of the geotechnical aspects of the project during construction by this firm. The subsurface conditions described herein have been projected from limited subsurface exploration and laboratory testing. The exploration and testing presented in this report should in no way be construed to reflect any variations which may occur between the exploration locations, or that may result from changes in subsurface conditions.

Should you have any questions please contact this office.

Respectfully submitted,
GEOTECHNOLOGIES, INC.



STEVEN J. MEDINA
Staff Geologist

REINARD T. KNUR, G.E. 2755, C.E.G. 1547
Principal Engineer/Principal Geologist

SJM/RTK:ln

Distribution: (2) Addressee

Email to: [mdavis@hiltonuniversal.com], Attn: Mark Davis
[mqiao@upcsf.com], Attn: Michael Qiao
[travist@ankrommoisan.com], Attn: Travis Throckmorton

TABLE OF CONTENTS

SECTION **PAGE**

INTRODUCTION 1
PROPOSED DEVELOPMENT 1
SITE CONDITIONS 3
LOCAL GEOLOGY 4
GEOTECHNICAL EXPLORATION 9
SEISMIC EVALUATION 15
REGIONAL GEOLOGIC SETTING 15
REGIONAL FAULTING 15
Santa Monica-Hollywood Fault 17
Elysian Park Fault 17
Verdugo Fault 18
Newport-Inglewood Fault 18
SEISMIC HAZARDS AND DESIGN CONSIDERATIONS 19
Surface Rupture 19
Liquefaction 19
Lateral Spreading 20
Dynamic Dry Settlement 20
Tsunamis, Seiches, and Flooding 20
Landsliding 20
SLOPE STABILITY ANALYSES 21
Geologic Material Strengths 22
Groundwater 23
External Loads 23
Results of Stability Analysis 24
Discussion 24
SURFICIAL STABILITY 25
CONCLUSIONS AND RECOMMENDATIONS 25
SEISMIC DESIGN CONSIDERATIONS 29
2019 California Building Code Seismic Parameters 29
FILL SOIL 30
EXPANSIVE SOILS 31
WATER-SOLUBLE SULFATES 31
HYDROCONSOLIDATION 32
CONSTRUCTION DEWATERING 32
METHANE ZONES 32
GRADING GUIDELINES 33
Site Preparation 33
Recommended Overexcavation 33
Compaction 33
Acceptable Materials 34
Utility Trench Backfill 35
Wet Soils 35
Shrinkage/Bulking 35

TABLE OF CONTENTS

SECTION **PAGE**

Weather Related Grading Considerations 35
Geotechnical Observations and Testing During Grading 36
LEED Considerations 36
Hillside Grading Issues 37
FOUNDATION DESIGN 39
Conventional 39
Miscellaneous Foundations 39
Foundation Reinforcement 40
Lateral Design 40
Foundation Settlement 40
Foundation Observations 41
Building Setback 41
Deepened Footings 41
FOUNDATION DESIGN - FRICTION PILES 42
Vertical Capacities 42
Lateral Design 42
Pile Installation 43
Settlement 44
RETAINING WALL DESIGN 44
Cantilever Retaining Walls 44
Restrained Drained Retaining Walls 45
Dynamic (Seismic) Earth Pressure 45
Retaining Wall Drainage 47
Sump Pump Design 47
Surcharge from Adjacent Structures 48
Waterproofing 48
Retaining Wall Backfill 49
Freeboard 49
TEMPORARY EXCAVATIONS 49
Slot Cuts 50
Temporary Dewatering 50
Excavation Observations 51
SHORING DESIGN 51
Soldier Piles 51
Lagging 53
Tied-Back Anchors 53
Anchor Installation 54
Lateral Pressures 55
Deflection 56
Monitoring 57
Shoring Observations 57
Raker Brace Foundations 58
SLABS ON GRADE 58

TABLE OF CONTENTS

SECTION **PAGE**

Concrete Slabs-on Grade 58
Design of Slabs That Receive Moisture-Sensitive Floor Coverings 58
Concrete Crack Control 59
Slab Reinforcing 60
Pavements 60
SITE DRAINAGE 62
STORMWATER DISPOSAL 63
DESIGN REVIEW 63
CONSTRUCTION MONITORING 63
EXCAVATION CHARACTERISTICS 64
CLOSURE AND LIMITATIONS 64
GEOTECHNICAL TESTING 65
Classification and Sampling 65
Grain Size Distribution 66
Moisture and Density Relationships 66
Direct Shear Testing 67
Consolidation Testing 67
Expansion Index Testing 68
Laboratory Compaction Characteristics 68

ENCLOSURES
References
Vicinity Map
Plot Plan
Regional Geologic Map
Local Geologic Map-Dibblee
Local Geologic Map – Hill
Local Geologic Map- City of Los Angeles
Historically Highest Groundwater Map
Geologic Map (in Pocket)
Cross Section A-A'
Cross Section B-B'
Cross Section C-C'
Cross Section D-D'
Cross Section E-E'
Cross Section F-F'
Cross Section G-G'
Cross Section H-H'
Cross Section I-I'
Cross Section J-J'
Bedrock Contour Map
Table I- Seismic Source Summary Table
Test Pit Profiles (This Investigation)

TABLE OF CONTENTS

SECTION **PAGE**

Plates A-1 through A-5 (This Investigation)
Test Pit Profiles
Plates A-1 through A-20
Plates A-1 through A-5 (File No. 21062)
Plates B-1 through B-3
Plates B-1 and B-3 (File No. 21062)
Plate C-1 and C-2
Plate C (File No. 21062)
Plate D (This Investigation)
Plate D
Plate D (File No. 21062)
City of Los Angeles, Approval Letter dated February 23, 2017 (6 pages)
Pages from LeRoy Crandall and Associates, Job No. ADE-81093 (25 pages)
LeRoy Crandall and Associates, Job No. B-81178 (6 pages)
City Approval Letter, dated March 25, 1982 (1 page)
Foundation Plans, Existing Hotel (11 pages)
Calculation Sheets (30 pages)
SLIDE7.0 Calculation Sheets (134 pages)
RSPILE Calculation Sheets (50 pages)

UPDATED GEOTECHNICAL ENGINEERING INVESTIGATION
PROPOSED HILTON LOS ANGELES/UNIVERSAL CITY HOTEL EXPANSION
555 UNIVERSAL HOLLYWOOD DRIVE
LOS ANGELES, CALIFORNIA

INTRODUCTION

This report presents the updated geotechnical engineering design and recommendations for the proposed expansion to the Hilton Los Angeles/Universal City Hotel. This report has been updated to reflect changes in the proposed hotel tower expansion, deepening changes to the proposed subterranean parking level, and additional details for the proposed chiller/boiler room. The proposed parking area on the east side of the site will remain the same.

The original report, (File No. 21062) was submitted to the City of Los Angeles, Department of Building and Safety Grading Division. The report was approved (Geology and Soils Report Approval Letter, dated February 23, 2017, LOG# 95877-01). A copy of the approval letter is attached to this report. This firm prepared an updated report for the hotel addition dated November 20, 2020 (File No. 21578). The report was not submitted to the City of Los Angles, Department of Building and Safety for review.

This investigation included excavation of 5 additional test pits, laboratory testing of samples, , engineering analysis, and preparation of this report. The recent and previous exploratory excavation locations are shown on the enclosed Plot Plan. Previous results of the exploration and the laboratory testing are presented in the Appendix of this report.

PROPOSED DEVELOPMENT

Information concerning the proposed development was furnished by Travis Throckmorton of Ankrom Moisan. A site visit was also performed with Michael Qiao of Sun Hill Properties, Inc. The proposed development consists of several components to the hotel expansion project. Each component is described below.

Hotel Addition (South Side of Hotel)

The addition to the south side of the hotel, where a pool and deck reside on top of an undeveloped slope, will have four levels of partially subterranean parking with 14 levels above the main lobby. The lowest finish floor elevation will be approximately 680 feet above mean sea level (amsl). Excavations as much as 30 feet below the current ground surface are expected. Column loads are anticipated to range from 400 to 830 kips and line loads are anticipated to range from 5 to 20 kips per lineal foot.

A pool and food service area as well as a mechanical and electrical space are planned at the lowest (B4) level. Additional excavation to an elevation of approximately 670 feet amsl will be needed for the pool.

Chiller/Boiler Room (South Side of Hotel)

The development of the P3 level on the south side of the hotel, just north of the hotel addition, may be used for a mechanical equipment storage, boiler room, or gym. The finish floor elevation for this area is approximately 684 feet amsl. Depending on the lateral extent of the proposed space, excavations up to 15 feet in depth may be necessary.

Subterranean Parking Levels, Meeting Room (North Plaza)

Three levels of subterranean parking are planned below the existing North Plaza deck. The addition of the subterranean parking levels will be offset from the elevations of the three existing parking levels located on the west side of the structure. The lowest finished floor will be 697 feet amsl. Excavations as much as 43 feet below the current deck elevation (735 feet amsl) are expected. Column loads of 200 to 500 kips and line loads of three to nine kips per lineal foot are anticipated.

At-Grade Parking (East Side of Site)

The at-grade parking is planned to be constructed on the east side of the service road located on the east side of the Subject Site. The parking extends for approximately 3/4 the length of the service road. The parking will contain at-grade parking stalls. Excavations as much as 15 feet in depth will be made into the westerly-descending slope to accommodate the parking stalls. The proposed design has not changed since the November 20, 2020, geotechnical report.

SITE CONDITIONS

The Hilton Hotel is located at the end of a promontory that descends to the west, north, and east. The elevation at the top of the promontory is 703 feet amsl with slopes descend to approximately 670 feet at a 2:1 (horizontal to vertical) gradient. The existing hotel is composed of a guest room tower that is 22 stories in height with an attached parking structure that is up to five levels in height. The site is shown relative to nearby topographic features on the attached Vicinity Map.

Based on original design drawings, the existing-hotel tower is supported on conventional foundations `bearing the siltstone bedrock. The foundations extend to an elevation of 701 feet amsl and the finish floor elevation of the tower is 710 feet. The lowest finish floor elevation of the parking structure is 702 feet amsl with foundations that set down to the east from 685 feet to 652 feet.

South Side of Hotel

The southern slope is vegetated with large trees and annual grasses. A pool and concrete deck are located at the top of the slope in the proposed improvement. During the site investigation, the descending slope was inspected for indications of slope instability. No indications of slope failure such as hummocky topography, arcuate-shaped depressions, or seeps were noted. Cross sections A-A' through D-D' show the subsurface conditions in this complex area.

North Plaza

The north plaza is a flat terrace that is developed with hardscape features, grass, and small trees. A portion of the plaza is paved with concrete block pavers. Three ramps descend from the plaza elevation to the P1 parking level below. The plaza level is underlain by three levels of subterranean parking on the west side of the structure and is at grade on the east side of the structure. The proposed parking will be located on the east side of the structure and will be excavated to a depth of approximately 50 feet for basement levels and foundation elements. Cross sections E-E', F-F' and G-G' show the subsurface conditions in this complex area.

Service Road

A paved service road is located on the east side of the site. The road descends from the hotel entrance at the northeast corner of the site to its terminus at the southeast corner of the site. The road is approximately 650 feet long. The east side of the road forms the bottom of an easterly ascending slope. The slope ranges from 2 feet to 30 feet in height and is inclined at gradients from 3:1 to 1.75:1. A terrace with a concrete-lined V-ditch is located near the mid-height elevation and another is located at the top of the slope. Offsite and at the top of the slope, the property is developed with an at-grade parking lot. The slope is vegetated with annual grasses and mature pine trees. Cross section H-H', I-I', and J-J' are drawn through different critical sections of the slope.

During the field investigation, the slope did not exhibit indications of instability such as erosion, cracks, offsets in the terrace drains, and cracks near the tops of the slopes. No seepage was noted at the toe of the slope.

LOCAL GEOLOGY

As indicated on the attached Regional Geologic Map (Campbell, 2005), the site is located on the north slope of the Santa Monica Mountains near the Cahuenga Pass. In this area, the Santa Monica Mountains are comprised of fine-grained sedimentary rocks of the Upper Topanga Formation

(Dibblee, 1991). The rocks consist of well bedded siltstone and claystone with thin interbeds of sandstone. Bedding in the site vicinity has been deformed into a broad northwest plunging syncline. Local bedding attitudes dip to the north at angles from 35 to 65 degrees. The local geology is presented on the attached Local Geologic Map-Dibblee, Local Geologic Map-Hill, and Local Geologic Map- City of Los Angeles.

Additional geologic maps such as the Geologic Map by the City of Los Angeles, (1960) and the Geologic Map of the North-Central Los Angeles Area by Weber (1979) indicate bedding dips to the northwest from 45 to 65 degrees in the site vicinity. These bedding directions are favorable from a stability standpoint of the promontory.

According to the Local Geologic Map-Dibblee, the Benedict Canyon Fault is located approximately 570 feet to the northwest. The Benedict Canyon Fault strikes northeast across the Santa Monica Mountains from the area of Sepulveda Boulevard and Sunset Boulevard, where it is exposed in Cretaceous-age sandstone, to the foothills along the north flank of the Santa Monica mountains area, east of Universal Studios. The fault varies from very sharp and well defined where it clearly offsets Miocene sedimentary and volcanic units, to broader and more diffuse where it trends through the Jurassic-age Santa Monica Slate. The mapped trace of the Benedict Canyon Fault extends northward from the Santa Monica Mountains into the southeastern San Fernando Valley.

No direct evidence of movement has been observed since late Quaternary time (Weber, 1979). As a result, this fault is not considered active by the California Geological Survey (CGS, 2022). This fault is not indicated as active on the Earthquake Zones of Required Investigation for the Burbank Quadrangle (CGS, 2022).

PREVIOUS WORK BY GEOTECHNOLOGIES, INC.

Geotechnologies, Inc. dated December 17, 2015, Revised February 12, 2016. Geotechnical Engineering Investigation, Proposed Hilton Universal City Expansion Project, 555 Universal Hollywood Drive, Los Angeles, California, File No. 21062.

Three borings and two test pits were excavated to depths ranging from 10 to 60 feet. Fill soil was identified on the site ranging in thickness from 3 to 22 ½ feet. The fill thickens from east to west on the south side of the existing parking structure. Deeper fill may be encountered to the west. The fill was placed in 1981 under the observation of another geotechnical engineering consultant. Underlying the fill is interbedded Siltstone and Sandstone of the Upper Topanga Formation dipping to the north and northeast.

Seepage was identified in the Borings B1, B2, and B3. The proposed structure was recommended to be supported on conventional foundations where rock is exposed at the subgrade elevation and friction piles where fill soil is too thick for deepened foundations. The finish floor elevation of the proposed structure was to be 670 feet above mean sea level.

Geotechnologies, Inc., dated June 9, 2020, Updated November 20, 2020. Geotechnical Engineering Investigation, Proposed Hilton Universal City Expansion Project, 555 Universal Hollywood Drive, Los Angeles, California, File No. 21578.

Five borings and 15 test pits were excavated to depths ranging from 4 to 40 feet. Fill soil was identified on the site ranging in thickness from 3 to greater than 25 feet below ground surface. The fill is the thickest along the east slope where the at grade parking will be constructed. The fill was place in 1981 under the observation of another geotechnical engineering consultant. Underlying the fill is interbedded Siltstone and Sandstone of the Upper Topanga Formation. Generally, the bedrock is striking east west and dipping to the north and northeast from 42 to 62 degrees. At the north end of the site, the rock is hard to very hard near a depth of 25 feet. The borings required coring tools or abandonment of the boring altogether. Similarly, LeRoy Crandall and Associates found hard to very hard rock at locations LC7 and LC10. The geologic structure and subsurface distribution of the geologic materials are shown on the attached cross sections H-H' and J-J'.

Seepage was identified in borings B1 to B5. The proposed structure was recommended to be supported on conventional foundations where rock is exposed at the subgrade elevation and friction piles where fill is too thick for deepened foundations.

WORK BY OTHERS

This firm researched other reports and permit files at the City of Los Angeles, Department of Building and Safety, as part of this investigation. The following reports were reviewed.

LeRoy Crandall and Associates, Report of Geotechnical Investigation Report, Proposed MCA/Sheraton Hotel No. 2, Universal City, Los Angeles, California, for the MCA Development Company, File No. ADE-81093, dated May 28, 1981.

This report was prepared for the planning and design of the existing Hotel. Fifteen borings were drilled as part of the investigation. The investigation supplemented previous geotechnical work performed on the site. The Plot Plan, Geologic Map, pertinent cross sections, and boring logs are included in the Appendix of this report.

The geologic materials encountered in the borings included fill soil, natural colluvium, and sandstone and siltstone of the Upper Topanga Formation. The fill reached a thickness of 23 feet. Records of fill certification were not identified during the record search. Colluvium consisting of sandy silt and sandy clay was found mantling the slope to a thickness of 7 feet. The bedrock had some cemented zones that were difficult to drill. The bedrock was identified to dip to the northeast from 20 to 60 degrees, which is favorable to neutral for most of the proposed cuts on the site. Local folding in the rock was also identified. No indications of faulting were noted on the site.

The Geologic Map by LeRoy Crandall and Associates, included with the report, shows an “Area of Shallow Failures and Soil Creep” offsite at the north end of the site. This area will not impact the proposed development.

Groundwater seepage was found in the joints and fractures or along sandy beds in the bedrock. Seepage occurred at depths ranging from 14 to 32 feet below the ground surface (bgs). A summary of the groundwater depths and elevations are presented in the following table. The boring locations are shown on the attached Plot Plan and the Geologic Map.

BORING NO. and DESIGNATION	DATE OF DRILLING	DEPTH OF SEEPAGE (feet)	ELEVATION OF SEEPAGE (feet)
BORINGS FROM LeROY CRANDALL AND ASSOCIATES FILE NO. ADE-81093			
Boring 3 (LC3)	3/21/81	Drilling mud used; water not established. Boring Drilled to 90 feet	-
Boring 4 (LC4)	3/18/81	40	630
Boring 6 (LC6)	3/31/81	42.5	627.5
Boring 7 (LC7)	4/1/81	>31	<711
Boring 8 (LC8)	4/1/81	52	693
Boring 9 (LC9)	4/2/81	52.0	686.0
BORINGS FROM LeROY CRANDALL AND ASSOCIATES FILE NO. AD-79128			
Boring 3 (LC3)	5/18/79	Drilling mud used	-
Boring 5 (LC5)	5/23/79	53	677
Boring 6 (LC6)	5/24/79	>31	<701
Boring 10 (LC10)	5/22/79	>25	<716

A downhole seismic survey was performed in Boring 3 (LC3) as part of the investigation. The maximum compression wave velocity of the rock within the depth of the proposed excavation was 3,500 feet per second. Based on this velocity, the consultant classified the rock as moderately difficult to rip. The rock may be excavated with heavy excavation equipment. The need for blasting is not anticipated.

The structure was recommended to bear in the siltstone and sandstone bedrock. A bearing capacity of 12,000 psf was provided.

LeRoy Crandall And Associates, Inspection and Testing of Compacted Fill Report, Proposed MCA/Sheraton Hotel No. 2, 3838 Lankershim Boulevard, Lot 1, Tract 27621, Universal City, California for the MCA Development Company, Job No. B-81178, dated January 20, 1982.

Grading for the hotel occurred from September to October 1981. The hotel and parking structure were supported on the Upper Topanga Formation bedrock. The compacted fill was used for support of the building floor slabs, low retaining wall and walks. The fill was compacted to 90% of the maximum density obtained using ASTM method D1557-70. The test locations are shown on an attached map; however, the test results are missing from the report copy reviewed. A copy of this report is included in the Appendix of this report.

City of Los Angeles, Grading Division, Primary Structural Fill Letter, dated March 25, 1982.

This letter confirms approval of the compaction report and fill observed during grading. A copy of the letter is included in the Appendix of this report.

GEOTECHNICAL EXPLORATION

FIELD EXPLORATION

Recent Investigation

The supplemental exploration for the Proposed Chiller/Boiler Room (located below the P2 parking level) consisted of five test pits excavated using hand tools. The test pits were approximately 30 inches square and were excavated to a maximum depth of 16 feet bgs. The test pits were further deepened with a 4-inch hand auger. The test pits ranged in depth from 20 to 30 feet The exploration locations are shown on the attached Plot Plan and the Geologic Map, and the geologic materials encountered are logged on Plates A-1 through A-5.

Bedrock was identified in 4 of the 5 test pits. The belled portion of the footing was identified in 2 of the excavations. In Test Pit 4, belled caisson could not be confirmed to be bearing directly on the bedrock. Sketches of the test pits are presented on Test Pit Profiles.

Subsurface Investigation for the November 2020 Report

This investigation included drilling five borings with the aid of a truck-mounted drilling rig equipped with 24-inch diameter bucket auger to depths between 27 and 40 feet. Soil samples were obtained by dropping a Kelley from a height of 12 inches and using a California-modified split spoon sampler. At the termination of drilling, a geologist was lowered into the boring to obtain information regarding the structure of the bedrock.

In addition, 15 test pits were excavated using hand tools to depths between 4 and 25 feet. All the test pits were downhole logged by a geologist. The site was explored on March 26, 2018, to October 17, 2019. The exploration locations are shown on the attached Plot Plan and the Geologic Map, and the geologic materials encountered are logged on Plates A-1 through A-20.

Subsurface Investigation for the December 2015 Report

The previous investigation focused on the proposed addition on the south side of the site. The area was explored from September 24 through 26, 2015, by excavating three borings and two test pits. Boring B1 was drilled with a limited access drilling rig equipped with an 8-inch diameter hollowstem auger. Samples were obtained using an automatic hammer dropping a weight of 140 pounds from a height of 30 inches. A Standard Penetration Test split-spoon sampler and a California-modified split-spoon sampler lined with 2.5-inch diameter brass rings were used at alternating depths. Borings B2 and B3 were drilled with a truck–mounted drilling rig equipped with a 24-inch diameter bucket auger. The borings were drilled to depths of 35 to 60 feet bgs.

The test pits were excavated using hand labor. The upper reaches of the excavation were on the order of 30 inches square. Samples were obtained using hand sampling equipment. The exploration locations are shown on the Plot Plan and the Geologic Map. The geologic materials encountered are logged on Plates A-1 through A-5.

The location of exploratory excavations was determined by measurement from hardscape features shown on the attached Plot Plan. Elevations of the excavations were determined by interpolation of the elevation contours shown on the plan. The location and elevation of the excavations should be considered accurate only to the degree implied by the method used.

GEOLOGIC MATERIALS

The geologic materials consist of fill soil and sedimentary bedrock of the Upper Topanga Formation. The geologic materials are described below based on the specific development location, South Side of Hotel, North Plaza, and East Side of Site. The distribution of the geologic materials is shown on the attached Geologic Map.

Hotel Addition and Chiller/Boiler Room (South Side of Hotel)

Fill Soil

The fill soil underneath the proposed hotel addition consists of silty sand and sand that is dark brown, moist, and medium dense. In the pool deck area, the fill ranges in depth from three to five feet bgs. The westerly descending slope is blanketed with 6 to 7 ½ feet of fill. At the toe of the westerly-descending slope, the fill in Boring B5 is 15 feet and 22 ½ feet in Boring B3. The deep fill identified in Borings B3 and B5 coincides with the deep fill observed by LeRoy Crandall and Associates' Boring B6, at 13 feet.

Underneath the proposed chiller/boiler room, the fill soil consists of silty sand that is mottled pale yellow to yellowish brown, moist, medium dense, fine grained with some gravel up to 1" in the maximum dimension. The fill ranges in depth from 15 to 30 feet bgs. The deep fill correlates with the deep fill found in Geotechnologies' Boring B3 from the 2015 investigation as well as Boring B3 from Geotechnologies' Boring B5 from the 2020 investigation. Both borings are located just south of the proposed chiller/boiler room.

Alluvium

The alluvium consists of silty sand and sandy silt that is brown to dark brown, moist, and medium dense. Near the base of the alluvium, the soil coarsens, and gravel and a few cobbles were identified. The thickness of the alluvium is 17 ½ feet, and the basal contact was identified at a depth of 32 ½ feet.

No alluvium was encountered underneath the proposed chiller/boiler room.

Bedrock (Upper Topanga Formation)

The bedrock underneath the proposed hotel addition and proposed boiler/chiller room consists of interbedded siltstone and sandstone with beds of coarse-grained conglomerate of the Upper Topanga Formation. The shallower depth weathered rock is generally dark and yellowish brown, greenish gray, and grayish brown in color. With increasing depth, the rock is gray to dark gray in color. The rock is moderately hard to hard, moist, and well bedded. It should be noted that during the recent investigation, drilling with the hand augers was terminated because of hard concretions encountered in the rock. The geologic structure and subsurface distribution of the geologic materials is shown on the attached Cross Sections A-A', through D-D'. A Bedrock Contour Map was prepared for this area of the site and is found in the Appendix.

Bedding was identified in only one of the test pits (Test Pit 2). The bedding dips to the north at 35 degrees. This attitude is consistent with orientations found elsewhere on the site. In Boring B2 (from the 2015 investigation) at a depth of 8 feet, the bedding dips to the southeast at a moderate angle. Ata depth of 13 feet, the bedding returned to the regional trend. The change in bedding orientation is indicative of a local fold and is consistent with the findings identified in the investigation by LeRoy Crandall and Associates (1981)

Subterranean Parking Levels (North Plaza)

Fill in this area consists of silty sand and sandy silt that is yellowish brown, moist, and moderately dense. The fill ranges from one to four feet in thickness and is deepest along the north side of the existing structure. Although not specifically identified by this firm, a wedge of fill may be located on the east side of the north-south retaining wall of the parking structure and is illustrated on the attached Cross Sections E-E' and F-F'. This fill will be removed as part of the proposed excavation.

Bedrock (Upper Topanga Formation)

The bedrock in this area consists of interbedded sandstone and siltstone that is yellow and gray, and moderately hard to hard. In Boring B6, by LeRoy Crandall and Associates, a conglomerate layer was identified; similar rock is anticipated in the proposed excavation. Boring LC5 encountered numerous cemented layers including one that required the use of a coring bucket.

The geologic structure and subsurface distribution of the geologic materials is shown on the attached Cross Sections E-E', F-F' and G-G'.

At-grade Parking (East Side of Site)

Fill

The fill soil consists of silty sand and sandy silt that ranges in color from brown to yellowish brown to gray. The fill thickness ranges from one foot to greater than 25 feet. The fill is up to nine feet thick at Test Pit 1 near the north end of the proposed parking stalls. At the southern end of the proposed parking area, the fill thickens considerably. In Test Pits 7 and 8, the fill is 13-½ and greater than 25 feet, respectively.

Bedrock (Upper Topanga Formation)

The bedrock consists of well bedded sandstone and siltstone from the Upper Topanga Formation. A pyroclastic rock was identified at depth of 25 feet in Boring B2. This rock was not identified elsewhere on the site. Bedding consistently dips to the north and northeast from 42 to 62 degrees.

The rock is poorly jointed with variable strikes and vertical dips. At the north end of the proposed parking area, the rock was hard to very hard at a depth of 25 feet. The borings required coring tools or abandonment of the boring altogether. Similar hard to very hard rock was identified in the nearby borings by LeRoy Crandall and Associates (Borings LC7 and LC10). The geologic structure and subsurface distribution of the geologic materials is shown on the attached Cross Sections H-H', I-I' and J-J'.

Groundwater Seepage

Groundwater seepage was identified only in the borings listed in the table below. The flow of water in the borings was relatively light in the vicinity of the Hotel addition. Water flow was greater in the borings along the service road. The borings cited below were drilled by this firm.

BORING	DEPTH TO WATER SEEPAGE (feet)	ELEVATION OF WATER SEEPAGE (feet)
Borings From File No. 21062 (December 2015)		
B1	36	668
B2	33	672
B3	32	643
Borings From File No. 21578 (November 2020)		
B1	19	699.5
B2	21.5	709.5
B3	24	692.5
B4	25	703
B5	29	642

Overall, the bedrock underlying the site is well bedded and moderately fractured. Water will follow bedding planes s and fractures within the bedrock. Generally, water will flow to the southwest and northeast.

The Seismic Hazard Zone Report for the Burbank Quadrangle (CDMG, 1999) was reviewed to identify the historically highest groundwater level for the site. The historically highest groundwater level contours are not shown within 0.3 mile of the site. This finding indicates that the underlying

geologic materials are not of sufficient permeability to transmit water. As stated earlier in this section, seepage should be anticipated at the bedrock contacts, from fractures, and from coarse sandstone beds.

Fluctuations in the level of groundwater may occur because of variations in rainfall, temperature, and other factors not evident at the time of the measurements reported herein. Fluctuations also may occur across the site. High groundwater levels can result in changed conditions.

Caving

Caving did not occur in either the large-diameter bucket auger borings or the test pits. Caving is not anticipated in the bedrock. However, where seepage occurs in fractured rock zones, some sloughing may occur.

SEISMIC EVALUATION

REGIONAL GEOLOGIC SETTING

The Subject Site is in the Transverse Ranges Geomorphic Province. The Transverse Ranges are characterized by roughly east-west trending mountains, and the northern and southern boundaries are formed by reverse fault scarps. The convergent deformational features of the Transverse Ranges are a result of north-south shortening because of plate tectonics. This has resulted in local folding and uplift of the mountains along with the propagation of thrust faults (including blind thrusts). The intervening valleys have been filled with sediments derived from the bordering mountains.

REGIONAL FAULTING

Based on criteria established by the California Geologic Survey (CGS), faults may be categorized as active, potentially active, or inactive. Active faults are those which show evidence of surface displacement within the last 11,700 years (Holocene-age). Potentially active faults are those that show evidence of most recent surface displacement within the last 1.6 million years (Quaternary-age). Faults showing no evidence of surface displacement within the last 1.6 million years are considered inactive for most purposes except for the design of some critical structures.

Buried thrust faults are faults without a surface expression but are a significant source of seismic activity. They are typically broadly defined based on the analysis of seismic wave recordings of hundreds of small and large earthquakes in the southern California area. Because of the buried nature of these thrust faults, their existence is usually not known until they produce an earthquake. The risk for surface rupture potential of these buried thrust faults is inferred to be low (Leighton, 1990). However, the seismic risk of these buried structures in terms of recurrence and maximum potential magnitude is not well established. Therefore, the potential for surface rupture on these surface-verging splays at magnitudes higher than 6.0 is possible.

A table summarizing the location of nearby faults within a 60-mile radius of the site, their distance from the Site and pertinent data regarding the results are presented in Table I, Seismic Source Summary Table. Characteristics of the four nearest faults to the site are summarized in the following paragraphs.

Benedict Canyon Fault

According to the Local Geologic Map (Dibblee, 1991) the Benedict Canyon Fault is located approximately 570 feet to the northwest. The Benedict Canyon Fault strikes northeast across the Santa Monica Mountains from the area of Sepulveda Boulevard at Sunset Boulevard, where it is exposed in Cretaceous-age sandstone, to the foothills along the north flank of the Santa Monica mountains area, east of Universal Studios. The fault varies from very sharp and well defined where it clearly offsets Miocene sedimentary and volcanic units, to broader and more diffuse where it trends through the Jurassic-age Santa Monica Slate. The mapped trace of the Benedict Canyon Fault extends northward from the Santa Monica Mountains into the southeastern San Fernando Valley.

No direct evidence of movement has been observed since late Quaternary time (Weber, 1979). As a result, this fault is not considered active by the California Geological Survey (CGS, 2022). This fault is not indicated as active on the Earthquake Zones of Required Investigation for the Burbank Quadrangle (CGS, 2022).

Santa Monica-Hollywood Fault

The Hollywood Fault is located 2.27 miles south of the site. The fault is a reverse, north-dipping fault located along the southern edge of the eastern Santa Monica Mountains (Dolan, 2000). The fault dips steeply to the north and juxtaposes Miocene sedimentary rocks over Pleistocene and Holocene alluvium. Work by Dolan, et al. (2000), suggests that surface rupture occurred between 6,000 and 11,000 years ago. The Hollywood Fault is capable of a moment magnitude (Mw) 6.6 earthquake. The California Geological Survey has designated an Earthquake Fault Zone for this fault and is indicated on the Hollywood 7.5-Minute Quadrangle (CGS, 2014).

The Santa Monica Fault is located 3.34 miles southwest of the site along the southern edge of the Santa Monica Mountains. This fault has a reverse motion and is considered to have relatively recent actively based on the presence of groundwater barriers and offset in Pleistocene-age soils (Dolan, 2000). The Santa Monica Fault has been designated within an Earthquake Fault Zone by the California Geological Survey and is shown on the Earthquake Fault Zone Map for the Beverly Hills 7.5-Minute Quadrangle (CGS, 1998). The Santa Monica segment is capable of a Mw 7.0 earthquake.

Elysian Park Fault

The Elysian Park Thrust Fault located 3.85 miles southeast of the site. This fault is not zoned with an Earthquake Fault Rupture Zone (CGS, 2007). However, work by Shaw and Suppe (1996) suggests that a buried thrust fault is responsible for uplift of the Elysian Park Hills and Repetto Hills. The centerline of the Elysian Park Anticline is mapped by Lamar (1970) and Dibblee (1991) to be located 1.3 miles northeast of the Site. This fault is believed to be capable of a magnitude Mw 6.7 earthquake. However, because of the lack of ground surface displacement caused by this fault, it is not considered an active fault by the California Geological Survey.

Verdugo Fault

The Verdugo Fault is located approximately 5.35 miles to the northeast of the site. The Verdugo Fault trends along the base of the southwest side of the Verdugo Mountains. According to Weber, et. al., (1980), evidence cited for recent fault activity include two to three-meter-high reverse scarps were identified in alluvial fan deposits at the toe of slopes in the Burbank and Glendale areas. Further to the northwest, in Sun Valley, faults were reportedly identified at a depth of 40 feet in a sand and gravel pit. The precise location of the effects is unknown. The fault is characterized as a reverse fault with a dip of 45 degrees to the north. The Verdugo Fault is considered to capable of producing a maximum Mw 6.9 earthquake.

Although considered active by the County of Los Angeles Department of Public Works (Leighton, 1990) recently the City of Los Angeles Department of Public Works and the United States Geological Survey have considered the fault to be not within an Earthquake Fault Zone by the California Geological Survey. Therefore, the fault is not considered active by the CGS because of the lack of surface displacement.

Newport-Inglewood Fault

The Newport-Inglewood Fault is located 6.65 miles southwest of the site. This fault is considered active and has been designated with and Earthquake Fault Zone (Hart and Bryant, 1997). The Newport-Inglewood fault zone is a broad zone of discontinuous north to northwest en-echelon faults and northwest to west trending folds. The fault zone extends southeastward from west Los Angeles, across the Los Angeles Basin, to Newport Beach and possibly offshore beyond San Diego (Barrows, 1974; Weber, 1982; Ziony, 1985).

The onshore segment of the Newport-Inglewood Fault zone extends for about 37 miles from the Santa Ana River to the Santa Monica Mountains. In the Beverly Hills area, the fault is overridden by, or merges with, the east-west trending Santa Monica zone of reverse faults. This fault has multiple locations with ground surface displacement. Therefore, this fault is considered active.

The most significant earthquake associated with the Newport-Inglewood Fault system was the Long Beach earthquake of 1933 with a magnitude of 6.3 on the Richter scale. It is believed that the Newport-Inglewood fault zone can produce a 6.9 magnitude earthquake.

As with all Southern California, the site is subject to potential strong ground motion should a moderate to strong earthquake occur on a local or regional fault. Design of the proposed structures, in accordance with the provisions of the 2013 California Building Code, will mitigate the potential effects of strong ground shaking.

SEISMIC HAZARDS AND DESIGN CONSIDERATIONS

The primary geologic hazard at the site is moderate to strong ground motion (acceleration) caused by an earthquake on any of the local or regional faults. The potential for other earthquake-induced hazards was also evaluated including surface rupture, liquefaction, dynamic settlement, inundation and landsliding.

Surface Rupture

Surface rupture is defined as ground displacement which occurs along the surface trace of the causative fault during an earthquake. Based on research of available literature and results of site reconnaissance, no known active or potentially active faults underlie the Subject Site. In addition, the site is not located within an Alquist-Priolo Earthquake Fault Zone. Based on these considerations, the potential for surface ground rupture at the site is considered low.

Liquefaction

Liquefaction is a phenomenon in which saturated silty to cohesionless soils below the groundwater table are subject to a temporary loss of strength because of the buildup of excess pore pressure during cyclic loading conditions such as those induced by an earthquake. Liquefaction-related effects include loss of bearing strength, amplified ground oscillations, lateral spreading, and flow failures.

The proposed improvements will be supported in the moderately hard to hard bedrock of the Upper Topanga Formation. This bedrock is considered non-liquefiable because of its moderately hard consistency and long geologic history.

The Earthquake Zones of Required Investigation (CGS, 2022) do not classify the site as part of the potentially "Liquefiable" area. This determination is based on groundwater depth records, soil type and distance to a fault capable of producing a substantial earthquake.

Lateral Spreading

Because of the non-liquefiable characteristics of the underlying bedrock, the potential for lateral spread is remote.

Dynamic Dry Settlement

The potential for dynamic dry settlement of the underlying bedrock and compacted fill soil is considered remote.

Tsunamis, Seiches, and Flooding

Tsunamis are large ocean waves generated by sudden water displacement caused by a submarine earthquake, landslide, or volcanic eruption. Review of the County of Los Angeles Flood and Inundation Hazards Map, Leighton (1990), indicates the site does not lie within the mapped tsunami inundation boundaries.

Landsliding

The descending slopes that surround the site are mantled by a thin cover of fill soil. During the field exploration part of this investigation, no indications of slope instability such as soil cracks, scarps, scars, or offset concrete drained terraces were noted.

The site is underlain by bedrock of the Upper Topanga Formation. The rock is moderately hard to hard. According to the subsurface work by this firm, as well as the work of others, bedding dips moderately to the north and northeast, which is favorable from the standpoint of stability for the proposed hotel expansion, North Plaza excavations, and the parking spaces adjacent to the service road. In Boring B2 drilled by this firm (File No. 21062), at a depth of 8 feet, bedding was noted to dip in a downslope direction (to the southeast). At a depth of 13 feet and below, the bedding was noted to be more consistent with regional trends. It is the opinion of this firm that the bedding observed in B2 represents a local fold and does not impact the stability of the slope.

Several geologic maps were reviewed as part of this investigation as well as a geotechnical engineering investigation performed by LeRoy Crandall and Associates in 1981 and 1982. The only indication of slope instability is a location identified as "shallow failures and creep" offsite and north of the proposed North Plaza. This area is located offsite and does not represent a concern to the proposed development.

The Earthquake Zones of Required Investigation map (CGS, 2022) indicates the southerly descending slope below the proposed hotel expansion is susceptible to seismic inducted landslides. This slope was analyzed in detail along the Cross Sections B-B', C-C' and D-D'. Based on the results of the slope stability analysis described in this report and is the recommendations provided in this report are followed, the potential of earthquake-induced landslides is not a concern.

SLOPE STABILITY ANALYSES

Slope stability analyses were performed on the Cross Section D-D' and I-I' . These sections represent the most critical sections in terms of slope inclination and bedding plane orientation and surcharge to the slope. Therefore, all other slopes of flatter gradient, or lesser heights, or more favorable geologic conditions are considered stable. For Cross Section I-I'. A retaining wall will be constructed at the toe of the cut. As a result, only the portion of the slope above the proposed wall was modeled.

No analyses were performed at the North Plaza area since all new development will be within the existing structure and the development will represent a net unweighting of the ground.

The procedure for the stability analyses conforms with the "Recommended Procedures for Implementation of California Division of Mines and Geology Special Publication 117 Guideline for Analyzing and Mitigating Landslide Hazards in California" (Blake, Hollingsworth, and Stewart, 2002). In addition, the procedure followed the LA Department of Building and Safety "Slope Stability Evaluation and Acceptance Standards", Information Bulletin P/BC 2020-049. The computer program SLIDE2 (Version 9.012) by RocScience was used for the slope stability analyses

Bishop's simplified method for circular failure surfaces and Janbu's method for planar surfaces were used.

Geologic Material Strengths

The geologic materials comprising the slopes include artificial fill, alluvium, and bedrock of the Upper Topanga Formation.

Because of bedding in the rock, the bedrock is modeled as anisotropic with weaker strength along bedding. The range of angles for which the weaker strength is used is identified in the table. The weakest strength for each material was used in the analysis and are summarized in the table below.

Geologic Material	Moist Unit Weight (pcf)	Saturated Unit Weight (pcf)	Cohesion (psf)	Angle of Internal Friction (degrees)
Artificial Fill (Compacted)	120	130	735	24
Artificial Fill (Existing)	115	125	240	20
Topanga Formation	120	130	140	34
	120	130	125 *-45° to -75° *-8° to -28°	25 *-45° to -75° *-8° to -28°

* Denotes angular range of reduced strength for Cross Section D-D'
** Denotes angular range of reduced strength for Cross Section I-I'

Groundwater

Groundwater seepage was identified in several borings. A planar water surface was modeled from the base of the slope which was used in the slope stability analysis.

External Loads

An external static load was applied to the cross section to model the load from the proposed hotel addition. A distributed load of 2,200 psf was used to model the proposed Hotel load A traffic surcharge of 100 psf was applied to the top of Cross Section I-I' where an at-grade parking lot is located.

The slope is comprised primarily of Upper Topanga Formation bedrock, which is a Site Class C material. Based on the deaggregation of the seismic risk for a 10% in 50-year probability of exceedance and using a Site Class C, an Earthquake Magnitude of 6.82 with a distance of 11.28 kilometers was input into the attached spread sheet. The US Seismic Design Map returned a PGAm of 1.06g. A displacement value of 5 cm was used in the spreadsheet calculation. Based on these inputs, a Seismic Coefficient for Screen Procedure (k_{eq}) of 0.33g was determined. The spreadsheet used to perform the calculation is attached to this letter.

Retaining Walls

Retaining walls were modeled in the analysis as an existing retaining wall at the top of Cross Section D-D' and a proposed retaining wall to support a cut along Cross Section I-I'.

The existing retaining wall in Cross Section D-D' was modeled with a shear resistance of 1000 pounds for each pile spaced at 8-foot centers. The proposed retaining wall in Cross Section I-I' was modeled with a shear resistance of 90,000 pounds for each pile spaced at 8-foot centers.

The proposed piles in Cross Section I-I' extend a depth of 20 feet below the proposed finish floor elevation.

Results of Stability Analysis

The stability analyses indicated that the existing slope has a factor of safety greater than the City of Los Angeles, Department of Building and Safety's, minimum requirement of 1.5 for static conditions and 1.00 for pseudostatic conditions. The computer output files are included in the Appendix. The results are summarized below. The file number of the analysis is shown in the corresponding box for each result.

SLOPE STABILITY ANALYSES RESULTS			
Cross Section	**Analysis Type**	**Condition**	**Factor of Safety**
D-D'	**Janbu (curved)**	**Static**	**1.86**
	Janbu (curved)	**Pseudo-static**	**1.04**
	Janbu (Planar)	**Static**	**2.01**
	Janbu (Planar)	**Pseudo-Static**	**1.02**
I-I'	**Janbu (curved)**	**Static**	**2.09**
	Janbu (curved)	**Pseudo-static**	**1.10**
	Janbu (Planar)	**Static**	**1.85**
	Janbu (Planar)	**Pseudo-Static**	**1.02**

Discussion

The stability of the slopes was analyzed along Cross Sections D-D' and I-I' which are considered the most critical. For curved potential failure planes, Bishop's method of analysis was used. For potential block failure plans, Janbu's method of analysis was used.

All of the wall configuration analyses identified a static factor of safety exceeding the minimum required 1.5 and the pseudostatic minimum value of 1.0. The printouts of the slope stability calculations are provided in the Appendix of this report.

SURFICIAL STABILITY

The easterly ascending slope above the eastern fire road is inclined at a 1-3/4:1 (horizontal to vertical) inclination. The analysis used was developed by Blake, Hollingsworth and Stewart (2002). The slope is mantled by a cover of fill that ranges in thickness from 1-1/2 to 13-1/2 feet thick. The factor of safety for this slope is 1.49. Since the slope is beyond the limits of grading, it is recommended that the retaining wall be designed for the impact and retention of soil from a small mudslide. The retaining wall should be designed with two feet of freeboard to support an impact load of 125 pounds per cubic foot.

CONCLUSIONS AND RECOMMENDATIONS

Based upon the exploration, laboratory testing, and research, it is the finding of Geotechnologies, Inc. that construction of the proposed hotel expansion, parking levels as well at the parking extension along the service road are considered feasible from a geotechnical engineering standpoint provided the advice and recommendations presented herein are followed and implemented during construction.

The Subject Site is underlain by fill soil, alluvium, and sedimentary bedrock of the Upper Topanga Formation. Fill soil greater than 25 feet in depth was identified in the proposed development areas. Only the fill at the southwest corner of the site proposed hotel expansion was placed under the observation of a geotechnical consultant and approved by the City of Los Angeles. The City of Los Angeles compaction report approval letter for the fill is attached to this report. Fill soil on the North Plaza Area and on the slope east of the service road was placed without geotechnical observation. The alluvial soil is limited in extent and thickness and is found only at the southwest corner of the proposed hotel addition.

The bedrock underlying the site is moderately to poorly bedded. Bedding dips consistently to the north and northeast at moderate angles which are favorable with respect to stability of the promontory slope but will be daylighted in excavations that are exposed to the north. This condition will occur in the areas for the proposed hotel expansion and the excavation for Level P3 in the parking structure.

Water seepage was encountered in several of the borings, but at depths generally below the proposed excavations. However, some seepage should be expected. No seepage was encountered in the recent test pit excavations.

No indications of slope instability, such as cracked hardscape features, soil scarps, hummock topography on the slope, or soil cracks were noted during any of the investigations by this firm.. An area of shallow instability was noted by the previous consultant in 1981. This area is located offsite and to the north of the existing hotel. No landslides are indicated on or adjacent to the site on published geologic maps. The slope stability analysis identified the slopes below the proposed hotel expansion and above the at-grade parking along the service road have a factor of safety greater than the minimum required for both static and pseudostatic conditions.

The site is not located in an area that is considered liquefiable nor is the site within a Los Angeles Methane zone.

Stormwater infiltration is not feasible on the subject site due to the shallow occurrence of Bedrock beneath the site.

Hotel Expansion (South Side of Hotel)

The proposed addition may be supported with conventional foundations or mat foundations on the sedimentary siltstone and sandstone bedrock. However, on the west end of the addition, as shown on Cross Section A-A', the proposed addition will extend over existing fill soil. The depth to bedrock may exceed 32 feet from the existing grade and 57 feet from the proposed finish floor elevation. Because of the limited construction area and proximity to property lines, removal and recompaction of the existing fill for foundation support will not be feasible. Piles will be needed that extend through the existing fill and into sufficiently into bedrock. The foundations must be deepened sufficiently to be set back from the slope a distance of one-third of the height of the slope but need not exceed 15 feet.

It should be noted that the foundations be deepened sufficiently to not surcharge the adjacent retaining walls and that the retaining wall be designed to accommodate the surcharge imposed by the new foundations. The use of end bearing caissons or friction piles may also be considered to avoid surcharges.

The existing fill soil (certified in 1982) may be used for support of the ground floor slab in the first-floor elevation. However, it is recommended that at least 5 feet of the existing fill soil be removed and recompacted for all slab support. As an alternative, the fill soil may be left in place and a structural slab may be used. Where bedrock is exposed, the slab may be constructed as a conventional slab.

All new hardscape areas should be supported on a newly created compacted fill blanket that bears directly on the bedrock.

Excavation of the proposed subterranean levels will require shoring measures to provide a stable working area. The south side of the excavation will encounter daylighted bedrock. The shoring and retaining walls will experience higher lateral loads. Limited seepage from the bedrock should be anticipated.

Underpinning of the existing hotel is anticipated. The recommendations provided in the Foundation Design Friction Pile Section of this report are applicable.

The proposed Chiller /Boiler room will require removal of a portion of the Parking Structure B3 level slab. The proposed Chiller/Boiler room should be supported on friction piles bearing in the bedrock. As an alternative, the slab may be constructed as a structural slab tied into the existing piles with end bearing caissons.

Subterranean Parking P3 Level (North Plaza)

This area will encounter a thin cover of fill soil underlain by sedimentary bedrock. As a result of the excavation, the fill soil will be removed. The structure may be supported on conventional foundations bearing in the bedrock.

The south side of the excavation will expose daylighted bedding. As a result, the southern wall will experience higher lateral loads. In addition, the southern wall will have a surcharge from the existing hotel.

Hard, cemented beds of rock may be encountered during drilling or excavation that will require jackhammering and coring equipment. Seepage may occur from fractures or coarse-grained beds at the southern end of the excavation.

At Grade Parking (East Side of Site)

The parking in this area will be at grade and follow the descent of the service road from north to south. The cut will extend laterally from 10 to 30 feet into the slope. Cuts up to 15 feet in height will be made. Fill soil and obliquely oriented bedrock will be exposed in the cuts. Some seepage at the base of the cuts may occur.

The retaining wall should be constructed as a pile supported retaining wall. The piles should extend at least 20 feet into the bedrock where the cut is at least 10 feet in height. For lower cuts, shorter pile lengths may be calculated. Bedrock is anticipated at the subgrade elevation over most of the area. However, fill extends below the subgrade elevation, near the south end of the proposed parking area. Retaining walls at that location should be supported on deepened footings or friction piles.

General Recommendations

As part of geotechnical investigation by another consultant in 1981, a downhole shear wave velocity measurement was made. Within the depth of the proposed excavation for the Hotel expansion , the shear wave measurements suggest that the rock is moderately hard to hard, and that heavy ripping may be necessary in places. As identified in the recent work by this firm, some beds or the bedrock are hard and may require the use of a coring bucket or gad to drill through the rock. Similar drilling difficulty is anticipated for the P3 Parking Level and for the at-grade parking along the service road.

Foundations for small outlying structures, such as property line walls, which will not be tied-in to the proposed additional may be supported on conventional foundations bearing in the bedrock.

SEISMIC DESIGN CONSIDERATIONS

2019 California Building Code Seismic Parameters

Based on information derived from the subsurface investigation, the Subject Site is classified as Site Class C, which corresponds to a "Very Dense Soil or Soft Rock" Profile, according to Table 20.3-1 of ASCE 7-16. This information and the site coordinates were input into the Seismic Design Maps Tool by Structural Engineers Association of California (SEOC) and California's Office of Statewide Health Planning and Development (OSHPD) to calculate the ground motions for the site (https://seismicmaps.org/). A copy of the website printout is attached to this report.

CALIFORNIA BUILDING CODE SEISMIC PARAMETERS	
California Building Code	2019
ASCE Design Standard	7-16
Risk Category	II
Site Class	C
Mapped Spectral Acceleration at Short Periods (S_S)	2.084g
Site Coefficient (F_a)	1.2
Maximum Considered Earthquake Spectral Response for Short Periods (S_{MS})	2.500g
Five-Percent Damped Design Spectral Response Acceleration at Short Periods (S_{DS})	1.667g
Mapped Spectral Acceleration at One-Second Period (S_1)	0.747g
Site Coefficient (F_v)	1.4
Maximum Considered Earthquake Spectral Response for One-Second Period (S_{M1})	1.048g
Five-Percent Damped Design Spectral Response Acceleration for One-Second Period (S_{D1})	0.697g

FILL SOIL

Fill soil was encountered at each of the proposed development locations. The fill may be reused as compacted fill as necessary.

The fill soil located at the southern hotel expansion at base of the slope was placed in 1981 under the observation of another consultant and was approved by the City of Los Angeles. The fill may be utilized for slab support and support of hardscape features, subject to grading recommendations contained in this report. Fill encountered at the proposed parking area will be removed from the site. Some of the fill located at the proposed at-grade parking along the service road will be removed from the site. Where the fill will be left in place, the fill may not be used as foundation support.

EXPANSIVE SOILS

The onsite geologic materials are in the very low to low expansion range. The Expansion Index was found to be 13 for bulk samples remolded to 90 percent of the laboratory maximum density. Special considerations are not required. Reinforcing beyond the minimum required by the City of Los Angeles Department of Building and Safety is not required.

WATER-SOLUBLE SULFATES

The Portland cement portion of concrete is subject to attack when exposed to water-soluble sulfates. Usually, the two most common sources of exposure are from soil and marine environments.

The sources of natural sulfate minerals in soils include the sulfates of calcium, magnesium, sodium, and potassium. When these minerals interact and dissolve in subsurface water, a sulfate concentration is created, which will react with exposed concrete. Over time sulfate attack will destroy improperly proportioned concrete well before the end of its intended service life.

The water-soluble sulfate content of the onsite geologic materials was tested by California Test 417. The water-soluble sulfate content was determined to be range from less than 0.1% percent to greater than 0.2 percent by weight for the soils tested. Based on American Concrete Institute (ACI) Standard 318-08, the sulfate exposure is severe for geologic materials in contact with the on-site soils. Type V cement is recommended. In addition, a water-cement ratio of 0.5 should be maintained in the poured concrete. Concrete strength should be a minimum of 4,000psi.

The design of the concrete mix is not within the area of expertise of the geotechnical engineer. It is recommended that a competent engineer familiar with concrete mix design should develop the recommendations for this project based on the tested severe sulfate exposure indicated above.

HYDROCONSOLIDATION

Hydroconsolidation is a phenomenon wherein soils lose volume when they are saturated. This can result in settlement of structures bearing thereon. Based on the laboratory testing, it is the opinion of Geotechnologies, Inc. that the potential for damaging settlement because of hydrocollapse is anticipated to be insignificant.

CONSTRUCTION DEWATERING

Water seepage was identified above the proposed finish floor elevation at the proposed parking levels. However, it is the opinion of this firm that the seepage rate will be low and can be considered nuisance water. The water will emanate from fractures and along bedding planes that are daylighted in the excavation walls. The water can be collected at the base of the wall and directed to appropriate disposal facilities.

Some seepage may be encountered in the excavation for the at-grade parking along the service road. The water will seep from fractures and bedding planes. A flow rate of 10 gallons per minute should be considered for sizing pumps.

Excavations for the hotel expansion will encounter water. The water likely occurs along the alluvium/bedrock contact and from fractures and bedding planes in the rock. Some caving may occur at the alluvium/bedrock contact A flow rate of 10 gallons per minute should be considered for sizing pumps.

It is recommended that a qualified dewatering consultant should be retained for the project.

METHANE ZONES

This office has reviewed the City of Los Angeles Methane and Methane Buffer Zones map (City of Los Angeles, 2003). Based on this review, the Subject Site is not located within a City of Los Angeles Methane or Methane Buffer Zone.

GRADING GUIDELINES

Site Preparation

- A thorough search should be made for possible underground utilities and/or structures. Any existing or abandoned utilities or structures located within the footprint of the proposed grading should be removed or relocated as appropriate.

- All vegetation, existing fill, and soft or disturbed geologic materials should be removed from the areas to receive controlled fill. All existing fill materials and any disturbed geologic materials resulting from grading operations shall be completely removed and properly recompacted prior to foundation excavation.

- Any vegetation or associated root system located within the footprint of the proposed structures should be removed during grading.

- Subsequent to the indicated removals, the exposed grade shall be scarified to a depth of six inches, moistened to optimum moisture content, and recompacted in excess of the minimum required comparative density.

- The excavated areas shall be observed by the geotechnical engineer prior to placing compacted fill.

Recommended Overexcavation

In the southern Hotel Expansion area building slab, the bedrock should be removed and recompacted to a depth of 2 feet below the subgrade. The fill should be removed to a depth below any root line where the existing fill is firm and unyielding.

Compaction

The City of Los Angeles Department of Building and Safety requires a minimum comparative compaction of 95 percent of the laboratory maximum density where the soils to be utilized in the fill have less than 15 percent finer than 0.005 millimeters. The soils tested by this firm would not meet the 95 percent compaction requirement. Comparative compaction is defined, for purposes of these guidelines, as the ratio of the in-place density to the maximum density as determined by applicable ASTM testing.

All fill should be mechanically compacted in layers not more than 8 inches thick. The materials placed should be moisture conditions to within 3 percent of the optimum moisture content of the material placed. All fill shall be compacted to at least 90 percent of the maximum laboratory density for the materials used. The maximum density shall be determined by the laboratory operated by Geotechnologies, Inc. using the test method described in the most recent revision of ASTM D 1557.

Field observation and testing shall be performed by a representative of the geotechnical engineer during grading to assist the contractor in obtaining the required degree of compaction and the proper moisture content. Where compaction is less than required, additional compactive effort shall be made with adjustment of the moisture content, as necessary, until a minimum of 90 percent compaction is obtained.

Acceptable Materials

The excavated onsite materials are considered satisfactory for reuse in the controlled fills if any debris and/or organic matter is removed.

Any imported materials shall be observed and tested by the representative of the geotechnical engineer prior to use in fill areas. Imported materials should contain sufficient fines to be relatively impermeable and result in a stable subgrade when compacted. Any required import materials should consist of geologic materials with an expansion index of less than 30. The water-soluble sulfate content of the import materials should be less than 0.1% percentage by weight.

Imported materials should be free from chemical or organic substances which could affect the proposed development. A competent professional should be retained to test imported materials and address environmental issues and organic substances which might affect the proposed development.

Utility Trench Backfill

Utility trenches should be backfilled with controlled fill. The utility should be bedded with clean sands at least one foot over the crown. The remainder of the backfill may be onsite soil compacted to 90 percent of the laboratory maximum density. Utility trench backfill should be tested by representatives of this firm in accordance with the most recent revision of ASTM D-1557.

Wet Soils

At the time of exploration, the soils which will be exposed were above optimum moisture content. It is anticipated that the excavated material to be placed as compacted fill, and the materials exposed at the bottom of excavated plane may require drying and aeration prior to recompaction.

Shrinkage/Bulking

Shrinkage results when a volume of soil removed at one density is compacted to a higher density. A shrinkage factor of 5 percent should be anticipated when excavating and recompacting the existing fill and underlying bedrock native geologic materials on the site to an average comparative compaction of 95 percent.

Bulking occurs when soil is removed and stockpiled for export. A bulking factor of 20% should be planned for the excavated bedrock from the slope or excavated soil from the northern stages area.

Weather Related Grading Considerations

When rain is forecasted, all fill that has been spread and awaits compaction shall be properly compacted prior to stopping work for the day or prior to stopping because of inclement weather. These fills, once compacted, shall have the surface sloped to drain to an area where water can be removed.

Temporary drainage devices should be installed to collect and transfer excess water to the street in non-erosive drainage devices. Drainage should not be allowed to pond anywhere on the site, and especially not against any foundation or retaining wall. Drainage should not be allowed to flow uncontrolled over any descending slope.

Work may start again, after a period of rainfall once the site has been reviewed by a representative of this office. Any soils saturated by the rain shall be removed and aerated so that the moisture content will fall within three percent of the optimum moisture content.

Surface materials previously compacted before the rain shall be scarified, brought to the proper moisture content and recompacted prior to placing additional fill, if considered necessary by a representative of this firm.

Geotechnical Observations and Testing During Grading

Geotechnical observations and testing during grading are a continuation of the geotechnical investigation. It is critical that the geotechnical aspects of the project be reviewed by representatives of Geotechnologies, Inc. during the construction process. Compliance with the design concepts, specifications or recommendations during construction requires review by this firm during construction. Any fill which is placed should be observed, tested, and verified if used for engineered purposes. Please advise this office at least twenty-four hours prior to any required site visit.

LEED Considerations

The Leadership in Energy and Environmental Design (LEED) Green Building Rating System encourages adoption of sustainable green building and development practices. Credit for LEED Certification can be assigned for reuse of construction waste and diversion of materials from landfills in new construction.

To provide the design team with a viable option in this regard, demolition debris could be crushed onsite to use it in the ongoing grading operations. The environmental ramifications of this option, if any, should be considered by the team.

The demolition debris should be limited to concrete, asphalt, and other non-deleterious materials. All deleterious materials should be removed including, but not limited to, paper, garbage, ceramic materials, and wood.

For structural fill applications, the materials should be crushed to 2 inches in maximum dimension or smaller. The crushed materials should be thoroughly blended and mixed with onsite soils prior to placement as compacted fill. The amount of crushed material should not exceed 20 percent. The blended and mixed materials should be tested by this office prior to placement to insure it is suitable for compaction purposes. The blended and mixed materials should be tested by Geotechnologies, Inc. during placement to ensure that it has been compacted in a suitable manner.

Hillside Grading Issues

A 10-foot high, permanent slope will likely be needed on the west side of the proposed hotel expansion. The slope must be constructed at a 2 to 1 gradient. The fill slope must have a key placed at the toe of the proposed fill slope. This key should be cut a minimum of 4 feet into the existing fill and be at least 10 feet in width. . The base of the key shall be sloped back into the hill.

The sidehill fills shall have a backdrain installed at the new fill/existing fill contact to prevent future pore water pressure buildup. Backdrains shall consist of four-inch perforated pipes; placed with perforations down. The pipe should be encased with at least one foot of gravel. The minimum cover on the pipe should be one foot. The gravel should consist of three-quarter inch to one-inch crushed rock.

The first drain shall be placed no higher than three feet above the front cut of the key excavation. Additional backdrains shall be placed at intervals roughly equivalent to 10 feet of vertical rise in elevation or were considered necessary by the representative of this firm.

Each drain shall be placed into a trench excavated along the back of a horizontal bench at the fill bedrock contact. The trench bottom shall slope downward to each exit drain with a minimum gradient of two percent. The exit pipe shall consist of a four-inch diameter non-perforated pipe. This pipe need not be encased in gravel. It shall exit at a minimum gradient of two percent to the finish face of the fill slope. A cutoff wall consisting of concrete or soil cement shall be placed at the junction of the perforated pipe and the exit drains to stop seepage and force the water being removed into the perforated pipe.

Materials excavated uphill from where fills are to be placed, shall not be cast over the slope into the fill area. Materials shall be channeled down a ramp to the area to receive compacted fill and then spread in horizontal layers. As compacted fills are placed, this ramp will be trimmed out to expose the dense, tight materials approved by the soils engineer. The minimum vertical height of bench in approved materials shall be three feet. This will maintain the proper benching, as fill is placed up the slope. The ramp will be shifted periodically during the grading operations to allow for complete removal of the loose fill materials and for the proper benching.

A minimum compaction of 90 percent out to the finish face of fill slopes will be required. Compaction on slopes may be achieved by over building the slope and cutting back to the compacted core or by direct compaction of the slope face with suitable equipment. Direct compaction on the slope faces shall be accomplished by back-rolling the slopes in three-foot to four-foot increments of elevation gain.

FOUNDATION DESIGN

Conventional

Conventional foundations may bear in the sedimentary bedrock. All conventional foundations for a structure should bear in the same material.

Continuous foundations may be designed for a bearing capacity of 8,000 pounds per square foot and should be a minimum of 12 inches in width, 18 inches in depth below the lowest adjacent grade and 18 inches into the recommended bearing material.

Column foundations may be designed for a bearing capacity of 10,000 pounds per square foot and should be a minimum of 24 inches in width, 18 inches in depth below the lowest adjacent grade and 18 inches into the recommended bearing material.

The bearing capacity increase for each additional foot of width is 500 pounds per square foot. The bearing capacity increase for each additional foot of depth is 500 pounds per square foot. The maximum recommended bearing capacity is 12,000 pounds per square foot.

The bearing capacities indicated above are for the total of dead and frequently applied live loads and may be increased by one third for short duration loading, which includes the effects of wind or seismic forces.

Miscellaneous Foundations

Conventional foundations for structures such as privacy walls or trash enclosures which will not be rigidly connected to the proposed addition may bear in newly compacted fill or bedrock. Continuous footings may be designed for a bearing capacity of 2,000 pounds per square foot and should be a minimum of 12 inches in width, 18 inches in depth below the lowest adjacent grade and 18 inches into the recommended bearing material. No bearing capacity increases are recommended.

Since the recommended bearing capacity is a net value, the weight of concrete in the foundations may be taken as 50 pounds per cubic foot and the weight of the soil backfill may be neglected when determining the downward load on the foundations.

Foundation Reinforcement

Based on City of Los Angeles minimum requirements, all continuous foundations should be reinforced with a minimum of four #4 steel bars. Two should be placed near the top of the foundation, and two should be placed near the bottom.

Lateral Design

Resistance to lateral loading may be provided by friction acting at the base of foundations and by passive earth pressure. An allowable coefficient of friction of 0.4 may be used with the dead load forces for footings bearing in the bedrock

Passive geologic pressure for the sides of foundations poured against the bedrock may be computed as an equivalent fluid having a density of 500 pounds per cubic foot with a maximum earth pressure of 5,000 pounds per square foot.

The passive and friction components may be combined for lateral resistance without reduction. A one-third increase in the passive value may be used for short duration loading such as wind or seismic forces.

Foundation Settlement

Settlement of the foundation system bearing in the bedrock is expected to occur on initial application of loading. The maximum settlement of the Hotel Expansion is expected to be 3/4 inch and occur below the heaviest loaded columns. Differential settlement is not expected to exceed 1/2 inch across a distance of 30 feet

The maximum settlement of the subterranean parking levels is expected to be 1/2 inch and occur below the heaviest loaded columns. Differential settlement is not expected to exceed 1/4 inch across a distance of 30 feet.

Foundation Observations

It is critical that all foundation excavations are observed by a representative of this firm to verify penetration into the recommended bearing materials. The observation should be performed prior to the placement of reinforcement. Foundations should be deepened to extend into satisfactory geologic materials, if necessary.

Foundation excavations should be cleaned of all loose soils prior to placing steel and concrete. Any required foundation backfill should be mechanically compacted, flooding is not permitted.

Building Setback

The Los Angeles Building Code requires that foundations be excavated to a sufficient distance from the face of a descending slope to provide sufficient vertical and lateral support. The required setback is 1/3 the height of the descending slope with a minimum of five feet measured horizontally from the base of the foundation to the slope face. For slopes flatter than 3 to 1 (horizontal to vertical), no setback distance is required.

Deepened Footings

Deepened footings may be used where the depth to bedrock exceeds the required footing embedment depth. Deepened footings must have a flat-bottomed excavation free of loose soils. The excavation footing excavation must be inspected by a representative of this firm and must be backfilled with concrete of the same strength or greater as the footing itself.

FOUNDATION DESIGN - FRICTION PILES

Vertical Capacities

Where the depth to bedrock is not feasible for deepened footings, cast-in-place friction piles bearing in the siltstone bedrock may be used. Friction piles may be used together with either conventional footings or a mat foundation only if all foundation bear in bedrock. The capacities of drilled cast-in-place piles are shown on the enclosed "Drilled Cast in Place Pile Capacities" chart. Capacities based on dead plus live load are indicated. A one-third increase may be used for transient loading such as wind or seismic forces. The capacities presented are based on the strength of the soils. The compressive and tensile strength of the pile sections should be checked to verify the structural capacity of the piles.

Piles in groups should be spaced at least 2-1/2 diameters on center. If the piles are so spaced, no reduction in the downward or upward capacities need be considered because of group action.

Lateral Design

Lateral loads may be resisted by the piles, and by the passive resistance of the soils against the pile caps. The passive resistance of the existing soils against pile caps and grade beams may be assumed to be equal to the pressure developed by a fluid with a density of 500 pounds per cubic foot. A one-third increase in this value may be used for wind or seismic loads. The resistance of the piles and the passive resistance of the soils against pile caps and grade beams may be combined without reduction in determining the total lateral resistance.

Analyses of the proposed piles using a varying shear load were performed using the program RSPile (Version 3.005) by RocScience. The results of the analysis are attached to this report. The printouts show the calculated shear, moment, and deflection of the proposed piles. Scenarios where the bedrock is 10 and 20 feet deep were analyzed. The analyses were performed for 24-inch, 30-inch, and 36-inch drilled, cast-in-place friction piles. Assumed as part of these lateral capacity calculations are:

- A Free Head Condition
- A concrete shear strength (f'c) of 4,000 psi
- Vertical reinforcement consisting of 8-#10 bars (24-inch diam.) 10-#10 bars (30-inch diam.) 12-#10 bars (36-inch diam.)
- Lateral deflection of ½ inch

If any of these assumptions are not valid, please contact this firm and a modified analysis can be performed. The printouts from the RSPile program are attached to this letter.

Pile Installation

Some seepage may be encountered during drilling. If the amount of water accumulation in the hole exceeds 3 inches deep, a tremie should be used to place the concrete. A tremie shall consist of a water-tight tube having a diameter of not less than 4 inches and connected to a concrete pump. The tube shall be equipped with a device that will close the discharge end and prevent water from entering the tube while it is being charged with concrete. The tremie shall be supported to permit free movement of the discharge end over the entire top surface of the work and to permit rapid lowering when necessary to retard or stop the flow of concrete. The discharge end shall be closed at the start of the work to prevent water entering the tube and shall be entirely always sealed, except when the concrete is being placed. The tremie tube shall be kept full of concrete. The flow shall be continuous until the work is completed, and the resulting concrete seal shall be monolithic and homogeneous. The tip of the tremie tube shall always be kept about five feet below the surface of the concrete and definite steps and safeguards should be taken to ensure that the tip of the tremie tube is never raised above the surface of the concrete.

Closely spaced piles should be drilled and filled alternately, with the concrete permitted to set at least overnight before drilling an adjacent hole. Pile excavations should be filled with concrete as soon after drilling and inspection as possible; the shafts should not be left open overnight.

Settlement

The maximum settlement of pile-supported foundations is not expected to exceed 1/2 inch. Differential settlement is expected to be negligible.

RETAINING WALL DESIGN

Cantilever Retaining Walls

Since the bedding in the rock dips to the north and northeast, all walls with a northern exposure (or on the south side of the excavations) will incur an increased lateral load because of the daylighted bedding. Walls on the east and west will have a neutral bedding orientation and may use the same loads as the northern walls.

Retaining walls supporting a level backslope may be designed utilizing a triangular distribution of pressure. Cantilever retaining walls may be designed for the active pressure condition in conformation with the following table.

CANTILEVER RETAINING WALLS		
Height of Wall (feet)	Equivalent Fluid Pressure (psf)	
	Southern Walls (Daylighted/Adverse Bedding)	All Other Walls (Favorable Bedding)
Up to 10	45	31
10 to 20	56	41
20 to 30	60	45

For this equivalent fluid pressure to be valid, walls which are to be restrained at the top should be backfilled prior to the upper connection being made. Additional active pressure should be added for a surcharge condition Because of sloping ground, vehicular traffic, or adjacent structures.

All walls retaining an ascending slope should maintain a minimum of 2 feet of freeboard. In addition, a concrete swale shall be provided behind the proposed retaining walls to aid in facilitating drainage. Drainage shall be collected and discharged to an acceptable drainage area.

Restrained Drained Retaining Walls

Restrained subterranean retaining walls up to 30 feet in height and supporting a level back slope may be designed to resist a triangular distribution of earth pressure. It is recommended the walls be designed to resist the greater of the at-rest pressure, or the active pressure plus the seismic pressure, as discussed in the "Dynamic (Seismic) Earth Pressure" section below. Due to the north to northeast-dipping orientation of the bedding, the southern walls (or any wall facing to the south) will have a higher lateral pressure as indicated in the table below.

RESTRAINED, DRAINED RETAINING BASEMENT WALLS		
Height of Wall (Feet)	**AT-REST EARTH PRESSURE Triangular Distribution of Pressure Favorable Bedding Orientation (West, North and East Walls)**	**AT-REST EARTH PRESSURE Triangular Distribution of Pressure Adverse Bedding Orientation (South Wall)**
Up to 50 feet	57 psf	75 psf

The lateral earth pressure recommended above for retaining walls assumes that a permanent drainage system will be installed so that external water pressure will not be developed against the walls. Also, where necessary, the retaining walls should be designed to accommodate any surcharge pressures that may be imposed by adjacent traffic and existing structures.

Dynamic (Seismic) Earth Pressure

Retaining walls exceeding 6 feet in height shall be designed to resist the additional earth pressure caused by seismic ground shaking. A triangular pressure distribution should be utilized for the additional seismic loads, with an equivalent fluid pressure of 29 pounds per cubic foot. When

using the load combination, the greater of the seismic earth pressure and the active pressure or the at-rest pressure should be used for that depth interval. In the tables below, the values are compared for each given depth range. Where an asterisk appears, that value should be used in design.

WALL PRESSURE INCLUDING SEISMIC PRESSURE Drained Conditions, Favorable Bedding (West, North and East Walls) (All Pressure Distributions are Triangular)			
Wall Height (feet)	**Active pressure (psf)**	**Active + Seismic (psf)**	**At-Rest (psf)**
Up to 10	31	(31 + 29) = 60*	57
10 to 20	41	70*	57
20 to 30	45	74*	57
30 to 40	46	75*	57

Note: * denotes value to be used in design

WALL PRESSURE INCLUDING SEISMIC PRESSURE Drained Conditions, Daylighted Adversely Oriented Rock (South Wall) (All Pressure Distributions are Triangular)			
Wall Height (feet)	**Active pressure (psf)**	**Active + Seismic (psf)**	**At-Rest (psf)**
Up to 10	45	(45 + 29) = 74	75*
10 to 20	56	85*	75
20 to 30	60	89*	75
30 to 40	62	91*	75

Note: * denotes value to be used in design

The lateral earth pressures recommended assuming that a permanent drainage system will be installed so that external water pressure will not be developed against the walls. Additional active pressure should be added for a surcharge condition due to sloping ground, vehicular traffic, or adjacent structures.

Retaining Wall Drainage

Retaining walls should be provided with a subdrain covered with a minimum of 12 inches of gravel, and a compacted fill blanket or other seal at the surface. The onsite geologic materials are acceptable for use as retaining wall backfill if they are compacted to a minimum of 90 percent of the maximum density as determined by the most recent revision of ASTM D 1557.

Certain types of subdrain pipe are not acceptable to the various municipal agencies, it is recommended that prior to purchasing subdrainage pipe, the type and brand is cleared with the proper municipal agencies. Subdrainage pipes should outlet to an acceptable location.

Where retaining walls are to be constructed adjacent to property lines there is usually not enough space for emplacement of a standard pipe and gravel drainage system. Under these circumstances, the use of a flat drainage produce is acceptable.

Some municipalities do not allow the use of flat-drainage products. The use of such a product should be researched with the building official. Where shoring will not allow the installation of a standard subdrainage system outside the wall, rock pockets may be utilized. The rock pockets with should drain through the wall. The pockets should be a minimum of 12 inches in length, width, and depth. The pocket should be filled with gravel. The rock pockets should be no more than 8 feet on center.

Sump Pump Design

The purpose of the recommended retaining wall backdrainage system is to relieve hydrostatic pressure. Light groundwater seepage was encountered during exploration above the lowest finish floor elevation of the proposed addition. The water which could affect the proposed retaining walls would be irrigation waters and precipitation. Additionally, the proposed site grading is such that all drainage is directed to the street and the structure has been designed with adequate non-erosive drainage devices.

Based on these considerations, the retaining wall backdrainage system is not expected to experience an appreciable flow of water, and in particular, no groundwater will affect it. However, for the purposes of design, a flow of 10 gallons per minute may be assumed.

Surcharge from Adjacent Structures

The following surcharge equation provided in the LADBS Information Bulletin Document No. P/BC 2008-83, may be utilized to determine the surcharge loads on basement walls and shoring system for existing structures located within the 1:1 (h:v) surcharge influence zone of the excavation and basement.

Resultant lateral force: $R = (0.3 \times P \times h^2)/(x^2 + h^2)$

Location of lateral resultant: $d = x \times [({}^{x^2}/_{h^2} + 1) \times tan^{-1}({}^{h}/_{x}) - ({}^{x}/_{h})]$

where:

R	=	resultant lateral force measured in pounds per foot of wall width.
P	=	resultant surcharge loads of continuous or isolated footings measured in pounds per foot of length parallel to the wall.
x	=	distance of resultant load from back face of wall measured in feet.
h	=	depth below point of application of surcharge loading to top of wall footing measured in feet.
d	=	depth of lateral resultant below points of application of surcharge loading measure in feet.
$\tan^{-1}(h/x)$	=	the angle in radians whose tangent is equal to h/x.

The structural engineer and shoring engineer may use this equation to determine the surcharge loads based on the loading of the adjacent structures located within the surcharge influence zone.

Waterproofing

Moisture affecting retaining walls is one of the most common post construction complaints. Poorly applied or omitted waterproofing can lead to efflorescence or standing water inside the building. Efflorescence is a process in which a powdery substance is produced on the surface of the concrete by the evaporation of water. The white powder usually consists of soluble salts such as gypsum, calcite, or common salt. Efflorescence is common to retaining walls and does not affect their strength or integrity.

It is recommended that retaining walls be waterproofed. Waterproofing design and inspection of its installation is not the responsibility of the geotechnical engineer. A qualified waterproofing consultant should be retained to recommend a product or method which would provide protection to below grade walls.

Retaining Wall Backfill

Any required backfill should be mechanically compacted in layers not more than 8 inches thick, to at least 90 of the maximum density obtainable by the most recent revision of ASTM D 1557 method of compaction. Flooding is not being permitted. Compaction within 5 feet, measured horizontally, behind a retaining structure should be achieved by use of light weight, hand operated compaction equipment.

Proper compaction of the backfill will be necessary to reduce settlement of overlying walks and paving. Some settlement of required backfill should be anticipated, and any utilities supported therein should be designed to accept differential settlement, particularly at the points of entry to the structure.

Freeboard

All walls retaining an ascending slope should maintain a minimum of 2 foot of freeboard. In addition, a concrete swale shall be provided behind the proposed retaining walls to facilitate drainage. Drainage shall be collected and discharged to an acceptable drainage system.

TEMPORARY EXCAVATIONS

Excavations on the order of 30 feet deep at the southern hotel addition and 40 feet in depth for the subterranean parking levels at the North Plaza, and 15 feet for the at-grade parking area are planned. The excavations are expected to expose fill and bedrock, which are suitable for vertical excavations up to 6 feet where bedding is favorable or neutral with respect to the cut fac. This recommendation applies to the west, north and east cut faces. Cuts on the southern wall swill

expose adverse/daylighted bedding . This recommendation does not apply to cuts surcharged by adjacent traffic or structures. Excavations which will be surcharged by adjacent traffic or structures should be shored.

Where bedding will be daylighted on the southern (north facing) cuts, the cut must be sloped back to the angle of bedding, ranging from 40 to 75 degrees which corresponds to a range of 1:1 to ¾:1 cut. All cuts should be checked by a representative of this firm to verify bedding orientations.

Where sloped embankments are utilized, the tops of the slopes should be barricaded to prevent vehicles and storage loads near the top of slope within a horizontal distance equal to the depth of the excavation. If the temporary construction embankments are to be maintained during the rainy season, berms are strongly recommended along the tops of the slopes to prevent runoff water from entering the excavation and eroding the slope faces. Water should not be allowed to pond on top of the excavation nor to flow towards it.

Slot Cuts

Where foundation excavations will leave an adjacent foundation unsupported, the excavation must be slot cut. The slot cutting method employs the earth as a buttress and allows the earth excavation to proceed in phases. Alternate "A" slots of 8 feet may be worked. The remaining earth buttresses ("B" and "C" slots) should each be 8 feet in width for a combined intervening length of 16 feet. The foundation should be poured in the "A" slots before the "B" slots are excavated. After completing the foundation in the "B" slots, finally the "C" slots may be excavated. Slot cuts made be made for excavation up to 8 feet in height.

Temporary Dewatering

Currently it is proposed that the structures will extend to depths between 15 and 40 feet below existing site grades. Continuous groundwater is not expected; however, finite zones of perched groundwater could be encountered locally.

Temporary dewatering should be installed as necessary. Temporary dewatering should consist of gravel-filled drainage trenches leading to a sump area. The collected water should be pumped to an acceptable disposal area.

Where the exposed subgrade is wet, pumping may be encountered. Under these conditions, please refer to the "Wet Soils" section of this report.

Excavation Observations

It is critical that the soils exposed in the cut slopes are observed by a representative of Geotechnologies, Inc. during excavation so that modifications of the slopes can be made if variations in the geologic material conditions occur. Many building officials require that temporary excavations should be made during the continuous observations of the geotechnical engineer. All excavations should be stabilized within 30 days of initial excavation.

SHORING DESIGN

The following information on the design and installation of the shoring is as complete as possible currently. It is suggested that Geotechnologies, Inc. review the final shoring plans and specifications prior to bidding or negotiating with a shoring contractor.

One method of shoring would consist of steel soldier piles, placed in drilled holes, and backfilled with concrete. The soldier piles may be designed as cantilevers or laterally braced utilizing drilled tied-back anchors or raker braces.

Soldier Piles

Drilled cast-in-place soldier piles should be placed no closer than 2 diameters on center. The minimum diameter of the piles is 18 inches. Structural concrete should be used for the soldier piles below the excavation; lean-mix concrete may be employed above that level. As an alternative, lean-mix concrete may be used throughout the pile where the reinforcing consists of a wideflange

section. The slurry must be of sufficient strength to impart the lateral bearing pressure developed by the wideflange section to the geologic materials. For design purposes, an allowable passive value for the geologic materials below the bottom plane of excavation may be assumed to be 500 pounds per square foot per foot. To develop the full lateral value, provisions should be implemented to assure firm contact between the soldier piles and the undisturbed geologic materials.

Shoring piles may extend to a depth of 50 feet and will encounter water. Piles placed below the water level require the use of a tremie to place the concrete into the bottom of the hole. A tremie shall consist of a water-tight tube having a diameter of not less than 4 inches connected to a concrete pump. The tube shall be equipped with a device that will close the discharge end and prevent water from entering the tube while it is being charged with concrete. The tremie shall be supported to permit free movement of the discharge end over the entire top surface of the work and to permit rapid lowering when necessary to retard or stop the flow of concrete. The discharge end shall be closed at the start of the work to prevent water entering the tube and shall be entirely always sealed, except when the concrete is being placed. The tremie tube shall be kept full of concrete. The flow shall be continuous until the work is completed and the resulting concrete seal shall be monolithic and homogeneous. The tip of the tremie tube shall always be kept about five feet below the surface of the concrete and definite steps and safeguards should be taken to ensure that the tip of the tremie tube is never raised above the surface of the concrete.

A special concrete mix should be used for concrete to be placed below a water depth of 3 inches. The design shall provide for concrete with a strength p.s.i. of 1,000 over the initial job specification. An admixture that reduces the problem of segregation of paste/aggregates and dilution of paste shall be included. The slump shall be commensurate to any research report for the admixture, if it shall also be the minimum for a reasonable consistency for placing when water is present.

The frictional resistance between the soldier piles and retained geologic material may be used to resist the vertical component of the anchor load. The coefficient of friction may be taken as 0.3 based on uniform contact between the steel beam and lean-mix concrete and retained soil. The portion of soldier piles below the plane of excavation may also be employed to resist the downward loads. The downward capacity may be determined using a frictional resistance of 300 pounds per square foot. The minimum depth of embedment for shoring piles is 5 feet below the bottom of the footing excavation or 7 feet below the bottom of excavated plane, whichever is deeper.

Lagging

Soldier piles and anchors should be designed for the full anticipated pressures. Because of arching in the geologic materials, the pressure on the lagging will be less. It is recommended that the lagging should be designed for the full design pressure but be limited to a maximum of 400 pounds per square foot. It is recommended that a representative of this firm observe the installation of lagging to insure uniform support of the excavated embankment.

Tied-Back Anchors

Tied-back anchors may be used to resist lateral loads. Friction anchors are recommended. For design purposes, it may be assumed that the active wedge adjacent to the shoring is defined by a plane drawn 35 degrees with the vertical through the bottom plane of the excavation. Friction anchors should extend a minimum of 20 feet beyond the potentially active wedge.

Drilled friction anchors may be designed for a skin friction of 600 pounds per square foot. Only the frictional resistance developed beyond the active wedge would be effective in resisting lateral loads. This skin friction is based on 15-foot-high shoring, a tied back anchor elevation 6 feet below-grade and a minimum twenty-foot embedment beyond the potentially active wedge yielding an overburden of 12½ feet below ground surface. Where belled anchors are utilized, the capacity of belled anchors may be designed by applying the skin friction over the surface area of the bonded anchor shaft. The diameter of the bell may be utilized as the diameter of the bonded anchor shaft when determining the surface area. This implies that for the belled anchor to fail, the entire parallel soil column must also fail.

Depending on the techniques utilized, and the experience of the contractor performing the installation, it is anticipated that a skin friction of 2,500 pounds per square foot could be utilized for post-grouted anchors. Only the frictional resistance developed beyond the active wedge would be effective in resisting lateral loads.

Anchors should be placed at least 6 feet on center to be considered isolated. It is recommended that at least 3 of the initial anchors have their capacities tested to 200 percent of their design capacities for a 24-hour period to verify their design capacity.

The anchor deflection should not exceed 0.75 inches during the 24-hour period, measured after the 200 percent load has been applied. All anchors should be tested to at least 150 percent of design load. The total deflection during this test should not exceed 1inch.

The rate of creep under the 150 percent test load should not exceed 0.1 inch over a 15-minute period for the anchor to be approved for the design loading. After a satisfactory test, each anchor should be locked-off at the design load. This should be verified by rechecking the load in the anchor. The load should be within 10 percent of the design load. Where satisfactory tests are not attained, the anchor diameter and/or length should be increased, or additional anchors installed until satisfactory test results are obtained. The installation and testing of the anchors should be observed by the geotechnical engineer. Minor caving during drilling of the anchors should be anticipated.

Anchor Installation

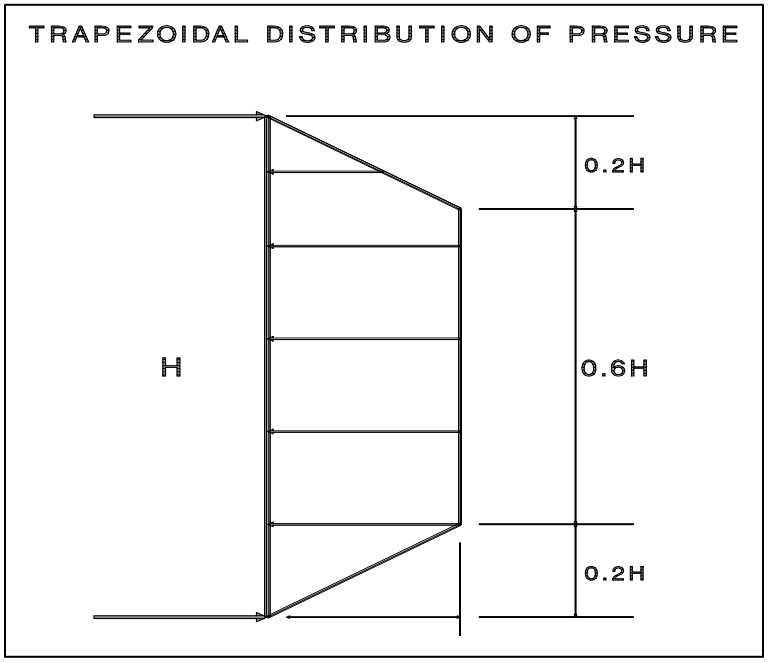
Tied-back anchors may be installed between 20 and 40 degrees below the horizontal. Caving of the anchor shafts is not anticipated. However, the following provisions should be implemented in the event caving occurs. The anchor shafts should be filled with concrete by pumping from the tip out, and the concrete should extend from the tip of the anchor to the active wedge. To minimize the chances of caving, it is recommended that the portion of the anchor shaft within the active wedge be backfilled with sand before testing the anchor. This portion of the shaft should be filled tightly and flush with the face of the excavation. The sand backfill should be placed by pumping; the sand may contain a small amount of cement to facilitate pumping.

Lateral Pressures

Cantilevered shoring supporting a level backslope may be designed utilizing a triangular distribution of pressure as indicated in the following table:

HEIGHT OF SHORING "H" (feet)	EQUIVALENT FLUID PRESSURE East, North and West Wall (Favorable Bedding)	EQUIVALENT FLUID PRESSURE South Wall (Adverse/Daylighted Bedding)
Up to 10	28	35
10 to 20	32	47
20 to 30	36	51
30 to 40	38	53
40 to 50	39	55

A trapezoidal distribution of lateral earth pressure would be appropriate where shoring is to be restrained near the top by bracing or tie backs, with the trapezoidal distribution as shown in the diagram below.



Restrained shoring supporting a level backslope may be designed utilizing a trapezoidal distribution of pressure as indicated in the following table:

HEIGHT OF SHORING "H" (feet)	EQUIVALENT FLUID PRESSURE East, North and West Wall (Favorable Bedding)	EQUIVALENT FLUID PRESSURE South Wall (Adverse/Daylighted Bedding) (where "H" is the height of the wall)
Up to 10	18H	22H
10 to 20	20H	29H
20 to 30	23H	32H
30 to 40	24H	33H
40 to 50	25H	34H

Where a combination of sloped embankment and shoring is utilized, the pressure will be greater and must be determined for each combination. Additional active pressure should be applied where the shoring will be surcharged by adjacent traffic or structures. Where a combination of sloped embankment and shoring is utilized, the pressure will be greater and must be determined for each combination.

Deflection

It is difficult to accurately predict the amount of deflection of a shored embankment. It should be realized that some deflection will occur. It is estimated that the deflection could be on the order of one inch at the top of the shored embankment. If greater deflection occurs during construction, additional bracing may be necessary to minimize settlement of adjacent buildings and utilities in adjacent street and alleys. If desired to reduce the deflection, a greater active pressure could be used in the shoring design. Where internal bracing is used, the rakers should be tightly wedged to minimize deflection. The proper installation of the raker braces and the wedging will be critical to the performance of the shoring.

The City of Los Angeles Department of Building and Safety requires limiting shoring deflection to ½ inch at the top of the shored embankment where a structure is within a 1:1 plane projected up from the base of the excavation. A maximum deflection of 1-inch has been allowed provided there are no structures within a 1:1 plane drawn upward from the base of the excavation.

Monitoring

Because of the depth of the excavation, some mean of monitoring the performance of the shoring system is suggested. The monitoring should consist of periodic surveying of the lateral and vertical locations of the tops of all soldier piles and the lateral movement along the entire lengths of selected soldier piles. Also, some means of periodically checking the load on selected anchors will be necessary, where applicable.

Some movement of the shored embankments should be anticipated because of the relatively deep excavation. It is recommended that photographs of the existing buildings on the adjacent properties be made during construction to record any movements for use in the event of a dispute.

Shoring Observations

It is critical that the installation of shoring is observed by a representative of Geotechnologies, Inc. Many building officials require that shoring installation should be performed during continuous observation of a representative of the geotechnical engineer. The observations ensure that the recommendations of the geotechnical report are implemented and so that modifications of the recommendations can be made if variations in the geologic material or groundwater conditions warrant. The observations will allow for a report to be prepared on the installation of shoring for the use of the local building official, where necessary.

Raker Brace Foundations

An allowable bearing pressure of 8,000 pounds per square foot may be used for the design of raker foundations. This bearing pressure is based on a raker foundation a minimum of 4 feet in width and length as well as 4 feet in depth. The base of the raker foundations should be cut horizontal where they will support footings later in construction. Care should be employed in the positioning of raker foundations so that they do not interfere with the foundations for the proposed structure.

SLABS ON GRADE

Concrete Slabs-on Grade

Concrete floor slabs should be a minimum of 4 inches in thickness. Slabs-on-grade should be cast over undisturbed bedrock or properly controlled fill materials. Any geologic materials loosened or over-excavated should be wasted from the site or properly compacted to 90 percent of the maximum dry density.

Outdoor concrete flatwork should be a minimum of 3 inches in thickness. Outdoor concrete flatwork should be cast over undisturbed bedrock or properly controlled fill. Any geologic materials loosened or over-excavated should be wasted from the site or properly compacted to 90 percent of the maximum dry density.

Design of Slabs That Receive Moisture-Sensitive Floor Coverings

Geotechnologies, Inc. does not practice in the field of moisture vapor transmission evaluation and mitigation. Therefore, it is recommended that a qualified consultant be engaged to evaluate the general and specific moisture vapor transmission paths and any impact on the proposed construction. The qualified consultant should provide recommendations for mitigation of potential adverse impacts of moisture vapor transmission on various components of the structure.

Where dampness would be objectionable, it is recommended that the floor slabs should be waterproofed. A qualified waterproofing consultant should be retained to recommend a product or method which would provide protection for concrete slabs-on-grade.

All concrete slabs-on-grade should be supported on vapor retarder. The design of the slab and the installation of the vapor retarder should comply with the most recent revisions of ASTM E 1643 and ASTM E 1745. The vapor retarder should comply with ASTM E 1745 Class A requirements.

Where a vapor retarder is used, a low-slump concrete should be used to minimize possible curling of the slabs. The barrier can be underlain with a layer of trimmable, compactable, granular fill, where it is thought to be beneficial. See ACI 302.2R-32, Chapter 7 for information on the placement of vapor retarders and the use of a fill layer.

Groundwater seepage was encountered near the finish floor elevation of the proposed subterranean parking level. Proposed concrete slabs-on-grade do not need to be supported on a layer of compacted aggregate to provide a capillary break.

Concrete Crack Control

The recommendations presented in this report are intended to reduce the potential for cracking of concrete slabs-on-grade Because of settlement. However, even where these recommendations have been implemented, foundations, stucco walls and concrete slabs-on-grade may display some cracking minor soil movement and/or concrete shrinkage. The occurrence of concrete cracking may be reduced and/or controlled by limiting the slump of the concrete used, proper concrete placement and curing, and by placement of crack control joints at reasonable intervals where re-entrant slab corners occur.

For standard control of concrete cracking, a maximum crack control joint spacing of 15 feet should not be exceeded. Lesser spacings would provide greater crack control. Joints at curves and angle points are recommended. The crack control joints should be installed as soon as practical following concrete placement. Crack control joints should extend a minimum depth of one-fourth the slab thickness. Construction joints should be designed by a structural engineer.

Complete removal of the existing fill soil beneath outdoor flatwork such as walkways or patio areas, is not required, however, because of the rigid nature of concrete, some cracking, a shorter design life and increased maintenance costs should be anticipated. To provide uniform support beneath the flatwork it is recommended that a minimum of 12 inches of the exposed subgrade beneath the flatwork be scarified and recompacted to 90 percent relative compaction.

Slab Reinforcing

Concrete slabs-on-grade should be reinforced with a minimum of #4 steel bars on 16-inch centers each way.

Outdoor flatwork should be reinforced with a minimum of #3 steel bars on 24-inch centers each way.

Pavements

Prior to placing paving, the existing grade should be scarified to a depth of 12 inches, moistened as required to obtain optimum moisture content, and recompacted to 90 percent of the maximum density as determined by the most recent revision of ASTM D 1557. The client should be aware that removal of all existing fill in new paving is not required. However, pavement constructed in this manner will most likely have a shorter design life and increased maintenance costs. The following pavement sections are recommended:

Service	Asphalt Pavement Thickness Inches	Base Course Inches
Passenger Cars	3	4
Moderate Truck	4	6
Heavy Truck (Fire Lane)	7	6.5

Service	Portland Cement Concrete Pavement Inches	Base Course Inches
Heavy Truck (Fire Lane)	7.5	4

Aggregate base should be compacted to a minimum of 95 percent of the most recent revision of ASTM D 1557 laboratory maximum dry density. Base materials should conform with Sections 200-2.2 or 200-2.4 of the most recent edition of "Standard Specifications for Public Works Construction", (Green Book).

The performance of pavement is highly dependent upon providing positive surface drainage away from the edges. Ponding of water on or adjacent to pavement can result in saturation of the subgrade materials and subsequent pavement distress. If planter islands are planned, the perimeter curb should extend a minimum of 12 inches below the bottom of the aggregate base.

For standard control of concrete cracking, a maximum crack control joint spacing of 12 feet should not be exceeded. Lesser spacings would provide greater crack control. Joints at curves and angle points are recommended. The crack control joints should be installed as soon as practical following concrete placement. Crack control joints should extend a minimum depth of one-fourth the slab thickness. Construction joints should be designed by a structural engineer. Concrete paving should be reinforced with a minimum of #3 steel bars on 18-inch centers each way.

The management of pavement wear primarily is focused on the distress caused by vertical loads. The reduction of vertical loading from large vehicles is assisted by increasing the number of axles. Multi-axle groups reduce the peak vertical loading and, when closely spaced, reduce the magnitude

of the strain cycles to which the pavement is subjected. However, where tight low-speed turns are executed, non-steering axle groups lead to transverse shear forces (scuffing) at the pavement-tire interface.

With asphaltic concrete pavements, tensile shear stresses from tires can cause surface cracking and raveling, thus, the increased use of non-steering axle groups results in increased pavement wear in the vicinity of intersections and turnarounds where tight low speed turns are executed.

When designing intersections and turnarounds the turn radius should be as large as possible. This will lead to reduced "scuffing" forces. Where tight radius turns are unavoidable, the pavement surface design should take into account the high level of "scuffing" forces that will occur, and thickened pavement and subgrade and base course keyways should be considered to assist in the reduction of lateral deflection.

SITE DRAINAGE

Proper surface drainage is critical to the future performance of the project. Saturation of a soil can cause it to lose internal shear strength and increase its compressibility, resulting in a change in the designed engineering properties. Proper site drainage should be maintained at all times.

All site drainage, with the exception of any required to be disposed of onsite by stormwater regulations, should be collected and transferred to the street in non-erosive drainage devices. The proposed structure should be provided with roof drainage. Discharge from downspouts, roof drains and scuppers should not be permitted on unprotected soils within five feet of the building perimeter. Drainage should not be allowed to pond anywhere on the site, and especially not against any foundation or retaining wall. Drainage should not be allowed to flow uncontrolled over any descending slope. Planters which are located within a distance equal to the depth of a retaining wall should be sealed to prevent moisture adversely affecting the wall. Planters which are located within five feet of a foundation should be sealed to prevent moisture affecting the earth materials supporting the foundation.

STORMWATER DISPOSAL

Because of the dense consistency of the bedrock and the portions of the building at the top of a descending slope, stormwater infiltration is not recommended for the proposed project. Some other means of stormwater disposal such as flow-through planters, must be considered by the design team.

DESIGN REVIEW

Engineering of the proposed project should not begin until approval of the geotechnical report by the Building Official is obtained in writing. Significant changes in the geotechnical recommendations may result during the building department review process.

It is recommended that the geotechnical aspects of the project be reviewed by this firm during the design process. This review aids the design team by providing specific recommendations, as well as review of the proposed construction to evaluate whether the intent of the recommendations presented herein are satisfied.

CONSTRUCTION MONITORING

Geotechnical observations and testing during construction are a continuation of the geotechnical investigation. It is critical that this firm review the geotechnical aspects of the project during the construction process. Compliance with the design concepts, specifications or recommendations during construction requires review by this firm during the course of construction. All foundations should be observed by a representative of this firm prior to placing concrete or steel. Any fill which is placed should be observed, tested, and verified if used for engineered purposes. Please advise Geotechnologies, Inc. at least twenty-four hours prior to any required site visit.

If conditions encountered during construction appear to differ from those disclosed herein, notify Geotechnologies, Inc. immediately so the need for modifications may be considered in a timely manner.

It is the responsibility of the contractor to ensure that all excavations and trenches are properly sloped or shored. All temporary excavations should be cut and maintained in accordance with applicable OSHA rules and regulations.

EXCAVATION CHARACTERISTICS

The exploration performed for this investigation is limited to the geotechnical excavations described. Direct exploration of the entire site would not be economically feasible. The owner, design team and contractor must understand that differing excavation and drilling conditions may be encountered based on boulders, gravel, oversize materials, groundwater and many other conditions. Fill materials, especially when they were placed without benefit of modern grading codes, regularly contain materials which could impede efficient grading and drilling. Southern California sedimentary bedrock is known to contain variable layers which reflect differences in depositional environment. Such layers may include abundant gravel, cobbles and boulders. Similarly, bedrock can contain concretions. Concretions are typically lenticular and follow the bedding. They are formed by mineral deposits. Concretions can be very hard. Excavation and drilling in these areas may require full size equipment and coring capability. The contractor should be familiar with the site and the geologic materials in the vicinity.

CLOSURE AND LIMITATIONS

The purpose of this report is to aid in the design and completion of the described project. Implementation of the advice presented in this report is intended to reduce certain risks associated with construction projects. The professional opinions and geotechnical advice contained in this report are sought because of special skill in engineering and geology and were prepared in

accordance with generally accepted geotechnical engineering practice. Geotechnologies, Inc. has a duty to exercise the ordinary skill and competence of members of the engineering profession. Those who hire Geotechnologies, Inc. are not justified in expecting infallibility, but can expect reasonable professional care and competence.

The scope of the geotechnical services provided did not include any environmental site assessment for the presence or absence of organic substances, hazardous/toxic materials in the soil, surface water, groundwater, or atmosphere, or the presence of wetlands.

Proper compaction is necessary to reduce settlement of overlying improvements. Some settlement of compacted fill should be anticipated. Any utilities supported therein should be designed to accept differential settlement. Differential settlement should also be considered at the points of entry to the structure.

The City of Los Angeles does not require corrosion testing. However, if corrosion sensitive improvements are planned, it is recommended that a comprehensive corrosion study should be commissioned. The study will develop recommendations to avoid premature corrosion of buried pipes and concrete structures in direct contact with the soils.

GEOTECHNICAL TESTING

Classification and Sampling

The soil is continuously logged by a representative of this firm and classified by visual examination in accordance with the Unified Soil Classification system. The field classification is verified in the laboratory, also in accordance with the Unified Soil Classification System. Laboratory classification may include visual examination, Atterberg Limit Tests and grain size distribution. The final classification is shown on the excavation logs.

Samples of the geologic materials encountered in the exploratory excavations were collected and transported to the laboratory. Relatively undisturbed samples of soil are obtained at frequent intervals. Unless noted on the excavation logs as an SPT sample, samples acquired while utilizing a hollow-stem auger drill rig are obtained by driving a thin-walled, California Modified Sampler with successive 30-inch drops of a 140-pound hammer. Samples from bucket-auger drilling are obtained utilizing a California Modified Sampler with successive 12-inch drops of a kelly bar, whose weight is noted on the excavation logs. The soil is retained in brass rings of 2.50 inches outside diameter and 1.00 inch in height. The central portion of the samples are stored in close fitting, moisture retaining containers for transportation to the laboratory. Samples noted on the excavation logs as SPT samples are obtained in accordance with the most recent revision of ASTM D 1586. Samples are retained for 30 days after the date of the geotechnical report.

Grain Size Distribution

These tests cover the quantitative determination of the distribution of particle sizes in soils. Sieve analysis is used to determine the grain size distribution of the soil larger than the Number 200 sieve.

The most recent revision of ASTM D 422 is used to determine particle sizes smaller than the Number 200 sieve. A hydrometer is used to determine the distribution of particle sizes by a sedimentation process.

The grain size distributions are plotted on the E-Plates presented in the Appendix of this report.

Moisture and Density Relationships

The field moisture content and dry unit weight are determined for each of the undisturbed soil samples, and the moisture content is determined for SPT samples by the most recent revision of ASTM D 4959 or ASTM D 4643. This information is useful in providing a gross picture of the

soil consistency between exploration locations and any local variations. The dry unit weight is determined in pounds per cubic foot and shown on the “Excavation Logs”, A-Plates. The field moisture content is determined as a percentage of the dry unit weight.

Direct Shear Testing

Shear tests are performed by the most recent revision of ASTM D 3080 with a strain controlled, direct shear machine manufactured by Soil Test, Inc. or a Direct Shear Apparatus manufactured by GeoMatic, Inc. The rate of deformation is approximately 0.025 inches per minute. Each sample is sheared under varying confining pressures in order to determine the Mohr-Coulomb shear strength parameters of the cohesion intercept and the angle of internal friction. Samples are generally tested in an artificially saturated condition. Depending upon the sample location and future site conditions, samples may be tested at field moisture content. The results are plotted on the "Shear Test Diagram," B-Plates.

The most recent revision of ASTM 3080 limits the particle size to 10 percent of the diameter of the direct shear test specimen. The sheared sample is inspected by the laboratory technician running the test. The inspection is performed by splitting the sample along the sheared plane and observing the soils exposed on both sides. Where oversize particles are observed in the shear plane, the results are discarded, and the test run again with a fresh sample.

Consolidation Testing

Settlement predictions of the soil's behavior under load are made based on the consolidation tests using the most recent revision of ASTM D 2435. The consolidation apparatus is designed to receive a single one-inch-high ring. Loads are applied in several increments in a geometric progression, and the resulting deformations are recorded at selected time intervals. Porous stones are placed in contact with the top and bottom of each specimen to permit addition and release of pore fluid. Samples are generally tested at increased moisture content to determine the effects of water on the bearing soil. The normal pressure at which the water is added is noted on the drawing. Results are plotted on the "Consolidation Test," C-Plates.

Expansion Index Testing

The expansion tests performed on the remolded samples are in accordance with the Expansion Index testing procedures, as described in the most recent revision of ASTM D4829. The soil sample is compacted into a metal ring at a saturation degree of 50 percent. The ring sample is then placed in a consolidometer, under a vertical confining pressure of 1 lbf/square inch and inundated with distilled water. The deformation of the specimen is recorded for a period of 24 hour or until the rate of deformation becomes less than 0.0002 inches/hour, whichever occurs first. The expansion index, EI, is determined by dividing the difference between final and initial height of the ring sample by the initial height and multiplied by 1,000.

Laboratory Compaction Characteristics

The maximum dry unit weight and optimum moisture content of a soil are determined by use of the most recent revision of ASTM D 1557. A soil at a selected moisture content is placed in five layers into a mold of given dimensions, with each layer compacted by 25 blows of a 10-pound hammer dropped from a distance of 18 inches subjecting the soil to a total compactive effort of about 56,000 pounds per cubic foot. The resulting dry unit weight is determined. The procedure is repeated for a sufficient number of moisture contents to establish a relationship between the dry unit weight and the water content of the soil. The data when plotted represent a curvilinear relationship known as the compaction curve. The values of optimum moisture content and modified maximum dry unit weight are determined from the compaction curve.

REFERENCES

California Division of Mines and Geology, 1979, Special Studies Zone Map, USGS 7.5-Minute Burbank Quadrangle, map scale 1:24,000.

California Division of Mines and Geology, 1998, Seismic Hazard Zone Report for the Burbank (7.5 Minute) Quadrangle, Los Angeles County, California, Seismic Hazard Zone Report 016, 63 pages.

California Division of Mines and Geology, 1998, Seismic Hazard Evaluation Report for the Hollywood 7.5-Minute Quadrangle, Los Angeles County, California, Seismic Hazard Zone Report 026.

California Geological Survey, 2014, Earthquake Zones of Required Investigation, Hollywood Quadrangle, map scale 1:24,000.

California Geological Survey, 2018, Earthquake Zones of Required Investigation, Beverly Hills Quadrangle, map scale 1:24,000.

California Geological Survey, 2022, Earthquake Zones of Required Investigation, Burbank Quadrangle, map scale 1:24,000.

City of Los Angeles, 1960, Preliminary Geologic Maps, Santa Monica Mountains Maps, map scale 1:4,800.

City of Los Angeles, Department of Public Works, 2003, Methane and Methane Buffer Zones Map, Map Number A-20960.

City of Los Angeles, Letter dated March 25, 1982, Primary Structural Fill, DM#7322.

City of Los Angeles, Grading Division, Letter dated March 25, 1982, Primary Structural Fill, LOG #9587-01.

Dibblee, T.W., 1991, Geologic Map of the Hollywood and Burbank (South ½) Quadrangles, Dibblee Foundation Map #DF-30, Map Scale 1:24,000.

Dolan, J.F., Stevens, D., and Rockwell, T.K., 2000, Paleoseismologic Evidence for and Early to Mid-Holocene Age of the Most Recent Surface Rupture on the Hollywood Fault, Los Angeles, California, Bulleting for the Seismological Society of America, 90, 2 pp.334-344.

REFERENCES - continued

Dolan, J.F., Sieh, K., Rockwell, T.K., Guptill, P., and Miller, G., 1997, Active Tectonics, Paleoseismology, and Seismic Hazards of the Hollywood Fault, Northern Los Angeles Basin, California, GSA Bulletin, v. 109: no 12, p1595-1616.

Geotechnologies, Inc. dated December 17, 2015, Revised February 12, 2016. Geotechnical Engineering Investigation, Proposed Hilton Universal City Expansion Project, 555 Universal Hollywood Drive, Los Angeles, California, File No. 21062.

Geotechnologies, Inc., dated June 9, 2020, Updated November 20, 2020. Geotechnical Engineering Investigation, Proposed Hilton Universal City Expansion Project, 555 Universal Hollywood Drive, Los Angeles, California, File No. 21578.

Lamar, D.F., 1970, Geology of the Elysian Park-Repetto Hills Area, Los Angeles County, California, California Division of Mines and Geology, Special Report No. 101, 45 pages.

Leighton and Associates, Inc. (1990), Technical Appendix to the Safety Element of the Los Angeles County General Plan: Hazard Reduction in Los Angeles County.

LeRoy Crandall and Associates, Report dated May 28, 1981, Report of Geotechnical Investigation, Proposed MCA/Sheraton Hotel No. 2, Universal City, Los Angeles, California, For the MCA Development Company, File No. ADE-81093.

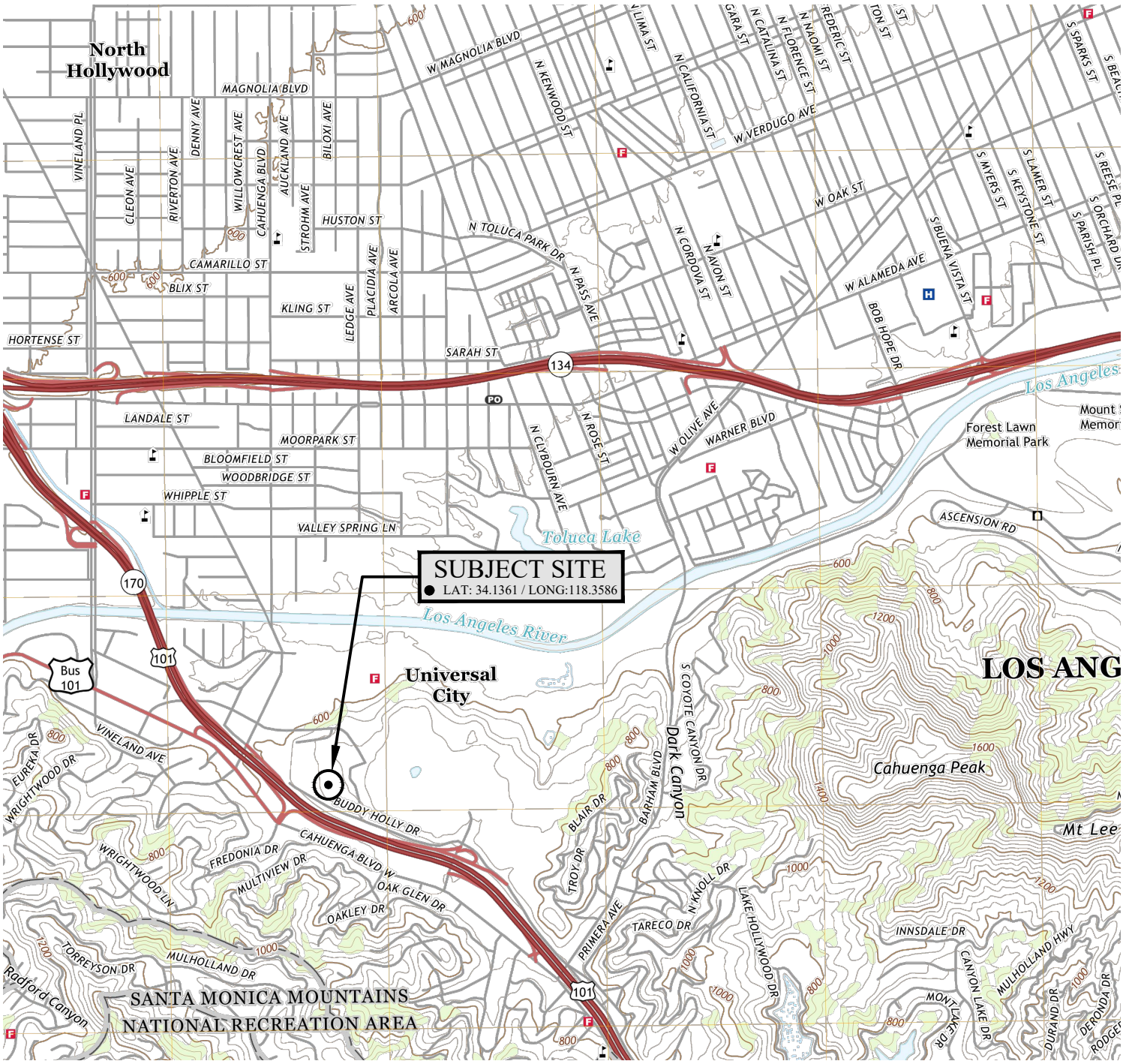
LeRoy Crandall And Associates, Report dated January 20, 1982, Inspection and Testing of Compacted Fill, Proposed MCA/Sheraton Hotel No. 2, 3838 Lankershim Boulevard, Lot 1, Tract 27621, Universal City, California for the MCA Development Company, Job No. B-81178.

Shaw, J.H. and Suppe, J., 1996, Earthquake Hazards of Active Blind Thrust Fault Under the Central Los Angeles Basin, California Journal of Geophysical Research, Vol. 101, No. 4, pages 8623-8642.

Structural Engineers Association of California (SEOC) and California's Office of Statewide Health Planning and Development (OSHPD), Seismic Design Maps Tool, (https://seismicmaps.org/).

United States Geological Survey, 2005, Yerkes, R.F., Campbell, R.H., Preliminary Geologic Map of the Los Angeles 30' x 60' Quadrangle, Southern California, USGS Open File Report 2005-1019, Map Scale 1:100,000.

Weber, F.H., Jr., Bennett, J.H., Chapman, R.H., Chase, G.W., and Saul, R.B., 1980, Earthquake hazards associated with the Verdugo-Eagle Rock and Benedict Canyon fault zones, Los Angeles, California: California Division of Mines and Geology Open File Report 80-10LA, 163 p.



1 0.5 0 KILOMETERS 1 2

1000 500 0 METERS 1000 2000

1 0.5 0 1

MILES

1000 0 1000 2000 3000 4000 5000 6000 7000 8000 9000 10000

FEET

N

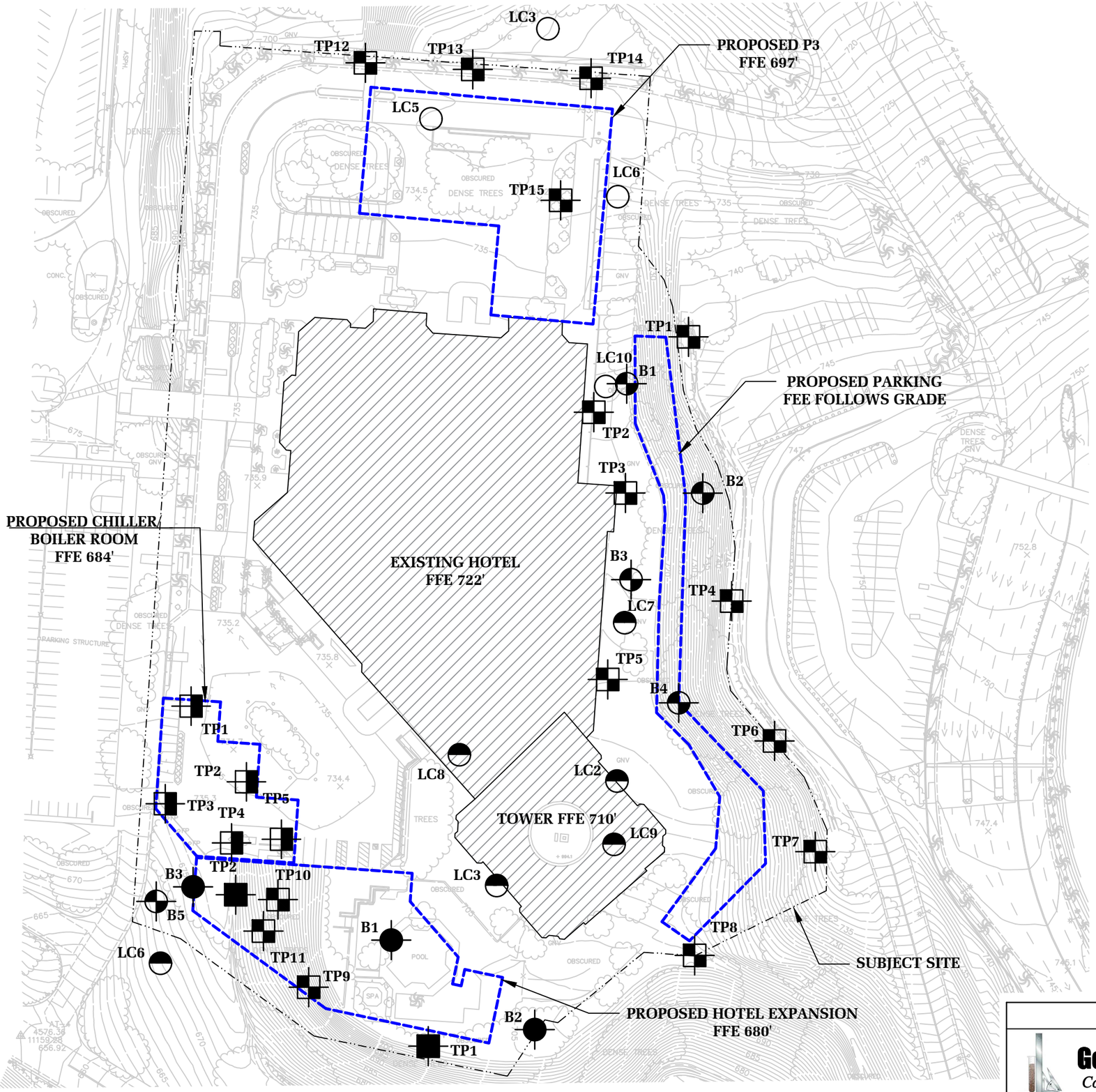
REFERENCE: USGS TOPOGRAPHIC MAPS, 7.5 MINUTE SERIES BURBANK, CA QUADRANGLE 2022

VICINITY MAP

Geotechnologies, Inc.
Consulting Geotechnical Engineers

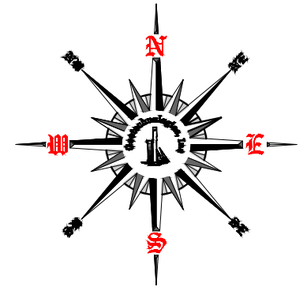
HILTON LOS ANGELES, UNIVERSAL CITY
555 UNIVERSAL HOLLYWOOD DR. UNIVERSAL CITY

FILE NO: 21578



LEGEND

- TP5 — LOCATION & NUMBER OF TEST PIT(BY: GEOTECHNOLOIGIES, INC., 2022)
- B5 — LOCATION & NUMBER OF BORING (BY: GEOTECHNOLOIGIES, INC., 2020)
- TP5 — LOCATION & NUMBER OF TEST PIT (BY: GEOTECHNOLOGIES, INC., 2020)
- B3 — LOCATION & NUMBER OF BORING (BY: GEOTECHNOLOGIES, INC., 2015)
- TP2 — LOCATION & NUMBER OF TEST PIT (BY: GEOTECHNOLOGIES, INC., 2015)
- LC9 — LOCATION & NUMBER OF BORING (PREVIOUS INVESTIGATION BY LEROY CRANDALL & ASSOCIATES, JOB NO. ADE-81093)



SCALE IN FEET

0 80 160

Reference: Topographic map provided by Robert J. Lung & Associates dated November 26, 2013.

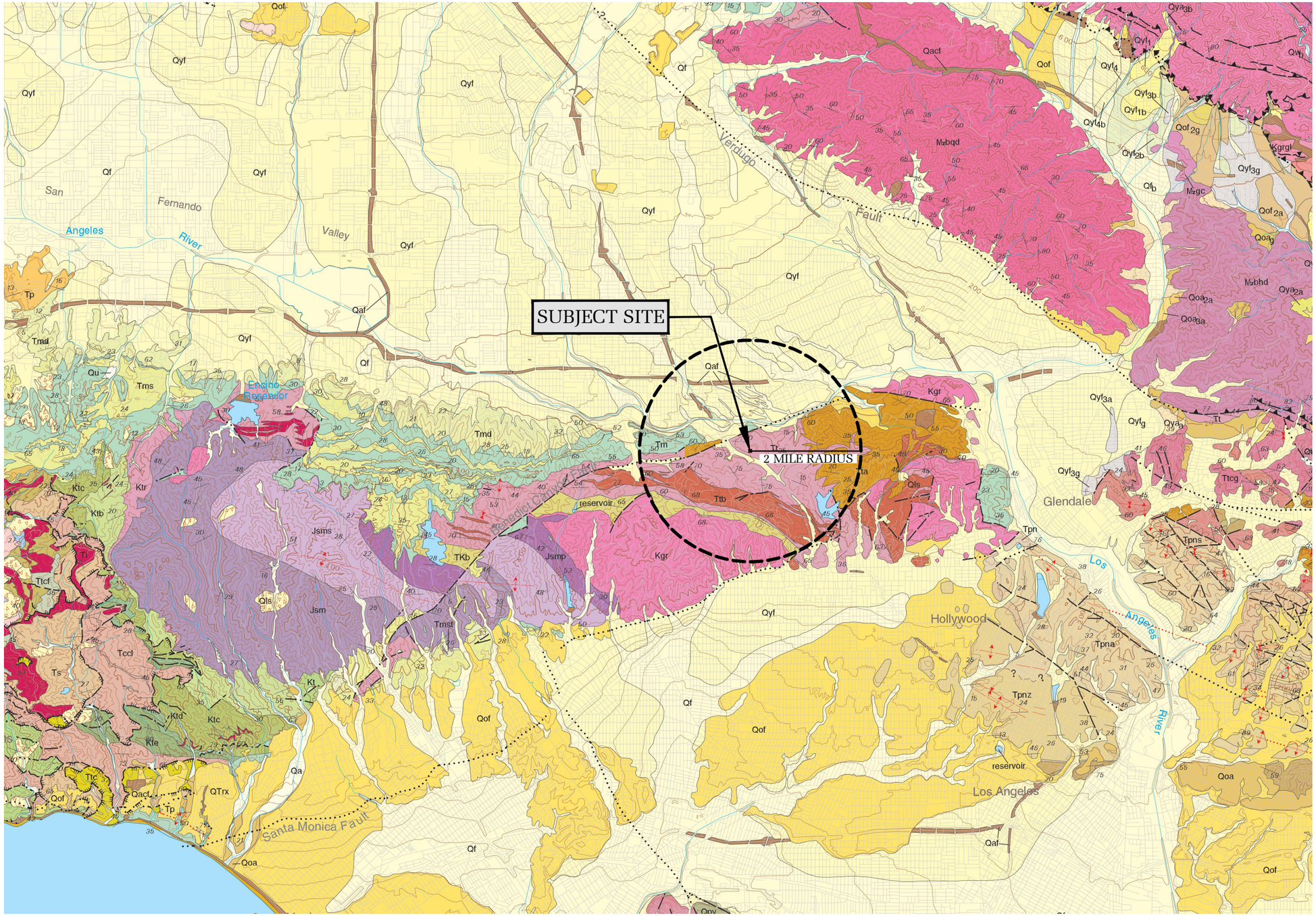
PLOT PLAN

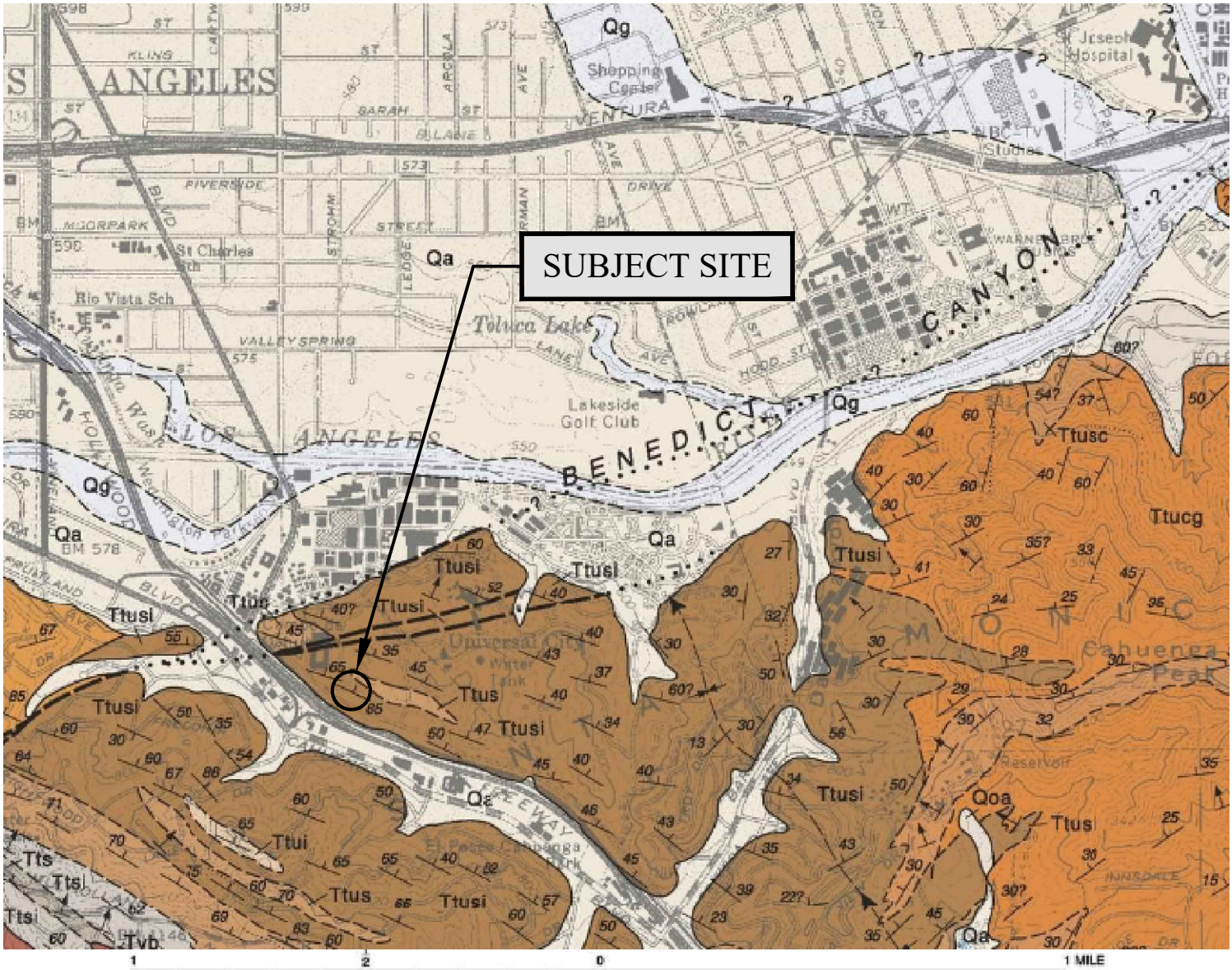
Geotechnologies, Inc.
Consulting Geotechnical Engineers

Hilton Los Angeles, Universal City
555 Universal Hollywood Dr., Universal City

DRAWN BY: SJM | FILE NO. 21578

DATE: August 2022


SUBJECT SITE
2 MILE RADIUS
San Fernando Valley
Angeles River
Verdugo Fault
Benedict Canyon Fault
Santa Monica Fault
Ensino Reservoir
reservoir
Glendale
Hollywood
Los Angeles
Los Angeles River
Qaf
Qf
Qof
Qyf
Qoa
Qa
Qls
Tm
Tt
Ttb
Tpn
Tpna
Tpnz
Tmd
Tms
Tmst
Ttcf
Tccl
Ts
Ti
Tp
Ttc
Kgr
Kgrgr
Ktc
Ktr
Ktb
Kte
Ktd
Kt
Jsm
Jsms
Jsmp
TKb
QTrx
Qaf
Qaf
Qyf1
Qyf1a
Qyf1b
Qyf1b
Qyf2b
Qyf3a
Qyf3b
Qyf3g
Qyf3g
Qyfg
Qof2g
Qof2a
Qoa2a
Qoa3a
Qoa3a
Qoag
Qya3b
Qya2a
Qya3a
Qvb
Qfb
Mzbqd
Mzgc
Mzbhd
Qact
Ttcg
Tpns
Qls
Qaf
Qaf
Qof
Qoa
Qof
Qof
Qoa
Qof
Qaf
Qoa
Qaf
Qof
Qaf
Qaf
Qaf



LEGEND

Qoa: Older alluvium, gray to light brown pebble-gravel, sand, silt, and clay of detritus derived from Santa Monica Mountains; similar to Qae, but slightly consolidated; in Baldwin Hills designated as Baldwin Hills sandy gravel (Weber ed al, 1982), where it is much dissected and eroded.

Qa: Alluvium; clay, sand and gravel; includes gravel and sand of minor stream channels

Qg: Gravel and sand of major stream channels

Ttusi: Mostly gray micaceous clay shale or claystone, crumbly where weathered, and thin interbedds of gray to tan semi-friable sandstone

Ttus: Light gray to tan moderately hard, bedded sandstone; locally pebbly

Tts: Dark gray sandstone of basaltic grains (basaltic graywacke of Neuerburg 1953)

N

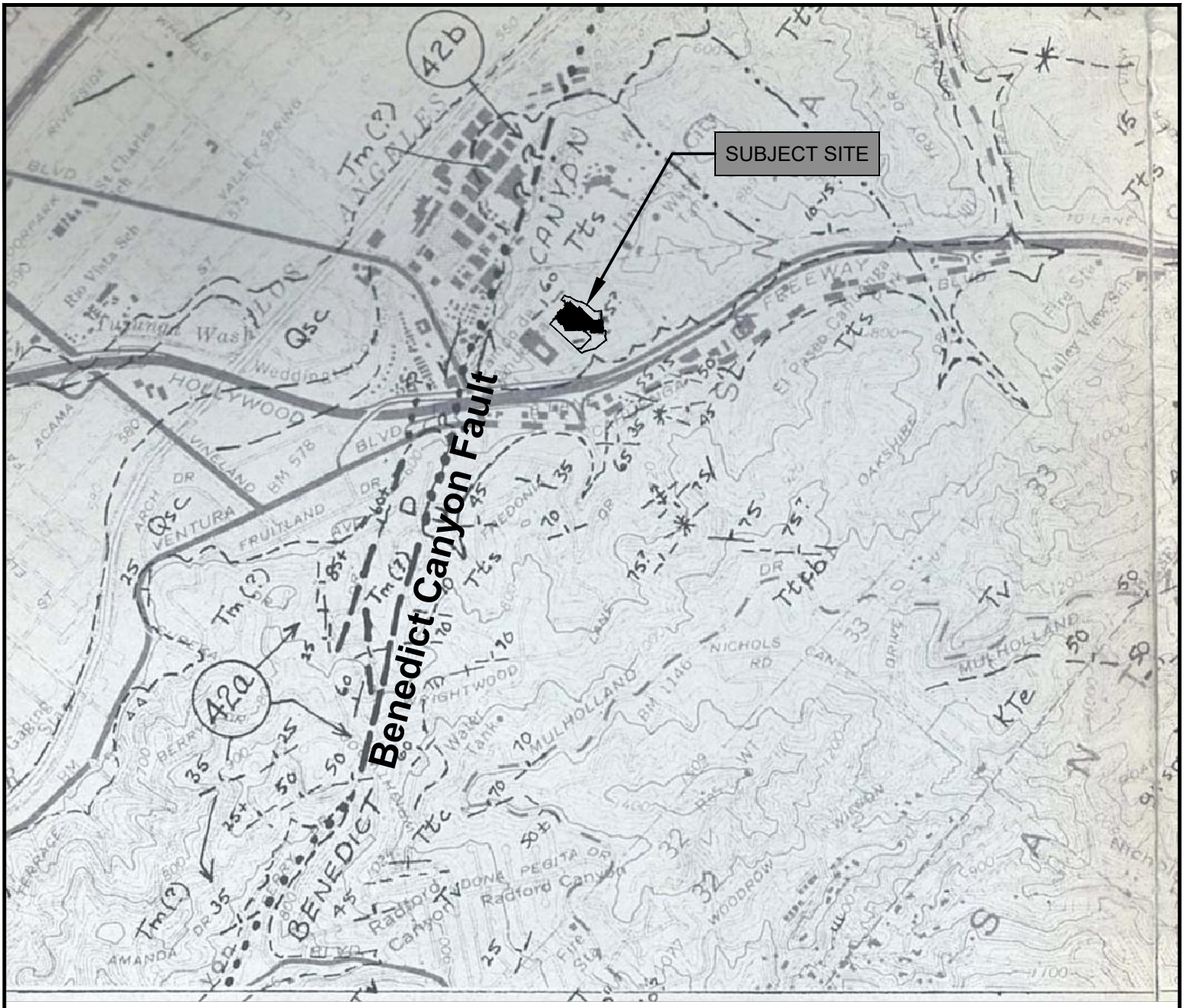
REFERENCE: T.W. DIBBLEE (EDITED 2010) GEOLOGIC MAP OF THE HOLLYWOOD & SOUTH HALF BURBANK QUADRANGLES (#DF-30)

LOCAL GEOLOGIC MAP (DIBBLEE)

Geotechnologies, Inc.
Consulting Geotechnical Engineers

HILTON LOS ANGELES, UNIVERSAL CITY
555 UNIVERSAL HOLLYWOOD DR., UNIVERSAL CITY

FILE NO: 21578



SCALE 1:1500

SCALE IN FEET

0 1500 3000

MILES

0 0.25 0.5 1MI.

LEGEND

Qsc: Younger Alluvium - stream channel deposits

Tm: Modelo Formation - Marine deposits that range from shale through siltstone to sandstone

(42A): The principle trace of the Benedict Canyon fault extends east-northeastward to crest of northwest-trending ridge shown in vicinity of arrow point

(42B): The Benedict Canyon fault apparently extends through a saddle developed in bedrock (before it was developed by Universal Studios)

Folds - arrow on axial trace of fold indicates direction of plunge

Fault - dashed where indefinite or inferred, dotted where concealed, queried where existence is doubtful

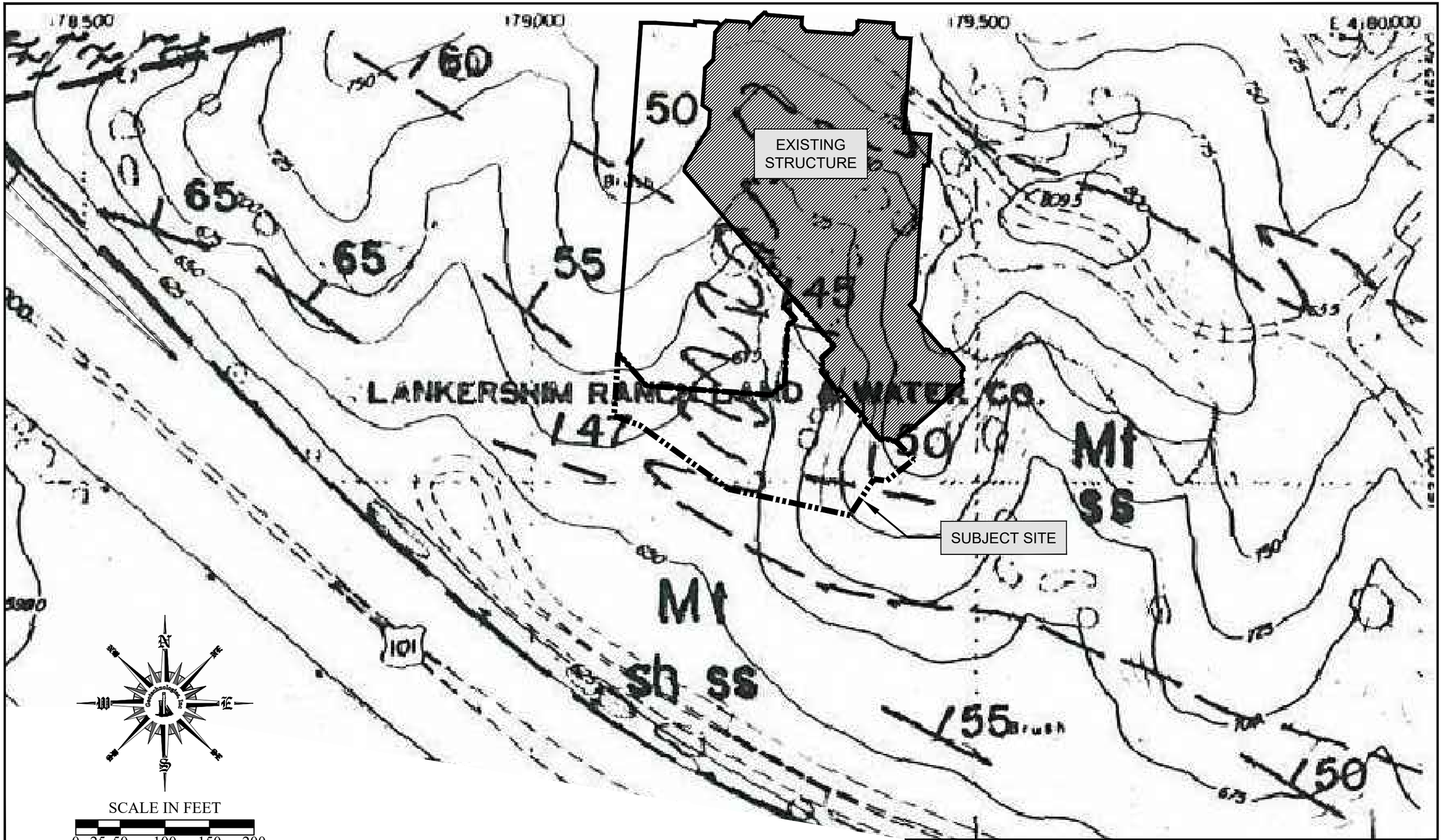
REFERENCE: WEBER, F.H., (1979) GEOLOGIC MAP OF THE NORTH-CENTRAL LOS ANGELES AREA (#OFR-79-16)

LOCAL GEOLOGIC MAP - HILL

Geotechnologies, Inc.
Consulting Geotechnical Engineers

HILTON LOS ANGELES, UNIVERSAL CITY
555 UNIVERSAL HOLLYWOOD DR., UNIVERSAL CITY

FILE NO: 21578



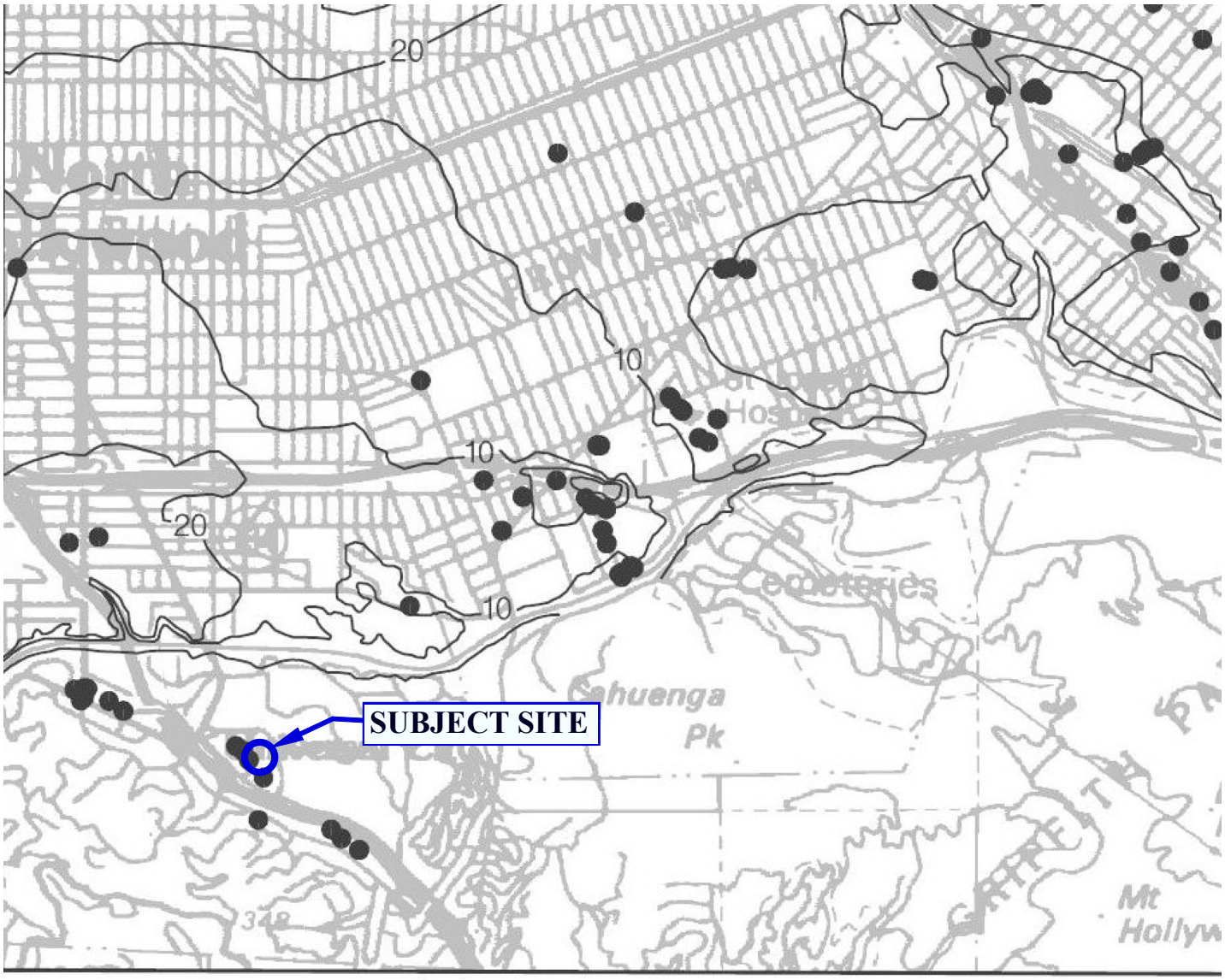
REFERENCE: GEOLOGIC MAP BY THE CITY OF LOS ANGELES
DATED: JANUARY 1960

LOCAL GEOLOGIC MAP - CITY OF LOS ANGELES

Geotechnologies, Inc.
Consulting Geotechnical Engineers

HILTON LOS ANGELES, UNIVERSAL CITY
555 UNIVERSAL HOLLYWOOD DR., UNIVERSAL CITY

DRAWN BY: YD	FILE NO. 21578
DATE: AUGUST 2022	



ONE MILE

SCALE

20 *Depth to groundwater in feet*

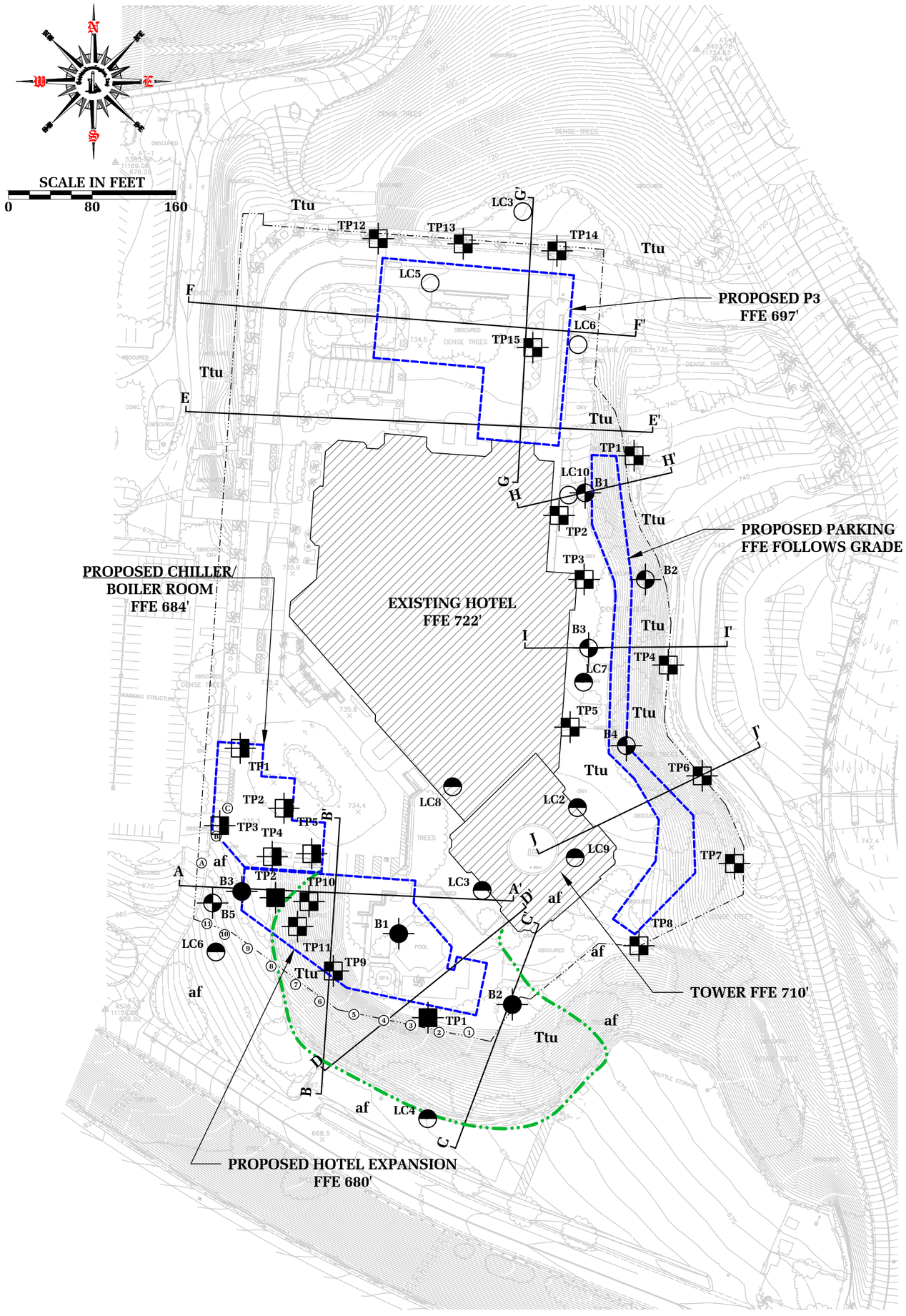
REFERENCE: **PLATE 1.2, GROUNDWATER MAP, SEISMIC HAZARD EVALUATION REPORT, OFR 98-07**
7.5 -MINUTE QUADRANGLE, BURBANK, CA QUADRANGLE

HISTORICALLY HIGHEST GROUNDWATER LEVELS

Geotechnologies, Inc.
Consulting Geotechnical Engineers

HILTON LOS ANGELES, UNIVERSAL CITY
555 UNIVERSAL HOLLYWOOD DR., UNIVERSAL CITY

FILE No. 21578



Reference: topographic map provided by Robert J. Lung & Associates dated November 26, 2013.

LEGEND

- TP5 — LOCATION & NUMBER OF TEST PIT (BY: GEOTECHNOLOGIES, INC., 2022)
- B5 — LOCATION & NUMBER OF BORING (BY: GEOTECHNOLOIGIES, INC., 2020)
- TP5 — LOCATION & NUMBER OF TEST PIT (BY: GEOTECHNOLOGIES, INC., 2020)
- B3 — LOCATION & NUMBER OF BORING (BY: GEOTECHNOLOGIES, INC., 2015)
- TP2 — LOCATION & NUMBER OF TEST PIT (BY: GEOTECHNOLOGIES, INC., 2015)
- LC9 — LOCATION & NUMBER OF BORING (PREVIOUS INVESTIGATION BY LEROY CRANDALL & ASSOCIATES, JOB NO. ADE-81093)
- LC10 — LOCATION & NUMBER OF BORING (PREVIOUS INVESTIGATION BY LEROY CRANDALL & ASSOCIATES, JOB NO. AD-79128)

SYMBOLS

- J — J' — CROSS SECTION
- PROPOSED EXPANSION
- GEOLOGIC CONTACT
- @ 13' / 70 — BEDDING ORIENTATION AND DEPTH
- @36' — WATER SEEPAGE AND DEPTH
- @ 8' / 21 — SHEAR ORIENTATION AND DEPTH
- 52 — BEDDING ATTITUDE BY LEROY CRANDALL & ASSOC. (FILE NO. ADE-81093)
- @25' — BEDDING ORIENTATION: VERTICAL JOINT

GEOLOGIC UNITS

- af — ARTIFICIAL FILL: SILT SAND AND SANDY SILT (WHERE GREATER THAN 4' FT THICK)
- Ttu — BEDROCK (UPPER TOPANGA FORMATION): SILTSTONE AND SANDSTONE

EXCAVATION DETAILS CONTINUED

BORINGS BY LEROY CRANDALL & ASSOCIATES (FILE NO. ADE-81093)

BORING LC2	BORING LC3	BORING LC4	BORING LC6
G.S. ELEV. 738'	G.S. ELEV. 734'	G.S. ELEV. 670'	G.S. ELEV. 670'
0-2' af	0-1' af	0-7' af	0-13' af
2-92' Ttu	1-90' Ttu	7-45.5' Ttu	13-22' Ttu
		@41'	@33'
			@42.5'

BORING LC7	BORING LC8	BORING LC9
G.S. ELEV. 742'	G.S. ELEV. 734'	G.S. ELEV. 738'
0-31' Ttu	0-68' Ttu	0-15' af
	@41'	15-68 Ttu

BORINGS BY LEROY CRANDALL & ASSOCIATES (FILE NO. AD-79128)

BORING LC3	BORING LC5	BORING LC6	BORING LC10
G.S. ELEV. 730'	G.S. ELEV. 730'	G.S. ELEV. 732'	G.S. ELEV. 741'
0-60' Ttu	0-60' Ttu	0-7' af	0-0.5' af
	@53'	7'-8' Qsw	0.5-41 Ttu
		8-31' Ttu	

EXCAVATION DETAILS

GETECHNOLOGIES, INC. (2022)

TEST PIT 1	TEST PIT 2	TEST PIT 3	TEST PIT 4	TEST PIT 5
G.S. ELEV. 696'	G.S. ELEV. 677'	G.S. ELEV. 698'	G.S. ELEV. 681'	G.S. ELEV. 696'
0-19.5' af	0-15' af	0-30' af	0-23' af	0-19' af
19.5-20' Ttu	15-20 Ttu		23-24 Ttu	19-20' Ttu
	@ 16' 35			

GETECHNOLOGIES, INC. (2020)

BORING 1	BORING 2	BORING 3	BORING 4
G.S. ELEV. 718.5'	G.S. ELEV. 731'	G.S. ELEV. 716.5'	G.S. ELEV. 728'
0-1' af	0-1' af	0-3' af	0-3' af
1-39' Ttu	1-27' Ttu	3-40' Ttu	3-40' Ttu
@13' 45	@ 4' 50	@ 3' 54	@ 3' 41
@18' 44	@ 7' 48	@ 4'	@ 6' 41
@19'	@19' 28	@8.5' 62	@12' 43
@21' 42	@21'	@12' 52	@15' 43
@25' 45		@14'	@17' 42
@31' 45		@15' 52	@23' 42
		@18'	@25'
		@24'	@28' 45
		@24' 42	@30' 43
		@25'	@36' 48
		@25.5' 50	

BORING 5
G.S. ELEV. 671'
0-15' af
15-32.5' Qal
32.5'-40" Ttu
@29'

TEST PIT 1	TEST PIT 2	TEST PIT 3	TEST PIT 4	TEST PIT 5
G.S. ELEV. 741'	G.S. ELEV. 718'	G.S. ELEV. 704'	G.S. ELEV. 745'	G.S. ELEV. 714.5'
0-9' af	0-2.5' af	0-1.5' af	0-2.5' af	0-3.5' af
9-10' Ttu	2.5-5 Ttu	1.5-4' Ttu	2.5-7.5 Ttu	3.5-6.5' Ttu
	@ 4' 52	@ 1.5' 43		@4.5' 49

TEST PIT 6	TEST PIT 7	TEST PIT 8	TEST PIT 9	TEST PIT 10
G.S. ELEV. 745'	G.S. ELEV. 736'	G.S. ELEV. 707.5'	G.S. ELEV. 695'	G.S. ELEV. 690'
0-3' af	0-13.5' af	0-25' af	0-6' af	0-7.5' af
3-7.5 Tu	13.5-15' Ttu		6-10' Ttu	7.5-11' Ttu
@ 5' 57			@ 8' 65	
@ 7' 52				

TEST PIT 11	TEST PIT 12	TEST PIT 13	TEST PIT 14	TEST PIT 15
G.S. ELEV. 685'	G.S. ELEV. 690'	G.S. ELEV. 728'	G.S. ELEV. 730'	G.S. ELEV. 731'
0-7' af	0-4' af	0-3' af	0-3' af	0-1' af
7-10' Ttu	4-7' Ttu	3-7' Ttu	3-6' Tu	1-10.5' Ttu
	@ 6' 38	@4' 33		

GETECHNOLOGIES, INC. (2015)

BORING 1	BORING 2	BORING 3
G.S. ELEV. 705'	G.S. ELEV. 705'	G.S. ELEV. 675'
0-3' af	0-5' af	0-22' af
3-60' Ttu	5-39' Ttu	22-35' Ttu
@36'	@ 5' 50	@ 25' 60
	@ 7' 48	@26' 60
	@ 8' 21	@28' 55
	@ 13' 70	@30' 55
	@ 27' 56	@32' 55
	@ 30' 60	@32'
	@33'	

TEST PIT 1	TEST PIT 2
G.S. ELEV. 704'	G.S. ELEV. 674'
0-4' af	0-14.5' af
4-10' Ttu	14.5-15 Ttu
@ 5' 75	
@ 6' 78	

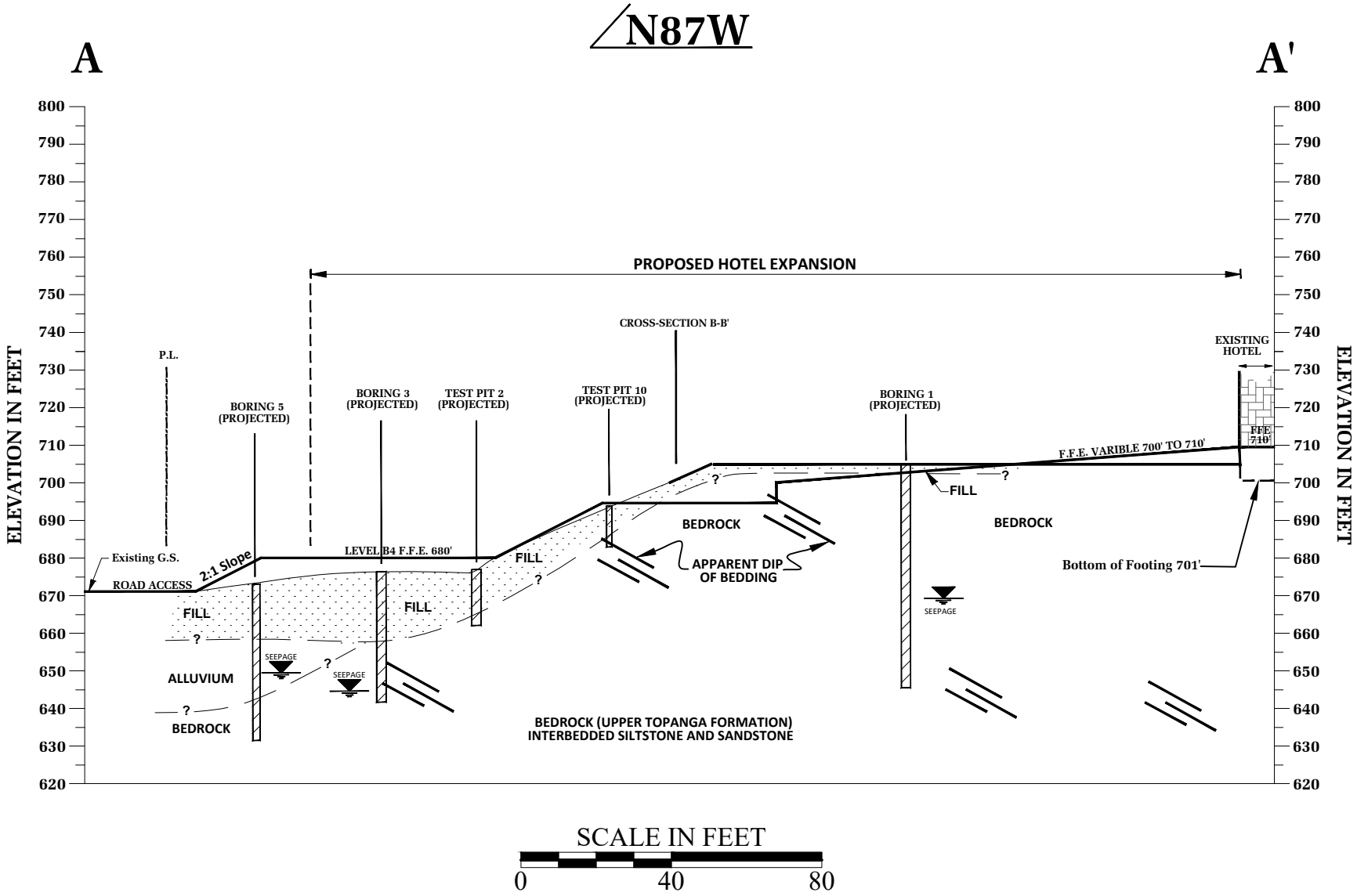
GEOLOGIC MAP

Geotechnologies, Inc.
Consulting Geotechnical Engineers

Hilton Los Angeles/universal City
555 Universal Hollywood Dr., Universal City

DRAWN BY: SJM | FILE NO. 21578

DATE: August 2022



SCALE IN FEET

0 40 80

CROSS SECTION A-A'

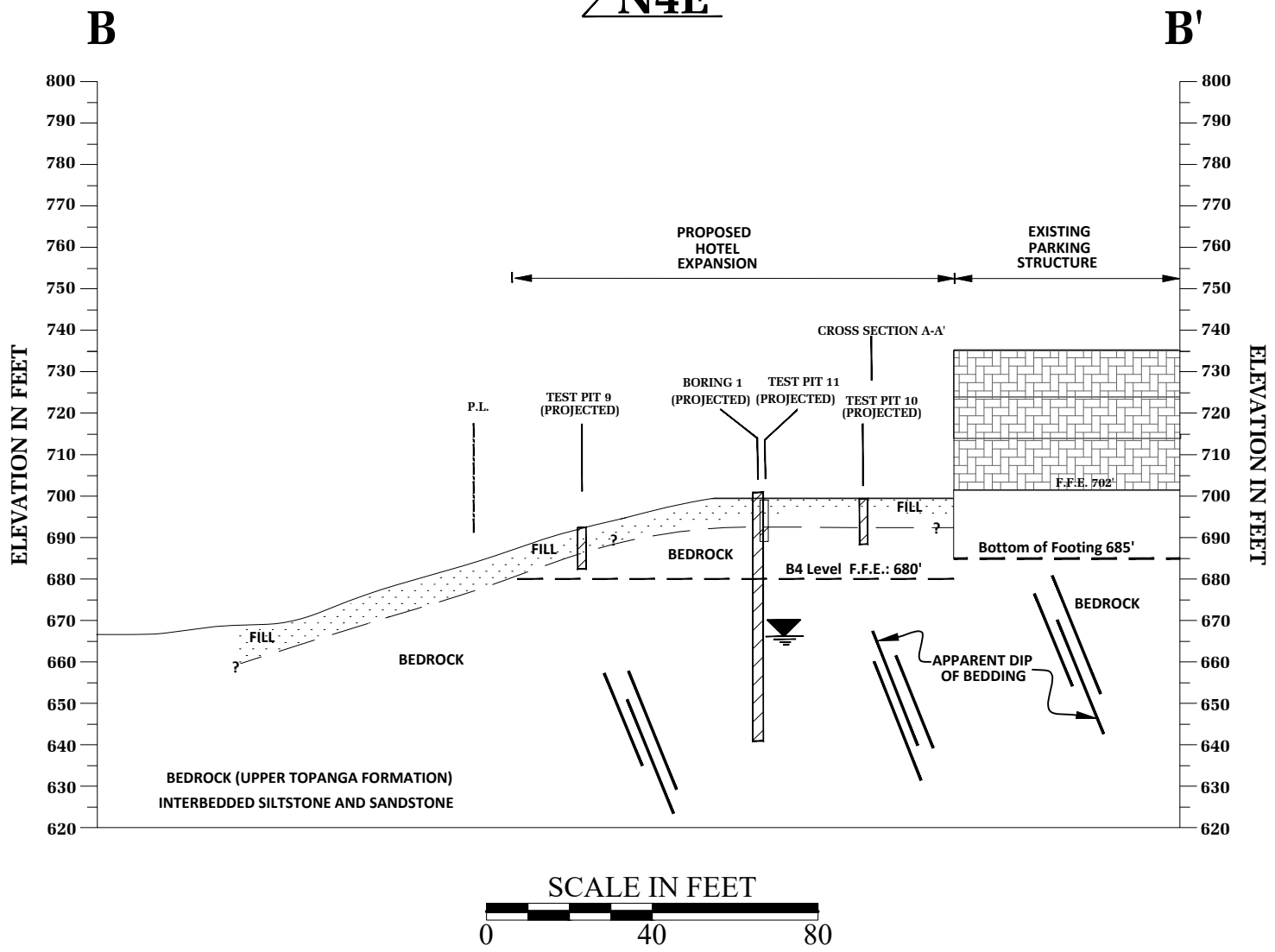
Geotechnologies, Inc.
Consulting Geotechnical Engineers

HILTON LOS ANGELES, UNIVERSAL CITY
555 UNIVERSAL HOLLYWOOD DR., UNIVERSAL CITY

DRAWN BY:YD | FILE NO. 21578

DATE: SEPTEMBER 2022

REFERENCE: TOPOGRAPHIC MAP PROVIDED BY ROBERT J. LUNG & ASSOCIATES DATED NOVEMBER 26, 2013



REFERENCE: TOPOGRAPHIC MAP PROVIDED BY ROBERT J. LUNG & ASSOCIATES DATED NOVEMBER 26, 2013

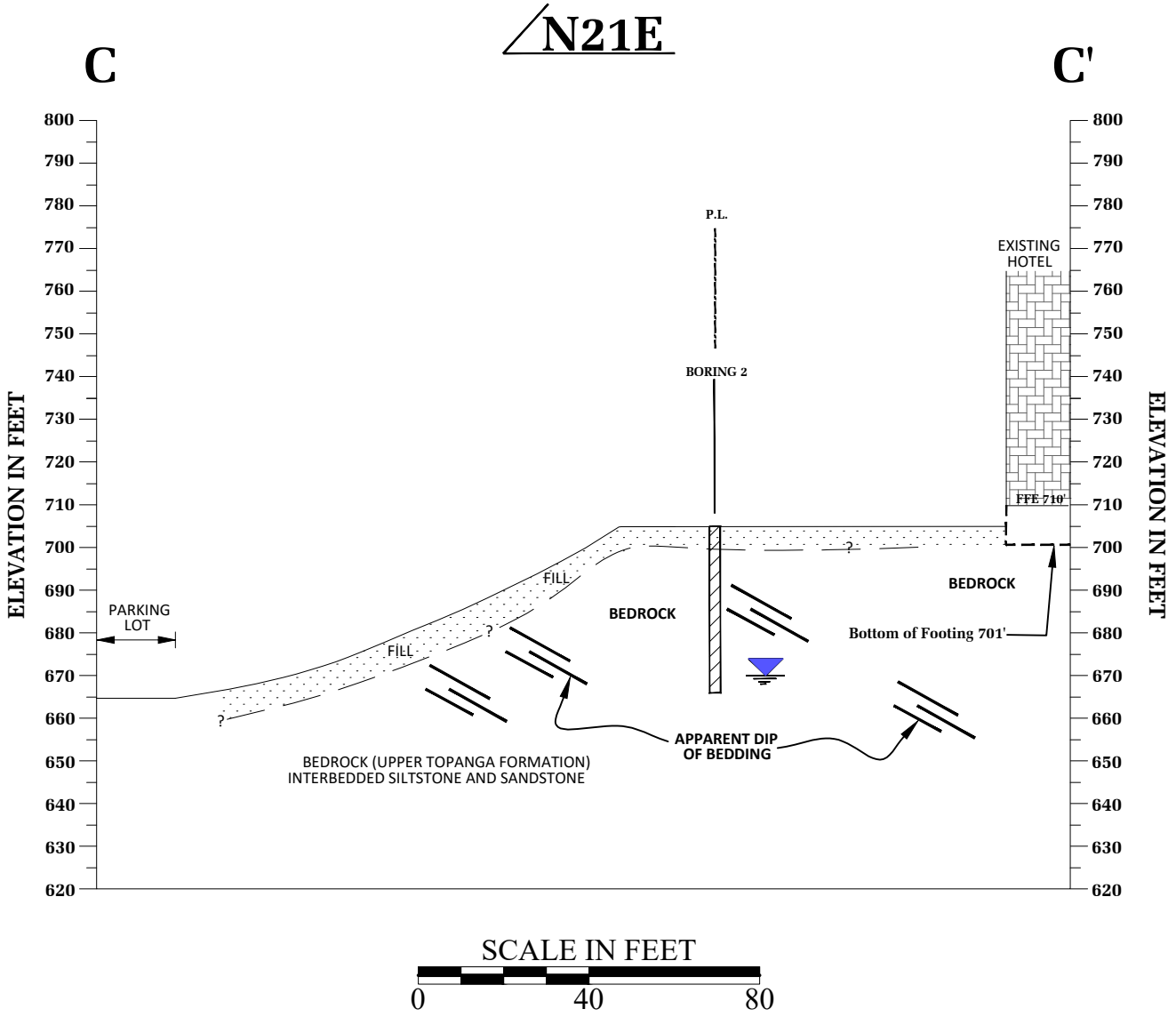
CROSS SECTION B-B'

Geotechnologies, Inc.
Consulting Geotechnical Engineers

HILTON LOS ANGELES, UNIVERSAL CITY
555 UNIVERSAL HOLLYWOOD DR., UNIVERSAL CITY

DRAWN BY:YD | FILE NO. 21578

DATE: SEPTEMBER 2022



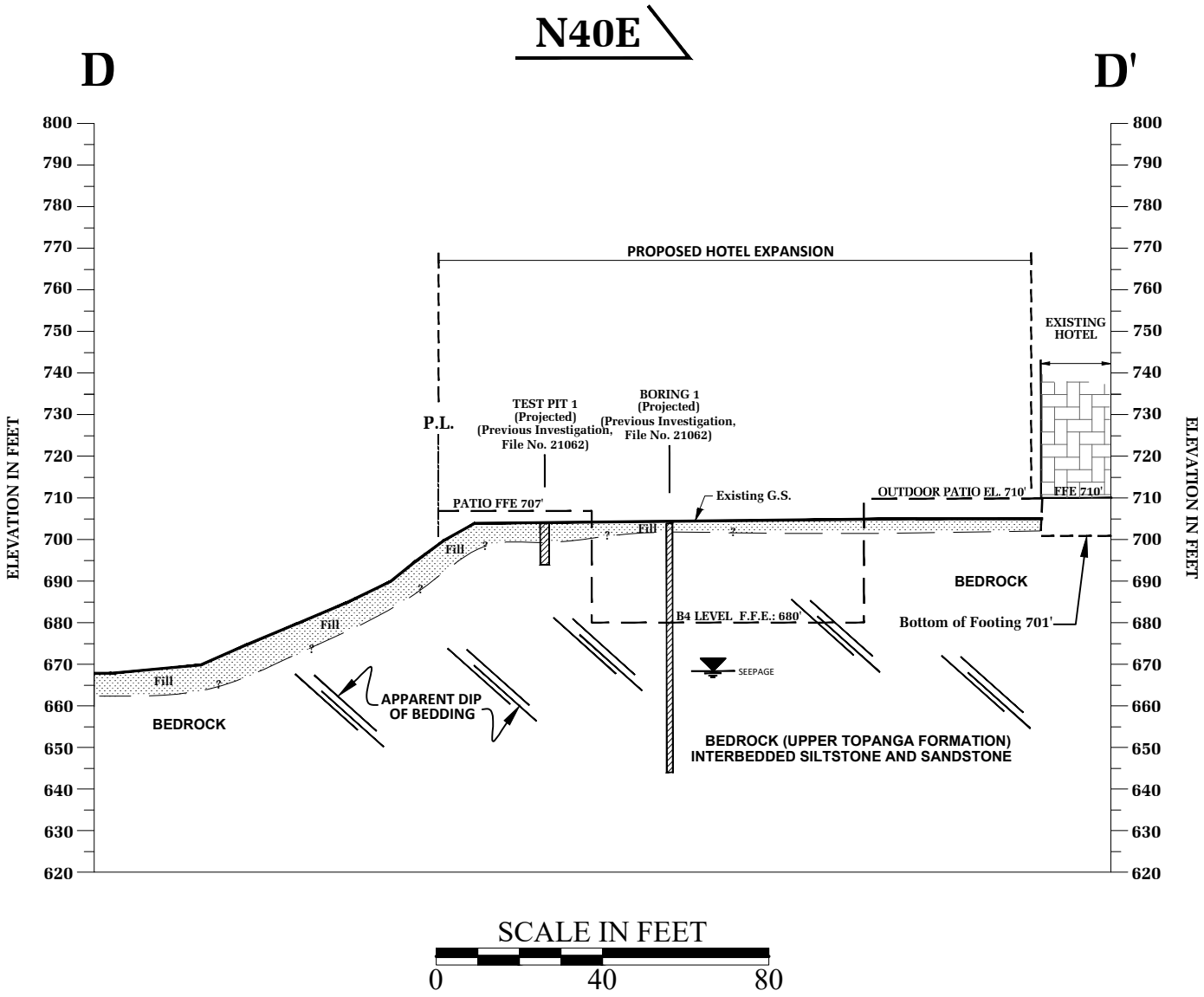
REFERENCE: TOPOGRAPHIC MAP PROVIDED BY ROBERT J. LUNG & ASSOCIATES DATED NOVEMBER 26, 2013

CROSS SECTION C-C'

Geotechnologies, Inc.
Consulting Geotechnical Engineers

HILTON LOS ANGELES, UNIVERSAL CITY
555 UNIVERSAL HOLLYWOOD DR., UNIVERSAL CITY

DRAWN BY:YD	FILE NO. 21578
DATE: SEPTEMBER 2022	



SCALE IN FEET

0 40 80

REFERENCE: TOPOGRAPHIC MAP PROVIDED BY ROBERT J. LUNG & ASSOCIATES DATED NOVEMBER 26, 2013

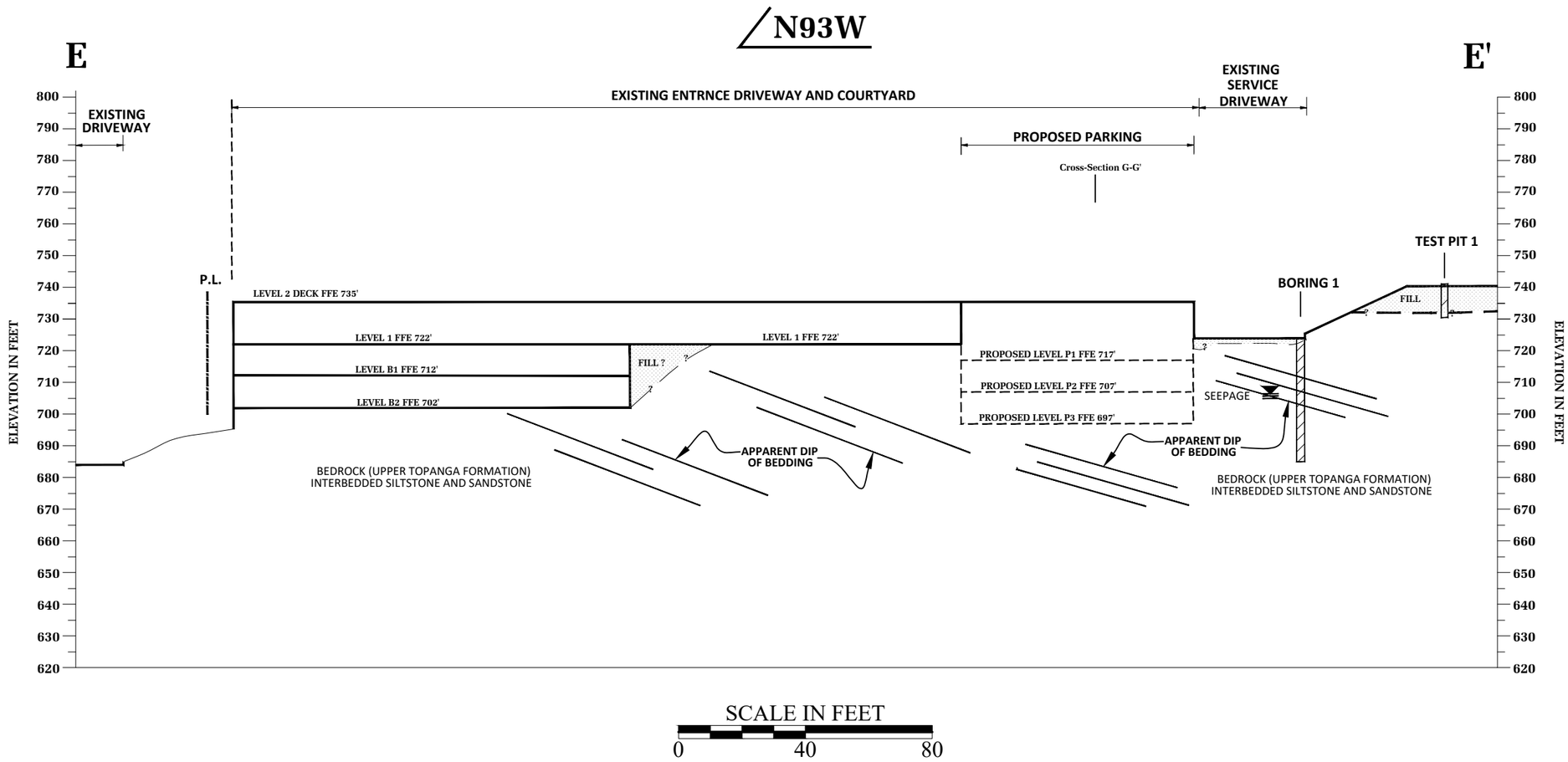
CROSS SECTION D-D'

Geotechnologies, Inc.
Consulting Geotechnical Engineers

HILTON LOS ANGELES, UNIVERSAL CITY
555 UNIVERSAL HOLLYWOOD DR., UNIVERSAL CITY

DRAWN BY:YD | FILE NO. 21578

DATE: SEPTEMBER 2022



SCALE IN FEET

0 40 80

REFERENCE: TOPOGRAPHIC MAP PROVIDED BY ROBERT J. LUNG & ASSOCIATES DATED NOVEMBER 26, 2013

CROSS SECTION E-E'

Geotechnologies, Inc.
Consulting Geotechnical Engineers

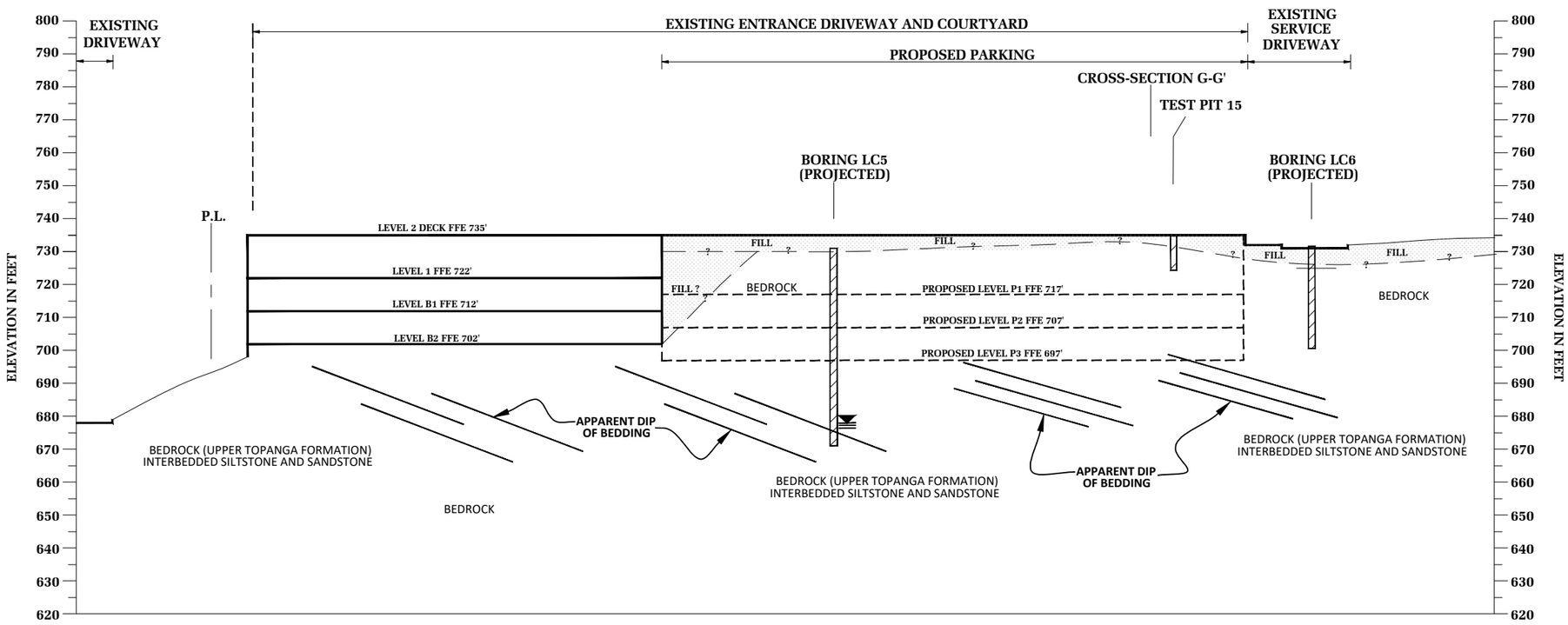
HILTON LOS ANGELES, UNIVERSAL CITY
555 UNIVERSAL HOLLYWOOD DR., UNIVERSAL CITY

DRAWN BY: YD	FILE NO. 21578
DATE: SEPTEMBER 2022	

N94W

F

F'



SCALE IN FEET

0 40 80

REFERENCE: TOPOGRAPHIC MAP PROVIDED BY ROBERT J. LUNG & ASSOCIATES DATED NOVEMBER 26, 2013

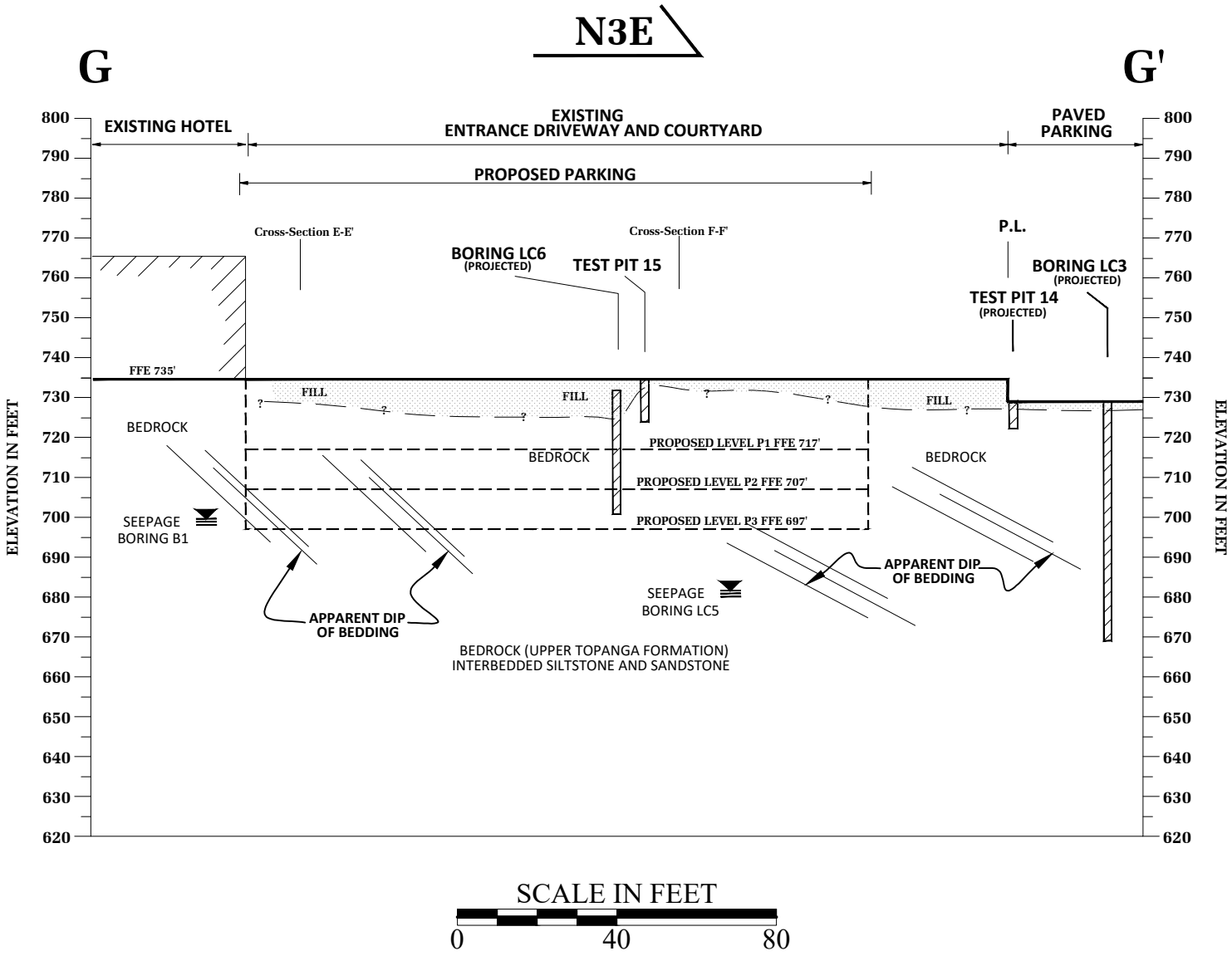
CROSS SECTION F-F'

Geotechnologies, Inc.
Consulting Geotechnical Engineers

HILTON LOS ANGELES, UNIVERSAL CITY
555 UNIVERSAL HOLLYWOOD DR., UNIVERSAL CITY

DRAWN BY: YD | FILE NO. 21578

DATE: SEPTEMBER 2022



SCALE IN FEET

0 40 80

REFERENCE: TOPOGRAPHIC MAP PROVIDED BY ROBERT J. LUNG & ASSOCIATES DATED NOVEMBER 26, 2013

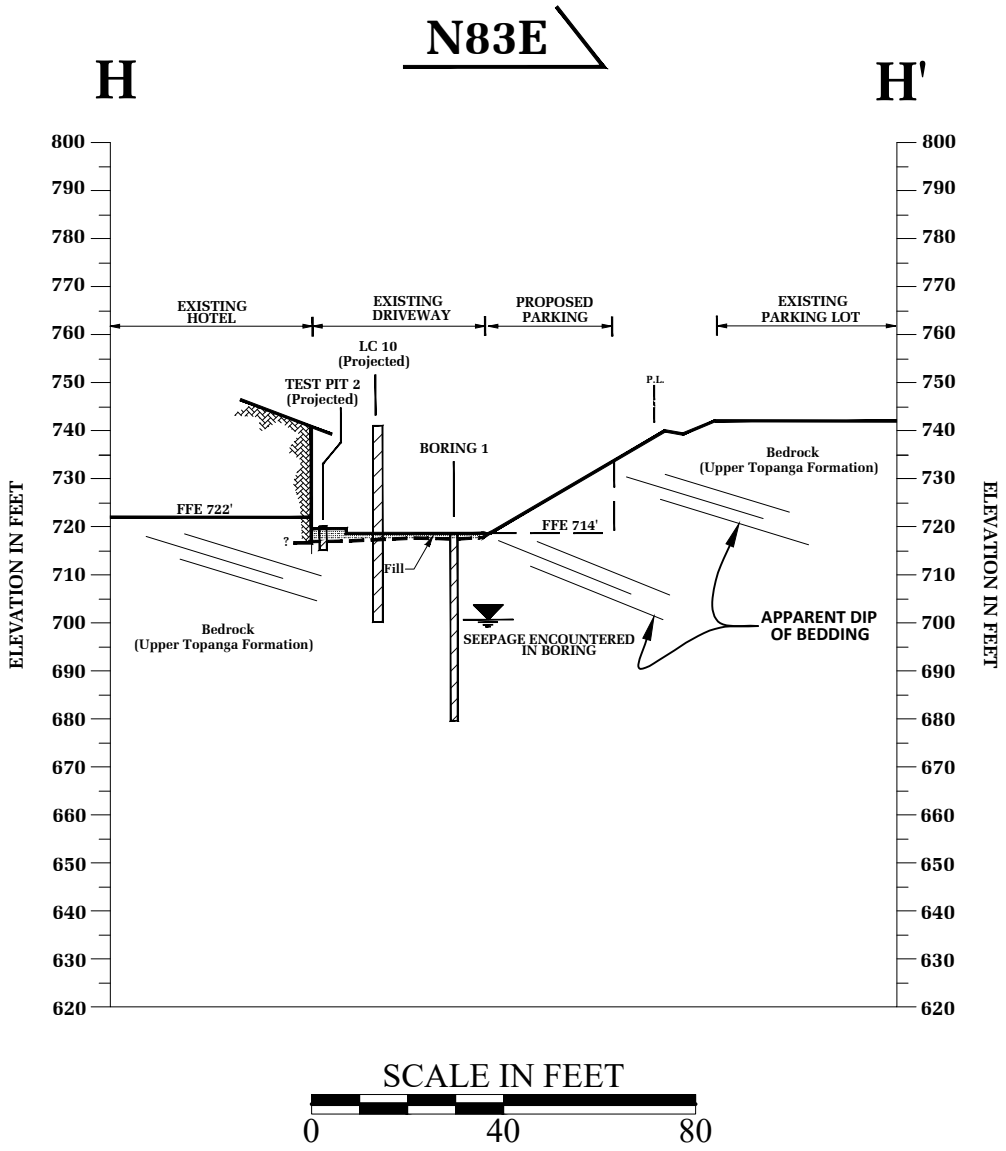
CROSS SECTION G-G'

Geotechnologies, Inc.
Consulting Geotechnical Engineers

HILTON LOS ANGELES, UNIVERSAL CITY
555 UNIVERSAL HOLLYWOOD DR., UNIVERSAL CITY

DRAWN BY:YD | FILE NO. 21578

DATE: SEPTEMBER 2022



SCALE IN FEET

0 40 80

REFERENCE: TOPOGRAPHIC MAP PROVIDED BY ROBERT J. LUNG & ASSOCIATES DATED NOVEMBER 26, 2013

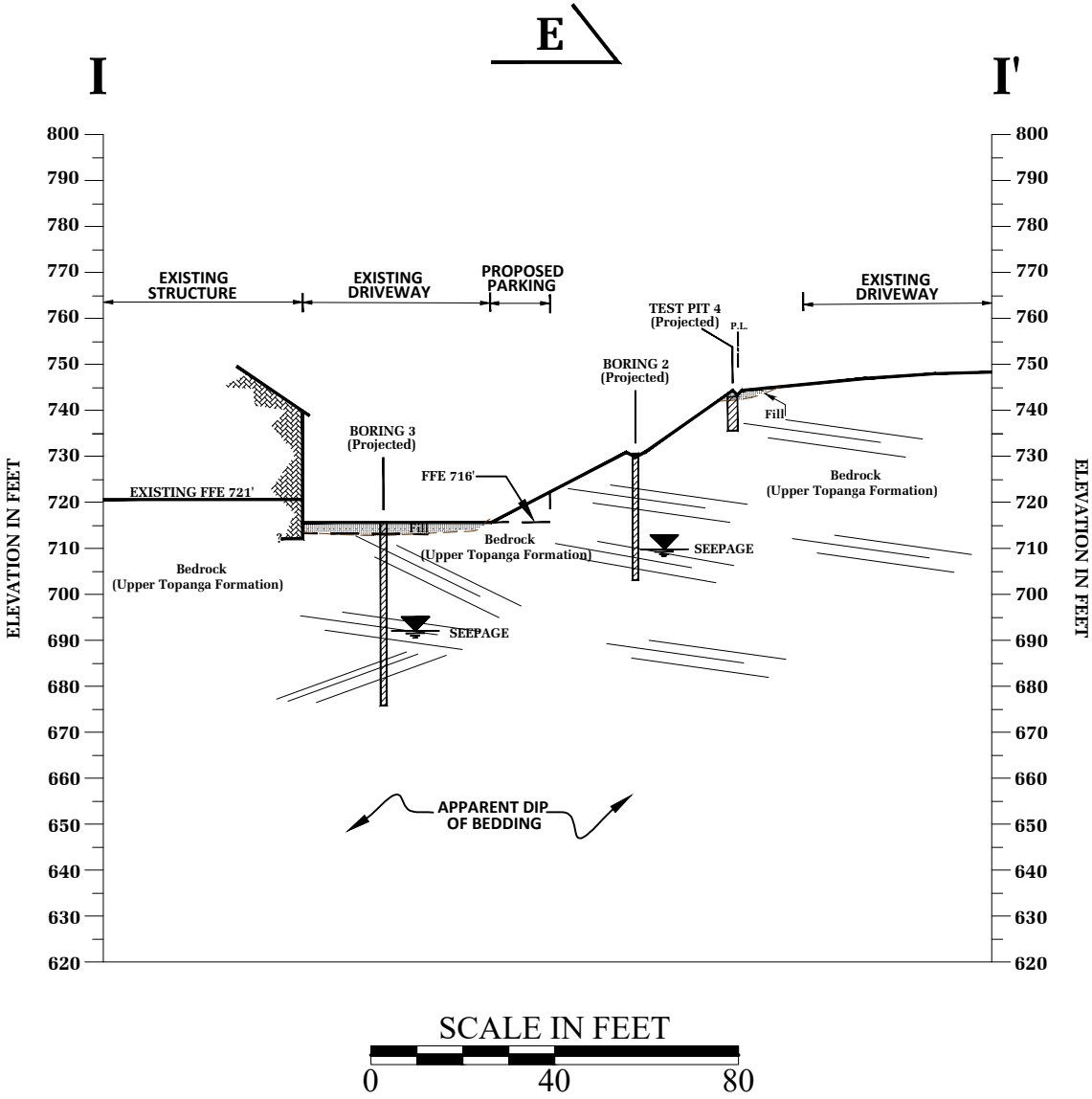
CROSS SECTION H-H'

Geotechnologies, Inc.
Consulting Geotechnical Engineers

HILTON LOS ANGELES, UNIVERSAL CITY
555 UNIVERSAL HOLLYWOOD DR., UNIVERSAL CITY

DRAWN BY:YD | FILE NO. 21578

DATE: SEPTEMBER 2022



SCALE IN FEET

0 40 80

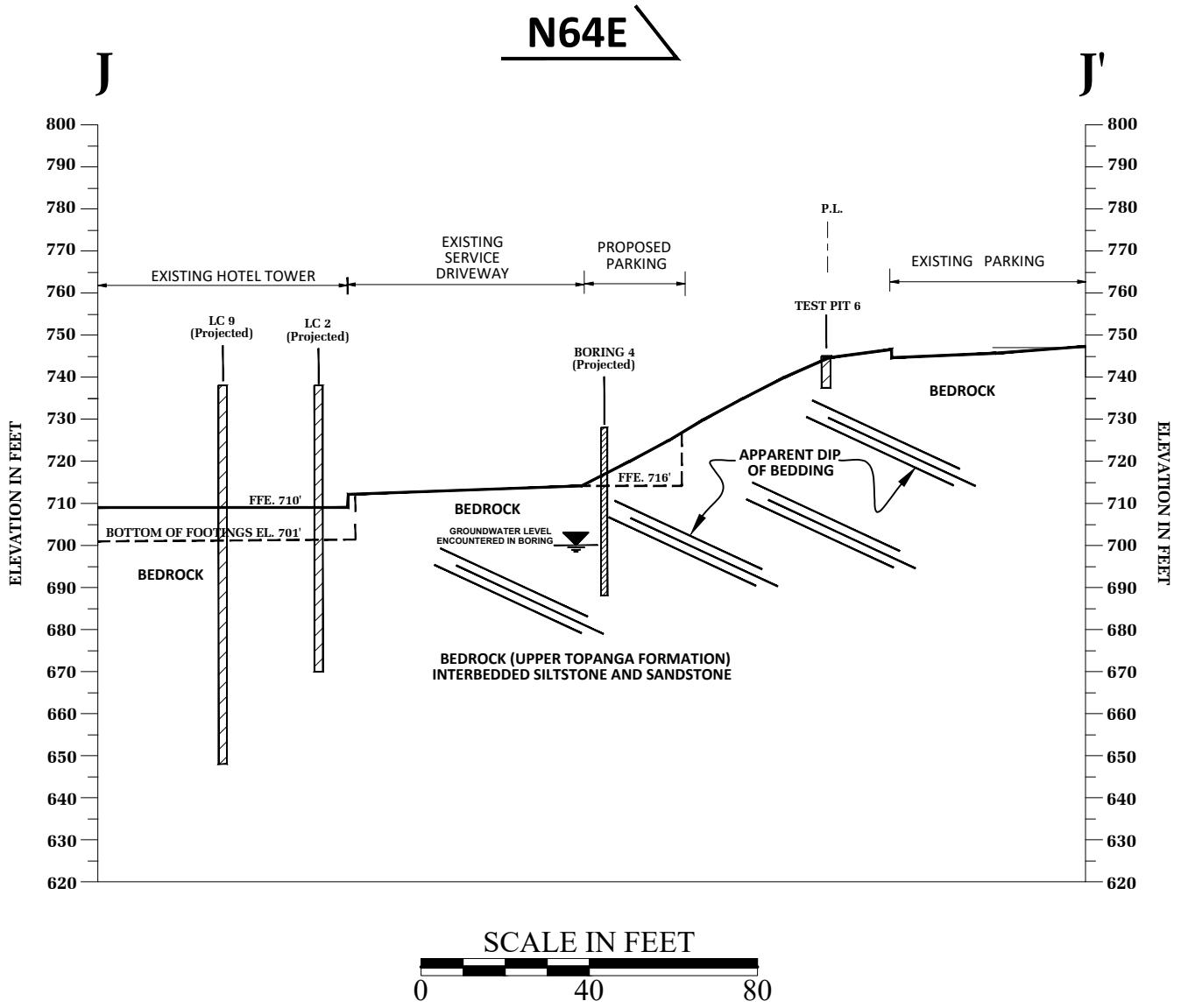
REFERENCE: TOPOGRAPHIC MAP PROVIDED BY ROBERT J. LUNG & ASSOCIATES DATED NOVEMBER 26, 2013

CROSS SECTION I-I'

Geotechnologies, Inc.
Consulting Geotechnical Engineers

HILTON LOS ANGELES, UNIVERSAL CITY
555 UNIVERSAL HOLLYWOOD DR., UNIVERSAL CITY

DRAWN BY:YD	FILE NO. 21578
DATE: SEPTEMBER 2022	



SCALE IN FEET

0 40 80

REFERENCE: TOPOGRAPHIC MAP PROVIDED BY ROBERT J. LUNG & ASSOCIATES DATED NOVEMBER 26, 2013

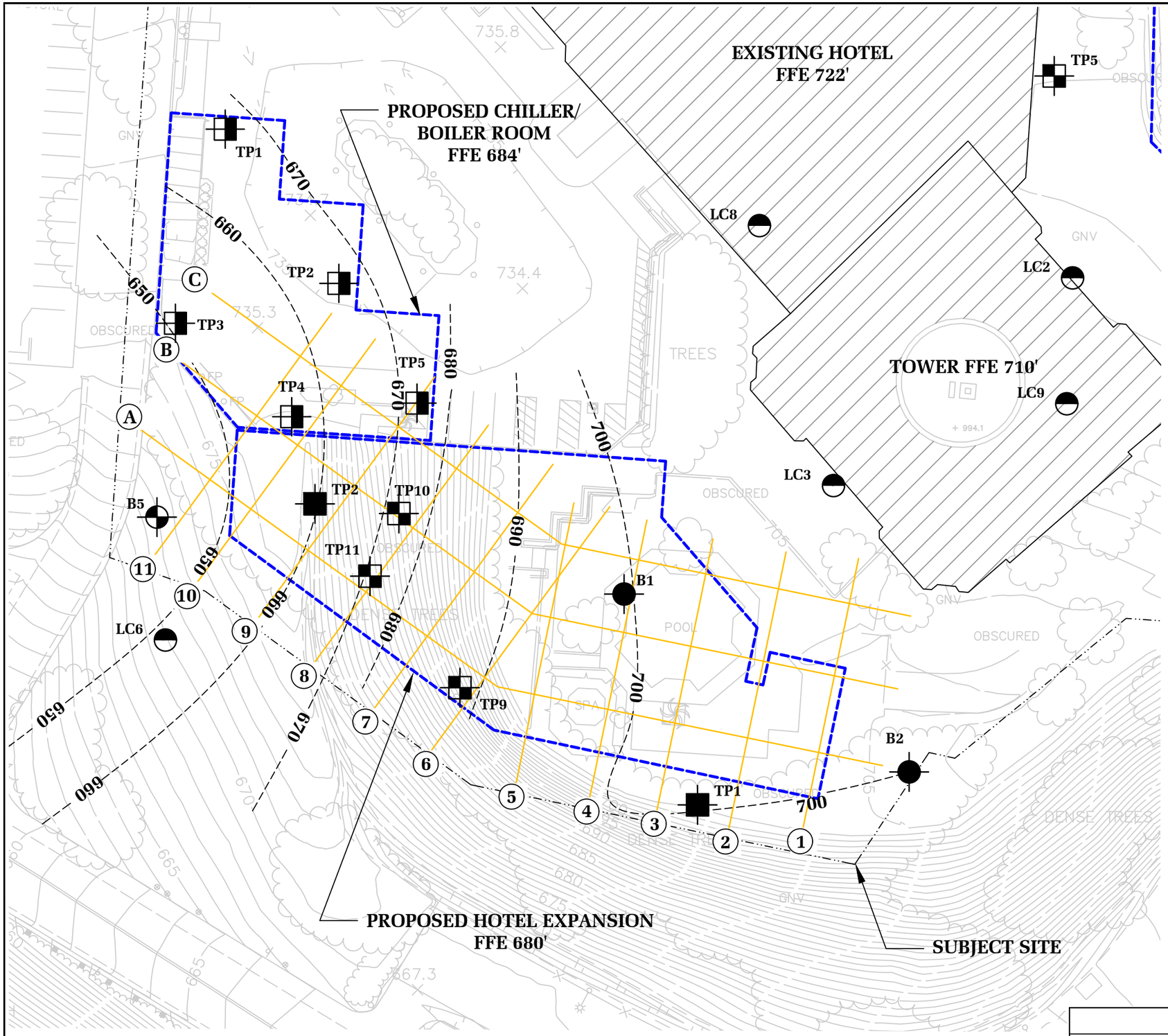
CROSS SECTION J-J'

Geotechnologies, Inc.
Consulting Geotechnical Engineers

HILTON LOS ANGELES, UNIVERSAL CITY
555 UNIVERSAL HOLLYWOOD DR., UNIVERSAL CITY

DRAWN BY:YD | FILE NO. 21578

DATE: SEPTEMBER 2022



LEGEND

- TP5 — LOCATION & NUMBER OF TEST PIT (BY: GEOTECHNOLOGIES, INC. 2022)
- B5 — LOCATION & NUMBER OF BORING (BY: GEOTECHNOLOIGIES, INC. 2020)
- TP5 — LOCATION & NUMBER OF TEST PIT (BY: GEOTECHNOLOGIES, INC. 2020)
- B3 — LOCATION & NUMBER OF BORING (BY: GEOTECHNOLOGIES, INC. 2015)
- TP2 — LOCATION & NUMBER OF TEST PIT (BY: GEOTECHNOLOGIES, INC. 2015)
- LC9 — LOCATION & NUMBER OF BORING (PREVIOUS INVESTIGATION BY LEROY CRANDALL & ASSOCIATES, JOB NO. ADE-81093)

SYMBOLS

- PROPOSED EXPANSION
- 700 — BEDROCK CONTOURS IN FEET
- 11 — BUILDING LINE

N W E S

SCALE IN FEET

0 40 80

Reference: floor plan (outline of proposed hotel buildings) provided by client dated may 30, 2022. Topographic map provided by Robert J. Lung & Associates dated November 26, 2013.

BEDROCK CONTOUR MAP

Geotechnologies, Inc.
Consulting Geotechnical Engineers

Hilton Los Angeles/Universal City
555 Universal Hollywood Dr., Universal City

DRAWN BY: SJM | FILE NO. 21578

DATE: August 2022

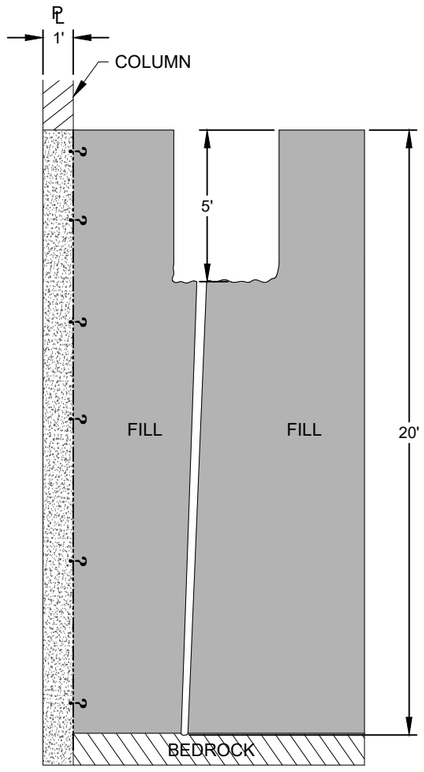
TABLE I - SEISMIC SOURCE SUMMARY TABLE (within 60 miles of site)

Fault Name	Closest Distance* (km)	Site Lies*	Deterministic Magnitude*	Relative Motion*	Activity	Reference
Hollywood	2.27	North	6.7	Strike Slip	A (EFZ)	2
Santa Monica	3.34	Northeast	7.4	Strike Slip	PA	2
Elysian Park	3.85	Northwest	6.7	Reverse	-	1
Verdugo	5.35	Southwest	6.9	Reverse	A	1, 3
Newport-Inglewood	6.65	Northeast	7.5	Strike Slip	A (EFZ)	2
Raymond	7.78	West	6.8	Reverse	A (EFZ)	2
Sierra Madre	9.53	Southwest	7.3	Reverse	A	3
Northridge	12.02	Southeast	6.9	Reverse	A	3
Malibu Coast	12.12	East	7.0	Strike Slip	A (EFZ)	2
San Gabriel	13.29	Southeast	7.3	Strike Slip	A (EFZ)	2
Anacapa-Dume	13.71	East	7.2	Reverse	PA	3
Santa Susana	15.03	Southeast	6.9	Reverse	A	3
Palos Verdes	16.17	North	7.7	Strike Slip	A	2
Puente Hills	20.19	Northwest	7.0	Reverse	-	1
Elsinore	20.25	Northwest	7.8	Strike Slip	A (EFZ)	2
Clamshell-Sawpit	20.75	West	6.7	Reverse	PA	3
Holser	22.24	Southeast	6.8	Reverse	-	1
Simi-Santa Rosa	22.56	Southeast	6.9	Strike Slip	A (EFZ)	2
Oak Ridge	27.60	Southeast	7.4	Reverse	-	1
Oak Ridge (Offshore)	27.60	East	7.0	Reverse	PA	2
San Jose	28.26	Northwest	6.7	Strike Slip	-	1
San Cayetano	31.03	Southeast	7.2	Reverse	A (EFZ)	2
San Andreas	31.84	Southwest	8.2	Strike Slip	A (EFZ)	2
Chino	35.82	West	6.8	Strike Slip	PA	2
Cucamonga	36.05	West	6.7	Reverse	A (EFZ)	2
San Joaquin Hills	38.98	Northwest	7.1	Reverse	-	1
Santa Ynez	43.91	Southeast	7.4	Strike Slip	A	2
San Jacinto	46.67	Northwest	7.9	Reverse	-	1
Ventura-Pitas Point	47.06	East	7.0	Reverse	A (EFZ)	2
Channel Islands Thrust	52.47	East	7.3	Reverse	-	1
Cleghorn	52.55	Southwest	6.8	Strike Slip	-	1
Santa Cruz Island	52.83	East	7.2	Strike Slip	A	2
Garlock	55.87	Southeast	7.6	Strike Slip	A	1
Red Mountain	55.94	Southeast	7.4	Reverse	A	1
Parida-Santa Ana	64.00	Southeast	6.9	Reverse	-	1

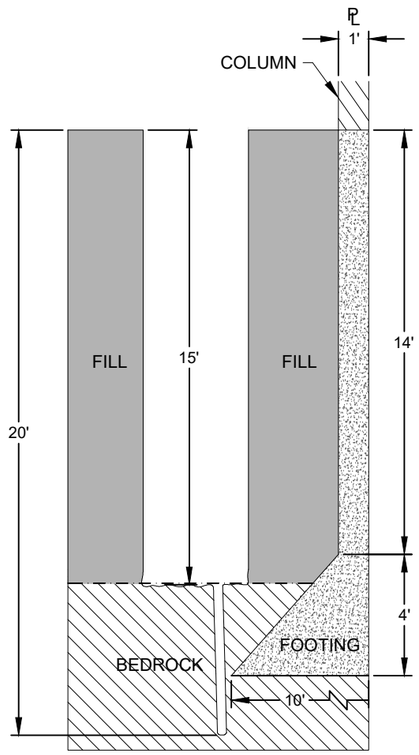
Notes: *Based on USGS 2008 National Seismic Hazard Maps - Source Parameters
http://earthquake.USGS.gov/cfusion/hazfaults_2008_search/query-main.cfm

1 = United States Geological Survey	3 = County of Los Angeles, Dept. of Public Works, 1990	A = Active
2 = California Geological Survey	A (EFZ) = Active (Earthquake Fault Zone)	PA = Potentially Active

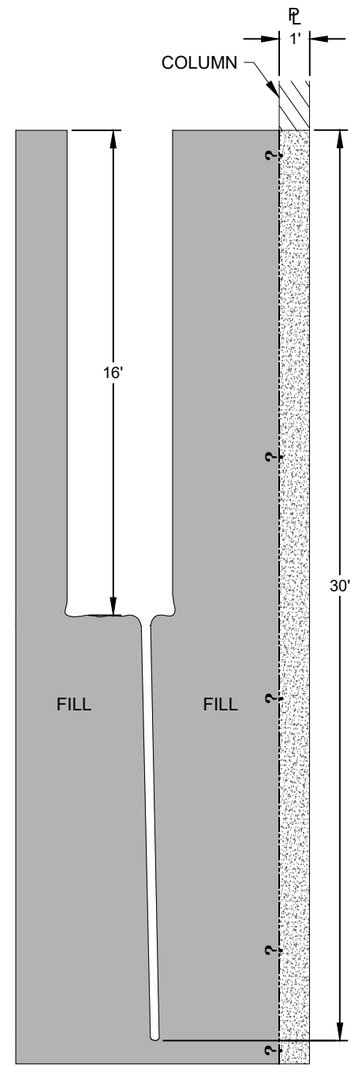
TEST PIT 1



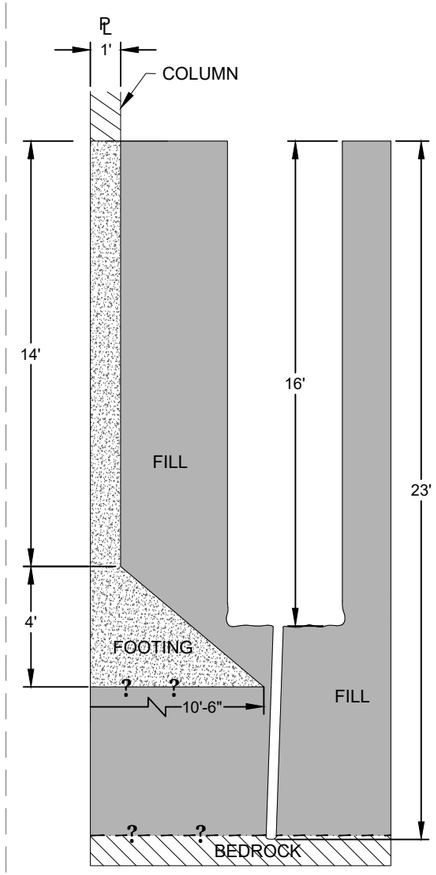
TEST PIT 2



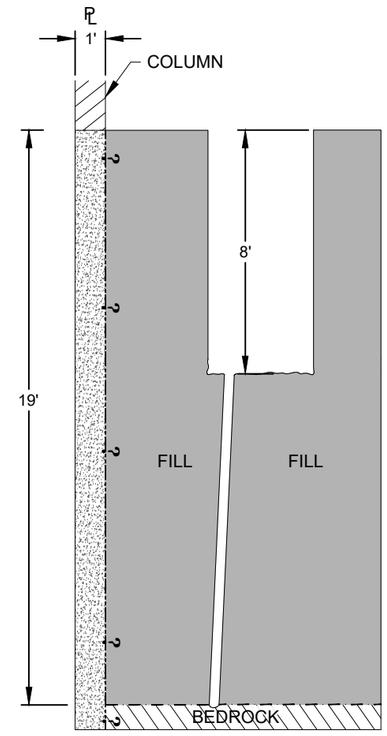
TEST PIT 3



TEST PIT 4



TEST PIT 5



SCALE IN FEET

0 1 5 10

REFERENCE: FIELD MEASUREMENTS OBTAINED BY A REPRESENTATIVE OF GEOTECHNOLOGIES, INC.

TEST PIT PROFILES

Geotechnologies, Inc.
Consulting Geotechnical Engineers

HILTON LOS ANGELES, UNIVERSAL CITY
555 UNIVERSAL HOLLYWOOD DR., UNIVERSAL CITY

DRAWN BY: YD	FILE NO. 21578
DATE: SEPTEMBER 2022	

LOG OF TEST PIT NUMBER 1

Hilton Los Angeles / Universal City **Drilling Date: 08/05/22** **Elevation: 696'***

File No. 21578 **Method: Hand Dig and Auger**

km

*Reference: Topographic Map by Robert Lung & Associates, dated 11/26/2013

Sample Depth ft.	Moisture Content %	Dry Density p.c.f.	Depth in feet	USCS Class.	Description Surface Conditions: Bare Ground
			0 --		FILL: Silty Sand, yellowish brown and pale brown, slightly moist,
			-		medium dense, fine grained, gravel to 1" (Sandstone)
1	4.7	94.0	1 --		
			-		
			2 --		
			-		
			3 --		
			-		
			4 --		
			-		
5	8.5	91.8	5 --		
			-		
			6 --		
			-		
7	6.4	114.6	7 --		
			-		mottled light gray and pale brown, gravel to ½" (Sandstone)
			8 --		
			-		
			9 --		
			-		
10	9.5	106.1	10 --		
			-		
			11 --		
			-		
			12 --		
			-		
13	6.3	107.7	13 --		
			-		
			14 --		
			-		
15	7.9	107.3	15 --		
			-		Silty Sand to Sandy Silt, yellowish brown and pale brown, medium dense,
			16 --		fine grained, gravel to ½" (Sandstone)
			-		
17	9.4	107.9	17 --		
			-		gravel to 1" (Sandstone)
			18 --		
			-		
			19 --		BEDROCK (UPPER TOPANGA FORMATION): Siltstone, greenish gray,
			-		moist, moderately hard, bedding not discernable
20	18.2	95.1	20 --		
			-		Total Depth 20 feet
			21 --		No Water
			-		Fill to 19½ feet
			22 --		
			-		
			23 --		NOTE: The stratification lines represent the approximate
			-		boundary between earth types; the transition may be gradual.
			24 --		
			-		Used hand tools to 5 foot depth. Deepened with 4-inch diameter
			25 --		Hand-Augering Equipment to 20 feet.
			-		Sampled with hand sampler.

LOG OF TEST PIT NUMBER 2

Hilton Los Angeles / Universal City **Drilling Date: 08/03/22** **Elevation: 677'***

File No. 21578 **Method: Hand Dig and Auger**

km

*Reference: Topographic Map by Robert Lung & Associates, dated 11/26/2013

Sample Depth ft.	Moisture Content %	Dry Density p.c.f.	Depth in feet	USCS Class.	Description Surface Conditions: Bare Ground
			0 --		FILL: Silty Sand, mottled yellowish brown and pale yellow, slightly moist, medium dense, fine grained, gravel to ½" (Sandstone)
			1 --		
2	7.7	102.5	2 --		
			3 --		
4	8.5	99.2	4 --		
			5 --		
			6 --		
7	9.1	106.7	7 --		
			8 --		
			9 --		
10	13.1	104.2	10 --		mottled light yellowish brown and olive brown
			11 --		
			12 --		
			13 --		
			14 --		
15	16.9	106.9	15 --		BEDROCK (UPPER TOPANGA FORMATION): Interbedded Siltstone and Sandstone, yellowish brown and olive brown, moist, moderately hard, caliche streaks, well bedded
			16 --		
			17 --		Bedding @ 16' [N90E/35N]
18	15.2	110.3	18 --		mottled yellowish brown and gray
			19 --		gray and yellowish brown
20	15.8	100.8	20 --		Total Depth 20 feet No Water Fill to 15 feet
			21 --		
			22 --		
			23 --		NOTE: The stratification lines represent the approximate boundary between earth types; the transition may be gradual.
			24 --		
			25 --		Used hand tools to 15 foot depth. Deepened with 4-inch diameter Hand-Augering Equipment to 20 feet. Sampled with hand sampler

LOG OF TEST PIT NUMBER 3

Hilton Los Angeles / Universal City **Drilling Date: 08/03/22** **Elevation: 698'***

File No. 21578 **Method: Hand Dig and Auger**

km

*Reference: Topographic Map by Robert Lung & Associates, dated 11/26/2013

Sample Depth ft.	Moisture Content %	Dry Density p.c.f.	Depth in feet	USCS Class.	Description Surface Conditions: Bare Ground
			0 --		FILL: Silty Sand, mottled pale brown and yellowish brown, slightly moist, medium dense, fine grained, gravel to 1" (Siltstone and Sandstone)
1	13.8	101.6	1 --		
			2 --		
3	11.9	102.2	3 --		mottled yellow and yellowish brown
			4 --		
5	12.4	113.7	5 --		
			6 --		
7	13.5	109.0	7 --		
			8 --		
			9 --		
10	11.4	101.6	10 --		
			11 --		
			12 --		
			13 --		
			14 --		
15	12.0	107.0	15 --		
			16 --		
			17 --		
			18 --		mottled olive yellow and yellowish brown, moist, gravel to 2" (Sandstone)
			19 --		
20	13.5	98.8	20 --		
			21 --		
			22 --		
			23 --		
			24 --		
25	10.9	100.3	25 --		

LOG OF TEST PIT NUMBER 3

Hilton Los Angeles / Universal City

File No. 21578

km

Sample Depth ft.	Moisture content %	Dry Density p.c.f.	Depth in feet	USCS Class.	Description
			- 26 -- - 27 -- - 28 -- - 29 -- -		Silty Sand, mottled olive yellow and yellowish brown, moist, gravel to 2" (Sandstone)
30	19.5	100.5	30 -- - 31 -- - 32 -- - 33 -- - 34 -- - 35 -- - 36 -- - 37 -- - 38 -- - 39 -- - 40 -- - 41 -- - 42 -- - 43 -- - 44 -- - 45 -- - 46 -- - 47 -- - 48 -- - 49 -- - 50 -- -		Total Depth 30 feet No Water Fill to 30 feet NOTE: The stratification lines represent the approximate boundary between earth types; the transition may be gradual. Used hand tools to 16 foot depth. Depended with 4-inch diameter Hand-Augering Equipment to 30 feet. Sampled with hand sampler.

LOG OF TEST PIT NUMBER 4

Hilton Los Angeles / Universal City **Drilling Date: 08/03/22** **Elevation: 681'***

File No. 21578 **Method: Hand Dig and Auger**

km

*Reference: Topographic Map by Robert Lung & Associates, dated 11/26/2013

Sample Depth ft.	Moisture Content %	Dry Density p.c.f.	Depth in feet	USCS Class.	Description Surface Conditions: Bare Ground
			0 --		FILL: Silty Sand, yellowish brown, moist, medium dense, fine grained, gravel to ½" (Sandstone)
			1 --		
2	10.3	95.2	2 --		
			3 --		
4	15.0	102.5	4 --		
			5 --		
			6 --		
7	9.8	110.6	7 --		Silty Sand, yellowish brown, moist, medium dense, fine grained, gravel to 2" (Sandstone)
			8 --		
			9 --		
10	14.7	104.4	10 --		Silty Sand, mottled yellowish brown and gray, gravel to 1" (Sandstone)
			11 --		
			12 --		
			13 --		
			14 --		
15	17.9	105.6	15 --		NOTE: The stratification lines represent the approximate boundary between earth types; the transition may be gradual. Used hand tools to 16 foot depth. Deepened with 4-inch diameter Hand-Augering Equipment to 23 feet Sampled with hand sampler.
			16 --		
			17 --		
			18 --		
			19 --		
20	16.6	114.7	20 --		mottled olive brown and yellowish brown, root to ½" diameter
			21 --		
			22 --		
23	16.0	116.2	23 --		BEDROCK (UPPER TOPANGA FORMATION): Siltstone, reddish and yellowish brown, moist, moderately hard, very weathered, poorly bedded
			24 --		Total Depth 24 feet No Water Fill to 23 feet
			25 --		

LOG OF TEST PIT NUMBER 5

Hilton Los Angeles / Universal City **Drilling Date: 08/05/22** **Elevation: 696'***

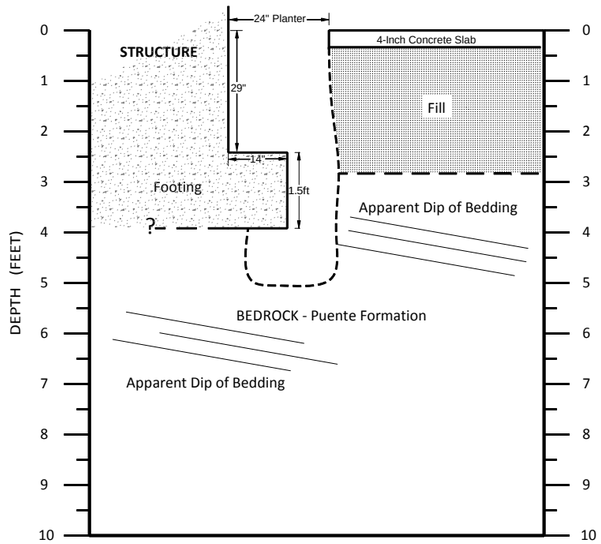
File No. 21578 **Method: Hand Dig and Auger**

km

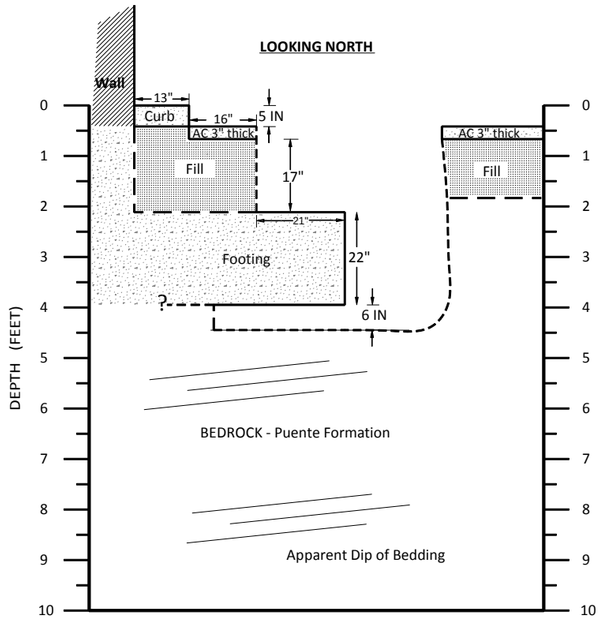
*Reference: Topographic Map by Robert Lung & Associates, dated 11/26/2013

Sample Depth ft.	Moisture Content %	Dry Density p.c.f.	Depth in feet	USCS Class.	Description Surface Conditions: Bare Ground
			0 --		FILL: Silty Sand, mottled pale yellow to yellowish brown, slightly moist, medium dense, fine grained, gravel to 1" (Sandstone)
1	4.6	96.9	1 --		
			2 --		
3	6.3	96.4	3 --		
			4 --		
5	7.6	96.3	5 --		
			6 --		
7	8.1	105.1	7 --		
			8 --		
			9 --		
10	9.2	90.9	10 --		
			11 --		
			12 --		
			13 --		
			14 --		
15	10.0	104.8	15 --		
			16 --		
17	13.0	97.4	17 --		
18	17.8	Disturbed	18 --		
19	8.6	Disturbed	19 --		BEDROCK (UPPER TOPANGA FORMATION): Interbedded Siltstone and Sandstone, yellowish brown and grayish brown, moist, moderately hard, well bedded
			20 --		
			21 --		Total Depth 20 feet No Water Fill to 19 feet
			22 --		
			23 --		
			24 --		NOTE: The stratification lines represent the approximate boundary between earth types; the transition may be gradual.
			25 --		Used hand tools to 8 foot depth. Deepened with 4-inch diameter Hand-Augering Equipment to 20 feet. Sampled with hand sampler.

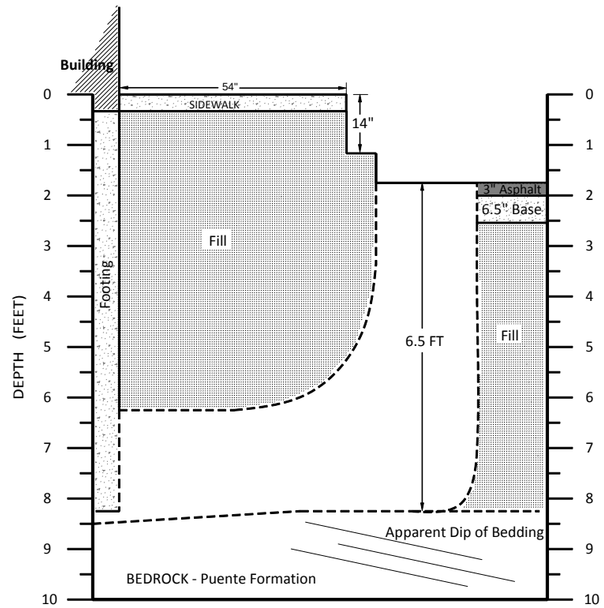
TEST PIT 2



TEST PIT 3



TEST PIT 5



SCALE IN FEET

0 3 6

TEST PIT PROFILES

Geotechnologies, Inc.
Consulting Geotechnical Engineers

HILTON LOS ANGELES, UNIVERSAL CITY
555 UNIVERSAL HOLLYWOOD DR., UNIVERSAL CITY

FILE No. 21578 | **DRAWN BY: TC**

DATE: October 2018

BORING LOG NUMBER 1

Hilton Los Angeles / Universal City **Date: 03/29/18** **Elevation: 718.5'***

File No. 21578 **Method: 24-inch diameter Bucket Auger**

ae/km/nk

*Reference: Topographic Map by Robert J. Lung and Associates, dated 11/20/18

Sample Depth ft.	Blows per ft.	Moisture content %	Dry Density p.c.f.	Depth in feet	USCS Class.	Description Surface Conditions: Asphalt Driveway
				0 --		4-inch Asphalt over 3-inch Base
				-		
				1 --		FILL: Silty Sand, dark yellowish brown, moist, medium dense, fine grained
				-		
				2 --		
				-		BEDROCK (UPPER TOPANGA FORMATION): Sandstone, dark yellowish brown, moist, medium hard to hard
				3 --		
				-		@ 3' Bedding [N80W, 57NE]
				4 --		
				-		
5	10/4"	LOST SAMPLE		5 --		
				-		
				6 --		
				-		
				7 --		
				-		
				8 --		@ 8' Bedding [N75W, 53NE]
				-		
				9 --		
				-		
10	8/6" 4/6"	11.2	116.7	10 --		
				-		
				11 --		
				-		
				12 --		
				-		
				13 --		@ 13' Bedding [N70W, 45NE]
				-		
				14 --		
				-		
15	11/6"	11.5	115.5	15 --		
				-		
				16 --		
				-		
				17 --		
				-		
				18 --		@ 18' Bedding [N65W, 44NE]
				-		
				19 --		@ 19' water seeping from vertical fracture in rock
				-		
20	5/6" 8/6"	10.9	126.3	20 --		
				-		
				21 --		@ 21' Bedding [N75W, 42NE]
				-		
				22 --		
				-		
				23 --		
				-		
				24 --		
				-		
25	5/6" 4/6"	16.2	114.6	25 --		Interbedded Sandstone and Siltstone, dark gray, moist, moderately hard to hard
				-		@ 25' Bedding [N65W, 45NE]

BORING LOG NUMBER 1

Hilton Los Angeles / Universal City

File No. 21578

ae/km/nk

Sample Depth ft.	Blows per ft.	Moisture content %	Dry Density p.c.f.	Depth in feet	USCS Class.	Description
				26 --		
				27 --		
				28 --		
				29 --		
30	5/6" 10/3"	14.2	114.8	30 --		
				31 --		dark gray and gray, very moist, medium hard to hard, wet
				32 --		@ 31' Bedding [N60W, 45NE]
				33 --		
				34 --		
35	18/6"	17.1	108.0	35 --		
				36 --		Sandstone, gray, wet, hard
				37 --		
				38 --		very hard layer, required coring
				39 --		
				40 --		Total Depth 39 feet due to refusal Water seepage at 19 feet Water at 31½ feet at start of logging
				41 --		Fill to 1 foot
				42 --		
				43 --		NOTE: The stratification lines represent the approximate boundary between earth types; the transition may be gradual.
				44 --		Used 24-inch diameter Bucket Auger
				45 --		Kelley Weights: 0' - 26' 3390lbs. 26' - 52' 2230lbs.
				46 --		Downhole logged by geologist
				47 --		
				48 --		
				49 --		
				50 --		

BORING LOG NUMBER 2

Hilton Los Angeles / Universal City **Date: 03/26/18** **Elevation: 731'***

File No. 21578 **Method: 24-inch diameter Bucket Auger, Limited Access**

ae/nk/km

*Reference: Topographic Map by Robert J. Lung and associates, dated 11/20/18

Sample Depth ft.	Blows per ft.	Moisture content %	Dry Density p.c.f.	Depth in feet	USCS Class.	Description Surface Conditions: Concrete Swale
				0 --		2-inch Concrete, No Base
				-		
				1 --		FILL: Silty Sand, yellowish brown, moist, medium dense, fine grained, gravel to ¼", roots to ⅛"
				-		
				2 --		
				-		BEDROCK (UPPER TOPANGA FORMATION): Sandstone, mottled reddish brown and yellowish brown, moist, medium hard to hard
				3 --		
				-		
				4 --		@ 4' Bedding [N83W, 50NE]
				-		
5	10/4"	6.8	97.7	5 --		
				-		Interbedded Siltstone and fine grained Sandstone, poorly bedded
				6 --		
				-		Siltstone, gray and light gray, Sandstone, yellowish brown
				7 --		@ 7' Bedding [N81W, 48NE]
				-		
				8 --		Sandstone, medium grained
				-		
				9 --		
				-		
10	15/3"	7.1	86.9	10 --		
				-		fine to medium grained, light reddish brown, Siltstone,
				11 --		rip-up-clasts to 2" (light brown), Sandstone coarsens with depth
				-		
				12 --		
				-		
				13 --		
				-		
				14 --		
				-		
				15 --		
				-		
				16 --		
				-		
				17 --		
				-		
				18 --		
				-		
				19 --		@ 19' Bedding [N71W, 28NE], clayey Siltstone clast to 6"
				-		
20	23/6"	11.5	109.4	20 --		
				-		Sandstone, dark yellowish brown, moist, hard
				21 --		
				-		@ 21½' seepage
				22 --		
				-		
				23 --		
				-		
				24 --		
				-		
				25 --		
				-		pyroclastic rock, dark gray, slightly moist, very hard

BORING LOG NUMBER 2

Hilton Los Angeles / Universal City

File No. 21578

ae/nk/km

Sample Depth ft.	Blows per ft.	Moisture content %	Dry Density p.c.f.	Depth in feet	USCS Class.	Description
				- 26 -- - 27 -- - 28 -- - 29 -- - 30 -- - 31 -- - 32 -- - 33 -- - 34 -- - 35 -- - 36 -- - 37 -- - 38 -- - 39 -- - 40 -- - 41 -- - 42 -- - 43 -- - 44 -- - 45 -- - 46 -- - 47 -- - 48 -- - 49 -- - 50 -- -		**Total Depth 27 feet due to refusal** **No Caving** **Water seepage at 21½ feet** **Water at 24 feet at completion of logging** **Fill to 8 inches** **NOTE: The stratification lines represent the approximate boundary between earth types; the transition may be gradual.** **Used 24-inch diameter Bucket Auger** **Kelley Weights: 0-8 feet 1315 lbs., 8-15½ feet 1095 lbs., 15½-23 feet 897 lbs., 23-31½ feet 722 lbs., 30½-38 570 lbs.** **0' - 8' 1315lbs.** **8' - 15½' 1095lbs.** **15½' - 23' 897lbs.** **23' - 31½' 722lbs.** **31½' - 38' 570lbs.** **Downhole logged by geologist**

BORING LOG NUMBER 3

Hilton Los Angeles / Universal City **Date: 03/30/18** **Elevation: 716.5'***

File No. 21578 **Method: 24-inch diameter Bucket Auger**

ae\nk\km

*Reference: Topographic Map by Robert J. Lung and associates, dated 11/20/18

Sample Depth ft.	Blows per ft.	Moisture content %	Dry Density p.c.f.	Depth in feet	USCS Class.	Description Surface Conditions: Asphalt Driveway
				0 --		3-inch Asphalt over 4-inch Base
				-		
				1 --		FILL: Silty Sand to Sandy silt, dark yellowish brown, moist, medium dense, fine grained, stiff
				-		
				2 --		
				-		@ 3' Bedding [N83E, 54NW], well bedded fissile
				3 --		
				-		BEDROCK (UPPER TOPANGA FORMATION): Interbedded Sandstone and Siltstone, dark gray, moist, medium hard
				4 --		
				-		@ 4' Fracture [N11E, 90]
5	5/10"	18.6	105.6	5 --		
				-		gray and reddish brown
				6 --		@ 6' Fracture with polished shears, 1/16" thick, clay film on fracture
				-		
				7 --		
				-		dark gray and light gray
				8 --		
				-		@ 8½' Bedding [N74W, 62NE], polished surface no clay
				9 --		
				-		
10	3/6" 4/4"	14.2	111.1	10 --		
				-		
				11 --		
				-		
				12 --		@ 12' Bedding [N70W, 52NE]
				-		
				13 --		
				-		Sandstone, cemented, hard to very hard
				14 --		@ 14' Fracture [N68E, 90] cemented zone along fracture, 2" wide
				-		
15	3/6" 3/3"	6.0	127.3	15 --		@ 15' 4"-thick Sandstone bed offset 10' East side up
				-		@ 15' Bedding [N76W, 52NE]
				16 --		
				-		
				17 --		
				-		
				18 --		@ 18' Fracture [N76E, 90]
				-		
				19 --		
				-		
20	3/6" 4/6"	15.3	120.3	20 --		
				-		
				21 --		
				-		
				22 --		
				-		
				23 --		
				-		@ 24' Seepage from Fracture, Bedding [N82W, 42NE]
				24 --		
				-		Interbedded Sandstone with Siltstone, dark gray to gray, poorly fissile
25	3/6" 4/6"	140.0	116.5	25 --		@ 25' Fracture [N58E, 90], 1" thick crushed zone with polished surface, Bedding [N80E, 50NW]
				-		

BORING LOG NUMBER 3

Hilton Los Angeles / Universal City

File No. 21578

ae\nk\km

Sample Depth ft.	Blows per ft.	Moisture content %	Dry Density p.c.f.	Depth in feet	USCS Class.	Description
				- 26 -- - 27 -- - 28 -- - 29 -- -		
30	16/9"	12.0	115.9	30 -- - 31 -- - 32 -- - 33 -- - 34 -- -		@ 31' Bedding [N76E, 54NW]
35	13/6" 9/3"	16.1	112.2	35 -- - 36 -- - 37 -- - 38 -- - 39 -- -		
40	??	13.7	Disturbed	40 -- - 41 -- - 42 -- - 43 -- - 44 -- - 45 -- - 46 -- - 47 -- - 48 -- - 49 -- - 50 -- -		Total Depth 40 feet Seepage at 24 feet Standing Water at 34 feet at completion of logging No Caving Fill to 3 feet NOTE: The stratification lines represent the approximate boundary between earth types; the transition may be gradual. Used 24-inch diameter Bucket Auger Kelley Weights: 0' - 26' 3390lbs. 26' - 52' 2230lbs. Downhole logged by geologist

BORING LOG NUMBER 4

Hilton Los Angeles / Universal City **Date: 03/27/18** **Elevation: 728'***

File No. 21578 **Method: 24-inch diameter Bucket Auger, Limited Access**

ae/km

*Reference: Topographic Map by Robert J. Lung and associates, dated 11/20/18

Sample Depth ft.	Blows per ft.	Moisture content %	Dry Density p.c.f.	Depth in feet	USCS Class.	Description Surface Conditions: Concrete V-Ditch
				0 --		3-inch Concrete, No Base
				1 --		FILL: Silty Sand, dark yellowish brown, moist, medium dense, fine grained
				2 --		
				3 --		
				4 --		BEDROCK (UPPER TOPANGA FORMATION): Interbedded Siltstone and Sandstone, dark yellowish brown, well bedded, moist, moderately hard
5	12/8"	18.2	106.3	5 --		@ 3' Bedding [N70W, 41NE]
				6 --		@ 6' Bedding [N75W, 41NE]
				7 --		
				8 --		cement layer, hard
				9 --		
10	15/8"	11.9	98.2	10 --		Siltstone, dark gray, moist, hard, well bedded
				11 --		
				12 --		@ 12' Bedding [N80W, 43NE]
				13 --		
				14 --		
				15 --		@ 15' Bedding [N80W, 43NE]
				16 --		Sandstone with Siltstone interbedded, moderately hard
				17 --		@ 17' Bedding [N75W, 42NE]
				18 --		
				19 --		
20	20/8"	14.9	111.4	20 --		Sandstone, moist, hard
				21 --		
				22 --		
				23 --		@ 23' Bedding [N85W, 42N]
				24 --		
				25 --		@ 25' Seepage

BORING LOG NUMBER 4

Hilton Los Angeles / Universal City

File No. 21578

ae/km

Sample Depth ft.	Blows per ft.	Moisture content %	Dry Density p.c.f.	Depth in feet	USCS Class.	Description
				26 --		
				27 --		
				28 --		@ 28' Bedding [N85W, 45NE]
				29 --		
						@ 30' Bedding [N87W, 43NE]
30	25/6"	12.8	98.5	30 --		Siltstone interbedded with Sandstone, gray to dark gray, moist, hard
				31 --		
				32 --		
				33 --		
				34 --		
				35 --		
				36 --		@36' Bedding [N82W, 48NE]
				37 --		
				38 --		
				39 --		
40	35/10"	9.0	116.3	40 --		Total Depth 40 feet Seepage at 25 feet Water at 28 feet at completion of logging No Caving Fill to 3 feet
				41 --		
				42 --		
				43 --		
				44 --		NOTE: The stratification lines represent the approximate boundary between earth types; the transition may be gradual.
				45 --		
				46 --		Used 24-inch diameter Bucket Auger, Limited Access Rig Kelley Weights: 0' - 8' 1315lbs. 8' - 15½' 1095lbs. 15½' - 23' 897lbs. 23' - 31½' 722lbs. 31½' - 38' 570lbs. 48-45½ 400 lbs. Downhole logged by geologist
				47 --		
				48 --		
				49 --		
				50 --		

BORING LOG NUMBER 5

Hilton Los Angeles / Universal City **Date: 05/30/19** **Elevation: 671'***

File No. 21578 **Method: 8-inch diameter Hollow Stem Auger**

ae/km

*Reference: Topographic Map by Robert J. Lung and associates, dated 11/20/18

Sample Depth ft.	Blows per ft.	Moisture content %	Dry Density p.c.f.	Depth in feet	USCS Class.	Description Surface Conditions: Lawn Area
				0 --		FILL: Silty Sand to Sandy Silt, dark and yellowish brown, moist, medium dense, fine grained, stiff, Siltstone fragments to ½"
				1 --		
				2 --		
				3 --		
				4 --		
5	42	16.4	113.8	5 --		
				6 --		
				7 --		
				8 --		
				9 --		
10	29	16.4	106.3	10 --		Silty Sand to Sand
				11 --		
12.5	24	19.7	106.3	12 --		
				13 --		
				14 --		
15	15	13.7	108.7	15 --	SM/ML	ALLUVIUM: Silty Sand to Sandy Silt, dark brown, moist, medium dense, fine grained, stiff
				16 --		
17.5	15	13.8	108.8	17 --		
				18 --		
				19 --		
20	18	12.9	106.8	20 --		
				21 --		
22.5	40	14.8	110.8	22 --		
				23 --	SM	Silty Sand, brown, moist, medium dense, fine grained
				24 --		
25	24	10.9	120.0	25 --		yellowish brown

BORING LOG NUMBER 5

Hilton Los Angeles / Universal City

File No. 21578

ae/km

Sample Depth ft.	Blows per ft.	Moisture content %	Dry Density p.c.f.	Depth in feet	USCS Class.	Description
				26		
				27		
27.5	36	11.3	116.9	28		fine to coarse grained, gravel up to 1", few cobbles
				29		
30	68	15.4	94.8	30		
				31		
				32		
32.5	40/6" 50/5"	18.2	109.3	33		BEDROCK (UPPER TOPANGA FORMATION): Siltstone, well bedded, brown and bluish gray, moist, medium hard, bedding dips 60°
				34		
35	100/6"	21.5	105.2	35		Sandstone, dark yellowish brown, wet
				36		
				37		
				38		
				39		Silty Sandstone, dark gray, moist
40	100/5"	13.0	116.6	40		Total Depth 40 feet Water at 29 feet No Caving Fill to 17½ feet
				41		
				42		
				43		NOTE: The stratification lines represent the approximate boundary between earth types; the transition may be gradual.
				44		
				45		Used 8-inch diameter Hollow-Stem Auger 140-lb. Automatic Hammer, 30-inch drop Modified California Sampler used unless otherwise noted
				46		
				47		
				48		
				49		
				50		

LOG OF TEST PIT NUMBER 1

Hilton Los Angeles / Universal City **Drilling Date: 04/03/18** **Elevation: 741'***

File No. 21578 **Method: Hand Tools**

km

*Reference: Topographic Map by Robert J. Lung and Associates, dated 11/20/13

Sample Depth ft.	Moisture Content %	Dry Density p.c.f.	Depth in feet	USCS Class.	Description Surface Conditions: Top of Westerly descending 35° slope Annual grasses and bushes
			0 --		FILL: Silty Sand, mottled yellowish brown and light gray, slightly moist, moderately dense, rock to ½" diameter, gravel to 3"
1	11.2	101.4	1 --		
			2 --		
3	9.9	97.7	3 --		
			4 --		
5	3.5	111.0	5 --		Silty Sand, boulders to 18" (very hard)
			6 --		
7	5.1	107.0	7 --		
			8 --		
			9 --		
9.5	7.7	110.5	10 --		BEDROCK (UPPER TOPANGA FORMATION): Siltstone, grayish brown, moderately hard, moist, well bedded
			11 --		Total Depth 10 feet No Water No Caving Fill to 9 feet
			12 --		
			13 --		
			14 --		NOTE: The stratification lines represent the approximate boundary between earth types; the transition may be gradual.
			15 --		
			16 --		Used Hand Tools, Hand Sampler
			17 --		
			18 --		
			19 --		
			20 --		
			21 --		
			22 --		
			23 --		
			24 --		
			25 --		

LOG OF TEST PIT NUMBER 2

Hilton Los Angeles / Universal City **Drilling Date: 04/02/18** **Elevation: 718'***

File No. 21578 **Method: Hand Tools**

km

*Reference: Topographic Map by Robert J. Lung and Associates, dated 11/20/13

Sample Depth ft.	Moisture Content %	Dry Density p.c.f.	Depth in feet	USCS Class.	Description Surface Conditions: Planter Area
			0 --		FILL: Silty Sand, dark and yellowish brown, moist, medium dense, fine grained, pieces of wire and metal
			-		
			1 --		
			-		
2	12.3	104.2	2 --		
			-		
			3 --		BEDROCK (UPPER TOPANGA FORMATION): Sandstone, dark and gray, moist, moderately hard, massive, non fissile
			-		
4	6.0	113.9	4 --		
			-		@ 4' Bedding [N75W, 52NE]
			5 --		
			-		Total Depth 5 feet
			6 --		No Water
			-		No Caving
			7 --		Fill to 2½ feet
			-		
			8 --		
			-		NOTE: The stratification lines represent the approximate
			9 --		boundary between earth types; the transition may be gradual.
			-		
			10 --		Used Hand Tools, Hand Sampler
			-		
			11 --		
			-		
			12 --		
			-		
			13 --		
			-		
			14 --		
			-		
			15 --		
			-		
			16 --		
			-		
			17 --		
			-		
			18 --		
			-		
			19 --		
			-		
			20 --		
			-		
			21 --		
			-		
			22 --		
			-		
			23 --		
			-		
			24 --		
			-		
			25 --		
			-		

LOG OF TEST PIT NUMBER 3

Hilton Los Angeles / Universal City **Drilling Date: 04/02/18** **Elevation: 716.5'***

File No. 21578 **Method: Hand Tools**

km/nk

*Reference: Topographic Map by Robert J. Lung and Associates, dated 11/20/13

Sample Depth ft.	Moisture Content %	Dry Density p.c.f.	Depth in feet	USCS Class.	Description
			0 --		Surface Conditions: Asphalt for Driveway 3-inch Asphalt over 3-inch Base, Seepage from Bottom of Base
			-		
1	13.8	103.6	1 --		FILL: Silty Sand to Sandy Silt, dark and gray, moist, medium dense, fine grained
			-		
			2 --		@ 1½' Bedding [N87E, 43NW]
			-		
			3 --		BEDROCK (UPPER TOPANGA FORMATION): Interbedded Sandstone,
3.5	14.6	106.8	-		yellowish brown, brown and gray, Siltstone, light reddish brown and gray,
4	12.1	102.7	4 --		moist, moderately hard
			-		
			5 --		well bedded, fissile
			-		
			6 --		Total Depth 4 feet
			-		No Water
			7 --		No Caving
			-		Fill to 1½ feet
			8 --		
			-		
			9 --		NOTE: The stratification lines represent the approximate
			-		boundary between earth types; the transition may be gradual.
			10 --		
			-		Used Hand Tools, Hand Sampler
			11 --		
			-		
			12 --		
			-		
			13 --		
			-		
			14 --		
			-		
			15 --		
			-		
			16 --		
			-		
			17 --		
			-		
			18 --		
			-		
			19 --		
			-		
			20 --		
			-		
			21 --		
			-		
			22 --		
			-		
			23 --		
			-		
			24 --		
			-		
			25 --		
			-		

LOG OF TEST PIT NUMBER 4

Hilton Los Angeles / Universal City **Drilling Date: 04/02/18** **Elevation: 745'***

File No. 21578 **Method: Hand Tools**

km/nk

*Reference: Topographic Map by Robert J. Lung and Associates, dated 11/20/13

Sample Depth ft.	Moisture Content %	Dry Density p.c.f.	Depth in feet	USCS Class.	Description Surface Conditions: Top of Westerly descending 36° slope Annual grasses and bushes, trees
			0 --		FILL: Silty Sand, mottled yellowish brown and grayish brown, slightly moist, medium dense, roots to ¼" pieces Sandstone to 8"
			-		
			1 --		
			-		
2	10.8	93.0	2 --		
			-		
			3 --		BEDROCK (UPPER TOPANGA FORMATION): Sandstone, light reddish brown, moist, moderately hard, massive, poorly fissile
			-		
4	0.5	109.9	4 --		
			-		
			5 --		
			-		12" concretions on both sides of test pit, reddish brown Sandstone
			6 --		
			-		moderately hard to hard, massive
			7 --		
			-		
			8 --		Total Depth 7½ feet
			-		No Water
			9 --		No Caving
			-		Fill to 2½ feet
			10 --		
			-		
			11 --		NOTE: The stratification lines represent the approximate boundary between earth types; the transition may be gradual.
			-		
			12 --		Used Hand Tools, Hand Sampler
			-		
			13 --		
			-		
			14 --		
			-		
			15 --		
			-		
			16 --		
			-		
			17 --		
			-		
			18 --		
			-		
			19 --		
			-		
			20 --		
			-		
			21 --		
			-		
			22 --		
			-		
			23 --		
			-		
			24 --		
			-		
			25 --		
			-		

LOG OF TEST PIT NUMBER 5

Hilton Los Angeles / Universal City **Drilling Date: 04/02/18** **Elevation: 714.5'***

File No. 21578 **Method: Hand Tools**

km/nk

*Reference: Topographic Map by Robert J. Lung and Associates, dated 11/20/13

Sample Depth ft.	Moisture Content %	Dry Density p.c.f.	Depth in feet	USCS Class.	Description
			0 --		3½-inch Asphalt over 6½-inch Base
			-		
			1 --		
			-		FILL: Silty Sand to Sandy Silt, mottled gray and yellowish brown, moist, stiff
2	17.8	105.9	2 --		to medium dense, Siltstone fragments to 2"
			-		
			3 --		@ 4½' Bedding [N69W,49NE]
			-		
4	17.5	103.9	4 --		BEDROCK (UPPER TOPANGA FORMATION): Interbedded Sandstone,
			-		Sandstone, Contact @ 3½' on south side of excavation and 6½' on north side,
			5 --		light reddish brown and olive gray, polished surfaces on fractures in Siltstone,
			-		Sandstone is grayish brown and yellowish brown, moist, moderately hard,
			6 --		massive
			-		
7	9.4	111.6	7 --		Total Depth 6½ feet
			-		No Water
			8 --		No Caving
			-		Fill to 6 feet
			9 --		
			-		
			10 --		NOTE: The stratification lines represent the approximate
			-		boundary between earth types; the transition may be gradual.
			11 --		
			-		Used Hand Tools, Hand Sampler
			12 --		
			-		
			13 --		
			-		
			14 --		
			-		
			15 --		
			-		
			16 --		
			-		
			17 --		
			-		
			18 --		
			-		
			19 --		
			-		
			20 --		
			-		
			21 --		
			-		
			22 --		
			-		
			23 --		
			-		
			24 --		
			-		
			25 --		
			-		

LOG OF TEST PIT NUMBER 6

Hilton Los Angeles, Universal City **Drilling Date: 04/03/18** **Elevation: 745'***

File No. 21578 **Method: Hand Dug Test Pit**

km/nk

*Reference: Topographic Map by Robert J. Lung and Associates, dated 11/20/13

Sample Depth ft.	Moisture Content %	Dry Density p.c.f.	Depth in feet	USCS Class.	Description Surface Conditions: Top of 30° Westerly descending slope, Annual grasses and trees
			0 --		FILL: Silty Sand, mottled yellowish brown and gray, moist, medium dense, cemented boulder to 20", siltstone fragments to 1"
			1 --		
2	14.0	104.9	2 --		
			3 --		
					BEDROCK (UPPER TOPANGA FORMATION) Interbedded Siltstone and
4	16.2	104.9	4 --		Sandstone, reddish brown and gray, moderately hard, moist, well bedded, fissile
			5 --		@ 5' Bedding [N80W, 51NE]
			6 --		Sandstone, yellowish brown, moderately hard
7	9.7	114.3	7 --		Interbedded Siltstone and Sandstone
					@ 7' Bedding [N78W, 52NE]
			8 --		
					Total Depth 7½ feet
			9 --		No Water
					No Caving
			10 --		Fill to 3 feet
			11 --		
					NOTE: The stratification lines represent the approximate
			12 --		boundary between earth types; the transition may be gradual.
			13 --		Used Hand Tools, Hand Sampler
			14 --		
			15 --		
			16 --		
			17 --		
			18 --		
			19 --		
			20 --		
			21 --		
			22 --		
			23 --		
			24 --		
			25 --		

LOG OF TEST PIT NUMBER 7

Hilton Los Angeles, Universal City **Drilling Date: 05/30/19** **Elevation: 736'***

File No. 21578 **Method: Hand Dug Test Pit**

km/nk

*Reference: Topographic Map by Robert J. Lung and Associates, dated 11/20/13

Sample Depth ft.	Moisture Content %	Dry Density p.c.f.	Depth in feet	USCS Class.	Description Surface Conditions: Bare Ground
			0 --		FILL: Silty Sand, yellowish brown, moist, medium dense, fine grained
			-		
1	7.7	103.3	1 --		
			-		
			2 --		
			-		
3	8.6	116.2	3 --		
			-		Silty Sand to Sandy Silt, dark and gray, fine grained, stiff
			4 --		
			-		
5	15.7	102.4	5 --		
			-		Silty Sand, dark and yellowish brown, fine grained
			6 --		
			-		
7	12.7	114.5	7 --		
			-		
			8 --		
			-		
			9 --		
			-		
10	13.0	114.2	10 --		
			-		
			11 --		
			-		
			12 --		
			-		
			13 --		
			-		
14	7.4	108.1	14 --		BEDROCK (UPPER TOPANGA FORMATION): Sandstone, yellowish gray and reddish brown, moist, moderately hard, massive, coarse grained
			-		
15	6.8	85.7	15 --		
			-		Total Depth 15 feet
			16 --		No Water
			-		Fill to 13½ feet
			17 --		
			-		
			18 --		NOTE: The stratification lines represent the approximate
			-		boundary between earth types; the transition may be gradual.
			19 --		
			-		Used Hand Tools, Hand Sampler
			20 --		
			-		
			21 --		
			-		
			22 --		
			-		
			23 --		
			-		
			24 --		
			-		
			25 --		
			-		

LOG OF TEST PIT NUMBER 8

Hilton Los Angeles, Universal City **Drilling Date: 05/30/19** **Elevation: 707.5'***

File No. 21578 **Method: Hand Dug Test Pit**

km/nk

*Reference: Topographic Map by Robert J. Lung and Associates, dated 11/20/13

Sample Depth ft.	Moisture Content %	Dry Density p.c.f.	Depth in feet	USCS Class.	Description Surface Conditions: Bare Ground
			0 --		FILL: Silty Sand, dark brown, moist, medium dense, fine grained, minor rock fragments
			-		
			1 --		
			-		
2	11.1	107.8	2 --		
			-		mottled dark and yellowish brown, fine grained
			3 --		
			-		
4	14.9	110.6	4 --		
			-		
			5 --		
			-		
			6 --		
			-		
7	15.8	114.9	7 --		
			-		
			8 --		
			-		
			9 --		
			-		
10	17.3	105.6	10 --		
			-		
			11 --		
			-		
			12 --		
			-		
			13 --		
			-		
			14 --		
			-		
15	16.9	109.9	15 --		
			-		
			16 --		
			-		
			17 --		
			-		
			18 --		
			-		
			19 --		
			-		
20	8.6	98.4	20 --		
			-		mottled dark gray and reddish brown, Siltstone and Sandstone fragments to 1"
			21 --		
			-		
			22 --		
			-		NOTE: The stratification lines represent the approximate boundary between earth types; the transition may be gradual.
			23 --		
			-		
			24 --		Used Hand Tools, Hand Sampler
			-		
25	17.4	110.0	25 --		
			-		Total Depth 25 feet; No Water; Bottom of fill not reached

LOG OF TEST PIT NUMBER 9

Hilton Los Angeles, Universal City **Drilling Date: 05/30/19** **Elevation: 695'***

File No. 21578 **Method: Hand Dug Test Pit**

km/nk

*Reference: Topographic Map by Robert J. Lung and Associates, dated 11/20/13

Sample Depth ft.	Moisture Content %	Dry Density p.c.f.	Depth in feet	USCS Class.	Description Surface Conditions: Bare Ground, Southwesterly descending
			0 --		FILL: Silty Sand, dark brown, moist, medium dense, fine grained, minor rock fragments
1	9.2	103.5	1 --		
			2 --		
3	8.5	104.2	3 --		
			4 --		
5	9.6	104.3	5 --		
			6 --		
7	6.0	100.8	7 --		BEDROCK (UPPER TOPANGA FORMATION): weathered Siltstone to Sandstone, dark gray, moist, moderately hard, very weathered, well bedded @ 8' Bedding [N85W, 65NE]
			8 --		
			9 --		
10	23.9	87.9	10 --		Total Depth 10 feet No Water Fill to 6 feet
			11 --		
			12 --		
			13 --		NOTE: The stratification lines represent the approximate boundary between earth types; the transition may be gradual.
			14 --		
			15 --		Used Hand Tools, Hand Sampler
			16 --		
			17 --		
			18 --		
			19 --		
			20 --		
			21 --		
			22 --		
			23 --		
			24 --		
			25 --		

LOG OF TEST PIT NUMBER 10

Hilton Los Angeles, Universal City **Drilling Date: 10/17/19** **Elevation: 690'***

File No. 21578 **Method: Hand Dug Test Pit**

sm *Reference: Topographic Map by Robert J. Lung and Associates, dated 11/20/13

Sample Depth ft.	Moisture Content %	Dry Density p.c.f.	Depth in feet	USCS Class.	Description Surface Conditions: West descending slope, Chaparral Vegetation
			0 --		FILL: Silty Sand, yellowish brown, moist, medium dense, fine grained, minor rock fragments
1	9.6	111.7	1 --		
			2 --		
3	8.4	109.5	3 --		
			4 --		
5	8.5	108.0	5 --		
			6 --		
7	9.8	98.4	7 --		
			8 --		BEDROCK (UPPER TOPANGA FORMATION): Basalt, dark brown, slightly moist, medium dense, massive
			9 --		
10	7.1	115.4	10 --		
11	12.4	117.7	11 --		Total Depth 11 feet No Water Fill to 7½ feet
			12 --		
			13 --		
			14 --		NOTE: The stratification lines represent the approximate boundary between earth types; the transition may be gradual.
			15 --		
			16 --		Used 4-inch diameter Hand-Augering Equipment; Hand Sampler
			17 --		
			18 --		
			19 --		
			20 --		
			21 --		
			22 --		
			23 --		
			24 --		
			25 --		

LOG OF TEST PIT NUMBER 11

Hilton Los Angeles, Universal City **Drilling Date: 10/17/19** **Elevation: 685'***

File No. 21578 **Method: Hand Dug Test Pit**

sm/km

*Reference: Topographic Map by Robert J. Lung and Associates, dated 11/20/13

Sample Depth ft.	Moisture Content %	Dry Density p.c.f.	Depth in feet	USCS Class.	Description Surface Conditions: West slope, Chaparral Vegetation
			0 --		FILL: Silty Sand to Sandy Silt, dark and yellowish brown, moist, medium dense, fine grained, stiff
			1 --		
2	8.0	106.8	2 --		Silty Sand, dark and yellowish brown, fine grained, minor rock fragments
			3 --		
4	8.3	109.4	4 --		
			5 --		
			6 --		
7	9.0	99.7	7 --		BEDROCK (UPPER TOPANGA FORMATION): Sandstone, yellowish brown, slightly moist, medium dense, massive
			8 --		
			9 --		
10	3.6	101.5	10 --		Total Depth 10 feet No Water Fill to 7 feet
			11 --		
			12 --		
			13 --		NOTE: The stratification lines represent the approximate boundary between earth types; the transition may be gradual.
			14 --		
			15 --		Used 4-inch diameter Hand-Augering Equipment; Hand Sampler
			16 --		
			17 --		
			18 --		
			19 --		
			20 --		
			21 --		
			22 --		
			23 --		
			24 --		
			25 --		

LOG OF TEST PIT NUMBER 12

Hilton Los Angeles, Universal City **Drilling Date: 10/17/19** **Elevation: 703'***

File No. 21578 **Method: Hand Dug Test Pit**

sm\km

*Reference: Topographic Map by Robert J. Lung and Associates, dated 11/20/13

Sample Depth ft.	Moisture Content %	Dry Density p.c.f.	Depth in feet	USCS Class.	Description Surface Conditions: West descending slope, Chaparral Vegetation
			0 --		FILL: Silty Sand to Sandy Silt, dark and yellowish brown, moist, medium dense, fine grained, stiff, minor rock fragments
1	7.3	112.5	1 --		
			2 --		
3	7.7	96.2	3 --		
			4 --		
5	8.3	105.0	5 --		BEDROCK (UPPER TOPANGA FORMATION): Interbedded Sandstone and Siltstone, moist, yellowish brown, moderately hard @ 5' Bedding {N55W, 38NE]
			6 --		
7	17.4	104.5	7 --		Total Depth 7 feet No Water Fill to 4 feet
			8 --		
			9 --		
			10 --		NOTE: The stratification lines represent the approximate boundary between earth types; the transition may be gradual.
			11 --		
			12 --		Used 4-inch diameter Hand-Augering Equipment; Hand Sampler
			13 --		
			14 --		
			15 --		
			16 --		
			17 --		
			18 --		
			19 --		
			20 --		
			21 --		
			22 --		
			23 --		
			24 --		
			25 --		

LOG OF TEST PIT NUMBER 13

Hilton Los Angeles, Universal City **Drilling Date: 10/17/19** **Elevation: 728'***

File No. 21578 **Method: Hand Dug Test Pit**

sm\km

*Reference: Topographic Map by Robert J. Lung and Associates, dated 11/20/13

Sample Depth ft.	Moisture Content %	Dry Density p.c.f.	Depth in feet	USCS Class.	Description Surface Conditions: West descending slope, Chaparral Vegetation
			0 --		FILL: Silty Sand, yellowish brown, moist, medium dense, fine grained
			1 --		
2	9.3	105.6	2 --		
			3 --		
4	8.5	114.2	4 --		BEDROCK (UPPER TOPANGA FORMATION): Interbedded Sandstone and Siltstone, yellowish brown, moist, medium hard
			5 --		yellowish and gray, moist, medium hard
			6 --		@ 4' Bedding [N50W, 33NE]
7	10.3	104.2	7 --		
			8 --		Total Depth 7 feet No Water Fill to 3 feet
			9 --		
10	7.7	107.7	10 --		NOTE: The stratification lines represent the approximate boundary between earth types; the transition may be gradual.
			11 --		
			12 --		Used 4-inch diameter Hand-Augering Equipment; Hand Sampler
			13 --		
			14 --		
			15 --		
			16 --		
			17 --		
			18 --		
			19 --		
			20 --		
			21 --		
			22 --		
			23 --		
			24 --		
			25 --		

LOG OF TEST PIT NUMBER 14

Hilton Los Angeles, Universal City **Drilling Date: 10/17/19** **Elevation: 730'***

File No. 21578 **Method: Hand Dug Test Pit**

sm\km *Reference: Topographic Map by Robert J. Lung and Associates, dated 11/20/13

Sample Depth ft.	Moisture Content %	Dry Density p.c.f.	Depth in feet	USCS Class.	Description Surface Conditions: Flat Terrace, Chaparral Vegetation
			0 --		FILL: Silty Sand, yellowish brown, moist, medium dense, fine grained
1	7.7	107.7	1 --		
			2 --		
3	3.7	116.3	3 --		
			4 --		BEDROCK (UPPER TOPANGA FORMATION): Interbedded Sandstone and Siltstone, yellowish brown, moist, medium hard
5	6.0	112.9	5 --		yellowish brown and gray
			6 --		Total Depth 6 feet
			7 --		No Water
			8 --		Fill to 3 feet
			9 --		NOTE: The stratification lines represent the approximate boundary between earth types; the transition may be gradual.
			10 --		Used 4-inch diameter Hand-Augering Equipment; Hand Sampler
			11 --		
			12 --		
			13 --		
			14 --		
			15 --		
			16 --		
			17 --		
			18 --		
			19 --		
			20 --		
			21 --		
			22 --		
			23 --		
			24 --		
			25 --		

LOG OF TEST PIT NUMBER 15

Hilton Los Angeles, Universal City **Drilling Date: 10/17/19** **Elevation: 731'***

File No. 21578 **Method: Hand Dug Test Pit**

sm\km

*Reference: Topographic Map by Robert J. Lung and Associates, dated 11/20/13

Sample Depth ft.	Moisture Content %	Dry Density p.c.f.	Depth in feet	USCS Class.	Description Surface Conditions: Flat Terrace, Chaparral Vegetation
			0 --		FILL: Silty Sand, yellowish brown, moist, medium dense, fine grained
			-		
			1 --		
			-		BEDROCK (UPPER TOPANGA FORMATION): Sandstone, yellow and
2	12.3	99.9	2 --		gray, moist, medium hard
			-		
			3 --		Sandstone to Siltstone, yellow and gray, moist, medium hard
			-		
4	7.9	121.4	4 --		
			-		light brown, moist, medium hard to hard
			5 --		
			-		
			6 --		
			-		
7	4.9	119.4	7 --		
			-		yellow and gray
			8 --		
			-		
			9 --		
			-		
10	16.0	95.3	10 --		
			-		
			11 --		Total Depth to 10½ feet
			-		No Water
			12 --		Fill to 1 foot
			-		
			13 --		
			-		NOTE: The stratification lines represent the approximate
			14 --		boundary between earth types; the transition may be gradual.
			-		
			15 --		Used 4-inch diameter Hand-Augering Equipment; Hand Sampler
			-		
			16 --		
			-		
			17 --		
			-		
			18 --		
			-		
			19 --		
			-		
			20 --		
			-		
			21 --		
			-		
			22 --		
			-		
			23 --		
			-		
			24 --		
			-		
			25 --		
			-		

BORING LOG NUMBER 1

Hilton Universal **Date: 09/24/15** **Elevation: 704'***

File No. 21062 **Method: 8-inch diameter Hollow Stem Auger**

km *Reference: Plan by Robert J. Lung and Associates, dated 11/26/13

Sample Depth ft.	Blows per ft.	Moisture content %	Dry Density p.c.f.	Depth in feet	USCS Class.	Description Surface Conditions: Flat Lawn Area
				0 --		FILL: Silty Sand to Sand, dark brown, moist, medium dense, fine grained
				-		
				1 --		
				-		
				2 --		
				-		
				3 --		
				-		BEDROCK (UPPER TOPANGA FORMATION): interbedded Siltstone and Sandstone, dark and yellowish brown, moist, moderately hard, few gravel to 1/4", weathered, slightly fractured
				4 --		
				-		
5	30	14.3	SPT	5 --		@ 3' Bedding [N55W, 55NE]
				-		
				6 --		
				-		@ 5' Bedding [N40W, 48N]
				7 --		
7.5	77	12.8	Disturbed	-		
				8 --		
				-		coarse Sandstone
				9 --		
				-		
10	38	14.7	SPT	10 --		
				-		Sandy Siltstone, dark and grayish brown
				11 --		
				-		
				12 --		
12.5	74	14.4	118.2	-		
				13 --		
				-		moderately hard to hard, coarse grained, few gravel to 1/4"
				14 --		
				-		
15	33	11.8	SPT	15 --		
				-		Conglomerate, gravel to 1/2 inch rounded and hard
				16 --		
				-		
				17 --		
17.5	100/8"	6.1	85.8	-		
				18 --		
				-		
				19 --		
				-		
20	13/6" 50/3"	8.5	SPT	20 --		
				-		
				21 --		
				-		
				22 --		
22.5	100/7"	13.4	91.3	-		
				23 --		Siltstone to Sandstone, greenish gray to grayish brown
				-		
				24 --		
				-		
25	64	11.0	SPT	25 --		
				-		

BORING LOG NUMBER 1

Hilton Universal

File No. 21062

km

Sample Depth ft.	Blows per ft.	Moisture content %	Dry Density p.c.f.	Depth in feet	USCS Class.	Description
				26		
				27		
27.5	100/9"	2.5	115.4			
				28		Siltstone
				29		
30	51	16.4	SPT	30		
				31		
				32		Sandstone, few gravel, reddish brown, moderately hard to hard
32.5	100/4"	9.0	117.0			
				33		
				34		
35	100/9"	8.6	SPT	35		
				36		
				37		Clayey Siltstone, grayish brown, moderately hard
37.5	100/5"	13.4	122.8			
				38		
				39		
40	47 50/3"	12.9	SPT	40		
				41		
				42		
				43		
				44		
45	45/6" 50/3"	7.5	121.0	45		Siltstone, unweathered, dark gray
				46		
				47		
				48		
				49		
50	100/8"	6.8	106.5	50		

BORING LOG NUMBER 1

Hilton Universal

File No. 21062

km

Sample Depth ft.	Blows per ft.	Moisture content %	Dry Density p.c.f.	Depth in feet	USCS Class.	Description
				51 --		
				52 --		
				53 --		
				54 --		
55	100/6"	9.7	118.2	55 --		piece of granite rock in sample to 1"
				56 --		
				57 --		
				58 --		Clayey Siltstone, dark gray, moist
				59 --		
60	35/6" 50/4"	21.4	110.0	60 --		Total Depth 60 feet Water at 36 feet Fill to 3 feet
				61 --		
				62 --		
				63 --		NOTE: The stratification lines represent the approximate boundary between earth types; the transition may be gradual.
				64 --		
				65 --		Used 8-inch diameter Hollow-Stem Auger 140-lb. Automatic Hammer, 30-inch drop Modified California Sampler used unless otherwise noted
				66 --		
				67 --		SPT=Standard Penetration Test
				68 --		
				69 --		
				70 --		
				71 --		
				72 --		
				73 --		
				74 --		
				75 --		

BORING LOG NUMBER 2

Hilton Universal **Date: 09/25/15** **Elevation: 705'***

File No. 21062 **Method: 24-inch diameter Bucket Auger**

km

*Reference: Plan by Robert J. Lung and Associates, dated 11/26/13

Sample Depth ft.	Blows per ft.	Moisture content %	Dry Density p.c.f.	Depth in feet	USCS Class.	Description Surface Conditions: Planter Area
				0 --		FILL: Silty Sand, dark brown, moist, medium dense, fine grained
				-		
				1 --		
				-		
				2 --		
				-		
				3 --		
				-		BEDROCK (UPPER TOPANGA FORMATION): interbedded Siltstone and Sandstone, mottled light brown and gray, hard, slightly fractured, massive, slightly moist, very weathered
				4 --		
				-		
5	7/12"	10.2	100.1	5 --		
				-		Siltstone, dark and yellowish brown
				6 --		
				-		@ 3' Bedding [N55W, 50NE]
				7 --		
				-		@ 7' Bedding [N40W, 48NE]
				8 --		
				-		Sandstone
				9 --		
				-		@ 8' unconformity [N50E, 21SE]
10	10/6"	6.4	117.9	10 --		
				-		
				11 --		
				-		
				12 --		
				-		
				13 --		@ 13' Bedding [N80E, 70SE]
				-		
				14 --		
				-		
15	11/6"	3.5	116.5	15 --		
				-		
				16 --		
				-		
				17 --		
				-		
				18 --		
				-		Sandstone, massive, mottled light gray and reddish brown
				19 --		
				-		
20	17/7"	7.0	109.0	20 --		
				-		
				21 --		
				-		
				22 --		
				-		
				23 --		
				-		
				24 --		
				-		
25	21/6"	6.5	102.2	25 --		
				-		light brown, fine to medium grained, massive, moderately fractured

BORING LOG NUMBER 2

Hilton Universal

File No. 21062

km

Sample Depth ft.	Blows per ft.	Moisture content %	Dry Density p.c.f.	Depth in feet	USCS Class.	Description
				26 --		
				27 --		@27' Bedding [N40W, 56SW]
				28 --		
				29 --		
				30 --		@ 30' Bedding [N80W, 60SW]
				31 --		
				32 --		
33	15/13"	8.6	103.0	33 --		medium grained
				34 --		
				35 --		
				36 --		
				37 --		
				38 --		
				39 --		
				40 --		Total Depth 39 feet Water Seepage at 33 feet Fill to 1 foot
				41 --		
				42 --		NOTE: The stratification lines represent the approximate boundary between earth types; the transition may be gradual.
				43 --		
				44 --		Used 24-inch diameter Bucket Auger Modified California Sampler used unless otherwise noted
				45 --		Kelly Weights 0-24' 3160 lbs. 24-48' 2400 lbs.
				46 --		
				47 --		
				48 --		
				49 --		
				50 --		

BORING LOG NUMBER 3

Hilton Universal **Date: 09/25/15** **Elevation: 675***

File No. 21062 **Method: 24-inch diameter Bucket Auger**

km *Reference: Plan by Robert J. Lung and Associates, dated 11/26/13

Sample Depth ft.	Blows per ft.	Moisture content %	Dry Density p.c.f.	Depth in feet	USCS Class.	Description Surface Conditions: Bare Ground
				0 --		FILL: Silty Sand, dark and yellowish brown, moist, medium dense, fine grained, pieces of Siltstone to 1/4"
				1 --		
				2 --		
				3 --		
				4 --		
5	4/12"	12.4	108.5	5 --		
				6 --		
				7 --		
				8 --		
				9 --		
10	4/12"	16.7	111.4	10 --		
				11 --		
				12 --		gray to dark gray, medium dense, asphalt fragments
				13 --		
				14 --		
15	3/12"	13.9	113.8	15 --		dark yellowish brown
				16 --		
				17 --		
				18 --		
				19 --		
20	3/12"	13.3	109.9	20 --		Silty Sand, dark and grayish brown, moist, medium dense, fine grained
				21 --		
				22 --		asphalt and wood fragments to 1/2" size
				23 --		BEDROCK (UPPER TOPANGA FORMATION) interbedded Siltstone and Sandstone, gray and light reddish brown, moist, moderately hard to hard
				24 --		
25	21/10"	15.5	105.9	25 --		@ 22' Contact [N-S, 32W]
						@ 23' Bedding [N55W, 60NE]

BORING LOG NUMBER 3

Hilton Universal

File No. 21062

km

Sample Depth ft.	Blows per ft.	Moisture content %	Dry Density p.c.f.	Depth in feet	USCS Class.	Description
				26 --		@ 26' Bedding [N65W, 60NE]
				27 --		
				28 --		@ 28' Bedding [N60W, 55NE]
				29 --		
30	20/12"	12.1	119.4	30 --		@ 30' Bedding [N60W, 55NE]
				31 --		
				32 --		@ 32' Bedding [N70W, 55NE]
				33 --		
				34 --		
35	23/12"	17.5	115.7	35 --		light gray and dark gray beds
				36 --		Total Depth 35 feet Seepage at 32 feet Fill to 22½ feet
				37 --		
				38 --		NOTE: The stratification lines represent the approximate boundary between earth types; the transition may be gradual.
				39 --		
				40 --		Used 24-inch diameter Bucket Auger Modified California Sampler used unless otherwise noted
				41 --		Kelly Weights 0-24' 3160 lbs.
				42 --		24-48' 2400 lbs.
				43 --		
				44 --		
				45 --		
				46 --		
				47 --		
				48 --		
				49 --		
				50 --		

LOG OF TEST PIT NUMBER 1

Hilton Universal **Drilling Date: 09/26/15** **Elevation: 704'**

File No. 21062 **Method: Hand Dug Test Pit**

km *Reference: Plan by Robert J. Lung and Associates, dated 11/26/13

Sample Depth ft.	Moisture Content %	Dry Density p.c.f.	Depth in feet	USCS Class.	Description Surface Conditions:
			0 --		FILL: Silty Sand with few gravel to 1/2", light grayish brown, slightly moist, dense
1	5.8	98.3	1 --		
			2 --		
3	8.9	100.4	3 --		
			4 --		
5	1.9	116.0	5 --		BEDROCK (UPPER TOPANGA FORMATION): Sandstone interbedded with Siltstone, light brown to yellowish brown, moist, moderately hard to hard, moderately fractured, Bedding [N55W, 75NE]
			6 --		
7	8.9	102.4	7 --		@ 6' Bedding [N55W, 78NE]
			8 --		
			9 --		
					Sandstone, light gray, massive
10	3.3	117.3	10 --		
			11 --		Total Depth 10 feet No Water Fill to 4 feet
			12 --		
			13 --		NOTE: The stratification lines represent the approximate boundary between earth types; the transition may be gradual.
			14 --		
			15 --		Used 4-inch diameter Hand-Augering Equipment; Hand Sampler
			16 --		
			17 --		
			18 --		
			19 --		
			20 --		
			21 --		
			22 --		
			23 --		
			24 --		
			25 --		

LOG OF TEST PIT NUMBER 2

Hilton Universal **Drilling Date: 09/26/15** **Elevation: 674'**

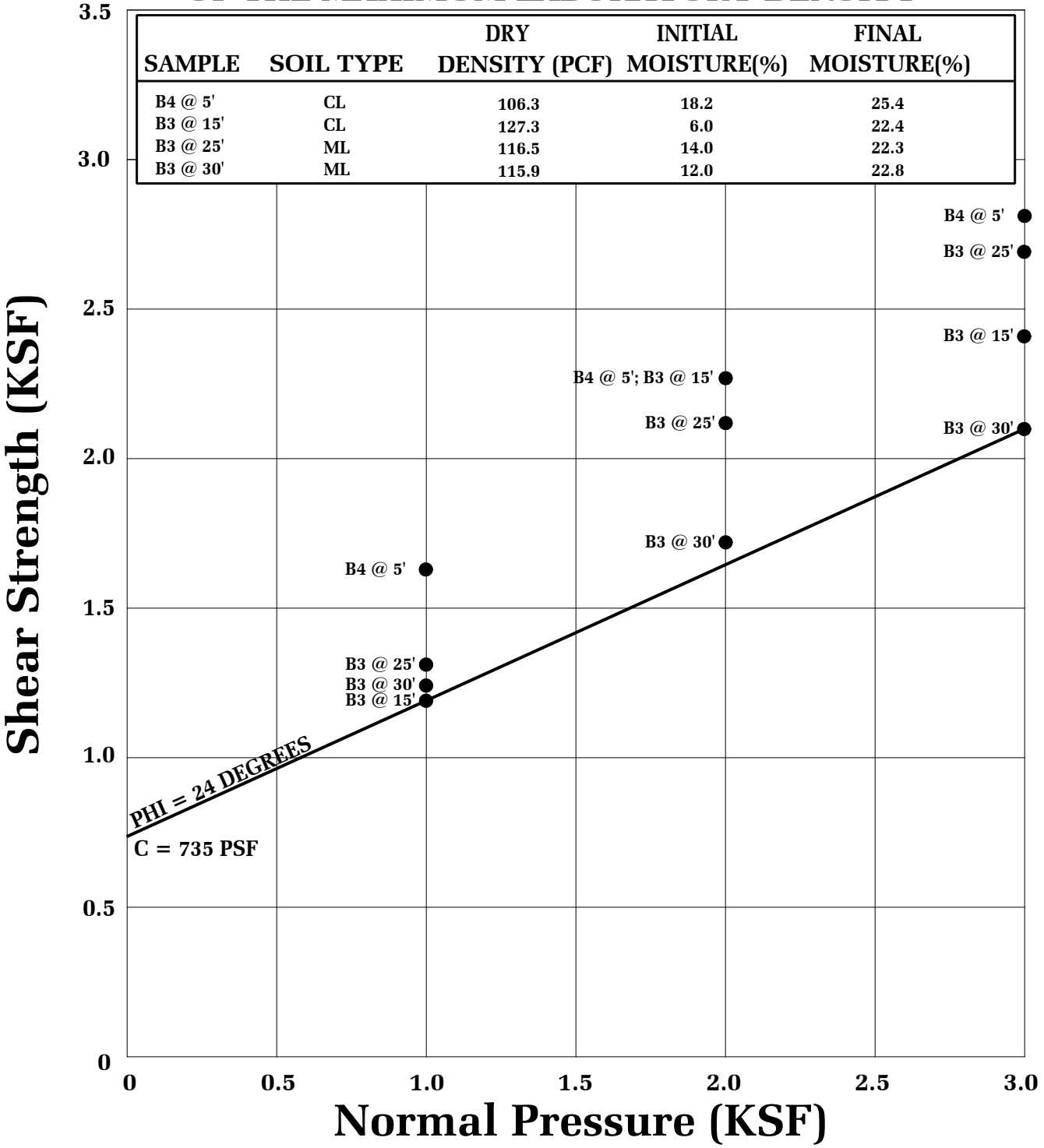
File No. 21062 **Method: Hand Tools**

km *Reference: Plan by Robert J. Lung and Associates, dated 11/26/13

Sample Depth ft.	Moisture Content %	Dry Density p.c.f.	Depth in feet	USCS Class.	Description Surface Conditions: Bare Ground, Toe of Slope
			0 --		FILL: Silty Sand, yellowish brown, moist, medium dense, fine grained
			-		
			1 --		
			-		
2	9.3	114.3	2 --		
			-		
			3 --		
			-		
4	8.7	103.1	4 --		
			-		
			5 --		
			-		
			6 --		
			-		
7	10.0	104.4	7 --		
			-		Silty Sand, dark and yellowish brown, moist, medium dense, fine grained, minor Siltstone pieces to 1/2"
			8 --		
			-		
			9 --		
			-		
10	6.7	117.5	10 --		
			-		yellowish brown, dense
			11 --		
			-		
			12 --		
			-		
13	13.9	111.3	13 --		
			-		dark yellowish brown, a few rounded gravel pieces to 1/2"
			14 --		
			-		
15	15.0	112.3	15 --		BEDROCK (UPPER TOPANGA FORMATION): Siltstone, well bedded, dark and grayish brown, moist, moderately hard, fractured
			-		
			16 --		
			-		Total Depth 16 feet
			17 --		No Water
			-		Fill to 14½ feet
			18 --		
			-		
			19 --		NOTE: The stratification lines represent the approximate boundary between earth types; the transition may be gradual.
			-		
			20 --		
			-		Used 4-inch diameter Hand-Augering Equipment; Hand Sampler
			21 --		
			-		
			22 --		
			-		
			23 --		
			-		
			24 --		
			-		
			25 --		
			-		

BULK SAMPLE REMOLDED TO 90 PERCENT OF THE MAXIMUM LABORATORY DENSITY

SAMPLE	SOIL TYPE	DRY DENSITY (PCF)	INITIAL MOISTURE(%)	FINAL MOISTURE(%)
B4 @ 5'	CL	106.3	18.2	25.4
B3 @ 15'	CL	127.3	6.0	22.4
B3 @ 25'	ML	116.5	14.0	22.3
B3 @ 30'	ML	115.9	12.0	22.8



● Direct Shear, Saturated

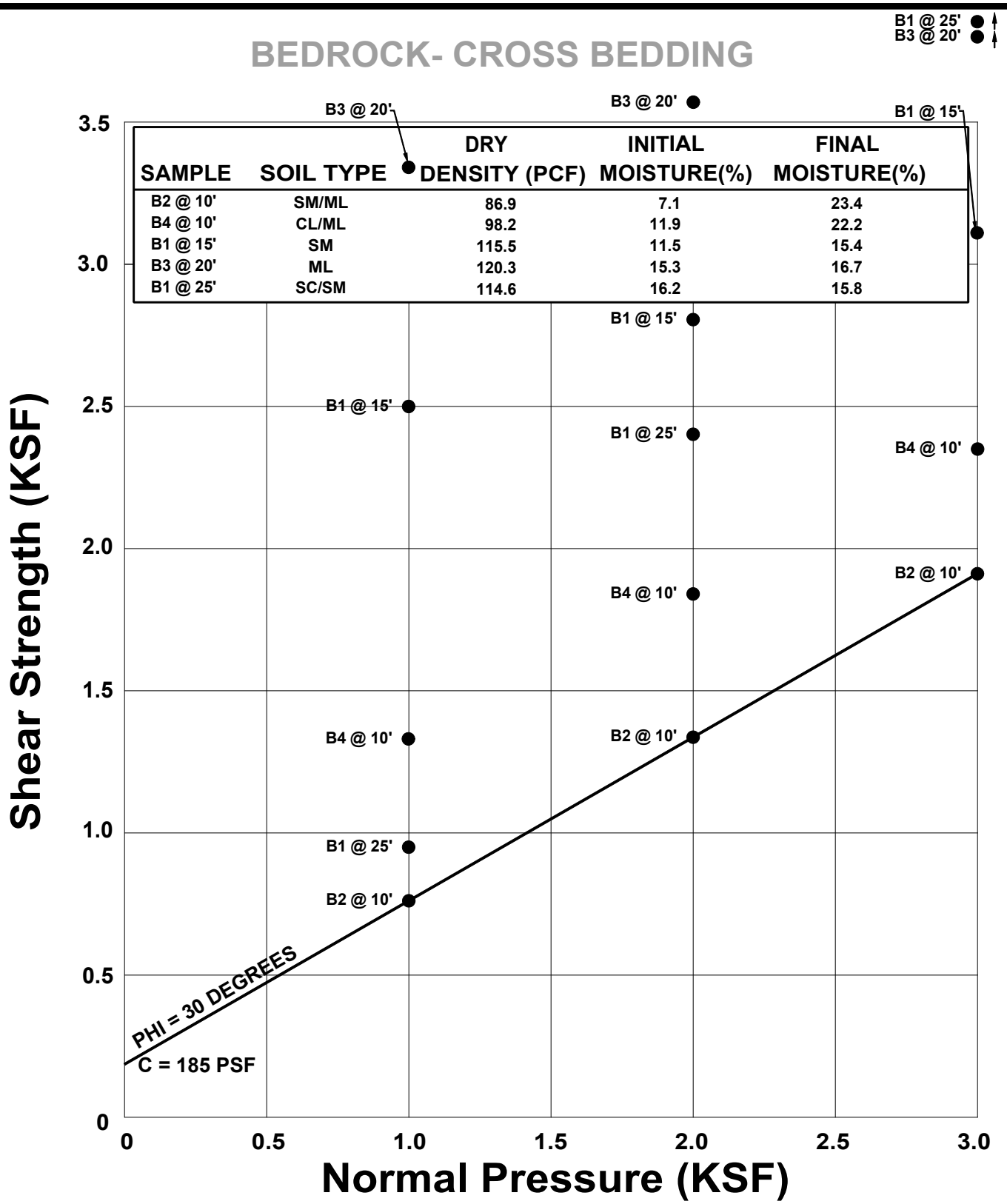
SHEAR TEST DIAGRAM

Geotechnologies, Inc.
Consulting Geotechnical Engineers

HILTON LOS ANGELES, UNIVERSAL CITY
555 UNIVERSAL HOLLYWOOD DR., UNIVERSAL CITY

FILE NO. 21578 | **PLATE: B-1**

BEDROCK- CROSS BEDDING



SAMPLE	SOIL TYPE	DRY DENSITY (PCF)	INITIAL MOISTURE(%)	FINAL MOISTURE(%)
B2 @ 10'	SM/ML	86.9	7.1	23.4
B4 @ 10'	CL/ML	98.2	11.9	22.2
B1 @ 15'	SM	115.5	11.5	15.4
B3 @ 20'	ML	120.3	15.3	16.7
B1 @ 25'	SC/SM	114.6	16.2	15.8

● Direct Shear, Saturated

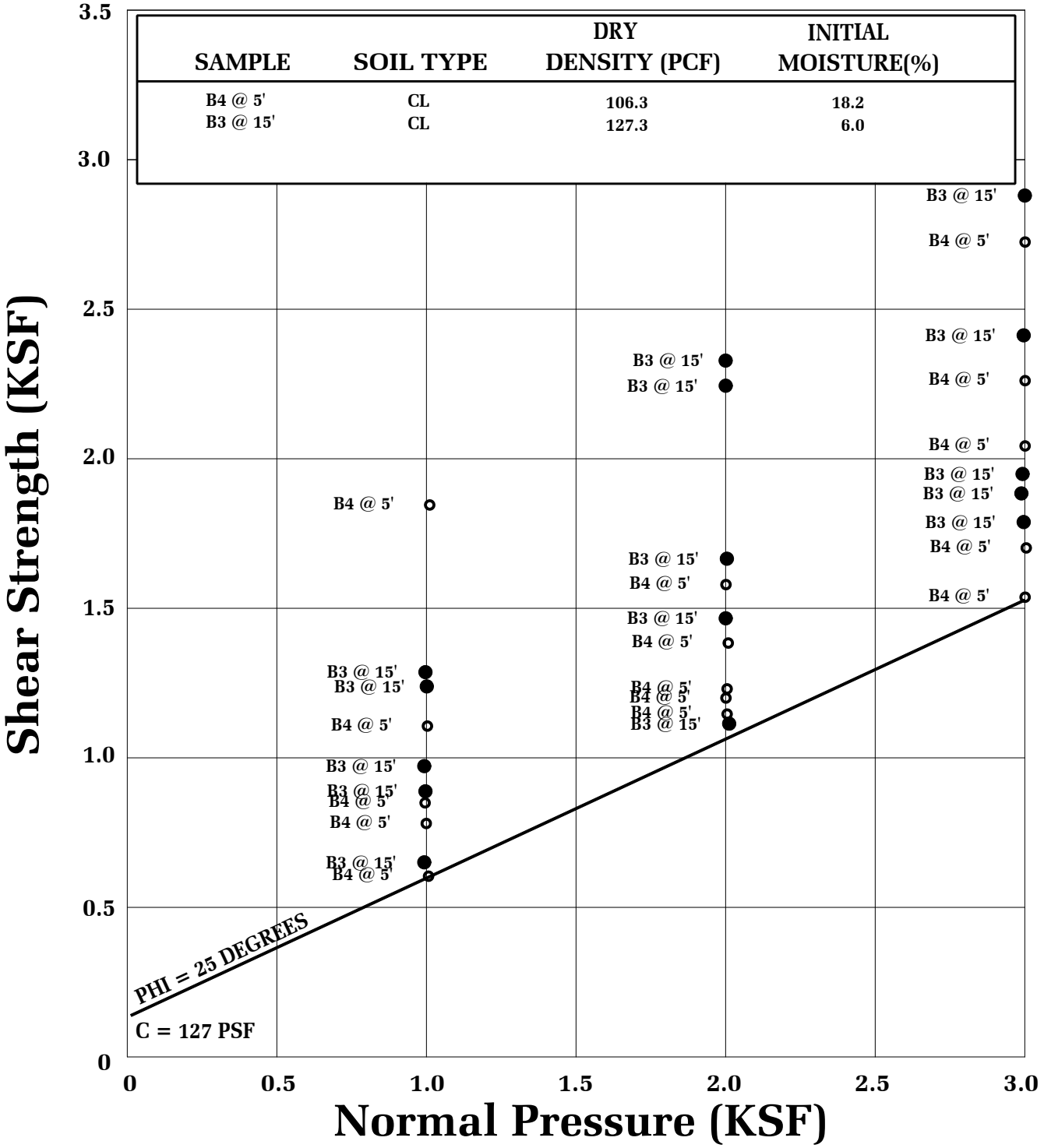
SHEAR TEST DIAGRAM

Geotechnologies, Inc.
Consulting Geotechnical Engineers

HILTON LOS ANGELES, UNIVERSAL CITY
555 UNIVERSAL HOLLYWOOD DR., UNIVERSAL CITY

FILE NO. 21578 | **PLATE: B-2**

REMOLDED BEDROCK SAMPLES
RESHEARED 5 TIMES



● Direct Shear, Saturated Moisture

SHEAR TEST DIAGRAM

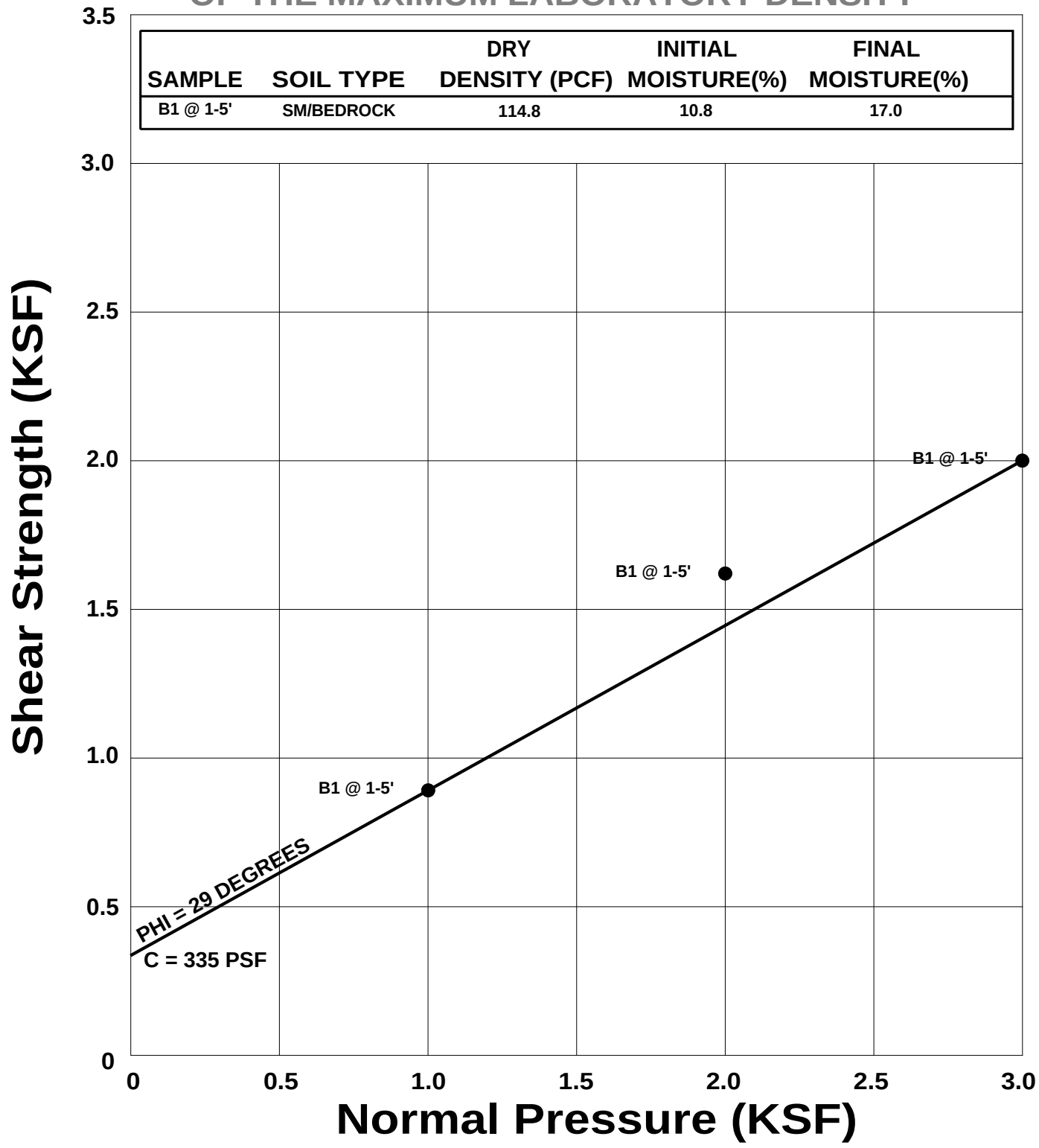
Geotechnologies, Inc.
Consulting Geotechnical Engineers

HILTON LOS ANGELES, UNIVERSAL CITY
555 UNIVERSAL HOLLYWOOD DR., UNIVERSAL CITY

FILE NO. 21578 | **PLATE: B-3**

BULK SAMPLE REMOLDED TO 90 PERCENT OF THE MAXIMUM LABORATORY DENSITY

SAMPLE	SOIL TYPE	DRY DENSITY (PCF)	INITIAL MOISTURE(%)	FINAL MOISTURE(%)
B1 @ 1-5'	SM/BEDROCK	114.8	10.8	17.0



● Direct Shear, Saturated

SHEAR TEST DIAGRAM

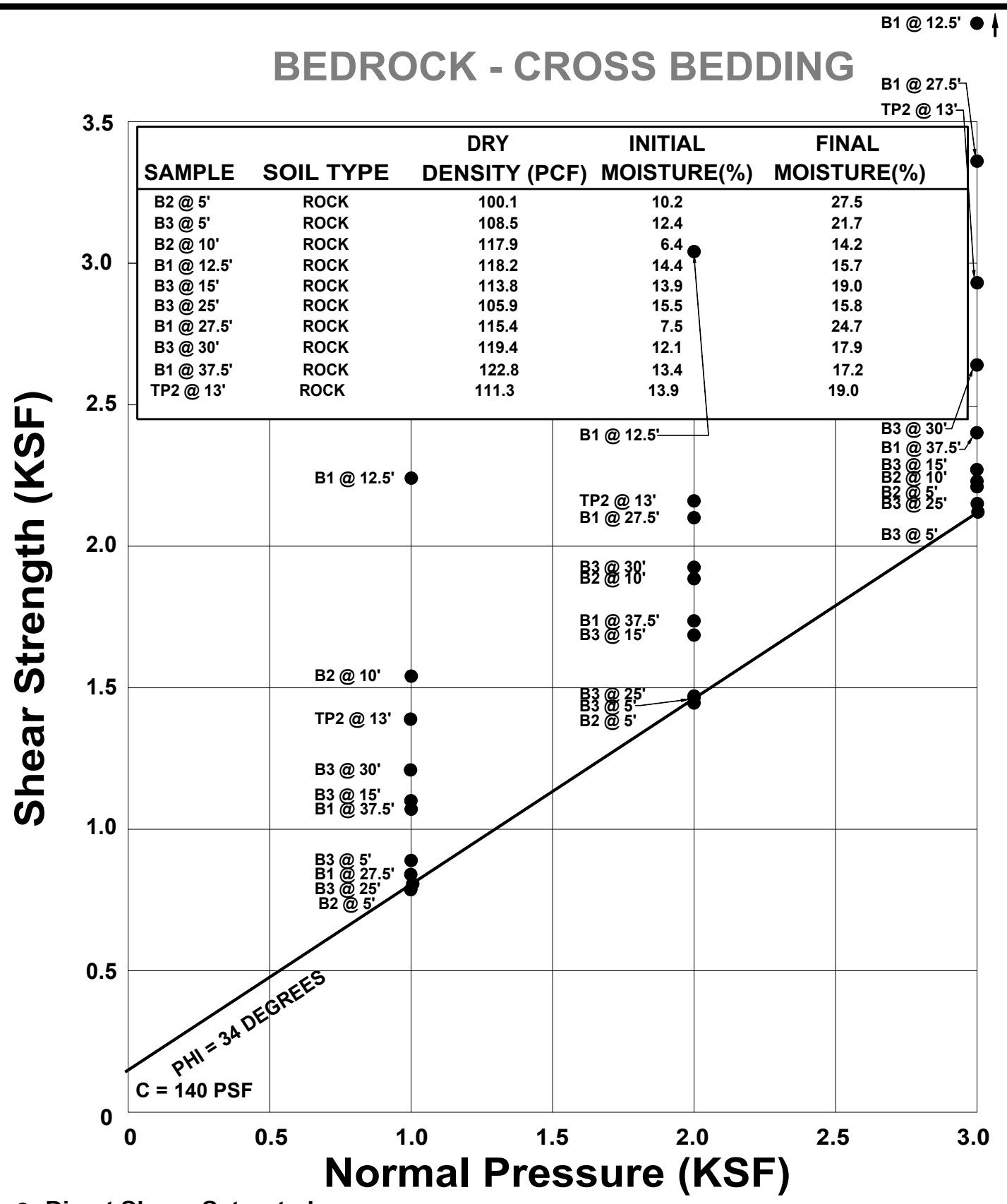
Geotechnologies, Inc.
Consulting Geotechnical Engineers

HILTON UNIVERSAL CITY HOTEL

FILE NO. 21062 | **PLATE: B-1**

BEDROCK - CROSS BEDDING

SAMPLE	SOIL TYPE	DRY DENSITY (PCF)	INITIAL MOISTURE(%)	FINAL MOISTURE(%)
B2 @ 5'	ROCK	100.1	10.2	27.5
B3 @ 5'	ROCK	108.5	12.4	21.7
B2 @ 10'	ROCK	117.9	6.4	14.2
B1 @ 12.5'	ROCK	118.2	14.4	15.7
B3 @ 15'	ROCK	113.8	13.9	19.0
B3 @ 25'	ROCK	105.9	15.5	15.8
B1 @ 27.5'	ROCK	115.4	7.5	24.7
B3 @ 30'	ROCK	119.4	12.1	17.9
B1 @ 37.5'	ROCK	122.8	13.4	17.2
TP2 @ 13'	ROCK	111.3	13.9	19.0



● Direct Shear, Saturated

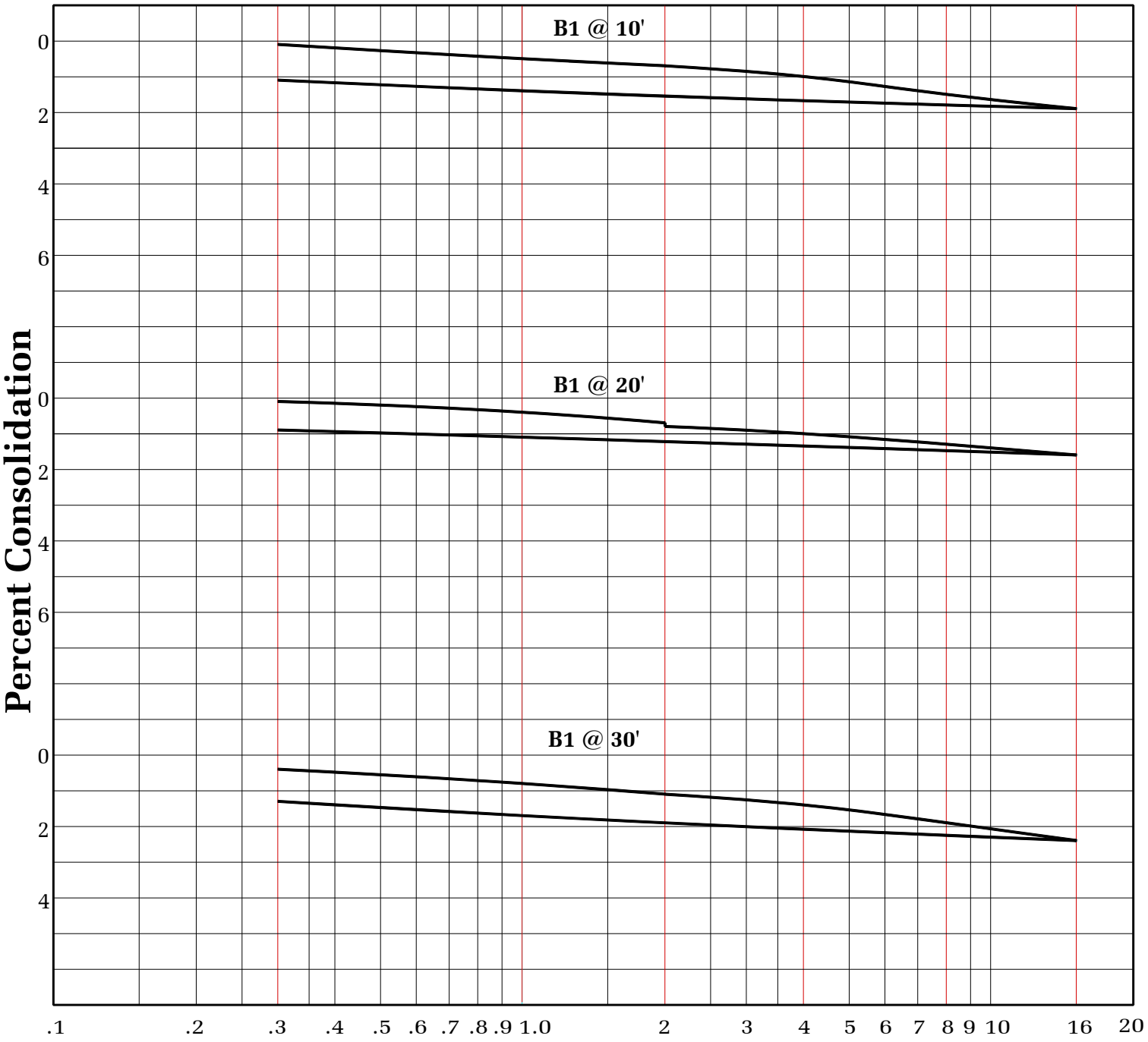
SHEAR TEST DIAGRAM

Geotechnologies, Inc.
Consulting Geotechnical Engineers

HILTON UNIVERSAL CITY HOTEL

FILE NO. 21062 | PLATE: B-3

WATER ADDED AT 2 KSF



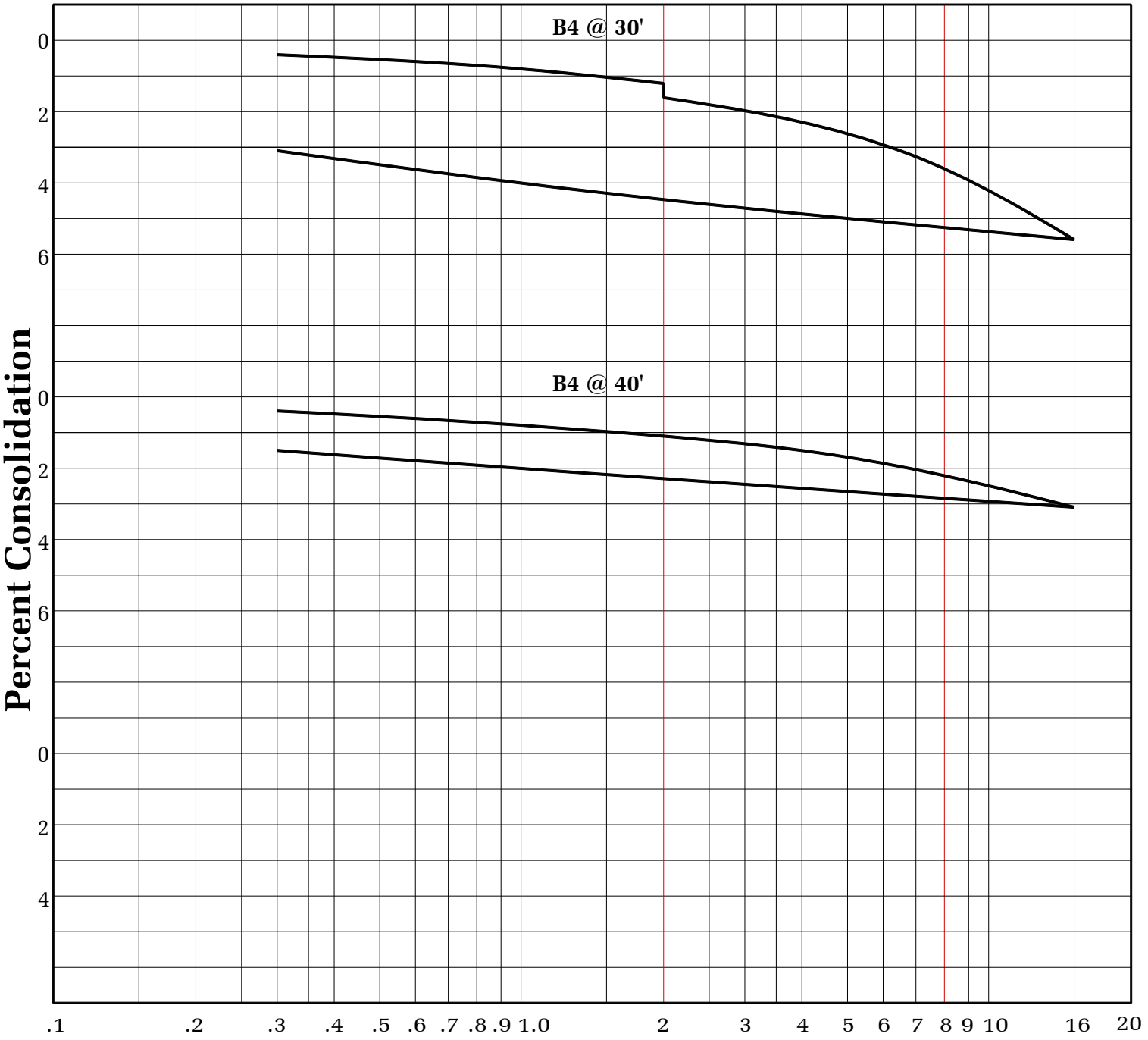
CONSOLIDATION TEST

Geotechnologies, Inc.
Consulting Geotechnical Engineers

HILTON LOS ANGELES, UNIVERSAL CITY
555 UNIVERSAL HOLLYWOOD DR., UNIVERSAL CITY

FILE NO. 21578 | **PLATE: C-1**

WATER ADDED AT 2 KSF



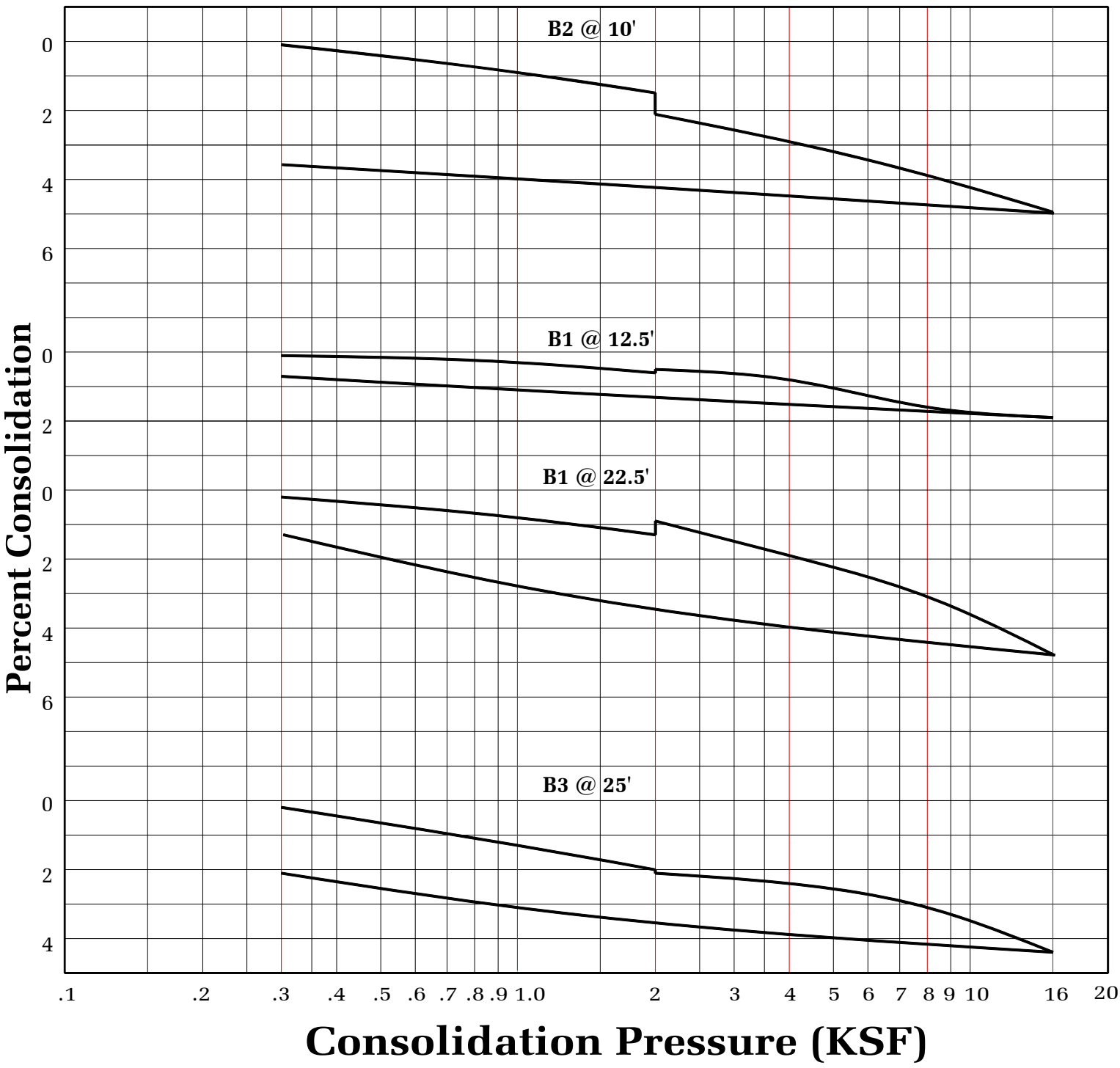
CONSOLIDATION TEST

Geotechnologies, Inc.
Consulting Geotechnical Engineers

HILTON LOS ANGELES, UNIVERSAL CITY
555 UNIVERSAL HOLLYWOOD DR., UNIVERSAL CITY

FILE NO. 21578 | **PLATE: C-2**

WATER ADDED AT 2 KSF



CONSOLIDATION TEST

Geotechnologies, Inc.
Consulting Geotechnical Engineers

HILTON UNIVERSAL CITY HOTEL

FILE NO. 21062 | **PLATE: C**

ASTM D-1557		
SAMPLE	TP1 @ 1'-5'	TP4 @ 1'-5'
SOIL TYPE	SM/BR	SM/BR
MAXIMUM DENSITY PCF.	119.4	119.9
OPTIMUM MOISTURE %	13.3	12.4

ASTM D 4829		
SAMPLE	TP1 @ 1'-5'	TP4 @ 1'-5'
SOIL TYPE	SM/BR	SM/BR
EXPANSION INDEX UBC STANDARD 18-2	17	10
EXPANSION CHARACTER	VERY LOW	VERY LOW

SULFATE CONTENT		
SAMPLE	TP1 @ 1'-5'	TP4 @ 1'-5'
SULFATE CONTENT: (PERCENTAGE BY WEIGHT)	<0.2%	<0.2%

COMPACTION/EXPANSION/SULFATE DATA SHEET

Geotechnologies, Inc.
Consulting Geotechnical Engineers

HILTON LOS ANGELES, UNIVERSAL CITY
555 UNIVERSAL HOLLYWOOD, UNIVERSAL CITY

FILE NO: 21578 | PLATE: D

SULFATE CONTENT

SAMPLE	B3 @ 15'	B3 @ 25'	B3 @ 30'	B4 @ 5'
SULFATE CONTENT: (percentage by weight)	> 0.20 %	> 0.20 %	> 0.20 %	< 0.10 %

ASTM D-1557

SAMPLE	B1 @ 1- 5'
SOIL TYPE:	SM/BEDROCK
MAXIMUM DENSITY pcf.	127.5
OPTIMUM MOISTURE %	10.8

ASTM D 4829

SAMPLE	B1 @ 1- 5'
SOIL TYPE:	SM/BEDROCK
EXPANSION INDEX UBC STANDARD 18-2	13
EXPANSION CHARACTER	VERY LOW

SULFATE CONTENT

SAMPLE	B1 @ 1'- 5'	B1 @ 12.5'	B1 @ 27.5'	B1 @ 37.5'	B2 @ 10'	B3 @ 25'
SULFATE CONTENT: (percentage by weight)	< 0.10 %	> 0.20 %	< 0.10 %	< 0.10 %	< 0.10 %	> 0.20 %

COMPACTION/EXPANSION/SULFATE DATA SHEET

Geotechnologies, Inc.
Consulting Geotechnical Engineers

HILTON UNIVERSAL CITY HOTEL

FILE NO. 21062 | **PLATE: D**

BOARD OF
BUILDING AND SAFETY
COMMISSIONERS

VAN AMBATIELOS
PRESIDENT

E. FELICIA BRANNON
VICE PRESIDENT

JOSELYN GEAGA-ROSENTHAL
GEORGE HOVAGUIMIAN
JAVIER NUNEZ

CITY OF LOS ANGELES
CALIFORNIA

ERIC GARCETTI
MAYOR

DEPARTMENT OF
BUILDING AND SAFETY
201 NORTH FIGUEROA STREET
LOS ANGELES, CA 90012

FRANK M. BUSH
GENERAL MANAGER
SUPERINTENDENT OF BUILDING

OSAMA YOUNAN, P.E.
EXECUTIVE OFFICER

GEOLOGY AND SOILS REPORT APPROVAL LETTER

February 23, 2017

LOG # 95877-01
SOILS/GEOLOGY FILE - 2
LAN

Hilton Los Angeles, Universal City
555 Universal Hollywood Drive
Los Angeles, CA 91608

TRACT: 5569
LOT(S): B
LOCATION: 555 Universal Hollywood Drive

CURRENT REFERENCE REPORT/LETTER(S)	REPORT No.	DATE(S) OF DOCUMENT	PREPARED BY
Addendum Report	21062	01/31/2017	Geotechnologies, Inc.

PREVIOUS REFERENCE REPORT/LETTER(S)	REPORT No.	DATE(S) OF DOCUMENT	PREPARED BY
Dept. Correction Letter	95877	12/21/2016	LADBS
Geology/Soils Report	21062	12/17/2015 rev. 02/12/2016	Geotechnologies, Inc.

The Grading Division of the Department of Building and Safety has reviewed the referenced report that provides recommendations for a proposed addition to the Hilton Hotel at Universal City. According to the report, the proposed addition will be located south of the existing hotel structure where currently there are descending slopes about 30 feet high at a gradient of 2:1 (H:V). The proposed addition is up to 18 stories high.

The earth materials at the subsurface exploration locations consist of compacted fill Topanga Formation bedrock. Bedding within the Topanga formation is reported to generally dip to the north, which is favorable for relative to the slope but north-facing temporary excavations will expose unsupported bedding. The consultants recommend to support the proposed hotel structure on conventional and/or drilled-pile foundations bearing on competent bedrock. Small independent structures, such as free-standing walls can be supported by fill or bedrock. Because of seepage observed in the exploratory borings, minor dewatering may be necessary during construction.

AN EQUAL EMPLOYMENT OPPORTUNITY - AFFIRMATIVE ACTION EMPLOYER

The referenced reports are acceptable, provided the following conditions are complied with during site development:

(Note: Numbers in parenthesis ( ) refer to applicable sections of the 2017 City of LA Building Code. P/BC numbers refer the applicable Information Bulletin. Information Bulletins can be accessed on the internet at LADBS.ORG.)

1. The geologist and soils engineer shall review and approve the detailed plans prior to issuance of any permits. This approval shall be by signature on the plans that clearly indicates the geologist and soils engineer have reviewed the plans prepared by the design engineer and that the plans include the recommendations contained in their reports. (7006.1)

2. All recommendations of the report that are in addition to or more restrictive than the conditions contained herein shall be incorporated into the plans.

3. A copy of the subject and appropriate referenced reports and this approval letter shall be attached to the District Office and field set of plans. Submit one copy of the above reports to the Building Department Plan Checker prior to issuance of the permit. (7006.1)

4. A grading permit shall be obtained for all structural fill and retaining wall backfill. (106.1.2)

5. All graded, brushed or bare slopes shall be planted with low-water consumption, native-type plant varieties to protect slopes against erosion. (7012)

6. All new graded slopes shall be no steeper than 2H:1V (7010.2 & 7011.2).

7. All man-made fill shall be compacted to a minimum 90 percent of the maximum dry density of the fill material per the latest version of ASTM D 1557. Where cohesionless soil having less than 15 percent finer than 0.005 millimeters is used for fill, it shall be compacted to a minimum of 95 percent relative compaction based on maximum dry density (D1556). Placement of gravel in lieu of compacted fill is allowed only if complying with Section 91.7011.3 of the Code. (7011.3)

8. Existing uncertified fill shall not be used for support of footings, concrete slabs or new fill. (1809.2, 7011.3)

9. Drainage in conformance with the provisions of the Code shall be maintained during and subsequent to construction. (7013.12)

10. The applicant is advised that the approval of this report does not waive the requirements for excavations contained in the State Construction Safety Orders enforced by the State Division of Industrial Safety. (3301.1)

11. Temporary excavations that remove lateral support to the public way, adjacent property, or adjacent structures shall be supported by shoring or constructed using ABC slot cuts. Note: Lateral support shall be considered to be removed when the excavation extends below a plane projected downward at an angle of 45 degrees from the bottom of a footing of an existing structure, from the edge of the public way or an adjacent property. (3307.3.1)

12. Prior to the issuance of any permit which authorizes an excavation where the excavation is to be of a greater depth than are the walls or foundation of any adjoining building or structure and located closer to the property line than the depth of the excavation, the owner of the subject site shall provide the Department with evidence that the adjacent property owner has been given a 30-day written notice of such intent to make an excavation. (3307.1)

13. Unsurcharged temporary excavations exposing unsupported geology and/or unsupported bedding planes shall be trimmed back along the lowest unsupported plane, or shored, as recommended.

14. The soils engineer shall review and approve the shoring and/or underpinning plans prior to issuance of the permit. (3307.3.2)

15. Prior to the issuance of the permits, the soils engineer and/or the structural designer shall evaluate the surcharge loads used in the report calculations for the design of the retaining walls and shoring. If the surcharge loads used in the calculations do not conform to the actual surcharge loads, the soil engineer shall submit a supplementary report with revised recommendations to the Department for approval.

16. Unsurcharged temporary excavations may be cut vertical up to 7 feet. For excavations over 7 feet, the lower 7 feet may be cut vertically and the portion of the excavation above 7 feet shall be trimmed back at a gradient not exceeding 1:1 (horizontal to vertical), as recommended.

17. Shoring shall be designed for the lateral earth pressures specified in the section titled "Shoring Design" starting on page 40 of the rev. 02/12/2016 report; all surcharge loads shall be included into the design. Total lateral load on shoring piles shall be determined by multiplying the recommended EFP by the pile spacing.

18. Shoring shall be designed for a maximum lateral deflection of ½ inch where a structure is within a 1:1 plane projected up from the base of the excavation, and for a maximum lateral deflection of 1 inch provided there are no structures within a 1:1 plane projected up from the base of the excavation, as recommended.

19. A shoring monitoring program shall be implemented to the satisfaction of the soils engineer.

20. A–B–C slot-cut method may be used for unsurcharged temporary excavations with each slot not exceeding 8 feet in height and not exceeding 8 feet in width, as recommended. The soils engineer shall verify in the field if the existing earth materials are stable in the slot cut excavation. Each slot shall be inspected by the soils engineer and approved in writing prior to any worker access.

21. Pile caisson and/or isolated foundation ties are required by Code Sections 1809.13 and/or 1810.3.13. Exceptions and modification to this requirement are provided in Information Bulletin P/BC 2014-030.

22. The group effects on lateral and axial behavior of the piles shall be included in the design of the deep foundation, as specified in the response to Item #4 included in the referenced report dated 01/31/2017. (1810.2.5)

23. When water over 3 inches in depth is present in drilled pile holes, a concrete mix with a strength of 1000 p.s.i. over the design p.s.i. shall be tremied from the bottom up; an admixture that reduces the problem of segregation of paste/aggregates and dilution of paste shall be included. (1808.8.3)

24. Slabs placed on approved compacted fill shall be at least 3½ inches thick and shall be reinforced with ½-inch diameter (#4) reinforcing bars spaced maximum of 16 inches on center each way.

25. The seismic design shall be based on a Site Class C as recommended. All other seismic design parameters shall be reviewed by LADBS building plan check.

26. Retaining walls shall be designed for the lateral earth pressures specified in the section titled "Retaining Wall Design" starting on page 33 of the report dated 12/17/2015 (rev. 02/12/2016) and in the response to Item #5 in the report dated 01/31/2017. Note: Where two separate stacked retaining walls (the upper wall surcharges the lower wall) are proposed, the lower of the 2 walls shall be designed for the combined height of the 2 walls. All surcharge loads shall be included into the design.

27. Retaining walls higher than 6 feet shall be designed for lateral earth pressure due to earthquake motions as specified on page 36 of the report (1803.5.12).

    Note: Lateral earth pressure due to earthquake motions shall be in addition to static lateral earth pressures and other surcharge pressures. The height of a stacked retaining wall shall be considered as the summation of the heights of each wall.

28. Retaining walls at the base of ascending slopes shall be provided with a minimum freeboard of 2 feet, as recommended.

29. The recommended equivalent fluid pressure (EFP) for the proposed retaining wall shall apply from the top of the freeboard to the bottom of the wall footing.

30. All retaining walls shall be provided with a standard surface backdrain system and all drainage shall be conducted to the street in an acceptable manner and in a non-erosive device. (7013.11)

31. With the exception of retaining walls designed for hydrostatic pressure, all retaining walls shall be provided with a subdrain system to prevent possible hydrostatic pressure behind the wall. Prior to issuance of any permit, the retaining wall subdrain system recommended in the soil report shall be incorporated into the foundation plan which shall be reviewed and approved by the soils engineer of record. (1805.4)

32. Installation of the subdrain system shall be inspected and approved by the soils engineer of record and the City grading/building inspector. (108.9)

33. Basement walls and floors shall be waterproofed/damp-proofed with an L.A. City approved "Below-grade" waterproofing/damp-proofing material with a research report number. (104.2.6)

34. Prefabricated drainage composites (Miradrain) (Geotextiles) may be only used in addition to traditionally accepted methods of draining retained earth.

35. The structure shall be connected to the public sewer system. (P/BC 2014-027)

36. All roof and pad drainage shall be conducted to the street in an acceptable manner; water shall not be dispersed on to descending slopes without specific approval from the Grading Division and the consulting geologist and soils engineer. (7013.10)

37. All concentrated drainage shall be conducted in an approved device and disposed of in a manner approved by the LADBS. (7013.10)

38. Prior to issuance of a permit involving de-watering, clearance shall be obtained from the Department of Public Works and from the California Regional Water Quality Control Board.

201 N. Figueroa Street 3rd Floor, LA	(213) 482-7045
320 W. 4th Street, Suite 200	(213) 576-6600 (LARWQB)

39. The area shall be de-watered under the direction of the consultants prior to beginning the excavation. Note, that a permit from the State of California Regional Water Quality Control Board and Department of Public Works shall be obtained to discharge the water into a storm drain.

201 N. Figueroa Street 3rd Floor, LA	(213) 482-7045
320 W. 4th Street, Suite 200	(213) 576-6600 (LARWQB)

40. Any recommendations prepared by the geologist and/or the soils engineer for correction of geological hazards found during grading shall be submitted to the Grading Division of the Department for approval prior to utilization in the field. (7008.2, 7008.3)

41. The geologist and soils engineer shall inspect all excavations to determine that conditions anticipated in the report have been encountered and to provide recommendations for the correction of hazards found during grading. (7008 & 1705.6)

42. All friction pile or caisson drilling and installation shall be performed under the inspection and approval of the geologist and soils engineer. The geologist shall indicate the distance that friction piles or caissons penetrate into competent [material] bedrock in a written field memorandum. (1803.5.5, 1704.9)

43. Prior to the pouring of concrete, a representative of the consulting soils engineer shall inspect and approve the footing excavations. He/She shall post a notice on the job site for the LADBS Building Inspector and the Contractor stating that the work so inspected meets the conditions of the report, but that no concrete shall be poured until the City Building Inspector has also inspected and approved the footing excavations. A written certification to this effect shall be filed with the Grading Division of the Department upon completion of the work. (108.9 & 7008.2)

44. Prior to excavation, an initial inspection shall be called with LADBS Inspector at which time sequence of construction, shoring, ABC slot cuts, pile installation, protection fences and dust and traffic control will be scheduled. (108.9.1)

45. Installation of shoring, slot cutting excavations and/or pile installation shall be performed under the inspection and approval of the soils engineer and deputy grading inspector. (1705.6)

46. The installation and testing of tie-back anchors shall comply with the recommendations included in the report or the standard sheets titled "Requirement for Tie-back Earth Anchors", whatever is more restrictive. (Research Report #23835)

47. Prior to the placing of compacted fill, a representative of the soils engineer shall inspect and approve the bottom excavations. He/She shall post a notice on the job site for the City Grading Inspector and the Contractor stating that the soil inspected meets the conditions of the report, but that no fill shall be placed until the LADBS Grading Inspector has also inspected and approved the bottom excavations. A written certification to this effect shall be included in the final compaction report filed with the Grading Division of the Department. All fill shall be placed under the inspection and approval of the soils engineer. A compaction report together with the approved soil report and Department approval letter shall be submitted to the Grading Division of the Department upon completion of the compaction. In addition, an Engineer's Certificate of Compliance with the legal description as indicated in the grading permit and the permit number shall be included. (7011.3)

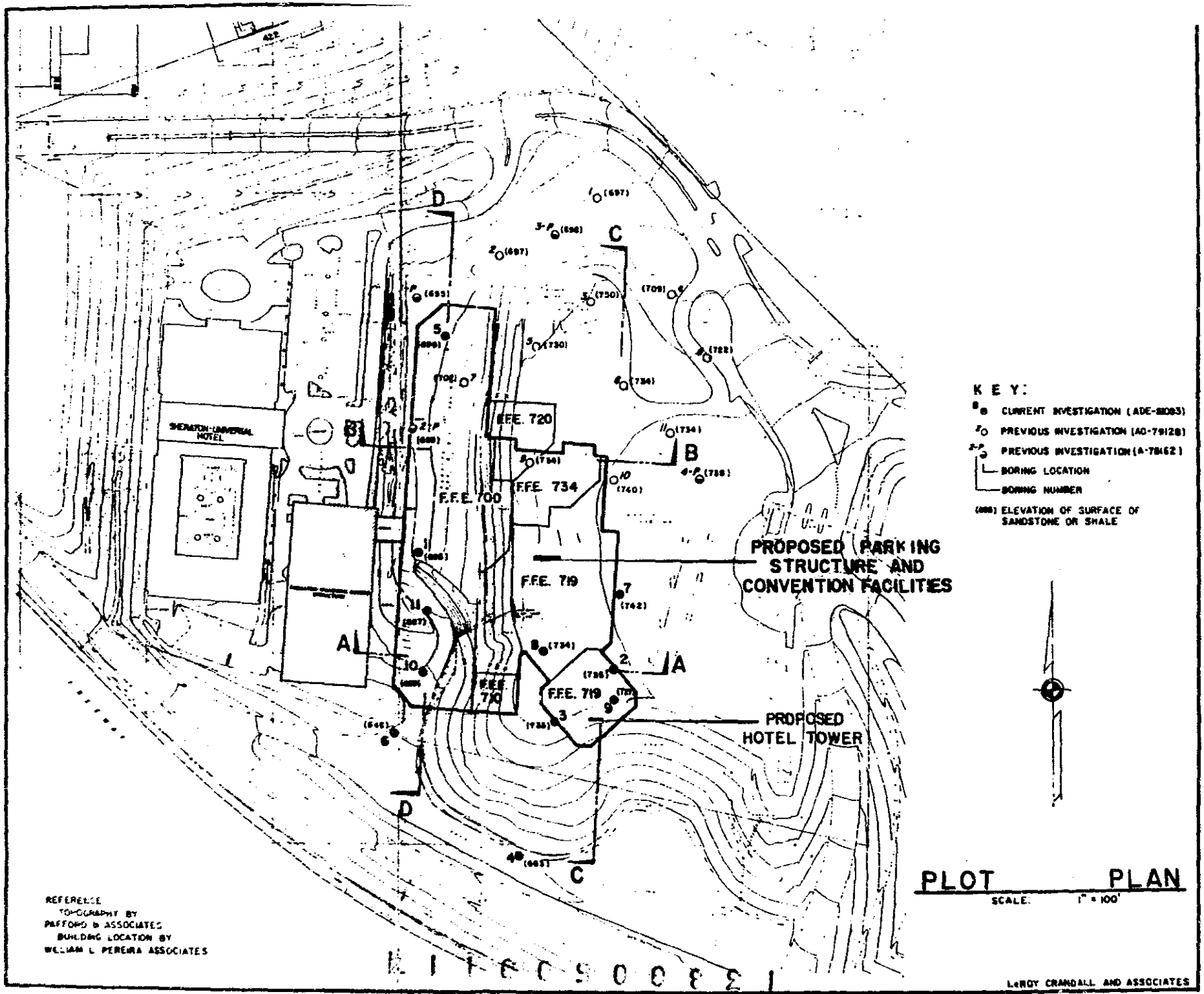
48. No footing/slab shall be poured until the compaction report is submitted and approved by the Grading Division of the Department.

DANIEL C. SCHNEIDEREIT
Engineering Geologist II

DAN L. STOICA
Geotechnical Engineer I

DCS/DLS:dcs/dls
Log No. 95877-01
213-482-0480

cc: Geotechnologies, Inc., Project Consultant
LA District Office

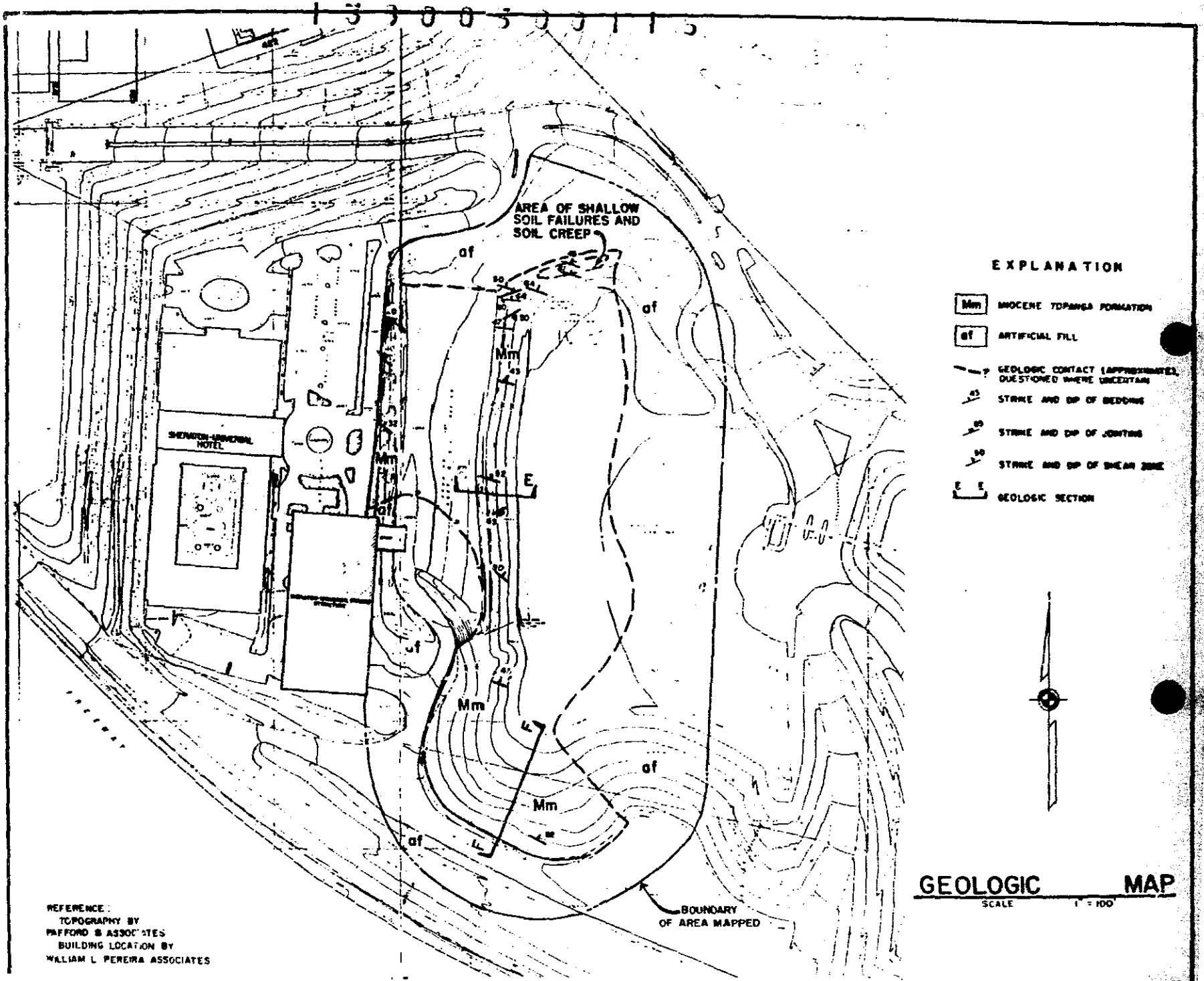


PLOT PLAN

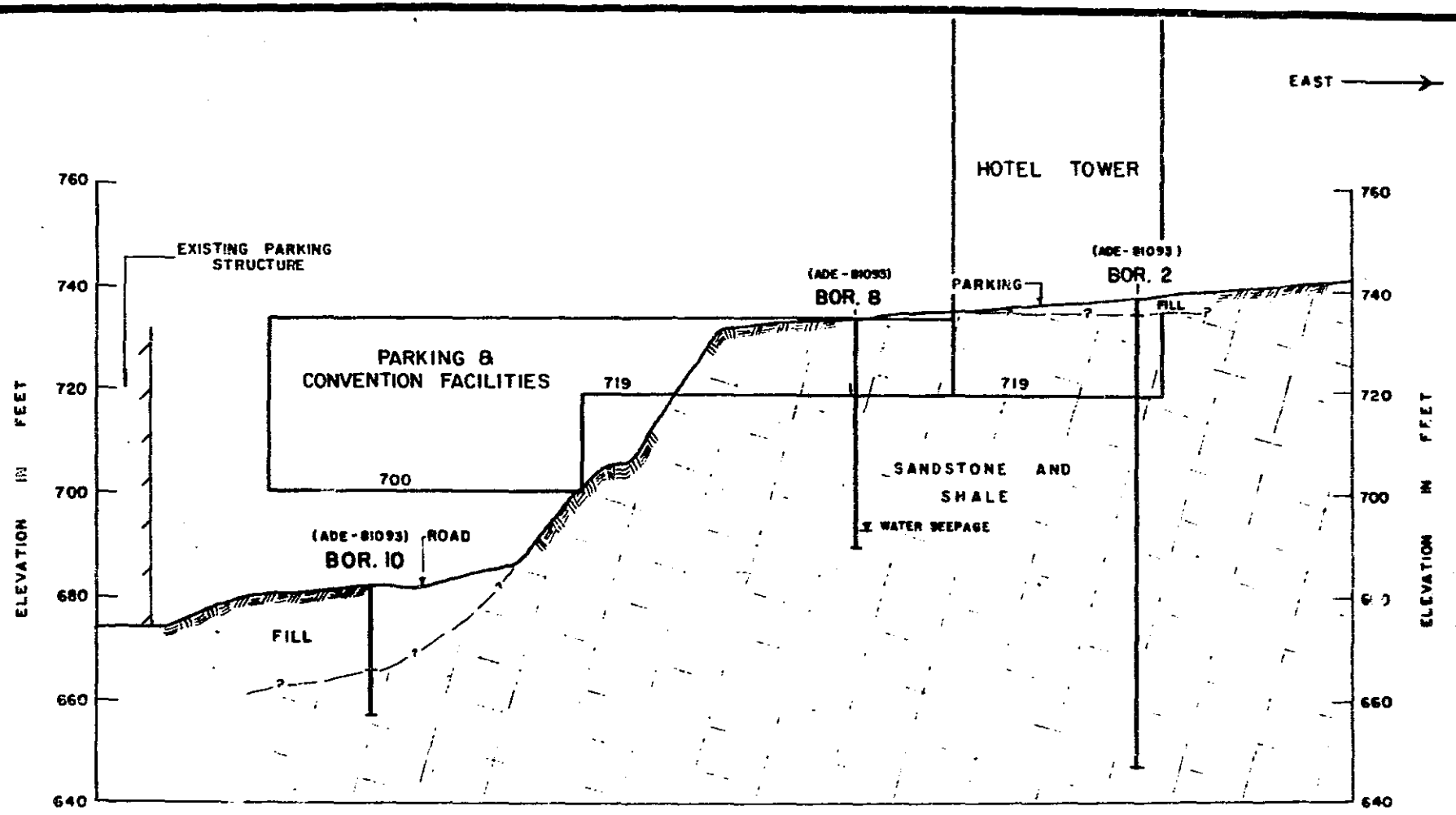
SCALE: 1" = 100'

LeROY CRANDALL AND ASSOCIATES

PLATE 1


AREA OF SHALLOW SOIL FAILURES AND SOIL CREEP
af
Mm
E
E
BOUNDARY OF AREA MAPPED
REFERENCE:
TOPOGRAPHY BY
PAFFORD & ASSOCIATES
BUILDING LOCATION BY
WILLIAM L PEREIRA ASSOCIATES
EXPLANATION
Mm MIOCENE TOPANGA FORMATION
af ARTIFICIAL FILL
GEOLOGIC CONTACT (APPROXIMATE), QUESTIONED WHERE UNCERTAIN
STRIKE AND DIP OF BEDDING
STRIKE AND DIP OF JOINTING
STRIKE AND DIP OF SHEAR ZONE
E E GEOLOGIC SECTION
GEOLOGIC MAP
SCALE 1" = 100'
LeROY CRANDALL AND ASSOCIATES

1330050116



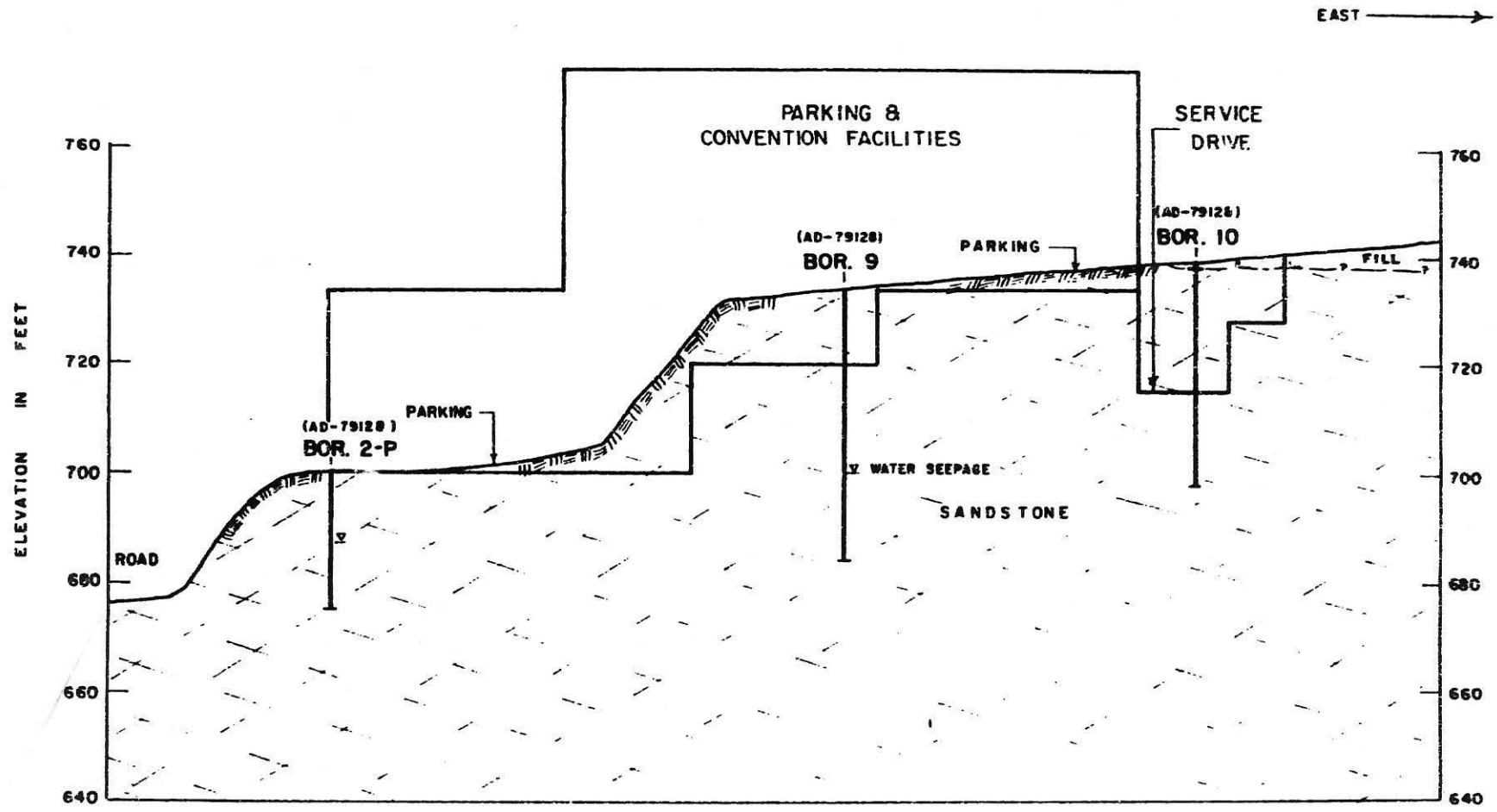
Notes:
Location of section shown on Plate 1.

Sections based on soil conditions at locations explored. Soil conditions between explorations have been interpolated and are not necessarily accurate.

SUBSURFACE SECTION A-A

HORIZONTAL SCALE 1"=40' VERTICAL SCALE 1"=20'

1 3 8 0 0 5 0 0 1 1 7



Notes:
Location of section shown on Plate 1.

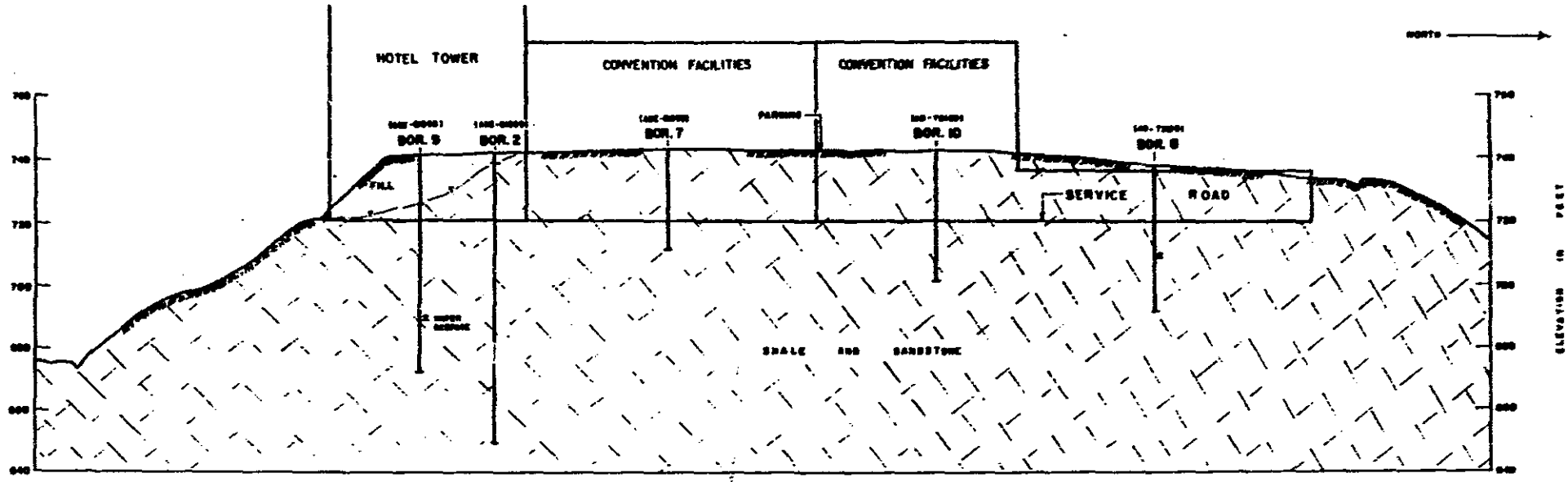
Sections based on soil conditions at locations explored. Soil conditions between explorations have been interpolated and are not necessarily accurate.

SUBSURFACE SECTION B-B

HORIZONTAL SCALE 1"=40' VERTICAL SCALE 1"=20'

LeROY CRANDALL AND ASSOCIATES

1 3 3 0 0 5 0 0 1 1 3



Notes:
Location of section shown on Plate 1.

Sections based on soil conditions at boreholes explored. Soil conditions between explorations have been interpolated and are not necessarily accurate.

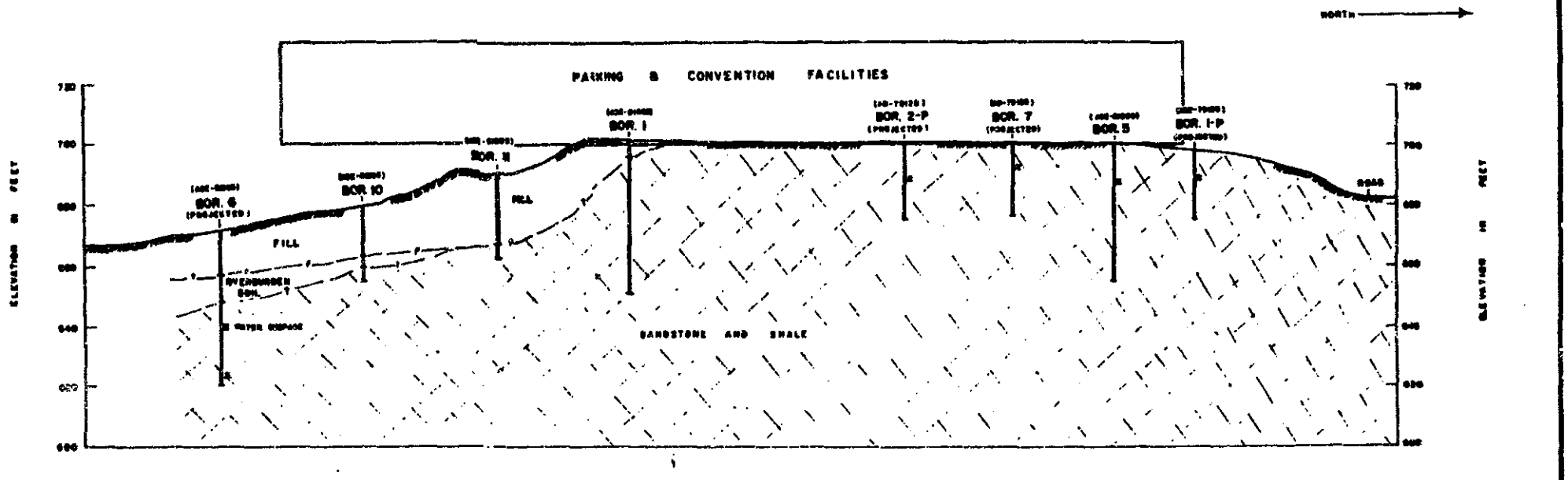
SUBSURFACE SECTION C-C

HORIZONTAL SCALE 1"=40' VERTICAL SCALE 1"=10'

LOUIS CAMPBELL AND ASSOCIATES

PLATE 9

1 3 3 0 0 5 0 0 1 1 9



Notes:
Location of section shown on Plate 1.

Sections based on soil conditions at locations explored. Soil conditions between explorations have been interpolated and are not necessarily accurate.

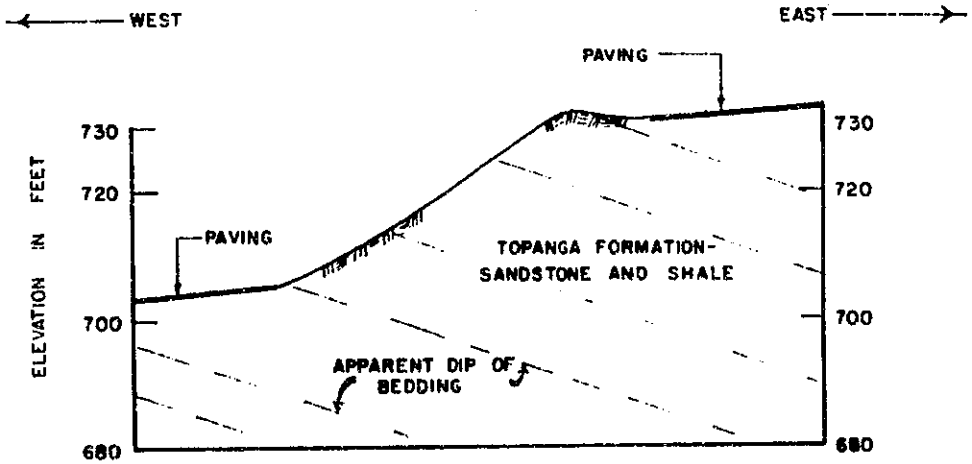
SUBSURFACE SECTION D-D

HORIZONTAL SCALE 1"=40' VERTICAL SCALE 1"=20'

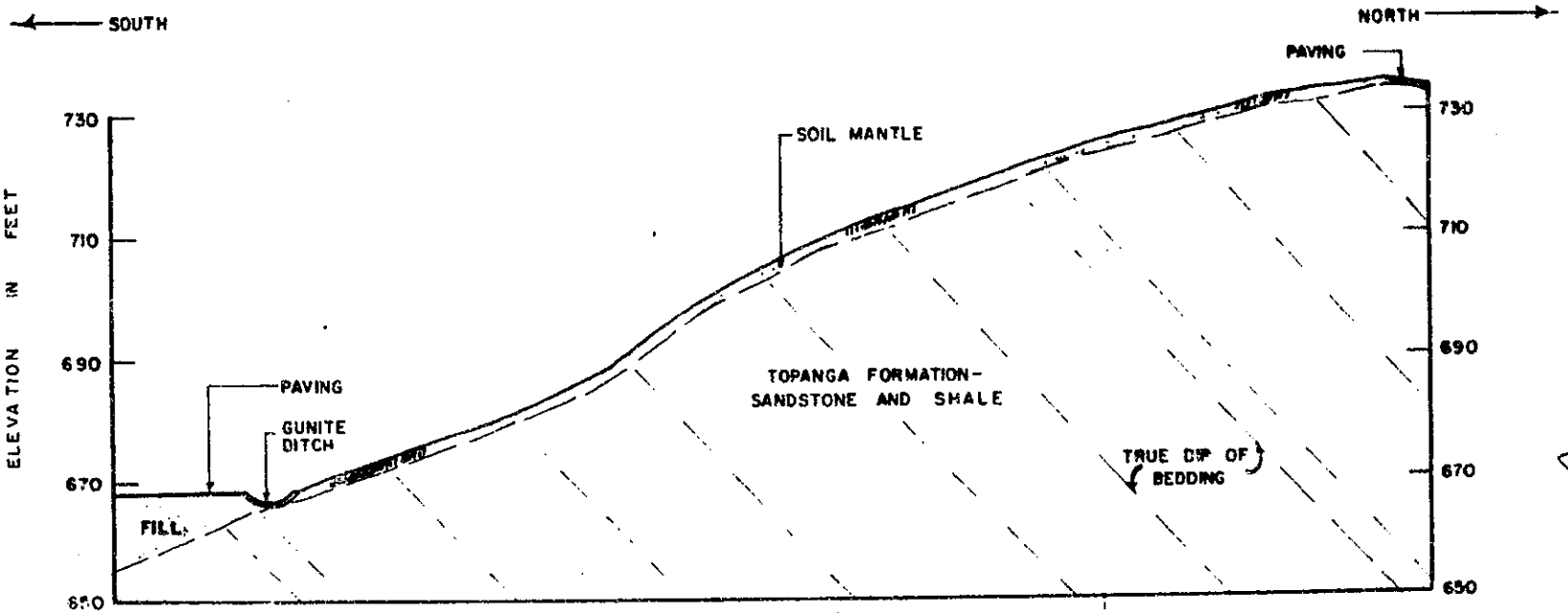
LUDDY CRANDALL AND ASSOCIATES

PLATE D-D

1 3 3 0 0 5 0 0 1 2 0



SECTION E-E



SECTION F-F

GEOLOGIC SECTIONS

Note:

BORING 3

DATE DRILLED March 20 & 21, 1961

EQUIPMENT USED 5"-Diameter Rotary Wash

ELEVATION 734

ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD. PEN. TEST	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	DRIVE ENERGY (ft.-lbs./ft.)	SAMPLE LOC.
			6.1	106	14	
730	5		15.4	112	14	
			7.8	109	6	
725	10		11.8	114	14	
720	15		6.2	117	20	
715	20		9.3	118	43	
710	25		9.4	120	48	
705	30		20.9	104	16	

ML

2" Asphaltic Paving

FILL - SANDY SILT - pieces of Sandstone, brown

SANDSTONE - fine, weathered, some shale interbeds, light brown and light grey

SANDSTONE and SHALE - interbedded, weath brown and grey

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES

(CONTINUED ON FOLLOWING PLATE)

LOG OF BORING

BORING 3 (CONTINUE

DATE DRILLED March 30 & 31, 1951

EQUIPMENT USED 5"-Diameter Rotary Wash

ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD PEN. TEST	MOISTURE (% of dry wt.)	DRY DENSITY (lbs/cu ft)	DRIVE ENERGY (ft-lbs/ft)	SAMPLE LOC	
		21.0	105	11			Light brown
700	35	19.2	107	8			
		11.3	117	38			Light and dark grey
695	40						
		13.9	116	48			
690	45	12.6	118	38			
685	50	13.6	113	64			
680	55	13.2	117	35			Dark grey
675	60	13.5	120	38			

NOTE THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES

(CONTINUED ON FOLLOWING PLATE)

LOG OF BORING

BORING 3 (CONTINUE

DATE DRILLED March 20 & 21, 1981

EQUIPMENT USED 5"-Diameter Rotary Wash

ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD PEN. TEST	MOISTURE (% of dry wt.)	DRY DENSITY (lbs/cu ft.)	DRIVE ENERGY (ft-lbs/ft.)	SAMPLE LOC
670	65	13.3	120	64		
665	70					
660	75	14.5	111	55		
655	80					
650	85					
645	90	14.1	119	55		

NOTE: Drilling mud used in drilling process.
Water level not established.

NOTE THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES

LOG OF BORING

LeROY CRANDALL AND ASSOCIATES

BORING 4

DATE DRILLED March 16, 1951

EQUIPMENT USED 24" [illegible]

ELEVATION 670

ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD PEN. TEST	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu ft.)	DRIVE ENERGY (ft.-lbs./ft.)	SAMPLE LOC
			16.4	103	7	
			14.5	114	5	
665	5		14.1	95	2	
			17.1	106	7	
660	10		14.3	114	26	
			12.7	117	26	
655	15					
			9.2	117	28	
650	20					
			12.1	111	16	
645	25					

ML

21" Asphaltic [illegible]

FILL - SANDY SILT - some Clay, pieces of Sandstone, brown

SANDSTONE and SHALE - interbedded, weather light brown and grey

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES

(CONTINUED ON FOLLOWING PLATE)

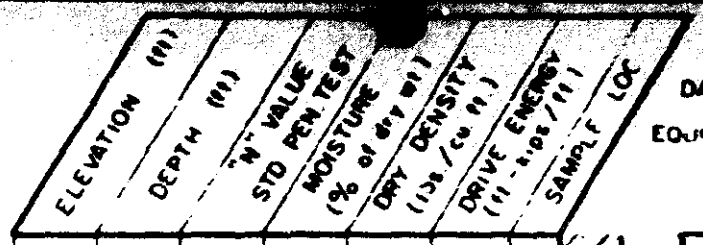
LOG OF BORING

LEROY CRANDALL AND ASSOCIATE

BORING 4 (CONTINUE

DATE DRILLED March 16, 1971

EQUIPMENT USED 24"-Diameter Bucket



ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD PEN TEST	MOISTURE (% of dry wt)	DRY DENSITY (lbs/cu ft)	DRIVE ENERGY (ft-lbs/ft)	SAMPLE LOC
640		12.7	119	55		
635		11.1	112	55		
630		19.0	110	6		
625		20.2	107	39		
620						

BORING TERMINATED DUE TO DIFFICULT DRILLING

Water encountered at [illegible] measured at 41' at completion of drilling and at 40' 15 minutes later. No caving.

NOTE THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREIN APPLIES ONLY AT THE SPECIFIC BORING LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES

LOG OF BORING

DATE DRILLED March 31, 1960

EQUIPMENT USED 24 -Diameter Bucket

ELEVATION 670

ELEVATION	DEPTH	STRUCTURE	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu.ft.)	DRIVE ENERGY (ft.-lbs./ft.)	SAMPLE LOG		
								2" Asphaltic Paving FILL - SHALE - some sandstone, brown
			12.0	109	6			
665	5							
			14.9	111	8			
660	10		16.9	106	6			
			17.7	109	2		ML	SANDY SILT - few Shale fragments, dark brown
655	15						CL	SANDY CLAY few Shale fragments, brown
			13.9	108	5			
			13.4	109	5			
650	20							
			16.9	108	5			SHALE - highly weathered, fractured, light brown Bedded with Sandstone interbeds Layer of fine grained Sandstone
645	25		12.5	120	32			

B6 1/2

(CONTINUED ON FOLLOWING PLATE)

NOTE THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES

LOG OF BORING

LeROY CRANDALL AND ASSOCIATES

[illegible] CONTINUED

DATE DRILLED March [illegible], 196[illegible]

EQUIPMENT USED 24"-Diameter Bucket

ELEVATION	DEPTH	[illegible]	[illegible]	[illegible]	DRIVE ENERGY (ft-kips/ft)	SAMPLE LOG
640	30		16.0	113	28	
635	35		13.3	120	39	
630	40		13.1	113	53	
625	45		13.6	120	48	
620	50					

B6 2/2

Some Sandstone interbeds

Cemented layers

SANDSTONE - fine, light brown

Cemented

(BORING TERMINATED DUE TO DIFFICULT DRILLING)

NOTE: Slight water seepage encountered at 33'. Water seepage at 42½'. Water level measured at 49' at completion of drilling and at 48½' 10 minutes later. No caving.

NOTE THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES

LOG OF BORING

LeROY CRANDALL AND ASSOCIATES

BORING 7

DATE DRILLED April 1, 1981

EQUIPMENT USED 24"-Diameter Bucket

ELEVATION 742

ELEVATION (ft)	DEPTH (ft)	"N" DATA STD PENETRATION	MOISTURE (% of dry wt)	DRY DENSITY (lbs/cu ft)	DRIVE ENERGY (ft-kips/ft)	SAMPLE LOC	
							2" Asphaltic Paving
740							SHALE - fractured, weathered, some Sandstone interbeds, light brown and grey
			17.8	104	24		
	5						SANDSTONE - fine, some Shale interbeds, light brown and grey
735			4.5	120	53		
							SHALE - bedded, some Sandstone interbeds, light brown and grey
	10		21.1	102	29		Cemented layer (USED CORING BUCKET)
730			17.5	110	27		
	15						
725			18.1	107	26		Cemented layer (USED CORING BUCKET)
	20						
720			19.2	104	32		Bluish-grey (USED CORING AND CHOPPING BUCKET)
	25						
715							
	30						(BORING TERMINATED DUE TO DIFFICULT DRILLI
710							
	35						

B7

NOTE: Water not encountered. No caving.

NOTE THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES

A-6 13 DATE 22 JOHN E W KD

0900010062

LOG OF BORING

LeROY CRANDALL AND ASSOCIATES

PLATE A-1

BORING 8

DATE DRILLED April 1, 1981

EQUIPMENT USED 24"-Diameter Bucket

ELEVATION 734

ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD. PEN. TEST	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	DRIVE ENERGY (ft.-kips/ft.)	SAMPLE LOC.	
							2" Asphaltic Paving SHALE - bedded, weathered, some Sandstone interbeds, light brown
730							Light brown and light grey
	5		20.5	106	24	■	
725							
	10		19.9	105	17	■	
720			19.7	108	32	■	
	15		15.6	111	22	■	
715			14.3	111	19	■	Layer of Sandstone
	20						
710			10.4	111	19	■	
	25						(USED CORING BUCKET INTERMITANTLY FROM 26' to 29½')
705			13.3	110	21	■	
	30						
700			17.5	110	23	■	
	35						
695			12.3	115	14	■	SANDSTONE - fine, some Shale interbeds, light grey
	40						
690							Cemented (BORING TERMINATED DUE TO DIFFICULT DRILLING)
	45						

NOTE: Water seepage encountered at 41'. Water level measured at 44' at completion of drilling and at 43½' 10 minutes later. No caving.

B8

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

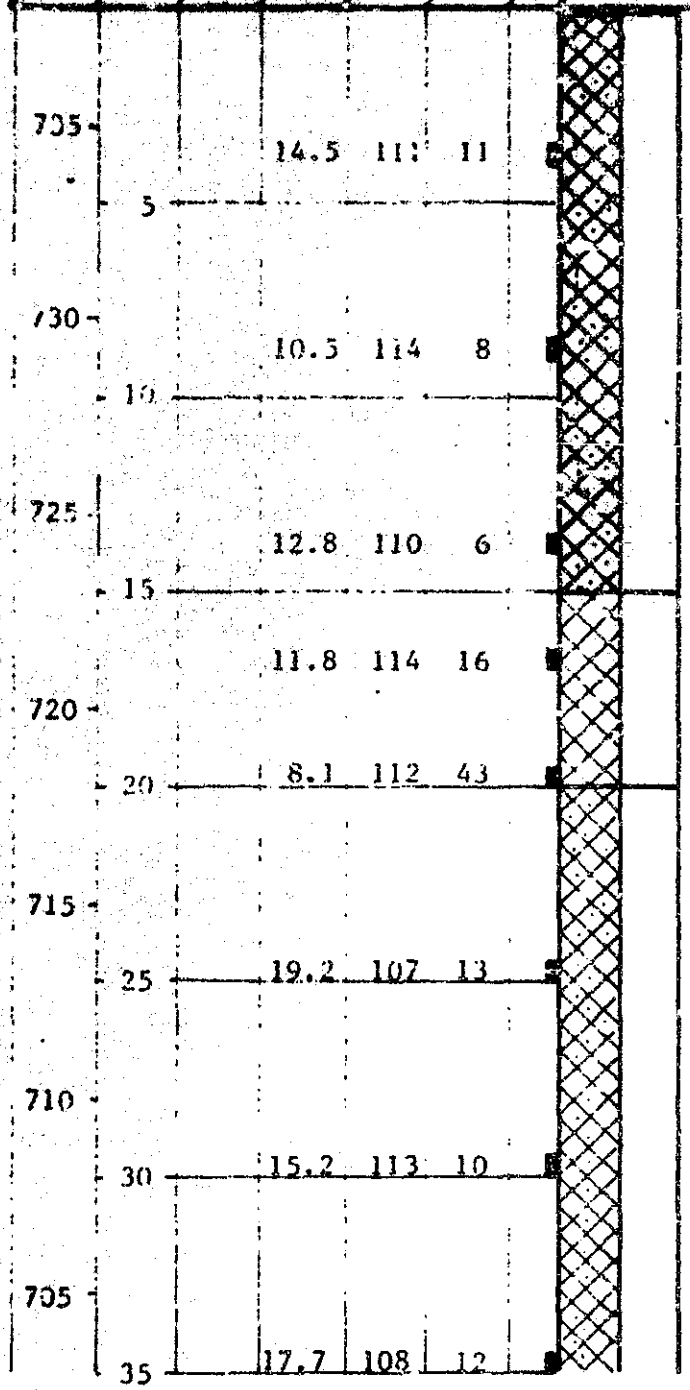
LOG OF BORING

LeROY CRANDALL AND ASSOCIATES

DATE DRILLED [illegible]

EQUIPMENT USED 24"-Diameter Bucket

ELEVATION 738



2" Asphaltic Paving

FILL - SHALE and SANDSTONE - light brown

B9 1/2

SHALE - bedded, fractured, some Sandstone interbeds, light brown and light grey

SANDSTONE - fine, Shale interbeds, light brown

(CONTINUED ON FOLLOWING PLATE)

NOTE THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES

U7JUU4UU64

LOG OF BORING

LeROY CRANDALL AND ASSOCIATES

PLATE A-1.9

[illegible] CONTINUED

DATE DRILLED April [illegible], [illegible]

EQUIPMENT USED 24"-Diameter Bucket

ELEVATION	DEPTH	STD. [illegible]	[illegible] (% of [illegible])	CAT. [illegible] (lbs./cu.ft.)	DRIVE ENERGY (ft.-lbs./ft.)	SAMPLE [illegible]	
700							
	40		11.4	103	32		
695							
	45		10.7	124	36		
690							
	50		16.5	111	11		Light grey
685							No Shale, grey
	55		13.3	120	26		
680							Slightly cemented from 57½' to 63' (USED CORING BUCKET FROM 57½' to 68½')
	60						
675							
	65		12.6	113	24		
670							(BORING TERMINATED DUE TO DIFFICULT DRILLI
	70						

B9 2/2

NOTE: Slight water seepage encountered at 52'. No caving.

NOTE THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES

0900040065

LOG OF BORING

LeROY CRANDALL AND ASSOCIATE

PLATE A-

Form 124

BORING 3 (Previous Job AD-79128)

DATE DRILLED: May 18, 1979

EQUIPMENT USED 5"-Diameter Rotary Wash

ELEVATION 730

ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD. PEN. TEST	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	DRIVE ENERGY (ft-lbs/ft.)	SAMPLE LOC.
		24.7	90	7		
725	5	10.1	102	13		
720	10	24.0	94	8		
715	15	9.2	122	50		
710	20	12.1	110	50		
705	25	16.7	110	50		
		14.4	110	50		
700	30	15.5	111	50		
695	35					

2½" Asphaltic Paving

SANDSTONE and SILTSTONE - fine, interbedded weathered and fractured, yellowish-brown and grey with some light reddish-brown stains

(CONTINUED ON FOLLOWING PLATE)

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

ADR-8/1093

LOG OF BORING

LeROY CRANDALL AND ASSOCIATES

BORING 3 (CONTINUED) (Previous Job AD-79128)

DATE DRILLED: May 18, 1979

EQUIPMENT USED: 5"-Diameter Rotary Wash

ELEVATION (ft.)	DEPTH (ft.)	"N" VALUE STD. PEN. TEST	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	DRIVE ENERGY (ft.-lbs./ft.)	SAMPLE LOC.
			12.0	114	50	
690	40		13.3	114	75	
685	45		14.5	117	80	
680	50		15.0	115	70	
675	55		17.8	109	70	
670	60		15.2	114	72	
665	65					

Cemented layer

Grey and dark grey

NOTE: Drilling mud used in drilling process. Wa level not established. 3" PVC pipe instal to a depth of 59½'. Annular space around outside of pipe backfilled with grout.

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

AD-79128

LOG OF BORING

LeROY CRANDALL AND ASSOCIATI

BORING 5 (Previous AD-7912)

DATE DRILLED: May 23, 1979

EQUIPMENT USED: 24"-Diameter Bucket

ELEVATION 730

ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD. PEN. TEST	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	DRIVE ENERGY (ft.-kips/ft.)	SAMPLE LOC.
725	5					
720	10		4.9	126	96	
715	15		12.5	112	24	
710	20		13.9	114	22	
705	25		17.0	112	32	
			13.0	110	13	
700	30					

2-3/4" Asphaltic Paving
SANDSTONE - fine, weathered and slightly fractured, bedded, light brown

Bedded with thin layers of Shale, grey

Light reddish-brown

SHALE and SANDSTONE - interbedded, few cemented layers, slightly weathered and fractured, grey

(CONTINUED ON FOLLOWING PLATE)

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

LOG OF BORING

LeROY CRANDALL AND ASSOCIA

BORING 5 (Previous Jo
(CONTINUED) AD-79128)

DATE DRILLED: May 23, 1979

EQUIPMENT USED: 24"-Diameter Bucket

ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD. PEN. TEST	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	DRIVE ENERGY (ft.-lbs./ft.)	SAMPLE LOC.
			14.4	118	24	
695	35		17.8	111	24	
690	40		15.1	115	16	
685	45		11.4	107	18	
680	50		15.7	111	36	
675	55		14.3	120	36	
670	60		13.8	116	48	

Cemented layer (CORE BUCKET USED TO PENETRATE)

NOTE: Slight water seepage encountered at a dept of 53'. No caving.

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

ADE-81093

LOG OF BORING

LeROY CRANDALL AND ASSOCIATE

BORING 6 (Previous Job AD-79128)

DATE DRILLED: May 24, 1979

EQUIPMENT USED: 24"-Diameter Bucket

ELEVATION 732

ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD. PEN. TEST	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	DRIVE ENERGY (ft.-kips/ft.)	SAMPLE LOC.
730	0		17.2	112	6	
725	5		16.1	106	3	
	10		16.0	109	5	
720			14.2	100	16	
715	15		10.3	110	40	
	20		19.5	106	22	
710			16.8	113	19	
705	25		14.8	113	48	
	30		16.4	113	23	
700	35					

SM/ML 3" Asphaltic Paving - 6" crushed rock and Sand base
FILL - SILTY SAND and SILT (crushed Sandstor and Shale) - fine, mottled light brown an grey

ML FILL - CLAYEY SILT - occasional pieces of organic matter, brownish-grey

CL SILTY CLAY - few fragments of Shale, greyis brown

SHALE - highly weathered and fractured, mottled light brown and grey

CONGLOMERATE - gravel and cobbles (up to 8' in diameter) in a Sandstone matrix, ligh brown

SANDSTONE - fine, weathered, bedded with t layers of Shale, light brown

NOTE: Water not encountered. No caving.

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

LOG OF BORING

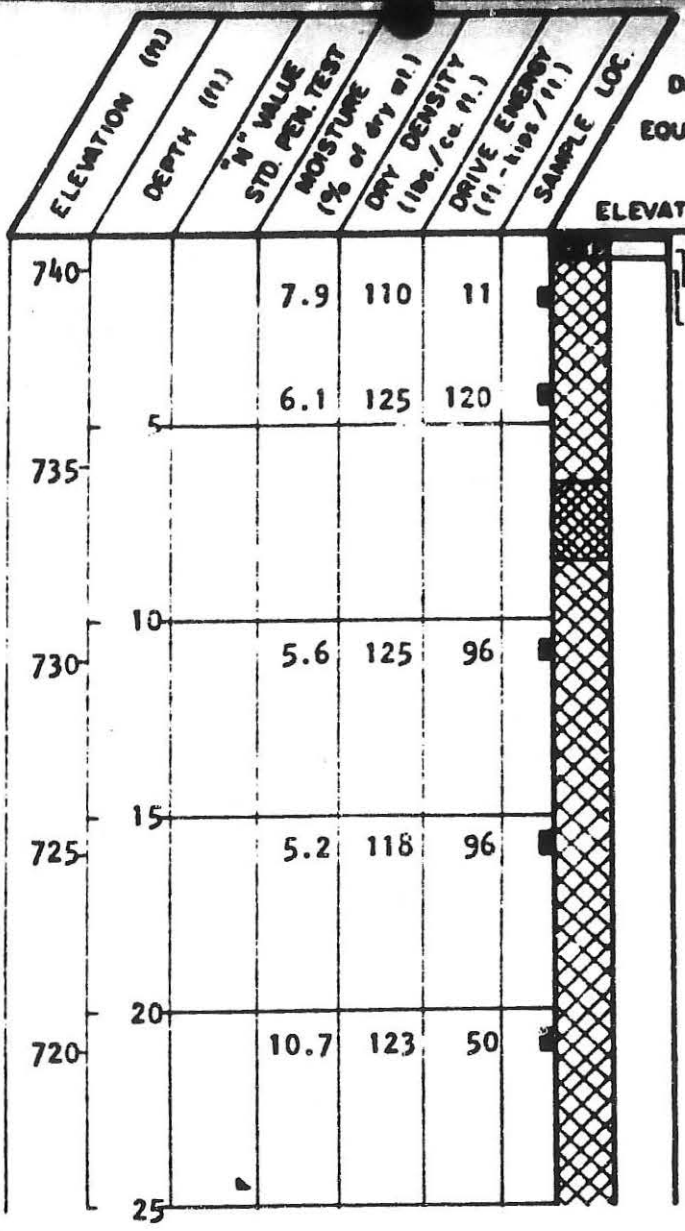
LeROY CRANDALL AND ASSOCIATES

BORING 10 (Previous Job AD-79128)

DATE DRILLED: May 21 and 22, 1979

EQUIPMENT USED: 24"-Diameter Bucket

ELEVATION 741



2½" Asphaltic Paving
FILL - SILTY SAND - fine, light brown
SANDSTONE - fine, weathered, thick bedded, light brown

Highly cemented layer (GAD, CHOPPING BUCKET AND CORING BUCKET USED TO PENETRATE)

Few beds of Shale, grey

(CONTINUED ON FOLLOWING PLATE)

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

LOG OF BORING

LeROY CRANDALL AND ASSOCIATES

BORING 10 (CONTINUED) (Previous Job AD-79128)

DATE DRILLED: May 21 and 22, 1979

EQUIPMENT USED: 24"-Diameter Bucket

ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD. PEN. TEST	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	DRIVE ENERGY (ft.-lbs./ft.)	SAMPLE LOC.
715			13.8	114	28	
			10.5	105	48	
	30					
710			9.9	111	34	
	35					
705			16.6	105	48	
	40					
700						
	45					

Thin bedded with layers of Shale and Sandstone, light brown and grey

Highly cemented (CORING BUCKET USED TO PENETRATE)

NOTE: Water not encountered. No caving.

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

ADE-8093

LOG OF BORING

LeROY CRANDALL AND ASSOCIATES

PLATE D-1

LeROY CRANDALL AND ASSOCIATES [illegible] geotechnical engineers, 711 [illegible] st., Los Angeles, CA [illegible], (213) 413-3650

January 20, 1982

MCA Development Company
100 Universal City Plaza
Universal City, California 91608

(Our Job No. B-81178)

Attention: Mr. Hector Mecca

Gentlemen:

Inspection and Testing of Compacted Fill
Proposed MCA/Sheraton Hotel No. 2
3838 Lankershim Boulevard
Lot 1, Tract 27621
Universal City, Los Angeles, California
for the MCA Development Company

SCOPE

This report provides a formal record of our inspection and testing of the compacted fill placed to grade the site for the proposed MCA/Sheraton Hotel No. 2 development. The location of the site is shown, with relation to project coordinates, on the attached Plot Plan. The inspection work was performed during the months of September and October, 1981. The scope of our inspection services did not include the responsibility for job safety. We previously performed a geotechnical investigation of the site, and submitted our recommendations in a report dated May 28, 1981 (our Job No. ADE-81093).

Our professional services have been performed using that degree of care and skill ordinarily exercised, under similar circumstances, by reputable geotechnical engineers practicing in this or similar localities. No other warranty, expressed or implied, is made as to the professional opinions included in this report.

INSPECTION AND TESTING OF COMPACTED FILL

The earthwork for the project consisted of the placement of compacted fill to grade the westerly portion of the site for the proposed hotel development and provide support for the building floor slab, as well as subgrade support for adjacent walks and slabs. The main building foundations will extend into firm natural materials. The compacted fill, however, could be used to support minor structures such as low retaining walls and planter walls which are structurally separate from the major structures. The specifications required that the fill be compacted to at least 90% of the maximum density obtainable by the ASTM Designation D1557-70 method of compaction.

The soils used for the required filling consisted of on-site sandstone. A compaction test was performed on a representative sample of the soils, to establish the maximum dry density. The test was performed in accordance with the specified method of compaction, which utilizes a 1/30-cubic-foot mold in which each of five layers of soil is compacted by 25 blows of a ten-pound hammer falling 18 inches. The results of the compaction test were used in establishing the degree of compaction achieved during the placing of the fill.

After the site was stripped and cleared, the existing fill and disturbed natural soils were excavated. Following the required excavation,

the resultant exposed natural soils were scarified to a depth of six inches, brought to approximately optimum moisture content, and rolled with heavy compaction equipment. The required fill materials were then placed in loose lifts not exceeding eight inches in thickness, brought to approximately optimum moisture content, and compacted. Scrapers, a dozer, and a sheepsfoot roller were used to compact the fill. Moisture was added by spraying with a water truck. To establish the degree of compaction achieved, ASTM 1556 sand-cone field density tests were made as the filling progressed. The results of the field density tests are presented in the attached Table of Test Results; the locations of the tests are shown on the Plot Plan.

At the locations and elevations tested by us, the fill was compacted to 90% or better of the maximum dry density. During the grading, we made site observations and to the best of our knowledge and belief feel that the work, in general, was performed in compliance with the report, plans, and specifications prepared for the project. Our testing of the compacted soils work, however, does not imply a guarantee or warranty of the contractors' work.

We understand that the major building foundations will extend into the sandstone and shale underlying the site. However, as indicated in our foundation investigation report, minor structures such as low retaining walls and planter walls which are structurally separate from the major structures may be supported on spread footings established in either properly compacted fill or the natural soils. Such footings may be designed to impose a dead plus live load pressure of 2,000 pounds per square foot at a depth of two feet below the adjacent grade. A one-third increase may be used for wind or seismic loads.

[redacted]

This final report is limited to the earthwork performed through October 21, 1981, the date of our last inspection and testing of compacted soils work for the project.

Yours very truly,

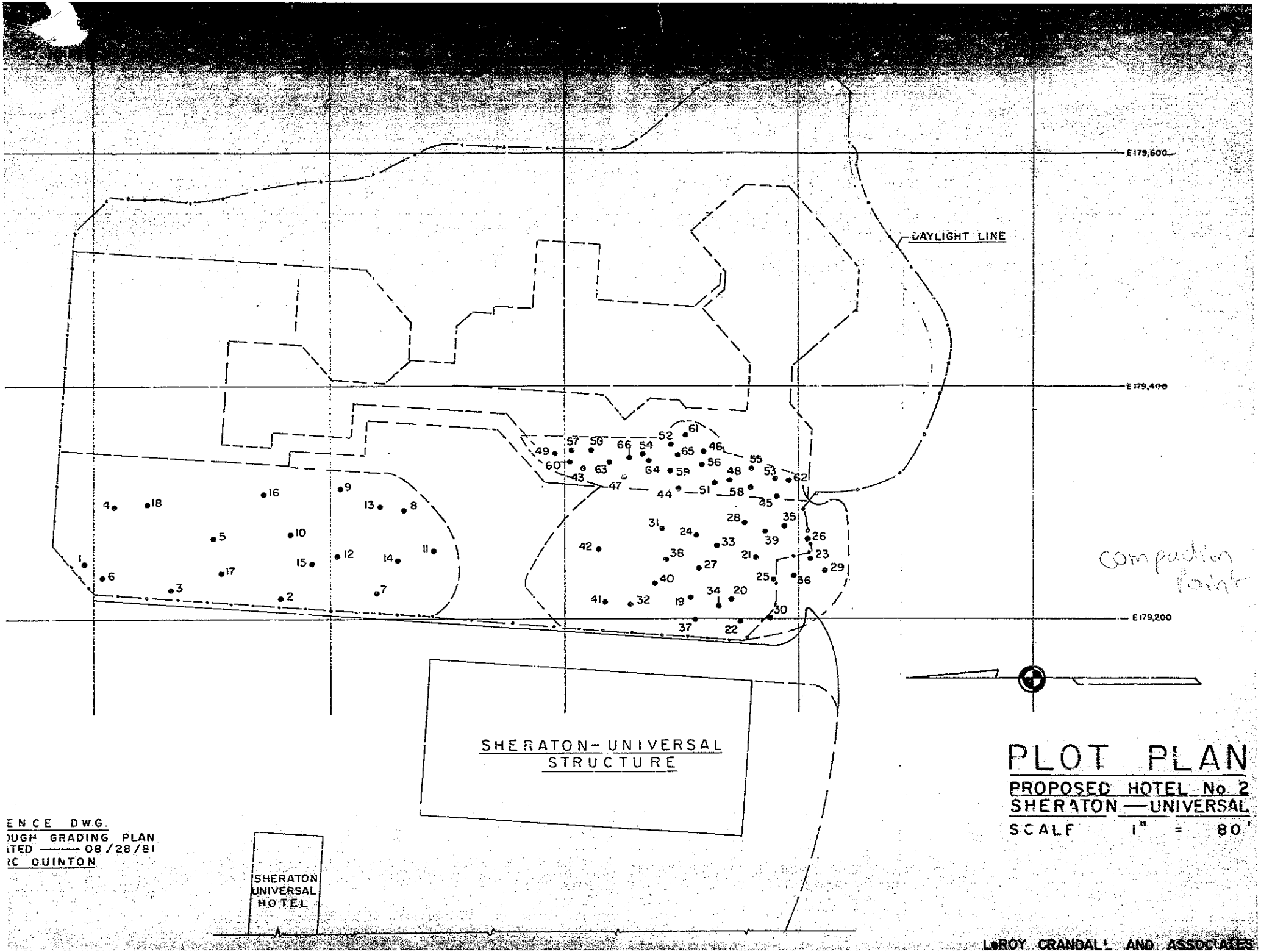
LeROY CRANDALL AND ASSOCIATES

by Russell C. Weber, R.C.E. 8954
Senior Vice President

RW-JA/lb
Attachments (2)
(4 copies submitted)

cc: (2) PRC Quinton
(2) L.A. Dept. of Bldg. & Safety (Dwntn)
(1) L.A. Dept. of Bldg. & Safety (W.L.A.)

63 & 64 are the tests



PLOT PLAN

PROPOSED HOTEL No 2
SHERATON — UNIVERSAL

SCALE 1" = 80'

ENCE DWG.
OUGH GRADING PLAN
ITED —— 08/28/81
RC QUINTON

LeROY CRANDALL AND ASSOCIATES

JOB NO. B-81178

CITY OF LOS ANGELES

DEPARTMENT OF BUILDING AND SAFETY

ENGINEER'S CERTIFICATE OF COMPLIANCE FOR COMPACTED EARTH FILLS

LOCATION OF FILL: TRACT NO. 27621 LOT NOS. 1

JOB ADDRESS: 3838 Lankershim Boulevard, Universal City, California

SOIL TESTING AGENCY: LeRoy Crandall and Associates

PROPERTY OWNER'S NAME: MCA Development Company

OWNER'S ADDRESS: 100 Universal City Plaza, Universal City, California 91608

PER REPORT ON OUR PROJECT NO. ADE-81093

DATE WORK STARTED ON PROJECT: September 23, 1981

DATE FILL WAS COMPLETED: October 21, 1981

DATE OF THIS CERTIFICATE: January 20, 1982

TO THE SUPERINTENDENT OF BUILDING:

*I hereby certify that I have personally inspected and tested the placing of compacted earth fill on the above described property, and on the basis of these inspections and tests it is my opinion that the same was placed in conformity with the requirements of the Los Angeles City Building Code.

Russell C. Weber

Civil Engineer Russell C. Weber

California Certificate No. 8954

*For the purpose of this Certificate, to "have personally inspected and tested" shall include inspection and testing performed by any person or persons responsible to, the licensed engineer signing this certificate. Where the inspection and testing of all or part of the work above is delegated, full responsibility shall be assumed by the licensed engineer whose signature is affixed thereon.

CITY OF LOS ANGELES
CALIFORNIA

TOM BRADLEY
MAYOR

JACK M. PRATT
GENERAL MANAGER

DEPARTMENT OF
BUILDING AND SAFETY
402, CITY HALL
LOS ANGELES, CALIF. 90012

TUNG FILE

MCA Development Co.
100 Universal City Plaza
Universal City, CA 91608
Attn: Hector Mecca

TRACT : 27621
LOT(S) : 1
LOCATION: 3838 Lankershim Blvd.

DATE : March 25, 1982
PERMIT: LA 30757/81
D M # : 7322

SUBJECT : PRIMARY STRUCTURAL FILL

Fill soil classification, per Table 28-A

Lots having compacted fill: 1

Reference: Department Letter dated March 23, 1982

Approval is granted for compacted fill constructed on the above lots as described in the compaction report No. B-81178 prepared by Le Roy Crandall & Associates

Approval is limited to the area shown in the report and by the following requirements:

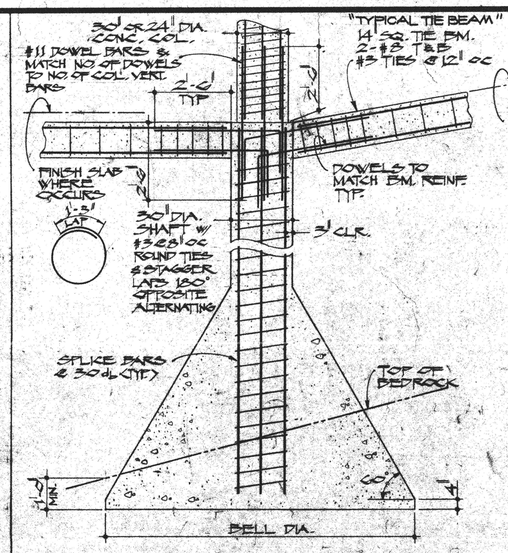
A. Compacted fill shall extend beyond the footings a minimum distance equal to the depth of fill below the footings.
B. Footing bearing pressure for all structures shall not exceed a value of 2000 lbs. per sq. ft. at 12 inches minimum, below approved compacted surface.
C. Continuous footings per Code Section 91.3012 are required.
D. Dwelling foundations located partially or wholly upon compacted fill ground shall meet the requirements of Section 91.3012.
E. Slope erosion control, planting, and irrigation of fill slopes, and runoff control are required as per Code Section 91.3007.
F. Building or structure footings shall be set back 5 feet from the face of slopes 20 feet or less in vertical height where the slope angle is between 1½ horizontal to 1 vertical and 2 horizontal to 1 vertical. Where the vertical height of slope exceeds 20 feet and the slope angle is as described above, the set back shall be increased 1 foot for each additional 5 feet in vertical height over 20 feet to a maximum set back of 10 feet. For slopes exceeding 100 feet in vertical height the set back shall be 40 feet except as permitted in Code Section 91.3009(c).

JOHN D. COLVIN
Chief of Grading Division

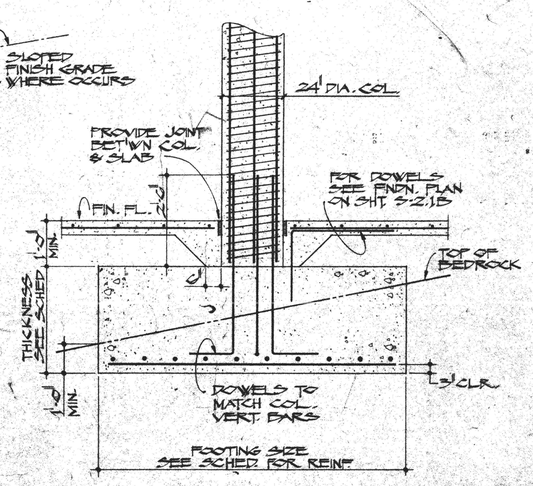
By ARMANDO FLORES
Grading Engineer
485-3435 - LA Office
989-8211 - VN Office

cc: Le Roy Crandall & Associates
LA Inspection - Forbus

AJF:yp
B&S B-142 R1.81



TYPICAL BELLED CAISSON

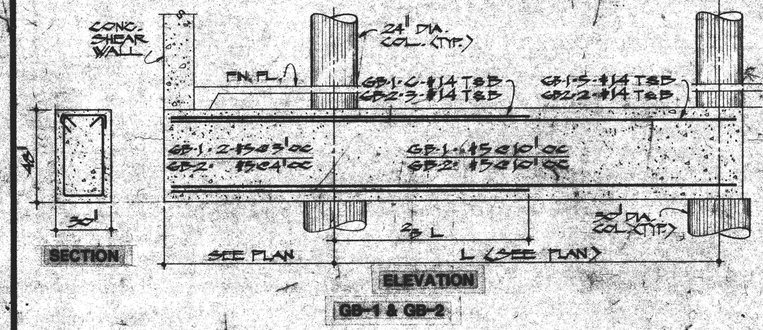


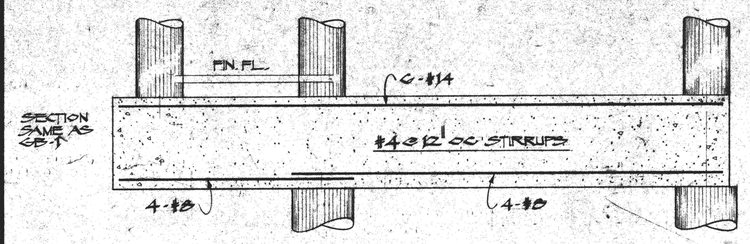
TYPICAL SQUARE FOOTING

MARK	FOOTING SIZE	THICKNESS	REINFORCEMENT	BELL EQUIV.
A	8'-0" SQ	36"	9-#7 EW	V
B	6'-0" SQ	30"	7-#5 EW	Y
C	5'-0" SQ	40"	10-#9 EW	X
D	10'-0" SQ	42"	10-#9 EW	W
E	10'-0" SQ	44"	12-#9 EW	W
F	8'-0" x 13'-0"	46"	5-#8 LONG (T&B) #5 @ 12" OC SHORT	
G				
H	8'-0" SQ	33"	11-#7 EW	V
J	7'-0" SQ	30"	9-#7 EW	U
K	6'-0" SQ	26"	6-#7 EW	Y
L	5'-0" SQ	24"	6-#6 EW	Y
M	4'-0" SQ	24"	7-#5 EW	Z
N	3'-0" SQ	24"	5-#5 EW	Z

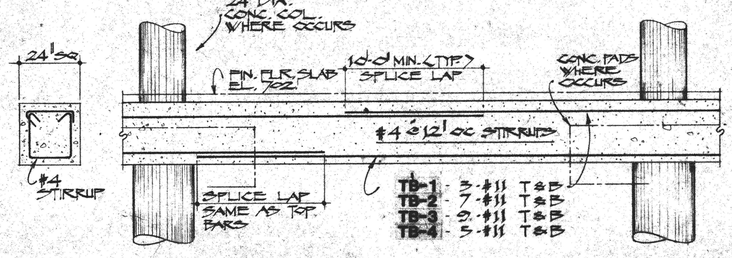
MARK	BELL DIAMETER	REINF.	TIES
U	8'-0" ϕ	6-#10	SEE DETAIL
V	9'-6" ϕ	6-#10	-DO-
W	12'-0" ϕ	12-#10	-DO-
X	10'-0" ϕ	8-#10	-DO-
Y	7'-0" ϕ	6-#10	-DO-
Z	4'-0" ϕ	6-#5	SEE DETAIL

SCHEDULE OF FOOTINGS AND DETAILS 2

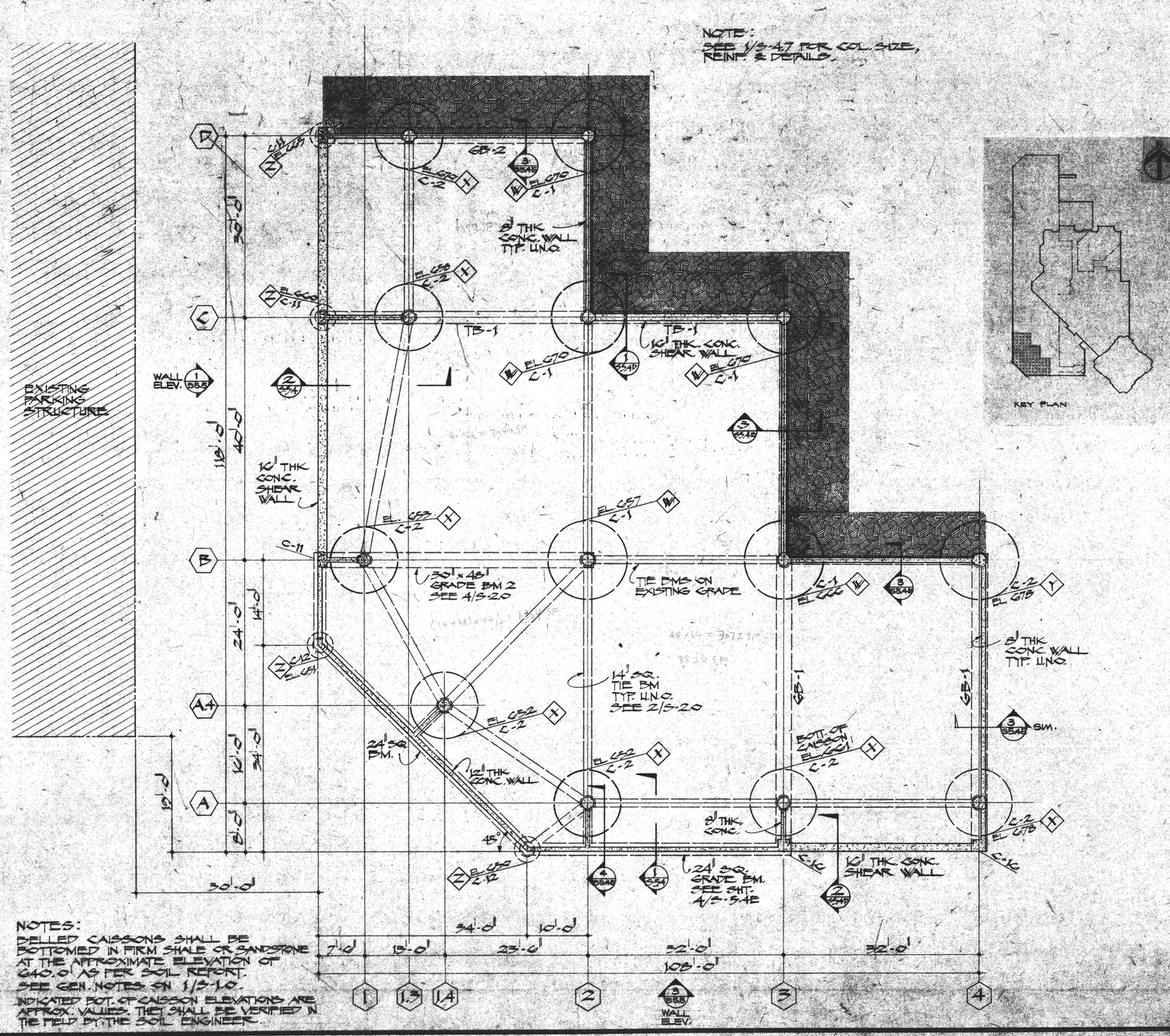




GRADE BEAM DETAILS 4



TIE BEAM DETAIL 5



NOTES:
BELLED CAISSONS SHALL BE BOTTOMED IN FIRM SHALE OR SANDSTONE AT THE APPROXIMATE ELEVATION OF 640.0' AS PER SOIL REPORT.
SEE GEN. NOTES ON 1/S-1.0.
INDICATED BOT. OF CAISSON ELEVATIONS ARE APPROX. VALUES. THEY SHALL BE VERIFIED IN THE FIELD BY THE SOIL ENGINEER.

10-2048 BLDG. PERMIT SET.

DESIGNED BY
DRAWN BY
ARCHITECT
ENGINEER
PROJECT ARCHITECT
OWNER

ALEXANDER & JOHNSTON ASSOCIATES
STRUCTURAL ENGINEERS
1055 WILSHIRE BLVD., LOS ANGELES, CALIF. 90017
(213) 482-0066

WILLIAM L. PEREIRA ASSOCIATES
PLANNERS · ARCHITECTS · ENGINEERS
1055 WILSHIRE BOULEVARD LOS ANGELES, CALIFORNIA 90017
TELEPHONE 213 · 975-1341

MCA/SHERATON
HOTEL no.2

PARKING LEVEL 3
PARTIAL FOUNDATION PLAN
SCHEDULE OF FOOTINGS AND DETAILS

ISSUED July-1-82
PROJECT
SHEET
S-2.0

GENERAL REVISIONS

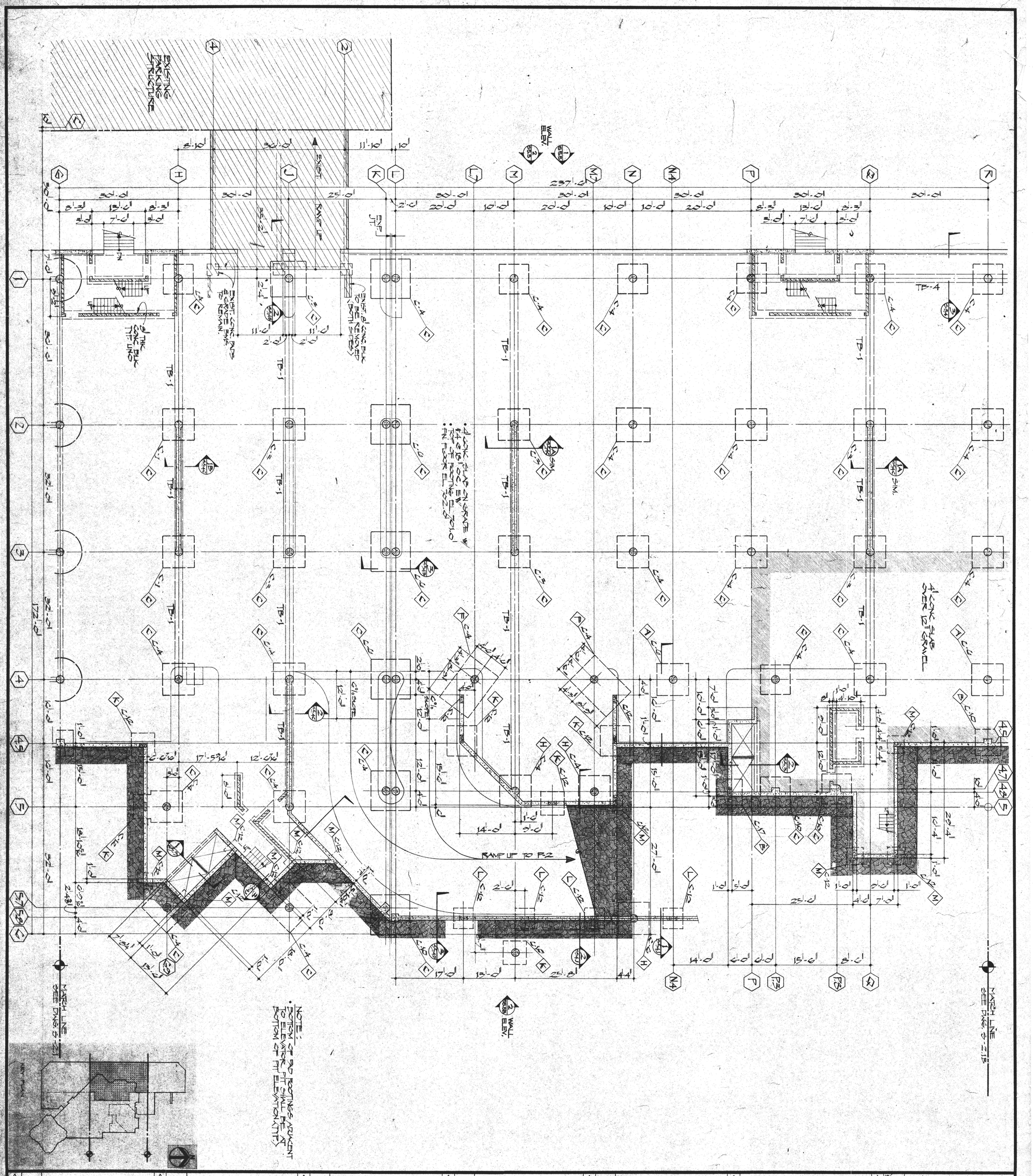
EXISTING PARKING STRUCTURE

NOTES:

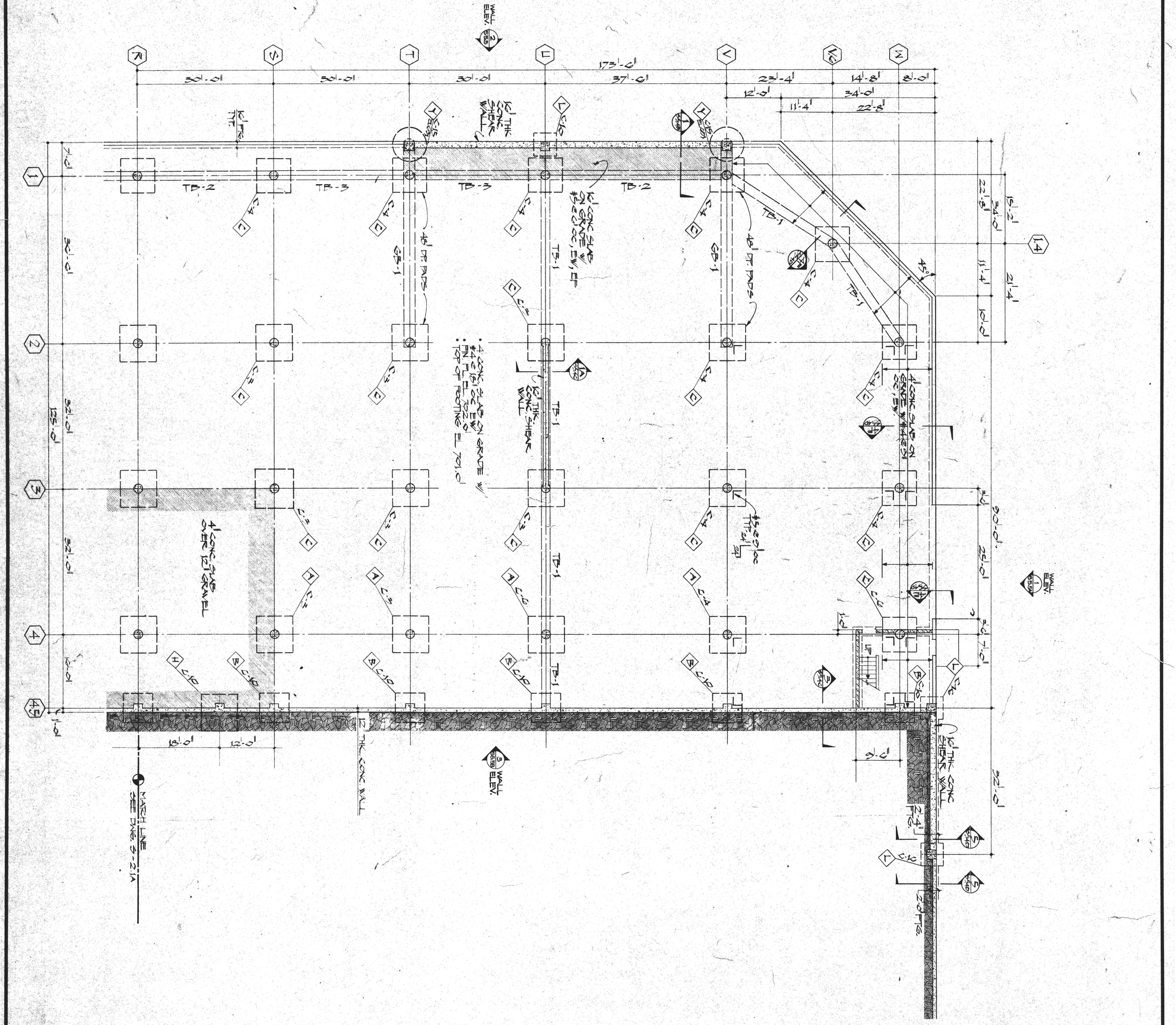
- REFER TO SHT. S-4.0 FOR CONC. JOINTS NOT DESIGNATED AS J.
- SEE SHT. S-4.0 FOR JOINT TYPICAL DETAILS
- LIMIT OF CONC. SLAB ON GRADE TYP. U.N.O. ON ALL SHTS.

- 4" CONC. SLAB ON GRADE w #4 @ 18" OC EW
- TOP OF FOOTING EL 701.0
- TOP OF FOOTING EL 702.0 U.N.O.

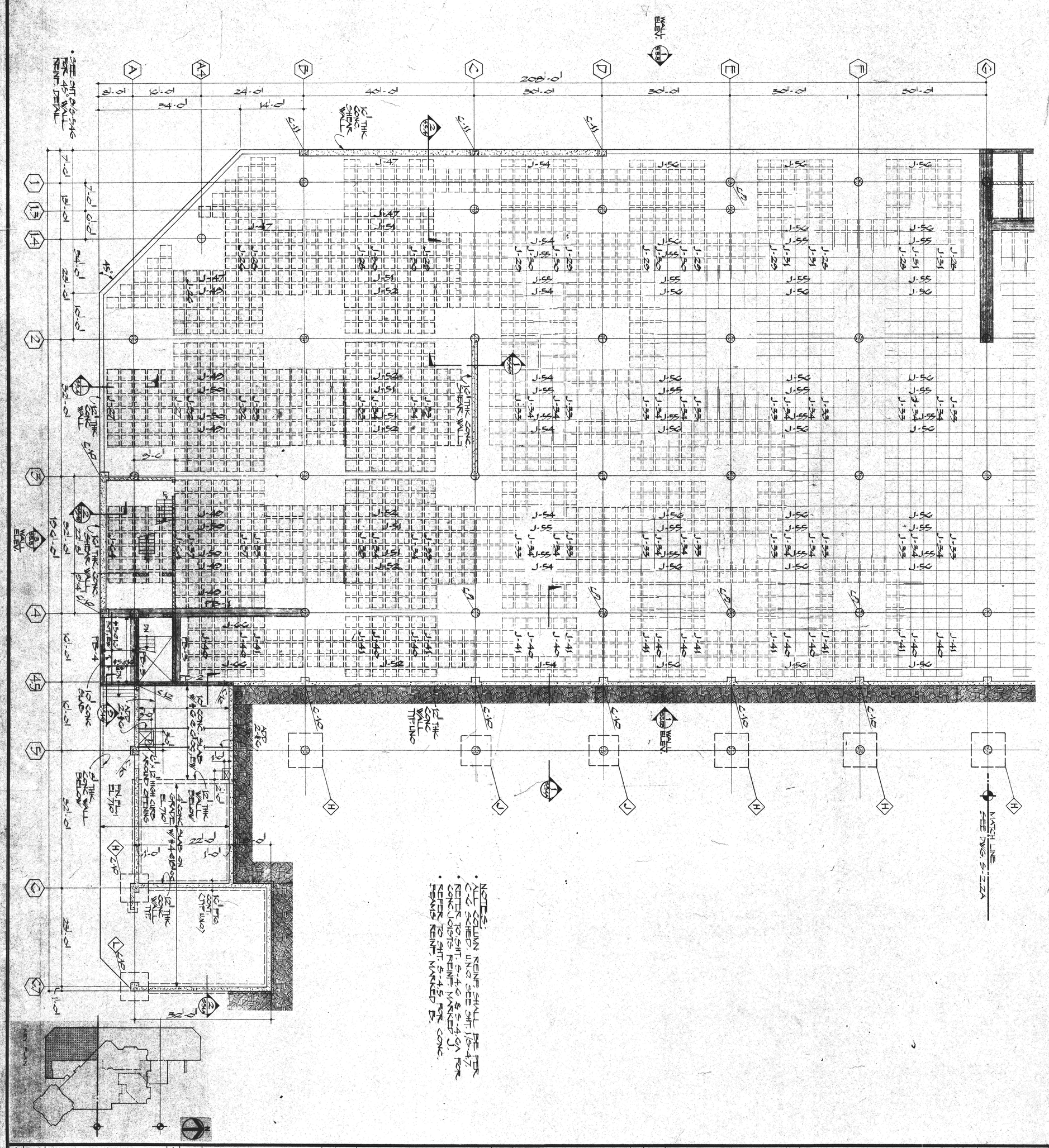
| | | |



ISSUED FOR BIDDING	PARKING LEVEL 3 FOUNDATION PLAN EL. 702	MCA/SHERATON HOTEL no.2	WILLIAM L. PEREIRA ASSOCIATES PLANNERS · ARCHITECTS · ENGINEERS 5657 WILSHIRE BOULEVARD LOS ANGELES CALIFORNIA 90036 TELEPHONE 213/933-8341	BRANDOW & JOHNSTON ASSOCIATES CONSULTING STRUCTURAL ENGINEERS 1660 W. THIRD ST., LOS ANGELES, CALIFORNIA 90017 TELEPHONE 484-9920 AREA CODE 213	DESIGNED BY	ARCHITECT
ISSUED JULY-1-82					DRAWN BY	ENGINEER
SHEET S-2.1A OF					PROJECT ARCHITECT	


R
S
T
U
V
W
1
2
3
4
173'-0"
30'-0"
37'-0"
23'-4"
14'-8"
8'-0"
12'-0"
34'-0"
11'-4"
22'-8"
15'-2"
21'-4"
10'-0"
45°
TB-1
TB-2
TB-3
CB-1
48" DP PADS
12" THK CONC SHEAR WALL
8" CONC SLAB ON GRADE W/ #5 @ 12" OC, EW, EF
4" CONC SLAB ON GRADE W/ #4 @ 18" OC EW
TOP OF FOOTING EL 702.0
TOP OF FOOTING EL 701.0
4" CONC SLAB ON GRADE W/ #3 @ 12" OC, EW
#5 @ 18" OC EW
4" CONC SLAB OVER 12" GRAVEL
WALL ELEV. 1/S5.2
WALL ELEV. 2/S5.2
WALL ELEV. 3/S5.2
WALL ELEV. 4/S5.2
WALL ELEV. 5/S5.2
MATCH LINE SEE DWG. S-2.1A
12" THK CONC WALL
12" THK CONC SHEAR WALL
2'-4" FTG.
20 FTG.
UP
DN
KEY PLAN

| | | |



NOTES:
- ALL COLUMN REINF. SHALL BE PER C-6 SCHED. U.N.O. SEE SHT. 1/S-4.7.
- REFER TO SHT. S-4.6 & S-4.6A FOR CONC. JOISTS REINF. MARKED J.
- REFER TO SHT. S-4.5 FOR CONC. BEAMS REINF. MARKED B.

1	7-19-82	GENERAL REVISIONS													10/20/82	BLDG. PERMIT SET	

ISSUED FOR BIDDING

ISSUED JULY 1-82

PROJECT

SHEET S-2.2

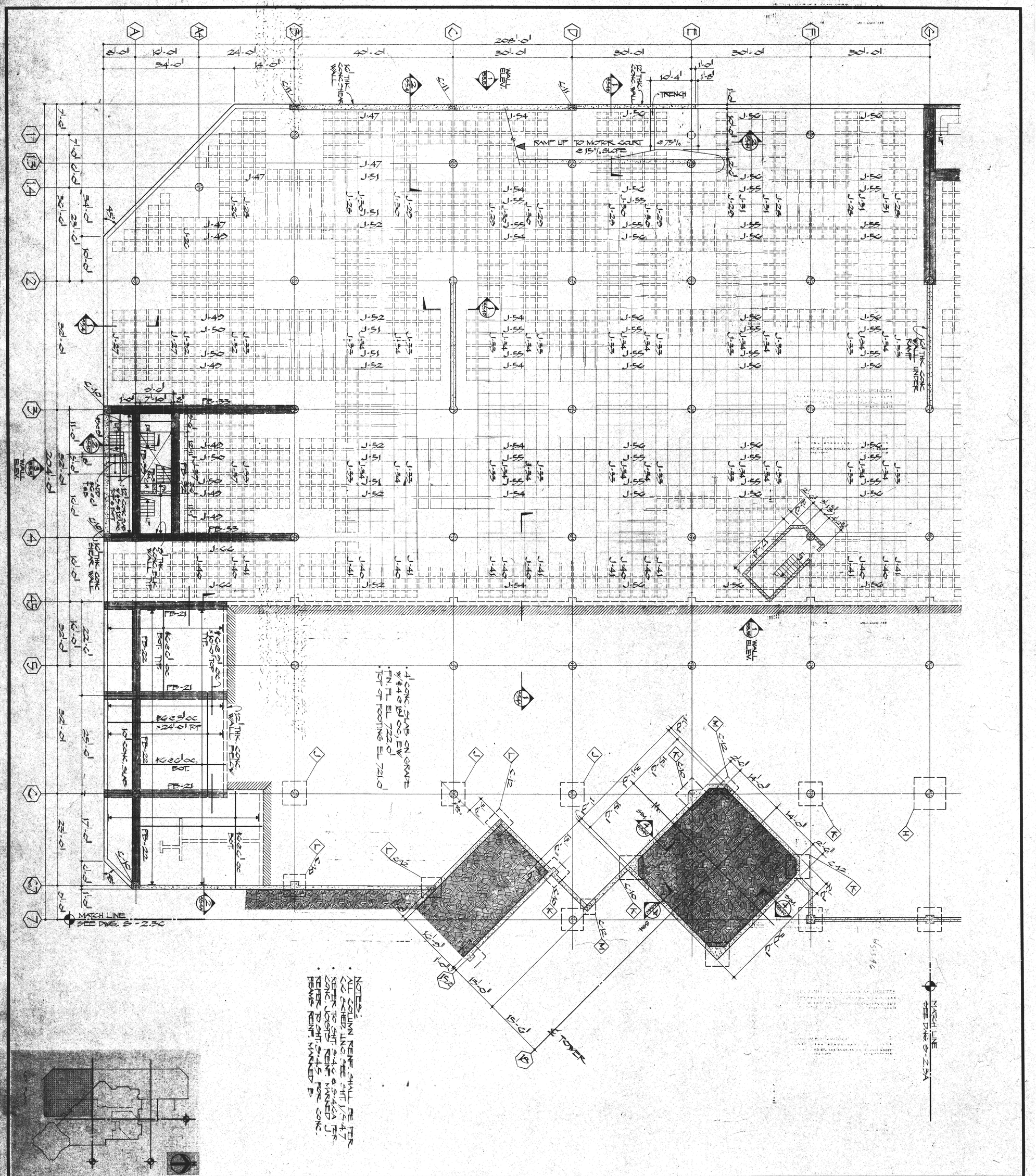
PARKING LEVEL 2
FRAMING PLAN
EL. 712

MCA/SHERATON HOTEL no.2

WILLIAM L. PEREIRA ASSOCIATES
PLANNERS · ARCHITECTS · ENGINEERS
5657 WILSHIRE BOULEVARD LOS ANGELES CALIFORNIA 90036 TELEPHONE 213/933-8341

BRANDOW & JOHNSTON ASSOCIATES
CONSULTING STRUCTURAL ENGINEERS
1660 W. THIRD ST., LOS ANGELES, CALIFORNIA 90017
TELEPHONE 484-8920 AREA CODE 213

DESIGNED BY	ARCHITECT
DRAWN BY	ENGINEER
PROJECT ARCHITECT	



1	7-19-82	GENERAL REVISIONS														10/20/82	BLDG PERMIT SET

SHEET S-2.3 OF	ISSUED FOR BIDDING	PARKING LEVEL 1 FRAMING PLAN EL. 722	MCA/SHERATON HOTEL no.2	WILLIAM L. PEREIRA ASSOCIATES PLANNERS · ARCHITECTS · ENGINEERS 5657 WILSHIRE BOULEVARD LOS ANGELES CALIFORNIA 90036 TELEPHONE 213/933-8341	BRANDOW & JOHNSTON ASSOCIATES CONSULTING STRUCTURAL ENGINEERS 1650 W. THIRD ST., LOS ANGELES, CALIFORNIA 90017 TELEPHONE 484-8980 AREA CODE 213	DESIGNED BY	ARCHITECT
						DRAWN BY	ENGINEER
						PROJECT ARCHITECT	

RAMP UP

RAMP DN.

MATCH LINE SEE DWG. S-2.2A

MATCH LINE SEE DWG. S-2.2B

MATCH LINE SEE DWG. S-2.2B

CONC. CURB SEE ARCH. DWG. FOR LOCATION & DIMENSION

• 4" CONC. SLAB ON GRADE w/ #4 @ 18" OC, EW. TOP OF FTG. EL. 722.0

• 4" CONC. SLAB ON GRADE w/ TOP OF FTG. EL. 722.0

NOTES:
• ALL COLUMN LINES SHALL BE PER C.I.G. SCHED. U.N.O. SEE SHT. S-4.1
• REFER TO SHT. S-4.6 & S-4.6A FOR CONC. JOISTS REINF. MARKED J
• REFER TO SHT. S-4.5 FOR CONC. BEAMS REINF. MARKED B.

| | | |

NOTES:
- ALL COLUMN KENT SHALL BE F'c = 6000 PSI. U.N.O. SEE SHT. S-1.5 & 4.1.
- REFER TO SHT. S-2.4 & S-2.4A FOR CONC. JOINT KENT MARKED J.
- REFER TO SHT. S-4.5 FOR CONC. RAMP KENT MARKED R.
- COLUMNS C-10 @ GRID LINE 45 WITHIN WALL SYSTEM ARE 8000 PSI CONCRETE.

| | | |

MATCH LINE
SEE DWG S-23

12" THK. CONC. WALL
REFER TO DET. S/S-54C
FOR REINF.

WALL ELEV.

12" THK CONC. SHEAR WALL

12" THK CONC. WALL

12" THK CONC. SHEAR WALL

12" THK CONC. WALL

12" THK CONC. SHEAR WALL

12" THK CONC. WALL

MATCH LINE SEE DWG. S-2.3A

MATCH LINE SEE DWG. S-2.2B & DWG. S-2.2E

MATCH LINE SEE DWG. S-2.2C

UNEXCAVATED AREA

RAMP DN 24'-0"

RAMP DN

EL 722.0

EL 716.0

EL 715.0

TOP EL 715.0

TOP EL 716.0

TOP EL 720.0

EL 717.0

EL 716.0

EL 721.0

TOP OF FTG EL 720.0

FIN. FL EL 721.0

FIN. FL EL 716.0±

24" CONT FTG

24" SQ GRADE BM.

24" CONT FIRE

30'-0" FIRE ACCESS ROAD

EDGE OF CONC SLAB

EL CONC CURB

LINE OF BALCONY ABOVE

WALL ELEV.

3'-0" SQ. PEDESTAL

4 CONC SLAB ON GRADE OVER 4" ROCK MAT'L W/ #4 @ 18" OC, EW

4 CONC SLAB ON GRADE OVER 6" ROCK BASE W/ #4 @ 18" OC, EW

SEE MECH. DWG FOR LOUVER OPNG DTL

SEE ARCH. DWGS FOR WALL OPNG LOCATION

12" THK CONC SHEAR WALL

12" THK CONC RET WALL

12" THK CONC BULK HD WALL

UNIT OF SLAB

CONC SLAB W/ TILE FINISH

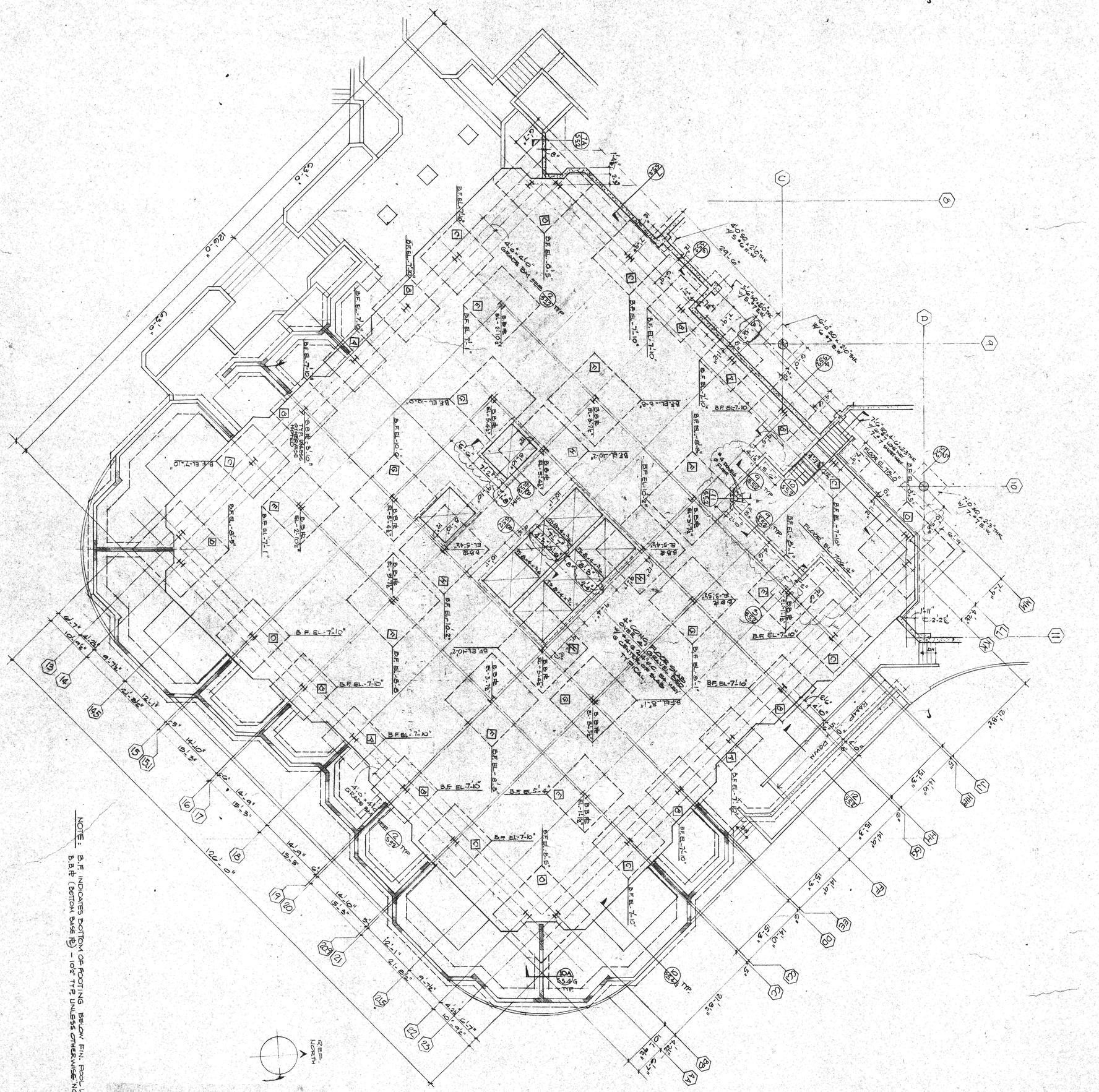
CONC SLAB

TRENCH

NOTE:
- FOR WALL OPENING DIMENSIONS SEE ARCH. & MECH. DWGS.

KEY PLAN

| | | |


NOTES: B.F. INDICATES BOTTOM OF FOOTING. BELOW FIN. POOL LEVEL (EL 7'-0" = 0'-0")
B.B.R. (BOTTOM BASE RL) - 10'2" TYP. UNLESS OTHERWISE NOTED
KEY PLAN
REF. NORTH
B.F. EL. -7'-10"
B.F. EL. -6'-0"
B.F. EL. -7'-1"
B.F. EL. -10'-0"
B.F. EL. -5'-4"
B.F. EL. -8'-6"
B.F. EL. -10'-2"
B.F. EL. -7'-11"
B.F. EL. -5'-0"
B.F. EL. -7'-10"
B.B.R. EL. -5.42'
B.B.R. EL. -5.75'
B.B.R. EL. -8.75'
B.B.R. EL. -11.75'
B.B.R. EL. -5.75'
B.B.R. EL. -5.75'
B.B.R. EL. -5

U.S. Geological Survey - Earthquake Hazards Program

Unified Hazard Tool

Please do not use this tool to obtain ground motion parameter values for the design code reference documents covered by the U.S. Seismic Design Maps web tools (e.g., the International Building Code and the ASCE 7 or 41 Standard). The values returned by the two applications are not identical.

Input

Edition

Dynamic: Conterminous U.S. 2014 (update...

Spectral Period

Peak Ground Acceleration

Latitude

Decimal degrees

34.1361

Time Horizon

Return period in years

475

Longitude

Decimal degrees, negative values for western longitudes

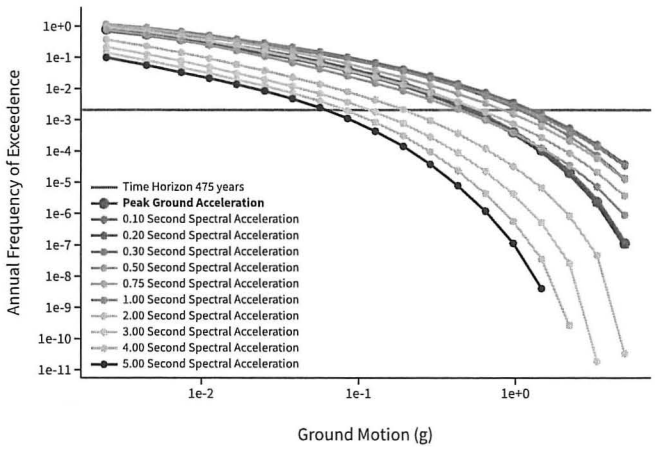
-118.3586

Site Class

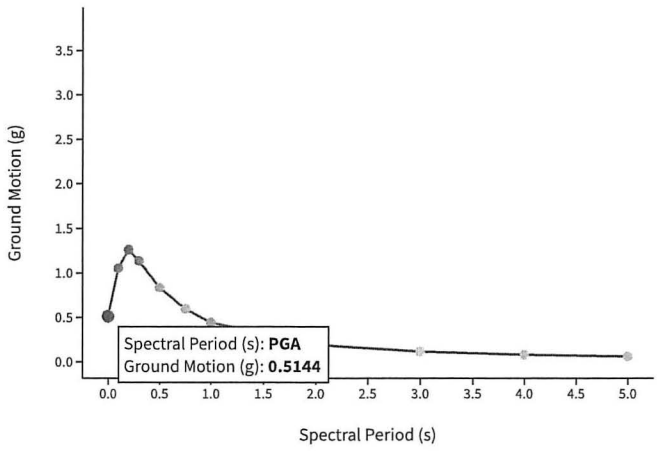
537 m/s (Site class C)

Hazard Curve

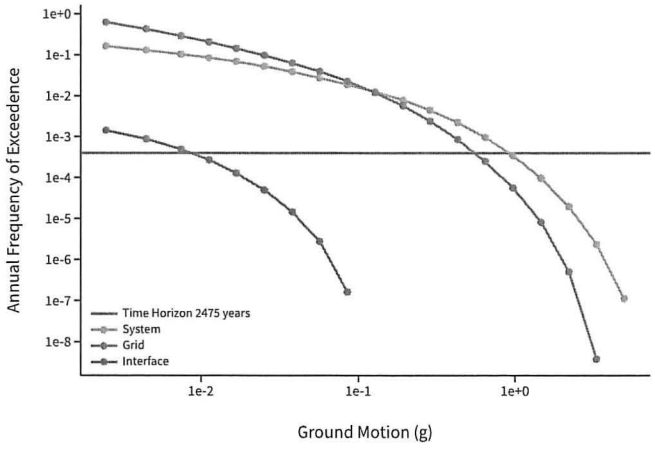
Hazard Curves



Uniform Hazard Response Spectrum



Component Curves for Peak Ground Acceleration

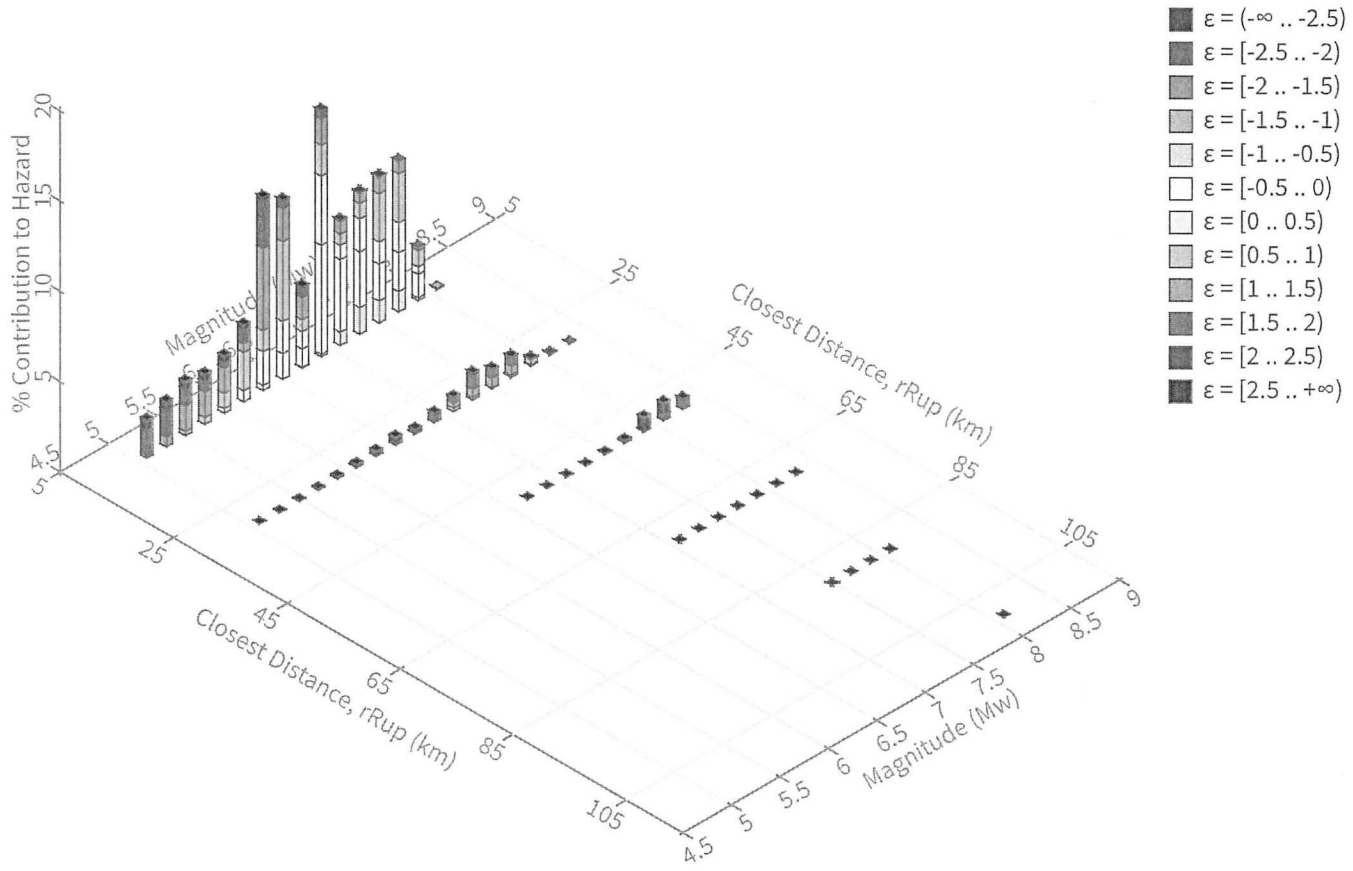


View Raw Data

Deaggregation

Component

Total



Summary statistics for, Deaggregation: Total

Deaggregation targets

Return period: 475 yrs
Exceedance rate: 0.0021052632 yr^{-1}
PGA ground motion: 0.51435075 g

Recovered targets

Return period: 500.18239 yrs
Exceedance rate: 0.0019992707 yr^{-1}

Totals

Binned: 100 %
Residual: 0 %
Trace: 0.12 %

Mean (over all sources)

m: 6.82
r: 11.28 km
ε_0: 0.71 σ

Mode (largest m-r bin)

m: 6.9
r: 7.34 km
ε_0: 0.18 σ
Contribution: 13.63 %

Mode (largest m-r-ε_0 bin)

m: 6.91
r: 3.62 km
ε_0: -0.31 σ
Contribution: 6.04 %

Discretization

r: min = 0.0, max = 1000.0, Δ = 20.0 km
m: min = 4.4, max = 9.4, Δ = 0.2
ε: min = -3.0, max = 3.0, Δ = 0.5 σ

Epsilon keys

ε0: [-∞ .. -2.5)
ε1: [-2.5 .. -2.0)
ε2: [-2.0 .. -1.5)
ε3: [-1.5 .. -1.0)
ε4: [-1.0 .. -0.5)
ε5: [-0.5 .. 0.0)
ε6: [0.0 .. 0.5)
ε7: [0.5 .. 1.0)
ε8: [1.0 .. 1.5)
ε9: [1.5 .. 2.0)
ε10: [2.0 .. 2.5)
ε11: [2.5 .. +∞]

Deaggregation Contributors

Source Set ↳ Source	Type	r	m	ε_0	lon	lat	az	%
UC33brAvg_FM32	System							41.07
Hollywood [1]		3.52	7.02	-0.28	118.351°W	34.109°N	165.93	12.95
Santa Monica alt 2 [0]		4.16	7.24	-0.38	118.338°W	34.100°N	154.68	2.70
Santa Susana East (connector) [1]		16.87	6.69	1.47	118.419°W	34.292°N	342.18	2.30
Newport-Inglewood alt 2 [8]		10.81	6.75	1.07	118.390°W	34.043°N	195.45	2.25
Compton [4]		15.56	7.54	0.09	118.608°W	34.022°N	241.13	1.97
Santa Monica alt 2 [1]		4.53	6.81	-0.16	118.358°W	34.093°N	179.23	1.68
Puente Hills (LA) [1]		8.81	7.00	0.27	118.325°W	34.054°N	161.50	1.58
San Vicente [1]		7.85	6.83	0.17	118.373°W	34.072°N	190.65	1.39
Elysian Park (Upper) [2]		7.47	6.76	0.59	118.294°W	34.121°N	105.41	1.36
Verdugo [2]		9.77	7.51	0.49	118.317°W	34.216°N	23.17	1.31
San Andreas (Mojave S) [5]		51.35	8.06	2.12	118.129°W	34.557°N	24.17	1.16
UC33brAvg_FM31	System							35.66
Hollywood [1]		3.52	7.18	-0.31	118.351°W	34.109°N	165.93	9.18
Elysian Park (Upper) [2]		7.47	6.68	0.59	118.294°W	34.121°N	105.41	4.21
Newport-Inglewood alt 1 [8]		10.77	6.66	1.15	118.389°W	34.044°N	195.30	2.85
Compton [4]		15.56	7.37	0.15	118.608°W	34.022°N	241.13	2.50
Santa Susana East (connector) [1]		16.87	6.96	1.28	118.419°W	34.292°N	342.18	1.89
Verdugo [2]		9.77	7.53	0.47	118.317°W	34.216°N	23.17	1.53
Northridge [4]		18.21	7.23	0.92	118.383°W	34.298°N	352.84	1.21
Elysian Park (Upper) [1]		13.26	6.35	1.38	118.239°W	34.081°N	118.89	1.21
San Andreas (Mojave S) [5]		51.35	8.07	2.12	118.129°W	34.557°N	24.17	1.16
Northridge Hills [0]		15.01	7.69	0.86	118.445°W	34.250°N	327.86	1.04
UC33brAvg_FM32 (opt)	Grid							11.88
PointSourceFinite: -118.359, 34.186		7.26	5.74	1.10	118.359°W	34.186°N	0.00	1.70
PointSourceFinite: -118.359, 34.186		7.26	5.74	1.10	118.359°W	34.186°N	0.00	1.70
PointSourceFinite: -118.359, 34.195		7.93	5.75	1.21	118.359°W	34.195°N	0.00	1.41
PointSourceFinite: -118.359, 34.195		7.93	5.75	1.21	118.359°W	34.195°N	0.00	1.41
PointSourceFinite: -118.359, 34.213		9.19	5.85	1.34	118.359°W	34.213°N	0.00	1.20
PointSourceFinite: -118.359, 34.213		9.19	5.85	1.34	118.359°W	34.213°N	0.00	1.20
UC33brAvg_FM31 (opt)	Grid							11.40
PointSourceFinite: -118.359, 34.186		7.22	5.77	1.07	118.359°W	34.186°N	0.00	1.59
PointSourceFinite: -118.359, 34.186		7.22	5.77	1.07	118.359°W	34.186°N	0.00	1.59
PointSourceFinite: -118.359, 34.195		7.94	5.75	1.21	118.359°W	34.195°N	0.00	1.26
PointSourceFinite: -118.359, 34.195		7.94	5.75	1.21	118.359°W	34.195°N	0.00	1.26
PointSourceFinite: -118.359, 34.213		9.19	5.85	1.34	118.359°W	34.213°N	0.00	1.21
PointSourceFinite: -118.359, 34.213		9.19	5.85	1.34	118.359°W	34.213°N	0.00	1.21

FN 21578 Hilton Los Angeles/Universal City

Latitude, Longitude: 34.1361, -118.3586

Date	9/12/2022, 3:22:01 PM
Design Code Reference Document	ASCE7-16
Risk Category	II
Site Class	C - Very Dense Soil and Soft Rock

Type	Value	Description
S_S	2.084	MCE_R ground motion. (for 0.2 second period)
S_1	0.747	MCE_R ground motion. (for 1.0s period)
S_{MS}	2.5	Site-modified spectral acceleration value
S_{M1}	1.046	Site-modified spectral acceleration value
S_{DS}	1.667	Numeric seismic design value at 0.2 second SA
S_{D1}	0.697	Numeric seismic design value at 1.0 second SA

Type	Value	Description
SDC	D	Seismic design category
F_a	1.2	Site amplification factor at 0.2 second
F_v	1.4	Site amplification factor at 1.0 second
PGA	0.883	MCE_G peak ground acceleration
F_{PGA}	1.2	Site amplification factor at PGA
PGA_M	1.059	Site modified peak ground acceleration
T_L	8	Long-period transition period in seconds
SsRT	2.084	Probabilistic risk-targeted ground motion. (0.2 second)
SsUH	2.304	Factored uniform-hazard (2% probability of exceedance in 50 years) spectral acceleration
SsD	2.428	Factored deterministic acceleration value. (0.2 second)
S1RT	0.747	Probabilistic risk-targeted ground motion. (1.0 second)
S1UH	0.829	Factored uniform-hazard (2% probability of exceedance in 50 years) spectral acceleration.
S1D	0.754	Factored deterministic acceleration value. (1.0 second)
PGAd	0.986	Factored deterministic acceleration value. (Peak Ground Acceleration)
PGA_{UH}	0.883	Uniform-hazard (2% probability of exceedance in 50 years) Peak Ground Acceleration
C_{RS}	0.905	Mapped value of the risk coefficient at short periods
C_{R1}	0.901	Mapped value of the risk coefficient at a period of 1 s
C_V	1.3	Vertical coefficient

Project:	Hilton- Los Angeles/Universal
Date:	9/12/2022
File No.:	21578
Cross Section	D-D' and I-I'
Description:	Bedrock

ESTIMATION OF PERMANENT SEISMIC DISPLACEMENT USING THE BRAY AND RATHJE (1998) PROCEDURE.

INPUT PARAMETERS:

Yield Acceleration, ky (g):	0		Normalized MHEA Sigma:	0	
Vertical Thickness, H (m):	0		Mean Period Sigma:	0	
Shear Wave Vel., Vs (m/s):	360		Significant Duration Sigma:	0	
Earthquake Magnitude, M:	6.82	*	Normalized Displacement Sigma:	0	
Peak Ground Acceleration, PGAm (g)	1.06				
Earthquake Accel., Firm Rock, MHAr, (g):	0.706	*			
Earthquake Distance, r (km):	11.29	*	Allowable screen displacement (c	5	*
Landslide factor, 0.8 for large slide, 1.0 for small slide	1	*			

CALCULATIONS:

Site Period (Ts): 0.000

(eqn. 11.5) $Ts = 4*H/Vs$

NRF Factor: 0.811

(eqn. 11.3) $NRF= 0.6225+ 0.9196*\exp(-MHAr/0.4449)$

Mean Period (Tm): 0.503

(eqn. 10.2a) $Tm = (C1+C2*(M-6)+C3*r)*EXP(\varepsilon_T)$ for M<7.25

(eqn. 10.2b) $Tm = (C1+ 1.25* C2+C3*r)*EXP(\varepsilon_T)$ for 7.25<M<8.0

where: C1 = 0.411
C2= 0.0837
C3 = 0.00208
ε_T = 0.437

Duration, D_{5-95} (s): 12.131

(eqn. 10.1a) $\ln(D_{5-95}) = \ln(\exp(5.204+0.851*(M-6)))/power(10,1.5*M+16.05), -1/3)/(15.7*10^6))+0.063*(r-10))+0.8664$ for r>10 km

(eqn. 10.1b) $\ln(D_{5-95}) = \ln(\exp(5.204+0.851*(M-6)))/power(10,1.5*M+16.05), -1/3)/(15.7*10^6)+0.8664)$ for r<10 km

Ts/Tm: 0.0000

MHEA/MHA*NRF: #NUM!

MHEA, kmax: #NUM!

ky/kmax: #NUM!

Normalized Disp. (cm/sec): #NUM!

(Input values marked with asterisks are used for calculation of seismic coefficient for screen)

Estimated Displacement (cm):	#NUM!	**Median f_{eq} for Screen Procedure:**	0.469 *
Estimated Displacement (in):	#NUM!	**Seismic Coefficient for Screen Procedu**	0.331 *

Geotechnologies, Inc.

Project: Hilton Universal Expansion
File No.: 21578
Description: Fill

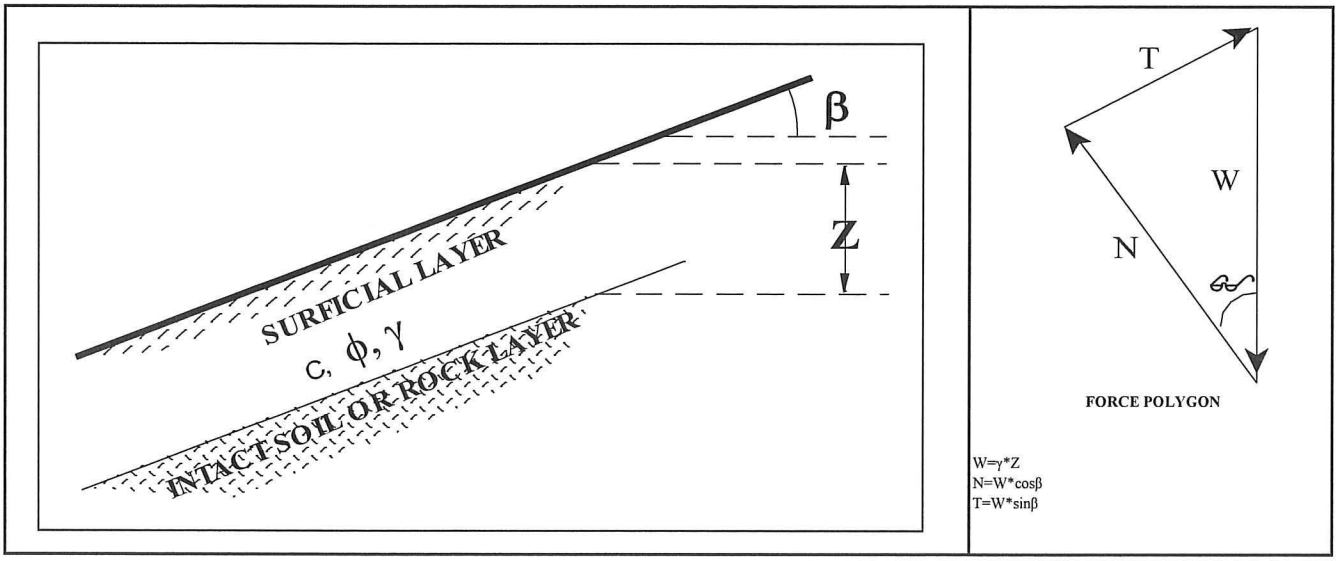
SURFICIAL SLOPE STABLITY FOR INFINITE SLOPE

Input Slope Properties:

Vertical Thickness of Surficial Materials	(Z)	4.00 feet	
Slope Angle	(β)	29.0 degrees	0.50614548 radians
Saturated Thickness	(h_s)	4.0 feet	

Input Soil Properties:

Unit Weight of Saturated Surficial Soils	(γ)	125.0 pcf	
Friction Angle of Surficial Soils	(ϕ)	20.0 degrees	0.34906585 radians
Cohesion of Surficial Soils	(c)	240.0 psf	
Density of Water	(γ_ω)	62.4 pcf	



Equation $$F = \frac{c' + (\gamma - m*\gamma w)*z*\cos^2\beta*\tan\varphi}{\gamma*z*\sin\beta\cos\beta}$$

Factor of Safety	**1.46**

Ref: Blake, T.F., Hollingsworth, R.A., and Stewart, J.P., 2002, Recommended Procedures for Implementation of DMG Special Publication 117 Guidelines for analyzing and Mitigating Landslide Hazards in California, Southern California Earthquake Center

Geotechnologies, Inc.

Project: Hilton Universal
File No.: 21578
Description: Bedrock- Topanga Formation
9/13/2022

Friction Pile Capacity Calculation

Input Data:

Unit Weight of Overlying Soil Layer	γ_1	125	pcf
Thickness of Overlying Soil Layer	H_1	0	feet
Unit Weight of Bearing Strata	γ_2	125	pcf
Friction Angle of Bearing Strata	ϕ_2	34	degrees
Cohesion of Bearing Strata	c_2	140	psf
Minimum Embedment into Bearing Strata	H_2	10	feet
Unit Weight of Water	γ_w	62.4	pcf
Depth to Groundwater from Pile Cap	H_w	45	feet

Pile Design:
drilled <<Driven/Drilled
Circular <<Circular/Square Pile

Pile Dimension:

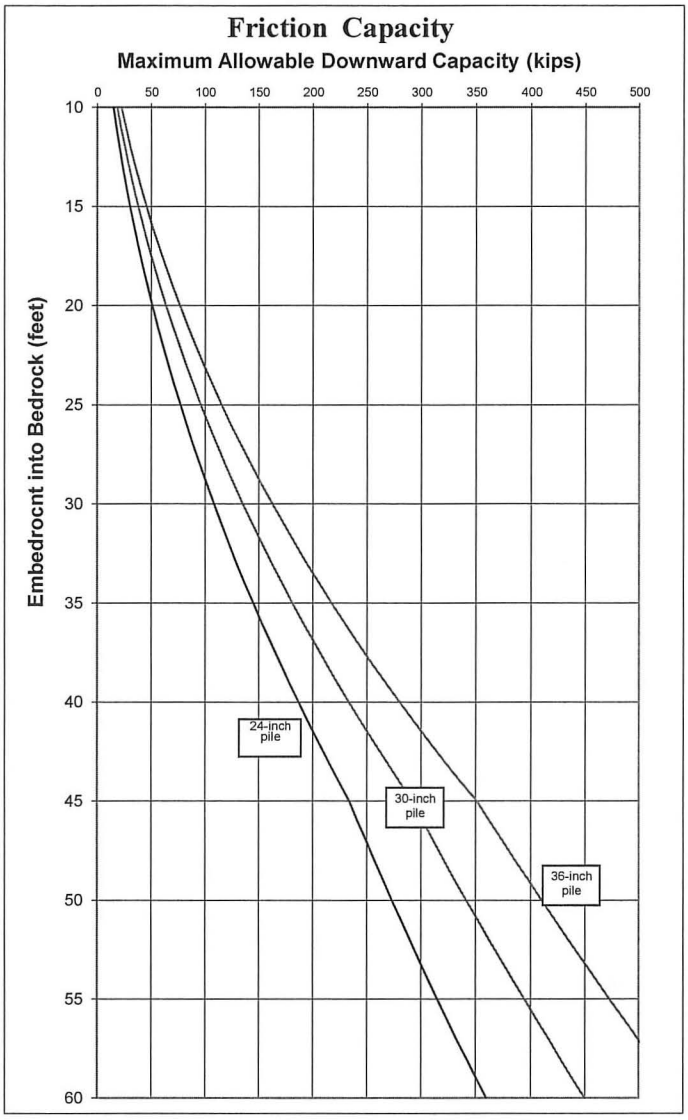
24	in. Diam.	3.14 ft^2 Area
30	in. Diam.	4.91 ft^2 Area
36	in. Diam.	7.07 ft^2 Area

Critical Depth Limit (Dc):
30 B

Lateral Earth Pressure Coefficient: $K_c = 0.80$
Applied Factor of Safety: $FS = 2$
Factored Skin Friction $fult = [c_2 + K_c * \sigma'_v * (\tan \phi_2)]/FS$
$f_{allow} = f_{ult}/FS$

Pile Capacity:

Total Depth of Pile (feet)	Depth of Embedment into Bearing Strata (feet)	Maximum Allowable Downward Pile Capacity: Capacity of 24 inch diameter pile (kips)	Capacity of 30 inch diameter pile (kips)	Capacity of 36 inch diameter pile (kips)
10	10	15.0	18.7	22.5
11	11	17.7	22.1	26.5
12	12	20.5	25.7	30.8
13	13	23.6	29.5	35.4
14	14	26.9	33.7	40.4
15	15	30.4	38.0	45.7
16	16	34.2	42.7	51.2
17	17	38.1	47.6	57.1
18	18	42.2	52.8	63.4
19	19	46.6	58.3	69.9
20	20	51.2	64.0	76.8
21	21	56.0	70.0	83.9
22	22	61.0	76.2	91.4
23	23	66.2	82.7	99.2
24	24	71.6	89.5	107.4
25	25	77.2	96.5	115.8
26	26	83.1	103.8	124.6
27	27	89.1	111.4	133.7
28	28	95.4	119.2	143.1
29	29	101.9	127.3	152.8
30	30	108.6	135.7	162.8
31	31	115.5	144.3	173.2
32	32	122.6	153.2	183.9
33	33	129.9	162.4	194.8
34	34	137.4	171.8	206.2
35	35	145.2	181.5	217.8
36	36	153.1	191.4	229.7
37	37	161.3	201.7	242.0
38	38	169.7	212.1	254.6
39	39	178.3	222.9	267.5
40	40	187.1	233.9	280.7
41	41	196.1	245.2	294.2
42	42	205.4	256.7	308.1
43	43	214.8	268.5	322.2
44	44	224.5	280.6	336.7
45	45	234.3	292.9	351.5
46	46	242.0	302.5	363.0
47	47	249.7	312.2	374.6
48	48	257.6	322.0	386.4
49	49	265.6	332.0	398.4
50	50	273.6	342.1	410.5
51	51	281.8	352.3	422.7
52	52	290.1	362.6	435.2
53	53	298.5	373.1	447.8
54	54	307.0	383.8	460.5
55	55	315.6	394.5	473.4
56	56	324.3	405.4	486.5
57	57	333.1	416.4	499.7
58	58	342.1	427.6	513.1
59	59	351.1	438.8	526.6
60	60	360.2	450.3	540.3



Note: 1. Minimum pile embedment depth of 20 feet
2. Uplift capacity may be designed using 50% of the downward capacity
3. Pile should be spaced a minimum of 2-1/2 diameters on center
4. See text of report for pile details and installation recommendations

Geotechnologies, Inc.

Project: Hilton Los Angeles/Universal
File No.: 21587
Geologic Material Bedrock- Favorable Bedding

Soil Weight	γ	130 pcf
Internal Friction Angle	ϕ	34 degrees
Cohesion	c	140 psf
Height of Retaining Wall	H	50 feet

Cantilever Retaining Wall Design based on At Rest Earth Pressure

$\sigma'_h = K_o\sigma'_v$

$K_o = 1 - \sin\phi$	0.441	
$\sigma'_v = \gamma H$	6500.0 psf	
σ'_h =	2865.2 psf	
EFP =	57.3 pcf	
P_o =	71631.2 lbs/ft	(based on a triangular distribution of pressure)

Design wall for an EFP of 57 pcf

Restrained Wall Design based on At Rest Earth Pressure

P_o =	71631.2 lbs/ft	
$\sigma'_{h,\,max}$ =	35.8 H	(based on a trapezoidal distribution of pressure)
$\sigma'_{h,\,max}$ =	1432.6 psf	

Design restrained wall for 53 H

Geotechnologies, Inc.

Project: Hilton Los Angeles/Universal
File No.: 21587
Geologic Material Bedrock- Adverse Bedding

Soil Weight	γ	130 pcf
Internal Friction Angle	ϕ	25 degrees
Cohesion	c	127 psf
Height of Retaining Wall	H	50 feet

Cantilever Retaining Wall Design based on At Rest Earth Pressure

$\sigma'_h = K_o\sigma'_v$

$K_o = 1 - \sin\phi$	0.577	
$\sigma'_v = \gamma H$	6500.0 psf	
$\sigma'_h =$	3753.0 psf	
EFP =	75.1 pcf	
$P_o =$	93824.5 lbs/ft	(based on a triangular distribution of pressure)

Design wall for an EFP of 75 pcf

Restrained Wall Design based on At Rest Earth Pressure

$P_o =$	93824.5 lbs/ft	
$\sigma'_{h,\,max} =$	46.9 H	(based on a trapezoidal distribution of pressure)
$\sigma'_{h,\,max} =$	1876.5 psf	

Design restrained wall for 53 H

Geotechnologies, Inc.

Project: Hilton Universal

File No.: 21062

Seismically Induced Lateral Soil Pressure on Retaining Wall

Input:

Height of Retaining Wall:	(H)	35.0 feet
Retained Soil Unit Weight:	(γ)	130.0 pcf
Short Duration Acceleration	(SDs)	1.667 g
Horizontal Ground Acceleration: (1/2 of Sds/2.5)	(k_h)	0.33 g

Seismic Increment (ΔP_{AE}):

$\Delta P_{AE} = (0.5*\gamma*H^2)*(0.75*k_h)$

ΔP_{AE} = 19910.2 lbs/ft

Force applied at 0.6H above the base of the wall
Transfer load to 2/3 of the height of the wall

$T*(2/3)*H = \Delta P_{AE}*0.6*H$

T = 17919.2 lbs/ft

$EFP = 2*T/H^2$

EFP = **29.3 pcf** Triangular shape

Geotechnologies, Inc.

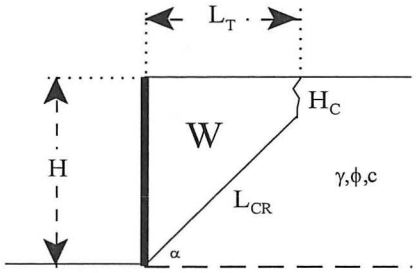
Project: Hilton Los Angeles/Universal
File No.: 21578
Description: Bedrock-Favorable Bedding

Retaining Wall Design with Level Backfill (Vector Analysis)

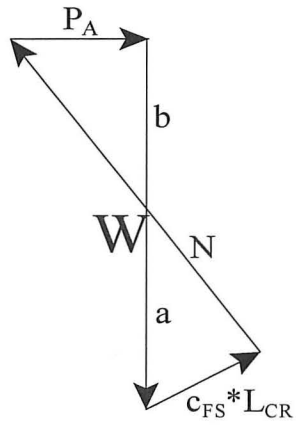
Input:

Retaining Wall Height	(H)	10.00 feet
Unit Weight of Retained Soils	(γ)	125.0 pcf
Friction Angle of Retained Soils	(ϕ)	34.0 degrees
Cohesion of Retained Soils	(c)	140.0 psf
Factor of Safety	(FS)	1.50
Factored Parameters:	(ϕ_{FS})	24.2 degrees
	(c_{FS})	93.3 psf

28



Failure Angle (α) degrees	Height of Tension Crack (H_C) feet	Area of Wedge (A) $feet^2$	Weight of Wedge (W) lbs/lineal foot	Length of Failure Plane (L_{CR}) feet	a lbs/lineal foot	b lbs/lineal foot	Active Pressure (P_A) lbs/lineal foot
40	3.3	53	6653.3	10.5	3277.0	3376.3	954.6
41	3.1	52	6488.1	10.5	3088.9	3399.3	1025.5
42	3.0	51	6316.8	10.5	2915.1	3401.7	1091.4
43	2.9	49	6142.1	10.4	2755.0	3387.1	1152.3
44	2.8	48	5966.0	10.4	2607.5	3358.5	1208.3
45	2.7	46	5789.8	10.3	2471.5	3318.3	1259.7
46	2.6	45	5614.5	10.2	2346.1	3268.4	1306.5
47	2.6	44	5440.9	10.1	2230.3	3210.5	1348.8
48	2.5	42	5269.3	10.1	2123.3	3146.0	1386.7
49	2.5	41	5100.0	10.0	2024.2	3075.9	1420.5
50	2.4	39	4933.4	9.9	1932.2	3001.1	1450.0
51	2.4	38	4769.4	9.8	1846.8	2922.6	1475.5
52	2.4	37	4608.2	9.7	1767.3	2840.8	1497.0
53	2.3	36	4449.7	9.6	1693.2	2756.4	1514.6
54	2.3	34	4293.9	9.5	1624.0	2669.9	1528.3
55	2.3	33	4140.8	9.4	1559.3	2581.6	1538.2
56	2.3	32	3990.4	9.3	1498.6	2491.8	1544.3
57	2.3	31	3842.4	9.2	1441.5	2400.9	1546.6
58	2.3	30	3696.9	9.1	1387.8	2309.0	1545.1
59	2.3	28	3553.7	9.0	1337.2	2216.5	1539.8
60	2.3	27	3412.7	8.9	1289.4	2123.4	1530.7
61	2.3	26	3273.8	8.8	1244.0	2029.8	1517.8
62	2.4	25	3137.0	8.6	1200.9	1936.0	1501.1
63	2.4	24	3001.9	8.5	1159.9	1842.1	1480.4
64	2.4	23	2868.7	8.4	1120.7	1748.0	1455.8
65	2.5	22	2737.1	8.3	1083.1	1654.0	1427.1



Design Equations (Vector Analysis):

$a = c_{FS}*L_{CR}*\sin(90+\phi_{FS})/\sin(\alpha-\phi_{FS})$

$b = W-a$

$P_A = b*\tan(\alpha-\phi_{FS})$

$EFP = 2*P_A/H^2$

Maximum Active Pressure Resultant

$P_{A,\,max}$ 1546.6 lbs/lineal foot

Equivalent Fluid Pressure (per lineal foot of wall)

$EFP = 2*P_A/H^2$

EFP 30.9 pcf

Design Wall for an Equivalent Fluid Pressure: 31 pcf

Geotechnologies, Inc.

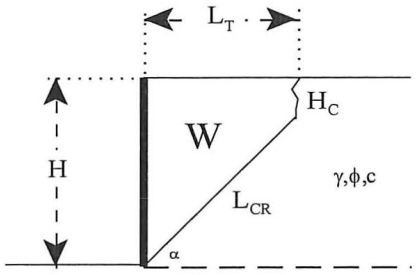
Project: Hilton Los Angeles/Universal
File No.: 21578
Description: Bedrock-Favorable Bedding

Retaining Wall Design with Level Backfill (Vector Analysis)

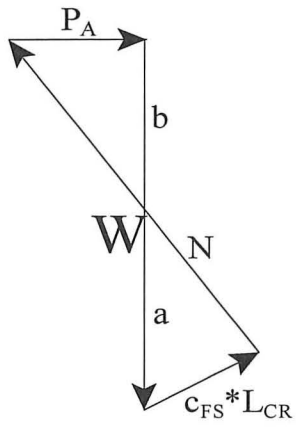
Input:

Retaining Wall Height	(H)	20.00 feet
Unit Weight of Retained Soils	(γ)	125.0 pcf
Friction Angle of Retained Soils	(ϕ)	34.0 degrees
Cohesion of Retained Soils	(c)	140.0 psf
Factor of Safety	(FS)	1.50
Factored Parameters:	(ϕ_{FS})	24.2 degrees
	(c_{FS})	93.3 psf

28



Failure Angle (α) degrees	Height of Tension Crack (H_C) feet	Area of Wedge (A) $feet^2$	Weight of Wedge (W) lbs/lineal foot	Length of Failure Plane (L_{CR}) feet	a lbs/lineal foot	b lbs/lineal foot	Active Pressure (P_A) lbs/lineal foot
40	3.3	232	28998.7	26.0	8144.3	20854.4	5896.4
41	3.1	224	28057.5	25.7	7581.1	20476.4	6177.5
42	3.0	217	27140.8	25.4	7079.4	20061.4	6436.3
43	2.9	210	26249.0	25.1	6630.4	19618.6	6674.1
44	2.8	203	25382.2	24.8	6227.1	19155.0	6891.7
45	2.7	196	24539.8	24.4	5863.4	18676.4	7090.0
46	2.6	190	23721.2	24.1	5534.3	18186.9	7269.8
47	2.6	183	22925.5	23.8	5235.4	17690.2	7431.8
48	2.5	177	22151.8	23.5	4963.1	17188.7	7576.8
49	2.5	171	21399.2	23.2	4714.4	16684.8	7705.2
50	2.4	165	20666.5	22.9	4486.5	16180.0	7817.5
51	2.4	160	19952.8	22.6	4277.2	15675.7	7914.2
52	2.4	154	19257.3	22.4	4084.4	15172.8	7995.6
53	2.3	149	18578.8	22.1	3906.5	14672.3	8062.1
54	2.3	143	17916.6	21.8	3742.0	14174.6	8113.9
55	2.3	138	17269.7	21.6	3589.4	13680.3	8151.2
56	2.3	133	16637.4	21.3	3447.7	13189.7	8174.1
57	2.3	128	16018.8	21.1	3315.8	12703.0	8182.7
58	2.3	123	15413.2	20.9	3192.8	12220.4	8177.1
59	2.3	119	14819.8	20.6	3077.8	11742.0	8157.2
60	2.3	114	14238.0	20.4	2970.2	11267.9	8123.0
61	2.3	109	13667.1	20.2	2869.2	10797.9	8074.3
62	2.4	105	13106.5	20.0	2774.3	10332.2	8011.0
63	2.4	100	12555.5	19.8	2685.0	9870.6	7932.7
64	2.4	96	12013.7	19.6	2600.6	9413.1	7839.3
65	2.5	92	11480.4	19.3	2520.9	8959.5	7730.3



Design Equations (Vector Analysis):

$a = c_{FS}*L_{CR}*\sin(90+\phi_{FS})/\sin(\alpha-\phi_{FS})$

$b = W-a$

$P_A = b*\tan(\alpha-\phi_{FS})$

$EFP = 2*P_A/H^2$

Maximum Active Pressure Resultant

$P_{A,\,max}$ 8182.7 lbs/lineal foot

Equivalent Fluid Pressure (per lineal foot of wall)

$EFP = 2*P_A/H^2$

EFP 40.9 pcf

Design Wall for an Equivalent Fluid Pressure: 41 pcf

Geotechnologies, Inc.

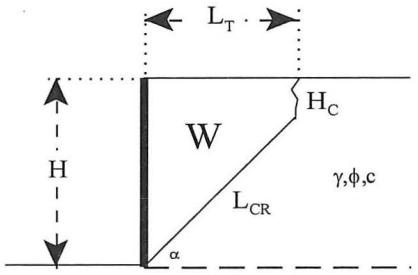
Project: Hilton Los Angeles/Universal
File No.: 21578
Description: Bedrock-Favorable Bedding

Retaining Wall Design with Level Backfill (Vector Analysis)

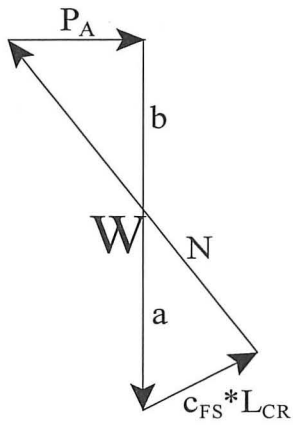
Input:

Retaining Wall Height	(H)	30.00 feet
Unit Weight of Retained Soils	(γ)	125.0 pcf
Friction Angle of Retained Soils	(ϕ)	34.0 degrees
Cohesion of Retained Soils	(c)	140.0 psf
Factor of Safety	(FS)	1.50
Factored Parameters:	(ϕ_{FS})	24.2 degrees
	(c_{FS})	93.3 psf

28



Failure Angle (α) degrees	Height of Tension Crack (H_C) feet	Area of Wedge (A) $feet^2$	Weight of Wedge (W) lbs/lineal foot	Length of Failure Plane (L_{CR}) feet	a lbs/lineal foot	b lbs/lineal foot	Active Pressure (P_A) lbs/lineal foot
40	3.3	530	66241.0	41.6	13011.6	53229.4	15050.2
41	3.1	512	64006.5	41.0	12073.3	51933.2	15667.6
42	3.0	495	61847.4	40.4	11243.6	50603.8	16235.3
43	2.9	478	59760.5	39.7	10505.9	49254.7	16756.0
44	2.8	462	57742.5	39.2	9846.8	47895.7	17232.1
45	2.7	446	55789.8	38.6	9255.3	46534.4	17665.5
46	2.6	431	53899.0	38.0	8722.4	45176.6	18058.2
47	2.6	417	52066.6	37.5	8240.4	43826.2	18411.9
48	2.5	402	50289.5	37.0	7802.9	42486.5	18728.1
49	2.5	389	48564.4	36.5	7404.6	41159.8	19007.9
50	2.4	375	46888.3	36.0	7040.7	39847.6	19252.7
51	2.4	362	45258.6	35.5	6707.5	38551.1	19463.3
52	2.4	349	43672.4	35.1	6401.5	37270.9	19640.6
53	2.3	337	42127.4	34.6	6119.8	36007.5	19785.4
54	2.3	325	40621.1	34.2	5859.9	34761.1	19898.1
55	2.3	313	39151.2	33.8	5619.6	33531.6	19979.2
56	2.3	302	37715.8	33.4	5396.9	32318.9	20029.1
57	2.3	291	36312.8	33.0	5190.1	31122.7	20047.9
58	2.3	280	34940.4	32.7	4997.7	29942.7	20035.7
59	2.3	269	33596.7	32.3	4818.4	28778.3	19992.4
60	2.3	258	32280.2	32.0	4651.0	27629.2	19917.9
61	2.3	248	30989.3	31.6	4494.4	26494.9	19812.0
62	2.4	238	29722.4	31.3	4347.7	25374.7	19674.0
63	2.4	228	28478.2	31.0	4210.0	24268.2	19503.7
64	2.4	218	27255.3	30.7	4080.6	23174.8	19300.2
65	2.5	208	26052.5	30.4	3958.6	22093.9	19062.7



Design Equations (Vector Analysis):

$a = c_{FS}*L_{CR}*\sin(90+\phi_{FS})/\sin(\alpha-\phi_{FS})$

$b = W-a$

$P_A = b*\tan(\alpha-\phi_{FS})$

$EFP = 2*P_A/H^2$

Maximum Active Pressure Resultant

$P_{A,\,max}$ 20047.9 lbs/lineal foot

Equivalent Fluid Pressure (per lineal foot of wall)

$EFP = 2*P_A/H^2$

EFP 44.6 pcf

Design Wall for an Equivalent Fluid Pressure: 45 pcf

Geotechnologies, Inc.

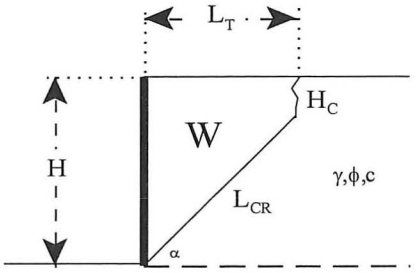
Project: Hilton Los Angeles/Universal
File No.: 21578
Description: Bedrock-Favorable Bedding

Retaining Wall Design with Level Backfill (Vector Analysis)

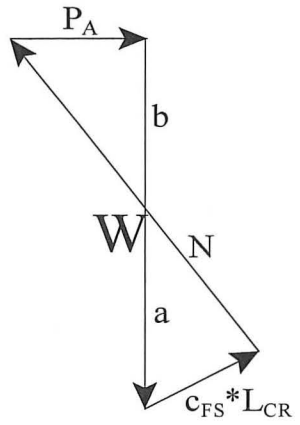
Input:

Retaining Wall Height	(H)	40.00 feet
Unit Weight of Retained Soils	(γ)	125.0 pcf
Friction Angle of Retained Soils	(ϕ)	34.0 degrees
Cohesion of Retained Soils	(c)	140.0 psf
Factor of Safety	(FS)	1.50
Factored Parameters:	(ϕ_{FS})	24.2 degrees
	(c_{FS})	93.3 psf

28



Failure Angle (α) degrees	Height of Tension Crack (H_C) feet	Area of Wedge (A) $feet^2$	Weight of Wedge (W) lbs/lineal foot	Length of Failure Plane (L_{CR}) feet	a lbs/lineal foot	b lbs/lineal foot	Active Pressure (P_A) lbs/lineal foot
40	3.3	947	118380.2	57.1	17878.9	100501.3	28416.0
41	3.1	915	114335.1	56.2	16565.6	97769.6	29495.8
42	3.0	883	110436.7	55.3	15407.8	95028.9	30488.2
43	2.9	853	106676.7	54.4	14381.3	92295.4	31398.1
44	2.8	824	103046.9	53.6	13466.5	89580.5	32229.5
45	2.7	796	99539.8	52.7	12647.3	86892.5	32986.3
46	2.6	769	96147.9	51.9	11910.6	84237.3	33671.8
47	2.6	743	92864.2	51.2	11245.4	81618.7	34289.0
48	2.5	717	89682.1	50.4	10642.7	79039.4	34840.5
49	2.5	693	86595.7	49.7	10094.8	76500.9	35328.7
50	2.4	669	83599.0	49.0	9595.0	74004.0	35755.6
51	2.4	645	80686.6	48.4	9137.9	71548.8	36122.9
52	2.4	623	77853.7	47.7	8718.6	69135.1	36432.1
53	2.3	601	75095.4	47.1	8333.2	66762.2	36684.4
54	2.3	579	72407.3	46.6	7977.9	64429.4	36880.9
55	2.3	558	69785.3	46.0	7649.8	62135.5	37022.4
56	2.3	538	67225.5	45.5	7346.0	59879.5	37109.3
57	2.3	518	64724.4	44.9	7064.3	57660.0	37142.1
58	2.3	498	62278.4	44.4	6802.6	55475.8	37120.8
59	2.3	479	59884.4	44.0	6559.0	53325.4	37045.4
60	2.3	460	57539.3	43.5	6331.8	51207.5	36915.5
61	2.3	442	55240.3	43.1	6119.6	49120.7	36730.8
62	2.4	424	52984.7	42.6	5921.1	47063.6	36490.3
63	2.4	406	50770.0	42.2	5735.1	45034.9	36193.3
64	2.4	389	48593.6	41.8	5560.5	43033.1	35838.4
65	2.5	372	46453.4	41.4	5396.4	41057.1	35424.3



Design Equations (Vector Analysis):

$a = c_{FS}*L_{CR}*\sin(90+\phi_{FS})/\sin(\alpha-\phi_{FS})$

$b = W-a$

$P_A = b*\tan(\alpha-\phi_{FS})$

$EFP = 2*P_A/H^2$

Maximum Active Pressure Resultant

$P_{A,\,max}$ 37142.1 lbs/lineal foot

Equivalent Fluid Pressure (per lineal foot of wall)

$EFP = 2*P_A/H^2$

EFP 46.4 pcf

Design Wall for an Equivalent Fluid Pressure: 46 pcf

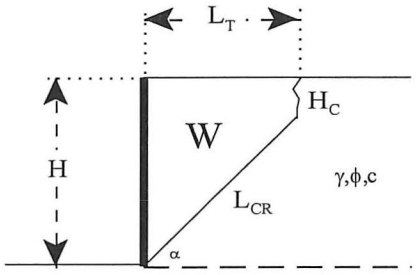
Geotechnologies, Inc.

Project: Hilton Los Angeles/Universal
File No.: 21578
Description: Bedrock-Adverse Bedding

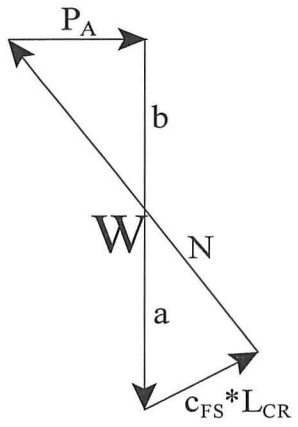
Retaining Wall Design with Level Backfill
(Vector Analysis)

Input:

Retaining Wall Height	(H)	10.00	feet
Unit Weight of Retained Soils	(γ)	125.0	pcf
Friction Angle of Retained Soils	(ϕ)	25.0	degrees
Cohesion of Retained Soils	(c)	127.0	psf
Factor of Safety	(FS)	1.50	
		28	
Factored Parameters:	(ϕ_{FS})	17.3	degrees
	(c_{FS})	84.7	psf



Failure Angle (α) degrees	Height of Tension Crack (H_C) feet	Area of Wedge (A) $feet^2$	Weight of Wedge (W) lbs/lineal foot	Length of Failure Plane (L_{CR}) feet	a lbs/lineal foot	b lbs/lineal foot	Active Pressure (P_A) lbs/lineal foot
30	3.4	77	9582.0	13.2	4850.8	4731.2	1068.9
31	3.2	75	9350.5	13.2	4511.0	4839.5	1182.5
32	3.0	73	9102.3	13.2	4200.4	4901.9	1288.8
33	2.8	71	8845.4	13.1	3917.8	4927.6	1388.0
34	2.7	69	8585.4	13.0	3661.3	4924.2	1480.2
35	2.6	67	8325.9	12.9	3428.4	4897.5	1565.9
36	2.5	65	8069.2	12.8	3217.0	4852.2	1645.3
37	2.4	63	7816.7	12.6	3024.7	4792.0	1718.7
38	2.3	61	7569.5	12.5	2849.6	4719.9	1786.4
39	2.2	59	7328.1	12.3	2689.9	4638.2	1848.7
40	2.2	57	7092.8	12.2	2543.9	4549.0	1905.8
41	2.1	55	6863.7	12.0	2410.1	4453.7	1957.9
42	2.1	53	6640.9	11.8	2287.3	4353.6	2005.3
43	2.0	51	6424.2	11.7	2174.4	4249.8	2048.1
44	2.0	50	6213.4	11.5	2070.3	4143.1	2086.6
45	2.0	48	6008.5	11.4	1974.2	4034.3	2120.8
46	1.9	46	5809.1	11.2	1885.3	3923.8	2151.0
47	1.9	45	5615.1	11.1	1802.8	3812.2	2177.2
48	1.9	43	5426.2	10.9	1726.3	3699.9	2199.5
49	1.9	42	5242.1	10.8	1655.1	3587.1	2218.1
50	1.9	41	5062.7	10.6	1588.7	3474.0	2232.9
51	1.9	39	4887.8	10.5	1526.7	3361.0	2244.2
52	1.8	38	4717.0	10.4	1468.8	3248.2	2251.8
53	1.8	36	4550.2	10.2	1414.5	3135.7	2255.8
54	1.8	35	4387.2	10.1	1363.5	3023.6	2256.3
55	1.8	34	4227.7	10.0	1315.7	2912.0	2253.2



Design Equations (Vector Analysis):

$a = c_{FS}*L_{CR}*\sin(90+\phi_{FS})/\sin(\alpha-\phi_{FS})$

$b = W-a$

$P_A = b*\tan(\alpha-\phi_{FS})$

$EFP = 2*P_A/H^2$

Maximum Active Pressure Resultant

$P_{A,\,max}$ 2256.3 lbs/lineal foot

Equivalent Fluid Pressure (per lineal foot of wall)

$EFP = 2*P_A/H^2$

EFP 45.1 pcf

Design Wall for an Equivalent Fluid Pressure: 45 pcf

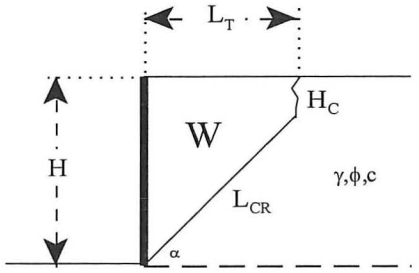
Geotechnologies, Inc.

Project: Hilton Los Angeles/Universal
File No.: 21578
Description: Bedrock-Adverse Bedding

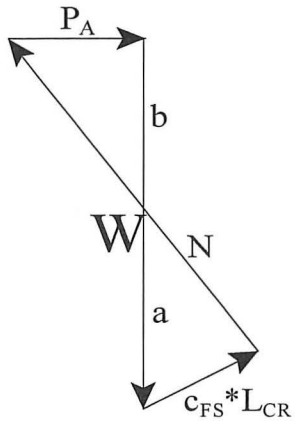
Retaining Wall Design with Level Backfill
(Vector Analysis)

Input:

Retaining Wall Height	(H)	20.00 feet
Unit Weight of Retained Soils	(γ)	125.0 pcf
Friction Angle of Retained Soils	(ϕ)	25.0 degrees
Cohesion of Retained Soils	(c)	127.0 psf
Factor of Safety	(FS)	1.50
		28
Factored Parameters:	(ϕ_{FS})	17.3 degrees
	(c_{FS})	84.7 psf



Failure Angle (α) degrees	Height of Tension Crack (H_C) feet	Area of Wedge (A) $feet^2$	Weight of Wedge (W) lbs/lineal foot	Length of Failure Plane (L_{CR}) feet	a lbs/lineal foot	b lbs/lineal foot	Active Pressure (P_A) lbs/lineal foot
30	3.4	336	42057.9	33.2	12188.3	29869.6	6748.4
31	3.2	324	40555.8	32.7	11124.4	29431.3	7191.5
32	3.0	313	39108.5	32.1	10200.5	28908.1	7600.6
33	2.8	302	37717.9	31.5	9393.1	28324.8	7978.3
34	2.7	291	36383.5	30.9	8683.6	27699.8	8326.7
35	2.6	281	35103.7	30.3	8056.8	27046.9	8647.9
36	2.5	271	33876.3	29.8	7500.4	26376.0	8943.7
37	2.4	262	32698.8	29.2	7004.0	25694.8	9215.8
38	2.3	253	31568.4	28.7	6559.5	25008.9	9465.6
39	2.2	244	30482.4	28.2	6159.8	24322.7	9694.4
40	2.2	236	29438.2	27.7	5799.0	23639.2	9903.5
41	2.1	227	28433.2	27.2	5472.3	22960.9	10093.9
42	2.1	220	27464.9	26.8	5175.5	22289.4	10266.6
43	2.0	212	26531.1	26.3	4905.0	21626.1	10422.4
44	2.0	205	25629.6	25.9	4657.8	20971.8	10561.9
45	2.0	198	24758.5	25.5	4431.4	20327.1	10686.0
46	1.9	191	23915.8	25.1	4223.4	19692.4	10795.1
47	1.9	185	23099.7	24.7	4032.0	19067.8	10889.7
48	1.9	178	22308.7	24.4	3855.3	18453.4	10970.4
49	1.9	172	21541.3	24.0	3692.0	17849.3	11037.3
50	1.9	166	20795.9	23.7	3540.7	17255.2	11090.8
51	1.9	161	20071.2	23.4	3400.2	16671.0	11131.2
52	1.8	155	19366.1	23.0	3269.7	16096.4	11158.6
53	1.8	149	18679.3	22.7	3148.0	15531.3	11173.1
54	1.8	144	18009.8	22.4	3034.6	14975.3	11174.8
55	1.8	139	17356.6	22.2	2928.5	14428.1	11163.8



Design Equations (Vector Analysis):

$a = c_{FS}*L_{CR}*\sin(90+\phi_{FS})/\sin(\alpha-\phi_{FS})$

$b = W-a$

$P_A = b*\tan(\alpha-\phi_{FS})$

$EFP = 2*P_A/H^2$

Maximum Active Pressure Resultant

$P_{A,\,max}$ 11174.8 lbs/lineal foot

Equivalent Fluid Pressure (per lineal foot of wall)

$EFP = 2*P_A/H^2$

EFP 55.9 pcf

Design Wall for an Equivalent Fluid Pressure: 56 pcf

Geotechnologies, Inc.

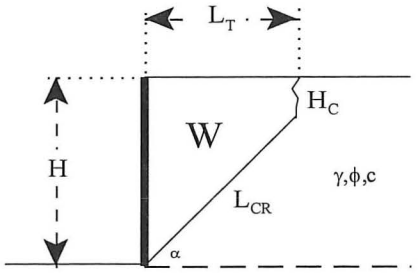
Project: Hilton Los Angeles/Universal
File No.: 21578
Description: Bedrock-Adverse Bedding

Retaining Wall Design with Level Backfill
(Vector Analysis)

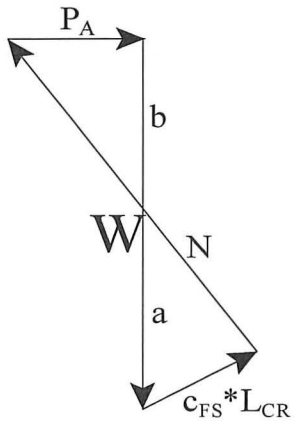
Input:

Retaining Wall Height	(H)	30.00 feet
Unit Weight of Retained Soils	(γ)	125.0 pcf
Friction Angle of Retained Soils	(ϕ)	25.0 degrees
Cohesion of Retained Soils	(c)	127.0 psf
Factor of Safety	(FS)	1.50
Factored Parameters:	(ϕ_{FS})	17.3 degrees
	(c_{FS})	84.7 psf

28



Failure Angle (α) degrees	Height of Tension Crack (H_C) feet	Area of Wedge (A) feet^2	Weight of Wedge (W) lbs/lineal foot	Length of Failure Plane (L_{CR}) feet	a lbs/lineal foot	b lbs/lineal foot	Active Pressure (P_A) lbs/lineal foot
30	3.4	769	96184.5	53.2	19525.8	76658.6	17319.4
31	3.2	741	92564.5	52.1	17737.9	74826.7	18283.7
32	3.0	713	89119.0	51.0	16200.5	72918.5	19172.0
33	2.8	687	85838.7	49.9	14868.4	70970.3	19990.3
34	2.7	662	82713.5	48.8	13706.0	69007.5	20744.0
35	2.6	638	79733.3	47.8	12685.2	67048.1	21437.8
36	2.5	615	76888.3	46.8	11783.7	65104.5	22075.9
37	2.4	593	74169.0	45.9	10983.4	63185.6	22662.3
38	2.3	573	71566.6	45.0	10269.4	61297.2	23200.2
39	2.2	553	69073.0	44.1	9629.6	59443.3	23692.6
40	2.2	533	66680.5	43.3	9054.1	57626.4	24142.3
41	2.1	515	64382.2	42.5	8534.5	55847.7	24551.5
42	2.1	497	62171.5	41.7	8063.6	54107.9	24922.3
43	2.0	480	60042.6	41.0	7635.6	52407.0	25256.7
44	2.0	464	57990.0	40.3	7245.4	50744.6	25556.3
45	2.0	448	56008.5	39.6	6888.6	49119.9	25822.4
46	1.9	433	54093.5	39.0	6561.6	47532.0	26056.4
47	1.9	418	52240.8	38.4	6261.1	45979.8	26259.4
48	1.9	404	50446.4	37.8	5984.3	44462.0	26432.2
49	1.9	390	48706.5	37.3	5728.9	42977.6	26575.6
50	1.9	376	47017.7	36.7	5492.6	41525.1	26690.4
51	1.9	363	45377.0	36.2	5273.7	40103.2	26776.9
52	1.8	350	43781.3	35.7	5070.5	38710.7	26835.6
53	1.8	338	42227.9	35.3	4881.6	37346.3	26866.7
54	1.8	326	40714.3	34.8	4705.6	36008.7	26870.4
55	1.8	314	39238.1	34.4	4541.4	34696.7	26846.7



Design Equations (Vector Analysis):

$a = c_{FS}*L_{CR}*\sin(90+\phi_{FS})/\sin(\alpha-\phi_{FS})$

$b = W-a$

$P_A = b*\tan(\alpha-\phi_{FS})$

$EFP = 2*P_A/H^2$

Maximum Active Pressure Resultant

$P_{A,\,max}$ 26870.4 lbs/lineal foot

Equivalent Fluid Pressure (per lineal foot of wall)

$EFP = 2*P_A/H^2$

EFP 59.7 pcf

Design Wall for an Equivalent Fluid Pressure: 60 pcf

Geotechnologies, Inc.

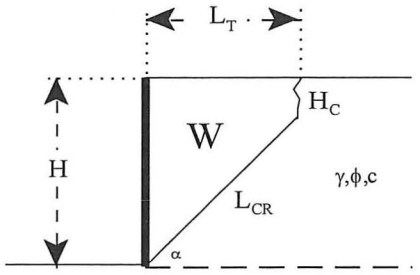
Project: Hilton Los Angeles/Universal
File No.: 21578
Description: Bedrock-Adverse Bedding

Retaining Wall Design with Level Backfill
(Vector Analysis)

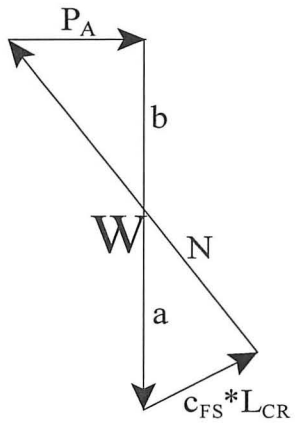
Input:

Retaining Wall Height	(H)	40.00 feet
Unit Weight of Retained Soils	(γ)	125.0 pcf
Friction Angle of Retained Soils	(ϕ)	25.0 degrees
Cohesion of Retained Soils	(c)	127.0 psf
Factor of Safety	(FS)	1.50
Factored Parameters:	(ϕ_{FS})	17.3 degrees
	(c_{FS})	84.7 psf

28



Failure Angle (α) degrees	Height of Tension Crack (H_C) feet	Area of Wedge (A) $feet^2$	Weight of Wedge (W) lbs/lineal foot	Length of Failure Plane (L_{CR}) feet	a lbs/lineal foot	b lbs/lineal foot	Active Pressure (P_A) lbs/lineal foot
30	3.4	1376	171961.7	73.2	26863.4	145098.3	32781.8
31	3.2	1323	165376.7	71.5	24351.3	141025.5	34459.2
32	3.0	1273	159133.6	69.8	22200.6	136933.0	36002.9
33	2.8	1226	153207.8	68.2	20343.7	132864.0	37424.0
34	2.7	1181	147575.5	66.7	18728.4	128847.2	38732.0
35	2.6	1138	142214.8	65.2	17313.7	124901.1	39935.5
36	2.5	1097	137105.0	63.8	16067.1	121037.9	41042.1
37	2.4	1058	132227.2	62.5	14962.7	117264.5	42058.4
38	2.3	1021	127564.0	61.2	13979.2	113584.8	42990.4
39	2.2	985	123099.7	60.0	13099.5	110000.2	43843.4
40	2.2	951	118819.7	58.8	12309.3	106510.4	44622.0
41	2.1	918	114710.8	57.7	11596.7	103114.1	45330.5
42	2.1	886	110760.8	56.7	10951.8	99809.1	45972.5
43	2.0	856	106958.7	55.7	10366.2	96592.5	46551.2
44	2.0	826	103294.4	54.7	9832.9	93461.5	47069.6
45	2.0	798	99758.5	53.8	9345.8	90412.7	47530.1
46	1.9	771	96342.4	52.9	8899.7	87442.7	47935.0
47	1.9	744	93038.4	52.1	8490.2	84548.2	48286.1
48	1.9	719	89839.0	51.3	8113.3	81725.7	48585.0
49	1.9	694	86737.8	50.5	7765.8	78972.0	48833.1
50	1.9	670	83728.3	49.8	7444.6	76283.7	49031.6
51	1.9	646	80805.0	49.1	7147.2	73657.8	49181.2
52	1.8	624	77962.5	48.4	6871.4	71091.1	49282.8
53	1.8	602	75195.9	47.8	6615.1	68580.8	49336.6
54	1.8	580	72500.5	47.2	6376.6	66123.9	49343.0
55	1.8	559	69872.2	46.6	6154.2	63717.9	49301.9



Design Equations (Vector Analysis):

$a = c_{FS}*L_{CR}*\sin(90+\phi_{FS})/\sin(\alpha-\phi_{FS})$

$b = W-a$

$P_A = b*\tan(\alpha-\phi_{FS})$

$EFP = 2*P_A/H^2$

Maximum Active Pressure Resultant

$P_{A,\,max}$ 49343.0 lbs/lineal foot

Equivalent Fluid Pressure (per lineal foot of wall)

$EFP = 2*P_A/H^2$

EFP 61.7 pcf

Design Wall for an Equivalent Fluid Pressure: 62 pcf

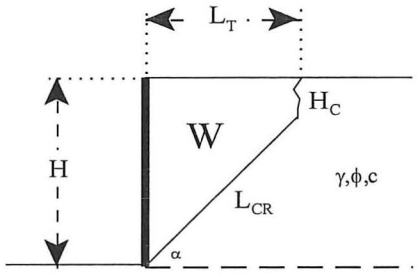
Geotechnologies, Inc.

Project: Hilton Los Angeles/Universal
File No.: 21578
Description: Bedrock-Favorable Bedding

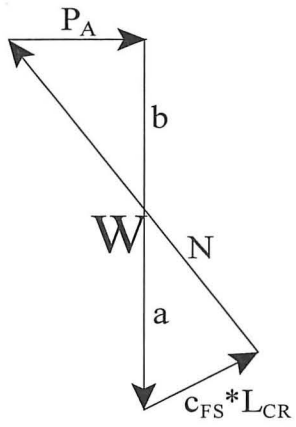
Shoring Design with Level Backfill
(Vector Analysis)

Input:

Shoring Height	(H)	10.00 feet
Unit Weight of Retained Soils	(γ)	125.0 pcf
Friction Angle of Retained Soils	(ϕ)	34.0 degrees
Cohesion of Retained Soils	(c)	140.0 psf
Factor of Safety	(FS)	1.25
		28
Factored Parameters:	(ϕ_{FS})	28.4 degrees
	(c_{FS})	112.0 psf



Failure Angle (α) degrees	Height of Tension Crack (H_C) feet	Area of Wedge (A) feet^2	Weight of Wedge (W) lbs/lineal foot	Length of Failure Plane (L_{CR}) feet	a lbs/lineal foot	b lbs/lineal foot	Active Pressure (P_A) lbs/lineal foot
40	5.1	44	5512.5	7.6	3722.8	1789.7	369.0
41	4.8	44	5552.9	8.0	3587.4	1965.5	441.1
42	4.5	44	5537.7	8.2	3435.5	2102.2	510.5
43	4.3	44	5484.0	8.4	3278.4	2205.6	576.5
44	4.1	43	5403.2	8.5	3122.6	2280.6	638.8
45	3.9	42	5303.1	8.6	2971.6	2331.5	697.2
46	3.7	42	5189.5	8.7	2827.4	2362.1	751.5
47	3.6	41	5066.2	8.7	2690.8	2375.4	801.7
48	3.5	39	4936.3	8.7	2562.1	2374.2	847.7
49	3.4	38	4801.9	8.7	2441.3	2360.6	889.6
50	3.3	37	4664.5	8.7	2328.0	2336.5	927.4
51	3.3	36	4525.3	8.7	2221.9	2303.4	961.1
52	3.2	35	4385.2	8.6	2122.6	2262.6	990.8
53	3.1	34	4244.8	8.6	2029.6	2215.3	1016.5
54	3.1	33	4104.7	8.5	1942.3	2162.4	1038.3
55	3.1	32	3965.1	8.5	1860.5	2104.7	1056.2
56	3.0	31	3826.4	8.4	1783.5	2042.9	1070.2
57	3.0	30	3688.7	8.3	1711.1	1977.6	1080.4
58	3.0	28	3552.1	8.2	1642.8	1909.3	1086.7
59	3.0	27	3416.6	8.2	1578.3	1838.4	1089.3
60	3.0	26	3282.5	8.1	1517.2	1765.3	1088.1
61	3.0	25	3149.5	8.0	1459.2	1690.4	1083.1
62	3.0	24	3017.8	7.9	1404.0	1613.9	1074.2
63	3.1	23	2887.3	7.8	1351.3	1536.0	1061.5
64	3.1	22	2758.0	7.7	1300.9	1457.1	1045.0
65	3.1	21	2629.7	7.6	1252.5	1377.2	1024.6



Design Equations (Vector Analysis):

$a = c_{FS}*L_{CR}*\sin(90+\phi_{FS})/\sin(\alpha-\phi_{FS})$

$b = W-a$

$P_A = b*\tan(\alpha-\phi_{FS})$

$EFP = 2*P_A/H^2$

Maximum Active Pressure Resultant

$P_{A,\,max}$ 1089.3 lbs/lineal foot

Equivalent Fluid Pressure (per lineal foot of shoring)

$EFP = 2*P_A/H^2$

EFP 21.8 pcf

Design Shoring for an Equivalent Fluid Pressure: 28 pcf

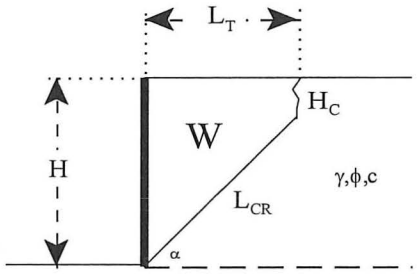
Geotechnologies, Inc.

Project: Hilton Los Angeles/Universal
File No.: 21578
Description: Bedrock-Favorable Bedding

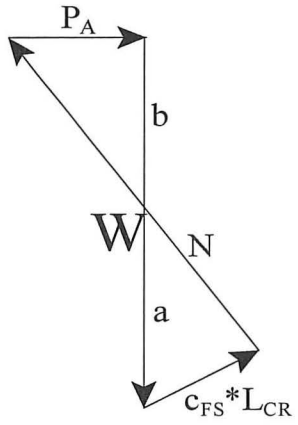
Shoring Design with Level Backfill (Vector Analysis)

Input:

Shoring Height	(H)	20.00 feet
Unit Weight of Retained Soils	(γ)	125.0 pcf
Friction Angle of Retained Soils	(ϕ)	34.0 degrees
Cohesion of Retained Soils	(c)	140.0 psf
Factor of Safety	(FS)	1.25
		28
Factored Parameters:	(ϕ_{FS})	28.4 degrees
	(c_{FS})	112.0 psf



Failure Angle (α) degrees	Height of Tension Crack (H_C) feet	Area of Wedge (A) feet^2	Weight of Wedge (W) lbs/lineal foot	Length of Failure Plane (L_{CR}) feet	a lbs/lineal foot	b lbs/lineal foot	Active Pressure (P_A) lbs/lineal foot
40	5.1	223	27857.9	23.2	11317.5	16540.4	3409.8
41	4.8	217	27122.3	23.2	10448.6	16673.7	3741.8
42	4.5	211	26361.7	23.2	9678.2	16683.6	4051.1
43	4.3	205	25590.9	23.1	8993.4	16597.5	4338.3
44	4.1	199	24819.4	22.9	8383.0	16436.3	4604.1
45	3.9	192	24053.1	22.8	7837.0	16216.1	4849.1
46	3.7	186	23296.1	22.6	7347.0	15949.2	5074.2
47	3.6	180	22550.9	22.4	6905.6	15645.3	5280.0
48	3.5	175	21818.9	22.2	6506.6	15312.3	5467.0
49	3.4	169	21101.0	22.0	6144.9	14956.1	5636.1
50	3.3	163	20397.6	21.8	5815.8	14581.8	5787.6
51	3.3	158	19708.7	21.5	5515.6	14193.2	5922.1
52	3.2	152	19034.3	21.3	5240.9	13793.4	6040.1
53	3.1	147	18374.0	21.1	4988.9	13385.1	6141.9
54	3.1	142	17727.4	20.9	4757.1	12970.3	6227.8
55	3.1	137	17094.0	20.7	4543.3	12550.8	6298.2
56	3.0	132	16473.4	20.5	4345.6	12127.8	6353.3
57	3.0	127	15865.1	20.2	4162.4	11702.6	6393.3
58	3.0	122	15268.4	20.0	3992.3	11276.0	6418.3
59	3.0	117	14682.8	19.8	3834.0	10848.8	6428.3
60	3.0	113	14107.8	19.6	3686.3	10421.5	6423.5
61	3.0	108	13542.8	19.4	3548.1	9994.7	6403.8
62	3.0	104	12987.4	19.2	3418.7	9568.7	6369.1
63	3.1	100	12440.9	19.0	3297.1	9143.9	6319.3
64	3.1	95	11902.9	18.8	3182.6	8720.4	6254.3
65	3.1	91	11372.9	18.6	3074.5	8298.5	6173.9



Design Equations (Vector Analysis):

$a = c_{FS}*L_{CR}*\sin(90+\phi_{FS})/\sin(\alpha-\phi_{FS})$

$b = W-a$

$P_A = b*\tan(\alpha-\phi_{FS})$

$EFP = 2*P_A/H^2$

Maximum Active Pressure Resultant

$P_{A,\,max}$ 6428.3 lbs/lineal foot

Equivalent Fluid Pressure (per lineal foot of shoring)

$EFP = 2*P_A/H^2$

EFP 32.1 pcf

Design Shoring for an Equivalent Fluid Pressure: 32 pcf

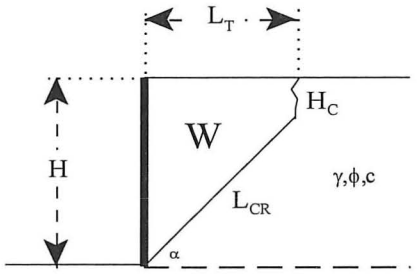
Geotechnologies, Inc.

Project: Hilton Los Angeles/Universal
File No.: 21578
Description: Bedrock-Favorable Bedding

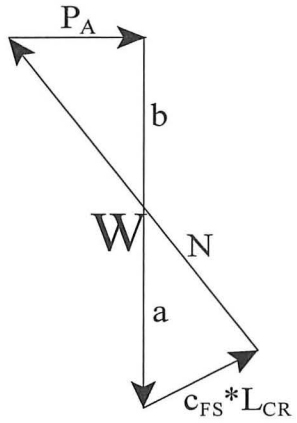
Shoring Design with Level Backfill (Vector Analysis)

Input:

Shoring Height	(H)	30.00 feet
Unit Weight of Retained Soils	(γ)	125.0 pcf
Friction Angle of Retained Soils	(ϕ)	34.0 degrees
Cohesion of Retained Soils	(c)	140.0 psf
Factor of Safety	(FS)	1.25
		28
Factored Parameters:	(ϕ_{FS})	28.4 degrees
	(c_{FS})	112.0 psf



Failure Angle (α) degrees	Height of Tension Crack (H_C) feet	Area of Wedge (A) feet^2	Weight of Wedge (W) lbs/lineal foot	Length of Failure Plane (L_{CR}) feet	a lbs/lineal foot	b lbs/lineal foot	Active Pressure (P_A) lbs/lineal foot
40	5.1	521	65100.2	38.7	18912.2	46188.0	9521.7
41	4.8	505	63071.3	38.5	17309.9	45761.4	10269.5
42	4.5	489	61068.4	38.1	15920.8	45147.5	10962.7
43	4.3	473	59102.5	37.7	14708.4	44394.0	11603.8
44	4.1	457	57179.7	37.3	13643.4	43536.3	12195.2
45	3.9	442	55303.1	36.9	12702.4	42600.7	12739.0
46	3.7	428	53473.9	36.5	11866.5	41607.4	13237.3
47	3.6	414	51692.0	36.1	11120.3	40571.7	13692.0
48	3.5	400	49956.5	35.7	10451.1	39505.4	14104.9
49	3.4	386	48266.2	35.2	9848.5	38417.8	14477.3
50	3.3	373	46619.5	34.8	9303.6	37315.9	14810.9
51	3.3	360	45014.5	34.4	8809.2	36205.3	15106.7
52	3.2	348	43449.5	34.0	8359.2	35090.3	15365.9
53	3.1	335	41922.6	33.6	7948.2	33974.4	15589.4
54	3.1	323	40431.8	33.3	7571.8	32860.1	15778.1
55	3.1	312	38975.5	32.9	7226.0	31749.5	15932.5
56	3.0	300	37551.8	32.5	6907.7	30644.2	16053.4
57	3.0	289	36159.0	32.2	6613.8	29545.2	16141.0
58	3.0	278	34795.5	31.8	6341.9	28453.6	16195.7
59	3.0	268	33459.7	31.5	6089.7	27370.0	16217.8
60	3.0	257	32150.0	31.2	5855.4	26294.6	16207.2
61	3.0	247	30865.0	30.9	5637.1	25227.9	16164.0
62	3.0	237	29603.3	30.5	5433.3	24170.0	16087.9
63	3.1	227	28363.6	30.2	5242.8	23120.8	15978.8
64	3.1	217	27144.6	29.9	5064.2	22080.4	15836.2
65	3.1	208	25945.0	29.7	4896.4	21048.6	15659.7



Design Equations (Vector Analysis):

$a = c_{FS}*L_{CR}*\sin(90+\phi_{FS})/\sin(\alpha-\phi_{FS})$

$b = W-a$

$P_A = b*\tan(\alpha-\phi_{FS})$

$EFP = 2*P_A/H^2$

Maximum Active Pressure Resultant

$P_{A,\,max}$ 16217.8 lbs/lineal foot

Equivalent Fluid Pressure (per lineal foot of shoring)

$EFP = 2*P_A/H^2$

EFP 36.0 pcf

Design Shoring for an Equivalent Fluid Pressure: 36 pcf

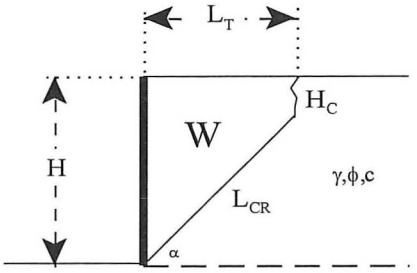
Geotechnologies, Inc.

Project: Hilton Los Angeles/Universal
File No.: 21578
Description: Bedrock-Favorable Bedding

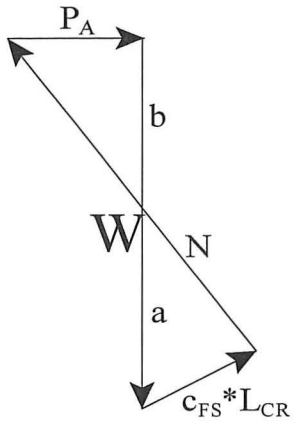
Shoring Design with Level Backfill
(Vector Analysis)

Input:

Shoring Height	(H)	40.00 feet
Unit Weight of Retained Soils	(γ)	125.0 pcf
Friction Angle of Retained Soils	(ϕ)	34.0 degrees
Cohesion of Retained Soils	(c)	140.0 psf
Factor of Safety	(FS)	1.25
		28
Factored Parameters:	(ϕ_{FS})	28.4 degrees
	(c_{FS})	112.0 psf



Failure Angle (α) degrees	Height of Tension Crack (H_C) feet	Area of Wedge (A) $feet^2$	Weight of Wedge (W) lbs/lineal foot	Length of Failure Plane (L_{CR}) feet	a lbs/lineal foot	b lbs/lineal foot	Active Pressure (P_A) lbs/lineal foot
40	5.1	938	117239.4	54.3	26506.9	90732.5	18704.6
41	4.8	907	113399.9	53.7	24171.1	89228.8	20024.2
42	4.5	877	109657.7	53.1	22163.5	87494.1	21245.3
43	4.3	848	106018.6	52.4	20423.4	85595.2	22373.1
44	4.1	820	102484.1	51.7	18903.8	83580.3	23412.2
45	3.9	792	99053.1	51.1	17567.9	81485.3	24366.8
46	3.7	766	95722.8	50.4	16386.1	79336.7	25240.8
47	3.6	740	92489.5	49.7	15335.1	77154.4	26037.9
48	3.5	715	89349.2	49.1	14395.6	74953.6	26761.1
49	3.4	690	86297.5	48.5	13552.0	72745.5	27413.4
50	3.3	667	83330.1	47.9	12791.4	70538.7	27997.2
51	3.3	644	80442.6	47.3	12102.9	68339.7	28514.8
52	3.2	621	77630.7	46.7	11477.5	66153.3	28968.2
53	3.1	599	74890.5	46.2	10907.5	63983.0	29359.1
54	3.1	578	72218.1	45.6	10386.5	61831.6	29689.0
55	3.1	557	69609.6	45.1	9908.8	59700.8	29959.0
56	3.0	536	67061.6	44.6	9469.7	57591.8	30170.3
57	3.0	517	64570.6	44.1	9065.2	55505.5	30323.4
58	3.0	497	62133.6	43.6	8691.4	53442.1	30419.1
59	3.0	478	59747.3	43.2	8345.4	51401.9	30457.6
60	3.0	459	57409.1	42.7	8024.5	49384.6	30439.1
61	3.0	441	55116.0	42.3	7726.0	47390.0	30363.6
62	3.0	423	52865.6	41.9	7448.0	45417.6	30230.7
63	3.1	405	50655.3	41.5	7188.5	43466.8	30040.0
64	3.1	388	48482.9	41.1	6945.8	41537.0	29790.7
65	3.1	371	46346.0	40.7	6718.4	39627.6	29482.0



Design Equations (Vector Analysis):

$a = c_{FS}*L_{CR}*\sin(90+\phi_{FS})/\sin(\alpha-\phi_{FS})$

$b = W-a$

$P_A = b*\tan(\alpha-\phi_{FS})$

$EFP = 2*P_A/H^2$

Maximum Active Pressure Resultant

$P_{A,\,max}$ 30457.6 lbs/lineal foot

Equivalent Fluid Pressure (per lineal foot of shoring)

$EFP = 2*P_A/H^2$

EFP 38.1 pcf

Design Shoring for an Equivalent Fluid Pressure: 38 pcf

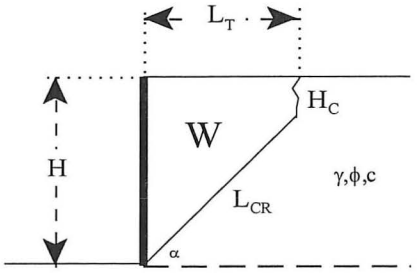
Geotechnologies, Inc.

Project: Hilton Los Angeles/Universal
File No.: 21578
Description: Bedrock-Favorable Bedding

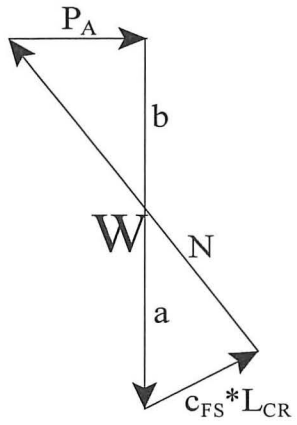
Shoring Design with Level Backfill
(Vector Analysis)

Input:

Shoring Height	(H)	50.00 feet
Unit Weight of Retained Soils	(γ)	125.0 pcf
Friction Angle of Retained Soils	(ϕ)	34.0 degrees
Cohesion of Retained Soils	(c)	140.0 psf
Factor of Safety	(FS)	1.25
		28
Factored Parameters:	(ϕ_{FS})	28.4 degrees
	(c_{FS})	112.0 psf



Failure Angle (α) degrees	Height of Tension Crack (H_C) feet	Area of Wedge (A) feet^2	Weight of Wedge (W) lbs/lineal foot	Length of Failure Plane (L_{CR}) feet	a lbs/lineal foot	b lbs/lineal foot	Active Pressure (P_A) lbs/lineal foot
40	5.1	1474	184275.6	69.9	34101.6	150174.0	30958.5
41	4.8	1425	178108.1	68.9	31032.4	147075.8	33005.8
42	4.5	1377	172129.6	68.0	28406.2	143723.4	34898.9
43	4.3	1331	166339.3	67.1	26138.4	140200.9	36646.1
44	4.1	1286	160732.7	66.1	24164.2	136568.5	38255.0
45	3.9	1242	155303.1	65.2	22433.3	132869.9	39732.5
46	3.7	1200	150042.8	64.3	20905.7	129137.1	41084.8
47	3.6	1160	144943.5	63.4	19549.9	125393.6	42317.6
48	3.5	1120	139996.9	62.6	18340.1	121656.8	43435.9
49	3.4	1082	135194.9	61.7	17255.6	117939.2	44444.2
50	3.3	1044	130529.4	60.9	16279.2	114250.2	45346.5
51	3.3	1008	125992.9	60.2	15396.5	110596.4	46146.5
52	3.2	973	121578.0	59.4	14595.8	106982.3	46847.1
53	3.1	938	117278.0	58.7	13866.8	103411.1	47451.0
54	3.1	905	113086.1	58.0	13201.2	99884.9	47960.6
55	3.1	872	108996.3	57.3	12591.6	96404.7	48377.8
56	3.0	840	105002.7	56.6	12031.8	92970.9	48704.0
57	3.0	809	101099.8	56.0	11516.5	89583.3	48940.6
58	3.0	778	97282.5	55.4	11041.0	86241.5	49088.4
59	3.0	748	93545.7	54.8	10601.2	82944.6	49147.9
60	3.0	719	89885.0	54.3	10193.6	79691.5	49119.4
61	3.0	690	86295.9	53.7	9815.0	76480.9	49002.7
62	3.0	662	82774.2	53.2	9462.7	73311.5	48797.4
63	3.1	635	79316.1	52.7	9134.3	70181.9	48502.8
64	3.1	607	75917.8	52.2	8827.5	67090.3	48117.7
65	3.1	581	72575.8	51.7	8540.4	64035.4	47640.8



Design Equations (Vector Analysis):

$a = c_{FS}*L_{CR}*\sin(90+\phi_{FS})/\sin(\alpha-\phi_{FS})$

$b = W-a$

$P_A = b*\tan(\alpha-\phi_{FS})$

$EFP = 2*P_A/H^2$

Maximum Active Pressure Resultant

$P_{A,\,max}$ 49147.9 lbs/lineal foot

Equivalent Fluid Pressure (per lineal foot of shoring)

$EFP = 2*P_A/H^2$

EFP 39.3 pcf

Design Shoring for an Equivalent Fluid Pressure: 39 pcf

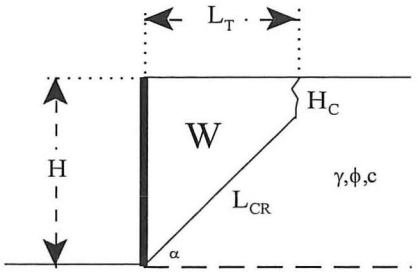
Geotechnologies, Inc.

Project: Hilton Los Angeles/Universal
File No.: 21578
Description: Bedrock-Adverse Bedding

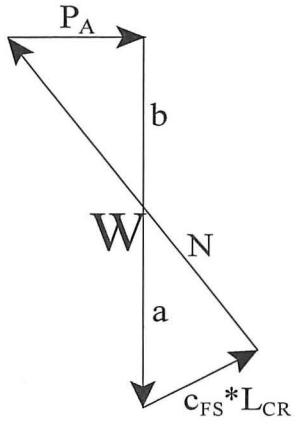
Shoring Design with Level Backfill
(Vector Analysis)

Input:

Shoring Height	(H)	10.00 feet
Unit Weight of Retained Soils	(γ)	125.0 pcf
Friction Angle of Retained Soils	(ϕ)	25.0 degrees
Cohesion of Retained Soils	(c)	127.0 psf
Factor of Safety	(FS)	1.25
		28
Factored Parameters:	(ϕ_{FS})	20.5 degrees
	(c_{FS})	101.6 psf



Failure Angle (α) degrees	Height of Tension Crack (H_C) feet	Area of Wedge (A) feet^2	Weight of Wedge (W) lbs/lineal foot	Length of Failure Plane (L_{CR}) feet	a lbs/lineal foot	b lbs/lineal foot	Active Pressure (P_A) lbs/lineal foot
30	5.3	62	7779.3	9.4	5392.6	2386.7	401.2
31	4.9	64	7949.0	10.0	5196.6	2752.5	512.2
32	4.5	64	7987.5	10.4	4948.6	3038.9	620.6
33	4.2	64	7941.4	10.7	4683.1	3258.3	724.9
34	3.9	63	7840.1	10.9	4418.0	3422.1	824.2
35	3.7	62	7702.3	11.0	4162.4	3539.9	918.3
36	3.5	60	7540.7	11.0	3920.8	3619.9	1006.8
37	3.3	59	7363.8	11.1	3694.9	3668.9	1089.7
38	3.2	57	7177.2	11.0	3485.1	3692.2	1167.1
39	3.1	56	6985.2	11.0	3290.9	3694.4	1239.1
40	3.0	54	6790.6	10.9	3111.5	3679.1	1305.9
41	2.9	53	6595.3	10.9	2946.0	3649.3	1367.5
42	2.8	51	6400.7	10.8	2793.1	3607.6	1424.1
43	2.7	50	6207.8	10.7	2652.0	3555.9	1476.0
44	2.7	48	6017.4	10.6	2521.5	3495.9	1523.1
45	2.6	47	5829.8	10.5	2400.7	3429.1	1565.8
46	2.5	45	5645.4	10.4	2288.8	3356.6	1604.1
47	2.5	44	5464.3	10.3	2184.9	3279.4	1638.1
48	2.5	42	5286.6	10.1	2088.4	3198.3	1667.9
49	2.4	41	5112.4	10.0	1998.5	3113.9	1693.7
50	2.4	40	4941.6	9.9	1914.7	3026.9	1715.5
51	2.4	38	4774.2	9.8	1836.4	2937.8	1733.4
52	2.4	37	4610.0	9.7	1763.2	2846.8	1747.4
53	2.4	36	4449.1	9.6	1694.6	2754.5	1757.7
54	2.3	34	4291.2	9.5	1630.2	2661.1	1764.1
55	2.3	33	4136.3	9.3	1569.6	2566.8	1766.9



Design Equations (Vector Analysis):

$a = c_{FS}*L_{CR}*\sin(90+\phi_{FS})/\sin(\alpha-\phi_{FS})$

$b = W-a$

$P_A = b*\tan(\alpha-\phi_{FS})$

$EFP = 2*P_A/H^2$

Maximum Active Pressure Resultant

$P_{A,\,max}$ 1766.9 lbs/lineal foot

Equivalent Fluid Pressure (per lineal foot of shoring)

$EFP = 2*P_A/H^2$

EFP 35.3 pcf

Design Shoring for an Equivalent Fluid Pressure: 35 pcf

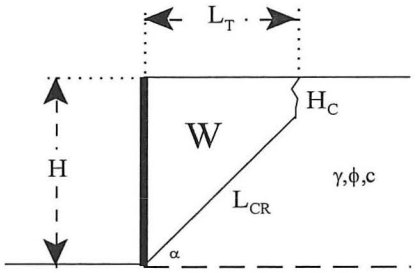
Geotechnologies, Inc.

Project: Hilton Los Angeles/Universal
File No.: 21578
Description: Bedrock-Adverse Bedding

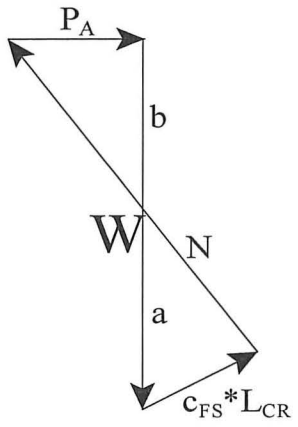
Shoring Design with Level Backfill
(Vector Analysis)

Input:

Shoring Height	(H)	20.00 feet
Unit Weight of Retained Soils	(γ)	125.0 pcf
Friction Angle of Retained Soils	(ϕ)	25.0 degrees
Cohesion of Retained Soils	(c)	127.0 psf
Factor of Safety	(FS)	1.25
		28
Factored Parameters:	(ϕ_{FS})	20.5 degrees
	(c_{FS})	101.6 psf



Failure Angle (α) degrees	Height of Tension Crack (H_C) feet	Area of Wedge (A) feet^2	Weight of Wedge (W) lbs/lineal foot	Length of Failure Plane (L_{CR}) feet	a lbs/lineal foot	b lbs/lineal foot	Active Pressure (P_A) lbs/lineal foot
30	5.3	322	40255.3	29.4	16877.2	23378.1	3929.8
31	4.9	313	39154.3	29.4	15298.6	23855.7	4439.6
32	4.5	304	37993.8	29.3	13926.3	24067.4	4915.0
33	4.2	295	36813.9	29.0	12731.6	24082.3	5357.5
34	3.9	285	35638.1	28.8	11687.8	23950.3	5768.6
35	3.7	276	34480.1	28.4	10772.0	23708.1	6149.9
36	3.5	267	33347.9	28.0	9964.9	23383.0	6503.2
37	3.3	258	32245.8	27.7	9250.3	22995.5	6830.0
38	3.2	249	31176.1	27.3	8614.9	22561.2	7131.8
39	3.1	241	30139.6	26.9	8047.5	22092.1	7410.0
40	3.0	233	29136.0	26.5	7538.8	21597.2	7665.9
41	2.9	225	28164.7	26.1	7081.0	21083.7	7900.6
42	2.8	218	27224.7	25.7	6667.5	20557.2	8115.2
43	2.7	211	26314.8	25.3	6292.9	20021.9	8310.6
44	2.7	203	25433.6	25.0	5952.3	19481.3	8487.8
45	2.6	197	24579.8	24.6	5641.8	18938.0	8647.4
46	2.5	190	23752.1	24.3	5357.9	18394.2	8790.2
47	2.5	184	22948.9	23.9	5097.7	17851.3	8916.7
48	2.5	177	22169.2	23.6	4858.5	17310.6	9027.6
49	2.4	171	21411.5	23.3	4638.3	16773.2	9123.1
50	2.4	165	20674.7	23.0	4434.9	16239.8	9203.8
51	2.4	160	19957.6	22.7	4246.8	15710.8	9270.0
52	2.4	154	19259.1	22.4	4072.4	15186.7	9321.8
53	2.4	149	18578.2	22.1	3910.4	14667.8	9359.6
54	2.3	143	17913.9	21.8	3759.6	14154.3	9383.5
55	2.3	138	17265.2	21.6	3619.1	13646.2	9393.6



Design Equations (Vector Analysis):

$a = c_{FS}*L_{CR}*\sin(90+\phi_{FS})/\sin(\alpha-\phi_{FS})$

$b = W-a$

$P_A = b*\tan(\alpha-\phi_{FS})$

$EFP = 2*P_A/H^2$

Maximum Active Pressure Resultant

$P_{A,\,max}$ 9393.6 lbs/lineal foot

Equivalent Fluid Pressure (per lineal foot of shoring)

$EFP = 2*P_A/H^2$

EFP 47.0 pcf

Design Shoring for an Equivalent Fluid Pressure: 47 pcf

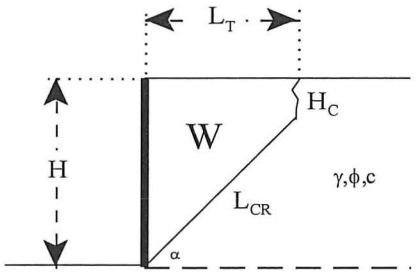
Geotechnologies, Inc.

Project: Hilton Los Angeles/Universal
File No.: 21578
Description: Bedrock-Adverse Bedding

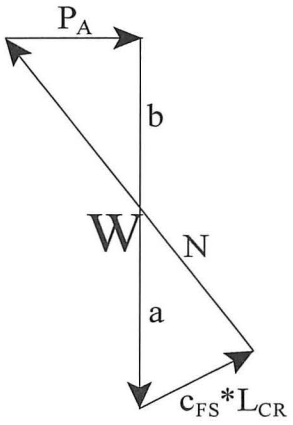
Shoring Design with Level Backfill (Vector Analysis)

Input:

Shoring Height	(H)	30.00	feet
Unit Weight of Retained Soils	(γ)	125.0	pcf
Friction Angle of Retained Soils	(ϕ)	25.0	degrees
Cohesion of Retained Soils	(c)	127.0	psf
Factor of Safety	(FS)	1.25	
		28	
Factored Parameters:	(ϕ_{FS})	20.5	degrees
	(c_{FS})	101.6	psf



Failure Angle (α) degrees	Height of Tension Crack (H_C) feet	Area of Wedge (A) $feet^2$	Weight of Wedge (W) lbs/lineal foot	Length of Failure Plane (L_{CR}) feet	a lbs/lineal foot	b lbs/lineal foot	Active Pressure (P_A) lbs/lineal foot
30	5.3	755	94381.8	49.4	28361.8	66020.1	11097.9
31	4.9	729	91163.0	48.8	25400.6	65762.4	12238.4
32	4.5	704	88004.2	48.1	22904.1	65100.1	13294.7
33	4.2	679	84934.7	47.4	20780.1	64154.6	14272.3
34	3.9	656	81968.1	46.6	18957.7	63010.5	15176.5
35	3.7	633	79109.7	45.8	17381.6	61728.1	16012.4
36	3.5	611	76359.8	45.1	16009.0	60350.8	16784.6
37	3.3	590	73716.0	44.3	14805.8	58910.2	17497.2
38	3.2	569	71174.3	43.5	13744.8	57429.6	18153.9
39	3.1	550	68730.1	42.8	12804.1	55926.0	18758.3
40	3.0	531	66378.3	42.0	11966.1	54412.2	19313.4
41	2.9	513	64113.7	41.3	11216.0	52897.7	19822.0
42	2.8	495	61931.3	40.7	10541.9	51389.4	20286.5
43	2.7	479	59826.3	40.0	9933.7	49892.5	20709.2
44	2.7	462	57793.9	39.4	9383.1	48410.8	21092.0
45	2.6	447	55829.8	38.8	8882.8	46947.0	21436.7
46	2.5	431	53929.8	38.2	8427.0	45502.8	21744.9
47	2.5	417	52090.0	37.6	8010.4	44079.6	22017.8
48	2.5	402	50306.8	37.1	7628.7	42678.1	22256.7
49	2.4	389	48576.7	36.5	7278.1	41298.7	22462.7
50	2.4	375	46896.6	36.0	6955.2	39941.4	22636.6
51	2.4	362	45263.4	35.5	6657.2	38606.2	22779.1
52	2.4	349	43674.3	35.1	6381.6	37292.7	22890.8
53	2.4	337	42126.8	34.6	6126.2	36000.6	22972.2
54	2.3	325	40618.4	34.2	5889.1	34729.3	23023.6
55	2.3	313	39146.7	33.8	5668.5	33478.2	23045.2



Design Equations (Vector Analysis):

$a = c_{FS}*L_{CR}*\sin(90+\phi_{FS})/\sin(\alpha-\phi_{FS})$

$b = W-a$

$P_A = b*\tan(\alpha-\phi_{FS})$

$EFP = 2*P_A/H^2$

Maximum Active Pressure Resultant

$P_{A,\,max}$ 23045.2 lbs/lineal foot

Equivalent Fluid Pressure (per lineal foot of shoring)

$EFP = 2*P_A/H^2$

EFP 51.2 pcf

Design Shoring for an Equivalent Fluid Pressure: 51 pcf

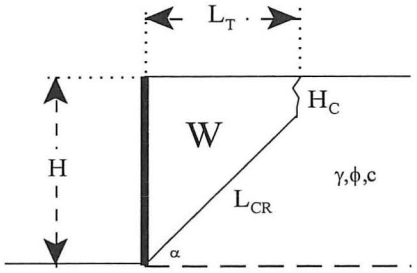
Geotechnologies, Inc.

Project: Hilton Los Angeles/Universal
File No.: 21578
Description: Bedrock-Adverse Bedding

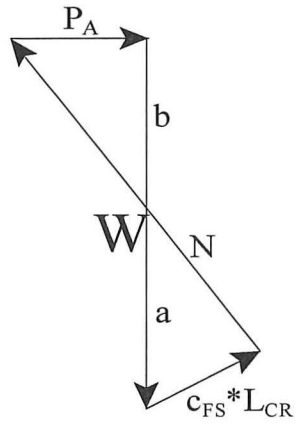
Shoring Design with Level Backfill (Vector Analysis)

Input:

Shoring Height	(H)	40.00 feet
Unit Weight of Retained Soils	(γ)	125.0 pcf
Friction Angle of Retained Soils	(ϕ)	25.0 degrees
Cohesion of Retained Soils	(c)	127.0 psf
Factor of Safety	(FS)	1.25
		28
Factored Parameters:	(ϕ_{FS})	20.5 degrees
	(c_{FS})	101.6 psf



Failure Angle (α) degrees	Height of Tension Crack (H_C) feet	Area of Wedge (A) feet^2	Weight of Wedge (W) lbs/lineal foot	Length of Failure Plane (L_{CR}) feet	a lbs/lineal foot	b lbs/lineal foot	Active Pressure (P_A) lbs/lineal foot
30	5.3	1361	170159.1	69.4	39846.4	130312.7	21905.5
31	4.9	1312	163975.2	68.2	35502.6	128472.7	23908.8
32	4.5	1264	158018.9	67.0	31881.9	126137.0	25759.5
33	4.2	1218	152303.8	65.8	28828.7	123475.1	27469.1
34	3.9	1175	146830.2	64.5	26227.5	120602.7	29048.0
35	3.7	1133	141591.2	63.3	23991.2	117600.0	30505.8
36	3.5	1093	136576.5	62.1	22053.1	114523.4	31850.9
37	3.3	1054	131774.2	60.9	20361.2	111413.0	33091.2
38	3.2	1017	127171.8	59.8	18874.6	108297.2	34233.6
39	3.1	982	122756.8	58.7	17560.7	105196.1	35284.2
40	3.0	948	118517.5	57.6	16393.3	102124.1	36248.7
41	2.9	916	114442.3	56.6	15351.0	99091.3	37131.8
42	2.8	884	110520.6	55.6	14416.3	96104.3	37938.2
43	2.7	854	106742.4	54.7	13574.6	93167.8	38671.7
44	2.7	825	103098.4	53.8	12813.9	90284.5	39335.8
45	2.6	797	99579.8	52.9	12123.9	87455.9	39933.7
46	2.5	769	96178.7	52.1	11496.1	84682.6	40468.0
47	2.5	743	92887.6	51.3	10923.2	81964.4	40941.3
48	2.5	718	89699.5	50.5	10398.9	79300.6	41355.5
49	2.4	693	86608.0	49.8	9917.9	76690.2	41712.5
50	2.4	669	83607.2	49.1	9475.4	74131.8	42013.8
51	2.4	646	80691.4	48.4	9067.6	71623.8	42260.7
52	2.4	623	77855.6	47.8	8690.8	69164.8	42454.3
53	2.4	601	75094.8	47.1	8342.0	66752.8	42595.3
54	2.3	579	72404.6	46.5	8018.6	64386.0	42684.4
55	2.3	558	69780.8	46.0	7718.0	62062.8	42721.9



Design Equations (Vector Analysis):

$a = c_{FS}*L_{CR}*\sin(90+\phi_{FS})/\sin(\alpha-\phi_{FS})$

$b = W-a$

$P_A = b*\tan(\alpha-\phi_{FS})$

$EFP = 2*P_A/H^2$

Maximum Active Pressure Resultant

$P_{A,\,max}$ 42721.9 lbs/lineal foot

Equivalent Fluid Pressure (per lineal foot of shoring)

$EFP = 2*P_A/H^2$

EFP 53.4 pcf

Design Shoring for an Equivalent Fluid Pressure: 53 pcf

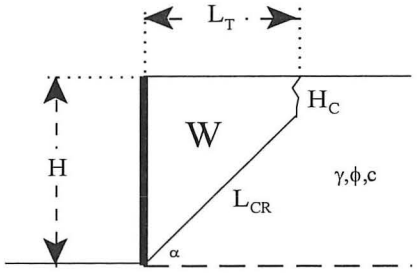
Geotechnologies, Inc.

Project: Hilton Los Angeles/Universal
File No.: 21578
Description: Bedrock-Adverse Bedding

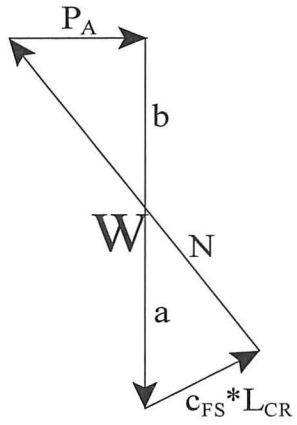
Shoring Design with Level Backfill
(Vector Analysis)

Input:

Shoring Height	(H)	50.00 feet
Unit Weight of Retained Soils	(γ)	125.0 pcf
Friction Angle of Retained Soils	(ϕ)	25.0 degrees
Cohesion of Retained Soils	(c)	127.0 psf
Factor of Safety	(FS)	1.25
		28
Factored Parameters:	(ϕ_{FS})	20.5 degrees
	(c_{FS})	101.6 psf



Failure Angle (α) degrees	Height of Tension Crack (H_C) feet	Area of Wedge (A) $feet^2$	Weight of Wedge (W) lbs/lineal foot	Length of Failure Plane (L_{CR}) feet	a lbs/lineal foot	b lbs/lineal foot	Active Pressure (P_A) lbs/lineal foot
30	5.3	2141	267586.9	89.4	51331.0	216255.9	36352.5
31	4.9	2061	257590.9	87.7	45604.6	211986.4	39450.7
32	4.5	1984	248037.7	85.9	40859.6	207178.1	42309.7
33	4.2	1911	238921.2	84.1	36877.2	202044.0	44948.1
34	3.9	1842	230224.2	82.4	33497.3	196726.9	47383.1
35	3.7	1775	221924.5	80.7	30600.9	191323.7	49629.9
36	3.5	1712	213998.0	79.1	28097.2	185900.8	51702.2
37	3.3	1651	206420.5	77.5	25916.6	180503.8	53612.2
38	3.2	1593	199168.5	76.0	24004.5	175164.0	55370.8
39	3.1	1538	192219.8	74.6	22317.4	169902.5	56987.6
40	3.0	1484	185553.6	73.2	20820.6	164733.0	58471.5
41	2.9	1433	179150.5	71.8	19486.1	159664.5	59830.1
42	2.8	1384	172992.6	70.6	18290.7	154701.9	61070.2
43	2.7	1337	167063.2	69.3	17215.5	149847.6	62198.2
44	2.7	1291	161347.0	68.2	16244.7	145102.3	63219.3
45	2.6	1247	155829.8	67.0	15365.0	140464.8	64138.4
46	2.5	1204	150498.7	66.0	14565.2	135933.5	64959.8
47	2.5	1163	145341.6	64.9	13836.0	131505.6	65687.1
48	2.5	1123	140347.2	64.0	13169.1	127178.1	66323.7
49	2.4	1084	135505.4	63.0	12557.7	122947.7	66872.4
50	2.4	1046	130806.5	62.1	11995.7	118810.9	67335.4
51	2.4	1010	126241.8	61.3	11478.0	114763.8	67714.9
52	2.4	974	121802.9	60.5	11000.0	110802.9	68012.3
53	2.4	940	117482.2	59.7	10557.8	106924.3	68229.0
54	2.3	906	113272.6	58.9	10148.0	103124.6	68365.9
55	2.3	873	109167.5	58.2	9767.5	99400.0	68423.5



Design Equations (Vector Analysis):

$a = c_{FS}*L_{CR}*\sin(90+\phi_{FS})/\sin(\alpha-\phi_{FS})$

$b = W-a$

$P_A = b*\tan(\alpha-\phi_{FS})$

$EFP = 2*P_A/H^2$

Maximum Active Pressure Resultant

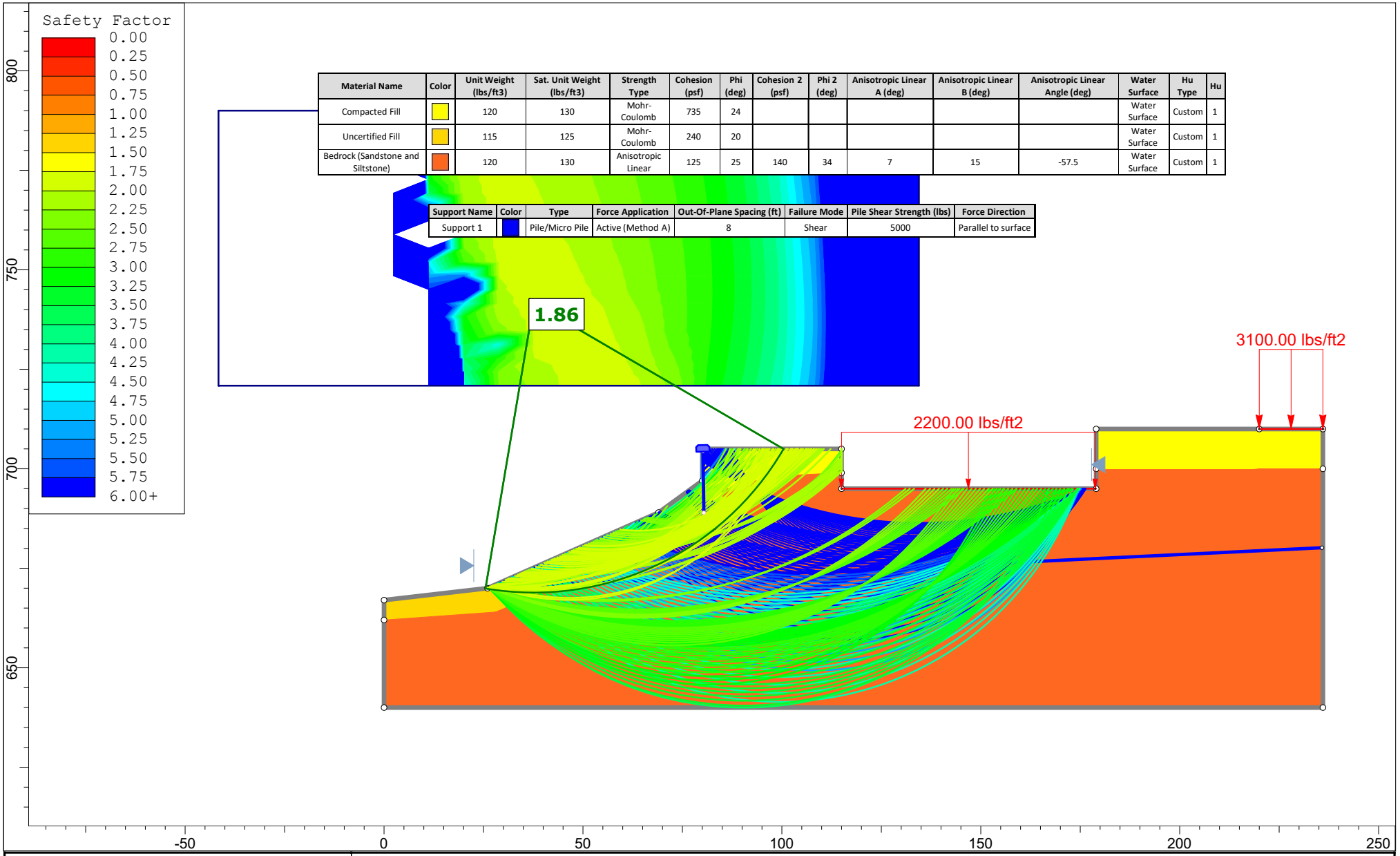
$P_{A,\,max}$ 68423.5 lbs/lineal foot

Equivalent Fluid Pressure (per lineal foot of shoring)

$EFP = 2*P_A/H^2$

EFP 54.7 pcf

Design Shoring for an Equivalent Fluid Pressure: 55 pcf



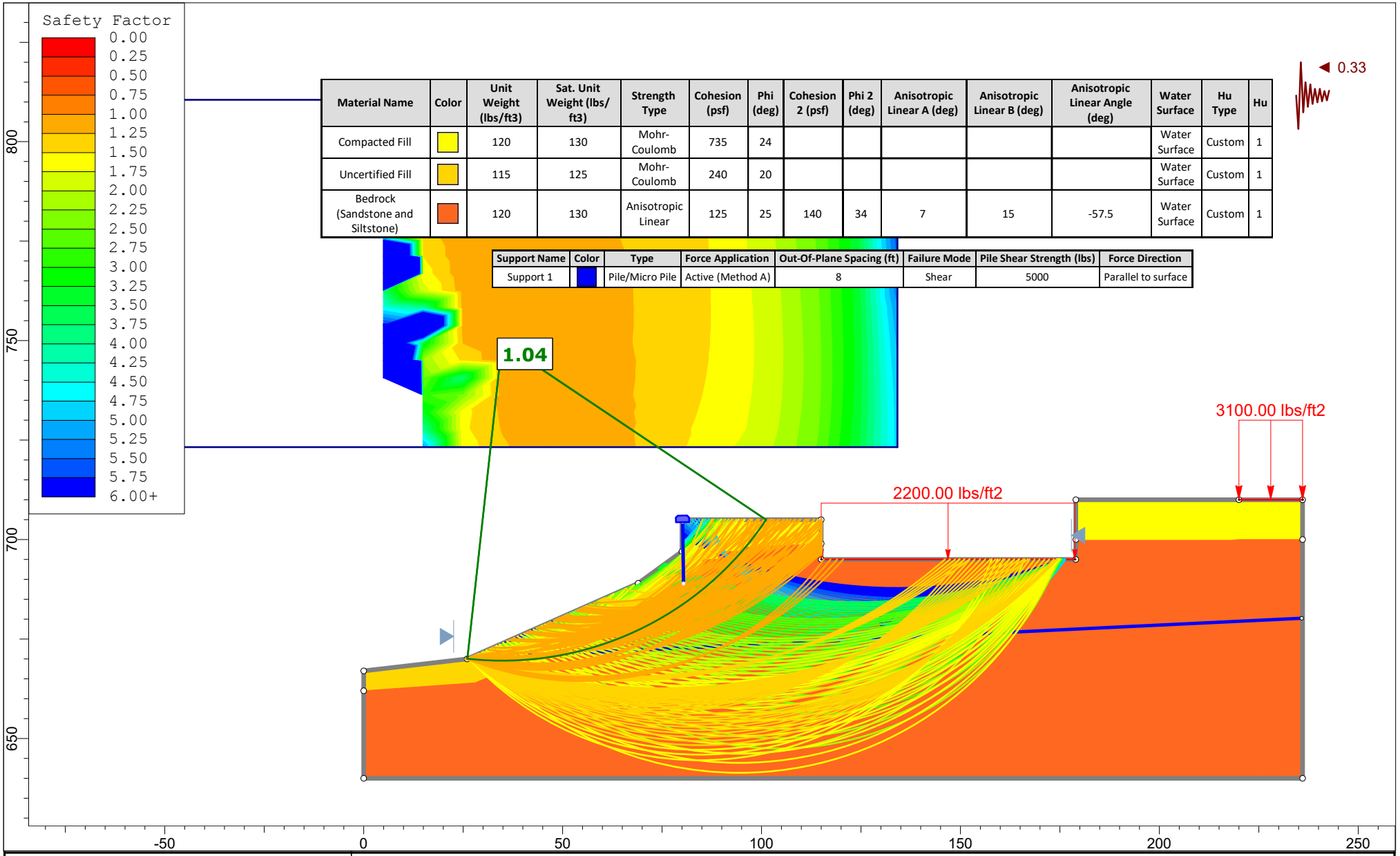
Material Name	Color	Unit Weight (lbs/ft3)	Sat. Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Cohesion 2 (psf)	Phi 2 (deg)	Anisotropic Linear A (deg)	Anisotropic Linear B (deg)	Anisotropic Linear Angle (deg)	Water Surface	Hu Type	Hu
Compacted Fill		120	130	Mohr-Coulomb	735	24						Water Surface	Custom	1
Uncertified Fill		115	125	Mohr-Coulomb	240	20						Water Surface	Custom	1
Bedrock (Sandstone and Siltstone)		120	130	Anisotropic Linear	125	25	140	34	7	15	-57.5	Water Surface	Custom	1

Support Name	Color	Type	Force Application	Out-Of-Plane Spacing (ft)	Failure Mode	Pile Shear Strength (lbs)	Force Direction
Support 1		Pile/Micro Pile	Active (Method A)	8	Shear	5000	Parallel to surface

GEOTECHNOLOGIES, INC.
CONSULTING GEOTECHNICAL ENGINEERS

SLIDEINTERPRET 9.012

Project	File No. 21578 Hilton-Los Angeles/Universal City
Analysis	Cross Section D-D'
Scale	1:400
Comment 1	Curved Static
Date	9/13/2022
File Name	Proposed Hotel Extension



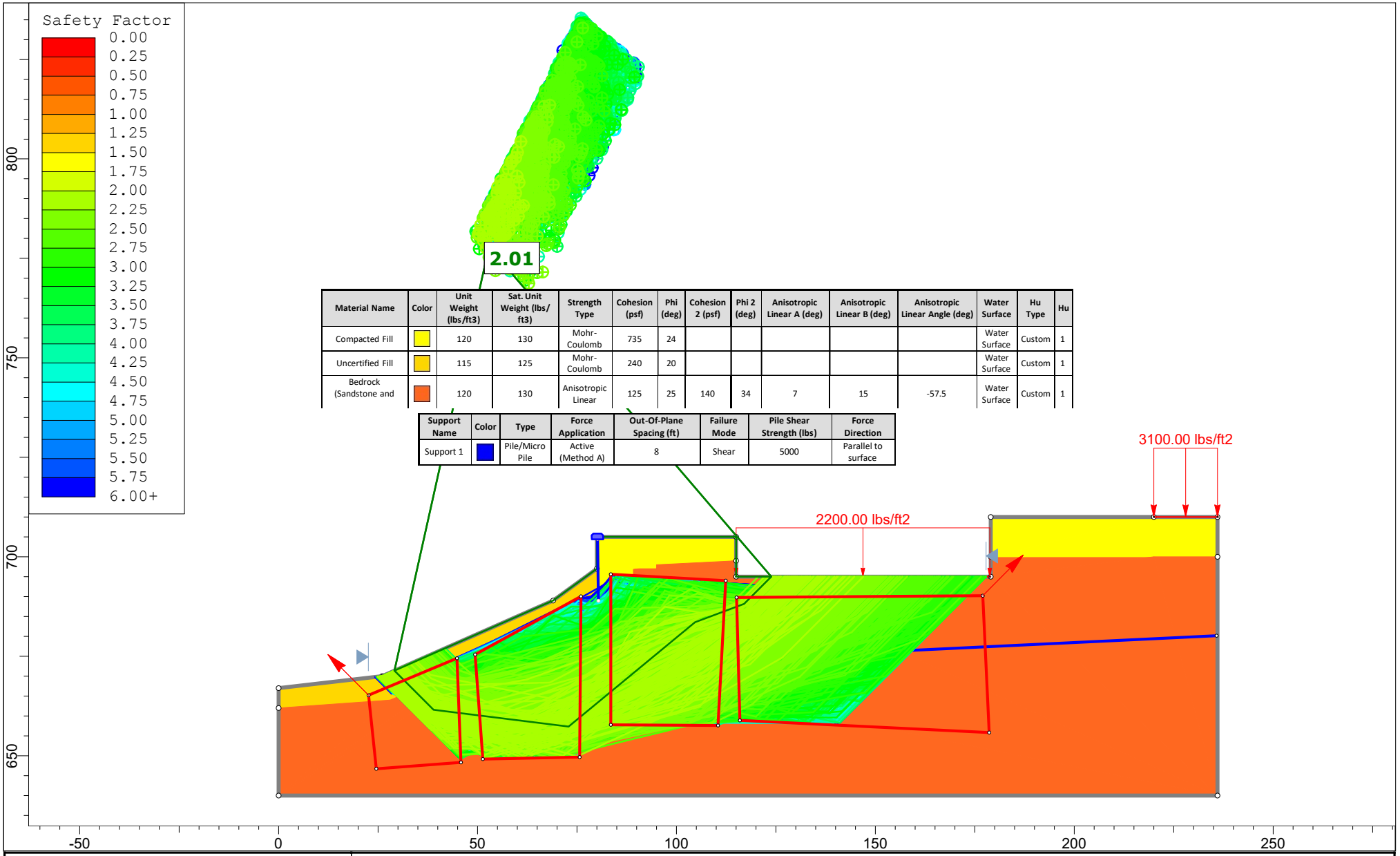
Material Name	Color	Unit Weight (lbs/ft3)	Sat. Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Cohesion 2 (psf)	Phi 2 (deg)	Anisotropic Linear A (deg)	Anisotropic Linear B (deg)	Anisotropic Linear Angle (deg)	Water Surface	Hu Type	Hu
Compacted Fill		120	130	Mohr-Coulomb	735	24						Water Surface	Custom	1
Uncertified Fill		115	125	Mohr-Coulomb	240	20						Water Surface	Custom	1
Bedrock (Sandstone and Siltstone)		120	130	Anisotropic Linear	125	25	140	34	7	15	-57.5	Water Surface	Custom	1

Support Name	Color	Type	Force Application	Out-Of-Plane Spacing (ft)	Failure Mode	Pile Shear Strength (lbs)	Force Direction
Support 1		Pile/Micro Pile	Active (Method A)	8	Shear	5000	Parallel to surface

GEOTECHNOLOGIES, INC.
CONSULTING GEOTECHNICAL ENGINEERS

SLIDEINTERPRET 9.012

Project	File No. 21578 Hilton-Los Angeles/Universal City
Analysis	Cross Section D-D'
Scale	1:400
Comment 1	Curved PStatic
Date	9/13/2022
File Name	Proposed Hotel Extension



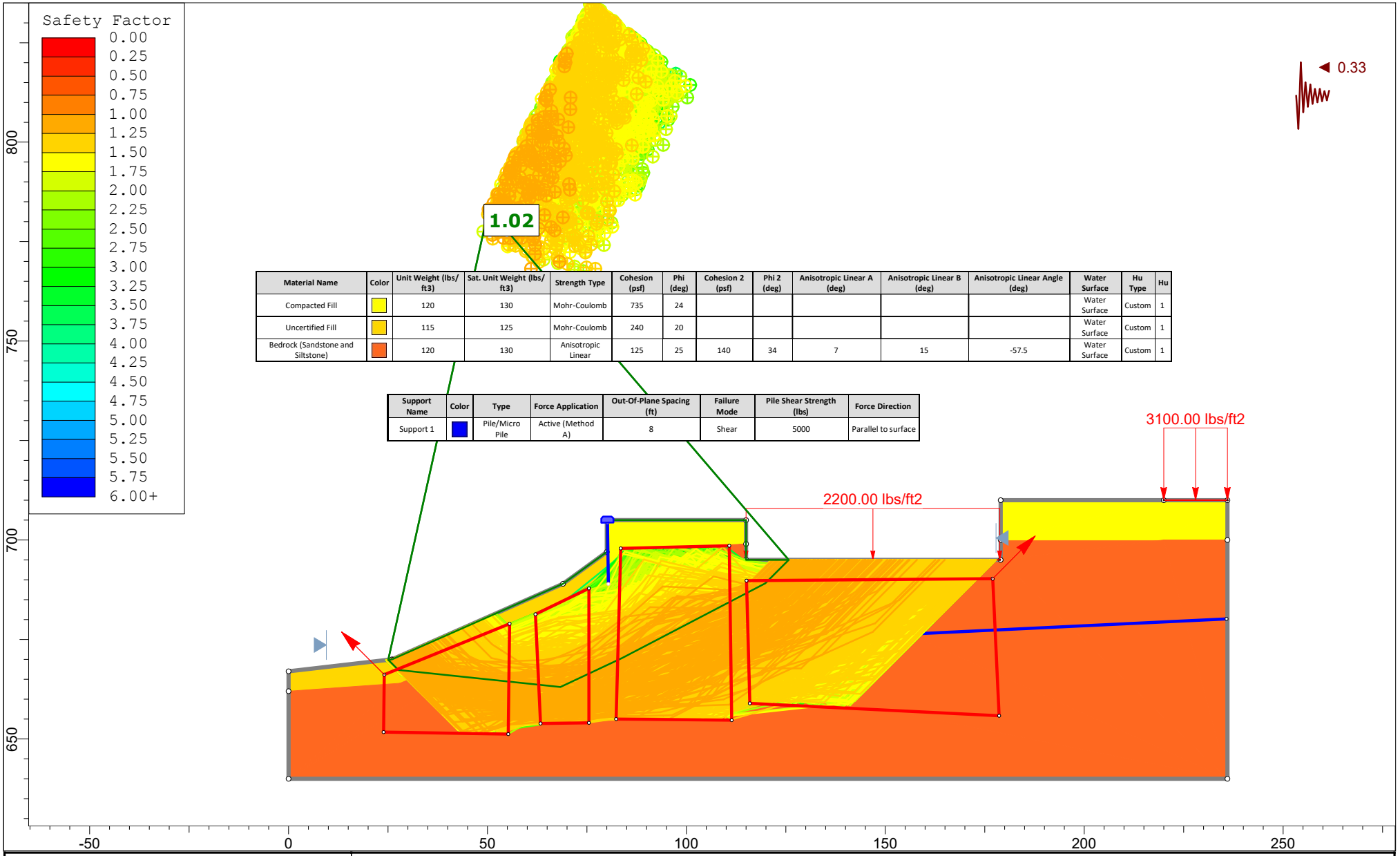
Material Name	Color	Unit Weight (lbs/ft3)	Sat. Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Cohesion 2 (psf)	Phi 2 (deg)	Anisotropic Linear A (deg)	Anisotropic Linear B (deg)	Anisotropic Linear Angle (deg)	Water Surface	Hu Type	Hu
Compacted Fill		120	130	Mohr-Coulomb	735	24						Water Surface	Custom	1
Uncertified Fill		115	125	Mohr-Coulomb	240	20						Water Surface	Custom	1
Bedrock (Sandstone and		120	130	Anisotropic Linear	125	25	140	34	7	15	-57.5	Water Surface	Custom	1

Support Name	Color	Type	Force Application	Out-Of-Plane Spacing (ft)	Failure Mode	Pile Shear Strength (lbs)	Force Direction
Support 1		Pile/Micro Pile	Active (Method A)	8	Shear	5000	Parallel to surface

GEOTECHNOLOGIES, INC.
CONSULTING GEOTECHNICAL ENGINEERS

SLIDEINTERPRET 9.012

Project	File No. 21578 Hilton-Los Angeles/Universal City		
Analysis	Cross Section D-D'		
Scale	1:400	*Comment 1*	Block Static
Date	9/13/2022	*File Name*	Proposed Hotel Extension



Material Name	Color	Unit Weight (lbs/ft3)	Sat. Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Cohesion 2 (psf)	Phi 2 (deg)	Anisotropic Linear A (deg)	Anisotropic Linear B (deg)	Anisotropic Linear Angle (deg)	Water Surface	Hu Type	Hu
Compacted Fill		120	130	Mohr-Coulomb	735	24						Water Surface	Custom	1
Uncertified Fill		115	125	Mohr-Coulomb	240	20						Water Surface	Custom	1
Bedrock (Sandstone and Siltstone)		120	130	Anisotropic Linear	125	25	140	34	7	15	-57.5	Water Surface	Custom	1

Support Name	Color	Type	Force Application	Out-Of-Plane Spacing (ft)	Failure Mode	Pile Shear Strength (lbs)	Force Direction
Support 1		Pile/Micro Pile	Active (Method A)	8	Shear	5000	Parallel to surface

GEOTECHNOLOGIES, INC.
CONSULTING GEOTECHNICAL ENGINEERS

SLIDEINTERPRET 9.012

Project	File No. 21578 Hilton-Los Angeles/Universal City
Analysis	Cross Section D-D'
Scale	1:400
Comment 1	Block Static
Date	9/13/2022
File Name	Proposed Hotel Extension

rocscience

21578Hilton XS DD Update with rock strength
File No 21578 Hilton Expansion
Geotechnologies, Inc.
Date Created: 4/17/20
Software Version: 9.012

Table of Contents

Project Summary 5
Currently Open Scenarios 5
General Settings 6
Analysis Options 7
All Open Scenarios 7
Groundwater Analysis 8
All Open Scenarios 8
Random Numbers 9
All Open Scenarios 9
Surface Options 10
Curved Static 10
Block Static 10
Seismic Loading 11
Curved Static - Master Scenario 11
Curved Static - Curved Pseudostatic 11
Block Static - Master Scenario 11
Block Static - Block Pseudostatic 11
Loading 12
All Open Scenarios 12
Materials 13
Materials In Use 13
Support 14
Global Minimums 15
Curved Static - Master Scenario 15
Method: bishop simplified 15
Method: janbu simplified 15
Curved Static - Curved Pseudostatic 15
Method: bishop simplified 15
Method: janbu simplified 15
Block Static - Master Scenario 16
Method: bishop simplified 16
Method: janbu simplified 16
Block Static - Block Pseudostatic 16
Method: bishop simplified 16
Method: janbu simplified 16
Global Minimum Coordinates 18
Block Static - Master Scenario 18
Method: bishop simplified 18
Method: janbu simplified 18
Block Static - Block Pseudostatic 18
Method: bishop simplified 18
Method: janbu simplified 18

Global Minimum Support Data 19
Curved Static - Curved Pseudostatic 19
Method: bishop simplified 19
Method: janbu simplified 19
All other Scenarios 19
Method: bishop simplified 19
Method: janbu simplified 19
Valid and Invalid Surfaces 20
Curved Static - Master Scenario 20
Method: bishop simplified 20
Method: janbu simplified 20
Curved Static - Curved Pseudostatic 20
Method: bishop simplified 20
Method: janbu simplified 20
Block Static - Master Scenario 21
Method: bishop simplified 21
Method: janbu simplified 21
Block Static - Block Pseudostatic 21
Method: bishop simplified 21
Method: janbu simplified 21
Error Code Descriptions 21
Slice Data 23
Curved Static - Master Scenario 23
Global Minimum Query (bishop simplified) - Safety Factor: 1.86399 23
Global Minimum Query (janbu simplified) - Safety Factor: 1.76318 26
Curved Static - Curved Pseudostatic 29
Global Minimum Query (bishop simplified) - Safety Factor: 1.03927 29
Global Minimum Query (janbu simplified) - Safety Factor: 0.929143 32
Block Static - Master Scenario 35
Global Minimum Query (bishop simplified) - Safety Factor: 2.13426 35
Global Minimum Query (janbu simplified) - Safety Factor: 2.00685 38
Block Static - Block Pseudostatic 41
Global Minimum Query (bishop simplified) - Safety Factor: 1.11118 41
Global Minimum Query (janbu simplified) - Safety Factor: 1.02484 44
Interslice Data 47
Curved Static - Master Scenario 47
Global Minimum Query (bishop simplified) - Safety Factor: 1.86399 47
Global Minimum Query (janbu simplified) - Safety Factor: 1.76318 48
Curved Static - Curved Pseudostatic 49
Global Minimum Query (bishop simplified) - Safety Factor: 1.03927 49
Global Minimum Query (janbu simplified) - Safety Factor: 0.929143 50
Block Static - Master Scenario 51
Global Minimum Query (bishop simplified) - Safety Factor: 2.13426 51

Global Minimum Query (janbu simplified) - Safety Factor: 2.00685 52
Block Static - Block Pseudostatic 53
Global Minimum Query (bishop simplified) - Safety Factor: 1.11118 53
Global Minimum Query (janbu simplified) - Safety Factor: 1.02484 54
Entity Information 55
Curved Static 55
Shared Entities 55
Scenario-based Entities 55
Block Static 56
Shared Entities 56
Scenario-based Entities 57

Slide Analysis Information

21578Hilton XS DD Update with rock strength

Project Summary

File Name:	21578Hilton XS DD Update with rock strength.slmd
Slide Modeler Version:	9.012
Project Title:	File No 21578 Hilton Expansion
Analysis:	Cross Section D-D'
Author:	RTK
Company:	Geotechnologies, Inc.
Date Created:	4/17/20
Comments	
	Curved Static

Currently Open Scenarios

Group Name	Scenario Name	Global Minimum	Compute Time
Curved Static	Master Scenario	Bishop Simplified: 1.863990 Janbu Simplified: 1.763180	00h:00m:00.550s
	Curved Pseudostatic	Bishop Simplified: 1.039270 Janbu Simplified: 0.929143	00h:00m:00.571s
Block Static	Master Scenario	Bishop Simplified: 2.134260 Janbu Simplified: 2.006850	00h:00m:00.923s
	Block Pseudostatic	Bishop Simplified: 1.111180 Janbu Simplified: 1.024840	00h:00m:00.867s

General Settings

Units of Measurement:	Imperial Units
Time Units:	days
Permeability Units:	feet/second
Data Output:	Standard
Failure Direction:	Right to Left

Analysis Options

All Open Scenarios

Slices Type:	Vertical
Analysis Methods Used	
	Bishop simplified
	Janbu simplified
Number of slices:	50
Tolerance:	0.005
Maximum number of iterations:	75
Check malpha < 0.2:	Yes
Create Interslice boundaries at intersections with water tables and piezos:	Yes
Initial trial value of FS:	1
Steffensen Iteration:	Yes

Groundwater Analysis

All Open Scenarios

Groundwater Method:	Water Surfaces
Pore Fluid Unit Weight [lbs/ft3]:	62.4
Use negative pore pressure cutoff:	Yes
Maximum negative pore pressure [psf]:	0
Advanced Groundwater Method:	None

Random Numbers

All Open Scenarios

Pseudo-random Seed:	10116
Random Number Generation Method:	Park and Miller v.3

Surface Options

Curved Static

Surface Type:	Circular
Search Method:	Grid Search
Radius Increment:	10
Composite Surfaces:	Disabled
Reverse Curvature:	Invalid Surfaces
Minimum Elevation [ft]:	640
Minimum Depth:	Not Defined
Minimum Area:	Not Defined
Minimum Weight:	Not Defined

Block Static

Surface Type:	Non-Circular Block Search
Number of Surfaces:	5000
Multiple Groups:	Disabled
Pseudo-Random Surfaces:	Enabled
Convex Surfaces Only:	Disabled
Left Projection Angle (Start Angle) [deg]:	135
Left Projection Angle (End Angle) [deg]:	135
Right Projection Angle (Start Angle) [deg]:	45
Right Projection Angle (End Angle) [deg]:	45
Minimum Elevation [ft]:	640
Minimum Depth:	Not Defined
Minimum Area:	Not Defined
Minimum Weight:	Not Defined

Seismic Loading

Curved Static - Master Scenario

Advanced seismic analysis:	No
Staged pseudostatic analysis:	No

Curved Static - Curved Pseudostatic

Advanced seismic analysis:	No
Staged pseudostatic analysis:	No
Seismic Load Coefficient (Horizontal):	0.33

Block Static - Master Scenario

Advanced seismic analysis:	No
Staged pseudostatic analysis:	No

Block Static - Block Pseudostatic

Advanced seismic analysis:	No
Staged pseudostatic analysis:	No
Seismic Load Coefficient (Horizontal):	0.33

Loading

All Open Scenarios

Distribution:	Constant
Magnitude [psf]:	3100
Orientation:	Normal to boundary

Distribution:	Constant
Magnitude [psf]:	2200
Orientation:	Normal to boundary

Materials

Compacted Fill	
Color	
Strength Type	Mohr-Coulomb
Unsaturated Unit Weight [lbs/ft3]	120
Saturated Unit Weight [lbs/ft3]	130
Cohesion [psf]	735
Friction Angle [deg]	24
Water Surface	Assigned per scenario
Hu Value	1
Uncertified Fill	
Color	
Strength Type	Mohr-Coulomb
Unsaturated Unit Weight [lbs/ft3]	115
Saturated Unit Weight [lbs/ft3]	125
Cohesion [psf]	240
Friction Angle [deg]	20
Water Surface	Assigned per scenario
Hu Value	1
Bedrock (Sandstone and Siltstone)	
Color	
Strength Type	Anisotropic Linear
Unsaturated Unit Weight [lbs/ft3]	120
Saturated Unit Weight [lbs/ft3]	130
Cohesion 1 [psf]	125
Cohesion 2 [psf]	140
Friction Angle 1 [deg]	25
Friction Angle 2 [deg]	34
A [deg]	7
B [deg]	15
Anisotropic Definition	Angle
Angle from 1 [deg]	-57.5
Anisotropic Surface	
Water Surface	Assigned per scenario
Hu Value	1

Materials In Use

Material	Curved Static	Curved Pseudostatic	Block Static	Block Pseudostatic
Compacted Fill	✓	✓	✓	✓
Uncertified Fill	✓	✓	✓	✓
Bedrock (Sandstone and Siltstone)	✓	✓	✓	✓

Support

Support 1	
Color	
Support Type	Pile/Micro Pile
Force Application	Active
Out-of-Plane Spacing [ft]	8
Failure Mode	Shear
Pile Shear Strength [lb]	5000
Force Direction	Parallel to surface

Global Minimums

Curved Static - Master Scenario

Method: bishop simplified

FS	1.863990
Center:	37.642, 741.631
Radius:	72.699
Left Slip Surface Endpoint:	25.538, 669.947
Right Slip Surface Endpoint:	100.437, 705.000
Resisting Moment:	5.39246e+06 lb-ft
Driving Moment:	2.89297e+06 lb-ft
Total Slice Area:	792.761 ft2
Surface Horizontal Width:	74.8993 ft
Surface Average Height:	10.5844 ft

Method: janbu simplified

FS	1.763180
Center:	46.446, 720.897
Radius:	53.842
Left Slip Surface Endpoint:	27.300, 670.574
Right Slip Surface Endpoint:	97.888, 705.000
Resisting Horizontal Force:	69653.4 lb
Driving Horizontal Force:	39504.5 lb
Total Slice Area:	953.883 ft2
Surface Horizontal Width:	70.5881 ft
Surface Average Height:	13.5134 ft

Curved Static - Curved Pseudostatic

Method: bishop simplified

FS	1.039270
Center:	34.760, 749.398
Radius:	79.845
Left Slip Surface Endpoint:	26.062, 670.027
Right Slip Surface Endpoint:	101.123, 705.000
Resisting Moment:	4.98103e+06 lb-ft
Driving Moment:	4.79283e+06 lb-ft
Total Slice Area:	734.738 ft2
Surface Horizontal Width:	75.0614 ft
Surface Average Height:	9.7885 ft

Method: janbu simplified

FS	0.929143
Center:	54.647, 731.942
Radius:	68.437
Left Slip Surface Endpoint:	25.638, 669.958
Right Slip Surface Endpoint:	115.000, 699.677
Left Slope Intercept:	25.638 669.958
Right Slope Intercept:	115.000 705.000
Resisting Horizontal Force:	114137 lb
Driving Horizontal Force:	122841 lb
Total Slice Area:	1777.09 ft2
Surface Horizontal Width:	89.3617 ft
Surface Average Height:	19.8865 ft

Block Static - Master Scenario

Method: bishop simplified

FS	2.134260
Axis Location:	52.899, 777.916
Left Slip Surface Endpoint:	29.148, 671.391
Right Slip Surface Endpoint:	123.869, 695.000
Resisting Moment:	2.03166e+07 lb-ft
Driving Moment:	9.51928e+06 lb-ft
Total Slice Area:	2141.45 ft2
Surface Horizontal Width:	94.7205 ft
Surface Average Height:	22.6081 ft

Method: janbu simplified

FS	2.006850
Axis Location:	52.899, 777.916
Left Slip Surface Endpoint:	29.148, 671.391
Right Slip Surface Endpoint:	123.869, 695.000
Resisting Horizontal Force:	157839 lb
Driving Horizontal Force:	78650 lb
Total Slice Area:	2141.45 ft2
Surface Horizontal Width:	94.7205 ft
Surface Average Height:	22.6081 ft

Block Static - Block Pseudostatic

Method: bishop simplified

FS	1.111180
Axis Location:	50.302, 783.100
Left Slip Surface Endpoint:	25.081, 669.894
Right Slip Surface Endpoint:	125.734, 695.000
Resisting Moment:	1.83768e+07 lb-ft
Driving Moment:	1.65381e+07 lb-ft
Total Slice Area:	1925.07 ft2
Surface Horizontal Width:	100.653 ft
Surface Average Height:	19.1259 ft

Method: janbu simplified

FS	1.024840
Axis Location:	50.302, 783.100
Left Slip Surface Endpoint:	25.081, 669.894
Right Slip Surface Endpoint:	125.734, 695.000
Resisting Horizontal Force:	142346 lb
Driving Horizontal Force:	138895 lb
Total Slice Area:	1925.07 ft2
Surface Horizontal Width:	100.653 ft
Surface Average Height:	19.1259 ft

Global Minimum Coordinates

Block Static - Master Scenario

Method: bishop simplified

X	Y
29.1481	671.391
38.9816	661.558
72.9321	657.329
104.702	683.581
117.023	688.155
123.869	695

Method: janbu simplified

X	Y
29.1481	671.391
38.9816	661.558
72.9321	657.329
104.702	683.581
117.023	688.155
123.869	695

Block Static - Block Pseudostatic

Method: bishop simplified

X	Y
25.0814	669.894
27.6178	667.358
68.3406	663.035
83.9946	670.42
119.856	689.122
125.734	695

Method: janbu simplified

X	Y
25.0814	669.894
27.6178	667.358
68.3406	663.035
83.9946	670.42
119.856	689.122
125.734	695

Global Minimum Support Data

Curved Static - Curved Pseudostatic

Method: bishop simplified

Number of Supports: 1

Support 1						
Support Type: Pile/Micro Pile						
Start (x, y)	**Length (ft)**	**L Inside SS (ft)**	**L Outside SS (ft)**	**Li (ft)**	**Lo (ft)**	**Force (lb)**
80.175, 704.493	15.5506	Not Effective	Not Effective	Not Effective	Not Effective	0

Method: janbu simplified

Number of Supports: 1

Support 1						
Support Type: Pile/Micro Pile						
Start (x, y)	**Length (ft)**	**L Inside SS (ft)**	**L Outside SS (ft)**	**Li (ft)**	**Lo (ft)**	**Force (lb)**
80.175, 704.493	15.5506	Not Effective	Not Effective	Not Effective	Not Effective	0

All other Scenarios

Method: bishop simplified

Number of Supports: 1

Support 1						
Support Type: Pile/Micro Pile						
Start (x, y)	**Length (ft)**	**L Inside SS (ft)**	**L Outside SS (ft)**	**Li (ft)**	**Lo (ft)**	**Force (lb)**
80.175, 704.493	15.5506	Not Effective	Not Effective	Not Effective	Not Effective	0

Method: janbu simplified

Number of Supports: 1

Support 1						
Support Type: Pile/Micro Pile						
Start (x, y)	**Length (ft)**	**L Inside SS (ft)**	**L Outside SS (ft)**	**Li (ft)**	**Lo (ft)**	**Force (lb)**
80.175, 704.493	15.5506	Not Effective	Not Effective	Not Effective	Not Effective	0

Valid and Invalid Surfaces

Curved Static - Master Scenario

Method: bishop simplified

Number of Valid Surfaces:	5078
Number of Invalid Surfaces:	4183

Error Codes

Error Code -106 reported for 194 surfaces
Error Code -107 reported for 1492 surfaces
Error Code -108 reported for 130 surfaces
Error Code -110 reported for 36 surfaces
Error Code -1000 reported for 2331 surfaces

Method: janbu simplified

Number of Valid Surfaces:	4890
Number of Invalid Surfaces:	4371

Error Codes

Error Code -106 reported for 192 surfaces
Error Code -107 reported for 1492 surfaces
Error Code -108 reported for 150 surfaces
Error Code -110 reported for 36 surfaces
Error Code -111 reported for 170 surfaces
Error Code -1000 reported for 2331 surfaces

Curved Static - Curved Pseudostatic

Method: bishop simplified

Number of Valid Surfaces:	5577
Number of Invalid Surfaces:	3684

Error Codes

Error Code -103 reported for 2 surfaces
Error Code -106 reported for 189 surfaces
Error Code -107 reported for 480 surfaces
Error Code -108 reported for 26 surfaces
Error Code -110 reported for 26 surfaces
Error Code -1000 reported for 2961 surfaces

Method: janbu simplified

Number of Valid Surfaces:	5483
Number of Invalid Surfaces:	3778

Error Codes

Error Code -103 reported for 2 surfaces
Error Code -106 reported for 189 surfaces
Error Code -107 reported for 480 surfaces
Error Code -108 reported for 28 surfaces
Error Code -110 reported for 26 surfaces
Error Code -111 reported for 92 surfaces
Error Code -1000 reported for 2961 surfaces

Block Static - Master Scenario

Method: bishop simplified

Number of Valid Surfaces:	4099
Number of Invalid Surfaces:	901

Error Codes

Error Code -108 reported for 6 surfaces
Error Code -110 reported for 882 surfaces
Error Code -111 reported for 7 surfaces
Error Code -112 reported for 6 surfaces

Method: janbu simplified

Number of Valid Surfaces:	4081
Number of Invalid Surfaces:	919

Error Codes

Error Code -108 reported for 10 surfaces
Error Code -110 reported for 882 surfaces
Error Code -111 reported for 21 surfaces
Error Code -112 reported for 6 surfaces

Block Static - Block Pseudostatic

Method: bishop simplified

Number of Valid Surfaces:	3302
Number of Invalid Surfaces:	1698

Error Codes

Error Code -105 reported for 8 surfaces
Error Code -108 reported for 2 surfaces
Error Code -110 reported for 1646 surfaces
Error Code -111 reported for 36 surfaces
Error Code -112 reported for 6 surfaces

Method: janbu simplified

Number of Valid Surfaces:	3263
Number of Invalid Surfaces:	1737

Error Codes

Error Code -105 reported for 8 surfaces
Error Code -110 reported for 1646 surfaces
Error Code -111 reported for 77 surfaces
Error Code -112 reported for 6 surfaces

Error Code Descriptions

The following errors were encountered during the computation:

-103 = Two surface / slope intersections, but one or more surface / nonslope external polygon intersections lie between them. This usually occurs when the slip surface extends past the bottom of the soil region, but may also occur on a benched slope model with two sets of Slope Limits.

-105 = More than two surface / slope intersections with no valid slip surface.

-106 = Average slice width is less than 0.0001 * (maximum horizontal extent of soil region). This limitation is imposed to avoid numerical errors which may result from too many slices, or too small a slip region.

-107 = Total driving moment or total driving force is negative. This will occur if the wrong failure direction is specified, or if high external or anchor loads are applied against the failure direction.

-108 = Total driving moment or total driving force < 0.1. This is to limit the calculation of extremely high safety factors if the driving force is very small (0.1 is an arbitrary number).

-110 = The water table or a piezoline does not span the slip region for a given slip surface, when Water Surfaces is specified as the method of pore pressure calculation. If this error occurs, check that the water table or piezoline(s) span the appropriate soil cells.

-111 = Safety factor equation did not converge

-112 = The coefficient M-Alpha = cos(alpha)(1+tan(alpha)tan(phi)/F) < 0.2 for the final iteration of the safety factor calculation. This screens out some slip surfaces which may not be valid in the context of the analysis, in particular, deep seated slip surfaces with many high negative base angle slices in the passive zone.

-1000 = No valid slip surface is generated

Slice Data

Curved Static - Master Scenario

Global Minimum Query (bishop simplified) - Safety Factor: 1.86399

Slice Number	Width [ft]	Weight [lbs]	Angle of Slice Base [deg]	Base Material	Base Cohesion [psf]	Base Friction Angle [deg]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]	Base Vertical Stress [psf]	Effective Vertical Stress [psf]
1	1.45389	54.8193	-9.00388	Uncertified Fill	240	20	136.684	254.778	59.3172	18.7164	40.6008	37.6591	18.9427
2	1.45389	199.667	-7.84545	Uncertified Fill	240	20	152.538	284.33	158.307	36.5112	121.796	137.288	100.777
3	1.45389	341.792	-6.69024	Uncertified Fill	240	20	168.267	313.648	254.784	52.4392	202.345	235.046	182.607
4	1.45389	478.523	-5.53775	Uncertified Fill	240	20	183.503	342.047	346.887	66.5147	280.372	329.096	262.581
5	1.45389	609.893	-4.38752	Uncertified Fill	240	20	198.254	369.544	434.671	78.7498	355.921	419.459	340.709
6	1.45389	735.931	-3.23905	Uncertified Fill	240	20	212.53	396.154	518.184	89.154	429.03	506.156	417.002
7	1.45389	856.658	-2.09188	Uncertified Fill	240	20	226.336	421.888	597.469	97.7347	499.734	589.202	491.467
8	1.45389	972.089	-0.945549	Uncertified Fill	240	20	239.678	446.758	672.561	104.497	568.064	668.606	564.109
9	1.45389	1082.23	0.200401	Uncertified Fill	240	20	252.563	470.774	743.492	109.444	634.048	744.376	634.932
10	1.45389	1187.09	1.34643	Uncertified Fill	240	20	264.992	493.943	810.28	112.576	697.704	816.508	703.932
11	1.55854	1385.13	2.5343	Bedrock (Sandstone and Siltstone)	140	34	349.911	652.231	873.285	113.871	759.414	888.773	774.902
12	1.55854	1497.35	3.76458	Bedrock (Sandstone and Siltstone)	140	34	372.945	695.165	936.253	113.189	823.064	960.792	847.603
13	1.55854	1602.75	4.9966	Bedrock (Sandstone and Siltstone)	140	34	394.82	735.94	993.926	110.409	883.517	1028.45	918.036
14	1.55854	1701.19	6.23095	Bedrock (Sandstone and Siltstone)	140	34	415.527	774.539	1046.26	105.518	940.745	1091.63	986.113
15	1.55854	1792.53	7.4682	Bedrock (Sandstone and Siltstone)	140	34	435.06	810.947	1093.23	98.5053	994.721	1150.26	1051.75
16	1.55854	1876.91	8.70897	Bedrock (Sandstone and Siltstone)	140	34	453.475	845.273	1134.96	89.3526	1045.61	1204.42	1115.07
17	1.55854	1954.28	9.95388	Bedrock (Sandstone and Siltstone)	140	34	470.782	877.533	1171.47	78.0404	1093.43	1254.1	1176.06

18	1.55854	2024.57	11.2035	Bedrock (Sandstone and Siltstone)	140	34	486.988	907.74	1202.76	64.5455	1138.22	1299.22	1234.68
19	1.55854	2087.68	12.4586	Bedrock (Sandstone and Siltstone)	140	34	502.097	935.904	1228.82	48.841	1179.97	1339.75	1290.91
20	1.55854	2143.52	13.7198	Bedrock (Sandstone and Siltstone)	140	34	516.113	962.029	1249.61	30.8963	1218.71	1375.61	1344.71
21	1.55854	2191.97	14.9879	Bedrock (Sandstone and Siltstone)	140	34	529.034	986.115	1265.09	10.6766	1254.42	1406.73	1396.05
22	1.4847	2129.23	16.233	Bedrock (Sandstone and Siltstone)	140	34	537.547	1001.98	1277.94	0	1277.94	1434.45	1434.45
23	1.4847	2166.84	17.4557	Bedrock (Sandstone and Siltstone)	140	34	541.72	1009.76	1289.47	0	1289.47	1459.81	1459.81
24	1.4847	2198.47	18.6867	Bedrock (Sandstone and Siltstone)	140	34	544.444	1014.84	1297	0	1297	1481.14	1481.14
25	1.4847	2223.73	19.9267	Bedrock (Sandstone and Siltstone)	140	34	545.665	1017.11	1300.37	0	1300.37	1498.19	1498.19
26	1.4847	2242.49	21.1764	Bedrock (Sandstone and Siltstone)	140	34	545.376	1016.58	1299.57	0	1299.57	1510.85	1510.85
27	1.4847	2254.59	22.4369	Bedrock (Sandstone and Siltstone)	140	34	543.567	1013.2	1294.58	0	1294.58	1519.03	1519.03
28	1.4847	2259.84	23.7089	Bedrock (Sandstone and Siltstone)	140	34	540.228	1006.98	1285.35	0	1285.35	1522.59	1522.59
29	1.4847	2258.2	24.9934	Bedrock (Sandstone and Siltstone)	140	34	535.376	997.936	1271.94	0	1271.94	1521.52	1521.52
30	1.4847	2289.96	26.2915	Bedrock (Sandstone and Siltstone)	140	34	537.37	1001.65	1277.45	0	1277.45	1542.94	1542.94
31	1.4847	2346.5	27.6044	Bedrock (Sandstone and Siltstone)	140	34	544.256	1014.49	1296.48	0	1296.48	1581.07	1581.07
32	1.4847	2397.3	28.9331	Bedrock (Sandstone and Siltstone)	140	34	549.678	1024.6	1311.47	0	1311.47	1615.32	1615.32
33	1.4847	2440.14	30.2792	Bedrock (Sandstone and Siltstone)	140	34	553.208	1031.17	1321.22	0	1321.22	1644.22	1644.22
34	1.4847	2474.59	31.6439	Bedrock (Sandstone and Siltstone)	140	34	554.783	1034.11	1325.58	0	1325.58	1667.47	1667.47
35	1.4847	2500.28	33.029	Bedrock (Sandstone and Siltstone)	140	34	554.359	1033.32	1324.4	0	1324.4	1684.8	1684.8
36	1.4847	2516.79	34.4363	Bedrock (Sandstone and Siltstone)	140	34	551.885	1028.71	1317.57	0	1317.57	1695.97	1695.97

37	1.4847	3434.93	35.8677	Bedrock (Sandstone and Siltstone)	140	34	723.432	1348.47	1791.62	0	1791.62	2314.68	2314.68
38	1.4847	3772.58	37.3254	Bedrock (Sandstone and Siltstone)	140	34	779.87	1453.67	1947.6	0	1947.6	2542.25	2542.25
39	1.4847	3565.36	38.8121	Bedrock (Sandstone and Siltstone)	140	34	731.597	1363.69	1814.19	0	1814.19	2402.66	2402.66
40	1.4847	3346.69	40.3304	Bedrock (Sandstone and Siltstone)	140	34	681.785	1270.84	1676.54	0	1676.54	2255.36	2255.36
41	1.4847	3115.8	41.8838	Bedrock (Sandstone and Siltstone)	140	34	630.395	1175.05	1534.52	0	1534.52	2099.82	2099.82
42	1.4847	2871.8	43.476	Bedrock (Sandstone and Siltstone)	140	34	577.37	1076.21	1387.99	0	1387.99	1935.44	1935.44
43	1.4847	2613.62	45.1113	Bedrock (Sandstone and Siltstone)	140	34	522.659	974.232	1236.8	0	1236.8	1761.49	1761.49
44	1.4847	2340.03	46.795	Bedrock (Sandstone and Siltstone)	140	34	466.205	869.001	1080.79	0	1080.79	1577.16	1577.16
45	1.4847	2049.55	48.5332	Bedrock (Sandstone and Siltstone)	140	34	407.947	760.41	919.794	0	919.794	1381.43	1381.43
46	1.4847	1740.38	50.3333	Bedrock (Sandstone and Siltstone)	140	34	347.827	648.346	753.656	0	753.656	1173.11	1173.11
47	1.4847	1410.35	52.2047	Bedrock (Sandstone and Siltstone)	140	34	285.789	532.708	582.213	0	582.213	950.712	950.712
48	1.53815	1087.66	54.1955	Compacted Fill	735	24	423.337	789.096	121.501	0	121.501	708.375	708.375
49	1.53815	677.816	56.3249	Compacted Fill	735	24	367.949	685.853	-110.385	0	-110.385	441.85	441.85
50	1.53815	232.383	58.5809	Compacted Fill	735	24	309.601	577.093	-354.667	0	-354.667	152.161	152.161

Global Minimum Query (janbu simplified) - Safety Factor: 1.76318

Slice Number	Width [ft]	Weight [lbs]	Angle of Slice Base [deg]	Base Material	Base Cohesion [psf]	Base Friction Angle [deg]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]	Base Vertical Stress [psf]	Effective Vertical Stress [psf]
1	0.940511	41.2855	-20.297	Uncertified Fill	240	20	157.179	277.134	102.026	0	102.026	43.8929	43.8929
2	1.51227	240.395	-18.9128	Uncertified Fill	240	20	177.696	313.31	219.842	18.4253	201.417	158.959	140.534
3	1.51227	450.977	-17.2198	Uncertified Fill	240	20	199.335	351.463	359.988	53.7465	306.241	298.208	244.461
4	1.51227	652.337	-15.5422	Uncertified Fill	240	20	220.037	387.965	492.555	86.024	406.531	431.359	345.335
5	1.51227	844.713	-13.8781	Uncertified Fill	240	20	239.846	422.892	617.827	115.335	502.492	558.569	443.234
6	1.51227	1028.31	-12.2259	Uncertified Fill	240	20	258.798	456.308	736.051	141.748	594.303	679.975	538.227
7	1.51227	1203.29	-10.584	Uncertified Fill	240	20	276.924	488.267	847.427	165.32	682.107	795.683	630.363
8	1.45954	1322.43	-8.97913	Bedrock (Sandstone and Siltstone)	140	34	377.779	666.093	965.748	185.784	779.964	906.055	720.271
9	1.45954	1475.98	-7.40974	Bedrock (Sandstone and Siltstone)	140	34	408.836	720.852	1064.43	203.276	861.151	1011.26	807.981
10	1.45954	1621.82	-5.84592	Bedrock (Sandstone and Siltstone)	140	34	438.162	772.558	1156.04	218.234	937.805	1111.18	892.943
11	1.45954	1760.03	-4.28646	Bedrock (Sandstone and Siltstone)	140	34	465.82	821.325	1240.79	230.683	1010.11	1205.88	975.194
12	1.45954	1890.67	-2.73018	Bedrock (Sandstone and Siltstone)	140	34	491.868	867.252	1318.84	240.642	1078.2	1295.38	1054.74
13	1.45954	2013.69	-1.17592	Bedrock (Sandstone and Siltstone)	140	34	516.334	910.389	1390.27	248.122	1142.15	1379.67	1131.55
14	1.45954	2129	0.377482	Bedrock (Sandstone and Siltstone)	140	34	539.227	950.754	1455.12	253.13	1201.99	1458.67	1205.54
15	1.45954	2236.78	1.93116	Bedrock (Sandstone and Siltstone)	140	34	560.635	988.5	1513.62	255.668	1257.95	1532.52	1276.86
16	1.45954	2337.05	3.48626	Bedrock (Sandstone and Siltstone)	140	34	580.59	1023.68	1565.85	255.732	1310.12	1601.22	1345.49
17	1.45954	2429.76	5.04393	Bedrock (Sandstone and Siltstone)	140	34	599.118	1056.35	1611.86	253.312	1358.55	1664.74	1411.43
18	1.45954	2514.87	6.60536	Bedrock (Sandstone and Siltstone)	140	34	616.239	1086.54	1651.69	248.393	1403.3	1723.05	1474.66
19	1.45954	2592.32	8.17174	Bedrock (Sandstone and Siltstone)	140	34	631.967	1114.27	1685.37	240.955	1444.42	1776.12	1535.17

20	1.45954	2662.02	9.74429	Bedrock (Sandstone and Siltstone)	140	34	646.314	1139.57	1712.89	230.969	1481.92	1823.88	1592.91
21	1.45954	2723.88	11.3243	Bedrock (Sandstone and Siltstone)	140	34	659.286	1162.44	1734.24	218.403	1515.83	1866.26	1647.86
22	1.45954	2778.33	12.9131	Bedrock (Sandstone and Siltstone)	140	34	671.021	1183.13	1749.72	203.217	1546.51	1903.57	1700.35
23	1.45954	2825.72	14.5121	Bedrock (Sandstone and Siltstone)	140	34	681.632	1201.84	1759.61	185.363	1574.25	1936.05	1750.68
24	1.45954	2864.86	16.1227	Bedrock (Sandstone and Siltstone)	140	34	690.865	1218.12	1763.16	164.786	1598.37	1962.86	1798.07
25	1.45954	2895.53	17.7465	Bedrock (Sandstone and Siltstone)	140	34	698.692	1231.92	1760.27	141.423	1618.84	1983.87	1842.45
26	1.45954	2917.5	19.3852	Bedrock (Sandstone and Siltstone)	140	34	705.112	1243.24	1750.82	115.2	1635.62	1998.93	1883.73
27	1.45954	2930.52	21.0406	Bedrock (Sandstone and Siltstone)	140	34	710.098	1252.03	1734.69	86.033	1648.66	2007.85	1921.81
28	1.45954	2934.29	22.7146	Bedrock (Sandstone and Siltstone)	140	34	713.631	1258.26	1711.71	53.8269	1657.88	2010.44	1956.61
29	1.45954	2931.44	24.4093	Bedrock (Sandstone and Siltstone)	140	34	716.325	1263.01	1683.41	18.4723	1664.94	2008.49	1990.02
30	1.48651	3028.14	26.1433	Bedrock (Sandstone and Siltstone)	140	34	722.955	1274.7	1682.26	0	1682.26	2037.11	2037.11
31	1.48651	3084.85	27.9195	Bedrock (Sandstone and Siltstone)	140	34	726.103	1280.25	1690.49	0	1690.49	2075.26	2075.26
32	1.48651	3132.53	29.7255	Bedrock (Sandstone and Siltstone)	140	34	726.812	1281.5	1692.34	0	1692.34	2107.34	2107.34
33	1.48651	3169.03	31.5646	Bedrock (Sandstone and Siltstone)	140	34	724.651	1277.69	1686.7	0	1686.7	2131.89	2131.89
34	1.48651	3193.67	33.4408	Bedrock (Sandstone and Siltstone)	140	34	719.524	1268.65	1673.3	0	1673.3	2148.47	2148.47
35	1.48651	3205.69	35.3586	Bedrock (Sandstone and Siltstone)	140	34	711.311	1254.17	1651.83	0	1651.83	2156.56	2156.56
36	1.48651	3204.17	37.3231	Bedrock (Sandstone and Siltstone)	140	34	699.877	1234.01	1621.93	0	1621.93	2155.54	2155.54
37	1.48651	4403.09	39.3405	Bedrock (Sandstone and Siltstone)	140	34	923.105	1627.6	2205.45	0	2205.45	2962.09	2962.09
38	1.48651	4365.43	41.418	Bedrock (Sandstone and Siltstone)	140	34	899.352	1585.72	2143.37	0	2143.37	2936.76	2936.76

39	1.48651	4122.37	43.5643	Bedrock (Sandstone and Siltstone)	140	34	836.103	1474.2	1978.03	0	1978.03	2773.25	2773.25
40	1.48651	3859.98	45.7903	Bedrock (Sandstone and Siltstone)	140	34	769.989	1357.63	1805.2	0	1805.2	2596.73	2596.73
41	1.48651	3575.88	48.1093	Bedrock (Sandstone and Siltstone)	140	34	700.785	1235.61	1624.32	0	1624.32	2405.61	2405.61
42	1.48651	3267.01	50.5385	Bedrock (Sandstone and Siltstone)	140	34	628.238	1107.7	1434.67	0	1434.67	2197.83	2197.83
43	1.48651	2929.37	53.1005	Bedrock (Sandstone and Siltstone)	140	34	552.025	973.319	1235.45	0	1235.45	1970.69	1970.69
44	1.48651	2557.5	55.8262	Bedrock (Sandstone and Siltstone)	140	34	471.769	831.813	1025.65	0	1025.65	1720.52	1720.52
45	1.48651	2143.65	58.7596	Bedrock (Sandstone and Siltstone)	140	34	387.012	682.371	804.097	0	804.097	1442.11	1442.11
46	1.48651	1676.06	61.968	Bedrock (Sandstone and Siltstone)	140	34	297.206	524.027	569.344	0	569.344	1127.56	1127.56
47	0.305649	281.919	64.0225	Compacted Fill	735	24	427.983	754.612	44.0488	0	44.0488	922.421	922.421
48	0.181119	156.092	64.6186	Bedrock (Sandstone and Siltstone)	140	34	226.484	399.332	384.475	0	384.475	861.85	861.85
49	1.35332	880.632	66.6614	Compacted Fill	735	24	366.625	646.427	-198.939	0	-198.939	650.778	650.778
50	1.35332	312.974	70.6533	Compacted Fill	735	24	276.451	487.432	-556.045	0	-556.045	231.317	231.317

Curved Static - Curved Pseudostatic

Global Minimum Query (bishop simplified) - Safety Factor: 1.03927

Slice Number	Width [ft]	Weight [lbs]	Angle of Slice Base [deg]	Base Material	Base Cohesion [psf]	Base Friction Angle [deg]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]	Base Vertical Stress [psf]	Effective Vertical Stress [psf]
1	1.48217	71.4857	-5.71924	Uncertified Fill	240	20	252.207	262.111	73.488	12.7379	60.7501	48.2289	35.491
2	1.48217	209.1	-4.65122	Uncertified Fill	240	20	279.342	290.311	163.802	25.5731	138.229	141.076	115.503
3	1.48217	341.558	-3.58483	Uncertified Fill	240	20	305.495	317.492	249.582	36.674	212.908	230.443	193.769
4	1.48217	468.887	-2.51967	Uncertified Fill	240	20	330.693	343.679	330.902	46.0475	284.854	316.35	270.302
5	1.48217	591.103	-1.45538	Uncertified Fill	240	20	354.953	368.892	407.825	53.6989	354.126	398.807	345.108
6	1.48217	708.215	-0.391601	Uncertified Fill	240	20	378.294	393.15	480.407	59.6313	420.775	477.821	418.19
7	1.48217	820.228	0.672047	Uncertified Fill	240	20	400.733	416.47	548.695	63.8464	484.848	553.395	489.549
8	1.48217	927.141	1.73593	Uncertified Fill	240	20	422.285	438.868	612.73	66.344	546.386	625.528	559.184
9	1.48217	1028.95	2.80041	Uncertified Fill	240	20	442.963	460.358	672.549	67.1219	605.427	694.217	627.095
10	1.48217	1125.64	3.86585	Uncertified Fill	240	20	462.777	480.95	728.179	66.1764	662.003	759.451	693.275
11	1.48217	1217.2	4.93264	Uncertified Fill	240	20	481.739	500.657	779.648	63.502	716.146	821.224	757.722
12	1.53886	1356.88	6.02162	Bedrock (Sandstone and Siltstone)	140	34	625.859	650.437	815.725	58.9727	756.752	881.744	822.771
13	1.53886	1447.71	7.13327	Bedrock (Sandstone and Siltstone)	140	34	657.784	683.615	858.451	52.5109	805.941	940.771	888.26
14	1.53886	1532.24	8.24762	Bedrock (Sandstone and Siltstone)	140	34	687.599	714.601	896.034	44.1542	851.88	995.702	951.548
15	1.53886	1610.56	9.36513	Bedrock (Sandstone and Siltstone)	140	34	715.407	743.501	928.614	33.8877	894.726	1046.6	1012.71
16	1.53886	1682.71	10.4862	Bedrock (Sandstone and Siltstone)	140	34	741.278	770.388	956.283	21.694	934.589	1093.49	1071.79
17	1.53886	1748.61	11.6114	Bedrock (Sandstone and Siltstone)	140	34	765.247	795.298	979.071	7.5532	971.518	1136.31	1128.76
18	1.47671	1736.09	12.7183	Bedrock (Sandstone and Siltstone)	140	34	783.033	813.783	998.925	0	998.925	1175.65	1175.65
19	1.47671	1789.4	13.807	Bedrock (Sandstone and Siltstone)	140	34	794.452	825.65	1016.52	0	1016.52	1211.76	1211.76

20	1.47671	1837.44	14.9009	Bedrock (Sandstone and Siltstone)	140	34	803.509	835.063	1030.48	0	1030.48	1244.29	1244.29
21	1.47671	1880.1	16.0004	Bedrock (Sandstone and Siltstone)	140	34	810.238	842.056	1040.84	0	1040.84	1273.18	1273.18
22	1.47671	1917.69	17.106	Bedrock (Sandstone and Siltstone)	140	34	814.804	846.801	1047.87	0	1047.87	1298.63	1298.63
23	1.47671	1950.95	18.2181	Bedrock (Sandstone and Siltstone)	140	34	817.532	849.636	1052.08	0	1052.08	1321.16	1321.16
24	1.47671	1978.65	19.3374	Bedrock (Sandstone and Siltstone)	140	34	818.029	850.153	1052.85	0	1052.85	1339.92	1339.92
25	1.47671	2000.58	20.4645	Bedrock (Sandstone and Siltstone)	140	34	816.282	848.337	1050.15	0	1050.15	1354.77	1354.77
26	1.47671	2016.63	21.5999	Bedrock (Sandstone and Siltstone)	140	34	812.306	844.205	1044.03	0	1044.03	1365.64	1365.64
27	1.47671	2026.66	22.7443	Bedrock (Sandstone and Siltstone)	140	34	806.118	837.774	1034.5	0	1034.5	1372.43	1372.43
28	1.47671	2030.51	23.8983	Bedrock (Sandstone and Siltstone)	140	34	797.727	829.054	1021.56	0	1021.56	1375.04	1375.04
29	1.47671	2029.71	25.0627	Bedrock (Sandstone and Siltstone)	140	34	787.71	818.643	1006.13	0	1006.13	1374.5	1374.5
30	1.47671	2070.31	26.2384	Bedrock (Sandstone and Siltstone)	140	34	791.451	822.531	1011.89	0	1011.89	1401.99	1401.99
31	1.47671	2127.24	27.426	Bedrock (Sandstone and Siltstone)	140	34	800.164	831.586	1025.32	0	1025.32	1440.55	1440.55
32	1.47671	2179.01	28.6266	Bedrock (Sandstone and Siltstone)	140	34	806.653	838.33	1035.32	0	1035.32	1475.6	1475.6
33	1.47671	2223.64	29.841	Bedrock (Sandstone and Siltstone)	140	34	810.327	842.149	1040.98	0	1040.98	1505.83	1505.83
34	1.47671	2260.85	31.0705	Bedrock (Sandstone and Siltstone)	140	34	811.167	843.022	1042.27	0	1042.27	1531.03	1531.03
35	1.47671	2290.36	32.316	Bedrock (Sandstone and Siltstone)	140	34	809.154	840.929	1039.17	0	1039.17	1551.01	1551.01
36	1.47671	2311.84	33.5789	Bedrock (Sandstone and Siltstone)	140	34	804.263	835.846	1031.63	0	1031.63	1565.56	1565.56
37	1.47671	3378.16	34.8606	Bedrock (Sandstone and Siltstone)	140	34	1115.24	1159.04	1510.8	0	1510.8	2287.66	2287.66
38	1.47671	3554.91	36.1626	Bedrock (Sandstone and Siltstone)	140	34	1151.1	1196.3	1566.03	0	1566.03	2407.36	2407.36

39	1.47671	3358.93	37.4866	Bedrock (Sandstone and Siltstone)	140	34	1075.6	1117.84	1449.71	0	1449.71	2274.65	2274.65
40	1.47671	3153.25	38.8346	Bedrock (Sandstone and Siltstone)	140	34	998.775	1038	1331.34	0	1331.34	2135.36	2135.36
41	1.47671	2937.32	40.2085	Bedrock (Sandstone and Siltstone)	140	34	920.621	956.774	1210.92	0	1210.92	1989.14	1989.14
42	1.47671	2710.51	41.611	Bedrock (Sandstone and Siltstone)	140	34	841.14	874.172	1088.45	0	1088.45	1835.54	1835.54
43	1.47671	2472.1	43.0447	Bedrock (Sandstone and Siltstone)	140	34	760.339	790.197	963.956	0	963.956	1674.09	1674.09
44	1.47671	2221.26	44.5127	Bedrock (Sandstone and Siltstone)	140	34	678.228	704.862	837.443	0	837.443	1504.23	1504.23
45	1.47671	1957.05	46.0187	Bedrock (Sandstone and Siltstone)	140	34	594.828	618.187	708.943	0	708.943	1325.31	1325.31
46	1.47671	1678.35	47.567	Bedrock (Sandstone and Siltstone)	140	34	510.173	530.208	578.51	0	578.51	1136.57	1136.57
47	1.47671	1383.84	49.1625	Bedrock (Sandstone and Siltstone)	140	34	424.313	440.976	446.214	0	446.214	937.137	937.137
48	1.74096	1228.71	50.9647	Compacted Fill	735	24	660.573	686.514	-108.901	0	-108.901	705.812	705.812
49	1.74096	763.136	52.9944	Compacted Fill	735	24	570.668	593.078	-318.763	0	-318.763	438.385	438.385
50	1.74096	260.926	55.1248	Compacted Fill	735	24	477.776	496.538	-535.594	0	-535.594	149.912	149.912

Global Minimum Query (janbu simplified) - Safety Factor: 0.929143

Slice Number	Width [ft]	Weight [lbs]	Angle of Slice Base [deg]	Base Material	Base Cohesion [psf]	Base Friction Angle [deg]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]	Base Vertical Stress [psf]	Effective Vertical Stress [psf]
1	1.73416	141.889	-24.2833	Uncertified Fill	240	20	335.734	311.945	233.605	35.9378	197.667	82.1329	46.1951
2	1.73416	458.542	-22.7	Uncertified Fill	240	20	391.649	363.898	428.586	88.1782	340.408	264.756	176.578
3	1.73416	764.082	-21.1348	Uncertified Fill	240	20	444.75	413.236	612.885	136.923	475.962	440.96	304.037
4	1.73416	1057.87	-19.586	Uncertified Fill	240	20	494.992	459.918	786.504	182.287	604.217	610.383	428.096
5	1.73416	1340.27	-18.0519	Uncertified Fill	240	20	542.577	504.132	950.068	224.369	725.699	773.23	548.861
6	1.84717	1731.66	-16.482	Bedrock (Sandstone and Siltstone)	140	34	814.596	756.876	1178.98	264.42	914.558	937.963	673.543
7	1.84717	2038.23	-14.8755	Bedrock (Sandstone and Siltstone)	140	34	907.62	843.309	1345.02	302.315	1042.7	1103.93	801.617
8	1.84717	2331.54	-13.2809	Bedrock (Sandstone and Siltstone)	140	34	993.013	922.651	1497.09	336.762	1160.33	1262.7	925.941
9	1.84717	2611.84	-11.6967	Bedrock (Sandstone and Siltstone)	140	34	1071.48	995.562	1636.25	367.832	1268.42	1414.42	1046.59
10	1.84717	2879.4	-10.1216	Bedrock (Sandstone and Siltstone)	140	34	1143.63	1062.59	1763.39	395.587	1367.8	1559.23	1163.65
11	1.84717	3134.38	-8.55414	Bedrock (Sandstone and Siltstone)	140	34	1209.94	1124.2	1879.22	420.08	1459.14	1697.23	1277.15
12	1.84717	3376.67	-6.99312	Bedrock (Sandstone and Siltstone)	140	34	1270.71	1180.67	1984.21	441.353	1542.86	1828.34	1386.99
13	1.84717	3606.56	-5.43731	Bedrock (Sandstone and Siltstone)	140	34	1326.38	1232.4	2078.99	459.443	1619.54	1952.74	1493.29
14	1.84717	3824.32	-3.88551	Bedrock (Sandstone and Siltstone)	140	34	1377.32	1279.73	2164.1	474.378	1689.72	2070.55	1596.18
15	1.84717	4030.01	-2.33656	Bedrock (Sandstone and Siltstone)	140	34	1423.81	1322.92	2239.93	486.179	1753.75	2181.84	1695.66
16	1.84717	4223.7	-0.789324	Bedrock (Sandstone and Siltstone)	140	34	1466.06	1362.18	2306.81	494.86	1811.95	2286.61	1791.75
17	1.84717	4405.4	0.757338	Bedrock (Sandstone and Siltstone)	140	34	1504.27	1397.68	2365.01	500.428	1864.58	2384.9	1884.47
18	1.84717	4575.16	2.30455	Bedrock (Sandstone and Siltstone)	140	34	1538.62	1429.6	2414.8	502.882	1911.91	2476.72	1973.83

19	1.84717	4734.61	3.85345	Bedrock (Sandstone and Siltstone)	140	34	1569.89	1458.65	2457.2	502.216	1954.98	2562.94	2060.73
20	1.84717	4882.89	5.40518	Bedrock (Sandstone and Siltstone)	140	34	1597.87	1484.65	2491.94	498.416	1993.52	2643.13	2144.71
21	1.84717	5019.03	6.9609	Bedrock (Sandstone and Siltstone)	140	34	1622.31	1507.36	2518.66	491.462	2027.2	2716.73	2225.27
22	1.84717	5142.93	8.52179	Bedrock (Sandstone and Siltstone)	140	34	1643.33	1526.89	2537.47	481.325	2056.14	2783.7	2302.38
23	1.84717	5254.44	10.0891	Bedrock (Sandstone and Siltstone)	140	34	1660.98	1543.29	2548.43	467.97	2080.46	2843.97	2376
24	1.84717	5356.09	11.6641	Bedrock (Sandstone and Siltstone)	140	34	1676.25	1557.48	2552.86	451.354	2101.51	2898.9	2447.55
25	1.84717	5520.22	13.248	Bedrock (Sandstone and Siltstone)	140	34	1713.49	1592.08	2584.22	431.423	2152.8	2987.63	2556.21
26	1.84717	5708.22	14.8424	Bedrock (Sandstone and Siltstone)	140	34	1758.72	1634.1	2623.22	408.117	2215.1	3089.28	2681.17
27	1.84717	5884.63	16.4486	Bedrock (Sandstone and Siltstone)	140	34	1799.94	1672.4	2653.24	381.365	2271.87	3184.65	2803.28
28	1.84717	6047.46	18.0682	Bedrock (Sandstone and Siltstone)	140	34	1836.62	1706.48	2673.49	351.083	2322.4	3272.66	2921.58
29	1.84717	6196.34	19.703	Bedrock (Sandstone and Siltstone)	140	34	1868.78	1736.36	2683.88	317.178	2366.7	3353.11	3035.93
30	1.84717	6793.35	21.3546	Bedrock (Sandstone and Siltstone)	140	34	2037.93	1893.53	2879.26	279.542	2599.72	3676.05	3396.51
31	1.84717	8053.62	23.025	Bedrock (Sandstone and Siltstone)	140	34	2400.75	2230.64	3337.56	238.051	3099.51	4357.85	4119.8
32	1.84717	7863.36	24.7165	Bedrock (Sandstone and Siltstone)	140	34	2323.28	2158.66	3185.36	192.566	2992.79	4254.76	4062.19
33	1.84717	7652.67	26.4313	Bedrock (Sandstone and Siltstone)	140	34	2243.27	2084.32	3025.5	142.925	2882.58	4140.6	3997.67
34	1.84717	7425.28	28.172	Bedrock (Sandstone and Siltstone)	140	34	2161.97	2008.78	2859.53	88.947	2770.59	4017.41	3928.46
35	1.84717	7180.39	29.9415	Bedrock (Sandstone and Siltstone)	140	34	2079.29	1931.96	2687.11	30.4211	2656.69	3884.76	3854.34
36	1.77848	6673.89	31.7091	Bedrock (Sandstone and Siltstone)	140	34	1983.43	1842.89	2524.64	0	2524.64	3750.06	3750.06
37	1.77848	6431.14	33.4768	Bedrock (Sandstone and Siltstone)	140	34	1874.18	1741.38	2374.14	0	2374.14	3613.54	3613.54

38	1.77848	6171.36	35.2814	Bedrock (Sandstone and Siltstone)	140	34	1762.54	1637.65	2220.36	0	2220.36	3467.45	3467.45
39	1.77848	5893.41	37.1272	Bedrock (Sandstone and Siltstone)	140	34	1648.45	1531.65	2063.21	0	2063.21	3311.16	3311.16
40	1.77848	5595.96	39.0193	Bedrock (Sandstone and Siltstone)	140	34	1531.86	1423.32	1902.59	0	1902.59	3143.93	3143.93
41	1.77848	5277.41	40.9635	Bedrock (Sandstone and Siltstone)	140	34	1412.67	1312.57	1738.41	0	1738.41	2964.84	2964.84
42	1.77848	4935.88	42.9669	Bedrock (Sandstone and Siltstone)	140	34	1290.81	1199.35	1570.55	0	1570.55	2772.86	2772.86
43	1.77848	4569.09	45.038	Bedrock (Sandstone and Siltstone)	140	34	1166.22	1083.59	1398.92	0	1398.92	2566.69	2566.69
44	1.77848	4174.21	47.1871	Bedrock (Sandstone and Siltstone)	140	34	1038.82	965.215	1223.43	0	1223.43	2344.75	2344.75
45	1.77848	3747.73	49.4273	Bedrock (Sandstone and Siltstone)	140	34	908.57	844.191	1044	0	1044	2105.07	2105.07
46	1.77848	3285.14	51.7753	Bedrock (Sandstone and Siltstone)	140	34	775.432	720.487	860.607	0	860.607	1845.13	1845.13
47	1.77848	2780.54	54.2531	Bedrock (Sandstone and Siltstone)	140	34	639.435	594.127	673.27	0	673.27	1561.6	1561.6
48	1.77848	2225.88	56.8906	Bedrock (Sandstone and Siltstone)	140	34	500.707	465.228	482.172	0	482.172	1249.98	1249.98
49	1.77848	1609.69	59.7307	Bedrock (Sandstone and Siltstone)	140	34	359.565	334.087	287.744	0	287.744	903.824	903.824
50	0.377032	256.581	61.539	Compacted Fill	735	24	592.399	550.423	-414.566	0	-414.566	678.271	678.271

Block Static - Master Scenario

Global Minimum Query (bishop simplified) - Safety Factor: 2.13426

Slice Number	Width [ft]	Weight [lbs]	Angle of Slice Base [deg]	Base Material	Base Cohesion [psf]	Base Friction Angle [deg]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]	Base Vertical Stress [psf]	Effective Vertical Stress [psf]
1	1.06963	94.8554	-45	Uncertified Fill	240	20	153.857	328.372	242.8	0	242.8	88.9421	88.9421
2	1.9154	663.108	-45	Uncertified Fill	240	20	193.942	413.922	540.47	62.6238	477.846	346.528	283.904
3	1.9154	1309.89	-45	Uncertified Fill	240	20	237.629	507.162	921.906	187.885	734.021	684.277	496.392
4	1.64435	1650.04	-45	Bedrock (Sandstone and Siltstone)	135.312	31.36	368.441	786.349	1372.53	304.283	1068.24	1004.09	699.803
5	1.64435	2145.8	-45	Bedrock (Sandstone and Siltstone)	135.312	31.36	446.017	951.917	1751.73	411.818	1339.92	1305.72	893.898
6	1.64435	2641.57	-45	Bedrock (Sandstone and Siltstone)	135.312	31.36	523.594	1117.49	2130.94	519.352	1611.58	1607.34	1087.99
7	1.88614	3438.03	-7.10027	Bedrock (Sandstone and Siltstone)	140	34	476.104	1016.13	1882.19	583.276	1298.91	1822.89	1239.61
8	1.88614	3685.44	-7.10027	Bedrock (Sandstone and Siltstone)	140	34	512.579	1093.98	2017.92	603.588	1414.33	1954.07	1350.48
9	1.88614	3932.85	-7.10027	Bedrock (Sandstone and Siltstone)	140	34	549.052	1171.82	2153.64	623.9	1529.74	2085.25	1461.35
10	1.88614	4180.11	-7.10027	Bedrock (Sandstone and Siltstone)	140	34	585.5	1249.61	2289.28	644.213	1645.07	2216.35	1572.13
11	1.88614	4427.05	-7.10027	Bedrock (Sandstone and Siltstone)	140	34	621.892	1327.28	2424.74	664.525	1760.22	2347.28	1682.75
12	1.88614	4673.97	-7.10027	Bedrock (Sandstone and Siltstone)	140	34	658.284	1404.95	2560.2	684.837	1875.36	2478.2	1793.36
13	1.88614	4920.9	-7.10027	Bedrock (Sandstone and Siltstone)	140	34	694.672	1482.61	2695.66	705.15	1990.51	2609.13	1903.98
14	1.88614	5167.83	-7.10027	Bedrock (Sandstone and Siltstone)	140	34	731.064	1560.28	2831.12	725.462	2105.65	2740.05	2014.59
15	1.88614	5414.76	-7.10027	Bedrock (Sandstone and Siltstone)	140	34	767.456	1637.95	2966.58	745.774	2220.8	2870.98	2125.21
16	1.88614	5661.69	-7.10027	Bedrock (Sandstone and Siltstone)	140	34	803.843	1715.61	3102.03	766.086	2335.94	3001.9	2235.82
17	1.88614	5909.77	-7.10027	Bedrock (Sandstone and Siltstone)	140	34	840.436	1793.71	3238.13	786.399	2451.73	3133.44	2347.04

18	1.88614	6159.42	-7.10027	Bedrock (Sandstone and Siltstone)	140	34	877.302	1872.39	3375.08	806.711	2568.37	3265.81	2459.1
19	1.88614	6409.09	-7.10027	Bedrock (Sandstone and Siltstone)	140	34	914.172	1951.08	3512.05	827.023	2685.03	3398.18	2571.16
20	1.88614	6658.76	-7.10027	Bedrock (Sandstone and Siltstone)	140	34	951.037	2029.76	3649.02	847.335	2801.69	3530.56	2683.23
21	1.88614	6908.42	-7.10027	Bedrock (Sandstone and Siltstone)	140	34	987.907	2108.45	3785.99	867.648	2918.34	3662.94	2795.29
22	1.88614	7158.51	-7.10027	Bedrock (Sandstone and Siltstone)	140	34	1024.85	2187.29	3923.19	887.96	3035.23	3795.54	2907.58
23	1.88614	7476.03	-7.10027	Bedrock (Sandstone and Siltstone)	140	34	1073.55	2291.24	4097.62	908.272	3189.34	3963.89	3055.62
24	1.88614	7844.9	-7.10027	Bedrock (Sandstone and Siltstone)	140	34	1131.21	2414.3	4300.38	928.584	3371.79	4159.47	3230.89
25	1.93292	8193.52	39.5679	Bedrock (Sandstone and Siltstone)	140	34	890.477	1900.51	3501.86	891.803	2610.06	4237.69	3345.89
26	1.93292	8121.39	39.5679	Bedrock (Sandstone and Siltstone)	140	34	904.646	1930.75	3452.82	797.929	2654.89	4200.35	3402.43
27	1.93292	8049.26	39.5679	Bedrock (Sandstone and Siltstone)	140	34	918.81	1960.98	3403.77	704.054	2699.72	4163.01	3458.96
28	1.93292	8602.52	39.5679	Bedrock (Sandstone and Siltstone)	140	34	1014.03	2164.21	3611.19	610.179	3001.01	4449.12	3838.94
29	1.93292	9548.24	39.5679	Bedrock (Sandstone and Siltstone)	140	34	1160.11	2475.98	3979.55	516.304	3463.24	4938.18	4421.88
30	1.93292	9150.61	39.5679	Bedrock (Sandstone and Siltstone)	140	34	1132.1	2416.19	3797.02	422.43	3374.59	4732.5	4310.07
31	1.93292	8751.06	39.5679	Bedrock (Sandstone and Siltstone)	140	34	1103.83	2355.86	3613.7	328.555	3285.15	4525.83	4197.28
32	1.93292	8351.5	39.5679	Bedrock (Sandstone and Siltstone)	140	34	1075.56	2295.53	3430.39	234.68	3195.71	4319.16	4084.48
33	1.93292	7951.95	39.5679	Bedrock (Sandstone and Siltstone)	140	34	1047.3	2235.21	3247.08	140.805	3106.27	4112.49	3971.69
34	1.93292	7552.39	39.5679	Bedrock (Sandstone and Siltstone)	140	34	1019.03	2174.88	3063.76	46.9307	3016.83	3905.82	3858.89
35	2.0734	7673.85	39.5679	Bedrock (Sandstone and Siltstone)	140	34	979.145	2089.75	2890.62	0	2890.62	3699.72	3699.72
36	2.0734	7247.57	39.5679	Bedrock (Sandstone and Siltstone)	140	34	927.642	1979.83	2727.66	0	2727.66	3494.2	3494.2

37	2.0734	6821.28	39.5679	Bedrock (Sandstone and Siltstone)	140	34	876.14	1869.91	2564.69	0	2564.69	3288.67	3288.67
38	2.0734	6395	39.5679	Bedrock (Sandstone and Siltstone)	140	34	824.632	1759.98	2401.73	0	2401.73	3083.15	3083.15
39	2.0734	5968.71	39.5679	Bedrock (Sandstone and Siltstone)	140	34	773.13	1650.06	2238.76	0	2238.76	2877.62	2877.62
40	2.0734	5542.43	39.5679	Bedrock (Sandstone and Siltstone)	140	34	721.627	1540.14	2075.79	0	2075.79	2672.09	2672.09
41	2.05357	5184.4	20.3654	Bedrock (Sandstone and Siltstone)	140	34	772.661	1649.06	2237.27	0	2237.27	2524.09	2524.09
42	2.05357	4996.55	20.3654	Bedrock (Sandstone and Siltstone)	140	34	746.788	1593.84	2155.41	0	2155.41	2432.63	2432.63
43	2.05357	4808.69	20.3654	Bedrock (Sandstone and Siltstone)	140	34	720.92	1538.63	2073.56	0	2073.56	2341.17	2341.17
44	2.05357	4620.84	20.3654	Bedrock (Sandstone and Siltstone)	140	34	695.051	1483.42	1991.7	0	1991.7	2249.71	2249.71
45	2.05357	4432.99	20.3654	Bedrock (Sandstone and Siltstone)	140	34	669.178	1428.2	1909.84	0	1909.84	2158.25	2158.25
46	2.05357	1817.45	20.3654	Bedrock (Sandstone and Siltstone)	140	34	921.912	1967.6	2709.54	0	2709.54	3051.76	3051.76
47	1.71137	1230.09	45	Bedrock (Sandstone and Siltstone)	140	34	750.462	1601.68	2167.03	0	2167.03	2917.5	2917.5
48	1.71137	878.634	45	Bedrock (Sandstone and Siltstone)	140	34	701.166	1496.47	2011.05	0	2011.05	2712.21	2712.21
49	1.71137	527.18	45	Bedrock (Sandstone and Siltstone)	140	34	651.87	1391.26	1855.06	0	1855.06	2506.93	2506.93
50	1.71137	175.727	45	Bedrock (Sandstone and Siltstone)	140	34	602.574	1286.05	1699.08	0	1699.08	2301.66	2301.66

Global Minimum Query (janbu simplified) - Safety Factor: 2.00685

Slice Number	Width [ft]	Weight [lbs]	Angle of Slice Base [deg]	Base Material	Base Cohesion [psf]	Base Friction Angle [deg]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]	Base Vertical Stress [psf]	Effective Vertical Stress [psf]
1	1.06963	94.8554	-45	Uncertified Fill	240	20	165.703	332.542	254.257	0	254.257	88.5532	88.5532
2	1.9154	663.108	-45	Uncertified Fill	240	20	208.874	419.178	554.912	62.6238	492.288	346.038	283.414
3	1.9154	1309.89	-45	Uncertified Fill	240	20	255.924	513.602	939.6	187.885	751.715	683.676	495.791
4	1.64435	1650.04	-45	Bedrock (Sandstone and Siltstone)	135.312	31.36	401.626	806.004	1404.78	304.283	1100.5	1003.15	698.87
5	1.64435	2145.8	-45	Bedrock (Sandstone and Siltstone)	135.312	31.36	486.19	975.711	1790.77	411.818	1378.95	1304.58	892.763
6	1.64435	2641.57	-45	Bedrock (Sandstone and Siltstone)	135.312	31.36	570.756	1145.42	2176.77	519.352	1657.42	1606.01	1086.66
7	1.88614	3438.03	-7.10027	Bedrock (Sandstone and Siltstone)	140	34	507.599	1018.67	1885.96	583.276	1302.69	1822.73	1239.46
8	1.88614	3685.44	-7.10027	Bedrock (Sandstone and Siltstone)	140	34	546.486	1096.72	2021.98	603.588	1418.39	1953.91	1350.32
9	1.88614	3932.85	-7.10027	Bedrock (Sandstone and Siltstone)	140	34	585.375	1174.76	2157.99	623.9	1534.09	2085.08	1461.18
10	1.88614	4180.11	-7.10027	Bedrock (Sandstone and Siltstone)	140	34	624.232	1252.74	2293.92	644.213	1649.71	2216.16	1571.95
11	1.88614	4427.05	-7.10027	Bedrock (Sandstone and Siltstone)	140	34	663.034	1330.61	2429.67	664.525	1765.14	2347.08	1682.55
12	1.88614	4673.97	-7.10027	Bedrock (Sandstone and Siltstone)	140	34	701.831	1408.47	2565.42	684.837	1880.58	2478	1793.16
13	1.88614	4920.9	-7.10027	Bedrock (Sandstone and Siltstone)	140	34	740.628	1486.33	2701.16	705.15	1996.01	2608.91	1903.76
14	1.88614	5167.83	-7.10027	Bedrock (Sandstone and Siltstone)	140	34	779.425	1564.19	2836.91	725.462	2111.45	2739.82	2014.36
15	1.88614	5414.76	-7.10027	Bedrock (Sandstone and Siltstone)	140	34	818.223	1642.05	2972.66	745.774	2226.88	2870.74	2124.96
16	1.88614	5661.69	-7.10027	Bedrock (Sandstone and Siltstone)	140	34	857.02	1719.91	3108.4	766.086	2342.31	3001.65	2235.56
17	1.88614	5909.77	-7.10027	Bedrock (Sandstone and Siltstone)	140	34	896.031	1798.2	3244.79	786.399	2458.39	3133.18	2346.78
18	1.88614	6159.42	-7.10027	Bedrock (Sandstone and Siltstone)	140	34	935.336	1877.08	3382.04	806.711	2575.33	3265.53	2458.82

19	1.88614	6409.09	-7.10027	Bedrock (Sandstone and Siltstone)	140	34	974.642	1955.96	3519.3	827.023	2692.28	3397.9	2570.88
20	1.88614	6658.76	-7.10027	Bedrock (Sandstone and Siltstone)	140	34	1013.95	2034.85	3656.56	847.335	2809.23	3530.26	2682.93
21	1.88614	6908.42	-7.10027	Bedrock (Sandstone and Siltstone)	140	34	1053.26	2113.73	3793.82	867.648	2926.17	3662.63	2794.98
22	1.88614	7158.51	-7.10027	Bedrock (Sandstone and Siltstone)	140	34	1092.64	2192.77	3931.32	887.96	3043.36	3795.22	2907.26
23	1.88614	7476.03	-7.10027	Bedrock (Sandstone and Siltstone)	140	34	1144.57	2296.98	4106.12	908.272	3197.85	3963.56	3055.28
24	1.88614	7844.9	-7.10027	Bedrock (Sandstone and Siltstone)	140	34	1206.04	2420.35	4309.34	928.584	3380.76	4159.12	3230.53
25	1.93292	8193.52	39.5679	Bedrock (Sandstone and Siltstone)	140	34	935.207	1876.82	3466.74	891.803	2574.94	4239.53	3347.73
26	1.93292	8121.39	39.5679	Bedrock (Sandstone and Siltstone)	140	34	950.086	1906.68	3417.14	797.929	2619.22	4202.23	3404.3
27	1.93292	8049.26	39.5679	Bedrock (Sandstone and Siltstone)	140	34	964.965	1936.54	3367.54	704.054	2663.49	4164.92	3460.87
28	1.93292	8602.52	39.5679	Bedrock (Sandstone and Siltstone)	140	34	1064.97	2137.23	3571.2	610.179	2961.02	4451.22	3841.04
29	1.93292	9548.24	39.5679	Bedrock (Sandstone and Siltstone)	140	34	1218.39	2445.13	3933.79	516.304	3417.49	4940.59	4424.28
30	1.93292	9150.61	39.5679	Bedrock (Sandstone and Siltstone)	140	34	1188.96	2386.07	3752.37	422.43	3329.94	4734.85	4312.42
31	1.93292	8751.06	39.5679	Bedrock (Sandstone and Siltstone)	140	34	1159.28	2326.5	3570.17	328.555	3241.62	4528.12	4199.57
32	1.93292	8351.5	39.5679	Bedrock (Sandstone and Siltstone)	140	34	1129.59	2266.92	3387.97	234.68	3153.29	4321.39	4086.71
33	1.93292	7951.95	39.5679	Bedrock (Sandstone and Siltstone)	140	34	1099.91	2207.35	3205.77	140.805	3064.97	4114.66	3973.86
34	1.93292	7552.39	39.5679	Bedrock (Sandstone and Siltstone)	140	34	1070.22	2147.77	3023.57	46.9307	2976.64	3907.93	3861
35	2.0734	7673.85	39.5679	Bedrock (Sandstone and Siltstone)	140	34	1028.33	2063.7	2852.01	0	2852.01	3701.75	3701.75
36	2.0734	7247.57	39.5679	Bedrock (Sandstone and Siltstone)	140	34	974.238	1955.15	2691.07	0	2691.07	3496.12	3496.12
37	2.0734	6821.28	39.5679	Bedrock (Sandstone and Siltstone)	140	34	920.148	1846.6	2530.14	0	2530.14	3290.49	3290.49

38	2.0734	6395	39.5679	Bedrock (Sandstone and Siltstone)	140	34	866.059	1738.05	2369.21	0	2369.21	3084.86	3084.86
39	2.0734	5968.71	39.5679	Bedrock (Sandstone and Siltstone)	140	34	811.969	1629.5	2208.27	0	2208.27	2879.22	2879.22
40	2.0734	5542.43	39.5679	Bedrock (Sandstone and Siltstone)	140	34	757.879	1520.95	2047.34	0	2047.34	2673.59	2673.59
41	2.05357	5184.4	20.3654	Bedrock (Sandstone and Siltstone)	140	34	816.489	1638.57	2221.72	0	2221.72	2524.81	2524.81
42	2.05357	4996.55	20.3654	Bedrock (Sandstone and Siltstone)	140	34	789.152	1583.71	2140.39	0	2140.39	2433.33	2433.33
43	2.05357	4808.69	20.3654	Bedrock (Sandstone and Siltstone)	140	34	761.816	1528.85	2059.05	0	2059.05	2341.84	2341.84
44	2.05357	4620.84	20.3654	Bedrock (Sandstone and Siltstone)	140	34	734.474	1473.98	1977.71	0	1977.71	2250.36	2250.36
45	2.05357	4432.99	20.3654	Bedrock (Sandstone and Siltstone)	140	34	707.138	1419.12	1896.38	0	1896.38	2158.87	2158.87
46	2.05357	1817.45	20.3654	Bedrock (Sandstone and Siltstone)	140	34	974.208	1955.09	2690.98	0	2690.98	3052.62	3052.62
47	1.71137	1230.09	45	Bedrock (Sandstone and Siltstone)	140	34	786.596	1578.58	2132.78	0	2132.78	2919.38	2919.38
48	1.71137	878.634	45	Bedrock (Sandstone and Siltstone)	140	34	734.923	1474.88	1979.05	0	1979.05	2713.97	2713.97
49	1.71137	527.18	45	Bedrock (Sandstone and Siltstone)	140	34	683.255	1371.19	1825.32	0	1825.32	2508.57	2508.57
50	1.71137	175.727	45	Bedrock (Sandstone and Siltstone)	140	34	631.587	1267.5	1671.58	0	1671.58	2303.17	2303.17

Block Static - Block Pseudostatic

Global Minimum Query (bishop simplified) - Safety Factor: 1.11118

Slice Number	Width [ft]	Weight [lbs]	Angle of Slice Base [deg]	Base Material	Base Cohesion [psf]	Base Friction Angle [deg]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]	Base Vertical Stress [psf]	Effective Vertical Stress [psf]
1	2.53642	491.701	-45	Uncertified Fill	240	20	369.719	410.824	563.541	94.206	469.335	193.822	99.6161
2	2.26224	1102.84	-6.05953	Uncertified Fill	240	20	325.395	361.572	522.043	188.025	334.018	487.501	299.476
3	2.26224	1433.26	-6.05953	Uncertified Fill	240	20	367.574	408.441	672.574	209.789	462.785	633.554	423.765
4	2.26224	1763.68	-6.05953	Uncertified Fill	240	20	409.754	455.31	823.11	231.553	591.557	779.612	548.059
5	1.99624	1835.89	-6.05953	Bedrock (Sandstone and Siltstone)	140	34	567.849	630.982	979.947	252.038	727.909	919.667	667.629
6	1.99624	2103.49	-6.05953	Bedrock (Sandstone and Siltstone)	140	34	642.365	713.783	1121.91	271.243	850.67	1053.72	782.479
7	1.99624	2371.1	-6.05953	Bedrock (Sandstone and Siltstone)	140	34	716.882	796.585	1263.87	290.448	973.425	1187.77	897.325
8	1.99624	2638.7	-6.05953	Bedrock (Sandstone and Siltstone)	140	34	791.398	879.386	1405.84	309.653	1096.19	1321.83	1012.18
9	1.99624	2906.3	-6.05953	Bedrock (Sandstone and Siltstone)	140	34	865.916	962.188	1547.8	328.858	1218.94	1455.88	1127.02
10	1.99624	3173.78	-6.05953	Bedrock (Sandstone and Siltstone)	140	34	940.389	1044.94	1689.7	348.063	1341.63	1589.87	1241.81
11	1.99624	3440.86	-6.05953	Bedrock (Sandstone and Siltstone)	140	34	1014.74	1127.56	1831.38	367.268	1464.11	1723.66	1356.4
12	1.99624	3707.93	-6.05953	Bedrock (Sandstone and Siltstone)	140	34	1089.08	1210.16	1973.05	386.474	1586.58	1857.44	1470.97
13	1.99624	3974.99	-6.05953	Bedrock (Sandstone and Siltstone)	140	34	1163.42	1292.77	2114.73	405.679	1709.05	1991.23	1585.55
14	1.99624	4242.05	-6.05953	Bedrock (Sandstone and Siltstone)	140	34	1237.77	1375.38	2256.4	424.884	1831.52	2125.01	1700.12
15	1.99624	4509.11	-6.05953	Bedrock (Sandstone and Siltstone)	140	34	1312.1	1457.98	2398.07	444.089	1953.99	2258.79	1814.7
16	1.99624	4776.23	-6.05953	Bedrock (Sandstone and Siltstone)	140	34	1386.46	1540.61	2539.78	463.294	2076.48	2392.6	1929.3
17	1.99624	5045.32	-6.05953	Bedrock (Sandstone and Siltstone)	140	34	1461.46	1623.95	2682.54	482.499	2200.04	2527.4	2044.9

18	1.99624	5315.45	-6.05953	Bedrock (Sandstone and Siltstone)	140	34	1536.8	1707.66	2825.86	501.704	2324.15	2662.72	2161.01
19	1.99624	5585.58	-6.05953	Bedrock (Sandstone and Siltstone)	140	34	1612.13	1791.37	2969.17	520.909	2448.26	2798.04	2277.13
20	1.99624	5855.71	-6.05953	Bedrock (Sandstone and Siltstone)	140	34	1687.48	1875.09	3112.49	540.115	2572.37	2933.35	2393.24
21	1.99624	6125.84	-6.05953	Bedrock (Sandstone and Siltstone)	140	34	1762.81	1958.8	3255.8	559.32	2696.48	3068.67	2509.35
22	1.95676	6150.63	25.2572	Bedrock (Sandstone and Siltstone)	140	34	1324.97	1472.28	2518.24	543.051	1975.18	3143.34	2600.28
23	1.95676	6242.07	25.2572	Bedrock (Sandstone and Siltstone)	140	34	1371.43	1523.91	2543.04	491.309	2051.73	3190.06	2698.75
24	1.95676	6344.3	25.2572	Bedrock (Sandstone and Siltstone)	140	34	1420.51	1578.44	2572.14	439.567	2132.57	3242.31	2802.75
25	1.95676	6446.86	25.2572	Bedrock (Sandstone and Siltstone)	140	34	1469.65	1633.05	2601.37	387.825	2213.54	3294.73	2906.9
26	1.95676	6549.41	25.2572	Bedrock (Sandstone and Siltstone)	140	34	1518.81	1687.67	2630.59	336.083	2294.51	3347.14	3011.06
27	1.95676	6729.67	25.2572	Bedrock (Sandstone and Siltstone)	140	34	1586.69	1763.1	2690.69	284.341	2406.35	3439.27	3154.92
28	1.95676	8503.5	25.2572	Bedrock (Sandstone and Siltstone)	140	34	2038.89	2265.57	3383.88	232.599	3151.28	4345.8	4113.2
29	1.95676	8284.86	25.2572	Bedrock (Sandstone and Siltstone)	140	34	2010.57	2234.11	3285.5	180.857	3104.64	4234.06	4053.2
30	1.74864	7196.66	27.5423	Bedrock (Sandstone and Siltstone)	140	34	1933.74	2148.73	3107.22	129.154	2978.06	4115.67	3986.52
31	1.74864	6990.83	27.5423	Bedrock (Sandstone and Siltstone)	140	34	1903.28	2114.89	3005.39	77.4896	2927.9	3997.96	3920.47
32	1.74864	6784.99	27.5423	Bedrock (Sandstone and Siltstone)	140	34	1872.83	2081.05	2903.56	25.8255	2877.73	3880.25	3854.42
33	2.04103	7669.05	27.5423	Bedrock (Sandstone and Siltstone)	140	34	1828.16	2031.41	2804.13	0	2804.13	3757.53	3757.53
34	2.04103	7408.35	27.5423	Bedrock (Sandstone and Siltstone)	140	34	1769.26	1965.97	2707.11	0	2707.11	3629.8	3629.8
35	2.04103	7147.65	27.5423	Bedrock (Sandstone and Siltstone)	140	34	1710.37	1900.53	2610.09	0	2610.09	3502.06	3502.06
36	2.04103	6886.95	27.5423	Bedrock (Sandstone and Siltstone)	140	34	1651.48	1835.09	2513.07	0	2513.07	3374.33	3374.33

37	2.04103	6626.25	27.5423	Bedrock (Sandstone and Siltstone)	140	34	1592.59	1769.65	2416.05	0	2416.05	3246.6	3246.6
38	2.04103	6365.55	27.5423	Bedrock (Sandstone and Siltstone)	140	34	1533.69	1704.21	2319.04	0	2319.04	3118.87	3118.87
39	2.04103	6104.85	27.5423	Bedrock (Sandstone and Siltstone)	140	34	1474.8	1638.77	2222.02	0	2222.02	2991.13	2991.13
40	2.04103	5844.15	27.5423	Bedrock (Sandstone and Siltstone)	140	34	1415.91	1573.33	2125	0	2125	2863.41	2863.41
41	2.04103	5583.45	27.5423	Bedrock (Sandstone and Siltstone)	140	34	1357.02	1507.89	2027.98	0	2027.98	2735.67	2735.67
42	2.04103	5322.76	27.5423	Bedrock (Sandstone and Siltstone)	140	34	1298.12	1442.45	1930.96	0	1930.96	2607.94	2607.94
43	2.04103	5062.06	27.5423	Bedrock (Sandstone and Siltstone)	140	34	1239.23	1377.01	1833.94	0	1833.94	2480.21	2480.21
44	2.04103	4801.36	27.5423	Bedrock (Sandstone and Siltstone)	140	34	1180.34	1311.57	1736.92	0	1736.92	2352.48	2352.48
45	2.04103	3611.94	27.5423	Bedrock (Sandstone and Siltstone)	140	34	1296.28	1440.4	1927.92	0	1927.92	2603.94	2603.94
46	2.04103	1830.72	27.5423	Bedrock (Sandstone and Siltstone)	140	34	1523.62	1693.02	2302.45	0	2302.45	3097.03	3097.03
47	2.04103	1570.03	27.5423	Bedrock (Sandstone and Siltstone)	140	34	1464.73	1627.58	2205.43	0	2205.43	2969.3	2969.3
48	1.95935	1151.72	45	Bedrock (Sandstone and Siltstone)	140	34	1131.48	1257.28	1656.43	0	1656.43	2787.91	2787.91
49	1.95935	691.033	45	Bedrock (Sandstone and Siltstone)	140	34	1042.67	1158.59	1510.12	0	1510.12	2552.78	2552.78
50	1.95935	230.344	45	Bedrock (Sandstone and Siltstone)	140	34	953.847	1059.9	1363.8	0	1363.8	2317.65	2317.65

Global Minimum Query (janbu simplified) - Safety Factor: 1.02484

Slice Number	Width [ft]	Weight [lbs]	Angle of Slice Base [deg]	Base Material	Base Cohesion [psf]	Base Friction Angle [deg]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]	Base Vertical Stress [psf]	Effective Vertical Stress [psf]
1	2.53642	491.701	-45	Uncertified Fill	240	20	417.93	428.311	611.586	94.206	517.38	193.656	99.4504
2	2.26224	1102.84	-6.05953	Uncertified Fill	240	20	353.877	362.667	525.05	188.025	337.025	487.484	299.459
3	2.26224	1433.26	-6.05953	Uncertified Fill	240	20	399.748	409.678	675.976	209.789	466.187	633.541	423.752
4	2.26224	1763.68	-6.05953	Uncertified Fill	240	20	445.62	456.689	826.899	231.553	595.346	779.594	548.041
5	1.99624	1835.89	-6.05953	Bedrock (Sandstone and Siltstone)	140	34	619.263	634.646	985.382	252.038	733.344	919.644	667.606
6	1.99624	2103.49	-6.05953	Bedrock (Sandstone and Siltstone)	140	34	700.527	717.928	1128.05	271.243	856.812	1053.69	782.447
7	1.99624	2371.1	-6.05953	Bedrock (Sandstone and Siltstone)	140	34	781.79	801.21	1270.73	290.448	980.285	1187.74	897.294
8	1.99624	2638.7	-6.05953	Bedrock (Sandstone and Siltstone)	140	34	863.054	884.492	1413.41	309.653	1103.76	1321.79	1012.14
9	1.99624	2906.3	-6.05953	Bedrock (Sandstone and Siltstone)	140	34	944.318	967.775	1556.08	328.858	1227.23	1455.84	1126.98
10	1.99624	3173.78	-6.05953	Bedrock (Sandstone and Siltstone)	140	34	1025.54	1051.01	1698.69	348.063	1350.63	1589.83	1241.76
11	1.99624	3440.86	-6.05953	Bedrock (Sandstone and Siltstone)	140	34	1106.62	1134.11	1841.09	367.268	1473.82	1723.62	1356.35
12	1.99624	3707.93	-6.05953	Bedrock (Sandstone and Siltstone)	140	34	1187.69	1217.19	1983.48	386.474	1597	1857.4	1470.92
13	1.99624	3974.99	-6.05953	Bedrock (Sandstone and Siltstone)	140	34	1268.76	1300.28	2125.86	405.679	1720.18	1991.17	1585.5
14	1.99624	4242.05	-6.05953	Bedrock (Sandstone and Siltstone)	140	34	1349.83	1383.36	2268.24	424.884	1843.36	2124.95	1700.07
15	1.99624	4509.11	-6.05953	Bedrock (Sandstone and Siltstone)	140	34	1430.91	1466.45	2410.63	444.089	1966.54	2258.73	1814.64
16	1.99624	4776.23	-6.05953	Bedrock (Sandstone and Siltstone)	140	34	1511.99	1549.55	2553.04	463.294	2089.75	2392.54	1929.24
17	1.99624	5045.32	-6.05953	Bedrock (Sandstone and Siltstone)	140	34	1593.79	1633.38	2696.52	482.499	2214.02	2527.33	2044.83
18	1.99624	5315.45	-6.05953	Bedrock (Sandstone and Siltstone)	140	34	1675.95	1717.58	2840.56	501.704	2338.85	2662.65	2160.94

19	1.99624	5585.58	-6.05953	Bedrock (Sandstone and Siltstone)	140	34	1758.11	1801.78	2984.59	520.909	2463.68	2797.96	2277.05
20	1.99624	5855.71	-6.05953	Bedrock (Sandstone and Siltstone)	140	34	1840.26	1885.97	3128.63	540.115	2588.51	2933.27	2393.16
21	1.99624	6125.84	-6.05953	Bedrock (Sandstone and Siltstone)	140	34	1922.42	1970.17	3272.66	559.32	2713.34	3068.59	2509.27
22	1.95676	6150.63	25.2572	Bedrock (Sandstone and Siltstone)	140	34	1410.28	1445.31	2478.25	543.051	1935.2	3143.59	2600.54
23	1.95676	6242.07	25.2572	Bedrock (Sandstone and Siltstone)	140	34	1459.74	1496	2501.66	491.309	2010.35	3190.34	2699.03
24	1.95676	6344.3	25.2572	Bedrock (Sandstone and Siltstone)	140	34	1511.96	1549.52	2529.27	439.567	2089.71	3242.59	2803.03
25	1.95676	6446.86	25.2572	Bedrock (Sandstone and Siltstone)	140	34	1564.28	1603.14	2557.01	387.825	2169.19	3295.02	2907.19
26	1.95676	6549.41	25.2572	Bedrock (Sandstone and Siltstone)	140	34	1616.59	1656.75	2584.75	336.083	2248.67	3347.44	3011.36
27	1.95676	6729.67	25.2572	Bedrock (Sandstone and Siltstone)	140	34	1688.85	1730.8	2642.8	284.341	2358.46	3439.57	3155.23
28	1.95676	8503.5	25.2572	Bedrock (Sandstone and Siltstone)	140	34	2170.16	2224.07	3322.35	232.599	3089.75	4346.2	4113.6
29	1.95676	8284.86	25.2572	Bedrock (Sandstone and Siltstone)	140	34	2140.02	2193.18	3224.83	180.857	3043.97	4234.46	4053.6
30	1.74864	7196.66	27.5423	Bedrock (Sandstone and Siltstone)	140	34	2055.23	2106.28	3044.28	129.154	2915.13	4116.1	3986.94
31	1.74864	6990.83	27.5423	Bedrock (Sandstone and Siltstone)	140	34	2022.86	2073.11	2943.44	77.4896	2865.95	3998.38	3920.89
32	1.74864	6784.99	27.5423	Bedrock (Sandstone and Siltstone)	140	34	1990.5	2039.94	2842.6	25.8255	2816.78	3880.66	3854.83
33	2.04103	7669.05	27.5423	Bedrock (Sandstone and Siltstone)	140	34	1943.02	1991.28	2744.63	0	2744.63	3757.93	3757.93
34	2.04103	7408.35	27.5423	Bedrock (Sandstone and Siltstone)	140	34	1880.42	1927.13	2649.53	0	2649.53	3630.18	3630.18
35	2.04103	7147.65	27.5423	Bedrock (Sandstone and Siltstone)	140	34	1817.83	1862.98	2554.43	0	2554.43	3502.43	3502.43
36	2.04103	6886.95	27.5423	Bedrock (Sandstone and Siltstone)	140	34	1755.24	1798.84	2459.32	0	2459.32	3374.69	3374.69
37	2.04103	6626.25	27.5423	Bedrock (Sandstone and Siltstone)	140	34	1692.64	1734.69	2364.22	0	2364.22	3246.95	3246.95

38	2.04103	6365.55	27.5423	Bedrock (Sandstone and Siltstone)	140	34	1630.05	1670.54	2269.12	0	2269.12	3119.2	3119.2
39	2.04103	6104.85	27.5423	Bedrock (Sandstone and Siltstone)	140	34	1567.45	1606.39	2174.02	0	2174.02	2991.45	2991.45
40	2.04103	5844.15	27.5423	Bedrock (Sandstone and Siltstone)	140	34	1504.87	1542.25	2078.92	0	2078.92	2863.72	2863.72
41	2.04103	5583.45	27.5423	Bedrock (Sandstone and Siltstone)	140	34	1442.27	1478.1	1983.81	0	1983.81	2735.97	2735.97
42	2.04103	5322.76	27.5423	Bedrock (Sandstone and Siltstone)	140	34	1379.68	1413.95	1888.71	0	1888.71	2608.22	2608.22
43	2.04103	5062.06	27.5423	Bedrock (Sandstone and Siltstone)	140	34	1317.08	1349.8	1793.61	0	1793.61	2480.48	2480.48
44	2.04103	4801.36	27.5423	Bedrock (Sandstone and Siltstone)	140	34	1254.5	1285.66	1698.51	0	1698.51	2352.73	2352.73
45	2.04103	3611.94	27.5423	Bedrock (Sandstone and Siltstone)	140	34	1377.72	1411.94	1885.73	0	1885.73	2604.22	2604.22
46	2.04103	1830.72	27.5423	Bedrock (Sandstone and Siltstone)	140	34	1619.36	1659.58	2252.86	0	2252.86	3097.37	3097.37
47	2.04103	1570.03	27.5423	Bedrock (Sandstone and Siltstone)	140	34	1556.76	1595.43	2157.76	0	2157.76	2969.62	2969.62
48	1.95935	1151.72	45	Bedrock (Sandstone and Siltstone)	140	34	1189.15	1218.69	1599.22	0	1599.22	2788.37	2788.37
49	1.95935	691.033	45	Bedrock (Sandstone and Siltstone)	140	34	1095.81	1123.03	1457.4	0	1457.4	2553.21	2553.21
50	1.95935	230.344	45	Bedrock (Sandstone and Siltstone)	140	34	1002.47	1027.37	1315.58	0	1315.58	2318.04	2318.04

Interslice Data

Curved Static - Master Scenario

Global Minimum Query (bishop simplified) - Safety Factor: 1.86399

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [deg]
1	25.5379	669.947	0	0	0
2	26.9918	669.716	211.964	0	0
3	28.4457	669.516	464.978	0	0
4	29.8996	669.345	752.548	0	0
5	31.3535	669.204	1067.67	0	0
6	32.8074	669.093	1403.78	0	0
7	34.2613	669.011	1754.75	0	0
8	35.7151	668.958	2114.84	0	0
9	37.169	668.934	2478.7	0	0
10	38.6229	668.939	2841.34	0	0
11	40.0768	668.973	3198.09	0	0
12	41.6353	669.042	3682.04	0	0
13	43.1939	669.144	4166.03	0	0
14	44.7524	669.281	4644.63	0	0
15	46.311	669.451	5112.82	0	0
16	47.8695	669.655	5566.08	0	0
17	49.428	669.894	6000.37	0	0
18	50.9866	670.167	6412.11	0	0
19	52.5451	670.476	6798.19	0	0
20	54.1036	670.82	7155.93	0	0
21	55.6622	671.201	7483.11	0	0
22	57.2207	671.618	7778.01	0	0
23	58.7054	672.05	8021.98	0	0
24	60.1901	672.517	8222.54	0	0
25	61.6748	673.019	8377.85	0	0
26	63.1595	673.558	8486.37	0	0
27	64.6442	674.133	8546.87	0	0
28	66.1289	674.746	8558.52	0	0
29	67.6136	675.398	8520.82	0	0
30	69.0983	676.09	8433.66	0	0
31	70.583	676.824	8292.76	0	0
32	72.0677	677.6	8092.6	0	0
33	73.5524	678.421	7830.63	0	0
34	75.0371	679.287	7504.9	0	0
35	76.5218	680.202	7113.98	0	0
36	78.0065	681.168	6656.91	0	0
37	79.4912	682.186	6133.3	0	0
38	80.9758	683.259	5281.83	0	0
39	82.4605	684.391	4232.4	0	0
40	83.9452	685.585	3149.7	0	0
41	85.4299	686.846	2046.55	0	0
42	86.9146	688.177	937.459	0	0
43	88.3993	689.585	-161.083	0	0
44	89.884	691.075	-1230.17	0	0
45	91.3687	692.656	-2247.94	0	0
46	92.8534	694.336	-3188.91	0	0
47	94.3381	696.127	-4022.97	0	0
48	95.8228	698.041	-4714.14	0	0
49	97.3609	700.173	-4323.46	0	0
50	98.8991	702.482	-3503.88	0	0
51	100.437	705	0	0	0

Global Minimum Query (janbu simplified) - Safety Factor: 1.76318

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [deg]
1	27.2996	670.574	0	0	0
2	28.2401	670.226	183.308	0	0
3	29.7524	669.708	565.924	0	0
4	31.2647	669.24	1036.08	0	0
5	32.777	668.819	1575.97	0	0
6	34.2892	668.445	2169.5	0	0
7	35.8015	668.118	2802.04	0	0
8	37.3138	667.835	3460.26	0	0
9	38.7733	667.604	4234.33	0	0
10	40.2329	667.415	5033.05	0	0
11	41.6924	667.265	5845.28	0	0
12	43.1519	667.156	6660.85	0	0
13	44.6115	667.086	7470.5	0	0
14	46.071	667.056	8265.71	0	0
15	47.5306	667.066	9038.69	0	0
16	48.9901	667.115	9782.42	0	0
17	50.4497	667.204	10490.5	0	0
18	51.9092	667.333	11157.3	0	0
19	53.3687	667.502	11777.5	0	0
20	54.8283	667.711	12346.6	0	0
21	56.2878	667.962	12860.5	0	0
22	57.7474	668.254	13315.8	0	0
23	59.2069	668.589	13709.6	0	0
24	60.6665	668.967	14039.6	0	0
25	62.126	669.389	14304	0	0
26	63.5856	669.856	14501.5	0	0
27	65.0451	670.369	14631.4	0	0
28	66.5046	670.931	14693.8	0	0
29	67.9642	671.542	14689.5	0	0
30	69.4237	672.204	14619.9	0	0
31	70.9102	672.934	14467.1	0	0
32	72.3967	673.721	14214.8	0	0
33	73.8832	674.57	13858.7	0	0
34	75.3698	675.483	13395.5	0	0
35	76.8563	676.465	12822.3	0	0
36	78.3428	677.52	12137.3	0	0
37	79.8293	678.653	11339.4	0	0
38	81.3158	679.872	10024.2	0	0
39	82.8023	681.183	8550.31	0	0
40	84.2888	682.597	6996.53	0	0
41	85.7753	684.125	5382.52	0	0
42	87.2618	685.782	3732.23	0	0
43	88.7483	687.588	2075.39	0	0
44	90.2348	689.568	449.891	0	0
45	91.7213	691.757	-1094.52	0	0
46	93.2078	694.208	-2489.8	0	0
47	94.6944	697	-3637.61	0	0
48	95	697.627	-3534.44	0	0
49	95.1811	698.009	-3640.2	0	0
50	96.5344	701.146	-2520.09	0	0
51	97.8878	705	0	0	0

Curved Static - Curved Pseudostatic

Global Minimum Query (bishop simplified) - Safety Factor: 1.03927

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [deg]
1	26.062	670.027	0	0	0
2	27.5441	669.879	361.162	0	0
3	29.0263	669.758	725.921	0	0
4	30.5085	669.665	1089.15	0	0
5	31.9907	669.6	1446.12	0	0
6	33.4728	669.563	1792.48	0	0
7	34.955	669.552	2124.31	0	0
8	36.4372	669.57	2438.02	0	0
9	37.9193	669.615	2730.4	0	0
10	39.4015	669.687	2998.6	0	0
11	40.8837	669.787	3240.08	0	0
12	42.3659	669.915	3452.65	0	0
13	43.9047	670.078	3835.52	0	0
14	45.4436	670.27	4204.64	0	0
15	46.9824	670.493	4557.19	0	0
16	48.5213	670.747	4890.87	0	0
17	50.0602	671.032	5203.86	0	0
18	51.599	671.348	5494.77	0	0
19	53.0757	671.681	5745.19	0	0
20	54.5525	672.044	5958.89	0	0
21	56.0292	672.437	6134.1	0	0
22	57.5059	672.861	6269.34	0	0
23	58.9826	673.315	6363.45	0	0
24	60.4593	673.801	6415.48	0	0
25	61.936	674.319	6424.84	0	0
26	63.4127	674.871	6391.28	0	0
27	64.8894	675.455	6314.86	0	0
28	66.3662	676.074	6195.98	0	0
29	67.8429	676.729	6035.41	0	0
30	69.3196	677.419	5833.96	0	0
31	70.7963	678.147	5582.92	0	0
32	72.273	678.913	5276.77	0	0
33	73.7497	679.719	4914.34	0	0
34	75.2264	680.567	4495.25	0	0
35	76.7032	681.456	4019.57	0	0
36	78.1799	682.39	3487.87	0	0
37	79.6566	683.371	2901.21	0	0
38	81.1333	684.399	1879.13	0	0
39	82.61	685.479	715.513	0	0
40	84.0867	686.611	-446.572	0	0
41	85.5634	687.8	-1594.98	0	0
42	87.0402	689.048	-2716.47	0	0
43	88.5169	690.36	-3796.49	0	0
44	89.9936	691.739	-4819.05	0	0
45	91.4703	693.191	-5766.37	0	0
46	92.947	694.721	-6618.67	0	0
47	94.4237	696.336	-7353.67	0	0
48	95.9004	698.045	-7946.16	0	0
49	97.6414	700.192	-6967.83	0	0
50	99.3824	702.502	-5489.91	0	0
51	101.123	705	0	0	0

Global Minimum Query (janbu simplified) - Safety Factor: 0.929143

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [deg]
1	25.6383	669.958	0	0	0
2	27.3724	669.176	719.418	0	0
3	29.1066	668.45	1559.59	0	0
4	30.8407	667.78	2491.16	0	0
5	32.5749	667.163	3487.53	0	0
6	34.3091	666.598	4525.08	0	0
7	36.1562	666.051	6105.79	0	0
8	38.0034	665.561	7773.1	0	0
9	39.8506	665.125	9494.48	0	0
10	41.6978	664.742	11241.6	0	0
11	43.5449	664.413	12989.7	0	0
12	45.3921	664.135	14717.1	0	0
13	47.2393	663.908	16404.5	0	0
14	49.0865	663.732	18034.9	0	0
15	50.9336	663.607	19593.8	0	0
16	52.7808	663.531	21068.2	0	0
17	54.628	663.506	22446.8	0	0
18	56.4752	663.53	23719.6	0	0
19	58.3223	663.605	24878.3	0	0
20	60.1695	663.729	25916	0	0
21	62.0167	663.904	26826.7	0	0
22	63.8639	664.129	27605.3	0	0
23	65.711	664.406	28247.6	0	0
24	67.5582	664.735	28750.5	0	0
25	69.4054	665.116	29112.3	0	0
26	71.2526	665.551	29338.5	0	0
27	73.0997	666.041	29426	0	0
28	74.9469	666.586	29368.8	0	0
29	76.7941	667.189	29161.6	0	0
30	78.6413	667.85	28800.6	0	0
31	80.4884	668.572	28251.5	0	0
32	82.3356	669.357	27417.5	0	0
33	84.1828	670.208	26414.6	0	0
34	86.03	671.126	25263.5	0	0
35	87.8771	672.115	23986.1	0	0
36	89.7243	673.179	22606.3	0	0
37	91.5028	674.278	21164.6	0	0
38	93.2813	675.454	19590.2	0	0
39	95.0597	676.712	17900.7	0	0
40	96.8382	678.059	16115.8	0	0
41	98.6167	679.5	14257.2	0	0
42	100.395	681.044	12349.1	0	0
43	102.174	682.7	10419	0	0
44	103.952	684.481	8498.35	0	0
45	105.731	686.401	6623.56	0	0
46	107.509	688.478	4837.63	0	0
47	109.288	690.736	3192.19	0	0
48	111.066	693.207	1750.7	0	0
49	112.844	695.934	593.524	0	0
50	114.623	698.981	-173.708	0	0
51	115	699.677	0	0	0

Block Static - Master Scenario

Global Minimum Query (bishop simplified) - Safety Factor: 2.13426

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [deg]
1	29.1481	671.391	0	0	0
2	30.2177	670.321	424.559	0	0
3	32.1331	668.406	1831.89	0	0
4	34.0485	666.491	4053.64	0	0
5	35.6929	664.846	6917.44	0	0
6	37.3372	663.202	10532.6	0	0
7	38.9816	661.558	14899	0	0
8	40.8677	661.323	16240.7	0	0
9	42.7538	661.088	17683.3	0	0
10	44.64	660.853	19226.6	0	0
11	46.5261	660.618	20870.7	0	0
12	48.4123	660.383	22615.3	0	0
13	50.2984	660.148	24460.5	0	0
14	52.1845	659.913	26406.3	0	0
15	54.0707	659.678	28452.7	0	0
16	55.9568	659.443	30599.7	0	0
17	57.843	659.208	32847.2	0	0
18	59.7291	658.973	35195.9	0	0
19	61.6153	658.738	37646.3	0	0
20	63.5014	658.503	40198.7	0	0
21	65.3875	658.268	42852.8	0	0
22	67.2737	658.033	45608.8	0	0
23	69.1598	657.798	48466.8	0	0
24	71.046	657.564	51457.8	0	0
25	72.9321	657.329	54605.4	0	0
26	74.865	658.926	50736.3	0	0
27	76.7979	660.523	46973	0	0
28	78.7308	662.12	43315.4	0	0
29	80.6638	663.717	39510.9	0	0
30	82.5967	665.315	35400.9	0	0
31	84.5296	666.912	31528.1	0	0
32	86.4625	668.509	27893.5	0	0
33	88.3954	670.106	24496.9	0	0
34	90.3283	671.704	21338.4	0	0
35	92.2613	673.301	18417.9	0	0
36	94.3346	675.014	15499	0	0
37	96.408	676.727	12752.3	0	0
38	98.4814	678.441	10177.9	0	0
39	100.555	680.154	7775.7	0	0
40	102.628	681.867	5545.75	0	0
41	104.702	683.581	3488.04	0	0
42	106.755	684.343	3371.98	0	0
43	108.809	685.105	3265.1	0	0
44	110.862	685.868	3167.4	0	0
45	112.916	686.63	3078.89	0	0
46	114.969	687.392	2999.57	0	0
47	117.023	688.155	2830.52	0	0
48	118.734	689.866	408.439	0	0
49	120.446	691.577	-1831.21	0	0
50	122.157	693.289	-3888.42	0	0
51	123.869	695	0	0	0

Global Minimum Query (janbu simplified) - Safety Factor: 2.00685

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [deg]
1	29.1481	671.391	0	0	0
2	30.2177	670.321	449.069	0	0
3	32.1331	668.406	1911.72	0	0
4	34.0485	666.491	4201.26	0	0
5	35.6929	664.846	7171.12	0	0
6	37.3372	663.202	10914.6	0	0
7	38.9816	661.558	15431.8	0	0
8	40.8677	661.323	16831.6	0	0
9	42.7538	661.088	18336.6	0	0
10	44.64	660.853	19946.8	0	0
11	46.5261	660.618	21662.2	0	0
12	48.4123	660.383	23482.7	0	0
13	50.2984	660.148	25408.1	0	0
14	52.1845	659.913	27438.6	0	0
15	54.0707	659.678	29574.1	0	0
16	55.9568	659.443	31814.6	0	0
17	57.843	659.208	34160.1	0	0
18	59.7291	658.973	36611.2	0	0
19	61.6153	658.738	39168.6	0	0
20	63.5014	658.503	41832.3	0	0
21	65.3875	658.268	44602.4	0	0
22	67.2737	658.033	47478.8	0	0
23	69.1598	657.798	50461.7	0	0
24	71.046	657.564	53583.6	0	0
25	72.9321	657.329	56869.1	0	0
26	74.865	658.926	53138.2	0	0
27	76.7979	660.523	49515.3	0	0
28	78.7308	662.12	46000.3	0	0
29	80.6638	663.717	42353.2	0	0
30	82.5967	665.315	38423.3	0	0
31	84.5296	666.912	34726.3	0	0
32	86.4625	668.509	31263	0	0
33	88.3954	670.106	28033.4	0	0
34	90.3283	671.704	25037.5	0	0
35	92.2613	673.301	22275.2	0	0
36	94.3346	675.014	19519.3	0	0
37	96.408	676.727	16927.1	0	0
38	98.4814	678.441	14498.6	0	0
39	100.555	680.154	12233.7	0	0
40	102.628	681.867	10132.5	0	0
41	104.702	683.581	8194.97	0	0
42	106.755	684.343	8176.78	0	0
43	108.809	685.105	8164.5	0	0
44	110.862	685.868	8158.12	0	0
45	112.916	686.63	8157.65	0	0
46	114.969	687.392	8163.09	0	0
47	117.023	688.155	8110.82	0	0
48	118.734	689.866	5805.97	0	0
49	120.446	691.577	3675.86	0	0
50	122.157	693.289	1720.48	0	0
51	123.869	695	0	0	0

Block Static - Block Pseudostatic

Global Minimum Query (bishop simplified) - Safety Factor: 1.11118

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [deg]
1	25.0814	669.894	0	0	0
2	27.6178	667.358	2204.84	0	0
3	29.88	667.117	2702.32	0	0
4	32.1423	666.877	3222.33	0	0
5	34.4045	666.637	3764.85	0	0
6	36.4007	666.425	4500.13	0	0
7	38.397	666.213	5325.92	0	0
8	40.3932	666.001	6242.22	0	0
9	42.3895	665.79	7249.04	0	0
10	44.3857	665.578	8346.37	0	0
11	46.3819	665.366	9534.16	0	0
12	48.3782	665.154	10812.2	0	0
13	50.3744	664.942	12180.6	0	0
14	52.3707	664.73	13639.3	0	0
15	54.3669	664.518	15188.2	0	0
16	56.3631	664.306	16827.4	0	0
17	58.3594	664.094	18556.9	0	0
18	60.3556	663.882	20377.5	0	0
19	62.3519	663.67	22289.8	0	0
20	64.3481	663.458	24293.7	0	0
21	66.3443	663.247	26389.2	0	0
22	68.3406	663.035	28576.2	0	0
23	70.2973	663.958	26814.2	0	0
24	72.2541	664.881	25090	0	0
25	74.2109	665.804	23401.2	0	0
26	76.1676	666.727	21747.7	0	0
27	78.1244	667.651	20129.6	0	0
28	80.0811	668.574	18529.3	0	0
29	82.0379	669.497	16588.5	0	0
30	83.9946	670.42	14755.3	0	0
31	85.7433	671.332	12928	0	0
32	87.4919	672.244	11208.1	0	0
33	89.2406	673.156	9595.88	0	0
34	91.2816	674.22	7811.33	0	0
35	93.3226	675.285	6095.89	0	0
36	95.3636	676.349	4449.56	0	0
37	97.4047	677.413	2872.33	0	0
38	99.4457	678.478	1364.21	0	0
39	101.487	679.542	-74.7953	0	0
40	103.528	680.607	-1444.7	0	0
41	105.569	681.671	-2745.49	0	0
42	107.61	682.735	-3977.17	0	0
43	109.651	683.8	-5139.75	0	0
44	111.692	684.864	-6233.21	0	0
45	113.733	685.929	-7257.57	0	0
46	115.774	686.993	-7856.11	0	0
47	117.815	688.058	-7801.52	0	0
48	119.856	689.122	-7677.82	0	0
49	121.815	691.081	-9086.65	0	0
50	123.775	693.041	-10230.8	0	0
51	125.734	695	0	0	0

Global Minimum Query (janbu simplified) - Safety Factor: 1.02484

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [deg]
1	25.0814	669.894	0	0	0
2	27.6178	667.358	2448.56	0	0
3	29.88	667.117	3010.88	0	0
4	32.1423	666.877	3604.13	0	0
5	34.4045	666.637	4228.31	0	0
6	36.4007	666.425	5066.88	0	0
7	38.397	666.213	6009.53	0	0
8	40.3932	666.001	7056.24	0	0
9	42.3895	665.79	8207.03	0	0
10	44.3857	665.578	9461.88	0	0
11	46.3819	665.366	10820.7	0	0
12	48.3782	665.154	12283.4	0	0
13	50.3744	664.942	13849.9	0	0
14	52.3707	664.73	15520.2	0	0
15	54.3669	664.518	17294.3	0	0
16	56.3631	664.306	19172.2	0	0
17	58.3594	664.094	21153.9	0	0
18	60.3556	663.882	23240.4	0	0
19	62.3519	663.67	25432.2	0	0
20	64.3481	663.458	27729.4	0	0
21	66.3443	663.247	30131.8	0	0
22	68.3406	663.035	32639.6	0	0
23	70.2973	663.958	31080.3	0	0
24	72.2541	664.881	29566	0	0
25	74.2109	665.804	28094.5	0	0
26	76.1676	666.727	26666	0	0
27	78.1244	667.651	25280.3	0	0
28	80.0811	668.574	23922.8	0	0
29	82.0379	669.497	22294	0	0
30	83.9946	670.42	20768.5	0	0
31	85.7433	671.332	19209.5	0	0
32	87.4919	672.244	17753.9	0	0
33	89.2406	673.156	16401.6	0	0
34	91.2816	674.22	14913.3	0	0
35	93.3226	675.285	13484.5	0	0
36	95.3636	676.349	12115.3	0	0
37	97.4047	677.413	10805.6	0	0
38	99.4457	678.478	9555.54	0	0
39	101.487	679.542	8365.02	0	0
40	103.528	680.607	7234.07	0	0
41	105.569	681.671	6162.69	0	0
42	107.61	682.735	5150.87	0	0
43	109.651	683.8	4198.62	0	0
44	111.692	684.864	3305.93	0	0
45	113.733	685.929	2472.82	0	0
46	115.774	686.993	2084.31	0	0
47	117.815	688.058	2385.76	0	0
48	119.856	689.122	2746.78	0	0
49	121.815	691.081	1562.12	0	0
50	123.775	693.041	624.564	0	0
51	125.734	695	0	0	0

Entity Information

Curved Static

Shared Entities

Type	Coordinates (x,y)
External Boundary	0, 640 236, 640 236, 700 236, 710 220, 710 179, 710 179, 700 179, 695 115, 695 115, 699 115, 705 80, 705 80, 697 69, 689 26, 670 0, 667 0, 662
Material Boundary	0, 662 28, 664 45, 671 58, 676 71, 683 76, 687 81, 691 85, 691 85, 695 89, 695 89, 697 95, 697 95, 698 115, 699
Material Boundary	80, 697 81, 691
Material Boundary	179, 700 220, 700 236, 700

Scenario-based Entities

Type	Coordinates (x,y)	Master Scenario	Curved Pseudostatic
Water Table	26.191, 670.128 235.781, 680.193	Assigned to: Compacted Fill Uncertified Fill Bedrock (Sandstone and Siltstone)	Assigned to: Compacted Fill Uncertified Fill Bedrock (Sandstone and Siltstone)
Distributed Load	236, 710 220.033, 710	Constant DistributionOrientation: Normal to boundaryMagnitude: 3100 lbs/ft2Creates Excess Pore Pressure: No	Constant DistributionOrientation: Normal to boundaryMagnitude: 3100 lbs/ft2Creates Excess Pore Pressure: No
Distributed Load	178.797, 695 115, 695	Constant DistributionOrientation: Normal to boundaryMagnitude: 2200 lbs/ft2Creates Excess Pore Pressure: No	Constant DistributionOrientation: Normal to boundaryMagnitude: 2200 lbs/ft2Creates Excess Pore Pressure: No

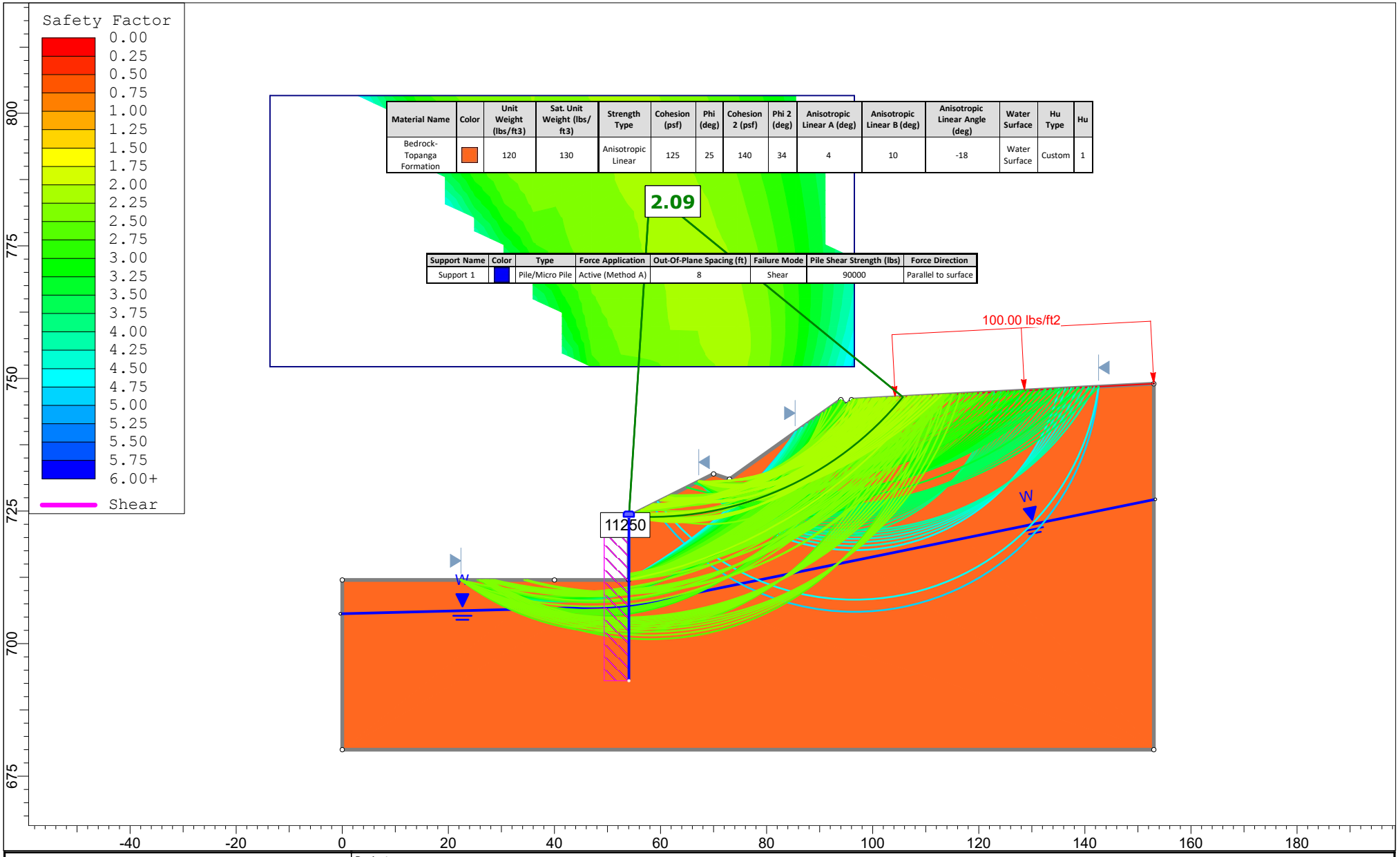
Block Static

Shared Entities

Type	Coordinates (x,y)
External Boundary	0, 640 236, 640 236, 700 236, 710 220, 710 179, 710 179, 700 179, 695 115, 695 115, 699 115, 705 80, 705 80, 697 69, 689 26, 670 0, 667 0, 662
Material Boundary	0, 662 28, 664 45, 671 58, 676 71, 683 76, 687 81, 691 85, 691 85, 695 89, 695 89, 697 95, 697 95, 698 115, 699
Material Boundary	80, 697 81, 691
Material Boundary	179, 700 220, 700 236, 700

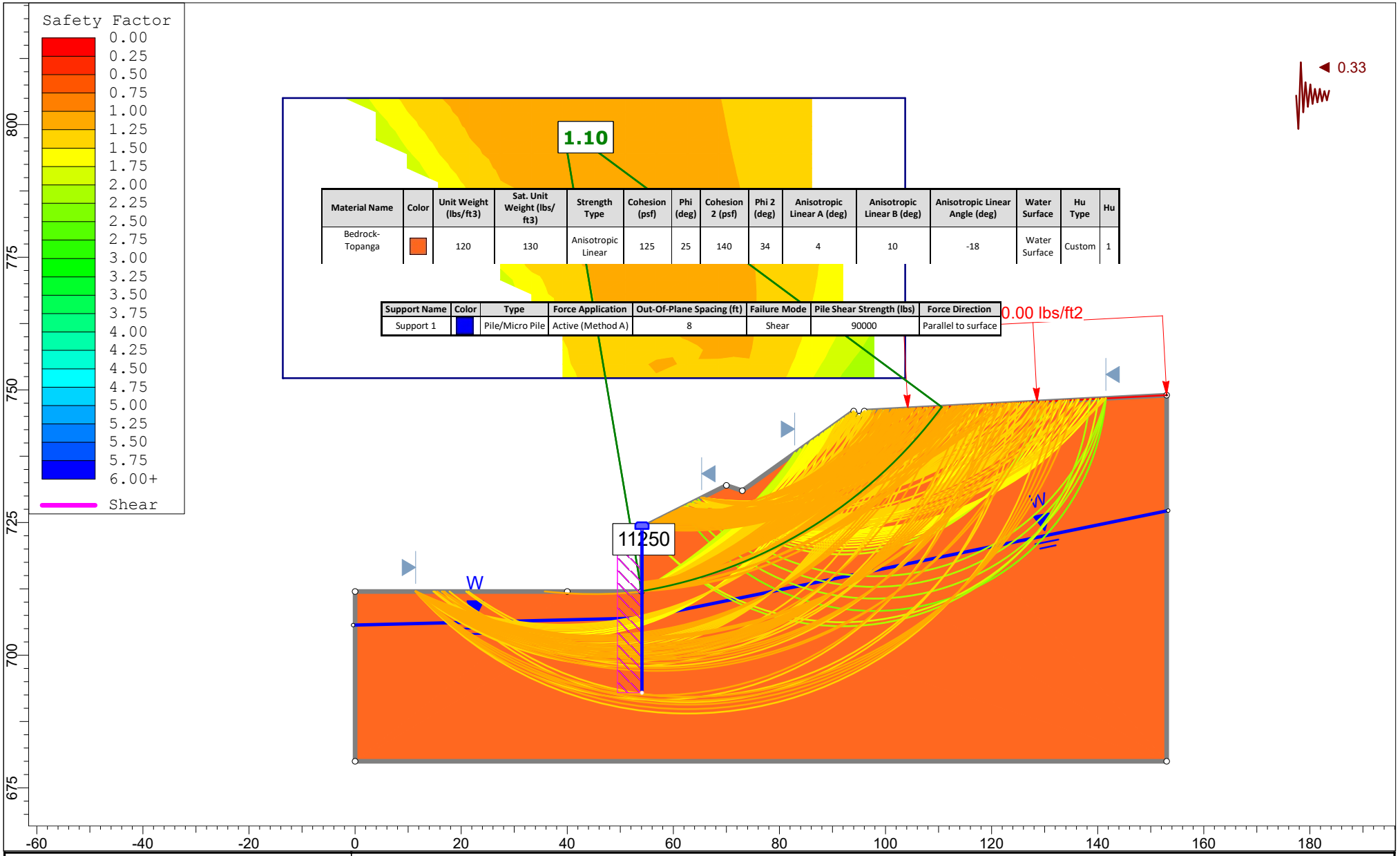
Scenario-based Entities

Type	Coordinates (x,y)	Master Scenario	Block Pseudostatic
Water Table	26.191, 670.128 235.781, 680.193	Assigned to: Compacted Fill Uncertified Fill Bedrock (Sandstone and Siltstone)	Assigned to: Compacted Fill Uncertified Fill Bedrock (Sandstone and Siltstone)
Distributed Load	236, 710 220.033, 710	Constant DistributionOrientation: Normal to boundaryMagnitude: 3100 lbs/ft2Creates Excess Pore Pressure: No	Constant DistributionOrientation: Normal to boundaryMagnitude: 3100 lbs/ft2Creates Excess Pore Pressure: No
Distributed Load	178.797, 695 115, 695	Constant DistributionOrientation: Normal to boundaryMagnitude: 2200 lbs/ft2Creates Excess Pore Pressure: No	Constant DistributionOrientation: Normal to boundaryMagnitude: 2200 lbs/ft2Creates Excess Pore Pressure: No
Block Search Window	115.969, 658.926 178.635, 655.841 177.011, 690.259 115.157, 689.772		
Block Search Window	83.499, 657.789 110.449, 657.627 112.397, 693.993 83.499, 695.616		
Block Search Window	76.031, 690.096 49.407, 675.485 51.355, 649.185 75.707, 649.672		
Block Search Window	44.861, 674.511 22.619, 665.257 24.567, 646.75 45.835, 648.373		
Block Search Window	82.363, 655.029 111.423, 654.705 110.774, 698.538 83.499, 697.889		
Block Search Window	75.544, 687.824 62.07, 681.33 63.368, 653.893 75.544, 654.055		
Block Search Window	23.918, 651.701 55.251, 651.214 55.576, 678.976 24.08, 666.15		



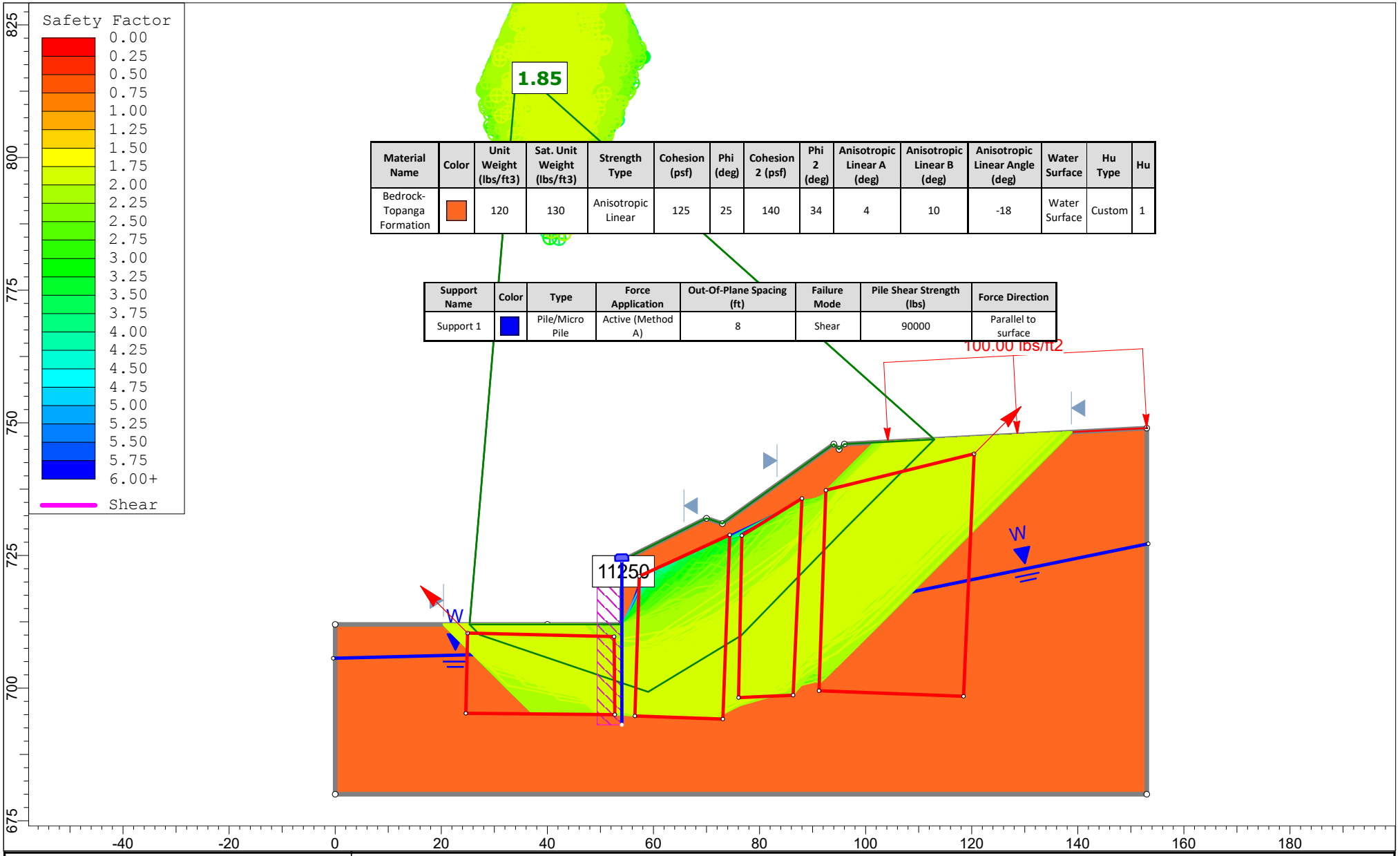
GEOTECHNOLOGIES, INC. CONSULTING GEOTECHNICAL ENGINEERS	*Project*	File No. 21578 Hilton-Los Angeles/Universal City	
	Analysis	Cross Section I-I'	
	Scale	1:300	*Comment 1* Curved Static
	Date	9/13/2022	*File Name* Proposed Hotel Extension

SLIDEINTERPRET 9.012



GEOTECHNOLOGIES, INC. CONSULTING GEOTECHNICAL ENGINEERS	*Project*	File No. 21578 Hilton-Los Angeles/Universal City	
	Analysis	Cross Section I-I'	
	Scale	1:300	*Comment 1* Curved PStatic
	Date	9/13/2022	*File Name* Proposed Hotel Extension

SLIDEINTERPRET 9.012



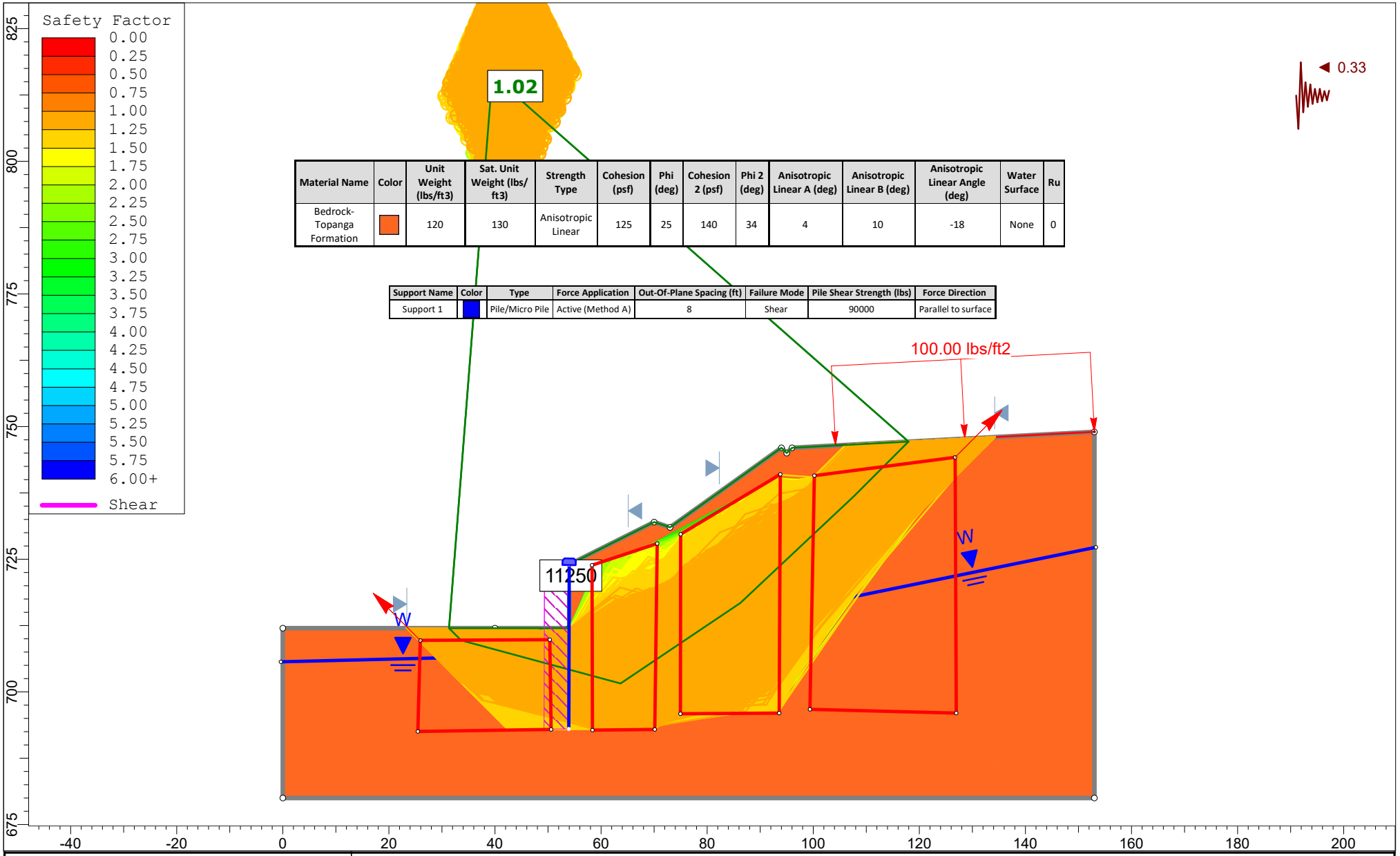
Material Name	Color	Unit Weight (lbs/ft3)	Sat. Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Cohesion 2 (psf)	Phi 2 (deg)	Anisotropic Linear A (deg)	Anisotropic Linear B (deg)	Anisotropic Linear Angle (deg)	Water Surface	Hu Type	Hu
Bedrock-Topanga Formation		120	130	Anisotropic Linear	125	25	140	34	4	10	-18	Water Surface	Custom	1

Support Name	Color	Type	Force Application	Out-Of-Plane Spacing (ft)	Failure Mode	Pile Shear Strength (lbs)	Force Direction
Support 1		Pile/Micro Pile	Active (Method A)	8	Shear	90000	Parallel to surface

GEOTECHNOLOGIES, INC.
CONSULTING GEOTECHNICAL ENGINEERS

SLIDEINTERPRET 9.012

Project	File No. 21578 Hilton-Los Angeles/Universal City
Analysis	Cross Section I-I'
Scale	1:300
Comment 1	Block Static
Date	9/13/2022
File Name	Proposed Hotel Extension



Material Name	Color	Unit Weight (lbs/ft3)	Sat. Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Cohesion 2 (psf)	Phi 2 (deg)	Anisotropic Linear A (deg)	Anisotropic Linear B (deg)	Anisotropic Linear Angle (deg)	Water Surface	Ru
Bedrock-Topanga Formation		120	130	Anisotropic Linear	125	25	140	34	4	10	-18	None	0

Support Name	Color	Type	Force Application	Out-Of-Plane Spacing (ft)	Failure Mode	Pile Shear Strength (lbs)	Force Direction
Support 1		Pile/Micro Pile	Active (Method A)	8	Shear	90000	Parallel to surface

GEOTECHNOLOGIES, INC.
CONSULTING GEOTECHNICAL ENGINEERS

SLIDEINTERPRET 9.012

Project	File No. 21578 Hilton-Los Angeles/Universal City
Analysis	Cross Section I-I'
Scale	1:300
Comment 1	Block PStatic
Date	9/13/2022
File Name	Proposed Hotel Extension

rocscience

I21578 Hilton XS II Update with rock strength
21578 Hilton Expansion Project
Geotechnologies, Inc.
Date Created: 4/17/20
Software Version: 9.012

Table of Contents

Project Summary 5
Currently Open Scenarios 5
General Settings 6
Analysis Options 7
All Open Scenarios 7
Groundwater Analysis 8
All Open Scenarios 8
Random Numbers 9
All Open Scenarios 9
Surface Options 10
Section II Proposed topography - Master Scenario 10
Section II Proposed topography - Curved Static 10
Section II Proposed topography - Curved PseudoStatic 10
Section II Proposed topography - Block Static 10
Section II Proposed topography - Block , Pseudostatic 11
Seismic Loading 12
Section II Proposed topography - Master Scenario 12
Section II Proposed topography - Curved Static 12
Section II Proposed topography - Curved PseudoStatic 12
Section II Proposed topography - Block Static 12
Section II Proposed topography - Block , Pseudostatic 12
Loading 13
All Open Scenarios 13
Materials 14
Materials In Use 14
Support 15
Global Minimums 16
Section II Proposed topography - Master Scenario 16
Method: bishop simplified 16
Method: janbu simplified 16
Section II Proposed topography - Curved Static 16
Method: bishop simplified 16
Method: janbu simplified 16
Section II Proposed topography - Curved PseudoStatic 17
Method: bishop simplified 17
Method: janbu simplified 17
Section II Proposed topography - Block Static 17
Method: bishop simplified 17
Method: janbu simplified 18
Section II Proposed topography - Block , Pseudostatic 18
Method: bishop simplified 18
Method: janbu simplified 18

Global Minimum Coordinates 20
Section II Proposed topography - Master Scenario 20
Method: bishop simplified 20
Method: janbu simplified 20
Section II Proposed topography - Block Static 20
Method: bishop simplified 20
Method: janbu simplified 20
Section II Proposed topography - Block , Pseudostatic 20
Method: bishop simplified 20
Method: janbu simplified 21
Global Minimum Support Data 22
Section II Proposed topography - Master Scenario 22
Method: bishop simplified 22
Method: janbu simplified 22
Section II Proposed topography - Curved Static 22
Method: bishop simplified 22
Method: janbu simplified 22
Section II Proposed topography - Curved PseudoStatic 22
Method: bishop simplified 22
Method: janbu simplified 23
Section II Proposed topography - Block Static 23
Method: bishop simplified 23
Method: janbu simplified 23
Section II Proposed topography - Block , Pseudostatic 23
Method: bishop simplified 23
Method: janbu simplified 23
Valid and Invalid Surfaces 24
Section II Proposed topography - Master Scenario 24
Method: bishop simplified 24
Method: janbu simplified 24
Section II Proposed topography - Curved Static 24
Method: bishop simplified 24
Method: janbu simplified 24
Section II Proposed topography - Curved PseudoStatic 24
Method: bishop simplified 24
Method: janbu simplified 24
Section II Proposed topography - Block Static 25
Method: bishop simplified 25
Method: janbu simplified 25
Section II Proposed topography - Block , Pseudostatic 25
Method: bishop simplified 25
Method: janbu simplified 25
Error Code Descriptions 25

Slice Data 27
Section II Proposed topography - Master Scenario 27
Global Minimum Query (bishop simplified) - Safety Factor: 1.8851 27
Global Minimum Query (janbu simplified) - Safety Factor: 1.7516 30
Section II Proposed topography - Curved Static 33
Global Minimum Query (bishop simplified) - Safety Factor: 2.08999 33
Global Minimum Query (janbu simplified) - Safety Factor: 1.91292 36
Section II Proposed topography - Curved PseudoStatic 39
Global Minimum Query (bishop simplified) - Safety Factor: 1.10057 39
Global Minimum Query (janbu simplified) - Safety Factor: 0.957984 42
Section II Proposed topography - Block Static 45
Global Minimum Query (bishop simplified) - Safety Factor: 2.01668 45
Global Minimum Query (janbu simplified) - Safety Factor: 1.84885 48
Section II Proposed topography - Block , Pseudostatic 51
Global Minimum Query (bishop simplified) - Safety Factor: 1.12876 51
Global Minimum Query (janbu simplified) - Safety Factor: 1.01902 54
Interslice Data 57
Section II Proposed topography - Master Scenario 57
Global Minimum Query (bishop simplified) - Safety Factor: 1.8851 57
Global Minimum Query (janbu simplified) - Safety Factor: 1.7516 58
Section II Proposed topography - Curved Static 59
Global Minimum Query (bishop simplified) - Safety Factor: 2.08999 59
Global Minimum Query (janbu simplified) - Safety Factor: 1.91292 60
Section II Proposed topography - Curved PseudoStatic 61
Global Minimum Query (bishop simplified) - Safety Factor: 1.10057 61
Global Minimum Query (janbu simplified) - Safety Factor: 0.957984 62
Section II Proposed topography - Block Static 63
Global Minimum Query (bishop simplified) - Safety Factor: 2.01668 63
Global Minimum Query (janbu simplified) - Safety Factor: 1.84885 64
Section II Proposed topography - Block , Pseudostatic 65
Global Minimum Query (bishop simplified) - Safety Factor: 1.12876 65
Global Minimum Query (janbu simplified) - Safety Factor: 1.01902 66
Entity Information 67
Section II Proposed topography 67
Shared Entities 67
Scenario-based Entities 67

Slide Analysis Information

I21578 Hilton XS II Update with rock strength

Project Summary

File Name:	I21578 Hilton XS II Update with rock strength.slmd
Slide Modeler Version:	9.012
Project Title:	21578 Hilton Expansion Project
Analysis:	Cross Section I-I'
Author:	RTK
Company:	Geotechnologies, Inc.
Date Created:	4/17/20
Comments	
	Curved, Static

Currently Open Scenarios

Group Name	Scenario Name	Global Minimum	Compute Time
Section II Proposed topography	Master Scenario	Bishop Simplified: 1.885100 Janbu Simplified: 1.751600	00h:00m:00.774s
	Curved Static	Bishop Simplified: 2.089990 Janbu Simplified: 1.912920	00h:00m:00.476s
	Curved PseudoStatic	Bishop Simplified: 1.100570 Janbu Simplified: 0.957984	00h:00m:00.403s
	Block Static	Bishop Simplified: 2.016680 Janbu Simplified: 1.848850	00h:00m:02.462s
	Block , Pseudostatic	Bishop Simplified: 1.128760 Janbu Simplified: 1.019020	00h:00m:02.475s

General Settings

Units of Measurement:	Imperial Units
Time Units:	days
Permeability Units:	feet/second
Data Output:	Standard
Failure Direction:	Right to Left

Analysis Options

All Open Scenarios

Slices Type:	Vertical
Analysis Methods Used	
	Bishop simplified
	Janbu simplified
Number of slices:	50
Tolerance:	0.005
Maximum number of iterations:	75
Check malpha < 0.2:	Yes
Create Interslice boundaries at intersections with water tables and piezos:	Yes
Initial trial value of FS:	1
Steffensen Iteration:	Yes

Groundwater Analysis

All Open Scenarios

Groundwater Method:	Water Surfaces
Pore Fluid Unit Weight [lbs/ft3]:	62.4
Use negative pore pressure cutoff:	Yes
Maximum negative pore pressure [psf]:	0
Advanced Groundwater Method:	None

Random Numbers

All Open Scenarios

Pseudo-random Seed:	10116
Random Number Generation Method:	Park and Miller v.3

Surface Options

Section II Proposed topography - Master Scenario

Surface Type:	Non-Circular Block Search
Number of Surfaces:	5000
Multiple Groups:	Disabled
Pseudo-Random Surfaces:	Enabled
Convex Surfaces Only:	Disabled
Left Projection Angle (Start Angle) [deg]:	135
Left Projection Angle (End Angle) [deg]:	135
Right Projection Angle (Start Angle) [deg]:	45
Right Projection Angle (End Angle) [deg]:	45
Minimum Elevation [ft]:	680
Minimum Depth:	Not Defined
Minimum Area:	Not Defined
Minimum Weight:	Not Defined

Section II Proposed topography - Curved Static

Surface Type:	Circular
Search Method:	Grid Search
Radius Increment:	10
Composite Surfaces:	Disabled
Reverse Curvature:	Invalid Surfaces
Minimum Elevation [ft]:	680
Minimum Depth:	Not Defined
Minimum Area:	Not Defined
Minimum Weight:	Not Defined

Section II Proposed topography - Curved PseudoStatic

Surface Type:	Circular
Search Method:	Grid Search
Radius Increment:	10
Composite Surfaces:	Disabled
Reverse Curvature:	Invalid Surfaces
Minimum Elevation [ft]:	680
Minimum Depth:	Not Defined
Minimum Area:	Not Defined
Minimum Weight:	Not Defined

Section II Proposed topography - Block Static

Surface Type:	Non-Circular Block Search
Number of Surfaces:	20000
Multiple Groups:	Disabled
Pseudo-Random Surfaces:	Enabled
Convex Surfaces Only:	Disabled
Left Projection Angle (Start Angle) [deg]:	135
Left Projection Angle (End Angle) [deg]:	135
Right Projection Angle (Start Angle) [deg]:	45
Right Projection Angle (End Angle) [deg]:	45
Minimum Elevation [ft]:	680
Minimum Depth:	Not Defined
Minimum Area:	Not Defined
Minimum Weight:	Not Defined

Section II Proposed topography - Block , Pseudostatic

Surface Type:	Non-Circular Block Search
Number of Surfaces:	20000
Multiple Groups:	Disabled
Pseudo-Random Surfaces:	Enabled
Convex Surfaces Only:	Disabled
Left Projection Angle (Start Angle) [deg]:	135
Left Projection Angle (End Angle) [deg]:	135
Right Projection Angle (Start Angle) [deg]:	45
Right Projection Angle (End Angle) [deg]:	45
Minimum Elevation [ft]:	680
Minimum Depth:	Not Defined
Minimum Area:	Not Defined
Minimum Weight:	Not Defined

Seismic Loading

Section II Proposed topography - Master Scenario

Advanced seismic analysis:	No
Staged pseudostatic analysis:	No

Section II Proposed topography - Curved Static

Advanced seismic analysis:	No
Staged pseudostatic analysis:	No

Section II Proposed topography - Curved PseudoStatic

Advanced seismic analysis:	No
Staged pseudostatic analysis:	No
Seismic Load Coefficient (Horizontal):	0.33

Section II Proposed topography - Block Static

Advanced seismic analysis:	No
Staged pseudostatic analysis:	No

Section II Proposed topography - Block , Pseudostatic

Advanced seismic analysis:	No
Staged pseudostatic analysis:	No
Seismic Load Coefficient (Horizontal):	0.33

Loading

All Open Scenarios

Distribution:	Constant
Magnitude [psf]:	100
Orientation:	Normal to boundary

Materials

Bedrock- Topanga Formation	
Color	
Strength Type	Anisotropic Linear
Unsaturated Unit Weight [lbs/ft3]	120
Saturated Unit Weight [lbs/ft3]	130
Cohesion 1 [psf]	125
Cohesion 2 [psf]	140
Friction Angle 1 [deg]	25
Friction Angle 2 [deg]	34
A [deg]	4
B [deg]	10
Anisotropic Definition	Angle
Angle from 1 [deg]	-18
Anisotropic Surface	
Water Surface	Assigned per scenario
Ru Value	0

Materials In Use

Material	Section II Proposed topography	Curved Static	Curved PseudoStatic	Block Static	Block , Pseudostatic
Bedrock-Topanga Formation	✓	✓	✓	✓	✓

Support

Support 1	
Color	
Support Type	Pile/Micro Pile
Force Application	Active
Out-of-Plane Spacing [ft]	8
Failure Mode	Shear
Pile Shear Strength [lb]	90000
Force Direction	Parallel to surface

Global Minimums

Section II Proposed topography - Master Scenario

Method: bishop simplified

FS	1.885100
Axis Location:	46.310, 784.669
Left Slip Surface Endpoint:	53.308, 712.000
Right Slip Surface Endpoint:	108.644, 746.665
Resisting Moment:	4.64437e+06 lb-ft
Driving Moment:	2.46372e+06 lb-ft
Total Slice Area:	697.013 ft2
Surface Horizontal Width:	55.3358 ft
Surface Average Height:	12.5961 ft

Method: janbu simplified

FS	1.751600
Axis Location:	46.310, 784.669
Left Slip Surface Endpoint:	53.308, 712.000
Right Slip Surface Endpoint:	108.644, 746.665
Resisting Horizontal Force:	54681.1 lb
Driving Horizontal Force:	31217.8 lb
Total Slice Area:	697.013 ft2
Surface Horizontal Width:	55.3358 ft
Surface Average Height:	12.5961 ft

Section II Proposed topography - Curved Static

Method: bishop simplified

FS	2.089990
Center:	57.963, 785.463
Radius:	61.573
Left Slip Surface Endpoint:	54.031, 724.016
Right Slip Surface Endpoint:	105.646, 746.508
Resisting Moment:	2.04161e+06 lb-ft
Driving Moment:	976849 lb-ft
Total Slice Area:	325.957 ft2
Surface Horizontal Width:	51.6152 ft
Surface Average Height:	6.31513 ft

Method: janbu simplified

FS	1.912920
Center:	74.486, 754.771
Radius:	25.268
Left Slip Surface Endpoint:	67.170, 730.585
Right Slip Surface Endpoint:	98.226, 746.117
Resisting Horizontal Force:	14511.4 lb
Driving Horizontal Force:	7585.99 lb
Total Slice Area:	158.851 ft2
Surface Horizontal Width:	31.056 ft
Surface Average Height:	5.115 ft

Section II Proposed topography - Curved PseudoStatic

Method: bishop simplified

FS	1.100570
Center:	39.168, 799.726
Radius:	88.944
Left Slip Surface Endpoint:	54.000, 712.027
Right Slip Surface Endpoint:	110.629, 746.770
Left Slope Intercept:	54.000 724.000
Right Slope Intercept:	110.629 746.770
Resisting Moment:	5.19988e+06 lb-ft
Driving Moment:	4.72473e+06 lb-ft
Active Support Moment:	-1.0006e+06 lb-ft
Maximum Single Support Force:	11250 lb
Total Support Force:	11250 lb
Total Slice Area:	742.82 ft2
Surface Horizontal Width:	56.6291 ft
Surface Average Height:	13.1173 ft

Method: janbu simplified

FS	0.957984
Center:	62.636, 768.051
Radius:	75.928
Left Slip Surface Endpoint:	11.417, 712.000
Right Slip Surface Endpoint:	135.896, 748.100
Resisting Horizontal Force:	208527 lb
Driving Horizontal Force:	217673 lb
Total Slice Area:	3418.9 ft2
Surface Horizontal Width:	124.479 ft
Surface Average Height:	27.4657 ft

Section II Proposed topography - Block Static

Method: bishop simplified

FS	2.016680
Axis Location:	35.567, 826.738
Left Slip Surface Endpoint:	22.234, 712.000
Right Slip Surface Endpoint:	119.358, 747.229
Resisting Moment:	1.6503e+07 lb-ft
Driving Moment:	8.18325e+06 lb-ft
Active Support Moment:	-1.31172e+06 lb-ft
Maximum Single Support Force:	11250 lb
Total Support Force:	11250 lb
Total Slice Area:	1662.87 ft2
Surface Horizontal Width:	97.1234 ft
Surface Average Height:	17.1212 ft

Method: janbu simplified

FS	1.848850
Axis Location:	34.241, 817.084
Left Slip Surface Endpoint:	25.314, 712.000
Right Slip Surface Endpoint:	112.952, 746.892
Resisting Horizontal Force:	87526.9 lb
Driving Horizontal Force:	47341.3 lb
Active Horizontal Support Force:	-10655.1 lb
Maximum Single Support Force:	11250 lb
Total Support Force:	11250 lb
Total Slice Area:	1282.8 ft2
Surface Horizontal Width:	87.6376 ft
Surface Average Height:	14.6376 ft

Section II Proposed topography - Block , Pseudostatic

Method: bishop simplified

FS	1.128760
Axis Location:	42.093, 833.027
Left Slip Surface Endpoint:	26.279, 712.000
Right Slip Surface Endpoint:	129.426, 747.759
Resisting Moment:	1.56218e+07 lb-ft
Driving Moment:	1.38399e+07 lb-ft
Active Support Moment:	-1.38999e+06 lb-ft
Maximum Single Support Force:	11250 lb
Total Support Force:	11250 lb
Total Slice Area:	1590.47 ft2
Surface Horizontal Width:	103.147 ft
Surface Average Height:	15.4194 ft

Method: janbu simplified

FS	1.019020
Axis Location:	39.488, 816.222
Left Slip Surface Endpoint:	31.322, 712.000
Right Slip Surface Endpoint:	117.966, 747.156
Resisting Horizontal Force:	87728.6 lb
Driving Horizontal Force:	86091.4 lb
Active Horizontal Support Force:	-10858.5 lb
Maximum Single Support Force:	11250 lb
Total Support Force:	11250 lb
Total Slice Area:	1330.31 ft2
Surface Horizontal Width:	86.6438 ft
Surface Average Height:	15.3538 ft

Global Minimum Coordinates

Section II Proposed topography - Master Scenario

Method: bishop simplified

X	Y
53.3078	712
57.2338	708.074
83.0429	723.78
99.0016	737.023
108.644	746.665

Method: janbu simplified

X	Y
53.3078	712
57.2338	708.074
83.0429	723.78
99.0016	737.023
108.644	746.665

Section II Proposed topography - Block Static

Method: bishop simplified

X	Y
22.2344	712
27.1199	707.114
56.8395	697.709
81.6876	708.441
108.972	736.843
119.358	747.229

Method: janbu simplified

X	Y
25.3139	712
27.2549	710.059
59.0038	699.303
76.5208	709.95
96.1332	730.074
112.952	746.892

Section II Proposed topography - Block , Pseudostatic

Method: bishop simplified

X	Y
26.279	712
29.3898	708.889
61.2758	701
77.0536	709.973
124.311	742.644
129.426	747.759

Method: janbu simplified

X	Y
31.3219	712
33.628	709.694
63.6598	701.557
86.2608	716.738
107.686	736.876
117.966	747.156

Global Minimum Support Data

Section II Proposed topography - Master Scenario

Method: bishop simplified

Number of Supports: 1

Support 1						
Support Type: Pile/Micro Pile						
Start (x, y)	**Length (ft)**	**L Inside SS (ft)**	**L Outside SS (ft)**	**Li (ft)**	**Lo (ft)**	**Force (lb)**
53.662, 723.446	11.7436	Not Effective	Not Effective	Not Effective	Not Effective	0

Method: janbu simplified

Number of Supports: 1

Support 1						
Support Type: Pile/Micro Pile						
Start (x, y)	**Length (ft)**	**L Inside SS (ft)**	**L Outside SS (ft)**	**Li (ft)**	**Lo (ft)**	**Force (lb)**
53.662, 723.446	11.7436	Not Effective	Not Effective	Not Effective	Not Effective	0

Section II Proposed topography - Curved Static

Method: bishop simplified

Number of Supports: 1

Support 1						
Support Type: Pile/Micro Pile						
Start (x, y)	**Length (ft)**	**L Inside SS (ft)**	**L Outside SS (ft)**	**Li (ft)**	**Lo (ft)**	**Force (lb)**
54.023, 724.023	31	Not Effective	Not Effective	Not Effective	Not Effective	0

Method: janbu simplified

Number of Supports: 1

Support 1						
Support Type: Pile/Micro Pile						
Start (x, y)	**Length (ft)**	**L Inside SS (ft)**	**L Outside SS (ft)**	**Li (ft)**	**Lo (ft)**	**Force (lb)**
54.023, 724.023	31	Not Effective	Not Effective	Not Effective	Not Effective	0

Section II Proposed topography - Curved PseudoStatic

Method: bishop simplified

Number of Supports: 1

Support 1

Support Type: Pile/Micro Pile

Start (x, y)	Length (ft)	L Inside SS (ft)	L Outside SS (ft)	Li (ft)	Lo (ft)	Force (lb)
54.106, 723.938	31	11.8921	19.1079	11.8921	19.1079	11250

Method: janbu simplified

Number of Supports: 1

Support 1

Support Type: Pile/Micro Pile

Start (x, y)	Length (ft)	L Inside SS (ft)	L Outside SS (ft)	Li (ft)	Lo (ft)	Force (lb)
54.106, 723.938	31	Not Effective	Not Effective	Not Effective	Not Effective	0

Section II Proposed topography - Block Static

Method: bishop simplified

Number of Supports: 1

Support 1

Support Type: Pile/Micro Pile

Start (x, y)	Length (ft)	L Inside SS (ft)	L Outside SS (ft)	Li (ft)	Lo (ft)	Force (lb)
54.023, 724.101	31	25.5011	5.49887	25.5011	5.49887	11250

Method: janbu simplified

Number of Supports: 1

Support 1

Support Type: Pile/Micro Pile

Start (x, y)	Length (ft)	L Inside SS (ft)	L Outside SS (ft)	Li (ft)	Lo (ft)	Force (lb)
54.023, 724.101	31	23.1113	7.88871	23.1113	7.88871	11250

Section II Proposed topography - Block , Pseudostatic

Method: bishop simplified

Number of Supports: 1

Support 1

Support Type: Pile/Micro Pile

Start (x, y)	Length (ft)	L Inside SS (ft)	L Outside SS (ft)	Li (ft)	Lo (ft)	Force (lb)
53.99, 723.989	31	21.1744	9.82555	21.1744	9.82555	11250

Method: janbu simplified

Number of Supports: 1

Support 1

Support Type: Pile/Micro Pile

Start (x, y)	Length (ft)	L Inside SS (ft)	L Outside SS (ft)	Li (ft)	Lo (ft)	Force (lb)
53.99, 723.989	31	19.7997	11.2003	19.7997	11.2003	11250

Valid and Invalid Surfaces

Section II Proposed topography - Master Scenario

Method: bishop simplified

Number of Valid Surfaces:	4684
Number of Invalid Surfaces:	316

Error Codes

Error Code -108 reported for 7 surfaces
Error Code -111 reported for 144 surfaces
Error Code -112 reported for 165 surfaces

Method: janbu simplified

Number of Valid Surfaces:	4371
Number of Invalid Surfaces:	629

Error Codes

Error Code -108 reported for 7 surfaces
Error Code -111 reported for 484 surfaces
Error Code -112 reported for 138 surfaces

Section II Proposed topography - Curved Static

Method: bishop simplified

Number of Valid Surfaces:	5425
Number of Invalid Surfaces:	3836

Error Codes

Error Code -107 reported for 346 surfaces
Error Code -108 reported for 4 surfaces
Error Code -1000 reported for 3486 surfaces

Method: janbu simplified

Number of Valid Surfaces:	5427
Number of Invalid Surfaces:	3834

Error Codes

Error Code -107 reported for 346 surfaces
Error Code -108 reported for 2 surfaces
Error Code -1000 reported for 3486 surfaces

Section II Proposed topography - Curved PseudoStatic

Method: bishop simplified

Number of Valid Surfaces:	5455
Number of Invalid Surfaces:	3806

Error Codes

Error Code -107 reported for 152 surfaces
Error Code -1000 reported for 3654 surfaces

Method: janbu simplified

Number of Valid Surfaces:	5423
Number of Invalid Surfaces:	3838

Error Codes

Error Code -107 reported for 152 surfaces
Error Code -108 reported for 2 surfaces
Error Code -112 reported for 30 surfaces
Error Code -1000 reported for 3654 surfaces

Section II Proposed topography - Block Static

Method: bishop simplified

Number of Valid Surfaces:	15977
Number of Invalid Surfaces:	4023

Error Codes

Error Code -105 reported for 3351 surfaces
Error Code -108 reported for 31 surfaces
Error Code -111 reported for 531 surfaces
Error Code -112 reported for 110 surfaces

Method: janbu simplified

Number of Valid Surfaces:	15218
Number of Invalid Surfaces:	4782

Error Codes

Error Code -105 reported for 3351 surfaces
Error Code -108 reported for 29 surfaces
Error Code -111 reported for 1306 surfaces
Error Code -112 reported for 96 surfaces

Section II Proposed topography - Block , Pseudostatic

Method: bishop simplified

Number of Valid Surfaces:	15987
Number of Invalid Surfaces:	4013

Error Codes

Error Code -105 reported for 3497 surfaces
Error Code -108 reported for 6 surfaces
Error Code -111 reported for 475 surfaces
Error Code -112 reported for 35 surfaces

Method: janbu simplified

Number of Valid Surfaces:	15427
Number of Invalid Surfaces:	4573

Error Codes

Error Code -105 reported for 3497 surfaces
Error Code -108 reported for 6 surfaces
Error Code -111 reported for 1042 surfaces
Error Code -112 reported for 28 surfaces

Error Code Descriptions

The following errors were encountered during the computation:

-105 = More than two surface / slope intersections with no valid slip surface.

-107 = Total driving moment or total driving force is negative. This will occur if the wrong failure direction is specified, or if high external or anchor loads are applied against the failure direction.

-108 = Total driving moment or total driving force < 0.1. This is to limit the calculation of extremely high safety factors if the driving force is very small (0.1 is an arbitrary number).

-111 = Safety factor equation did not converge

-112 = The coefficient M-Alpha = cos(alpha)(1+tan(alpha)tan(phi)/F) < 0.2 for the final iteration of the safety factor calculation. This screens out some slip surfaces which may not be valid in the context of the analysis, in particular, deep seated slip surfaces with many high negative base angle slices in the passive zone.

-1000 = No valid slip surface is generated

Slice Data

Section II Proposed topography - Master Scenario

Global Minimum Query (bishop simplified) - Safety Factor: 1.8851

Slice Number	Width [ft]	Weight [lbs]	Angle of Slice Base [deg]	Base Material	Base Cohesion [psf]	Base Friction Angle [deg]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]	Base Vertical Stress [psf]	Effective Vertical Stress [psf]
1	0.0990871	0.589096	-45	Bedrock-Topanga Formation	140	34	118.903	224.144	124.749	0	124.749	5.84571	5.84571
2	1.27566	1118.75	-45	Bedrock-Topanga Formation	140	34	604.001	1138.6	1480.49	0	1480.49	876.488	876.488
3	1.27566	2273.96	-45	Bedrock-Topanga Formation	140	34	1108.33	2089.31	2889.98	0	2889.98	1781.65	1781.65
4	1.27566	2585.65	-45	Bedrock-Topanga Formation	140	34	1244.41	2345.83	3270.28	0	3270.28	2025.87	2025.87
5	1.07302	2295.89	31.3228	Bedrock-Topanga Formation	140	34	689.783	1300.31	1720.23	0	1720.23	2140	2140
6	1.07302	2275.65	31.3228	Bedrock-Topanga Formation	140	34	684.24	1289.86	1704.74	0	1704.74	2121.14	2121.14
7	1.07302	2255.42	31.3228	Bedrock-Topanga Formation	140	34	678.701	1279.42	1689.26	0	1689.26	2102.28	2102.28
8	1.07302	2235.18	31.3228	Bedrock-Topanga Formation	140	34	673.158	1268.97	1673.76	0	1673.76	2083.42	2083.42
9	1.07302	2214.95	31.3228	Bedrock-Topanga Formation	140	34	667.614	1258.52	1658.28	0	1658.28	2064.56	2064.56
10	1.07302	2194.71	31.3228	Bedrock-Topanga Formation	140	34	662.076	1248.08	1642.79	0	1642.79	2045.7	2045.7
11	1.07302	2174.48	31.3228	Bedrock-Topanga Formation	140	34	656.533	1237.63	1627.3	0	1627.3	2026.84	2026.84
12	1.07302	2154.24	31.3228	Bedrock-Topanga Formation	140	34	650.989	1227.18	1611.82	0	1611.82	2007.98	2007.98
13	1.07302	2134.01	31.3228	Bedrock-Topanga Formation	140	34	645.451	1216.74	1596.32	0	1596.32	1989.12	1989.12
14	1.1537	2274.93	31.3228	Bedrock-Topanga Formation	140	34	640.47	1207.35	1582.41	0	1582.41	1972.17	1972.17
15	1.1537	2257.59	31.3228	Bedrock-Topanga Formation	140	34	636.051	1199.02	1570.07	0	1570.07	1957.14	1957.14
16	1.1537	2234.05	31.3228	Bedrock-Topanga Formation	140	34	630.057	1187.72	1553.31	0	1553.31	1936.73	1936.73
17	1.1537	2115.73	31.3228	Bedrock-Topanga Formation	140	34	599.92	1130.91	1469.08	0	1469.08	1834.17	1834.17
18	1.1537	1965.29	31.3228	Bedrock-Topanga Formation	140	34	561.599	1058.67	1361.99	0	1361.99	1703.75	1703.75
19	1.1537	1856.42	31.3228	Bedrock-Topanga Formation	140	34	533.867	1006.39	1284.48	0	1284.48	1609.37	1609.37
20	1.1537	1866.02	31.3228	Bedrock-Topanga Formation	140	34	536.313	1011	1291.32	0	1291.32	1617.69	1617.69

21	1.1537	1882.91	31.3228	Bedrock-Topanga Formation	140	34	540.614	1019.11	1303.34	0	1303.34	1632.33	1632.33
22	1.1537	1899.8	31.3228	Bedrock-Topanga Formation	140	34	544.916	1027.22	1315.36	0	1315.36	1646.97	1646.97
23	1.1537	1916.69	31.3228	Bedrock-Topanga Formation	140	34	549.218	1035.33	1327.39	0	1327.39	1661.61	1661.61
24	1.1537	1933.57	31.3228	Bedrock-Topanga Formation	140	34	553.52	1043.44	1339.4	0	1339.4	1676.25	1676.25
25	1.1537	1950.46	31.3228	Bedrock-Topanga Formation	140	34	557.821	1051.55	1351.43	0	1351.43	1690.89	1690.89
26	1.1537	1967.35	31.3228	Bedrock-Topanga Formation	140	34	562.123	1059.66	1363.45	0	1363.45	1705.53	1705.53
27	1.1537	1984.24	31.3228	Bedrock-Topanga Formation	140	34	566.425	1067.77	1375.47	0	1375.47	1720.17	1720.17
28	1.13991	1959.84	39.6876	Bedrock-Topanga Formation	140	34	531.703	1002.31	1278.43	0	1278.43	1719.67	1719.67
29	1.13991	1941.82	39.6876	Bedrock-Topanga Formation	140	34	527.341	994.091	1266.24	0	1266.24	1703.86	1703.86
30	1.13991	1923.8	39.6876	Bedrock-Topanga Formation	140	34	522.979	985.868	1254.05	0	1254.05	1688.04	1688.04
31	1.13991	1905.78	39.6876	Bedrock-Topanga Formation	140	34	518.617	977.644	1241.86	0	1241.86	1672.23	1672.23
32	1.13991	1887.76	39.6876	Bedrock-Topanga Formation	140	34	514.254	969.421	1229.67	0	1229.67	1656.42	1656.42
33	1.13991	1869.74	39.6876	Bedrock-Topanga Formation	140	34	509.892	961.198	1217.48	0	1217.48	1640.61	1640.61
34	1.13991	1851.72	39.6876	Bedrock-Topanga Formation	140	34	505.53	952.975	1205.29	0	1205.29	1624.8	1624.8
35	1.13991	1833.7	39.6876	Bedrock-Topanga Formation	140	34	501.168	944.752	1193.1	0	1193.1	1608.99	1608.99
36	1.13991	1815.68	39.6876	Bedrock-Topanga Formation	140	34	496.806	936.529	1180.9	0	1180.9	1593.18	1593.18
37	1.13991	1777.58	39.6876	Bedrock-Topanga Formation	140	34	487.581	919.139	1155.12	0	1155.12	1559.74	1559.74
38	1.13991	1582.99	39.6876	Bedrock-Topanga Formation	140	34	440.476	830.341	1023.47	0	1023.47	1389	1389
39	1.13991	1542.53	39.6876	Bedrock-Topanga Formation	140	34	430.683	811.881	996.105	0	996.105	1353.51	1353.51
40	1.13991	1431.28	39.6876	Bedrock-Topanga Formation	140	34	403.753	761.114	920.84	0	920.84	1255.89	1255.89
41	1.13991	1310.09	39.6876	Bedrock-Topanga Formation	140	34	374.416	705.811	838.85	0	838.85	1149.56	1149.56
42	1.07133	1109.09	45	Bedrock-Topanga Formation	140	34	327.576	617.513	707.944	0	707.944	1035.52	1035.52
43	1.07133	978.609	45	Bedrock-Topanga Formation	140	34	295.473	556.997	618.224	0	618.224	913.698	913.698
44	1.07133	848.127	45	Bedrock-Topanga Formation	140	34	263.372	496.482	528.506	0	528.506	791.878	791.878
45	1.07133	717.646	45	Bedrock-Topanga Formation	140	34	231.269	435.966	438.787	0	438.787	670.057	670.057

46	1.07133	587.165	45	Bedrock-Topanga Formation	140	34	202.787	382.274	359.186	0	359.186	561.973	561.973
47	1.07133	456.684	45	Bedrock-Topanga Formation	140	34	193.423	364.622	333.016	0	333.016	526.439	526.439
48	1.07133	326.203	45	Bedrock-Topanga Formation	140	34	161.321	304.106	243.298	0	243.298	404.618	404.618
49	1.07133	195.722	45	Bedrock-Topanga Formation	140	34	129.219	243.591	153.58	0	153.58	282.799	282.799
50	1.07133	65.2406	45	Bedrock-Topanga Formation	140	34	97.1168	183.075	63.8611	0	63.8611	160.978	160.978

Global Minimum Query (janbu simplified) - Safety Factor: 1.7516

Slice Number	Width [ft]	Weight [lbs]	Angle of Slice Base [deg]	Base Material	Base Cohesion [psf]	Base Friction Angle [deg]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]	Base Vertical Stress [psf]	Effective Vertical Stress [psf]
1	0.0990871	0.589096	-45	Bedrock-Topanga Formation	140	34	133.685	234.163	139.602	0	139.602	5.91689	5.91689
2	1.27566	1118.75	-45	Bedrock-Topanga Formation	140	34	679.093	1189.5	1555.94	0	1555.94	876.848	876.848
3	1.27566	2273.96	-45	Bedrock-Topanga Formation	140	34	1246.12	2182.7	3028.43	0	3028.43	1782.31	1782.31
4	1.27566	2585.65	-45	Bedrock-Topanga Formation	140	34	1399.11	2450.68	3425.73	0	3425.73	2026.62	2026.62
5	1.07302	2295.89	31.3228	Bedrock-Topanga Formation	140	34	732.296	1282.69	1694.1	0	1694.1	2139.75	2139.75
6	1.07302	2275.65	31.3228	Bedrock-Topanga Formation	140	34	726.41	1272.38	1678.83	0	1678.83	2120.89	2120.89
7	1.07302	2255.42	31.3228	Bedrock-Topanga Formation	140	34	720.53	1262.08	1663.55	0	1663.55	2102.03	2102.03
8	1.07302	2235.18	31.3228	Bedrock-Topanga Formation	140	34	714.644	1251.77	1648.27	0	1648.27	2083.17	2083.17
9	1.07302	2214.95	31.3228	Bedrock-Topanga Formation	140	34	708.763	1241.47	1632.99	0	1632.99	2064.31	2064.31
10	1.07302	2194.71	31.3228	Bedrock-Topanga Formation	140	34	702.877	1231.16	1617.71	0	1617.71	2045.45	2045.45
11	1.07302	2174.48	31.3228	Bedrock-Topanga Formation	140	34	696.997	1220.86	1602.43	0	1602.43	2026.59	2026.59
12	1.07302	2154.24	31.3228	Bedrock-Topanga Formation	140	34	691.111	1210.55	1587.15	0	1587.15	2007.73	2007.73
13	1.07302	2134.01	31.3228	Bedrock-Topanga Formation	140	34	685.225	1200.24	1571.88	0	1571.88	1988.87	1988.87
14	1.1537	2274.93	31.3228	Bedrock-Topanga Formation	140	34	679.944	1190.99	1558.15	0	1558.15	1971.93	1971.93
15	1.1537	2257.59	31.3228	Bedrock-Topanga Formation	140	34	675.251	1182.77	1545.97	0	1545.97	1956.9	1956.9
16	1.1537	2234.05	31.3228	Bedrock-Topanga Formation	140	34	668.886	1171.62	1529.45	0	1529.45	1936.5	1936.5
17	1.1537	2115.73	31.3228	Bedrock-Topanga Formation	140	34	636.893	1115.58	1446.36	0	1446.36	1833.94	1833.94
18	1.1537	1965.29	31.3228	Bedrock-Topanga Formation	140	34	596.211	1044.32	1340.71	0	1340.71	1703.54	1703.54
19	1.1537	1856.42	31.3228	Bedrock-Topanga Formation	140	34	566.769	992.753	1264.26	0	1264.26	1609.16	1609.16
20	1.1537	1866.02	31.3228	Bedrock-Topanga Formation	140	34	569.366	997.301	1271	0	1271	1617.49	1617.49
21	1.1537	1882.91	31.3228	Bedrock-Topanga Formation	140	34	573.932	1005.3	1282.86	0	1282.86	1632.13	1632.13
22	1.1537	1899.8	31.3228	Bedrock-Topanga Formation	140	34	578.5	1013.3	1294.72	0	1294.72	1646.77	1646.77
23	1.1537	1916.69	31.3228	Bedrock-Topanga Formation	140	34	583.066	1021.3	1306.58	0	1306.58	1661.41	1661.41

24	1.1537	1933.57	31.3228	Bedrock-Topanga Formation	140	34	587.633	1029.3	1318.44	0	1318.44	1676.05	1676.05
25	1.1537	1950.46	31.3228	Bedrock-Topanga Formation	140	34	592.2	1037.3	1330.3	0	1330.3	1690.68	1690.68
26	1.1537	1967.35	31.3228	Bedrock-Topanga Formation	140	34	596.767	1045.3	1342.16	0	1342.16	1705.32	1705.32
27	1.1537	1984.24	31.3228	Bedrock-Topanga Formation	140	34	601.334	1053.3	1354.02	0	1354.02	1719.96	1719.96
28	1.13991	1959.84	39.6876	Bedrock-Topanga Formation	140	34	562.334	984.985	1252.74	0	1252.74	1719.39	1719.39
29	1.13991	1941.82	39.6876	Bedrock-Topanga Formation	140	34	557.721	976.904	1240.76	0	1240.76	1703.59	1703.59
30	1.13991	1923.8	39.6876	Bedrock-Topanga Formation	140	34	553.107	968.823	1228.78	0	1228.78	1687.78	1687.78
31	1.13991	1905.78	39.6876	Bedrock-Topanga Formation	140	34	548.495	960.743	1216.8	0	1216.8	1671.97	1671.97
32	1.13991	1887.76	39.6876	Bedrock-Topanga Formation	140	34	543.881	952.662	1204.82	0	1204.82	1656.16	1656.16
33	1.13991	1869.74	39.6876	Bedrock-Topanga Formation	140	34	539.268	944.581	1192.84	0	1192.84	1640.35	1640.35
34	1.13991	1851.72	39.6876	Bedrock-Topanga Formation	140	34	534.654	936.5	1180.86	0	1180.86	1624.54	1624.54
35	1.13991	1833.7	39.6876	Bedrock-Topanga Formation	140	34	530.041	928.419	1168.88	0	1168.88	1608.74	1608.74
36	1.13991	1815.68	39.6876	Bedrock-Topanga Formation	140	34	525.427	920.338	1156.9	0	1156.9	1592.92	1592.92
37	1.13991	1777.58	39.6876	Bedrock-Topanga Formation	140	34	515.671	903.249	1131.56	0	1131.56	1559.49	1559.49
38	1.13991	1582.99	39.6876	Bedrock-Topanga Formation	140	34	465.852	815.986	1002.19	0	1002.19	1388.78	1388.78
39	1.13991	1542.53	39.6876	Bedrock-Topanga Formation	140	34	455.495	797.845	975.292	0	975.292	1353.29	1353.29
40	1.13991	1431.28	39.6876	Bedrock-Topanga Formation	140	34	427.012	747.955	901.33	0	901.33	1255.69	1255.69
41	1.13991	1310.09	39.6876	Bedrock-Topanga Formation	140	34	395.985	693.608	820.758	0	820.758	1149.37	1149.37
42	1.07133	1109.09	45	Bedrock-Topanga Formation	140	34	345.545	605.257	689.774	0	689.774	1035.32	1035.32
43	1.07133	978.609	45	Bedrock-Topanga Formation	140	34	311.682	545.942	601.834	0	601.834	913.516	913.516
44	1.07133	848.127	45	Bedrock-Topanga Formation	140	34	277.819	486.628	513.896	0	513.896	791.716	791.716
45	1.07133	717.646	45	Bedrock-Topanga Formation	140	34	243.956	427.313	425.959	0	425.959	669.915	669.915
46	1.07133	587.165	45	Bedrock-Topanga Formation	140	34	213.911	374.687	347.937	0	347.937	561.849	561.849
47	1.07133	456.684	45	Bedrock-Topanga Formation	140	34	204.033	357.385	322.286	0	322.286	526.32	526.32
48	1.07133	326.203	45	Bedrock-Topanga Formation	140	34	170.17	298.07	234.349	0	234.349	404.519	404.519

49	1.07133	195.722	45	Bedrock-Topanga Formation	140	34	136.307	238.756	146.412	0	146.412	282.719	282.719
50	1.07133	65.2406	45	Bedrock-Topanga Formation	140	34	102.444	179.441	58.474	0	58.474	160.918	160.918

Section II Proposed topography - Curved Static

Global Minimum Query (bishop simplified) - Safety Factor: 2.08999

Slice Number	Width [ft]	Weight [lbs]	Angle of Slice Base [deg]	Base Material	Base Cohesion [psf]	Base Friction Angle [deg]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]	Base Vertical Stress [psf]	Effective Vertical Stress [psf]
1	1.0323	35.522	-3.18003	Bedrock-Topanga Formation	140	34	79.5144	166.184	38.8197	0	38.8197	34.4019	34.4019
2	1.0323	105.49	-2.21832	Bedrock-Topanga Formation	140	34	101.229	211.567	106.103	0	106.103	102.182	102.182
3	1.0323	173.309	-1.25723	Bedrock-Topanga Formation	140	34	122.031	255.043	170.559	0	170.559	167.881	167.881
4	1.0323	238.983	-0.296503	Bedrock-Topanga Formation	140	34	141.937	296.646	232.238	0	232.238	231.503	231.503
5	1.0323	302.511	0.664145	Bedrock-Topanga Formation	140	34	160.96	336.405	291.182	0	291.182	293.048	293.048
6	1.0323	363.895	1.62498	Bedrock-Topanga Formation	140	34	179.115	374.349	347.436	0	347.436	352.517	352.517
7	1.0323	423.133	2.58627	Bedrock-Topanga Formation	140	34	196.413	410.502	401.037	0	401.037	409.909	409.909
8	1.0323	480.219	3.54829	Bedrock-Topanga Formation	140	34	212.867	444.889	452.017	0	452.017	465.216	465.216
9	1.0323	535.148	4.51132	Bedrock-Topanga Formation	140	34	228.484	477.53	500.408	0	500.408	518.436	518.436
10	1.0323	587.913	5.47562	Bedrock-Topanga Formation	140	34	243.275	508.443	546.24	0	546.24	569.561	569.561
11	1.0323	638.505	6.44148	Bedrock-Topanga Formation	140	34	257.249	537.647	589.535	0	589.535	618.579	618.579
12	1.0323	686.91	7.40919	Bedrock-Topanga Formation	140	34	270.41	565.154	630.317	0	630.317	665.482	665.482
13	1.0323	733.117	8.37902	Bedrock-Topanga Formation	140	34	282.767	590.98	668.605	0	668.605	710.255	710.255
14	1.0323	777.109	9.35128	Bedrock-Topanga Formation	140	34	294.324	615.134	704.416	0	704.416	752.884	752.884
15	1.0323	818.869	10.3263	Bedrock-Topanga Formation	140	34	305.086	637.627	737.762	0	737.762	793.35	793.35
16	1.0323	843.366	11.3043	Bedrock-Topanga Formation	140	34	310.647	649.25	754.994	0	754.994	817.092	817.092
17	1.0323	785.765	12.2857	Bedrock-Topanga Formation	140	34	292.149	610.588	697.675	0	697.675	761.297	761.297
18	1.0323	714.135	13.2707	Bedrock-Topanga Formation	140	34	269.755	563.785	628.287	0	628.287	691.909	691.909
19	1.0323	666.316	14.2598	Bedrock-Topanga Formation	140	34	254.466	531.832	580.916	0	580.916	645.588	645.588
20	1.0323	714.535	15.2532	Bedrock-Topanga Formation	140	34	266.927	557.875	619.525	0	619.525	692.314	692.314
21	1.0323	769.803	16.2513	Bedrock-Topanga Formation	140	34	281.244	587.798	663.887	0	663.887	745.87	745.87
22	1.0323	822.647	17.2545	Bedrock-Topanga Formation	140	34	294.69	615.899	705.549	0	705.549	797.078	797.078

23	1.0323	873.029	18.2633	Bedrock-Topanga Formation	140	34	307.262	642.174	744.504	0	744.504	845.903	845.903
24	1.0323	920.907	19.2779	Bedrock-Topanga Formation	140	34	318.957	666.617	780.743	0	780.743	892.302	892.302
25	1.0323	966.235	20.2988	Bedrock-Topanga Formation	140	34	329.772	689.22	814.252	0	814.252	936.23	936.23
26	1.0323	1008.96	21.3266	Bedrock-Topanga Formation	140	34	339.701	709.971	845.017	0	845.017	977.642	977.642
27	1.0323	1049.04	22.3615	Bedrock-Topanga Formation	140	34	348.738	728.858	873.018	0	873.018	1016.48	1016.48
28	1.0323	1086.4	23.4043	Bedrock-Topanga Formation	140	34	356.875	745.866	898.234	0	898.234	1052.7	1052.7
29	1.0323	1120.99	24.4553	Bedrock-Topanga Formation	140	34	364.106	760.977	920.633	0	920.633	1086.22	1086.22
30	1.0323	1152.73	25.5151	Bedrock-Topanga Formation	140	34	370.419	774.172	940.2	0	940.2	1117	1117
31	1.0323	1181.56	26.5844	Bedrock-Topanga Formation	140	34	375.804	785.427	956.888	0	956.888	1144.95	1144.95
32	1.0323	1207.39	27.6638	Bedrock-Topanga Formation	140	34	380.249	794.717	970.657	0	970.657	1169.99	1169.99
33	1.0323	1230.13	28.754	Bedrock-Topanga Formation	140	34	383.74	802.013	981.471	0	981.471	1192.03	1192.03
34	1.0323	1249.69	29.8556	Bedrock-Topanga Formation	140	34	386.262	807.284	989.293	0	989.293	1211.01	1211.01
35	1.0323	1265.96	30.9696	Bedrock-Topanga Formation	140	34	387.799	810.495	994.047	0	994.047	1226.78	1226.78
36	1.0323	1278.82	32.0967	Bedrock-Topanga Formation	140	34	388.331	811.607	995.701	0	995.701	1239.27	1239.27
37	1.0323	1288.16	33.238	Bedrock-Topanga Formation	140	34	387.837	810.576	994.174	0	994.174	1248.33	1248.33
38	1.0323	1293.83	34.3943	Bedrock-Topanga Formation	140	34	386.297	807.357	989.4	0	989.4	1253.85	1253.85
39	1.0323	1286.97	35.5668	Bedrock-Topanga Formation	140	34	381.472	797.272	974.443	0	974.443	1247.22	1247.22
40	1.0323	1134.69	36.7568	Bedrock-Topanga Formation	140	34	339.94	710.471	845.76	0	845.76	1099.67	1099.67
41	1.0323	1097.4	37.9655	Bedrock-Topanga Formation	140	34	327.701	684.891	807.837	0	807.837	1063.55	1063.55
42	1.0323	1028.13	39.1945	Bedrock-Topanga Formation	140	34	307.616	642.914	745.601	0	745.601	996.437	996.437
43	1.0323	928.222	40.4454	Bedrock-Topanga Formation	140	34	280.232	585.682	660.752	0	660.752	899.631	899.631
44	1.0323	823.441	41.72	Bedrock-Topanga Formation	140	34	252.037	526.754	573.387	0	573.387	798.101	798.101
45	1.0323	713.497	43.0205	Bedrock-Topanga Formation	140	34	223.013	466.094	483.454	0	483.454	691.566	691.566
46	1.0323	598.058	44.3491	Bedrock-Topanga Formation	140	34	193.142	403.665	390.9	0	390.9	579.703	579.703
47	1.0323	476.745	45.7086	Bedrock-Topanga Formation	140	34	162.408	339.431	295.668	0	295.668	462.143	462.143

48	1.0323	349.123	47.102	Bedrock-Topanga Formation	140	34	130.792	273.355	197.707	0	197.707	338.466	338.466
49	1.0323	214.688	48.533	Bedrock-Topanga Formation	140	34	107.511	224.697	125.568	0	125.568	247.229	247.229
50	1.0323	72.8497	50.0057	Bedrock-Topanga Formation	140	34	88.1777	184.291	65.6631	0	65.6631	170.77	170.77

Global Minimum Query (janbu simplified) - Safety Factor: 1.91292

Slice Number	Width [ft]	Weight [lbs]	Angle of Slice Base [deg]	Base Material	Base Cohesion [psf]	Base Friction Angle [deg]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]	Base Vertical Stress [psf]	Effective Vertical Stress [psf]
1	0.621119	18.2531	-16.0962	Bedrock-Topanga Formation	125	25	77.995	149.198	51.8931	0	51.8931	29.3866	29.3866
2	0.621119	54.1247	-14.6354	Bedrock-Topanga Formation	125	25	92.4736	176.895	111.288	0	111.288	87.1396	87.1396
3	0.621119	88.7392	-13.1843	Bedrock-Topanga Formation	127.039	26.3175	110.015	210.451	168.641	0	168.641	142.869	142.869
4	0.621119	122.12	-11.7418	Bedrock-Topanga Formation	130.645	28.5757	132.095	252.688	224.069	0	224.069	196.613	196.613
5	0.621119	150.494	-10.3068	Bedrock-Topanga Formation	134.233	30.7299	154.181	294.935	270.332	0	270.332	242.293	242.293
6	0.621119	148.86	-8.87829	Bedrock-Topanga Formation	137.804	32.7828	161.205	308.373	264.845	0	264.845	239.663	239.663
7	0.621119	140.074	-7.45533	Bedrock-Topanga Formation	140	34	160.092	306.244	246.468	0	246.468	225.518	225.518
8	0.621119	130.119	-6.03699	Bedrock-Topanga Formation	140	34	152.751	292.2	225.645	0	225.645	209.491	209.491
9	0.621119	119.007	-4.62235	Bedrock-Topanga Formation	140	34	144.876	277.137	203.314	0	203.314	191.6	191.6
10	0.621119	115.874	-3.21053	Bedrock-Topanga Formation	140	34	141.772	271.198	194.509	0	194.509	186.556	186.556
11	0.621119	147.346	-1.80066	Bedrock-Topanga Formation	140	34	158.592	303.374	242.212	0	242.212	237.226	237.226
12	0.621119	181.299	-0.391879	Bedrock-Topanga Formation	140	34	176.535	337.698	293.1	0	293.1	291.892	291.892
13	0.621119	214.114	1.01666	Bedrock-Topanga Formation	140	34	193.528	370.203	341.29	0	341.29	344.724	344.724
14	0.621119	245.791	2.42582	Bedrock-Topanga Formation	140	34	209.59	400.929	386.844	0	386.844	395.723	395.723
15	0.621119	276.326	3.83645	Bedrock-Topanga Formation	140	34	224.741	429.912	429.814	0	429.814	444.884	444.884
16	0.621119	305.714	5.24941	Bedrock-Topanga Formation	140	34	238.997	457.182	470.241	0	470.241	492.2	492.2
17	0.621119	333.95	6.66558	Bedrock-Topanga Formation	140	34	252.37	482.763	508.167	0	508.167	537.66	537.66
18	0.621119	361.024	8.08586	Bedrock-Topanga Formation	140	34	264.87	506.676	543.62	0	543.62	581.249	581.249
19	0.621119	386.925	9.51116	Bedrock-Topanga Formation	140	34	276.508	528.937	576.624	0	576.624	622.951	622.951
20	0.621119	411.639	10.9424	Bedrock-Topanga Formation	140	34	287.288	549.559	607.196	0	607.196	662.74	662.74
21	0.621119	435.15	12.3807	Bedrock-Topanga Formation	140	34	297.216	568.55	635.352	0	635.352	700.594	700.594
22	0.621119	457.44	13.8269	Bedrock-Topanga Formation	140	34	306.293	585.914	661.096	0	661.096	736.481	736.481
23	0.621119	478.486	15.2821	Bedrock-Topanga Formation	140	34	314.52	601.652	684.427	0	684.427	770.365	770.365

24	0.621119	498.263	16.7475	Bedrock-Topanga Formation	140	34	321.895	615.759	705.342	0	705.342	802.206	802.206
25	0.621119	516.744	18.2243	Bedrock-Topanga Formation	140	34	328.414	628.229	723.83	0	723.83	831.961	831.961
26	0.621119	533.896	19.7138	Bedrock-Topanga Formation	140	34	334.07	639.049	739.871	0	739.871	859.576	859.576
27	0.621119	549.683	21.2172	Bedrock-Topanga Formation	140	34	338.856	648.204	753.442	0	753.442	884.993	884.993
28	0.621119	564.065	22.7362	Bedrock-Topanga Formation	140	34	342.759	655.671	764.514	0	764.514	908.148	908.148
29	0.621119	576.995	24.2722	Bedrock-Topanga Formation	140	34	345.768	661.427	773.048	0	773.048	928.966	928.966
30	0.621119	588.421	25.8271	Bedrock-Topanga Formation	140	34	347.866	665.439	778.995	0	778.995	947.362	947.362
31	0.621119	598.285	27.4027	Bedrock-Topanga Formation	140	34	349.032	667.67	782.304	0	782.304	963.245	963.245
32	0.621119	606.522	29.0011	Bedrock-Topanga Formation	140	34	349.245	668.078	782.908	0	782.908	976.506	976.506
33	0.621119	613.055	30.6246	Bedrock-Topanga Formation	140	34	348.479	666.612	780.734	0	780.734	987.026	987.026
34	0.621119	617.801	32.2759	Bedrock-Topanga Formation	140	34	346.702	663.213	775.695	0	775.695	994.666	994.666
35	0.621119	620.661	33.9578	Bedrock-Topanga Formation	140	34	343.879	657.813	767.69	0	767.69	999.271	999.271
36	0.621119	621.523	35.6737	Bedrock-Topanga Formation	140	34	339.97	650.335	756.604	0	756.604	1000.66	1000.66
37	0.621119	620.259	37.4274	Bedrock-Topanga Formation	140	34	334.927	640.688	742.3	0	742.3	998.624	998.624
38	0.621119	616.717	39.2232	Bedrock-Topanga Formation	140	34	328.694	628.766	724.625	0	724.625	992.923	992.923
39	0.621119	610.722	41.0663	Bedrock-Topanga Formation	140	34	321.209	614.447	703.397	0	703.397	983.272	983.272
40	0.621119	602.064	42.9626	Bedrock-Topanga Formation	140	34	312.395	597.587	678.4	0	678.4	969.333	969.333
41	0.621119	590.492	44.9195	Bedrock-Topanga Formation	140	34	302.165	578.017	649.387	0	649.387	950.703	950.703
42	0.621119	575.702	46.9455	Bedrock-Topanga Formation	140	34	290.412	555.535	616.056	0	616.056	926.892	926.892
43	0.621119	557.318	49.0516	Bedrock-Topanga Formation	140	34	277.011	529.899	578.049	0	578.049	897.294	897.294
44	0.621119	509.242	51.2513	Bedrock-Topanga Formation	140	34	251.699	481.481	506.266	0	506.266	819.891	819.891
45	0.621119	406.018	53.5621	Bedrock-Topanga Formation	140	34	205.526	393.154	375.316	0	375.316	653.699	653.699
46	0.621119	356.529	56.0075	Bedrock-Topanga Formation	140	34	180.963	346.168	305.656	0	305.656	574.021	574.021
47	0.621119	323.077	58.6196	Bedrock-Topanga Formation	140	34	162.6	311.04	253.577	0	253.577	520.163	520.163
48	0.621119	248.83	61.4454	Bedrock-Topanga Formation	140	34	130.131	248.931	161.496	0	161.496	400.625	400.625

49	0.621119	160.074	64.5582	Bedrock-Topanga Formation	140	34	94.2244	180.244	59.6639	0	59.6639	257.727	257.727
50	0.621119	56.3181	68.0847	Bedrock-Topanga Formation	140	34	56.0417	107.203	-48.6231	0	-48.6231	90.6774	90.6774

Section II Proposed topography - Curved PseudoStatic

Global Minimum Query (bishop simplified) - Safety Factor: 1.10057

Slice Number	Width [ft]	Weight [lbs]	Angle of Slice Base [deg]	Base Material	Base Cohesion [psf]	Base Friction Angle [deg]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]	Base Vertical Stress [psf]	Effective Vertical Stress [psf]
1	1.13258	1652.17	9.9698	Bedrock-Topanga Formation	140	34	0	0	-260.937	0	-260.937	-260.937	-260.937
2	1.13258	1701.05	10.7115	Bedrock-Topanga Formation	140	34	938.893	1033.32	1324.4	0	1324.4	1502	1502
3	1.13258	1747.86	11.4549	Bedrock-Topanga Formation	140	34	954.532	1050.53	1349.91	0	1349.91	1543.33	1543.33
4	1.13258	1792.58	12.2004	Bedrock-Topanga Formation	140	34	968.892	1066.33	1373.35	0	1373.35	1582.84	1582.84
5	1.13258	1835.21	12.9479	Bedrock-Topanga Formation	140	34	981.986	1080.74	1394.71	0	1394.71	1620.48	1620.48
6	1.13258	1875.72	13.6977	Bedrock-Topanga Formation	140	34	993.826	1093.78	1414.03	0	1414.03	1656.26	1656.26
7	1.13258	1914.1	14.4499	Bedrock-Topanga Formation	140	34	1004.42	1105.44	1431.32	0	1431.32	1690.14	1690.14
8	1.13258	1950.31	15.2046	Bedrock-Topanga Formation	140	34	1013.79	1115.74	1446.6	0	1446.6	1722.12	1722.12
9	1.13258	1984.34	15.9621	Bedrock-Topanga Formation	140	34	1021.93	1124.7	1459.88	0	1459.88	1752.18	1752.18
10	1.13258	2016.17	16.7224	Bedrock-Topanga Formation	140	34	1028.85	1132.33	1471.18	0	1471.18	1780.29	1780.29
11	1.13258	2045.77	17.4857	Bedrock-Topanga Formation	140	34	1034.57	1138.62	1480.51	0	1480.51	1806.43	1806.43
12	1.13258	2073.1	18.2523	Bedrock-Topanga Formation	140	34	1039.09	1143.59	1487.89	0	1487.89	1830.57	1830.57
13	1.13258	2098.15	19.0223	Bedrock-Topanga Formation	140	34	1042.41	1147.25	1493.31	0	1493.31	1852.7	1852.7
14	1.13258	2120.88	19.7959	Bedrock-Topanga Formation	140	34	1044.55	1149.6	1496.79	0	1496.79	1872.77	1872.77
15	1.13258	2092.37	20.5733	Bedrock-Topanga Formation	140	34	1024	1126.98	1463.26	0	1463.26	1847.6	1847.6
16	1.13258	1983.12	21.3546	Bedrock-Topanga Formation	140	34	968.385	1065.78	1372.52	0	1372.52	1751.14	1751.14
17	1.13258	1874.45	22.1401	Bedrock-Topanga Formation	140	34	913.768	1005.67	1283.4	0	1283.4	1655.19	1655.19
18	1.13258	1872	22.93	Bedrock-Topanga Formation	140	34	905.528	996.597	1269.96	0	1269.96	1653.03	1653.03
19	1.13258	1915.56	23.7246	Bedrock-Topanga Formation	140	34	916.914	1009.13	1288.54	0	1288.54	1691.5	1691.5
20	1.13258	1956.58	24.524	Bedrock-Topanga Formation	140	34	926.905	1020.12	1304.83	0	1304.83	1727.72	1727.72
21	1.13258	1994.98	25.3286	Bedrock-Topanga Formation	140	34	935.5	1029.58	1318.86	0	1318.86	1761.64	1761.64
22	1.13258	2030.74	26.1385	Bedrock-Topanga Formation	140	34	942.699	1037.51	1330.61	0	1330.61	1793.22	1793.22

23	1.13258	2063.78	26.9541	Bedrock-Topanga Formation	140	34	948.499	1043.89	1340.07	0	1340.07	1822.4	1822.4
24	1.13258	2094.05	27.7757	Bedrock-Topanga Formation	140	34	952.899	1048.73	1347.25	0	1347.25	1849.14	1849.14
25	1.13258	2121.5	28.6035	Bedrock-Topanga Formation	140	34	955.892	1052.03	1352.14	0	1352.14	1873.38	1873.38
26	1.13258	2146.04	29.4379	Bedrock-Topanga Formation	140	34	957.475	1053.77	1354.72	0	1354.72	1895.06	1895.06
27	1.13258	2167.62	30.2792	Bedrock-Topanga Formation	140	34	957.641	1053.95	1354.99	0	1354.99	1914.12	1914.12
28	1.13258	2186.15	31.1278	Bedrock-Topanga Formation	140	34	956.383	1052.57	1352.94	0	1352.94	1930.5	1930.5
29	1.13258	2201.56	31.984	Bedrock-Topanga Formation	140	34	953.691	1049.6	1348.55	0	1348.55	1944.11	1944.11
30	1.13258	2213.76	32.8483	Bedrock-Topanga Formation	140	34	949.557	1045.05	1341.8	0	1341.8	1954.88	1954.88
31	1.13258	2222.64	33.7211	Bedrock-Topanga Formation	140	34	943.97	1038.9	1332.68	0	1332.68	1962.73	1962.73
32	1.13258	2228.12	34.6029	Bedrock-Topanga Formation	140	34	936.917	1031.14	1321.17	0	1321.17	1967.58	1967.58
33	1.13258	2230.09	35.4942	Bedrock-Topanga Formation	140	34	928.385	1021.75	1307.25	0	1307.25	1969.32	1969.32
34	1.13258	2228.41	36.3954	Bedrock-Topanga Formation	140	34	918.359	1010.72	1290.89	0	1290.89	1967.85	1967.85
35	1.13258	2222.98	37.3072	Bedrock-Topanga Formation	140	34	906.822	998.021	1272.07	0	1272.07	1963.06	1963.06
36	1.13258	2152.2	38.2303	Bedrock-Topanga Formation	140	34	871.328	958.957	1214.15	0	1214.15	1900.56	1900.56
37	1.13258	1986.65	39.1652	Bedrock-Topanga Formation	140	34	802.025	882.685	1101.07	0	1101.07	1754.38	1754.38
38	1.13258	1945.61	40.1127	Bedrock-Topanga Formation	140	34	778.337	856.614	1062.42	0	1062.42	1718.14	1718.14
39	1.13258	1822.3	41.0736	Bedrock-Topanga Formation	140	34	725.795	798.788	976.694	0	976.694	1609.26	1609.26
40	1.13258	1693.9	42.0487	Bedrock-Topanga Formation	140	34	672.337	739.954	889.466	0	889.466	1495.88	1495.88
41	1.13258	1560.72	43.0391	Bedrock-Topanga Formation	140	34	618.149	680.316	801.054	0	801.054	1378.28	1378.28
42	1.13258	1422.51	44.0457	Bedrock-Topanga Formation	140	34	563.235	619.879	711.448	0	711.448	1256.23	1256.23
43	1.13258	1279.02	45.0698	Bedrock-Topanga Formation	140	34	507.602	558.652	620.676	0	620.676	1129.52	1129.52
44	1.13258	1129.95	46.1125	Bedrock-Topanga Formation	140	34	451.263	496.646	528.749	0	528.749	997.885	997.885
45	1.13258	974.999	47.1754	Bedrock-Topanga Formation	140	34	418.828	460.95	475.828	0	475.828	927.732	927.732
46	1.13258	813.796	48.26	Bedrock-Topanga Formation	140	34	372.857	410.355	400.818	0	400.818	818.716	818.716
47	1.13258	645.941	49.3681	Bedrock-Topanga Formation	140	34	313.916	345.487	304.646	0	304.646	670.487	670.487

48	1.13258	470.975	50.5019	Bedrock-Topanga Formation	140	34	254.333	279.911	207.427	0	207.427	515.978	515.978
49	1.13258	288.379	51.6635	Bedrock-Topanga Formation	140	34	194.145	213.67	109.22	0	109.22	354.729	354.729
50	1.13258	97.5515	52.8558	Bedrock-Topanga Formation	140	34	133.4	146.816	10.1054	0	10.1054	186.209	186.209

Global Minimum Query (janbu simplified) - Safety Factor: 0.957984

Slice Number	Width [ft]	Weight [lbs]	Angle of Slice Base [deg]	Base Material	Base Cohesion [psf]	Base Friction Angle [deg]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]	Base Vertical Stress [psf]	Effective Vertical Stress [psf]
1	2.42634	309.271	-41.2039	Bedrock-Topanga Formation	140	34	614.869	589.035	665.722	0	665.722	127.37	127.37
2	2.42634	902.669	-38.8121	Bedrock-Topanga Formation	140	34	940.825	901.295	1128.67	0	1128.67	371.897	371.897
3	2.42634	1448.15	-36.4983	Bedrock-Topanga Formation	140	34	1182.11	1132.44	1471.35	0	1471.35	596.693	596.693
4	2.52298	2059.65	-34.2082	Bedrock-Topanga Formation	140	34	1307.73	1252.78	1705.21	55.4468	1649.76	816.202	760.756
5	2.52298	2600.39	-31.9353	Bedrock-Topanga Formation	140	34	1350.36	1293.62	1872.21	161.906	1710.31	1030.53	868.628
6	2.52298	3096.01	-29.7174	Bedrock-Topanga Formation	140	34	1382.92	1324.82	2016.36	259.784	1756.57	1226.99	967.208
7	2.52298	3549.57	-27.5476	Bedrock-Topanga Formation	138.869	33.3773	1359.7	1302.57	2116.02	349.658	1766.37	1406.77	1057.12
8	2.52298	3963.6	-25.4198	Bedrock-Topanga Formation	133.55	30.3266	1176.19	1126.78	2129.9	432.012	1697.89	1570.91	1138.89
9	2.52298	4340.25	-23.3291	Bedrock-Topanga Formation	128.323	27.1318	1017.48	974.734	2159.02	507.254	1651.77	1720.21	1212.96
10	2.52298	4681.33	-21.2708	Bedrock-Topanga Formation	125	25	929.521	890.466	2217.27	575.729	1641.55	1855.42	1279.69
11	2.52298	4988.39	-19.2409	Bedrock-Topanga Formation	125	25	942.589	902.985	2306.13	637.731	1668.4	1977.13	1339.4
12	2.52298	5262.73	-17.2359	Bedrock-Topanga Formation	125	25	951.989	911.99	2381.21	693.51	1687.7	2085.87	1392.36
13	2.52298	5505.48	-15.2524	Bedrock-Topanga Formation	125	25	957.992	917.741	2443.32	743.278	1700.04	2182.1	1438.82
14	2.52298	5717.58	-13.2875	Bedrock-Topanga Formation	126.781	26.1524	1013.03	970.464	2505.4	787.214	1718.19	2266.16	1478.95
15	2.52298	5899.83	-11.3385	Bedrock-Topanga Formation	131.654	29.1905	1154.75	1106.23	2569.95	825.471	1744.48	2338.4	1512.93
16	2.52298	6052.88	-9.4026	Bedrock-Topanga Formation	136.494	32.0399	1288.52	1234.38	2612.44	858.173	1754.27	2399.07	1540.89
17	2.52298	6203.24	-7.47753	Bedrock-Topanga Formation	140	34	1381.53	1323.48	2640	885.422	1754.58	2458.67	1573.25
18	2.52298	10105.9	-5.56092	Bedrock-Topanga Formation	140	34	2488.28	2383.73	4247.77	921.296	3326.48	4005.51	3084.21
19	2.52298	10567.4	-3.65055	Bedrock-Topanga Formation	140	34	2528.58	2422.34	4349.78	966.078	3383.7	4188.46	3222.38
20	2.52298	11001.3	-1.74424	Bedrock-Topanga Formation	140	34	2563.23	2455.53	4438.49	1005.59	3432.9	4360.44	3354.85
21	2.52298	11407.7	0.160147	Bedrock-Topanga Formation	140	34	2592.44	2483.52	4514.3	1039.87	3474.43	4521.54	3481.67
22	2.52298	11786.5	2.06471	Bedrock-Topanga Formation	140	34	2616.42	2506.49	4577.37	1068.9	3508.47	4671.7	3602.8
23	2.52298	12137.8	3.97155	Bedrock-Topanga Formation	140	34	2635.29	2524.57	4627.99	1092.7	3535.29	4810.95	3718.25

24	2.52298	12320.4	5.88282	Bedrock-Topanga Formation	140	34	2612.52	2502.75	4614.14	1111.21	3502.93	4883.33	3772.12
25	2.52298	12105.9	7.80069	Bedrock-Topanga Formation	140	34	2492.47	2387.75	4456.83	1124.42	3332.41	4798.29	3673.87
26	2.52298	12427.1	9.72741	Bedrock-Topanga Formation	140	34	2513.66	2408.05	4494.77	1132.23	3362.54	4925.67	3793.44
27	2.52298	12829.4	11.6653	Bedrock-Topanga Formation	140	34	2556.1	2448.7	4557.36	1134.58	3422.78	5085.09	3950.51
28	2.52298	13202.3	13.6169	Bedrock-Topanga Formation	140	34	2591.95	2483.05	4605.07	1131.36	3473.71	5232.94	4101.58
29	2.52298	13545.2	15.5847	Bedrock-Topanga Formation	140	34	2621.27	2511.13	4637.77	1122.43	3515.34	5368.89	4246.46
30	2.52298	13857.4	17.5715	Bedrock-Topanga Formation	140	34	2644.04	2532.95	4655.32	1107.64	3547.68	5492.61	4384.97
31	2.52298	14137.8	19.5805	Bedrock-Topanga Formation	140	34	2660.25	2548.48	4657.54	1086.81	3570.73	5603.79	4516.98
32	2.52298	14385.3	21.6149	Bedrock-Topanga Formation	140	34	2669.83	2557.65	4644.03	1059.72	3584.31	5701.89	4642.17
33	2.52298	14583.2	23.6784	Bedrock-Topanga Formation	140	34	2669.38	2557.22	4609.79	1026.1	3583.69	5780.36	4754.26
34	2.52298	14311.1	25.775	Bedrock-Topanga Formation	140	34	2571.75	2463.7	4430.7	985.67	3445.03	5672.55	4686.88
35	2.52298	14048.2	27.9095	Bedrock-Topanga Formation	140	34	2481	2376.76	4254.22	938.06	3316.16	5568.36	4630.3
36	2.52298	13642.5	30.087	Bedrock-Topanga Formation	140	34	2366.55	2267.12	4036.44	882.854	3153.58	5407.56	4524.71
37	2.52298	13194.3	32.3136	Bedrock-Topanga Formation	140	34	2254.73	2160	3814.33	819.554	2994.78	5240.47	4420.91
38	2.52298	12700.4	34.5965	Bedrock-Topanga Formation	140	34	2177.28	2085.8	3632.33	747.564	2884.77	5134.14	4386.58
39	2.52298	12157	36.9442	Bedrock-Topanga Formation	140	34	2053.21	1966.94	3374.73	666.167	2708.56	4918.79	4252.63
40	2.52298	11559.6	39.3667	Bedrock-Topanga Formation	140	34	1925.76	1844.85	3102.03	574.483	2527.55	4682	4107.51
41	2.52298	10902.4	41.8767	Bedrock-Topanga Formation	140	34	1794.58	1719.18	2812.65	471.425	2341.23	4421.52	3950.09
42	2.52298	10178.2	44.4898	Bedrock-Topanga Formation	140	34	1659.19	1589.48	2504.57	355.623	2148.95	4134.47	3778.85
43	2.52298	9377.68	47.2262	Bedrock-Topanga Formation	140	34	1519.08	1455.25	2175.24	225.307	1949.94	3817.2	3591.89
44	2.52298	8488.58	50.1126	Bedrock-Topanga Formation	140	34	1373.52	1315.81	1821.35	78.1316	1743.21	3464.79	3386.66
45	2.29299	6886.45	53.0361	Bedrock-Topanga Formation	140	34	1204.45	1153.84	1503.08	0	1503.08	3103.53	3103.53
46	2.29299	6032.35	56.0233	Bedrock-Topanga Formation	140	34	1011.87	969.352	1229.57	0	1229.57	2731.04	2731.04
47	2.29299	5066.88	59.2646	Bedrock-Topanga Formation	140	34	811.554	777.456	945.067	0	945.067	2309.96	2309.96
48	2.29299	3954.26	62.8543	Bedrock-Topanga Formation	140	34	602.936	577.603	648.774	0	648.774	1824.7	1824.7

49	2.29299	2630.36	66.9621	Bedrock-Topanga Formation	140	34	385.716	369.51	340.263	0	340.263	1247.29	1247.29
50	2.29299	952.564	71.9696	Bedrock-Topanga Formation	140	34	160.953	154.191	21.0384	0	21.0384	515.51	515.51

Section II Proposed topography - Block Static

Global Minimum Query (bishop simplified) - Safety Factor: 2.01668

Slice Number	Width [ft]	Weight [lbs]	Angle of Slice Base [deg]	Base Material	Base Cohesion [psf]	Base Friction Angle [deg]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]	Base Vertical Stress [psf]	Effective Vertical Stress [psf]
1	1.6285	159.121	-45	Bedrock-Topanga Formation	140	34	153.43	309.42	251.175	0	251.175	97.745	97.745
2	1.6285	477.363	-45	Bedrock-Topanga Formation	140	34	251.65	507.498	544.839	0	544.839	293.189	293.189
3	1.6285	795.605	-45	Bedrock-Topanga Formation	140	34	349.87	705.575	838.502	0	838.502	488.632	488.632
4	2.28091	1436	-17.5615	Bedrock-Topanga Formation	125	25	223.948	451.631	700.465	0	700.465	629.59	629.59
5	1.9599	1398.28	-17.5615	Bedrock-Topanga Formation	125	25	239.67	483.337	789.312	20.8535	768.459	713.462	692.608
6	1.9599	1557.26	-17.5615	Bedrock-Topanga Formation	125	25	249.499	503.16	873.541	62.5744	810.966	794.58	732.005
7	1.9599	1716.25	-17.5615	Bedrock-Topanga Formation	125	25	259.328	522.982	957.769	104.295	853.474	875.697	771.402
8	1.9599	1875.23	-17.5615	Bedrock-Topanga Formation	125	25	269.157	542.804	1042	146.016	895.982	956.815	810.799
9	1.9599	2034.22	-17.5615	Bedrock-Topanga Formation	125	25	278.986	562.626	1126.23	187.737	938.495	1037.94	850.201
10	1.9599	2193.2	-17.5615	Bedrock-Topanga Formation	125	25	288.815	582.448	1210.46	229.458	981.002	1119.06	889.598
11	1.9599	2352.19	-17.5615	Bedrock-Topanga Formation	125	25	298.645	602.271	1294.69	271.179	1023.51	1200.17	928.995
12	1.9599	2511.17	-17.5615	Bedrock-Topanga Formation	125	25	308.474	622.093	1378.92	312.9	1066.02	1281.29	968.392
13	1.9599	2670.15	-17.5615	Bedrock-Topanga Formation	125	25	318.303	641.915	1463.15	354.621	1108.53	1362.41	1007.79
14	1.9599	2829.14	-17.5615	Bedrock-Topanga Formation	125	25	328.132	661.737	1547.38	396.342	1151.04	1443.53	1047.19
15	1.9599	2988.12	-17.5615	Bedrock-Topanga Formation	125	25	337.961	681.559	1631.61	438.063	1193.55	1524.65	1086.59
16	1.9599	3147.11	-17.5615	Bedrock-Topanga Formation	125	25	347.79	701.382	1715.84	479.784	1236.05	1605.77	1125.98
17	1.9599	4596.51	-17.5615	Bedrock-Topanga Formation	125	25	953.984	1923.88	4379.21	521.505	3857.7	4077.29	3555.79
18	1.9599	6512.44	-17.5615	Bedrock-Topanga Formation	125	25	750.253	1513.02	3560.33	583.706	2976.62	3322.89	2739.18
19	1.91139	6555.27	23.3596	Bedrock-Topanga Formation	140	34	887.007	1788.81	3046.39	601.926	2444.47	3429.49	2827.57
20	1.91139	6576.8	23.3596	Bedrock-Topanga Formation	140	34	898.249	1811.48	3052.79	574.728	2478.07	3440.75	2866.02
21	1.91139	6598.32	23.3596	Bedrock-Topanga Formation	140	34	909.485	1834.14	3059.2	547.53	2511.67	3452.01	2904.48
22	1.91139	6619.84	23.3596	Bedrock-Topanga Formation	140	34	920.726	1856.81	3065.61	520.332	2545.28	3463.27	2942.94

23	1.91139	6641.37	23.3596	Bedrock-Topanga Formation	140	34	931.962	1879.47	3072.01	493.135	2578.88	3474.53	2981.39
24	1.91139	6662.89	23.3596	Bedrock-Topanga Formation	140	34	943.204	1902.14	3078.42	465.937	2612.48	3485.79	3019.85
25	1.91139	6682.01	23.3596	Bedrock-Topanga Formation	140	34	954.078	1924.07	3083.72	438.739	2644.99	3495.79	3057.05
26	1.91139	6481.37	23.3596	Bedrock-Topanga Formation	140	34	931.348	1878.23	2988.57	411.541	2577.03	3390.82	2979.28
27	1.91139	6205.8	23.3596	Bedrock-Topanga Formation	140	34	897.163	1809.29	2859.17	384.343	2474.82	3246.65	2862.31
28	1.91139	6273.76	23.3596	Bedrock-Topanga Formation	140	34	915.5	1846.27	2886.8	357.145	2529.65	3282.2	2925.06
29	1.91139	6389.23	23.3596	Bedrock-Topanga Formation	140	34	941.106	1897.91	2936.15	329.947	2606.2	3342.61	3012.67
30	1.91139	6504.7	23.3596	Bedrock-Topanga Formation	140	34	966.708	1949.54	2985.5	302.749	2682.75	3403.02	3100.27
31	1.91139	6620.17	23.3596	Bedrock-Topanga Formation	140	34	992.309	2001.17	3034.85	275.551	2759.3	3463.43	3187.88
32	1.67162	5773.74	46.1505	Bedrock-Topanga Formation	140	34	854.171	1722.59	2564.58	218.292	2346.29	3453.77	3235.47
33	1.67162	5640.79	46.1505	Bedrock-Topanga Formation	140	34	856.105	1726.49	2483.04	130.973	2352.07	3374.24	3243.26
34	1.67162	5507.85	46.1505	Bedrock-Topanga Formation	140	34	858.039	1730.39	2401.5	43.6529	2357.85	3294.71	3251.06
35	2.02449	6509.67	46.1505	Bedrock-Topanga Formation	140	34	849.158	1712.48	2331.3	0	2331.3	3215.26	3215.26
36	2.02449	6348.99	46.1505	Bedrock-Topanga Formation	140	34	829.467	1672.77	2272.43	0	2272.43	3135.9	3135.9
37	2.02449	6188.3	46.1505	Bedrock-Topanga Formation	140	34	809.781	1633.07	2213.56	0	2213.56	3056.54	3056.54
38	2.02449	5961.73	46.1505	Bedrock-Topanga Formation	140	34	782.013	1577.07	2130.55	0	2130.55	2944.62	2944.62
39	2.02449	5472.98	46.1505	Bedrock-Topanga Formation	140	34	722.127	1456.3	1951.49	0	1951.49	2703.22	2703.22
40	2.02449	5063.9	46.1505	Bedrock-Topanga Formation	140	34	672.001	1355.21	1801.62	0	1801.62	2501.16	2501.16
41	2.02449	4577.8	46.1505	Bedrock-Topanga Formation	140	34	612.432	1235.08	1623.53	0	1623.53	2261.06	2261.06
42	2.02449	4091.7	46.1505	Bedrock-Topanga Formation	140	34	552.869	1114.96	1445.44	0	1445.44	2020.97	2020.97
43	2.02449	3605.59	46.1505	Bedrock-Topanga Formation	140	34	502.026	1012.43	1293.42	0	1293.42	1816.03	1816.03
44	2.02449	3119.49	46.1505	Bedrock-Topanga Formation	140	34	458.547	924.742	1163.43	0	1163.43	1640.77	1640.77
45	2.02449	2633.39	46.1505	Bedrock-Topanga Formation	140	34	398.982	804.619	985.338	0	985.338	1400.67	1400.67
46	2.07718	2207.3	45	Bedrock-Topanga Formation	140	34	343.402	692.532	819.161	0	819.161	1162.56	1162.56
47	2.07718	1716.79	45	Bedrock-Topanga Formation	140	34	284.22	573.18	642.216	0	642.216	926.436	926.436

48	2.07718	1226.28	45	Bedrock-Topanga Formation	140	34	225.037	453.828	465.268	0	465.268	690.305	690.305
49	2.07718	735.767	45	Bedrock-Topanga Formation	140	34	165.855	334.476	288.322	0	288.322	454.177	454.177
50	2.07718	245.256	45	Bedrock-Topanga Formation	140	34	106.672	215.123	111.375	0	111.375	218.047	218.047

Global Minimum Query (janbu simplified) - Safety Factor: 1.84885

Slice Number	Width [ft]	Weight [lbs]	Angle of Slice Base [deg]	Base Material	Base Cohesion [psf]	Base Friction Angle [deg]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]	Base Vertical Stress [psf]	Effective Vertical Stress [psf]
1	1.94095	226.036	-45	Bedrock-Topanga Formation	140	34	186.035	343.95	302.369	0	302.369	116.334	116.334
2	1.70552	456.369	-18.7163	Bedrock-Topanga Formation	125	25	147.712	273.097	317.595	0	317.595	267.55	267.55
3	1.70552	574.629	-18.7163	Bedrock-Topanga Formation	125	25	166.833	308.449	393.408	0	393.408	336.885	336.885
4	1.70552	692.888	-18.7163	Bedrock-Topanga Formation	125	25	185.955	343.802	469.221	0	469.221	406.22	406.22
5	1.70552	811.148	-18.7163	Bedrock-Topanga Formation	125	25	205.076	379.154	545.035	0	545.035	475.556	475.556
6	1.70552	929.408	-18.7163	Bedrock-Topanga Formation	125	25	224.197	414.506	620.848	0	620.848	544.89	544.89
7	1.70552	1047.67	-18.7163	Bedrock-Topanga Formation	125	25	243.318	449.859	696.661	0	696.661	614.225	614.225
8	1.79298	1234.75	-18.7163	Bedrock-Topanga Formation	125	25	258.223	477.416	776.084	20.3254	755.759	688.599	668.273
9	1.79298	1377.13	-18.7163	Bedrock-Topanga Formation	125	25	268.908	497.171	859.112	60.9902	798.122	768.007	707.017
10	1.79298	1519.52	-18.7163	Bedrock-Topanga Formation	125	25	279.593	516.926	942.146	101.655	840.491	847.42	745.765
11	1.79298	1661.9	-18.7163	Bedrock-Topanga Formation	125	25	290.278	536.681	1025.17	142.32	882.854	926.828	784.508
12	1.79298	1804.29	-18.7163	Bedrock-Topanga Formation	125	25	300.963	556.436	1108.2	182.985	925.217	1006.24	823.251
13	1.79298	1946.67	-18.7163	Bedrock-Topanga Formation	125	25	311.648	576.191	1191.23	223.649	967.581	1085.64	861.995
14	1.79298	2089.06	-18.7163	Bedrock-Topanga Formation	125	25	322.334	595.947	1274.26	264.314	1009.95	1165.06	900.743
15	1.79298	2231.44	-18.7163	Bedrock-Topanga Formation	125	25	333.019	615.702	1357.29	304.979	1052.31	1244.47	939.486
16	1.79298	2373.83	-18.7163	Bedrock-Topanga Formation	125	25	343.704	635.457	1440.32	345.644	1094.68	1323.87	978.23
17	1.79298	4619.94	-18.7163	Bedrock-Topanga Formation	125	25	1231.64	2277.11	5007.04	391.826	4615.21	4589.76	4197.94
18	1.79298	5496.81	-18.7163	Bedrock-Topanga Formation	125	25	794.548	1469	3334.75	452.54	2882.21	3065.56	2613.02
19	1.79298	5837.85	-18.7163	Bedrock-Topanga Formation	125	25	830.251	1535.01	3537.04	513.255	3023.79	3255.75	2742.5
20	1.7517	5843.97	31.2932	Bedrock-Topanga Formation	140	34	902.556	1668.69	2787.91	521.533	2266.38	3336.53	2815
21	1.7517	5791.86	31.2932	Bedrock-Topanga Formation	140	34	906.861	1676.65	2755.55	477.376	2278.18	3306.78	2829.41
22	1.7517	5739.76	31.2932	Bedrock-Topanga Formation	140	34	911.166	1684.61	2723.19	433.218	2289.97	3277.04	2843.82
23	1.7517	5687.65	31.2932	Bedrock-Topanga Formation	140	34	915.466	1692.56	2690.83	389.061	2301.77	3247.3	2858.23

24	1.7517	5635.54	31.2932	Bedrock-Topanga Formation	140	34	919.772	1700.52	2658.47	344.903	2313.57	3217.55	2872.65
25	1.7517	5583.44	31.2932	Bedrock-Topanga Formation	140	34	924.077	1708.48	2626.11	300.746	2325.36	3187.81	2887.06
26	1.7517	5451.23	31.2932	Bedrock-Topanga Formation	140	34	914.725	1691.19	2556.32	256.588	2299.73	3112.33	2855.74
27	1.7517	5104.1	31.2932	Bedrock-Topanga Formation	140	34	868.729	1606.15	2386.09	212.431	2173.66	2914.14	2701.71
28	1.7517	4941.84	31.2932	Bedrock-Topanga Formation	140	34	854.255	1579.39	2302.25	168.273	2133.98	2821.51	2653.24
29	1.7517	4968.64	31.2932	Bedrock-Topanga Formation	140	34	872.012	1612.22	2306.76	124.116	2182.65	2836.81	2712.7
30	1.98896	5566.55	45.7372	Bedrock-Topanga Formation	140	34	784.634	1450.67	1994.17	51.0151	1943.15	2799.25	2748.24
31	1.76234	4794.22	45.7372	Bedrock-Topanga Formation	140	34	777.375	1437.25	1923.26	0	1923.26	2720.9	2720.9
32	1.76234	4678.02	45.7372	Bedrock-Topanga Formation	140	34	759.872	1404.89	1875.28	0	1875.28	2654.96	2654.96
33	1.76234	4561.82	45.7372	Bedrock-Topanga Formation	140	34	742.364	1372.52	1827.29	0	1827.29	2589	2589
34	1.76234	4445.62	45.7372	Bedrock-Topanga Formation	140	34	724.861	1340.16	1779.3	0	1779.3	2523.06	2523.06
35	1.76234	4329.41	45.7372	Bedrock-Topanga Formation	140	34	707.353	1307.79	1731.32	0	1731.32	2457.11	2457.11
36	1.76234	4213.21	45.7372	Bedrock-Topanga Formation	140	34	689.845	1275.42	1683.33	0	1683.33	2391.16	2391.16
37	1.76234	4097.01	45.7372	Bedrock-Topanga Formation	140	34	672.342	1243.06	1635.35	0	1635.35	2325.22	2325.22
38	1.76234	3980.81	45.7372	Bedrock-Topanga Formation	140	34	654.834	1210.69	1587.36	0	1587.36	2259.27	2259.27
39	1.76234	3850.47	45.7372	Bedrock-Topanga Formation	140	34	635.195	1174.38	1533.54	0	1533.54	2185.29	2185.29
40	1.76234	3447.59	45.7372	Bedrock-Topanga Formation	140	34	574.502	1062.17	1367.17	0	1367.17	1956.65	1956.65
41	1.68184	3054.86	45	Bedrock-Topanga Formation	140	34	541.107	1000.43	1275.64	0	1275.64	1816.74	1816.74
42	1.68184	2733.3	45	Bedrock-Topanga Formation	140	34	489.989	905.917	1135.52	0	1135.52	1625.51	1625.51
43	1.68184	2411.73	45	Bedrock-Topanga Formation	140	34	438.872	811.409	995.406	0	995.406	1434.28	1434.28
44	1.68184	2090.17	45	Bedrock-Topanga Formation	140	34	387.755	716.9	855.291	0	855.291	1243.05	1243.05
45	1.68184	1768.6	45	Bedrock-Topanga Formation	140	34	341.903	632.128	729.61	0	729.61	1071.51	1071.51
46	1.68184	1447.04	45	Bedrock-Topanga Formation	140	34	312.255	577.313	648.343	0	648.343	960.599	960.599
47	1.68184	1125.48	45	Bedrock-Topanga Formation	140	34	261.137	482.804	508.229	0	508.229	769.366	769.366
48	1.68184	803.911	45	Bedrock-Topanga Formation	140	34	210.02	388.296	368.114	0	368.114	578.134	578.134

49	1.68184	482.347	45	Bedrock-Topanga Formation	140	34	158.903	293.788	227.999	0	227.999	386.902	386.902
50	1.68184	160.782	45	Bedrock-Topanga Formation	140	34	107.785	199.279	87.8848	0	87.8848	195.67	195.67

Section II Proposed topography - Block , Pseudostatic

Global Minimum Query (bishop simplified) - Safety Factor: 1.12876

Slice Number	Width [ft]	Weight [lbs]	Angle of Slice Base [deg]	Base Material	Base Cohesion [psf]	Base Friction Angle [deg]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]	Base Vertical Stress [psf]	Effective Vertical Stress [psf]
1	1.55543	145.162	-45	Bedrock-Topanga Formation	140	34	448.474	506.22	542.944	0	542.944	94.4697	94.4697
2	1.55543	435.485	-45	Bedrock-Topanga Formation	140	34	726.683	820.251	1008.51	0	1008.51	281.831	281.831
3	2.29403	934.498	-13.8977	Bedrock-Topanga Formation	125.256	25.1669	312.839	353.12	484.963	0	484.963	407.556	407.556
4	2.29403	1090.75	-13.8977	Bedrock-Topanga Formation	125.256	25.1669	344.457	388.809	560.923	0	560.923	475.693	475.693
5	2.29403	1247.01	-13.8977	Bedrock-Topanga Formation	125.256	25.1669	376.076	424.499	636.879	0	636.879	543.826	543.826
6	2.29403	1403.27	-13.8977	Bedrock-Topanga Formation	125.256	25.1669	407.693	460.188	712.835	0	712.835	611.958	611.958
7	2.06453	1402.26	-13.8977	Bedrock-Topanga Formation	125.256	25.1669	439.033	495.563	788.124	0	788.124	679.493	679.493
8	2.06453	1540.42	-13.8977	Bedrock-Topanga Formation	125.256	25.1669	470.096	530.625	862.748	0	862.748	746.431	746.431
9	2.06453	1678.57	-13.8977	Bedrock-Topanga Formation	125.256	25.1669	501.158	565.687	937.373	0	937.373	813.37	813.37
10	2.06453	1816.72	-13.8977	Bedrock-Topanga Formation	125.256	25.1669	532.22	600.749	1011.99	0	1011.99	880.304	880.304
11	2.06453	1954.87	-13.8977	Bedrock-Topanga Formation	125.256	25.1669	563.283	635.811	1086.62	0	1086.62	947.242	947.242
12	2.06453	2093.02	-13.8977	Bedrock-Topanga Formation	125.256	25.1669	594.345	670.873	1161.24	0	1161.24	1014.18	1014.18
13	2.06453	2231.18	-13.8977	Bedrock-Topanga Formation	125.256	25.1669	625.408	705.935	1235.86	0	1235.86	1081.11	1081.11
14	2.06453	3963.8	-13.8977	Bedrock-Topanga Formation	125.256	25.1669	1622.53	1831.45	3631.28	0	3631.28	3229.82	3229.82
15	2.06453	5750.04	-13.8977	Bedrock-Topanga Formation	125.256	25.1669	1416.6	1599	3136.57	0	3136.57	2786.05	2786.05
16	2.06453	6151.56	-13.8977	Bedrock-Topanga Formation	125.256	25.1669	1506.87	1700.9	3353.45	0	3353.45	2980.6	2980.6
17	2.06453	6553.09	-13.8977	Bedrock-Topanga Formation	125.256	25.1669	1597.16	1802.81	3570.33	0	3570.33	3175.14	3175.14
18	1.97222	6428.76	29.6284	Bedrock-Topanga Formation	140	34	1545.35	1744.33	2378.52	0	2378.52	3257.41	3257.41
19	1.97222	6382.49	29.6284	Bedrock-Topanga Formation	140	34	1534.9	1732.53	2361.02	0	2361.02	3233.96	3233.96
20	1.97222	6336.21	29.6284	Bedrock-Topanga Formation	140	34	1524.43	1720.72	2343.51	0	2343.51	3210.51	3210.51
21	1.97222	6289.94	29.6284	Bedrock-Topanga Formation	140	34	1513.98	1708.92	2326.02	0	2326.02	3187.07	3187.07
22	1.97222	6179.04	29.6284	Bedrock-Topanga Formation	140	34	1488.92	1680.63	2284.07	0	2284.07	3130.87	3130.87

23	1.97222	5779.43	29.6284	Bedrock-Topanga Formation	140	34	1398.61	1578.69	2132.95	0	2132.95	2928.39	2928.39
24	1.97222	5614.99	29.6284	Bedrock-Topanga Formation	140	34	1361.45	1536.75	2070.76	0	2070.76	2845.06	2845.06
25	1.97222	5668.74	29.6284	Bedrock-Topanga Formation	140	34	1373.59	1550.45	2091.09	0	2091.09	2872.29	2872.29
26	1.76547	5095.23	34.6576	Bedrock-Topanga Formation	140	34	1307.21	1475.53	1980.01	0	1980.01	2883.74	2883.74
27	1.76547	5088.62	34.6576	Bedrock-Topanga Formation	140	34	1305.63	1473.74	1977.36	0	1977.36	2879.99	2879.99
28	2.08219	6003.56	34.6576	Bedrock-Topanga Formation	140	34	1306.05	1474.22	1978.06	0	1978.06	2880.99	2880.99
29	2.08219	6015.5	34.6576	Bedrock-Topanga Formation	140	34	1308.47	1476.95	1982.11	0	1982.11	2886.71	2886.71
30	2.08219	6027.43	34.6576	Bedrock-Topanga Formation	140	34	1310.9	1479.69	1986.17	0	1986.17	2892.44	2892.44
31	2.08219	6039.37	34.6576	Bedrock-Topanga Formation	140	34	1313.32	1482.42	1990.22	0	1990.22	2898.17	2898.17
32	2.08219	6051.31	34.6576	Bedrock-Topanga Formation	140	34	1315.74	1485.16	1994.28	0	1994.28	2903.91	2903.91
33	2.08219	6063.25	34.6576	Bedrock-Topanga Formation	140	34	1318.16	1487.89	1998.33	0	1998.33	2909.63	2909.63
34	2.08219	5939.88	34.6576	Bedrock-Topanga Formation	140	34	1293.13	1459.63	1956.44	0	1956.44	2850.43	2850.43
35	2.08219	5656.83	34.6576	Bedrock-Topanga Formation	140	34	1235.69	1394.8	1860.31	0	1860.31	2714.59	2714.59
36	2.08219	5364.66	34.6576	Bedrock-Topanga Formation	140	34	1176.4	1327.87	1761.09	0	1761.09	2574.38	2574.38
37	2.08219	5032.36	34.6576	Bedrock-Topanga Formation	140	34	1108.96	1251.75	1648.24	0	1648.24	2414.91	2414.91
38	2.08219	4700.07	34.6576	Bedrock-Topanga Formation	140	34	1041.52	1175.63	1535.39	0	1535.39	2255.43	2255.43
39	2.08219	4367.77	34.6576	Bedrock-Topanga Formation	140	34	1001.68	1130.66	1468.71	0	1468.71	2161.21	2161.21
40	2.08219	4035.48	34.6576	Bedrock-Topanga Formation	140	34	948.909	1071.09	1380.4	0	1380.4	2036.42	2036.42
41	2.08219	3703.18	34.6576	Bedrock-Topanga Formation	140	34	881.473	994.972	1267.55	0	1267.55	1876.95	1876.95
42	2.08219	3370.88	34.6576	Bedrock-Topanga Formation	140	34	814.038	918.854	1154.7	0	1154.7	1717.48	1717.48
43	2.08219	3038.59	34.6576	Bedrock-Topanga Formation	140	34	746.603	842.736	1041.85	0	1041.85	1558	1558
44	2.08219	2706.29	34.6576	Bedrock-Topanga Formation	140	34	679.167	766.617	928.997	0	928.997	1398.53	1398.53
45	2.08219	2373.99	34.6576	Bedrock-Topanga Formation	140	34	611.732	690.499	816.148	0	816.148	1239.06	1239.06
46	2.08219	2041.7	34.6576	Bedrock-Topanga Formation	140	34	544.297	614.381	703.299	0	703.299	1079.59	1079.59
47	2.08219	1709.4	34.6576	Bedrock-Topanga Formation	140	34	476.862	538.263	590.45	0	590.45	920.124	920.124

48	2.08219	1377.11	34.6576	Bedrock-Topanga Formation	140	34	409.426	462.144	477.597	0	477.597	760.649	760.649
49	2.55787	1115.7	45	Bedrock-Topanga Formation	140	34	277.93	313.716	257.545	0	257.545	535.475	535.475
50	2.55787	371.9	45	Bedrock-Topanga Formation	140	34	169.265	191.059	75.6984	0	75.6984	244.963	244.963

Global Minimum Query (janbu simplified) - Safety Factor: 1.01902

Slice Number	Width [ft]	Weight [lbs]	Angle of Slice Base [deg]	Base Material	Base Cohesion [psf]	Base Friction Angle [deg]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]	Base Vertical Stress [psf]	Effective Vertical Stress [psf]
1	2.30616	319.102	-45	Bedrock-Topanga Formation	140	34	677.239	690.12	815.588	0	815.588	138.349	138.349
2	1.80243	551.619	-15.1604	Bedrock-Topanga Formation	125	25	299.895	305.599	387.296	0	387.296	306.039	306.039
3	1.80243	657.25	-15.1604	Bedrock-Topanga Formation	125	25	330.509	336.795	454.196	0	454.196	364.644	364.644
4	1.80243	762.881	-15.1604	Bedrock-Topanga Formation	125	25	361.121	367.99	521.095	0	521.095	423.248	423.248
5	1.80243	868.512	-15.1604	Bedrock-Topanga Formation	125	25	391.735	399.186	587.993	0	587.993	481.851	481.851
6	1.80243	974.143	-15.1604	Bedrock-Topanga Formation	125	25	422.349	430.382	654.892	0	654.892	540.456	540.456
7	1.80243	1079.77	-15.1604	Bedrock-Topanga Formation	125	25	452.962	461.577	721.792	0	721.792	599.061	599.061
8	1.74702	1151.9	-15.1604	Bedrock-Topanga Formation	125	25	484.454	493.668	790.609	0	790.609	659.345	659.345
9	1.74702	1260.16	-15.1604	Bedrock-Topanga Formation	125	25	516.824	526.654	861.349	0	861.349	721.314	721.314
10	1.74702	1368.41	-15.1604	Bedrock-Topanga Formation	125	25	549.193	559.639	932.089	0	932.089	783.284	783.284
11	1.74702	1476.67	-15.1604	Bedrock-Topanga Formation	125	25	581.564	592.625	1002.82	0	1002.82	845.247	845.247
12	1.74702	1584.93	-15.1604	Bedrock-Topanga Formation	125	25	613.933	625.61	1073.56	0	1073.56	907.217	907.217
13	1.74702	3051.17	-15.1604	Bedrock-Topanga Formation	125	25	1932.06	1968.81	3954.07	0	3954.07	3430.58	3430.58
14	1.74702	4511.19	-15.1604	Bedrock-Topanga Formation	125	25	1488.9	1517.22	2985.63	0	2985.63	2582.21	2582.21
15	1.74702	4808.04	-15.1604	Bedrock-Topanga Formation	125	25	1577.66	1607.67	3179.6	0	3179.6	2752.13	2752.13
16	1.74702	5104.89	-15.1604	Bedrock-Topanga Formation	125	25	1666.42	1698.12	3373.57	0	3373.57	2922.05	2922.05
17	1.74702	5401.74	-15.1604	Bedrock-Topanga Formation	125	25	1755.19	1788.57	3567.54	0	3567.54	3091.97	3091.97
18	1.74702	5698.59	-15.1604	Bedrock-Topanga Formation	125	25	1843.95	1879.02	3761.5	0	3761.5	3261.88	3261.88
19	1.75917	5848.56	33.8892	Bedrock-Topanga Formation	140	34	1618.46	1649.24	2237.54	0	2237.54	3324.66	3324.66
20	1.75917	5770.32	33.8892	Bedrock-Topanga Formation	140	34	1598.07	1628.47	2206.75	0	2206.75	3280.18	3280.18
21	1.75917	5692.08	33.8892	Bedrock-Topanga Formation	140	34	1577.7	1607.71	2175.97	0	2175.97	3235.71	3235.71
22	1.75917	5589.59	33.8892	Bedrock-Topanga Formation	140	34	1551	1580.5	2135.63	0	2135.63	3177.44	3177.44
23	1.75917	5258.35	33.8892	Bedrock-Topanga Formation	140	34	1464.73	1492.59	2005.29	0	2005.29	2989.15	2989.15

24	1.75917	4963.4	33.8892	Bedrock-Topanga Formation	140	34	1387.9	1414.3	1889.23	0	1889.23	2821.48	2821.48
25	1.75917	4946.12	33.8892	Bedrock-Topanga Formation	140	34	1383.4	1409.71	1882.43	0	1882.43	2811.65	2811.65
26	1.75917	4947.45	33.8892	Bedrock-Topanga Formation	140	34	1383.75	1410.07	1882.95	0	1882.95	2812.41	2812.41
27	1.75917	4948.79	33.8892	Bedrock-Topanga Formation	140	34	1384.09	1410.42	1883.48	0	1883.48	2813.17	2813.17
28	1.69212	4768.13	33.8892	Bedrock-Topanga Formation	140	34	1386.25	1412.62	1886.74	0	1886.74	2817.88	2817.88
29	1.69212	4782.77	33.8892	Bedrock-Topanga Formation	140	34	1390.22	1416.66	1892.72	0	1892.72	2826.53	2826.53
30	1.69212	4797.4	33.8892	Bedrock-Topanga Formation	140	34	1394.17	1420.69	1898.71	0	1898.71	2835.17	2835.17
31	1.69212	4812.03	33.8892	Bedrock-Topanga Formation	140	34	1398.14	1424.73	1904.69	0	1904.69	2843.82	2843.82
32	1.64807	4657.13	43.2271	Bedrock-Topanga Formation	140	34	1237.76	1261.3	1662.4	0	1662.4	2825.84	2825.84
33	1.64807	4583.57	43.2271	Bedrock-Topanga Formation	140	34	1219.55	1242.75	1634.89	0	1634.89	2781.21	2781.21
34	1.64807	4510.02	43.2271	Bedrock-Topanga Formation	140	34	1201.34	1224.19	1607.38	0	1607.38	2736.58	2736.58
35	1.64807	4436.47	43.2271	Bedrock-Topanga Formation	140	34	1183.13	1205.63	1579.86	0	1579.86	2691.95	2691.95
36	1.64807	4337.08	43.2271	Bedrock-Topanga Formation	140	34	1158.52	1180.56	1542.69	0	1542.69	2631.64	2631.64
37	1.64807	3997.3	43.2271	Bedrock-Topanga Formation	140	34	1074.39	1094.83	1415.59	0	1415.59	2425.47	2425.47
38	1.64807	3805.92	43.2271	Bedrock-Topanga Formation	140	34	1027.01	1046.54	1344.01	0	1344.01	2309.35	2309.35
39	1.64807	3516.71	43.2271	Bedrock-Topanga Formation	140	34	955.404	973.576	1235.82	0	1235.82	2133.86	2133.86
40	1.64807	3227.5	43.2271	Bedrock-Topanga Formation	140	34	883.797	900.607	1127.65	0	1127.65	1958.37	1958.37
41	1.64807	2938.29	43.2271	Bedrock-Topanga Formation	140	34	812.191	827.639	1019.46	0	1019.46	1782.89	1782.89
42	1.64807	2649.08	43.2271	Bedrock-Topanga Formation	140	34	745.005	759.175	917.963	0	917.963	1618.23	1618.23
43	1.64807	2359.87	43.2271	Bedrock-Topanga Formation	140	34	709.783	723.283	864.754	0	864.754	1531.92	1531.92
44	1.64807	2070.66	43.2271	Bedrock-Topanga Formation	140	34	638.177	650.315	756.572	0	756.572	1356.43	1356.43
45	1.71332	1835.45	45	Bedrock-Topanga Formation	140	34	549.179	559.624	622.116	0	622.116	1171.29	1171.29
46	1.71332	1501.73	45	Bedrock-Topanga Formation	140	34	471.6	480.57	504.914	0	504.914	976.514	976.514
47	1.71332	1168.01	45	Bedrock-Topanga Formation	140	34	394.022	401.516	387.714	0	387.714	781.735	781.735
48	1.71332	834.294	45	Bedrock-Topanga Formation	140	34	316.443	322.462	270.511	0	270.511	586.954	586.954

49	1.71332	500.576	45	Bedrock-Topanga Formation	140	34	238.865	243.408	153.309	0	153.309	392.174	392.174
50	1.71332	166.859	45	Bedrock-Topanga Formation	140	34	161.287	164.355	36.1072	0	36.1072	197.394	197.394

Interslice Data

Section II Proposed topography - Master Scenario

Global Minimum Query (bishop simplified) - Safety Factor: 1.8851

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [deg]
1	53.3078	712	0	0	0
2	53.4068	711.901	24.133	0	0
3	54.6825	710.625	2682.6	0	0
4	55.9582	709.35	7781.91	0	0
5	57.2338	708.074	13539.8	0	0
6	58.3068	708.727	13156	0	0
7	59.3799	709.38	12776.4	0	0
8	60.4529	710.033	12401	0	0
9	61.5259	710.686	12029.8	0	0
10	62.5989	711.339	11662.7	0	0
11	63.6719	711.992	11299.8	0	0
12	64.745	712.645	10941.1	0	0
13	65.818	713.298	10586.5	0	0
14	66.891	713.951	10236.1	0	0
15	68.0447	714.653	9863.43	0	0
16	69.1984	715.355	9494.31	0	0
17	70.3521	716.057	9130.03	0	0
18	71.5058	716.759	8790.16	0	0
19	72.6595	717.461	8481.3	0	0
20	73.8132	718.163	8194.88	0	0
21	74.9669	718.865	7906.49	0	0
22	76.1206	719.568	7614.62	0	0
23	77.2743	720.27	7319.26	0	0
24	78.428	720.972	7020.43	0	0
25	79.5817	721.674	6718.11	0	0
26	80.7354	722.376	6412.3	0	0
27	81.8891	723.078	6103.02	0	0
28	83.0429	723.78	5790.26	0	0
29	84.1828	724.726	5186.5	0	0
30	85.3227	725.672	4589.31	0	0
31	86.4626	726.618	3998.69	0	0
32	87.6025	727.564	3414.63	0	0
33	88.7424	728.51	2837.13	0	0
34	89.8823	729.456	2266.2	0	0
35	91.0222	730.402	1701.83	0	0
36	92.1621	731.348	1144.03	0	0
37	93.302	732.294	592.788	0	0
38	94.4419	733.24	55.4292	0	0
39	95.5818	734.186	-411.047	0	0
40	96.7217	735.132	-862.787	0	0
41	97.8617	736.078	-1274	0	0
42	99.0016	737.023	-1641.07	0	0
43	100.073	738.095	-2048.86	0	0
44	101.144	739.166	-2394.9	0	0
45	102.216	740.237	-2679.18	0	0
46	103.287	741.309	-2901.71	0	0
47	104.358	742.38	-3068.67	0	0
48	105.43	743.451	-3212.76	0	0
49	106.501	744.523	-3295.09	0	0
50	107.572	745.594	-3315.66	0	0
51	108.644	746.665	0	0	0

Global Minimum Query (janbu simplified) - Safety Factor: 1.7516

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [deg]
1	53.3078	712	0	0	0
2	53.4068	711.901	27.0765	0	0
3	54.6825	710.625	2878.04	0	0
4	55.9582	709.35	8330.59	0	0
5	57.2338	708.074	14485.1	0	0
6	58.3068	708.727	14164.4	0	0
7	59.3799	709.38	13847.5	0	0
8	60.4529	710.033	13534.2	0	0
9	61.5259	710.686	13224.5	0	0
10	62.5989	711.339	12918.6	0	0
11	63.6719	711.992	12616.3	0	0
12	64.745	712.645	12317.6	0	0
13	65.818	713.298	12022.7	0	0
14	66.891	713.951	11731.3	0	0
15	68.0447	714.653	11421.7	0	0
16	69.1984	715.355	11115.1	0	0
17	70.3521	716.057	10812.9	0	0
18	71.5058	716.759	10532	0	0
19	72.6595	717.461	10278.4	0	0
20	73.8132	718.163	10044.5	0	0
21	74.9669	718.865	9808.92	0	0
22	76.1206	719.568	9570.25	0	0
23	77.2743	720.27	9328.51	0	0
24	78.428	720.972	9083.72	0	0
25	79.5817	721.674	8835.87	0	0
26	80.7354	722.376	8584.96	0	0
27	81.8891	723.078	8330.99	0	0
28	83.0429	723.78	8073.96	0	0
29	84.1828	724.726	7529.8	0	0
30	85.3227	725.672	6991.71	0	0
31	86.4626	726.618	6459.7	0	0
32	87.6025	727.564	5933.77	0	0
33	88.7424	728.51	5413.91	0	0
34	89.8823	729.456	4900.12	0	0
35	91.0222	730.402	4392.41	0	0
36	92.1621	731.348	3890.77	0	0
37	93.302	732.294	3395.21	0	0
38	94.4419	733.24	2912.5	0	0
39	95.5818	734.186	2495.39	0	0
40	96.7217	735.132	2091.92	0	0
41	97.8617	736.078	1725.96	0	0
42	99.0016	737.023	1400.85	0	0
43	100.073	738.095	1031.99	0	0
44	101.144	739.166	721.072	0	0
45	102.216	740.237	468.092	0	0
46	103.287	741.309	273.052	0	0
47	104.358	742.38	130.191	0	0
48	105.43	743.451	9.09604	0	0
49	106.501	744.523	-54.0601	0	0
50	107.572	745.594	-59.2771	0	0
51	108.644	746.665	0	0	0

Section II Proposed topography - Curved Static

Global Minimum Query (bishop simplified) - Safety Factor: 2.08999

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [deg]
1	54.0311	724.016	0	0	0
2	55.0634	723.958	84.1529	0	0
3	56.0957	723.918	192.695	0	0
4	57.128	723.896	322.292	0	0
5	58.1603	723.89	469.775	0	0
6	59.1926	723.902	632.134	0	0
7	60.2249	723.931	806.507	0	0
8	61.2572	723.978	990.179	0	0
9	62.2895	724.042	1180.57	0	0
10	63.3218	724.124	1375.23	0	0
11	64.3541	724.222	1571.83	0	0
12	65.3864	724.339	1768.17	0	0
13	66.4187	724.473	1962.17	0	0
14	67.451	724.625	2151.85	0	0
15	68.4833	724.795	2335.36	0	0
16	69.5156	724.983	2510.93	0	0
17	70.5479	725.19	2675.21	0	0
18	71.5802	725.415	2819.37	0	0
19	72.6125	725.658	2944.34	0	0
20	73.6448	725.92	3054.12	0	0
21	74.6771	726.202	3154.75	0	0
22	75.7094	726.503	3244.75	0	0
23	76.7418	726.823	3322.16	0	0
24	77.7741	727.164	3385.12	0	0
25	78.8064	727.525	3431.85	0	0
26	79.8387	727.907	3460.72	0	0
27	80.871	728.31	3470.16	0	0
28	81.9033	728.735	3458.72	0	0
29	82.9356	729.182	3425.09	0	0
30	83.9679	729.651	3368.02	0	0
31	85.0002	730.144	3286.42	0	0
32	86.0325	730.66	3179.31	0	0
33	87.0648	731.201	3045.83	0	0
34	88.0971	731.768	2885.27	0	0
35	89.1294	732.36	2697.06	0	0
36	90.1617	732.98	2480.78	0	0
37	91.194	733.627	2236.2	0	0
38	92.2263	734.304	1963.25	0	0
39	93.2586	735.011	1662.07	0	0
40	94.2909	735.749	1335.83	0	0
41	95.3232	736.52	1033.96	0	0
42	96.3555	737.325	720.87	0	0
43	97.3878	738.167	410.199	0	0
44	98.4201	739.047	117.49	0	0
45	99.4524	739.967	-150.571	0	0
46	100.485	740.931	-386.519	0	0
47	101.517	741.94	-581.979	0	0
48	102.549	742.998	-727.508	0	0
49	103.582	744.109	-812.395	0	0
50	104.614	745.277	-846.187	0	0
51	105.646	746.508	0	0	0

Global Minimum Query (janbu simplified) - Safety Factor: 1.91292

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [deg]
1	67.1699	730.585	0	0	0
2	67.791	730.406	57.7432	0	0
3	68.4121	730.244	133.229	0	0
4	69.0332	730.098	226.097	0	0
5	69.6544	729.969	337.068	0	0
6	70.2755	729.856	463.363	0	0
7	70.8966	729.759	589.184	0	0
8	71.5177	729.678	708.649	0	0
9	72.1388	729.612	818.344	0	0
10	72.76	729.562	918.536	0	0
11	73.3811	729.527	1013.37	0	0
12	74.0022	729.507	1116.6	0	0
13	74.6233	729.503	1227.49	0	0
14	75.2444	729.514	1343.92	0	0
15	75.8656	729.54	1463.92	0	0
16	76.4867	729.582	1585.6	0	0
17	77.1078	729.639	1707.21	0	0
18	77.7289	729.712	1827.07	0	0
19	78.35	729.8	1943.61	0	0
20	78.9712	729.904	2055.34	0	0
21	79.5923	730.024	2160.86	0	0
22	80.2134	730.161	2258.83	0	0
23	80.8345	730.313	2348.01	0	0
24	81.4556	730.483	2427.2	0	0
25	82.0767	730.67	2495.29	0	0
26	82.6979	730.874	2551.24	0	0
27	83.319	731.097	2594.06	0	0
28	83.9401	731.338	2622.85	0	0
29	84.5612	731.598	2636.74	0	0
30	85.1823	731.879	2634.98	0	0
31	85.8035	732.179	2616.85	0	0
32	86.4246	732.501	2581.74	0	0
33	87.0457	732.845	2529.09	0	0
34	87.6668	733.213	2458.46	0	0
35	88.2879	733.605	2369.5	0	0
36	88.9091	734.024	2261.97	0	0
37	89.5302	734.47	2135.76	0	0
38	90.1513	734.945	1990.93	0	0
39	90.7724	735.452	1827.7	0	0
40	91.3935	735.993	1646.53	0	0
41	92.0147	736.572	1448.14	0	0
42	92.6358	737.191	1233.6	0	0
43	93.2569	737.856	1004.42	0	0
44	93.878	738.572	762.692	0	0
45	94.4991	739.346	527.205	0	0
46	95.1202	740.187	339.102	0	0
47	95.7414	741.108	169.955	0	0
48	96.3625	742.126	12.7176	0	0
49	96.9836	743.268	-90.7847	0	0
50	97.6047	744.573	-110.16	0	0
51	98.2258	746.117	0	0	0

Section II Proposed topography - Curved PseudoStatic

Global Minimum Query (bishop simplified) - Safety Factor: 1.10057

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [deg]
1	54	712.027	0	0	0
2	55.1326	712.226	10586.8	0	0
3	56.2652	712.441	10804.7	0	0
4	57.3977	712.67	10998.7	0	0
5	58.5303	712.915	11167.7	0	0
6	59.6629	713.175	11310.6	0	0
7	60.7955	713.451	11426.4	0	0
8	61.9281	713.743	11514.1	0	0
9	63.0607	714.051	11572.9	0	0
10	64.1932	714.375	11602	0	0
11	65.3258	714.715	11600.8	0	0
12	66.4584	715.072	11568.7	0	0
13	67.591	715.446	11505.2	0	0
14	68.7236	715.836	11409.8	0	0
15	69.8561	716.244	11282.2	0	0
16	70.9887	716.669	11128.9	0	0
17	72.1213	717.112	10963	0	0
18	73.2539	717.572	10787.5	0	0
19	74.3865	718.052	10586.4	0	0
20	75.5191	718.549	10350.9	0	0
21	76.6516	719.066	10080.4	0	0
22	77.7842	719.602	9774.1	0	0
23	78.9168	720.158	9431.63	0	0
24	80.0494	720.734	9052.57	0	0
25	81.182	721.33	8636.62	0	0
26	82.3145	721.948	8183.61	0	0
27	83.4471	722.587	7693.47	0	0
28	84.5797	723.248	7166.26	0	0
29	85.7123	723.932	6602.18	0	0
30	86.8449	724.64	6001.53	0	0
31	87.9775	725.371	5364.77	0	0
32	89.11	726.127	4692.52	0	0
33	90.2426	726.908	3985.55	0	0
34	91.3752	727.716	3244.78	0	0
35	92.5078	728.551	2471.33	0	0
36	93.6404	729.414	1666.52	0	0
37	94.7729	730.306	859.412	0	0
38	95.9055	731.229	95.9622	0	0
39	97.0381	732.183	-678.658	0	0
40	98.1707	733.17	-1422.44	0	0
41	99.3033	734.191	-2128.91	0	0
42	100.436	735.249	-2791.33	0	0
43	101.568	736.344	-3402.51	0	0
44	102.701	737.48	-3954.61	0	0
45	103.834	738.657	-4439.2	0	0
46	104.966	739.879	-4864.3	0	0
47	106.099	741.149	-5213.59	0	0
48	107.231	742.469	-5467.52	0	0
49	108.364	743.843	-5614.06	0	0
50	109.497	745.275	-5639.9	0	0
51	110.629	746.77	0	0	0

Global Minimum Query (janbu simplified) - Safety Factor: 0.957984

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [deg]
1	11.4173	712	0	0	0
2	13.8437	709.876	2803.83	0	0
3	16.27	707.924	6991.1	0	0
4	18.6964	706.129	12022.4	0	0
5	21.2194	704.413	17566.2	0	0
6	23.7423	702.841	23058.5	0	0
7	26.2653	701.401	28429.1	0	0
8	28.7883	700.085	33472.4	0	0
9	31.3113	698.886	37685.3	0	0
10	33.8342	697.798	41168.8	0	0
11	36.3572	696.815	44146.5	0	0
12	38.8802	695.935	46908.8	0	0
13	41.4032	695.152	49437.4	0	0
14	43.9261	694.464	51718.1	0	0
15	46.4491	693.868	53879.4	0	0
16	48.9721	693.362	56145.5	0	0
17	51.4951	692.945	58489.9	0	0
18	54.018	692.613	60802	0	0
19	56.541	692.368	64787.2	0	0
20	59.064	692.207	68378.6	0	0
21	61.587	692.13	71555	0	0
22	64.1099	692.137	74298.1	0	0
23	66.6329	692.228	76592.3	0	0
24	69.1559	692.403	78423.8	0	0
25	71.6789	692.663	79748.7	0	0
26	74.2018	693.009	80500.7	0	0
27	76.7248	693.441	80796.6	0	0
28	79.2478	693.962	80636.8	0	0
29	81.7708	694.573	80003.9	0	0
30	84.2937	695.277	78882.6	0	0
31	86.8167	696.076	77260	0	0
32	89.3397	696.973	75125.3	0	0
33	91.8627	697.973	72470.4	0	0
34	94.3856	699.08	69291.4	0	0
35	96.9086	700.298	65658.1	0	0
36	99.4316	701.634	61595.4	0	0
37	101.955	703.096	57162.8	0	0
38	104.478	704.692	52410.9	0	0
39	107.001	706.432	47404.1	0	0
40	109.523	708.329	42181.9	0	0
41	112.046	710.399	36817.3	0	0
42	114.569	712.661	31397.8	0	0
43	117.092	715.14	26030.2	0	0
44	119.615	717.867	20848.7	0	0
45	122.138	720.885	16027.3	0	0
46	124.431	723.932	11948.4	0	0
47	126.724	727.335	8105.98	0	0
48	129.017	731.191	4661.97	0	0
49	131.31	735.663	1850.04	0	0
50	133.603	741.055	43.6731	0	0
51	135.896	748.1	0	0	0

Section II Proposed topography - Block Static

Global Minimum Query (bishop simplified) - Safety Factor: 2.01668

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [deg]
1	22.2344	712	0	0	0
2	23.8629	710.371	658.958	0	0
3	25.4914	708.743	1956.13	0	0
4	27.1199	707.114	3891.52	0	0
5	29.4008	706.393	4908.08	0	0
6	31.3607	705.772	5867.5	0	0
7	33.3206	705.152	6898.44	0	0
8	35.2805	704.532	8000.89	0	0
9	37.2404	703.912	9174.85	0	0
10	39.2003	703.291	10420.3	0	0
11	41.1602	702.671	11737.3	0	0
12	43.1201	702.051	13125.8	0	0
13	45.08	701.43	14585.8	0	0
14	47.0399	700.81	16117.4	0	0
15	48.9998	700.19	17720.4	0	0
16	50.9597	699.57	19395	0	0
17	52.9197	698.949	21141.1	0	0
18	54.8796	698.329	36453.2	0	0
19	56.8395	697.709	40132.3	0	0
20	58.7509	698.534	39313.2	0	0
21	60.6623	699.36	38510.3	0	0
22	62.5736	700.185	37723.6	0	0
23	64.485	701.011	36953.1	0	0
24	66.3964	701.837	36198.8	0	0
25	68.3078	702.662	35460.7	0	0
26	70.2192	703.488	34739	0	0
27	72.1306	704.313	34052.5	0	0
28	74.042	705.139	33407.3	0	0
29	75.9534	705.964	32774.5	0	0
30	77.8648	706.79	32149.8	0	0
31	79.7762	707.615	31533.4	0	0
32	81.6876	708.441	30925.1	0	0
33	83.3592	710.181	27890.5	0	0
34	85.0308	711.921	25001.1	0	0
35	86.7025	713.661	22256.8	0	0
36	88.7269	715.769	19063.2	0	0
37	90.7514	717.876	15953.7	0	0
38	92.7759	719.984	12928.5	0	0
39	94.8004	722.091	10021.9	0	0
40	96.8249	724.199	7371.47	0	0
41	98.8494	726.306	4935.38	0	0
42	100.874	728.414	2753.98	0	0
43	102.898	730.521	827.294	0	0
44	104.923	732.628	-878.24	0	0
45	106.947	734.736	-2390.94	0	0
46	108.972	736.843	-3648.94	0	0
47	111.049	738.921	-4626.09	0	0
48	113.126	740.998	-5358.64	0	0
49	115.203	743.075	-5846.61	0	0
50	117.281	745.152	-6089.98	0	0
51	119.358	747.229	0	0	0

Global Minimum Query (janbu simplified) - Safety Factor: 1.84885

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [deg]
1	25.3139	712	0	0	0
2	27.2549	710.059	947.727	0	0
3	28.9604	709.481	1383	0	0
4	30.6659	708.903	1894.67	0	0
5	32.3714	708.326	2482.74	0	0
6	34.077	707.748	3147.21	0	0
7	35.7825	707.17	3888.07	0	0
8	37.488	706.592	4705.34	0	0
9	39.281	705.985	5639.46	0	0
10	41.074	705.377	6643.17	0	0
11	42.8669	704.77	7716.46	0	0
12	44.6599	704.162	8859.33	0	0
13	46.4529	703.555	10071.8	0	0
14	48.2459	702.947	11353.8	0	0
15	50.0389	702.34	12705.5	0	0
16	51.8319	701.732	14126.7	0	0
17	53.6249	701.125	15617.4	0	0
18	55.4178	700.517	31521	0	0
19	57.2108	699.91	34970.4	0	0
20	59.0038	699.303	38606.6	0	0
21	60.7555	700.367	37218.1	0	0
22	62.5072	701.432	35871.6	0	0
23	64.2589	702.497	34567.1	0	0
24	66.0106	703.562	33304.5	0	0
25	67.7623	704.626	32084	0	0
26	69.514	705.691	30905.4	0	0
27	71.2657	706.756	29784.8	0	0
28	73.0174	707.821	28765	0	0
29	74.7691	708.885	27809	0	0
30	76.5208	709.95	26879.3	0	0
31	78.5098	711.991	24369.2	0	0
32	80.2721	713.799	22260.5	0	0
33	82.0345	715.608	20207.8	0	0
34	83.7968	717.416	18210.9	0	0
35	85.5591	719.224	16270.1	0	0
36	87.3215	721.032	14385.1	0	0
37	89.0838	722.841	12556.1	0	0
38	90.8461	724.649	10783.1	0	0
39	92.6085	726.457	9065.97	0	0
40	94.3708	728.266	7411.6	0	0
41	96.1332	730.074	5951.18	0	0
42	97.815	731.756	4715.22	0	0
43	99.4968	733.437	3629	0	0
44	101.179	735.119	2692.52	0	0
45	102.861	736.801	1905.77	0	0
46	104.542	738.483	1255.08	0	0
47	106.224	740.165	698.34	0	0
48	107.906	741.847	291.336	0	0
49	109.588	743.529	34.0673	0	0
50	111.27	745.21	-73.4661	0	0
51	112.952	746.892	0	0	0

Section II Proposed topography - Block , Pseudostatic

Global Minimum Query (bishop simplified) - Safety Factor: 1.12876

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [deg]
1	26.279	712	0	0	0
2	27.8344	710.445	1495.96	0	0
3	29.3898	708.889	4054.11	0	0
4	31.6839	708.322	4740.49	0	0
5	33.9779	707.754	5491.14	0	0
6	36.2719	707.186	6306.06	0	0
7	38.566	706.619	7185.24	0	0
8	40.6305	706.108	8033.8	0	0
9	42.695	705.597	8939.18	0	0
10	44.7596	705.086	9901.38	0	0
11	46.8241	704.575	10920.4	0	0
12	48.8886	704.065	11996.2	0	0
13	50.9531	703.554	13128.9	0	0
14	53.0177	703.043	14318.4	0	0
15	55.0822	702.532	29144.3	0	0
16	57.1467	702.021	31781.1	0	0
17	59.2112	701.51	34583	0	0
18	61.2758	701	37550.1	0	0
19	63.248	702.121	35816.2	0	0
20	65.2202	703.243	34096.6	0	0
21	67.1924	704.365	32391.2	0	0
22	69.1647	705.486	30700	0	0
23	71.1369	706.608	29042.9	0	0
24	73.1091	707.73	27508.6	0	0
25	75.0813	708.851	26024.9	0	0
26	77.0536	709.973	24524.6	0	0
27	78.819	711.193	22740.3	0	0
28	80.5845	712.414	20958.5	0	0
29	82.6667	713.853	18856.3	0	0
30	84.7489	715.293	16749.4	0	0
31	86.8311	716.733	14637.7	0	0
32	88.9133	718.172	12521.3	0	0
33	90.9955	719.612	10400.3	0	0
34	93.0777	721.051	8274.45	0	0
35	95.1598	722.491	6197.41	0	0
36	97.242	723.93	4232.23	0	0
37	99.3242	725.37	2382.53	0	0
38	101.406	726.809	664.166	0	0
39	103.489	728.249	-922.866	0	0
40	105.571	729.688	-2380.28	0	0
41	107.653	731.128	-3707.26	0	0
42	109.735	732.567	-4902.91	0	0
43	111.817	734.007	-5967.23	0	0
44	113.9	735.446	-6900.22	0	0
45	115.982	736.886	-7701.87	0	0
46	118.064	738.325	-8372.18	0	0
47	120.146	739.765	-8911.16	0	0
48	122.228	741.204	-9318.81	0	0
49	124.311	742.644	-9595.12	0	0
50	126.868	745.201	-9895.88	0	0
51	129.426	747.759	0	0	0

Global Minimum Query (janbu simplified) - Safety Factor: 1.01902

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [deg]
1	31.3219	712	0	0	0
2	33.628	709.694	3337.34	0	0
3	35.4305	709.205	3884.98	0	0
4	37.2329	708.717	4485.6	0	0
5	39.0353	708.229	5139.21	0	0
6	40.8378	707.74	5845.82	0	0
7	42.6402	707.252	6605.41	0	0
8	44.4426	706.764	7418	0	0
9	46.1896	706.29	8258.44	0	0
10	47.9367	705.817	9153.18	0	0
11	49.6837	705.344	10102.2	0	0
12	51.4307	704.87	11105.6	0	0
13	53.1777	704.397	12163.3	0	0
14	54.9247	703.923	27261.8	0	0
15	56.6717	703.45	29787.4	0	0
16	58.4188	702.977	32462	0	0
17	60.1658	702.503	35285.5	0	0
18	61.9128	702.03	38257.8	0	0
19	63.6598	701.557	41379.2	0	0
20	65.419	702.738	39652.2	0	0
21	67.1781	703.92	37951.6	0	0
22	68.9373	705.102	36277.4	0	0
23	70.6965	706.283	34637.7	0	0
24	72.4556	707.465	33109.6	0	0
25	74.2148	708.646	31680.7	0	0
26	75.974	709.828	30257.7	0	0
27	77.7331	711.01	28834.3	0	0
28	79.4923	712.191	27410.4	0	0
29	81.1844	713.328	26038.1	0	0
30	82.8766	714.465	24660.9	0	0
31	84.5687	715.601	23278.7	0	0
32	86.2608	716.738	21891.6	0	0
33	87.9089	718.287	19819.4	0	0
34	89.5569	719.836	17784	0	0
35	91.205	721.385	15785.5	0	0
36	92.8531	722.934	13823.9	0	0
37	94.5012	724.483	11912.2	0	0
38	96.1492	726.032	10170.8	0	0
39	97.7973	727.581	8525.34	0	0
40	99.4454	729.131	7024.91	0	0
41	101.093	730.68	5669.51	0	0
42	102.742	732.229	4459.11	0	0
43	104.39	733.778	3391.61	0	0
44	106.038	735.327	2451.67	0	0
45	107.686	736.876	1656.74	0	0
46	109.399	738.589	935.062	0	0
47	111.112	740.303	391.402	0	0
48	112.826	742.016	25.7627	0	0
49	114.539	743.729	-161.858	0	0
50	116.252	745.443	-171.459	0	0
51	117.966	747.156	0	0	0

Entity Information

Section II Proposed topography

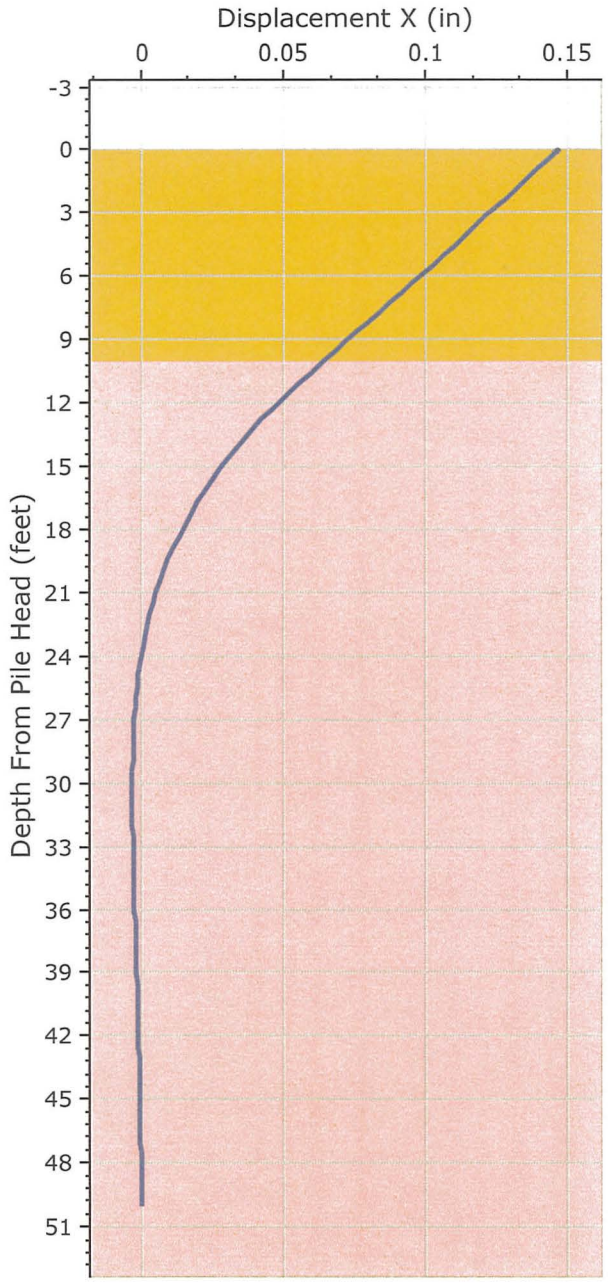
Shared Entities

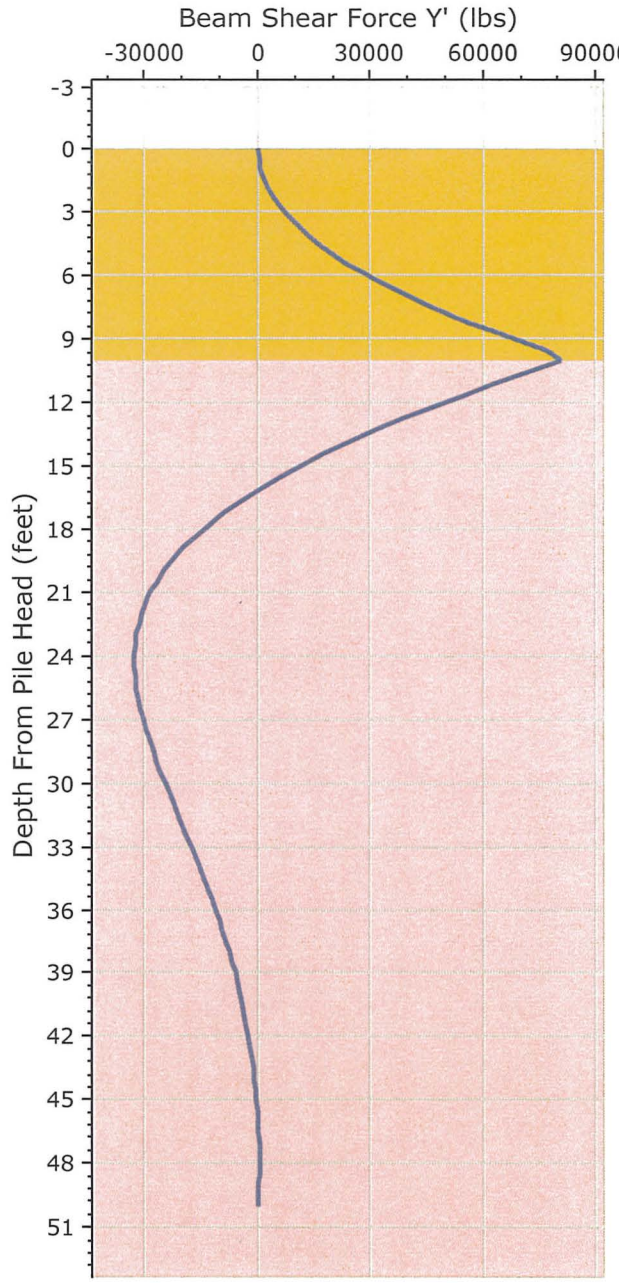
Type	Coordinates (x,y)
External Boundary	0, 680 153, 680 153, 749 96, 746 95, 745 94, 746 73, 731 70, 732 54, 724 54, 712 40, 712 0, 712

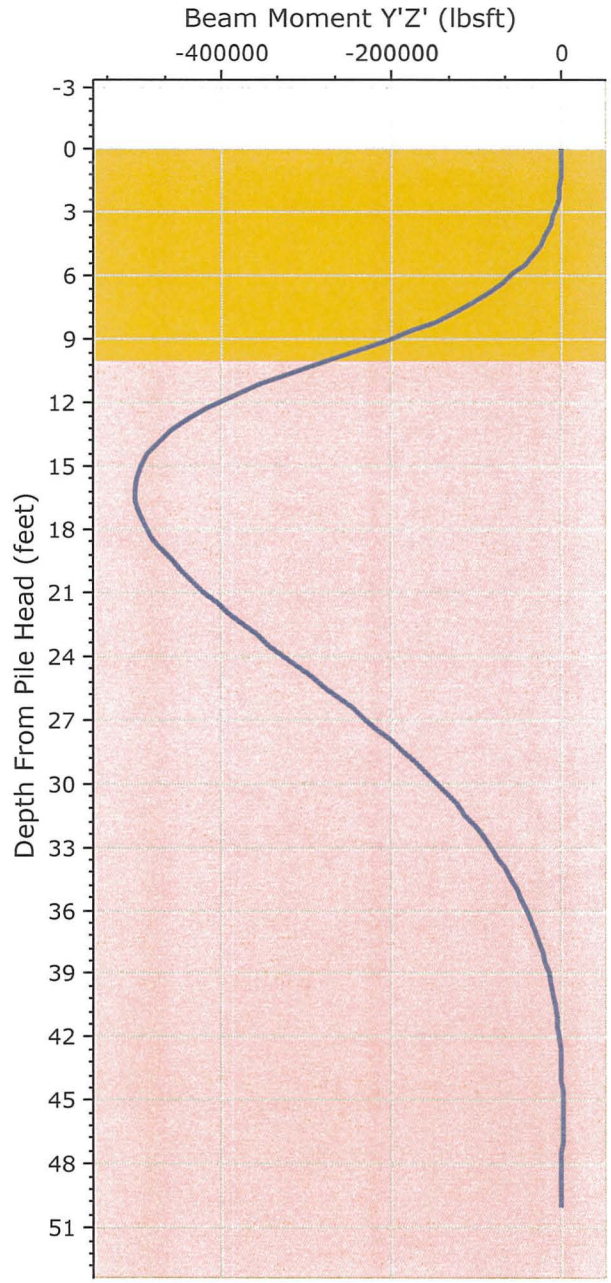
Scenario-based Entities

Type	Coordinates (x,y)	Master Scenario	Curved Static	Curved PseudoStatic	Block Static	Block , Pseudostatic
Water Table	-0.387, 705.658 54.028, 711.973 153.279, 727.234	Not assigned to any materials	Assigned to: Bedrock-Topanga Formation	Assigned to: Bedrock-Topanga Formation	Assigned to: Bedrock-Topanga Formation	Not assigned to any materials
Distributed Load	153, 749 104.211, 746.432	Constant DistributionOrientation: Normal to boundaryMagnitude: 100 lbs/ft2Creates Excess Pore Pressure: No	Constant DistributionOrientation: Normal to boundaryMagnitude: 100 lbs/ft2Creates Excess Pore Pressure: No	Constant DistributionOrientation: Normal to boundaryMagnitude: 100 lbs/ft2Creates Excess Pore Pressure: No	Constant DistributionOrientation: Normal to boundaryMagnitude: 100 lbs/ft2Creates Excess Pore Pressure: No	Constant DistributionOrientation: Normal to boundaryMagnitude: 100 lbs/ft2Creates Excess Pore Pressure: No
Block Search Window	57.118, 705.488 78.411, 704.345 77.787, 715.043 57.326, 714.836					

Block Search Window	76.957, 719.821 104.792, 719.51 103.442, 728.754 76.437, 729.169					
Block Search Window	98.664, 733.324 127.227, 733.739 126.604, 741.737 98.976, 741.737					
Block Search Window	52.707, 695.025 52.589, 709.714 24.964, 710.408 24.633, 695.262					
Block Search Window	56.498, 694.788 73.081, 694.196 74.384, 728.903 57.327, 721.085					
Block Search Window	76.043, 698.223 86.348, 698.697 88.007, 735.774 76.675, 728.766					
Block Search Window	91.205, 699.526 118.45, 698.46 120.464, 744.184 92.508, 737.314					
Block Search Window	99.379, 696.683 126.979, 695.973 126.742, 744.184 100.208, 740.749					







Geotechnologies, Inc. Consulting Geotechnical Engineers	*Project*	File No. 21578 Hilton Los Angeles/ Universal	
	Analysis Description	24 inch diameter, 10 footh fill depth	
	Reinforcement:	1/2 in deflection	*Comment* Geotechnologies,Inc.
	Criteria:		*File Name* 21578 24in.rspile2

RSPILE 3.005

rocscience

File No. 21578 Hilton Los Angeles/ Universal
RTK
Geotechnologies,Inc.
Report Created Date: 2022/09/13, 13:24:25
Software Version: 3.005

Table of Contents

Project Summary 3
Soil Layers 4
Soil Properties 5
    Fill 5
    Bedrock 5
Pile Properties 6
    Pile Property 1 6
Pile Settings 7
    Pile 1 7

RSPile Analysis Information

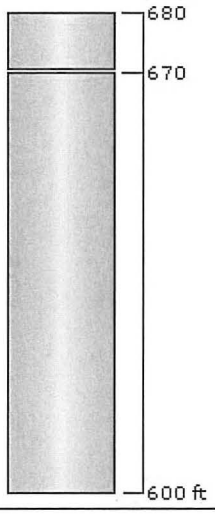
File No. 21578 Hilton Los Angeles/ Universal

Project Summary

Document Name	21578 24in.rspile2
Project Title	File No. 21578 Hilton Los Angeles/ Universal
Analysis	24 inch diameter, 10 footh fill depth
Author	RTK
Company	Geotechnologies,Inc.
Date Created	9/13/2022, 12:32:51 PM
Comments	
1/2 in deflection	
Last saved with RSPile version	3.005

Soil Layers

Layer Name	Color	Layer Type	Thickness [ft]	Depth [ft]
Fill		Silt (Cemented C - Phi Coil)	10	-680
Bedrock		Silt (Cemented C - Phi Coil)	70	-670



Soil Properties

Fill

Property	Value
Name	Fill
Color	
Soil Type	Silt (Cemented C - Phi Coil)
Unit Weight (lbs/ft3)	120
Sat. Unit Weight (lbs/ft3)	130

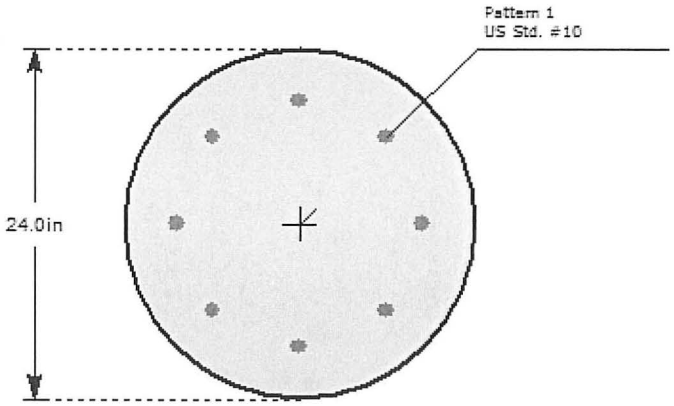
Bedrock

Property	Value
Name	Bedrock
Color	
Soil Type	Silt (Cemented C - Phi Coil)
Unit Weight (lbs/ft3)	130
Sat. Unit Weight (lbs/ft3)	140

Pile Properties

Pile Property 1

Property	Value
Name	Pile Property 1
Color	
Pile Type	Reinforced Concrete
Pile Cross Section	Circular
Diameter (ft)	2
Compressive Strength (psf)	5.2e+08



Reinforcement Pattern 1	
Rebar Size	US Std. #10
Yield Stress (psf)	8640000
Elastic Modulus (psf)	4176000000

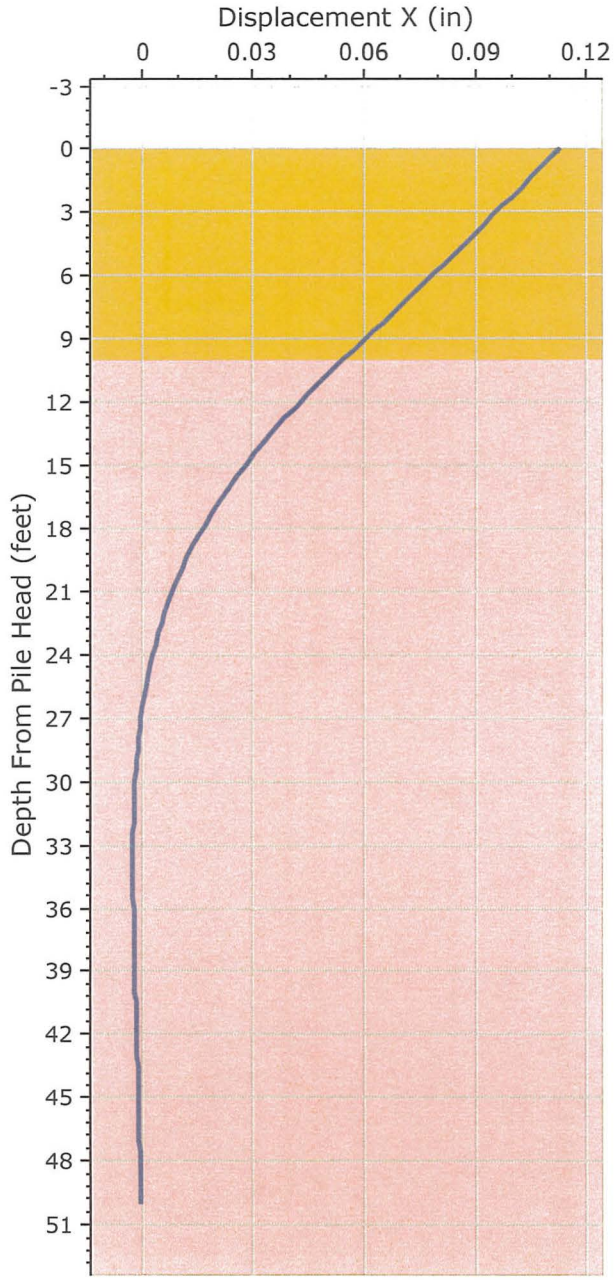
Pattern 1 Bar Locations

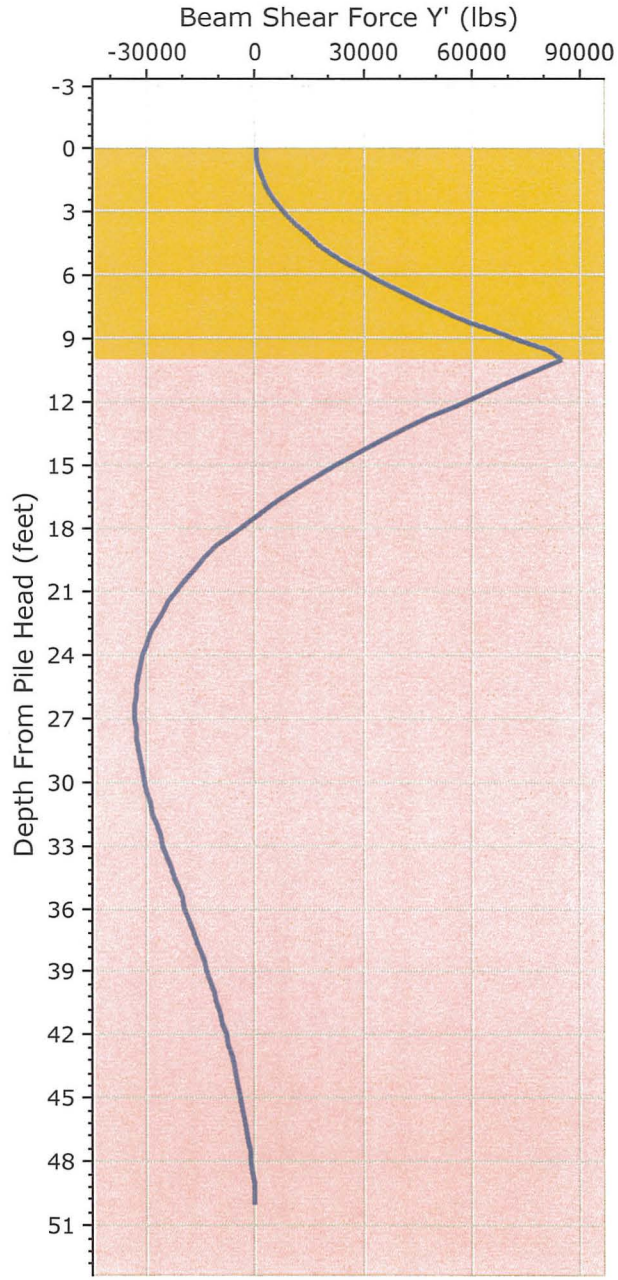
#	X (ft)	Y (ft)
1	8.365	0.000
2	5.915	5.915
3	0.000	8.365
4	-5.915	5.915
5	-8.365	0.000
6	-5.915	-5.915
7	-0.000	-8.365
8	5.915	-5.915

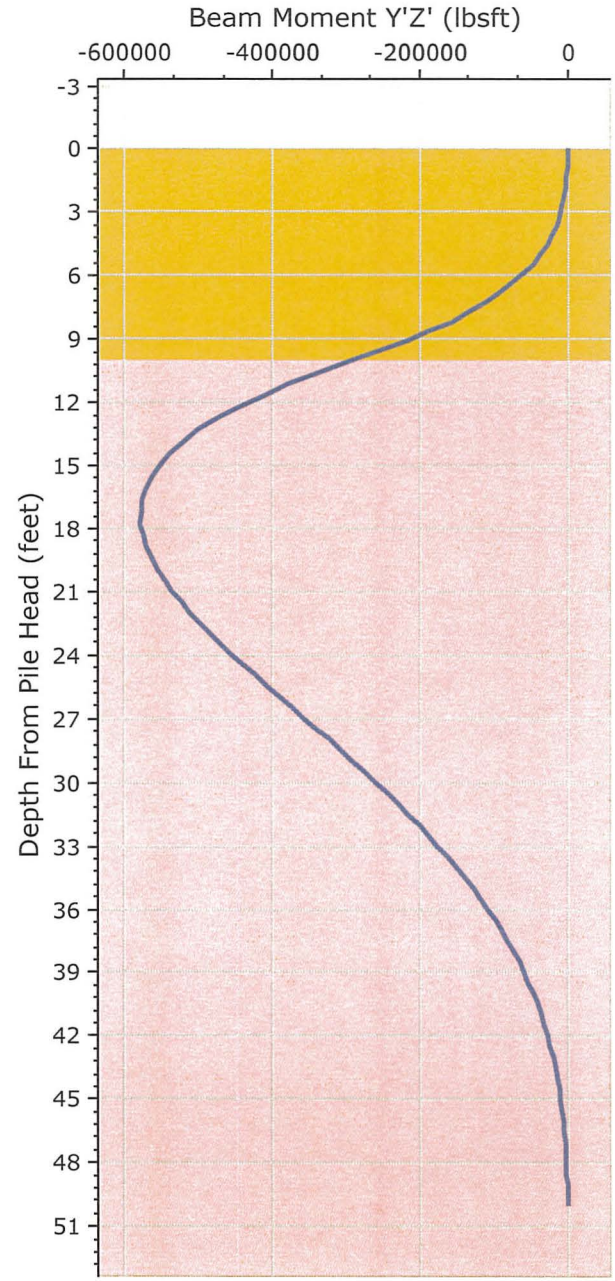
Pile Settings

Pile 1

General			
Property		Pile Property 1	
Location		0, 0	
Elevation (ft)		680	
Length (ft)		50	
Orientation			
Ground Slope Angle (°)		0	
Alpha Angle (°)		0	
Beta Angle (°)		90	
Rotation Angle (°)		0	
Loading			
Loading Type		Static	
Load Factor Profile		None	
Type		Value	Depth
Force Z, (lbs)		400000	0
Soil Displacement (in)	0.5		
Sliding Depth (ft)	10		







Geotechnologies, Inc.
Consulting Geotechnical Engineers

RSPILE 3.005

Project	File No. 21578 Hilton Los Angeles/ Universal		
Analysis Description	30 inch diameter, 10 foot fill depth		
Reinforcement:	1/2 in deflection	*Comment*	Geotechnologies,Inc.
Criteria:		*File Name*	21578 30in fill 10.rspile2

rocscience

File No. 21578 Hilton Los Angeles/ Universal
RTK
Geotechnologies,Inc.
Report Created Date: 2022/09/13, 13:28:12
Software Version: 3.005

Table of Contents

Project Summary 3
Soil Layers 4
Soil Properties 5
    Fill 5
    Bedrock 5
Pile Properties 6
    Pile Property 1 6
Pile Settings 7
    Pile 1 7

RSPile Analysis Information

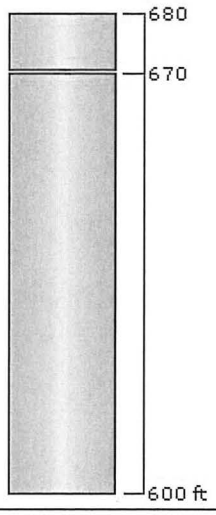
File No. 21578 Hilton Los Angeles/ Universal

Project Summary

Document Name	21578 30in fill 10.rspile2
Project Title	File No. 21578 Hilton Los Angeles/ Universal
Analysis	30 inch diameter, 10 foot fill depth
Author	RTK
Company	Geotechnologies,Inc.
Date Created	9/13/2022, 12:32:51 PM
Comments	
1/2 in deflection	
Last saved with RSPile version	3.005

Soil Layers

Layer Name	Color	Layer Type	Thickness [ft]	Depth [ft]
Fill		Silt (Cemented C - Phi Coil)	10	-680
Bedrock		Silt (Cemented C - Phi Coil)	70	-670



Soil Properties

Fill

Property	Value
Name	Fill
Color	
Soil Type	Silt (Cemented C - Phi Coil)
Unit Weight (lbs/ft3)	120
Sat. Unit Weight (lbs/ft3)	130

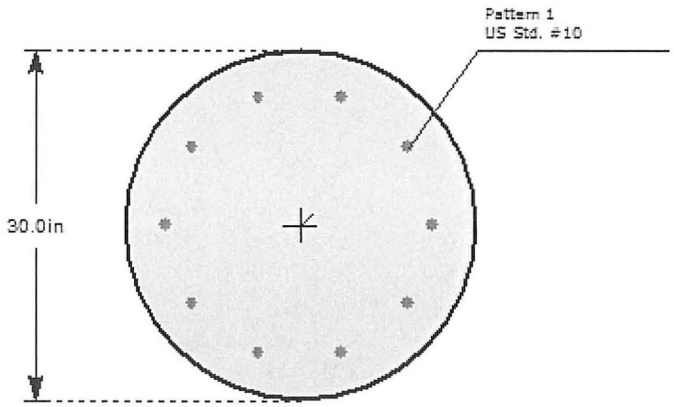
Bedrock

Property	Value
Name	Bedrock
Color	
Soil Type	Silt (Cemented C - Phi Coil)
Unit Weight (lbs/ft3)	130
Sat. Unit Weight (lbs/ft3)	140

Pile Properties

Pile Property 1

Property	Value
Name	Pile Property 1
Color	
Pile Type	Reinforced Concrete
Pile Cross Section	Circular
Diameter (ft)	2.5
Compressive Strength (psf)	5.2e+08



Reinforcement Pattern 1	
Rebar Size	US Std. #10
Yield Stress (psf)	8640000
Elastic Modulus (psf)	4176000000

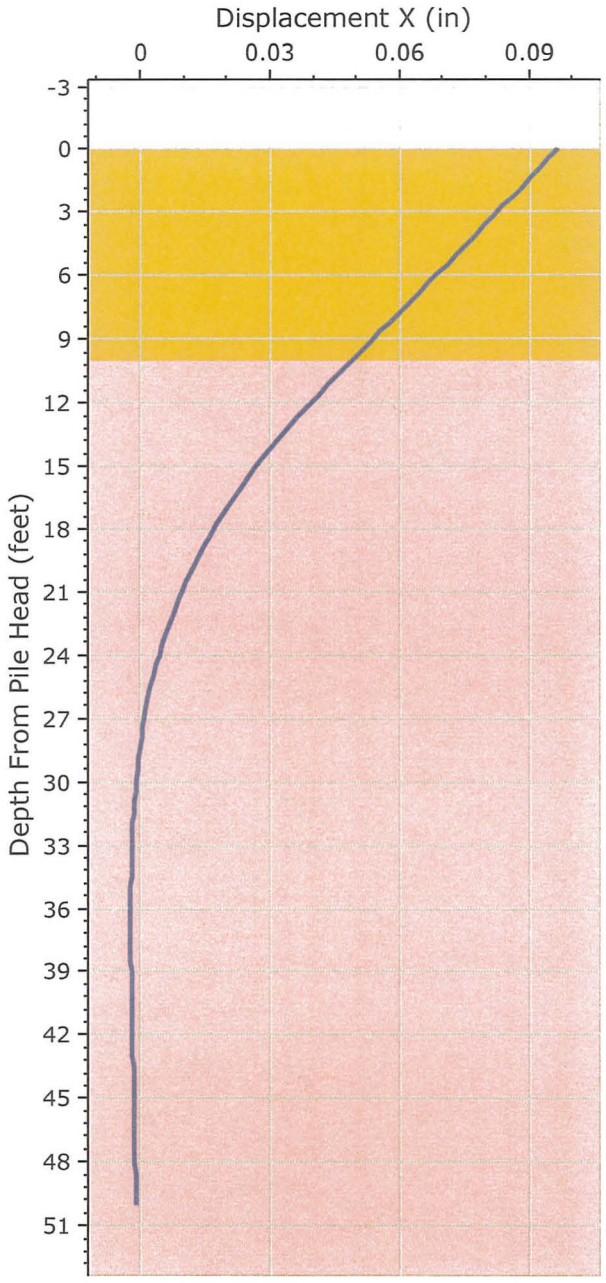
Pattern 1 Bar Locations

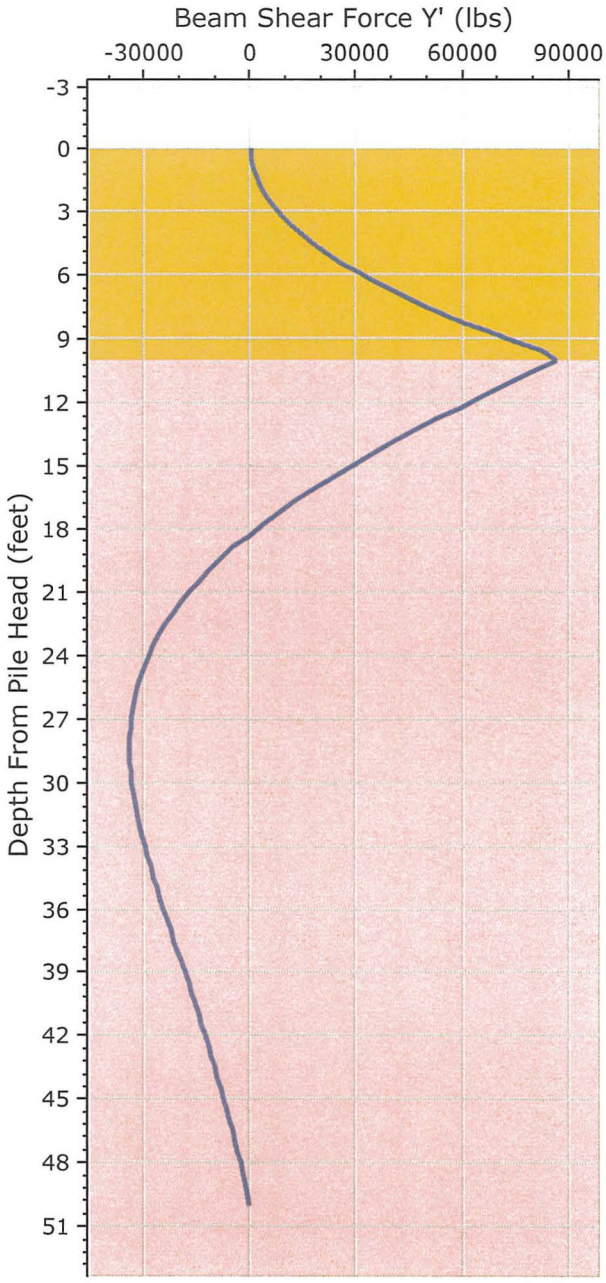
#	X (ft)	Y (ft)
1	11.365	0.000
2	9.194	6.680
3	3.512	10.809
4	-3.512	10.809
5	-9.194	6.680
6	-11.365	0.000
7	-9.194	-6.680
8	-3.512	-10.809
9	3.512	-10.809
10	9.194	-6.680

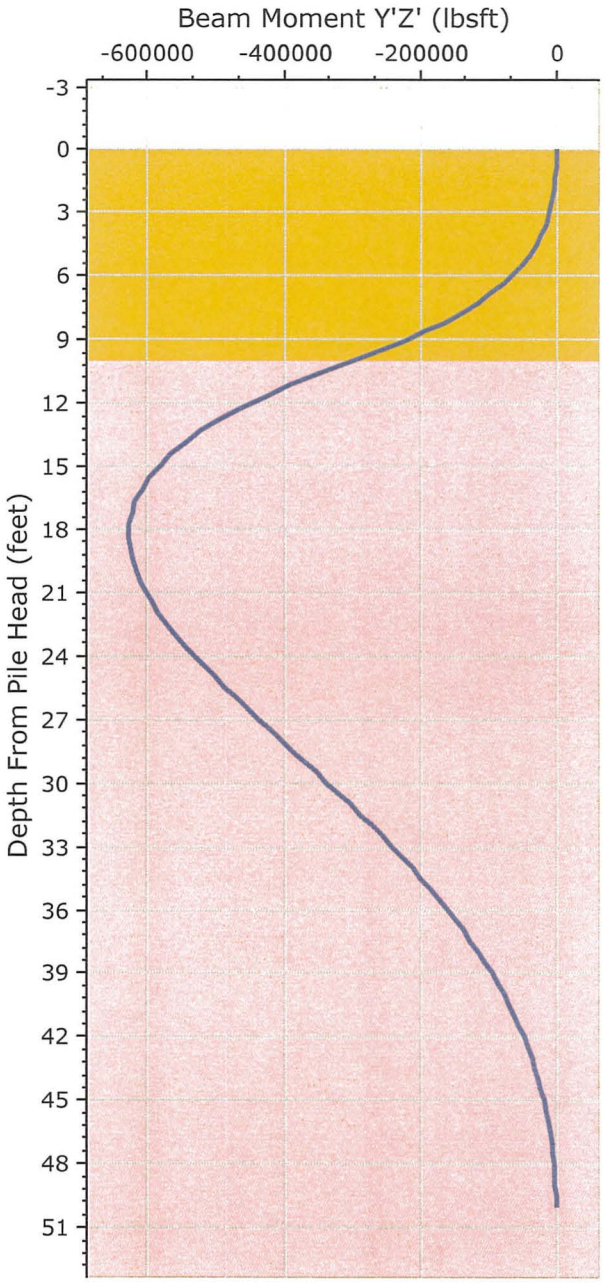
Pile Settings

Pile 1

General			
Property		Pile Property 1	
Location		0, 0	
Elevation (ft)		680	
Length (ft)		50	
Orientation			
Ground Slope Angle (°)		0	
Alpha Angle (°)		0	
Beta Angle (°)		90	
Rotation Angle (°)		0	
Loading			
Loading Type		Static	
Load Factor Profile		None	
Type	Value	Depth	
Force Z, (lbs)	400000	0	
Soil Displacement (in)	0.5		
Sliding Depth (ft)	10		







Geotechnologies, Inc.
Consulting Geotechnical Engineers

RSPILE 3.005

Project	File No. 21578 Hilton Los Angeles/ Universal		
Analysis Description	36 inch diameter, 10 foot fill depth		
Reinforcement:	1/2 in deflection	*Comment*	Geotechnologies,Inc.
Criteria:		*File Name*	21578 36in fill 10.rspile2

rocscience

File No. 21578 Hilton Los Angeles/ Universal
RTK
Geotechnologies,Inc.
Report Created Date: 2022/09/13, 13:30:39
Software Version: 3.005

Table of Contents

Project Summary 3
Soil Layers 4
Soil Properties 5
    Fill 5
    Bedrock 5
Pile Properties 6
    Pile Property 1 6
Pile Settings 7
    Pile 1 7

RSPile Analysis Information

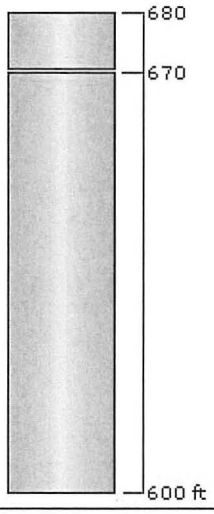
File No. 21578 Hilton Los Angeles/ Universal

Project Summary

Document Name	21578 36in fill 10.rspile2
Project Title	File No. 21578 Hilton Los Angeles/ Universal
Analysis	36 inch diameter, 10 foot fill depth
Author	RTK
Company	Geotechnologies,Inc.
Date Created	9/13/2022, 12:32:51 PM
Comments	
1/2 in deflection	
Last saved with RSPile version	3.005

Soil Layers

Layer Name	Color	Layer Type	Thickness [ft]	Depth [ft]
Fill		Silt (Cemented C - Phi Coil)	10	-680
Bedrock		Silt (Cemented C - Phi Coil)	70	-670



Soil Properties

Fill

Property	Value
Name	Fill
Color	
Soil Type	Silt (Cemented C - Phi Coil)
Unit Weight (lbs/ft3)	120
Sat. Unit Weight (lbs/ft3)	130

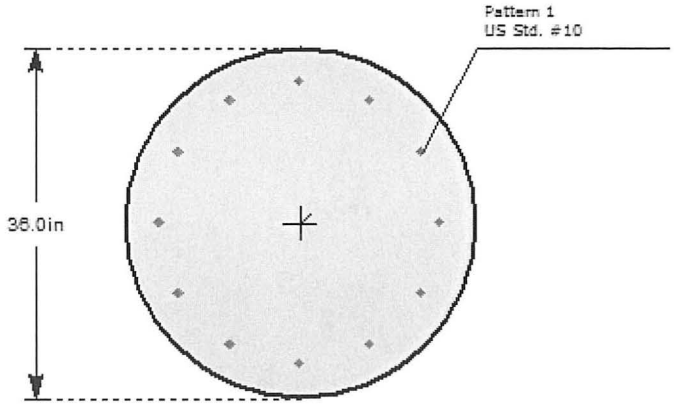
Bedrock

Property	Value
Name	Bedrock
Color	
Soil Type	Silt (Cemented C - Phi Coil)
Unit Weight (lbs/ft3)	130
Sat. Unit Weight (lbs/ft3)	140

Pile Properties

Pile Property 1

Property	Value
Name	Pile Property 1
Color	
Pile Type	Reinforced Concrete
Pile Cross Section	Circular
Diameter (ft)	3
Compressive Strength (psf)	5.2e+08



Reinforcement Pattern 1	
Rebar Size	US Std. #10
Yield Stress (psf)	8640000
Elastic Modulus (psf)	4176000000

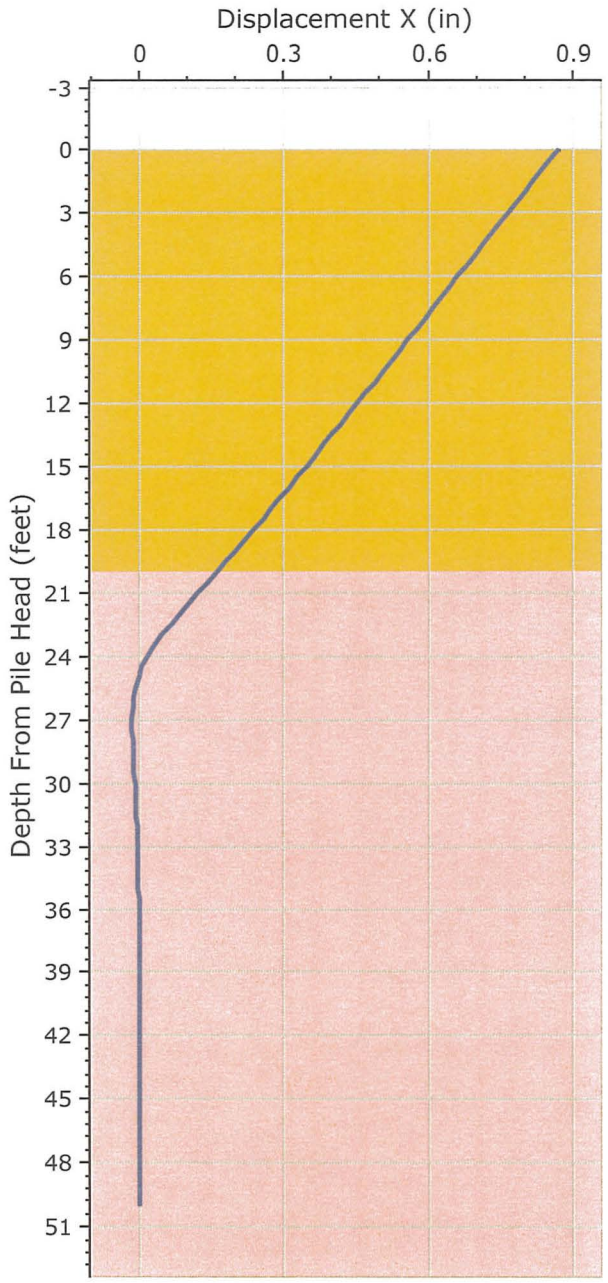
Pattern 1 Bar Locations

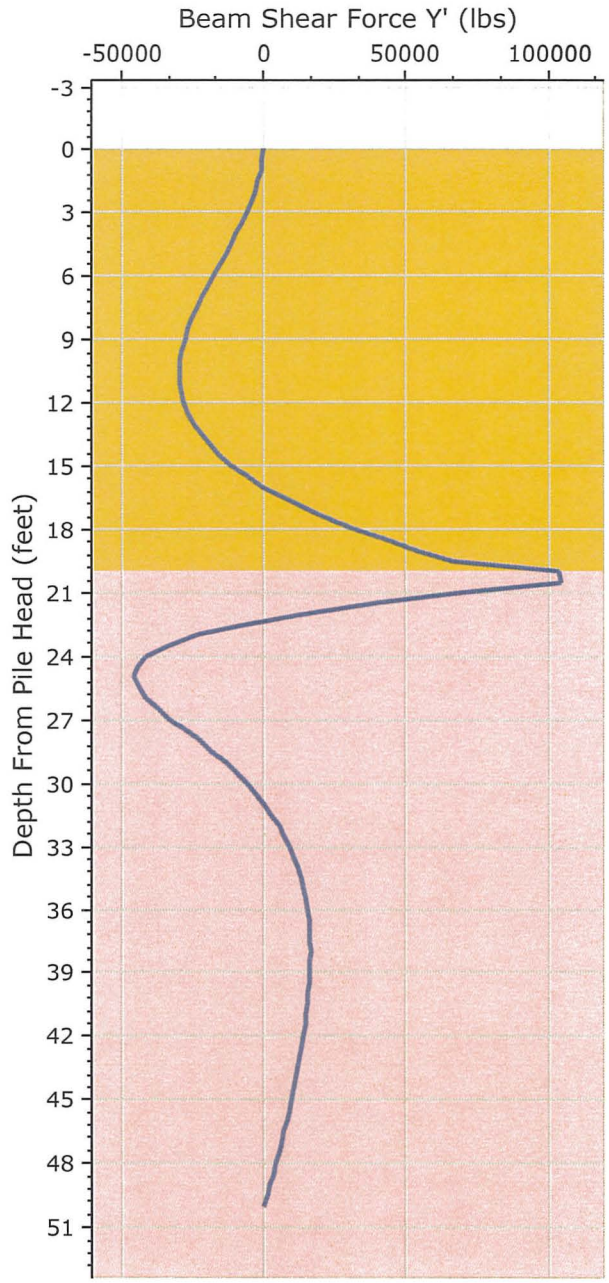
#	X (ft)	Y (ft)
1	14.365	0.000
2	12.440	7.182
3	7.183	12.440
4	0.000	14.365
5	-7.182	12.440
6	-12.440	7.183
7	-14.365	0.000
8	-12.440	-7.182
9	-7.183	-12.440
10	-0.000	-14.365
11	7.182	-12.440
12	12.440	-7.183

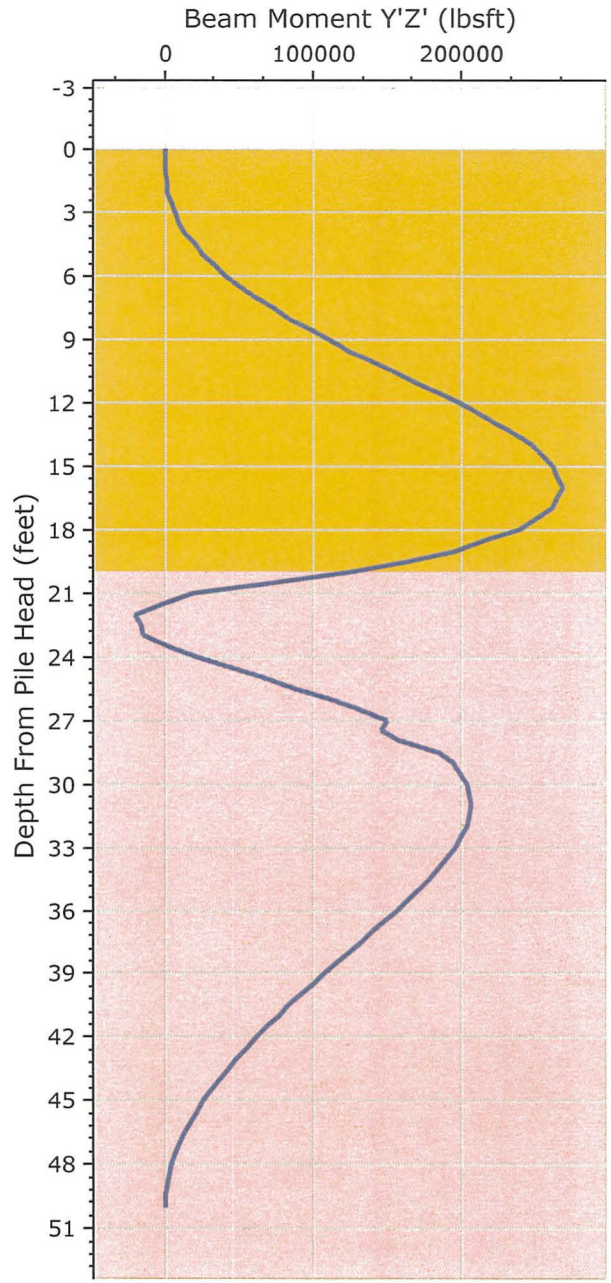
Pile Settings

Pile 1

General			
Property		Pile Property 1	
Location		0, 0	
Elevation (ft)		680	
Length (ft)		50	
Orientation			
Ground Slope Angle (°)		0	
Alpha Angle (°)		0	
Beta Angle (°)		90	
Rotation Angle (°)		0	
Loading			
Loading Type		Static	
Load Factor Profile		None	
Type		Value	Depth
Force Z, (lbs)		400000	0
Soil Displacement (in)	0.5		
Sliding Depth (ft)	10		







Geotechnologies, Inc. Consulting Geotechnical Engineers	*Project*	File No. 21578 Hilton Los Angeles/ Universal	
	Analysis Description	24 inch diameter, 20 footh fill depth	
	Reinforcement:	1/2 in deflection	*Comment* Geotechnologies,Inc.
RSPILE 3.005	*Criteria:*		*File Name* 21578 24in Fill 20.rspile2

rocscience

File No. 21578 Hilton Los Angeles/ Universal
RTK
Geotechnologies,Inc.
Report Created Date: 2022/09/13, 13:36:57
Software Version: 3.005

Table of Contents

Project Summary 3
Soil Layers 4
Soil Properties 5
    Fill 5
    Bedrock 5
Pile Properties 6
    Pile Property 1 6
Pile Settings 7
    Pile 1 7

RSPile Analysis Information

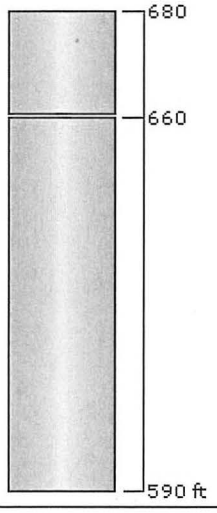
File No. 21578 Hilton Los Angeles/ Universal

Project Summary

Document Name	21578 24in Fill 20.rspile2
Project Title	File No. 21578 Hilton Los Angeles/ Universal
Analysis	24 inch diameter, 20 footh fill depth
Author	RTK
Company	Geotechnologies,Inc.
Date Created	9/13/2022, 12:32:51 PM
Comments	
1/2 in deflection	
Last saved with RSPile version	3.005

Soil Layers

Layer Name	Color	Layer Type	Thickness [ft]	Depth [ft]
Fill		Silt (Cemented C - Phi Coil)	20	-680
Bedrock		Silt (Cemented C - Phi Coil)	70	-660



Soil Properties

Fill

Property	Value
Name	Fill
Color	
Soil Type	Silt (Cemented C - Phi Coil)
Unit Weight (lbs/ft3)	120
Sat. Unit Weight (lbs/ft3)	130

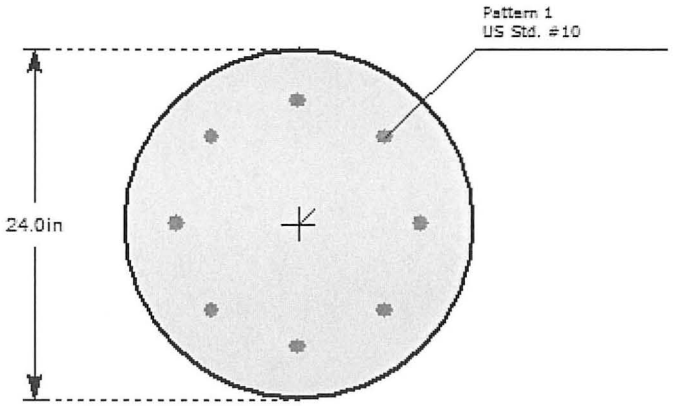
Bedrock

Property	Value
Name	Bedrock
Color	
Soil Type	Silt (Cemented C - Phi Coil)
Unit Weight (lbs/ft3)	130
Sat. Unit Weight (lbs/ft3)	140

Pile Properties

Pile Property 1

Property	Value
Name	Pile Property 1
Color	
Pile Type	Reinforced Concrete
Pile Cross Section	Circular
Diameter (ft)	2
Compressive Strength (psf)	5.2e+08



Reinforcement Pattern 1	
Rebar Size	US Std. #10
Yield Stress (psf)	8640000
Elastic Modulus (psf)	4176000000

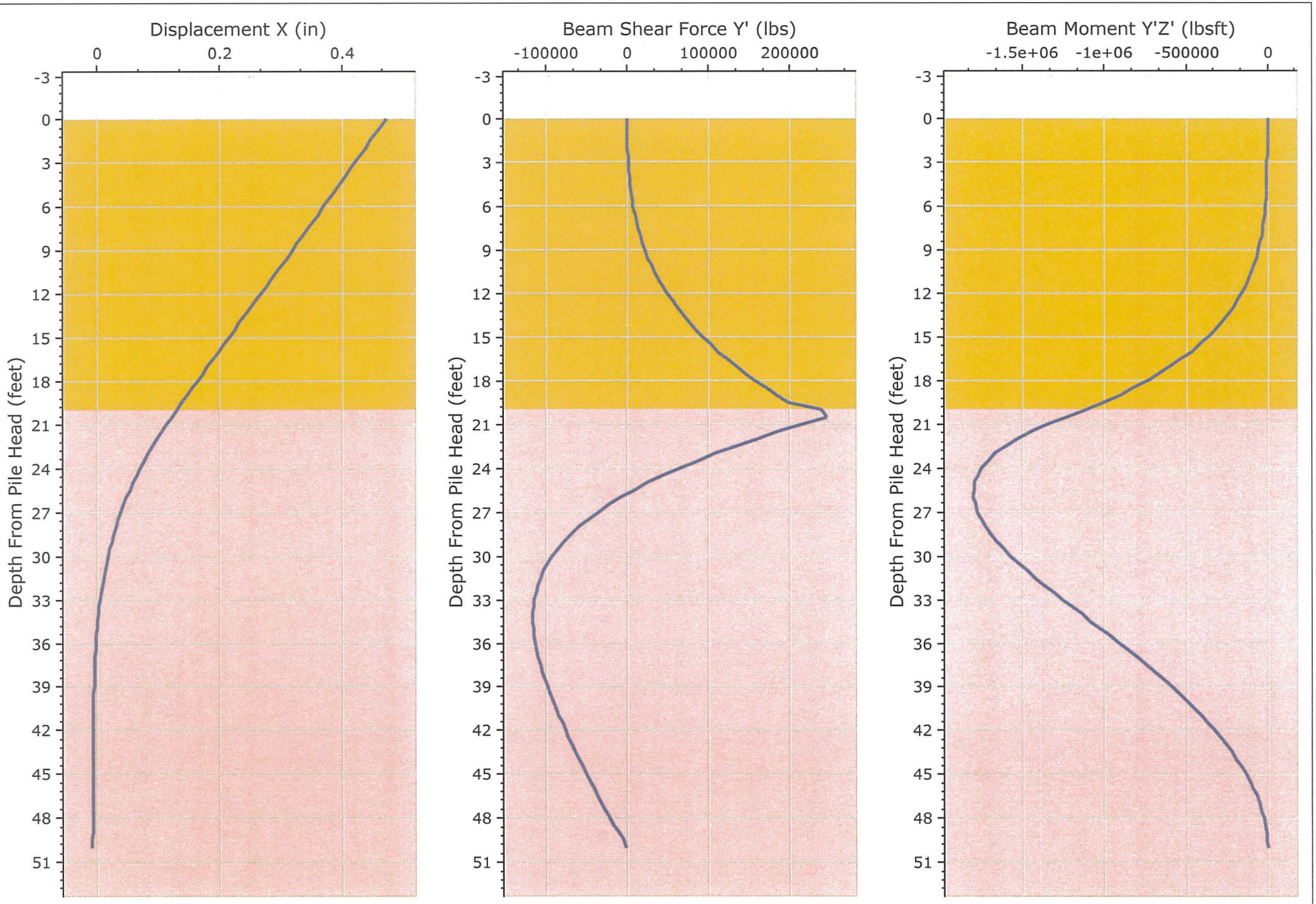
Pattern 1 Bar Locations

#	X (ft)	Y (ft)
1	8.365	0.000
2	5.915	5.915
3	0.000	8.365
4	-5.915	5.915
5	-8.365	0.000
6	-5.915	-5.915
7	-0.000	-8.365
8	5.915	-5.915

Pile Settings

Pile 1

General			
Property		Pile Property 1	
Location		0, 0	
Elevation (ft)		680	
Length (ft)		50	
Orientation			
Ground Slope Angle (°)		0	
Alpha Angle (°)		0	
Beta Angle (°)		90	
Rotation Angle (°)		0	
Loading			
Loading Type		Static	
Load Factor Profile		None	
Type		Value	Depth
Force Z, (lbs)		400000	0
Soil Displacement (in)	0.5		
Sliding Depth (ft)	20		



Geotechnologies, Inc.
Consulting Geotechnical Engineers

RSPILE 3.005

Project	File No. 21578 Hilton Los Angeles/ Universal		
Analysis Description	30 inch diameter, 20 foot fill depth		
Reinforcement:	1/2 in deflection	*Comment*	Geotechnologies,Inc.
Criteria:		*File Name*	21578 30in Fill 20.rspile2

rocscience

File No. 21578 Hilton Los Angeles/ Universal
RTK
Geotechnologies,Inc.
Report Created Date: 2022/09/13, 13:39:03
Software Version: 3.005

Table of Contents

Project Summary 3
Soil Layers 4
Soil Properties 5
    Fill 5
    Bedrock 5
Pile Properties 6
    Pile Property 1 6
Pile Settings 7
    Pile 1 7

RSPile Analysis Information

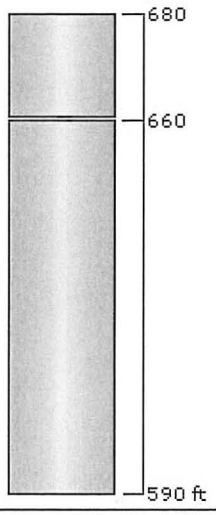
File No. 21578 Hilton Los Angeles/ Universal

Project Summary

Document Name	21578 30in Fill 20.rspile2
Project Title	File No. 21578 Hilton Los Angeles/ Universal
Analysis	30 inch diameter, 20 foot fill depth
Author	RTK
Company	Geotechnologies,Inc.
Date Created	9/13/2022, 12:32:51 PM
Comments	
1/2 in deflection	
Last saved with RSPile version	3.005

Soil Layers

Layer Name	Color	Layer Type	Thickness [ft]	Depth [ft]
Fill		Silt (Cemented C - Phi Coil)	20	-680
Bedrock		Silt (Cemented C - Phi Coil)	70	-660



Soil Properties

Fill

Property	Value
Name	Fill
Color	
Soil Type	Silt (Cemented C - Phi Coil)
Unit Weight (lbs/ft3)	120
Sat. Unit Weight (lbs/ft3)	130

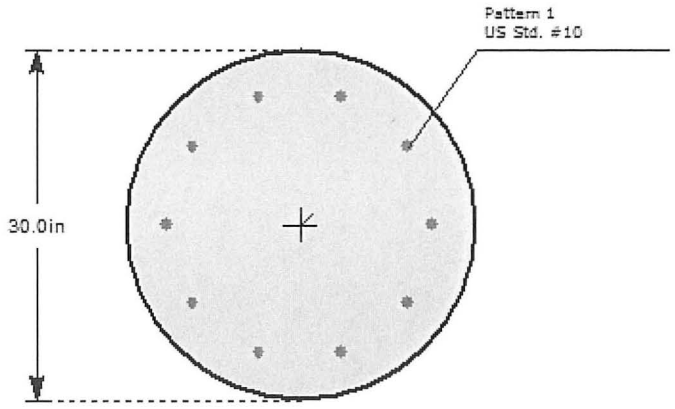
Bedrock

Property	Value
Name	Bedrock
Color	
Soil Type	Silt (Cemented C - Phi Coil)
Unit Weight (lbs/ft3)	130
Sat. Unit Weight (lbs/ft3)	140

Pile Properties

Pile Property 1

Property	Value
Name	Pile Property 1
Color	
Pile Type	Reinforced Concrete
Pile Cross Section	Circular
Diameter (ft)	2.5
Compressive Strength (psf)	5.2e+08



Reinforcement Pattern 1	
Rebar Size	US Std. #10
Yield Stress (psf)	8640000
Elastic Modulus (psf)	4176000000

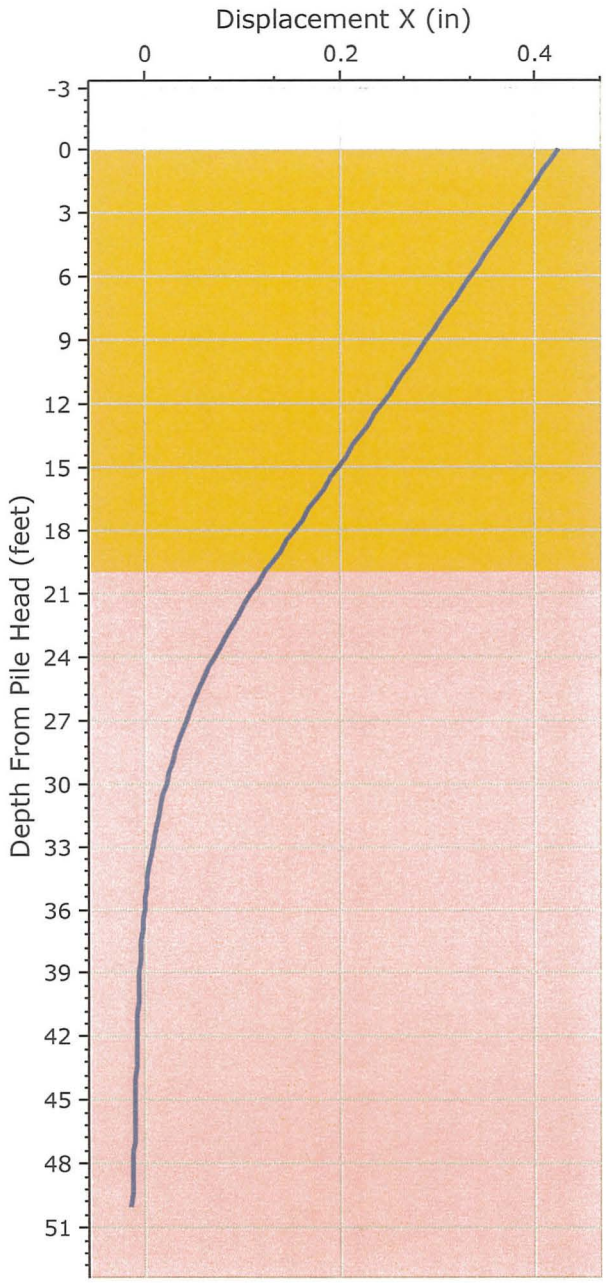
Pattern 1 Bar Locations

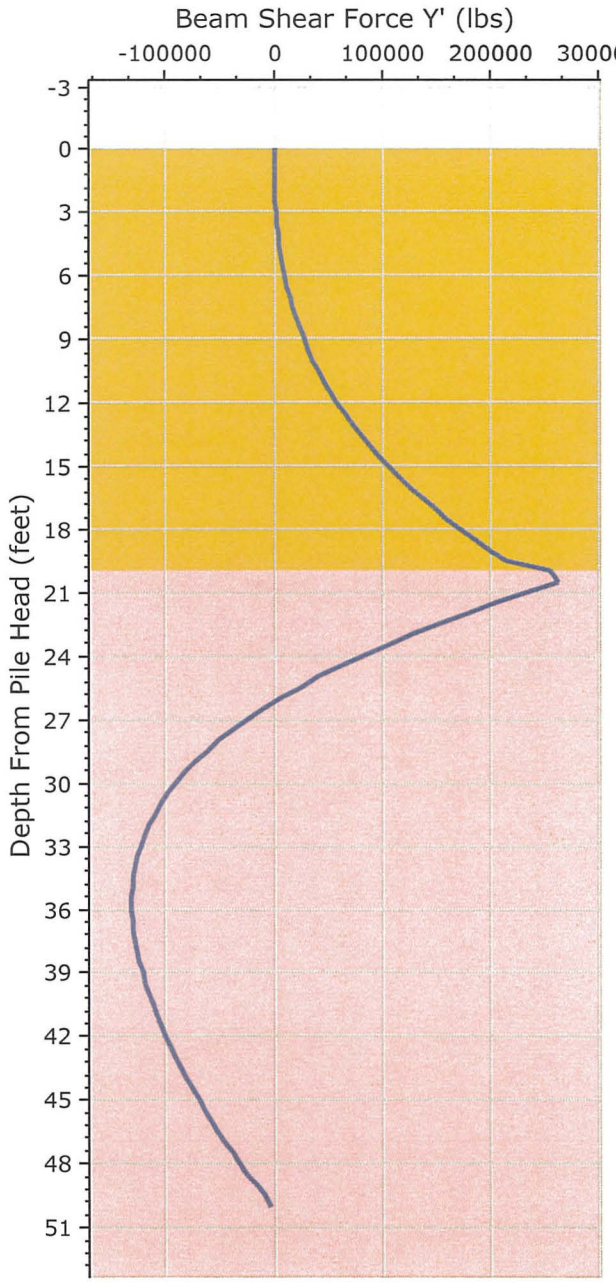
#	X (ft)	Y (ft)
1	11.365	0.000
2	9.194	6.680
3	3.512	10.809
4	-3.512	10.809
5	-9.194	6.680
6	-11.365	0.000
7	-9.194	-6.680
8	-3.512	-10.809
9	3.512	-10.809
10	9.194	-6.680

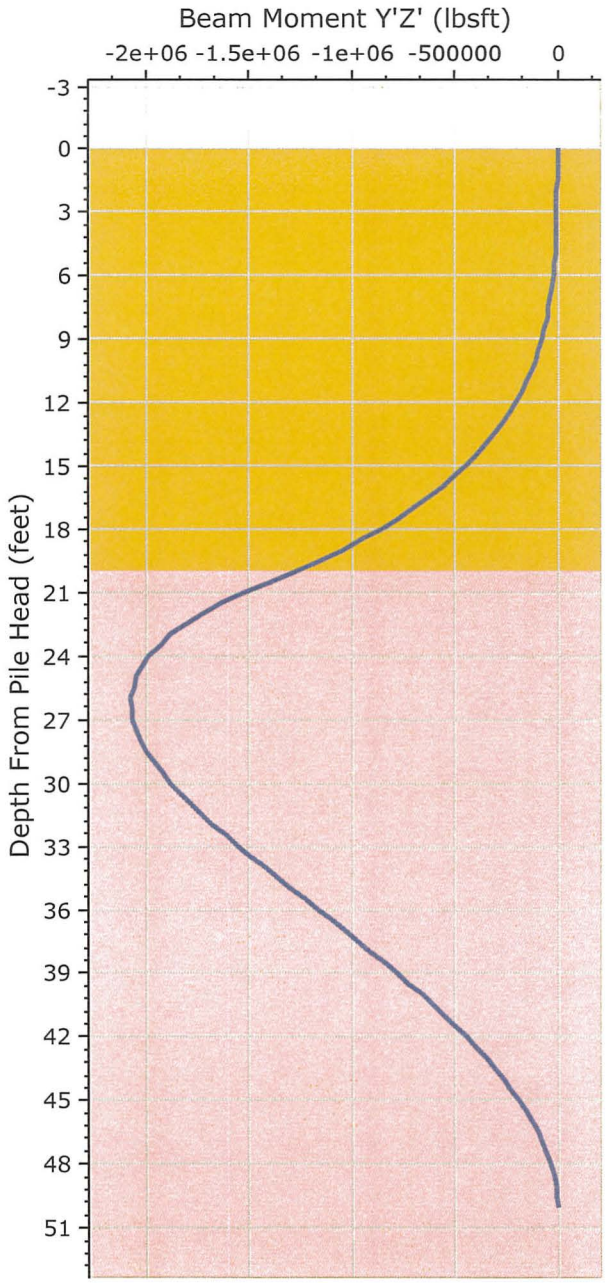
Pile Settings

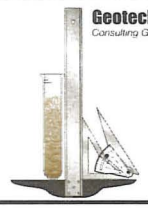
Pile 1

General			
Property		Pile Property 1	
Location		0, 0	
Elevation (ft)		680	
Length (ft)		50	
Orientation			
Ground Slope Angle (°)		0	
Alpha Angle (°)		0	
Beta Angle (°)		90	
Rotation Angle (°)		0	
Loading			
Loading Type		Static	
Load Factor Profile		None	
Type		Value	Depth
Force Z, (lbs)		400000	0
Soil Displacement (in)	0.5		
Sliding Depth (ft)	20		









Geotechnologies, Inc.
Consulting Geotechnical Engineers

RSPILE 3.005

Project	File No. 21578 Hilton Los Angeles/ Universal		
Analysis Description	36 inch diameter, 20 foot fill depth		
Reinforcement:	1/2 in deflection	*Comment*	Geotechnologies,Inc.
Criteria:		*File Name*	21578 36in Fill 20.rspile2

rocscience

File No. 21578 Hilton Los Angeles/ Universal
RTK
Geotechnologies,Inc.
Report Created Date: 2022/09/13, 13:41:55
Software Version: 3.005

Table of Contents

Project Summary 3
Soil Layers 4
Soil Properties 5
    Fill 5
    Bedrock 5
Pile Properties 6
    Pile Property 1 6
Pile Settings 7
    Pile 1 7

RSPile Analysis Information

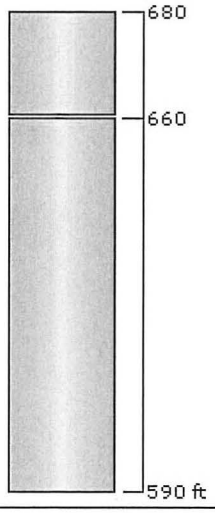
File No. 21578 Hilton Los Angeles/ Universal

Project Summary

Document Name	21578 36in Fill 20.rspile2
Project Title	File No. 21578 Hilton Los Angeles/ Universal
Analysis	36 inch diameter, 20 foot fill depth
Author	RTK
Company	Geotechnologies,Inc.
Date Created	9/13/2022, 12:32:51 PM
Comments	
1/2 in deflection	
Last saved with RSPile version	3.005

Soil Layers

Layer Name	Color	Layer Type	Thickness [ft]	Depth [ft]
Fill		Silt (Cemented C - Phi Coil)	20	-680
Bedrock		Silt (Cemented C - Phi Coil)	70	-660



Soil Properties

Fill

Property	Value
Name	Fill
Color	
Soil Type	Silt (Cemented C - Phi Coil)
Unit Weight (lbs/ft3)	120
Sat. Unit Weight (lbs/ft3)	130

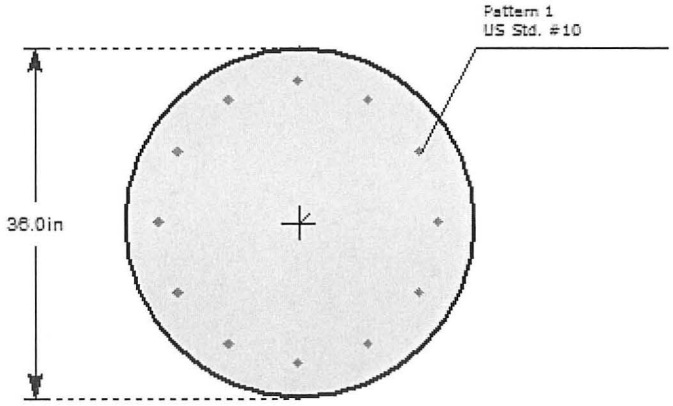
Bedrock

Property	Value
Name	Bedrock
Color	
Soil Type	Silt (Cemented C - Phi Coil)
Unit Weight (lbs/ft3)	130
Sat. Unit Weight (lbs/ft3)	140

Pile Properties

Pile Property 1

Property	Value
Name	Pile Property 1
Color	
Pile Type	Reinforced Concrete
Pile Cross Section	Circular
Diameter (ft)	3
Compressive Strength (psf)	5.2e+08



Reinforcement Pattern 1	
Rebar Size	US Std. #10
Yield Stress (psf)	8640000
Elastic Modulus (psf)	4176000000

Pattern 1 Bar Locations

#	X (ft)	Y (ft)
1	14.365	0.000
2	12.440	7.182
3	7.183	12.440
4	0.000	14.365
5	-7.182	12.440
6	-12.440	7.183
7	-14.365	0.000
8	-12.440	-7.182
9	-7.183	-12.440
10	-0.000	-14.365
11	7.182	-12.440
12	12.440	-7.183

Pile Settings

Pile 1

General			
Property		Pile Property 1	
Location		0, 0	
Elevation (ft)		680	
Length (ft)		50	
Orientation			
Ground Slope Angle (°)		0	
Alpha Angle (°)		0	
Beta Angle (°)		90	
Rotation Angle (°)		0	
Loading			
Loading Type		Static	
Load Factor Profile		None	
Type	Value	Depth	
Force Z, (lbs)	400000	0	
Soil Displacement (in)	0.5		
Sliding Depth (ft)	20		

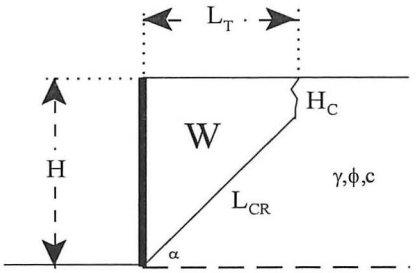
Geotechnologies, Inc.

Project: G.H. Palmer
File No.: 21767
Description: Cantilever Retaining Walls up to 20 feet

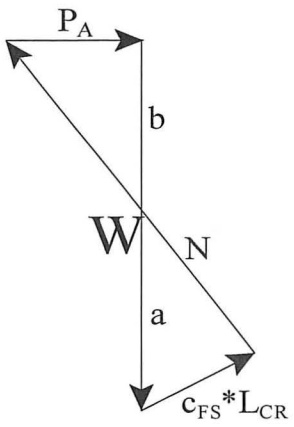
Retaining Wall Design with Level Backfill
(Vector Analysis)

Input:

Retaining Wall Height	(H)	20.00 feet
Unit Weight of Retained Soils	(γ)	120.0 pcf
Friction Angle of Retained Soils	(ϕ)	26.0 degrees
Cohesion of Retained Soils	(c)	545.0 psf
Factor of Safety	(FS)	1.50
Factored Parameters:	(ϕ_{FS})	18.0 degrees
	(c_{FS})	363.3 psf



Failure Angle (α) degrees	Height of Tension Crack (H_C) feet	Area of Wedge (A) feet^2	Weight of Wedge (W) lbs/lineal foot	Length of Failure Plane (L_{CR}) feet	a lbs/lineal foot	b lbs/lineal foot	Active Pressure (P_A) lbs/lineal foot
40	10.0	178	21395.4	15.5	14300.8	7094.5	2864.6
41	9.8	175	21021.5	15.6	13797.1	7224.5	3064.8
42	9.5	172	20601.9	15.6	13298.0	7303.9	3250.0
43	9.3	168	20147.8	15.7	12808.9	7338.8	3420.2
44	9.1	164	19667.8	15.6	12333.4	7334.4	3575.3
45	9.0	160	19168.8	15.6	11873.5	7295.3	3715.2
46	8.8	155	18656.1	15.5	11430.4	7225.8	3840.0
47	8.7	151	18133.9	15.4	11004.5	7129.3	3949.9
48	8.6	147	17605.2	15.3	10595.9	7009.3	4044.8
49	8.5	142	17072.7	15.2	10204.4	6868.4	4124.9
50	8.5	138	16538.4	15.1	9829.2	6709.2	4190.4
51	8.4	133	16003.6	14.9	9469.7	6533.9	4241.2
52	8.4	129	15469.7	14.8	9125.2	6344.5	4277.4
53	8.3	124	14937.4	14.6	8794.7	6142.7	4299.2
54	8.3	120	14407.4	14.4	8477.3	5930.1	4306.5
55	8.3	116	13880.1	14.2	8172.0	5708.0	4299.4
56	8.4	111	13355.7	14.0	7878.0	5477.7	4277.8
57	8.4	107	12834.5	13.8	7594.1	5240.4	4241.7
58	8.5	103	12316.4	13.6	7319.5	4996.9	4191.1
59	8.5	98	11801.4	13.4	7053.2	4748.3	4125.8
60	8.6	94	11289.4	13.2	6794.0	4495.3	4045.9
61	8.7	90	10780.0	12.9	6541.1	4238.9	3951.1
62	8.8	86	10273.0	12.6	6293.3	3979.7	3841.5
63	9.0	81	9768.0	12.4	6049.6	3718.4	3716.8
64	9.1	77	9264.6	12.1	5808.8	3455.8	3577.1
65	9.3	73	8762.3	11.8	5569.6	3192.6	3422.2



Design Equations (Vector Analysis):

$a = c_{FS}*L_{CR}*\sin(90+\phi_{FS})/\sin(\alpha-\phi_{FS})$

$b = W-a$

$P_A = b*\tan(\alpha-\phi_{FS})$

$EFP = 2*P_A/H^2$

Maximum Active Pressure Resultant

$P_{A,\,max}$ 4306.53 lbs/lineal foot

Equivalent Fluid Pressure (per lineal foot of wall)

$EFP = 2*P_A/H^2$

EFP 21.5 pcf

Design Wall for an Equivalent Fluid Pressure: 30 pcf

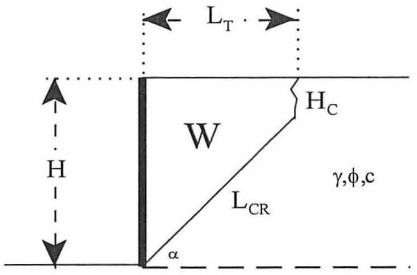
Geotechnologies, Inc.

Project: G.H. Palmer
File No.: 21767
Description: Cantilever Retaining Walls up to 30 feet

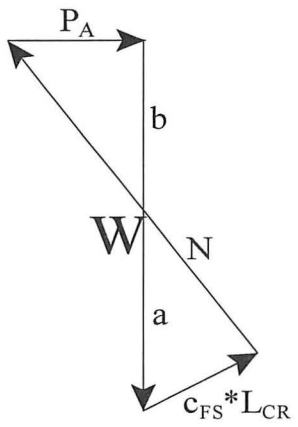
Retaining Wall Design with Level Backfill
(Vector Analysis)

Input:

Retaining Wall Height	(H)	30.00 feet
Unit Weight of Retained Soils	(γ)	120.0 pcf
Friction Angle of Retained Soils	(ϕ)	26.0 degrees
Cohesion of Retained Soils	(c)	545.0 psf
Factor of Safety	(FS)	1.50
Factored Parameters:	(ϕ_{FS})	18.0 degrees
	(c_{FS})	363.3 psf



Failure Angle (α) degrees	Height of Tension Crack (H_C) feet	Area of Wedge (A) $feet^2$	Weight of Wedge (W) lbs/lineal foot	Length of Failure Plane (L_{CR}) feet	a lbs/lineal foot	b lbs/lineal foot	Active Pressure (P_A) lbs/lineal foot
40	10.0	476	57148.0	31.1	28657.9	28490.0	11503.7
41	9.8	463	55532.6	30.8	27282.9	28249.7	11984.2
42	9.5	449	53920.3	30.6	25999.8	27920.5	12423.9
43	9.3	436	52318.8	30.3	24802.5	27516.3	12823.9
44	9.1	423	50733.7	30.0	23685.0	27048.7	13185.4
45	9.0	410	49168.8	29.7	22641.4	26527.4	13509.3
46	8.8	397	47626.8	29.4	21665.9	25960.9	13796.6
47	8.7	384	46109.3	29.1	20753.3	25356.0	14048.0
48	8.6	372	44617.3	28.8	19898.4	24718.9	14264.5
49	8.5	360	43151.3	28.5	19096.7	24054.6	14446.5
50	8.5	348	41711.3	28.1	18343.8	23367.5	14594.7
51	8.4	336	40297.1	27.8	17635.8	22661.3	14709.6
52	8.4	324	38908.3	27.5	16969.0	21939.3	14791.4
53	8.3	313	37544.0	27.1	16339.9	21204.1	14840.5
54	8.3	302	36203.6	26.8	15745.6	20458.1	14857.0
55	8.3	291	34886.3	26.4	15183.0	19703.3	14840.9
56	8.4	280	33591.0	26.1	14649.5	18941.5	14792.2
57	8.4	269	32316.7	25.8	14142.5	18174.2	14710.8
58	8.5	259	31062.5	25.4	13659.7	17402.8	14596.3
59	8.5	249	29827.2	25.1	13199.0	16628.3	14448.5
60	8.6	238	28609.9	24.7	12758.1	15851.8	14266.9
61	8.7	228	27409.2	24.3	12335.1	15074.1	14050.9
62	8.8	219	26224.3	24.0	11928.0	14296.2	13799.8
63	9.0	209	25053.8	23.6	11535.0	13518.8	13513.0
64	9.1	199	23896.6	23.2	11154.2	12742.5	13189.6
65	9.3	190	22751.5	22.8	10783.6	11967.9	12828.6



Design Equations (Vector Analysis):

$a = c_{FS}*L_{CR}*\sin(90+\phi_{FS})/\sin(\alpha-\phi_{FS})$

$b = W-a$

$P_A = b*\tan(\alpha-\phi_{FS})$

$EFP = 2*P_A/H^2$

Maximum Active Pressure Resultant

$P_{A,\,max}$ 14857.00 lbs/lineal foot

Equivalent Fluid Pressure (per lineal foot of wall)

$EFP = 2*P_A/H^2$

EFP 33.0 pcf

Design Wall for an Equivalent Fluid Pressure: 33 pcf

Geotechnologies, Inc.
Consulting Geotechnical Engineers
439 Western Avenue
Glendale, California 91201-2837
818.240.9600 • Fax 818.240.9675

Celebrating 50 YEARS OF SERVICE 1971-2021

December 8, 2022
File No. 21578

Hilton Los Angeles/Universal City
555 Universal Hollywood Drive
Los Angeles, California 91608

Attention: Mark Davis

Subject: Response to City of Los Angeles Soils Report Review Letter
Proposed Hilton Los Angeles/Universal City Expansion
555 Universal Hollywood Drive, Los Angeles, California

References: *Reports by Geotechnologies, Inc., (File No. 21578):*
Geotechnical Engineering Investigation, dated October 16, 2018;
Updated Geotechnical Engineering Investigation, dated November 20, 2020;
Updated Geotechnical Engineering Investigation, dated November 3, 2022.

Reports by Geotechnologies, Inc., (File No 21062):
Geotechnical Engineering Investigation dated December 17, 2015, Revised February 12, 2016;
Response to City of Los Angeles Geology and Soils Report Correction Letter, dated January 31, 2017.

City of Los Angeles Correspondence (File No. 21062):
Geology and Soils Report Correction Letter, Log # 95877, dated December 21, 2016;
Geology and Soils Report Approval Letter, Log # 95877-01, dated February 23, 2017.

City of Los Angeles Correspondence (File No. 21578):
Geology and Soils Report Review Letter, Log #123421, dated October 31, 2022.

Dear Mr. Davis:

This firm is in receipt of the referenced Geology and Soils Report Review Letter, dated October 31, 2022, issued by the City of Los Angeles, Department of Building and Safety. Therein, comments are made which requires input from this office. The comments are repeated below, and the response immediately follows. A copy of the review letter has been enclosed for reference.

Comment 1: *Regarding the slope stability analyses, provide responses to the following comments:*

a. Show on Geologic Map the retaining wall supported by piles, as shown on section D-D'.

b. It appears that a distributed load/resistance was modeled acting on wall face, as shown in slope stability analyses for sect 1-1'. Clarify if it is a distributed load, indicate if it acts as a load or resistance, specify the load direction and justify its use in the slope stability analyses.

c. Show all piles required to increase the factor of safety of southern and eastern slopes. Indicate the required pile resistance to increase the factor of safety of the slope to Code conforming values.

d. Provide additional slope stability analyses of the southern slope at location where additional resistance will not be provided by the soldier piles. The critical section appears to be in the N-S direction in the proximity of boring B2. However, other locations can be considered.

Comment 1a: *Show on Geologic Map the retaining wall supported by piles, as shown on section D-D'.*

Response 1a: Cross Section D-D' has been modified to reflect the finish floor elevation of the B4 level at 680 feet. Cross Section D-D' as well as the Geologic Map that shows the cross section location, are attached. The referenced piles are no longer needed to support a deck or support the slope. based on the cross section shown. The slope stability analysis has been updated and the printouts are attached.

The results are reported using Janbu's method of analysis which provided the most conservative results. The stability analyses indicated that the existing slope has a factor of safety greater than the City of Los Angeles, Department of Building and Safety's, minimum requirement of 1.5 for static conditions and 1.00 for pseudostatic conditions. The analysis parameters are the same as those provided in the reference report. The program output files are included in the Appendix. The results are summarized below.

SLOPE STABILITY ANALYSES RESULTS			
Cross Section	**Analysis Type**	**Condition**	**Factor of Safety**
D-D'	**Janbu (curved)**	**Static**	**1.98**
	Janbu (curved)	**Pseudo-static**	**1.02**
	Janbu (Planar)	**Static**	**2.00**
	Janbu (Planar)	**Pseudo-Static**	**1.03**

Discussion

The top of the slope is overlain with a layer of uncertified fill soil. It is recommended that the fill be removed to the bedrock surface downslope of the proposed structure within the site limits. The bedrock surface should be properly benched before the fill is replaced and recompacted. Hillside grading recommendations are presented in the referenced report. When replacing the fill, the ground surface should exceed elevation 700 feet.

Cross Section A-A' has also been modified to reflect the B4 finish floor elevation of 680 feet and is attached to this response letter.

Comment 1b. *It appears that a distributed load/resistance was modeled acting on wall face, as shown in slope stability analyses for sect 1-1'. Clarify if it is a distributed load, indicate if it acts as a load or resistance, specify the load direction and justify its use in the slope stability analyses.*

Response 1b: The modeled resistance is the pile shear strength needed along the pile to provide the required factors of safety. The shear strength is 90,000 pounds and perpendicular to the beam and opposite to the driving force direction. The minimum pile length needed for support is 25 feet as measured from the top of the beam. For purposes of wall design of the ascending slope, the wall should be designed for an equivalent Fluid pressure of 83 pcf using a triangular distribution.
A lateral seismic load of 29 psf with a triangular distribution should asl be applied where the wall height exceeds 6 feet. The slope is shown on the attached Cross Section I-I'.

The stability analysis was reevaluated using bottom of excavation depth of 715 feet instead of the elevation of 712. The change is due to a difference shallower over excavation requirement at the paved level.

The slope stability results are reported using Janbu's method of analysis which provided the most conservative results. The stability analyses indicated that the existing slope has a factor of safety greater than the City of Los Angeles, Department of Building and Safety's, minimum requirement of 1.5 for static conditions and 1.00 for pseudostatic conditions. The analysis parameters and soil properties are the same as those provided in the reference report. The program output files are included in the Appendix. The results are summarized below and the computer printouts are attached.

SLOPE STABILITY ANALYSES RESULTS			
Cross Section	**Analysis Type**	**Condition**	**Factor of Safety**
I-I'	**Janbu (curved)**	**Static**	**1.91**
	Janbu (curved)	**Pseudo-static**	**1.04**
	Janbu (Planar)	**Static**	**2.89**
	Janbu (Planar)	**Pseudo-Static**	**1.23**

Comment 1c. Show all piles required to increase the factor of safety of southern and eastern slopes. Indicate the required pile resistance to increase the factor of safety of the slope to Code conforming values.

Response 1c: The pile wall at the top of the of the southern slope is not needed considering the revised proposed structure design. The southern slopes is shown on Cross Section D-D'. On Cross Section I-I', at the location of the proposed at-grade parking, the pile wall is shown as an annotated single line. The individual piles are not shown on the Geologic Map. The location and design of the individual piles is the responsibility of the shoring engineer. The minimum pile parameters are described in the response to comment 1B above.

Comment 1d. Provide additional slope stability analyses of the southern slope at location where additional resistance will not be provided by the soldier piles. The critical section appears to be in the N-S direction in the proximity of boring B2. However, other locations can be considered.

Response 1d: A slope stability analysis was performed on Cross Section C-C' with illustrates the southern slope geometry near Boring 2 and will not be impacted by the proposed building construction. This area will not receive piles to support an elevated fill pad. It should be noted that a compacted fill pad or a trimmed slope is indicated in the cross section.

The slope stability results are reported using Janbu's method of analysis which provided the most conservative results. The stability analyses indicated that the existing slope has a factor of safety greater than the City of Los Angeles, Department of Building and Safety's, minimum requirement of 1.5 for static conditions and 1.00 for pseudostatic conditions. The analysis parameters and soil properties are the same as those provided in the reference report. The program output files are included in the Appendix. The results are summarized below.

SLOPE STABILITY Analysis RESULTS			
Cross Section	**Analysis Type**	**Condition**	**Factor of Safety**
C-C'	**Janbu (curved)**	**Static**	**2.01**
	Janbu (curved)	**Pseudo-static**	**1.03**
	Janbu (Planar)	**Static**	**2.14**
	Janbu (Planar)	**Pseudo-Static**	**1.07**

Comment 2: *The proposed improvements shall not surcharge the existing structures. The consultants indicated that end bearing caissons or friction piles may be considered to avoid surcharges. However, the report did not include any details about deep foundation construction to avoid surcharging of the existing structure. Indicate if isolated piles are recommended and provide the minimum depth of casing/isolation relative to the bottom of the existing structure. Note: As a minimum, the pile casing shall extend below a 1H:1V line projected upwards from the bottom of the existing structure.*

Response: Existing foundations shall not be surcharged. The original foundation plans for the existing structure are included in the geotechnical engineering report. The sheet numbers 2.0 through S-3.0 provide the location and design elevation of the footings for the existing structure. All new footings bust bear below a plane drawn upwards from the base of the existing footings. If piles are used for the proposed structure, the portion of the pile located above the 1 to 1 plane drawn upward from the existing foundation should be sleeved.

Comment 3: *Clarify the statement included on page 27 of 09/14/2022 report "the retaining wall be design to accommodate the surcharge load imposed by the new foundation". Note that the new construction shall not surcharge the existing structures.*

Response: The proposed Hotel Expansion will have a finish floor elevation at elevation 680 feet and will be located adjacent to the existing parking structure, as shown on Cross Section B-B'. During excavation to the basement level, the nearby existing footings will be undermined as determined by a 1 to 1 plane drawn downwards from the existing footing.

To avoid undermining the existing footings, they must be deepened to extend below the proposed basement level. As an alternative, the proposed shoring and the retaining walls must be designed to accommodate the surcharge load from the adjacent structure.

Comment 4: *The consultants indicated that the piles shall be spaced at least 2.5 diameter on center to avoid group effects reduction of axial capacity. However, the Code requires analysis for the group effects on axial behavior where the center-to-center*

spacing of deep foundation elements is less than three times the least horizontal dimension of an element. The Code also requires analysis for the group effects on lateral behavior where the center-to-center spacing of deep foundation elements in the direction of lateral force is less than eight times the least horizontal dimension of an element. Where this occurs for the proposed pile layout, provide said recommendations for reduction factors as appropriate. (1810.2.5).

Response: Single piles may be classified as isolated piles when spaced at or greater than 8 diameters on center. Where piles will be spaced closer than 8 diameters on center in the direction of loading, the following table presents the reduction factor should be utilized to determine the allowable lateral pile capacities to maintain a ½-inch pile deflection.

REDUCTION FACTORS FOR PILES SPACED CLOSER THAN 8 DIAMETERS ON CENTER	
Pile Spacing (where B is the diameter of the proposed piles)	**Percentage of Passive Resistance**
7B	70%
6B	55%
5B	45%
4B	38%
3B	33%

Lateral capacities provided are for drilled, cast-in-place concrete piles, penetrating siltstone bedrock encountered during the course of this investigation.

Comment 5: *Provide ABC slot-cut calculations considering the maximum height and width of the slot, and surcharge load from the existing foundation.*

Response: Given the size and loading of the foundations on the existing adjacent structure, slot cuts along the north side of the proposed structure are not recommended. Slot cuts may be considered where than excavation wall is not surcharged. In cases with the cut is surcharged, temporary shoring should be utilized. The A-B-C slot cut recommendations.

The slot cutting method employs the earth as a buttress and allows the earth excavation to proceed in phases. The initial excavation is made at a uniform 1:1 slope. Alternate "A" slots of 8 feet may be worked. The remaining earth buttresses ("B" and "C" slots) should each be 8 feet in width for a combined intervening length

of 16 feet. The retaining wall should be completed and backfilled in the "A" slots before the "B" slots are excavated. After completing and backfilling the wall in the "B" slots, finally the "C" slots may be excavated. Where the retaining wall in the "A" and/or "B" slots is to be braced, the bracing should be designed for a triangular pressure distribution a minimum equivalent fluid pressure of 25 pounds per cubic foot.

Geotechnologies, Inc. appreciates the opportunity to provide our services on this project. Should you have any questions please contact this office.

Respectfully submitted,
GEOTECHNOLOGIES, INC.

REINARD T. KNUR
G.E. 2755

RTK:km

Enclosure: Soils Report Review Letter dated October 31, 2022 (3 pages)
Geologic Map
Cross Section A-A'
Cross Section B-B'
Cross Section C-C'
Cross Section D-D'
Cross Section H-H'
Cross Section I - I'
Cross Section J-J'
SLIDE Printouts Cross Section C-C' (68 pages)
SLIDE Printouts Cross Section D-D' (65 pages)
SLIDE Printouts Cross Section I-I' (71 pages)
Calculation Sheets (3 pages)

Distribution: (1) Addressee
(2) City of Los Angeles, Department of Building and Safety

Email to: [mdavis@hiltonuniversal.com], Attn: Mark Davis
[mqiao@upcsf.com], Attn: Michael Qiao
[achen@thebaylands.com], Attn: Anthony Chen
[travist@ankrommoisan.com], Attn: Travis Throckmorton

CITY OF LOS ANGELES
CALIFORNIA

BOARD OF
BUILDING AND SAFETY
COMMISSIONERS

JAVIER NUNEZ
PRESIDENT

ELVIN W. MOON
VICE PRESIDENT

JOSELYN GEAGA-ROSENTHAL
LAUREL GILLETTE
GEORGE HOVAGUIMIAN

ERIC GARCETTI
MAYOR

DEPARTMENT OF
BUILDING AND SAFETY
201 NORTH FIGUEROA STREET
LOS ANGELES, CA 90012

OSAMA YOUNAN, P.E.
GENERAL MANAGER
SUPERINTENDENT OF BUILDING

JOHN WEIGHT
EXECUTIVE OFFICER

GEOLOGY AND SOILS REPORT REVIEW LETTER

October 31, 2022

LOG # 123421
SOILS/GEOLOGY FILE - 2
LAN

Hilton Los Angeles, Universal City
555 Universal Hollywood Drive
Los Angeles, CA 91608

TRACT: 5569
LOT(S): B
LOCATION: 555 Universal Hollywood Drive

CURRENT REFERENCE REPORT/LETTER(S)	REPORT No.	DATE OF DOCUMENT	PREPARED BY
Update Report	21578	09/14/2022	Geotechnologies, Inc.
Oversized Doc(s).	"	"	"

PREVIOUS REFERENCE REPORT/LETTER(S)	REPORT No.	DATE OF DOCUMENT	PREPARED BY
Dept. Approval Letter	95877-01	02/23/2017	LADBS
Addendum Report	21062	01/31/2017	Geotechnologies, Inc.
Dept. Correction Letter	95877	12/21/2016	LADBS
Geology/Soils Report	21062	12/17/2015 rev. 02/12/2016	Geotechnologies, Inc.

The Grading Division of the Department of Building and Safety has reviewed the referenced update report that provides recommendations for proposed additions to the Hilton Hotel at Universal City. The Department previously conditionally approved the above previous referenced reports for a proposed hotel addition in a letter dated 02/23/2017, Log #95877-01.

According to the current report, the proposed addition has been expanded. There is still an addition that will be located south of the existing hotel structure where currently there are descending slopes about 30 feet high at a gradient of 2:1 (H:V), which is still up to 18 stories high, including lower parking levels. A chiller/boiler room is to be located southwest of the existing structure. Subterranean parking levels and a meeting room is to be located north of the existing structure; and at-grade parking is proposed at the east side of the site. Excavations as much as 43 feet are proposed to construct parking levels.

The earth materials at the subsurface exploration locations consist of compacted fill Topanga Formation bedrock. Bedding within the Topanga formation is reported to generally dip to the north, which is favorable for relative to the slope but north-facing temporary excavations will expose unsupported bedding. The consultants recommend to support the proposed hotel structure on conventional and/or drilled-pile foundations bearing on competent bedrock. Small independent structures, such as free-standing walls can be supported by fill or bedrock. Because of seepage observed in the exploratory borings, minor dewatering may be necessary during construction.

The review of the subject report cannot be completed at this time and will be continued upon submittal of an addendum to the report which shall include, but not be limited to, the following:

(Note: Numbers in parenthesis ( ) refer to applicable sections of the 2020 City of LA Building Code. P/BC numbers refer the applicable Information Bulletin. Information Bulletins can be accessed on the internet at LADBS.ORG.)

1. Regarding the slope stability analyses, provide responses to the following comments:

    a. Show on Geologic Map the retaining wall supported by piles, as shown on section D-D'.

    b. It appears that a distributed load/resistance was modeled acting on wall face, as shown in slope stability analyses for sect I-I'. Clarify if it is a distributed load, indicate if it acts as a load or resistance, specify the load direction and justify its use in the slope stability analyses.

    c. Show all piles required to increase the factor of safety of southern and eastern slopes. Indicate the required pile resistance to increase the factor of safety of the slope to Code conforming values.

    d. Provide additional slope stability analyses of the southern slope at location where additional resistance will not be provided by the soldier piles. The critical section appears to be in the N-S direction in the proximity of boring B2. However, other locations can be considered.

2. The proposed improvements shall not surcharge the existing structures. The consultants indicated that end bearing caissons or friction piles may be considered to avoid surcharges. However, the report did not include any details about deep foundation construction to avoid surcharging of the existing structure. Indicate if isolated piles are recommended and provide the minimum depth of casing/isolation relative to the bottom of the existing structure. Note: As a minimum, the pile casing shall extend below a 1H:1V line projected upwards from the bottom of the existing structure.

3. Clarify the statement included on page 27 of 09/14/2022 report "the retaining wall be design to accommodate the surcharge load imposed by the new foundation". Note that the new construction shall not surcharge the existing structures.

4. The consultants indicated that the piles shall be spaced at least 2.5 diameter on center to avoid group effects reduction of axial capacity. However, the Code requires analysis for the group effects on axial behavior where the center-to-center spacing of deep foundation elements is less than three times the least horizontal dimension of an element. The Code also requires analysis for the group effects on lateral behavior where the center-to-center spacing of deep foundation elements in the direction of lateral force is less than eight times

the least horizontal dimension of an element. Where this occurs for the proposed pile layout, provide said recommendations for reduction factors as appropriate. (1810.2.5)

5. Provide ABC slot-cut calculations considering the maximum height and width of the slot, and surcharge load from the existing foundation.

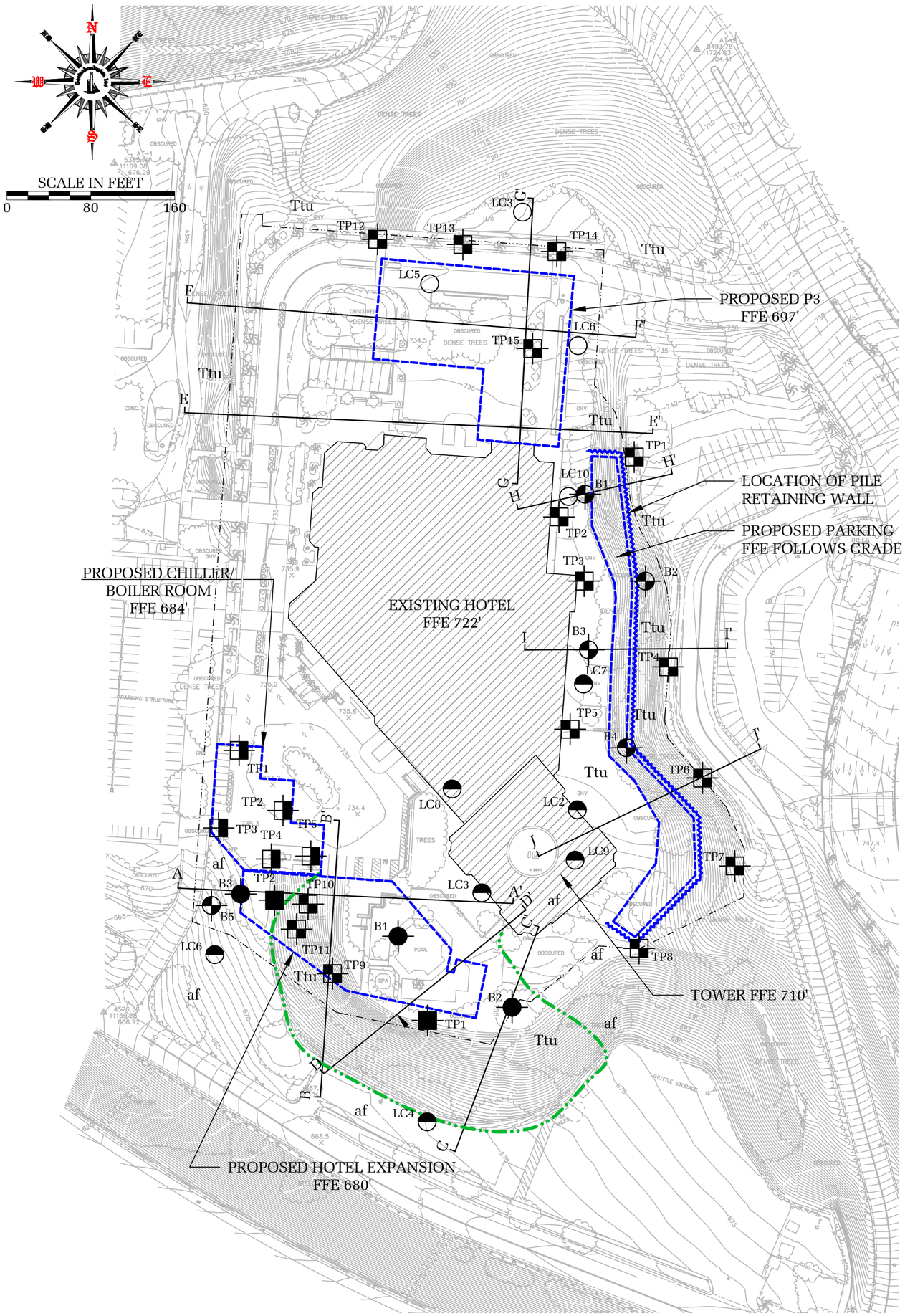
The geologist and soils engineer shall prepare a report containing an itemized response to the review items indicated in this letter. If clarification concerning the review letter is necessary, the report review engineer and/or geologist may be contacted. Two copies of the response report, including one unbound wet-signed original for archiving purposes, a pdf-copy of the complete report in a flash drive, and the appropriate fees will be required for submittal.

DANIEL C. SCHNEIDEREIT
Engineering Geologist II

DAN L. STOICA
Geotechnical Engineer I

DCS/DLS:dcs/dls
Log No. 123421
213-482-0480

cc: Geotechnologies, Inc., Project Consultant
LA District Office



Reference: topographic map provided by Robert J. Lung & Associates dated November 26, 2013.

LEGEND

- TP5 — LOCATION & NUMBER OF TEST PIT (BY: GEOTECHNOLOGIES, INC., 2022)
- B5 — LOCATION & NUMBER OF BORING (BY: GEOTECHNOLOIGIES, INC., 2020)
- TP5 — LOCATION & NUMBER OF TEST PIT (BY: GEOTECHNOLOGIES, INC., 2020)
- B3 — LOCATION & NUMBER OF BORING (BY: GEOTECHNOLOGIES, INC., 2015)
- TP2 — LOCATION & NUMBER OF TEST PIT (BY: GEOTECHNOLOGIES, INC., 2015)
- LC9 — LOCATION & NUMBER OF BORING (PREVIOUS INVESTIGATION BY LEROY CRANDALL & ASSOCIATES, JOB NO. ADE-81093)
- LC10 — LOCATION & NUMBER OF BORING (PREVIOUS INVESTIGATION BY LEROY CRANDALL & ASSOCIATES, JOB NO. AD-79128)

SYMBOLS

- J — J' CROSS SECTION
- PILE RETAINING WALL
- PROPOSED EXPANSION
- GEOLOGIC CONTACT
- @ 13' / 70 — BEDDING ORIENTATION AND DEPTH
- @36' — WATER SEEPAGE AND DEPTH
- @ 8' / 21 — SHEAR ORIENTATION AND DEPTH
- 52 — BEDDING ATTITUDE BY LEROY CRANDALL & ASSOC. (FILE NO. ADE-81093)
- @25' — BEDDING ORIENTATION: VERTICAL JOINT

GEOLOGIC UNITS

- af — ARTIFICIAL FILL: SILT SAND AND SANDY SILT (WHERE GREATER THAN 4' FT THICK)
- Ttu — BEDROCK (UPPER TOPANGA FORMATION): SILTSTONE AND SANDSTONE

EXCAVATION DETAILS CONTINUED

BORINGS BY LEROY CRANDALL & ASSOCIATES (FILE NO. ADE-81093)

BORING LC2	BORING LC3	BORING LC4	BORING LC6
G.S. ELEV. 738'	G.S. ELEV. 734'	G.S. ELEV. 670'	G.S. ELEV. 670'
0-2' af	0-1' af	0-7' af	0-13' af
2-92' Ttu	1-90' Ttu	7-45.5' Ttu	13-22' Ttu
		@41'	@33'
			@42.5'

BORING LC7	BORING LC8	BORING LC9
G.S. ELEV. 742'	G.S. ELEV. 734'	G.S. ELEV. 738'
0-31' Ttu	0-68' Ttu	0-15' af
	@41'	15-68 Ttu

BORINGS BY LEROY CRANDALL & ASSOCIATES (FILE NO. AD-79128)

BORING LC3	BORING LC5	BORING LC6	BORING LC10
G.S. ELEV. 730'	G.S. ELEV. 730'	G.S. ELEV. 732'	G.S. ELEV. 741'
0-60' Ttu	0-60' Ttu	0-7' af	0-0.5' af
	@53'	7'-8' Qsw	0.5-41 Ttu
		8-31' Ttu	

EXCAVATION DETAILS

GEOTECHNOLOGIES, INC. (2022)

TEST PIT 1	TEST PIT 2	TEST PIT 3	TEST PIT 4	TEST PIT 5
G.S. ELEV. 696'	G.S. ELEV. 677'	G.S. ELEV. 698'	G.S. ELEV. 681'	G.S. ELEV. 696'
0-19.5' af	0-15' af	0-30' af	0-23' af	0-19' af
19.5-20' Ttu	15-20 Ttu		23-24 Ttu	19-20' Ttu
	@ 16' 35			

GEOTECHNOLOGIES, INC. (2020)

BORING 1	BORING 2	BORING 3	BORING 4
G.S. ELEV. 718.5'	G.S. ELEV. 731'	G.S. ELEV. 716.5'	G.S. ELEV. 728'
0-1' af	0-1' af	0-3' af	0-3' af
1-39' Ttu	1-27' Ttu	3-40' Ttu	3-40' Ttu
@13' 45	@ 4' 50	@ 3' 54	@ 3' 41
@18' 44	@ 7' 48	@ 4'	@ 6' 41
@19'	@19' 28	@8.5' 62	@12' 43
@21' 42	@21'	@12' 52	@15' 43
@25' 45		@14' 52	@17' 42
@31' 45		@15' 52	@23' 42
BORING 5		@18'	@25'
G.S. ELEV. 671'		@24' 42	@28' 45
0-15' af		@24' 42	@30' 43
15-32.5' Qal		@25'	@36' 48
32.5'-40" Ttu		@25.5' 50	
@29'			

TEST PIT 1	TEST PIT 2	TEST PIT 3	TEST PIT 4	TEST PIT 5
G.S. ELEV. 741'	G.S. ELEV. 718'	G.S. ELEV. 704'	G.S. ELEV. 745'	G.S. ELEV. 714.5'
0-9' af	0-2.5' af	0-1.5' af	0-2.5' af	0-3.5' af
9-10' Ttu	2.5-5 Ttu	1.5-4' Ttu	2.5-7.5 Ttu	3.5-6.5' Ttu
	@ 4' 52	@ 1.5' 43		@4.5' 49

TEST PIT 6	TEST PIT 7	TEST PIT 8	TEST PIT 9	TEST PIT 10
G.S. ELEV. 745'	G.S. ELEV. 736'	G.S. ELEV. 707.5'	G.S. ELEV. 695'	G.S. ELEV. 690'
0-3' af	0-13.5' af	0-25' af	0-6' af	0-7.5' af
3-7.5 Tu	13.5-15' Ttu		6-10' Ttu	7.5-11' Ttu
@ 5' 57			@ 8' 65	
@ 7' 52				

TEST PIT 11	TEST PIT 12	TEST PIT 13	TEST PIT 14	TEST PIT 15
G.S. ELEV. 685'	G.S. ELEV. 690'	G.S. ELEV. 728'	G.S. ELEV. 730'	G.S. ELEV. 731'
0-7' af	0-4' af	0-3' af	0-3' af	0-1' af
7-10' Ttu	4-7' Ttu	3-7' Ttu	3-6' Tu	1-10.5' Ttu
	@ 6' 38	@4' 33		

GEOTECHNOLOGIES, INC. (2015)

BORING 1	BORING 2	BORING 3
G.S. ELEV. 705'	G.S. ELEV. 705'	G.S. ELEV. 675'
0-3' af	0-5' af	0-22' af
3-60' Ttu	5-39' Ttu	22-35' Ttu
@36'	@ 5' 50	@ 25' 60
	@ 7' 48	@26' 60
	@ 8' 21	@28' 55
	@ 13' 70	@30' 55
	@ 27' 56	@32' 55
	@ 30' 60	@32'
	@33'	

TEST PIT 1	TEST PIT 2
G.S. ELEV. 704'	G.S. ELEV. 674'
0-4' af	0-14.5' af
4-10' Ttu	14.5-15 Ttu
@ 5' 75	
@ 6' 78	

GEOLOGIC MAP

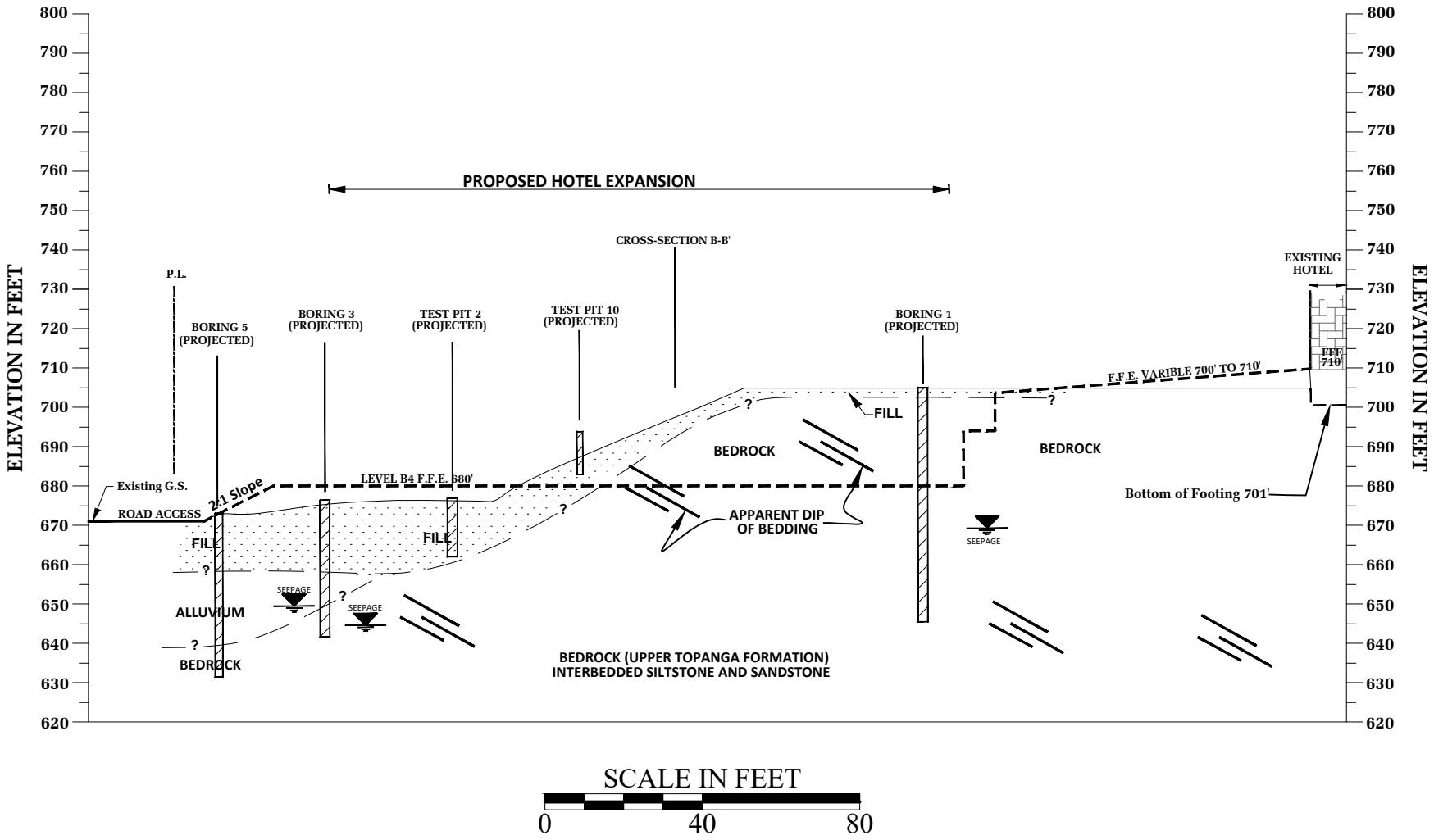
Hilton Los Angeles/universal City
555 Universal Hollywood Dr., Universal City

Geotechnologies, Inc.
Consulting Geotechnical Engineers

DRAWN BY: SJM | FILE NO. 21578

DATE: December 2022

N87W



SCALE IN FEET

0 40 80

REFERENCE: TOPOGRAPHIC MAP PROVIDED BY ROBERT J. LUNG & ASSOCIATES DATED NOVEMBER 26, 2013

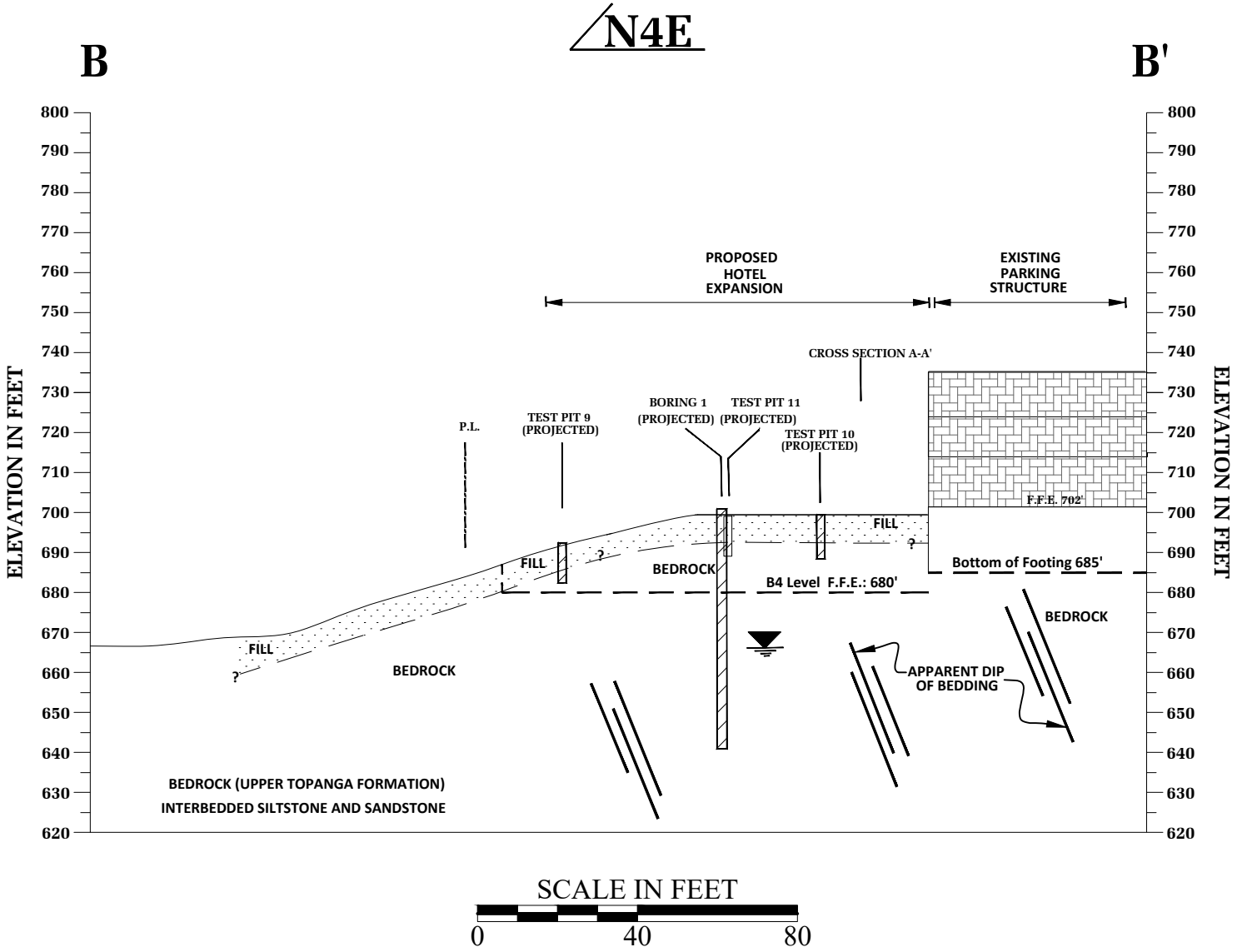
CROSS SECTION A-A'

Geotechnologies, Inc.
Consulting Geotechnical Engineers

HILTON LOS ANGELES, UNIVERSAL CITY
555 UNIVERSAL HOLLYWOOD DR., UNIVERSAL CITY

DRAWN BY:YD | FILE NO. 21578

DATE: December 2022



SCALE IN FEET

0 40 80

CROSS SECTION B-B'

Geotechnologies, Inc.
Consulting Geotechnical Engineers

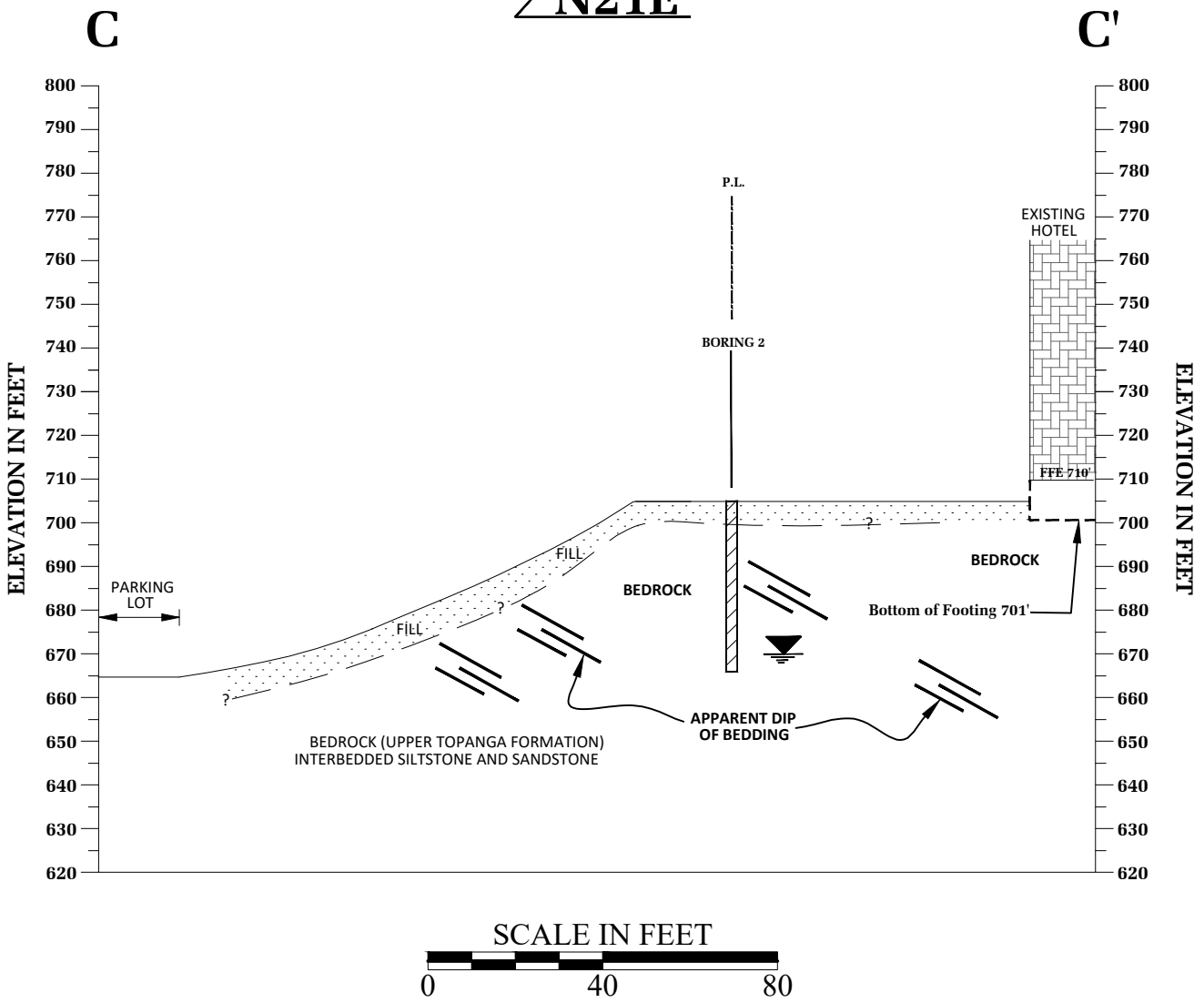
HILTON LOS ANGELES, UNIVERSAL CITY
555 UNIVERSAL HOLLYWOOD DR., UNIVERSAL CITY

DRAWN BY:YD | FILE NO. 21578

DATE: December 2022

REFERENCE: TOPOGRAPHIC MAP PROVIDED BY ROBERT J. LUNG & ASSOCIATES DATED NOVEMBER 26, 2013

N21E



SCALE IN FEET

0 40 80

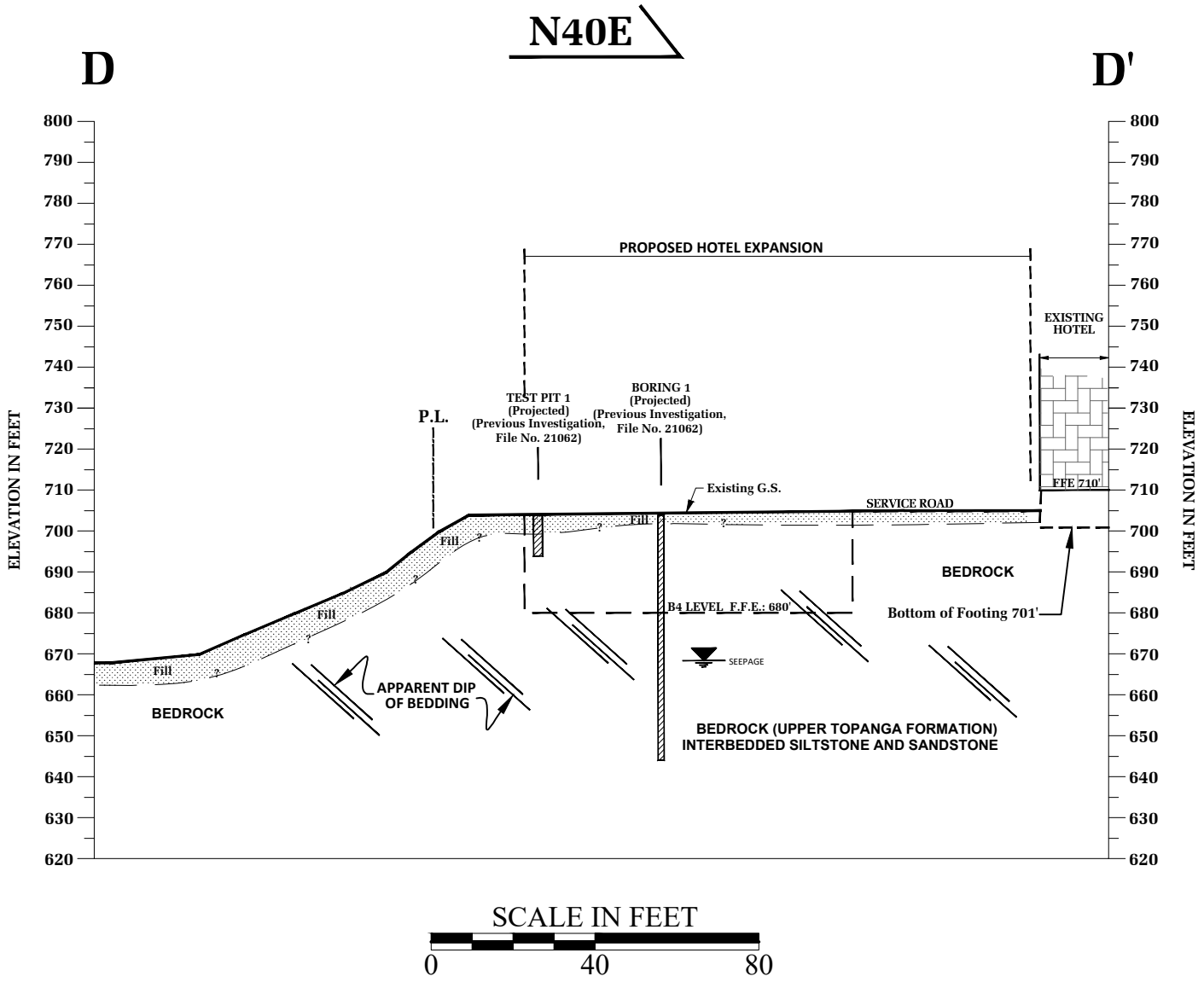
REFERENCE: TOPOGRAPHIC MAP PROVIDED BY ROBERT J. LUNG & ASSOCIATES DATED NOVEMBER 26, 2013

CROSS SECTION C-C'

Geotechnologies, Inc.
Consulting Geotechnical Engineers

HILTON LOS ANGELES, UNIVERSAL CITY
555 UNIVERSAL HOLLYWOOD DR., UNIVERSAL CITY

DRAWN BY:YD	FILE NO. 21578
DATE: December 2022	



SCALE IN FEET

0 40 80

REFERENCE: TOPOGRAPHIC MAP PROVIDED BY ROBERT J. LUNG & ASSOCIATES DATED NOVEMBER 26, 2013

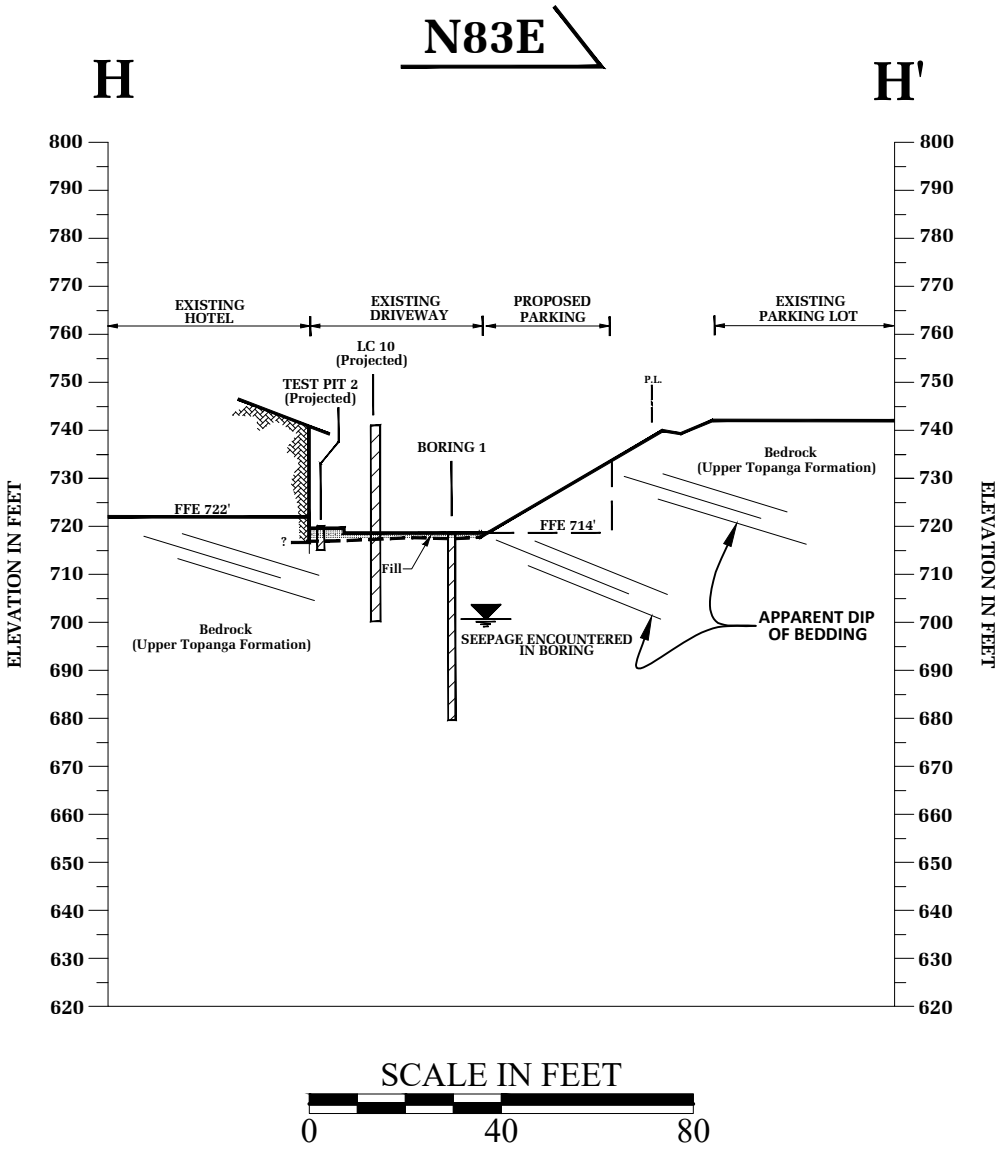
CROSS SECTION D-D'

Geotechnologies, Inc.
Consulting Geotechnical Engineers

HILTON LOS ANGELES, UNIVERSAL CITY
555 UNIVERSAL HOLLYWOOD DR., UNIVERSAL CITY

DRAWN BY:YD | FILE NO. 21578

DATE: December 2022



SCALE IN FEET

0 40 80

REFERENCE: TOPOGRAPHIC MAP PROVIDED BY ROBERT J. LUNG & ASSOCIATES DATED NOVEMBER 26, 2013

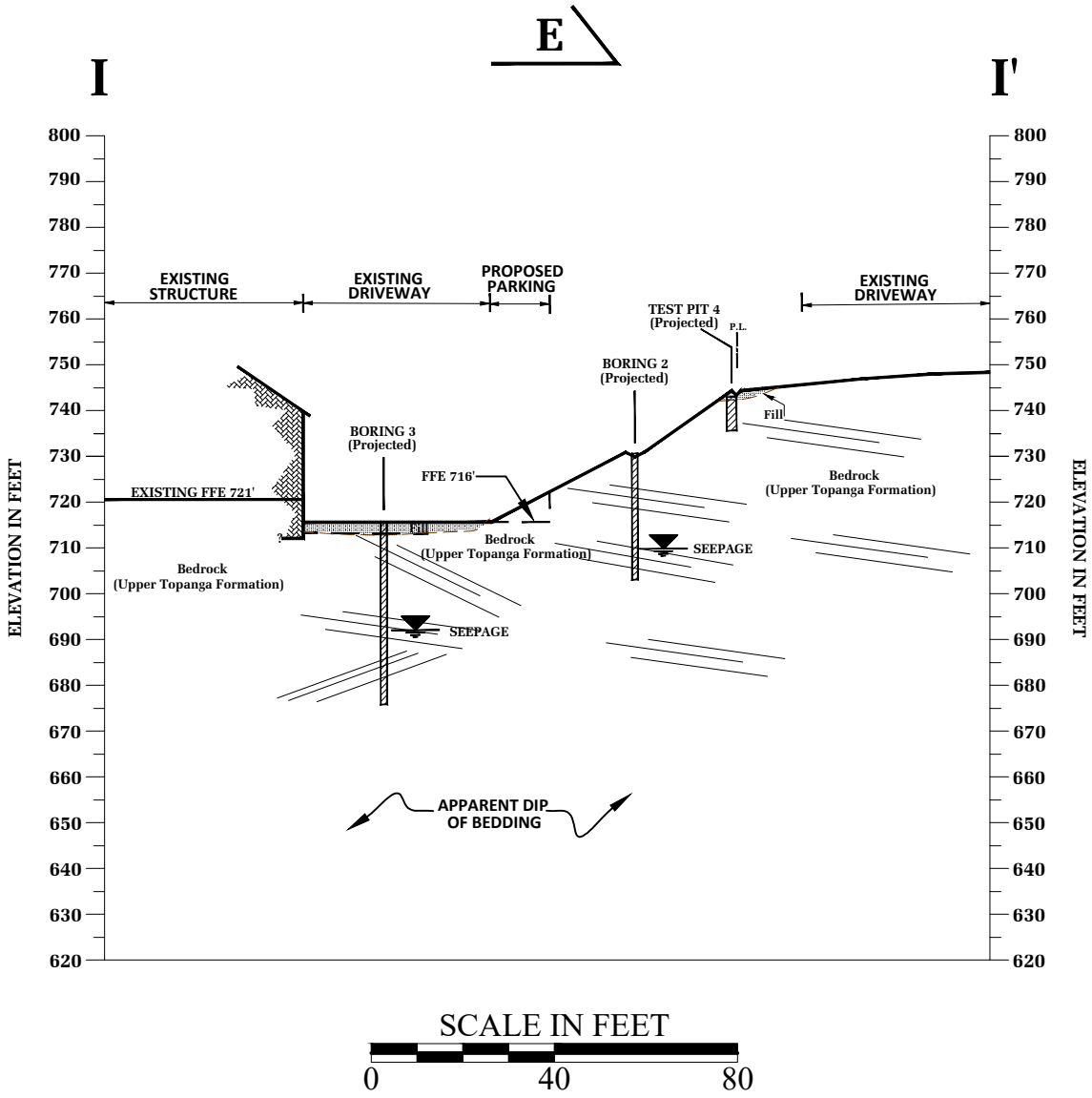
CROSS SECTION H-H'

Geotechnologies, Inc.
Consulting Geotechnical Engineers

HILTON LOS ANGELES, UNIVERSAL CITY
555 UNIVERSAL HOLLYWOOD DR., UNIVERSAL CITY

DRAWN BY:YD | FILE NO. 21578

DATE: December 2022



SCALE IN FEET

0 40 80

CROSS SECTION I-I'

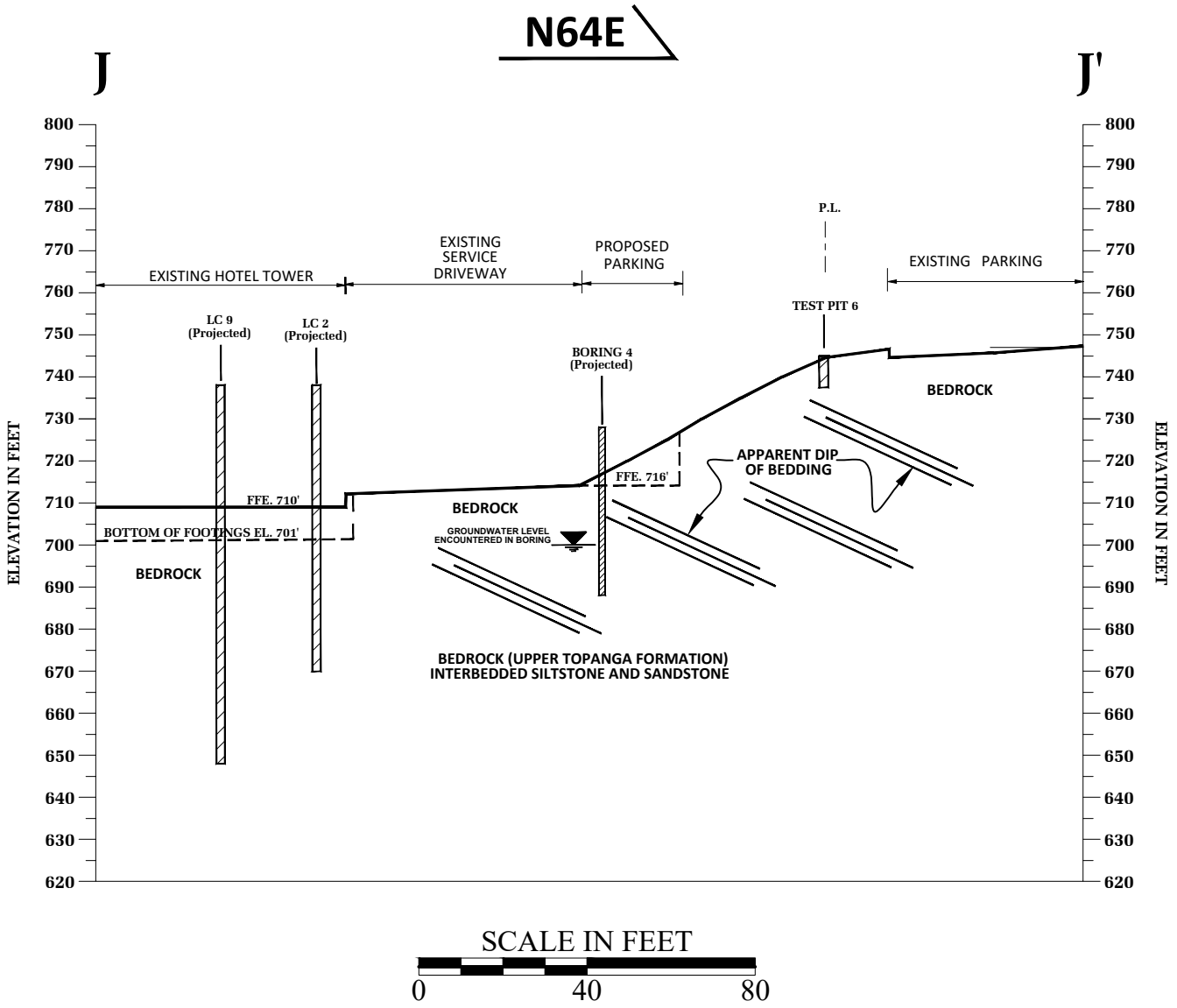
Geotechnologies, Inc.
Consulting Geotechnical Engineers

HILTON LOS ANGELES, UNIVERSAL CITY
555 UNIVERSAL HOLLYWOOD DR., UNIVERSAL CITY

DRAWN BY:YD | FILE NO. 21578

DATE: December 2022

REFERENCE: TOPOGRAPHIC MAP PROVIDED BY ROBERT J. LUNG & ASSOCIATES DATED NOVEMBER 26, 2013



SCALE IN FEET

0 40 80

REFERENCE: TOPOGRAPHIC MAP PROVIDED BY ROBERT J. LUNG & ASSOCIATES DATED NOVEMBER 26, 2013

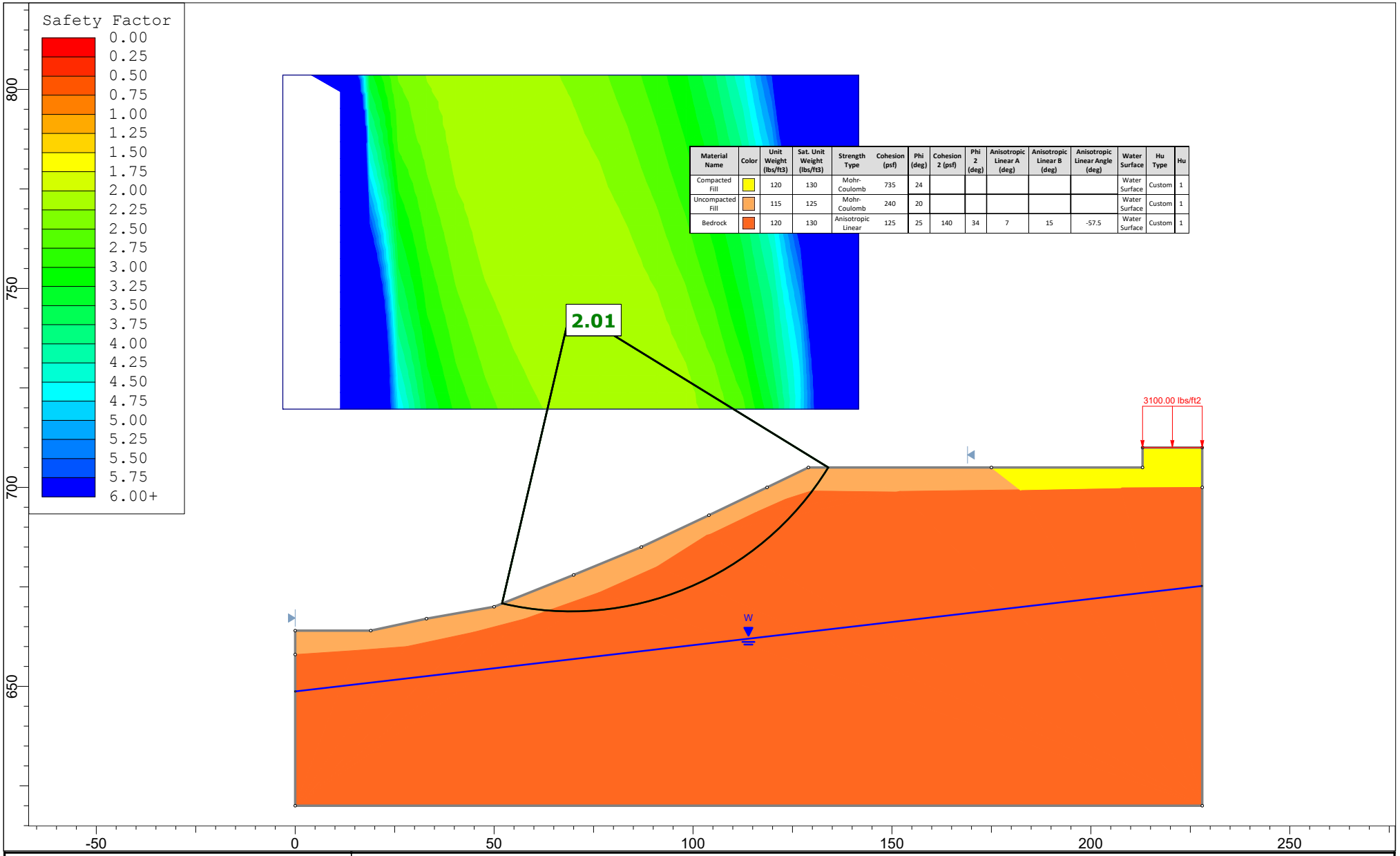
CROSS SECTION J-J'

Geotechnologies, Inc.
Consulting Geotechnical Engineers

HILTON LOS ANGELES, UNIVERSAL CITY
555 UNIVERSAL HOLLYWOOD DR., UNIVERSAL CITY

DRAWN BY:YD | FILE NO. 21578

DATE: December 2022

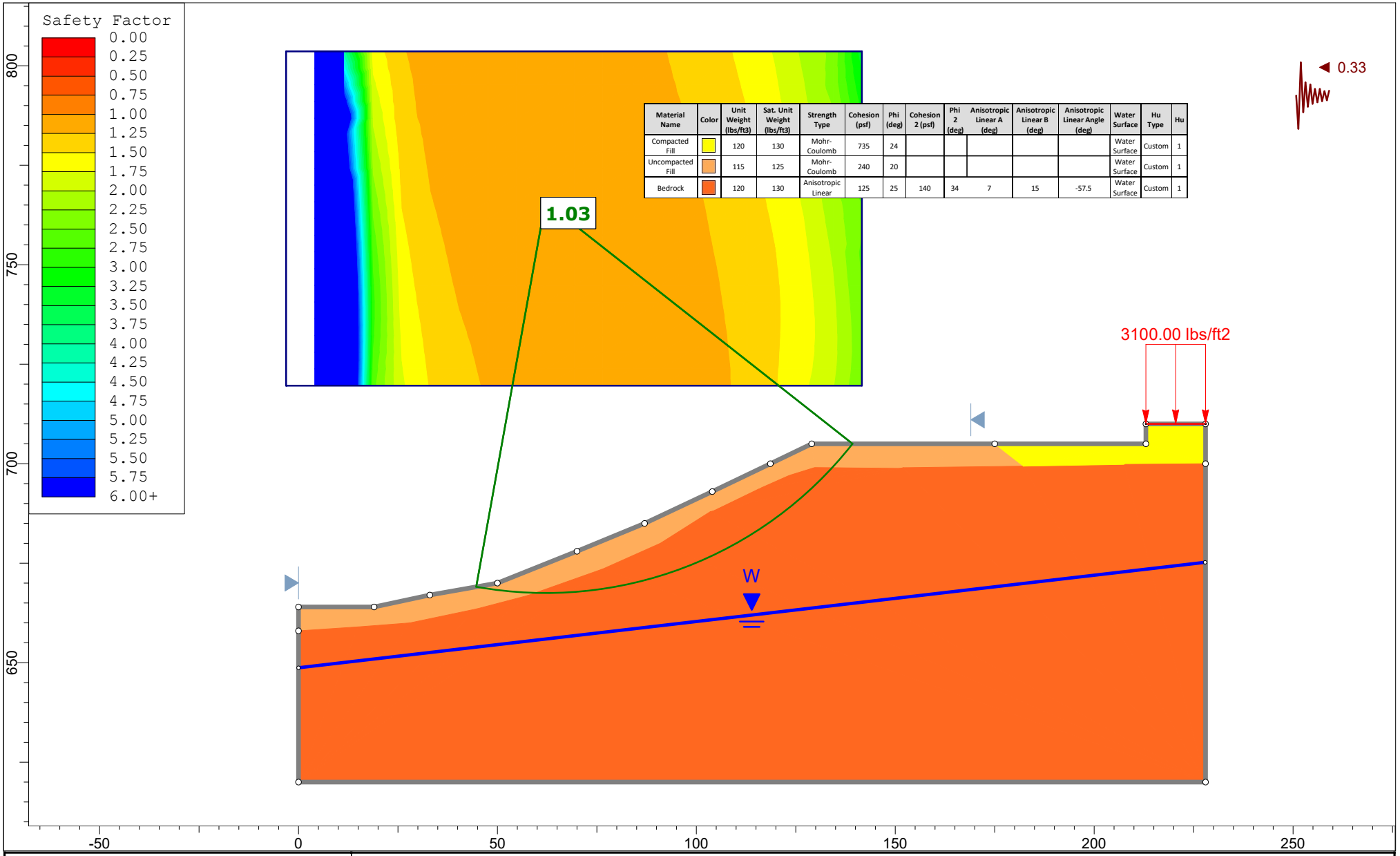


Material Name	Color	Unit Weight (lbs/ft3)	Sat. Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Cohesion 2 (psf)	Phi 2 (deg)	Anisotropic Linear A (deg)	Anisotropic Linear B (deg)	Anisotropic Linear Angle (deg)	Water Surface	Hu Type	Hu
Compacted Fill		120	130	Mohr-Coulomb	735	24						Water Surface	Custom	1
Uncompacted Fill		115	125	Mohr-Coulomb	240	20						Water Surface	Custom	1
Bedrock		120	130	Anisotropic Linear	125	25	140	34	7	15	-57.5	Water Surface	Custom	1

GEOTECHNOLOGIES, INC.
CONSULTING GEOTECHNICAL ENGINEERS

SLIDEINTERPRET 9.012

Project	File No. 21578 Hilton-Los Angeles/Universal City		
Analysis	Cross Section C-C'		
Scale	1:400	*Comment 1*	Curved, Static, janbu
Date	12/7/2022	*File Name*	Proposed Hotel Extension

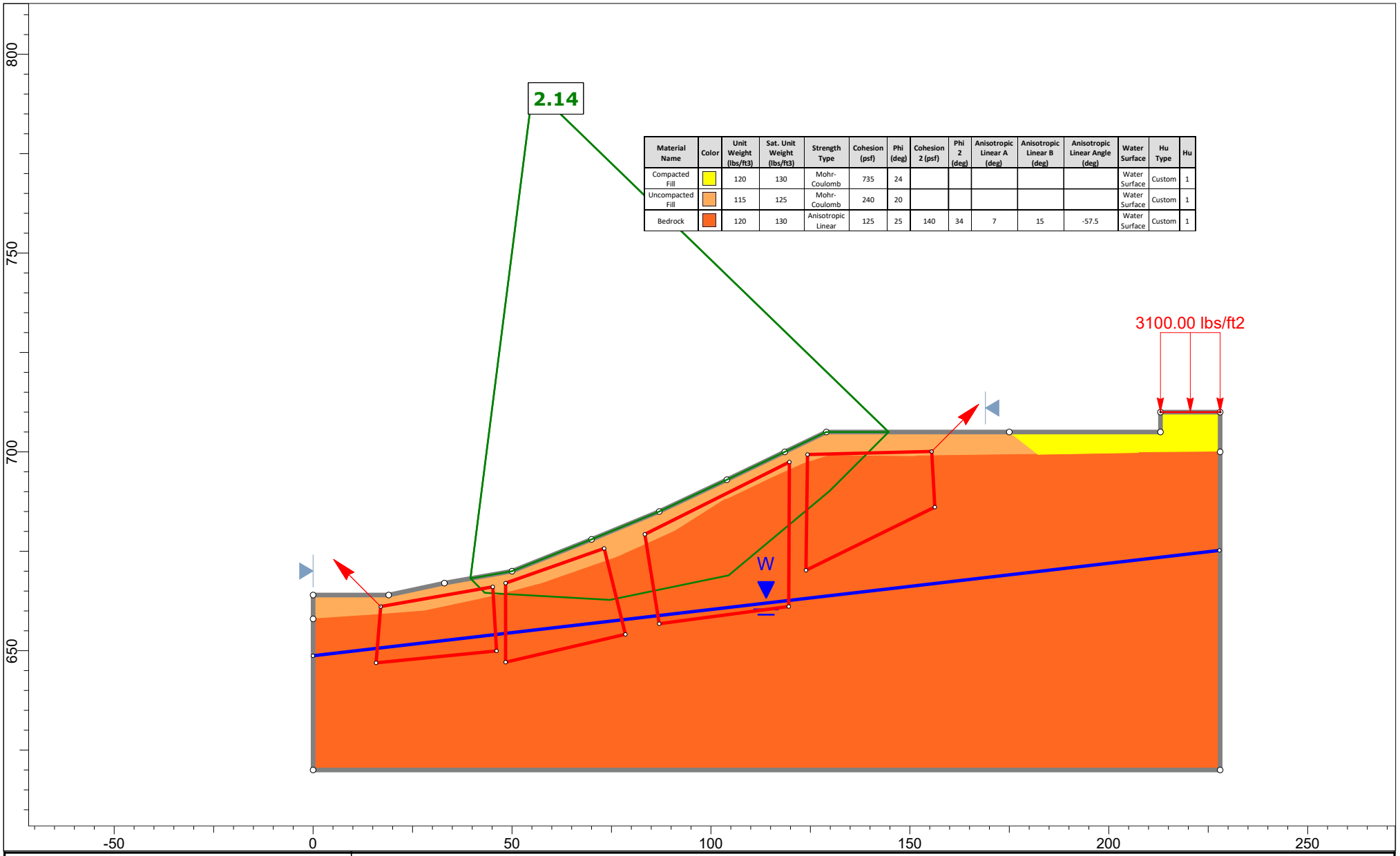


Material Name	Color	Unit Weight (lbs/ft3)	Sat. Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Cohesion 2 (psf)	Phi 2 (deg)	Anisotropic Linear A (deg)	Anisotropic Linear B (deg)	Anisotropic Linear Angle (deg)	Water Surface	Hu Type	Hu
Compacted Fill		120	130	Mohr-Coulomb	735	24						Water Surface	Custom	1
Uncompacted Fill		115	125	Mohr-Coulomb	240	20						Water Surface	Custom	1
Bedrock		120	130	Anisotropic Linear	125	25	140	34	7	15	-57.5	Water Surface	Custom	1

GEOTECHNOLOGIES, INC.
CONSULTING GEOTECHNICAL ENGINEERS

SLIDEINTERPRET 9.012

Project	File No. 21578 Hilton-Los Angeles/Universal City		
Analysis	Cross Section C-C'		
Scale	1:400	*Comment 1*	Curved, PseudoStatic, janbu
Date	12/7/2022	*File Name*	Proposed Hotel Extension

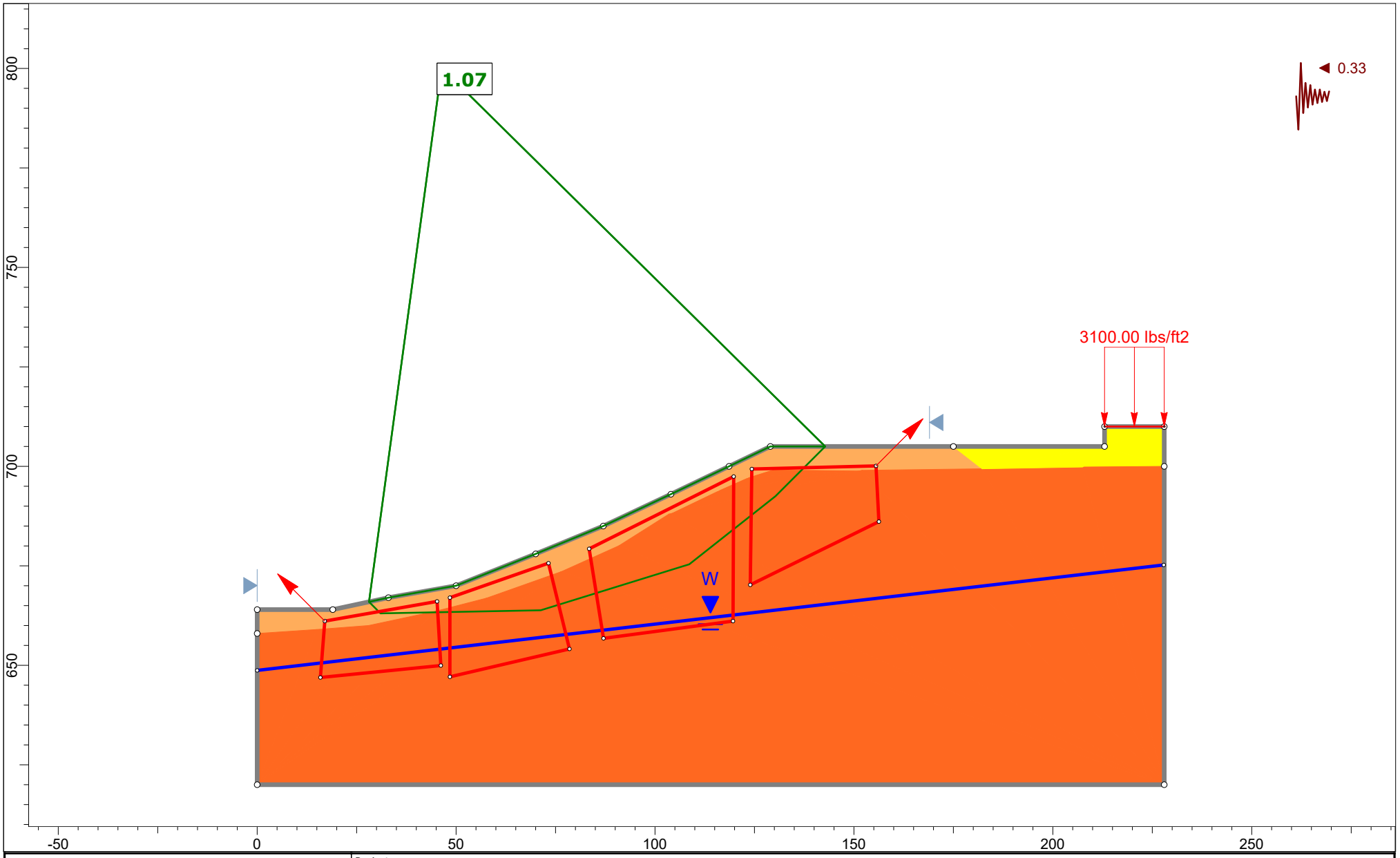


Material Name	Color	Unit Weight (lbs/ft3)	Sat. Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Cohesion 2 (psf)	Phi 2 (deg)	Anisotropic Linear A (deg)	Anisotropic Linear B (deg)	Anisotropic Linear Angle (deg)	Water Surface	Hu Type	Hu
Compacted Fill		120	130	Mohr-Coulomb	735	24						Water Surface	Custom	1
Uncompacted Fill		115	125	Mohr-Coulomb	240	20						Water Surface	Custom	1
Bedrock		120	130	Anisotropic Linear	125	25	140	34	7	15	-57.5	Water Surface	Custom	1

GEOTECHNOLOGIES, INC.
CONSULTING GEOTECHNICAL ENGINEERS

SLIDEINTERPRET 9.012

Project	File No. 21578 Hilton-Los Angeles/Universal City		
Analysis	Cross Section C-C'		
Scale	1:400	*Comment 1*	Block, Static, Janbu
Date	12/7/2022	*File Name*	Proposed Hotel Extension



GEOTECHNOLOGIES, INC. CONSULTING GEOTECHNICAL ENGINEERS	Project	File No. 21578 Hilton-Los Angeles/Universal City	
	Analysis	Cross Section C-C'	
	Scale	1:400	Comment 1: Block, PseudoStatic, Janbu
	Date	12/7/2022	File Name: Proposed Hotel Extension

SLIDEINTERPRET 9.012

rocscience

21578 XS CC
File No 21578 HIlton Universal
Geotechnologies, Inc.
Date Created: 12/7/2022, 12:35:18 AM
Software Version: 9.012

Table of Contents

Project Summary 5
Currently Open Scenarios 5
General Settings 6
Analysis Options 7
All Open Scenarios 7
Groundwater Analysis 8
All Open Scenarios 8
Random Numbers 9
All Open Scenarios 9
Surface Options 10
Curved, Static, Janbu 10
Block, Static, Janbu 10
Seismic Loading 11
Curved, Static, Janbu - Master Scenario 11
Curved, Static, Janbu - Curved, PseudoStatic Janbu 11
Block, Static, Janbu - Master Scenario 11
Block, Static, Janbu - Block, PseudoStatic, Janbu 11
Loading 12
All Open Scenarios 12
Materials 13
Materials In Use 13
Global Minimums 14
Curved, Static, Janbu - Master Scenario 14
Method: bishop simplified 14
Method: janbu simplified 14
Method: gle/morgenstern-price 14
Curved, Static, Janbu - Curved, PseudoStatic Janbu 14
Method: bishop simplified 14
Method: janbu simplified 15
Method: gle/morgenstern-price 15
Block, Static, Janbu - Master Scenario 15
Method: bishop simplified 15
Method: janbu simplified 15
Method: gle/morgenstern-price 16
Block, Static, Janbu - Block, PseudoStatic, Janbu 16
Method: bishop simplified 16
Method: janbu simplified 16
Method: gle/morgenstern-price 16
Global Minimum Coordinates 18
Block, Static, Janbu - Master Scenario 18
Method: bishop simplified 18
Method: janbu simplified 18

Method: gle/morgenstern-price 18
Block, Static, Janbu - Block, PseudoStatic, Janbu 18
Method: bishop simplified 18
Method: janbu simplified 18
Method: gle/morgenstern-price 19
Global Minimum Support Data 20
All Open Scenarios 20
Valid and Invalid Surfaces 21
Curved, Static, Janbu - Master Scenario 21
Method: bishop simplified 21
Method: janbu simplified 21
Method: gle/morgenstern-price 21
Curved, Static, Janbu - Curved, PseudoStatic Janbu 21
Method: bishop simplified 21
Method: janbu simplified 21
Method: gle/morgenstern-price 21
Block, Static, Janbu - Master Scenario 22
Method: bishop simplified 22
Method: janbu simplified 22
Method: gle/morgenstern-price 22
Block, Static, Janbu - Block, PseudoStatic, Janbu 22
Method: bishop simplified 22
Method: janbu simplified 22
Method: gle/morgenstern-price 22
Error Code Descriptions 23
Slice Data 24
Curved, Static, Janbu - Master Scenario 24
Global Minimum Query (bishop simplified) - Safety Factor: 2.12377 24
Global Minimum Query (janbu simplified) - Safety Factor: 2.01003 26
Query 1 (janbu simplified) - Safety Factor: 2.01003 28
Global Minimum Query (gle/morgenstern-price) - Safety Factor: 2.10815 30
Curved, Static, Janbu - Curved, PseudoStatic Janbu 32
Global Minimum Query (bishop simplified) - Safety Factor: 1.0901 32
Global Minimum Query (janbu simplified) - Safety Factor: 1.02904 34
Global Minimum Query (gle/morgenstern-price) - Safety Factor: 1.08159 36
Block, Static, Janbu - Master Scenario 38
Global Minimum Query (bishop simplified) - Safety Factor: 2.26111 38
Global Minimum Query (janbu simplified) - Safety Factor: 2.14377 40
Global Minimum Query (gle/morgenstern-price) - Safety Factor: 2.25593 41
Block, Static, Janbu - Block, PseudoStatic, Janbu 43
Global Minimum Query (bishop simplified) - Safety Factor: 1.13576 43
Global Minimum Query (janbu simplified) - Safety Factor: 1.06707 45
Global Minimum Query (gle/morgenstern-price) - Safety Factor: 1.1363 47

Interslice Data 49
Curved, Static, Janbu - Master Scenario 49
Global Minimum Query (bishop simplified) - Safety Factor: 2.12377 49
Global Minimum Query (janbu simplified) - Safety Factor: 2.01003 50
Query 1 (janbu simplified) - Safety Factor: 2.01003 51
Global Minimum Query (gle/morgenstern-price) - Safety Factor: 2.10815 52
Curved, Static, Janbu - Curved, PseudoStatic Janbu 53
Global Minimum Query (bishop simplified) - Safety Factor: 1.0901 53
Global Minimum Query (janbu simplified) - Safety Factor: 1.02904 54
Global Minimum Query (gle/morgenstern-price) - Safety Factor: 1.08159 55
Block, Static, Janbu - Master Scenario 56
Global Minimum Query (bishop simplified) - Safety Factor: 2.26111 56
Global Minimum Query (janbu simplified) - Safety Factor: 2.14377 57
Global Minimum Query (gle/morgenstern-price) - Safety Factor: 2.25593 58
Block, Static, Janbu - Block, PseudoStatic, Janbu 59
Global Minimum Query (bishop simplified) - Safety Factor: 1.13576 59
Global Minimum Query (janbu simplified) - Safety Factor: 1.06707 60
Global Minimum Query (gle/morgenstern-price) - Safety Factor: 1.1363 61
Entity Information 62
Curved, Static, Janbu 62
Shared Entities 62
Scenario-based Entities 62
Block, Static, Janbu 63
Shared Entities 63
Scenario-based Entities 63

Slide Analysis Information

21578 XS CC

Project Summary

File Name:	21578 XS CC.slmd
Slide Modeler Version:	9.012
Project Title:	File No 21578 HIlton Universal
Analysis:	Cross Section C-C'
Author:	RTK
Company:	Geotechnologies, Inc.
Date Created:	12/7/2022, 12:35:18 AM
Comments	
	Curved, Static, Janbu

Currently Open Scenarios

Group Name	Scenario Name	Global Minimum	Compute Time
Curved, Static, Janbu	Master Scenario	Bishop Simplified: 2.123770 Janbu Simplified: 2.010030 Gle/morgenstern-price: 2.108150	00h:00m:02.49s
	Curved, PseudoStatic Janbu	Bishop Simplified: 1.090100 Janbu Simplified: 1.029040 Gle/morgenstern-price: 1.081590	00h:00m:02.588s
Block, Static, Janbu	Master Scenario	Bishop Simplified: 2.261110 Janbu Simplified: 2.143770 Gle/morgenstern-price: 2.255930	00h:00m:04.37s
	Block, PseudoStatic, Janbu	Bishop Simplified: 1.135760 Janbu Simplified: 1.067070 Gle/morgenstern-price: 1.136300	00h:00m:05.384s

General Settings

Units of Measurement:	Imperial Units
Time Units:	days
Permeability Units:	feet/second
Data Output:	Standard
Failure Direction:	Right to Left

Analysis Options

All Open Scenarios

Slices Type:	Vertical
Analysis Methods Used	
	Bishop simplified
	GLE/Morgenstern-Price with interslice force function (Half Sine)
	Janbu simplified
Number of slices:	50
Tolerance:	0.005
Maximum number of iterations:	75
Check malpha < 0.2:	Yes
Create Interslice boundaries at intersections with water tables and piezos:	Yes
Initial trial value of FS:	1
Steffensen Iteration:	Yes

Groundwater Analysis

All Open Scenarios

Groundwater Method:	Water Surfaces
Pore Fluid Unit Weight [lbs/ft3]:	62.4
Use negative pore pressure cutoff:	Yes
Maximum negative pore pressure [psf]:	0
Advanced Groundwater Method:	None

Random Numbers

All Open Scenarios

Pseudo-random Seed:	10116
Random Number Generation Method:	Park and Miller v.3

Surface Options

Curved, Static, Janbu

Surface Type:	Circular
Search Method:	Grid Search
Radius Increment:	10
Composite Surfaces:	Disabled
Reverse Curvature:	Invalid Surfaces
Minimum Elevation:	Not Defined
Minimum Depth:	Not Defined
Minimum Area:	Not Defined
Minimum Weight:	Not Defined

Block, Static, Janbu

Surface Type:	Non-Circular Block Search
Number of Surfaces:	10000
Multiple Groups:	Disabled
Pseudo-Random Surfaces:	Enabled
Convex Surfaces Only:	Disabled
Left Projection Angle (Start Angle) [deg]:	135
Left Projection Angle (End Angle) [deg]:	135
Right Projection Angle (Start Angle) [deg]:	45
Right Projection Angle (End Angle) [deg]:	45
Minimum Elevation:	Not Defined
Minimum Depth:	Not Defined
Minimum Area:	Not Defined
Minimum Weight:	Not Defined

Seismic Loading

Curved, Static, Janbu - Master Scenario

Advanced seismic analysis:	No
Staged pseudostatic analysis:	No

Curved, Static, Janbu - Curved, PseudoStatic Janbu

Advanced seismic analysis:	No
Staged pseudostatic analysis:	No
Seismic Load Coefficient (Horizontal):	0.33

Block, Static, Janbu - Master Scenario

Advanced seismic analysis:	No
Staged pseudostatic analysis:	No

Block, Static, Janbu - Block, PseudoStatic, Janbu

Advanced seismic analysis:	No
Staged pseudostatic analysis:	No
Seismic Load Coefficient (Horizontal):	0.33

Loading

All Open Scenarios

Distribution:	Constant
Magnitude [psf]:	3100
Orientation:	Normal to boundary

Materials

Compacted Fill	
Color	
Strength Type	Mohr-Coulomb
Unsaturated Unit Weight [lbs/ft3]	120
Saturated Unit Weight [lbs/ft3]	130
Cohesion [psf]	735
Friction Angle [deg]	24
Water Surface	Assigned per scenario
Hu Value	1
Uncompacted Fill	
Color	
Strength Type	Mohr-Coulomb
Unsaturated Unit Weight [lbs/ft3]	115
Saturated Unit Weight [lbs/ft3]	125
Cohesion [psf]	240
Friction Angle [deg]	20
Water Surface	Assigned per scenario
Hu Value	1
Bedrock	
Color	
Strength Type	Anisotropic Linear
Unsaturated Unit Weight [lbs/ft3]	120
Saturated Unit Weight [lbs/ft3]	130
Cohesion 1 [psf]	125
Cohesion 2 [psf]	140
Friction Angle 1 [deg]	25
Friction Angle 2 [deg]	34
A [deg]	7
B [deg]	15
Anisotropic Definition	Angle
Angle from 1 [deg]	-57.5
Anisotropic Surface	
Water Surface	Assigned per scenario
Hu Value	1

Materials In Use

Material	Curved, Static, Janbu	Curved, PseudoStatic Janbu	Block, Static, Janbu	Block, PseudoStatic, Janbu
Compacted Fill	✓	✓	✓	✓
Uncompacted Fill	✓	✓	✓	✓
Bedrock	✓	✓	✓	✓

Global Minimums

Curved, Static, Janbu - Master Scenario

Method: bishop simplified

FS	2.123770
Center:	54.773, 782.619
Radius:	111.203
Left Slip Surface Endpoint:	53.556, 671.422
Right Slip Surface Endpoint:	134.406, 705.000
Resisting Moment:	5.99572e+06 lb-ft
Driving Moment:	2.82315e+06 lb-ft
Total Slice Area:	565.909 ft2
Surface Horizontal Width:	80.8498 ft
Surface Average Height:	6.99952 ft

Method: janbu simplified

FS	2.010030
Center:	69.247, 744.826
Radius:	76.009
Left Slip Surface Endpoint:	52.000, 670.800
Right Slip Surface Endpoint:	133.986, 705.000
Resisting Horizontal Force:	72440.1 lb
Driving Horizontal Force:	36039.4 lb
Total Slice Area:	895.175 ft2
Surface Horizontal Width:	81.9858 ft
Surface Average Height:	10.9187 ft

Method: gle/morgenstern-price

FS	2.108150
Center:	54.773, 782.619
Radius:	111.203
Left Slip Surface Endpoint:	53.556, 671.422
Right Slip Surface Endpoint:	134.406, 705.000
Resisting Moment:	5.95162e+06 lb-ft
Driving Moment:	2.82315e+06 lb-ft
Resisting Horizontal Force:	48408.6 lb
Driving Horizontal Force:	22962.6 lb
Total Slice Area:	565.909 ft2
Surface Horizontal Width:	80.8498 ft
Surface Average Height:	6.99952 ft

Curved, Static, Janbu - Curved, PseudoStatic Janbu

Method: bishop simplified

FS	1.090100
Center:	54.773, 795.217
Radius:	125.232
Left Slip Surface Endpoint:	50.172, 670.069
Right Slip Surface Endpoint:	141.629, 705.000
Resisting Moment:	8.54051e+06 lb-ft
Driving Moment:	7.83462e+06 lb-ft
Total Slice Area:	817.217 ft2
Surface Horizontal Width:	91.457 ft
Surface Average Height:	8.93553 ft

Method: janbu simplified

FS	1.029040
Center:	62.010, 765.822
Radius:	98.304
Left Slip Surface Endpoint:	44.671, 669.060
Right Slip Surface Endpoint:	139.239, 705.000
Resisting Horizontal Force:	76220.1 lb
Driving Horizontal Force:	74069.4 lb
Total Slice Area:	1027.91 ft2
Surface Horizontal Width:	94.568 ft
Surface Average Height:	10.8696 ft

Method: gle/morgenstern-price

FS	1.081590
Center:	54.773, 795.217
Radius:	125.232
Left Slip Surface Endpoint:	50.172, 670.069
Right Slip Surface Endpoint:	141.629, 705.000
Resisting Moment:	8.47381e+06 lb-ft
Driving Moment:	7.83462e+06 lb-ft
Resisting Horizontal Force:	62542.8 lb
Driving Horizontal Force:	57825.2 lb
Total Slice Area:	817.217 ft2
Surface Horizontal Width:	91.457 ft
Surface Average Height:	8.93553 ft

Block, Static, Janbu - Master Scenario

Method: bishop simplified

FS	2.261110
Axis Location:	46.356, 800.151
Left Slip Surface Endpoint:	28.072, 665.944
Right Slip Surface Endpoint:	142.751, 705.000
Resisting Moment:	1.72411e+07 lb-ft
Driving Moment:	7.62504e+06 lb-ft
Total Slice Area:	1394.49 ft2
Surface Horizontal Width:	114.679 ft
Surface Average Height:	12.1599 ft

Method: janbu simplified

FS	2.143770
Axis Location:	55.302, 791.693
Left Slip Surface Endpoint:	39.584, 668.162
Right Slip Surface Endpoint:	144.696, 705.000
Resisting Horizontal Force:	123800 lb
Driving Horizontal Force:	57749.1 lb
Total Slice Area:	1547.38 ft2
Surface Horizontal Width:	105.112 ft
Surface Average Height:	14.7212 ft

Method: gle/morgenstern-price

FS	2.255930
Axis Location:	50.859, 793.540
Left Slip Surface Endpoint:	34.845, 667.326
Right Slip Surface Endpoint:	142.222, 705.000
Resisting Moment:	1.28406e+07 lb-ft
Driving Moment:	5.69191e+06 lb-ft
Resisting Horizontal Force:	92581.4 lb
Driving Horizontal Force:	41039.1 lb
Total Slice Area:	1112.63 ft2
Surface Horizontal Width:	107.377 ft
Surface Average Height:	10.3619 ft

Block, Static, Janbu - Block, PseudoStatic, Janbu

Method: bishop simplified

FS	1.135760
Axis Location:	46.356, 800.151
Left Slip Surface Endpoint:	28.072, 665.944
Right Slip Surface Endpoint:	142.751, 705.000
Resisting Moment:	1.57874e+07 lb-ft
Driving Moment:	1.39002e+07 lb-ft
Total Slice Area:	1394.49 ft2
Surface Horizontal Width:	114.679 ft
Surface Average Height:	12.1599 ft

Method: janbu simplified

FS	1.067070
Axis Location:	46.356, 800.151
Left Slip Surface Endpoint:	28.072, 665.944
Right Slip Surface Endpoint:	142.751, 705.000
Resisting Horizontal Force:	103911 lb
Driving Horizontal Force:	97380 lb
Total Slice Area:	1394.49 ft2
Surface Horizontal Width:	114.679 ft
Surface Average Height:	12.1599 ft

Method: gle/morgenstern-price

FS	1.136300
Axis Location:	42.159, 808.423
Left Slip Surface Endpoint:	20.893, 664.406
Right Slip Surface Endpoint:	144.614, 705.000
Resisting Moment:	1.4699e+07 lb-ft
Driving Moment:	1.29359e+07 lb-ft
Resisting Horizontal Force:	94600.4 lb
Driving Horizontal Force:	83252.9 lb
Total Slice Area:	1223.73 ft2
Surface Horizontal Width:	123.72 ft
Surface Average Height:	9.89108 ft

Global Minimum Coordinates

Block, Static, Janbu - Master Scenario

Method: bishop simplified

X	Y
28.0723	665.944
30.9646	663.052
71.2416	663.859
108.595	675.375
130.264	692.512
142.751	705

Method: janbu simplified

X	Y
39.5844	668.162
43.2001	664.546
74.6507	662.792
104.462	668.928
129.852	690.155
144.696	705

Method: gle/morgenstern-price

X	Y
34.8452	667.326
38.3516	663.819
58.6712	664.032
93.8793	673.786
129.753	692.531
142.222	705

Block, Static, Janbu - Block, PseudoStatic, Janbu

Method: bishop simplified

X	Y
28.0723	665.944
30.9646	663.052
71.2416	663.859
108.595	675.375
130.264	692.512
142.751	705

Method: janbu simplified

X	Y
28.0723	665.944
30.9646	663.052
71.2416	663.859
108.595	675.375
130.264	692.512
142.751	705

Method: gle/morgenstern-price

X	Y
20.8931	664.406
23.1191	662.18
65.5236	665.569
112.33	680.394
137.089	697.476
144.614	705

Global Minimum Support Data

All Open Scenarios

No Supports Present

Valid and Invalid Surfaces

Curved, Static, Janbu - Master Scenario

Method: bishop simplified

Number of Valid Surfaces:	8198
Number of Invalid Surfaces:	1063
Error Codes	
Error Code -106 reported for 2 surfaces	
Error Code -108 reported for 620 surfaces	
Error Code -1000 reported for 441 surfaces	

Method: janbu simplified

Number of Valid Surfaces:	8130
Number of Invalid Surfaces:	1131
Error Codes	
Error Code -106 reported for 2 surfaces	
Error Code -108 reported for 682 surfaces	
Error Code -111 reported for 6 surfaces	
Error Code -1000 reported for 441 surfaces	

Method: gle/morgenstern-price

Number of Valid Surfaces:	8106
Number of Invalid Surfaces:	1155
Error Codes	
Error Code -106 reported for 2 surfaces	
Error Code -108 reported for 682 surfaces	
Error Code -111 reported for 30 surfaces	
Error Code -1000 reported for 441 surfaces	

Curved, Static, Janbu - Curved, PseudoStatic Janbu

Method: bishop simplified

Number of Valid Surfaces:	8768
Number of Invalid Surfaces:	493
Error Codes	
Error Code -106 reported for 2 surfaces	
Error Code -108 reported for 50 surfaces	
Error Code -1000 reported for 441 surfaces	

Method: janbu simplified

Number of Valid Surfaces:	8756
Number of Invalid Surfaces:	505
Error Codes	
Error Code -106 reported for 2 surfaces	
Error Code -108 reported for 60 surfaces	
Error Code -111 reported for 2 surfaces	
Error Code -1000 reported for 441 surfaces	

Method: gle/morgenstern-price

Number of Valid Surfaces:	8446
Number of Invalid Surfaces:	815

Error Codes

Error Code -106 reported for 2 surfaces
Error Code -108 reported for 60 surfaces
Error Code -111 reported for 312 surfaces
Error Code -1000 reported for 441 surfaces

Block, Static, Janbu - Master Scenario

Method: bishop simplified

Number of Valid Surfaces:	9996
Number of Invalid Surfaces:	4

Error Codes

Error Code -108 reported for 3 surfaces
Error Code -112 reported for 1 surface

Method: janbu simplified

Number of Valid Surfaces:	9993
Number of Invalid Surfaces:	7

Error Codes

Error Code -108 reported for 4 surfaces
Error Code -111 reported for 2 surfaces
Error Code -112 reported for 1 surface

Method: gle/morgenstern-price

Number of Valid Surfaces:	9788
Number of Invalid Surfaces:	212

Error Codes

Error Code -108 reported for 26 surfaces
Error Code -111 reported for 185 surfaces
Error Code -112 reported for 1 surface

Block, Static, Janbu - Block, PseudoStatic, Janbu

Method: bishop simplified

Number of Valid Surfaces:	9992
Number of Invalid Surfaces:	8

Error Codes

Error Code -111 reported for 1 surface
Error Code -112 reported for 7 surfaces

Method: janbu simplified

Number of Valid Surfaces:	9987
Number of Invalid Surfaces:	13

Error Codes

Error Code -111 reported for 3 surfaces
Error Code -112 reported for 10 surfaces

Method: gle/morgenstern-price

Number of Valid Surfaces:	9622
Number of Invalid Surfaces:	378

Error Codes
Error Code -108 reported for 12 surfaces
Error Code -111 reported for 354 surfaces
Error Code -112 reported for 12 surfaces

Error Code Descriptions

The following errors were encountered during the computation:

-106 = Average slice width is less than 0.0001 * (maximum horizontal extent of soil region). This limitation is imposed to avoid numerical errors which may result from too many slices, or too small a slip region.

-108 = Total driving moment or total driving force < 0.1. This is to limit the calculation of extremely high safety factors if the driving force is very small (0.1 is an arbitrary number).

-111 = Safety factor equation did not converge

-112 = The coefficient M-Alpha = cos(alpha)(1+tan(alpha)tan(phi)/F) < 0.2 for the final iteration of the safety factor calculation. This screens out some slip surfaces which may not be valid in the context of the analysis, in particular, deep seated slip surfaces with many high negative base angle slices in the passive zone.

-1000 = No valid slip surface is generated

Slice Data

Curved, Static, Janbu - Master Scenario

Global Minimum Query (bishop simplified) - Safety Factor: 2.12377

Slice Number	Width [ft]	Weight [lbs]	Angle of Slice Base [deg]	Base Material	Base Cohesion [psf]	Base Friction Angle [deg]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]	Base Vertical Stress [psf]	Effective Vertical Stress [psf]
1	1.62987	61.651	-0.206964	Uncompacted Fill	240	20	119.563	253.924	38.2569	0	38.2569	37.825	37.825
2	1.62987	182.714	0.63284	Uncompacted Fill	240	20	131.969	280.272	110.648	0	110.648	112.105	112.105
3	1.62987	299.298	1.47278	Uncompacted Fill	240	20	143.845	305.493	179.94	0	179.94	183.638	183.638
4	1.62987	411.4	2.31304	Uncompacted Fill	240	20	155.192	329.592	246.153	0	246.153	252.421	252.421
5	1.62987	519.012	3.15379	Uncompacted Fill	240	20	166.015	352.577	309.303	0	309.303	318.45	318.45
6	1.62987	622.126	3.99523	Uncompacted Fill	240	20	176.315	374.453	369.405	0	369.405	381.72	381.72
7	1.62987	720.728	4.83753	Uncompacted Fill	240	20	186.095	395.223	426.472	0	426.472	442.222	442.222
8	1.62987	814.805	5.68088	Uncompacted Fill	240	20	195.357	414.893	480.514	0	480.514	499.948	499.948
9	1.62987	904.336	6.52546	Uncompacted Fill	240	20	204.101	433.464	531.538	0	531.538	554.885	554.885
10	1.62987	989.301	7.37148	Uncompacted Fill	240	20	212.329	450.939	579.552	0	579.552	607.021	607.021
11	1.62987	1071.17	8.21911	Uncompacted Fill	240	20	220.196	467.645	625.448	0	625.448	657.253	657.253
12	1.62987	1150.5	9.06856	Uncompacted Fill	240	20	227.76	483.709	669.583	0	669.583	705.936	705.936
13	1.62987	1225.2	9.92002	Uncompacted Fill	240	20	234.807	498.677	710.711	0	710.711	751.776	751.776
14	1.62987	1295.21	10.7737	Uncompacted Fill	240	20	241.338	512.546	748.813	0	748.813	794.736	794.736
15	1.60175	1337.99	11.6224	Bedrock	140	34	310.938	660.36	771.469	0	771.469	835.422	835.422
16	1.60175	1399.53	12.4663	Bedrock	140	34	320.923	681.567	802.905	0	802.905	873.854	873.854
17	1.60175	1456.32	13.3129	Bedrock	140	34	329.925	700.685	831.252	0	831.252	909.322	909.322
18	1.60175	1508.3	14.1626	Bedrock	140	34	337.945	717.717	856.501	0	856.501	941.78	941.78
19	1.60175	1555.41	15.0154	Bedrock	140	34	344.984	732.666	878.66	0	878.66	971.198	971.198
20	1.60175	1597.59	15.8716	Bedrock	140	34	351.042	745.533	897.74	0	897.74	997.548	997.548
21	1.60175	1635.96	16.7315	Bedrock	140	34	356.332	756.767	914.393	0	914.393	1021.51	1021.51
22	1.60175	1681.98	17.5953	Bedrock	140	34	362.928	770.775	935.164	0	935.164	1050.26	1050.26
23	1.60175	1726.37	18.4632	Bedrock	140	34	369.143	783.974	954.731	0	954.731	1077.98	1077.98
24	1.60175	1766.57	19.3355	Bedrock	140	34	374.523	795.401	971.67	0	971.67	1103.09	1103.09
25	1.60175	1802.83	20.2126	Bedrock	140	34	379.123	805.169	986.151	0	986.151	1125.74	1125.74
26	1.60175	1833.72	21.0946	Bedrock	140	34	382.698	812.762	997.413	0	997.413	1145.04	1145.04
27	1.60175	1859.16	21.9819	Bedrock	140	34	385.243	818.167	1005.43	0	1005.43	1160.93	1160.93
28	1.60175	1879.03	22.8747	Bedrock	140	34	386.753	821.375	1010.18	0	1010.18	1173.35	1173.35
29	1.60175	1893.23	23.7735	Bedrock	140	34	387.222	822.37	1011.65	0	1011.65	1182.23	1182.23
30	1.60175	1901.65	24.6785	Bedrock	140	34	386.642	821.139	1009.83	0	1009.83	1187.49	1187.49
31	1.60175	1904.14	25.5902	Bedrock	140	34	385.005	817.662	1004.68	0	1004.68	1189.06	1189.06

32	1.60175	1900.26	26.5088	Bedrock	140	34	382.245	811.801	995.984	0	995.984	1186.64	1186.64
33	1.60175	1891.26	27.4349	Bedrock	140	34	378.595	804.049	984.495	0	984.495	1181.03	1181.03
34	1.60175	1876	28.3688	Bedrock	140	34	373.872	794.019	969.624	0	969.624	1171.51	1171.51
35	1.60175	1854.23	29.311	Bedrock	140	34	368.051	781.655	951.291	0	951.291	1157.92	1157.92
36	1.60175	1825.76	30.2619	Bedrock	140	34	361.118	766.931	929.462	0	929.462	1140.16	1140.16
37	1.60175	1790.41	31.2222	Bedrock	140	34	353.059	749.817	904.092	0	904.092	1118.1	1118.1
38	1.60175	1747.97	32.1924	Bedrock	140	34	343.861	730.281	875.13	0	875.13	1091.61	1091.61
39	1.60175	1698.19	33.173	Bedrock	140	34	333.503	708.284	842.518	0	842.518	1060.53	1060.53
40	1.60175	1640.55	34.1647	Bedrock	140	34	321.922	683.689	806.049	0	806.049	1024.54	1024.54
41	1.60175	1574.95	35.1682	Bedrock	140	34	309.13	656.521	765.774	0	765.774	983.584	983.584
42	1.60175	1501.22	36.1842	Bedrock	140	34	295.126	626.779	721.68	0	721.68	937.554	937.554
43	1.60175	1419.06	37.2136	Bedrock	140	34	279.888	594.418	673.701	0	673.701	886.253	886.253
44	1.60175	1327.65	38.2573	Bedrock	140	34	263.321	559.234	621.542	0	621.542	829.182	829.182
45	1.60175	1225.91	39.3161	Bedrock	140	34	245.291	520.941	564.768	0	564.768	765.652	765.652
46	1.60175	1114.53	40.3913	Bedrock	140	34	225.947	479.86	503.865	0	503.865	696.102	696.102
47	1.69385	1047.37	41.5158	Uncompacted Fill	240	20	190.169	403.875	450.241	0	450.241	618.582	618.582
48	1.69385	800.897	42.6923	Uncompacted Fill	240	20	167.583	355.908	318.454	0	318.454	473.054	473.054
49	1.69385	489.992	43.8916	Uncompacted Fill	240	20	139.6	296.479	155.174	0	155.174	289.475	289.475
50	1.69385	165.64	45.1155	Uncompacted Fill	240	20	110.739	235.184	-13.2331	0	-13.2331	97.9528	97.9528

Global Minimum Query (janbu simplified) - Safety Factor: 2.01003

Slice Number	Width [ft]	Weight [lbs]	Angle of Slice Base [deg]	Base Material	Base Cohesion [psf]	Base Friction Angle [deg]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]	Base Vertical Stress [psf]	Effective Vertical Stress [psf]
1	1.65778	98.1699	-12.4749	Uncompacted Fill	240	20	135.564	272.488	89.2614	0	89.2614	59.2699	59.2699
2	1.65778	290.833	-11.198	Uncompacted Fill	240	20	156.799	315.171	206.53	0	206.53	175.489	175.489
3	1.65778	476.191	-9.92666	Uncompacted Fill	240	20	177.035	355.845	318.282	0	318.282	287.3	287.3
4	1.65778	654.335	-8.66028	Uncompacted Fill	240	20	196.297	394.562	424.655	0	424.655	394.757	394.757
5	1.65778	825.342	-7.39815	Uncompacted Fill	240	20	214.607	431.366	525.773	0	525.773	497.907	497.907
6	1.65778	989.278	-6.13963	Uncompacted Fill	240	20	231.985	466.297	621.743	0	621.743	596.788	596.788
7	1.65778	1146.2	-4.88408	Uncompacted Fill	240	20	248.45	499.391	712.672	0	712.672	691.441	691.441
8	1.62139	1268.9	-3.6446	Bedrock	140	34	339.538	682.482	804.264	0	804.264	782.637	782.637
9	1.62139	1411.18	-2.42058	Bedrock	140	34	366.93	737.541	885.891	0	885.891	870.38	870.38
10	1.62139	1546.72	-1.19766	Bedrock	140	34	392.525	788.988	962.167	0	962.167	953.96	953.96
11	1.62139	1675.52	0.0247154	Bedrock	140	34	416.364	836.905	1033.2	0	1033.2	1033.38	1033.38
12	1.62139	1799.56	1.2471	Bedrock	140	34	438.885	882.172	1100.31	0	1100.31	1109.87	1109.87
13	1.62139	1918.45	2.47005	Bedrock	140	34	460.031	924.677	1163.33	0	1163.33	1183.18	1183.18
14	1.62139	2030.59	3.69414	Bedrock	140	34	479.504	963.817	1221.36	0	1221.36	1252.31	1252.31
15	1.62139	2135.95	4.91991	Bedrock	140	34	497.327	999.642	1274.47	0	1274.47	1317.28	1317.28
16	1.62139	2235.2	6.14794	Bedrock	140	34	513.659	1032.47	1323.14	0	1323.14	1378.47	1378.47
17	1.62139	2328.17	7.37882	Bedrock	140	34	528.493	1062.29	1367.35	0	1367.35	1435.79	1435.79
18	1.62139	2414.23	8.61314	Bedrock	140	34	541.729	1088.89	1406.79	0	1406.79	1488.84	1488.84
19	1.62139	2493.33	9.8515	Bedrock	140	34	553.38	1112.31	1441.51	0	1441.51	1537.61	1537.61
20	1.62139	2565.4	11.0945	Bedrock	140	34	563.456	1132.56	1471.54	0	1471.54	1582.03	1582.03
21	1.62139	2630.34	12.3429	Bedrock	140	34	571.967	1149.67	1496.89	0	1496.89	1622.05	1622.05
22	1.62139	2690.95	13.5972	Bedrock	140	34	579.469	1164.75	1519.26	0	1519.26	1659.41	1659.41
23	1.62139	2757.49	14.8582	Bedrock	140	34	587.922	1181.74	1544.45	0	1544.45	1700.42	1700.42
24	1.62139	2818.23	16.1266	Bedrock	140	34	595.086	1196.14	1565.8	0	1565.8	1737.86	1737.86
25	1.62139	2872.91	17.4032	Bedrock	140	34	600.926	1207.88	1583.2	0	1583.2	1771.55	1771.55
26	1.62139	2920.7	18.6888	Bedrock	140	34	605.304	1216.68	1596.25	0	1596.25	1801	1801
27	1.62139	2960.56	19.9842	Bedrock	140	34	608.051	1222.2	1604.43	0	1604.43	1825.56	1825.56
28	1.62139	2992.32	21.2903	Bedrock	140	34	609.16	1224.43	1607.73	0	1607.73	1845.11	1845.11
29	1.62139	3015.75	22.6082	Bedrock	140	34	608.608	1223.32	1606.09	0	1606.09	1859.53	1859.53
30	1.62139	3030.62	23.9389	Bedrock	140	34	606.389	1218.86	1599.47	0	1599.47	1868.68	1868.68
31	1.62139	3036.67	25.2834	Bedrock	140	34	602.474	1210.99	1587.81	0	1587.81	1872.38	1872.38
32	1.62139	3033.45	26.643	Bedrock	140	34	596.817	1199.62	1570.95	0	1570.95	1870.37	1870.37
33	1.62139	3020.96	28.0189	Bedrock	140	34	589.444	1184.8	1548.98	0	1548.98	1862.65	1862.65
34	1.62139	2999.53	29.4127	Bedrock	140	34	580.444	1166.71	1522.16	0	1522.16	1849.4	1849.4
35	1.62139	2967.9	30.826	Bedrock	140	34	569.633	1144.98	1489.95	0	1489.95	1829.87	1829.87
36	1.62139	2925.63	32.2603	Bedrock	140	34	556.974	1119.53	1452.22	0	1452.22	1803.79	1803.79
37	1.62139	2872.23	33.7177	Bedrock	140	34	542.416	1090.27	1408.84	0	1408.84	1770.82	1770.82
38	1.62139	2807.11	35.2003	Bedrock	140	34	525.913	1057.1	1359.66	0	1359.66	1730.65	1730.65
39	1.62139	2729.65	36.7105	Bedrock	140	34	507.406	1019.9	1304.51	0	1304.51	1682.86	1682.86
40	1.62139	2639	38.251	Bedrock	140	34	486.817	978.517	1243.15	0	1243.15	1626.94	1626.94
41	1.62139	2534.1	39.825	Bedrock	140	34	464.04	932.735	1175.28	0	1175.28	1562.25	1562.25
42	1.62139	2414.3	41.4359	Bedrock	140	34	439.046	882.496	1100.79	0	1100.79	1488.35	1488.35
43	1.62139	2278.5	43.0879	Bedrock	140	34	411.751	827.631	1019.45	0	1019.45	1404.6	1404.6
44	1.62139	2125.33	44.7857	Bedrock	140	34	382.049	767.929	930.944	0	930.944	1310.15	1310.15
45	1.62139	1952.13	46.5352	Bedrock	140	34	349.659	702.825	834.422	0	834.422	1203.34	1203.34
46	1.62139	1757.65	48.343	Bedrock	140	34	314.561	632.277	729.828	0	729.828	1083.42	1083.42
47	1.62139	1540.15	50.2176	Bedrock	140	34	276.699	556.174	617.004	0	617.004	949.316	949.316
48	1.62139	1264.42	52.1691	Bedrock	140	34	231.24	464.799	481.534	0	481.534	779.314	779.314
49	1.95213	982.489	54.4305	Uncompacted Fill	240	20	167.938	337.56	268.045	0	268.045	502.882	502.882
50	1.95213	338.04	57.0483	Uncompacted Fill	240	20	117.794	236.77	-8.87413	0	-8.87413	172.848	172.848

Query 1 (janbu simplified) - Safety Factor: 2.01003

Slice Number	Width [ft]	Weight [lbs]	Angle of Slice Base [deg]	Base Material	Base Cohesion [psf]	Base Friction Angle [deg]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]	Base Vertical Stress [psf]	Effective Vertical Stress [psf]
1	1.65778	98.1699	-12.4749	Uncompacted Fill	240	20	135.564	272.488	89.2614	0	89.2614	59.2699	59.2699
2	1.65778	290.833	-11.198	Uncompacted Fill	240	20	156.799	315.171	206.53	0	206.53	175.489	175.489
3	1.65778	476.191	-9.92666	Uncompacted Fill	240	20	177.035	355.845	318.282	0	318.282	287.3	287.3
4	1.65778	654.335	-8.66028	Uncompacted Fill	240	20	196.297	394.562	424.655	0	424.655	394.757	394.757
5	1.65778	825.342	-7.39815	Uncompacted Fill	240	20	214.607	431.366	525.773	0	525.773	497.907	497.907
6	1.65778	989.278	-6.13963	Uncompacted Fill	240	20	231.985	466.297	621.743	0	621.743	596.788	596.788
7	1.65778	1146.2	-4.88408	Uncompacted Fill	240	20	248.45	499.391	712.672	0	712.672	691.441	691.441
8	1.62139	1268.9	-3.6446	Bedrock	140	34	339.538	682.482	804.264	0	804.264	782.637	782.637
9	1.62139	1411.18	-2.42058	Bedrock	140	34	366.93	737.541	885.891	0	885.891	870.38	870.38
10	1.62139	1546.72	-1.19766	Bedrock	140	34	392.525	788.988	962.167	0	962.167	953.96	953.96
11	1.62139	1675.52	0.0247154	Bedrock	140	34	416.364	836.905	1033.2	0	1033.2	1033.38	1033.38
12	1.62139	1799.56	1.2471	Bedrock	140	34	438.885	882.172	1100.31	0	1100.31	1109.87	1109.87
13	1.62139	1918.45	2.47005	Bedrock	140	34	460.031	924.677	1163.33	0	1163.33	1183.18	1183.18
14	1.62139	2030.59	3.69414	Bedrock	140	34	479.504	963.817	1221.36	0	1221.36	1252.31	1252.31
15	1.62139	2135.95	4.91991	Bedrock	140	34	497.327	999.642	1274.47	0	1274.47	1317.28	1317.28
16	1.62139	2235.2	6.14794	Bedrock	140	34	513.659	1032.47	1323.14	0	1323.14	1378.47	1378.47
17	1.62139	2328.17	7.37882	Bedrock	140	34	528.493	1062.29	1367.35	0	1367.35	1435.79	1435.79
18	1.62139	2414.23	8.61314	Bedrock	140	34	541.729	1088.89	1406.79	0	1406.79	1488.84	1488.84
19	1.62139	2493.33	9.8515	Bedrock	140	34	553.38	1112.31	1441.51	0	1441.51	1537.61	1537.61
20	1.62139	2565.4	11.0945	Bedrock	140	34	563.456	1132.56	1471.54	0	1471.54	1582.03	1582.03
21	1.62139	2630.34	12.3429	Bedrock	140	34	571.967	1149.67	1496.89	0	1496.89	1622.05	1622.05
22	1.62139	2690.95	13.5972	Bedrock	140	34	579.469	1164.75	1519.26	0	1519.26	1659.41	1659.41
23	1.62139	2757.49	14.8582	Bedrock	140	34	587.922	1181.74	1544.45	0	1544.45	1700.42	1700.42
24	1.62139	2818.23	16.1266	Bedrock	140	34	595.086	1196.14	1565.8	0	1565.8	1737.86	1737.86
25	1.62139	2872.91	17.4032	Bedrock	140	34	600.926	1207.88	1583.2	0	1583.2	1771.55	1771.55
26	1.62139	2920.7	18.6888	Bedrock	140	34	605.304	1216.68	1596.25	0	1596.25	1801	1801
27	1.62139	2960.56	19.9842	Bedrock	140	34	608.051	1222.2	1604.43	0	1604.43	1825.56	1825.56
28	1.62139	2992.32	21.2903	Bedrock	140	34	609.16	1224.43	1607.73	0	1607.73	1845.11	1845.11
29	1.62139	3015.75	22.6082	Bedrock	140	34	608.608	1223.32	1606.09	0	1606.09	1859.53	1859.53
30	1.62139	3030.62	23.9389	Bedrock	140	34	606.389	1218.86	1599.47	0	1599.47	1868.68	1868.68
31	1.62139	3036.67	25.2834	Bedrock	140	34	602.474	1210.99	1587.81	0	1587.81	1872.38	1872.38
32	1.62139	3033.45	26.643	Bedrock	140	34	596.817	1199.62	1570.95	0	1570.95	1870.37	1870.37
33	1.62139	3020.96	28.0189	Bedrock	140	34	589.444	1184.8	1548.98	0	1548.98	1862.65	1862.65
34	1.62139	2999.53	29.4127	Bedrock	140	34	580.444	1166.71	1522.16	0	1522.16	1849.4	1849.4
35	1.62139	2967.9	30.826	Bedrock	140	34	569.633	1144.98	1489.95	0	1489.95	1829.87	1829.87
36	1.62139	2925.63	32.2603	Bedrock	140	34	556.974	1119.53	1452.22	0	1452.22	1803.79	1803.79
37	1.62139	2872.23	33.7177	Bedrock	140	34	542.416	1090.27	1408.84	0	1408.84	1770.82	1770.82
38	1.62139	2807.11	35.2003	Bedrock	140	34	525.913	1057.1	1359.66	0	1359.66	1730.65	1730.65
39	1.62139	2729.65	36.7105	Bedrock	140	34	507.406	1019.9	1304.51	0	1304.51	1682.86	1682.86
40	1.62139	2639	38.251	Bedrock	140	34	486.817	978.517	1243.15	0	1243.15	1626.94	1626.94
41	1.62139	2534.1	39.825	Bedrock	140	34	464.04	932.735	1175.28	0	1175.28	1562.25	1562.25
42	1.62139	2414.3	41.4359	Bedrock	140	34	439.046	882.496	1100.79	0	1100.79	1488.35	1488.35
43	1.62139	2278.5	43.0879	Bedrock	140	34	411.751	827.631	1019.45	0	1019.45	1404.6	1404.6
44	1.62139	2125.33	44.7857	Bedrock	140	34	382.049	767.929	930.944	0	930.944	1310.15	1310.15
45	1.62139	1952.13	46.5352	Bedrock	140	34	349.659	702.825	834.422	0	834.422	1203.34	1203.34
46	1.62139	1757.65	48.343	Bedrock	140	34	314.561	632.277	729.828	0	729.828	1083.42	1083.42
47	1.62139	1540.15	50.2176	Bedrock	140	34	276.699	556.174	617.004	0	617.004	949.316	949.316
48	1.62139	1264.42	52.1691	Bedrock	140	34	231.24	464.799	481.534	0	481.534	779.314	779.314
49	1.95213	982.489	54.4305	Uncompacted Fill	240	20	167.938	337.56	268.045	0	268.045	502.882	502.882
50	1.95213	338.04	57.0483	Uncompacted Fill	240	20	117.794	236.77	-8.87413	0	-8.87413	172.848	172.848

Global Minimum Query (gle/morgenstern-price) - Safety Factor: 2.10815

Slice Number	Width [ft]	Weight [lbs]	Angle of Slice Base [deg]	Base Material	Base Cohesion [psf]	Base Friction Angle [deg]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]	Base Vertical Stress [psf]	Effective Vertical Stress [psf]
1	1.62987	61.651	-0.206964	Uncompacted Fill	240	20	121.076	255.246	41.8892	0	41.8892	41.4519	41.4519
2	1.62987	182.714	0.63284	Uncompacted Fill	240	20	134.942	284.479	122.205	0	122.205	123.696	123.696
3	1.62987	299.298	1.47278	Uncompacted Fill	240	20	148.399	312.846	200.144	0	200.144	203.959	203.959
4	1.62987	411.4	2.31304	Uncompacted Fill	240	20	161.379	340.211	275.327	0	275.327	281.846	281.846
5	1.62987	519.012	3.15379	Uncompacted Fill	240	20	173.82	366.439	347.389	0	347.389	356.966	356.966
6	1.62987	622.126	3.99523	Uncompacted Fill	240	20	185.663	391.406	415.983	0	415.983	428.951	428.951
7	1.62987	720.728	4.83753	Uncompacted Fill	240	20	196.853	414.995	480.796	0	480.796	497.456	497.456
8	1.62987	814.805	5.68088	Uncompacted Fill	240	20	207.342	437.107	541.548	0	541.548	562.173	562.173
9	1.62987	904.336	6.52546	Uncompacted Fill	240	20	217.089	457.657	598.007	0	598.007	622.838	622.838
10	1.62987	989.301	7.37148	Uncompacted Fill	240	20	226.063	476.575	649.984	0	649.984	679.23	679.23
11	1.62987	1071.17	8.21911	Uncompacted Fill	240	20	234.396	494.142	698.25	0	698.25	732.107	732.107
12	1.62987	1150.5	9.06856	Uncompacted Fill	240	20	242.132	510.45	743.058	0	743.058	781.705	781.705
13	1.62987	1225.2	9.92002	Uncompacted Fill	240	20	249.047	525.028	783.108	0	783.108	826.663	826.663
14	1.62987	1295.21	10.7737	Uncompacted Fill	240	20	255.142	537.877	818.41	0	818.41	866.96	866.96
15	1.60175	1337.99	11.6224	Bedrock	140	34	342.633	722.321	863.325	0	863.325	933.797	933.797
16	1.60175	1399.53	12.4663	Bedrock	140	34	352.044	742.161	892.741	0	892.741	970.57	970.57
17	1.60175	1456.32	13.3129	Bedrock	140	34	359.885	758.692	917.249	0	917.249	1002.41	1002.41
18	1.60175	1508.3	14.1626	Bedrock	140	34	366.191	771.986	936.957	0	936.957	1029.36	1029.36
19	1.60175	1555.41	15.0154	Bedrock	140	34	371.011	782.146	952.021	0	952.021	1051.54	1051.54
20	1.60175	1597.59	15.8716	Bedrock	140	34	374.402	789.295	962.619	0	962.619	1069.07	1069.07
21	1.60175	1635.96	16.7315	Bedrock	140	34	376.645	794.025	969.632	0	969.632	1082.86	1082.86
22	1.60175	1681.98	17.5953	Bedrock	140	34	379.904	800.894	979.815	0	979.815	1100.29	1100.29
23	1.60175	1726.37	18.4632	Bedrock	140	34	382.518	806.405	987.988	0	987.988	1115.7	1115.7
24	1.60175	1766.57	19.3355	Bedrock	140	34	384.105	809.752	992.948	0	992.948	1127.73	1127.73
25	1.60175	1802.83	20.2126	Bedrock	140	34	384.799	811.213	995.115	0	995.115	1136.79	1136.79
26	1.60175	1833.72	21.0946	Bedrock	140	34	384.437	810.451	993.982	0	993.982	1142.28	1142.28
27	1.60175	1859.16	21.9819	Bedrock	140	34	383.097	807.626	989.795	0	989.795	1144.44	1144.44
28	1.60175	1879.03	22.8747	Bedrock	140	34	380.851	802.891	982.776	0	982.776	1143.46	1143.46
29	1.60175	1893.23	23.7735	Bedrock	140	34	377.765	796.386	973.135	0	973.135	1139.54	1139.54
30	1.60175	1901.65	24.6785	Bedrock	140	34	373.9	788.237	961.052	0	961.052	1132.86	1132.86
31	1.60175	1904.14	25.5902	Bedrock	140	34	369.303	778.547	946.686	0	946.686	1123.55	1123.55
32	1.60175	1900.26	26.5088	Bedrock	140	34	363.967	767.296	930.004	0	930.004	1111.54	1111.54
33	1.60175	1891.26	27.4349	Bedrock	140	34	358.15	755.033	911.825	0	911.825	1097.75	1097.75
34	1.60175	1876	28.3688	Bedrock	140	34	351.714	741.465	891.711	0	891.711	1081.63	1081.63
35	1.60175	1854.23	29.311	Bedrock	140	34	344.66	726.594	869.66	0	869.66	1063.16	1063.16
36	1.60175	1825.76	30.2619	Bedrock	140	34	336.991	710.427	845.696	0	845.696	1042.32	1042.32
37	1.60175	1790.41	31.2222	Bedrock	140	34	328.702	692.954	819.785	0	819.785	1019.03	1019.03
38	1.60175	1747.97	32.1924	Bedrock	140	34	319.778	674.139	791.891	0	791.891	993.206	993.206
39	1.60175	1698.19	33.173	Bedrock	140	34	310.188	653.922	761.922	0	761.922	964.695	964.695

40	1.60175	1640.55	34.1647	Bedrock	140	34	299.851	632.131	729.617	0	729.617	933.125	933.125
41	1.60175	1574.95	35.1682	Bedrock	140	34	288.747	608.723	694.911	0	694.911	898.36	898.36
42	1.60175	1501.22	36.1842	Bedrock	140	34	276.831	583.602	657.665	0	657.665	860.157	860.157
43	1.60175	1419.06	37.2136	Bedrock	140	34	264.026	556.606	617.642	0	617.642	818.148	818.148
44	1.60175	1327.65	38.2573	Bedrock	140	34	250.169	527.393	574.332	0	574.332	771.6	771.6
45	1.60175	1225.91	39.3161	Bedrock	140	34	235.041	495.502	527.055	0	527.055	719.544	719.544
46	1.60175	1114.53	40.3913	Bedrock	140	34	218.673	460.995	475.896	0	475.896	661.944	661.944
47	1.69385	1047.37	41.5158	Uncompacted Fill	240	20	187.821	395.954	428.479	0	428.479	594.742	594.742
48	1.69385	800.897	42.6923	Uncompacted Fill	240	20	167.507	353.129	310.82	0	310.82	465.349	465.349
49	1.69385	489.992	43.8916	Uncompacted Fill	240	20	140.949	297.142	156.997	0	156.997	292.596	292.596
50	1.69385	165.64	45.1155	Uncompacted Fill	240	20	111.997	236.107	-10.6957	0	-10.6957	101.754	101.754

Curved, Static, Janbu - Curved, PseudoStatic Janbu

Global Minimum Query (bishop simplified) - Safety Factor: 1.0901

Slice Number	Width [ft]	Weight [lbs]	Angle of Slice Base [deg]	Base Material	Base Cohesion [psf]	Base Friction Angle [deg]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]	Base Vertical Stress [psf]	Effective Vertical Stress [psf]
1	1.8262	82.3539	-1.68732	Uncompacted Fill	240	20	237.556	258.96	52.0922	0	52.0922	45.0944	45.0944
2	1.8262	244.263	-0.851565	Uncompacted Fill	240	20	266.143	290.122	137.71	0	137.71	133.754	133.754
3	1.8262	400.577	-0.0159954	Uncompacted Fill	240	20	293.429	319.867	219.432	0	219.432	219.35	219.35
4	1.8262	551.297	0.819571	Uncompacted Fill	240	20	319.432	348.213	297.314	0	297.314	301.884	301.884
5	1.8262	696.423	1.65531	Uncompacted Fill	240	20	344.171	375.181	371.407	0	371.407	381.353	381.353
6	1.8262	835.947	2.4914	Uncompacted Fill	240	20	367.661	400.787	441.759	0	441.759	457.756	457.756
7	1.8262	969.863	3.32803	Uncompacted Fill	240	20	389.916	425.047	508.414	0	508.414	531.088	531.088
8	1.8262	1098.16	4.16536	Uncompacted Fill	240	20	410.95	447.977	571.414	0	571.414	601.343	601.343
9	1.8262	1220.81	5.00359	Uncompacted Fill	240	20	430.776	469.589	630.793	0	630.793	668.508	668.508
10	1.8262	1337.81	5.84289	Uncompacted Fill	240	20	449.406	489.897	686.586	0	686.586	732.575	732.575
11	1.85376	1473.88	6.68981	Bedrock	140	34	578.419	630.535	727.246	0	727.246	795.09	795.09
12	1.85376	1589.52	7.54455	Bedrock	140	34	609.084	663.962	776.808	0	776.808	857.478	857.478
13	1.85376	1700.55	8.40099	Bedrock	140	34	637.78	695.244	823.181	0	823.181	917.371	917.371
14	1.85376	1805.28	9.25932	Bedrock	140	34	664.034	723.864	865.612	0	865.612	973.868	973.868
15	1.85376	1904	10.1198	Bedrock	140	34	687.992	749.98	904.334	0	904.334	1027.13	1027.13
16	1.85376	1997.52	10.9825	Bedrock	140	34	709.942	773.908	939.808	0	939.808	1077.58	1077.58
17	1.85376	2084.69	11.8478	Bedrock	140	34	729.585	795.321	971.554	0	971.554	1124.61	1124.61
18	1.85376	2165.34	12.7158	Bedrock	140	34	746.924	814.222	999.575	0	999.575	1168.12	1168.12
19	1.85376	2239.42	13.5868	Bedrock	140	34	761.99	830.645	1023.92	0	1023.92	1208.08	1208.08
20	1.85376	2306.85	14.461	Bedrock	140	34	774.811	844.621	1044.65	0	1044.65	1244.46	1244.46
21	1.85376	2378.83	15.3387	Bedrock	140	34	788.629	859.684	1066.97	0	1066.97	1283.29	1283.29
22	1.85376	2455.97	16.2201	Bedrock	140	34	803.582	875.985	1091.15	0	1091.15	1324.91	1324.91
23	1.85376	2527.43	17.1054	Bedrock	140	34	816.588	890.163	1112.16	0	1112.16	1363.46	1363.46
24	1.85376	2593.82	17.995	Bedrock	140	34	827.854	902.444	1130.37	0	1130.37	1399.28	1399.28
25	1.85376	2653.13	18.8891	Bedrock	140	34	836.865	912.266	1144.93	0	1144.93	1431.28	1431.28
26	1.85376	2705.23	19.7879	Bedrock	140	34	843.628	919.639	1155.86	0	1155.86	1459.39	1459.39
27	1.85376	2750.01	20.6919	Bedrock	140	34	848.161	924.58	1163.19	0	1163.19	1483.54	1483.54
28	1.85376	2787.33	21.6013	Bedrock	140	34	850.475	927.103	1166.93	0	1166.93	1503.68	1503.68
29	1.85376	2817.03	22.5165	Bedrock	140	34	850.581	927.218	1167.1	0	1167.1	1519.71	1519.71
30	1.85376	2838.69	23.4378	Bedrock	140	34	848.409	924.851	1163.59	0	1163.59	1531.39	1531.39
31	1.85376	2853.79	24.3655	Bedrock	140	34	844.405	920.486	1157.12	0	1157.12	1539.54	1539.54
32	1.85376	2860.89	25.3001	Bedrock	140	34	838.232	913.757	1147.14	0	1147.14	1543.37	1543.37
33	1.85376	2859.71	26.2419	Bedrock	140	34	829.877	904.649	1133.64	0	1133.64	1542.74	1542.74
34	1.85376	2850.08	27.1915	Bedrock	140	34	819.345	893.168	1116.62	0	1116.62	1537.55	1537.55
35	1.85376	2831.77	28.1492	Bedrock	140	34	806.637	879.315	1096.08	0	1096.08	1527.67	1527.67
36	1.85376	2804.51	29.1156	Bedrock	140	34	791.745	863.081	1072.01	0	1072.01	1512.97	1512.97
37	1.85376	2767.68	30.0911	Bedrock	140	34	774.573	844.362	1044.26	0	1044.26	1493.1	1493.1
38	1.85376	2721.28	31.0763	Bedrock	140	34	755.194	823.237	1012.94	0	1012.94	1468.08	1468.08
39	1.85376	2665.17	32.0719	Bedrock	140	34	733.636	799.737	978.1	0	978.1	1437.81	1437.81
40	1.85376	2598.81	33.0784	Bedrock	140	34	709.844	773.801	939.651	0	939.651	1402.01	1402.01
41	1.85376	2520.38	34.0966	Bedrock	140	34	683.468	745.049	897.022	0	897.022	1359.71	1359.71
42	1.85376	2430.84	35.1272	Bedrock	140	34	654.82	713.819	850.72	0	850.72	1311.4	1311.4
43	1.85376	2319.92	36.1711	Bedrock	140	34	621.629	677.638	797.082	0	797.082	1251.56	1251.56
44	1.85376	2058.23	37.229	Bedrock	140	34	554.696	604.674	688.91	0	688.91	1110.39	1110.39

45	1.85376	1738.52	38.302	Bedrock	140	34	476.1	518.997	561.884	0	561.884	937.912	937.912
46	1.85376	1406.16	39.3911	Bedrock	140	34	396.413	432.13	433.101	0	433.101	758.615	758.615
47	1.61494	949.679	40.4251	Uncompacted Fill	240	20	324.294	353.513	311.876	0	311.876	588.117	588.117
48	1.61494	689.716	41.4029	Uncompacted Fill	240	20	280.27	305.522	180.02	0	180.02	427.137	427.137
49	1.61494	420.58	42.3957	Uncompacted Fill	240	20	235.381	256.589	45.5766	0	45.5766	260.476	260.476
50	1.61494	141.834	43.4044	Uncompacted Fill	240	20	189.62	206.704	-91.4786	0	-91.4786	87.8637	87.8637

Global Minimum Query (janbu simplified) - Safety Factor: 1.02904

Slice Number	Width [ft]	Weight [lbs]	Angle of Slice Base [deg]	Base Material	Base Cohesion [psf]	Base Friction Angle [deg]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]	Base Vertical Stress [psf]	Effective Vertical Stress [psf]
1	1.84432	67.6457	-9.61396	Uncompacted Fill	240	20	261.897	269.503	81.0587	0	81.0587	36.6965	36.6965
2	1.84432	199.126	-8.52533	Uncompacted Fill	240	20	286.618	294.941	150.95	0	150.95	107.985	107.985
3	1.84432	323.551	-7.43979	Uncompacted Fill	240	20	309.581	318.572	215.874	0	215.874	175.447	175.447
4	1.84432	492.762	-6.35694	Uncompacted Fill	240	20	341.177	351.085	305.203	0	305.203	267.193	267.193
5	1.84432	689.085	-5.27636	Uncompacted Fill	240	20	377.721	388.69	408.522	0	408.522	373.639	373.639
6	1.84432	877.973	-4.19766	Uncompacted Fill	240	20	412.31	424.283	506.314	0	506.314	476.053	476.053
7	1.84432	1059.46	-3.12044	Uncompacted Fill	240	20	444.991	457.914	598.713	0	598.713	574.454	574.454
8	1.84432	1233.57	-2.04434	Uncompacted Fill	240	20	475.809	489.626	685.842	0	685.842	668.858	668.858
9	1.91994	1464.55	-0.946912	Bedrock	140	34	643.021	661.694	773.444	0	773.444	762.816	762.816
10	1.91994	1643.61	0.17221	Bedrock	140	34	695.812	716.018	853.981	0	853.981	856.072	856.072
11	1.91994	1814.03	1.2914	Bedrock	140	34	744.361	765.977	928.048	0	928.048	944.828	944.828
12	1.91994	1975.8	2.41108	Bedrock	140	34	788.814	811.721	995.867	0	995.867	1029.08	1029.08
13	1.91994	2128.91	3.53168	Bedrock	140	34	829.301	853.384	1057.63	0	1057.63	1108.82	1108.82
14	1.91994	2273.93	4.65364	Bedrock	140	34	866.141	891.294	1113.84	0	1113.84	1184.34	1184.34
15	1.91994	2413.96	5.77739	Bedrock	140	34	900.44	926.589	1166.17	0	1166.17	1257.27	1257.27
16	1.91994	2545.86	6.90338	Bedrock	140	34	931.276	958.32	1213.21	0	1213.21	1325.96	1325.96
17	1.91994	2668.94	8.03205	Bedrock	140	34	958.536	986.372	1254.8	0	1254.8	1390.06	1390.06
18	1.91994	2784.17	9.16387	Bedrock	140	34	982.627	1011.16	1291.55	0	1291.55	1450.07	1450.07
19	1.91994	2891.12	10.2993	Bedrock	140	34	1003.51	1032.65	1323.4	0	1323.4	1505.76	1505.76
20	1.91994	2989	11.4389	Bedrock	140	34	1021.03	1050.68	1350.14	0	1350.14	1556.74	1556.74
21	1.91994	3077.7	12.583	Bedrock	140	34	1035.25	1065.32	1371.84	0	1371.84	1602.92	1602.92
22	1.91994	3157.11	13.7323	Bedrock	140	34	1046.24	1076.62	1388.6	0	1388.6	1644.27	1644.27
23	1.91994	3232.16	14.8872	Bedrock	140	34	1055.51	1086.17	1402.75	0	1402.75	1683.35	1683.35
24	1.91994	3315.86	16.0484	Bedrock	140	34	1066.85	1097.83	1420.04	0	1420.04	1726.93	1726.93
25	1.91994	3392.08	17.2164	Bedrock	140	34	1075.57	1106.8	1433.34	0	1433.34	1766.62	1766.62
26	1.91994	3460.88	18.3918	Bedrock	140	34	1081.75	1113.16	1442.77	0	1442.77	1802.45	1802.45
27	1.91994	3519.83	19.5753	Bedrock	140	34	1084.78	1116.28	1447.39	0	1447.39	1833.14	1833.14
28	1.91994	3568.45	20.7675	Bedrock	140	34	1084.62	1116.12	1447.15	0	1447.15	1858.45	1858.45
29	1.91994	3606.5	21.9693	Bedrock	140	34	1081.29	1112.69	1442.07	0	1442.07	1878.26	1878.26
30	1.91994	3633.72	23.1813	Bedrock	140	34	1074.81	1106.02	1432.18	0	1432.18	1892.43	1892.43
31	1.91994	3649.8	24.4043	Bedrock	140	34	1065.19	1096.12	1417.5	0	1417.5	1900.79	1900.79
32	1.91994	3654.1	25.6394	Bedrock	140	34	1052.36	1082.92	1397.93	0	1397.93	1903.02	1903.02
33	1.91994	3648.03	26.8874	Bedrock	140	34	1036.77	1066.88	1374.15	0	1374.15	1899.85	1899.85
34	1.91994	3629.87	28.1493	Bedrock	140	34	1018.09	1047.65	1345.65	0	1345.65	1890.38	1890.38
35	1.91994	3599.09	29.4263	Bedrock	140	34	996.276	1025.21	1312.38	0	1312.38	1874.35	1874.35
36	1.91994	3555.23	30.7195	Bedrock	140	34	971.33	999.537	1274.32	0	1274.32	1851.5	1851.5
37	1.91994	3497.76	32.0304	Bedrock	140	34	943.24	970.632	1231.46	0	1231.46	1821.56	1821.56
38	1.91994	3426.01	33.3603	Bedrock	140	34	911.971	938.455	1183.76	0	1183.76	1784.18	1784.18
39	1.91994	3338.95	34.7109	Bedrock	140	34	877.415	902.895	1131.04	0	1131.04	1738.83	1738.83
40	1.91994	3236.25	36.0839	Bedrock	140	34	839.649	864.032	1073.42	0	1073.42	1685.34	1685.34
41	1.91994	3117.16	37.4813	Bedrock	140	34	798.662	821.855	1010.89	0	1010.89	1623.31	1623.31
42	1.91994	2980.06	38.9054	Bedrock	140	34	754.272	776.176	943.168	0	943.168	1551.91	1551.91
43	1.91994	2822.95	40.3587	Bedrock	140	34	706.244	726.753	869.895	0	869.895	1470.08	1470.08
44	1.91994	2646.21	41.8441	Bedrock	140	34	654.904	673.922	791.571	0	791.571	1378.03	1378.03
45	1.91994	2388.98	43.3648	Bedrock	140	34	587.677	604.743	689.01	0	689.01	1244.06	1244.06
46	1.91994	1966.15	44.9247	Bedrock	140	34	488.081	502.255	537.065	0	537.065	1023.87	1023.87
47	1.91994	1512.05	46.5282	Bedrock	140	34	385.57	396.767	380.671	0	380.671	787.378	787.378
48	1.64524	922.483	48.0589	Uncompacted Fill	240	20	309.618	318.61	215.978	0	215.978	560.555	560.555

49	1.64524	566.941	49.5148	Uncompacted Fill	240	20	251.047	258.337	50.3806	0	50.3806	344.472	344.472
50	1.64524	192.307	51.0154	Uncompacted Fill	240	20	191.044	196.592	-119.262	0	-119.262	116.788	116.788

Global Minimum Query (gle/morgenstern-price) - Safety Factor: 1.08159

Slice Number	Width [ft]	Weight [lbs]	Angle of Slice Base [deg]	Base Material	Base Cohesion [psf]	Base Friction Angle [deg]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]	Base Vertical Stress [psf]	Effective Vertical Stress [psf]
1	1.8262	82.3539	-1.68732	Uncompacted Fill	240	20	243.151	262.989	63.1623	0	63.1623	55.9997	55.9997
2	1.8262	244.263	-0.851565	Uncompacted Fill	240	20	279.53	302.336	171.268	0	171.268	167.113	167.113
3	1.8262	400.577	-0.0159954	Uncompacted Fill	240	20	314.644	340.316	275.617	0	275.617	275.529	275.529
4	1.8262	551.297	0.819571	Uncompacted Fill	240	20	348.23	376.642	375.421	0	375.421	380.402	380.402
5	1.8262	696.423	1.65531	Uncompacted Fill	240	20	380.026	411.032	469.906	0	469.906	480.888	480.888
6	1.8262	835.947	2.4914	Uncompacted Fill	240	20	409.787	443.222	558.349	0	558.349	576.179	576.179
7	1.8262	969.863	3.32803	Uncompacted Fill	240	20	437.297	472.976	640.098	0	640.098	665.527	665.527
8	1.8262	1098.16	4.16536	Uncompacted Fill	240	20	462.37	500.095	714.607	0	714.607	748.28	748.28
9	1.8262	1220.81	5.00359	Uncompacted Fill	240	20	484.868	524.428	781.46	0	781.46	823.911	823.911
10	1.8262	1337.81	5.84289	Uncompacted Fill	240	20	504.695	545.873	840.382	0	840.382	892.029	892.029
11	1.85376	1473.88	6.68981	Bedrock	140	34	729.596	789.124	962.364	0	962.364	1047.94	1047.94
12	1.85376	1589.52	7.54455	Bedrock	140	34	770.064	832.893	1027.25	0	1027.25	1129.24	1129.24
13	1.85376	1700.55	8.40099	Bedrock	140	34	805.06	870.745	1083.38	0	1083.38	1202.27	1202.27
14	1.85376	1805.28	9.25932	Bedrock	140	34	833.802	901.832	1129.46	0	1129.46	1265.39	1265.39
15	1.85376	1904	10.1198	Bedrock	140	34	856.331	926.199	1165.59	0	1165.59	1318.43	1318.43
16	1.85376	1997.52	10.9825	Bedrock	140	34	872.986	944.213	1192.29	0	1192.29	1361.71	1361.71
17	1.85376	2084.69	11.8478	Bedrock	140	34	883.624	955.719	1209.35	0	1209.35	1394.72	1394.72
18	1.85376	2165.34	12.7158	Bedrock	140	34	888.557	961.054	1217.27	0	1217.27	1417.77	1417.77
19	1.85376	2239.42	13.5868	Bedrock	140	34	888.231	960.702	1216.74	0	1216.74	1431.41	1431.41
20	1.85376	2306.85	14.461	Bedrock	140	34	883.179	955.238	1208.64	0	1208.64	1436.4	1436.4
21	1.85376	2378.83	15.3387	Bedrock	140	34	877.136	948.702	1198.95	0	1198.95	1439.55	1439.55
22	1.85376	2455.97	16.2201	Bedrock	140	34	870.677	941.715	1188.59	0	1188.59	1441.88	1441.88
23	1.85376	2527.43	17.1054	Bedrock	140	34	861.329	931.605	1173.6	0	1173.6	1438.67	1438.67
24	1.85376	2593.82	17.995	Bedrock	140	34	849.883	919.225	1155.25	0	1155.25	1431.31	1431.31
25	1.85376	2653.13	18.8891	Bedrock	140	34	836.423	904.667	1133.67	0	1133.67	1419.86	1419.86
26	1.85376	2705.23	19.7879	Bedrock	140	34	821.499	888.525	1109.73	0	1109.73	1405.29	1405.29
27	1.85376	2750.01	20.6919	Bedrock	140	34	805.608	871.338	1084.25	0	1084.25	1388.54	1388.54
28	1.85376	2787.33	21.6013	Bedrock	140	34	789.181	853.57	1057.91	0	1057.91	1370.39	1370.39
29	1.85376	2817.03	22.5165	Bedrock	140	34	772.564	835.597	1031.26	0	1031.26	1351.53	1351.53
30	1.85376	2838.69	23.4378	Bedrock	140	34	755.969	817.648	1004.65	0	1004.65	1332.38	1332.38
31	1.85376	2853.79	24.3655	Bedrock	140	34	739.969	800.343	978.997	0	978.997	1314.12	1314.12
32	1.85376	2860.89	25.3001	Bedrock	140	34	724.397	783.501	954.028	0	954.028	1296.45	1296.45
33	1.85376	2859.71	26.2419	Bedrock	140	34	709.306	767.178	929.828	0	929.828	1279.49	1279.49
34	1.85376	2850.08	27.1915	Bedrock	140	34	694.699	751.379	906.409	0	906.409	1263.3	1263.3
35	1.85376	2831.77	28.1492	Bedrock	140	34	680.53	736.054	883.687	0	883.687	1247.81	1247.81
36	1.85376	2804.51	29.1156	Bedrock	140	34	666.701	721.097	861.51	0	861.51	1232.83	1232.83
37	1.85376	2767.68	30.0911	Bedrock	140	34	652.998	706.276	839.541	0	839.541	1217.93	1217.93
38	1.85376	2721.28	31.0763	Bedrock	140	34	639.319	691.481	817.607	0	817.607	1202.91	1202.91
39	1.85376	2665.17	32.0719	Bedrock	140	34	625.493	676.527	795.432	0	795.432	1187.38	1187.38
40	1.85376	2598.81	33.0784	Bedrock	140	34	611.252	661.124	772.6	0	772.6	1170.74	1170.74
41	1.85376	2520.38	34.0966	Bedrock	140	34	596.046	644.677	748.213	0	748.213	1151.72	1151.72
42	1.85376	2430.84	35.1272	Bedrock	140	34	579.858	627.169	722.256	0	722.256	1130.2	1130.2
43	1.85376	2319.92	36.1711	Bedrock	140	34	560.378	606.099	691.019	0	691.019	1100.72	1100.72
44	1.85376	2058.23	37.229	Bedrock	140	34	510.923	552.609	611.716	0	611.716	999.935	999.935
45	1.85376	1738.52	38.302	Bedrock	140	34	449.289	485.946	512.884	0	512.884	867.735	867.735
46	1.85376	1406.16	39.3911	Bedrock	140	34	383.971	415.299	408.148	0	408.148	723.445	723.445

47	1.61494	949.679	40.4251	Uncompacted Fill	240	20	324.112	350.556	303.751	0	303.751	579.836	579.836
48	1.61494	689.716	41.4029	Uncompacted Fill	240	20	284.934	308.182	187.327	0	187.327	438.556	438.556
49	1.61494	420.58	42.3957	Uncompacted Fill	240	20	241.536	261.243	58.3638	0	58.3638	278.883	278.883
50	1.61494	141.834	43.4044	Uncompacted Fill	240	20	193.27	209.039	-85.0656	0	-85.0656	97.7289	97.7289

Block, Static, Janbu - Master Scenario

Global Minimum Query (bishop simplified) - Safety Factor: 2.26111

Slice Number	Width [ft]	Weight [lbs]	Angle of Slice Base [deg]	Base Material	Base Cohesion [psf]	Base Friction Angle [deg]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]	Base Vertical Stress [psf]	Effective Vertical Stress [psf]
1	2.89234	584.1	-45	Uncompacted Fill	240	20	165.239	373.624	367.129	0	367.129	201.89	201.89
2	2.50958	1083.46	1.14811	Uncompacted Fill	240	20	175.073	395.86	428.22	0	428.22	431.729	431.729
3	2.50958	1205.77	1.14811	Uncompacted Fill	240	20	182.893	413.541	476.8	0	476.8	480.466	480.466
4	2.50958	1319.06	1.14811	Uncompacted Fill	240	20	190.137	429.92	521.803	0	521.803	525.613	525.613
5	2.50958	1432.36	1.14811	Uncompacted Fill	240	20	197.38	446.299	566.801	0	566.801	570.757	570.757
6	2.50958	1545.66	1.14811	Uncompacted Fill	240	20	204.624	462.678	611.804	0	611.804	615.905	615.905
7	2.31075	1526.06	1.14811	Bedrock	140	34	257.387	581.98	655.261	0	655.261	660.419	660.419
8	2.31075	1628.32	1.14811	Bedrock	140	34	270.509	611.651	699.251	0	699.251	704.672	704.672
9	2.31075	1733.35	1.14811	Bedrock	140	34	283.988	642.127	744.435	0	744.435	750.126	750.126
10	2.31075	1928.34	1.14811	Bedrock	140	34	309.011	698.708	828.317	0	828.317	834.51	834.51
11	2.31075	2168.09	1.14811	Bedrock	140	34	339.777	768.274	931.453	0	931.453	938.263	938.263
12	2.31075	2407.83	1.14811	Bedrock	140	34	370.544	837.84	1034.59	0	1034.59	1042.02	1042.02
13	2.31075	2648.54	1.14811	Bedrock	140	34	401.432	907.683	1138.14	0	1138.14	1146.18	1146.18
14	2.31075	2890.72	1.14811	Bedrock	140	34	432.512	977.957	1242.32	0	1242.32	1250.99	1250.99
15	2.31075	3132.92	1.14811	Bedrock	140	34	463.594	1048.24	1346.52	0	1346.52	1355.81	1355.81
16	2.31075	3375.13	1.14811	Bedrock	140	34	494.675	1118.51	1450.71	0	1450.71	1460.62	1460.62
17	2.31075	3617.33	1.14811	Bedrock	140	34	525.755	1188.79	1554.9	0	1554.9	1565.44	1565.44
18	2.31075	3860.57	1.14811	Bedrock	140	34	556.97	1259.37	1659.54	0	1659.54	1670.7	1670.7
19	2.19728	3818.11	17.135	Bedrock	140	34	531.416	1201.59	1573.87	0	1573.87	1737.71	1737.71
20	2.19728	3876.63	17.135	Bedrock	140	34	538.691	1218.04	1598.26	0	1598.26	1764.34	1764.34
21	2.19728	3935.57	17.135	Bedrock	140	34	546.019	1234.61	1622.83	0	1622.83	1791.17	1791.17
22	2.19728	3996.23	17.135	Bedrock	140	34	553.56	1251.66	1648.11	0	1648.11	1818.77	1818.77
23	2.19728	4057.06	17.135	Bedrock	140	34	561.123	1268.76	1673.46	0	1673.46	1846.46	1846.46
24	2.19728	4117.89	17.135	Bedrock	140	34	568.685	1285.86	1698.81	0	1698.81	1874.14	1874.14
25	2.19728	4178.72	17.135	Bedrock	140	34	576.252	1302.97	1724.17	0	1724.17	1901.83	1901.83
26	2.19728	4250.75	17.135	Bedrock	140	34	585.208	1323.22	1754.19	0	1754.19	1934.61	1934.61
27	2.19728	4343.77	17.135	Bedrock	140	34	596.773	1349.37	1792.96	0	1792.96	1976.95	1976.95
28	2.19728	4439.69	17.135	Bedrock	140	34	608.697	1376.33	1832.93	0	1832.93	2020.6	2020.6
29	2.19728	4537.61	17.135	Bedrock	140	34	620.872	1403.86	1873.75	0	1873.75	2065.17	2065.17
30	2.19728	4635.53	17.135	Bedrock	140	34	633.047	1431.39	1914.56	0	1914.56	2109.74	2109.74
31	2.19728	4733.46	17.135	Bedrock	140	34	645.223	1458.92	1955.37	0	1955.37	2154.3	2154.3
32	2.19728	4831.38	17.135	Bedrock	140	34	657.398	1486.45	1996.19	0	1996.19	2198.87	2198.87
33	2.19728	4929.12	17.135	Bedrock	140	34	669.547	1513.92	2036.93	0	2036.93	2243.35	2243.35
34	2.19728	5027.26	17.135	Bedrock	140	34	681.749	1541.51	2077.83	0	2077.83	2288.02	2288.02
35	2.19728	5126.73	17.135	Bedrock	140	34	694.119	1569.48	2119.29	0	2119.29	2333.29	2333.29
36	2.40761	5563.84	38.3395	Bedrock	140	34	607.918	1374.57	1830.32	0	1830.32	2311.11	2311.11
37	2.40761	5347.6	38.3395	Bedrock	140	34	586.239	1325.55	1757.65	0	1757.65	2221.29	2221.29
38	2.40761	5131.35	38.3395	Bedrock	140	34	564.559	1276.53	1684.97	0	1684.97	2131.46	2131.46
39	2.40761	4914.69	38.3395	Bedrock	140	34	542.835	1227.41	1612.15	0	1612.15	2041.46	2041.46
40	2.40761	4697.45	38.3395	Bedrock	140	34	521.054	1178.16	1539.14	0	1539.14	1951.23	1951.23
41	2.40761	4480.22	38.3395	Bedrock	140	34	499.276	1128.92	1466.13	0	1466.13	1860.99	1860.99
42	2.40761	4261.39	38.3395	Bedrock	140	34	477.337	1079.31	1392.58	0	1392.58	1770.1	1770.1
43	2.40761	4040.37	38.3395	Bedrock	140	34	455.177	1029.21	1318.3	0	1318.3	1678.29	1678.29
44	2.40761	3775	38.3395	Bedrock	140	34	428.572	969.048	1229.12	0	1229.12	1568.06	1568.06
45	2.22181	2969.27	45	Bedrock	140	34	354.783	802.204	981.757	0	981.757	1336.54	1336.54
46	2.22181	2376.61	45	Bedrock	140	34	293.488	663.609	776.282	0	776.282	1069.77	1069.77
47	2.22181	1783.94	45	Bedrock	140	34	232.193	525.014	570.809	0	570.809	803.002	803.002
48	1.94071	1082.83	45	Uncompacted Fill	240	20	168.795	381.664	389.218	0	389.218	558.013	558.013
49	1.94071	649.699	45	Uncompacted Fill	240	20	137.849	311.692	196.972	0	196.972	334.821	334.821
50	1.94071	216.566	45	Uncompacted Fill	240	20	106.903	241.72	4.7248	0	4.7248	111.628	111.628

Global Minimum Query (janbu simplified) - Safety Factor: 2.14377

Slice Number	Width [ft]	Weight [lbs]	Angle of Slice Base [deg]	Base Material	Base Cohesion [psf]	Base Friction Angle [deg]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]	Base Vertical Stress [psf]	Effective Vertical Stress [psf]
1	1.8079	221.104	-45	Uncompacted Fill	240	20	159.857	342.696	282.153	0	282.153	122.297	122.297
2	1.8079	663.312	-45	Uncompacted Fill	240	20	209.877	449.928	576.77	0	576.77	366.893	366.893
3	2.19591	1138.62	-3.19267	Uncompacted Fill	240	20	201.899	432.825	529.782	0	529.782	518.52	518.52
4	2.19591	1267.41	-3.19267	Uncompacted Fill	240	20	211.952	454.376	588.995	0	588.995	577.173	577.173
5	2.08144	1323.67	-3.19267	Bedrock	140	34	270.137	579.111	651.008	0	651.008	635.94	635.94
6	2.08144	1485.82	-3.19267	Bedrock	140	34	295.086	632.597	730.306	0	730.306	713.846	713.846
7	2.08144	1718.39	-3.19267	Bedrock	140	34	330.87	709.31	844.036	0	844.036	825.58	825.58
8	2.08144	1952.34	-3.19267	Bedrock	140	34	366.865	786.475	958.438	0	958.438	937.974	937.974
9	2.08144	2186.31	-3.19267	Bedrock	140	34	402.865	863.649	1072.85	0	1072.85	1050.38	1050.38
10	2.08144	2421.55	-3.19267	Bedrock	140	34	439.06	941.244	1187.89	0	1187.89	1163.4	1163.4
11	2.08144	2657.48	-3.19267	Bedrock	140	34	475.362	1019.07	1303.27	0	1303.27	1276.75	1276.75
12	2.08144	2893.42	-3.19267	Bedrock	140	34	511.664	1096.89	1418.64	0	1418.64	1390.1	1390.1
13	2.08144	3129.35	-3.19267	Bedrock	140	34	547.965	1174.71	1534.02	0	1534.02	1503.46	1503.46
14	2.08144	3365.29	-3.19267	Bedrock	140	34	584.265	1252.53	1649.4	0	1649.4	1616.81	1616.81
15	2.08144	3601.38	-3.19267	Bedrock	140	34	620.594	1330.41	1764.86	0	1764.86	1730.24	1730.24
16	2.08144	3841.46	-3.19267	Bedrock	140	34	657.533	1409.6	1882.26	0	1882.26	1845.58	1845.58
17	2.08144	4083.26	-3.19267	Bedrock	140	34	694.734	1489.35	2000.5	0	2000.5	1961.75	1961.75
18	2.12941	4356.44	11.6312	Bedrock	140	34	665.878	1427.49	1908.78	0	1908.78	2045.84	2045.84
19	2.12941	4468.51	11.6312	Bedrock	140	34	681.43	1460.83	1958.21	0	1958.21	2098.47	2098.47
20	2.12941	4581.4	11.6312	Bedrock	140	34	697.094	1494.41	2008	0	2008	2151.48	2151.48
21	2.12941	4694.29	11.6312	Bedrock	140	34	712.758	1527.99	2057.79	0	2057.79	2204.5	2204.5
22	2.12941	4807.18	11.6312	Bedrock	140	34	728.427	1561.58	2107.58	0	2107.58	2257.51	2257.51
23	2.12941	4920.68	11.6312	Bedrock	140	34	744.175	1595.34	2157.64	0	2157.64	2310.82	2310.82
24	2.12941	5054.45	11.6312	Bedrock	140	34	762.74	1635.14	2216.63	0	2216.63	2373.63	2373.63
25	2.12941	5198.29	11.6312	Bedrock	140	34	782.701	1677.93	2280.07	0	2280.07	2441.18	2441.18
26	2.12941	5345.17	11.6312	Bedrock	140	34	803.085	1721.63	2344.86	0	2344.86	2510.16	2510.16
27	2.12941	5492.9	11.6312	Bedrock	140	34	823.582	1765.57	2410.01	0	2410.01	2579.53	2579.53
28	2.12941	5640.62	11.6312	Bedrock	140	34	844.083	1809.52	2475.16	0	2475.16	2648.91	2648.91
29	2.12941	5788.35	11.6312	Bedrock	140	34	864.584	1853.47	2540.32	0	2540.32	2718.28	2718.28
30	2.12941	5936.07	11.6312	Bedrock	140	34	885.081	1897.41	2605.47	0	2605.47	2787.66	2787.66
31	2.12941	6083.54	11.6312	Bedrock	140	34	905.545	1941.28	2670.51	0	2670.51	2856.91	2856.91
32	2.11575	6021.99	39.8979	Bedrock	140	34	760.73	1630.83	2210.25	0	2210.25	2846.27	2846.27
33	2.11575	5830.71	39.8979	Bedrock	140	34	738.209	1582.55	2138.67	0	2138.67	2755.86	2755.86
34	2.11575	5639.44	39.8979	Bedrock	140	34	715.688	1534.27	2067.1	0	2067.1	2665.46	2665.46
35	2.11575	5448.17	39.8979	Bedrock	140	34	693.167	1485.99	1995.52	0	1995.52	2575.05	2575.05
36	2.11575	5256.9	39.8979	Bedrock	140	34	670.65	1437.72	1923.94	0	1923.94	2484.65	2484.65
37	2.11575	5065.51	39.8979	Bedrock	140	34	648.115	1389.41	1852.32	0	1852.32	2394.19	2394.19
38	2.11575	4873.55	39.8979	Bedrock	140	34	625.515	1340.96	1780.49	0	1780.49	2303.46	2303.46
39	2.11575	4681.51	39.8979	Bedrock	140	34	602.905	1292.49	1708.63	0	1708.63	2212.7	2212.7
40	2.11575	4489.45	39.8979	Bedrock	140	34	580.291	1244.01	1636.76	0	1636.76	2121.92	2121.92
41	2.11575	4295.61	39.8979	Bedrock	140	34	557.467	1195.08	1564.22	0	1564.22	2030.3	2030.3
42	2.11575	4100.63	39.8979	Bedrock	140	34	534.512	1145.87	1491.26	0	1491.26	1938.15	1938.15
43	2.11575	3885.63	39.8979	Bedrock	140	34	509.196	1091.6	1410.8	0	1410.8	1836.53	1836.53
44	2.25	3639.64	45	Bedrock	140	34	436.827	936.457	1180.8	0	1180.8	1617.62	1617.62
45	2.25	3031.84	45	Bedrock	140	34	372.175	797.858	975.315	0	975.315	1347.49	1347.49
46	2.25	2424.04	45	Bedrock	140	34	307.524	659.26	769.833	0	769.833	1077.36	1077.36
47	2.25	1816.25	45	Bedrock	140	34	242.872	520.661	564.353	0	564.353	807.225	807.225
48	1.94828	1091.29	45	Uncompacted Fill	240	20	177	379.448	383.13	0	383.13	560.131	560.131
49	1.94828	654.771	45	Uncompacted Fill	240	20	144.482	309.736	191.597	0	191.597	336.079	336.079
50	1.94828	218.257	45	Uncompacted Fill	240	20	111.963	240.023	0.0639692	0	0.0639692	112.027	112.027

Global Minimum Query (gle/morgenstern-price) - Safety Factor: 2.25593

Slice Number	Width [ft]	Weight [lbs]	Angle of Slice Base [deg]	Base Material	Base Cohesion [psf]	Base Friction Angle [deg]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]	Base Vertical Stress [psf]	Effective Vertical Stress [psf]
1	1.75319	207.925	-45	Uncompacted Fill	240	20	151.479	341.727	279.492	0	279.492	128.013	128.013
2	1.75319	623.774	-45	Uncompacted Fill	240	20	203.869	459.915	604.211	0	604.211	400.341	400.341
3	1.92577	948.966	0.601087	Uncompacted Fill	240	20	191.915	432.946	530.116	0	530.116	532.13	532.13
4	1.92577	1019.75	0.601087	Uncompacted Fill	240	20	199.313	449.636	575.971	0	575.971	578.062	578.062
5	1.92577	1090.54	0.601087	Uncompacted Fill	240	20	206.75	466.413	622.064	0	622.064	624.233	624.233
6	1.92577	1161.33	0.601087	Uncompacted Fill	240	20	214.215	483.253	668.334	0	668.334	670.581	670.581
7	2.10275	1351.67	0.601087	Bedrock	140	34	279.334	630.158	726.689	0	726.689	729.62	729.62
8	2.10275	1442.47	0.601087	Bedrock	140	34	296.655	669.232	784.62	0	784.62	787.732	787.732
9	2.10275	1602.43	0.601087	Bedrock	140	34	324.529	732.114	877.845	0	877.845	881.249	881.249
10	2.10275	1806.02	0.601087	Bedrock	140	34	359.318	810.596	994.2	0	994.2	997.97	997.97
11	2.10275	2009.62	0.601087	Bedrock	140	34	394.46	889.874	1111.73	0	1111.73	1115.87	1115.87
12	2.10275	2213.45	0.601087	Bedrock	140	34	429.907	969.841	1230.29	0	1230.29	1234.8	1234.8
13	2.20051	2458.82	15.4846	Bedrock	140	34	393.17	886.963	1107.42	0	1107.42	1216.34	1216.34
14	2.20051	2529.14	15.4846	Bedrock	140	34	401.756	906.333	1136.14	0	1136.14	1247.44	1247.44
15	2.20051	2599.45	15.4846	Bedrock	140	34	410.179	925.335	1164.3	0	1164.3	1277.94	1277.94
16	2.20051	2669.76	15.4846	Bedrock	140	34	418.435	943.96	1191.92	0	1191.92	1307.84	1307.84
17	2.20051	2740.07	15.4846	Bedrock	140	34	426.521	962.202	1218.96	0	1218.96	1337.13	1337.13
18	2.20051	2812.76	15.4846	Bedrock	140	34	434.737	980.736	1246.44	0	1246.44	1366.88	1366.88
19	2.20051	2889.55	15.4846	Bedrock	140	34	443.3	1000.05	1275.08	0	1275.08	1397.89	1397.89
20	2.20051	2966.41	15.4846	Bedrock	140	34	451.701	1019	1303.18	0	1303.18	1428.31	1428.31
21	2.20051	3044.21	15.4846	Bedrock	140	34	460.051	1037.84	1331.11	0	1331.11	1458.56	1458.56
22	2.20051	3123.38	15.4846	Bedrock	140	34	468.407	1056.69	1359.05	0	1359.05	1488.82	1488.82
23	2.20051	3202.56	15.4846	Bedrock	140	34	476.6	1075.18	1386.46	0	1386.46	1518.49	1518.49
24	2.20051	3281.75	15.4846	Bedrock	140	34	484.635	1093.3	1413.33	0	1413.33	1547.59	1547.59
25	2.20051	3361.19	15.4846	Bedrock	140	34	492.548	1111.15	1439.79	0	1439.79	1576.25	1576.25
26	2.20051	3460.62	15.4846	Bedrock	140	34	502.843	1134.38	1474.23	0	1474.23	1613.54	1613.54
27	2.20051	3572.83	15.4846	Bedrock	140	34	514.617	1160.94	1513.6	0	1513.6	1656.17	1656.17
28	2.20051	3688.28	15.4846	Bedrock	140	34	526.665	1188.12	1553.9	0	1553.9	1699.81	1699.81
29	2.24213	3803.71	27.5881	Bedrock	140	34	460.319	1038.45	1332	0	1332	1572.53	1572.53
30	2.24213	3776.44	27.5881	Bedrock	140	34	456.085	1028.9	1317.84	0	1317.84	1556.16	1556.16
31	2.24213	3749.18	27.5881	Bedrock	140	34	452.162	1020.04	1304.72	0	1304.72	1540.99	1540.99
32	2.24213	3721.91	27.5881	Bedrock	140	34	448.544	1011.88	1292.62	0	1292.62	1526.99	1526.99
33	2.24213	3694.29	27.5881	Bedrock	140	34	445.188	1004.31	1281.4	0	1281.4	1514.02	1514.02
34	2.24213	3668.07	27.5881	Bedrock	140	34	442.275	997.742	1271.65	0	1271.65	1502.75	1502.75
35	2.24213	3642.41	27.5881	Bedrock	140	34	439.71	991.954	1263.07	0	1263.07	1492.83	1492.83
36	2.24213	3616.76	27.5881	Bedrock	140	34	437.422	986.794	1255.42	0	1255.42	1483.99	1483.99
37	2.24213	3591.1	27.5881	Bedrock	140	34	435.404	982.242	1248.68	0	1248.68	1476.18	1476.18
38	2.24213	3565.44	27.5881	Bedrock	140	34	433.644	978.27	1242.79	0	1242.79	1469.37	1469.37
39	2.24213	3539.24	27.5881	Bedrock	140	34	432.072	974.725	1237.53	0	1237.53	1463.3	1463.3
40	2.24213	3512.73	27.5881	Bedrock	140	34	430.7	971.628	1232.94	0	1232.94	1457.99	1457.99
41	2.24213	3486.21	27.5881	Bedrock	140	34	429.545	969.024	1229.08	0	1229.08	1453.52	1453.52
42	2.24213	3458.35	27.5881	Bedrock	140	34	428.446	966.544	1225.4	0	1225.4	1449.27	1449.27
43	2.24213	3428.55	27.5881	Bedrock	140	34	427.314	963.991	1221.62	0	1221.62	1444.9	1444.9
44	2.24213	3383.07	27.5881	Bedrock	140	34	424.589	957.842	1212.5	0	1212.5	1434.36	1434.36
45	2.21756	2959.18	45	Bedrock	140	34	329.82	744.05	895.542	0	895.542	1225.36	1225.36
46	2.21756	2368.78	45	Bedrock	140	34	277.982	627.107	722.164	0	722.164	1000.15	1000.15
47	2.21756	1778.38	45	Bedrock	140	34	224.206	505.793	542.31	0	542.31	766.516	766.516
48	1.93866	1080.54	45	Uncompacted Fill	240	20	167.089	376.94	376.237	0	376.237	543.326	543.326
49	1.93866	648.321	45	Uncompacted Fill	240	20	138.017	311.358	196.054	0	196.054	334.071	334.071
50	1.93866	216.107	45	Uncompacted Fill	240	20	107.434	242.364	6.49563	0	6.49563	113.93	113.93

Block, Static, Janbu - Block, PseudoStatic, Janbu

Global Minimum Query (bishop simplified) - Safety Factor: 1.13576

Slice Number	Width [ft]	Weight [lbs]	Angle of Slice Base [deg]	Base Material	Base Cohesion [psf]	Base Friction Angle [deg]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]	Base Vertical Stress [psf]	Effective Vertical Stress [psf]
1	2.89234	584.1	-45	Uncompacted Fill	240	20	406.164	461.305	608.031	0	608.031	201.867	201.867
2	2.50958	1083.46	1.14811	Uncompacted Fill	240	20	347.435	394.603	424.766	0	424.766	431.729	431.729
3	2.50958	1205.77	1.14811	Uncompacted Fill	240	20	362.953	412.228	473.191	0	473.191	480.465	480.465
4	2.50958	1319.06	1.14811	Uncompacted Fill	240	20	377.329	428.555	518.05	0	518.05	525.612	525.612
5	2.50958	1432.36	1.14811	Uncompacted Fill	240	20	391.704	444.882	562.909	0	562.909	570.759	570.759
6	2.50958	1545.66	1.14811	Uncompacted Fill	240	20	406.08	461.209	607.764	0	607.764	615.902	615.902
7	2.31075	1526.06	1.14811	Bedrock	140	34	509.415	578.573	650.212	0	650.212	660.421	660.421
8	2.31075	1628.32	1.14811	Bedrock	140	34	535.387	608.071	693.942	0	693.942	704.672	704.672
9	2.31075	1733.35	1.14811	Bedrock	140	34	562.062	638.368	738.862	0	738.862	750.126	750.126
10	2.31075	1928.34	1.14811	Bedrock	140	34	611.589	694.618	822.255	0	822.255	834.512	834.512
11	2.31075	2168.09	1.14811	Bedrock	140	34	672.481	763.777	924.786	0	924.786	938.263	938.263
12	2.31075	2407.83	1.14811	Bedrock	140	34	733.372	832.935	1027.32	0	1027.32	1042.02	1042.02
13	2.31075	2648.54	1.14811	Bedrock	140	34	794.508	902.37	1130.26	0	1130.26	1146.18	1146.18
14	2.31075	2890.72	1.14811	Bedrock	140	34	856.019	972.232	1233.84	0	1233.84	1250.99	1250.99
15	2.31075	3132.92	1.14811	Bedrock	140	34	917.535	1042.1	1337.42	0	1337.42	1355.81	1355.81
16	2.31075	3375.13	1.14811	Bedrock	140	34	979.051	1111.97	1441	0	1441	1460.62	1460.62
17	2.31075	3617.33	1.14811	Bedrock	140	34	1040.56	1181.83	1544.58	0	1544.58	1565.43	1565.43
18	2.31075	3860.57	1.14811	Bedrock	140	34	1102.35	1252	1648.61	0	1648.61	1670.7	1670.7
19	2.19728	3818.11	17.135	Bedrock	140	34	976.471	1109.04	1436.66	0	1436.66	1737.71	1737.71
20	2.19728	3876.63	17.135	Bedrock	140	34	989.84	1124.22	1459.17	0	1459.17	1764.34	1764.34
21	2.19728	3935.57	17.135	Bedrock	140	34	1003.31	1139.52	1481.84	0	1481.84	1791.17	1791.17
22	2.19728	3996.23	17.135	Bedrock	140	34	1017.16	1155.25	1505.18	0	1505.18	1818.77	1818.77
23	2.19728	4057.06	17.135	Bedrock	140	34	1031.06	1171.04	1528.58	0	1528.58	1846.46	1846.46
24	2.19728	4117.89	17.135	Bedrock	140	34	1044.96	1186.82	1551.98	0	1551.98	1874.15	1874.15
25	2.19728	4178.72	17.135	Bedrock	140	34	1058.86	1202.61	1575.38	0	1575.38	1901.84	1901.84
26	2.19728	4250.75	17.135	Bedrock	140	34	1075.32	1221.3	1603.09	0	1603.09	1934.62	1934.62
27	2.19728	4343.77	17.135	Bedrock	140	34	1096.56	1245.43	1638.87	0	1638.87	1976.95	1976.95
28	2.19728	4439.69	17.135	Bedrock	140	34	1118.48	1270.32	1675.77	0	1675.77	2020.61	2020.61
29	2.19728	4537.61	17.135	Bedrock	140	34	1140.85	1295.73	1713.44	0	1713.44	2065.17	2065.17
30	2.19728	4635.53	17.135	Bedrock	140	34	1163.22	1321.14	1751.11	0	1751.11	2109.74	2109.74
31	2.19728	4733.46	17.135	Bedrock	140	34	1185.59	1346.55	1788.78	0	1788.78	2154.31	2154.31
32	2.19728	4831.38	17.135	Bedrock	140	34	1207.97	1371.96	1826.45	0	1826.45	2198.88	2198.88
33	2.19728	4929.12	17.135	Bedrock	140	34	1230.3	1397.32	1864.05	0	1864.05	2243.36	2243.36
34	2.19728	5027.26	17.135	Bedrock	140	34	1252.71	1422.78	1901.8	0	1901.8	2288.02	2288.02
35	2.19728	5126.73	17.135	Bedrock	140	34	1275.44	1448.59	1940.07	0	1940.07	2333.29	2333.29
36	2.40761	5563.84	38.3395	Bedrock	140	34	1017.76	1155.93	1506.18	0	1506.18	2311.1	2311.1
37	2.40761	5347.6	38.3395	Bedrock	140	34	981.465	1114.71	1445.06	0	1445.06	2221.28	2221.28
38	2.40761	5131.35	38.3395	Bedrock	140	34	945.169	1073.49	1383.95	0	1383.95	2131.46	2131.46
39	2.40761	4914.69	38.3395	Bedrock	140	34	908.801	1032.18	1322.71	0	1322.71	2041.46	2041.46
40	2.40761	4697.45	38.3395	Bedrock	140	34	872.339	990.768	1261.32	0	1261.32	1951.22	1951.22
41	2.40761	4480.22	38.3395	Bedrock	140	34	835.876	949.355	1199.92	0	1199.92	1860.99	1860.99
42	2.40761	4261.39	38.3395	Bedrock	140	34	799.147	907.639	1138.07	0	1138.07	1770.09	1770.09
43	2.40761	4040.37	38.3395	Bedrock	140	34	762.047	865.503	1075.6	0	1075.6	1678.28	1678.28
44	2.40761	3775	38.3395	Bedrock	140	34	717.505	814.914	1000.6	0	1000.6	1568.06	1568.06
45	2.22181	2969.27	45	Bedrock	140	34	575.331	653.438	761.203	0	761.203	1336.53	1336.53
46	2.22181	2376.61	45	Bedrock	140	34	475.932	540.545	593.831	0	593.831	1069.76	1069.76
47	2.22181	1783.94	45	Bedrock	140	34	376.534	427.652	426.46	0	426.46	802.994	802.994
48	1.94071	1082.83	45	Uncompacted Fill	240	20	295.454	335.564	262.561	0	262.561	558.014	558.014
49	1.94071	649.699	45	Uncompacted Fill	240	20	241.287	274.044	93.5344	0	93.5344	334.821	334.821
50	1.94071	216.566	45	Uncompacted Fill	240	20	187.12	212.523	-75.4916	0	-75.4916	111.628	111.628

Global Minimum Query (janbu simplified) - Safety Factor: 1.06707

Slice Number	Width [ft]	Weight [lbs]	Angle of Slice Base [deg]	Base Material	Base Cohesion [psf]	Base Friction Angle [deg]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]	Base Vertical Stress [psf]	Effective Vertical Stress [psf]
1	2.89234	584.1	-45	Uncompacted Fill	240	20	445.586	475.471	646.951	0	646.951	201.366	201.366
2	2.50958	1083.46	1.14811	Uncompacted Fill	240	20	369.651	394.444	424.332	0	424.332	431.74	431.74
3	2.50958	1205.77	1.14811	Uncompacted Fill	240	20	386.162	412.062	472.737	0	472.737	480.476	480.476
4	2.50958	1319.06	1.14811	Uncompacted Fill	240	20	401.456	428.382	517.576	0	517.576	525.621	525.621
5	2.50958	1432.36	1.14811	Uncompacted Fill	240	20	416.751	444.702	562.415	0	562.415	570.767	570.767
6	2.50958	1545.66	1.14811	Uncompacted Fill	240	20	432.046	461.023	607.254	0	607.254	615.913	615.913
7	2.31075	1526.06	1.14811	Bedrock	140	34	541.804	578.143	649.576	0	649.576	660.434	660.434
8	2.31075	1628.32	1.14811	Bedrock	140	34	569.427	607.619	693.276	0	693.276	704.688	704.688
9	2.31075	1733.35	1.14811	Bedrock	140	34	597.8	637.894	738.157	0	738.157	750.137	750.137
10	2.31075	1928.34	1.14811	Bedrock	140	34	650.475	694.102	821.49	0	821.49	834.526	834.526
11	2.31075	2168.09	1.14811	Bedrock	140	34	715.238	763.209	923.946	0	923.946	938.281	938.281
12	2.31075	2407.83	1.14811	Bedrock	140	34	780.002	832.317	1026.4	0	1026.4	1042.04	1042.04
13	2.31075	2648.54	1.14811	Bedrock	140	34	845.024	901.7	1129.27	0	1129.27	1146.2	1146.2
14	2.31075	2890.72	1.14811	Bedrock	140	34	910.446	971.51	1232.77	0	1232.77	1251.01	1251.01
15	2.31075	3132.92	1.14811	Bedrock	140	34	975.874	1041.33	1336.27	0	1336.27	1355.83	1355.83
16	2.31075	3375.13	1.14811	Bedrock	140	34	1041.3	1111.14	1439.77	0	1439.77	1460.64	1460.64
17	2.31075	3617.33	1.14811	Bedrock	140	34	1106.73	1180.96	1543.28	0	1543.28	1565.46	1565.46
18	2.31075	3860.57	1.14811	Bedrock	140	34	1172.43	1251.07	1647.23	0	1647.23	1670.73	1670.73
19	2.19728	3818.11	17.135	Bedrock	140	34	1029.26	1098.3	1420.73	0	1420.73	1738.06	1738.06
20	2.19728	3876.63	17.135	Bedrock	140	34	1043.36	1113.33	1443.03	0	1443.03	1764.7	1764.7
21	2.19728	3935.57	17.135	Bedrock	140	34	1057.55	1128.48	1465.49	0	1465.49	1791.54	1791.54
22	2.19728	3996.23	17.135	Bedrock	140	34	1072.16	1144.07	1488.59	0	1488.59	1819.15	1819.15
23	2.19728	4057.06	17.135	Bedrock	140	34	1086.81	1159.7	1511.76	0	1511.76	1846.84	1846.84
24	2.19728	4117.89	17.135	Bedrock	140	34	1101.46	1175.33	1534.94	0	1534.94	1874.53	1874.53
25	2.19728	4178.72	17.135	Bedrock	140	34	1116.1	1190.96	1558.11	0	1558.11	1902.22	1902.22
26	2.19728	4250.75	17.135	Bedrock	140	34	1133.45	1209.47	1585.55	0	1585.55	1935.01	1935.01
27	2.19728	4343.77	17.135	Bedrock	140	34	1155.85	1233.37	1620.99	0	1620.99	1977.35	1977.35
28	2.19728	4439.69	17.135	Bedrock	140	34	1178.95	1258.02	1657.53	0	1657.53	2021.01	2021.01
29	2.19728	4537.61	17.135	Bedrock	140	34	1202.53	1283.18	1694.84	0	1694.84	2065.59	2065.59
30	2.19728	4635.53	17.135	Bedrock	140	34	1226.11	1308.34	1732.14	0	1732.14	2110.16	2110.16
31	2.19728	4733.46	17.135	Bedrock	140	34	1249.69	1333.51	1769.45	0	1769.45	2154.74	2154.74
32	2.19728	4831.38	17.135	Bedrock	140	34	1273.27	1358.67	1806.75	0	1806.75	2199.31	2199.31
33	2.19728	4929.12	17.135	Bedrock	140	34	1296.81	1383.79	1843.99	0	1843.99	2243.81	2243.81
34	2.19728	5027.26	17.135	Bedrock	140	34	1320.44	1409	1881.37	0	1881.37	2288.48	2288.48
35	2.19728	5126.73	17.135	Bedrock	140	34	1344.39	1434.56	1919.27	0	1919.27	2333.76	2333.76
36	2.40761	5563.84	38.3395	Bedrock	140	34	1061.83	1133.05	1472.26	0	1472.26	2312.04	2312.04
37	2.40761	5347.6	38.3395	Bedrock	140	34	1023.97	1092.64	1412.35	0	1412.35	2222.18	2222.18
38	2.40761	5131.35	38.3395	Bedrock	140	34	986.098	1052.24	1352.45	0	1352.45	2132.32	2132.32
39	2.40761	4914.69	38.3395	Bedrock	140	34	948.156	1011.75	1292.42	0	1292.42	2042.29	2042.29
40	2.40761	4697.45	38.3395	Bedrock	140	34	910.115	971.156	1232.24	0	1232.24	1952.02	1952.02
41	2.40761	4480.22	38.3395	Bedrock	140	34	872.073	930.563	1172.06	0	1172.06	1861.76	1861.76
42	2.40761	4261.39	38.3395	Bedrock	140	34	833.753	889.673	1111.43	0	1111.43	1770.83	1770.83
43	2.40761	4040.37	38.3395	Bedrock	140	34	795.047	848.371	1050.2	0	1050.2	1678.99	1678.99
44	2.40761	3775	38.3395	Bedrock	140	34	748.577	798.784	976.686	0	976.686	1568.71	1568.71
45	2.22181	2969.27	45	Bedrock	140	34	598.28	638.407	738.918	0	738.918	1337.2	1337.2
46	2.22181	2376.61	45	Bedrock	140	34	494.917	528.111	575.398	0	575.398	1070.32	1070.32
47	2.22181	1783.94	45	Bedrock	140	34	391.554	417.815	411.878	0	411.878	803.431	803.431
48	1.94071	1082.83	45	Uncompacted Fill	240	20	309.723	330.496	248.636	0	248.636	558.359	558.359
49	1.94071	649.699	45	Uncompacted Fill	240	20	252.94	269.905	82.1629	0	82.1629	335.103	335.103
50	1.94071	216.566	45	Uncompacted Fill	240	20	196.157	209.314	-84.3104	0	-84.3104	111.847	111.847

Global Minimum Query (gle/morgenstern-price) - Safety Factor: 1.1363

Slice Number	Width [ft]	Weight [lbs]	Angle of Slice Base [deg]	Base Material	Base Cohesion [psf]	Base Friction Angle [deg]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]	Base Vertical Stress [psf]	Effective Vertical Stress [psf]
1	2.226	345.971	-45	Uncompacted Fill	240	20	401.963	456.75	595.516	0	595.516	193.554	193.554
2	2.6175	866.571	4.56925	Uncompacted Fill	240	20	326.127	370.578	358.761	0	358.761	384.825	384.825
3	2.6175	972.439	4.56925	Uncompacted Fill	240	20	344.114	391.017	414.914	0	414.914	442.415	442.415
4	2.6175	1078.31	4.56925	Uncompacted Fill	240	20	361.948	411.282	470.595	0	470.595	499.522	499.522
5	2.6175	1183.42	4.56925	Uncompacted Fill	240	20	379.484	431.208	525.34	0	525.34	555.667	555.667
6	2.6175	1268.44	4.56925	Uncompacted Fill	240	20	394.42	448.18	571.972	0	571.972	603.494	603.494
7	2.6175	1344.51	4.56925	Uncompacted Fill	240	20	408.03	463.644	614.458	0	614.458	647.067	647.067
8	2.6175	1420.59	4.56925	Uncompacted Fill	240	20	421.299	478.722	655.881	0	655.881	689.55	689.55
9	2.6175	1496.66	4.56925	Uncompacted Fill	240	20	434.167	493.344	696.058	0	696.058	730.756	730.756
10	2.6175	1572.74	4.56925	Uncompacted Fill	240	20	446.575	507.443	734.792	0	734.792	770.482	770.482
11	2.35588	1483.1	4.56925	Bedrock	140	34	613.975	697.66	826.765	0	826.765	875.832	875.832
12	2.35588	1574.53	4.56925	Bedrock	140	34	649.898	738.479	887.279	0	887.279	939.218	939.218
13	2.35588	1771.82	4.56925	Bedrock	140	34	713.642	810.911	994.667	0	994.667	1051.7	1051.7
14	2.35588	1981.14	4.56925	Bedrock	140	34	780.459	886.835	1107.23	0	1107.23	1169.6	1169.6
15	2.35588	2190.61	4.56925	Bedrock	140	34	846.885	962.315	1219.13	0	1219.13	1286.81	1286.81
16	2.35588	2401.93	4.56925	Bedrock	140	34	913.027	1037.47	1330.56	0	1330.56	1403.52	1403.52
17	2.35588	2613.81	4.56925	Bedrock	140	34	978.169	1111.49	1440.3	0	1440.3	1518.47	1518.47
18	2.35588	2825.68	4.56925	Bedrock	140	34	1041.78	1183.77	1547.45	0	1547.45	1630.71	1630.71
19	2.46349	3095.13	17.5756	Bedrock	140	34	788.72	896.222	1121.14	0	1121.14	1370.97	1370.97
20	2.46349	3154.46	17.5756	Bedrock	140	34	791.365	899.228	1125.6	0	1125.6	1376.27	1376.27
21	2.46349	3219.13	17.5756	Bedrock	140	34	794.585	902.887	1131.03	0	1131.03	1382.71	1382.71
22	2.46349	3286.54	17.5756	Bedrock	140	34	797.978	906.742	1136.74	0	1136.74	1389.5	1389.5
23	2.46349	3354.39	17.5756	Bedrock	140	34	801.207	910.411	1142.18	0	1142.18	1395.96	1395.96
24	2.46349	3424.4	17.5756	Bedrock	140	34	804.698	914.378	1148.06	0	1148.06	1402.95	1402.95
25	2.46349	3494.72	17.5756	Bedrock	140	34	808.206	918.365	1153.97	0	1153.97	1409.97	1409.97
26	2.46349	3565.04	17.5756	Bedrock	140	34	811.784	922.43	1160	0	1160	1417.13	1417.13
27	2.46349	3636.99	17.5756	Bedrock	140	34	815.844	927.043	1166.84	0	1166.84	1425.26	1425.26
28	2.46349	3737.78	17.5756	Bedrock	140	34	825.574	938.1	1183.23	0	1183.23	1444.73	1444.73
29	2.46349	3850.49	17.5756	Bedrock	140	34	837.943	952.155	1204.07	0	1204.07	1469.49	1469.49
30	2.46349	3967.18	17.5756	Bedrock	140	34	851.582	967.653	1227.05	0	1227.05	1496.78	1496.78
31	2.46349	4084.12	17.5756	Bedrock	140	34	865.909	983.932	1251.18	0	1251.18	1525.46	1525.46
32	2.46349	4201.06	17.5756	Bedrock	140	34	880.97	1001.05	1276.55	0	1276.55	1555.6	1555.6
33	2.46349	4318	17.5756	Bedrock	140	34	896.853	1019.09	1303.31	0	1303.31	1587.39	1587.39
34	2.46349	4434.6	17.5756	Bedrock	140	34	913.569	1038.09	1331.47	0	1331.47	1620.84	1620.84
35	2.46349	4552.61	17.5756	Bedrock	140	34	931.508	1058.47	1361.69	0	1361.69	1656.75	1656.75
36	2.46349	4671.49	17.5756	Bedrock	140	34	950.618	1080.19	1393.88	0	1393.88	1694.99	1694.99
37	2.46349	4790.37	17.5756	Bedrock	140	34	970.768	1103.08	1427.83	0	1427.83	1735.32	1735.32
38	2.47596	4797.15	34.6017	Bedrock	140	34	713.994	811.311	995.258	0	995.258	1487.84	1487.84
39	2.47596	4642.59	34.6017	Bedrock	140	34	704.963	801.05	980.049	0	980.049	1466.4	1466.4
40	2.47596	4487.25	34.6017	Bedrock	140	34	696.476	791.406	965.75	0	965.75	1446.25	1446.25
41	2.47596	4331.79	34.6017	Bedrock	140	34	688.413	782.244	952.166	0	952.166	1427.1	1427.1
42	2.47596	4175.62	34.6017	Bedrock	140	34	680.481	773.231	938.805	0	938.805	1408.27	1408.27
43	2.47596	4016.47	34.6017	Bedrock	140	34	672.13	763.741	924.733	0	924.733	1388.43	1388.43
44	2.47596	3844.91	34.6017	Bedrock	140	34	661.687	751.875	907.14	0	907.14	1363.64	1363.64
45	2.47596	3433.09	34.6017	Bedrock	140	34	613.415	697.023	825.821	0	825.821	1249.01	1249.01
46	2.47596	2925.21	34.6017	Bedrock	140	34	547.247	621.837	714.352	0	714.352	1091.9	1091.9

47	2.47596	2417.33	34.6017	Bedrock	140	34	477.288	542.342	596.497	0	596.497	925.776	925.776
48	1.68015	1298.59	45	Bedrock	140	34	352.034	400.016	385.49	0	385.49	737.524	737.524
49	2.92193	1472.75	45	Uncompacted Fill	240	20	281.714	320.112	220.105	0	220.105	501.82	501.82
50	2.92193	490.916	45	Uncompacted Fill	240	20	202.863	230.513	-26.0644	0	-26.0644	176.799	176.799

Interslice Data

Curved, Static, Janbu - Master Scenario

Global Minimum Query (bishop simplified) - Safety Factor: 2.12377

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [deg]
1	53.5562	671.422	0	0	0
2	55.1861	671.417	194.812	0	0
3	56.8159	671.435	407.597	0	0
4	58.4458	671.477	634.161	0	0
5	60.0757	671.542	870.528	0	0
6	61.7056	671.632	1112.94	0	0
7	63.3354	671.746	1357.83	0	0
8	64.9653	671.884	1601.87	0	0
9	66.5952	672.046	1841.9	0	0
10	68.2251	672.232	2074.98	0	0
11	69.8549	672.443	2298.34	0	0
12	71.4848	672.679	2509.46	0	0
13	73.1147	672.939	2705.94	0	0
14	74.7446	673.224	2885.5	0	0
15	76.3744	673.534	3046.04	0	0
16	77.9762	673.864	3289.19	0	0
17	79.5779	674.218	3518.16	0	0
18	81.1797	674.597	3730.78	0	0
19	82.7815	675.001	3925.1	0	0
20	84.3832	675.431	4099.35	0	0
21	85.985	675.886	4251.97	0	0
22	87.5867	676.367	4381.59	0	0
23	89.1885	676.875	4487.04	0	0
24	90.7902	677.41	4566.86	0	0
25	92.392	677.972	4619.75	0	0
26	93.9937	678.562	4644.55	0	0
27	95.5955	679.18	4640.35	0	0
28	97.1972	679.826	4606.44	0	0
29	98.799	680.502	4542.36	0	0
30	100.401	681.208	4447.89	0	0
31	102.003	681.944	4323.05	0	0
32	103.604	682.711	4168.15	0	0
33	105.206	683.51	3983.8	0	0
34	106.808	684.341	3770.72	0	0
35	108.41	685.206	3530.03	0	0
36	110.011	686.105	3263.22	0	0
37	111.613	687.04	2972.15	0	0
38	113.215	688.011	2659.05	0	0
39	114.817	689.019	2326.56	0	0
40	116.418	690.066	1977.78	0	0
41	118.02	691.154	1616.4	0	0
42	119.622	692.282	1246.59	0	0
43	121.224	693.454	873.073	0	0
44	122.825	694.67	501.237	0	0
45	124.427	695.933	137.358	0	0
46	126.029	697.245	-211.172	0	0
47	127.631	698.608	-536.446	0	0
48	129.324	700.107	-889.908	0	0
49	131.018	701.67	-1104.09	0	0
50	132.712	703.299	-1120.84	0	0
51	134.406	705	0	0	0

Global Minimum Query (janbu simplified) - Safety Factor: 2.01003

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [deg]
1	52.0005	670.8	0	0	0
2	53.6582	670.433	257.865	0	0
3	55.316	670.105	586.038	0	0
4	56.9738	669.815	972.376	0	0
5	58.6316	669.563	1405.59	0	0
6	60.2894	669.347	1875.15	0	0
7	61.9471	669.169	2371.28	0	0
8	63.6049	669.027	2884.83	0	0
9	65.2263	668.924	3519.37	0	0
10	66.8477	668.856	4176.07	0	0
11	68.4691	668.822	4846.23	0	0
12	70.0905	668.822	5521.77	0	0
13	71.7119	668.858	6195.78	0	0
14	73.3333	668.928	6861.6	0	0
15	74.9547	669.032	7512.56	0	0
16	76.5761	669.172	8142.45	0	0
17	78.1975	669.346	8745.66	0	0
18	79.8189	669.556	9316.95	0	0
19	81.4402	669.802	9851.33	0	0
20	83.0616	670.084	10344.3	0	0
21	84.683	670.402	10791.6	0	0
22	86.3044	670.756	11189.5	0	0
23	87.9258	671.149	11534.9	0	0
24	89.5472	671.579	11825.4	0	0
25	91.1686	672.047	12057.9	0	0
26	92.79	672.556	12229.4	0	0
27	94.4114	673.104	12337	0	0
28	96.0328	673.694	12378.6	0	0
29	97.6542	674.326	12352.2	0	0
30	99.2756	675.001	12256.3	0	0
31	100.897	675.721	12089.9	0	0
32	102.518	676.486	11852.4	0	0
33	104.14	677.3	11543.9	0	0
34	105.761	678.163	11164.8	0	0
35	107.383	679.077	10716.2	0	0
36	109.004	680.044	10199.8	0	0
37	110.625	681.068	9618.2	0	0
38	112.247	682.15	8974.76	0	0
39	113.868	683.294	8273.81	0	0
40	115.489	684.503	7520.79	0	0
41	117.111	685.781	6722.42	0	0
42	118.732	687.133	5887.04	0	0
43	120.354	688.564	5024.63	0	0
44	121.975	690.081	4147.27	0	0
45	123.596	691.69	3269.63	0	0
46	125.218	693.401	2410.11	0	0
47	126.839	695.223	1590.86	0	0
48	128.461	697.171	838.81	0	0
49	130.082	699.259	208.97	0	0
50	132.034	701.988	-194.323	0	0
51	133.986	705	0	0	0

Query 1 (janbu simplified) - Safety Factor: 2.01003

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [deg]
1	52.0005	670.8	0	0	0
2	53.6582	670.433	257.865	0	0
3	55.316	670.105	586.038	0	0
4	56.9738	669.815	972.376	0	0
5	58.6316	669.563	1405.59	0	0
6	60.2894	669.347	1875.15	0	0
7	61.9471	669.169	2371.28	0	0
8	63.6049	669.027	2884.83	0	0
9	65.2263	668.924	3519.37	0	0
10	66.8477	668.856	4176.07	0	0
11	68.4691	668.822	4846.23	0	0
12	70.0905	668.822	5521.77	0	0
13	71.7119	668.858	6195.78	0	0
14	73.3333	668.928	6861.6	0	0
15	74.9547	669.032	7512.56	0	0
16	76.5761	669.172	8142.45	0	0
17	78.1975	669.346	8745.66	0	0
18	79.8189	669.556	9316.95	0	0
19	81.4402	669.802	9851.33	0	0
20	83.0616	670.084	10344.3	0	0
21	84.683	670.402	10791.6	0	0
22	86.3044	670.756	11189.5	0	0
23	87.9258	671.149	11534.9	0	0
24	89.5472	671.579	11825.4	0	0
25	91.1686	672.047	12057.9	0	0
26	92.79	672.556	12229.4	0	0
27	94.4114	673.104	12337	0	0
28	96.0328	673.694	12378.6	0	0
29	97.6542	674.326	12352.2	0	0
30	99.2756	675.001	12256.3	0	0
31	100.897	675.721	12089.9	0	0
32	102.518	676.486	11852.4	0	0
33	104.14	677.3	11543.9	0	0
34	105.761	678.163	11164.8	0	0
35	107.383	679.077	10716.2	0	0
36	109.004	680.044	10199.8	0	0
37	110.625	681.068	9618.2	0	0
38	112.247	682.15	8974.76	0	0
39	113.868	683.294	8273.81	0	0
40	115.489	684.503	7520.79	0	0
41	117.111	685.781	6722.42	0	0
42	118.732	687.133	5887.04	0	0
43	120.354	688.564	5024.63	0	0
44	121.975	690.081	4147.27	0	0
45	123.596	691.69	3269.63	0	0
46	125.218	693.401	2410.11	0	0
47	126.839	695.223	1590.86	0	0
48	128.461	697.171	838.81	0	0
49	130.082	699.259	208.97	0	0
50	132.034	701.988	-194.323	0	0
51	133.986	705	0	0	0

Global Minimum Query (gle/morgenstern-price) - Safety Factor: 2.10815

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [deg]
1	53.5562	671.422	0	0	0
2	55.1861	671.417	197.332	5.91048	1.71561
3	56.8159	671.435	414.789	24.7977	3.42129
4	58.4458	671.477	647.963	57.9123	5.10729
5	60.0757	671.542	892.527	105.862	6.76421
6	61.7056	671.632	1144.27	168.629	8.38324
7	63.3354	671.746	1399.14	245.598	9.95598
8	64.9653	671.884	1653.25	335.607	11.475
9	66.5952	672.046	1902.95	437.01	12.9336
10	68.2251	672.232	2144.84	547.742	14.3258
11	69.8549	672.443	2375.77	665.408	15.6465
12	71.4848	672.679	2592.93	787.377	16.8916
13	73.1147	672.939	2793.76	910.843	18.0574
14	74.7446	673.224	2975.94	1032.9	19.141
15	76.3744	673.534	3137.43	1150.65	20.1405
16	77.9762	673.864	3401.12	1308.22	21.0389
17	79.5779	674.218	3648.15	1463.08	21.8531
18	81.1797	674.597	3876.21	1612.11	22.5824
19	82.7815	675.001	4083.29	1752.3	23.2261
20	84.3832	675.431	4267.76	1880.88	23.784
21	85.985	675.886	4428.3	1995.34	24.2558
22	87.5867	676.367	4563.94	2093.55	24.6417
23	89.1885	676.875	4673.96	2173.7	24.9415
24	90.7902	677.41	4757.5	2234.2	25.1555
25	92.392	677.972	4813.88	2273.82	25.2836
26	93.9937	678.562	4842.59	2291.75	25.3258
27	95.5955	679.18	4843.4	2287.63	25.2823
28	97.1972	679.826	4816.28	2261.52	25.1528
29	98.799	680.502	4761.39	2213.95	24.9375
30	100.401	681.208	4679.08	2145.83	24.6362
31	102.003	681.944	4569.88	2058.49	24.2491
32	103.604	682.711	4434.46	1953.59	23.7758
33	105.206	683.51	4273.7	1833.17	23.2165
34	106.808	684.341	4088.45	1699.47	22.5715
35	108.41	685.206	3879.81	1555.03	21.8409
36	110.011	686.105	3649.1	1402.61	21.0253
37	111.613	687.04	3397.84	1245.15	20.1255
38	113.215	688.011	3127.72	1085.69	19.1428
39	114.817	689.019	2840.74	927.33	18.0787
40	116.418	690.066	2539.16	773.161	16.9352
41	118.02	691.154	2225.66	626.238	15.7151
42	119.622	692.282	1903.31	489.453	14.4216
43	121.224	693.454	1575.61	365.464	13.0589
44	122.825	694.67	1246.68	256.62	11.6315
45	124.427	695.933	921.458	164.885	10.1451
46	126.029	697.245	606.078	91.7252	8.60596
47	127.631	698.608	307.349	37.8529	7.02115
48	129.324	700.107	-17.3919	-1.61465	5.30409
49	131.018	701.67	-219.718	-13.6482	3.55447
50	132.712	703.299	-237.112	-7.38031	1.7828
51	134.406	705	0	0	0

Curved, Static, Janbu - Curved, PseudoStatic Janbu

Global Minimum Query (bishop simplified) - Safety Factor: 1.0901

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [deg]
1	50.1724	670.069	0	0	0
2	51.9986	670.015	409.359	0	0
3	53.8248	669.988	818.418	0	0
4	55.651	669.987	1222.09	0	0
5	57.4772	670.014	1615.62	0	0
6	59.3033	670.066	1994.59	0	0
7	61.1295	670.146	2354.9	0	0
8	62.9557	670.252	2692.77	0	0
9	64.7819	670.385	3004.7	0	0
10	66.6081	670.545	3287.5	0	0
11	68.4343	670.732	3538.24	0	0
12	70.2881	670.949	3965.76	0	0
13	72.1419	671.195	4379.35	0	0
14	73.9956	671.469	4774.85	0	0
15	75.8494	671.771	5148.21	0	0
16	77.7031	672.102	5495.78	0	0
17	79.5569	672.461	5814.29	0	0
18	81.4106	672.85	6100.71	0	0
19	83.2644	673.269	6352.35	0	0
20	85.1182	673.717	6566.85	0	0
21	86.9719	674.195	6742.19	0	0
22	88.8257	674.703	6876.26	0	0
23	90.6794	675.242	6966.71	0	0
24	92.5332	675.813	7011.62	0	0
25	94.387	676.415	7009.34	0	0
26	96.2407	677.049	6958.61	0	0
27	98.0945	677.716	6858.53	0	0
28	99.9482	678.416	6708.54	0	0
29	101.802	679.15	6508.44	0	0
30	103.656	679.919	6258.37	0	0
31	105.51	680.723	5958.91	0	0
32	107.363	681.562	5610.68	0	0
33	109.217	682.438	5214.94	0	0
34	111.071	683.352	4773.32	0	0
35	112.925	684.305	4287.93	0	0
36	114.778	685.296	3761.28	0	0
37	116.632	686.329	3196.39	0	0
38	118.486	687.403	2596.88	0	0
39	120.34	688.52	1966.84	0	0
40	122.193	689.682	1310.88	0	0
41	124.047	690.889	634.29	0	0
42	125.901	692.144	-56.4176	0	0
43	127.755	693.448	-754.45	0	0
44	129.608	694.804	-1448.2	0	0
45	131.462	696.212	-2069.73	0	0
46	133.316	697.676	-2583.71	0	0
47	135.17	699.199	-2972.32	0	0
48	136.785	700.574	-3191.13	0	0
49	138.4	701.998	-3222.55	0	0
50	140.014	703.473	-3048.49	0	0
51	141.629	705	0	0	0

Global Minimum Query (janbu simplified) - Safety Factor: 1.02904

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [deg]
1	44.6709	669.06	0	0	0
2	46.5152	668.747	486.226	0	0
3	48.3595	668.471	991.084	0	0
4	50.2038	668.23	1507.51	0	0
5	52.0482	668.024	2037.11	0	0
6	53.8925	667.854	2576.23	0	0
7	55.7368	667.719	3115.78	0	0
8	57.5811	667.618	3647.41	0	0
9	59.4255	667.552	4163.39	0	0
10	61.3454	667.521	4939.71	0	0
11	63.2653	667.526	5728.87	0	0
12	65.1853	667.57	6519.8	0	0
13	67.1052	667.65	7302.39	0	0
14	69.0252	667.769	8067.4	0	0
15	70.9451	667.925	8806.57	0	0
16	72.865	668.12	9512.94	0	0
17	74.785	668.352	10179.5	0	0
18	76.7049	668.623	10799.9	0	0
19	78.6249	668.933	11368.5	0	0
20	80.5448	669.281	11880.2	0	0
21	82.4647	669.67	12330.5	0	0
22	84.3847	670.099	12715.4	0	0
23	86.3046	670.568	13031.6	0	0
24	88.2246	671.078	13276.4	0	0
25	90.1445	671.63	13447	0	0
26	92.0644	672.225	13540.8	0	0
27	93.9844	672.864	13555.4	0	0
28	95.9043	673.546	13489.3	0	0
29	97.8243	674.274	13341.4	0	0
30	99.7442	675.049	13111.2	0	0
31	101.664	675.871	12799	0	0
32	103.584	676.742	12405.8	0	0
33	105.504	677.664	11933	0	0
34	107.424	678.637	11382.8	0	0
35	109.344	679.665	10758.1	0	0
36	111.264	680.748	10062.7	0	0
37	113.184	681.888	9301.29	0	0
38	115.104	683.09	8479.61	0	0
39	117.024	684.354	7604.34	0	0
40	118.944	685.684	6683.54	0	0
41	120.864	687.083	5726.38	0	0
42	122.784	688.555	4743.48	0	0
43	124.703	690.104	3747.38	0	0
44	126.623	691.736	2752.99	0	0
45	128.543	693.455	1776.7	0	0
46	130.463	695.269	867.692	0	0
47	132.383	697.184	127.914	0	0
48	134.303	699.209	-401.417	0	0
49	135.948	701.04	-591.684	0	0
50	137.594	702.967	-462.671	0	0
51	139.239	705	0	0	0

Global Minimum Query (gle/morgenstern-price) - Safety Factor: 1.08159

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [deg]
1	50.1724	670.069	0	0	0
2	51.9986	670.015	420.591	19.897	2.70849
3	53.8248	669.988	855.488	80.7824	5.39436
4	55.651	669.987	1298.47	183.315	8.03578
5	57.4772	670.014	1743.14	326.616	10.6126
6	59.3033	670.066	2183.04	508.276	13.1066
7	61.1295	670.146	2611.72	724.414	15.5024
8	62.9557	670.252	3022.87	969.801	17.7873
9	64.7819	670.385	3410.44	1238.02	19.9513
10	66.6081	670.545	3768.75	1521.71	21.9874
11	68.4343	670.732	4092.58	1812.77	23.8905
12	70.2881	670.949	4750.45	2284.59	25.6839
13	72.1419	671.195	5402.27	2792.71	27.3368
14	73.9956	671.469	6037.98	3326.24	28.8498
15	75.8494	671.771	6647.71	3872.88	30.2246
16	77.7031	672.102	7222.35	4419.57	31.4637
17	79.5569	672.461	7753.75	4953.01	32.57
18	81.4106	672.85	8234.74	5460.13	33.5468
19	83.2644	673.269	8659.39	5928.6	34.3973
20	85.1182	673.717	9023.04	6347.28	35.1246
21	86.9719	674.195	9322.38	6706.6	35.7316
22	88.8257	674.703	9554.93	6998.5	36.2209
23	90.6794	675.242	9718.71	7216.34	36.5946
24	92.5332	675.813	9813.02	7355.67	36.8546
25	94.387	676.415	9838.08	7414.04	37.0019
26	96.2407	677.049	9795.15	7391.18	37.0373
27	98.0945	677.716	9686.27	7288.78	36.9609
28	99.9482	678.416	9514.11	7110.32	36.7724
29	101.802	679.15	9281.81	6860.89	36.4709
30	103.656	679.919	8992.9	6546.92	36.055
31	105.51	680.723	8651.17	6176.01	35.5228
32	107.363	681.562	8260.23	5756.42	34.872
33	109.217	682.438	7824	5297.23	34.0999
34	111.071	683.352	7346.43	4808.01	33.2035
35	112.925	684.305	6831.44	4298.59	32.1796
36	114.778	685.296	6282.93	3778.89	31.025
37	116.632	686.329	5704.8	3258.77	29.7364
38	118.486	687.403	5101.03	2747.91	28.3112
39	120.34	688.52	4475.59	2255.59	26.747
40	122.193	689.682	3832.48	1790.59	25.0427
41	124.047	690.889	3175.95	1361.08	23.198
42	125.901	692.144	2511.01	974.683	21.2144
43	127.755	693.448	1842.61	637.904	19.0956
44	129.608	694.804	1180.06	357.354	16.8477
45	131.462	696.212	587.038	151.59	14.4791
46	133.316	697.676	95.8937	20.3855	12.0015
47	135.17	699.199	-277.109	-46.0216	9.42948
48	136.785	700.574	-484.545	-60.5718	7.12544
49	138.4	701.998	-518.396	-43.3133	4.77611
50	140.014	703.473	-352.886	-14.765	2.3959
51	141.629	705	0	0	0

Block, Static, Janbu - Master Scenario

Global Minimum Query (bishop simplified) - Safety Factor: 2.26111

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [deg]
1	28.0723	665.944	0	0	0
2	30.9646	663.052	1539.63	0	0
3	33.4742	663.102	1957.3	0	0
4	35.9838	663.152	2392.14	0	0
5	38.4934	663.203	2842.9	0	0
6	41.003	663.253	3309.56	0	0
7	43.5126	663.303	3792.14	0	0
8	45.8233	663.35	4356.34	0	0
9	48.1341	663.396	4948.83	0	0
10	50.4448	663.442	5570.35	0	0
11	52.7556	663.488	6245.79	0	0
12	55.0663	663.535	6987.53	0	0
13	57.3771	663.581	7795.56	0	0
14	59.6878	663.627	8670.14	0	0
15	61.9986	663.674	9611.69	0	0
16	64.3093	663.72	10620.2	0	0
17	66.6201	663.766	11695.7	0	0
18	68.9308	663.813	12838.2	0	0
19	71.2416	663.859	14047.9	0	0
20	73.4389	664.536	14149	0	0
21	75.6361	665.214	14249.5	0	0
22	77.8334	665.891	14349.5	0	0
23	80.0307	666.569	14448.9	0	0
24	82.228	667.246	14547.7	0	0
25	84.4253	667.924	14646	0	0
26	86.6225	668.601	14743.7	0	0
27	88.8198	669.278	14840.8	0	0
28	91.0171	669.956	14937	0	0
29	93.2144	670.633	15032.3	0	0
30	95.4117	671.311	15126.7	0	0
31	97.6089	671.988	15220.2	0	0
32	99.8062	672.666	15312.8	0	0
33	102.004	673.343	15404.5	0	0
34	104.201	674.021	15495.3	0	0
35	106.398	674.698	15585.2	0	0
36	108.595	675.375	15674.1	0	0
37	111.003	677.28	13652.1	0	0
38	113.411	679.184	11716.3	0	0
39	115.818	681.088	9866.69	0	0
40	118.226	682.992	8103.46	0	0
41	120.633	684.896	6426.83	0	0
42	123.041	686.8	4836.8	0	0
43	125.449	688.704	3334	0	0
44	127.856	690.608	1919.32	0	0
45	130.264	692.512	610.423	0	0
46	132.486	694.734	-782.869	0	0
47	134.707	696.956	-1855.77	0	0
48	136.929	699.178	-2608.29	0	0
49	138.87	701.119	-3036.18	0	0
50	140.811	703.059	-3151.01	0	0
51	142.751	705	0	0	0

Global Minimum Query (janbu simplified) - Safety Factor: 2.14377

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [deg]
1	39.5844	668.162	0	0	0
2	41.3922	666.354	799.106	0	0
3	43.2001	664.546	2221.28	0	0
4	45.3961	664.424	2729.52	0	0
5	47.592	664.301	3267.09	0	0
6	49.6734	664.185	3904.94	0	0
7	51.7548	664.069	4603.92	0	0
8	53.8363	663.953	5390.6	0	0
9	55.9177	663.837	6265.47	0	0
10	57.9992	663.721	7228.56	0	0
11	60.0806	663.605	8280.35	0	0
12	62.162	663.488	9421.09	0	0
13	64.2435	663.372	10650.8	0	0
14	66.3249	663.256	11969.4	0	0
15	68.4063	663.14	13377	0	0
16	70.4878	663.024	14873.6	0	0
17	72.5692	662.908	16460.8	0	0
18	74.6507	662.792	18139.1	0	0
19	76.7801	663.23	18720.3	0	0
20	78.9095	663.668	19313.1	0	0
21	81.0389	664.107	19917.3	0	0
22	83.1683	664.545	20533.1	0	0
23	85.2977	664.983	21160.4	0	0
24	87.4271	665.422	21799.4	0	0
25	89.5566	665.86	22452	0	0
26	91.686	666.298	23119.2	0	0
27	93.8154	666.737	23801.5	0	0
28	95.9448	667.175	24498.9	0	0
29	98.0742	667.613	25211.4	0	0
30	100.204	668.052	25939	0	0
31	102.333	668.49	26681.7	0	0
32	104.462	668.928	27439.4	0	0
33	106.578	670.697	25139.2	0	0
34	108.694	672.466	22917.9	0	0
35	110.81	674.235	20775.6	0	0
36	112.925	676.004	18712.2	0	0
37	115.041	677.773	16727.9	0	0
38	117.157	679.542	14822.5	0	0
39	119.273	681.311	12996.4	0	0
40	121.388	683.08	11249.5	0	0
41	123.504	684.848	9581.98	0	0
42	125.62	686.617	7994.46	0	0
43	127.736	688.386	6487.43	0	0
44	129.852	690.155	5069.15	0	0
45	132.102	692.405	3395.21	0	0
46	134.352	694.655	2038.14	0	0
47	136.602	696.905	997.935	0	0
48	138.852	699.155	274.596	0	0
49	140.8	701.103	-127.006	0	0
50	142.748	703.052	-218.804	0	0
51	144.696	705	0	0	0

Global Minimum Query (gle/morgenstern-price) - Safety Factor: 2.25593

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [deg]
1	34.8452	667.326	0	0	0
2	36.5984	665.572	755.571	16.5073	1.25157
3	38.3516	663.819	2172.29	94.7931	2.49865
4	40.2774	663.839	2531.16	170.696	3.85806
5	42.2031	663.86	2903.35	264.276	5.20099
6	44.1289	663.88	3288.93	375.997	6.52185
7	46.0547	663.9	3687.95	506.196	7.8154
8	48.1574	663.922	4259.28	689.149	9.19077
9	50.2602	663.944	4865.75	903.714	10.5216
10	52.3629	663.966	5528.78	1155.28	11.8026
11	54.4657	663.988	6262.39	1449.08	13.0286
12	56.5684	664.01	7067.31	1787.71	14.1955
13	58.6712	664.032	7944.14	2173.2	15.2995
14	60.8717	664.642	8134.2	2391.56	16.384
15	63.0722	665.252	8325.65	2607.98	17.393
16	65.2727	665.861	8518.46	2821.17	18.324
17	67.4732	666.471	8712.6	3029.78	19.175
18	69.6737	667.081	8908.05	3232.46	19.9443
19	71.8742	667.69	9104.83	3427.87	20.6308
20	74.0747	668.3	9302.99	3614.67	21.2336
21	76.2752	668.909	9502.5	3791.49	21.752
22	78.4757	669.519	9703.37	3956.99	22.1854
23	80.6763	670.129	9905.59	4109.84	22.5336
24	82.8768	670.738	10109.1	4248.76	22.7966
25	85.0773	671.348	10314	4372.45	22.9737
26	87.2778	671.957	10520.1	4479.71	23.0655
27	89.4783	672.567	10727.9	4569.52	23.0714
28	91.6788	673.177	10937.5	4640.9	22.992
29	93.8793	673.786	11149.2	4692.81	22.8267
30	96.1214	674.958	10620.7	4414.56	22.5705
31	98.3636	676.129	10099.4	4126.71	22.2254
32	100.606	677.301	9584.61	3832.01	21.792
33	102.848	678.473	9075.9	3533.13	21.2703
34	105.09	679.644	8572.82	3232.72	20.6609
35	107.332	680.816	8074.62	2933.28	19.9646
36	109.574	681.987	7580.72	2637.26	19.1823
37	111.816	683.159	7090.66	2347.09	18.3151
38	114.058	684.33	6603.97	2065.13	17.365
39	116.301	685.502	6120.24	1793.62	16.3339
40	118.543	686.674	5639.14	1534.72	15.2246
41	120.785	687.845	5160.35	1290.48	14.0403
42	123.027	689.017	4683.49	1062.79	12.7852
43	125.269	690.188	4208.47	853.444	11.4637
44	127.511	691.36	3735.35	664.105	10.0812
45	129.753	692.531	3266.79	496.624	8.64404
46	131.971	694.749	2012.26	253.33	7.1754
47	134.189	696.966	1027.25	101.939	5.66718
48	136.406	699.184	321.831	23.2228	4.12722
49	138.345	701.123	-83.6444	-4.03458	2.76152
50	140.283	703.061	-196.16	-4.7385	1.38378
51	142.222	705	0	0	0

Block, Static, Janbu - Block, PseudoStatic, Janbu

Global Minimum Query (bishop simplified) - Safety Factor: 1.13576

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [deg]
1	28.0723	665.944	0	0	0
2	30.9646	663.052	2740.41	0	0
3	33.4742	663.102	3233.24	0	0
4	35.9838	663.152	3722.22	0	0
5	38.4934	663.203	4207.62	0	0
6	41.003	663.253	4689.45	0	0
7	43.5126	663.303	5167.7	0	0
8	45.8233	663.35	5810.88	0	0
9	48.1341	663.396	6478.3	0	0
10	50.4448	663.442	7170.61	0	0
11	52.7556	663.488	7909.12	0	0
12	55.0663	663.535	8704.45	0	0
13	57.3771	663.581	9556.6	0	0
14	59.6878	663.627	10465.8	0	0
15	61.9986	663.674	11432.4	0	0
16	64.3093	663.72	12456.3	0	0
17	66.6201	663.766	13537.7	0	0
18	68.9308	663.813	14676.5	0	0
19	71.2416	663.859	15872.9	0	0
20	73.4389	664.536	15784.8	0	0
21	75.6361	665.214	15691.5	0	0
22	77.8334	665.891	15593	0	0
23	80.0307	666.569	15489.2	0	0
24	82.228	667.246	15379.9	0	0
25	84.4253	667.924	15265.2	0	0
26	86.6225	668.601	15145.2	0	0
27	88.8198	669.278	15018.7	0	0
28	91.0171	669.956	14884	0	0
29	93.2144	670.633	14740.8	0	0
30	95.4117	671.311	14588.9	0	0
31	97.6089	671.988	14428.3	0	0
32	99.8062	672.666	14259	0	0
33	102.004	673.343	14081.1	0	0
34	104.201	674.021	13894.4	0	0
35	106.398	674.698	13699.1	0	0
36	108.595	675.375	13494.9	0	0
37	111.003	677.28	11240.8	0	0
38	113.411	679.184	9087.04	0	0
39	115.818	681.088	7033.64	0	0
40	118.226	682.992	5080.81	0	0
41	120.633	684.896	3228.79	0	0
42	123.041	686.8	1477.61	0	0
43	125.449	688.704	-172.022	0	0
44	127.856	690.608	-1719.06	0	0
45	130.264	692.512	-3142.94	0	0
46	132.486	694.734	-4536.03	0	0
47	134.707	696.956	-5582.47	0	0
48	136.929	699.178	-6282.27	0	0
49	138.87	701.119	-6575.89	0	0
50	140.811	703.059	-6503.64	0	0
51	142.751	705	0	0	0

Global Minimum Query (janbu simplified) - Safety Factor: 1.06707

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [deg]
1	28.0723	665.944	0	0	0
2	30.9646	663.052	2965.55	0	0
3	33.4742	663.102	3513.13	0	0
4	35.9838	663.152	4059.29	0	0
5	38.4934	663.203	4604.14	0	0
6	41.003	663.253	5147.68	0	0
7	43.5126	663.303	5689.91	0	0
8	45.8233	663.35	6406.57	0	0
9	48.1341	663.396	7151.21	0	0
10	50.4448	663.442	7924.59	0	0
11	52.7556	663.488	8751.32	0	0
12	55.0663	663.535	9643.64	0	0
13	57.3771	663.581	10601.6	0	0
14	59.6878	663.627	11625.3	0	0
15	61.9986	663.674	12715.4	0	0
16	64.3093	663.72	13871.7	0	0
17	66.6201	663.766	15094.3	0	0
18	68.9308	663.813	16383.1	0	0
19	71.2416	663.859	17738.5	0	0
20	73.4389	664.536	17774.7	0	0
21	75.6361	665.214	17807.4	0	0
22	77.8334	665.891	17836.6	0	0
23	80.0307	666.569	17862.2	0	0
24	82.228	667.246	17884.1	0	0
25	84.4253	667.924	17902.5	0	0
26	86.6225	668.601	17917.2	0	0
27	88.8198	669.278	17927.5	0	0
28	91.0171	669.956	17932.4	0	0
29	93.2144	670.633	17931.5	0	0
30	95.4117	671.311	17924.8	0	0
31	97.6089	671.988	17912.2	0	0
32	99.8062	672.666	17893.8	0	0
33	102.004	673.343	17869.6	0	0
34	104.201	674.021	17839.5	0	0
35	106.398	674.698	17803.6	0	0
36	108.595	675.375	17761.8	0	0
37	111.003	677.28	15675.5	0	0
38	113.411	679.184	13683.6	0	0
39	115.818	681.088	11786.1	0	0
40	118.226	682.992	9983.14	0	0
41	120.633	684.896	8274.99	0	0
42	123.041	686.8	6661.66	0	0
43	125.449	688.704	5143.84	0	0
44	127.856	690.608	3722.48	0	0
45	130.264	692.512	2416.94	0	0
46	132.486	694.734	1122.87	0	0
47	134.707	696.956	158.341	0	0
48	136.929	699.178	-476.651	0	0
49	138.87	701.119	-716.217	0	0
50	140.811	703.059	-599.828	0	0
51	142.751	705	0	0	0

Global Minimum Query (gle/morgenstern-price) - Safety Factor: 1.1363

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [deg]
1	20.8931	664.406	0	0	0
2	23.1191	662.18	2107.31	83.7604	2.27617
3	25.7366	662.389	2600.97	224.5	4.9332
4	28.3541	662.598	3095.08	410.095	7.54767
5	30.9716	662.807	3589.35	639.26	10.0984
6	33.5891	663.016	4083.44	910.25	12.5665
7	36.2066	663.226	4578.86	1221.37	14.9354
8	38.8241	663.435	5075.95	1570.46	17.1917
9	41.4416	663.644	5574.04	1954.69	19.3246
10	44.0591	663.853	6072.35	2370.73	21.3264
11	46.6766	664.062	6569.97	2814.75	23.1916
12	49.0325	664.251	7373.1	3399.19	24.7509
13	51.3883	664.439	8219.4	4043.75	26.1961
14	53.7442	664.627	9130.72	4758.63	27.527
15	56.1001	664.815	10109.4	5544.93	28.7444
16	58.456	665.004	11154.5	6401.11	29.8497
17	60.8119	665.192	12265	7324.25	30.8442
18	63.1677	665.38	13438.5	8309.58	31.7302
19	65.5236	665.569	14672	9350.49	32.5094
20	67.9871	666.349	14721.1	9637.78	33.2124
21	70.4506	667.129	14753.7	9877.88	33.8031
22	72.9141	667.909	14768.7	10068.2	34.2833
23	75.3776	668.69	14765.3	10206.8	34.6549
24	77.8411	669.47	14743.3	10292.4	34.9192
25	80.3046	670.25	14702.2	10324	35.0768
26	82.7681	671.031	14641.9	10301.6	35.1291
27	85.2315	671.811	14562.5	10225.5	35.0758
28	87.695	672.591	14464.1	10096.5	34.9165
29	90.1585	673.372	14343.6	9913.85	34.651
30	92.622	674.152	14200.1	9678.77	34.2783
31	95.0855	674.932	14033.9	9393.69	33.7967
32	97.549	675.713	13845.6	9061.92	33.2047
33	100.012	676.493	13636	8687.24	32.5004
34	102.476	677.273	13406.2	8273.88	31.6816
35	104.939	678.054	13157.1	7826.43	30.7461
36	107.403	678.834	12889.8	7349.64	29.6914
37	109.866	679.614	12605.2	6848.53	28.5157
38	112.33	680.394	12304.6	6328.29	27.2169
39	114.806	682.103	10791.5	5213.58	25.7861
40	117.282	683.811	9332.93	4200.1	24.2292
41	119.758	685.519	7929.03	3291.82	22.5463
42	122.234	687.227	6579.65	2491.4	20.7393
43	124.71	688.935	5284.97	1800.3	18.8112
44	127.186	690.643	4046.13	1219.08	16.7673
45	129.662	692.352	2868.07	747.856	14.6146
46	132.138	694.06	1845.16	404.421	12.3626
47	134.614	695.768	1016.22	179.608	10.023
48	137.089	697.476	382.771	51.14	7.60992
49	138.77	699.156	-101.256	-10.5328	5.93863
50	141.692	702.078	-406.245	-21.1873	2.9855
51	144.614	705	0	0	0

Entity Information

Curved, Static, Janbu

Shared Entities

Type	Coordinates (x,y)
External Boundary	0, 620 228, 620 228, 700 228, 710 213, 710 213, 705 175, 705 129, 705 118.583, 700 104, 693 87, 685 70, 678 50, 670 33, 667 19, 664 0, 664 0, 658
Material Boundary	0, 658 15, 659 28, 660 44.897, 663.598 57.648, 666.925 76.496, 673.577 90.91, 680.045 103.475, 687.99 116, 694 123.248, 697.23 129.715, 699.263 152, 699 182.225, 699.385 207.477, 699.855 228, 700
Material Boundary	175, 705 182.225, 699.385

Scenario-based Entities

Type	Coordinates (x,y)	Master Scenario	Curved, PseudoStatic Janbu
Water Table	-0.027, 648.724 227.867, 675.231	Assigned to: Compacted Fill Uncompacted Fill Bedrock	Assigned to: Compacted Fill Uncompacted Fill Bedrock
Distributed Load	228, 710 213, 710	Constant DistributionOrientation: Normal to boundaryMagnitude: 3100 lbs/ft2Creates Excess Pore Pressure: No	Constant DistributionOrientation: Normal to boundaryMagnitude: 3100 lbs/ft2Creates Excess Pore Pressure: No

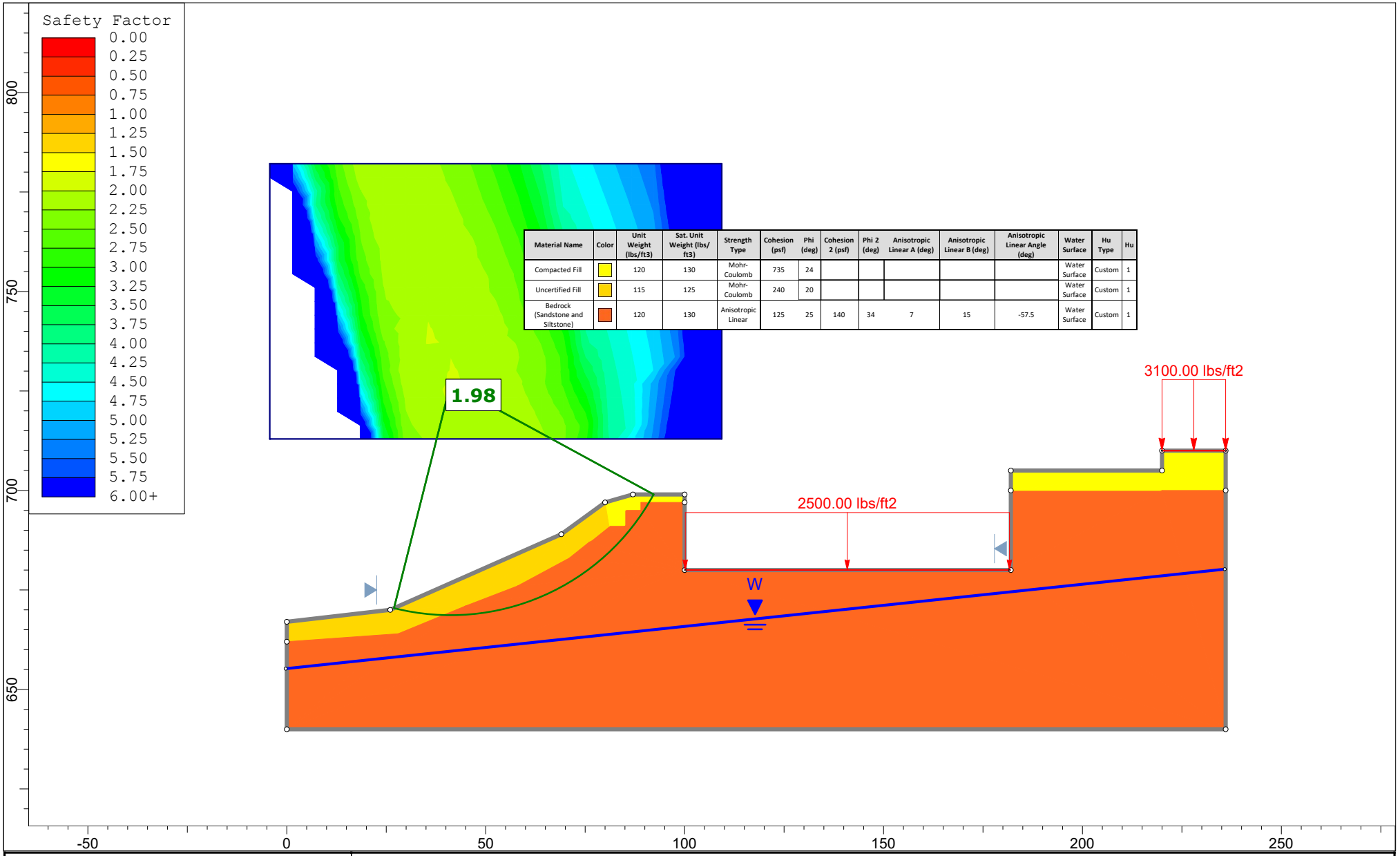
Block, Static, Janbu

Shared Entities

Type	Coordinates (x,y)
External Boundary	0, 620 228, 620 228, 700 228, 710 213, 710 213, 705 175, 705 129, 705 118.583, 700 104, 693 87, 685 70, 678 50, 670 33, 667 19, 664 0, 664 0, 658
Material Boundary	0, 658 15, 659 28, 660 44.897, 663.598 57.648, 666.925 76.496, 673.577 90.91, 680.045 103.475, 687.99 116, 694 123.248, 697.23 129.715, 699.263 152, 699 182.225, 699.385 207.477, 699.855 228, 700
Material Boundary	175, 705 182.225, 699.385

Scenario-based Entities

Type	Coordinates (x,y)	Master Scenario	Block, PseudoStatic, Janbu
Water Table	-0.027, 648.724 227.867, 675.231	Assigned to: Compacted Fill Uncompacted Fill Bedrock	Assigned to: Compacted Fill Uncompacted Fill Bedrock
Distributed Load	228, 710 213, 710	Constant DistributionOrientation: Normal to boundaryMagnitude: 3100 lbs/ft2Creates Excess Pore Pressure: No	Constant DistributionOrientation: Normal to boundaryMagnitude: 3100 lbs/ft2Creates Excess Pore Pressure: No
Block Search Window	123.916, 670.207 156.277, 686.104 155.52, 700.108 124.294, 699.351		
Block Search Window	83.417, 679.291 87.012, 656.77 119.563, 661.123 119.752, 697.459		
Block Search Window	48.406, 647.119 78.496, 654.121 73.197, 675.695 48.406, 666.99		
Block Search Window	15.855, 646.93 46.135, 649.957 45.189, 666.043 16.991, 661.123		

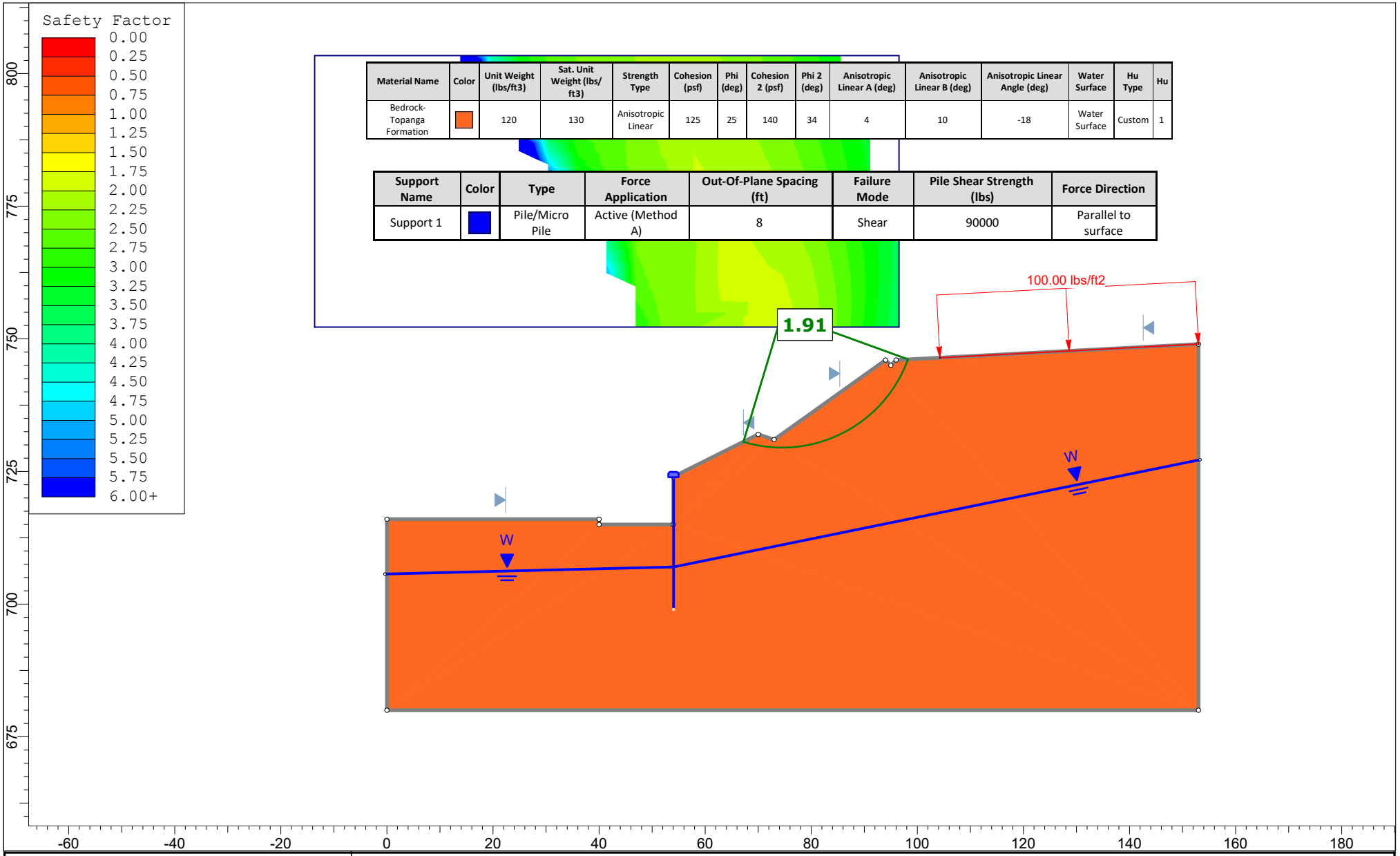


Material Name	Color	Unit Weight (lbs/ft3)	Sat. Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Cohesion 2 (psf)	Phi 2 (deg)	Anisotropic Linear A (deg)	Anisotropic Linear B (deg)	Anisotropic Linear Angle (deg)	Water Surface	Hu Type	Hu
Compacted Fill		120	130	Mohr-Coulomb	735	24						Water Surface	Custom	1
Uncertified Fill		115	125	Mohr-Coulomb	240	20						Water Surface	Custom	1
Bedrock (Sandstone and Siltstone)		120	130	Anisotropic Linear	125	25	140	34	7	15	-57.5	Water Surface	Custom	1

GEOTECHNOLOGIES, INC.
CONSULTING GEOTECHNICAL ENGINEERS

SLIDEINTERPRET 9.012

Project	File No. 21578 Hilton-Los Angeles/Universal City
Analysis	Cross Section D-D'
Scale	1:400
Comment 1	Curved Static
Date	12/6/2022
File Name	Proposed Hotel Extension



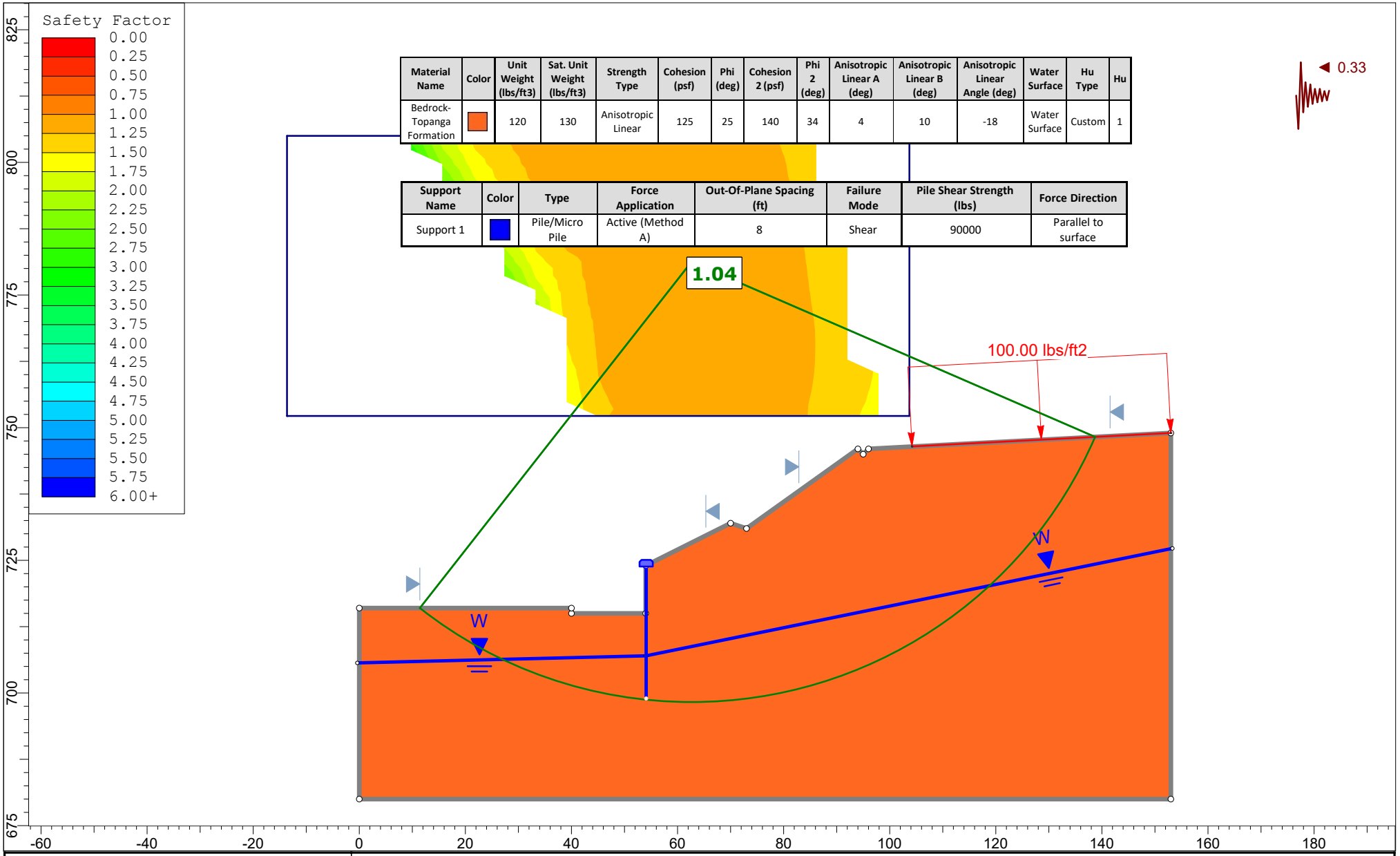
Material Name	Color	Unit Weight (lbs/ft3)	Sat. Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Cohesion 2 (psf)	Phi 2 (deg)	Anisotropic Linear A (deg)	Anisotropic Linear B (deg)	Anisotropic Linear Angle (deg)	Water Surface	Hu Type	Hu
Bedrock-Topanga Formation		120	130	Anisotropic Linear	125	25	140	34	4	10	-18	Water Surface	Custom	1

Support Name	Color	Type	Force Application	Out-Of-Plane Spacing (ft)	Failure Mode	Pile Shear Strength (lbs)	Force Direction
Support 1		Pile/Micro Pile	Active (Method A)	8	Shear	90000	Parallel to surface

GEOTECHNOLOGIES, INC.
CONSULTING GEOTECHNICAL ENGINEERS

SLIDEINTERPRET 9.012

Project	File No. 21578 Hilton-Los Angeles/Universal City
Analysis	Cross Section I-I'
Scale	1:300
Comment 1	Curved, Static, Janbu
Date	12/8/2022
File Name	Proposed Hotel Extension



GEOTECHNOLOGIES, INC.
CONSULTING GEOTECHNICAL ENGINEERS

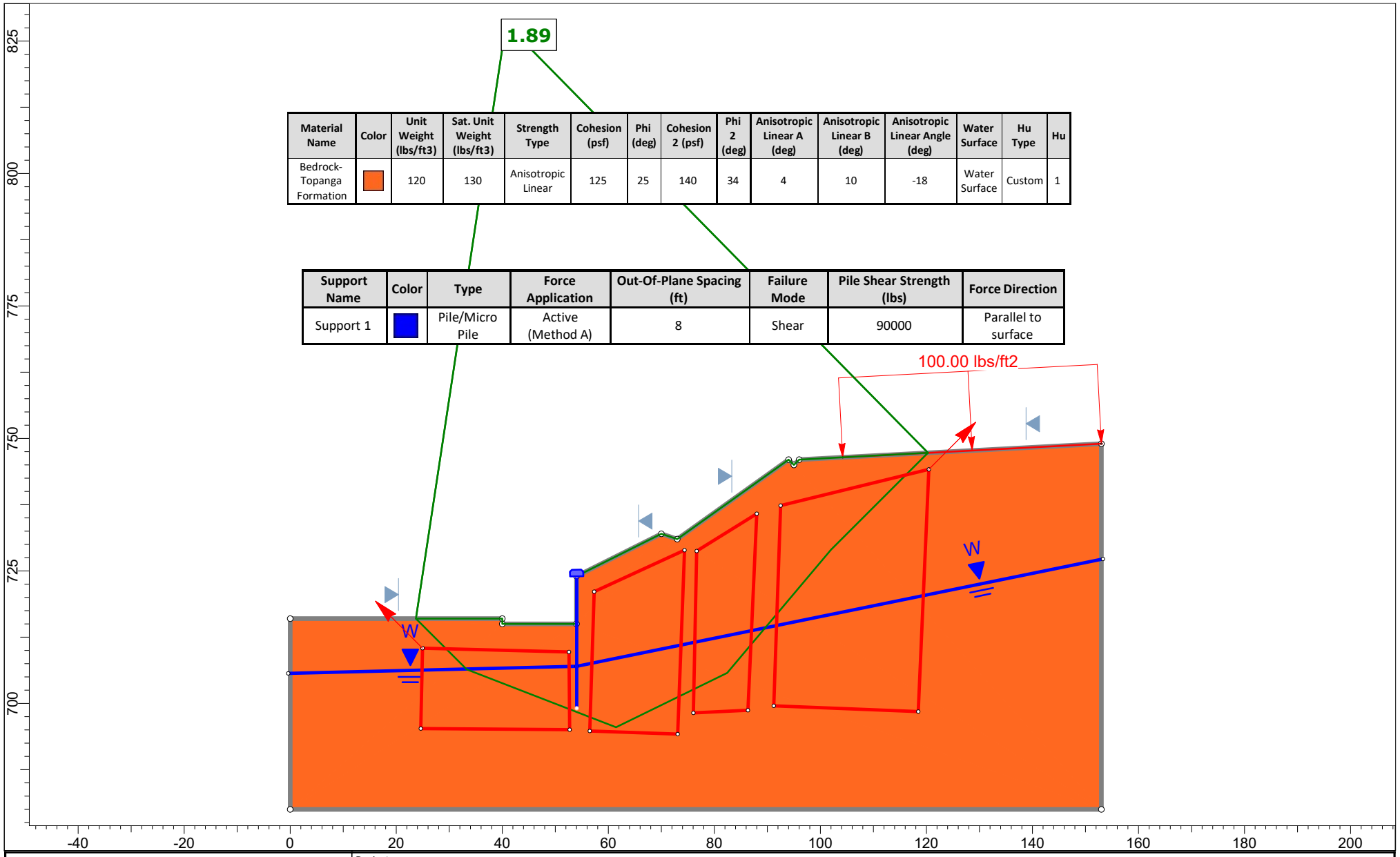
SLIDEINTERPRET 9.012

Project	File No. 21578 Hilton-Los Angeles/Universal City		
Analysis	Cross Section I-I'		
Scale	1:300	*Comment 1*	Curved, PseudoStatic, Janbu
Date	12/8/2022	*File Name*	Proposed Hotel Extension

1.89

Material Name	Color	Unit Weight (lbs/ft3)	Sat. Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Cohesion 2 (psf)	Phi 2 (deg)	Anisotropic Linear A (deg)	Anisotropic Linear B (deg)	Anisotropic Linear Angle (deg)	Water Surface	Hu Type	Hu
Bedrock-Topanga Formation		120	130	Anisotropic Linear	125	25	140	34	4	10	-18	Water Surface	Custom	1

Support Name	Color	Type	Force Application	Out-Of-Plane Spacing (ft)	Failure Mode	Pile Shear Strength (lbs)	Force Direction
Support 1		Pile/Micro Pile	Active (Method A)	8	Shear	90000	Parallel to surface



GEOTECHNOLOGIES, INC.
CONSULTING GEOTECHNICAL ENGINEERS

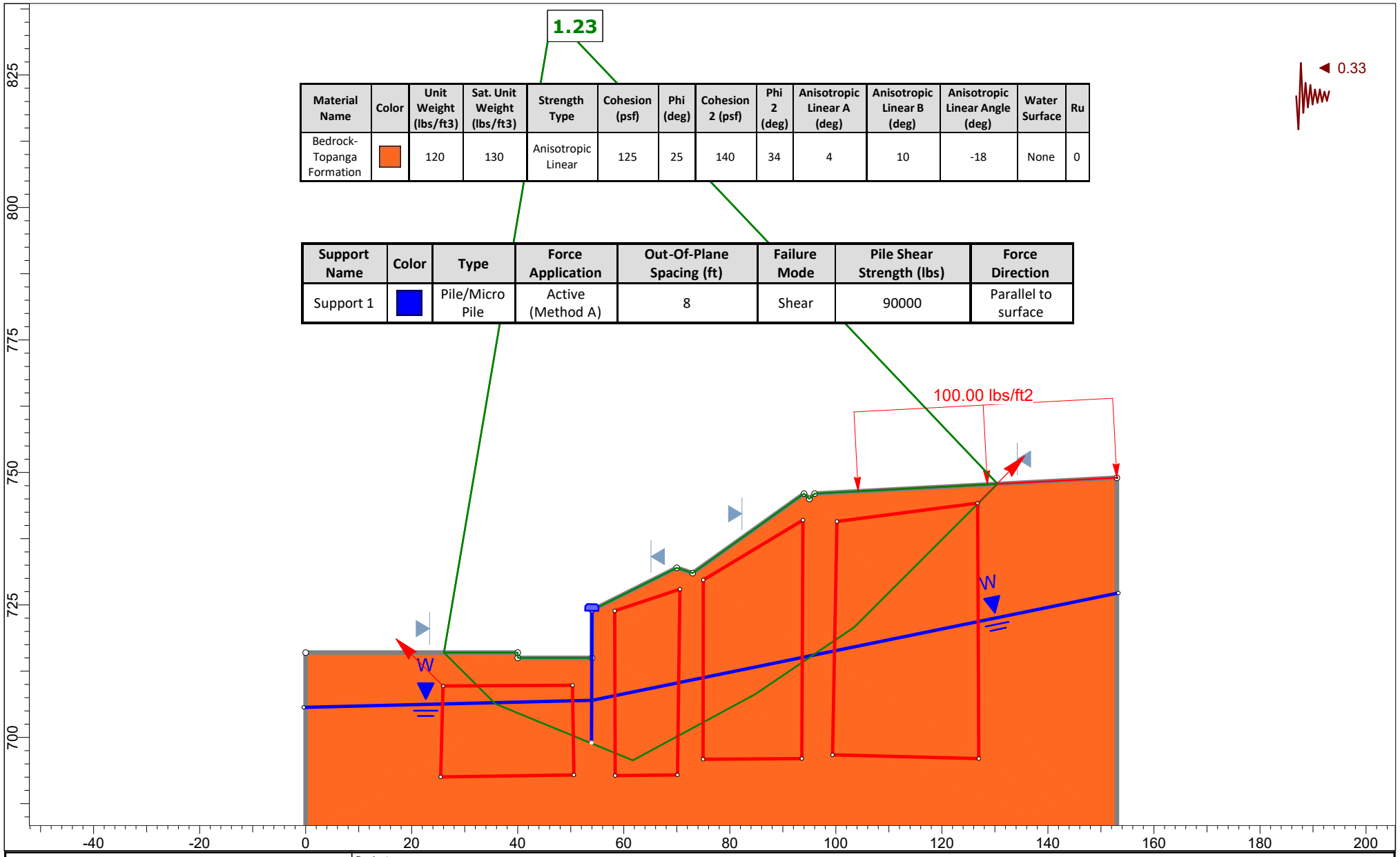
SLIDEINTERPRET 9.012

Project	File No. 21578 Hilton-Los Angeles/Universal City		
Analysis	Cross Section I-I'		
Scale	1:300	Comment 1	Block, Static, Janbu
Date	12/8/2022	File Name	Proposed Hotel Extension

1.23

Material Name	Color	Unit Weight (lbs/ft3)	Sat. Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Cohesion 2 (psf)	Phi 2 (deg)	Anisotropic Linear A (deg)	Anisotropic Linear B (deg)	Anisotropic Linear Angle (deg)	Water Surface	Ru
Bedrock-Topanga Formation		120	130	Anisotropic Linear	125	25	140	34	4	10	-18	None	0

Support Name	Color	Type	Force Application	Out-Of-Plane Spacing (ft)	Failure Mode	Pile Shear Strength (lbs)	Force Direction
Support 1		Pile/Micro Pile	Active (Method A)	8	Shear	90000	Parallel to surface



GEOTECHNOLOGIES, INC.
CONSULTING GEOTECHNICAL ENGINEERS

SLIDEINTERPRET 9.012

Project	File No. 21578 Hilton-Los Angeles/Universal City
Analysis	Cross Section I-I'
Scale	1:300
Comment 1	Block, PseudoStatic, Janbu
Date	12/8/2022
File Name	Proposed Hotel Extension

rocscience

I21578 Hilton XS II update 12-8-22 Shear Method
21578 Hilton Expansion Project
Geotechnologies, Inc.
Date Created: 4/17/20
Software Version: 9.012

Table of Contents

Project Summary 5
Currently Open Scenarios 5
General Settings 6
Analysis Options 7
All Open Scenarios 7
Groundwater Analysis 8
All Open Scenarios 8
Random Numbers 9
All Open Scenarios 9
Surface Options 10
Section II Proposed topography - Master Scenario 10
Section II Proposed topography - Curved Static 10
Section II Proposed topography - Curved PseudoStatic 10
Section II Proposed topography - Block Static 10
Section II Proposed topography - Block , Pseudostatic 11
Seismic Loading 12
Section II Proposed topography - Master Scenario 12
Section II Proposed topography - Curved Static 12
Section II Proposed topography - Curved PseudoStatic 12
Section II Proposed topography - Block Static 12
Section II Proposed topography - Block , Pseudostatic 12
Loading 13
All Open Scenarios 13
Materials 14
Materials In Use 14
Support 15
Global Minimums 16
Section II Proposed topography - Master Scenario 16
Method: bishop simplified 16
Method: janbu simplified 16
Section II Proposed topography - Curved Static 16
Method: bishop simplified 16
Method: janbu simplified 16
Section II Proposed topography - Curved PseudoStatic 17
Method: bishop simplified 17
Method: janbu simplified 17
Section II Proposed topography - Block Static 17
Method: bishop simplified 17
Method: janbu simplified 17
Section II Proposed topography - Block , Pseudostatic 18
Method: bishop simplified 18
Method: janbu simplified 18

Global Minimum Coordinates 19
Section II Proposed topography - Master Scenario 19
Method: bishop simplified 19
Method: janbu simplified 19
Section II Proposed topography - Block Static 19
Method: bishop simplified 19
Method: janbu simplified 19
Section II Proposed topography - Block , Pseudostatic 19
Method: bishop simplified 19
Method: janbu simplified 20
Global Minimum Support Data 21
Section II Proposed topography - Master Scenario 21
Method: bishop simplified 21
Method: janbu simplified 21
Section II Proposed topography - Curved Static 21
Method: bishop simplified 21
Method: janbu simplified 21
Section II Proposed topography - Curved PseudoStatic 21
Method: bishop simplified 21
Method: janbu simplified 22
Section II Proposed topography - Block Static 22
Method: bishop simplified 22
Method: janbu simplified 22
Section II Proposed topography - Block , Pseudostatic 22
Method: bishop simplified 22
Method: janbu simplified 22
Valid and Invalid Surfaces 23
Section II Proposed topography - Master Scenario 23
Method: bishop simplified 23
Method: janbu simplified 23
Section II Proposed topography - Curved Static 23
Method: bishop simplified 23
Method: janbu simplified 23
Section II Proposed topography - Curved PseudoStatic 23
Method: bishop simplified 23
Method: janbu simplified 23
Section II Proposed topography - Block Static 24
Method: bishop simplified 24
Method: janbu simplified 24
Section II Proposed topography - Block , Pseudostatic 24
Method: bishop simplified 24
Method: janbu simplified 24
Error Code Descriptions 24

Slice Data 26
Section II Proposed topography - Master Scenario 26
Global Minimum Query (bishop simplified) - Safety Factor: 2.01518 26
Global Minimum Query (janbu simplified) - Safety Factor: 1.87409 29
Section II Proposed topography - Curved Static 32
Global Minimum Query (bishop simplified) - Safety Factor: 2.08048 32
Global Minimum Query (janbu simplified) - Safety Factor: 1.91292 35
Section II Proposed topography - Curved PseudoStatic 38
Global Minimum Query (bishop simplified) - Safety Factor: 1.13199 38
Global Minimum Query (janbu simplified) - Safety Factor: 1.03932 41
Section II Proposed topography - Block Static 44
Global Minimum Query (bishop simplified) - Safety Factor: 2.00999 44
Global Minimum Query (janbu simplified) - Safety Factor: 1.89185 47
Section II Proposed topography - Block , Pseudostatic 50
Global Minimum Query (bishop simplified) - Safety Factor: 1.23276 50
Global Minimum Query (janbu simplified) - Safety Factor: 1.13398 53
Interslice Data 56
Section II Proposed topography - Master Scenario 56
Global Minimum Query (bishop simplified) - Safety Factor: 2.01518 56
Global Minimum Query (janbu simplified) - Safety Factor: 1.87409 57
Section II Proposed topography - Curved Static 58
Global Minimum Query (bishop simplified) - Safety Factor: 2.08048 58
Global Minimum Query (janbu simplified) - Safety Factor: 1.91292 59
Section II Proposed topography - Curved PseudoStatic 60
Global Minimum Query (bishop simplified) - Safety Factor: 1.13199 60
Global Minimum Query (janbu simplified) - Safety Factor: 1.03932 61
Section II Proposed topography - Block Static 62
Global Minimum Query (bishop simplified) - Safety Factor: 2.00999 62
Global Minimum Query (janbu simplified) - Safety Factor: 1.89185 63
Section II Proposed topography - Block , Pseudostatic 64
Global Minimum Query (bishop simplified) - Safety Factor: 1.23276 64
Global Minimum Query (janbu simplified) - Safety Factor: 1.13398 65
Entity Information 66
Section II Proposed topography 66
Shared Entities 66
Scenario-based Entities 66

Slide Analysis Information

I21578 Hilton XS II update 12-8-22 Shear Method

Project Summary

File Name:	I21578 Hilton XS II update 12-8-22 Shear Method.slmd
Slide Modeler Version:	9.012
Project Title:	21578 Hilton Expansion Project
Analysis:	Cross Section I-I'
Author:	RTK
Company:	Geotechnologies, Inc.
Date Created:	4/17/20
Comments	
	Curved, Static

Currently Open Scenarios

Group Name	Scenario Name	Global Minimum	Compute Time
Section II Proposed topography	Master Scenario	Bishop Simplified: 2.015180 Janbu Simplified: 1.874090	00h:00m:00.716s
	Curved Static	Bishop Simplified: 2.080480 Janbu Simplified: 1.912920	00h:00m:00.432s
	Curved PseudoStatic	Bishop Simplified: 1.131990 Janbu Simplified: 1.039320	00h:00m:00.392s
	Block Static	Bishop Simplified: 2.009990 Janbu Simplified: 1.891850	00h:00m:02.569s
	Block , Pseudostatic	Bishop Simplified: 1.232760 Janbu Simplified: 1.133980	00h:00m:02.584s

General Settings

Units of Measurement:	Imperial Units
Time Units:	days
Permeability Units:	feet/second
Data Output:	Standard
Failure Direction:	Right to Left

Analysis Options

All Open Scenarios

Slices Type:	Vertical
Analysis Methods Used	
	Bishop simplified
	Janbu simplified
Number of slices:	50
Tolerance:	0.005
Maximum number of iterations:	75
Check malpha < 0.2:	Yes
Create Interslice boundaries at intersections with water tables and piezos:	Yes
Initial trial value of FS:	1
Steffensen Iteration:	Yes

Groundwater Analysis

All Open Scenarios

Groundwater Method:	Water Surfaces
Pore Fluid Unit Weight [lbs/ft3]:	62.4
Use negative pore pressure cutoff:	Yes
Maximum negative pore pressure [psf]:	0
Advanced Groundwater Method:	None

Random Numbers

All Open Scenarios

Pseudo-random Seed:	10116
Random Number Generation Method:	Park and Miller v.3

Surface Options

Section II Proposed topography - Master Scenario

Surface Type:	Non-Circular Block Search
Number of Surfaces:	5000
Multiple Groups:	Disabled
Pseudo-Random Surfaces:	Enabled
Convex Surfaces Only:	Disabled
Left Projection Angle (Start Angle) [deg]:	135
Left Projection Angle (End Angle) [deg]:	135
Right Projection Angle (Start Angle) [deg]:	45
Right Projection Angle (End Angle) [deg]:	45
Minimum Elevation [ft]:	680
Minimum Depth:	Not Defined
Minimum Area:	Not Defined
Minimum Weight:	Not Defined

Section II Proposed topography - Curved Static

Surface Type:	Circular
Search Method:	Grid Search
Radius Increment:	10
Composite Surfaces:	Disabled
Reverse Curvature:	Invalid Surfaces
Minimum Elevation [ft]:	680
Minimum Depth:	Not Defined
Minimum Area:	Not Defined
Minimum Weight:	Not Defined

Section II Proposed topography - Curved PseudoStatic

Surface Type:	Circular
Search Method:	Grid Search
Radius Increment:	10
Composite Surfaces:	Disabled
Reverse Curvature:	Invalid Surfaces
Minimum Elevation [ft]:	680
Minimum Depth:	Not Defined
Minimum Area:	Not Defined
Minimum Weight:	Not Defined

Section II Proposed topography - Block Static

Surface Type:	Non-Circular Block Search
Number of Surfaces:	20000
Multiple Groups:	Disabled
Pseudo-Random Surfaces:	Enabled
Convex Surfaces Only:	Disabled
Left Projection Angle (Start Angle) [deg]:	135
Left Projection Angle (End Angle) [deg]:	135
Right Projection Angle (Start Angle) [deg]:	45
Right Projection Angle (End Angle) [deg]:	45
Minimum Elevation [ft]:	680
Minimum Depth:	Not Defined
Minimum Area:	Not Defined
Minimum Weight:	Not Defined

Section II Proposed topography - Block , Pseudostatic

Surface Type:	Non-Circular Block Search
Number of Surfaces:	20000
Multiple Groups:	Disabled
Pseudo-Random Surfaces:	Enabled
Convex Surfaces Only:	Disabled
Left Projection Angle (Start Angle) [deg]:	135
Left Projection Angle (End Angle) [deg]:	135
Right Projection Angle (Start Angle) [deg]:	45
Right Projection Angle (End Angle) [deg]:	45
Minimum Elevation [ft]:	680
Minimum Depth:	Not Defined
Minimum Area:	Not Defined
Minimum Weight:	Not Defined

Seismic Loading

Section II Proposed topography - Master Scenario

Advanced seismic analysis:	No
Staged pseudostatic analysis:	No

Section II Proposed topography - Curved Static

Advanced seismic analysis:	No
Staged pseudostatic analysis:	No

Section II Proposed topography - Curved PseudoStatic

Advanced seismic analysis:	No
Staged pseudostatic analysis:	No
Seismic Load Coefficient (Horizontal):	0.33

Section II Proposed topography - Block Static

Advanced seismic analysis:	No
Staged pseudostatic analysis:	No

Section II Proposed topography - Block , Pseudostatic

Advanced seismic analysis:	No
Staged pseudostatic analysis:	No
Seismic Load Coefficient (Horizontal):	0.33

Loading

All Open Scenarios

Distribution:	Constant
Magnitude [psf]:	100
Orientation:	Normal to boundary

Materials

Bedrock- Topanga Formation	
Color	
Strength Type	Anisotropic Linear
Unsaturated Unit Weight [lbs/ft3]	120
Saturated Unit Weight [lbs/ft3]	130
Cohesion 1 [psf]	125
Cohesion 2 [psf]	140
Friction Angle 1 [deg]	25
Friction Angle 2 [deg]	34
A [deg]	4
B [deg]	10
Anisotropic Definition	Angle
Angle from 1 [deg]	-18
Anisotropic Surface	
Water Surface	Assigned per scenario
Hu Value	1

Materials In Use

Material	Section II Proposed topography	Curved Static	Curved PseudoStatic	Block Static	Block , Pseudostatic
Bedrock-Topanga Formation	✓	✓	✓	✓	✓

Support

Support 1	
Color	
Support Type	Pile/Micro Pile
Force Application	Active
Out-of-Plane Spacing [ft]	8
Failure Mode	Shear
Pile Shear Strength [lb]	90000
Force Direction	Parallel to surface

Global Minimums

Section II Proposed topography - Master Scenario

Method: bishop simplified

FS	2.015180
Axis Location:	48.589, 782.551
Left Slip Surface Endpoint:	54.000, 715.266
Right Slip Surface Endpoint:	105.664, 746.509
Left Slope Intercept:	54.000 724.000
Right Slope Intercept:	105.664 746.509
Resisting Moment:	3.30156e+06 lb-ft
Driving Moment:	1.63835e+06 lb-ft
Total Slice Area:	522.607 ft2
Surface Horizontal Width:	51.6636 ft
Surface Average Height:	10.1156 ft

Method: janbu simplified

FS	1.874090
Axis Location:	48.589, 782.551
Left Slip Surface Endpoint:	54.000, 715.266
Right Slip Surface Endpoint:	105.664, 746.509
Left Slope Intercept:	54.000 724.000
Right Slope Intercept:	105.664 746.509
Resisting Horizontal Force:	42548.1 lb
Driving Horizontal Force:	22703.3 lb
Total Slice Area:	522.607 ft2
Surface Horizontal Width:	51.6636 ft
Surface Average Height:	10.1156 ft

Section II Proposed topography - Curved Static

Method: bishop simplified

FS	2.080480
Center:	57.963, 777.790
Radius:	53.619
Left Slip Surface Endpoint:	54.557, 724.279
Right Slip Surface Endpoint:	101.348, 746.281
Resisting Moment:	1.45017e+06 lb-ft
Driving Moment:	697036 lb-ft
Total Slice Area:	256.454 ft2
Surface Horizontal Width:	46.7909 ft
Surface Average Height:	5.48085 ft

Method: janbu simplified

FS	1.912920
Center:	74.486, 754.771
Radius:	25.268
Left Slip Surface Endpoint:	67.170, 730.585
Right Slip Surface Endpoint:	98.226, 746.117
Resisting Horizontal Force:	14511.4 lb
Driving Horizontal Force:	7585.99 lb
Total Slice Area:	158.851 ft2
Surface Horizontal Width:	31.056 ft
Surface Average Height:	5.115 ft

Section II Proposed topography - Curved PseudoStatic

Method: bishop simplified

FS	1.131990
Center:	56.769, 797.086
Radius:	73.076
Left Slip Surface Endpoint:	54.117, 724.058
Right Slip Surface Endpoint:	109.718, 746.722
Resisting Moment:	2.45872e+06 lb-ft
Driving Moment:	2.17203e+06 lb-ft
Total Slice Area:	367.936 ft2
Surface Horizontal Width:	55.6011 ft
Surface Average Height:	6.61742 ft

Method: janbu simplified

FS	1.039320
Center:	62.636, 781.249
Radius:	82.951
Left Slip Surface Endpoint:	11.417, 716.000
Right Slip Surface Endpoint:	138.740, 748.249
Resisting Horizontal Force:	197791 lb
Driving Horizontal Force:	190308 lb
Total Slice Area:	2989.83 ft2
Surface Horizontal Width:	127.323 ft
Surface Average Height:	23.4822 ft

Section II Proposed topography - Block Static

Method: bishop simplified

FS	2.009990
Axis Location:	40.787, 833.278
Left Slip Surface Endpoint:	21.424, 716.000
Right Slip Surface Endpoint:	122.992, 747.421
Resisting Moment:	1.9396e+07 lb-ft
Driving Moment:	9.64976e+06 lb-ft
Total Slice Area:	1919.95 ft2
Surface Horizontal Width:	101.568 ft
Surface Average Height:	18.9031 ft

Method: janbu simplified

FS	1.891850
Axis Location:	40.713, 828.239
Left Slip Surface Endpoint:	23.692, 716.000
Right Slip Surface Endpoint:	120.292, 747.279
Resisting Horizontal Force:	121327 lb
Driving Horizontal Force:	64131 lb
Total Slice Area:	1860.17 ft2
Surface Horizontal Width:	96.5996 ft
Surface Average Height:	19.2565 ft

Section II Proposed topography - Block , Pseudostatic

Method: bishop simplified

FS	1.232760
Axis Location:	46.489, 836.317
Left Slip Surface Endpoint:	26.101, 716.000
Right Slip Surface Endpoint:	130.510, 747.816
Resisting Moment:	2.27092e+07 lb-ft
Driving Moment:	1.84214e+07 lb-ft
Total Slice Area:	2118.59 ft2
Surface Horizontal Width:	104.409 ft
Surface Average Height:	20.2913 ft

Method: janbu simplified

FS	1.133980
Axis Location:	53.447, 821.808
Left Slip Surface Endpoint:	41.129, 715.000
Right Slip Surface Endpoint:	131.502, 747.869
Resisting Horizontal Force:	109519 lb
Driving Horizontal Force:	96579.5 lb
Active Horizontal Support Force:	-10922.8 lb
Maximum Single Support Force:	11250 lb
Total Support Force:	11250 lb
Total Slice Area:	1572.73 ft2
Surface Horizontal Width:	90.3737 ft
Surface Average Height:	17.4025 ft

Global Minimum Coordinates

Section II Proposed topography - Master Scenario

Method: bishop simplified

X	Y
54	715.266
57.3123	711.954
83.0954	726.869
100.751	741.597
105.664	746.509

Method: janbu simplified

X	Y
54	715.266
57.3123	711.954
83.0954	726.869
100.751	741.597
105.664	746.509

Section II Proposed topography - Block Static

Method: bishop simplified

X	Y
21.4235	716
30.059	707.365
59.1766	696.809
83.0146	706.43
96.4891	720.918
122.992	747.421

Method: janbu simplified

X	Y
23.6921	716
33.2851	706.407
61.4602	695.521
82.4258	705.763
102.005	728.991
120.292	747.279

Section II Proposed topography - Block , Pseudostatic

Method: bishop simplified

X	Y
26.1012	716
35.7945	706.307
61.7155	695.661
84.7533	708.101
103.477	720.784
130.51	747.816

Method: janbu simplified

X	Y
41.1286	715
47.1191	709.009
69.8081	703.414
85.1761	713.311
126.427	742.793
131.502	747.869

Global Minimum Support Data

Section II Proposed topography - Master Scenario

Method: bishop simplified

Number of Supports: 1

Support 1						
Support Type: Pile/Micro Pile						
Start (x, y)	**Length (ft)**	**L Inside SS (ft)**	**L Outside SS (ft)**	**Li (ft)**	**Lo (ft)**	**Force (lb)**
53.662, 723.446	11.7436	Not Effective	Not Effective	Not Effective	Not Effective	0

Method: janbu simplified

Number of Supports: 1

Support 1						
Support Type: Pile/Micro Pile						
Start (x, y)	**Length (ft)**	**L Inside SS (ft)**	**L Outside SS (ft)**	**Li (ft)**	**Lo (ft)**	**Force (lb)**
53.662, 723.446	11.7436	Not Effective	Not Effective	Not Effective	Not Effective	0

Section II Proposed topography - Curved Static

Method: bishop simplified

Number of Supports: 1

Support 1						
Support Type: Pile/Micro Pile						
Start (x, y)	**Length (ft)**	**L Inside SS (ft)**	**L Outside SS (ft)**	**Li (ft)**	**Lo (ft)**	**Force (lb)**
54.023, 724.023	25	Not Effective	Not Effective	Not Effective	Not Effective	0

Method: janbu simplified

Number of Supports: 1

Support 1						
Support Type: Pile/Micro Pile						
Start (x, y)	**Length (ft)**	**L Inside SS (ft)**	**L Outside SS (ft)**	**Li (ft)**	**Lo (ft)**	**Force (lb)**
54.023, 724.023	25	Not Effective	Not Effective	Not Effective	Not Effective	0

Section II Proposed topography - Curved PseudoStatic

Method: bishop simplified

Number of Supports: 1

Support 1						
Support Type: Pile/Micro Pile						
Start (x, y)	**Length (ft)**	**L Inside SS (ft)**	**L Outside SS (ft)**	**Li (ft)**	**Lo (ft)**	**Force (lb)**
54.106, 723.938	25	Not Effective	Not Effective	Not Effective	Not Effective	0

Method: janbu simplified

Number of Supports: 1

Support 1						
Support Type: Pile/Micro Pile						
Start (x, y)	**Length (ft)**	**L Inside SS (ft)**	**L Outside SS (ft)**	**Li (ft)**	**Lo (ft)**	**Force (lb)**
54.106, 723.938	25	Not Effective	Not Effective	Not Effective	Not Effective	0

Section II Proposed topography - Block Static

Method: bishop simplified

Number of Supports: 1

Support 1						
Support Type: Pile/Micro Pile						
Start (x, y)	**Length (ft)**	**L Inside SS (ft)**	**L Outside SS (ft)**	**Li (ft)**	**Lo (ft)**	**Force (lb)**
54.023, 724.101	25	Not Effective	Not Effective	Not Effective	Not Effective	0

Method: janbu simplified

Number of Supports: 1

Support 1						
Support Type: Pile/Micro Pile						
Start (x, y)	**Length (ft)**	**L Inside SS (ft)**	**L Outside SS (ft)**	**Li (ft)**	**Lo (ft)**	**Force (lb)**
54.023, 724.101	25	Not Effective	Not Effective	Not Effective	Not Effective	0

Section II Proposed topography - Block , Pseudostatic

Method: bishop simplified

Number of Supports: 1

Support 1						
Support Type: Pile/Micro Pile						
Start (x, y)	**Length (ft)**	**L Inside SS (ft)**	**L Outside SS (ft)**	**Li (ft)**	**Lo (ft)**	**Force (lb)**
53.99, 723.989	25	Not Effective	Not Effective	Not Effective	Not Effective	0

Method: janbu simplified

Number of Supports: 1

Support 1						
Support Type: Pile/Micro Pile						
Start (x, y)	**Length (ft)**	**L Inside SS (ft)**	**L Outside SS (ft)**	**Li (ft)**	**Lo (ft)**	**Force (lb)**
53.99, 723.989	25	16.6642	8.33575	16.6642	8.33575	11250

Valid and Invalid Surfaces

Section II Proposed topography - Master Scenario

Method: bishop simplified

Number of Valid Surfaces:	4670
Number of Invalid Surfaces:	330
Error Codes	
Error Code -108 reported for 8 surfaces	
Error Code -111 reported for 155 surfaces	
Error Code -112 reported for 167 surfaces	

Method: janbu simplified

Number of Valid Surfaces:	4341
Number of Invalid Surfaces:	659
Error Codes	
Error Code -108 reported for 6 surfaces	
Error Code -111 reported for 513 surfaces	
Error Code -112 reported for 140 surfaces	

Section II Proposed topography - Curved Static

Method: bishop simplified

Number of Valid Surfaces:	4754
Number of Invalid Surfaces:	4507
Error Codes	
Error Code -107 reported for 530 surfaces	
Error Code -108 reported for 8 surfaces	
Error Code -1000 reported for 3969 surfaces	

Method: janbu simplified

Number of Valid Surfaces:	4760
Number of Invalid Surfaces:	4501
Error Codes	
Error Code -107 reported for 530 surfaces	
Error Code -108 reported for 2 surfaces	
Error Code -1000 reported for 3969 surfaces	

Section II Proposed topography - Curved PseudoStatic

Method: bishop simplified

Number of Valid Surfaces:	4926
Number of Invalid Surfaces:	4335
Error Codes	
Error Code -107 reported for 198 surfaces	
Error Code -1000 reported for 4137 surfaces	

Method: janbu simplified

Number of Valid Surfaces:	4884
Number of Invalid Surfaces:	4377

Error Codes

Error Code -107 reported for 198 surfaces
Error Code -112 reported for 42 surfaces
Error Code -1000 reported for 4137 surfaces

Section II Proposed topography - Block Static

Method: bishop simplified

Number of Valid Surfaces:	17975
Number of Invalid Surfaces:	2025

Error Codes

Error Code -105 reported for 1140 surfaces
Error Code -108 reported for 34 surfaces
Error Code -111 reported for 721 surfaces
Error Code -112 reported for 130 surfaces

Method: janbu simplified

Number of Valid Surfaces:	16947
Number of Invalid Surfaces:	3053

Error Codes

Error Code -105 reported for 1140 surfaces
Error Code -108 reported for 46 surfaces
Error Code -111 reported for 1745 surfaces
Error Code -112 reported for 122 surfaces

Section II Proposed topography - Block , Pseudostatic

Method: bishop simplified

Number of Valid Surfaces:	17855
Number of Invalid Surfaces:	2145

Error Codes

Error Code -105 reported for 1363 surfaces
Error Code -108 reported for 10 surfaces
Error Code -111 reported for 724 surfaces
Error Code -112 reported for 48 surfaces

Method: janbu simplified

Number of Valid Surfaces:	16982
Number of Invalid Surfaces:	3018

Error Codes

Error Code -105 reported for 1363 surfaces
Error Code -108 reported for 11 surfaces
Error Code -111 reported for 1603 surfaces
Error Code -112 reported for 41 surfaces

Error Code Descriptions

The following errors were encountered during the computation:

-105 = More than two surface / slope intersections with no valid slip surface.

-107 = Total driving moment or total driving force is negative. This will occur if the wrong failure direction is specified, or if high external or anchor loads are applied against the failure direction.

-108 = Total driving moment or total driving force < 0.1. This is to limit the calculation of extremely high safety factors if the driving force is very small (0.1 is an arbitrary number).

-111 = Safety factor equation did not converge

-112 = The coefficient M-Alpha = cos(alpha)(1+tan(alpha)tan(phi)/F) < 0.2 for the final iteration of the safety factor calculation. This screens out some slip surfaces which may not be valid in the context of the analysis, in particular, deep seated slip surfaces with many high negative base angle slices in the passive zone.

-1000 = No valid slip surface is generated

Slice Data

Section II Proposed topography - Master Scenario

Global Minimum Query (bishop simplified) - Safety Factor: 2.01518

Slice Number	Width [ft]	Weight [lbs]	Angle of Slice Base [deg]	Base Material	Base Cohesion [psf]	Base Friction Angle [deg]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]	Base Vertical Stress [psf]	Effective Vertical Stress [psf]
1	0.952658	1080.13	-45	Bedrock-Topanga Formation	140	34	674.625	1359.49	1807.97	0	1807.97	1133.35	1133.35
2	0.952658	1243.49	-45	Bedrock-Topanga Formation	140	34	760.87	1533.29	2065.63	0	2065.63	1304.76	1304.76
3	0.952658	1406.85	-45	Bedrock-Topanga Formation	140	34	847.11	1707.08	2323.3	0	2323.3	1476.19	1476.19
4	0.454352	729.696	-45	Bedrock-Topanga Formation	140	34	912.117	1838.08	2517.51	0	2517.51	1605.4	1605.4
5	1.23423	2025.48	30.049	Bedrock-Topanga Formation	140	34	518.45	1044.77	1341.38	0	1341.38	1641.3	1641.3
6	1.06734	1737.24	30.049	Bedrock-Topanga Formation	140	34	514.676	1037.16	1330.1	0	1330.1	1627.84	1627.84
7	1.06734	1726.51	30.049	Bedrock-Topanga Formation	140	34	511.856	1031.48	1321.68	0	1321.68	1617.78	1617.78
8	1.06734	1715.78	30.049	Bedrock-Topanga Formation	140	34	509.037	1025.8	1313.25	0	1313.25	1607.72	1607.72
9	1.06734	1705.05	30.049	Bedrock-Topanga Formation	140	34	506.217	1020.12	1304.83	0	1304.83	1597.67	1597.67
10	1.06734	1694.32	30.049	Bedrock-Topanga Formation	140	34	503.398	1014.44	1296.41	0	1296.41	1587.62	1587.62
11	1.06734	1683.59	30.049	Bedrock-Topanga Formation	140	34	500.579	1008.76	1287.98	0	1287.98	1577.56	1577.56
12	1.06734	1672.86	30.049	Bedrock-Topanga Formation	140	34	497.759	1003.07	1279.56	0	1279.56	1567.51	1567.51
13	1.06734	1662.13	30.049	Bedrock-Topanga Formation	140	34	494.939	997.392	1271.14	0	1271.14	1557.45	1557.45
14	1.06734	1651.4	30.049	Bedrock-Topanga Formation	140	34	492.12	991.711	1262.71	0	1262.71	1547.4	1547.4
15	1.06734	1640.67	30.049	Bedrock-Topanga Formation	140	34	489.301	986.029	1254.29	0	1254.29	1537.35	1537.35
16	1.06734	1625.81	30.049	Bedrock-Topanga Formation	140	34	485.397	978.162	1242.63	0	1242.63	1523.43	1523.43
17	1.06734	1531.58	30.049	Bedrock-Topanga Formation	140	34	460.637	928.267	1168.65	0	1168.65	1435.13	1435.13
18	1.06734	1406.93	30.049	Bedrock-Topanga Formation	140	34	427.884	862.264	1070.8	0	1070.8	1318.33	1318.33
19	1.06734	1297.33	30.049	Bedrock-Topanga Formation	140	34	399.086	804.231	984.761	0	984.761	1215.63	1215.63
20	1.06734	1294.89	30.049	Bedrock-Topanga Formation	140	34	398.447	802.942	982.855	0	982.855	1213.35	1213.35

21	1.06734	1313.46	30.049	Bedrock-Topanga Formation	140	34	403.324	812.771	997.421	0	997.421	1230.74	1230.74
22	1.06734	1332.02	30.049	Bedrock-Topanga Formation	140	34	408.202	822.601	1011.99	0	1011.99	1248.14	1248.14
23	1.06734	1350.58	30.049	Bedrock-Topanga Formation	140	34	413.08	832.43	1026.57	0	1026.57	1265.53	1265.53
24	1.06734	1369.15	30.049	Bedrock-Topanga Formation	140	34	417.958	842.26	1041.14	0	1041.14	1282.93	1282.93
25	1.06734	1387.71	30.049	Bedrock-Topanga Formation	140	34	422.835	852.089	1055.71	0	1055.71	1300.32	1300.32
26	1.06734	1406.28	30.049	Bedrock-Topanga Formation	140	34	427.713	861.919	1070.29	0	1070.29	1317.72	1317.72
27	1.06734	1424.84	30.049	Bedrock-Topanga Formation	140	34	432.591	871.748	1084.86	0	1084.86	1335.11	1335.11
28	1.06734	1443.4	30.049	Bedrock-Topanga Formation	140	34	437.469	881.578	1099.43	0	1099.43	1352.51	1352.51
29	1.03859	1405.8	39.8324	Bedrock-Topanga Formation	140	34	408.544	823.289	1013.02	0	1013.02	1353.8	1353.8
30	1.03859	1390.28	39.8324	Bedrock-Topanga Formation	140	34	404.635	815.412	1001.34	0	1001.34	1338.86	1338.86
31	1.03859	1374.77	39.8324	Bedrock-Topanga Formation	140	34	400.726	807.535	989.663	0	989.663	1323.92	1323.92
32	1.03859	1359.26	39.8324	Bedrock-Topanga Formation	140	34	396.817	799.658	977.981	0	977.981	1308.98	1308.98
33	1.03859	1343.75	39.8324	Bedrock-Topanga Formation	140	34	392.908	791.781	966.306	0	966.306	1294.04	1294.04
34	1.03859	1328.23	39.8324	Bedrock-Topanga Formation	140	34	388.999	783.904	954.631	0	954.631	1279.11	1279.11
35	1.03859	1312.72	39.8324	Bedrock-Topanga Formation	140	34	385.091	776.027	942.948	0	942.948	1264.16	1264.16
36	1.03859	1297.21	39.8324	Bedrock-Topanga Formation	140	34	381.182	768.151	931.274	0	931.274	1249.23	1249.23
37	1.03859	1281.7	39.8324	Bedrock-Topanga Formation	140	34	377.273	760.274	919.591	0	919.591	1234.29	1234.29
38	1.03859	1266.18	39.8324	Bedrock-Topanga Formation	140	34	373.365	752.397	907.916	0	907.916	1219.35	1219.35
39	1.03859	1222.87	39.8324	Bedrock-Topanga Formation	140	34	362.45	730.402	875.309	0	875.309	1177.64	1177.64
40	1.03859	1050.56	39.8324	Bedrock-Topanga Formation	140	34	319.033	642.908	745.591	0	745.591	1011.71	1011.71
41	1.03859	1024.11	39.8324	Bedrock-Topanga Formation	140	34	312.367	629.476	725.679	0	725.679	986.233	986.233
42	1.03859	934.029	39.8324	Bedrock-Topanga Formation	140	34	289.67	583.737	657.867	0	657.867	899.489	899.489
43	1.03859	832.872	39.8324	Bedrock-Topanga Formation	140	34	264.181	532.372	581.715	0	581.715	802.075	802.075
44	1.03859	731.715	39.8324	Bedrock-Topanga Formation	140	34	238.692	481.007	505.563	0	505.563	704.663	704.663
45	1.03859	630.557	39.8324	Bedrock-Topanga Formation	140	34	213.202	429.641	429.411	0	429.411	607.249	607.249

46	0.982421	493.751	45	Bedrock-Topanga Formation	140	34	178.118	358.939	324.59	0	324.59	502.708	502.708
47	0.982421	384.028	45	Bedrock-Topanga Formation	140	34	150.105	302.488	240.898	0	240.898	391.002	391.002
48	0.982421	274.306	45	Bedrock-Topanga Formation	140	34	122.092	246.037	157.206	0	157.206	279.298	279.298
49	0.982421	164.584	45	Bedrock-Topanga Formation	140	34	106.08	213.77	109.369	0	109.369	215.449	215.449
50	0.982421	54.8612	45	Bedrock-Topanga Formation	140	34	91.1478	183.679	64.7572	0	64.7572	155.905	155.905

Global Minimum Query (janbu simplified) - Safety Factor: 1.87409

Slice Number	Width [ft]	Weight [lbs]	Angle of Slice Base [deg]	Base Material	Base Cohesion [psf]	Base Friction Angle [deg]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]	Base Vertical Stress [psf]	Effective Vertical Stress [psf]
1	0.952658	1080.13	-45	Bedrock-Topanga Formation	140	34	754.142	1413.33	1887.79	0	1887.79	1133.65	1133.65
2	0.952658	1243.49	-45	Bedrock-Topanga Formation	140	34	850.551	1594.01	2155.66	0	2155.66	1305.11	1305.11
3	0.952658	1406.85	-45	Bedrock-Topanga Formation	140	34	946.961	1774.69	2423.52	0	2423.52	1476.56	1476.56
4	0.454352	729.696	-45	Bedrock-Topanga Formation	140	34	1019.63	1910.88	2625.43	0	2625.43	1605.8	1605.8
5	1.23423	2025.48	30.049	Bedrock-Topanga Formation	140	34	550.714	1032.09	1322.58	0	1322.58	1641.16	1641.16
6	1.06734	1737.24	30.049	Bedrock-Topanga Formation	140	34	546.704	1024.57	1311.43	0	1311.43	1627.7	1627.7
7	1.06734	1726.51	30.049	Bedrock-Topanga Formation	140	34	543.71	1018.96	1303.11	0	1303.11	1617.64	1617.64
8	1.06734	1715.78	30.049	Bedrock-Topanga Formation	140	34	540.715	1013.35	1294.79	0	1294.79	1607.59	1607.59
9	1.06734	1705.05	30.049	Bedrock-Topanga Formation	140	34	537.72	1007.74	1286.47	0	1286.47	1597.54	1597.54
10	1.06734	1694.32	30.049	Bedrock-Topanga Formation	140	34	534.725	1002.12	1278.15	0	1278.15	1587.48	1587.48
11	1.06734	1683.59	30.049	Bedrock-Topanga Formation	140	34	531.73	996.51	1269.83	0	1269.83	1577.43	1577.43
12	1.06734	1672.86	30.049	Bedrock-Topanga Formation	140	34	528.735	990.897	1261.51	0	1261.51	1567.38	1567.38
13	1.06734	1662.13	30.049	Bedrock-Topanga Formation	140	34	525.74	985.285	1253.19	0	1253.19	1557.33	1557.33
14	1.06734	1651.4	30.049	Bedrock-Topanga Formation	140	34	522.745	979.672	1244.87	0	1244.87	1547.27	1547.27
15	1.06734	1640.67	30.049	Bedrock-Topanga Formation	140	34	519.75	974.059	1236.55	0	1236.55	1537.22	1537.22
16	1.06734	1625.81	30.049	Bedrock-Topanga Formation	140	34	515.604	966.288	1225.02	0	1225.02	1523.3	1523.3
17	1.06734	1531.58	30.049	Bedrock-Topanga Formation	140	34	489.304	916.999	1151.95	0	1151.95	1435	1435
18	1.06734	1406.93	30.049	Bedrock-Topanga Formation	140	34	454.512	851.797	1055.28	0	1055.28	1318.22	1318.22
19	1.06734	1297.33	30.049	Bedrock-Topanga Formation	140	34	423.923	794.469	970.293	0	970.293	1215.53	1215.53
20	1.06734	1294.89	30.049	Bedrock-Topanga Formation	140	34	423.243	793.195	968.404	0	968.404	1213.25	1213.25
21	1.06734	1313.46	30.049	Bedrock-Topanga Formation	140	34	428.424	802.905	982.799	0	982.799	1230.64	1230.64
22	1.06734	1332.02	30.049	Bedrock-Topanga Formation	140	34	433.605	812.615	997.194	0	997.194	1248.03	1248.03
23	1.06734	1350.58	30.049	Bedrock-Topanga Formation	140	34	438.786	822.325	1011.59	0	1011.59	1265.42	1265.42

24	1.06734	1369.15	30.049	Bedrock-Topanga Formation	140	34	443.967	832.035	1025.98	0	1025.98	1282.82	1282.82
25	1.06734	1387.71	30.049	Bedrock-Topanga Formation	140	34	449.149	841.746	1040.38	0	1040.38	1300.21	1300.21
26	1.06734	1406.28	30.049	Bedrock-Topanga Formation	140	34	454.33	851.456	1054.77	0	1054.77	1317.6	1317.6
27	1.06734	1424.84	30.049	Bedrock-Topanga Formation	140	34	459.512	861.166	1069.17	0	1069.17	1334.99	1334.99
28	1.06734	1443.4	30.049	Bedrock-Topanga Formation	140	34	464.693	870.876	1083.57	0	1083.57	1352.39	1352.39
29	1.03859	1405.8	39.8324	Bedrock-Topanga Formation	140	34	432.155	809.897	993.16	0	993.16	1353.63	1353.63
30	1.03859	1390.28	39.8324	Bedrock-Topanga Formation	140	34	428.021	802.149	981.678	0	981.678	1338.7	1338.7
31	1.03859	1374.77	39.8324	Bedrock-Topanga Formation	140	34	423.886	794.4	970.187	0	970.187	1323.76	1323.76
32	1.03859	1359.26	39.8324	Bedrock-Topanga Formation	140	34	419.751	786.651	958.697	0	958.697	1308.82	1308.82
33	1.03859	1343.75	39.8324	Bedrock-Topanga Formation	140	34	415.616	778.902	947.215	0	947.215	1293.89	1293.89
34	1.03859	1328.23	39.8324	Bedrock-Topanga Formation	140	34	411.482	771.154	935.725	0	935.725	1278.95	1278.95
35	1.03859	1312.72	39.8324	Bedrock-Topanga Formation	140	34	407.347	763.405	924.235	0	924.235	1264.01	1264.01
36	1.03859	1297.21	39.8324	Bedrock-Topanga Formation	140	34	403.212	755.656	912.744	0	912.744	1249.08	1249.08
37	1.03859	1281.7	39.8324	Bedrock-Topanga Formation	140	34	399.078	747.908	901.262	0	901.262	1234.14	1234.14
38	1.03859	1266.18	39.8324	Bedrock-Topanga Formation	140	34	394.943	740.159	889.772	0	889.772	1219.2	1219.2
39	1.03859	1222.87	39.8324	Bedrock-Topanga Formation	140	34	383.397	718.521	857.69	0	857.69	1177.49	1177.49
40	1.03859	1050.56	39.8324	Bedrock-Topanga Formation	140	34	337.471	632.451	730.088	0	730.088	1011.58	1011.58
41	1.03859	1024.11	39.8324	Bedrock-Topanga Formation	140	34	330.421	619.238	710.499	0	710.499	986.112	986.112
42	1.03859	934.029	39.8324	Bedrock-Topanga Formation	140	34	306.411	574.242	643.791	0	643.791	899.377	899.377
43	1.03859	832.872	39.8324	Bedrock-Topanga Formation	140	34	279.449	523.712	568.877	0	568.877	801.974	801.974
44	1.03859	731.715	39.8324	Bedrock-Topanga Formation	140	34	252.487	473.183	493.964	0	493.964	704.571	704.571
45	1.03859	630.557	39.8324	Bedrock-Topanga Formation	140	34	225.524	422.653	419.05	0	419.05	607.166	607.166
46	0.982421	493.751	45	Bedrock-Topanga Formation	140	34	187.956	352.247	314.669	0	314.669	502.625	502.625
47	0.982421	384.028	45	Bedrock-Topanga Formation	140	34	158.396	296.848	232.537	0	232.537	390.933	390.933
48	0.982421	274.306	45	Bedrock-Topanga Formation	140	34	128.836	241.45	150.405	0	150.405	279.241	279.241

49	0.982421	164.584	45	Bedrock-Topanga Formation	140	34	111.939	209.784	103.46	0	103.46	215.399	215.399
50	0.982421	54.8612	45	Bedrock-Topanga Formation	140	34	96.1826	180.255	59.6802	0	59.6802	155.863	155.863

Section II Proposed topography - Curved Static

Global Minimum Query (bishop simplified) - Safety Factor: 2.08048

Slice Number	Width [ft]	Weight [lbs]	Angle of Slice Base [deg]	Base Material	Base Cohesion [psf]	Base Friction Angle [deg]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]	Base Vertical Stress [psf]	Effective Vertical Stress [psf]
1	0.935817	29.1559	-3.14086	Bedrock-Topanga Formation	140	34	78.7917	163.925	35.4696	0	35.4696	31.146	31.146
2	0.935817	86.5478	-2.13976	Bedrock-Topanga Formation	140	34	98.4663	204.857	96.1546	0	96.1546	92.4756	92.4756
3	0.935817	142.101	-1.13932	Bedrock-Topanga Formation	140	34	117.277	243.992	154.175	0	154.175	151.842	151.842
4	0.935817	195.819	-0.13923	Bedrock-Topanga Formation	140	34	135.239	281.362	209.578	0	209.578	209.249	209.249
5	0.935817	247.703	0.86082	Bedrock-Topanga Formation	140	34	152.367	316.996	262.407	0	262.407	264.697	264.697
6	0.935817	297.751	1.86113	Bedrock-Topanga Formation	140	34	168.673	350.921	312.704	0	312.704	318.185	318.185
7	0.935817	345.962	2.86201	Bedrock-Topanga Formation	140	34	184.17	383.162	360.503	0	360.503	369.71	369.71
8	0.935817	392.331	3.86377	Bedrock-Topanga Formation	140	34	198.868	413.741	405.838	0	405.838	419.269	419.269
9	0.935817	436.854	4.86671	Bedrock-Topanga Formation	140	34	212.777	442.678	448.739	0	448.739	466.856	466.856
10	0.935817	479.522	5.87115	Bedrock-Topanga Formation	140	34	225.905	469.99	489.231	0	489.231	512.461	512.461
11	0.935817	520.326	6.8774	Bedrock-Topanga Formation	140	34	238.259	495.694	527.338	0	527.338	556.076	556.076
12	0.935817	559.256	7.88579	Bedrock-Topanga Formation	140	34	249.848	519.804	563.083	0	563.083	597.689	597.689
13	0.935817	596.298	8.89664	Bedrock-Topanga Formation	140	34	260.676	542.331	596.48	0	596.48	637.285	637.285
14	0.935817	631.438	9.9103	Bedrock-Topanga Formation	140	34	270.748	563.285	627.546	0	627.546	674.849	674.849
15	0.935817	664.658	10.9271	Bedrock-Topanga Formation	140	34	280.068	582.675	656.293	0	656.293	710.362	710.362
16	0.935817	695.941	11.9474	Bedrock-Topanga Formation	140	34	288.639	600.508	682.731	0	682.731	743.806	743.806
17	0.935817	714.407	12.9715	Bedrock-Topanga Formation	140	34	292.964	609.505	696.07	0	696.07	763.553	763.553
18	0.935817	665.209	13.9999	Bedrock-Topanga Formation	140	34	275.527	573.228	642.287	0	642.287	710.983	710.983
19	0.935817	602.966	15.033	Bedrock-Topanga Formation	140	34	254.109	528.669	576.225	0	576.225	644.47	644.47
20	0.935817	543.386	16.071	Bedrock-Topanga Formation	140	34	233.76	486.333	513.459	0	513.459	580.802	580.802
21	0.935817	559.555	17.1145	Bedrock-Topanga Formation	140	34	237.49	494.094	524.967	0	524.967	598.094	598.094
22	0.935817	601.201	18.1639	Bedrock-Topanga Formation	140	34	249.133	518.317	560.878	0	560.878	642.614	642.614

23	0.935817	640.708	19.2196	Bedrock-Topanga Formation	140	34	259.946	540.812	594.228	0	594.228	684.851	684.851
24	0.935817	678.036	20.2822	Bedrock-Topanga Formation	140	34	269.924	561.572	625.006	0	625.006	724.759	724.759
25	0.935817	713.14	21.3521	Bedrock-Topanga Formation	140	34	279.064	580.587	653.196	0	653.196	762.291	762.291
26	0.935817	745.974	22.4298	Bedrock-Topanga Formation	140	34	287.359	597.844	678.782	0	678.782	797.398	797.398
27	0.935817	776.484	23.516	Bedrock-Topanga Formation	140	34	294.802	613.33	701.741	0	701.741	830.022	830.022
28	0.935817	804.614	24.6113	Bedrock-Topanga Formation	140	34	301.385	627.026	722.046	0	722.046	860.103	860.103
29	0.935817	830.303	25.7162	Bedrock-Topanga Formation	140	34	307.1	638.915	739.671	0	739.671	887.575	887.575
30	0.935817	853.482	26.8315	Bedrock-Topanga Formation	140	34	311.934	648.972	754.582	0	754.582	912.366	912.366
31	0.935817	874.079	27.9579	Bedrock-Topanga Formation	140	34	315.876	657.173	766.741	0	766.741	934.397	934.397
32	0.935817	892.012	29.0961	Bedrock-Topanga Formation	140	34	318.912	663.49	776.106	0	776.106	953.582	953.582
33	0.935817	907.196	30.2471	Bedrock-Topanga Formation	140	34	321.028	667.892	782.631	0	782.631	969.828	969.828
34	0.935817	919.532	31.4118	Bedrock-Topanga Formation	140	34	322.206	670.343	786.265	0	786.265	983.032	983.032
35	0.935817	928.915	32.5911	Bedrock-Topanga Formation	140	34	322.428	670.804	786.949	0	786.949	993.08	993.08
36	0.935817	935.23	33.7861	Bedrock-Topanga Formation	140	34	321.672	669.232	784.619	0	784.619	999.846	999.846
37	0.935817	938.347	34.9981	Bedrock-Topanga Formation	140	34	319.917	665.58	779.205	0	779.205	1003.2	1003.2
38	0.935817	938.124	36.2283	Bedrock-Topanga Formation	140	34	317.136	659.795	770.628	0	770.628	1002.98	1002.98
39	0.935817	934.404	37.4782	Bedrock-Topanga Formation	140	34	313.302	651.819	758.803	0	758.803	999.019	999.019
40	0.935817	927.01	38.7494	Bedrock-Topanga Formation	140	34	308.385	641.588	743.635	0	743.635	991.134	991.134
41	0.935817	915.745	40.0436	Bedrock-Topanga Formation	140	34	302.349	629.031	725.018	0	725.018	979.112	979.112
42	0.935817	900.386	41.3629	Bedrock-Topanga Formation	140	34	295.157	614.068	702.835	0	702.835	962.711	962.711
43	0.935817	815.308	42.7096	Bedrock-Topanga Formation	140	34	269.327	560.329	623.163	0	623.163	871.773	871.773
44	0.935817	677.278	44.0861	Bedrock-Topanga Formation	140	34	229.896	478.295	501.543	0	501.543	724.22	724.22
45	0.935817	647.647	45.4955	Bedrock-Topanga Formation	140	34	219.44	456.54	469.29	0	469.29	692.558	692.558
46	0.935817	547.535	46.9412	Bedrock-Topanga Formation	140	34	190.896	397.155	381.248	0	381.248	585.538	585.538
47	0.935817	437.595	48.427	Bedrock-Topanga Formation	140	34	160.397	333.702	287.175	0	287.175	468.006	468.006

48	0.935817	321.359	49.9577	Bedrock-Topanga Formation	140	34	128.976	268.332	190.261	0	190.261	343.738	343.738
49	0.935817	198.213	51.5388	Bedrock-Topanga Formation	140	34	96.6152	201.006	90.4447	0	90.4447	212.075	212.075
50	0.935817	67.4141	53.1769	Bedrock-Topanga Formation	140	34	63.2986	131.692	-12.3178	0	-12.3178	72.2242	72.2242

Global Minimum Query (janbu simplified) - Safety Factor: 1.91292

Slice Number	Width [ft]	Weight [lbs]	Angle of Slice Base [deg]	Base Material	Base Cohesion [psf]	Base Friction Angle [deg]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]	Base Vertical Stress [psf]	Effective Vertical Stress [psf]
1	0.621119	18.2531	-16.0962	Bedrock-Topanga Formation	125	25	77.995	149.198	51.8931	0	51.8931	29.3866	29.3866
2	0.621119	54.1247	-14.6354	Bedrock-Topanga Formation	125	25	92.4736	176.895	111.288	0	111.288	87.1396	87.1396
3	0.621119	88.7392	-13.1843	Bedrock-Topanga Formation	127.039	26.3175	110.015	210.451	168.641	0	168.641	142.869	142.869
4	0.621119	122.12	-11.7418	Bedrock-Topanga Formation	130.645	28.5757	132.095	252.688	224.069	0	224.069	196.613	196.613
5	0.621119	150.494	-10.3068	Bedrock-Topanga Formation	134.233	30.7299	154.181	294.935	270.332	0	270.332	242.293	242.293
6	0.621119	148.86	-8.87829	Bedrock-Topanga Formation	137.804	32.7828	161.205	308.373	264.845	0	264.845	239.663	239.663
7	0.621119	140.074	-7.45533	Bedrock-Topanga Formation	140	34	160.092	306.244	246.468	0	246.468	225.518	225.518
8	0.621119	130.119	-6.03699	Bedrock-Topanga Formation	140	34	152.751	292.2	225.645	0	225.645	209.491	209.491
9	0.621119	119.007	-4.62235	Bedrock-Topanga Formation	140	34	144.876	277.137	203.314	0	203.314	191.6	191.6
10	0.621119	115.874	-3.21053	Bedrock-Topanga Formation	140	34	141.772	271.198	194.509	0	194.509	186.556	186.556
11	0.621119	147.346	-1.80066	Bedrock-Topanga Formation	140	34	158.592	303.374	242.212	0	242.212	237.226	237.226
12	0.621119	181.299	-0.391879	Bedrock-Topanga Formation	140	34	176.535	337.698	293.1	0	293.1	291.892	291.892
13	0.621119	214.114	1.01666	Bedrock-Topanga Formation	140	34	193.528	370.203	341.29	0	341.29	344.724	344.724
14	0.621119	245.791	2.42582	Bedrock-Topanga Formation	140	34	209.59	400.929	386.844	0	386.844	395.723	395.723
15	0.621119	276.326	3.83645	Bedrock-Topanga Formation	140	34	224.741	429.912	429.814	0	429.814	444.884	444.884
16	0.621119	305.714	5.24941	Bedrock-Topanga Formation	140	34	238.997	457.182	470.241	0	470.241	492.2	492.2
17	0.621119	333.95	6.66558	Bedrock-Topanga Formation	140	34	252.37	482.763	508.167	0	508.167	537.66	537.66
18	0.621119	361.024	8.08586	Bedrock-Topanga Formation	140	34	264.87	506.676	543.62	0	543.62	581.249	581.249
19	0.621119	386.925	9.51116	Bedrock-Topanga Formation	140	34	276.508	528.937	576.624	0	576.624	622.951	622.951
20	0.621119	411.639	10.9424	Bedrock-Topanga Formation	140	34	287.288	549.559	607.196	0	607.196	662.74	662.74
21	0.621119	435.15	12.3807	Bedrock-Topanga Formation	140	34	297.216	568.55	635.352	0	635.352	700.594	700.594
22	0.621119	457.44	13.8269	Bedrock-Topanga Formation	140	34	306.293	585.914	661.096	0	661.096	736.481	736.481
23	0.621119	478.486	15.2821	Bedrock-Topanga Formation	140	34	314.52	601.652	684.427	0	684.427	770.365	770.365

24	0.621119	498.263	16.7475	Bedrock-Topanga Formation	140	34	321.895	615.759	705.342	0	705.342	802.206	802.206
25	0.621119	516.744	18.2243	Bedrock-Topanga Formation	140	34	328.414	628.229	723.83	0	723.83	831.961	831.961
26	0.621119	533.896	19.7138	Bedrock-Topanga Formation	140	34	334.07	639.049	739.871	0	739.871	859.576	859.576
27	0.621119	549.683	21.2172	Bedrock-Topanga Formation	140	34	338.856	648.204	753.442	0	753.442	884.993	884.993
28	0.621119	564.065	22.7362	Bedrock-Topanga Formation	140	34	342.759	655.671	764.514	0	764.514	908.148	908.148
29	0.621119	576.995	24.2722	Bedrock-Topanga Formation	140	34	345.768	661.427	773.048	0	773.048	928.966	928.966
30	0.621119	588.421	25.8271	Bedrock-Topanga Formation	140	34	347.866	665.439	778.995	0	778.995	947.362	947.362
31	0.621119	598.285	27.4027	Bedrock-Topanga Formation	140	34	349.032	667.67	782.304	0	782.304	963.245	963.245
32	0.621119	606.522	29.0011	Bedrock-Topanga Formation	140	34	349.245	668.078	782.908	0	782.908	976.506	976.506
33	0.621119	613.055	30.6246	Bedrock-Topanga Formation	140	34	348.479	666.612	780.734	0	780.734	987.026	987.026
34	0.621119	617.801	32.2759	Bedrock-Topanga Formation	140	34	346.702	663.213	775.695	0	775.695	994.666	994.666
35	0.621119	620.661	33.9578	Bedrock-Topanga Formation	140	34	343.879	657.813	767.69	0	767.69	999.271	999.271
36	0.621119	621.523	35.6737	Bedrock-Topanga Formation	140	34	339.97	650.335	756.604	0	756.604	1000.66	1000.66
37	0.621119	620.259	37.4274	Bedrock-Topanga Formation	140	34	334.927	640.688	742.3	0	742.3	998.624	998.624
38	0.621119	616.717	39.2232	Bedrock-Topanga Formation	140	34	328.694	628.766	724.625	0	724.625	992.923	992.923
39	0.621119	610.722	41.0663	Bedrock-Topanga Formation	140	34	321.209	614.447	703.397	0	703.397	983.272	983.272
40	0.621119	602.064	42.9626	Bedrock-Topanga Formation	140	34	312.395	597.587	678.4	0	678.4	969.333	969.333
41	0.621119	590.492	44.9195	Bedrock-Topanga Formation	140	34	302.165	578.017	649.387	0	649.387	950.703	950.703
42	0.621119	575.702	46.9455	Bedrock-Topanga Formation	140	34	290.412	555.535	616.056	0	616.056	926.892	926.892
43	0.621119	557.318	49.0516	Bedrock-Topanga Formation	140	34	277.011	529.899	578.049	0	578.049	897.294	897.294
44	0.621119	509.242	51.2513	Bedrock-Topanga Formation	140	34	251.699	481.481	506.266	0	506.266	819.891	819.891
45	0.621119	406.018	53.5621	Bedrock-Topanga Formation	140	34	205.526	393.154	375.316	0	375.316	653.699	653.699
46	0.621119	356.529	56.0075	Bedrock-Topanga Formation	140	34	180.963	346.168	305.656	0	305.656	574.021	574.021
47	0.621119	323.077	58.6196	Bedrock-Topanga Formation	140	34	162.6	311.04	253.577	0	253.577	520.163	520.163
48	0.621119	248.83	61.4454	Bedrock-Topanga Formation	140	34	130.131	248.931	161.496	0	161.496	400.625	400.625

49	0.621119	160.074	64.5582	Bedrock-Topanga Formation	140	34	94.2244	180.244	59.6639	0	59.6639	257.727	257.727
50	0.621119	56.3181	68.0847	Bedrock-Topanga Formation	140	34	56.0417	107.203	-48.6231	0	-48.6231	90.6774	90.6774

Section II Proposed topography - Curved PseudoStatic

Global Minimum Query (bishop simplified) - Safety Factor: 1.13199

Slice Number	Width [ft]	Weight [lbs]	Angle of Slice Base [deg]	Base Material	Base Cohesion [psf]	Base Friction Angle [deg]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]	Base Vertical Stress [psf]	Effective Vertical Stress [psf]
1	1.11202	39.2273	-1.64403	Bedrock-Topanga Formation	140	34	147.212	166.642	39.4988	0	39.4988	35.2736	35.2736
2	1.11202	116.552	-0.771911	Bedrock-Topanga Formation	140	34	187.634	212.4	107.338	0	107.338	104.81	104.81
3	1.11202	191.618	0.100025	Bedrock-Topanga Formation	140	34	226.117	255.962	171.92	0	171.92	172.315	172.315
4	1.11202	264.425	0.971985	Bedrock-Topanga Formation	140	34	262.71	297.385	233.332	0	233.332	237.789	237.789
5	1.11202	334.973	1.84417	Bedrock-Topanga Formation	140	34	297.462	336.724	291.656	0	291.656	301.234	301.234
6	1.11202	403.259	2.71678	Bedrock-Topanga Formation	140	34	330.418	374.03	346.964	0	346.964	362.643	362.643
7	1.11202	469.278	3.59003	Bedrock-Topanga Formation	140	34	361.62	409.35	399.328	0	399.328	422.016	422.016
8	1.11202	533.026	4.46411	Bedrock-Topanga Formation	140	34	391.105	442.727	448.812	0	448.812	479.346	479.346
9	1.11202	594.495	5.33923	Bedrock-Topanga Formation	140	34	418.911	474.203	495.477	0	495.477	534.627	534.627
10	1.11202	653.676	6.2156	Bedrock-Topanga Formation	140	34	445.07	503.815	539.378	0	539.378	587.851	587.851
11	1.11202	710.558	7.09344	Bedrock-Topanga Formation	140	34	469.614	531.598	580.568	0	580.568	639.007	639.007
12	1.11202	765.129	7.97295	Bedrock-Topanga Formation	140	34	492.571	557.586	619.097	0	619.097	688.086	688.086
13	1.11202	817.375	8.85436	Bedrock-Topanga Formation	140	34	513.97	581.809	655.008	0	655.008	735.074	735.074
14	1.11202	867.279	9.73789	Bedrock-Topanga Formation	140	34	533.833	604.294	688.344	0	688.344	779.957	779.957
15	1.11202	883.065	10.6238	Bedrock-Topanga Formation	140	34	536.878	607.74	693.453	0	693.453	794.158	794.158
16	1.11202	809.535	11.5122	Bedrock-Topanga Formation	140	34	497.148	562.767	626.778	0	626.778	728.035	728.035
17	1.11202	728.67	12.4035	Bedrock-Topanga Formation	140	34	454.582	514.582	555.34	0	555.34	655.315	655.315
18	1.11202	725.993	13.2978	Bedrock-Topanga Formation	140	34	449.426	508.746	546.689	0	546.689	652.91	652.91
19	1.11202	795.682	14.1954	Bedrock-Topanga Formation	140	34	478.017	541.111	594.671	0	594.671	715.588	715.588
20	1.11202	862.893	15.0967	Bedrock-Topanga Formation	140	34	504.924	571.569	639.828	0	639.828	776.035	776.035
21	1.11202	927.594	16.0017	Bedrock-Topanga Formation	140	34	530.165	600.141	682.187	0	682.187	834.226	834.226
22	1.11202	989.753	16.9109	Bedrock-Topanga Formation	140	34	553.752	626.842	721.773	0	721.773	890.131	890.131

23	1.11202	1049.33	17.8245	Bedrock-Topanga Formation	140	34	575.701	651.688	758.608	0	758.608	943.717	943.717
24	1.11202	1106.29	18.7427	Bedrock-Topanga Formation	140	34	596.021	674.69	792.71	0	792.71	994.948	994.948
25	1.11202	1160.6	19.6661	Bedrock-Topanga Formation	140	34	614.723	695.86	824.097	0	824.097	1043.79	1043.79
26	1.11202	1212.19	20.5947	Bedrock-Topanga Formation	140	34	631.814	715.207	852.778	0	852.778	1090.19	1090.19
27	1.11202	1261.04	21.5291	Bedrock-Topanga Formation	140	34	647.301	732.738	878.767	0	878.767	1134.13	1134.13
28	1.11202	1307.07	22.4695	Bedrock-Topanga Formation	140	34	661.188	748.458	902.077	0	902.077	1175.54	1175.54
29	1.11202	1350.25	23.4163	Bedrock-Topanga Formation	140	34	673.479	762.371	922.706	0	922.706	1214.37	1214.37
30	1.11202	1390.5	24.37	Bedrock-Topanga Formation	140	34	684.175	774.479	940.658	0	940.658	1250.58	1250.58
31	1.11202	1427.76	25.3309	Bedrock-Topanga Formation	140	34	693.276	784.781	955.926	0	955.926	1284.09	1284.09
32	1.11202	1461.97	26.2995	Bedrock-Topanga Formation	140	34	700.781	793.277	968.521	0	968.521	1314.86	1314.86
33	1.11202	1493.03	27.2763	Bedrock-Topanga Formation	140	34	706.686	799.961	978.436	0	978.436	1342.81	1342.81
34	1.11202	1520.88	28.2617	Bedrock-Topanga Formation	140	34	710.986	804.829	985.654	0	985.654	1367.87	1367.87
35	1.11202	1545.43	29.2564	Bedrock-Topanga Formation	140	34	713.676	807.874	990.162	0	990.162	1389.94	1389.94
36	1.11202	1564.28	30.2608	Bedrock-Topanga Formation	140	34	713.832	808.051	990.424	0	990.424	1406.9	1406.9
37	1.11202	1431.03	31.2756	Bedrock-Topanga Formation	140	34	653.914	740.224	889.872	0	889.872	1287.08	1287.08
38	1.11202	1392.71	32.3014	Bedrock-Topanga Formation	140	34	631.983	715.398	853.061	0	853.061	1252.61	1252.61
39	1.11202	1335.8	33.339	Bedrock-Topanga Formation	140	34	603.14	682.749	804.66	0	804.66	1201.44	1201.44
40	1.11202	1244.02	34.3891	Bedrock-Topanga Formation	140	34	561.418	635.52	734.639	0	734.639	1118.89	1118.89
41	1.11202	1148.22	35.4526	Bedrock-Topanga Formation	140	34	518.888	587.376	663.263	0	663.263	1032.73	1032.73
42	1.11202	1048.24	36.5303	Bedrock-Topanga Formation	140	34	475.553	538.321	590.536	0	590.536	942.815	942.815
43	1.11202	943.898	37.6232	Bedrock-Topanga Formation	140	34	431.416	488.359	516.463	0	516.463	848.977	848.977
44	1.11202	835.011	38.7325	Bedrock-Topanga Formation	140	34	386.484	437.496	441.056	0	441.056	751.048	751.048
45	1.11202	721.363	39.8593	Bedrock-Topanga Formation	140	34	340.763	385.74	364.325	0	364.325	648.835	648.835
46	1.11202	602.717	41.0049	Bedrock-Topanga Formation	140	34	331.634	375.406	349.003	0	349.003	637.338	637.338
47	1.11202	478.811	42.1708	Bedrock-Topanga Formation	140	34	285.7	323.409	271.914	0	271.914	530.705	530.705

48	1.11202	349.352	43.3586	Bedrock-Topanga Formation	140	34	237.11	268.406	190.37	0	190.37	414.27	414.27
49	1.11202	214.01	44.5702	Bedrock-Topanga Formation	140	34	187.771	212.555	107.568	0	107.568	292.543	292.543
50	1.11202	72.412	45.8075	Bedrock-Topanga Formation	140	34	137.705	155.881	23.5447	0	23.5447	165.187	165.187

Global Minimum Query (janbu simplified) - Safety Factor: 1.03932

Slice Number	Width [ft]	Weight [lbs]	Angle of Slice Base [deg]	Base Material	Base Cohesion [psf]	Base Friction Angle [deg]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]	Base Vertical Stress [psf]	Effective Vertical Stress [psf]
1	2.60039	305.804	-37.0065	Bedrock-Topanga Formation	140	34	413.077	429.319	428.933	0	428.933	117.584	117.584
2	2.60039	893.468	-34.7882	Bedrock-Topanga Formation	140	34	651.341	676.952	796.065	0	796.065	343.57	343.57
3	2.60039	1435.08	-32.6282	Bedrock-Topanga Formation	140	34	843.187	876.341	1091.67	0	1091.67	551.846	551.846
4	2.60039	1934	-30.5192	Bedrock-Topanga Formation	140	34	999.902	1039.22	1333.15	0	1333.15	743.709	743.709
5	2.60039	2393.05	-28.4551	Bedrock-Topanga Formation	140	34	1129.03	1173.42	1532.1	0	1532.1	920.233	920.233
6	2.60039	2814.6	-26.4306	Bedrock-Topanga Formation	136.077	31.801	1104.06	1147.47	1631.14	0	1631.14	1082.35	1082.35
7	2.54947	3150.2	-24.4603	Bedrock-Topanga Formation	131.151	28.8847	1004.32	1043.81	1692.46	38.1383	1654.32	1235.61	1197.47
8	2.54947	3519.33	-22.5396	Bedrock-Topanga Formation	126.349	25.8749	885.328	920.139	1747.83	111.258	1636.57	1380.4	1269.14
9	2.54947	3855.45	-20.6453	Bedrock-Topanga Formation	125	25	865.064	899.078	1838.18	178.164	1660.01	1512.24	1334.08
10	2.54947	4159.86	-18.7743	Bedrock-Topanga Formation	125	25	879.14	913.708	1930.49	239.097	1691.39	1631.64	1392.54
11	2.54947	4433.63	-16.924	Bedrock-Topanga Formation	125	25	889.989	924.983	2009.83	294.263	1715.57	1739.02	1444.76
12	2.54947	4399.74	-15.0916	Bedrock-Topanga Formation	125	25	842.174	875.288	1952.84	343.839	1609	1725.74	1381.9
13	2.54947	4586.99	-13.2749	Bedrock-Topanga Formation	126.813	26.1727	888.458	923.392	2008.79	387.979	1620.81	1799.18	1411.2
14	2.54947	4774.01	-11.4717	Bedrock-Topanga Formation	131.321	28.9882	1005.85	1045.4	2076.67	426.812	1649.85	1872.54	1445.73
15	2.54947	4933.41	-9.68002	Bedrock-Topanga Formation	135.8	31.6419	1118.03	1161.99	2125.77	460.446	1665.33	1935.06	1474.62
16	2.54947	5065.69	-7.89782	Bedrock-Topanga Formation	140	34	1216.39	1264.22	2155.69	488.972	1666.72	1986.95	1497.98
17	2.54947	6355.1	-6.12329	Bedrock-Topanga Formation	140	34	1526.11	1586.12	2656.43	512.463	2143.96	2492.7	1980.24
18	2.54947	8372.04	-4.35464	Bedrock-Topanga Formation	140	34	2003.52	2082.3	3436.39	556.815	2879.58	3283.83	2727.01
19	2.54947	8826.56	-2.59015	Bedrock-Topanga Formation	140	34	2053.18	2133.91	3554.99	598.903	2956.09	3462.11	2863.21
20	2.54947	9255.02	-0.82811	Bedrock-Topanga Formation	140	34	2097.52	2179.99	3660.49	636.084	3024.41	3630.17	2994.09
21	2.54947	9657.49	0.933144	Bedrock-Topanga Formation	140	34	2136.75	2220.77	3753.23	668.371	3084.86	3788.04	3119.67
22	2.54947	10034	2.69528	Bedrock-Topanga Formation	140	34	2171.06	2256.43	3833.5	695.763	3137.74	3935.71	3239.94
23	2.54947	10377.8	4.45998	Bedrock-Topanga Formation	140	34	2199.03	2285.5	3899.08	718.247	3180.83	4070.6	3352.35

24	2.54947	10291.6	6.22893	Bedrock-Topanga Formation	140	34	2126.38	2209.99	3804.68	735.793	3068.89	4036.76	3300.97
25	2.54947	10319.6	8.00387	Bedrock-Topanga Formation	140	34	2085.65	2167.66	3754.49	748.359	3006.13	4047.75	3299.39
26	2.54947	10757.2	9.78658	Bedrock-Topanga Formation	140	34	2142.63	2226.88	3849.82	755.887	3093.93	4219.4	3463.51
27	2.54947	11168.1	11.5789	Bedrock-Topanga Formation	140	34	2193.82	2280.08	3931.09	758.302	3172.79	4380.58	3622.28
28	2.54947	11551.4	13.3828	Bedrock-Topanga Formation	140	34	2239.18	2327.22	3998.19	755.512	3242.68	4530.93	3775.42
29	2.54947	11906.5	15.2004	Bedrock-Topanga Formation	140	34	2278.75	2368.35	4051.06	747.408	3303.66	4670.2	3922.8
30	2.54947	12232.6	17.0338	Bedrock-Topanga Formation	140	34	2312.57	2403.5	4089.65	733.858	3355.79	4798.16	4064.3
31	2.54947	12529	18.8853	Bedrock-Topanga Formation	140	34	2340.62	2432.65	4113.72	714.71	3399.01	4914.42	4199.71
32	2.54947	12794.8	20.7576	Bedrock-Topanga Formation	140	34	2362.87	2455.78	4123.06	689.783	3433.27	5018.63	4328.84
33	2.54947	12762.4	22.6534	Bedrock-Topanga Formation	140	34	2325.92	2417.38	4035.22	658.869	3376.35	5005.95	4347.08
34	2.54947	12562.5	24.5758	Bedrock-Topanga Formation	140	34	2258.75	2347.56	3894.55	621.727	3272.83	4927.53	4305.81
35	2.54947	12213.9	26.5281	Bedrock-Topanga Formation	140	34	2166.75	2251.95	3709.17	578.075	3131.1	4790.8	4212.73
36	2.54947	11827.8	28.5144	Bedrock-Topanga Formation	140	34	2072.48	2153.97	3513.42	527.585	2985.83	4639.36	4111.77
37	2.54947	11403.3	30.5388	Bedrock-Topanga Formation	140	34	2009.94	2088.97	3359.34	469.876	2889.46	4545.12	4075.24
38	2.54947	10938.1	32.6065	Bedrock-Topanga Formation	140	34	1923.12	1998.74	3160.2	404.498	2755.7	4390.39	3985.89
39	2.54947	10429.3	34.7231	Bedrock-Topanga Formation	140	34	1820.81	1892.4	2928.97	330.922	2598.05	4190.84	3859.92
40	2.54947	9873.67	36.8954	Bedrock-Topanga Formation	140	34	1715.84	1783.31	2684.82	248.516	2436.3	3972.89	3724.38
41	2.54947	9267.08	39.1317	Bedrock-Topanga Formation	140	34	1608.02	1671.25	2426.69	156.519	2270.17	3734.97	3578.45
42	2.54947	8604.63	41.4415	Bedrock-Topanga Formation	140	34	1497.13	1556	2153.31	54.0061	2099.3	3475.13	3421.13
43	2.49246	7736.16	43.809	Bedrock-Topanga Formation	140	34	1364.51	1418.16	1894.95	0	1894.95	3203.88	3203.88
44	2.49246	7028.5	46.2467	Bedrock-Topanga Formation	140	34	1209.7	1257.27	1656.43	0	1656.43	2919.96	2919.96
45	2.49246	6252.66	48.7985	Bedrock-Topanga Formation	140	34	1049.63	1090.9	1409.76	0	1409.76	2608.68	2608.68
46	2.49246	5397.73	51.4879	Bedrock-Topanga Formation	140	34	884.092	918.854	1154.7	0	1154.7	2265.67	2265.67
47	2.49246	4448.94	54.3475	Bedrock-Topanga Formation	140	34	712.983	741.017	891.044	0	891.044	1885	1885
48	2.49246	3385.17	57.4234	Bedrock-Topanga Formation	140	34	536.318	557.406	618.829	0	618.829	1458.2	1458.2

49	2.49246	2174.47	60.7863	Bedrock-Topanga Formation	140	34	354.447	368.384	338.594	0	338.594	972.447	972.447
50	2.49246	763.758	64.5542	Bedrock-Topanga Formation	140	34	168.566	175.194	52.1768	0	52.1768	406.444	406.444

Section II Proposed topography - Block Static

Global Minimum Query (bishop simplified) - Safety Factor: 2.00999

Slice Number	Width [ft]	Weight [lbs]	Angle of Slice Base [deg]	Base Material	Base Cohesion [psf]	Base Friction Angle [deg]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]	Base Vertical Stress [psf]	Effective Vertical Stress [psf]
1	2.15887	279.642	-45	Bedrock-Topanga Formation	140	34	170.25	342.2	299.773	0	299.773	129.524	129.524
2	2.15887	838.927	-45	Bedrock-Topanga Formation	140	34	301.091	605.19	689.673	0	689.673	388.582	388.582
3	2.15887	1398.21	-45	Bedrock-Topanga Formation	140	34	431.933	868.181	1079.57	0	1079.57	647.639	647.639
4	2.15887	1957.5	-45	Bedrock-Topanga Formation	140	34	562.775	1131.17	1469.47	0	1469.47	906.696	906.696
5	2.46818	2690.18	-19.9271	Bedrock-Topanga Formation	125	25	343.98	691.396	1214.64	0	1214.64	1089.94	1089.94
6	2.04996	2443.94	-19.9271	Bedrock-Topanga Formation	125	25	363.608	730.848	1324	24.7573	1299.24	1192.18	1167.43
7	2.04996	2643.02	-19.9271	Bedrock-Topanga Formation	125	25	375.662	755.077	1425.49	74.286	1351.21	1289.3	1215.02
8	2.04996	2842.11	-19.9271	Bedrock-Topanga Formation	125	25	387.716	779.306	1526.98	123.815	1403.16	1386.42	1262.6
9	2.04996	2953.96	-19.9271	Bedrock-Topanga Formation	125	25	388.991	781.868	1582	173.343	1408.66	1440.98	1267.64
10	2.04996	2994.29	-19.9271	Bedrock-Topanga Formation	125	25	381.429	766.669	1598.93	222.872	1376.06	1460.65	1237.78
11	2.04996	3193.38	-19.9271	Bedrock-Topanga Formation	125	25	393.484	790.898	1700.42	272.401	1428.02	1557.77	1285.37
12	2.04996	3392.47	-19.9271	Bedrock-Topanga Formation	125	25	405.538	815.127	1801.91	321.929	1479.98	1654.89	1332.96
13	2.04996	3591.55	-19.9271	Bedrock-Topanga Formation	125	25	417.592	839.356	1903.4	371.458	1531.94	1752.01	1380.55
14	2.04996	3790.64	-19.9271	Bedrock-Topanga Formation	125	25	429.646	863.585	2004.88	420.987	1583.9	1849.12	1428.14
15	2.04996	3989.73	-19.9271	Bedrock-Topanga Formation	125	25	441.7	887.813	2106.37	470.515	1635.86	1946.24	1475.73
16	2.04996	5387.43	-19.9271	Bedrock-Topanga Formation	125	25	601.789	1209.59	2846.23	520.31	2325.92	2628.06	2107.75
17	2.04996	6867.98	-19.9271	Bedrock-Topanga Formation	125	25	766.377	1540.41	3628.13	592.762	3035.37	3350.29	2757.53
18	2.04996	7326.73	-19.9271	Bedrock-Topanga Formation	125	25	804.71	1617.46	3865.81	665.214	3200.6	3574.08	2908.86
19	1.9865	7341.1	21.9797	Bedrock-Topanga Formation	140	34	949.895	1909.28	3312.12	689.059	2623.06	3695.51	3006.45
20	1.9865	7378.86	21.9797	Bedrock-Topanga Formation	140	34	962.831	1935.28	3325.91	664.299	2661.61	3714.52	3050.22
21	1.9865	7416.62	21.9797	Bedrock-Topanga Formation	140	34	975.766	1961.28	3339.7	639.539	2700.16	3733.53	3093.99
22	1.9865	7454.38	21.9797	Bedrock-Topanga Formation	140	34	988.701	1987.28	3353.48	614.779	2738.7	3752.53	3137.76

23	1.9865	7492.14	21.9797	Bedrock-Topanga Formation	140	34	1001.64	2013.28	3367.27	590.018	2777.25	3771.55	3181.53
24	1.9865	7469.88	21.9797	Bedrock-Topanga Formation	140	34	1005.64	2021.33	3354.45	565.258	2789.19	3760.34	3195.08
25	1.9865	7153.13	21.9797	Bedrock-Topanga Formation	140	34	965.836	1941.32	3211.06	540.498	2670.56	3600.89	3060.39
26	1.9865	7064.4	21.9797	Bedrock-Topanga Formation	140	34	959.95	1929.49	3168.77	515.737	2653.03	3556.22	3040.48
27	1.9865	7203.63	21.9797	Bedrock-Topanga Formation	140	34	987.985	1985.84	3227.54	490.977	2736.57	3626.31	3135.33
28	1.9865	7342.87	21.9797	Bedrock-Topanga Formation	140	34	1016.02	2042.18	3286.32	466.217	2820.1	3696.4	3230.18
29	1.9865	7482.1	21.9797	Bedrock-Topanga Formation	140	34	1044.05	2098.53	3345.1	441.456	2903.64	3766.49	3325.03
30	1.9865	7621.33	21.9797	Bedrock-Topanga Formation	140	34	1072.08	2154.88	3403.87	416.696	2987.18	3836.58	3419.89
31	1.85901	7107.45	47.0763	Bedrock-Topanga Formation	140	34	906.761	1822.58	2848.31	353.776	2494.53	3823.29	3469.51
32	1.85901	6927.64	47.0763	Bedrock-Topanga Formation	140	34	907.835	1824.74	2750.43	252.695	2497.74	3726.57	3473.88
33	1.85901	6747.84	47.0763	Bedrock-Topanga Formation	140	34	908.915	1826.91	2652.55	151.614	2500.94	3629.85	3478.24
34	1.85901	6568.04	47.0763	Bedrock-Topanga Formation	140	34	909.99	1829.07	2554.68	50.5334	2504.15	3533.13	3482.6
35	2.0128	6926.3	47.0763	Bedrock-Topanga Formation	140	34	899.776	1808.54	2473.71	0	2473.71	3441.18	3441.18
36	2.0128	6727.49	47.0763	Bedrock-Topanga Formation	140	34	875.417	1759.58	2401.12	0	2401.12	3342.41	3342.41
37	2.0128	6213.91	47.0763	Bedrock-Topanga Formation	140	34	812.497	1633.11	2213.62	0	2213.62	3087.25	3087.25
38	2.03866	5906.07	45	Bedrock-Topanga Formation	140	34	780.074	1567.94	2117	0	2117	2897.08	2897.08
39	2.03866	5433.58	45	Bedrock-Topanga Formation	140	34	721.839	1450.89	1943.47	0	1943.47	2665.31	2665.31
40	2.03866	4961.1	45	Bedrock-Topanga Formation	140	34	663.605	1333.84	1769.94	0	1769.94	2433.54	2433.54
41	2.03866	4488.61	45	Bedrock-Topanga Formation	140	34	610.705	1227.51	1612.29	0	1612.29	2223	2223
42	2.03866	4016.13	45	Bedrock-Topanga Formation	140	34	572.262	1150.24	1497.75	0	1497.75	2070.01	2070.01
43	2.03866	3543.64	45	Bedrock-Topanga Formation	140	34	514.03	1033.2	1324.22	0	1324.22	1838.25	1838.25
44	2.03866	3071.15	45	Bedrock-Topanga Formation	140	34	455.797	916.147	1150.68	0	1150.68	1606.48	1606.48
45	2.03866	2598.67	45	Bedrock-Topanga Formation	140	34	397.563	799.098	977.151	0	977.151	1374.71	1374.71
46	2.03866	2126.18	45	Bedrock-Topanga Formation	140	34	339.33	682.049	803.619	0	803.619	1142.95	1142.95
47	2.03866	1653.7	45	Bedrock-Topanga Formation	140	34	281.096	565	630.087	0	630.087	911.182	911.182

48	2.03866	1181.21	45	Bedrock-Topanga Formation	140	34	222.862	447.951	456.554	0	456.554	679.417	679.417
49	2.03866	708.728	45	Bedrock-Topanga Formation	140	34	164.629	330.902	283.024	0	283.024	447.652	447.652
50	2.03866	236.243	45	Bedrock-Topanga Formation	140	34	106.395	213.853	109.491	0	109.491	215.886	215.886

Global Minimum Query (janbu simplified) - Safety Factor: 1.89185

Slice Number	Width [ft]	Weight [lbs]	Angle of Slice Base [deg]	Base Material	Base Cohesion [psf]	Base Friction Angle [deg]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]	Base Vertical Stress [psf]	Effective Vertical Stress [psf]
1	1.90271	217.217	-45	Bedrock-Topanga Formation	140	34	178.256	337.233	292.409	0	292.409	114.153	114.153
2	1.90271	651.652	-45	Bedrock-Topanga Formation	140	34	304.763	576.566	647.235	0	647.235	342.472	342.472
3	1.90271	1086.09	-45	Bedrock-Topanga Formation	140	34	431.27	815.899	1002.06	0	1002.06	570.791	570.791
4	1.90271	1520.52	-45	Bedrock-Topanga Formation	140	34	557.778	1055.23	1356.89	0	1356.89	799.111	799.111
5	1.90271	1954.96	-45	Bedrock-Topanga Formation	140	34	684.288	1294.57	1711.71	0	1711.71	1027.42	1027.42
6	0.0795185	91.192	-45	Bedrock-Topanga Formation	140	34	749.002	1417	1895.77	2.53515	1893.23	1146.77	1144.23
7	2.0125	2420.58	-21.1249	Bedrock-Topanga Formation	125	25	392.277	742.13	1354.33	30.8859	1323.44	1202.76	1171.88
8	2.0125	2625.01	-21.1249	Bedrock-Topanga Formation	125	25	405.888	767.88	1461.16	82.5029	1378.66	1304.34	1221.84
9	2.0125	2829.44	-21.1249	Bedrock-Topanga Formation	125	25	419.499	793.63	1568	134.12	1433.88	1405.92	1271.8
10	2.0125	2873.65	-21.1249	Bedrock-Topanga Formation	125	25	411.423	778.35	1586.85	185.737	1401.11	1427.89	1242.15
11	2.0125	2996.8	-21.1249	Bedrock-Topanga Formation	125	25	414.031	783.284	1649.05	237.354	1411.69	1489.08	1251.73
12	2.0125	3201.23	-21.1249	Bedrock-Topanga Formation	125	25	427.642	809.034	1755.89	288.971	1466.91	1590.66	1301.69
13	2.0125	3405.65	-21.1249	Bedrock-Topanga Formation	125	25	441.253	834.784	1862.73	340.588	1522.14	1692.24	1351.65
14	2.0125	3610.08	-21.1249	Bedrock-Topanga Formation	125	25	454.864	860.534	1969.56	392.205	1577.36	1793.82	1401.61
15	2.0125	3814.51	-21.1249	Bedrock-Topanga Formation	125	25	468.475	886.284	2076.4	443.822	1632.58	1895.4	1451.58
16	2.0125	4018.94	-21.1249	Bedrock-Topanga Formation	125	25	482.086	912.034	2183.24	495.44	1687.8	1996.98	1501.54
17	2.0125	5822.31	-21.1249	Bedrock-Topanga Formation	125	25	710.955	1345.02	3167.75	551.4	2616.35	2893.06	2341.66
18	2.0125	6903.26	-21.1249	Bedrock-Topanga Formation	125	25	837.085	1583.64	3753.59	625.522	3128.07	3430.17	2804.64
19	2.0125	7357.95	-21.1249	Bedrock-Topanga Formation	125	25	878.447	1661.89	3995.5	699.643	3295.86	3656.1	2956.46
20	2.0125	7812.65	-21.1249	Bedrock-Topanga Formation	125	25	919.803	1740.13	4237.42	773.765	3463.65	3882.04	3108.27
21	1.90597	7611.71	26.0367	Bedrock-Topanga Formation	140	34	1034.62	1957.34	3488.21	793.898	2694.31	3993.65	3199.75
22	1.90597	7606.37	26.0367	Bedrock-Topanga Formation	140	34	1044.05	1975.18	3480.8	760.043	2720.76	3990.85	3230.81
23	1.90597	7601.03	26.0367	Bedrock-Topanga Formation	140	34	1053.47	1993.01	3473.39	726.188	2747.2	3988.04	3261.85

24	1.90597	7595.69	26.0367	Bedrock-Topanga Formation	140	34	1062.9	2010.85	3465.99	692.332	2773.65	3985.24	3292.91
25	1.90597	7541.35	26.0367	Bedrock-Topanga Formation	140	34	1064.52	2013.92	3436.68	658.477	2778.21	3956.73	3298.25
26	1.90597	7214.69	26.0367	Bedrock-Topanga Formation	140	34	1022.77	1934.92	3285.69	624.622	2661.07	3785.34	3160.72
27	1.90597	7050.17	26.0367	Bedrock-Topanga Formation	140	34	1006.83	1904.78	3207.16	590.767	2616.39	3699.02	3108.26
28	1.90597	7137.57	26.0367	Bedrock-Topanga Formation	140	34	1031.04	1950.57	3241.19	556.911	2684.28	3744.88	3187.97
29	1.90597	7225.64	26.0367	Bedrock-Topanga Formation	140	34	1055.35	1996.56	3275.52	523.056	2752.47	3791.09	3268.03
30	1.90597	7313.71	26.0367	Bedrock-Topanga Formation	140	34	1079.66	2042.56	3309.86	489.201	2820.66	3837.3	3348.1
31	1.90597	7401.79	26.0367	Bedrock-Topanga Formation	140	34	1103.97	2088.55	3344.19	455.346	2888.84	3883.51	3428.16
32	1.78775	6877.76	49.8728	Bedrock-Topanga Formation	140	34	919.819	1740.16	2755.95	383.615	2372.33	3847.22	3463.6
33	1.78775	6665.29	49.8728	Bedrock-Topanga Formation	140	34	917.504	1735.78	2639.85	274.009	2365.84	3728.37	3454.36
34	1.78775	6452.83	49.8728	Bedrock-Topanga Formation	140	34	915.189	1731.4	2523.75	164.402	2359.35	3609.52	3445.12
35	1.78775	6240.36	49.8728	Bedrock-Topanga Formation	140	34	912.874	1727.02	2407.65	54.7961	2352.85	3490.68	3435.88
36	2.07129	6985.48	49.8728	Bedrock-Topanga Formation	140	34	897.011	1697.01	2308.37	0	2308.37	3372.58	3372.58
37	2.07129	6742.42	49.8728	Bedrock-Topanga Formation	140	34	867.611	1641.39	2225.9	0	2225.9	3255.23	3255.23
38	2.07129	6244.58	49.8728	Bedrock-Topanga Formation	140	34	807.39	1527.46	2056.99	0	2056.99	3014.88	3014.88
39	2.07129	5762.85	49.8728	Bedrock-Topanga Formation	140	34	749.119	1417.22	1893.55	0	1893.55	2782.3	2782.3
40	2.07129	5181.65	49.8728	Bedrock-Topanga Formation	140	34	678.812	1284.21	1696.36	0	1696.36	2501.7	2501.7
41	2.07129	4597.96	49.8728	Bedrock-Topanga Formation	140	34	608.204	1150.63	1498.32	0	1498.32	2219.89	2219.89
42	2.0319	3989.55	45	Bedrock-Topanga Formation	140	34	570.609	1079.51	1392.88	0	1392.88	1963.49	1963.49
43	2.0319	3520.19	45	Bedrock-Topanga Formation	140	34	533.92	1010.1	1289.97	0	1289.97	1823.89	1823.89
44	2.0319	3050.84	45	Bedrock-Topanga Formation	140	34	475.467	899.513	1126.02	0	1126.02	1601.49	1601.49
45	2.0319	2581.48	45	Bedrock-Topanga Formation	140	34	414.755	784.654	955.737	0	955.737	1370.49	1370.49
46	2.0319	2112.12	45	Bedrock-Topanga Formation	140	34	354.042	669.795	785.452	0	785.452	1139.49	1139.49
47	2.0319	1642.76	45	Bedrock-Topanga Formation	140	34	293.33	554.936	615.168	0	615.168	908.497	908.497
48	2.0319	1173.4	45	Bedrock-Topanga Formation	140	34	232.617	440.077	444.883	0	444.883	677.5	677.5

49	2.0319	704.039	45	Bedrock-Topanga Formation	140	34	171.905	325.218	274.596	0	274.596	446.501	446.501
50	2.0319	234.68	45	Bedrock-Topanga Formation	140	34	111.192	210.359	104.311	0	104.311	215.503	215.503

Section II Proposed topography - Block , Pseudostatic

Global Minimum Query (bishop simplified) - Safety Factor: 1.23276

Slice Number	Width [ft]	Weight [lbs]	Angle of Slice Base [deg]	Base Material	Base Cohesion [psf]	Base Friction Angle [deg]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]	Base Vertical Stress [psf]	Effective Vertical Stress [psf]
1	2.36389	335.277	-45	Bedrock-Topanga Formation	140	34	423.14	521.63	565.79	0	565.79	142.651	142.651
2	2.36389	1005.83	-45	Bedrock-Topanga Formation	140	34	766.682	945.135	1193.66	0	1193.66	426.98	426.98
3	2.36389	1676.39	-45	Bedrock-Topanga Formation	140	34	1110.22	1368.64	1821.53	0	1821.53	711.31	711.31
4	2.36389	2346.94	-45	Bedrock-Topanga Formation	140	34	1453.76	1792.14	2449.41	0	2449.41	995.643	995.643
5	0.23779	273.495	-45	Bedrock-Topanga Formation	140	34	1644.29	2027.02	2797.62	0	2797.62	1153.32	1153.32
6	2.16008	2643	-22.3274	Bedrock-Topanga Formation	125.819	25.5324	685.461	845.009	1505.62	0	1505.62	1224.11	1224.11
7	2.16008	2879.5	-22.3274	Bedrock-Topanga Formation	125.819	25.5324	735.932	907.228	1635.88	0	1635.88	1333.64	1333.64
8	2.16008	2884.32	-22.3274	Bedrock-Topanga Formation	125.819	25.5324	736.961	908.496	1638.53	0	1638.53	1335.87	1335.87
9	2.16008	3134.59	-22.3274	Bedrock-Topanga Formation	125.819	25.5324	790.37	974.336	1776.37	0	1776.37	1451.77	1451.77
10	2.16008	3384.85	-22.3274	Bedrock-Topanga Formation	125.819	25.5324	843.778	1040.18	1914.2	0	1914.2	1567.67	1567.67
11	2.16008	3635.11	-22.3274	Bedrock-Topanga Formation	125.819	25.5324	897.187	1106.02	2052.04	0	2052.04	1683.57	1683.57
12	2.16008	3885.38	-22.3274	Bedrock-Topanga Formation	125.819	25.5324	950.598	1171.86	2189.87	0	2189.87	1799.47	1799.47
13	2.16008	4135.64	-22.3274	Bedrock-Topanga Formation	125.819	25.5324	1004.01	1237.7	2327.71	0	2327.71	1915.37	1915.37
14	2.16008	5767.08	-22.3274	Bedrock-Topanga Formation	125.819	25.5324	1352.17	1666.9	3226.24	0	3226.24	2670.92	2670.92
15	2.16008	7277.99	-22.3274	Bedrock-Topanga Formation	125.819	25.5324	1674.61	2064.39	4058.38	0	4058.38	3370.64	3370.64
16	2.16008	7816.57	-22.3274	Bedrock-Topanga Formation	125.819	25.5324	1789.54	2206.08	4355	0	4355	3620.06	3620.06
17	2.16008	8355.16	-22.3274	Bedrock-Topanga Formation	125.819	25.5324	1904.48	2347.77	4651.64	0	4651.64	3869.49	3869.49
18	2.09435	8344.11	28.368	Bedrock-Topanga Formation	140	34	1769.63	2181.53	3026.7	0	3026.7	3982.26	3982.26
19	2.09435	8308.32	28.368	Bedrock-Topanga Formation	140	34	1762.42	2172.64	3013.51	0	3013.51	3965.18	3965.18
20	2.09435	8272.54	28.368	Bedrock-Topanga Formation	140	34	1755.21	2163.75	3000.33	0	3000.33	3948.1	3948.1
21	2.09435	8236.32	28.368	Bedrock-Topanga Formation	140	34	1747.91	2154.75	2986.99	0	2986.99	3930.82	3930.82
22	2.09435	7962.19	28.368	Bedrock-Topanga Formation	140	34	1692.65	2086.63	2885.99	0	2885.99	3799.99	3799.99

23	2.09435	7591.02	28.368	Bedrock-Topanga Formation	140	34	1617.83	1994.39	2749.25	0	2749.25	3622.84	3622.84
24	2.09435	7626.51	28.368	Bedrock-Topanga Formation	140	34	1624.98	2003.21	2762.32	0	2762.32	3639.77	3639.77
25	2.09435	7703.51	28.368	Bedrock-Topanga Formation	140	34	1640.51	2022.35	2790.69	0	2790.69	3676.53	3676.53
26	2.09435	7780.52	28.368	Bedrock-Topanga Formation	140	34	1656.02	2041.48	2819.06	0	2819.06	3713.28	3713.28
27	2.09435	7857.52	28.368	Bedrock-Topanga Formation	140	34	1671.55	2060.62	2847.43	0	2847.43	3750.03	3750.03
28	2.09435	7934.53	28.368	Bedrock-Topanga Formation	140	34	1687.07	2079.75	2875.8	0	2875.8	3786.78	3786.78
29	2.18082	8301.5	34.1113	Bedrock-Topanga Formation	140	34	1601.63	1974.43	2719.66	0	2719.66	3804.5	3804.5
30	2.18082	8300.07	34.1113	Bedrock-Topanga Formation	140	34	1601.37	1974.11	2719.18	0	2719.18	3803.85	3803.85
31	2.18082	8298.63	34.1113	Bedrock-Topanga Formation	140	34	1601.11	1973.78	2718.69	0	2718.69	3803.19	3803.19
32	2.18082	8297.2	34.1113	Bedrock-Topanga Formation	140	34	1600.85	1973.46	2718.22	0	2718.22	3802.53	3802.53
33	2.18082	8065.08	34.1113	Bedrock-Topanga Formation	140	34	1558.38	1921.11	2640.6	0	2640.6	3696.15	3696.15
34	1.95497	7004.12	34.1113	Bedrock-Topanga Formation	140	34	1512.31	1864.31	2556.4	0	2556.4	3580.74	3580.74
35	1.95497	6724.28	34.1113	Bedrock-Topanga Formation	140	34	1455.2	1793.91	2452.02	0	2452.02	3437.68	3437.68
36	1.95497	6437.77	34.1113	Bedrock-Topanga Formation	140	34	1396.72	1721.82	2345.14	0	2345.14	3291.2	3291.2
37	1.95497	6151.26	34.1113	Bedrock-Topanga Formation	140	34	1338.25	1649.74	2238.28	0	2238.28	3144.72	3144.72
38	2.07944	6144.74	45	Bedrock-Topanga Formation	140	34	1140.55	1406.02	1876.96	0	1876.96	3017.5	3017.5
39	2.07944	5653.16	45	Bedrock-Topanga Formation	140	34	1069.47	1318.4	1747.06	0	1747.06	2816.53	2816.53
40	2.07944	5161.58	45	Bedrock-Topanga Formation	140	34	985.926	1215.41	1594.37	0	1594.37	2580.29	2580.29
41	2.07944	4670	45	Bedrock-Topanga Formation	140	34	902.382	1112.42	1441.67	0	1441.67	2344.05	2344.05
42	2.07944	4178.42	45	Bedrock-Topanga Formation	140	34	818.836	1009.43	1288.98	0	1288.98	2107.82	2107.82
43	2.07944	3686.84	45	Bedrock-Topanga Formation	140	34	735.29	906.436	1136.29	0	1136.29	1871.58	1871.58
44	2.07944	3195.26	45	Bedrock-Topanga Formation	140	34	651.744	803.444	983.595	0	983.595	1635.34	1635.34
45	2.07944	2703.69	45	Bedrock-Topanga Formation	140	34	568.197	700.451	830.904	0	830.904	1399.1	1399.1
46	2.07944	2212.11	45	Bedrock-Topanga Formation	140	34	484.652	597.459	678.213	0	678.213	1162.86	1162.86
47	2.07944	1720.53	45	Bedrock-Topanga Formation	140	34	401.106	494.467	525.518	0	525.518	926.624	926.624

48	2.07944	1228.95	45	Bedrock-Topanga Formation	140	34	317.56	391.475	372.827	0	372.827	690.387	690.387
49	2.07944	737.369	45	Bedrock-Topanga Formation	140	34	234.013	288.482	220.134	0	220.134	454.147	454.147
50	2.07944	245.79	45	Bedrock-Topanga Formation	140	34	150.467	185.49	67.4421	0	67.4421	217.91	217.91

Global Minimum Query (janbu simplified) - Safety Factor: 1.13398

Slice Number	Width [ft]	Weight [lbs]	Angle of Slice Base [deg]	Base Material	Base Cohesion [psf]	Base Friction Angle [deg]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]	Base Vertical Stress [psf]	Effective Vertical Stress [psf]
1	1.99684	239.242	-45	Bedrock-Topanga Formation	140	34	481.522	546.036	601.974	0	601.974	120.453	120.453
2	1.99684	717.726	-45	Bedrock-Topanga Formation	140	34	833.976	945.712	1194.51	0	1194.51	360.539	360.539
3	1.99684	1196.21	-45	Bedrock-Topanga Formation	140	34	1186.43	1345.39	1787.06	0	1787.06	600.627	600.627
4	1.8969	1416.85	-13.8528	Bedrock-Topanga Formation	125.368	25.2399	469.236	532.104	862.797	0	862.797	747.083	747.083
5	1.8969	1523.33	-13.8528	Bedrock-Topanga Formation	125.368	25.2399	495.241	561.593	925.354	0	925.354	803.227	803.227
6	1.8969	1629.81	-13.8528	Bedrock-Topanga Formation	125.368	25.2399	521.246	591.083	987.906	0	987.906	859.366	859.366
7	1.8969	2514.54	-13.8528	Bedrock-Topanga Formation	125.368	25.2399	1395.16	1582.09	3090.09	0	3090.09	2746.04	2746.04
8	1.88767	4067.2	-13.8528	Bedrock-Topanga Formation	125.368	25.2399	1121.38	1271.62	2431.51	0	2431.51	2154.98	2154.98
9	1.88767	4402.5	-13.8528	Bedrock-Topanga Formation	125.368	25.2399	1203.67	1364.94	2629.46	0	2629.46	2332.63	2332.63
10	1.88767	4737.8	-13.8528	Bedrock-Topanga Formation	125.368	25.2399	1285.96	1458.25	2827.4	0	2827.4	2510.28	2510.28
11	1.88767	5073.09	-13.8528	Bedrock-Topanga Formation	125.368	25.2399	1368.24	1551.56	3025.34	0	3025.34	2687.93	2687.93
12	1.88767	5408.39	-13.8528	Bedrock-Topanga Formation	125.368	25.2399	1450.54	1644.88	3223.29	0	3223.29	2865.58	2865.58
13	1.88767	5743.68	-13.8528	Bedrock-Topanga Formation	125.368	25.2399	1532.82	1738.19	3421.23	0	3421.23	3043.23	3043.23
14	1.88767	6078.98	-13.8528	Bedrock-Topanga Formation	125.368	25.2399	1615.11	1831.51	3619.17	0	3619.17	3220.88	3220.88
15	1.88767	6414.28	-13.8528	Bedrock-Topanga Formation	125.368	25.2399	1697.4	1924.82	3817.12	0	3817.12	3398.54	3398.54
16	1.92099	6508.61	32.7807	Bedrock-Topanga Formation	140	34	1545.86	1752.97	2391.33	0	2391.33	3386.83	3386.83
17	1.92099	6087.99	32.7807	Bedrock-Topanga Formation	140	34	1451.73	1646.23	2233.07	0	2233.07	3167.95	3167.95
18	1.92099	6001.36	32.7807	Bedrock-Topanga Formation	140	34	1432.34	1624.24	2200.48	0	2200.48	3122.87	3122.87
19	1.92099	6016.25	32.7807	Bedrock-Topanga Formation	140	34	1435.67	1628.02	2206.08	0	2206.08	3130.62	3130.62
20	1.92099	6031.15	32.7807	Bedrock-Topanga Formation	140	34	1439	1631.8	2211.68	0	2211.68	3138.37	3138.37
21	1.92099	6046.04	32.7807	Bedrock-Topanga Formation	140	34	1442.34	1635.58	2217.29	0	2217.29	3146.12	3146.12
22	1.92099	6060.93	32.7807	Bedrock-Topanga Formation	140	34	1445.67	1639.36	2222.89	0	2222.89	3153.87	3153.87
23	1.92099	6075.83	32.7807	Bedrock-Topanga Formation	140	34	1449	1643.14	2228.49	0	2228.49	3161.62	3161.62

24	0.0765182	242.298	35.5535	Bedrock-Topanga Formation	140	34	1407.72	1596.33	2159.09	0	2159.09	3165.2	3165.2
25	1.79018	5668.24	35.5535	Bedrock-Topanga Formation	140	34	1407.62	1596.21	2158.93	0	2158.93	3164.95	3164.95
26	1.79018	5668.08	35.5535	Bedrock-Topanga Formation	140	34	1407.58	1596.17	2158.87	0	2158.87	3164.87	3164.87
27	1.79018	5667.92	35.5535	Bedrock-Topanga Formation	140	34	1407.55	1596.13	2158.8	0	2158.8	3164.78	3164.78
28	1.79018	5667.76	35.5535	Bedrock-Topanga Formation	140	34	1407.51	1596.09	2158.74	0	2158.74	3164.69	3164.69
29	1.79018	5663.34	35.5535	Bedrock-Topanga Formation	140	34	1406.48	1594.92	2157.01	0	2157.01	3162.22	3162.22
30	1.79018	5381.36	35.5535	Bedrock-Topanga Formation	140	34	1340.76	1520.4	2046.52	0	2046.52	3004.77	3004.77
31	1.79018	5234.06	35.5535	Bedrock-Topanga Formation	140	34	1306.43	1481.47	1988.81	0	1988.81	2922.52	2922.52
32	1.79018	4979.45	35.5535	Bedrock-Topanga Formation	140	34	1247.09	1414.18	1889.05	0	1889.05	2780.35	2780.35
33	1.79018	4724.84	35.5535	Bedrock-Topanga Formation	140	34	1187.75	1346.89	1789.29	0	1789.29	2638.18	2638.18
34	1.79018	4470.23	35.5535	Bedrock-Topanga Formation	140	34	1128.41	1279.6	1689.53	0	1689.53	2496.01	2496.01
35	1.79018	4215.62	35.5535	Bedrock-Topanga Formation	140	34	1086.17	1231.7	1618.51	0	1618.51	2394.8	2394.8
36	1.79018	3961.01	35.5535	Bedrock-Topanga Formation	140	34	1051.46	1192.33	1560.15	0	1560.15	2311.63	2311.63
37	1.79018	3706.39	35.5535	Bedrock-Topanga Formation	140	34	992.121	1125.05	1460.39	0	1460.39	2169.46	2169.46
38	1.79018	3451.78	35.5535	Bedrock-Topanga Formation	140	34	932.782	1057.76	1360.63	0	1360.63	2027.29	2027.29
39	1.79018	3197.17	35.5535	Bedrock-Topanga Formation	140	34	873.442	990.466	1260.87	0	1260.87	1885.12	1885.12
40	1.79018	2942.56	35.5535	Bedrock-Topanga Formation	140	34	814.103	923.177	1161.11	0	1161.11	1742.95	1742.95
41	1.79018	2687.95	35.5535	Bedrock-Topanga Formation	140	34	754.764	855.887	1061.35	0	1061.35	1600.78	1600.78
42	1.79018	2433.33	35.5535	Bedrock-Topanga Formation	140	34	695.425	788.598	961.584	0	961.584	1458.61	1458.61
43	1.79018	2178.72	35.5535	Bedrock-Topanga Formation	140	34	636.085	721.308	861.824	0	861.824	1316.44	1316.44
44	1.79018	1924.11	35.5535	Bedrock-Topanga Formation	140	34	576.747	654.019	762.064	0	762.064	1174.27	1174.27
45	1.79018	1669.5	35.5535	Bedrock-Topanga Formation	140	34	517.407	586.729	662.305	0	662.305	1032.1	1032.1
46	1.79018	1414.89	35.5535	Bedrock-Topanga Formation	140	34	458.068	519.44	562.541	0	562.541	889.923	889.923
47	1.79018	1160.27	35.5535	Bedrock-Topanga Formation	140	34	398.728	452.15	462.781	0	462.781	747.754	747.754
48	1.69188	813.54	45	Bedrock-Topanga Formation	140	34	293.906	333.283	286.553	0	286.553	580.459	580.459

49	1.69188	488.124	45	Bedrock-Topanga Formation	140	34	222.204	251.975	166.01	0	166.01	388.214	388.214
50	1.69188	162.708	45	Bedrock-Topanga Formation	140	34	150.503	170.668	45.4666	0	45.4666	195.97	195.97

Interslice Data

Section II Proposed topography - Master Scenario

Global Minimum Query (bishop simplified) - Safety Factor: 2.01518

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [deg]
1	54	715.266	0	0	0
2	54.9527	714.313	2364.63	0	0
3	55.9053	713.361	5056.82	0	0
4	56.858	712.408	8076.58	0	0
5	57.3123	711.954	9634.56	0	0
6	58.5466	712.668	9316.28	0	0
7	59.6139	713.285	9043.97	0	0
8	60.6812	713.903	8773.85	0	0
9	61.7486	714.52	8505.93	0	0
10	62.8159	715.138	8240.2	0	0
11	63.8833	715.755	7976.67	0	0
12	64.9506	716.372	7715.33	0	0
13	66.0179	716.99	7456.18	0	0
14	67.0853	717.607	7199.23	0	0
15	68.1526	718.225	6944.47	0	0
16	69.22	718.842	6691.91	0	0
17	70.2873	719.46	6442.38	0	0
18	71.3547	720.077	6212.12	0	0
19	72.422	720.695	6007.34	0	0
20	73.4893	721.312	5824.97	0	0
21	74.5567	721.93	5643.1	0	0
22	75.624	722.547	5457.43	0	0
23	76.6914	723.164	5267.97	0	0
24	77.7587	723.782	5074.71	0	0
25	78.8261	724.399	4877.66	0	0
26	79.8934	725.017	4676.81	0	0
27	80.9607	725.634	4472.17	0	0
28	82.0281	726.252	4263.73	0	0
29	83.0954	726.869	4051.5	0	0
30	84.134	727.735	3597.92	0	0
31	85.1726	728.602	3150.41	0	0
32	86.2112	729.468	2708.95	0	0
33	87.2498	730.334	2273.56	0	0
34	88.2884	731.201	1844.22	0	0
35	89.327	732.067	1420.95	0	0
36	90.3656	732.933	1003.73	0	0
37	91.4042	733.8	592.577	0	0
38	92.4427	734.666	187.482	0	0
39	93.4813	735.532	-211.553	0	0
40	94.5199	736.399	-593.667	0	0
41	95.5585	737.265	-908.468	0	0
42	96.5971	738.131	-1212.94	0	0
43	97.6357	738.998	-1482.21	0	0
44	98.6743	739.864	-1711.98	0	0
45	99.7129	740.73	-1902.22	0	0
46	100.751	741.597	-2052.95	0	0
47	101.734	742.579	-2196.97	0	0
48	102.716	743.561	-2286.26	0	0
49	103.699	744.544	-2320.84	0	0
50	104.681	745.526	-2321.67	0	0
51	105.664	746.509	0	0	0

Global Minimum Query (janbu simplified) - Safety Factor: 1.87409

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [deg]
1	54	715.266	0	0	0
2	54.9527	714.313	2516.71	0	0
3	55.9053	713.361	5380.44	0	0
4	56.858	712.408	8591.17	0	0
5	57.3123	711.954	10247.2	0	0
6	58.5466	712.668	9982.48	0	0
7	59.6139	713.285	9756.13	0	0
8	60.6812	713.903	9531.73	0	0
9	61.7486	714.52	9309.27	0	0
10	62.8159	715.138	9088.76	0	0
11	63.8833	715.755	8870.18	0	0
12	64.9506	716.372	8653.55	0	0
13	66.0179	716.99	8438.86	0	0
14	67.0853	717.607	8226.11	0	0
15	68.1526	718.225	8015.3	0	0
16	69.22	718.842	7806.44	0	0
17	70.2873	719.46	7600.26	0	0
18	71.3547	720.077	7411.14	0	0
19	72.422	720.695	7244.57	0	0
20	73.4893	721.312	7097.85	0	0
21	74.5567	721.93	6951.56	0	0
22	75.624	722.547	6801.91	0	0
23	76.6914	723.164	6648.91	0	0
24	77.7587	723.782	6492.54	0	0
25	78.8261	724.399	6332.82	0	0
26	79.8934	725.017	6169.73	0	0
27	80.9607	725.634	6003.29	0	0
28	82.0281	726.252	5833.48	0	0
29	83.0954	726.869	5660.32	0	0
30	84.134	727.735	5248.66	0	0
31	85.1726	728.602	4842.67	0	0
32	86.2112	729.468	4442.33	0	0
33	87.2498	730.334	4047.65	0	0
34	88.2884	731.201	3658.63	0	0
35	89.327	732.067	3275.27	0	0
36	90.3656	732.933	2897.56	0	0
37	91.4042	733.8	2525.52	0	0
38	92.4427	734.666	2159.14	0	0
39	93.4813	735.532	1798.41	0	0
40	94.5199	736.399	1453.48	0	0
41	95.5585	737.265	1171.42	0	0
42	96.5971	738.131	899.001	0	0
43	97.6357	738.998	659.444	0	0
44	98.6743	739.864	456.788	0	0
45	99.7129	740.73	291.035	0	0
46	100.751	741.597	162.183	0	0
47	101.734	742.579	37.6601	0	0
48	102.716	743.561	-35.2097	0	0
49	103.699	744.544	-56.4263	0	0
50	104.681	745.526	-45.6445	0	0
51	105.664	746.509	0	0	0

Section II Proposed topography - Curved Static

Global Minimum Query (bishop simplified) - Safety Factor: 2.08048

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [deg]
1	54.5571	724.279	0	0	0
2	55.4929	724.227	75.3934	0	0
3	56.4287	724.192	170.699	0	0
4	57.3645	724.174	283.075	0	0
5	58.3004	724.171	409.832	0	0
6	59.2362	724.185	548.415	0	0
7	60.172	724.216	696.405	0	0
8	61.1078	724.263	851.508	0	0
9	62.0436	724.326	1011.55	0	0
10	62.9795	724.405	1174.48	0	0
11	63.9153	724.502	1338.34	0	0
12	64.8511	724.615	1501.29	0	0
13	65.7869	724.744	1661.6	0	0
14	66.7227	724.891	1817.63	0	0
15	67.6585	725.054	1967.84	0	0
16	68.5944	725.235	2110.78	0	0
17	69.5302	725.433	2245.11	0	0
18	70.466	725.648	2368.62	0	0
19	71.4018	725.882	2476.03	0	0
20	72.3376	726.133	2568.48	0	0
21	73.2734	726.403	2648.33	0	0
22	74.2093	726.691	2718.82	0	0
23	75.1451	726.998	2779.24	0	0
24	76.0809	727.324	2828.1	0	0
25	77.0167	727.67	2863.99	0	0
26	77.9525	728.036	2885.6	0	0
27	78.8883	728.422	2891.72	0	0
28	79.8242	728.829	2881.23	0	0
29	80.76	729.258	2853.13	0	0
30	81.6958	729.709	2806.51	0	0
31	82.6316	730.182	2740.59	0	0
32	83.5674	730.679	2654.7	0	0
33	84.5032	731.2	2548.3	0	0
34	85.4391	731.745	2420.99	0	0
35	86.3749	732.317	2272.51	0	0
36	87.3107	732.915	2102.76	0	0
37	88.2465	733.541	1911.84	0	0
38	89.1823	734.196	1700.01	0	0
39	90.1182	734.882	1467.77	0	0
40	91.054	735.599	1215.87	0	0
41	91.9898	736.351	945.315	0	0
42	92.9256	737.137	657.438	0	0
43	93.8614	737.961	353.935	0	0
44	94.7972	738.825	67.1088	0	0
45	95.7331	739.731	-172.838	0	0
46	96.6689	740.683	-414.768	0	0
47	97.6047	741.685	-618.33	0	0
48	98.5405	742.74	-771.539	0	0
49	99.4763	743.853	-862.98	0	0
50	100.412	745.032	-879.32	0	0
51	101.348	746.281	0	0	0

Global Minimum Query (janbu simplified) - Safety Factor: 1.91292

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [deg]
1	67.1699	730.585	0	0	0
2	67.791	730.406	57.7432	0	0
3	68.4121	730.244	133.229	0	0
4	69.0332	730.098	226.097	0	0
5	69.6544	729.969	337.068	0	0
6	70.2755	729.856	463.363	0	0
7	70.8966	729.759	589.184	0	0
8	71.5177	729.678	708.649	0	0
9	72.1388	729.612	818.344	0	0
10	72.76	729.562	918.536	0	0
11	73.3811	729.527	1013.37	0	0
12	74.0022	729.507	1116.6	0	0
13	74.6233	729.503	1227.49	0	0
14	75.2444	729.514	1343.92	0	0
15	75.8656	729.54	1463.92	0	0
16	76.4867	729.582	1585.6	0	0
17	77.1078	729.639	1707.21	0	0
18	77.7289	729.712	1827.07	0	0
19	78.35	729.8	1943.61	0	0
20	78.9712	729.904	2055.34	0	0
21	79.5923	730.024	2160.86	0	0
22	80.2134	730.161	2258.83	0	0
23	80.8345	730.313	2348.01	0	0
24	81.4556	730.483	2427.2	0	0
25	82.0767	730.67	2495.29	0	0
26	82.6979	730.874	2551.24	0	0
27	83.319	731.097	2594.06	0	0
28	83.9401	731.338	2622.85	0	0
29	84.5612	731.598	2636.74	0	0
30	85.1823	731.879	2634.98	0	0
31	85.8035	732.179	2616.85	0	0
32	86.4246	732.501	2581.74	0	0
33	87.0457	732.845	2529.09	0	0
34	87.6668	733.213	2458.46	0	0
35	88.2879	733.605	2369.5	0	0
36	88.9091	734.024	2261.97	0	0
37	89.5302	734.47	2135.76	0	0
38	90.1513	734.945	1990.93	0	0
39	90.7724	735.452	1827.7	0	0
40	91.3935	735.993	1646.53	0	0
41	92.0147	736.572	1448.14	0	0
42	92.6358	737.191	1233.6	0	0
43	93.2569	737.856	1004.42	0	0
44	93.878	738.572	762.692	0	0
45	94.4991	739.346	527.205	0	0
46	95.1202	740.187	339.102	0	0
47	95.7414	741.108	169.955	0	0
48	96.3625	742.126	12.7176	0	0
49	96.9836	743.268	-90.7847	0	0
50	97.6047	744.573	-110.16	0	0
51	98.2258	746.117	0	0	0

Section II Proposed topography - Curved PseudoStatic

Global Minimum Query (bishop simplified) - Safety Factor: 1.13199

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [deg]
1	54.1167	724.058	0	0	0
2	55.2287	724.026	151.937	0	0
3	56.3407	724.011	323.634	0	0
4	57.4527	724.013	511.388	0	0
5	58.5647	724.032	711.72	0	0
6	59.6768	724.068	921.357	0	0
7	60.7888	724.121	1137.22	0	0
8	61.9008	724.191	1356.43	0	0
9	63.0128	724.277	1576.27	0	0
10	64.1249	724.381	1794.2	0	0
11	65.2369	724.502	2007.85	0	0
12	66.3489	724.641	2214.99	0	0
13	67.4609	724.797	2413.55	0	0
14	68.5729	724.97	2601.61	0	0
15	69.685	725.161	2777.39	0	0
16	70.797	725.369	2938.05	0	0
17	71.909	725.596	3081.51	0	0
18	73.021	725.84	3210.49	0	0
19	74.133	726.103	3326.75	0	0
20	75.2451	726.384	3428.21	0	0
21	76.3571	726.684	3512.73	0	0
22	77.4691	727.003	3578.33	0	0
23	78.5811	727.341	3623.17	0	0
24	79.6932	727.699	3645.52	0	0
25	80.8052	728.076	3643.8	0	0
26	81.9172	728.474	3616.54	0	0
27	83.0292	728.892	3562.41	0	0
28	84.1412	729.33	3480.22	0	0
29	85.2533	729.79	3368.89	0	0
30	86.3653	730.272	3227.5	0	0
31	87.4773	730.775	3055.23	0	0
32	88.5893	731.302	2851.44	0	0
33	89.7014	731.851	2615.61	0	0
34	90.8134	732.425	2347.36	0	0
35	91.9254	733.023	2046.48	0	0
36	93.0374	733.646	1712.92	0	0
37	94.1494	734.294	1347.53	0	0
38	95.2615	734.97	1001.02	0	0
39	96.3735	735.673	644.127	0	0
40	97.4855	736.404	285.04	0	0
41	98.5975	737.165	-60.6257	0	0
42	99.7096	737.957	-387.987	0	0
43	100.822	738.781	-691.803	0	0
44	101.934	739.638	-966.438	0	0
45	103.046	740.53	-1205.82	0	0
46	104.158	741.459	-1403.38	0	0
47	105.27	742.425	-1565.53	0	0
48	106.382	743.433	-1674.03	0	0
49	107.494	744.483	-1719.83	0	0
50	108.606	745.578	-1693.73	0	0
51	109.718	746.722	0	0	0

Global Minimum Query (janbu simplified) - Safety Factor: 1.03932

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [deg]
1	11.4173	716	0	0	0
2	14.0177	714.04	1813.9	0	0
3	16.6181	712.233	4650.82	0	0
4	19.2185	710.569	8187.19	0	0
5	21.8189	709.036	12192.6	0	0
6	24.4193	707.626	16497.8	0	0
7	27.0197	706.334	20548.2	0	0
8	29.5691	705.174	24031.8	0	0
9	32.1186	704.116	26976.8	0	0
10	34.6681	703.156	29675.5	0	0
11	37.2176	702.289	32217	0	0
12	39.767	701.513	34582	0	0
13	42.3165	700.826	36619.6	0	0
14	44.866	700.224	38579.2	0	0
15	47.4154	699.707	40642.5	0	0
16	49.9649	699.272	42789.1	0	0
17	52.5144	698.918	44980.9	0	0
18	55.0638	698.645	47500.8	0	0
19	57.6133	698.451	50512.9	0	0
20	60.1628	698.335	53244.4	0	0
21	62.7123	698.298	55672.4	0	0
22	65.2617	698.34	57776.9	0	0
23	67.8112	698.46	59540.4	0	0
24	70.3607	698.659	60946.5	0	0
25	72.9101	698.937	61912.4	0	0
26	75.4596	699.296	62478.1	0	0
27	78.0091	699.735	62697.6	0	0
28	80.5586	700.258	62551.5	0	0
29	83.108	700.864	62022.8	0	0
30	85.6575	701.557	61096.8	0	0
31	88.207	702.338	59761.2	0	0
32	90.7564	703.21	58005.9	0	0
33	93.3059	704.176	55823.4	0	0
34	95.8554	705.24	53247.8	0	0
35	98.4048	706.406	50319.6	0	0
36	100.954	707.679	47092.3	0	0
37	103.504	709.064	43606.2	0	0
38	106.053	710.568	39924.2	0	0
39	108.603	712.199	36076.9	0	0
40	111.152	713.966	32115.5	0	0
41	113.702	715.88	28106.4	0	0
42	116.251	717.954	24127.6	0	0
43	118.801	720.205	20271.2	0	0
44	121.293	722.596	16601.5	0	0
45	123.786	725.199	12998	0	0
46	126.278	728.046	9550.17	0	0
47	128.77	731.178	6368.87	0	0
48	131.263	734.653	3594.72	0	0
49	133.755	738.554	1413.44	0	0
50	136.248	743.011	83.1974	0	0
51	138.74	748.249	0	0	0

Section II Proposed topography - Block Static

Global Minimum Query (bishop simplified) - Safety Factor: 2.00999

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [deg]
1	21.4235	716	0	0	0
2	23.5824	713.841	1014.7	0	0
3	25.7413	711.682	3153.6	0	0
4	27.9001	709.523	6416.69	0	0
5	30.059	707.365	10804	0	0
6	32.5272	706.47	12739.8	0	0
7	34.5771	705.727	14469.1	0	0
8	36.6271	704.983	16298.6	0	0
9	38.6771	704.24	18228.1	0	0
10	40.727	703.497	20201.2	0	0
11	42.777	702.754	22171.4	0	0
12	44.8269	702.011	24241.7	0	0
13	46.8769	701.268	26412.1	0	0
14	48.9268	700.524	28682.6	0	0
15	50.9768	699.781	31053.3	0	0
16	53.0268	699.038	33524.2	0	0
17	55.0767	698.295	36873	0	0
18	57.1267	697.552	41140.3	0	0
19	59.1766	696.809	45662.8	0	0
20	61.1631	697.61	44894.1	0	0
21	63.1496	698.412	44140	0	0
22	65.1361	699.214	43400.5	0	0
23	67.1226	700.016	42675.7	0	0
24	69.1091	700.817	41965.6	0	0
25	71.0956	701.619	41273.7	0	0
26	73.0821	702.421	40617.6	0	0
27	75.0686	703.223	39983.8	0	0
28	77.0551	704.025	39358.6	0	0
29	79.0416	704.826	38741.9	0	0
30	81.0281	705.628	38133.8	0	0
31	83.0146	706.43	37534.2	0	0
32	84.8736	708.429	33526.4	0	0
33	86.7326	710.428	29716.2	0	0
34	88.5917	712.427	26103.7	0	0
35	90.4507	714.425	22688.8	0	0
36	92.4635	716.59	19146.1	0	0
37	94.4763	718.754	15711.5	0	0
38	96.4891	720.918	12556	0	0
39	98.5277	722.957	9830.38	0	0
40	100.566	724.995	7339.82	0	0
41	102.605	727.034	5084.32	0	0
42	104.644	729.073	3044.64	0	0
43	106.682	731.111	1168.57	0	0
44	108.721	733.15	-472.445	0	0
45	110.76	735.189	-1878.4	0	0
46	112.798	737.227	-3049.29	0	0
47	114.837	739.266	-3985.12	0	0
48	116.876	741.305	-4685.89	0	0
49	118.914	743.343	-5151.61	0	0
50	120.953	745.382	-5382.26	0	0
51	122.992	747.421	0	0	0

Global Minimum Query (janbu simplified) - Safety Factor: 1.89185

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [deg]
1	23.6921	716	0	0	0
2	25.5948	714.097	895.52	0	0
3	27.4975	712.195	2706.87	0	0
4	29.4002	710.292	5434.04	0	0
5	31.3029	708.389	9077.03	0	0
6	33.2056	706.486	13635.8	0	0
7	33.2851	706.407	13846.2	0	0
8	35.2976	705.629	15688.7	0	0
9	37.3101	704.852	17641.6	0	0
10	39.3226	704.074	19705	0	0
11	41.3351	703.297	21766.9	0	0
12	43.3476	702.519	23882.3	0	0
13	45.3601	701.742	26108.2	0	0
14	47.3726	700.964	28444.6	0	0
15	49.3852	700.186	30891.4	0	0
16	51.3977	699.409	33448.7	0	0
17	53.4102	698.631	36116.5	0	0
18	55.4227	697.854	40010.3	0	0
19	57.4352	697.076	44613.5	0	0
20	59.4477	696.299	49488.1	0	0
21	61.4602	695.521	54634	0	0
22	63.3661	696.452	53357.9	0	0
23	65.2721	697.383	52106.7	0	0
24	67.1781	698.314	50880.3	0	0
25	69.084	699.246	49678.9	0	0
26	70.99	700.177	48507.8	0	0
27	72.896	701.108	47397.7	0	0
28	74.8019	702.039	46330.3	0	0
29	76.7079	702.97	45277.4	0	0
30	78.6139	703.901	44238.9	0	0
31	80.5198	704.832	43214.7	0	0
32	82.4258	705.763	42205	0	0
33	84.2136	707.884	38004	0	0
34	86.0013	710.005	34045.1	0	0
35	87.789	712.126	30328.4	0	0
36	89.5768	714.247	26853.7	0	0
37	91.6481	716.705	23039.1	0	0
38	93.7194	719.162	19366.2	0	0
39	95.7907	721.619	15983.7	0	0
40	97.8619	724.077	12882.1	0	0
41	99.9332	726.534	10119.5	0	0
42	102.005	728.991	7697.31	0	0
43	104.036	731.023	6026.48	0	0
44	106.068	733.055	4499.99	0	0
45	108.1	735.087	3188.77	0	0
46	110.132	737.119	2100.2	0	0
47	112.164	739.151	1234.27	0	0
48	114.196	741.183	590.994	0	0
49	116.228	743.215	170.365	0	0
50	118.26	745.247	-27.6173	0	0
51	120.292	747.279	0	0	0

Section II Proposed topography - Block , Pseudostatic

Global Minimum Query (bishop simplified) - Safety Factor: 1.23276

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [deg]
1	26.1012	716	0	0	0
2	28.4651	713.636	2229.01	0	0
3	30.829	711.272	6534.61	0	0
4	33.1929	708.908	12916.8	0	0
5	35.5567	706.544	21375.6	0	0
6	35.7945	706.307	22342.4	0	0
7	37.9546	705.42	24289.3	0	0
8	40.1147	704.532	26383.1	0	0
9	42.2748	703.645	28479.8	0	0
10	44.4349	702.758	30731.8	0	0
11	46.5949	701.871	33139.1	0	0
12	48.755	700.984	35701.6	0	0
13	50.9151	700.097	38419.5	0	0
14	53.0752	699.21	41292.6	0	0
15	55.2353	698.323	45177.9	0	0
16	57.3954	697.435	50000.8	0	0
17	59.5554	696.548	55157.8	0	0
18	61.7155	695.661	60648.9	0	0
19	63.8099	696.792	58185.8	0	0
20	65.9042	697.923	55734.4	0	0
21	67.9986	699.054	53294.5	0	0
22	70.0929	700.185	50866.3	0	0
23	72.1873	701.316	48526.8	0	0
24	74.2816	702.447	46307.5	0	0
25	76.376	703.577	44076.7	0	0
26	78.4703	704.708	41820.9	0	0
27	80.5647	705.839	39540.3	0	0
28	82.659	706.97	37234.7	0	0
29	84.7533	708.101	34904.2	0	0
30	86.9342	709.578	31647	0	0
31	89.115	711.055	28390.3	0	0
32	91.2958	712.533	25134.3	0	0
33	93.4766	714.01	21878.9	0	0
34	95.6574	715.487	18722	0	0
35	97.6124	716.811	15987.7	0	0
36	99.5674	718.135	13372.2	0	0
37	101.522	719.459	10878.1	0	0
38	103.477	720.784	8505.61	0	0
39	105.557	722.863	4958.19	0	0
40	107.636	724.942	1698.89	0	0
41	109.716	727.022	-1254.74	0	0
42	111.795	729.101	-3902.7	0	0
43	113.875	731.181	-6244.98	0	0
44	115.954	733.26	-8281.6	0	0
45	118.033	735.34	-10012.5	0	0
46	120.113	737.419	-11437.8	0	0
47	122.192	739.499	-12557.4	0	0
48	124.272	741.578	-13371.3	0	0
49	126.351	743.657	-13879.6	0	0
50	128.431	745.737	-14082.2	0	0
51	130.51	747.816	0	0	0

Global Minimum Query (janbu simplified) - Safety Factor: 1.13398

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [deg]
1	41.1286	715	0	0	0
2	43.1254	713.003	2085.89	0	0
3	45.1223	711.006	5901.83	0	0
4	47.1191	709.009	11447.8	0	0
5	49.016	708.542	12275.1	0	0
6	50.9129	708.074	13146	0	0
7	52.8098	707.606	14060.3	0	0
8	54.7067	707.138	28248.8	0	0
9	56.5944	706.673	30158.1	0	0
10	58.4821	706.207	32204.4	0	0
11	60.3698	705.742	34387.8	0	0
12	62.2574	705.276	36708.2	0	0
13	64.1451	704.811	39165.7	0	0
14	66.0328	704.345	41760.2	0	0
15	67.9204	703.88	44491.7	0	0
16	69.8081	703.414	47360.3	0	0
17	71.7291	704.651	45227.7	0	0
18	73.6501	705.889	43248.7	0	0
19	75.5711	707.126	41301.2	0	0
20	77.4921	708.363	39348.3	0	0
21	79.4131	709.6	37390	0	0
22	81.3341	710.837	35426.3	0	0
23	83.2551	712.074	33457.1	0	0
24	85.1761	713.311	31482.5	0	0
25	85.2526	713.366	31392.3	0	0
26	87.0427	714.645	29282.8	0	0
27	88.8329	715.925	27173.4	0	0
28	90.6231	717.204	25064	0	0
29	92.4133	718.483	22954.7	0	0
30	94.2035	719.763	20847.2	0	0
31	95.9936	721.042	18856.4	0	0
32	97.7838	722.322	16926.4	0	0
33	99.574	723.601	15101.8	0	0
34	101.364	724.881	13382.4	0	0
35	103.154	726.16	11768.3	0	0
36	104.945	727.44	10257.2	0	0
37	106.735	728.719	8848.21	0	0
38	108.525	729.998	7544.47	0	0
39	110.315	731.278	6346.02	0	0
40	112.105	732.557	5252.87	0	0
41	113.895	733.837	4265	0	0
42	115.686	735.116	3382.43	0	0
43	117.476	736.396	2605.14	0	0
44	119.266	737.675	1933.15	0	0
45	121.056	738.955	1366.45	0	0
46	122.846	740.234	905.039	0	0
47	124.637	741.513	548.921	0	0
48	126.427	742.793	298.094	0	0
49	128.119	744.485	51.6303	0	0
50	129.81	746.177	-4.97182	0	0
51	131.502	747.869	0	0	0

Entity Information

Section II Proposed topography

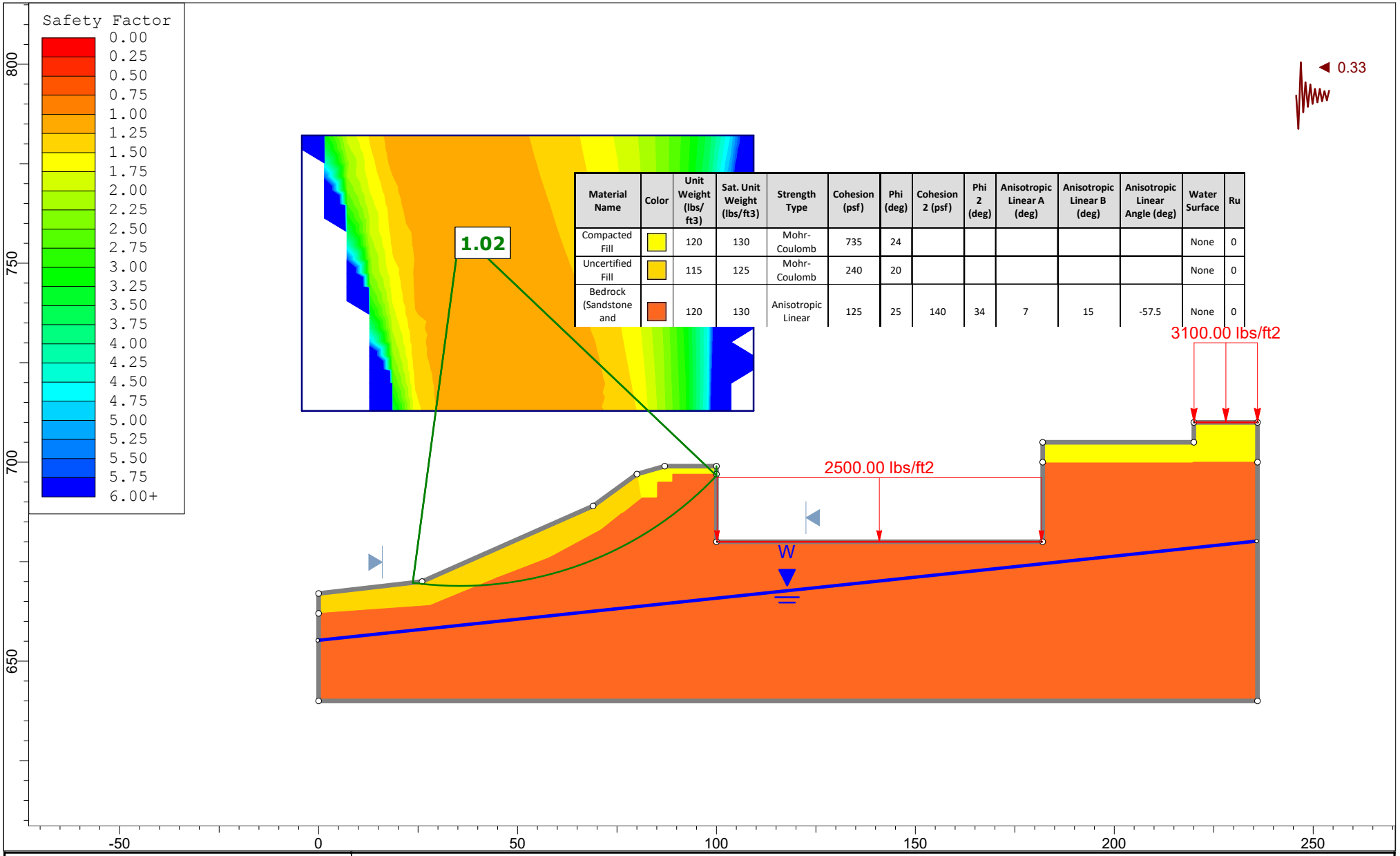
Shared Entities

Type	Coordinates (x,y)
External Boundary	0, 680 153, 680 153, 749 96, 746 95, 745 94, 746 73, 731 70, 732 54, 724 54, 715 40, 715 40, 716 0, 716

Scenario-based Entities

Type	Coordinates (x,y)	Master Scenario	Curved Static	Curved PseudoStatic	Block Static	Block , Pseudostatic
Water Table	-0.387, 705.658 54.028, 711.973 153.279, 727.234	Not assigned to any materials	Assigned to: Bedrock-Topanga Formatior	Assigned to: Bedrock-Topanga Formatior	Assigned to: Bedrock-Topanga Formatior	Not assigned to any materials
Distributed Load	153, 749 104.211, 746.432	Constant DistributionOrientation: Normal to boundaryMagnitude: 100 lbs/ft2Creates Excess Pore Pressure: No	Constant DistributionOrientation: Normal to boundaryMagnitude: 100 lbs/ft2Creates Excess Pore Pressure: No	Constant DistributionOrientation: Normal to boundaryMagnitude: 100 lbs/ft2Creates Excess Pore Pressure: No	Constant DistributionOrientation: Normal to boundaryMagnitude: 100 lbs/ft2Creates Excess Pore Pressure: No	Constant DistributionOrientation: Normal to boundaryMagnitude: 100 lbs/ft2Creates Excess Pore Pressure: No
Block Search Window	57.118, 705.488 78.411, 704.345 77.787, 715.043 57.326, 714.836					

Block Search Window	76.957, 719.821 104.792, 719.51 103.442, 728.754 76.437, 729.169					
Block Search Window	98.664, 733.324 127.227, 733.739 126.604, 741.737 98.976, 741.737					
Block Search Window	52.707, 695.025 52.589, 709.714 24.964, 710.408 24.633, 695.262					
Block Search Window	56.498, 694.788 73.081, 694.196 74.384, 728.903 57.327, 721.085					
Block Search Window	76.043, 698.223 86.348, 698.697 88.007, 735.774 76.675, 728.766					
Block Search Window	91.205, 699.526 118.45, 698.46 120.464, 744.184 92.508, 737.314					
Block Search Window	99.379, 696.683 126.979, 695.973 126.742, 744.184 100.208, 740.749					

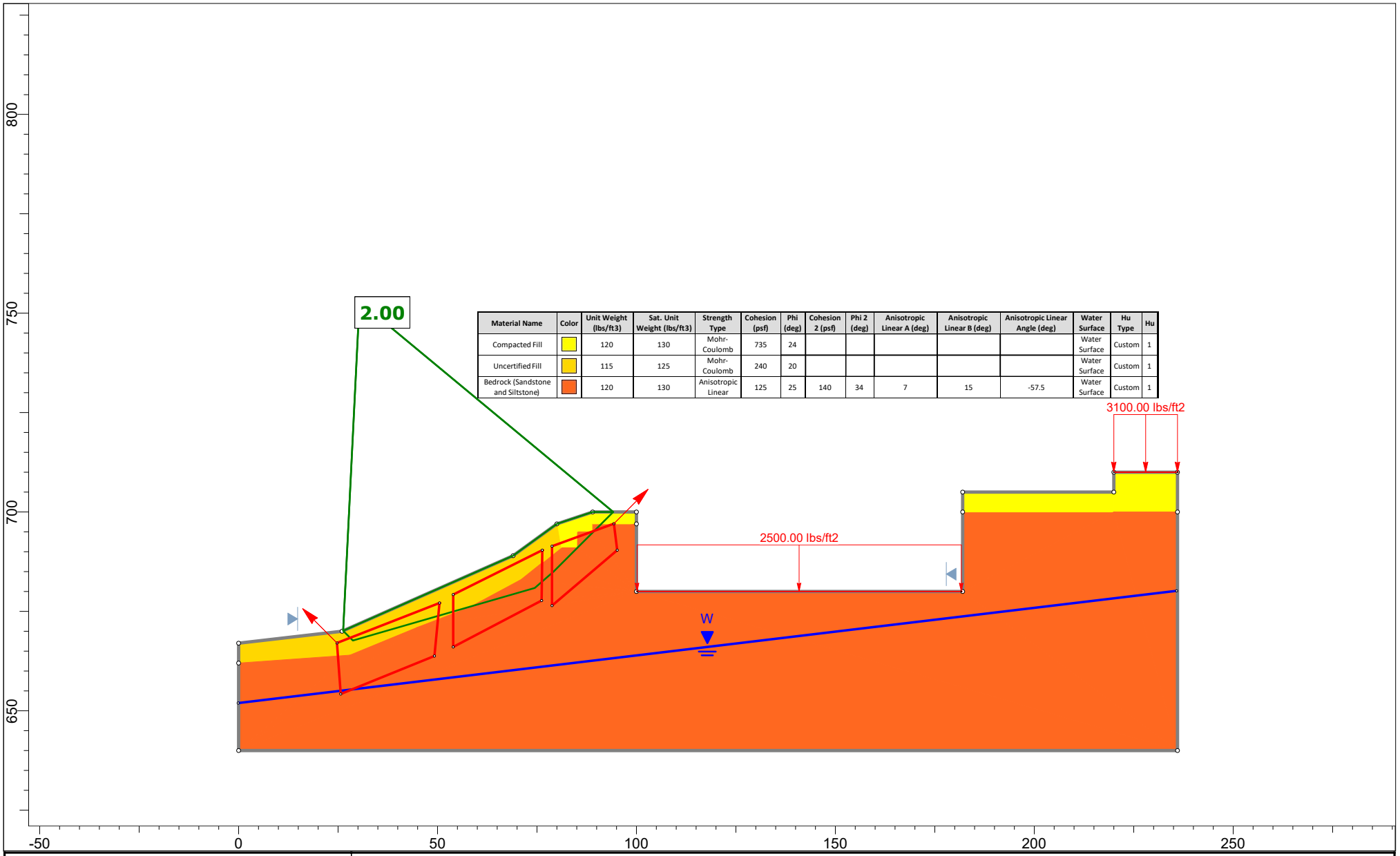


Material Name	Color	Unit Weight (lbs/ ft3)	Sat. Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Cohesion 2 (psf)	Phi 2 (deg)	Anisotropic Linear A (deg)	Anisotropic Linear B (deg)	Anisotropic Linear Angle (deg)	Water Surface	Ru
Compacted Fill		120	130	Mohr-Coulomb	735	24						None	0
Uncertified Fill		115	125	Mohr-Coulomb	240	20						None	0
Bedrock (Sandstone and		120	130	Anisotropic Linear	125	25	140	34	7	15	-57.5	None	0

GEOTECHNOLOGIES, INC.
CONSULTING GEOTECHNICAL ENGINEERS

SLIDEINTERPRET 9.012

Project	File No. 21578 Hilton-Los Angeles/Universal City		
Analysis	Cross Section D-D'		
Scale	1:400	Comment 1	Curved PseudoStatic
Date	12/6/2022	File Name	Proposed Hotel Extension

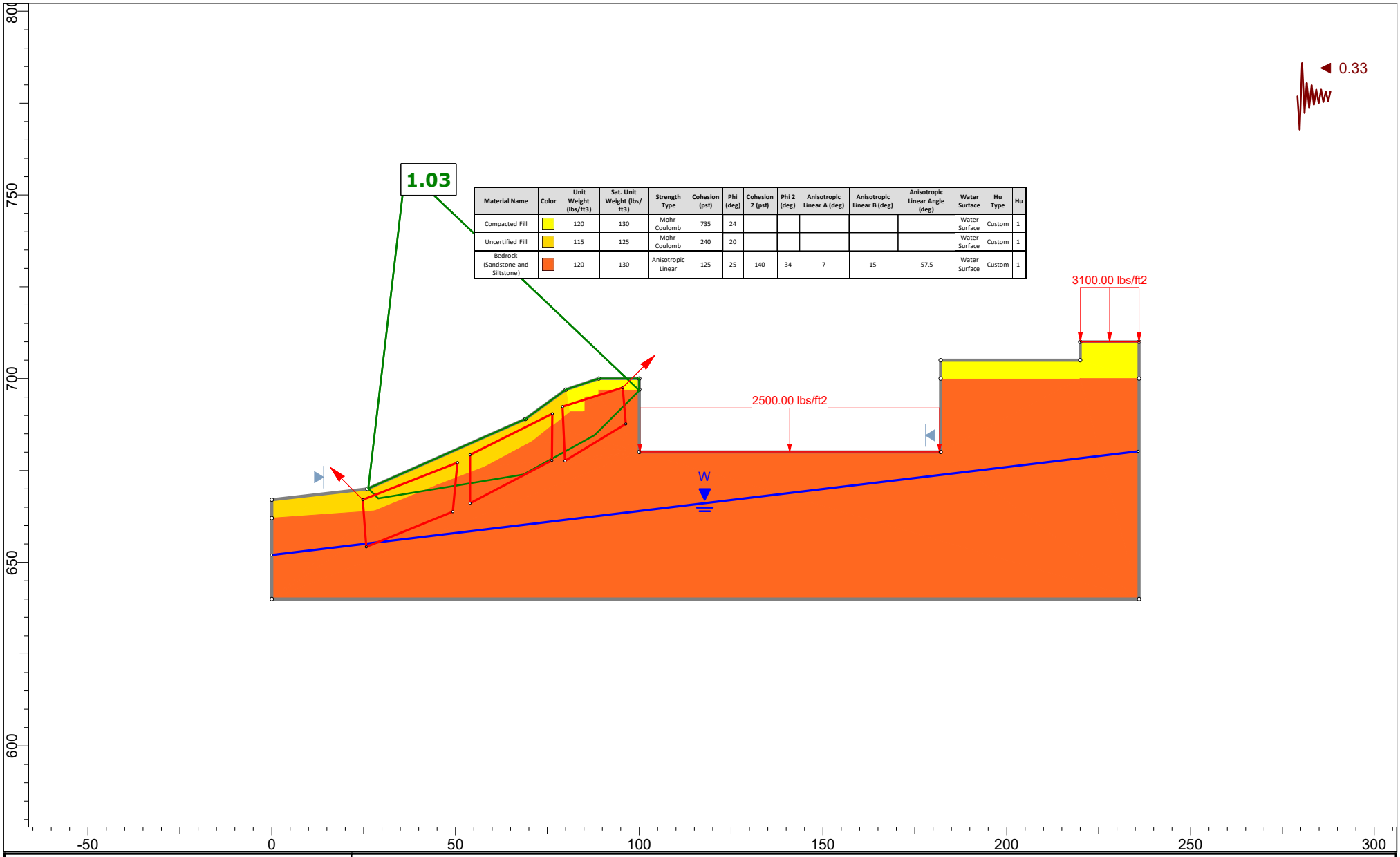


Material Name	Color	Unit Weight (lbs/ft3)	Sat. Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Cohesion 2 (psf)	Phi 2 (deg)	Anisotropic Linear A (deg)	Anisotropic Linear B (deg)	Anisotropic Linear Angle (deg)	Water Surface	Hu Type	Hu
Compacted Fill		120	130	Mohr-Coulomb	735	24						Water Surface	Custom	1
Uncertified Fill		115	125	Mohr-Coulomb	240	20						Water Surface	Custom	1
Bedrock (Sandstone and Siltstone)		120	130	Anisotropic Linear	125	25	140	34	7	15	-57.5	Water Surface	Custom	1

GEOTECHNOLOGIES, INC.
CONSULTING GEOTECHNICAL ENGINEERS

SLIDEINTERPRET 9.012

Project	File No. 21578 Hilton-Los Angeles/Universal City		
Analysis	Cross Section D-D'		
Scale	1:400	*Comment 1*	Block Static
Date	12/6/2022	*File Name*	Proposed Hotel Extension



Material Name	Color	Unit Weight (lbs/ft3)	Sat. Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Cohesion 2 (psf)	Phi 2 (deg)	Anisotropic Linear A (deg)	Anisotropic Linear B (deg)	Anisotropic Linear Angle (deg)	Water Surface	Hu Type	Hu
Compacted Fill		120	130	Mohr-Coulomb	735	24						Water Surface	Custom	1
Uncertified Fill		115	125	Mohr-Coulomb	240	20						Water Surface	Custom	1
Bedrock (Sandstone and Siltstone)		120	130	Anisotropic Linear	125	25	140	34	7	15	-57.5	Water Surface	Custom	1

GEOTECHNOLOGIES, INC.
CONSULTING GEOTECHNICAL ENGINEERS

SLIDEINTERPRET 9.012

Project	File No. 21578 Hilton-Los Angeles/Universal City		
Analysis	Cross Section D-D'		
Scale	1:433	*Comment 1*	Block PseudoStatic
Date	12/6/2022	*File Name*	Proposed Hotel Extension

rocscience

21578Hilton XS DD Update 12-5-22
File No 21578 Hilton Expansion
Geotechnologies, Inc.
Date Created: 4/17/20
Software Version: 9.012

Table of Contents

Project Summary 5
Currently Open Scenarios 5
General Settings 6
Analysis Options 7
Curved Static - Curved PseudoStatic 7
All other Scenarios 7
Groundwater Analysis 8
All Open Scenarios 8
Random Numbers 9
All Open Scenarios 9
Surface Options 10
Curved Static - Master Scenario 10
Curved Static - Curved PseudoStatic 10
Block Static 10
Seismic Loading 11
Curved Static - Master Scenario 11
Curved Static - Curved PseudoStatic 11
Block Static - Master Scenario 11
Block Static - Block PseudoStatic 11
Loading 12
All Open Scenarios 12
Materials 13
Materials In Use 13
Global Minimums 14
Curved Static - Master Scenario 14
Method: bishop simplified 14
Method: janbu simplified 14
Curved Static - Curved PseudoStatic 14
Method: bishop simplified 14
Method: janbu simplified 14
Method: gle/morgenstern-price 15
Block Static - Master Scenario 15
Method: bishop simplified 15
Method: janbu simplified 15
Block Static - Block PseudoStatic 16
Method: bishop simplified 16
Method: janbu simplified 16
Global Minimum Coordinates 17
Block Static - Master Scenario 17
Method: bishop simplified 17
Method: janbu simplified 17
Block Static - Block PseudoStatic 17

Method: bishop simplified 17
Method: janbu simplified 17
Global Minimum Support Data 18
All Open Scenarios 18
Valid and Invalid Surfaces 19
Curved Static - Master Scenario 19
Method: bishop simplified 19
Method: janbu simplified 19
Curved Static - Curved PseudoStatic 19
Method: bishop simplified 19
Method: janbu simplified 19
Method: gle/morgenstern-price 19
Block Static - Master Scenario 20
Method: bishop simplified 20
Method: janbu simplified 20
Block Static - Block PseudoStatic 20
Method: bishop simplified 20
Method: janbu simplified 20
Error Code Descriptions 20
Slice Data 22
Curved Static - Master Scenario 22
Global Minimum Query (bishop simplified) - Safety Factor: 2.05963 22
Global Minimum Query (janbu simplified) - Safety Factor: 1.98266 25
Curved Static - Curved PseudoStatic 28
Global Minimum Query (bishop simplified) - Safety Factor: 1.08246 28
Global Minimum Query (janbu simplified) - Safety Factor: 1.02299 31
Global Minimum Query (gle/morgenstern-price) - Safety Factor: 1.06434 34
Block Static - Master Scenario 37
Global Minimum Query (bishop simplified) - Safety Factor: 2.06523 37
Global Minimum Query (janbu simplified) - Safety Factor: 2.00241 40
Block Static - Block PseudoStatic 43
Global Minimum Query (bishop simplified) - Safety Factor: 1.10791 43
Global Minimum Query (janbu simplified) - Safety Factor: 1.02961 46
Interslice Data 49
Curved Static - Master Scenario 49
Global Minimum Query (bishop simplified) - Safety Factor: 2.05963 49
Global Minimum Query (janbu simplified) - Safety Factor: 1.98266 50
Curved Static - Curved PseudoStatic 51
Global Minimum Query (bishop simplified) - Safety Factor: 1.08246 51
Global Minimum Query (janbu simplified) - Safety Factor: 1.02299 52
Global Minimum Query (gle/morgenstern-price) - Safety Factor: 1.06434 53
Block Static - Master Scenario 54
Global Minimum Query (bishop simplified) - Safety Factor: 2.06523 54

Global Minimum Query (janbu simplified) - Safety Factor: 2.00241 55
Block Static - Block PseudoStatic 56
Global Minimum Query (bishop simplified) - Safety Factor: 1.10791 56
Global Minimum Query (janbu simplified) - Safety Factor: 1.02961 57
Entity Information 58
Curved Static 58
Shared Entities 58
Scenario-based Entities 58
Block Static 59
Shared Entities 59
Scenario-based Entities 60

Slide Analysis Information

21578Hilton XS DD Update 12-5-22

Project Summary

File Name:	21578Hilton XS DD Update 12-5-22.slmd
Slide Modeler Version:	9.012
Project Title:	File No 21578 Hilton Expansion
Analysis:	Cross Section D-D'
Author:	RTK
Company:	Geotechnologies, Inc.
Date Created:	4/17/20
Comments	
	Curved Static

Currently Open Scenarios

Group Name	Scenario Name	Global Minimum	Compute Time
Curved Static	Master Scenario	Bishop Simplified: 2.059630 Janbu Simplified: 1.982660	00h:00m:00.521s
	Curved PseudoStatic	Bishop Simplified: 1.082460 Janbu Simplified: 1.022990 Gle/morgenstern-price: 1.064340	00h:00m:02.41s
Block Static	Master Scenario	Bishop Simplified: 2.065230 Janbu Simplified: 2.002410	00h:00m:01.500s
	Block PseudoStatic	Bishop Simplified: 1.107910 Janbu Simplified: 1.029610	00h:00m:01.486s

General Settings

Units of Measurement:	Imperial Units
Time Units:	days
Permeability Units:	feet/second
Data Output:	Standard
Failure Direction:	Right to Left

Analysis Options

Curved Static - Curved PseudoStatic

Slices Type:	Vertical
Analysis Methods Used	
	Bishop simplified
	GLE/Morgenstern-Price with interslice force function (Half Sine)
	Janbu simplified
Number of slices:	50
Tolerance:	0.005
Maximum number of iterations:	75
Check malpha < 0.2:	Yes
Create Interslice boundaries at intersections with water tables and piezos:	Yes
Initial trial value of FS:	1
Steffensen Iteration:	Yes

All other Scenarios

Slices Type:	Vertical
Analysis Methods Used	
	Bishop simplified
	Janbu simplified
Number of slices:	50
Tolerance:	0.005
Maximum number of iterations:	75
Check malpha < 0.2:	Yes
Create Interslice boundaries at intersections with water tables and piezos:	Yes
Initial trial value of FS:	1
Steffensen Iteration:	Yes

Groundwater Analysis

All Open Scenarios

Groundwater Method:	Water Surfaces
Pore Fluid Unit Weight [lbs/ft3]:	62.4
Use negative pore pressure cutoff:	Yes
Maximum negative pore pressure [psf]:	0
Advanced Groundwater Method:	None

Random Numbers

All Open Scenarios

Pseudo-random Seed:	10116
Random Number Generation Method:	Park and Miller v.3

Surface Options

Curved Static - Master Scenario

Surface Type:	Circular
Search Method:	Grid Search
Radius Increment:	10
Composite Surfaces:	Disabled
Reverse Curvature:	Invalid Surfaces
Minimum Elevation [ft]:	640
Minimum Depth:	Not Defined
Minimum Area:	Not Defined
Minimum Weight:	Not Defined

Curved Static - Curved PseudoStatic

Surface Type:	Circular
Search Method:	Grid Search
Radius Increment:	10
Composite Surfaces:	Disabled
Reverse Curvature:	Invalid Surfaces
Minimum Elevation:	Not Defined
Minimum Depth:	Not Defined
Minimum Area:	Not Defined
Minimum Weight:	Not Defined

Block Static

Surface Type:	Non-Circular Block Search
Number of Surfaces:	10000
Multiple Groups:	Disabled
Pseudo-Random Surfaces:	Enabled
Convex Surfaces Only:	Disabled
Left Projection Angle (Start Angle) [deg]:	135
Left Projection Angle (End Angle) [deg]:	135
Right Projection Angle (Start Angle) [deg]:	45
Right Projection Angle (End Angle) [deg]:	45
Minimum Elevation [ft]:	640
Minimum Depth:	Not Defined
Minimum Area:	Not Defined
Minimum Weight:	Not Defined

Seismic Loading

Curved Static - Master Scenario

Advanced seismic analysis:	No
Staged pseudostatic analysis:	No

Curved Static - Curved PseudoStatic

Advanced seismic analysis:	No
Staged pseudostatic analysis:	No
Seismic Load Coefficient (Horizontal):	0.33

Block Static - Master Scenario

Advanced seismic analysis:	No
Staged pseudostatic analysis:	No

Block Static - Block PseudoStatic

Advanced seismic analysis:	No
Staged pseudostatic analysis:	No
Seismic Load Coefficient (Horizontal):	0.33

Loading

All Open Scenarios

Distribution:	Constant
Magnitude [psf]:	3100
Orientation:	Normal to boundary

Distribution:	Constant
Magnitude [psf]:	2500
Orientation:	Normal to boundary

Materials

Compacted Fill	
Color	
Strength Type	Mohr-Coulomb
Unsaturated Unit Weight [lbs/ft3]	120
Saturated Unit Weight [lbs/ft3]	130
Cohesion [psf]	735
Friction Angle [deg]	24
Water Surface	Assigned per scenario
Hu Value	1
Uncertified Fill	
Color	
Strength Type	Mohr-Coulomb
Unsaturated Unit Weight [lbs/ft3]	115
Saturated Unit Weight [lbs/ft3]	125
Cohesion [psf]	240
Friction Angle [deg]	20
Water Surface	Assigned per scenario
Hu Value	1
Bedrock (Sandstone and Siltstone)	
Color	
Strength Type	Anisotropic Linear
Unsaturated Unit Weight [lbs/ft3]	120
Saturated Unit Weight [lbs/ft3]	130
Cohesion 1 [psf]	125
Cohesion 2 [psf]	140
Friction Angle 1 [deg]	25
Friction Angle 2 [deg]	34
A [deg]	7
B [deg]	15
Anisotropic Definition	Angle
Angle from 1 [deg]	-57.5
Anisotropic Surface	
Water Surface	Assigned per scenario
Hu Value	1

Materials In Use

Material	Curved Static	Curved PseudoStatic	Block Static	Block PseudoStatic
Compacted Fill	✓	✓	✓	✓
Uncertified Fill	✓	✓	✓	✓
Bedrock (Sandstone and Siltstone)	✓	✓	✓	✓

Global Minimums

Curved Static - Master Scenario

Method: bishop simplified

FS	2.059630
Center:	24.149, 768.264
Radius:	98.260
Left Slip Surface Endpoint:	26.052, 670.023
Right Slip Surface Endpoint:	93.845, 699.000
Resisting Moment:	4.06014e+06 lb-ft
Driving Moment:	1.97129e+06 lb-ft
Total Slice Area:	427.465 ft2
Surface Horizontal Width:	67.7927 ft
Surface Average Height:	6.30547 ft

Method: janbu simplified

FS	1.982660
Center:	41.184, 726.748
Radius:	58.083
Left Slip Surface Endpoint:	26.974, 670.430
Right Slip Surface Endpoint:	92.210, 699.000
Resisting Horizontal Force:	52129.9 lb
Driving Horizontal Force:	26292.9 lb
Total Slice Area:	640.541 ft2
Surface Horizontal Width:	65.2362 ft
Surface Average Height:	9.8188 ft

Curved Static - Curved PseudoStatic

Method: bishop simplified

FS	1.082460
Center:	29.828, 775.184
Radius:	105.231
Left Slip Surface Endpoint:	26.047, 670.021
Right Slip Surface Endpoint:	100.000, 696.766
Left Slope Intercept:	26.047 670.021
Right Slope Intercept:	100.000 699.000
Resisting Moment:	5.63246e+06 lb-ft
Driving Moment:	5.2034e+06 lb-ft
Total Slice Area:	646.46 ft2
Surface Horizontal Width:	73.9531 ft
Surface Average Height:	8.74148 ft

Method: janbu simplified

FS	1.022990
Center:	35.506, 757.885
Radius:	88.954
Left Slip Surface Endpoint:	23.635, 669.727
Right Slip Surface Endpoint:	100.000, 696.621
Left Slope Intercept:	23.635 669.727
Right Slope Intercept:	100.000 699.000
Resisting Horizontal Force:	56551.4 lb
Driving Horizontal Force:	55280.4 lb
Total Slice Area:	759.925 ft2
Surface Horizontal Width:	76.365 ft
Surface Average Height:	9.95123 ft

Method: gle/morgenstern-price

FS	1.064340
Center:	29.828, 782.103
Radius:	110.582
Left Slip Surface Endpoint:	29.444, 671.522
Right Slip Surface Endpoint:	100.000, 696.639
Left Slope Intercept:	29.444 671.522
Right Slope Intercept:	100.000 699.000
Resisting Moment:	5.10835e+06 lb-ft
Driving Moment:	4.79953e+06 lb-ft
Resisting Horizontal Force:	42904.8 lb
Driving Horizontal Force:	40311 lb
Total Slice Area:	566.478 ft2
Surface Horizontal Width:	70.5557 ft
Surface Average Height:	8.0288 ft

Block Static - Master Scenario

Method: bishop simplified

FS	2.065230
Axis Location:	30.403, 752.958
Left Slip Surface Endpoint:	26.318, 670.141
Right Slip Surface Endpoint:	94.206, 700.000
Resisting Moment:	3.80665e+06 lb-ft
Driving Moment:	1.8432e+06 lb-ft
Total Slice Area:	481.464 ft2
Surface Horizontal Width:	67.8876 ft
Surface Average Height:	7.09208 ft

Method: janbu simplified

FS	2.002410
Axis Location:	30.403, 752.958
Left Slip Surface Endpoint:	26.318, 670.141
Right Slip Surface Endpoint:	94.206, 700.000
Resisting Horizontal Force:	40208.9 lb
Driving Horizontal Force:	20080.3 lb
Total Slice Area:	481.464 ft2
Surface Horizontal Width:	67.8876 ft
Surface Average Height:	7.09208 ft

Block Static - Block PseudoStatic

Method: bishop simplified

FS	1.107910
Axis Location:	36.978, 756.913
Left Slip Surface Endpoint:	26.318, 670.141
Right Slip Surface Endpoint:	100.000, 696.321
Left Slope Intercept:	26.318 670.141
Right Slope Intercept:	100.000 700.000
Resisting Moment:	4.15528e+06 lb-ft
Driving Moment:	3.75057e+06 lb-ft
Total Slice Area:	601.496 ft2
Surface Horizontal Width:	73.6816 ft
Surface Average Height:	8.16346 ft

Method: janbu simplified

FS	1.029610
Axis Location:	36.445, 757.201
Left Slip Surface Endpoint:	26.247, 670.109
Right Slip Surface Endpoint:	100.000, 696.788
Left Slope Intercept:	26.247 670.109
Right Slope Intercept:	100.000 700.000
Resisting Horizontal Force:	58178.1 lb
Driving Horizontal Force:	56505 lb
Total Slice Area:	793.834 ft2
Surface Horizontal Width:	73.7526 ft
Surface Average Height:	10.7635 ft

Global Minimum Coordinates

Block Static - Master Scenario

Method: bishop simplified

X	Y
26.3184	670.141
28.7636	667.696
74.4429	680.894
79.2036	684.998
94.206	700

Method: janbu simplified

X	Y
26.3184	670.141
28.7636	667.696
74.4429	680.894
79.2036	684.998
94.206	700

Block Static - Block PseudoStatic

Method: bishop simplified

X	Y
26.3184	670.141
28.7636	667.696
74.4429	680.894
95.5375	691.859
100	696.321
100.001	700

Method: janbu simplified

X	Y
26.2474	670.109
28.9487	667.408
68.4573	673.91
87.8364	684.625
100	696.788
100.001	700

Global Minimum Support Data

All Open Scenarios

No Supports Present

Valid and Invalid Surfaces

Curved Static - Master Scenario

Method: bishop simplified

Number of Valid Surfaces:	7473
Number of Invalid Surfaces:	1788
Error Codes	
Error Code -103 reported for 32 surfaces	
Error Code -106 reported for 6 surfaces	
Error Code -107 reported for 938 surfaces	
Error Code -108 reported for 14 surfaces	
Error Code -1000 reported for 798 surfaces	

Method: janbu simplified

Number of Valid Surfaces:	7396
Number of Invalid Surfaces:	1865
Error Codes	
Error Code -103 reported for 32 surfaces	
Error Code -106 reported for 5 surfaces	
Error Code -107 reported for 938 surfaces	
Error Code -108 reported for 44 surfaces	
Error Code -111 reported for 48 surfaces	
Error Code -1000 reported for 798 surfaces	

Curved Static - Curved PseudoStatic

Method: bishop simplified

Number of Valid Surfaces:	8089
Number of Invalid Surfaces:	1172
Error Codes	
Error Code -106 reported for 4 surfaces	
Error Code -107 reported for 293 surfaces	
Error Code -108 reported for 14 surfaces	
Error Code -1000 reported for 861 surfaces	

Method: janbu simplified

Number of Valid Surfaces:	8046
Number of Invalid Surfaces:	1215
Error Codes	
Error Code -106 reported for 4 surfaces	
Error Code -107 reported for 293 surfaces	
Error Code -108 reported for 43 surfaces	
Error Code -111 reported for 14 surfaces	
Error Code -1000 reported for 861 surfaces	

Method: gle/morgenstern-price

Number of Valid Surfaces:	7736
Number of Invalid Surfaces:	1525

Error Codes

Error Code -106 reported for 4 surfaces
Error Code -107 reported for 293 surfaces
Error Code -108 reported for 53 surfaces
Error Code -111 reported for 314 surfaces
Error Code -1000 reported for 861 surfaces

Block Static - Master Scenario

Method: bishop simplified

Number of Valid Surfaces:	9991
Number of Invalid Surfaces:	9

Error Codes

Error Code -108 reported for 7 surfaces
Error Code -112 reported for 2 surfaces

Method: janbu simplified

Number of Valid Surfaces:	9981
Number of Invalid Surfaces:	19

Error Codes

Error Code -108 reported for 12 surfaces
Error Code -111 reported for 6 surfaces
Error Code -112 reported for 1 surface

Block Static - Block PseudoStatic

Method: bishop simplified

Number of Valid Surfaces:	10000
Number of Invalid Surfaces:	0

Method: janbu simplified

Number of Valid Surfaces:	9998
Number of Invalid Surfaces:	2

Error Codes

Error Code -111 reported for 2 surfaces

Error Code Descriptions

The following errors were encountered during the computation:

-103 = Two surface / slope intersections, but one or more surface / nonslope external polygon intersections lie between them. This usually occurs when the slip surface extends past the bottom of the soil region, but may also occur on a benched slope model with two sets of Slope Limits.

-106 = Average slice width is less than 0.0001 * (maximum horizontal extent of soil region). This limitation is imposed to avoid numerical errors which may result from too many slices, or too small a slip region.

-107 = Total driving moment or total driving force is negative. This will occur if the wrong failure direction is specified, or if high external or anchor loads are applied against the failure direction.

-108 = Total driving moment or total driving force < 0.1. This is to limit the calculation of extremely high safety factors if the driving force is very small (0.1 is an arbitrary number).

-111 = Safety factor equation did not converge

-112 = The coefficient M-Alpha = cos(alpha)(1+tan(alpha)tan(phi)/F) < 0.2 for the final iteration of the safety factor calculation. This screens out some slip surfaces which may not be valid in the context of the analysis, in particular, deep seated slip surfaces with many high negative base angle slices in the passive zone.

-1000 = No valid slip surface is generated

Slice Data

Curved Static - Master Scenario

Global Minimum Query (bishop simplified) - Safety Factor: 2.05963

Slice Number	Width [ft]	Weight [lbs]	Angle of Slice Base [deg]	Base Material	Base Cohesion [psf]	Base Friction Angle [deg]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]	Base Vertical Stress [psf]	Effective Vertical Stress [psf]
1	1.39399	46.4139	1.51603	Uncertified Fill	240	20	121.841	250.947	30.076	0	30.076	33.3007	33.3007
2	1.39399	137.654	2.32936	Uncertified Fill	240	20	133.021	273.975	93.3452	0	93.3452	98.7562	98.7562
3	1.39399	225.715	3.14316	Uncertified Fill	240	20	143.747	296.065	154.039	0	154.039	161.932	161.932
4	1.39399	310.592	3.95759	Uncertified Fill	240	20	154.019	317.223	212.168	0	212.168	222.823	222.823
5	1.39399	392.274	4.77283	Uncertified Fill	240	20	163.841	337.451	267.745	0	267.745	281.425	281.425
6	1.39399	470.753	5.58904	Uncertified Fill	240	20	173.212	356.753	320.778	0	320.778	337.728	337.728
7	1.39399	546.016	6.40638	Uncertified Fill	240	20	182.136	375.132	371.274	0	371.274	391.724	391.724
8	1.39399	618.047	7.22504	Uncertified Fill	240	20	190.612	392.59	419.238	0	419.238	443.402	443.402
9	1.39399	686.831	8.04518	Uncertified Fill	240	20	198.642	409.128	464.675	0	464.675	492.752	492.752
10	1.39399	752.349	8.86699	Uncertified Fill	240	20	206.224	424.746	507.585	0	507.585	539.758	539.758
11	1.39399	814.58	9.69064	Uncertified Fill	240	20	213.361	439.445	547.972	0	547.972	584.406	584.406
12	1.39399	873.5	10.5163	Uncertified Fill	240	20	220.052	453.225	585.831	0	585.831	626.68	626.68
13	1.39399	929.084	11.3442	Uncertified Fill	240	20	226.295	466.084	621.161	0	621.161	666.561	666.561
14	1.39399	981.304	12.1745	Uncertified Fill	240	20	232.091	478.021	653.958	0	653.958	704.029	704.029
15	1.39399	1030.13	13.0074	Uncertified Fill	240	20	237.437	489.033	684.213	0	684.213	739.062	739.062
16	1.39399	1075.53	13.8431	Uncertified Fill	240	20	242.334	499.118	711.922	0	711.922	771.638	771.638
17	1.39399	1117.46	14.6819	Uncertified Fill	240	20	246.778	508.271	737.07	0	737.07	801.727	801.727
18	1.39399	1155.89	15.5238	Uncertified Fill	240	20	250.767	516.488	759.644	0	759.644	829.3	829.3
19	1.39399	1190.77	16.3692	Uncertified Fill	240	20	254.301	523.765	779.636	0	779.636	854.333	854.333
20	1.39399	1222.07	17.2183	Uncertified Fill	240	20	257.374	530.096	797.029	0	797.029	876.79	876.79

21	1.39399	1249.73	18.0713	Uncertified Fill	240	20	259.986	535.474	811.806	0	811.806	896.639	896.639
22	1.39399	1273.69	18.9285	Uncertified Fill	240	20	262.131	539.892	823.943	0	823.943	913.836	913.836
23	1.39399	1293.91	19.7901	Uncertified Fill	240	20	263.806	543.343	833.425	0	833.425	928.35	928.35
24	1.33708	1257.3	20.6386	Bedrock (Sandstone and Siltstone)	140	34	334.703	689.364	814.469	0	814.469	940.533	940.533
25	1.33708	1270.36	21.4741	Bedrock (Sandstone and Siltstone)	140	34	335.913	691.857	818.163	0	818.163	950.308	950.308
26	1.33708	1279.8	22.3144	Bedrock (Sandstone and Siltstone)	140	34	336.301	692.656	819.347	0	819.347	957.373	957.373
27	1.33708	1285.54	23.1598	Bedrock (Sandstone and Siltstone)	140	34	335.862	691.752	818.009	0	818.009	961.681	961.681
28	1.33708	1287.53	24.0105	Bedrock (Sandstone and Siltstone)	140	34	334.593	689.138	814.131	0	814.131	963.175	963.175
29	1.33708	1285.69	24.867	Bedrock (Sandstone and Siltstone)	140	34	332.488	684.803	807.703	0	807.703	961.806	961.806
30	1.33708	1279.94	25.7294	Bedrock (Sandstone and Siltstone)	140	34	329.542	678.734	798.703	0	798.703	957.509	957.509
31	1.33708	1270.2	26.5981	Bedrock (Sandstone and Siltstone)	140	34	325.748	670.92	787.125	0	787.125	950.233	950.233
32	1.33708	1277.98	27.4734	Bedrock (Sandstone and Siltstone)	140	34	325.623	670.663	786.738	0	786.738	956.055	956.055
33	1.33708	1318.21	28.3558	Bedrock (Sandstone and Siltstone)	140	34	332.214	684.237	806.863	0	806.863	986.159	986.159
34	1.33708	1356.45	29.2456	Bedrock (Sandstone and Siltstone)	140	34	338.275	696.721	825.375	0	825.375	1014.78	1014.78
35	1.33708	1390.78	30.1431	Bedrock (Sandstone and Siltstone)	140	34	343.41	707.298	841.052	0	841.052	1040.47	1040.47
36	1.33708	1420.59	31.049	Bedrock (Sandstone and Siltstone)	140	34	347.509	715.739	853.57	0	853.57	1062.78	1062.78
37	1.33708	1445.75	31.9635	Bedrock (Sandstone and Siltstone)	140	34	350.555	722.014	862.874	0	862.874	1081.61	1081.61
38	1.33708	1466.13	32.8872	Bedrock (Sandstone and Siltstone)	140	34	352.535	726.091	868.916	0	868.916	1096.87	1096.87
39	1.33708	1481.58	33.8207	Bedrock (Sandstone and Siltstone)	140	34	353.43	727.936	871.652	0	871.652	1108.44	1108.44
40	1.33708	1485.04	34.7644	Bedrock (Sandstone and Siltstone)	140	34	351.849	724.678	866.824	0	866.824	1111.04	1111.04

41	1.33708	1434.17	35.7191	Bedrock (Sandstone and Siltstone)	140	34	339.434	699.108	828.911	0	828.911	1072.99	1072.99
42	1.33708	1338.84	36.6854	Bedrock (Sandstone and Siltstone)	140	34	318.346	655.674	764.517	0	764.517	1001.68	1001.68
43	1.33708	1237.42	37.664	Bedrock (Sandstone and Siltstone)	140	34	296.276	610.219	697.125	0	697.125	925.816	925.816
44	0.144717	127.657	38.2101	Compacted Fill	735	24	468.023	963.955	514.242	0	514.242	882.675	882.675
45	1.35966	1136.05	38.7723	Bedrock (Sandstone and Siltstone)	140	34	270.546	557.225	618.564	0	618.564	835.873	835.873
46	1.35966	1009.06	39.7967	Bedrock (Sandstone and Siltstone)	140	34	244.433	503.442	538.825	0	538.825	742.455	742.455
47	1.35966	827.821	40.8366	Bedrock (Sandstone and Siltstone)	140	34	208.452	429.334	428.955	0	428.955	609.118	609.118
48	1.35966	632.453	41.8931	Bedrock (Sandstone and Siltstone)	140	34	170.342	350.842	312.586	0	312.586	465.389	465.389
49	1.35966	429.636	42.9674	Bedrock (Sandstone and Siltstone)	140	34	131.427	270.691	193.757	0	193.757	316.175	316.175
50	2.04637	245.564	44.3435	Compacted Fill	735	24	316.116	651.082	-188.482	0	-188.482	120.472	120.472

Global Minimum Query (janbu simplified) - Safety Factor: 1.98266

Slice Number	Width [ft]	Weight [lbs]	Angle of Slice Base [deg]	Base Material	Base Cohesion [psf]	Base Friction Angle [deg]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]	Base Vertical Stress [psf]	Effective Vertical Stress [psf]
1	1.3803	74.6285	-13.4615	Uncertified Fill	240	20	136.995	271.614	86.859	0	86.859	54.0669	54.0669
2	1.3803	221.079	-12.0652	Uncertified Fill	240	20	156.597	310.479	193.64	0	193.64	160.168	160.168
3	1.3803	361.959	-10.6762	Uncertified Fill	240	20	175.254	347.47	295.272	0	295.272	262.233	262.233
4	1.3803	497.35	-9.29357	Uncertified Fill	240	20	192.994	382.641	391.903	0	391.903	360.321	360.321
5	1.3803	627.322	-7.91633	Uncertified Fill	240	20	209.838	416.038	483.661	0	483.661	454.483	454.483
6	1.3803	751.932	-6.54368	Uncertified Fill	240	20	225.81	447.705	570.664	0	570.664	544.762	544.762
7	1.3803	871.231	-5.1748	Uncertified Fill	240	20	240.927	477.677	653.011	0	653.011	631.192	631.192
8	1.3803	985.258	-3.80888	Uncertified Fill	240	20	255.206	505.987	730.791	0	730.791	713.8	713.8
9	1.3803	1094.04	-2.44512	Uncertified Fill	240	20	268.661	532.663	804.088	0	804.088	792.615	792.615
10	1.29185	1119.71	-1.12637	Bedrock (Sandstone and Siltstone)	140	34	367.944	729.508	873.98	0	873.98	866.746	866.746
11	1.29185	1209.66	0.148135	Bedrock (Sandstone and Siltstone)	140	34	388.829	770.915	935.368	0	935.368	936.373	936.373
12	1.29185	1295.15	1.42271	Bedrock (Sandstone and Siltstone)	140	34	408.235	809.392	992.417	0	992.417	1002.56	1002.56
13	1.29185	1376.18	2.69799	Bedrock (Sandstone and Siltstone)	140	34	426.192	844.993	1045.19	0	1045.19	1065.28	1065.28
14	1.29185	1452.69	3.97462	Bedrock (Sandstone and Siltstone)	140	34	442.709	877.741	1093.74	0	1093.74	1124.5	1124.5
15	1.29185	1524.55	5.25322	Bedrock (Sandstone and Siltstone)	140	34	457.778	907.619	1138.04	0	1138.04	1180.13	1180.13
16	1.29185	1591.89	6.53445	Bedrock (Sandstone and Siltstone)	140	34	471.458	934.741	1178.25	0	1178.25	1232.26	1232.26
17	1.29185	1654.68	7.81898	Bedrock (Sandstone and Siltstone)	140	34	483.766	959.144	1214.43	0	1214.43	1280.86	1280.86
18	1.29185	1712.89	9.10747	Bedrock (Sandstone and Siltstone)	140	34	494.715	980.852	1246.61	0	1246.61	1325.92	1325.92
19	1.29185	1766.47	10.4006	Bedrock (Sandstone and Siltstone)	140	34	504.315	999.885	1274.83	0	1274.83	1367.39	1367.39

20	1.29185	1815.37	11.6992	Bedrock (Sandstone and Siltstone)	140	34	512.574	1016.26	1299.11	0	1299.11	1405.25	1405.25
21	1.29185	1859.52	13.0038	Bedrock (Sandstone and Siltstone)	140	34	519.496	1029.98	1319.45	0	1319.45	1439.42	1439.42
22	1.29185	1898.86	14.3154	Bedrock (Sandstone and Siltstone)	140	34	525.084	1041.06	1335.88	0	1335.88	1469.87	1469.87
23	1.29185	1933.29	15.6347	Bedrock (Sandstone and Siltstone)	140	34	529.34	1049.5	1348.39	0	1348.39	1496.53	1496.53
24	1.29185	1962.97	16.9625	Bedrock (Sandstone and Siltstone)	140	34	532.316	1055.4	1357.14	0	1357.14	1519.5	1519.5
25	1.29185	1988.51	18.2998	Bedrock (Sandstone and Siltstone)	140	34	534.177	1059.09	1362.61	0	1362.61	1539.27	1539.27
26	1.29185	2008.94	19.6476	Bedrock (Sandstone and Siltstone)	140	34	534.712	1060.15	1364.18	0	1364.18	1555.09	1555.09
27	1.29185	2024.03	21.0067	Bedrock (Sandstone and Siltstone)	140	34	533.888	1058.52	1361.76	0	1361.76	1566.77	1566.77
28	1.29185	2033.65	22.3783	Bedrock (Sandstone and Siltstone)	140	34	531.691	1054.16	1355.3	0	1355.3	1574.21	1574.21
29	1.29185	2037.63	23.7636	Bedrock (Sandstone and Siltstone)	140	34	528.109	1047.06	1344.77	0	1344.77	1577.29	1577.29
30	1.29185	2035.8	25.1639	Bedrock (Sandstone and Siltstone)	140	34	523.123	1037.17	1330.12	0	1330.12	1575.88	1575.88
31	1.29185	2027.95	26.5804	Bedrock (Sandstone and Siltstone)	140	34	516.712	1024.47	1311.27	0	1311.27	1569.8	1569.8
32	1.29185	2014.07	28.0146	Bedrock (Sandstone and Siltstone)	140	34	508.898	1008.97	1288.3	0	1288.3	1559.06	1559.06
33	1.29185	2025.33	29.4683	Bedrock (Sandstone and Siltstone)	140	34	506.593	1004.4	1281.53	0	1281.53	1567.77	1567.77
34	1.29185	2053.1	30.9431	Bedrock (Sandstone and Siltstone)	140	34	507.734	1006.66	1284.88	0	1284.88	1589.27	1589.27
35	1.29185	2075.44	32.441	Bedrock (Sandstone and Siltstone)	140	34	507.443	1006.09	1284.03	0	1284.03	1606.57	1606.57
36	1.29185	2090.6	33.9643	Bedrock (Sandstone and Siltstone)	140	34	505.356	1001.95	1277.9	0	1277.9	1618.31	1618.31
37	1.29185	2097.94	35.5154	Bedrock (Sandstone and Siltstone)	140	34	501.365	994.036	1266.16	0	1266.16	1623.98	1623.98
38	1.29185	2097.01	37.0971	Bedrock (Sandstone and Siltstone)	140	34	495.402	982.213	1248.63	0	1248.63	1623.26	1623.26

39	1.29185	2087.29	38.7126	Bedrock (Sandstone and Siltstone)	140	34	487.391	966.33	1225.09	0	1225.09	1615.74	1615.74
40	1.29185	2068.17	40.3656	Bedrock (Sandstone and Siltstone)	140	34	477.245	946.215	1195.26	0	1195.26	1600.93	1600.93
41	1.29185	2033.72	42.0601	Bedrock (Sandstone and Siltstone)	140	34	463.81	919.577	1155.77	0	1155.77	1574.27	1574.27
42	1.29185	1946.34	43.8012	Bedrock (Sandstone and Siltstone)	140	34	439.714	871.804	1084.94	0	1084.94	1506.63	1506.63
43	1.29185	1806.49	45.5947	Bedrock (Sandstone and Siltstone)	140	34	405.498	803.965	984.371	0	984.371	1398.38	1398.38
44	1.29185	1652.4	47.4476	Bedrock (Sandstone and Siltstone)	140	34	369.014	731.629	877.125	0	877.125	1279.09	1279.09
45	1.29185	1483.84	49.3684	Bedrock (Sandstone and Siltstone)	140	34	330.386	655.043	763.582	0	763.582	1148.62	1148.62
46	1.29185	1298.42	51.3675	Bedrock (Sandstone and Siltstone)	140	34	289.371	573.725	643.025	0	643.025	1005.09	1005.09
47	1.29185	1058.64	53.4584	Bedrock (Sandstone and Siltstone)	140	34	239.471	474.789	496.346	0	496.346	819.481	819.481
48	1.29185	776.969	55.6582	Bedrock (Sandstone and Siltstone)	140	34	183.735	364.285	332.517	0	332.517	601.441	601.441
49	1.29185	470.227	57.9899	Bedrock (Sandstone and Siltstone)	140	34	125.918	249.652	162.565	0	162.565	363.997	363.997
50	1.13951	136.741	60.3274	Compacted Fill	735	24	285.239	565.532	-380.63	0	-380.63	120.003	120.003

Curved Static - Curved PseudoStatic

Global Minimum Query (bishop simplified) - Safety Factor: 1.08246

Slice Number	Width [ft]	Weight [lbs]	Angle of Slice Base [deg]	Base Material	Base Cohesion [psf]	Base Friction Angle [deg]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]	Base Vertical Stress [psf]	Effective Vertical Stress [psf]
1	1.47485	58.8836	-1.6573	Uncertified Fill	240	20	237.451	257.032	46.7942	0	46.7942	39.9239	39.9239
2	1.47485	174.896	-0.854062	Uncertified Fill	240	20	262.909	284.588	122.505	0	122.505	118.585	118.585
3	1.47485	287.402	-0.0509888	Uncertified Fill	240	20	287.326	311.019	195.124	0	195.124	194.869	194.869
4	1.47485	396.401	0.752075	Uncertified Fill	240	20	310.719	336.341	264.696	0	264.696	268.774	268.774
5	1.47485	501.893	1.55529	Uncertified Fill	240	20	333.101	360.568	331.258	0	331.258	340.302	340.302
6	1.47485	603.874	2.3588	Uncertified Fill	240	20	354.482	383.713	394.848	0	394.848	409.45	409.45
7	1.47485	702.341	3.16278	Uncertified Fill	240	20	374.877	405.789	455.501	0	455.501	476.215	476.215
8	1.47485	797.285	3.96739	Uncertified Fill	240	20	394.293	426.806	513.246	0	513.246	540.592	540.592
9	1.47485	888.697	4.77278	Uncertified Fill	240	20	412.741	446.776	568.112	0	568.112	602.574	602.574
10	1.47485	976.566	5.57912	Uncertified Fill	240	20	430.231	465.708	620.127	0	620.127	662.154	662.154
11	1.47485	1060.88	6.38656	Uncertified Fill	240	20	446.77	483.611	669.315	0	669.315	719.322	719.322
12	1.47485	1141.62	7.19529	Uncertified Fill	240	20	462.365	500.492	715.694	0	715.694	774.066	774.066
13	1.47485	1218.77	8.00545	Uncertified Fill	240	20	477.025	516.36	759.291	0	759.291	826.378	826.378
14	1.48054	1298.69	8.81881	Bedrock (Sandstone and Siltstone)	140	34	616.348	667.172	781.563	0	781.563	877.186	877.186
15	1.48054	1371.56	9.63552	Bedrock (Sandstone and Siltstone)	140	34	639.002	691.694	817.918	0	817.918	926.404	926.404
16	1.48054	1440.56	10.4542	Bedrock (Sandstone and Siltstone)	140	34	659.787	714.193	851.279	0	851.279	973.018	973.018
17	1.48054	1505.67	11.2751	Bedrock (Sandstone and Siltstone)	140	34	678.732	734.7	881.677	0	881.677	1016.99	1016.99
18	1.48054	1566.86	12.0983	Bedrock (Sandstone and Siltstone)	140	34	695.861	753.242	909.169	0	909.169	1058.33	1058.33
19	1.48054	1624.09	12.9241	Bedrock (Sandstone and Siltstone)	140	34	711.199	769.844	933.784	0	933.784	1096.98	1096.98
20	1.48054	1677.32	13.7526	Bedrock (Sandstone and Siltstone)	140	34	724.766	784.53	955.558	0	955.558	1132.94	1132.94

21	1.48054	1726.51	14.584	Bedrock (Sandstone and Siltstone)	140	34	736.583	797.322	974.517	0	974.517	1166.16	1166.16
22	1.48054	1771.73	15.4186	Bedrock (Sandstone and Siltstone)	140	34	746.711	808.285	990.775	0	990.775	1196.71	1196.71
23	1.48054	1814.06	16.2566	Bedrock (Sandstone and Siltstone)	140	34	755.565	817.869	1004.98	0	1004.98	1225.31	1225.31
24	1.48054	1852.53	17.0981	Bedrock (Sandstone and Siltstone)	140	34	762.833	825.736	1016.65	0	1016.65	1251.3	1251.3
25	1.48054	1886.77	17.9435	Bedrock (Sandstone and Siltstone)	140	34	768.407	831.77	1025.59	0	1025.59	1274.42	1274.42
26	1.48054	1916.71	18.7929	Bedrock (Sandstone and Siltstone)	140	34	772.303	835.987	1031.85	0	1031.85	1294.65	1294.65
27	1.48054	1942.29	19.6467	Bedrock (Sandstone and Siltstone)	140	34	774.531	838.399	1035.42	0	1035.42	1311.93	1311.93
28	1.48054	1963.44	20.505	Bedrock (Sandstone and Siltstone)	140	34	775.104	839.019	1036.34	0	1036.34	1326.21	1326.21
29	1.48054	1980.08	21.3681	Bedrock (Sandstone and Siltstone)	140	34	774.03	837.856	1034.61	0	1034.61	1337.46	1337.46
30	1.48054	2023.81	22.2364	Bedrock (Sandstone and Siltstone)	140	34	781.941	846.42	1047.31	0	1047.31	1366.99	1366.99
31	1.48054	2103.5	23.1101	Bedrock (Sandstone and Siltstone)	140	34	801.546	867.641	1078.77	0	1078.77	1420.83	1420.83
32	1.48054	2180.71	23.9895	Bedrock (Sandstone and Siltstone)	140	34	819.844	887.448	1108.14	0	1108.14	1472.97	1472.97
33	1.48054	2253.3	24.8749	Bedrock (Sandstone and Siltstone)	140	34	836.16	905.11	1134.32	0	1134.32	1522.01	1522.01
34	1.48054	2320.93	25.7668	Bedrock (Sandstone and Siltstone)	140	34	850.415	920.54	1157.2	0	1157.2	1567.7	1567.7
35	1.48054	2383.5	26.6654	Bedrock (Sandstone and Siltstone)	140	34	862.607	933.738	1176.77	0	1176.77	1609.96	1609.96
36	1.48054	2440.88	27.5711	Bedrock (Sandstone and Siltstone)	140	34	872.737	944.703	1193.02	0	1193.02	1648.72	1648.72
37	1.48054	2487.45	28.4844	Bedrock (Sandstone and Siltstone)	140	34	879.075	951.564	1203.19	0	1203.19	1680.18	1680.18
38	1.48054	2470.9	29.4057	Bedrock (Sandstone and Siltstone)	140	34	865.408	936.77	1181.26	0	1181.26	1669.01	1669.01
39	1.48054	2396.01	30.3353	Bedrock (Sandstone and Siltstone)	140	34	833.782	902.536	1130.51	0	1130.51	1618.42	1618.42

40	1.48054	2314.32	31.2739	Bedrock (Sandstone and Siltstone)	140	34	800.47	866.477	1077.05	0	1077.05	1563.24	1563.24
41	1.48054	2226.69	32.222	Bedrock (Sandstone and Siltstone)	140	34	765.796	828.943	1021.4	0	1021.4	1504.06	1504.06
42	1.48054	2110.06	33.18	Bedrock (Sandstone and Siltstone)	140	34	722.912	782.523	952.581	0	952.581	1425.28	1425.28
43	1.48054	1936.66	34.1486	Bedrock (Sandstone and Siltstone)	140	34	663.884	718.628	857.851	0	857.851	1308.16	1308.16
44	1.48054	1754.92	35.1285	Bedrock (Sandstone and Siltstone)	140	34	603.438	653.198	760.848	0	760.848	1185.4	1185.4
45	1.48054	1566.41	36.1203	Bedrock (Sandstone and Siltstone)	140	34	542.125	586.829	662.449	0	662.449	1058.07	1058.07
46	1.48054	1370.88	37.1248	Bedrock (Sandstone and Siltstone)	140	34	479.956	519.533	562.682	0	562.682	925.996	925.996
47	1.48054	1168.04	38.1428	Bedrock (Sandstone and Siltstone)	140	34	416.942	451.323	461.555	0	461.555	788.983	788.983
48	1.48054	957.581	39.1753	Bedrock (Sandstone and Siltstone)	140	34	353.1	382.217	359.101	0	359.101	646.829	646.829
49	1.48054	739.176	40.2231	Bedrock (Sandstone and Siltstone)	140	34	288.449	312.234	255.347	0	255.347	499.304	499.304
50	1.48054	512.45	41.2874	Bedrock (Sandstone and Siltstone)	140	34	223.008	241.397	150.327	0	150.327	346.158	346.158

Global Minimum Query (janbu simplified) - Safety Factor: 1.02299

Slice Number	Width [ft]	Weight [lbs]	Angle of Slice Base [deg]	Base Material	Base Cohesion [psf]	Base Friction Angle [deg]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]	Base Vertical Stress [psf]	Effective Vertical Stress [psf]
1	1.51399	31.8055	-7.17755	Uncertified Fill	240	20	253.445	259.272	52.9485	0	52.9485	21.0319	21.0319
2	1.51399	101.379	-6.19564	Uncertified Fill	240	20	268.821	275.002	96.1665	0	96.1665	66.9839	66.9839
3	1.51399	230.599	-5.21556	Uncertified Fill	240	20	298.499	305.362	179.58	0	179.58	152.332	152.332
4	1.51399	368.869	-4.23701	Uncertified Fill	240	20	329.996	337.583	268.106	0	268.106	243.658	243.658
5	1.51399	502.615	-3.25969	Uncertified Fill	240	20	360.022	368.299	352.499	0	352.499	331.995	331.995
6	1.51399	631.851	-2.28333	Uncertified Fill	240	20	388.609	397.543	432.847	0	432.847	417.352	417.352
7	1.51399	756.589	-1.30762	Uncertified Fill	240	20	415.785	425.344	509.229	0	509.229	499.738	499.738
8	1.51399	876.837	-0.332301	Uncertified Fill	240	20	441.576	451.728	581.718	0	581.718	579.157	579.157
9	1.51399	992.597	0.642927	Uncertified Fill	240	20	466.006	476.719	650.382	0	650.382	655.611	655.611
10	1.51399	1103.87	1.61834	Uncertified Fill	240	20	489.097	500.341	715.279	0	715.279	729.097	729.097
11	1.51399	1210.65	2.59422	Uncertified Fill	240	20	510.868	522.613	776.472	0	776.472	799.619	799.619
12	1.53105	1330.32	3.57637	Bedrock (Sandstone and Siltstone)	140	34	681.647	697.318	826.257	0	826.257	868.86	868.86
13	1.53105	1434.24	4.56508	Bedrock (Sandstone and Siltstone)	140	34	716.75	733.228	879.496	0	879.496	936.725	936.725
14	1.53105	1533.27	5.55515	Bedrock (Sandstone and Siltstone)	140	34	749.086	766.307	928.539	0	928.539	1001.4	1001.4
15	1.53105	1627.26	6.54689	Bedrock (Sandstone and Siltstone)	140	34	778.667	796.569	973.401	0	973.401	1062.76	1062.76
16	1.53105	1716.12	7.5406	Bedrock (Sandstone and Siltstone)	140	34	805.543	824.062	1014.16	0	1014.16	1120.79	1120.79
17	1.53105	1800.01	8.5366	Bedrock (Sandstone and Siltstone)	140	34	829.839	848.917	1051.01	0	1051.01	1175.57	1175.57
18	1.53105	1878.9	9.53521	Bedrock (Sandstone and Siltstone)	140	34	851.612	871.191	1084.04	0	1084.04	1227.09	1227.09
19	1.53105	1952.73	10.5368	Bedrock (Sandstone and Siltstone)	140	34	870.911	890.933	1113.3	0	1113.3	1275.3	1275.3
20	1.53105	2021.47	11.5416	Bedrock (Sandstone and Siltstone)	140	34	887.779	908.189	1138.89	0	1138.89	1320.18	1320.18

21	1.53105	2085.06	12.55	Bedrock (Sandstone and Siltstone)	140	34	902.258	923.001	1160.85	0	1160.85	1361.7	1361.7
22	1.53105	2143.45	13.5624	Bedrock (Sandstone and Siltstone)	140	34	914.385	935.407	1179.24	0	1179.24	1399.82	1399.82
23	1.53105	2196.73	14.5791	Bedrock (Sandstone and Siltstone)	140	34	924.256	945.505	1194.21	0	1194.21	1434.6	1434.6
24	1.53105	2246.01	15.6005	Bedrock (Sandstone and Siltstone)	140	34	932.33	953.764	1206.46	0	1206.46	1466.78	1466.78
25	1.53105	2290.16	16.6271	Bedrock (Sandstone and Siltstone)	140	34	938.237	959.807	1215.42	0	1215.42	1495.6	1495.6
26	1.53105	2328.81	17.6592	Bedrock (Sandstone and Siltstone)	140	34	941.899	963.553	1220.97	0	1220.97	1520.83	1520.83
27	1.53105	2361.86	18.6972	Bedrock (Sandstone and Siltstone)	140	34	943.337	965.024	1223.15	0	1223.15	1542.4	1542.4
28	1.53105	2389.21	19.7417	Bedrock (Sandstone and Siltstone)	140	34	942.57	964.24	1221.98	0	1221.98	1560.25	1560.25
29	1.53105	2410.76	20.793	Bedrock (Sandstone and Siltstone)	140	34	939.619	961.221	1217.51	0	1217.51	1574.31	1574.31
30	1.53105	2428.73	21.8517	Bedrock (Sandstone and Siltstone)	140	34	935.299	956.802	1210.96	0	1210.96	1586.03	1586.03
31	1.53105	2493.45	22.9183	Bedrock (Sandstone and Siltstone)	140	34	946.583	968.345	1228.07	0	1228.07	1628.28	1628.28
32	1.53105	2575.1	23.9934	Bedrock (Sandstone and Siltstone)	140	34	963.001	985.14	1252.97	0	1252.97	1681.59	1681.59
33	1.53105	2652.11	25.0775	Bedrock (Sandstone and Siltstone)	140	34	977.238	999.705	1274.57	0	1274.57	1731.87	1731.87
34	1.53105	2722.61	26.1713	Bedrock (Sandstone and Siltstone)	140	34	988.727	1011.46	1291.99	0	1291.99	1777.89	1777.89
35	1.53105	2786.4	27.2755	Bedrock (Sandstone and Siltstone)	140	34	997.466	1020.4	1305.25	0	1305.25	1819.54	1819.54
36	1.53105	2843.29	28.3908	Bedrock (Sandstone and Siltstone)	140	34	1003.45	1026.52	1314.32	0	1314.32	1856.67	1856.67
37	1.53105	2892.98	29.5179	Bedrock (Sandstone and Siltstone)	140	34	1006.64	1029.78	1319.16	0	1319.16	1889.11	1889.11
38	1.53105	2903.27	30.6578	Bedrock (Sandstone and Siltstone)	140	34	997.14	1020.06	1304.75	0	1304.75	1895.81	1895.81
39	1.53105	2826.91	31.8112	Bedrock (Sandstone and Siltstone)	140	34	960.949	983.041	1249.86	0	1249.86	1845.93	1845.93

40	1.53105	2728.78	32.9793	Bedrock (Sandstone and Siltstone)	140	34	918.66	939.78	1185.72	0	1185.72	1781.83	1781.83
41	1.53105	2622.43	34.163	Bedrock (Sandstone and Siltstone)	140	34	874.567	894.673	1118.85	0	1118.85	1712.38	1712.38
42	1.53105	2497.85	35.3636	Bedrock (Sandstone and Siltstone)	140	34	825.822	844.808	1044.92	0	1044.92	1631.02	1631.02
43	1.53105	2304.06	36.5823	Bedrock (Sandstone and Siltstone)	140	34	757.921	775.346	941.94	0	941.94	1504.46	1504.46
44	1.53105	2090.49	37.8206	Bedrock (Sandstone and Siltstone)	140	34	685.835	701.602	832.608	0	832.608	1364.99	1364.99
45	1.53105	1867.09	39.08	Bedrock (Sandstone and Siltstone)	140	34	612.634	626.718	721.589	0	721.589	1219.11	1219.11
46	1.53105	1633.33	40.3623	Bedrock (Sandstone and Siltstone)	140	34	538.337	550.713	608.909	0	608.909	1066.46	1066.46
47	1.53105	1388.62	41.6696	Bedrock (Sandstone and Siltstone)	140	34	462.971	473.615	494.603	0	494.603	906.654	906.654
48	1.53105	1132.26	43.004	Bedrock (Sandstone and Siltstone)	140	34	386.569	395.456	378.729	0	378.729	739.26	739.26
49	1.53105	863.512	44.368	Bedrock (Sandstone and Siltstone)	140	34	309.171	316.279	261.345	0	261.345	563.77	563.77
50	1.53105	581.482	45.7646	Bedrock (Sandstone and Siltstone)	140	34	230.834	236.141	142.534	0	142.534	379.612	379.612

Global Minimum Query (gle/morgenstern-price) - Safety Factor: 1.06434

Slice Number	Width [ft]	Weight [lbs]	Angle of Slice Base [deg]	Base Material	Base Cohesion [psf]	Base Friction Angle [deg]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]	Base Vertical Stress [psf]	Effective Vertical Stress [psf]
1	1.43592	52.0273	0.173357	Uncertified Fill	240	20	241.965	257.533	48.1709	0	48.1709	48.903	48.903
2	1.43592	154.542	0.917407	Uncertified Fill	240	20	273.99	291.619	141.821	0	141.821	146.208	146.208
3	1.43592	253.977	1.66161	Uncertified Fill	240	20	305.083	324.712	232.744	0	232.744	241.594	241.594
4	1.43592	350.328	2.4061	Uncertified Fill	240	20	334.965	356.517	320.128	0	320.128	334.203	334.203
5	1.43592	443.591	3.15099	Uncertified Fill	240	20	363.373	386.752	403.197	0	403.197	423.201	423.201
6	1.43592	533.762	3.89642	Uncertified Fill	240	20	390.059	415.155	481.235	0	481.235	507.802	507.802
7	1.43592	620.831	4.6425	Uncertified Fill	240	20	414.808	441.497	553.608	0	553.608	587.293	587.293
8	1.43592	704.791	5.38938	Uncertified Fill	240	20	437.439	465.584	619.786	0	619.786	661.055	661.055
9	1.43592	785.63	6.13718	Uncertified Fill	240	20	457.81	487.265	679.355	0	679.355	728.581	728.581
10	1.43592	863.337	6.88602	Uncertified Fill	240	20	475.823	506.437	732.033	0	732.033	789.496	789.496
11	1.43592	937.896	7.63606	Uncertified Fill	240	20	491.426	523.044	777.659	0	777.659	843.544	843.544
12	1.43592	1009.29	8.38741	Uncertified Fill	240	20	504.613	537.08	816.22	0	816.22	890.621	890.621
13	1.43592	1077.51	9.14021	Uncertified Fill	240	20	515.424	548.586	847.833	0	847.833	930.762	930.762
14	1.43592	1142.53	9.89462	Uncertified Fill	240	20	523.938	557.648	872.733	0	872.733	964.124	964.124
15	1.43592	1204.32	10.6508	Uncertified Fill	240	20	530.277	564.395	891.27	0	891.27	990.995	990.995
16	1.43592	1262.87	11.4088	Uncertified Fill	240	20	534.592	568.988	903.89	0	903.89	1011.77	1011.77
17	1.39944	1284.85	12.1591	Bedrock (Sandstone and Siltstone)	140	34	770.757	820.347	1008.66	0	1008.66	1174.73	1174.73
18	1.39944	1335.9	12.902	Bedrock (Sandstone and Siltstone)	140	34	777.898	827.948	1019.92	0	1019.92	1198.11	1198.11
19	1.39944	1383.73	13.647	Bedrock (Sandstone and Siltstone)	140	34	780.858	831.098	1024.6	0	1024.6	1214.18	1214.18
20	1.39944	1428.33	14.3944	Bedrock (Sandstone and Siltstone)	140	34	779.964	830.147	1023.18	0	1023.18	1223.36	1223.36
21	1.39944	1470.42	15.1442	Bedrock (Sandstone and Siltstone)	140	34	775.888	825.809	1016.75	0	1016.75	1226.75	1226.75

22	1.39944	1509.94	15.8968	Bedrock (Sandstone and Siltstone)	140	34	769.012	818.49	1005.91	0	1005.91	1224.92	1224.92
23	1.39944	1546.11	16.6522	Bedrock (Sandstone and Siltstone)	140	34	759.488	808.353	990.875	0	990.875	1218.04	1218.04
24	1.39944	1578.91	17.4106	Bedrock (Sandstone and Siltstone)	140	34	747.766	795.877	972.376	0	972.376	1206.86	1206.86
25	1.39944	1608.28	18.1721	Bedrock (Sandstone and Siltstone)	140	34	734.294	781.539	951.122	0	951.122	1192.15	1192.15
26	1.39944	1634.18	18.937	Bedrock (Sandstone and Siltstone)	140	34	719.508	765.801	927.789	0	927.789	1174.65	1174.65
27	1.39944	1656.57	19.7054	Bedrock (Sandstone and Siltstone)	140	34	703.814	749.097	903.019	0	903.019	1155.1	1155.1
28	1.39944	1676.13	20.4775	Bedrock (Sandstone and Siltstone)	140	34	687.825	732.08	877.794	0	877.794	1134.65	1134.65
29	1.39944	1732.48	21.2535	Bedrock (Sandstone and Siltstone)	140	34	684.45	728.487	872.468	0	872.468	1138.68	1138.68
30	1.39944	1808.96	22.0336	Bedrock (Sandstone and Siltstone)	140	34	688.119	732.393	878.259	0	878.259	1156.75	1156.75
31	1.39944	1883.5	22.8181	Bedrock (Sandstone and Siltstone)	140	34	692.076	736.604	884.501	0	884.501	1175.68	1175.68
32	1.39944	1954.34	23.607	Bedrock (Sandstone and Siltstone)	140	34	696.124	740.913	890.889	0	890.889	1195.12	1195.12
33	1.39944	2021.31	24.4008	Bedrock (Sandstone and Siltstone)	140	34	700.524	745.596	897.832	0	897.832	1215.62	1215.62
34	1.39944	2084.34	25.1996	Bedrock (Sandstone and Siltstone)	140	34	705.515	750.908	905.709	0	905.709	1237.69	1237.69
35	1.39944	2143.35	26.0037	Bedrock (Sandstone and Siltstone)	140	34	711.28	757.044	914.802	0	914.802	1261.77	1261.77
36	1.39944	2196.66	26.8133	Bedrock (Sandstone and Siltstone)	140	34	717.488	763.651	924.598	0	924.598	1287.24	1287.24
37	1.39944	2207.93	27.6287	Bedrock (Sandstone and Siltstone)	140	34	713.888	759.82	918.923	0	918.923	1292.59	1292.59
38	1.39944	2155.87	28.4503	Bedrock (Sandstone and Siltstone)	140	34	694.55	739.237	888.404	0	888.404	1264.73	1264.73
39	1.39944	2093.46	29.2783	Bedrock (Sandstone and Siltstone)	140	34	674.357	717.745	856.542	0	856.542	1234.64	1234.64
40	1.39944	2026.58	30.113	Bedrock (Sandstone and Siltstone)	140	34	654.728	696.853	825.57	0	825.57	1205.3	1205.3

41	1.39944	1952.28	30.9549	Bedrock (Sandstone and Siltstone)	140	34	634.595	675.425	793.798	0	793.798	1174.42	1174.42
42	1.39944	1825.88	31.8043	Bedrock (Sandstone and Siltstone)	140	34	601.082	639.756	740.919	0	740.919	1113.67	1113.67
43	1.39944	1677.69	32.6615	Bedrock (Sandstone and Siltstone)	140	34	562.158	598.327	679.495	0	679.495	1039.86	1039.86
44	1.39944	1524.51	33.5271	Bedrock (Sandstone and Siltstone)	140	34	522.093	555.684	616.277	0	616.277	962.198	962.198
45	1.39944	1366.19	34.4014	Bedrock (Sandstone and Siltstone)	140	34	480.458	511.371	550.581	0	550.581	879.574	879.574
46	1.39944	1202.57	35.2849	Bedrock (Sandstone and Siltstone)	140	34	436.821	464.926	481.723	0	481.723	790.837	790.837
47	1.39944	1033.49	36.1782	Bedrock (Sandstone and Siltstone)	140	34	390.739	415.879	409.008	0	409.008	694.757	694.757
48	1.39944	858.745	37.0818	Bedrock (Sandstone and Siltstone)	140	34	341.759	363.748	331.719	0	331.719	590.02	590.02
49	1.39944	678.141	37.9963	Bedrock (Sandstone and Siltstone)	140	34	289.408	308.029	249.114	0	249.114	475.195	475.195
50	1.39944	491.456	38.9224	Bedrock (Sandstone and Siltstone)	140	34	233.195	248.199	160.412	0	160.412	348.728	348.728

Block Static - Master Scenario

Global Minimum Query (bishop simplified) - Safety Factor: 2.06523

Slice Number	Width [ft]	Weight [lbs]	Angle of Slice Base [deg]	Base Material	Base Cohesion [psf]	Base Friction Angle [deg]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]	Base Vertical Stress [psf]	Effective Vertical Stress [psf]
1	1.22259	123.923	-45	Uncertified Fill	240	20	162.748	336.112	264.066	0	264.066	101.318	101.318
2	1.22259	371.77	-45	Uncertified Fill	240	20	206.117	425.678	510.145	0	510.145	304.028	304.028
3	1.35494	565.497	16.1156	Uncertified Fill	240	20	180.572	372.922	365.201	0	365.201	417.374	417.374
4	1.35494	597.784	16.1156	Uncertified Fill	240	20	184.568	381.175	387.876	0	387.876	441.203	441.203
5	1.35494	630.071	16.1156	Uncertified Fill	240	20	188.564	389.428	410.551	0	410.551	465.033	465.033
6	1.35494	662.358	16.1156	Uncertified Fill	240	20	192.56	397.681	433.226	0	433.226	488.863	488.863
7	1.35494	694.645	16.1156	Uncertified Fill	240	20	196.556	405.934	455.901	0	455.901	512.692	512.692
8	1.35494	726.933	16.1156	Uncertified Fill	240	20	200.553	414.188	478.577	0	478.577	536.522	536.522
9	1.35494	759.22	16.1156	Uncertified Fill	240	20	204.549	422.441	501.251	0	501.251	560.351	560.351
10	1.35494	791.507	16.1156	Uncertified Fill	240	20	208.545	430.694	523.926	0	523.926	584.181	584.181
11	1.35494	823.794	16.1156	Uncertified Fill	240	20	212.541	438.947	546.601	0	546.601	608.011	608.011
12	1.35494	856.081	16.1156	Uncertified Fill	240	20	216.538	447.2	569.276	0	569.276	631.84	631.84
13	1.35494	888.369	16.1156	Uncertified Fill	240	20	220.534	455.453	591.951	0	591.951	655.67	655.67
14	1.35494	920.656	16.1156	Uncertified Fill	240	20	224.53	463.706	614.626	0	614.626	679.5	679.5
15	1.35494	952.943	16.1156	Uncertified Fill	240	20	228.526	471.959	637.301	0	637.301	703.329	703.329
16	1.35494	985.23	16.1156	Uncertified Fill	240	20	232.522	480.212	659.976	0	659.976	727.159	727.159
17	1.35494	1017.52	16.1156	Uncertified Fill	240	20	236.518	488.465	682.651	0	682.651	750.989	750.989
18	1.35494	1049.8	16.1156	Uncertified Fill	240	20	240.515	496.718	705.326	0	705.326	774.818	774.818
19	1.35494	1082.09	16.1156	Uncertified Fill	240	20	244.511	504.971	727.999	0	727.999	798.645	798.645
20	1.35494	1114.38	16.1156	Uncertified Fill	240	20	248.507	513.224	750.674	0	750.674	822.475	822.475
21	1.35494	1146.67	16.1156	Uncertified Fill	240	20	252.503	521.477	773.349	0	773.349	846.305	846.305
22	1.35494	1178.95	16.1156	Uncertified Fill	240	20	256.499	529.73	796.024	0	796.024	870.134	870.134

23	1.35494	1211.24	16.1156	Uncertified Fill	240	20	260.495	537.983	818.699	0	818.699	893.964	893.964
24	1.35494	1243.53	16.1156	Uncertified Fill	240	20	264.492	546.236	841.374	0	841.374	917.794	917.794
25	1.44279	1360.95	16.1156	Bedrock (Sandstone and Siltstone)	140	34	343.463	709.33	844.07	0	844.07	943.307	943.307
26	1.44279	1400.16	16.1156	Bedrock (Sandstone and Siltstone)	140	34	351.573	726.08	868.9	0	868.9	970.48	970.48
27	1.44279	1439.37	16.1156	Bedrock (Sandstone and Siltstone)	140	34	359.683	742.829	893.73	0	893.73	997.653	997.653
28	1.44279	1478.57	16.1156	Bedrock (Sandstone and Siltstone)	140	34	367.793	759.578	918.56	0	918.56	1024.83	1024.83
29	1.44279	1517.78	16.1156	Bedrock (Sandstone and Siltstone)	140	34	375.903	776.327	943.397	0	943.397	1052.01	1052.01
30	1.44279	1556.99	16.1156	Bedrock (Sandstone and Siltstone)	140	34	384.014	793.077	968.227	0	968.227	1079.18	1079.18
31	1.44279	1596.19	16.1156	Bedrock (Sandstone and Siltstone)	140	34	392.124	809.826	993.057	0	993.057	1106.35	1106.35
32	1.44279	1655.79	16.1156	Bedrock (Sandstone and Siltstone)	140	34	404.451	835.284	1030.8	0	1030.8	1147.66	1147.66
33	1.44279	1761.76	16.1156	Bedrock (Sandstone and Siltstone)	140	34	426.37	880.553	1097.92	0	1097.92	1221.11	1221.11
34	1.44279	1871.5	16.1156	Bedrock (Sandstone and Siltstone)	140	34	449.071	927.435	1167.42	0	1167.42	1297.17	1297.17
35	1.44279	1981.75	16.1156	Bedrock (Sandstone and Siltstone)	140	34	471.878	974.536	1237.25	0	1237.25	1373.59	1373.59
36	1.19016	1669.03	40.763	Bedrock (Sandstone and Siltstone)	140	34	410.31	847.385	1048.74	0	1048.74	1402.45	1402.45
37	1.19016	1646.63	40.763	Bedrock (Sandstone and Siltstone)	140	34	405.515	837.481	1034.06	0	1034.06	1383.63	1383.63
38	1.19016	1624.24	40.763	Bedrock (Sandstone and Siltstone)	140	34	400.719	827.577	1019.38	0	1019.38	1364.82	1364.82
39	1.19016	1601.85	40.763	Bedrock (Sandstone and Siltstone)	140	34	395.923	817.673	1004.69	0	1004.69	1345.99	1345.99
40	1.33361	1751.61	45	Bedrock (Sandstone and Siltstone)	140	34	374.487	773.401	939.055	0	939.055	1313.54	1313.54
41	1.33361	1661.24	45	Bedrock (Sandstone and Siltstone)	140	34	357.801	738.942	887.968	0	887.968	1245.77	1245.77

42	1.33361	1522.6	45	Bedrock (Sandstone and Siltstone)	140	34	332.206	686.081	809.601	0	809.601	1141.81	1141.81
43	1.33361	1380.32	45	Bedrock (Sandstone and Siltstone)	140	34	305.938	631.832	729.172	0	729.172	1035.11	1035.11
44	1.33361	1238.04	45	Bedrock (Sandstone and Siltstone)	140	34	279.67	577.583	648.742	0	648.742	928.412	928.412
45	1.33361	1095.76	45	Bedrock (Sandstone and Siltstone)	140	34	253.402	523.334	568.318	0	568.318	821.721	821.721
46	1.33361	953.477	45	Bedrock (Sandstone and Siltstone)	140	34	227.135	469.085	487.888	0	487.888	715.023	715.023
47	1.33361	795.975	45	Bedrock (Sandstone and Siltstone)	140	34	198.056	409.032	398.856	0	398.856	596.913	596.913
48	1.33361	586.808	45	Bedrock (Sandstone and Siltstone)	140	34	159.44	329.28	280.619	0	280.619	440.059	440.059
49	1.5	405	45	Compacted Fill	735	24	340.676	703.574	-70.5843	0	-70.5843	270.091	270.091
50	1.5	135	45	Compacted Fill	735	24	308.751	637.643	-218.669	0	-218.669	90.0828	90.0828

Global Minimum Query (janbu simplified) - Safety Factor: 2.00241

Slice Number	Width [ft]	Weight [lbs]	Angle of Slice Base [deg]	Base Material	Base Cohesion [psf]	Base Friction Angle [deg]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]	Base Vertical Stress [psf]	Effective Vertical Stress [psf]
1	1.22259	123.923	-45	Uncertified Fill	240	20	168.996	338.399	270.348	0	270.348	101.352	101.352
2	1.22259	371.77	-45	Uncertified Fill	240	20	214.029	428.573	518.102	0	518.102	304.073	304.073
3	1.35494	565.497	16.1156	Uncertified Fill	240	20	185.952	372.353	363.636	0	363.636	417.363	417.363
4	1.35494	597.784	16.1156	Uncertified Fill	240	20	190.067	380.593	386.276	0	386.276	441.192	441.192
5	1.35494	630.071	16.1156	Uncertified Fill	240	20	194.183	388.833	408.916	0	408.916	465.021	465.021
6	1.35494	662.358	16.1156	Uncertified Fill	240	20	198.298	397.074	431.557	0	431.557	488.851	488.851
7	1.35494	694.645	16.1156	Uncertified Fill	240	20	202.413	405.314	454.197	0	454.197	512.68	512.68
8	1.35494	726.933	16.1156	Uncertified Fill	240	20	206.529	413.555	476.837	0	476.837	536.51	536.51
9	1.35494	759.22	16.1156	Uncertified Fill	240	20	210.644	421.795	499.478	0	499.478	560.339	560.339
10	1.35494	791.507	16.1156	Uncertified Fill	240	20	214.759	430.035	522.118	0	522.118	584.168	584.168
11	1.35494	823.794	16.1156	Uncertified Fill	240	20	218.874	438.276	544.758	0	544.758	607.998	607.998
12	1.35494	856.081	16.1156	Uncertified Fill	240	20	222.989	446.516	567.399	0	567.399	631.827	631.827
13	1.35494	888.369	16.1156	Uncertified Fill	240	20	227.105	454.757	590.039	0	590.039	655.656	655.656
14	1.35494	920.656	16.1156	Uncertified Fill	240	20	231.22	462.997	612.679	0	612.679	679.486	679.486
15	1.35494	952.943	16.1156	Uncertified Fill	240	20	235.335	471.237	635.32	0	635.32	703.315	703.315
16	1.35494	985.23	16.1156	Uncertified Fill	240	20	239.45	479.478	657.96	0	657.96	727.144	727.144
17	1.35494	1017.52	16.1156	Uncertified Fill	240	20	243.566	487.718	680.6	0	680.6	750.974	750.974
18	1.35494	1049.8	16.1156	Uncertified Fill	240	20	247.681	495.959	703.241	0	703.241	774.803	774.803
19	1.35494	1082.09	16.1156	Uncertified Fill	240	20	251.796	504.199	725.879	0	725.879	798.63	798.63
20	1.35494	1114.38	16.1156	Uncertified Fill	240	20	255.911	512.439	748.518	0	748.518	822.459	822.459
21	1.35494	1146.67	16.1156	Uncertified Fill	240	20	260.027	520.68	771.165	0	771.165	846.295	846.295
22	1.35494	1178.95	16.1156	Uncertified Fill	240	20	264.142	528.92	793.805	0	793.805	870.123	870.123
23	1.35494	1211.24	16.1156	Uncertified Fill	240	20	268.257	537.161	816.444	0	816.444	893.952	893.952

24	1.35494	1243.53	16.1156	Uncertified Fill	240	20	272.372	545.401	839.084	0	839.084	917.78	917.78
25	1.44279	1360.95	16.1156	Bedrock (Sandstone and Siltstone)	140	34	353.276	707.404	841.213	0	841.213	943.285	943.285
26	1.44279	1400.16	16.1156	Bedrock (Sandstone and Siltstone)	140	34	361.618	724.107	865.977	0	865.977	970.459	970.459
27	1.44279	1439.37	16.1156	Bedrock (Sandstone and Siltstone)	140	34	369.96	740.811	890.74	0	890.74	997.633	997.633
28	1.44279	1478.57	16.1156	Bedrock (Sandstone and Siltstone)	140	34	378.302	757.515	915.504	0	915.504	1024.81	1024.81
29	1.44279	1517.78	16.1156	Bedrock (Sandstone and Siltstone)	140	34	386.644	774.219	940.267	0	940.267	1051.98	1051.98
30	1.44279	1556.99	16.1156	Bedrock (Sandstone and Siltstone)	140	34	394.986	790.923	965.031	0	965.031	1079.15	1079.15
31	1.44279	1596.19	16.1156	Bedrock (Sandstone and Siltstone)	140	34	403.327	807.626	989.794	0	989.794	1106.33	1106.33
32	1.44279	1655.79	16.1156	Bedrock (Sandstone and Siltstone)	140	34	416.007	833.016	1027.44	0	1027.44	1147.63	1147.63
33	1.44279	1761.76	16.1156	Bedrock (Sandstone and Siltstone)	140	34	438.553	878.162	1094.37	0	1094.37	1221.08	1221.08
34	1.44279	1871.5	16.1156	Bedrock (Sandstone and Siltstone)	140	34	461.901	924.916	1163.68	0	1163.68	1297.14	1297.14
35	1.44279	1981.75	16.1156	Bedrock (Sandstone and Siltstone)	140	34	485.359	971.888	1233.33	0	1233.33	1373.56	1373.56
36	1.19016	1669.03	40.763	Bedrock (Sandstone and Siltstone)	140	34	420.266	841.545	1040.09	0	1040.09	1402.38	1402.38
37	1.19016	1646.63	40.763	Bedrock (Sandstone and Siltstone)	140	34	415.354	831.709	1025.5	0	1025.5	1383.55	1383.55
38	1.19016	1624.24	40.763	Bedrock (Sandstone and Siltstone)	140	34	410.442	821.873	1010.92	0	1010.92	1364.74	1364.74
39	1.19016	1601.85	40.763	Bedrock (Sandstone and Siltstone)	140	34	405.53	812.038	996.339	0	996.339	1345.93	1345.93
40	1.33361	1751.61	45	Bedrock (Sandstone and Siltstone)	140	34	383.255	767.433	930.205	0	930.205	1313.46	1313.46
41	1.33361	1661.24	45	Bedrock (Sandstone and Siltstone)	140	34	366.179	733.24	879.516	0	879.516	1245.69	1245.69
42	1.33361	1522.6	45	Bedrock (Sandstone and Siltstone)	140	34	339.984	680.787	801.749	0	801.749	1141.73	1141.73

43	1.33361	1380.32	45	Bedrock (Sandstone and Siltstone)	140	34	313.101	626.957	721.945	0	721.945	1035.05	1035.05
44	1.33361	1238.04	45	Bedrock (Sandstone and Siltstone)	140	34	286.218	573.126	642.136	0	642.136	928.354	928.354
45	1.33361	1095.76	45	Bedrock (Sandstone and Siltstone)	140	34	259.336	519.296	562.327	0	562.327	821.662	821.662
46	1.33361	953.477	45	Bedrock (Sandstone and Siltstone)	140	34	232.452	465.465	482.522	0	482.522	714.974	714.974
47	1.33361	795.975	45	Bedrock (Sandstone and Siltstone)	140	34	202.693	405.875	394.177	0	394.177	596.87	596.87
48	1.33361	586.808	45	Bedrock (Sandstone and Siltstone)	140	34	163.173	326.739	276.852	0	276.852	440.025	440.025
49	1.5	405	45	Compacted Fill	735	24	349.406	699.654	-79.3878	0	-79.3878	270.018	270.018
50	1.5	135	45	Compacted Fill	735	24	316.663	634.09	-226.647	0	-226.647	90.0168	90.0168

Block Static - Block PseudoStatic

Global Minimum Query (bishop simplified) - Safety Factor: 1.10791

Slice Number	Width [ft]	Weight [lbs]	Angle of Slice Base [deg]	Base Material	Base Cohesion [psf]	Base Friction Angle [deg]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]	Base Vertical Stress [psf]	Effective Vertical Stress [psf]
1	1.22259	123.923	-45	Uncertified Fill	240	20	372.177	412.339	473.498	0	473.498	101.321	101.321
2	1.22259	371.77	-45	Uncertified Fill	240	20	471.353	522.217	775.388	0	775.388	304.035	304.035
3	1.49043	623.822	16.1156	Uncertified Fill	240	20	323.43	358.331	325.113	0	325.113	418.562	418.562
4	1.49043	662.89	16.1156	Uncertified Fill	240	20	331.295	367.045	349.053	0	349.053	444.774	444.774
5	1.49043	701.957	16.1156	Uncertified Fill	240	20	339.159	375.758	372.993	0	372.993	470.987	470.987
6	1.49043	741.025	16.1156	Uncertified Fill	240	20	347.025	384.472	396.933	0	396.933	497.199	497.199
7	1.49043	780.092	16.1156	Uncertified Fill	240	20	354.889	393.185	420.873	0	420.873	523.411	523.411
8	1.49043	819.16	16.1156	Uncertified Fill	240	20	362.754	401.899	444.814	0	444.814	549.624	549.624
9	1.49043	858.227	16.1156	Uncertified Fill	240	20	370.619	410.612	468.753	0	468.753	575.836	575.836
10	1.49043	897.295	16.1156	Uncertified Fill	240	20	378.484	419.326	492.694	0	492.694	602.049	602.049
11	1.49043	936.362	16.1156	Uncertified Fill	240	20	386.348	428.039	516.634	0	516.634	628.261	628.261
12	1.49043	975.43	16.1156	Uncertified Fill	240	20	394.213	436.753	540.574	0	540.574	654.474	654.474
13	1.49043	1014.5	16.1156	Uncertified Fill	240	20	402.078	445.466	564.514	0	564.514	680.686	680.686
14	1.49043	1053.56	16.1156	Uncertified Fill	240	20	409.943	454.18	588.454	0	588.454	706.899	706.899
15	1.49043	1092.63	16.1156	Uncertified Fill	240	20	417.807	462.893	612.394	0	612.394	733.111	733.111
16	1.49043	1131.7	16.1156	Uncertified Fill	240	20	425.673	471.607	636.334	0	636.334	759.324	759.324
17	1.49043	1170.77	16.1156	Uncertified Fill	240	20	433.537	480.32	660.276	0	660.276	785.538	785.538
18	1.49043	1209.83	16.1156	Uncertified Fill	240	20	441.402	489.034	684.216	0	684.216	811.751	811.751
19	1.49043	1248.9	16.1156	Uncertified Fill	240	20	449.267	497.747	708.156	0	708.156	837.963	837.963
20	1.49043	1287.97	16.1156	Uncertified Fill	240	20	457.132	506.461	732.096	0	732.096	864.175	864.175
21	1.49043	1327.04	16.1156	Uncertified Fill	240	20	464.996	515.174	756.035	0	756.035	890.387	890.387
22	1.49043	1366.1	16.1156	Uncertified Fill	240	20	472.862	523.888	779.975	0	779.975	916.599	916.599

23	1.44279	1360.95	16.1156	Bedrock (Sandstone and Siltstone)	140	34	595.843	660.14	771.138	0	771.138	943.294	943.294
24	1.44279	1400.16	16.1156	Bedrock (Sandstone and Siltstone)	140	34	609.912	675.728	794.25	0	794.25	970.472	970.472
25	1.44279	1439.37	16.1156	Bedrock (Sandstone and Siltstone)	140	34	623.981	691.315	817.362	0	817.362	997.649	997.649
26	1.44279	1478.57	16.1156	Bedrock (Sandstone and Siltstone)	140	34	638.051	706.903	840.467	0	840.467	1024.82	1024.82
27	1.44279	1517.78	16.1156	Bedrock (Sandstone and Siltstone)	140	34	652.121	722.491	863.58	0	863.58	1052	1052
28	1.44279	1556.99	16.1156	Bedrock (Sandstone and Siltstone)	140	34	666.19	738.079	886.685	0	886.685	1079.17	1079.17
29	1.44279	1596.19	16.1156	Bedrock (Sandstone and Siltstone)	140	34	680.259	753.666	909.797	0	909.797	1106.34	1106.34
30	1.44279	1655.79	16.1156	Bedrock (Sandstone and Siltstone)	140	34	701.645	777.359	944.922	0	944.922	1147.65	1147.65
31	1.44279	1761.76	16.1156	Bedrock (Sandstone and Siltstone)	140	34	739.671	819.489	1007.39	0	1007.39	1221.1	1221.1
32	1.44279	1871.5	16.1156	Bedrock (Sandstone and Siltstone)	140	34	779.052	863.119	1072.07	0	1072.07	1297.16	1297.16
33	1.44279	1981.75	16.1156	Bedrock (Sandstone and Siltstone)	140	34	818.617	906.954	1137.06	0	1137.06	1373.58	1373.58
34	1.50675	2155.85	27.4661	Bedrock (Sandstone and Siltstone)	140	34	757.687	839.449	1036.97	0	1036.97	1430.83	1430.83
35	1.50675	2213.19	27.4661	Bedrock (Sandstone and Siltstone)	140	34	775.288	858.949	1065.89	0	1065.89	1468.89	1468.89
36	1.50675	2270.54	27.4661	Bedrock (Sandstone and Siltstone)	140	34	792.888	878.449	1094.79	0	1094.79	1506.95	1506.95
37	1.50675	2326.38	27.4661	Bedrock (Sandstone and Siltstone)	140	34	810.027	897.437	1122.95	0	1122.95	1544.01	1544.01
38	1.50675	2343.87	27.4661	Bedrock (Sandstone and Siltstone)	140	34	815.398	903.388	1131.77	0	1131.77	1555.63	1555.63
39	1.50675	2297.85	27.4661	Bedrock (Sandstone and Siltstone)	140	34	801.271	887.736	1108.56	0	1108.56	1525.08	1525.08
40	1.50675	2247.04	27.4661	Bedrock (Sandstone and Siltstone)	140	34	785.678	870.46	1082.95	0	1082.95	1491.36	1491.36
41	1.50675	2196.24	27.4661	Bedrock (Sandstone and Siltstone)	140	34	770.083	853.183	1057.34	0	1057.34	1457.64	1457.64

42	1.50675	2145.43	27.4661	Bedrock (Sandstone and Siltstone)	140	34	754.49	835.907	1031.73	0	1031.73	1423.92	1423.92
43	1.50675	2089.42	27.4661	Bedrock (Sandstone and Siltstone)	140	34	737.297	816.859	1003.48	0	1003.48	1386.74	1386.74
44	1.50675	1967.65	27.4661	Bedrock (Sandstone and Siltstone)	140	34	699.924	775.453	942.1	0	942.1	1305.93	1305.93
45	1.50675	1826.04	27.4661	Bedrock (Sandstone and Siltstone)	140	34	656.458	727.296	870.699	0	870.699	1211.94	1211.94
46	1.50675	1684.42	27.4661	Bedrock (Sandstone and Siltstone)	140	34	612.99	679.138	799.305	0	799.305	1117.95	1117.95
47	1.50675	1542.8	27.4661	Bedrock (Sandstone and Siltstone)	140	34	569.524	630.981	727.91	0	727.91	1023.96	1023.96
48	1.48751	1320.43	45	Bedrock (Sandstone and Siltstone)	140	34	414.48	459.207	473.244	0	473.244	887.725	887.725
49	1.48751	1054.91	45	Bedrock (Sandstone and Siltstone)	140	34	346.929	384.366	362.288	0	362.288	709.217	709.217
50	1.48751	789.389	45	Bedrock (Sandstone and Siltstone)	140	34	279.377	309.525	251.331	0	251.331	530.708	530.708

Global Minimum Query (janbu simplified) - Safety Factor: 1.02961

Slice Number	Width [ft]	Weight [lbs]	Angle of Slice Base [deg]	Base Material	Base Cohesion [psf]	Base Friction Angle [deg]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]	Base Vertical Stress [psf]	Effective Vertical Stress [psf]
1	1.35064	151.242	-45	Uncertified Fill	240	20	421.614	434.098	533.276	0	533.276	111.662	111.662
2	1.35064	453.726	-45	Uncertified Fill	240	20	544.022	560.131	879.551	0	879.551	335.529	335.529
3	1.52589	720.583	9.34601	Uncertified Fill	240	20	378.057	389.251	410.064	0	410.064	472.285	472.285
4	1.52589	794.827	9.34601	Uncertified Fill	240	20	394.312	405.988	456.048	0	456.048	520.944	520.944
5	1.52589	869.07	9.34601	Uncertified Fill	240	20	410.567	422.724	502.03	0	502.03	569.602	569.602
6	1.52589	943.314	9.34601	Uncertified Fill	240	20	426.822	439.46	548.013	0	548.013	618.26	618.26
7	1.52589	1017.56	9.34601	Uncertified Fill	240	20	443.077	456.197	593.996	0	593.996	666.918	666.918
8	1.52589	1091.8	9.34601	Uncertified Fill	240	20	459.332	472.933	639.978	0	639.978	715.576	715.576
9	1.52589	1166.05	9.34601	Uncertified Fill	240	20	475.588	489.67	685.962	0	685.962	764.234	764.234
10	1.52589	1240.29	9.34601	Uncertified Fill	240	20	491.843	506.406	731.945	0	731.945	812.893	812.893
11	1.43692	1237.13	9.34601	Bedrock (Sandstone and Siltstone)	140	34	631.915	650.626	757.033	0	757.033	861.034	861.034
12	1.43692	1305.52	9.34601	Bedrock (Sandstone and Siltstone)	140	34	660.063	679.607	799.999	0	799.999	908.633	908.633
13	1.43692	1373.89	9.34601	Bedrock (Sandstone and Siltstone)	140	34	688.204	708.582	842.959	0	842.959	956.224	956.224
14	1.43692	1442.07	9.34601	Bedrock (Sandstone and Siltstone)	140	34	716.262	737.471	885.788	0	885.788	1003.67	1003.67
15	1.43692	1510.18	9.34601	Bedrock (Sandstone and Siltstone)	140	34	744.294	766.333	928.576	0	928.576	1051.07	1051.07
16	1.43692	1578.29	9.34601	Bedrock (Sandstone and Siltstone)	140	34	772.326	795.195	971.364	0	971.364	1098.47	1098.47
17	1.43692	1646.4	9.34601	Bedrock (Sandstone and Siltstone)	140	34	800.359	824.058	1014.16	0	1014.16	1145.88	1145.88
18	1.43692	1714.51	9.34601	Bedrock (Sandstone and Siltstone)	140	34	828.391	852.92	1056.95	0	1056.95	1193.28	1193.28
19	1.43692	1782.62	9.34601	Bedrock (Sandstone and Siltstone)	140	34	856.423	881.782	1099.73	0	1099.73	1240.69	1240.69
20	1.43692	1850.73	9.34601	Bedrock (Sandstone and Siltstone)	140	34	884.455	910.644	1142.53	0	1142.53	1288.09	1288.09

21	1.43692	1918.84	9.34601	Bedrock (Sandstone and Siltstone)	140	34	912.487	939.506	1185.32	0	1185.32	1335.5	1335.5
22	1.43692	1987.01	9.34601	Bedrock (Sandstone and Siltstone)	140	34	940.545	968.395	1228.15	0	1228.15	1382.94	1382.94
23	1.43692	2056.3	9.34601	Bedrock (Sandstone and Siltstone)	140	34	969.06	997.754	1271.68	0	1271.68	1431.16	1431.16
24	1.43692	2125.99	9.34601	Bedrock (Sandstone and Siltstone)	140	34	997.747	1027.29	1315.46	0	1315.46	1479.67	1479.67
25	1.43692	2195.69	9.34601	Bedrock (Sandstone and Siltstone)	140	34	1026.43	1056.83	1359.25	0	1359.25	1528.18	1528.18
26	1.43692	2265.39	9.34601	Bedrock (Sandstone and Siltstone)	140	34	1055.12	1086.36	1403.03	0	1403.03	1576.69	1576.69
27	1.43692	2335.09	9.34601	Bedrock (Sandstone and Siltstone)	140	34	1083.8	1115.89	1446.82	0	1446.82	1625.2	1625.2
28	1.43692	2404.79	9.34601	Bedrock (Sandstone and Siltstone)	140	34	1112.49	1145.43	1490.61	0	1490.61	1673.71	1673.71
29	1.43692	2474.49	9.34601	Bedrock (Sandstone and Siltstone)	140	34	1141.18	1174.97	1534.4	0	1534.4	1722.21	1722.21
30	1.4907	2603.73	28.9371	Bedrock (Sandstone and Siltstone)	140	34	940.011	967.845	1227.33	0	1227.33	1747.04	1747.04
31	1.4907	2643.43	28.9371	Bedrock (Sandstone and Siltstone)	140	34	952.821	981.034	1246.88	0	1246.88	1773.67	1773.67
32	1.4907	2690.02	28.9371	Bedrock (Sandstone and Siltstone)	140	34	967.855	996.513	1269.83	0	1269.83	1804.93	1804.93
33	1.4907	2737.33	28.9371	Bedrock (Sandstone and Siltstone)	140	34	983.122	1012.23	1293.14	0	1293.14	1836.68	1836.68
34	1.4907	2784.65	28.9371	Bedrock (Sandstone and Siltstone)	140	34	998.389	1027.95	1316.44	0	1316.44	1868.42	1868.42
35	1.4907	2831.96	28.9371	Bedrock (Sandstone and Siltstone)	140	34	1013.66	1043.67	1339.75	0	1339.75	1900.17	1900.17
36	1.4907	2879.27	28.9371	Bedrock (Sandstone and Siltstone)	140	34	1028.92	1059.39	1363.05	0	1363.05	1931.91	1931.91
37	1.4907	2925.59	28.9371	Bedrock (Sandstone and Siltstone)	140	34	1043.87	1074.78	1385.86	0	1385.86	1962.99	1962.99
38	1.4907	2937.99	28.9371	Bedrock (Sandstone and Siltstone)	140	34	1047.87	1078.9	1391.97	0	1391.97	1971.31	1971.31
39	1.4907	2885.92	28.9371	Bedrock (Sandstone and Siltstone)	140	34	1031.07	1061.6	1366.32	0	1366.32	1936.38	1936.38

40	1.4907	2827.38	28.9371	Bedrock (Sandstone and Siltstone)	140	34	1012.18	1042.15	1337.49	0	1337.49	1897.1	1897.1
41	1.4907	2768.84	28.9371	Bedrock (Sandstone and Siltstone)	140	34	993.287	1022.7	1308.65	0	1308.65	1857.82	1857.82
42	1.4907	2710.29	28.9371	Bedrock (Sandstone and Siltstone)	140	34	974.396	1003.25	1279.82	0	1279.82	1818.54	1818.54
43	1.52046	2639.52	45	Bedrock (Sandstone and Siltstone)	140	34	769.511	792.296	967.07	0	967.07	1736.58	1736.58
44	1.52046	2389.19	45	Bedrock (Sandstone and Siltstone)	140	34	704.324	725.179	867.565	0	867.565	1571.89	1571.89
45	1.52046	2111.78	45	Bedrock (Sandstone and Siltstone)	140	34	632.085	650.801	757.294	0	757.294	1389.38	1389.38
46	1.52046	1834.36	45	Bedrock (Sandstone and Siltstone)	140	34	559.846	576.423	647.023	0	647.023	1206.87	1206.87
47	1.52046	1556.95	45	Bedrock (Sandstone and Siltstone)	140	34	487.608	502.046	536.757	0	536.757	1024.36	1024.36
48	1.52046	1279.53	45	Bedrock (Sandstone and Siltstone)	140	34	415.369	427.668	426.486	0	426.486	841.854	841.854
49	1.52046	1002.12	45	Bedrock (Sandstone and Siltstone)	140	34	343.13	353.29	316.216	0	316.216	659.346	659.346
50	1.52046	724.705	45	Bedrock (Sandstone and Siltstone)	140	34	270.892	278.913	205.946	0	205.946	476.838	476.838

Interslice Data

Curved Static - Master Scenario

Global Minimum Query (bishop simplified) - Safety Factor: 2.05963

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [deg]
1	26.052	670.023	0	0	0
2	27.446	670.06	168.476	0	0
3	28.8399	670.117	348.33	0	0
4	30.2339	670.193	536.615	0	0
5	31.6279	670.29	730.527	0	0
6	33.0219	670.406	927.407	0	0
7	34.4159	670.542	1124.74	0	0
8	35.8099	670.699	1320.13	0	0
9	37.2039	670.876	1511.35	0	0
10	38.5979	671.073	1696.28	0	0
11	39.9919	671.29	1872.93	0	0
12	41.3859	671.528	2039.45	0	0
13	42.7799	671.787	2194.14	0	0
14	44.1738	672.067	2335.39	0	0
15	45.5678	672.367	2461.76	0	0
16	46.9618	672.689	2571.91	0	0
17	48.3558	673.033	2664.65	0	0
18	49.7498	673.398	2738.93	0	0
19	51.1438	673.785	2793.82	0	0
20	52.5378	674.195	2828.54	0	0
21	53.9318	674.627	2842.45	0	0
22	55.3258	675.082	2835.06	0	0
23	56.7198	675.56	2806.03	0	0
24	58.1138	676.061	2755.17	0	0
25	59.4508	676.565	2791.84	0	0
26	60.7879	677.091	2809.95	0	0
27	62.125	677.64	2809.3	0	0
28	63.4621	678.212	2789.82	0	0
29	64.7991	678.807	2751.61	0	0
30	66.1362	679.427	2694.95	0	0
31	67.4733	680.071	2620.27	0	0
32	68.8104	680.741	2528.17	0	0
33	70.1474	681.436	2415.91	0	0
34	71.4845	682.158	2277.17	0	0
35	72.8216	682.906	2110.86	0	0
36	74.1587	683.683	1916.31	0	0
37	75.4957	684.488	1693.16	0	0
38	76.8328	685.322	1441.26	0	0
39	78.1699	686.187	1160.67	0	0
40	79.507	687.082	851.692	0	0
41	80.8441	688.01	516.959	0	0
42	82.1811	688.972	173.145	0	0
43	83.5182	689.968	-163.386	0	0
44	84.8553	691	-487.331	0	0
45	85	691.114	-478.288	0	0
46	86.3597	692.206	-786.538	0	0
47	87.7193	693.339	-1065.02	0	0
48	89.079	694.514	-1286.12	0	0
49	90.4386	695.734	-1436.11	0	0
50	91.7983	697	-1503.07	0	0
51	93.8447	699	0	0	0

Global Minimum Query (janbu simplified) - Safety Factor: 1.98266

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [deg]
1	26.9739	670.43	0	0	0
2	28.3541	670.1	217.79	0	0
3	29.7344	669.805	491.069	0	0
4	31.1147	669.545	809.805	0	0
5	32.495	669.319	1164.71	0	0
6	33.8753	669.127	1547.18	0	0
7	35.2556	668.969	1949.22	0	0
8	36.6359	668.844	2363.39	0	0
9	38.0162	668.752	2782.81	0	0
10	39.3965	668.693	3201.03	0	0
11	40.6884	668.667	3698.55	0	0
12	41.9802	668.671	4197.73	0	0
13	43.2721	668.703	4693.27	0	0
14	44.5639	668.764	5180.21	0	0
15	45.8558	668.853	5653.94	0	0
16	47.1476	668.972	6110.15	0	0
17	48.4395	669.12	6544.84	0	0
18	49.7313	669.297	6954.36	0	0
19	51.0232	669.505	7335.28	0	0
20	52.315	669.742	7684.5	0	0
21	53.6069	670.009	7999.14	0	0
22	54.8987	670.308	8276.6	0	0
23	56.1906	670.637	8514.54	0	0
24	57.4824	670.999	8710.87	0	0
25	58.7743	671.393	8863.78	0	0
26	60.0661	671.82	8971.7	0	0
27	61.358	672.281	9033.28	0	0
28	62.6498	672.777	9047.45	0	0
29	63.9417	673.309	9013.44	0	0
30	65.2335	673.878	8930.77	0	0
31	66.5254	674.485	8799.31	0	0
32	67.8172	675.131	8619.27	0	0
33	69.1091	675.819	8391.22	0	0
34	70.4009	676.549	8110.2	0	0
35	71.6928	677.323	7771.01	0	0
36	72.9846	678.144	7372.19	0	0
37	74.2765	679.014	6913.01	0	0
38	75.5683	679.936	6393.3	0	0
39	76.8602	680.913	5813.47	0	0
40	78.152	681.949	5174.61	0	0
41	79.4439	683.047	4478.6	0	0
42	80.7357	684.212	3730.55	0	0
43	82.0276	685.451	2954.46	0	0
44	83.3194	686.77	2179.97	0	0
45	84.6113	688.177	1422.36	0	0
46	85.9031	689.683	699.562	0	0
47	87.195	691.299	34.0048	0	0
48	88.4868	693.043	-521.86	0	0
49	89.7787	694.933	-913.23	0	0
50	91.0705	697	-1086.52	0	0
51	92.2101	699	0	0	0

Curved Static - Curved PseudoStatic

Global Minimum Query (bishop simplified) - Safety Factor: 1.08246

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [deg]
1	26.0469	670.021	0	0	0
2	27.5217	669.978	332.708	0	0
3	28.9966	669.956	665.366	0	0
4	30.4714	669.955	994.467	0	0
5	31.9463	669.974	1316.71	0	0
6	33.4211	670.014	1629.01	0	0
7	34.896	670.075	1928.46	0	0
8	36.3708	670.156	2212.35	0	0
9	37.8457	670.259	2478.17	0	0
10	39.3205	670.382	2723.56	0	0
11	40.7954	670.526	2946.37	0	0
12	42.2702	670.691	3144.59	0	0
13	43.7451	670.877	3316.39	0	0
14	45.2199	671.085	3460.12	0	0
15	46.7005	671.314	3764.39	0	0
16	48.181	671.566	4052.09	0	0
17	49.6616	671.839	4320.82	0	0
18	51.1421	672.134	4568.41	0	0
19	52.6226	672.451	4792.89	0	0
20	54.1032	672.791	4992.47	0	0
21	55.5837	673.153	5165.55	0	0
22	57.0643	673.539	5310.76	0	0
23	58.5448	673.947	5426.87	0	0
24	60.0254	674.379	5512.8	0	0
25	61.5059	674.834	5567.67	0	0
26	62.9864	675.314	5590.77	0	0
27	64.467	675.817	5581.62	0	0
28	65.9475	676.346	5539.91	0	0
29	67.4281	676.9	5465.52	0	0
30	68.9086	677.479	5358.56	0	0
31	70.3891	678.084	5214.26	0	0
32	71.8697	678.716	5025.03	0	0
33	73.3502	679.375	4788.89	0	0
34	74.8308	680.061	4504.39	0	0
35	76.3113	680.776	4170.32	0	0
36	77.7919	681.52	3785.72	0	0
37	79.2724	682.293	3349.85	0	0
38	80.7529	683.096	2863.69	0	0
39	82.2335	683.93	2343.65	0	0
40	83.714	684.797	1807.74	0	0
41	85.1946	685.696	1260.39	0	0
42	86.6751	686.629	706.058	0	0
43	88.1557	687.597	157.654	0	0
44	89.6362	688.601	-360.198	0	0
45	91.1167	689.643	-838.597	0	0
46	92.5973	690.724	-1268.75	0	0
47	94.0778	691.844	-1641.29	0	0
48	95.5584	693.007	-1946.19	0	0
49	97.0389	694.213	-2172.74	0	0
50	98.5195	695.466	-2309.42	0	0
51	100	696.766	0	0	0

Global Minimum Query (janbu simplified) - Safety Factor: 1.02299

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [deg]
1	23.635	669.727	0	0	0
2	25.149	669.536	383.605	0	0
3	26.663	669.372	773.258	0	0
4	28.177	669.234	1174.25	0	0
5	29.691	669.122	1582.58	0	0
6	31.205	669.036	1992.6	0	0
7	32.719	668.975	2399.02	0	0
8	34.233	668.941	2796.92	0	0
9	35.747	668.932	3181.72	0	0
10	37.261	668.949	3549.18	0	0
11	38.775	668.992	3895.36	0	0
12	40.289	669.06	4216.62	0	0
13	41.82	669.156	4742.98	0	0
14	43.3511	669.278	5260.38	0	0
15	44.8821	669.427	5763.89	0	0
16	46.4132	669.603	6248.94	0	0
17	47.9442	669.805	6711.34	0	0
18	49.4753	670.035	7147.29	0	0
19	51.0063	670.292	7553.32	0	0
20	52.5374	670.577	7926.29	0	0
21	54.0684	670.89	8263.39	0	0
22	55.5995	671.231	8562.13	0	0
23	57.1306	671.6	8820.29	0	0
24	58.6616	671.998	9035.97	0	0
25	60.1927	672.426	9207.57	0	0
26	61.7237	672.883	9333.69	0	0
27	63.2548	673.37	9413.25	0	0
28	64.7858	673.888	9445.45	0	0
29	66.3169	674.438	9429.81	0	0
30	67.8479	675.019	9366.12	0	0
31	69.379	675.633	9254.22	0	0
32	70.91	676.281	9086.79	0	0
33	72.4411	676.962	8858.69	0	0
34	73.9721	677.679	8567.65	0	0
35	75.5032	678.431	8212.01	0	0
36	77.0342	679.22	7790.47	0	0
37	78.5653	680.048	7302.06	0	0
38	80.0963	680.915	6746.24	0	0
39	81.6274	681.822	6131.87	0	0
40	83.1584	682.772	5484.36	0	0
41	84.6895	683.765	4813.45	0	0
42	86.2205	684.805	4125.52	0	0
43	87.7516	685.891	3431.16	0	0
44	89.2826	687.027	2761.77	0	0
45	90.8137	688.216	2133.21	0	0
46	92.3447	689.459	1558.55	0	0
47	93.8758	690.761	1052.03	0	0
48	95.4068	692.123	629.181	0	0
49	96.9379	693.551	307.043	0	0
50	98.4689	695.049	104.4	0	0
51	100	696.621	0	0	0

Global Minimum Query (gle/morgenstern-price) - Safety Factor: 1.06434

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [deg]
1	29.4443	671.522	0	0	0
2	30.8802	671.526	330.964	18.1781	3.14379
3	32.3161	671.549	671.153	73.5749	6.25605
4	33.752	671.591	1016.86	166.639	9.30668
5	35.188	671.651	1364.16	296.65	12.2685
6	36.6239	671.73	1709.03	461.701	15.1178
7	38.0598	671.828	2047.37	658.727	17.8352
8	39.4957	671.945	2375.12	883.588	20.4061
9	40.9316	672.08	2688.33	1131.18	22.8201
10	42.3676	672.235	2983.27	1395.6	25.0706
11	43.8035	672.408	3256.44	1670.33	27.1547
12	45.2394	672.6	3504.7	1948.47	29.0723
13	46.6753	672.812	3725.29	2222.94	30.8252
14	48.1113	673.043	3915.86	2486.7	32.4169
15	49.5472	673.294	4074.52	2733	33.8519
16	50.9831	673.564	4199.82	2955.57	35.1355
17	52.419	673.853	4290.78	3148.75	36.2727
18	53.8185	674.155	4644.07	3530.87	37.2456
19	55.2179	674.476	4967.72	3893.7	38.0894
20	56.6174	674.815	5258.55	4229.26	38.8085
21	58.0168	675.175	5514.04	4530.36	39.4067
22	59.4162	675.553	5732.33	4790.83	39.8874
23	60.8157	675.952	5912.11	5005.57	40.2534
24	62.2151	676.37	6052.74	5170.77	40.5068
25	63.6146	676.809	6154.15	5283.89	40.649
26	65.014	677.269	6216.78	5343.71	40.6811
27	66.4134	677.749	6241.54	5350.24	40.6031
28	67.8129	678.25	6229.76	5304.68	40.4146
29	69.2123	678.773	6182.96	5209.21	40.1145
30	70.6118	679.317	6096.67	5061.73	39.701
31	72.0112	679.883	5967.78	4862.28	39.1716
32	73.4106	680.472	5796.47	4614.59	38.5234
33	74.8101	681.084	5583.37	4323.55	37.7528
34	76.2095	681.718	5329.24	3994.88	36.8558
35	77.609	682.377	5034.87	3634.96	35.8277
36	79.0084	683.06	4701.03	3250.76	34.6638
37	80.4078	683.767	4328.83	2849.91	33.3591
38	81.8073	684.499	3928.73	2446.25	31.9087
39	83.2067	685.258	3518.15	2056.5	30.308
40	84.6062	686.042	3101.4	1687.65	28.5532
41	86.0056	686.854	2681.18	1345.04	26.6411
42	87.405	687.693	2261.02	1033.77	24.5705
43	88.8045	688.561	1858.84	763.976	22.3425
44	90.2039	689.458	1484.37	539.097	19.9601
45	91.6034	690.386	1142.39	358.663	17.4301
46	93.0028	691.344	838.059	220.842	14.7628
47	94.4022	692.334	577.045	122.363	11.9723
48	95.8017	693.358	365.64	58.4155	9.077
49	97.2011	694.415	210.907	22.5363	6.09915
50	98.6006	695.508	120.844	6.46891	3.06418
51	100	696.639	0	0	0

Block Static - Master Scenario

Global Minimum Query (bishop simplified) - Safety Factor: 2.06523

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [deg]
1	26.3184	670.141	0	0	0
2	27.541	668.918	521.765	0	0
3	28.7636	667.696	1397.39	0	0
4	30.1185	668.087	1499.02	0	0
5	31.4735	668.478	1597.18	0	0
6	32.8284	668.87	1691.88	0	0
7	34.1833	669.261	1783.12	0	0
8	35.5383	669.653	1870.89	0	0
9	36.8932	670.044	1955.2	0	0
10	38.2482	670.436	2036.05	0	0
11	39.6031	670.827	2113.43	0	0
12	40.958	671.219	2187.35	0	0
13	42.313	671.61	2257.8	0	0
14	43.6679	672.002	2324.8	0	0
15	45.0228	672.393	2388.32	0	0
16	46.3778	672.785	2448.39	0	0
17	47.7327	673.176	2504.98	0	0
18	49.0877	673.568	2558.12	0	0
19	50.4426	673.959	2607.79	0	0
20	51.7975	674.351	2654	0	0
21	53.1525	674.742	2696.75	0	0
22	54.5074	675.134	2736.03	0	0
23	55.8623	675.525	2771.84	0	0
24	57.2173	675.917	2804.2	0	0
25	58.5722	676.308	2833.09	0	0
26	60.015	676.725	2976.64	0	0
27	61.4578	677.142	3121.53	0	0
28	62.9006	677.559	3267.78	0	0
29	64.3434	677.976	3415.37	0	0
30	65.7862	678.392	3564.3	0	0
31	67.229	678.809	3714.58	0	0
32	68.6718	679.226	3866.21	0	0
33	70.1145	679.643	4019.89	0	0
34	71.5573	680.06	4177.2	0	0
35	73.0001	680.477	4338.29	0	0
36	74.4429	680.894	4503.16	0	0
37	75.6331	681.92	3915.38	0	0
38	76.8232	682.946	3336.96	0	0
39	78.0134	683.972	2767.89	0	0
40	79.2036	684.998	2208.19	0	0
41	80.5372	686.331	1455.14	0	0
42	81.8708	687.665	747.98	0	0
43	83.2044	688.998	111.207	0	0
44	84.538	690.332	-453.329	0	0
45	85.8716	691.666	-945.628	0	0
46	87.2052	692.999	-1365.69	0	0
47	88.5388	694.333	-1713.51	0	0
48	89.8724	695.666	-1981.37	0	0
49	91.206	697	-2143.03	0	0
50	92.706	698.5	-1526.28	0	0
51	94.206	700	0	0	0

Global Minimum Query (janbu simplified) - Safety Factor: 2.00241

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [deg]
1	26.3184	670.141	0	0	0
2	27.541	668.918	537.127	0	0
3	28.7636	667.696	1432.21	0	0
4	30.1185	668.087	1541.79	0	0
5	31.4735	668.478	1648.09	0	0
6	32.8284	668.87	1751.1	0	0
7	34.1833	669.261	1850.82	0	0
8	35.5383	669.653	1947.25	0	0
9	36.8932	670.044	2040.39	0	0
10	38.2482	670.436	2130.25	0	0
11	39.6031	670.827	2216.82	0	0
12	40.958	671.219	2300.1	0	0
13	42.313	671.61	2380.1	0	0
14	43.6679	672.002	2456.8	0	0
15	45.0228	672.393	2530.22	0	0
16	46.3778	672.785	2600.35	0	0
17	47.7327	673.176	2667.2	0	0
18	49.0877	673.568	2730.75	0	0
19	50.4426	673.959	2791.02	0	0
20	51.7975	674.351	2848	0	0
21	53.1525	674.742	2901.69	0	0
22	54.5074	675.134	2952.1	0	0
23	55.8623	675.525	2999.22	0	0
24	57.2173	675.917	3043.05	0	0
25	58.5722	676.308	3083.59	0	0
26	60.015	676.725	3242.59	0	0
27	61.4578	677.142	3403.31	0	0
28	62.9006	677.559	3565.74	0	0
29	64.3434	677.976	3729.88	0	0
30	65.7862	678.392	3895.73	0	0
31	67.229	678.809	4063.29	0	0
32	68.6718	679.226	4232.56	0	0
33	70.1145	679.643	4404.44	0	0
34	71.5573	680.06	4580.94	0	0
35	73.0001	680.477	4762.23	0	0
36	74.4429	680.894	4948.34	0	0
37	75.6331	681.92	4381.39	0	0
38	76.8232	682.946	3823.56	0	0
39	78.0134	683.972	3274.85	0	0
40	79.2036	684.998	2735.25	0	0
41	80.5372	686.331	2005.8	0	0
42	81.8708	687.665	1321.19	0	0
43	83.2044	688.998	705.352	0	0
44	84.538	690.332	160.097	0	0
45	85.8716	691.666	-314.577	0	0
46	87.2052	692.999	-718.669	0	0
47	88.5388	694.333	-1052.18	0	0
48	89.8724	695.666	-1307.56	0	0
49	91.206	697	-1459.17	0	0
50	92.706	698.5	-816.009	0	0
51	94.206	700	0	0	0

Block Static - Block PseudoStatic

Global Minimum Query (bishop simplified) - Safety Factor: 1.10791

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [deg]
1	26.3184	670.141	0	0	0
2	27.541	668.918	992.971	0	0
3	28.7636	667.696	2394.48	0	0
4	30.254	668.126	2530.61	0	0
5	31.7445	668.557	2655.26	0	0
6	33.2349	668.987	2768.43	0	0
7	34.7253	669.418	2870.12	0	0
8	36.2157	669.849	2960.33	0	0
9	37.7062	670.279	3039.06	0	0
10	39.1966	670.71	3106.31	0	0
11	40.687	671.141	3162.07	0	0
12	42.1775	671.571	3206.36	0	0
13	43.6679	672.002	3239.16	0	0
14	45.1583	672.432	3260.49	0	0
15	46.6488	672.863	3270.33	0	0
16	48.1392	673.294	3268.69	0	0
17	49.6296	673.724	3255.57	0	0
18	51.1201	674.155	3230.97	0	0
19	52.6105	674.586	3194.89	0	0
20	54.1009	675.016	3147.33	0	0
21	55.5914	675.447	3088.28	0	0
22	57.0818	675.877	3017.76	0	0
23	58.5722	676.308	2935.75	0	0
24	60.015	676.725	3024.76	0	0
25	61.4578	677.142	3111.49	0	0
26	62.9006	677.559	3195.95	0	0
27	64.3434	677.976	3278.13	0	0
28	65.7862	678.392	3358.04	0	0
29	67.229	678.809	3435.67	0	0
30	68.6718	679.226	3511.03	0	0
31	70.1145	679.643	3582.93	0	0
32	71.5573	680.06	3648.68	0	0
33	73.0001	680.477	3708.07	0	0
34	74.4429	680.894	3761.05	0	0
35	75.9497	681.677	3378.95	0	0
36	77.4564	682.46	2981.8	0	0
37	78.9632	683.243	2569.6	0	0
38	80.4699	684.027	2142.74	0	0
39	81.9767	684.81	1711.29	0	0
40	83.4834	685.593	1291.93	0	0
41	84.9902	686.376	885.89	0	0
42	86.4969	687.16	493.188	0	0
43	88.0037	687.943	113.82	0	0
44	89.5105	688.726	-250.847	0	0
45	91.0172	689.509	-583.557	0	0
46	92.524	690.292	-879.101	0	0
47	94.0307	691.076	-1137.48	0	0
48	95.5375	691.859	-1358.69	0	0
49	97.025	693.346	-1881.91	0	0
50	98.5125	694.834	-2252.93	0	0
51	100	696.321	0	0	0

Global Minimum Query (janbu simplified) - Safety Factor: 1.02961

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [deg]
1	26.2474	670.109	0	0	0
2	27.5981	668.759	1239.39	0	0
3	28.9487	667.408	3011.85	0	0
4	30.4746	667.659	3247.53	0	0
5	32.0005	667.91	3471.93	0	0
6	33.5264	668.161	3685.08	0	0
7	35.0523	668.413	3886.96	0	0
8	36.5781	668.664	4077.58	0	0
9	38.104	668.915	4256.93	0	0
10	39.6299	669.166	4425.02	0	0
11	41.1558	669.417	4581.85	0	0
12	42.5927	669.654	4901.91	0	0
13	44.0296	669.89	5229.65	0	0
14	45.4666	670.127	5565.07	0	0
15	46.9035	670.363	5908.16	0	0
16	48.3404	670.6	6258.9	0	0
17	49.7773	670.836	6617.3	0	0
18	51.2142	671.073	6983.35	0	0
19	52.6512	671.309	7357.05	0	0
20	54.0881	671.546	7738.41	0	0
21	55.525	671.782	8127.42	0	0
22	56.9619	672.018	8524.09	0	0
23	58.3988	672.255	8928.42	0	0
24	59.8358	672.491	9340.53	0	0
25	61.2727	672.728	9760.48	0	0
26	62.7096	672.964	10188.3	0	0
27	64.1465	673.201	10623.9	0	0
28	65.5834	673.437	11067.3	0	0
29	67.0204	673.674	11518.6	0	0
30	68.4573	673.91	11977.7	0	0
31	69.948	674.735	11507.2	0	0
32	71.4387	675.559	11026.5	0	0
33	72.9294	676.383	10534	0	0
34	74.4201	677.207	10029.3	0	0
35	75.9108	678.031	9512.61	0	0
36	77.4015	678.855	8983.82	0	0
37	78.8922	679.68	8442.95	0	0
38	80.3829	680.504	7890.25	0	0
39	81.8736	681.328	7334.39	0	0
40	83.3643	682.152	6791.82	0	0
41	84.855	682.976	6264.2	0	0
42	86.3457	683.8	5751.52	0	0
43	87.8364	684.625	5253.79	0	0
44	89.3568	686.145	4081.5	0	0
45	90.8773	687.666	3044.07	0	0
46	92.3977	689.186	2156.1	0	0
47	93.9182	690.706	1417.58	0	0
48	95.4386	692.227	828.512	0	0
49	96.9591	693.747	388.895	0	0
50	98.4795	695.268	98.7305	0	0
51	100	696.788	0	0	0

Entity Information

Curved Static

Shared Entities

Type	Coordinates (x,y)
External Boundary	0, 640 236, 640 236, 700 236, 710 220, 710 220, 705 182, 705 182, 700 182, 680 100, 680 100, 697 100, 699 87, 699 80, 697 69, 689 26, 670 0, 667 0, 662
Material Boundary	80, 697 81, 691
Material Boundary	0, 662 28, 664 45, 671 58, 676 71, 683 76, 687 81, 691 85, 691 85, 695 89, 695 89, 697 100, 697
Material Boundary	182, 700 220, 700 236, 700

Scenario-based Entities

Type	Coordinates (x,y)	Master Scenario	Curved PseudoStatic
Water Table	-0.254, 655.22 235.781, 680.193	Assigned to: Compacted Fill Uncertified Fill Bedrock (Sandstone and Siltstone)	Not assigned to any materials
Distributed Load	236, 710 220.033, 710	Constant DistributionOrientation: Normal to boundaryMagnitude: 3100 lbs/ft2Creates Excess Pore Pressure: No	Constant DistributionOrientation: Normal to boundaryMagnitude: 3100 lbs/ft2Creates Excess Pore Pressure: No
Distributed Load	181.686, 680 100.16, 680	Constant DistributionOrientation: Normal to boundaryMagnitude: 2500 lbs/ft2Creates Excess Pore Pressure: No	Constant DistributionOrientation: Normal to boundaryMagnitude: 2500 lbs/ft2Creates Excess Pore Pressure: No

Block Static

Shared Entities

Type	Coordinates (x,y)
External Boundary	0, 640 236, 640 236, 700 236, 710 220, 710 220, 705 182, 705 182, 700 182, 680 100, 680 100, 697 100, 700 89, 700 80, 697 69, 689 26, 670 0, 667 0, 662
Material Boundary	80, 697 81, 691
Material Boundary	0, 662 28, 664 45, 671 58, 676 71, 683 76, 687 81, 691 85, 691 85, 695 89, 695 89, 697 100, 697
Material Boundary	182, 700 220, 700 236, 700

Scenario-based Entities

Type	Coordinates (x,y)	Master Scenario	Block PseudoStatic
Water Table	-0.109, 651.945 235.781, 680.193	Assigned to: Compacted Fill Uncertified Fill Bedrock (Sandstone and Siltstone)	Assigned to: Compacted Fill Uncertified Fill Bedrock (Sandstone and Siltstone)
Distributed Load	236, 710 220.033, 710	Constant DistributionOrientation: Normal to boundaryMagnitude: 3100 lbs/ft2Creates Excess Pore Pressure: No	Constant DistributionOrientation: Normal to boundaryMagnitude: 3100 lbs/ft2Creates Excess Pore Pressure: No
Distributed Load	181.686, 680 100.16, 680	Constant DistributionOrientation: Normal to boundaryMagnitude: 2500 lbs/ft2Creates Excess Pore Pressure: No	Constant DistributionOrientation: Normal to boundaryMagnitude: 2500 lbs/ft2Creates Excess Pore Pressure: No
Block Search Window	76.356, 690.421 53.952, 679.219 53.952, 666.069 76.194, 677.758		
Block Search Window	50.543, 677.109 24.73, 667.043 25.704, 654.218 49.244, 663.796		
Block Search Window	94.377, 697.077 78.791, 691.395 78.791, 676.459 95.188, 690.421		
Block Search Window	79.765, 677.596 96.325, 687.661 95.513, 697.564 79.116, 692.369		

Geotechnologies, Inc.

Project: Hilton Universal
File No.: 21578
Geologic Material Alluvium

Soil Weight	γ'	130	pcf
Internal Friction Angle	ϕ	34	degrees
Cohesion	c	140	psf
Height of Retaining Wall	H	14	feet
Slope angle from Horizontal	β	27	Degrees

Retaining Wall Design based on At Rest Earth Pressure Inclined Backslope

Lateral Earth Pressure	$P_o = \gamma' K_{o\beta} * H$		
At rest Eearth Pressure Coefficient for Inclined slope	$K_{o\beta} = (1-\sin\phi)*(1+\sin\beta)$	0.641	
Vertical Stress	$\sigma'_v = \gamma H$	1820.0	psf
$Po=\gamma' K_{o\beta} * H$	1166.5	psf	
EFP =	83.3	pcf	
P_o =	8165.4	lbs/ft	(based on a triangular distribution of pressure)

Design wall for an EFP of 83 pcf

Restrained Wall Design based on At Rest Earth Pressure Inclined Backslope

P_o =	8165.4	lbs/ft	
$\sigma'_{h,\,max}$ =	52.1	H	(based on a trapezoidal distribution of pressure)
$\sigma'_{h,\,max}$ =	583.2	psf	

Design restrained wall for 47 H

Geotechnologies, Inc.

Project: Hilton Universal

File No.: 21062

Seismically Induced Lateral Soil Pressure on Retaining Wall

Input:

Height of Retaining Wall:	(H)	35.0 feet
Retained Soil Unit Weight:	(γ)	130.0 pcf
Short Duration Acceleration	(SDs)	1.667 g
Horizontal Ground Acceleration: (1/2 of Sds/2.5)	(k_h)	0.33 g

Seismic Increment (ΔP_{AE}):

$\Delta P_{AE} = (0.5*\gamma*H^2)*(0.75*k_h)$

ΔP_{AE} = 19910.2 lbs/ft

Force applied at 0.6H above the base of the wall
Transfer load to 2/3 of the height of the wall

$T*(2/3)*H = \Delta P_{AE}*0.6*H$

T = 17919.2 lbs/ft

$EFP = 2*T/H^2$

EFP = **29.3 pcf** Triangular shape

Geotechnologies, Inc.

Project: Hilton -- Los Angeles
File No.: 21578
Description: Bedrock Favorable-dip Bedding Only
Boring: B1

Slot Cut Calculation

Input:

Height of Slots	(H)	8.0	feet
Unit Weight of Soils	(γ)	127.2	pcf
Friction Angle of Soils	(ϕ)	34.0	degrees
Cohesion of Soils	(c)	140.0	psf
Factor of Safety	(FS)	1.25	

Factor of Safety = Resistance Force/Driving Force

Coefficient of Lateral Earth Pressure At-Rest	K_o	0.4	

Surcharge Pressure:

Line Load	(q_L)	1000.0	psf
Distance Away from Edge of Excavation	(X)	2.0	feet

Design Equations

$b = H/(\tan\alpha)$

$A = 0.5*H*b$

$W = 0.5*H*b*\gamma$ *(per lineal foot of slot width)*

$F_1 = d*W*(\sin\alpha)*(\cos\alpha)$

$F_2 = d*L$

$R_1 = d*[W*(\cos^2\alpha)*(\tan\phi)+(c*b)]$

$R_2 = 2*\Delta F$

$\Delta F = A*[1/3*\gamma*H*K_o*(\tan\phi)+c]$

FS = Resistance Force/Driving Force

$FS = (R_1+R_2)/(F_1+F_2)$

Failure Angle (α) degrees	Base Width of Failure Wedge (b) feet	Area of Failure Wedge (A) feet2	Weight of Failure Wedge (W) lbs/lineal foot	**Driving Force** Wedge + Surcharge per lineal foot of Slot Width	**Resisting Force** Failure Wedge per lineal foot of Slot Width	**Resisting Force** Side Resistance Force (ΔF) lbs	Allowable Width of Slots* (d) feet
45	8.0	32	4070.4	2535.2	2830.0	7408.6	43.7
46	7.7	31	3930.7	2463.9	2686.4	7154.4	36.4
47	7.5	30	3795.7	2392.0	2549.0	6908.6	31.3
48	7.2	29	3665.0	2319.7	2417.3	6670.7	27.7
49	7.0	28	3538.3	2247.1	2291.2	6440.2	24.9
50	6.7	27	3415.5	2174.2	2170.3	6216.5	22.7
51	6.5	26	3296.1	2101.1	2054.6	5999.3	21.0
52	6.3	25	3180.1	2028.0	1943.8	5788.2	19.6
53	6.0	24	3067.3	1954.9	1837.6	5582.7	18.4
54	5.8	23	2957.3	1881.8	1735.9	5382.6	17.5
55	5.6	22	2850.1	1809.0	1638.6	5187.5	16.7
56	5.4	22	2745.5	1736.4	1545.4	4997.1	16.0
57	5.2	21	2643.3	1664.2	1456.3	4811.2	15.4
58	5.0	20	2543.5	1592.4	1371.0	4629.4	14.9
59	4.8	19	2445.7	1521.2	1289.5	4451.5	14.5
60	4.6	18	2350.0	1450.6	1211.5	4277.3	14.2
61	4.4	18	2256.3	1380.7	1137.1	4106.6	13.9
62	4.3	17	2164.3	1311.6	1065.9	3939.2	13.7
63	4.1	16	2074.0	1243.4	998.0	3774.8	13.6
64	3.9	16	1985.3	1176.2	933.2	3613.4	13.5
65	3.7	15	1898.1	1110.0	871.4	3454.7	13.4
66	3.6	14	1812.3	1045.0	812.5	3298.5	13.4
67	3.4	14	1727.8	981.1	756.3	3144.7	13.4
68	3.2	13	1644.5	918.5	702.8	2993.3	13.4
69	3.1	12	1562.5	857.3	651.9	2843.9	13.6
70	2.9	12	1481.5	797.5	603.4	2696.5	13.7

* Width of Slots to achieve a minimum o f 1.25 Factor of Saferty, with a Maximum Allowable Slot Width of 8-f

Critical Slot Width with Factor of Safety equal or exceeding 1.25:

d_{allow} 13.4 feet

The proposed excavation may be made using the A-B-C Slot-Cutting Method with a Maximum Allowable Slot Width of 8 Feet, and up to 8 Feet in Height, with a Factor of Safety Equal or Exceeding 1.25.

BOARD OF
BUILDING AND SAFETY
COMMISSIONERS

JAVIER NUNEZ
PRESIDENT

ELVIN W. MOON
VICE PRESIDENT

JOSELYN GEAGA-ROSENTHAL
LAUREL GILLETTE
GEORGE HOVAGUIMIAN

CITY OF LOS ANGELES
CALIFORNIA

ERIC GARCETTI
MAYOR

DEPARTMENT OF
BUILDING AND SAFETY
201 NORTH FIGUEROA STREET
LOS ANGELES, CA 90012

OSAMA YOUNAN, P.E.
GENERAL MANAGER
SUPERINTENDENT OF BUILDING

JOHN WEIGHT
EXECUTIVE OFFICER

GEOLOGY AND SOILS REPORT APPROVAL LETTER

January 10, 2023

LOG # 123421-01
SOILS/GEOLOGY FILE - 2
LAN

Hilton Los Angeles, Universal City
555 Universal Hollywood Drive
Los Angeles, CA 91608

TRACT: 5569
LOT(S): B
LOCATION: 555 Universal Hollywood Drive

CURRENT REFERENCE REPORT/LETTER(S)	REPORT No.	DATE OF DOCUMENT	PREPARED BY
Soils Report	21578	12/08/2022	Geotechnologies, Inc.
Oversized Doc(s).	"	"	"

PREVIOUS REFERENCE REPORT/LETTER(S)	REPORT No.	DATE OF DOCUMENT	PREPARED BY
Dept. Review Letter	123421	10/31/2022	LADBS
Update Report	21578	09/14/2022	Geotechnologies, Inc.
Oversized Doc(s).	"	"	"
Dept. Approval Letter	95877-01	02/23/2017	LADBS
Addendum Report	21062	01/31/2017	Geotechnologies, Inc.
Dept. Correction Letter	95877	12/21/2016	LADBS
Geology/Soils Report	21062	12/17/2015 rev. 02/12/2016	Geotechnologies, Inc.

The Grading Division of the Department of Building and Safety has reviewed the referenced update report that provides recommendations for proposed additions to the Hilton Hotel at Universal City. The Department previously conditionally approved the above previous referenced reports for a proposed hotel addition in a letter dated 02/23/2017, Log #95877-01.

According to the current report, the proposed addition has been expanded. There is still an addition that will be located south of the existing hotel structure where currently there are descending slopes about 30 feet high at a gradient of 2:1 (H:V), which is still up to 18 stories high, including lower parking levels. A chiller/boiler room is to be located southwest of the existing structure. Subterranean parking levels and a meeting room is to be located north of the existing structure;

and a parking lot is proposed at the east side of the site. Excavations as much as 43 feet are proposed to construct parking levels.

The earth materials at the subsurface exploration locations consist of compacted fill Topanga Formation bedrock. Bedding within the Topanga formation is reported to generally dip to the north, which is favorable for relative to the slope but north-facing temporary excavations will expose unsupported bedding. The consultants recommend to support the proposed hotel structure on conventional and/or drilled-pile foundations bearing on competent bedrock; the subterranean Parking P3 Level shall be supported on conventional shallow foundations bearing in the bedrock; the proposed Chiller/Boiler room shall be supported on friction piles bearing into bedrock; the toe of slope retaining wall proposed to create the east side parking lot shall be supported on piles with a minimum length of 25 feet (measured from the top of the wall). These piles are required to provide a sliding resistance of 90 kips for an 8-foot spacing to increase the slope stability factor of safety to the Code required minimum values. Small independent structures, such as free-standing walls can be supported by fill or bedrock. Because of seepage observed in the exploratory borings, minor dewatering may be necessary during construction.

The referenced reports are acceptable, provided the following conditions are complied with during site development:

(Note: Numbers in parenthesis ( ) refer to applicable sections of the 2020 City of LA Building Code. P/BC numbers refer the applicable Information Bulletin. Information Bulletins can be accessed on the internet at LADBS.ORG.)

1. The geologist and soils engineer shall review and approve the detailed plans prior to issuance of any permits. This approval shall be by signature on the plans that clearly indicates the geologist and soils engineer have reviewed the plans prepared by the design engineer; and, that the plans include the recommendations contained in their reports (7006.1).

2. All recommendations of the reports that are in addition to or more restrictive than the conditions contained herein shall be incorporated into the plans.

3. A copy of the subject and appropriate referenced reports and this approval letter shall be attached to the District Office and field set of plans (7006.1). Submit one copy of the above reports to the Building Department Plan Checker prior to issuance of the permit.

4. A grading permit shall be obtained for all structural fill and retaining wall backfill (106.1.2).

5. All man-made fill shall be compacted to a minimum 90 percent of the maximum dry density of the fill material per the latest version of ASTM D 1557. Where cohesionless soil having less than 15 percent finer than 0.005 millimeters is used for fill, it shall be compacted to a minimum of 95 percent relative compaction based on maximum dry density. Placement of gravel in lieu of compacted fill is only allowed if complying with LAMC Section 91.7011.3.

6. Existing uncertified fill shall not be used for support of footings, concrete slabs or new fill (1809.2, 7011.3).

7. Drainage in conformance with the provisions of the Code shall be maintained during and subsequent to construction (7013.12).

8. The applicant is advised that the approval of this report does not waive the requirements for excavations contained in the General Safety Orders of the California Department of Industrial Relations (3301.1).

9. Temporary excavations that remove lateral support to the public way, adjacent property, or adjacent structures shall be supported by shoring. Note: Lateral support shall be considered to be removed when the excavation extends below a plane projected downward at an angle of 45 degrees from the bottom of a footing of an existing structure, from the edge of the public way or an adjacent property. (3307.3.1)

10. Where any excavation, not addressed in the approved reports, would remove lateral support (as defined in 3307.3.1) from a public way, adjacent property or structures, a supplemental report shall be submitted to the Grading Division of the Department containing recommendations for shoring, underpinning, and sequence of construction.

11. Prior to the issuance of any permit that authorizes an excavation where the excavation is to be of a greater depth than are the walls or foundation of any adjoining building or structure and located closer to the property line than the depth of the excavation, the owner of the subject site shall provide the Department with evidence that the adjacent property owner has been given a 30-day written notice of such intent to make an excavation (3307.1).

12. The soils engineer shall review and approve the shoring and/or underpinning plans prior to issuance of the permit (3307.3.2).

13. Prior to the issuance of the permits, the soils engineer and/or the structural designer shall evaluate the surcharge loads used in the report calculations for the design of the retaining walls and shoring. If the surcharge loads used in the calculations do not conform to the actual surcharge loads, the soil engineer shall submit a supplementary report with revised recommendations to the Department for approval.

14. Unsurcharged temporary excavation exposing fill or favorably dipping bedding may be cut vertical up to 6 feet, as recommended.

15. Unsurcharged temporary excavation exposing adverse bedding shall be trimmed back at the angle of bedding, but not exceeding 1:1 (horizontal to vertical).

16. Shoring shall be designed for the lateral earth pressures specified in the section titled "Lateral Pressures" starting on page 55 of the 11/14/2022 report; all surcharge loads shall be included into the design. Total lateral load on shoring piles shall be determined by multiplying the recommended EFP by the pile spacing.

17. Shoring shall be designed for a maximum lateral deflection of ½ inch where a structure is within a 1:1 plane projected up from the base of the excavation, and for a maximum lateral deflection of 1 inch provided there are no structures within a 1:1 plane projected up from the base of the excavation, as recommended.

18. A shoring monitoring program shall be implemented to the satisfaction of the soils engineer.

19. ABC slot-cut method may be used for unsurcharged temporary excavations with each slot not exceeding 8 feet in height and not exceeding 8 feet in width, as recommended. The soils engineer shall verify in the field if the existing earth materials are stable in the slot-

cut excavation. Each slot shall be inspected by the soils engineer and approved in writing prior to any worker access.

20. Foundations adjacent to a descending slope steeper than 3:1 (horizontal to vertical) in gradient shall be a minimum distance of one-third the vertical height of the slope but need not exceed 40 feet measured horizontally from the footing bottom to the face of the slope (1808.7.2).

21. Buildings adjacent to ascending slopes steeper than 3H:1V in gradient shall be setback from the toe of the slope a level distance measured perpendicular to slope contours equal to one-half the vertical height of the slope, but need not exceed 15 feet (1808.7.1).

22. All foundations shall derive entire support from competent bedrock, as recommended (and approved by the geologist and soils engineer by inspection).

23. All new pile foundations located within the zone of influence of the existing foundations shall be sleeved for the portion located above the 1H:1V plane projected upward from the bottom of the existing foundation.

24. The pile foundations for the eastern retaining wall, located at the toe of the slope, are required to provide a resistance of 90 kips for an 8-foot spacing to increase the slope stability factor of safety to the Code required minimum values.

25. Pile caisson and/or isolated foundation ties are required by LAMC Sections 91.1809.13 and/or 91.1810.3.13. Exceptions and modification to this requirement are provided in Information Bulletin P/BC 2020-030.

26. When water is present in drilled pile holes, the concrete shall be tremied from the bottom up to ensure minimum segregation of the mix and negligible turbulence of the water (1808.8.3).

27. The group effects on lateral behavior of the piles shall be included in the design of the deep foundation, as specified in the response to Comment 4, included in the 12/08/2022 report. (1810.2.5)

28. The Code requires analysis for the group effects on axial behavior where the center-to-center spacing of deep foundation elements is less than three times the least horizontal dimension of an element. Where this occurs for the existing and/or proposed pile layout, a supplemental report shall be submitted that contains said analysis and recommendations for reduction factors as appropriate. (1810.2.5)

29. Existing uncertified fill shall not be used for lateral support of deep foundations (1810.2.1).

30. The structure shall be connected to the public sewer system per P/BC 2020-027.

31. Slabs on uncertified fill shall be designed as a structural slab (7011.3).

32. Slabs placed on approved compacted fill shall be at least 3½ inches thick and shall be reinforced with ½-inch diameter (#4) reinforcing bars spaced a maximum of 16 inches on center each way.

33. Concrete floor slabs placed on native soil or approved compacted fill shall be placed on a moisture barrier membrane. The slabs shall be at least 4 inches thick.

34. The seismic design shall be based on a Site Class C, as recommended.

35. Retaining walls shall be designed for the lateral earth pressures specified in the section titled "Retaining Wall Design" starting on page 44 of the 11/14/2022 report and as specified in the response to Comment 1b, included in the 12/08/2022 report. All surcharge loads shall be included into the design.

36. All retaining walls shall be provided with a standard surface backdrain system and all drainage shall be conducted in a non-erosive device to the street in an acceptable manner (7013.11).

37. With the exception of retaining walls designed for hydrostatic pressure, all retaining walls shall be provided with a subdrain system to prevent possible hydrostatic pressure behind the wall. Prior to issuance of any permit, the retaining wall subdrain system recommended in the soils report shall be incorporated into the foundation plan which shall be reviewed and approved by the soils engineer of record (1805.4).

38. Installation of the subdrain system shall be inspected and approved by the soils engineer of record and the City grading/building inspector (108.9).

39. Basement walls and floors shall be waterproofed/damp-proofed with an LA City approved "Below-grade" waterproofing/damp-proofing material with a research report number (104.2.6).

40. Prefabricated drainage composites (Miradrain, Geotextiles) may be only used in addition to traditionally accepted methods of draining retained earth.

41. Where the ground water table is lowered and maintained at an elevation not less than 6 inches below the bottom of the lowest floor, or where hydrostatic pressures will not occur, the floor and basement walls shall be damp-proofed. Where a hydrostatic pressure condition exists, and the design does not include a ground-water control system, basement walls and floors shall be waterproofed. (1803.5.4, 1805.1.3, 1805.2, 1805.3)

42. The structure shall be connected to the public sewer system per P/BC 2020-027.

43. A sump pump with either a bedrock-supported back-up dispersal wall or natural gas/propane powered generator are required and are not a part of this approval.

    Note: Approval will be considered upon submittal to the Grading Division of a Request for Modification by the applicant that includes the following: a map showing the final location of the sump pump; and, as applicable for dispersal walls, the proposed location and length of the bedrock-supported back-up dispersal wall and a professional opinion from the consultants that drainage from the dispersal wall will not contribute to any instability, erosion or nuisance conditions on the descending slope. (P/BC 2020-103)

44. All roof, pad and deck drainage shall be conducted to the street in an acceptable manner in non-erosive devices or other approved location in a manner that is acceptable to the LADBS and the Department of Public Works water shall not be dispersed on to descending

slopes without specific approval from the Grading Division and the consulting geologist and soils engineer (7013.10).

45. An on-site storm water infiltration system at the subject site shall not be implemented, as recommended.

46. All concentrated drainage shall be conducted in an approved device and disposed of in a manner approved by the LADBS (7013.10).

47. Sprinkler plans for irrigation shall be submitted and approved by the Mechanical Plan Check Section (7012.3.1).

48. Any recommendations prepared by the geologist and/or the soils engineer for correction of geological hazards found during grading shall be submitted to the Grading Division of the Department for approval prior to use in the field (7008.2, 7008.3).

49. All friction pile or caisson drilling and excavations shall be performed under the inspection and approval of the geologist and soils engineer. The geologist shall indicate the distance that friction piles or caissons penetrate into competent bedrock in a written field memorandum. (1803.5.5, 1705.1.2)

50. The geologist and soils engineer shall inspect all excavations to determine that conditions anticipated in the report have been encountered and to provide recommendations for the correction of hazards found during grading (7008, 1705.6 & 1705.8).

51. Prior to pouring concrete, a representative of the consulting soils engineer shall inspect and approve the footing excavations. The representative shall post a notice on the job site for the LADBS Inspector and the Contractor stating that the work inspected meets the conditions of the report. No concrete shall be poured until the LADBS Inspector has also inspected and approved the footing excavations. A written certification to this effect shall be filed with the Grading Division of the Department upon completion of the work. (108.9 & 7008.2)

52. Prior to excavation an initial inspection shall be called with the LADBS Inspector. During the initial inspection, the sequence of construction; shoring; ABC slot cuts; underpinning; pile installation; protection fences; and, dust and traffic control will be scheduled (108.9.1).

53. Installation of shoring, underpinning, slot cutting and/or pile excavations shall be performed under the inspection and approval of the soils engineer and deputy grading inspector (1705.6, 1705.8).

54. The installation and testing of tie-back anchors shall comply with the recommendations included in the report or the standard sheets titled "Requirement for Tie-back Earth Anchors", whichever is more restrictive. (Research Report #23835)

55. Prior to the placing of compacted fill, a representative of the soils engineer shall inspect and approve the bottom excavations. The representative shall post a notice on the job site for the LADBS Inspector and the Contractor stating that the soil inspected meets the conditions of the report. No fill shall be placed until the LADBS Inspector has also inspected and approved the bottom excavations. A written certification to this effect shall be included in the final compaction report filed with the Grading Division of the Department. All fill shall be placed under the inspection and approval of the soils engineer.

A compaction report together with the approved soil report and Department approval letter shall be submitted to the Grading Division of the Department upon completion of the compaction. In addition, an Engineer's Certificate of Compliance with the legal description as indicated in the grading permit and the permit number shall be included (7011.3).

56. No footing/slab shall be poured until the compaction report is submitted and approved by the Grading Division of the Department.

DANIEL C. SCHNEIDEREIT
Engineering Geologist II

DAN L. STOICA
Geotechnical Engineer I

DCS/DLS:dcs/dls
Log No. 123421-01
213-482-0480

cc: Geotechnologies, Inc., Project Consultant
LA District Office

CITY OF LOS ANGELES
DEPARTMENT OF BUILDING AND SAFETY
Grading Division

District	Log No. 123421-1

APPLICATION FOR REVIEW OF TECHNICAL REPORTS

INSTRUCTIONS

A. Address all communications to the Grading Division, LADBS, 201 N. Figueroa St., 3rd Fl., Los Angeles, CA 90012 Telephone No. (213)482-0480.
B. Submit two copies (three for subdivisions) of reports, one "pdf" copy of the report on a CD-Rom or flash drive, and one copy of application with items "1" through "10" completed.
C. Check should be made to the City of Los Angeles.

1. LEGAL DESCRIPTION
Tract: 5569
Block: N/A Lots: B
3. OWNER: Hilton Los Angeles, Universal City
Address: 555 Universal Hollywood Drive
City: Los Angeles Zip: 91608
Phone (Daytime):

2. PROJECT ADDRESS: 555 Universal Hollywood Drive
4. APPLICANT Geotechnologies, Inc.
Address: 439 Western Avenue
City: Glendale Zip: 91201
Phone (Daytime): (818) 240-9600
E-mail address: Pymt:accounting@geoteq.com/Eng:rknur@geoteq.com

5. Report(s) Prepared by: Geotechnologies, Inc. (File No. 21578)
6. Report Date(s): December 8, 2022

7. Status of project: ☑ Proposed ☐ Under Construction ☐ Storm Damage
8. Previous site reports? ☑ YES if yes, give date(s) of report(s) and name of company who prepared report(s)
Geotechnical Engineering Investigation November 3, 2022 Geotechnologies, Inc.
9. Previous Department actions? ☑ YES if yes, provide dates and attach a copy to expedite processing.
Dates: 02/12/16, Log #95877; 02/23/17, Log #95877-01
10. Applicant Signature: Position:

(DEPARTMENT USE ONLY)

REVIEW REQUESTED	FEES	REVIEW REQUESTED	FEES
☐ Soils Engineering		No. of Lots	
☐ Geology		No. of Acres	
☐ Combined Soils Engr. & Geol.		☐ Division of Land	
☐ Supplemental		Other	
☐ Combined Supplemental		☒ Expedite	$181.50
☐ Import-Export Route		☒ Response to Correction	$363.00
Cubic Yards:		☐ Expedite ONLY	
		Sub-total	$544.50
		One-Stop Surcharge	$129.80
		TOTAL FEE	$674.30

Fee Due: $674.30
Fee Verified By: GR Date: 12/13/2022
(Cashier Use Only)
Receipt # 1479303 GR 12/13/22

ACTION BY:
THE REPORT IS: ☐ NOT APPROVED
☐ APPROVED WITH CONDITIONS ☐ BELOW ☐ ATTACHED

For Geology Date
For Soils Date

E-2 Paleontological Resources Assessment Report

HILTON UNIVERSAL CITY PROJECT, CITY OF LOS ANGELES, CALIFORNIA

Paleontological Resources Assessment Report

Prepared for
Hillcrest Real Estate, LLC
555 Universal Hollywood Drive
Universal City, California 91608

May 2023

ESA

HILTON UNIVERSAL CITY PROJECT, CITY OF LOS ANGELES, CALIFORNIA

Paleontological Resources Assessment Report

May 2023

Prepared for:
Hillcrest Real Estate, LLC
555 Universal Hollywood Drive
Universal City, California 91608

Prepared by:
ESA
626 Wilshire Blvd. Suite 1100
Los Angeles, CA 90017

Project Director:
Monica Strauss, M.A., RPA

Project Manager:
Kyle Garcia, B.A.

Paleontological Principal Investigator and Report Author:
Alyssa Bell, Ph.D.

Project Location:
Burbank (CA) USGS 7.5-minute Topographic Quad;
Unsectioned portion of Township 1 North, Range 14 West

Acreage: Approx. 7.26 acres

Assessor Parcel Number: 2424-044-022

626 Wilshire Boulevard
Suite 1100
Los Angeles, CA 90017
213.599.4300
www.esassoc.com

Bend	Orlando	San Jose
Camarillo	Pasadena	Santa Monica
Delray Beach	Petaluma	Sarasota
Destin	Portland	Seattle
Irvine	Sacramento	Tampa
Los Angeles	San Diego	
Oakland	San Francisco	

D180143.01

OUR COMMITMENT TO SUSTAINABILITY | ESA helps a variety of public and private sector clients plan and prepare for climate change and emerging regulations that limit GHG emissions. ESA is a registered assessor with the California Climate Action Registry, a Climate Leader, and founding reporter for the Climate Registry. ESA is also a corporate member of the U.S. Green Building Council and the Business Council on Climate Change (BC3). Internally, ESA has adopted a Sustainability Vision and Policy Statement and a plan to reduce waste and energy within our operations. This document was produced using recycled paper.

TABLE OF CONTENTS

Hilton Universal City Project – Paleontological Resources Assessment Report

Page

Executive Summary **ES-1**

1.0 Introduction **1**
- 1.1 Project Location 1
- 1.2 Project Description 1

2.0 Regulatory Framework **4**
- 2.1 State 4
- 2.2 Local 5
- 2.3 Society of Vertebrate Paleontology 6
- 2.4 Paleontological Resources Significance Criteria 8

3.0 Setting **9**
- 3.1 Geological Setting 9

4.0 Archival Research **11**
- 4.1 Geological Map and Literature Review 11
- 4.2 Review of Geotechnical Investigation 11
- 4.3 LACM Database Search 12
- 4.4 Paleontological Sensitivity Analysis 13

5.0 Conclusions and Recommendations **13**
- 5.1 Conclusions 13
- 5.2 Mitigation Measures 13

References **14**

Appendices

A. Personnel
B. LACM Database Search Results

List of Figures

Figure 1 Regional Location Map 2
Figure 2 Project Location 3
Figure 3 Geology 10

HILTON UNIVERSAL CITY EXPANSION PROJECT

Paleontological Resources Assessment Report

Executive Summary

Environmental Science Associates (ESA) has prepared this paleontological resources assessment report for the Hilton Universal City Project (Project) located in Universal City area of the City of Los Angeles (City) in support of the Environmental Impact Report (EIR) prepared for the Project. The Project proposes to expand the existing 7.26-acre Hilton Universal City Hotel property (Project Site). The City is the lead agency pursuant to the California Environmental Quality Act (CEQA).

The scope of work for this assessment included a geologic map and literature review, review of the *Updated Geotechnical Engineering Investigation* (Geotechnical Report, Geotechnologies, 2022) prepared for the Project and provided as Appendix E-1 of this Project's Draft EIR, paleontological resources records searches through the Natural History Museum of Los Angeles County (LACM), and the recommendation of mitigation measures to reduce impacts from the Project to paleontological resources to a less than significant level.

Geological mapping indicates that the surficial geology of the Project Site consists of the Upper Topanga Formation. A review of the Geotechnical Report prepared for the Project indicates that the majority of the Project Site contains fill that is underlain by bedrock of the Upper Topanga Formation. There is a marginal amount of alluvium located on a slope in the southwestern portion of the Project Site. The Upper Topanga Formation is well known for the preservation of significant fossils across Southern California, including fossil localities known to the LACM in the vicinity of the Project Site. The closest fossil locality from the Upper Topanga Formation is LACM 6969 (located approximately 0.25 miles from the Project Site), which yielded numerous fossils of fish. Other animals preserved in the Upper Topanga Formation include marine mammals such as whales and dolphins, as well as sharks, birds, and some land animals. The Upper Topanga Formation possesses high paleontological sensitivity based on the Society for Vertebrate Paleontology guidelines. Additionally, fossils from unknown formations (of old alluvium and sandy mudstone sediments) have also yielded fossil specimens of sloth, camel, and bison.

The findings of this paleontological assessment indicate that any Project-related excavations will encounter geologic units with high paleontological sensitivity (Upper Topanga Formation). As such, recommended mitigation measures, including retention of a Qualified Paleontologist, paleontological resources monitoring, and procedures to be followed in the event of the discovery of paleontological resources, are provided in the *Conclusions and Recommendations* section of

this report. Compliance with the recommended mitigation measures will reduce Project impacts to paleontological resources to a less than significant level under CEQA.

1.0 Introduction

ESA has been retained by Hillcrest Real Estate, LLC to prepare this paleontological resources assessment report for the Project located in the City in support of the EIR prepare for the Project. The Project proposes to expand the existing 7.26-acre Project Site. The City is the lead agency pursuant to CEQA.

The scope of work for this assessment included a geologic map and literature review, review of a Geotechnical Report prepared for the Project, a paleontological resources records search through the LACM, and the recommendation of mitigation measures to reduce impacts from the Project to paleontological resources to a less than significant level. ESA personnel involved in the preparation of this report are as follows: Monica Strauss, M.A., RPA, Project Director; Kyle Garcia, B.A., Project Manager; Alyssa Bell, Ph.D., Paleontological Principal Investigator and report author; and Stephan Geissler, GIS specialist. Resumes of key personnel are included in **Appendix A**.

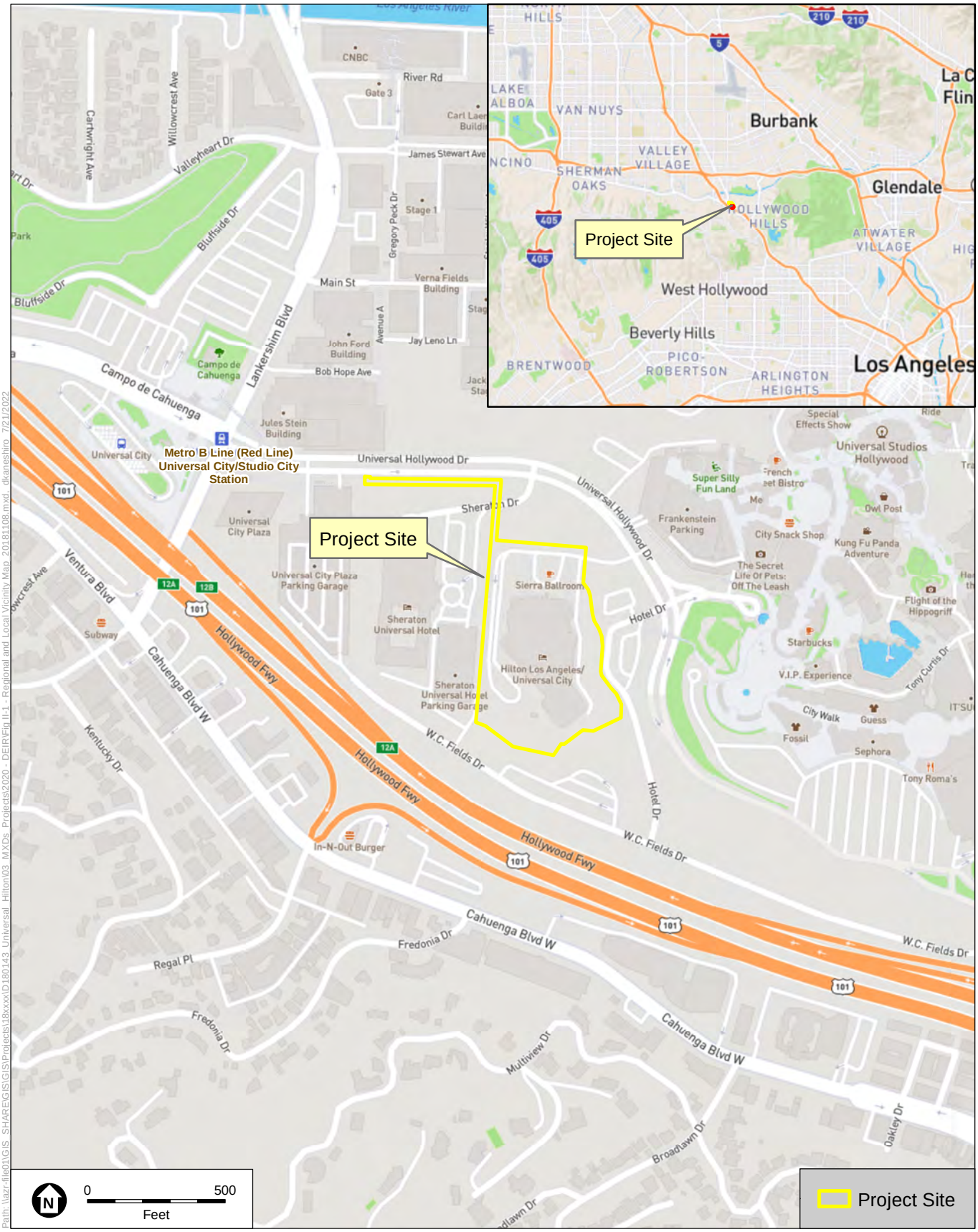
1.1 Project Location

The 7.26-acre Project Site is located on Assessor Parcel Number (APN) 2424-044-022 and north of the U.S. Highway 101 in Universal City (**Figure 1**). More specifically, the Project Site is located at 555 Universal Hollywood Drive and is bounded by Universal Hollywood Drive to the north, Buddy Holly Drive to the south, Hotel Drive to the east, and the Sheraton Universal Hotel to the west. The Project Site is situated in an unsectioned portion of Township 1 North, Range 14 West, of the Burbank, CA U.S. Geological Survey (USGS) 7.5-minute topographic quadrangle map (**Figure 2**).

1.2 Project Description

The Project Site is developed with a 24-story hotel building with 495 guestrooms (Existing Hotel Building), an attached ancillary hotel building providing meeting/banquet rooms and ancillary hotel uses (Existing Ancillary Hotel Building), a three-level parking garage, circulation facilities (i.e. internal driveway and service road), an outdoor pool area (Existing Outdoor Pool Area), and other related improvements.

The Project would involve construction of a new 18-story Hotel Expansion Building (with a Basement Level below grade) located on the south side of the Project Site. The Hotel Expansion Building would include up to 395 total guest rooms, a lobby and lounge/bar on Level 4, a restaurant (including a bar) on Level 3, a fitness center on Level 2, a spa on Level 1, and new outdoor pool area with poolside restaurant (including a bar) on the Basement Level. The Hotel Expansion Building would also feature a rooftop restaurant (including a bar) within indoor and outdoor seating. The rooftop would also feature a pool deck surrounding a rooftop pool and jacuzzi.

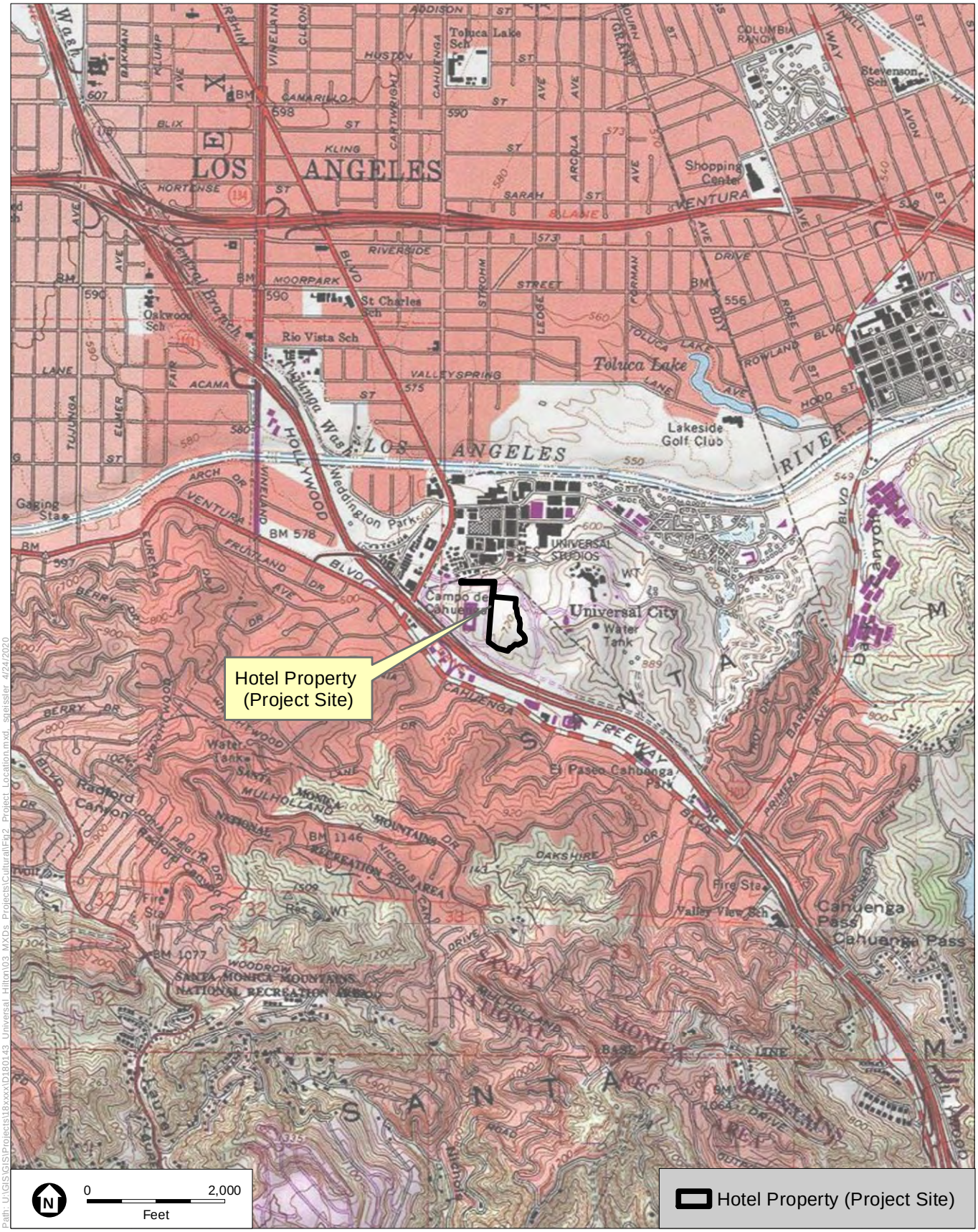


SOURCE: Open Street Map, 2020

Hilton Universal City Project

Figure 1

Regional and Local Vicinity Map



SOURCE: USGS Topographic Series (Burbank, Hollywood, Van Nuys, CA).

Hilton Universal City Project

Figure 2
Project Location

The existing auto courts at the North and South Plazas would be upgraded with new paving and landscaping. The Project would expand the existing three-level, parking garage to the north creating one contiguous parking garage; incorporate mechanical parking; provide overflow surface parking for workers and service vehicles only along the existing service road that runs generally along the eastern boundary of the Project Site; and add new parking spaces along the internal roadway and within the North Plaza on Level 4.

The Project would also expand the northern portion of the Existing Ancillary Hotel Building to include a one-story meeting room addition (Meeting Room Addition) of 3,00 square feet, which would consist of four separate meeting rooms of less than 750 square feet each and a connecting hallway.

Overall, the Project would add approximately 299,088 square feet of additional floor area to the Project Site. The Project would provide at least 464 new parking spaces to accommodate additional employees, hotel guests, bar/lounge, restaurant, and spa visitors. Upon completion of the Project, the Hilton Universal City Hotel would provide a maximum of 890 guestrooms and 696,609 square feet of floor area. Project development would require excavation and grading of the Project Site, including some areas of landscaped hillsides. An approximately 0.1-mile concrete retaining wall is proposed along the eastern boundary of the Project Site that would be approximately the same height as the existing grade and would vary between 4 feet to 20 feet in height. The excavations for the construction of floor areas and parking expansion would reach a maximum depth of approximately 50 feet below ground surface.

2.0 Regulatory Framework

Paleontological resources are limited, nonrenewable resources of scientific, cultural, and educational value that are afforded protection under state laws and regulations. The following section summarizes the applicable federal and State laws and regulations, as well as professional standards provided by the Society of Vertebrate Paleontology (SVP).

2.1 State

California Environmental Quality Act

The CEQA Guidelines (Title 14, Chapter 3 of the California Code of Regulations, Section 15000 *et seq*.), define the procedures, types of activities, individuals, and public agencies required to comply with CEQA. As part of CEQA's Initial Study process, one of the questions that must be answered by the lead agency relates to paleontological resources: "Will the proposed project directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?" (CEQA Guidelines Section 15023, Appendix G, Section XIV, Part a).

The loss of any identifiable fossil that could yield information important to prehistory, or that embodies the distinctive characteristics of a type of organism, environment, period of time, or geographic region, would be a significant environmental impact. Direct impacts to paleontological resources primarily concern the potential destruction of nonrenewable paleontological resources and the loss of information associated with these resources. This

includes the unauthorized collection of fossil remains. If potentially fossiliferous bedrock or surficial sediments are disturbed, the disturbance could result in the destruction of paleontological resources and subsequent loss of information (significant impact). At the project-specific level, direct impacts can be mitigated to a less than significant level through the implementation of paleontological mitigation.

The CEQA threshold of significance for a significant impact to paleontological resources is reached when a project is determined to "directly or indirectly destroy a significant paleontological resource or unique geologic feature." In general, for project sites that are underlain by paleontologically sensitive geologic units, the greater the amount of ground disturbance, the higher the potential for significant impacts to paleontological resources. For project sites that are directly underlain by geologic units with no paleontological sensitivity, there is no potential for impacts on paleontological resources unless sensitive geologic units which underlie the non-sensitive unit are also affected.

Public Resources Code Section 5097.5 and Section 30244

Other State requirements for paleontological resource management are included in Public Resources Code Section 5097.5 and Section 30244. These statutes prohibit the removal of any paleontological site or feature from public lands without permission of the jurisdictional agency, define the removal of paleontological sites or features as a misdemeanor, and require reasonable mitigation of adverse impacts to paleontological resources from developments on public (state, county, city, district) lands.

2.2 Local

City of Los Angeles General Plan

The Conservation Element of the City of Los Angeles General Plan recognizes paleontological resources in Section 3: "Archeological and Paleontological" (II-3), specifically the La Brea Tar Pits, and identifies protection of paleontological resources as an objective (II-5). The General Plan identifies site protection as important, stating:

> *Pursuant to CEQA, if a land development project is within a potentially significant paleontological area, the developer is required to contact a bona fide paleontologist to arrange for assessment of the potential impact and mitigation of potential disruption of or damage to the site. If significant paleontological resources are uncovered during project execution, authorities are to be notified and the designated paleontologist may order excavations stopped, within reasonable time limits, to enable assessment, removal or protection of the resources. (City of Los Angeles, 2001)*

City of Los Angeles CEQA Thresholds of Significance

The City of Los Angeles' CEQA Thresholds of Significance Guide (City of Los Angeles, 2006) Section D.2.A specifies that the determination of significance for paleontological resources shall be made on a case-by-case basis, taking into consideration the following factors:

- Whether, or the degree to which, the project might result in the permanent loss of, or loss of access to, a paleontological resource; and
- Whether the paleontological resource is of regional or statewide significance.

These factors are utilized for determining significance in the City thresholds and are also used for assisting in the analysis of the State threshold.

2.3 Society of Vertebrate Paleontology

The SVP has established standard guidelines (SVP, 1995, 2010) that outline professional protocols and practices for conducting paleontological resource assessments and surveys, monitoring and mitigation, data and fossil recovery, sampling procedures, and specimen preparation, identification, analysis, and curation. Most practicing professional vertebrate paleontologists adhere closely to the SVP's assessment, mitigation, and monitoring requirements as specifically provided in its standard guidelines. Most state regulatory agencies with paleontological resource-specific Laws, Ordinances, Regulations, and Standards (LORS) accept and use the professional standards set forth by the SVP.

As defined by the SVP (2010:11), significant nonrenewable paleontological resources are:

> *fossils and fossiliferous deposits, here defined as consisting of identifiable vertebrate fossils, large or small, uncommon invertebrate, plant, and trace fossils, and other data that provide taphonomic, taxonomic, phylogenetic, paleoecologic, stratigraphic, and/or biochronologic information. Paleontological resources are considered to be older than recorded human history and/or older than middle Holocene (i. e., older than about 5,000 radiocarbon years).*

As defined by the SVP (1995:26), significant fossiliferous deposits are:

> *a rock unit or formation which contains significant nonrenewable paleontologic resources, here defined as comprising one or more identifiable vertebrate fossils, large or small, and any associated invertebrate and plant fossils, traces, and other data that provide taphonomic, taxonomic, phylogenetic, ecologic, and stratigraphic information (ichnites and trace fossils generated by vertebrate animals, e.g., trackways, or nests and middens which provide datable material and climatic information). Paleontologic resources are considered to be older than recorded history and/or older than 5,000 years BP [before present].*

Based on the significance definitions of the SVP (1995), all identifiable vertebrate fossils are considered to have significant scientific value. This position is adhered to because vertebrate fossils are relatively uncommon, and only rarely will a fossil locality yield a statistically significant number of specimens of the same genus. Therefore, every vertebrate fossil found has the potential to provide significant new information on the taxon it represents, its paleoenvironment, and/or its distribution. Furthermore, all geologic units in which vertebrate fossils have previously been found are considered to have high sensitivity. Identifiable plant and invertebrate fossils are considered significant if found in association with vertebrate fossils or if defined as significant by project paleontologists, specialists, or local government agencies.

A geologic unit known to contain significant fossils is considered to be "sensitive" to adverse impacts if there is a high probability that earth-moving or ground-disturbing activities in that rock unit will either directly or indirectly disturb or destroy fossil remains. Paleontological sites indicate that the containing sedimentary rock unit or formation is fossiliferous. The limits of the entire rock formation, both areal and stratigraphic, therefore define the scope of the paleontological potential in each case (SVP, 1995).

Fossils are contained within surficial sediments or bedrock, and are therefore not observable or detectable unless exposed by erosion or human activity. In summary, paleontologists cannot know either the quality or quantity of fossils prior to natural erosion or human-caused exposure. As a result, even in the absence of surface fossils, it is necessary to assess the sensitivity of rock units based on their known potential to produce significant fossils elsewhere within the same geologic unit (both within and outside of the study area), a similar geologic unit, or based on whether the unit in question was deposited in a type of environment that is known to be favorable for fossil preservation. Monitoring by experienced paleontologists greatly increases the probability that fossils will be discovered during ground-disturbing activities and that, if these remains are significant, successful mitigation and salvage efforts may be undertaken in order to prevent adverse impacts to these resources.

Paleontological Sensitivity

Paleontological sensitivity is defined as the potential for a geologic unit to produce scientifically significant fossils. This is determined by rock type, past history of the geologic unit in producing significant fossils, and fossil localities recorded from that unit. Paleontological sensitivity is derived from the known fossil data collected from the entire geologic unit, not just from a specific survey. In its "Standard Guidelines for the Assessment and Mitigation of Adverse Impacts to Non-renewable Paleontologic Resources," the SVP (2010:1-2) defines four categories of paleontological sensitivity (potential) for rock units: high, low, undetermined, and no potential:

- **High Potential.** Rock units from which vertebrate or significant invertebrate, plant, or trace fossils have been recovered are considered to have a high potential for containing additional significant paleontological resources. Rocks units classified as having high potential for producing paleontological resources include, but are not limited to, sedimentary formations and some volcaniclastic formations (e. g., ashes or tephras), and some low-grade metamorphic rocks which contain significant paleontological resources anywhere within their geographical extent, and sedimentary rock units temporally or lithologically suitable for the preservation of fossils (e. g., middle Holocene and older, fine-grained fluvial sandstones, argillaceous and carbonate-rich paleosols, cross-bedded point bar sandstones, fine-grained marine sandstones, etc.).
- **Low Potential.** Reports in the paleontological literature or field surveys by a qualified professional paleontologist may allow determination that some rock units have low potential for yielding significant fossils. Such rock units will be poorly represented by fossil specimens in institutional collections, or based on general scientific consensus only preserve fossils in rare circumstances and the presence of fossils is the exception not the rule, e. g. basalt flows or Recent colluvium. Rock units with low potential typically will not require impact mitigation measures to protect fossils.

- **Undetermined Potential.** Rock units for which little information is available concerning their paleontological content, geologic age, and depositional environment are considered to have undetermined potential. Further study is necessary to determine if these rock units have high or low potential to contain significant paleontological resources. A field survey by a qualified professional paleontologist to specifically determine the paleontological resource potential of these rock units is required before a paleontological resource impact mitigation program can be developed. In cases where no subsurface data are available, paleontological potential can sometimes be determined by strategically located excavations into subsurface stratigraphy.
- **No Potential.** Some rock units have no potential to contain significant paleontological resources, for instance high-grade metamorphic rocks (such as gneisses and schists) and plutonic igneous rocks (such as granites and diorites). Rock units with no potential require no protection nor impact mitigation measures relative to paleontological resources.

For geologic units with high potential, full-time monitoring is generally recommended during any project-related ground disturbance. For geologic units with low potential, protection or salvage efforts will not generally be required. For geologic units with undetermined potential, field surveys by a qualified vertebrate paleontologist should be conducted to specifically determine the paleontologic potential of the rock units present within the study area.

2.4 Paleontological Resources Significance Criteria

Numerous paleontological studies have developed criteria for the assessment of significance of fossil discoveries (Eisentraut and Cooper, 2002; Murphey and Daitch, 2007). In general, these studies assess fossils as significant if one or more of the following criteria apply:

1. The fossils provide information on the evolutionary relationships and developmental trends among organisms, living or extinct;
2. The fossils provide data useful in determining the age(s) of the rock unit or sedimentary stratum, including data important in determining the depositional history of the region and the timing of geologic events therein;
3. The fossils provide data regarding the development of biological communities or interaction between paleobotanical and paleozoological biotas;
4. The fossils demonstrate unusual or spectacular circumstances in the history of life; or
5. The fossils are in short supply and/or in danger of being depleted or destroyed by the elements, vandalism, or commercial exploitation, and are not found in other geographic locations.

In summary, significant paleontological resources are determined to be fossils or assemblages of fossils that are unique, unusual, rare, uncommon, or diagnostically important (Eisentraut and Cooper, 2002; Murphey and Daitch, 2007; Scott and Springer, 2003). Significant fossils can include remains of large to very small aquatic and terrestrial vertebrates or remains of plants and animals previously not represented in certain portions of the stratigraphy. Assemblages of fossils that might aid stratigraphic correlation, particularly those offering data for the interpretation of tectonic events, geomorphologic evolution, and paleoclimatology are also critically important (Scott and Springer 2003, Scott et al. 2004).

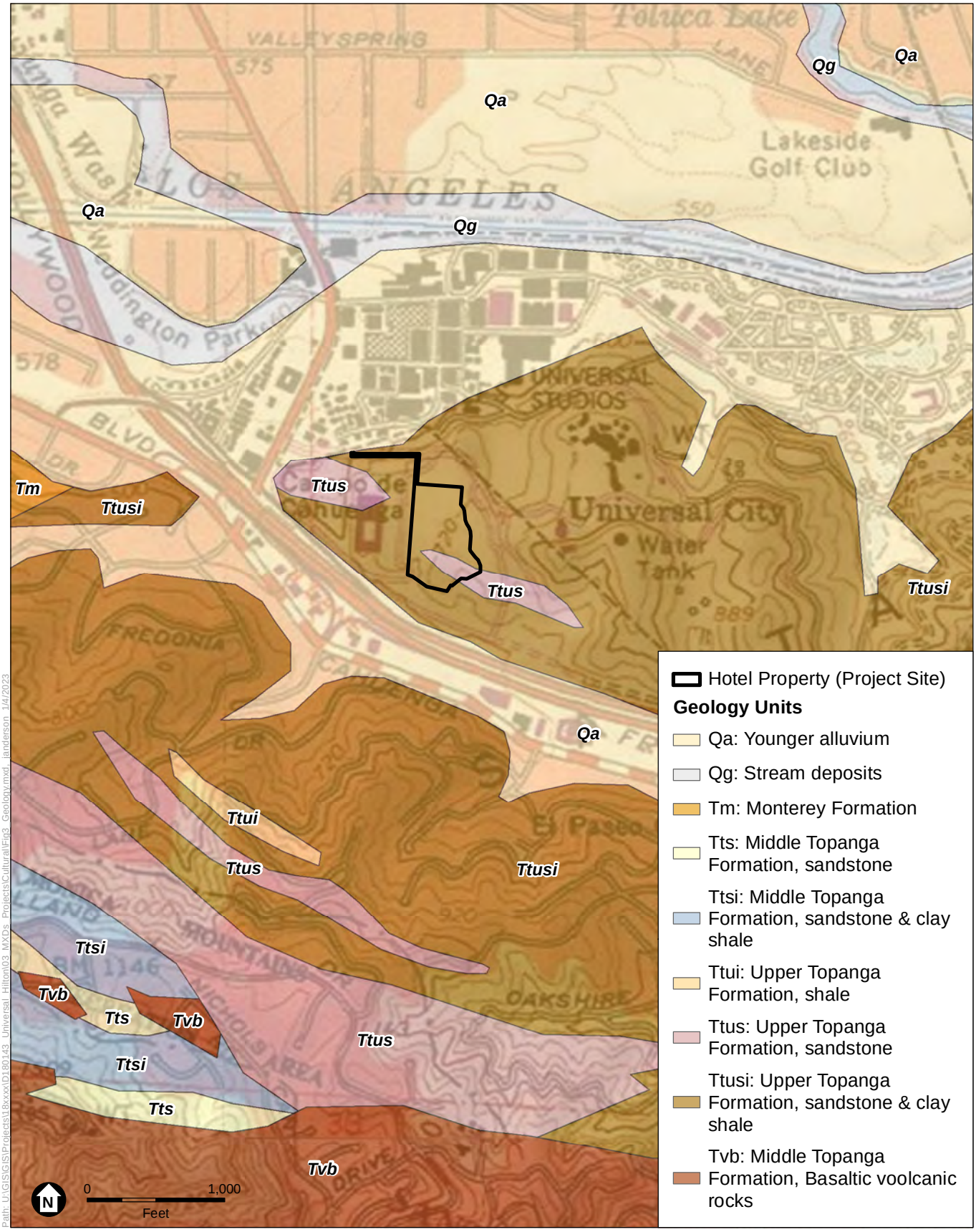
3.0 Setting

3.1 Geological Setting

The Project Site is located in the Transverse Ranges geomorphic province, which consists of a complex series of young, east/west-trending mountain ranges and valleys that contradict the general north/south orientation of California's other mountain ranges, such as the Peninsular Ranges and Coastal Ranges (Matti et al., 1992). The Transverse Ranges begin at Point Conception in Santa Barbara County and extend in an easterly direction, terminating at the San Bernardino Mountains in San Bernardino County. Most of the ranges are bounded to the north and east by the San Andreas Fault System, which separates the ranges from the Coastal Ranges and Peninsular Ranges. Components of the ranges that lie north of the San Andreas Fault are the Tehachapi Mountains and San Bernardino Mountains. Most of the tallest peaks are in the eastern portion of the range and include Mount San Gorgonio (3,505 meters) and San Bernardino Peak (3,246 meters). The Transverse Ranges are noted for being extremely steep and difficult to traverse.

The Transverse Ranges include a wide variety of geologic units, ranging in age from the Proterozoic to the recent (Norris and Web, 1990). The Transverse Ranges are underlain by a thick sequence of late Mesozoic- and Cenozoic-age strata that rest uncomfortably on a variety of basement rocks (Namson and Davis, 1988). These ranges are undergoing active north/south shortening due to faulting (Norris and Web, 1990), which causes a significant rise in elevation on an annual scale. These fault-bounded ranges are mainly composed of two distinct types of crystalline basement rocks that are separated by thrust faults. The lower type of rocks consist of metamorphosed sedimentary and volcanic rocks known as the Pelona Schist. The uppermost rock comprises older metamorphic and plutonic rocks that originally formed part of the ancient North American continental platform known as Mendenhall Gneiss and gabbro.

Within the Transverse Ranges, the Project Site is located on the northern slopes of the Santa Monica Mountains. The Santa Monica Mountains form the northern boundary of the Los Angeles Basin, where basement rocks overlain by approximately 4,420 m (14,500 feet) of late Cretaceous to Pleistocene sediments were uplifted in the early Pliocene along the Santa Monica Fault Zone (Yerkes et al., 1965). These sediments record the gradual filling of an initially deep marine basin from the late Cretaceous through the Pleistocene.



SOURCE: Dibblee Geological Foundation

Hilton Universal City Project

Figure 3
Geology

ESA

4.0 Archival Research

4.1 Geological Map and Literature Review

Geological mapping by Dibblee and Ehrenspeck (1991) indicates that the surficial geology of the Project Site consists of the Upper Topanga Formation (mapped as Ttusi and Ttus in **Figure 3, Geology**). Two facies of the Upper Topanga Formation are present in the Project Site, sandstone (Ttus) and clay shale (Ttusi) (Dibblee and Ehrenspeck, 1991). The sandstone is bedded and light gray to tan in color, while the clay shale is gray micaceous clay shale or claystone with thin interbeds of semi-friable sandstone (Dibblee and Ehrenspeck, 1991). The Upper Topanga Formation is interpreted to represent wave-dominated coastal deposits grading into river-dominated deltaic deposits and fluvial deposits in the upper parts of the formation (Critelli and Ingersoll, 1995). The Upper Topanga Formation dates to the middle Miocene, around 20 to 16 million years ago (Morton and Miller, 2006).

Fossils from the Upper Topanga Formation include numerous invertebrate and vertebrate fossil remains from both marine and terrestrial settings, including sharks, bony fishes, birds, whales, dolphins, and land mammals (Boessenecker and Churchill, 2015; Campbell and Yerkes, 1980; Morton and Miller, 2006; Whistler and Lander, 2003).

4.2 Review of Geotechnical Investigation

ESA reviewed the Geotechnical Report (Geotechnologies, Inc., 2022) prepared for the Project, which describes the soils within the Project Site by area. Cross sections were provided at the northern end of the Project Site, with an associated description of soils from west of the Project Site boundary to the existing entrance driveway (Northern Area), at the southern end of the site with a description of soils from west of the Project Site boundary to the Existing Hotel Building (Southern Area), and along the slope to the east of the Project Site (Eastern Area). The soils in the western portion of the Project Site are captured by the discussions of the Northern and Southern Areas. A brief summary is provided below.

Parking Garage, Meeting Room, and North Plaza (Northern Area)

The northern portion of the Project Site is composed of fill from 1 to 4 feet in thickness overlying bedrock of the Upper Topanga Formation, which consists of interbedded sandstone and siltstone (yellow and gray in color and moderately hard to hard). The fill is deepest along the north side of the existing parking garage structure underneath the North Plaza.

Hotel Expansion Building (Southern Area)

The south portion of the Project Site is located on a partial slope. Fill is encountered at the ground surface and ranges in thickness from one to 30 feet and predominantly overlies the bedrock from the Upper Topanga Formation throughout the Project Site. In the Existing Outdoor Pool Area on , fill ranges from three to five feet in depth. The westerly-descending slope has fill ranging from six to seven and a half feet in depth and the toe of the western slope has fill between 15 feet (Boring B3) and 22.5 feet (Boring B5) in depth. Fill underneath the proposed chiller/boiler room ranges in depth from 15 to 30 feet.

However, there is a small amount of alluvium that is approximately 15 feet thick that underlies 12 feet of fill in the southwestern portion of the Project Site that was encountered in Boring B5 (Boring B5 is located 20 feet outside the area proposed for excavation); however, this same layer of alluvium was not identified in Boring B3 (Geologic Map and Cross Section A-A', Ibid.:80-81). Since Boring B3 is located within the area proposed for excavation and is 40 feet east of Boring B5, this suggests that the layer of alluvium pinches out somewhere between Boring B5 and Boring B3, and, therefore, only a marginal amount of alluvium is actually located within the Hotel Expansion Building area. Bedrock from the Upper Topanga Formation underlies the alluvium in Boring B5 and the fill in Boring B3 (Geotechnologies, Inc., 2022).

Eastern Area

The eastern portion of the Project Site consists of fill generally ranging in thickness from 1 to greater than 25 feet, followed by bedrock from the Upper Topanga Formation (Geotechnologies, Inc., 2022).

4.3 LACM Database Search

An original paleontological resources database search was conducted with the Natural History Museum of Los Angeles County (i.e., the LACM) on April 6, 2018 and an updated database search was conducted on October 9, 2022. The searches entailed an examination of current geologic maps and known fossil localities within the Project Site and vicinity. The purpose of the museum database searches was to: (1) determine whether any previously recorded fossil localities occur in the Project Site or vicinity; (2) assess the potential for disturbance of these localities during construction; and (3) evaluate the paleontological sensitivity of the Project Site. The database searches indicate that the entire Project Site has bedrock exposures of the Upper Topanga Formation. The database searches also returned no known localities within the Project Site; however, a total of four (LACM VP 6386, LACM 6969, LACM 1084, and LACM VP 6970) vertebrate fossil localities are known to exist in the vicinity of the Project Site (McLeod, 2018; Bell, 2022), as summarized below. The results of the database searches are included as **Appendix B**.

LACM VP 6386, is located approximately 0.20 miles from the Project Site and yielded a fossil specimen of rodent (rodentia) within an unknown formation (sandy mudstone sediments of the early Holocene) at 60 feet below ground surface (bgs). LACM 6969, which is located approximately 0.25 miles from the Project Site, is where numerous fish fossils (containing specimens of grunion, Atherinidae, herrings, *Etringus*, *Ganolytes*, and *Sardinella*, codlets, Bregmacerotidae, bigeyes, Priacanthidae, croakers, Sciaenidae, mackerels, Scombridae, and boarfishes, Caproidae) were collected during excavations within the Upper Topanga Formation at an unknown depth (McLeod, 2018). LACM 1084 is located approximately 0.45 miles from the Project Site, where a fossil specimen of *Paleoparadoxia*, a member of the peculiar quadrupedal marine mammals called the Desmostylia was collected within Upper Topanga Formation sediments, at an unspecified depth (McLeod, 2018; Mitchell, 1963; Reinhart, 1959). LACM VP 6970 is located approximately 0.90 miles northwest from the Project Site and yielded fossil specimens of ground sloth (*glossotherium*), camel (*camelops*), and bison (*bison*) within old alluvium sediments at 60 to 80 feet bgs.

4.4 Paleontological Sensitivity Analysis

The results of the scientific literature review and the database search from the LACM have been used to assign the SVP's paleontological sensitivity rankings to the geologic units present at the surface or in the subsurface of the Project Site.

Upper Topanga Formation (Ttus, Ttusi). The Upper Topanga Formation has been shown to produce vertebrate and invertebrate fossils from marine and terrestrial contexts dating to the middle Miocene. The extensive record of significant fossils collected from the Upper Topanga Formation indicates that this unit has **high paleontological sensitivity**. There are fossil localities documented from as near as 0.25 miles from the Project Site. The geotechnical investigation indicates that in the northern portion of the Project Site, the Upper Topanga Formation is found beneath the fill at a minimum of 1 to 4 feet bgs. In the southern portion of the Project Site, the Upper Topanga Formation is also found below the fill at a depth of 1 to 12 feet bgs. A marginal amount of alluvium was encountered in portions of the slope located along the southern extent between the fill and the Upper Topanga Formation at a depth of 7.5 feet bgs. The age of the alluvium was not identified in the Geotechnical Report. Further, the results of the LACM database searches indicated that the entire Project Site has bedrock exposures of the Upper Topanga Formation while it does not mention the presence of alluvium within the Project Site. In the eastern portion of the Project Site, the Upper Topanga Formation is found below the fill which ranges in depths of 1 to 25 feet bgs. Therefore, excavations that exceed the depth of fill and the marginal amount of alluvium may encounter fossil resources.

5.0 Conclusions and Recommendations

5.1 Conclusions

The findings of this paleontological assessment indicate that Project-related excavation in the Upper Topanga Formation has the potential to encounter paleontological resources. The Upper Topanga Formation has a history of preserving significant fossil resources in the Los Angeles area, and is present across the Project Site's underlying fill and a marginal amount of alluvium. Since Project-related excavation is expected to extend to approximately 50 feet bgs, it could encounter paleontological resources and result in a potentially significant impact to resources qualifying as unique paleontological resources pursuant to CEQA and/or significant paleontological resources pursuant to City's significance thresholds.

5.2 Mitigation Measures

Impacts to unique or significant paleontological resources could occur if Project-related ground disturbance encounters geologic units with high paleontological sensitivity, such as the Upper Topanga Formation. Due to the high sensitivity of the Project Site to encounter paleontological resources, the following mitigation measures are recommended in order to reduce impacts to unique or significant paleontological resources to a less than significant level:

1. **Retention of a Qualified Paleontologist.** A Qualified Paleontologist meeting the Society of Vertebrate Paleontology Standards (SVP, 2010) (Qualified Paleontologist) shall be retained prior to the approval of demolition or grading permits. The Qualified Paleontologist shall

provide technical and compliance oversight of all work as it relates to paleontological resources, shall attend the Project kick-off meeting and Project progress meetings on a regular basis, and shall report to the Project Site in the event potential paleontological resources are encountered.

2. **Construction Worker Paleontological Resources Sensitivity Training.** The Qualified Paleontologist shall conduct construction worker paleontological resources sensitivity training at the Project kick-off meeting prior to the start of ground disturbing activities (including vegetation removal, pavement removal, etc.). In the event construction crews are phased, additional training shall be conducted for new construction personnel. The training session shall focus on the recognition of the types of paleontological resources that could be encountered within the Project Site and the procedures to be followed if they are found. Documentation shall be retained by the Qualified Paleontologist demonstrating that the appropriate construction personnel attended the training.
3. **Paleontological Resources Monitoring.** Paleontological resources monitoring shall be performed by a qualified paleontological monitor (meeting the standards of the SVP, 2010) under the direction of the Qualified Paleontologist. Paleontological resources monitoring shall be conducted for all ground disturbing activities in previously undisturbed sediments which have high sensitivity for encountering paleontological resources (Upper Topanga Formation). However, depending on the conditions encountered, full-time monitoring can be reduced to part-time inspections or ceased entirely if determined adequate by the Qualified Paleontologist. The Qualified Paleontologist shall spot check the excavation on an intermittent basis and recommend whether the depth of required monitoring needs to be revised based on his/her observations. Monitors shall have the authority to temporarily halt or divert work away from exposed fossils or potential fossils. Monitors shall prepare daily logs detailing the types of activities and soils observed and any discoveries. Any significant fossils collected during Project-related excavations shall be prepared to the point of identification and curated into an accredited repository with retrievable storage. The Qualified Paleontologist shall prepare a final monitoring and mitigation report for submittal to the City in order to document the results of the monitoring effort and any discoveries. If there are significant discoveries, fossil locality information and final disposition shall be included with the final report, which shall be submitted to the appropriate repository and the City.

References

Bell, Alyssa. 2022. Updated Paleontological Resources for the Universal Hilton Project. Letter from the Natural History Museum of Los Angeles County on file at ESA.

Boessenecker, R.W. and M. Churchill. 2015. The oldest known fur seal. Biology Letters 11:20140835.

Campbell, R.H. and R.F. Yerkes. 1980. Geologic guide to the stratigraphy & structure of the Topanga Group, central Santa Monica Mountains, Southern California. The Los Angeles Basin Geological Society, Guidebook Number 49.

City of Los Angeles. 2001. Conservation Element of the City of Los Angeles General Plan, City Plan Case No. 2001-0413-GPA, Council File No. 01-1094. Electronic document, http://cityplanning.lacity.org/cwd/gnlpln/consvelt.pdf, accessed December 6, 2017.

City of Los Angeles. 2006. "D. Cultural Resources." Section of L.A. CEQA Thresholds Guide. Electronic document, http://www.environmentla.org/programs/Thresholds/DCultural%20Resources.pdf, accessed December 6, 2017.

Critelli, S. and R.V. Ingersoll. 1995. Interpretation of neovolcanic versus palaeovolcanic sand grains: an example from Miocene deep-marine sandstone of the Topanga Group (Southern California). Sedimentology 42:783-804.

Dibblee, T. W. and E. E. Ehrenspeck. 1991. Geologic map of the Hollywood and Burbank (south 1/2) quadrangles, Los Angeles, California. Dibblee Foundation Map DF-30. 1:24,000.

Eisentraut, P., and J. Cooper. 2002. Development of a model curation program for Orange County's archaeological and paleontological collections. Prepared by California State University, Fullerton and submitted to the County of Orange Public Facilities and Resources Department/Harbors, Beaches, and Parks.

Geotechnologies, Inc. 2022. Updated Geotechnical Engineering Investigation proposed Hilton Universal City Hotel expansion; 555 Universal Hollywood Drive, Los Angeles, California. 204 p.

Matti, J. C., D. M. Morton, and B. F. Cox. 1992. The San Andreas fault system in the vicinity of the central Transverse Ranges province, Southern California. U.S. Geological Survey Open File Report 92-354, 50 pp.

McLeod, S. 2018. Re: Paleontological resources for the proposed Hilton Universal Project, Project # D180143.00, in Universal City, Los Angeles County, project area. Letter response to Vanessa Ortiz. April 6, 2018.

Mitchell, E. 1963. Brachyodont desmostylians from Miocene of San Clemente Island, California. Bulletin of the Southern California Academy of Sciences 62:192-201.

Morton, D. M. and F. K. Miller. 2006. Geologic map of the San Bernardino and Santa Ana 30' × 60' quadrangles, California. U.S. Geological Survey Open-File Report 2006-1217. Scale 1:100,000.

Murphey, P.C., and D. Daitch. 2007. Paleontological Overview of Shale and Tar Sands Areas in Colorado, Utah and Wyoming. Technical Report, Bureau of Land Management. Washington, D.C.

Namson, J., and T.L. Davis. 1988. Structural Transect of the Western Transverse Ranges California: Implications for Lithospheric Kinetics and Seismic Risk Evaluation. Geology, v. 16, p. 675-679.

Norris, R. M., and R. W. Webb. 1990. Geology of California, second edition: John Wiley & Sons, New York.

Reinhart, R. 1959. A review of the Sirenia and Desmostylia. University of California Publications in Geological Sciences 36:1-146.

Scott, E. and K. Springer. 2003. CEQA and Fossil Preservation in California. The Environmental Monitor. Fall 2003: 4-10.

Scott, E., K. Springer, and J. C. Sagebiel. 2004. Vertebrate paleontology in the Mojave Desert: the continuing importance of "follow-through" in preserving paleontologic resources. *In* The human journey and ancient life in California's deserts: Proceedings from the 2001 Millennium Conference. Ridgecrest: Maturango Museum Publication 15: 65-70.

Society of Vertebrate Paleontology. 2010. Standard Procedures for the assessment and Mitigation of adverse impacts to paleontological resources, http://www.vertpaleo.org/Impact_Mitigation_Guidelines.htm

Whistler, D. and E. Lander. 2003. New late Uintan to early Hemingfordian land mammal assemblages from the undifferentiated Sespe and Vaqueros Formations, Orange County, and from the Sespe and Equivalent marine formations in Los Angeles, Santa Barbara, and Ventura Counties, Southern California. Bulletin of the American Museum of Natural History 279:231-268.

Yerkes, R. F., T. H. McCulloh, J. E. Schollhamer, and J. G. Vedder. 1965. Geology of the Los Angeles Basin – an introduction. Geological Survey Professional Paper 420-A.

Appendix A
Personnel

Appendix A
Personnel

Kyle Garcia

Senior Archaeologist

EDUCATION

M.A., Anthropology (Archaeology Option), California State University Los Angeles, In Progress

B.A., Anthropology, (Physical/ Biological Emphasis), University of California, Santa Barbara

16 YEARS EXPERIENCE

CERTIFICATIONS/ REGISTRATION

Riverside County Registered Archaeologist #202

Orange County Certified Archaeologist

Orange County Certified Paleontologist

40-Hour HAZWOPER Training – Update, 2013

PROFESSIONAL AFFILIATIONS

Society for American Archaeology

Society for California Archaeology

Pacific Coast Archaeological Society

Kyle Garcia has 16 years of experience in the archaeology and prehistory of California, with a specialization in faunal analysis. He is well-versed in the archaeological resources of California's coastal, interior, and island settings. He is skilled in evaluation historic and prehistoric archaeological resources; agency and Native American consultation; pedestrian surveys, testing and evaluation excavations as well as construction monitoring; application of the California Environmental Quality Act (CEQA), National Environmental Policy Act (NEPA), Section 106 of the National Historical Preservation Act (NHPA), and local regulations; and laboratory processing. During his tenure, he has authored or contributed to more than 350 technical reports and sections to support all levels of CEQA and NEPA documents. Kyle's portfolio of projects includes energy, water, and transportation infrastructure as well as residential, commercial, mixed-use, institutional, and urban redevelopment serving public and private sector clients. In addition to his archaeological work, Kyle has been cross-trained in paleontological mitigation monitoring.

Representative Experience

Large-Scale Development Projects. Kyle directed the 1,400-acre field survey and the successful site recordation of over 150 prehistoric and historic archaeological resources per the Section 106 Process for a confidential project in Riverside County; served as the Deputy Project Manager for the 240-acre Archaeological Treatment & Restoration Plan for The Cove project that was subject to Section 106, responsible for the field survey, Native American consultation, final report, and supervised the thorough recordation and documentation of over 350 significant artifacts. In Arizona, he led crews on a pedestrian survey and site recordation of more than 200 historic and prehistoric archaeological resources during a Class III Inventory on an 11,000-acre portion of the La Osa Ranch Project site in Pinal County.

Water Infrastructure. Kyle has performed the archaeological and paleontological resources surveys and assessments for a number of regional water infrastructure projects including the Reservoir No. 1 Reconstruction Project MND for Burbank; the Pasadena Groundwater Storage Program; and recycled water facilities projects for San Clemente, Pasadena, the Town of Rosamond, and Palmdale.

Transportation Infrastructure. Kyle is often sought after to conduct Peer Review services of controversial projects across southern California including the Needles Highway Safety Realignment Project for the County of San Bernardino, various infrastructure projects for Caltrans/San Bernardino Associated Governments, and the I-710 Corridor Project Environmental Impact Statement (EIS)/Environmental Impact Report (EIR) for the City of Commerce.

In addition to road projects, Kyle has provided archaeological and paleontological services—cultural resources assessments and monitoring—on and around the Los Angeles International Airport (LAX). Among these include the cultural resources assessment of the proposed concrete pad/apron area and staging area within the southwest portion of LAX, known as the Southwest Remain Overnight Apron Project/West Aircraft Maintenance Area Project. He was also the ESA PCR cultural resources task manager for the EIR and Archaeological/Paleontological Monitoring for the LAX Central Utility Plant Replacement Project. Finally, Kyle was the PCR project manager for the archaeological and paleontological monitoring services during earthmoving operations associated with the development of the Crossfield Taxiway project. Monitoring was in compliance with the mitigation measures outlined in the Master Plan EIS/EIR pursuant to CEQA, NEPA, and Section 106.

Energy Projects. Kyle is well-versed in the potential effects of energy production projects on Southern California Archaeology through his service as an on-call consultant to Southern California Edison (SCE), where he has served as the Project Director and Manager for over 100 SCE projects and managed SCE purchase order contracts in excess of $1.5 million. These projects were subject to requirements of CEQA, Section 106 of the NHPA, and other local ordinances. These projects included deteriorated pole replacements, conduit and vault installations, and distribution circuit installations (aboveground and underground) located throughout SCE's service area in Central and Southern California. Kyle not only managed the budgets and supervised the work for these projects but also conducted most of the record searches, surveys, report writing, site recordation, and client/agency coordination for these projects. In addition to his SCE work, Kyle was the project manager for a 150-acre ground-mounted solar power project in San Bernardino County and assisted with a 245-acre confidential petroleum exploration project on California's Central Coast.

Education Facilities. Kyle's academic experience includes conducting cultural and paleontological records searches in support of an Initial Study/MND for the proposed John Thomas Dye School Improvement project in the Bel Air Community of the city of Los Angeles; the Long Beach Unified School District's District-Wide Cultural Resources Assessment; and the University High School Beautification project. In addition, Kyle has supervised ESA PCR staff paleontologists during paleontological monitoring services for the Stephen S. Wise Middle School Relocation project in the city of Los Angeles; he also supervised the subsequent fossil identification/analysis and final report preparation services for this project. These services have been conducted pursuant to a Mitigation Monitoring and Reporting Program that was established to implement the mitigation measures identified in the EIR for the project.

Cultural Resources Sensitivity Training. He is well-versed in conducting Cultural Resources Sensitivity Training Sessions to government staff, applicants, contractors, engineers, and construction personnel with regard to the procedures to implement in the event that archaeological or paleontological resources are encountered during construction.

Paleontology. In addition to his archaeological work, Kyle has been cross-trained in paleontological mitigation monitoring and assisted in the excavations of a

Miocene whale fossil near Irvine, California in associated with the proposed Orange County Great Park. Kyle has also managed more than 30 paleontological monitoring projects throughout southern California. He has assisted PCR's paleontologists with the preparation of paleontological reports in compliance with CEQA and local paleontological guidelines.

Geographic Information Systems. Kyle has also gained valuable experience with recording historic and prehistoric archaeological sites with Garmin, Magellan, and sub-meter Trimble GeoXT Global Positioning System (GPS) units. He has worked with GIS software such as ArcPad, ArcGIS, and ArcView and developed methods for using these products to accurately and efficiently record archaeological sites.

Presentations. Kyle presented a paper at the 72nd Annual Meeting for the Society of American Archaeology Conference in Austin, Texas, in 2007. The paper focused on prehistoric "yoni" features encountered on a project site proposed to be developed in western Riverside County, California. The project was subject to requirements of CEQA and Section 106 of the NHPA.

EDUCATION

Ph.D., Vertebrate Paleontology; University of Southern California

M.S., Environmental Microbiology; University of Tennessee

B.A. with honors, Ecology and Systematics; William Jewell College & Homerton College, Cambridge University

10 YEARS EXPERIENCE

Alyssa Bell, PhD

Paleontologist

Dr. Alyssa Bell has supervised and peformed field work, authored project reports, and provided scientific and compliance direction and quality control for paleontological projects throughout Southern California. Dr. Bell has accumulated a wealth of field experience, working with crews from a variety of institutions on field sites in California, Arizona, New Mexico, South Dakota, and Utah, and has led her own expeditions in Montana. She has performed all manner of investigations from surveys and assessments to monitoring and fossil idenfitication over the last 15 years as a part of her academic pursuits and professional consultation, with the last three years being exclusively professional endeavors.

In addition to consulting, Dr. Bell serves as a postdoctoral fellow at the Dinosaur Institute of the Natural History Museum of Los Angeles County (LACM). There she is involved in pursuing her own research into fossil birds as well as working with the Institute's field projects and museum-wide education and outreach initiatives. She has also published peer-reviewed articles and book chapters and given numerous presentations at scientific conferences on both her paleontological and microbiological research.

Relevant Experience

ICHA Area 10 (PA 10-2 & 10-4) Archaeological and Paleontological Monitoring, Irvine, CA. *Principal Investigator & Project Paleontologist.* Dr. Bell managed the curatorial process for fossils collected during monitoring of pre-construction activities at the University of California, Irvine, and authored the final report.

Suncrest Reactive Power Support Project, San Diego County, CA. *Principal Investigator.* Dr. Bell authored the paleontological assessment for the Proponent's Environmental Assessment (PEA) in support for a dynamic reactive power support facility and associated 230-kilovolt (kV) transmission line near Alpine, California. The application for Certificate of Public Convenience and Necessary was filed in summer 2015 and the PEA was deemed complete in December 2015.

Washington National Archaeological and Paleontological Monitoring (Access Culver City), Culver City, CA. *Principal Investigator & Project Paleontologist.* Dr. Bell managed the curatorial process for fossils collected during monitoring of pre-construction activities at the Washington national site in Culver City, CA and authored the final report.

OTO Hotels Santa Monica Archaeological and Paleontological Service, Santa Monica, CA. *Principal Investigator.* Dr. Bell supervised paleontological monitoring and mitigation services during construction excavations and grading. Services included implementation of a paleontological mitigation monitoring program and reporting.

Sacred Heart Specific Plan Environmental Impact Report (EIR), La Canada Flintridge, CA. *Principal Investigator.* Dr. Bell prepared paleontological studies and

developed monitoring & mitigation recommendations for the Sacred Heart development project.

Sixth & Bixel Paleontological Monitoring Services Project, Los Angeles, CA. *Principal Investigator & Project Paleontologist.* Dr. Bell supervised paleontological monitoring of preconstruction activities in support of a development project encompassing two parcels in downtown Los Angeles. During these activities, monitors identified and recovered numerous significant vertebrate fossils. Dr. Bell supervised the excavation of fossilized whale remains discovered on-site, and oversaw the collection and curation of all fossil specimens.

Natural and Cultural Support for the Gordon Mull Subdivision EIR, Glendora, CA. *Principal Investigator.* Dr. Bell collected the necessary data to prepare the technical sections and mitigation recommendations to support an EIR prepared by another firm to address the Gordon Mull Subdivision in the city of Glendora. The project is proposes to redevelop a 71-acre, 19-lot located in the San Gabriel Foothills.

Lake Elsinore Lakeshore Town Center Permitting, Riverside County, CA. *Principal Investigator.* Dr. Bell provided paleontological studies and developed monitoring and mitigation recommendations for the Lake Elsinore Town Center project in Riverside County.

San Pedro Plaza Park - Phase III Archaeological Monitor, Los Angeles, CA. *Principal Investigator.* Dr. Bell identified fossils during the mitigation measurement-required archaeological monitoring of earthmoving activities in San Pedro Park Plaza. She is also responsible for curation of the fossil material and authorship of the paleontological section of the final report.

City of Hope Specific Plan and EIR, Duarte, CA. *Principal Investigator.* Dr. Bell provided paleontological resource studies for the City of Hope Specific Plan Project.

Blythe Solar Power Project, Units 1 & 2, Riverside County, CA. *Project Paleontologist.* Dr. Bell supervised paleontological monitoring of preconstruction activities for a solar photo-voltaic cell power-generating facility outside the city of Blythe. As a part of her role, she provided oversight and management of paleontological monitors and development of the final monitoring report.

Industrial Project Environmental Impact Report, Colton, CA. *Principal Investigator.* Dr. Bell provided a paleontological resources study for a six-acre industrial project site at the southwest corner of Agua Mansa Road and Rancho Avenue in the city of Colton.

Mojave Solar Project Paleontological Reporting, San Bernardino County, CA. *Principal Investigator.* Dr. Bell managed curation of fossil materials and authored the final report of paleontological monitoring services provided for construction activities in support of a solar field development project in San Bernardino County.

El Camino Real Bridge Replacement Environmental Services, Atascadero, CA. *Principal Investigator.* Dr. Bell provided environmental services, including preparation of all California Environmental Quality Act (CEQA)/National Environmental Policy Act (NEPA) documentation, technical studies, and permitting, for the replacement of the El Camino Real Bridge over Santa Margarita Creek in Atascadero.

Recycled Water Transmission Water Main Paleo Monitoring, Fresno, CA. *Principal Investigator.* Dr. Bell developed a monitoring and mitigation plan for the city of Fresno recycled water main construction project.

Shafter Wasco Irrigation District Natural and Cultural Resource Evaluations and Air Quality, Kern County CA. *Principal Investigator.* Dr. Bell provided paleontological studies and developed recommendations for the monitoring and mitigation of paleontological resources for the project.

Valentine EIR, Kern County, CA. *Principal Investigator.* Dr. Bell provided paleontological resources support for a 2,000-acre solar PV project in the Mojave Desert. Deliverables included comprehensive technical reports, GIS impact analysis, strategic and permitting support, and a paleontological field survey in the preparation of an EIR and other permitting requirements.

Valentine Solar EIR 115MW Supplemental Reports, Kern County, CA. *Principal Investigator.* Dr. Bell provided paleontological studies in support of changes to the previously established Valentine Solar project.

Valentine Solar Biological and Paleontological Study Updates, Rosamond, Kern County, CA. *Principal Investigator & Project Paleontologist.* Dr. Bell provided paleontological studies, carried out a paleontological survey, and developed monitoring and mitigation guidelines for the Valentine Solar project.

Field Research

2006-Present. The Dinosaur Institute, LACM. Coordinator and Team Leader on expeditions in Montana (Niobrara and Pierre Shale Formations) and Arizona (Chinle Formation). Field assistant on expeditions to Montana (Hell Creek Formation), Utah (Morrison Formation), Arizona (Chinle Formation), New Mexico (Kirtland Formation), and California (Aztec Sandstone). During this period approximately four-six weeks are spent in the field in various locations every year.

2015. Principal Investigator, Field Manager. SWCA Environmental Consultants. Supervision of all paleontological field work, including excavation of a partial whale fossil from a downtown Los Angeles construction site and numerous monitoring projects.

2014. University of Southern California. Field Assistant on an expedition to South Africa (Pre-Cambrian).

2005. Cambridge University. Field Assistant on an expedition in Badlands National Park, South Dakota (White River Group).

2002-2004. Montana State University Northern. Field Assistant on excavations in Montana (Judith River Formation).

Publications

Bell, A. and L. Chiappe, 2015. Identification of a new Hesperornithiform from the Cretaceous Niobrara Chalk and implications for ecologic diversity among early diving birds. PLOS One 10: e0141690.

Bell, A. and L. Chiappe, 2015. A species-level phylogeny of the Cretaceous Hesperornithiformes (Aves: Ornithuromorpha): implications for body size

evolution among the earliest diving birds. Journal of Systematic Palaeontology 14: 239-251.

Liu, D., L. Chiappe, Y. Zhang, A. Bell, Q. Meng, Q. Ji, and X. Wang, 2014. An advanced, new long-legged bird from the Early Cretaceous of the Jehol Group (northeastern China): insights into the temporal divergence of modern birds. Zootaxa 3884: 253-266.

Bell, A. and L. Chiappe, 2011. Statistical approach for inferring the ecology of Mesozoic birds. Journal of Systematic Paleontology 9: 119-133.

Bell, A. and M.J. Everhart, 2011. Remains of small avians from a Late Cretaceous (Cenomanian) microsite in north central Kansas. Transactions of the Kansas Academy of Science 114: 115-123

O'Connor, J., L. Chiappe, and A. Bell, 2011. Pre-modern birds: avian divergences in the Mesozoic in Kaiser, G. and G. Dyke, Living Dinosaurs. Oxford: Wiley-Blackwell Publishing. pp. 39-114.

Bell, A., L.M. Chiappe, G.M. Ericksson, S. Suzuki, M. Watabe, R. Barsbold, and K. Tsogtbaatar, 2010. Description and ecologic analysis of Hollanda luceria, a Late Cretaceous bird from the Gobi Desert (Mongolia). Cretaceous Research 31: 16-26.

Bell, A., L. McKay, A. Layton, and D. Williams, 2009. Factors influencing the persistence of fecal Bacteroides in stream water. Journal of Environmental Quality 38: 1224-1232.

Bell, A. and M.J. Everhart, 2009. A new specimen of Parahesperornis (Aves: Hesperornithiformes) from the Smoky Hill Chalk (Early Campanian) of western Kansas. Transactions of the Kansas Academy of Science 112: 7-14.

Everhart, M.J. and A. Bell, 2009. A hesperornithiform limb bone from the basal Greenhorn Formation (Late Cretaceous; Middle Cenomanian) of north central Kansas. Journal of Vertebrate Paleontology 29: 952-956.

Conference Presentations

Bell, A., Y.-H.Wu, L. M. Chiappe, 2016. Use of morphometric data in taxonomy and functional morphology: a case study of modern and Cretaceous diving birds. 35th International Geological Congress. Cape Town, South Africa.

Bell, A., 2011. Inferring the ecology of extinct European birds from the Mesozoic and Tertiary. European Association of Vertebrate Paleontology. Heraklion, Crete.

Bell, A. and L.M. Chiappe, 2010. Identifying trends in avian ecomorphology. International Ornithological Congress. Sao Paulo, Brazil.

Bell, A., L.M. Chiappe, and J. O'Connor, 2009. Ecological diversity of Mesozoic birds: morphometric analysis with a phylogenetic perspective. Society of Vertebrate Paleontology. Bristol, United Kingdom.

Bell, A., Z.J. Tseng, and L. Chiappe, 2008. Diving mechanics of the extinct Hesperornithiformes: comparison to modern diving birds. Society of Vertebrate Paleontology. Cleveland, Ohio.

Bell, A., L. Chiappe, S. Susuki, and M. Watanabe, 2008. Phylogenetic and morphometric analysis of a new ornithuromorph from the Barun Goyot Formation, Southern Mongolia. Society of Avian Paleontology and Evolution. Sydney, Australia.

Bell, A., 2008. Diving mechanics of the extinct Hesperornithiformes: comparison to modern diving birds. CalPaleo. Sacramento, California.

Bell, A., L. McKay, A. Layton, D. Williams, 2007. Persistence of Bacteroides in surface water. American Society for Microbiology. Chicago, Illinois.

Bell, A., L. McKay, and A. Layton, 2006. Survival and transport of Bacteroides in streams. Geological Society of America, Southeastern Section. Knoxville, Tennessee.

Bell, A., L. McKay, and A. Layton, 2006. Survival and transport of Bacteroides in streams. American Water Resources Association, Tennessee Division. Nashville, Tennessee.

Bell, A., 2004. Avian phylogenetics: a combined molecular and morphological analysis. David Nelson Duke Colloquium. Kansas City, Missouri.

Appendix B
LACM Database Search Results

Natural History Museum
of Los Angeles County
900 Exposition Boulevard
Los Angeles, CA 90007

tel 213.763.DINO
www.nhm.org

Research & Collections

e-mail: paleorecords@nhm.org

October 9, 2022

Environmental Science Associates
Attn: Fatima Clark

re: Updated paleontological resources for the Universal Hilton Project

Dear Fatima:

I have conducted a thorough search of our paleontology collection records for the locality and specimen data for proposed development at the Universal Hilton Project area as outlined on the portion of the Burbank USGS topographic quadrangle map that you sent to me via e-mail on October 3, 2022. In addition to LACM 6969 and LACM 1084, which were returned with the original results, we have other localities now in our records.

The following table shows the closest additional known localities in the collection of the Natural History Museum of Los Angeles County (NHMLA).

Locality Number	Location	Formation	Taxa	Depth
LACM VP 6386	Universal City Station for the Red Line subway	Unknown formation (early Holocene; sandy mudstone)	Rodent (Rodentia)	60 feet bgs
LACM VP 6970	Lankershim Blvd & Bloomfield St	Old alluvium (pebble - gravel; sand; silt & clay)	Ground Sloth (*Glossotherium*); Camel (*Camelops*); Bison (*Bison*)	60-80 feet bgs (tunnel for Metrorail Redline)

VP, Vertebrate Paleontology; IP, Invertebrate Paleontology; bgs, below ground surface

This records search covers only the records of the NHMLA. It is not intended as a paleontological assessment of the project area for the purposes of CEQA or NEPA. Potentially fossil-bearing units are present in the project area, either at the surface or in the subsurface. As such, NHMLA recommends that a full paleontological assessment of the project area be conducted by a paleontologist meeting Bureau of Land Management or Society of Vertebrate Paleontology standards.

Sincerely,

Alyssa Bell, Ph.D.
Natural History Museum of Los Angeles County

enclosure: invoice