RESPONSE TO CITY OF MALIBU GEOTECHNICAL REVIEW SHEET
GEOTECHNICAL REVIEW COMMENTS, DATED JUNE 11, 2015,
Regarding Malibu Memorial Cemetery,
Tentative Tract Map 69653, 4000 Malibu Canyon Road,
Malibu, California

For

Green Acres, LLC

November 3, 2015 W.O. 6489

MDN 16329

GeoSoils Consultants Inc.
GEOTECHNICAL GEOLOGIC ENVIRONMENTAL

November 3, 2015
W.O. 6489

GREEN ACRES, LLC
22837 Pacific Coast Highway, Suite 775
Malibu, California 90265

Attention: Mr. Bruce McBride

Subject: Response to City of Malibu Geotechnical Review Sheet Geotechnical Review Comments, dated June 11, 2015, Regarding Malibu Memorial Cemetery, Tentative Tract Map 69653, 4000 Malibu Canyon Road, Malibu, California

Dear Mr. McBride:

As requested, GeoSoils Consultants, Inc. (GSC) has prepared this response to the geotechnical portion of the City of Malibu Geotechnical Review Sheet dated June 11, 2015. A copy of the review sheet is attached.

New development plans provided by Psomas Engineering have undergone substantial changes that render some of the geotechnical review comments non applicable. The new development plan has eliminated the proposed grading along the north and east portions of the site and the associated retaining walls along the northern portion of the site. The grading to create the mound in the northern portion of the site has also been omitted. To achieve the required factor of safety for the steep slope in the northern portion of the site, a row of piles is recommended. The location of the piles is shown on the Geologic Map, Plate 1, and Cross-Sections, Plate 2. Below is an item-by-item response to the review sheet:

6634 Valjean Avenue Van Nuys, California 91406 Phone: (818) 785-2158 Fax: (818) 785-1548

GEOTECHNICAL REVIEW COMMENTS

Comment 1

Please construct cross-section(s) perpendicular to the proposed 3:1 fill slope in the northern portion of the site (in the vicinity of Cross-Section 1-1') and perform static, seismic, and surficial stability analyses. Submit the cross-section(s) and results of the slope stability analyses for review. The Consultant needs to demonstrate that the constructed slopes meet the minimum required factors of safety.

Response to Comment 1

The new development plan omits the proposed 3:1 fill slope in the northern portion of the site in the vicinity of Cross Section 1-1'; therefore, a slope stability analysis was not performed in this area.

Comment 2

The project Geotechnical Consultant needs to evaluate the mitigation of the archaeological site (mounding of fill) in the north-central portion of the site. Mounding of fill at the top of a fill slope needs to be evaluated for slope stability. Provide additional cross-sections across the highest part of the mound and fill slope and present the results of the slope stability analyses for review.

Response to Comment 2

The current development plan has undergone changes that eliminate the proposed mounding of fill atop the previously proposed fill slope. In addition, the proposed fill slope itself has also been omitted. Due to the removal of the mound and fill slope, stability analysis for this area has not been performed.

Comment 3

The Geologic Map needs to show both the existing and proposed grades to fully evaluate the proposed grading and cut/fill areas across the site.

Response to Comment 3

Acknowledged. Please see the revised grading plan/geologic map (see Plates 1 and 2). Both existing and proposed grades are shown with updated associated geologic cross sections. The revised development plan shows that minor cuts and fills are proposed to "smooth" out the site. Any fill placed in this manner will be considered as secondary structural fill.

Comment 4

The Project Geotechnical Consultant states that the grading of the site will consist of flattening the steeper slope areas along the northern and eastern parts of the site to a 3.2:1 gradient in order to *"...eliminate the slope stability issues previously addressed along the subject slopes."* Review of the slope stability analyses performed by the Consultant for the cross-sections presented for the Hotel Project indicated that all slopes were stable except in the vicinity of Cross-Section 3-3'. Justification of the 175,000 yards of remedial grading needs to be provided by the Project Geotechnical Consultant. It appears that the majority of the slopes do not need mitigation for slope stability.

Response to Comment 4

The grading of the northern and eastern parts of the site has been removed from the current development plan. The steepest portion of slope in the area of Cross-Section 3-3' will be stabilized with a row of piles (as previously proposed for the hotel project) to address the slope stability issues for this area. The stability analysis for the proposed piles is included herein as Appendices A and B.

Comment 5

The Irrigation Plan indicates that over 16,000,000 gallons of water will be used to irrigate the park per year. The applicant needs to evaluate the water balance on the property considering the proposed landscaping plan and plants to be utilized, the evapotranspiration rates of the plants, average annual rainfall 16" per year), and infiltration rates of the surficial soils. It must be shown that the irrigation on the property will not adversely affect the groundwater levels and gross and surficial slope stability.

Response to Comment 5

We have reviewed the irrigation plan, dated October 27, 2015 prepared by Atomic Irrigation, for the subject site. The current plan indicates that over 19,000,000 gallons of water will be used to irrigate the park per year. According to the landscape plan and conversations with the applicant and Atomic Irrigation, the landscape plan was designed so the water balance was achieved considering plant type, evapotranspiration, and infiltration rates of surficial soils. During and after rainfall periods, irrigation is not proposed to be applied. Irrigation on the property will not adversely affect the groundwater levels and gross and surficial stability provided the water balance is achieved as proposed on the landscape plan.

Comment 6

Please include all subsurface exploration on the Geotechnical Map. The Consultant may submit the Geotechnical Map from the Hotel project without the proposed improvements. Not all boring and trench data is shown on the current map for the Memorial Park.

Response to Comment 6

Acknowledged. The requested subsurface investigation information is included herein as Plate 3. The geotechnical map from the hotel project without the proposed improvements was utilized for this purpose. Plate 3 depicts all boring locations from previous subsurface investigations for the hotel project. Plate 1 includes all test pits, trench investigations, and boring locations (if absent from Plate 3).

Comment 7

Several cross sections do not show the cut/fill transitions shown on the Geologic Map, as well as proposed retaining walls and walkways. Please review the cross sections and grading plan and provide the details, as applicable.

Response to Comment 7

The cross-sections have been revised to include proposed walkways and retaining walls. The revised grading plan depicts minor "contour" grading to smooth out the existing topography. The minor contour grading is not depicted on the cross-sections.

Response to Comment 8

Labeling of geologic units was incorrect and has been corrected on the geologic map. The associated Geologic Cross Sections 3-3' and 4-4' have been revised to reflect these changes.

Comment 9

Temporary stability and foundation design for retaining walls need to be evaluated for the proposed buried crypts shown on Cross Section 3-3'.

Response to Comment 9

Retaining walls for this area have been omitted from the current development plan. Additional stability analyses were performed in the immediate unstable slope area of Cross-Sections 3-3' and 7-7'. The results of the analyses yield factors below the minimum code values. As a result, analyses were performed to determine the location of the failure surfaces with a factor of safety satisfying code requirements The failure surfaces have been drafted on the Geologic Cross-Sections, Plate 2. The slope stability analyses are included herein as Appendix A. GSC recommends this slope area be supported with piles. The corresponding equivalent fluid pressures for Cross-Sections 3-3' and 7-7' are given in Appendix B.

BUILDING PLAN-CHECK STAGE REVIEW COMMENTS

Comment 1

Applicants are required to submit all Geotechnical Reports as searchable PDF files on a CD. The report as received by the City is not in the proper format. Please re-submit the report as a searchable PDF file.

Response to Comment 1

Acknowledged.

Comment 2

Shoring will be required for the subterranean garage excavations. Provide shoring recommendations.

Response to Comment 2

Subterranean parking is no longer part of the proposed development; therefore, shoring recommendations are not provided in this response.

Comment 3

The Consultant used a seismic factor, Kh, of 0.20g for the retaining wall seismicity calculations. The Consultant should review the 2013 CBC and confirm that the value used meets the new code requirements.

Response to Comment 3

Acknowledged. The seismic design factor for the retaining walls has been updated to conform to the City of Malibu current code. The table below summarizes these values and the seismic factor has been recalculated to k_h = .62.

The 2013 CBC (California Building Code) criteria are provided herein for structural design consideration.

2013 CBC Section 1613, Earthquake Loads	
Site Class Definition (1613.3.2)	D
Mapped Spectral Response Acceleration Parameter, S_s (Figure 1613.3.1(1) for 0.2 second)	2.338
Mapped Spectral Response Acceleration Parameter, S_1 (Figure 1613.3.1(2) for 1.0 second)	0.835
Site Coefficient, F_a (Table 1613.3.3(1) short period)	1.0
Site Coefficient, F_v (Table 1613.3.3(2) 1-second period)	1.5
Adjusted Maximum Considered Earthquake Spectral Response Acceleration Parameter S_{MS} (Eq. 16-37)	2.338
Adjusted Maximum Considered Earthquake Spectral Response Acceleration Parameter S_{M1} (Eq. 16-38)	1.253
Design Spectral Response Acceleration Parameter, S_{DS} (Eq. 16-39)	1.558
Design Spectral Response Acceleration Parameter, S_{D1} (Eq. 16-40)	0.835
Notes: Location: Latitude: 34.03796, Longitude: -118.69955 1. Site Class Designation: Class D is recommended based on subsurface condition. 2. Ss, SMs, and SDs are spectral response accelerations for the period of 0.2 second. 3. S1, SM1, and SD1 are spectral response accelerations for the period of 1.0 second.	

Conformance to the above criteria for seismic design does not constitute any guarantee or assurance that significant structural damage or ground failure will not occur if a maximum level earthquake occurs. The primary goal of seismic design is to protect life and not to avoid damage, since such design may be economically prohibitive.

Comment 4

The Project Geotechnical Consultant needs to provide a maximum height limit on un-shored slopes for temporary excavations per their calculations on Fig. 10. The Consultant suggests an unlimited (i.e. greater than 5 feet) height.

Response to Comment 4

Due to the revised development plan temporary excavations are no longer proposed to provide access to the buried crypts. All excavations on the subject site with the revised plan do not exceed 5 feet in vertical height and, therefore, temporary shoring will not be necessary.

Comment 5

The following note must be placed on the plans, *'Prior to the placement of concrete slabs, the slab subgrade soils shall be pre-moistened to at least 5% over the optimum moisture content to the depth specified by the geotechnical engineer. The pre-moistened soils should be tested and verified to be by the geotechnical engineer within one day prior to the placement of the moisture barrier and sand'.*

Response to Comment 5

Acknowledged. The note, *'Prior to the placement of concrete slabs, the slab subgrade soils shall be pre-moistened to at least 5% over the optimum moisture content to the depth specified by the geotechnical engineer. The pre-moistened soils should be tested and verified to be by the geotechnical engineer within one day prior to the placement of the moisture barrier and sand',* has been placed accordingly on the current development plans.

Comment 6

Please show the Stream Terrace Deposits on Cross-Sections C, D, and G. Are the stream terrace deposits displaced across the landslide?

Response to Comment 6

Stream channel deposits are shown on the geologic cross-sections and are not off-set by the ancient landslide.

Comment 7

Please depict limits and depths of over-excavation and structural fill to be placed on the grading plan, and cross sectional view of the proposed building area.

Response to Comment 7

The approximate limits of removals and over-excavations have been added to the Geologic Map and Cross-Sections.

Comment 8

Two sets of final grading, retaining wall, chapel, and shoring plans **(APPROVED BY BUILDING AND SAFETY)** incorporating the Project Geotechnical Consultant's recommendations and items in this review sheet must be **reviewed and wet stamped and manually signed by the Project Engineering Geologist and Project Geotechnical Engineer.** City Geotechnical staff will review the plans for conformance with the Project Geotechnical Consultants' recommendations and items in this review sheet over the counter at City Hall on Mondays through Thursdays between 8AM and 10AM.

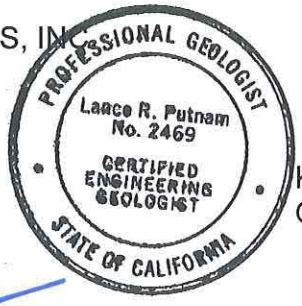
Response to Comment 8

Acknowledged.

We appreciate this opportunity to be of continued service to you. If you have any questions regarding the content of this report or any other aspects of the project, please do not hesitate to contact us.

Very truly yours,

GEOSOILS CONSULTANTS, INC.



LANCE R. PUTNAM
CEG 2469

KAREN L. MILLER
GE 2257

GEORGE C. EDWARDS
Staff Geologist

JONATHAN GURUNATHAN
Staff Engineer

LRP.KLM.GCE.JG.W:Rsp to City of Malibu Rev 6-11-15

Encl: References
City of Malibu Geotechnical Review Sheet dated June 11, 2015
Appendix A, Slope Stability Analyses
Appendix B, Equivalent Fluid Pressure Calculations
Plate 1, Geologic Map
Plate 2, Geologic Cross-Sections
Plate 3, Geologic Map (Hotel Project)

cc: (1) City of Malibu (via email)

MDN 16329

REFERENCES

1. Earth Forensics, Inc. dated July 22, 2013, "Updated Hydrogeologic Assessment of the Proposed Ranch Malibu Resort, Tentative Tract Map 69653, 4000 Malibu Canyon Road, Malibu, California"

2. GeoSoils Consultants, Inc. dated May 6, 2013, "Response to City of Malibu Geotechnical and Hydrogeologic Review Sheet dated April 26, 2013, Regarding Onsite Wastewater Treatment System (OWTS), Rancho Malibu Resort, Tentative Tract Map 69653, 4000 Malibu Canyon Road, Malibu, California"

3. GeoSoils Consultants, Inc. dated February 13, 2013, "Response to City of Malibu Geotechnical and Hydrogeologic Review Sheet dated December 14, 2012, Regarding Onsite Wastewater Treatment System (OWTS), Rancho Malibu Resort, Tentative Tract Map 69653, 4000 Malibu Canyon Road, Malibu, California

4. Ensitu Engineering, Inc. dated December 3, 2012, "Advanced Onsite Wastewater Treatment System, 4000 Malibu Canyon Road, Malibu, California"

5. Ensitu Engineering, Inc. dated October 1, 2012, "Advanced Onsite Wastewater Treatment System, 4000 Malibu Canyon Road, Malibu, California"

6. Earth Forensics, Inc. dated April 13, 2012, "Hydrogeologic Assessment of the Proposed Rancho Malibu Resort, Tentative Tract map 69653, 4000 Malibu Canyon Road, Malibu, California"

7. GeoSoils Consultants, Inc. dated May 21, 2012, "Response to City of Malibu Geotechnical Review Sheet dated May 7, 2011, Regarding Rancho Malibu Resort, Tentative Tract Map 69653, 4000 Malibu Canyon Road, Malibu, California

8. GeoSoils Consultants, Inc. dated April 2, 2012, "Geologic and Geotechnical Engineering Review of Proposed Onsite Wastewater Treatment System, Rancho Malibu Resort, Tentative Tract Map 69653, 4000 Malibu Canyon Road, Malibu, California"

9. GeoSoils Consultants, Inc. dated January 27, 2012, "Response to City of Malibu Geotechnical Review Sheet dated October 18, 2011, Regarding Rancho Malibu Resort, Tentative Tract Map 69653, 4000 Malibu Canyon Road, Malibu, California"

REFERENCES (cont'd)

10. GeoSoils Consultants, Inc. dated September 15, 2011, "Response to Comments of the City of Malibu Geotechnical Review Sheet Dated October 31, 2007, and Updated Geologic and Geotechnical Engineering Report, Rancho Malibu Resort, Tentative Tract Map 69653, 4000 Malibu Canyon Road, Malibu, California"

11. Dibblee, T.W., 1993, "Geologic Map of the Malibu Beach Quadrangle, Los Angeles County, California"

12. Leighton and Associates, Inc. dated August 4, 1989, "Report of Geotechnical Investigation, Rancho Malibu Mesa Project, Pacific Coast Highway at Malibu Canyon Road, Malibu, California"

13. Leighton and Associates, Inc., dated February 6, 1990, "Response to Geologic and Geotechnical Engineering Review Sheets (Grading Plan Check No. 1811), By the Department of Public Works, Land Development Division, For Rancho Malibu Hotel, 3930 Malibu Canyon Road, Malibu, California"

14. Van Beveren and Butelo, Inc. dated September 27, 2007, "Report of Geologic and Geotechnical Investigation, Proposed Rancho Malibu Resort, Pacific Coast Highway and Malibu Canyon Road, Malibu, California"

15. GeoSoils Consultants, Inc. dated January 23, 2015, "Geologic and Geotechnical Engineering Report, Proposed Malibu Memorial Cemetery, Tentative Tract Map 69653, 4000 Malibu Canyon Road, Malibu, California"

City of Malibu

23825 Stuart Ranch Road • Malibu, California 90265-4861
(310) 456-2489 • Fax (310) 317-1950 • www.malibucity.org

GEOTECHNICAL REVIEW SHEET

Project Information

Date: June 11, 2015		**Review Log #:**	**3745**
Site Address:	4000 Malibu Canyon Road		
Lot/Tract/PM #:	n/a	**Planning #:**	**CDP 15-028**
Applicant/Contact:	Bruce McBride, bmcbride@pda-11c.net	**BPC/GPC #:**	
Contact Phone #:	805-298-6570 **Fax #:**	**Planner:**	**Adrian Fernandez**
Project Type:	Church Memorial Park		

Submittal Information

Consultant(s) / Report Date(s): *(Current submittal(s) in **Bold.**)*

GeoSoils Consultants, Inc. (Miller, GE 2257; Ruberti, CEG 1708): **1-23-15**; Ref: 5-21-12, 1-27-12, 9-15-11
Ref: Van Beveren & Butelo, Inc.: 9-27-07
Ref: Roy J. Shlemon & Associates, Inc.: September 2007 (Included as Appendix D in the referenced Van Beveren & Butelo report)
References reviewed by the Consultant:
Leighton and Associates, Inc.: 3-28-90, 2-6-90, 8-4-89

Malibu Memorial Park plans prepared by Burdge & Associates Architects dated January 30, 2015.
Grading and Drainage Plan prepared by Psomas dated January 5, 2015.
Landscape plan prepared by Place Landscaping, undated.
Irrigation plan prepared by Atomic Irrigation dated January 9, 2015.

Previous Reviews: Geotechnical Review Referral Sheet dated 5-19-15

Review Findings

Coastal Development Permit Review

☐ The memorial park project is **APPROVED** from a geotechnical perspective.

☒ The memorial park project is **NOT APPROVED** from a geotechnical perspective. The listed 'Review Comments' shall be addressed prior to approval.

Building/Grading Plan-Check Stage Review

☒ Awaiting Building plan check submittal. Please respond to the listed 'Building Plan-Check Stage Review Comments' AND review and incorporate the attached 'Geotechnical Notes for Building Plan Check' into the plans.

☐ **APPROVED** from a geotechnical perspective. Please review the attached 'Geotechnical Notes for Building Plan Check' and incorporate into Building Plan-Check submittals.

☐ **NOT APPROVED** from a geotechnical perspective. The listed 'Building Plan-Check Stage Review Comments' shall be addressed prior to Building Plan-Check Stage approval.

Remarks

The report and plans were reviewed by the City from a geotechnical perspective. Based on the submitted information, the project comprises a new memorial park that includes an 8,500 square foot chapel with an 8,500 square foot subterranean garage, 45 free-standing mausoleums totaling 9,000 square feet, and 154 parking spaces. Grading will consist of 214,000 yards of R & R; 900 yards of fill under structure; 40 yards of cut and 230 yards of fill for safety; 30,960 yards of cut and 72,970 yards of fill non-exempt; and 109,000 yards of cut and 66,000 yards of fill remedial. Retaining walls, access roads, landscaping with irrigation, and hardscape are proposed.

The applicant is proposing to connect to the Civic Center Wastewater Treatment Facility for disposal of their wastewater.

NOTICE: Applicants shall be required to submit all Geotechnical reports for this project as searchable PDF files on a CD. At the time of Building Plan Check application, the Consultant must provide searchable PDF files on a CD to the Building Department for ALL previously submitted reports that have been reviewed by City Geotechnical Staff.

Review Comments:

GeoSoils 1. Please construct cross-section(s) perpendicular to the proposed 3:1 fill slope in the northern portion of the site (in the vicinity of Cross-Section 1-1') and perform static, seismic, and surficial stability analyses. Submit the cross-section(s) and results of the slope stability analyses for review. The Consultant needs to demonstrate that the constructed slopes meet the minimum required factors of safety.

GeoSoils 2. The Project Geotechnical Consultant needs to evaluate the mitigation of the archaeological site (mounding of fill) in the north-central portion of the site. Mounding of fill at the top of the proposed fill slope needs to be evaluated for slope stability. Provide additional cross-sections across the highest part of the mound and fill slope and present the results of the slope stability analyses for review.

GeoSoils 3. The Geologic Map needs to show both the existing and proposed grades to fully evaluate the proposed grading and cut/fill areas across the site.

GeoSoils 4. The Project Geotechnical Consultant states that grading of the site will consist of flattening the steeper slope areas along the northern and eastern parts of the site to a 3.2:1 gradient in order to "*...eliminate the slope stability issues previously addressed along the subject slopes.*" Review of the slope stability analyses performed by the Consultant for the cross-sections presented for the Hotel Project indicated that all slopes were stable except in the vicinity of Cross-Section 3-3'. Justification of the 175,000 yards of remedial grading needs to be provided by the Project Geotechnical Consultant. It appears that the majority of the slopes do not need mitigation for slope stability.

Atomic 5. The Irrigation Plan indicates that over 16,000,000 gallons of water will be used to irrigate the park per year. The applicant needs to evaluate the water balance on the property considering the proposed landscaping plan and plants to be utilized, the evapotranspiration rates of the plants, average annual rainfall (16" per year), and infiltration rates of the surficial soils. It must be shown that the irrigation on the property will not adversely affect the groundwater levels and gross and surficial slope stability.

GeoSoils 6. Please include all subsurface exploration on the Geotechnical Map. The Consultant may submit the Geotechnical Map from the Hotel project without the proposed improvements. Not all boring and trench data is shown on the current map for the Memorial Park.

Psomas 7. Several cross-sections do not show the cut/fill transitions shown on the Geologic Map, as well as proposed retaining walls and walkways. Please review the cross-sections and grading plan and provide the details,

as applicable.

GeoSoils 8. The east ends of Cross-Sections 3-3' and 4-4' depict bedrock at the toe of the slope. The Geotechnical Map shows stream terrace deposits or alluvium. Please clarify and correct.

Psomas 9. Temporary stability and foundation design for retaining walls need to be evaluated for the proposed buried crypts shown on Cross-Section 3-3'.

Building Plan-Check Stage Review Comments:

1. Applicants are required to submit all Geotechnical reports as searchable PDF files on a CD. The report as received by the City is not in the proper format. Please re-submit the report as a searchable PDF file.
2. Shoring will be required for the subterranean garage excavations. Provide shoring recommendations.
3. The Consultant used a seismic factor, Kh, of 0.20 g for the retaining wall seismicity calculations. The Consultant should review the 2013 CBC and confirm that the value used meets the new code requirements.
4. The Project Geotechnical Consultant needs to provide a maximum height limit on un-shored slopes for temporary excavations per their calculations on Fig. 10. The Consultant suggests an unlimited (i.e. greater than 5 feet) height.
5. The following note must be placed on the plans *'Prior to the placement of concrete slabs, the slab subgrade soils shall be pre-moistened to at least 5% over the optimum moisture content to the depth specified by the geotechnical engineer. The pre-moistened soils should be tested and verified to be by the geotechnical engineer within one day prior to the placement of the moisture barrier and sand.'*
6. Please show the Stream Terrace Deposits on Cross-Sections C, D, and G. Are the stream terrace deposits displaced across the landslide?
7. Please depict limits and depths of over-excavation and structural fill to be placed on the grading plan, and cross sectional view of the proposed building area.
8. Two sets of final grading, retaining wall, chapel, and shoring plans (**APPROVED BY BUILDING AND SAFETY**) incorporating the Project Geotechnical Consultant's recommendations and items in this review sheet must be **reviewed and wet stamped and manually signed by the Project Engineering Geologist and Project Geotechnical Engineer**. City geotechnical staff will review the plans for conformance with the Project Geotechnical Consultants' recommendations and items in this review sheet over the counter at City Hall on Mondays through Thursdays between 8 AM and 10 AM.

Please direct questions regarding this review sheet to City Geotechnical staff listed below.

Engineering Geology Review by: 6/11/15

Christopher Dean, C.E.G. #1751, Exp. 9-30-16 Date
Engineering Geology Reviewer (310-456-2489, x306)
Email: cdean@malibucity.org

Geotechnical Engineering Review by: *June 11, 2015*

Kenneth Clements, G.E. # 2010, Exp. 6-30-16 Date
Geotechnical Engineering Reviewer (805-563-8909)
Email: kclements@fugro.com

This review sheet was prepared by City Geotechnical Staff contracted with Fugro as an agent of the City of Malibu.

FUGRO CONSULTANTS, INC.
4820 McGrath Street, Suite 100
Ventura, California 93003-7778
(805) 650-7000 (*Ventura office*)
(310) 456-2489, x306 (*City of Malibu*)

City of Malibu

– GEOTECHNICAL –

NOTES FOR BUILDING PLAN-CHECK

The following standard items should be incorporated into Building Plan-Check submittals, as appropriate:

1. One set of grading, retaining wall, chapel, and shoring plans, incorporating the Project Geotechnical Consultant's recommendations and items in this review sheet, must be submitted to City geotechnical staff for review. **Additional review comments may be raised at that time that may require a response.**
2. Show the name, address, and phone number of the Project Geotechnical Consultant(s) on the cover sheet of the Building Plans.
3. Include the following note on Grading and Foundation Plans: "*Subgrade soils shall be tested for Expansion Index prior to pouring footings or slabs; Foundation Plans shall be reviewed and revised by the Project Geotechnical Consultant, as appropriate.*"
4. Include the following note on the Foundation Plans: "*All foundation excavations must be observed and approved by the Project Geotechnical Consultant prior to placement of reinforcing steel.*"
5. The Foundation Plans for the proposed project shall clearly depict the embedment material and minimum depth of embedment for the foundations in accordance with the Project Geotechnical Consultant's recommendations.
6. Foundation setback distances from descending slopes shall be in accordance with Section 1808 of the Malibu Building Code, or the requirements of the Project Geotechnical Consultant's recommendations, whichever are more stringent. Show minimum foundation setback distances on the foundation plans, as applicable.
7. Please contact the Building and Safety Department regarding the submittal requirements for a grading and drainage plan review.
8. A comprehensive Site Drainage Plan, incorporating the Geotechnical Consultant's recommendations, shall be included in the Plans. Show all area drains, outlets, and non-erosive drainage devices on the Plans. Water shall not be allowed to flow uncontrolled over descending slopes.

Grading Plans (as Applicable)

1. Grading Plans shall clearly depict the limits and depths of overexcavation, as applicable.
2. Prior to final approval of the project, an as-built compaction report prepared by the Project Geotechnical Consultant must be submitted to the City for review. The report must include the results of all density tests as well as a map depicting the limits of fill, locations of all density tests, locations and elevations of all removal bottoms, locations and elevations of all keyways and back drains, and locations and elevations of all retaining wall backdrains and outlets. Geologic conditions exposed during grading must be depicted on an as-built geologic map. This comment must be included as a note on the grading plans.

Retaining Walls (As Applicable)

1. Show retaining wall backdrain and backfill design, as recommended by the Geotechnical Consultant, on the Plans.
2. Retaining walls separate from a residence require separate permits. Contact the Building and Safety Department for permit information. One set of retaining wall plans shall be submitted to the City for review by City geotechnical staff. Additional concerns may be raised at that time which may require a response by the Project Geotechnical Consultant and applicant.

City of Malibu

23825 Stuart Ranch Road
Malibu, California 90265
(310) 456-2489 Fax (310) 317-1950

GEOTECHNICAL REVIEW FIXED FEE FORM

PROJECT OWNER/APPLICANT: Bruce McBride

PROJECT ADDRESS: 4000 Malibu Canyon Road

GEOTECHNICAL LOG NO: 3745

PLANNING NO: CDP 15-028

PLAN CHECK NO:

ITEM	STATUS	DATE	DEPOSIT	CHARGE	BALANCE	COMMENTS
FIXED FEE BY: Bruce McBride		4/28/2015	$3,000.00	$0.00	$0.00	Fixed Fee
Initial Review, CDP 15-028	Response Required	6/11/2015				
Second review						
Additional Reviews: Time & Material						
Third review						
Fourth review						
Applicant Paid Balance Due						
Fifth review						
Applicant Paid Balance Due						
					$0.00	
REFUND DUE APPLICANT						REFUND # _____
BALANCE DUE FUGRO						

NOTE:

The Fixed Fee incorporates the initial and one subsequent geotechnical review. Subsequent reviews will be performed in accordance with the City's time and materials rate of $201.50 per hour.

November 3, 2015
W.O. 6489

APPENDIX A

SLOPE STABILITY ANALYSES

November 3, 2015
W.O. 6489

APPENDIX A

SLOPE STABILITY ANALYSES

1.0 Introduction

SLIDE 6.0 is a fully integrated and comprehensive slope stability analysis program. Slide is a 2D slope stability program for evaluating the safety factor or probability of failure, of circular or non-circular failure surfaces in soil or rock slopes and can create complex models to be analyzed.

Slide 6.0 analyzes the stability of slip surfaces using vertical slice limit equilibrium methods (e.g. Bishop, Janbu, Spencer, etc). Individual slip surfaces can be analyzed, or search methods can be applied to locate the critical slip surface for a given slope. Deterministic (safety factor) or probabilistic (probability of failure) analyses can be examined.

2.0 General Information

If the reviewer wishes to obtain more information concerning slope stability analysis, the following publications may be consulted:

- The Stability of Slopes, by E.N. Bromhead, Surrey University Press, Chapman and Hall, NY, 374 pages, ISBN 0 412 01061 5 (1985).
- Rock Slope Engineering, by E. Hoek and J.W. Bray, Inst. of Mining and Metrallurgy, London, England, Third Edition, 358 pages, ISBN 0900488 573 (1981).
- Landslides: Analysis and Control, by R.L. Schuster and R.J. Krizek (editors), Special Report 176, Transportation Research Board, National Academy of Sciences, 234 pages, ISBN 0 309 02804 3 (1978).

Appendix A

3.0 Slide 6.0 Features

The present version of Slide contains the following features:

- Critical surface search methods for circular or non-circular slip surfaces
- Analysis methods include Bishop, Janbu, Spencer
- Multiple materials
- Anisotropic, non-linear Mohr-Coulomb materials
- Probabilistic analysis – calculate probability of failure, reliability index (see below)
- Sensitivity Analysis
- Groundwater – piezo surfaces, Ru factors, pore pressure grids, finite element seepage analysis (see below), excess pore pressure (B-bar method)
- Finite element groundwater seepage for steady state or transient conditions
- Rapid drawdown analysis
- Tension crack (dry or water filled)
- External loading – line, distributed or seismic
- Support – soil nails, tiebacks, geotextiles, piles. Infinite strength (slip surface exclusion) zones
- Back analysis of required support force for a given safety factor
- Back analysis of material strength using sensitivity or probabilistic analysis
- View any or all surfaces generated by search
- Detailed analysis results can be plotted for individual slip surfaces

Appendix A

4.0 Input Data

Input data includes the following items:

- Unit weight, cohesion, friction angle of bedrock material, alluvium and fill
- Slope geometry, surcharge boundary loads and water surface elevations
- Water level conditions for full basin and rapid draw down conditions
- Pseudo-static earthquake loading

5.0 Output Information

Output information includes:

- All input data
- Factors of safety for the global minimum slip surface
- High quality plots can be generated that include the slope geometry and slip surfaces

6.0 Stability Analysis

GeoSoils Consultants, Inc. has performed slope stability analyses for the proposed development as depicted on the following Geologic-Sections:

- Geologic Cross-Section 3-3'
- Geologic Cross-Section 7-7'

Appendix A

Soil Parameters

The parameters used in the slope stability calculations can be found in the table below.

TABLE A-1
SHEAR TEST DATA SUMMARY

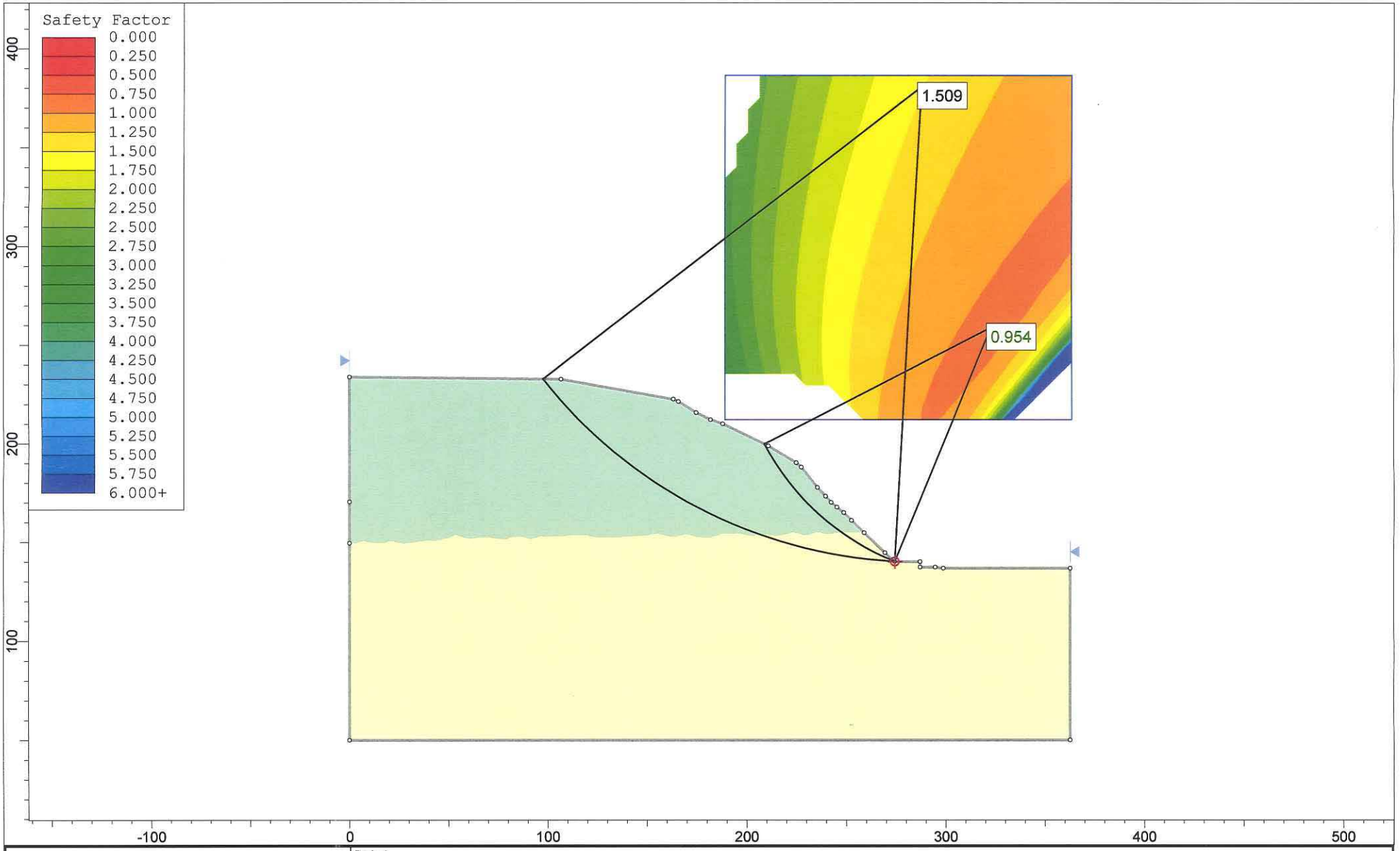
Soil Description	Reshear Values		Peak Values		Unit Weight (pcf)
	c (psf)	ϕ (degrees)	c (psf)	ϕ (degrees)	
Terrace (Qtn/Qtm)	100	34.5	300	35.0	130
Bedrock (TQs)	100	32.5	310	36.5	130

7.0 Results

The results of slope stability analyses are presented in Table A-2. Detailed outputs of the stability analysis results are included in this appendix. A seismic coefficient, k_h, value of 0.35 was used in the seismic analysis per City of Malibu guidelines.

TABLE A-2
SLIDE STABILITY ANALYSIS RESULTS

Cross-Section	Mode	Description	Lowest Factor of Safety	
			Static	Seismic
3-3'	1	Circular Failure, Minimum F.S.	0.954	0.760
	2	Circular Failure, F.S. Search	1.509	1.003
7-7'	1	Circular Failure, Minimum F.S.	0.778	0.841
	2	Circular Failure, F.S. Search	1.507	1.009



Project	#6489 - Green Acres, LLC		
Analysis Description	Section 3-3' Static Circular Failure		
Drawn By: Jonathan Gurunathan	Scale: 1:800	Company: GeoSoils Consultants, Inc	
Date: 11/5/2015, 10:06:26 AM		File Name: Section 3 Static.slim	

SLIDEINTERPRET 6.036

Slide Analysis Information

#6489 - Green Acres, LLC

Project Summary

File Name: Section 3 Static.slim
Slide Modeler Version: 6.036
Project Title: #6489 - Green Acres, LLC
Analysis: Section 3-3' Static Circular Failure
Author: Jonathan Gurunathan
Company: GeoSoils Consultants, Inc
Date Created: 11/5/2015, 10:06:26 AM

General Settings

Units of Measurement: Imperial Units
Time Units: days
Permeability Units: feet/second
Failure Direction: Left to Right
Data Output: Standard
Maximum Material Properties: 20
Maximum Support Properties: 20

Analysis Options

Analysis Methods Used

Bishop simplified
Janbu corrected
Spencer

Number of slices: 25
Tolerance: 0.005
Maximum number of iterations: 50
Check malpha < 0.2: Yes
Initial trial value of FS: 1
Steffensen Iteration: Yes

Groundwater Analysis

Groundwater Method: Water Surfaces
Pore Fluid Unit Weight: 62.4 lbs/ft3
Advanced Groundwater Method: None

Random Numbers

Pseudo-random Seed: 10116

Random Number Generation Method: Park and Miller v.3

Surface Options

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

Material Properties

Property	Bedrock	Qtn/Qtm
Color		
Strength Type	Mohr-Coulomb	Mohr-Coulomb
Unit Weight [lbs/ft3]	130	130
Cohesion [psf]	100	100
Friction Angle [deg]	32.5	34.5
Water Surface	None	None
Ru Value	0	0

Global Minimums

Method: bishop simplified

FS: 0.954055
Center: 322.535, 258.859
Radius: 128.081
Left Slip Surface Endpoint: 208.794, 199.973
Right Slip Surface Endpoint: 274.257, 140.226
Resisting Moment=6.16565e+006 lb-ft
Driving Moment=6.46258e+006 lb-ft
Total Slice Area=585.548 ft2

Method: janbu corrected

FS: 0.951396
Center: 305.122, 235.642
Radius: 100.284
Left Slip Surface Endpoint: 212.092, 198.195
Right Slip Surface Endpoint: 274.257, 140.226
Resisting Horizontal Force=37494.1 lb
Driving Horizontal Force=39409.6 lb
Total Slice Area=615.284 ft2

Method: spencer

FS: 0.945948

Center: 322.535, 258.859
Radius: 128.081
Left Slip Surface Endpoint: 208.794, 199.973
Right Slip Surface Endpoint: 274.257, 140.226
Resisting Moment=6.11326e+006 lb-ft
Driving Moment=6.46258e+006 lb-ft
Resisting Horizontal Force=35387.2 lb
Driving Horizontal Force=37409.2 lb
Total Slice Area=585.548 ft2

Valid / Invalid Surfaces

Method: bishop simplified

Number of Valid Surfaces: 888
Number of Invalid Surfaces: 73

Error Codes:

Error Code -101 reported for 33 surfaces
Error Code -114 reported for 40 surfaces

Method: janbu corrected

Number of Valid Surfaces: 886
Number of Invalid Surfaces: 75

Error Codes:

Error Code -101 reported for 33 surfaces
Error Code -108 reported for 2 surfaces
Error Code -114 reported for 40 surfaces

Method: spencer

Number of Valid Surfaces: 885
Number of Invalid Surfaces: 76

Error Codes:

Error Code -101 reported for 33 surfaces
Error Code -108 reported for 2 surfaces
Error Code -111 reported for 1 surface
Error Code -114 reported for 40 surfaces

Error Codes

The following errors were encountered during the computation:

-101 = Only one (or zero) surface / slope intersections.
-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
-114 = Surface with Reverse Curvature.

Slice Data

Global Minimum Query (bishop simplified) - Safety Factor: 0.954055

Slice Number	Width [ft]	Weight [lbs]	Base Material	Base Cohesion [psf]	Base Friction Angle [degrees]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]
1	2.59784	587.596	Qtn/Qtm	100	34.5	115.324	110.025	14.5869	0	14.5869
2	2.59784	1617.64	Qtn/Qtm	100	34.5	251.316	239.769	203.366	0	203.366
3	2.59784	2483.89	Qtn/Qtm	100	34.5	377.221	359.89	378.142	0	378.142
4	2.59784	3240.01	Qtn/Qtm	100	34.5	496.389	473.582	543.565	0	543.565
5	2.59784	3902.49	Qtn/Qtm	100	34.5	608.694	580.728	699.463	0	699.463
6	2.59784	4483.76	Qtn/Qtm	100	34.5	714.138	681.327	845.836	0	845.836
7	2.59784	4907.21	Qtn/Qtm	100	34.5	799.726	762.983	964.647	0	964.647
8	2.59784	4994.82	Qtn/Qtm	100	34.5	835.582	797.191	1014.42	0	1014.42
9	2.59784	4808.56	Qtn/Qtm	100	34.5	827.469	789.451	1003.16	0	1003.16
10	2.59784	4566.48	Qtn/Qtm	100	34.5	807.947	770.826	976.057	0	976.057
11	2.59784	4324.1	Qtn/Qtm	100	34.5	785.869	749.762	945.409	0	945.409
12	2.59784	4153.26	Qtn/Qtm	100	34.5	773.679	738.132	928.49	0	928.49
13	2.59784	3940.41	Qtn/Qtm	100	34.5	752.5	717.926	899.089	0	899.089
14	2.59784	3790.09	Qtn/Qtm	100	34.5	740.579	706.553	882.54	0	882.54
15	2.59784	3713.63	Qtn/Qtm	100	34.5	740.703	706.671	882.711	0	882.711
16	2.64953	3668.2	Bedrock	100	32.5	701.449	669.221	893.498	0	893.498
17	2.64953	3370.68	Bedrock	100	32.5	661.386	630.999	833.5	0	833.5
18	2.64953	3054.04	Bedrock	100	32.5	616.031	587.727	765.576	0	765.576
19	2.64953	2718.11	Bedrock	100	32.5	565.253	539.282	689.535	0	689.535
20	2.64953	2352.41	Bedrock	100	32.5	507.027	483.732	602.338	0	602.338
21	2.64953	1958.13	Bedrock	100	32.5	441.382	421.103	504.031	0	504.031
22	2.64953	1536.38	Bedrock	100	32.5	368.33	351.407	394.629	0	394.629
23	2.64953	1088.13	Bedrock	100	32.5	287.864	274.638	274.127	0	274.127
24	2.64953	643.018	Bedrock	100	32.5	205.549	196.105	150.854	0	150.854
25	2.64953	218.231	Bedrock	100	32.5	124.811	119.077	29.9442	0	29.9442

Query 1 (bishop simplified) - Safety Factor: 0.954055

Slice Number	Width [ft]	Weight [lbs]	Base Material	Base Cohesion [psf]	Base Friction Angle [degrees]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]
1	2.59784	587.596	Qtn/Qtm	100	34.5	115.324	110.025	14.5869	0	14.5869
2	2.59784	1617.64	Qtn/Qtm	100	34.5	251.316	239.769	203.366	0	203.366
3	2.59784	2483.89	Qtn/Qtm	100	34.5	377.221	359.89	378.142	0	378.142
4	2.59784	3240.01	Qtn/Qtm	100	34.5	496.389	473.582	543.565	0	543.565
5	2.59784	3902.49	Qtn/Qtm	100	34.5	608.694	580.728	699.463	0	699.463
6	2.59784	4483.76	Qtn/Qtm	100	34.5	714.138	681.327	845.836	0	845.836
7	2.59784	4907.21	Qtn/Qtm	100	34.5	799.726	762.983	964.647	0	964.647
8	2.59784	4994.82	Qtn/Qtm	100	34.5	835.582	797.191	1014.42	0	1014.42
9	2.59784	4808.56	Qtn/Qtm	100	34.5	827.469	789.451	1003.16	0	1003.16
10	2.59784	4566.48	Qtn/Qtm	100	34.5	807.947	770.826	976.057	0	976.057
11	2.59784	4324.1	Qtn/Qtm	100	34.5	785.869	749.762	945.409	0	945.409
12	2.59784	4153.26	Qtn/Qtm	100	34.5	773.679	738.132	928.49	0	928.49

13	2.59784	3940.41	Qtn/Qtm	100	34.5	752.5	717.926	899.089	0	899.089
14	2.59784	3790.09	Qtn/Qtm	100	34.5	740.579	706.553	882.54	0	882.54
15	2.59784	3713.63	Qtn/Qtm	100	34.5	740.703	706.671	882.711	0	882.711
16	2.64953	3668.2	Bedrock	100	32.5	701.449	669.221	893.498	0	893.498
17	2.64953	3370.68	Bedrock	100	32.5	661.386	630.999	833.5	0	833.5
18	2.64953	3054.04	Bedrock	100	32.5	616.031	587.727	765.576	0	765.576
19	2.64953	2718.11	Bedrock	100	32.5	565.253	539.282	689.535	0	689.535
20	2.64953	2352.41	Bedrock	100	32.5	507.027	483.732	602.338	0	602.338
21	2.64953	1958.13	Bedrock	100	32.5	441.382	421.103	504.031	0	504.031
22	2.64953	1536.38	Bedrock	100	32.5	368.33	351.407	394.629	0	394.629
23	2.64953	1088.13	Bedrock	100	32.5	287.864	274.638	274.127	0	274.127
24	2.64953	643.018	Bedrock	100	32.5	205.549	196.105	150.854	0	150.854
25	2.64953	218.231	Bedrock	100	32.5	124.811	119.077	29.9442	0	29.9442

Global Minimum Query (janbu corrected) - Safety Factor: 0.951396

Slice Number	Width [ft]	Weight [lbs]	Base Material	Base Cohesion [psf]	Base Friction Angle [degrees]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]
1	2.41857	635.074	Qtn/Qtm	100	34.5	108.109	102.854	4.15296	0	4.15296
2	2.41857	1786.44	Qtn/Qtm	100	34.5	256.44	243.976	209.486	0	209.486
3	2.41857	2733.02	Qtn/Qtm	100	34.5	397.243	377.935	404.397	0	404.397
4	2.41857	3527.11	Qtn/Qtm	100	34.5	529.683	503.938	587.732	0	587.732
5	2.41857	4201.08	Qtn/Qtm	100	34.5	653.606	621.838	759.279	0	759.279
6	2.41857	4716.91	Qtn/Qtm	100	34.5	760.166	723.219	906.789	0	906.789
7	2.41857	4940.74	Qtn/Qtm	100	34.5	825.232	785.122	996.858	0	996.858
8	2.41857	4874.84	Qtn/Qtm	100	34.5	844.127	803.099	1023.02	0	1023.02
9	2.41857	4732.17	Qtn/Qtm	100	34.5	847.928	806.715	1028.28	0	1028.28
10	2.41857	4542.96	Qtn/Qtm	100	34.5	841.005	800.129	1018.7	0	1018.7
11	2.41857	4410.35	Qtn/Qtm	100	34.5	841.21	800.324	1018.98	0	1018.98
12	2.41857	4260.62	Qtn/Qtm	100	34.5	836.237	795.593	1012.09	0	1012.09
13	2.41857	4080.99	Qtn/Qtm	100	34.5	823.679	783.645	994.709	0	994.709
14	2.41857	3983.75	Qtn/Qtm	100	34.5	824.664	784.582	996.074	0	996.074
15	2.57315	4160.3	Bedrock	100	32.5	794.198	755.597	1029.08	0	1029.08
16	2.57315	3974.59	Bedrock	100	32.5	778.539	740.699	1005.7	0	1005.7
17	2.57315	3649.77	Bedrock	100	32.5	735.916	700.148	942.042	0	942.042
18	2.57315	3315.78	Bedrock	100	32.5	688.96	655.474	871.92	0	871.92
19	2.57315	2953.03	Bedrock	100	32.5	633.968	603.155	789.797	0	789.797
20	2.57315	2557.85	Bedrock	100	32.5	570.002	542.298	694.271	0	694.271
21	2.57315	2131.68	Bedrock	100	32.5	497.061	472.902	585.338	0	585.338
22	2.57315	1675.79	Bedrock	100	32.5	415.11	394.934	462.951	0	462.951
23	2.57315	1191.28	Bedrock	100	32.5	324.088	308.336	327.022	0	327.022
24	2.57315	709.794	Bedrock	100	32.5	230.245	219.054	186.877	0	186.877
25	2.57315	240.942	Bedrock	100	32.5	135.628	129.036	45.5775	0	45.5775

Global Minimum Query (spencer) - Safety Factor: 0.945948

Slice Number	Width [ft]	Weight [lbs]	Base Material	Base Cohesion [psf]	Base Friction Angle [degrees]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]
1	2.59784	587.596	Qtn/Qtm	100	34.5	128.424	121.483	31.2575	0	31.2575

2	2.59784	1617.64	Qtn/Qtm	100	34.5	237.233	224.41	181.017	0	181.017
3	2.59784	2483.89	Qtn/Qtm	100	34.5	341.704	323.234	324.807	0	324.807
4	2.59784	3240.01	Qtn/Qtm	100	34.5	444.399	420.378	466.154	0	466.154
5	2.59784	3902.49	Qtn/Qtm	100	34.5	545.091	515.628	604.742	0	604.742
6	2.59784	4483.76	Qtn/Qtm	100	34.5	643.587	608.8	740.309	0	740.309
7	2.59784	4907.21	Qtn/Qtm	100	34.5	728.468	689.093	857.135	0	857.135
8	2.59784	4994.82	Qtn/Qtm	100	34.5	772.641	730.878	917.934	0	917.934
9	2.59784	4808.56	Qtn/Qtm	100	34.5	778.862	736.763	926.496	0	926.496
10	2.59784	4566.48	Qtn/Qtm	100	34.5	774.595	732.727	920.624	0	920.624
11	2.59784	4324.1	Qtn/Qtm	100	34.5	767.469	725.986	910.814	0	910.814
12	2.59784	4153.26	Qtn/Qtm	100	34.5	769.098	727.527	913.056	0	913.056
13	2.59784	3940.41	Qtn/Qtm	100	34.5	761.825	720.647	903.046	0	903.046
14	2.59784	3790.09	Qtn/Qtm	100	34.5	763.059	721.814	904.744	0	904.744
15	2.59784	3713.63	Qtn/Qtm	100	34.5	776.078	734.129	922.665	0	922.665
16	2.64953	3668.2	Bedrock	100	32.5	731.216	691.692	928.77	0	928.77
17	2.64953	3370.68	Bedrock	100	32.5	702.909	664.915	886.74	0	886.74
18	2.64953	3054.04	Bedrock	100	32.5	667.877	631.777	834.721	0	834.721
19	2.64953	2718.11	Bedrock	100	32.5	625.654	591.836	772.028	0	772.028
20	2.64953	2352.41	Bedrock	100	32.5	573.726	542.715	694.923	0	694.923
21	2.64953	1958.13	Bedrock	100	32.5	511.631	483.976	602.724	0	602.724
22	2.64953	1536.38	Bedrock	100	32.5	438.869	415.147	494.681	0	494.681
23	2.64953	1088.13	Bedrock	100	32.5	354.896	335.713	369.995	0	369.995
24	2.64953	643.018	Bedrock	100	32.5	265.533	251.18	237.305	0	237.305
25	2.64953	218.231	Bedrock	100	32.5	194.467	183.956	131.784	0	131.784

Query 1 (spencer) - Safety Factor: 0.945948

Slice Number	Width [ft]	Weight [lbs]	Base Material	Base Cohesion [psf]	Base Friction Angle [degrees]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]
1	2.59784	587.596	Qtn/Qtm	100	34.5	128.424	121.483	31.2575	0	31.2575
2	2.59784	1617.64	Qtn/Qtm	100	34.5	237.233	224.41	181.017	0	181.017
3	2.59784	2483.89	Qtn/Qtm	100	34.5	341.704	323.234	324.807	0	324.807
4	2.59784	3240.01	Qtn/Qtm	100	34.5	444.399	420.378	466.154	0	466.154
5	2.59784	3902.49	Qtn/Qtm	100	34.5	545.091	515.628	604.742	0	604.742
6	2.59784	4483.76	Qtn/Qtm	100	34.5	643.587	608.8	740.309	0	740.309
7	2.59784	4907.21	Qtn/Qtm	100	34.5	728.468	689.093	857.135	0	857.135
8	2.59784	4994.82	Qtn/Qtm	100	34.5	772.641	730.878	917.934	0	917.934
9	2.59784	4808.56	Qtn/Qtm	100	34.5	778.862	736.763	926.496	0	926.496
10	2.59784	4566.48	Qtn/Qtm	100	34.5	774.595	732.727	920.624	0	920.624
11	2.59784	4324.1	Qtn/Qtm	100	34.5	767.469	725.986	910.814	0	910.814
12	2.59784	4153.26	Qtn/Qtm	100	34.5	769.098	727.527	913.056	0	913.056
13	2.59784	3940.41	Qtn/Qtm	100	34.5	761.825	720.647	903.046	0	903.046
14	2.59784	3790.09	Qtn/Qtm	100	34.5	763.059	721.814	904.744	0	904.744
15	2.59784	3713.63	Qtn/Qtm	100	34.5	776.078	734.129	922.665	0	922.665
16	2.64953	3668.2	Bedrock	100	32.5	731.216	691.692	928.77	0	928.77
17	2.64953	3370.68	Bedrock	100	32.5	702.909	664.915	886.74	0	886.74
18	2.64953	3054.04	Bedrock	100	32.5	667.877	631.777	834.721	0	834.721
19	2.64953	2718.11	Bedrock	100	32.5	625.654	591.836	772.028	0	772.028

20	2.64953	2352.41	Bedrock	100	32.5	573.726	542.715	694.923	0	694.923
21	2.64953	1958.13	Bedrock	100	32.5	511.631	483.976	602.724	0	602.724
22	2.64953	1536.38	Bedrock	100	32.5	438.869	415.147	494.681	0	494.681
23	2.64953	1088.13	Bedrock	100	32.5	354.896	335.713	369.995	0	369.995
24	2.64953	643.018	Bedrock	100	32.5	265.533	251.18	237.305	0	237.305
25	2.64953	218.231	Bedrock	100	32.5	194.467	183.956	131.784	0	131.784

Interslice Data

Global Minimum Query (bishop simplified) - Safety Factor: 0.954055

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [degrees]
1	208.794	199.973	0	0	0
2	211.392	195.205	-229.992	0	0
3	213.99	190.87	-1.09001	0	0
4	216.588	186.889	524.627	0	0
5	219.185	183.206	1237.36	0	0
6	221.783	179.779	2053.21	0	0
7	224.381	176.577	2906.94	0	0
8	226.979	173.574	3726.73	0	0
9	229.577	170.749	4421.51	0	0
10	232.175	168.087	4942.97	0	0
11	234.772	165.573	5298.33	0	0
12	237.37	163.195	5504.92	0	0
13	239.968	160.944	5585.41	0	0
14	242.566	158.811	5548.62	0	0
15	245.164	156.789	5409.85	0	0
16	247.762	154.871	5179.16	0	0
17	250.411	153.016	4978.33	0	0
18	253.061	151.258	4691.34	0	0
19	255.71	149.593	4334.32	0	0
20	258.36	148.016	3924.28	0	0
21	261.009	146.524	3480.02	0	0
22	263.659	145.113	3022	0	0
23	266.308	143.78	2572.23	0	0
24	268.958	142.523	2154.3	0	0
25	271.607	141.339	1788.41	0	0
26	274.257	140.226	0	0	0

Query 1 (bishop simplified) - Safety Factor: 0.954055

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [degrees]
1	208.794	199.973	0	0	0
2	211.392	195.205	-229.992	0	0
3	213.99	190.87	-1.09001	0	0
4	216.588	186.889	524.627	0	0

5	219.185	183.206	1237.36	0	0
6	221.783	179.779	2053.21	0	0
7	224.381	176.577	2906.94	0	0
8	226.979	173.574	3726.73	0	0
9	229.577	170.749	4421.51	0	0
10	232.175	168.087	4942.97	0	0
11	234.772	165.573	5298.33	0	0
12	237.37	163.195	5504.92	0	0
13	239.968	160.944	5585.41	0	0
14	242.566	158.811	5548.62	0	0
15	245.164	156.789	5409.85	0	0
16	247.762	154.871	5179.16	0	0
17	250.411	153.016	4978.33	0	0
18	253.061	151.258	4691.34	0	0
19	255.71	149.593	4334.32	0	0
20	258.36	148.016	3924.28	0	0
21	261.009	146.524	3480.02	0	0
22	263.659	145.113	3022	0	0
23	266.308	143.78	2572.23	0	0
24	268.958	142.523	2154.3	0	0
25	271.607	141.339	1788.41	0	0
26	274.257	140.226	0	0	0

Global Minimum Query (janbu corrected) - Safety Factor: 0.951396

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [degrees]
1	212.092	198.195	0	0	0
2	214.511	192.672	-250.766	0	0
3	216.929	187.904	98.7237	0	0
4	219.348	183.684	799.714	0	0
5	221.767	179.886	1690.67	0	0
6	224.185	176.43	2660.15	0	0
7	226.604	173.258	3611.6	0	0
8	229.022	170.33	4441.62	0	0
9	231.441	167.613	5083.82	0	0
10	233.859	165.084	5538.12	0	0
11	236.278	162.722	5814.81	0	0
12	238.697	160.512	5936.81	0	0
13	241.115	158.441	5915.62	0	0
14	243.534	156.498	5762.9	0	0
15	245.952	154.674	5492.02	0	0
16	248.525	152.855	5224.8	0	0
17	251.099	151.153	4839.1	0	0
18	253.672	149.562	4355.81	0	0
19	256.245	148.076	3796.33	0	0
20	258.818	146.688	3184.52	0	0
21	261.391	145.395	2546.75	0	0

22	263.964	144.193	1911.57	0	0
23	266.538	143.078	1309.69	0	0
24	269.111	142.047	773.927	0	0
25	271.684	141.097	331.256	0	0
26	274.257	140.226	0	0	0

Global Minimum Query (spencer) - Safety Factor: 0.945948

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [degrees]
1	208.794	199.973	0	0	0
2	211.392	195.205	-184.649	-133.164	35.7982
3	213.99	190.87	-16.256	-11.7234	35.7982
4	216.588	186.889	389.08	280.593	35.798
5	219.185	183.206	951.357	686.091	35.798
6	221.783	179.779	1607.36	1159.18	35.798
7	224.381	176.577	2305.86	1662.92	35.7981
8	226.979	173.574	2987.25	2154.32	35.7981
9	229.577	170.749	3572.35	2576.28	35.7981
10	232.175	168.087	4015.3	2895.72	35.7981
11	234.772	165.573	4317.27	3113.49	35.7981
12	237.37	163.195	4488.75	3237.15	35.798
13	239.968	160.944	4545.75	3278.26	35.798
14	242.566	158.811	4492.53	3239.88	35.798
15	245.164	156.789	4339.64	3129.62	35.798
16	247.762	154.871	4093.04	2951.78	35.798
17	250.411	153.016	3878.15	2796.81	35.7981
18	253.061	151.258	3574.14	2577.57	35.7981
19	255.71	149.593	3194.33	2303.66	35.7981
20	258.36	148.016	2753.83	1985.98	35.798
21	261.009	146.524	2270.56	1637.46	35.798
22	263.659	145.113	1765.26	1273.06	35.7982
23	266.308	143.78	1261.6	909.831	35.7981
24	268.958	142.523	786.319	567.07	35.798
25	271.607	141.339	363.661	262.262	35.7981
26	274.257	140.226	0	0	0

Query 1 (spencer) - Safety Factor: 0.945948

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [degrees]
1	208.794	199.973	0	0	0
2	211.392	195.205	-184.649	-133.164	35.7982
3	213.99	190.87	-16.256	-11.7234	35.7982
4	216.588	186.889	389.08	280.593	35.798
5	219.185	183.206	951.357	686.091	35.798
6	221.783	179.779	1607.36	1159.18	35.798
7	224.381	176.577	2305.86	1662.92	35.7981
8	226.979	173.574	2987.25	2154.32	35.7981

9	229.577	170.749	3572.35	2576.28	35.7981
10	232.175	168.087	4015.3	2895.72	35.7981
11	234.772	165.573	4317.27	3113.49	35.7981
12	237.37	163.195	4488.75	3237.15	35.798
13	239.968	160.944	4545.75	3278.26	35.798
14	242.566	158.811	4492.53	3239.88	35.798
15	245.164	156.789	4339.64	3129.62	35.798
16	247.762	154.871	4093.04	2951.78	35.798
17	250.411	153.016	3878.15	2796.81	35.7981
18	253.061	151.258	3574.14	2577.57	35.7981
19	255.71	149.593	3194.33	2303.66	35.7981
20	258.36	148.016	2753.83	1985.98	35.798
21	261.009	146.524	2270.56	1637.46	35.798
22	263.659	145.113	1765.26	1273.06	35.7982
23	266.308	143.78	1261.6	909.831	35.7981
24	268.958	142.523	786.319	567.07	35.798
25	271.607	141.339	363.661	262.262	35.7981
26	274.257	140.226	0	0	0

List Of Coordinates

External Boundary

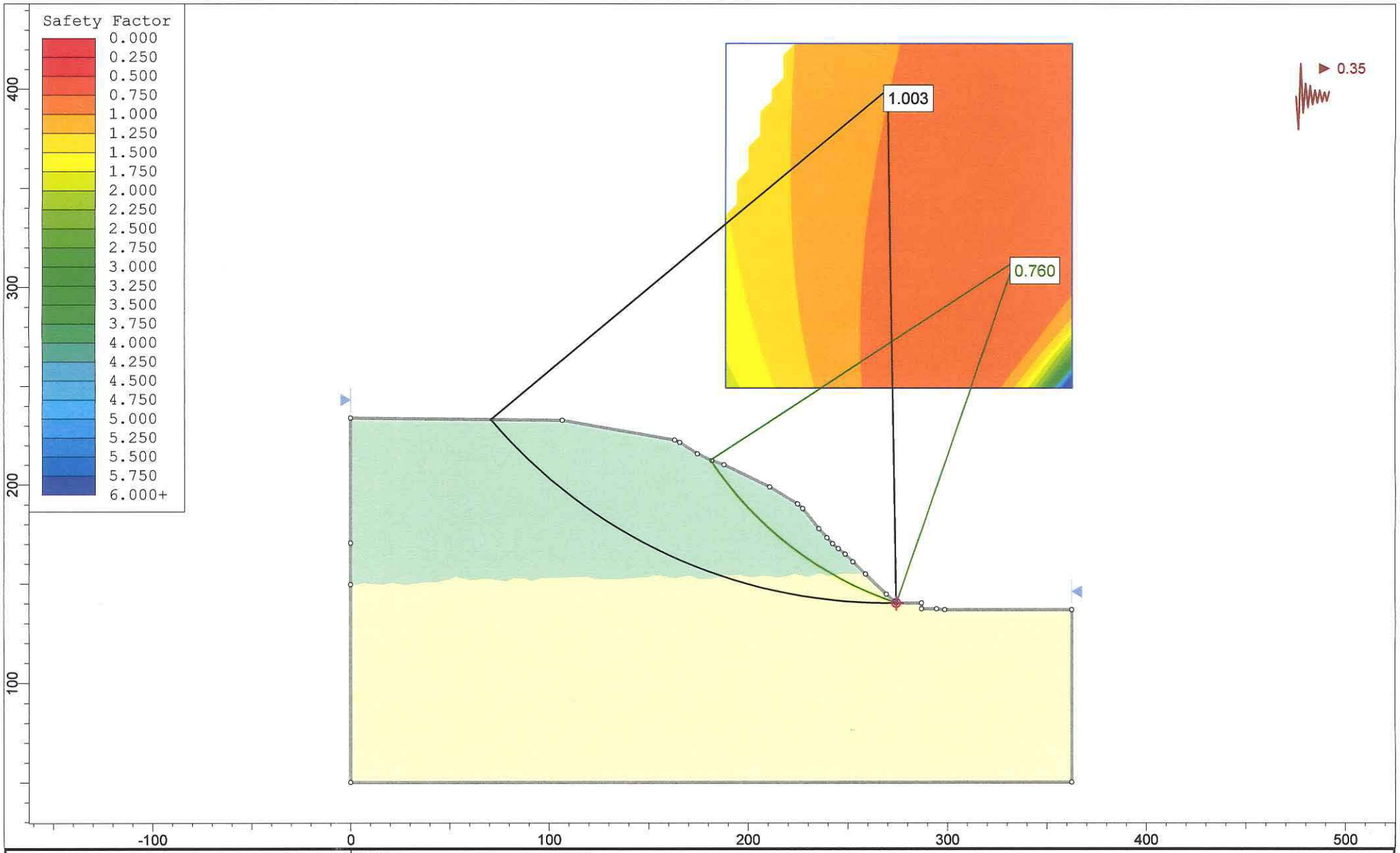
X	Y
362.5	50
362.5	136.88
298.67	136.88
294.554	137.386
286.992	137.386
286.992	140.226
274.257	140.226
269.279	144.698
258.898	154.871
252.489	161.151
248.692	165.032
245.233	167.816
242.364	170.347
239.58	173.385
235.417	177.879
227.346	188.147
224.746	190.434
210.745	199.021
187.827	210.203
181.738	212.362
174.512	215.841
165.627	221.582
163.098	222.744

106.671	232.801
0	233.897
0	170.541
0	149.556
0	50

Material Boundary

X	Y
0	149.556
4.008	149.556
7.606	150.51
10.68	149.866
15.175	149.655
18.365	149.655
20.335	150.5
22.007	150.5
26.812	149.296
38.582	150.891
44.277	150.891
50.048	152.106
53.693	153.701
57.642	152.562
60.755	151.726
66.742	152.345
71.585	152.345
78.001	151.498
79.535	151.498
82.754	152.856
86.931	152.856
91.197	151.591
92.08	151.591
96.993	152.973
100.405	152.973
112.625	153.376
119.904	153.376
124.909	152.484
137.298	152.484
150.111	153.302
152.759	154.217
155.832	154.217
162.435	152.877
164.625	152.877
169.397	153.857
171.326	153.857
174.758	152.713
181.721	152.288
185.741	153.367

188.258	154.446
196.234	154.446
201.007	153.465
204.014	153.465
207.414	153.988
210.78	153.988
215.422	153.203
219.312	153.726
223.594	155.001
226.994	154.282
228.465	153.726
231.439	153.726
234.937	154.903
237.421	154.903
239.709	154.151
242.651	154.151
247.195	154.871
250.562	154.871
258.898	154.871



Project	#6489 - Green Acres, LLC			
Analysis Description	Section 3-3' Seismic Circular Failure			
Drawn By	Jonathan Gurunathan	Scale	1:800	Company GeoSoils Consultants, Inc
Date	11/5/2015, 10:06:26 AM			File Name Section 3 Seismic.slim

SLIDEINTERPRET 6.036

Slide Analysis Information

#6489 - Green Acres, LLC

Project Summary

File Name: Section 3 Seismic.slim
Slide Modeler Version: 6.036
Project Title: #6489 - Green Acres, LLC
Analysis: Section 3-3' Seismic Circular Failure
Author: Jonathan Gurunathan
Company: GeoSoils Consultants, Inc
Date Created: 11/5/2015, 10:06:26 AM

General Settings

Units of Measurement: Imperial Units
Time Units: days
Permeability Units: feet/second
Failure Direction: Left to Right
Data Output: Standard
Maximum Material Properties: 20
Maximum Support Properties: 20

Analysis Options

Analysis Methods Used

Bishop simplified
Janbu corrected
Spencer

Number of slices: 25
Tolerance: 0.005
Maximum number of iterations: 50
Check malpha < 0.2: Yes
Initial trial value of FS: 1
Steffensen Iteration: Yes

Groundwater Analysis

Groundwater Method: Water Surfaces
Pore Fluid Unit Weight: 62.4 lbs/ft3
Advanced Groundwater Method: None

Random Numbers

Pseudo-random Seed: 10116

Random Number Generation Method: Park and Miller v.3

Surface Options

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

Loading

Seismic Load Coefficient (Horizontal): 0.35

Material Properties

Property	Bedrock	Qtn/Qtm
Color		
Strength Type	Mohr-Coulomb	Mohr-Coulomb
Unit Weight [lbs/ft3]	130	130
Cohesion [psf]	310	300
Friction Angle [deg]	36.5	35
Water Surface	None	None
Ru Value	0	0

Global Minimums

Method: bishop simplified

FS: 0.760341
Center: 333.723, 312.970
Radius: 182.693
Left Slip Surface Endpoint: 180.991, 212.722
Right Slip Surface Endpoint: 274.257, 140.226
Resisting Moment=2.03492e+007 lb-ft
Driving Moment=2.67633e+007 lb-ft
Total Slice Area=1313.14 ft2

Method: janbu corrected

FS: 0.737042
Center: 310.505, 278.143
Radius: 142.601
Left Slip Surface Endpoint: 184.496, 211.384
Right Slip Surface Endpoint: 274.257, 140.226
Resisting Horizontal Force=93568.9 lb

Driving Horizontal Force=126952 lb
Total Slice Area=1396.14 ft2

Method: spencer

FS: 0.769591
Center: 362.745, 382.623
Radius: 258.044
Left Slip Surface Endpoint: 159.725, 223.345
Right Slip Surface Endpoint: 274.257, 140.226
Resisting Moment=3.82093e+007 lb-ft
Driving Moment=4.96488e+007 lb-ft
Resisting Horizontal Force=122152 lb
Driving Horizontal Force=158724 lb
Total Slice Area=1757.25 ft2

Valid / Invalid Surfaces

Method: bishop simplified

Number of Valid Surfaces: 914
Number of Invalid Surfaces: 47

Error Codes:

Error Code -101 reported for 47 surfaces

Method: janbu corrected

Number of Valid Surfaces: 914
Number of Invalid Surfaces: 47

Error Codes:

Error Code -101 reported for 47 surfaces

Method: spencer

Number of Valid Surfaces: 913
Number of Invalid Surfaces: 48

Error Codes:

Error Code -101 reported for 47 surfaces
Error Code -108 reported for 1 surface

Error Codes

The following errors were encountered during the computation:

-101 = Only one (or zero) surface / slope intersections.
-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).

Slice Data

Global Minimum Query (bishop simplified) - Safety Factor: 0.760341

Slice Number	Width [ft]	Weight [lbs]	Base Material	Base Cohesion [psf]	Base Friction Angle [degrees]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]
1	3.66279	928.689	Qtn/Qtm	300	35	268.144	203.881	-137.273	0	-137.273
2	3.66279	2769.64	Qtn/Qtm	300	35	485.517	369.158	98.7681	0	98.7681
3	3.66279	4302.2	Qtn/Qtm	300	35	682.187	518.695	312.329	0	312.329
4	3.66279	5598.73	Qtn/Qtm	300	35	862.005	655.418	507.589	0	507.589
5	3.66279	6763.1	Qtn/Qtm	300	35	1034.44	786.525	694.83	0	694.83
6	3.66279	7808.72	Qtn/Qtm	300	35	1199.29	911.873	873.845	0	873.845
7	3.66279	8746.58	Qtn/Qtm	300	35	1356.46	1031.37	1044.51	0	1044.51
8	3.66279	9585.83	Qtn/Qtm	300	35	1505.85	1144.96	1206.73	0	1206.73
9	3.66279	10250.1	Qtn/Qtm	300	35	1635.8	1243.76	1347.84	0	1347.84
10	3.66279	10697.2	Qtn/Qtm	300	35	1738.5	1321.85	1459.35	0	1459.35
11	3.66279	11063.9	Qtn/Qtm	300	35	1831.68	1392.7	1560.53	0	1560.53
12	3.66279	11356.2	Qtn/Qtm	300	35	1915.5	1456.43	1651.55	0	1651.55
13	3.66279	11282.3	Qtn/Qtm	300	35	1945.15	1478.98	1683.76	0	1683.76
14	3.66279	10438.1	Qtn/Qtm	300	35	1854.87	1410.33	1585.71	0	1585.71
15	3.66279	9387.68	Qtn/Qtm	300	35	1726.46	1312.7	1446.29	0	1446.29
16	3.66279	8486.54	Qtn/Qtm	300	35	1615.32	1228.2	1325.6	0	1325.6
17	3.66279	7653.19	Qtn/Qtm	300	35	1509.59	1147.8	1210.79	0	1210.79
18	3.8748	7410.15	Bedrock	310	36.5	1477.09	1123.09	1098.83	0	1098.83
19	3.8748	6794.83	Bedrock	310	36.5	1403.96	1067.49	1023.69	0	1023.69
20	3.8748	5841.29	Bedrock	310	36.5	1269.34	965.132	885.36	0	885.36
21	3.8748	4856.65	Bedrock	310	36.5	1123.17	853.992	735.163	0	735.163
22	3.8748	3822.53	Bedrock	310	36.5	961.892	731.366	569.444	0	569.444
23	3.8748	2734.62	Bedrock	310	36.5	784.217	596.272	386.876	0	386.876
24	3.8748	1600.92	Bedrock	310	36.5	591.018	449.375	188.354	0	188.354
25	3.8748	528.426	Bedrock	310	36.5	401.716	305.441	-6.16078	0	-6.16078

Global Minimum Query (janbu corrected) - Safety Factor: 0.737042

Slice Number	Width [ft]	Weight [lbs]	Base Material	Base Cohesion [psf]	Base Friction Angle [degrees]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]
1	3.70499	1264.01	Qtn/Qtm	300	35	265.065	195.364	-149.436	0	-149.436
2	3.70499	3480.53	Qtn/Qtm	300	35	506.239	373.119	104.425	0	104.425
3	3.70499	5292.37	Qtn/Qtm	300	35	730.352	538.3	340.327	0	340.327
4	3.70499	6855.76	Qtn/Qtm	300	35	945.09	696.571	566.363	0	566.363
5	3.70499	8212.25	Qtn/Qtm	300	35	1149.83	847.475	781.875	0	781.875
6	3.70499	9392.01	Qtn/Qtm	300	35	1344.29	990.795	986.557	0	986.557
7	3.70499	10417.8	Qtn/Qtm	300	35	1528.33	1126.44	1180.28	0	1180.28
8	3.70499	11213.6	Qtn/Qtm	300	35	1689.55	1245.27	1349.99	0	1349.99
9	3.70499	11758	Qtn/Qtm	300	35	1821.85	1342.78	1489.24	0	1489.24
10	3.70499	12190.7	Qtn/Qtm	300	35	1941.67	1431.09	1615.36	0	1615.36
11	3.70499	12517.5	Qtn/Qtm	300	35	2048.57	1509.88	1727.89	0	1727.89
12	3.70499	12391	Qtn/Qtm	300	35	2089.47	1540.03	1770.95	0	1770.95

13	3.70499	11477.7	Qtn/Qtm	300	35	2007.65	1479.72	1684.82	0	1684.82
14	3.70499	10382.1	Qtn/Qtm	300	35	1888.94	1392.23	1559.86	0	1559.86
15	3.70499	9447.19	Qtn/Qtm	300	35	1786.9	1317.02	1452.45	0	1452.45
16	3.41865	7916.27	Bedrock	310	36.5	1741.26	1283.38	1315.45	0	1315.45
17	3.41865	7327.85	Bedrock	310	36.5	1670.39	1231.15	1244.86	0	1244.86
18	3.41865	6809.38	Bedrock	310	36.5	1608.14	1185.27	1182.86	0	1182.86
19	3.41865	6013.25	Bedrock	310	36.5	1486.11	1095.33	1061.3	0	1061.3
20	3.41865	5171.06	Bedrock	310	36.5	1347.84	993.415	923.582	0	923.582
21	3.41865	4295.27	Bedrock	310	36.5	1195.26	880.957	771.604	0	771.604
22	3.41865	3374.48	Bedrock	310	36.5	1025.39	755.753	602.4	0	602.4
23	3.41865	2409.96	Bedrock	310	36.5	837.738	617.448	415.493	0	415.493
24	3.41865	1415.74	Bedrock	310	36.5	634.634	467.752	213.19	0	213.19
25	3.41865	472.655	Bedrock	310	36.5	433.815	319.74	13.1629	0	13.1629

Global Minimum Query (spencer) - Safety Factor: 0.769591

Slice Number	Width [ft]	Weight [lbs]	Base Material	Base Cohesion [psf]	Base Friction Angle [degrees]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]
1	4.61332	1437.86	Qtn/Qtm	300	35	463.82	356.952	81.3355	0	81.3355
2	4.61332	3570.77	Qtn/Qtm	300	35	570.185	438.809	198.24	0	198.24
3	4.61332	4952.72	Qtn/Qtm	300	35	654.533	503.723	290.946	0	290.946
4	4.61332	6293.68	Qtn/Qtm	300	35	745.371	573.631	390.785	0	390.785
5	4.61332	7794.69	Qtn/Qtm	300	35	853.093	656.533	509.182	0	509.182
6	4.61332	9402.93	Qtn/Qtm	300	35	976.771	751.714	645.115	0	645.115
7	4.61332	10833.5	Qtn/Qtm	300	35	1101.69	847.854	782.417	0	782.417
8	4.61332	11927.6	Qtn/Qtm	300	35	1217.4	936.9	909.587	0	909.587
9	4.61332	12906.2	Qtn/Qtm	300	35	1335.69	1027.93	1039.6	0	1039.6
10	4.61332	13777.4	Qtn/Qtm	300	35	1456.84	1121.17	1172.76	0	1172.76
11	4.61332	14547	Qtn/Qtm	300	35	1581.07	1216.78	1309.3	0	1309.3
12	4.61332	15066.7	Qtn/Qtm	300	35	1696.93	1305.94	1436.63	0	1436.63
13	4.61332	15301.6	Qtn/Qtm	300	35	1799.41	1384.81	1549.27	0	1549.27
14	4.61332	15448.1	Qtn/Qtm	300	35	1902.22	1463.93	1662.26	0	1662.26
15	4.61332	15144.7	Qtn/Qtm	300	35	1972.15	1517.75	1739.13	0	1739.13
16	4.61332	13541.7	Qtn/Qtm	300	35	1921.29	1478.61	1683.23	0	1683.23
17	4.61332	11716.3	Qtn/Qtm	300	35	1836.37	1413.25	1589.88	0	1589.88
18	4.61332	10205.8	Qtn/Qtm	300	35	1769.52	1361.81	1516.43	0	1516.43
19	4.49888	8789.61	Bedrock	310	36.5	1884.33	1450.16	1540.84	0	1540.84
20	4.49888	7825.16	Bedrock	310	36.5	1852.41	1425.6	1507.64	0	1507.64
21	4.49888	6457.4	Bedrock	310	36.5	1750.33	1347.04	1401.48	0	1401.48
22	4.49888	5069.85	Bedrock	310	36.5	1625.11	1250.67	1271.24	0	1271.24
23	4.49888	3623.78	Bedrock	310	36.5	1466.78	1128.82	1106.57	0	1106.57
24	4.49888	2120.44	Bedrock	310	36.5	1270.31	977.617	902.232	0	902.232
25	4.49888	687.674	Bedrock	310	36.5	970.328	746.756	590.243	0	590.243

Interslice Data

Global Minimum Query (bishop simplified) - Safety Factor: 0.760341

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [degrees]
1	180.991	212.722	0	0	0
2	184.654	207.352	-1388.52	0	0
3	188.317	202.364	-1694.5	0	0
4	191.98	197.707	-1218.59	0	0
5	195.642	193.344	-183.219	0	0
6	199.305	189.242	1266.71	0	0
7	202.968	185.377	3009.58	0	0
8	206.631	181.729	4942.48	0	0
9	210.294	178.278	6977.71	0	0
10	213.956	175.011	9011.91	0	0
11	217.619	171.915	10943.8	0	0
12	221.282	168.978	12728.9	0	0
13	224.945	166.191	14330.5	0	0
14	228.607	163.546	15649.4	0	0
15	232.27	161.036	16529.4	0	0
16	235.933	158.653	16974.5	0	0
17	239.596	156.392	17059.7	0	0
18	243.259	154.247	16837.5	0	0
19	247.133	152.101	16099.5	0	0
20	251.008	150.074	15143.4	0	0
21	254.883	148.164	13989.2	0	0
22	258.758	146.366	12684.2	0	0
23	262.633	144.676	11278.8	0	0
24	266.507	143.091	9827.97	0	0
25	270.382	141.609	8390.72	0	0
26	274.257	140.226	0	0	0

Global Minimum Query (janbu corrected) - Safety Factor: 0.737042

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [degrees]
1	184.496	211.384	0	0	0
2	188.201	204.817	-1564.44	0	0
3	191.906	198.964	-1693.55	0	0
4	195.611	193.678	-867.574	0	0
5	199.316	188.857	606.106	0	0
6	203.021	184.43	2493.66	0	0
7	206.726	180.343	4612.44	0	0
8	210.431	176.555	6816.98	0	0
9	214.136	173.034	8959.05	0	0
10	217.841	169.753	10911.6	0	0
11	221.546	166.692	12611.2	0	0
12	225.251	163.833	14007.3	0	0
13	228.956	161.161	14992.7	0	0
14	232.661	158.664	15450.8	0	0
15	236.366	156.33	15417.1	0	0

16	240.071	154.151	14975.9	0	0
17	243.489	152.27	14004.7	0	0
18	246.908	150.509	12799.5	0	0
19	250.326	148.862	11390.4	0	0
20	253.745	147.325	9821.43	0	0
21	257.164	145.894	8141.46	0	0
22	260.582	144.566	6402.87	0	0
23	264.001	143.338	4663.59	0	0
24	267.42	142.207	2986.68	0	0
25	270.838	141.17	1437.77	0	0
26	274.257	140.226	0	0	0

Global Minimum Query (spencer) - Safety Factor: 0.769591

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [degrees]
1	159.725	223.345	0	0	0
2	164.338	217.634	-1182.33	-1587.75	53.3265
3	168.952	212.239	-1506.22	-2022.7	53.3265
4	173.565	207.131	-1320.75	-1773.63	53.3264
5	178.178	202.285	-679.636	-912.681	53.3265
6	182.792	197.682	438.017	588.212	53.3265
7	187.405	193.302	2026.37	2721.21	53.3265
8	192.018	189.132	3974.11	5336.82	53.3265
9	196.632	185.157	6120.71	8219.48	53.3265
10	201.245	181.366	8386.78	11262.6	53.3265
11	205.858	177.75	10696.9	14364.8	53.3264
12	210.472	174.298	12978.4	17428.7	53.3265
13	215.085	171.003	15119.1	20303.3	53.3263
14	219.698	167.858	17006.2	22837.5	53.3264
15	224.312	164.856	18585.5	24958.4	53.3265
16	228.925	161.991	19726.5	26490.7	53.3265
17	233.538	159.258	20159.9	27072.6	53.3264
18	238.152	156.652	19890.8	26711.2	53.3264
19	242.765	154.169	19025.1	25548.7	53.3264
20	247.264	151.862	17137.5	23013.8	53.3263
21	251.763	149.665	14814.6	19894.5	53.3265
22	256.261	147.575	12091.9	16238.1	53.3263
23	260.76	145.588	9045.31	12146.9	53.3264
24	265.259	143.703	5769.27	7747.53	53.3264
25	269.758	141.916	2380.77	3197.13	53.3265
26	274.257	140.226	0	0	0

List Of Coordinates

External Boundary

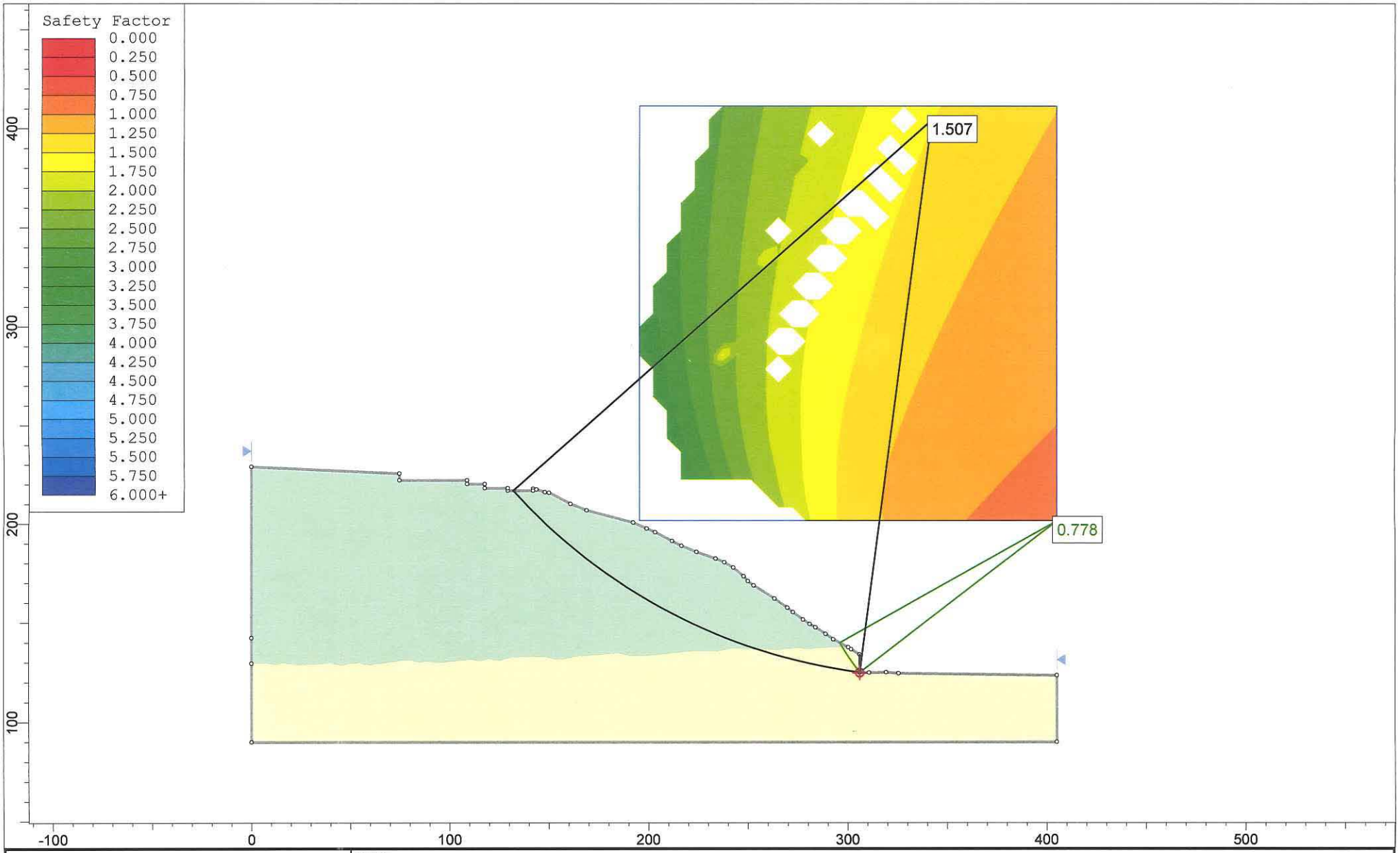
X	Y

362.5	50
362.5	136.88
298.67	136.88
294.554	137.386
286.992	137.386
286.992	140.226
274.257	140.226
269.279	144.698
258.898	154.871
252.489	161.151
248.692	165.032
245.233	167.816
242.364	170.347
239.58	173.385
235.417	177.879
227.346	188.147
224.746	190.434
210.745	199.021
187.827	210.203
181.738	212.362
174.512	215.841
165.627	221.582
163.098	222.744
106.671	232.801
0	233.897
0	170.541
0	149.556
0	50

Material Boundary

X	Y
0	149.556
4.008	149.556
7.606	150.51
10.68	149.866
15.175	149.655
18.365	149.655
20.335	150.5
22.007	150.5
26.812	149.296
38.582	150.891
44.277	150.891
50.048	152.106
53.693	153.701
57.642	152.562
60.755	151.726
66.742	152.345

71.585	152.345
78.001	151.498
79.535	151.498
82.754	152.856
86.931	152.856
91.197	151.591
92.08	151.591
96.993	152.973
100.405	152.973
112.625	153.376
119.904	153.376
124.909	152.484
137.298	152.484
150.111	153.302
152.759	154.217
155.832	154.217
162.435	152.877
164.625	152.877
169.397	153.857
171.326	153.857
174.758	152.713
181.721	152.288
185.741	153.367
188.258	154.446
196.234	154.446
201.007	153.465
204.014	153.465
207.414	153.988
210.78	153.988
215.422	153.203
219.312	153.726
223.594	155.001
226.994	154.282
228.465	153.726
231.439	153.726
234.937	154.903
237.421	154.903
239.709	154.151
242.651	154.151
247.195	154.871
250.562	154.871
258.898	154.871



	Project	#6489 - Green Acres, LLC		
	Analysis Description	Section 7-7' Static Circular Failure		
	Drawn By	Jonathan Gurunathan	Scale 1:800	Company GeoSoils Consultants, Inc
	Date	11/5/2015, 11:18:19 AM		File Name Section 7 Static.slim

SLIDEINTERPRET 6.036

Slide Analysis Information

#6489 - Green Acres, LLC

Project Summary

File Name: Section 7 Static.slim
Slide Modeler Version: 6.036
Project Title: #6489 - Green Acres, LLC
Analysis: Section 7-7' Static Circular Failure
Author: Jonathan Gurunathan
Company: GeoSoils Consultants, Inc
Date Created: 11/5/2015, 11:18:19 AM

General Settings

Units of Measurement: Imperial Units
Time Units: days
Permeability Units: feet/second
Failure Direction: Left to Right
Data Output: Standard
Maximum Material Properties: 20
Maximum Support Properties: 20

Analysis Options

Analysis Methods Used

Bishop simplified
Janbu corrected
Spencer

Number of slices: 25
Tolerance: 0.005
Maximum number of iterations: 50
Check malpha < 0.2: Yes
Initial trial value of FS: 1
Steffensen Iteration: Yes

Groundwater Analysis

Groundwater Method: Water Surfaces
Pore Fluid Unit Weight: 62.4 lbs/ft3
Advanced Groundwater Method: None

Random Numbers

Pseudo-random Seed: 10116

Random Number Generation Method: Park and Miller v.3

Surface Options

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

Material Properties

Property	Bedrock	Qtn/Qtm
Color		
Strength Type	Mohr-Coulomb	Mohr-Coulomb
Unit Weight [lbs/ft3]	130	130
Cohesion [psf]	100	100
Friction Angle [deg]	32.5	34.5
Water Surface	None	None
Ru Value	0	0

Global Minimums

Method: bishop simplified

FS: 0.778197
Center: 405.059, 201.772
Radius: 125.345
Left Slip Surface Endpoint: 295.946, 140.079
Right Slip Surface Endpoint: 305.907, 125.088
Left Slope Intercept: 295.946 140.079
Right Slope Intercept: 305.907 134.118
Resisting Moment=519672 lb-ft
Driving Moment=667789 lb-ft
Total Slice Area=50.0378 ft2

Method: janbu corrected

FS: 0.792608
Center: 405.059, 201.772
Radius: 125.345
Left Slip Surface Endpoint: 295.946, 140.079
Right Slip Surface Endpoint: 305.907, 125.088
Left Slope Intercept: 295.946 140.079
Right Slope Intercept: 305.907 134.118
Resisting Horizontal Force=2381.33 lb
Driving Horizontal Force=3004.42 lb
Total Slice Area=50.0378 ft2

Method: spencer

FS: 0.782102
Center: 405.059, 201.772
Radius: 125.345
Left Slip Surface Endpoint: 295.946, 140.079
Right Slip Surface Endpoint: 305.907, 125.088
Left Slope Intercept: 295.946 140.079
Right Slope Intercept: 305.907 134.118
Resisting Moment=522280 lb-ft
Driving Moment=667789 lb-ft
Resisting Horizontal Force=2350.4 lb
Driving Horizontal Force=3005.23 lb
Total Slice Area=50.0378 ft2

Valid / Invalid Surfaces

Method: bishop simplified

Number of Valid Surfaces: 840
Number of Invalid Surfaces: 121

Error Codes:

Error Code -101 reported for 51 surfaces
Error Code -103 reported for 31 surfaces
Error Code -106 reported for 21 surfaces
Error Code -114 reported for 18 surfaces

Method: janbu corrected

Number of Valid Surfaces: 838
Number of Invalid Surfaces: 123

Error Codes:

Error Code -101 reported for 51 surfaces
Error Code -103 reported for 31 surfaces
Error Code -106 reported for 21 surfaces
Error Code -108 reported for 2 surfaces
Error Code -114 reported for 18 surfaces

Method: spencer

Number of Valid Surfaces: 838
Number of Invalid Surfaces: 123

Error Codes:

Error Code -101 reported for 51 surfaces
Error Code -103 reported for 31 surfaces
Error Code -106 reported for 21 surfaces
Error Code -108 reported for 2 surfaces
Error Code -114 reported for 18 surfaces

Error Codes

The following errors were encountered during the computation:

-101 = Only one (or zero) surface / slope intersections.
-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.
-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).
-114 = Surface with Reverse Curvature.

Slice Data

Global Minimum Query (bishop simplified) - Safety Factor: 0.778197

Slice Number	Width [ft]	Weight [lbs]	Base Material	Base Cohesion [psf]	Base Friction Angle [degrees]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]
1	0.349125	9.65335	Qtn/Qtm	100	34.5	60.0636	46.7413	-77.4919	0	-77.4919
2	0.349125	28.7804	Qtn/Qtm	100	34.5	79.6925	62.0165	-55.2664	0	-55.2664
3	0.349125	47.5531	Qtn/Qtm	100	34.5	99.2539	77.2391	-33.1173	0	-33.1173
4	0.349125	65.9816	Qtn/Qtm	100	34.5	118.744	92.4064	-11.0487	0	-11.0487
5	0.407815	99.951	Bedrock	100	32.5	139.424	108.5	13.3417	0	13.3417
6	0.407815	124.122	Bedrock	100	32.5	161.292	125.517	40.0532	0	40.0532
7	0.407815	147.792	Bedrock	100	32.5	183.041	142.442	66.6207	0	66.6207
8	0.407815	170.975	Bedrock	100	32.5	204.669	159.273	93.0398	0	93.0398
9	0.407815	193.685	Bedrock	100	32.5	226.172	176.007	119.307	0	119.307
10	0.407815	215.936	Bedrock	100	32.5	247.548	192.641	145.418	0	145.418
11	0.407815	237.741	Bedrock	100	32.5	268.793	209.174	171.369	0	171.369
12	0.407815	257.731	Bedrock	100	32.5	288.667	224.64	195.645	0	195.645
13	0.407815	276.029	Bedrock	100	32.5	307.241	239.094	218.334	0	218.334
14	0.407815	293.915	Bedrock	100	32.5	325.645	253.416	240.815	0	240.815
15	0.407815	311.474	Bedrock	100	32.5	343.945	267.657	263.168	0	263.168
16	0.407815	329.04	Bedrock	100	32.5	362.44	282.05	285.76	0	285.76
17	0.407815	346.284	Bedrock	100	32.5	380.823	296.355	308.216	0	308.216
18	0.407815	363.158	Bedrock	100	32.5	399.039	310.531	330.468	0	330.468
19	0.407815	379.668	Bedrock	100	32.5	417.087	324.576	352.513	0	352.513
20	0.407815	395.825	Bedrock	100	32.5	434.966	338.489	374.353	0	374.353
21	0.407815	411.635	Bedrock	100	32.5	452.675	352.27	395.984	0	395.984
22	0.407815	427.106	Bedrock	100	32.5	470.213	365.918	417.408	0	417.408
23	0.407815	442.247	Bedrock	100	32.5	487.581	379.434	438.624	0	438.624
24	0.407815	457.063	Bedrock	100	32.5	504.778	392.817	459.63	0	459.63
25	0.407815	471.563	Bedrock	100	32.5	521.804	406.066	480.428	0	480.428

Global Minimum Query (janbu corrected) - Safety Factor: 0.792608

Slice Number	Width [ft]	Weight [lbs]	Base Material	Base Cohesion [psf]	Base Friction Angle [degrees]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]

1	0.349125	9.65335	Qtn/Qtm	100	34.5	59.0095	46.7714	-77.448	0	-77.448
2	0.349125	28.7804	Qtn/Qtm	100	34.5	78.2938	62.0563	-55.2085	0	-55.2085
3	0.349125	47.5531	Qtn/Qtm	100	34.5	97.5115	77.2884	-33.0456	0	-33.0456
4	0.349125	65.9816	Qtn/Qtm	100	34.5	116.659	92.4651	-10.9633	0	-10.9633
5	0.407815	99.951	Bedrock	100	32.5	136.973	108.566	13.4461	0	13.4461
6	0.407815	124.122	Bedrock	100	32.5	158.456	125.593	40.1732	0	40.1732
7	0.407815	147.792	Bedrock	100	32.5	179.822	142.528	66.7559	0	66.7559
8	0.407815	170.975	Bedrock	100	32.5	201.069	159.369	93.1902	0	93.1902
9	0.407815	193.685	Bedrock	100	32.5	222.193	176.112	119.472	0	119.472
10	0.407815	215.936	Bedrock	100	32.5	243.192	192.756	145.597	0	145.597
11	0.407815	237.741	Bedrock	100	32.5	264.062	209.298	171.563	0	171.563
12	0.407815	257.731	Bedrock	100	32.5	283.585	224.772	195.853	0	195.853
13	0.407815	276.029	Bedrock	100	32.5	301.831	239.234	218.553	0	218.553
14	0.407815	293.915	Bedrock	100	32.5	319.91	253.563	241.046	0	241.046
15	0.407815	311.474	Bedrock	100	32.5	337.887	267.812	263.411	0	263.411
16	0.407815	329.04	Bedrock	100	32.5	356.055	282.212	286.015	0	286.015
17	0.407815	346.284	Bedrock	100	32.5	374.113	296.525	308.483	0	308.483
18	0.407815	363.158	Bedrock	100	32.5	392.006	310.707	330.744	0	330.744
19	0.407815	379.668	Bedrock	100	32.5	409.735	324.759	352.801	0	352.801
20	0.407815	395.825	Bedrock	100	32.5	427.297	338.679	374.651	0	374.651
21	0.407815	411.635	Bedrock	100	32.5	444.693	352.467	396.293	0	396.293
22	0.407815	427.106	Bedrock	100	32.5	461.921	366.122	417.727	0	417.727
23	0.407815	442.247	Bedrock	100	32.5	478.981	379.644	438.953	0	438.953
24	0.407815	457.063	Bedrock	100	32.5	495.873	393.033	459.97	0	459.97
25	0.407815	471.563	Bedrock	100	32.5	512.596	406.288	480.777	0	480.777

Global Minimum Query (spencer) - Safety Factor: 0.782102

Slice Number	Width [ft]	Weight [lbs]	Base Material	Base Cohesion [psf]	Base Friction Angle [degrees]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]
1	0.349125	9.65335	Qtn/Qtm	100	34.5	98.0234	76.6643	-33.9537	0	-33.9537
2	0.349125	28.7804	Qtn/Qtm	100	34.5	113.734	88.9518	-16.0752	0	-16.0752
3	0.349125	47.5531	Qtn/Qtm	100	34.5	129.528	101.304	1.89775	0	1.89775
4	0.349125	65.9816	Qtn/Qtm	100	34.5	145.399	113.717	19.9582	0	19.9582
5	0.407815	99.951	Bedrock	100	32.5	161.336	126.181	41.0962	0	41.0962
6	0.407815	124.122	Bedrock	100	32.5	178.942	139.951	62.7109	0	62.7109
7	0.407815	147.792	Bedrock	100	32.5	196.624	153.78	84.4179	0	84.4179
8	0.407815	170.975	Bedrock	100	32.5	214.373	167.662	106.208	0	106.208
9	0.407815	193.685	Bedrock	100	32.5	232.183	181.591	128.072	0	128.072
10	0.407815	215.936	Bedrock	100	32.5	250.046	195.561	150.001	0	150.001
11	0.407815	237.741	Bedrock	100	32.5	267.955	209.568	171.987	0	171.987
12	0.407815	257.731	Bedrock	100	32.5	284.893	222.815	192.78	0	192.78
13	0.407815	276.029	Bedrock	100	32.5	300.901	235.335	212.433	0	212.433
14	0.407815	293.915	Bedrock	100	32.5	316.892	247.842	232.066	0	232.066
15	0.407815	311.474	Bedrock	100	32.5	332.918	260.376	251.74	0	251.74
16	0.407815	329.04	Bedrock	100	32.5	349.226	273.13	271.76	0	271.76
17	0.407815	346.284	Bedrock	100	32.5	365.558	285.904	291.811	0	291.811
18	0.407815	363.158	Bedrock	100	32.5	381.865	298.657	311.83	0	311.83

19	0.407815	379.668	Bedrock	100	32.5	398.142	311.388	331.813	0	331.813
20	0.407815	395.825	Bedrock	100	32.5	414.388	324.094	351.757	0	351.757
21	0.407815	411.635	Bedrock	100	32.5	430.596	336.77	371.654	0	371.654
22	0.407815	427.106	Bedrock	100	32.5	446.764	349.415	391.502	0	391.502
23	0.407815	442.247	Bedrock	100	32.5	462.887	362.025	411.298	0	411.298
24	0.407815	457.063	Bedrock	100	32.5	478.964	374.599	431.034	0	431.034
25	0.407815	471.563	Bedrock	100	32.5	487.004	380.887	440.905	0	440.905

Interslice Data

Global Minimum Query (bishop simplified) - Safety Factor: 0.778197

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [degrees]
1	295.946	140.079	0	0	0
2	296.296	139.466	-68.4279	0	0
3	296.645	138.86	-129.611	0	0
4	296.994	138.262	-183.933	0	0
5	297.343	137.672	-231.757	0	0
6	297.751	136.992	-279.326	0	0
7	298.159	136.321	-317.991	0	0
8	298.566	135.659	-348.292	0	0
9	298.974	135.007	-370.746	0	0
10	299.382	134.363	-385.848	0	0
11	299.79	133.728	-394.069	0	0
12	300.198	133.101	-395.861	0	0
13	300.605	132.483	-392.091	0	0
14	301.013	131.872	-383.543	0	0
15	301.421	131.269	-370.582	0	0
16	301.829	130.673	-353.534	0	0
17	302.237	130.084	-332.619	0	0
18	302.644	129.503	-308.143	0	0
19	303.052	128.928	-280.42	0	0
20	303.46	128.361	-249.747	0	0
21	303.868	127.8	-216.412	0	0
22	304.276	127.245	-180.691	0	0
23	304.684	126.697	-142.847	0	0
24	305.091	126.154	-103.135	0	0
25	305.499	125.618	-61.7981	0	0
26	305.907	125.088	0	0	0

Global Minimum Query (janbu corrected) - Safety Factor: 0.792608

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [degrees]
1	295.946	140.079	0	0	0
2	296.296	139.466	-68.3922	0	0
3	296.645	138.86	-129.529	0	0

4	296.994	138.262	-183.793	0	0
5	297.343	137.672	-231.549	0	0
6	297.751	136.992	-279.022	0	0
7	298.159	136.321	-317.576	0	0
8	298.566	135.659	-347.754	0	0
9	298.974	135.007	-370.071	0	0
10	299.382	134.363	-385.024	0	0
11	299.79	133.728	-393.084	0	0
12	300.198	133.101	-394.703	0	0
13	300.605	132.483	-390.748	0	0
14	301.013	131.872	-382.007	0	0
15	301.421	131.269	-368.843	0	0
16	301.829	130.673	-351.583	0	0
17	302.237	130.084	-330.446	0	0
18	302.644	129.503	-305.739	0	0
19	303.052	128.928	-277.776	0	0
20	303.46	128.361	-246.856	0	0
21	303.868	127.8	-213.265	0	0
22	304.276	127.245	-177.279	0	0
23	304.684	126.697	-139.164	0	0
24	305.091	126.154	-99.172	0	0
25	305.499	125.618	-57.5484	0	0
26	305.907	125.088	0	0	0

Global Minimum Query (spencer) - Safety Factor: 0.782102

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [degrees]
1	295.946	140.079	0	0	0
2	296.296	139.466	-55.1658	-31.3172	29.5832
3	296.645	138.86	-104.74	-59.4604	29.5834
4	296.994	138.262	-148.979	-84.5745	29.5833
5	297.343	137.672	-188.13	-106.8	29.5833
6	297.751	136.992	-226.184	-128.403	29.5833
7	298.159	136.321	-257.339	-146.09	29.5834
8	298.566	135.659	-281.955	-160.064	29.5833
9	298.974	135.007	-300.381	-170.524	29.5832
10	299.382	134.363	-312.955	-177.662	29.5832
11	299.79	133.728	-320.003	-181.664	29.5833
12	300.198	133.101	-321.842	-182.708	29.5833
13	300.605	132.483	-319.134	-181.17	29.5833
14	301.013	131.872	-312.486	-177.396	29.5833
15	301.421	131.269	-302.163	-171.536	29.5833
16	301.829	130.673	-288.407	-163.727	29.5833
17	302.237	130.084	-271.372	-154.056	29.5833
18	302.644	129.503	-251.29	-142.656	29.5833
19	303.052	128.928	-228.4	-129.661	29.5833
20	303.46	128.361	-202.934	-115.204	29.5832

21	303.868	127.8	-175.117	-99.4125	29.5832
22	304.276	127.245	-145.165	-82.4093	29.5833
23	304.684	126.697	-113.292	-64.3149	29.5832
24	305.091	126.154	-79.7013	-45.2459	29.5833
25	305.499	125.618	-44.5936	-25.3155	29.5833
26	305.907	125.088	0	0	0

List Of Coordinates

External Boundary

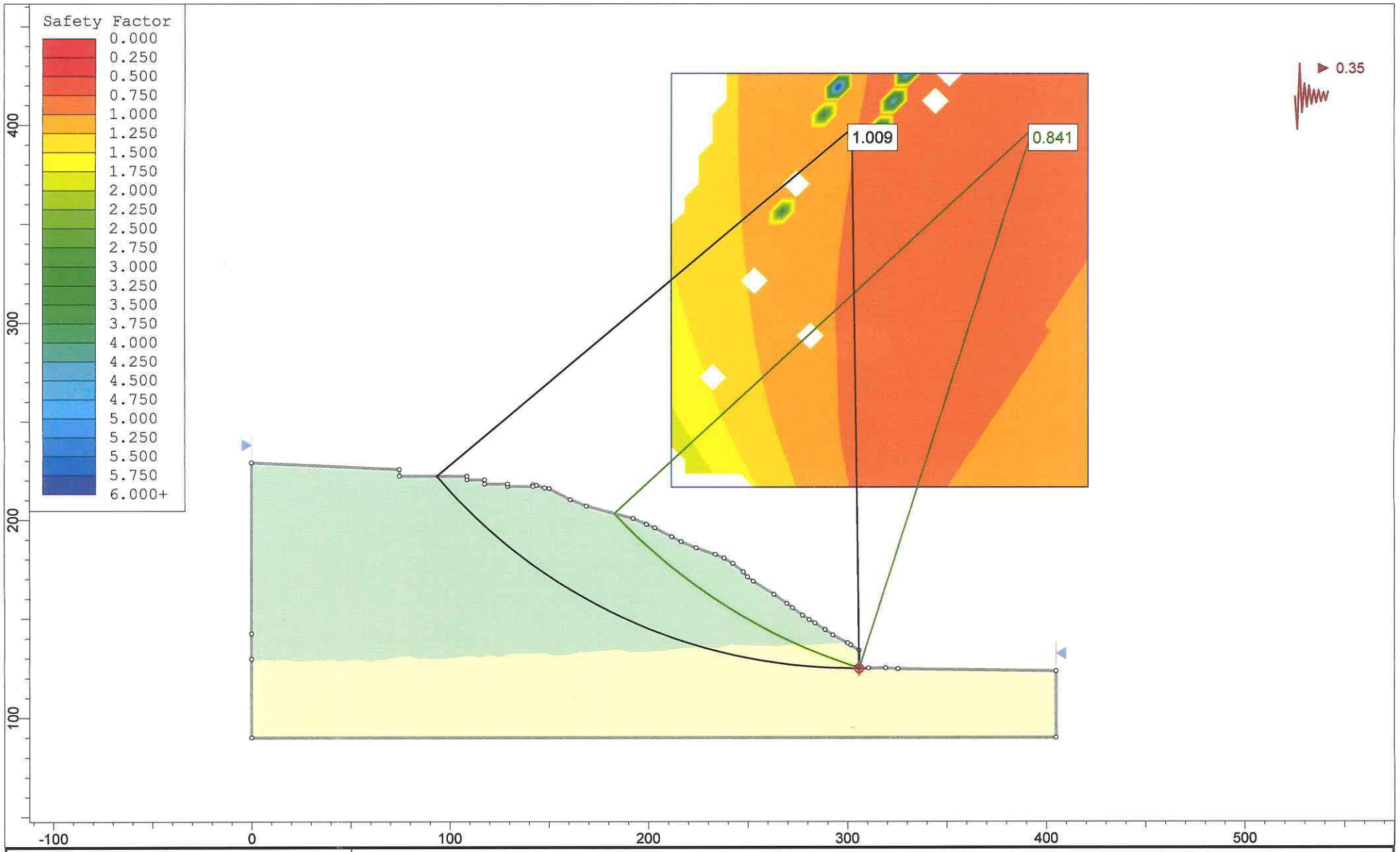
X	Y
405	90
405	123.673
325.408	124.748
319.195	125.218
310.665	125.088
305.907	125.088
305.907	134.118
301.615	136.851
300.189	137.794
292.696	141.83
288.861	144.505
283.74	147.835
280.914	149.45
277.534	151.72
272.472	155.458
269.632	157.726
263.165	162.263
252.721	168.923
249.87	171.118
247.776	173.641
242.503	178.005
238.063	180.654
233.673	182.572
224.138	185.887
216.577	189.02
211.832	191.473
203.294	195.968
199.049	197.808
192.305	200.805
168.895	207.026
160.789	210.296
150.04	215.955
147.892	216.235
143.653	217.623
141.988	217.926

141.988	217.017
129.19	217.017
129.19	218.237
117.637	218.237
117.637	220.321
108.716	220.321
108.716	222.209
74.658	222.209
74.658	225.66
0	229.112
0	142.448
0	129.644
0	90

Material Boundary

X	Y
0	129.644
7.938	129.644
12.282	128.742
16.747	129.751
21.868	128.716
24.089	128.716
37.485	129.423
41.749	129.423
45.684	128.313
49.191	129.044
51.285	129.524
54.842	129.524
58.929	128.767
61.578	128.767
76.816	130.911
81.66	130.911
84.536	130.054
86.983	130.054
87.993	130.407
92.357	130.104
93.366	130.104
99.068	130.104
111.657	131.416
114.836	130.735
116.274	130.735
119.68	131.744
120.992	131.744
124.902	130.836
125.76	130.836
131.815	132.602
136.255	132.602

148.566	132.602
153.41	131.643
158.078	131.643
165.924	133.283
170.969	133.283
173.518	133.661
185.905	134.469
190.698	133.384
197.838	133.384
210.553	134.368
222.991	135.68
236.009	135.68
242.997	137.219
246.302	136.865
247.336	136.865
260.455	136.536
263.018	136.298
266.191	136.298
274.638	137.132
277.11	137.132
278.13	136.708
282.398	136.708
286.508	137.208
300.189	137.794



	Project	#6489 - Green Acres, LLC		
	Analysis Description	Section 7-7' Seismic Circular Failure		
	Drawn By	Jonathan Gurunathan	Scale 1:800	Company GeoSoils Consultants, Inc
	Date	11/5/2015, 11:18:19 AM		File Name Section 7 Seismic.slim

SLIDEINTERPRET 6.036

Slide Analysis Information

#6489 - Green Acres, LLC

Project Summary

File Name: Section 7 Seismic.slim
Slide Modeler Version: 6.036
Project Title: #6489 - Green Acres, LLC
Analysis: Section 7-7' Seismic Circular Failure
Author: Jonathan Gurunathan
Company: GeoSoils Consultants, Inc
Date Created: 11/5/2015, 11:18:19 AM

General Settings

Units of Measurement: Imperial Units
Time Units: days
Permeability Units: feet/second
Failure Direction: Left to Right
Data Output: Standard
Maximum Material Properties: 20
Maximum Support Properties: 20

Analysis Options

Analysis Methods Used

Bishop simplified
Janbu corrected
Spencer

Number of slices: 25
Tolerance: 0.005
Maximum number of iterations: 50
Check malpha < 0.2: Yes
Initial trial value of FS: 1
Steffensen Iteration: Yes

Groundwater Analysis

Groundwater Method: Water Surfaces
Pore Fluid Unit Weight: 62.4 lbs/ft3
Advanced Groundwater Method: None

Random Numbers

Pseudo-random Seed: 10116

Random Number Generation Method: Park and Miller v.3

Surface Options

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

Loading

Seismic Load Coefficient (Horizontal): 0.35

Material Properties

Property	Bedrock	Qtn/Qtm
Color		
Strength Type	Mohr-Coulomb	Mohr-Coulomb
Unit Weight [lbs/ft3]	130	130
Cohesion [psf]	310	300
Friction Angle [deg]	36.5	35
Water Surface	None	None
Ru Value	0	0

Global Minimums

Method: bishop simplified

FS: 0.841237
Center: 393.236, 398.387
Radius: 286.912
Left Slip Surface Endpoint: 182.836, 203.321
Right Slip Surface Endpoint: 305.907, 125.088
Left Slope Intercept: 182.836 203.321
Right Slope Intercept: 305.907 134.118
Resisting Moment=4.8408e+007 lb-ft
Driving Moment=5.75438e+007 lb-ft
Total Slice Area=1936.63 ft2

Method: janbu corrected

FS: 0.836218
Center: 365.288, 349.478
Radius: 232.114
Left Slip Surface Endpoint: 185.557, 202.598

Right Slip Surface Endpoint: 305.907, 125.088
Left Slope Intercept: 185.557 202.598
Right Slope Intercept: 305.907 134.118
Resisting Horizontal Force=153357 lb
Driving Horizontal Force=183393 lb
Total Slice Area=2040.33 ft2

Method: spencer

FS: 0.853162
Center: 393.236, 398.387
Radius: 286.912
Left Slip Surface Endpoint: 182.836, 203.321
Right Slip Surface Endpoint: 305.907, 125.088
Left Slope Intercept: 182.836 203.321
Right Slope Intercept: 305.907 134.118
Resisting Moment=4.90942e+007 lb-ft
Driving Moment=5.75438e+007 lb-ft
Resisting Horizontal Force=146991 lb
Driving Horizontal Force=172290 lb
Total Slice Area=1936.63 ft2

Valid / Invalid Surfaces

Method: bishop simplified

Number of Valid Surfaces: 918
Number of Invalid Surfaces: 43

Error Codes:

Error Code -101 reported for 29 surfaces
Error Code -103 reported for 3 surfaces
Error Code -106 reported for 6 surfaces
Error Code -114 reported for 5 surfaces

Method: janbu corrected

Number of Valid Surfaces: 917
Number of Invalid Surfaces: 44

Error Codes:

Error Code -101 reported for 29 surfaces
Error Code -103 reported for 3 surfaces
Error Code -106 reported for 6 surfaces
Error Code -108 reported for 1 surface
Error Code -114 reported for 5 surfaces

Method: spencer

Number of Valid Surfaces: 885
Number of Invalid Surfaces: 76

Error Codes:

Error Code -101 reported for 29 surfaces
Error Code -103 reported for 3 surfaces
Error Code -106 reported for 6 surfaces
Error Code -108 reported for 3 surfaces
Error Code -111 reported for 30 surfaces
Error Code -114 reported for 5 surfaces

Error Codes

The following errors were encountered during the computation:

-101 = Only one (or zero) surface / slope intersections.
-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.
-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
-114 = Surface with Reverse Curvature.

Slice Data

Global Minimum Query (bishop simplified) - Safety Factor: 0.841237

Slice Number	Width [ft]	Weight [lbs]	Base Material	Base Cohesion [psf]	Base Friction Angle [degrees]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]
1	4.83188	1193.96	Qtn/Qtm	300	35	299.981	252.355	-68.044	0	-68.044
2	4.83188	3506.09	Qtn/Qtm	300	35	524.001	440.809	201.096	0	201.096
3	4.83188	5380.6	Qtn/Qtm	300	35	715.125	601.59	430.715	0	430.715
4	4.83188	6876.66	Qtn/Qtm	300	35	876.245	737.13	624.286	0	624.286
5	4.83188	8186.9	Qtn/Qtm	300	35	1024.21	861.6	802.048	0	802.048
6	4.83188	9187.79	Qtn/Qtm	300	35	1145.26	963.437	947.486	0	947.486
7	4.83188	10082.3	Qtn/Qtm	300	35	1258.64	1058.81	1083.7	0	1083.7
8	4.83188	11045	Qtn/Qtm	300	35	1382.1	1162.67	1232.03	0	1232.03
9	4.83188	12076.9	Qtn/Qtm	300	35	1516.1	1275.4	1393.01	0	1393.01
10	4.83188	13162.9	Qtn/Qtm	300	35	1659.33	1395.89	1565.1	0	1565.1
11	4.83188	14155.2	Qtn/Qtm	300	35	1795.71	1510.62	1728.94	0	1728.94
12	4.83188	14776.4	Qtn/Qtm	300	35	1893.56	1592.93	1846.5	0	1846.5
13	4.83188	14765.1	Qtn/Qtm	300	35	1921.15	1616.14	1879.63	0	1879.63
14	4.83188	13947.8	Qtn/Qtm	300	35	1855.15	1560.62	1800.36	0	1800.36
15	4.83188	13017.7	Qtn/Qtm	300	35	1772.98	1491.5	1701.64	0	1701.64
16	4.83188	12703.4	Qtn/Qtm	300	35	1760.99	1481.41	1687.23	0	1687.23
17	4.83188	12343.9	Qtn/Qtm	300	35	1742.4	1465.77	1664.9	0	1664.9
18	4.83188	11769.3	Qtn/Qtm	300	35	1696.22	1426.92	1609.41	0	1609.41
19	4.83188	10947.2	Qtn/Qtm	300	35	1617.34	1360.57	1514.65	0	1514.65
20	5.21082	10828.8	Bedrock	310	36.5	1582.37	1331.15	1380	0	1380
21	5.21082	10043.8	Bedrock	310	36.5	1509.28	1269.66	1296.91	0	1296.91
22	5.21082	9249.61	Bedrock	310	36.5	1432.26	1204.87	1209.35	0	1209.35
23	5.21082	8269.52	Bedrock	310	36.5	1328.82	1117.85	1091.75	0	1091.75

24	5.21082	7585.02	Bedrock	310	36.5	1260.01	1059.97	1013.52	0	1013.52
25	5.21082	6659.56	Bedrock	310	36.5	1157.26	973.532	896.711	0	896.711

Global Minimum Query (janbu corrected) - Safety Factor: 0.836218

Slice Number	Width [ft]	Weight [lbs]	Base Material	Base Cohesion [psf]	Base Friction Angle [degrees]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]
1	4.80901	1380.85	Qtn/Qtm	300	35	295.714	247.281	-75.2901	0	-75.2901
2	4.80901	3937.04	Qtn/Qtm	300	35	532.001	444.869	206.895	0	206.895
3	4.80901	5887.13	Qtn/Qtm	300	35	726.105	607.182	438.701	0	438.701
4	4.80901	7612.38	Qtn/Qtm	300	35	908.498	759.702	656.522	0	656.522
5	4.80901	8975.64	Qtn/Qtm	300	35	1063.9	889.65	842.107	0	842.107
6	4.80901	10117.7	Qtn/Qtm	300	35	1203.33	1006.25	1008.63	0	1008.63
7	4.80901	11180.2	Qtn/Qtm	300	35	1339.45	1120.07	1171.19	0	1171.19
8	4.80901	12339	Qtn/Qtm	300	35	1489.81	1245.8	1350.75	0	1350.75
9	4.80901	13496.1	Qtn/Qtm	300	35	1644.65	1375.29	1535.68	0	1535.68
10	4.80901	14636.6	Qtn/Qtm	300	35	1802.38	1507.18	1724.03	0	1724.03
11	4.80901	15528.3	Qtn/Qtm	300	35	1937.23	1619.95	1885.09	0	1885.09
12	4.80901	15890.7	Qtn/Qtm	300	35	2016.15	1685.94	1979.32	0	1979.32
13	4.80901	15504.9	Qtn/Qtm	300	35	2010.66	1681.35	1972.77	0	1972.77
14	4.80901	14398.1	Qtn/Qtm	300	35	1919.2	1604.87	1863.55	0	1863.55
15	4.80901	13868.8	Qtn/Qtm	300	35	1891.46	1581.67	1830.41	0	1830.41
16	4.80901	13525	Qtn/Qtm	300	35	1883.79	1575.26	1821.26	0	1821.26
17	4.80901	13021.9	Qtn/Qtm	300	35	1855.07	1551.24	1786.95	0	1786.95
18	4.80901	12275.8	Qtn/Qtm	300	35	1793.84	1500.04	1713.84	0	1713.84
19	4.82685	11344.6	Bedrock	310	36.5	1764.15	1475.21	1574.7	0	1574.7
20	4.82685	10437.3	Bedrock	310	36.5	1673.43	1399.35	1472.17	0	1472.17
21	4.82685	9728.9	Bedrock	310	36.5	1605.86	1342.85	1395.82	0	1395.82
22	4.82685	8850.69	Bedrock	310	36.5	1511.63	1264.05	1289.33	0	1289.33
23	4.82685	7901.35	Bedrock	310	36.5	1403.44	1173.58	1167.06	0	1167.06
24	4.82685	7190.71	Bedrock	310	36.5	1325.31	1108.25	1078.77	0	1078.77
25	4.82685	6212.73	Bedrock	310	36.5	1204.91	1007.57	942.712	0	942.712

Global Minimum Query (spencer) - Safety Factor: 0.853162

Slice Number	Width [ft]	Weight [lbs]	Base Material	Base Cohesion [psf]	Base Friction Angle [degrees]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]
1	4.83188	1193.96	Qtn/Qtm	300	35	439.833	375.249	107.466	0	107.466
2	4.83188	3506.09	Qtn/Qtm	300	35	551.926	470.882	244.044	0	244.044
3	4.83188	5380.6	Qtn/Qtm	300	35	654.926	558.758	369.544	0	369.544
4	4.83188	6876.66	Qtn/Qtm	300	35	748.979	639	484.142	0	484.142
5	4.83188	8186.9	Qtn/Qtm	300	35	841.559	717.986	596.946	0	596.946
6	4.83188	9187.79	Qtn/Qtm	300	35	925.225	789.367	698.888	0	698.888
7	4.83188	10082.3	Qtn/Qtm	300	35	1009.42	861.199	801.476	0	801.476
8	4.83188	11045	Qtn/Qtm	300	35	1104	941.888	916.711	0	916.711
9	4.83188	12076.9	Qtn/Qtm	300	35	1210.16	1032.46	1046.06	0	1046.06
10	4.83188	13162.9	Qtn/Qtm	300	35	1328.22	1133.19	1189.92	0	1189.92
11	4.83188	14155.2	Qtn/Qtm	300	35	1449.55	1236.7	1337.74	0	1337.74
12	4.83188	14776.4	Qtn/Qtm	300	35	1554.46	1326.21	1465.57	0	1465.57

13	4.83188	14765.1	Qtn/Qtm	300	35	1620.49	1382.54	1546.02	0	1546.02
14	4.83188	13947.8	Qtn/Qtm	300	35	1627.56	1388.57	1554.64	0	1554.64
15	4.83188	13017.7	Qtn/Qtm	300	35	1623.16	1384.82	1549.28	0	1549.28
16	4.83188	12703.4	Qtn/Qtm	300	35	1668.65	1423.63	1604.7	0	1604.7
17	4.83188	12343.9	Qtn/Qtm	300	35	1711.82	1460.46	1657.32	0	1657.32
18	4.83188	11769.3	Qtn/Qtm	300	35	1735.74	1480.87	1686.45	0	1686.45
19	4.83188	10947.2	Qtn/Qtm	300	35	1733.61	1479.05	1683.86	0	1683.86
20	5.21082	10828.8	Bedrock	310	36.5	1888.05	1610.81	1757.94	0	1757.94
21	5.21082	10043.8	Bedrock	310	36.5	1898.57	1619.79	1770.08	0	1770.08
22	5.21082	9249.61	Bedrock	310	36.5	1903.52	1624.01	1775.78	0	1775.78
23	5.21082	8269.52	Bedrock	310	36.5	1877.98	1602.22	1746.34	0	1746.34
24	5.21082	7585.02	Bedrock	310	36.5	1885.21	1608.39	1754.67	0	1754.67
25	5.21082	6659.56	Bedrock	310	36.5	1783.15	1521.32	1637.01	0	1637.01

Interslice Data

Global Minimum Query (bishop simplified) - Safety Factor: 0.841237

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [degrees]
1	182.836	203.321	0	0	0
2	187.668	198.236	-1374.93	0	0
3	192.5	193.39	-1700.56	0	0
4	197.332	188.768	-1275.39	0	0
5	202.164	184.354	-339.265	0	0
6	206.996	180.137	969.1	0	0
7	211.828	176.104	2482.05	0	0
8	216.66	172.247	4120.82	0	0
9	221.491	168.556	5868.41	0	0
10	226.323	165.023	7704.5	0	0
11	231.155	161.641	9601.03	0	0
12	235.987	158.405	11490.7	0	0
13	240.819	155.307	13249.4	0	0
14	245.651	152.344	14722.3	0	0
15	250.483	149.509	15760	0	0
16	255.315	146.799	16376.5	0	0
17	260.146	144.21	16698.1	0	0
18	264.978	141.738	16730.8	0	0
19	269.81	139.38	16465	0	0
20	274.642	137.132	15900.7	0	0
21	279.853	134.829	14639.2	0	0
22	285.064	132.648	13133.4	0	0
23	290.275	130.586	11415.1	0	0
24	295.485	128.64	9522.17	0	0
25	300.696	126.808	7479.95	0	0
26	305.907	125.088	0	0	0

Global Minimum Query (janbu corrected) - Safety Factor: 0.836218

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [degrees]
1	185.557	202.598	0	0	0
2	190.366	196.903	-1417.16	0	0
3	195.175	191.559	-1581.12	0	0
4	199.984	186.532	-928.753	0	0
5	204.793	181.793	325.437	0	0
6	209.602	177.319	1940.05	0	0
7	214.411	173.089	3758.95	0	0
8	219.22	169.087	5693.79	0	0
9	224.029	165.296	7717.71	0	0
10	228.838	161.706	9770.41	0	0
11	233.647	158.304	11789	0	0
12	238.456	155.08	13660.2	0	0
13	243.265	152.026	15233.4	0	0
14	248.074	149.134	16359.5	0	0
15	252.883	146.397	16948.5	0	0
16	257.692	143.808	17127.3	0	0
17	262.501	141.363	16939.3	0	0
18	267.31	139.056	16387.2	0	0
19	272.119	136.883	15480.8	0	0
20	276.946	134.833	13868.5	0	0
21	281.773	132.909	11994.7	0	0
22	286.6	131.109	9891.05	0	0
23	291.426	129.429	7603.58	0	0
24	296.253	127.868	5181.4	0	0
25	301.08	126.421	2638.42	0	0
26	305.907	125.088	0	0	0

Global Minimum Query (spencer) - Safety Factor: 0.853162

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [degrees]
1	182.836	203.321	0	0	0
2	187.668	198.236	-1169.25	-1565.84	53.2504
3	192.5	193.39	-1437	-1924.41	53.2505
4	197.332	188.768	-1022.7	-1369.59	53.2506
5	202.164	184.354	-112.427	-150.561	53.2505
6	206.996	180.137	1188.1	1591.09	53.2505
7	211.828	176.104	2733.73	3660.97	53.2505
8	216.66	172.247	4457.36	5969.24	53.2505
9	221.491	168.556	6351.23	8505.48	53.2505
10	226.323	165.023	8403.05	11253.2	53.2504
11	231.155	161.641	10590.4	14182.5	53.2505
12	235.987	158.405	12842.6	17198.6	53.2504
13	240.819	155.307	15013	20105.3	53.2506
14	245.651	152.344	16901.6	22634.3	53.2504

15	250.483	149.509	18294.6	24499.9	53.2505
16	255.315	146.799	19175	25678.9	53.2505
17	260.146	144.21	19681.3	26356.9	53.2505
18	264.978	141.738	19794.5	26508.5	53.2505
19	269.81	139.38	19470.8	26075	53.2505
20	274.642	137.132	18677.3	25012.4	53.2505
21	279.853	134.829	16639.1	22282.8	53.2504
22	285.064	132.648	14082.8	18859.5	53.2505
23	290.275	130.586	11023.6	14762.6	53.2504
24	295.485	128.64	7490.94	10031.8	53.2506
25	300.696	126.808	3497.27	4683.5	53.2505
26	305.907	125.088	0	0	0

List Of Coordinates

External Boundary

X	Y
405	90
405	123.673
325.408	124.748
319.195	125.218
310.665	125.088
305.907	125.088
305.907	134.118
301.615	136.851
300.189	137.794
292.696	141.83
288.861	144.505
283.74	147.835
280.914	149.45
277.534	151.72
272.472	155.458
269.632	157.726
263.165	162.263
252.721	168.923
249.87	171.118
247.776	173.641
242.503	178.005
238.063	180.654
233.673	182.572
224.138	185.887
216.577	189.02
211.832	191.473
203.294	195.968
199.049	197.808
192.305	200.805

168.895	207.026
160.789	210.296
150.04	215.955
147.892	216.235
143.653	217.623
141.988	217.926
141.988	217.017
129.19	217.017
129.19	218.237
117.637	218.237
117.637	220.321
108.716	220.321
108.716	222.209
74.658	222.209
74.658	225.66
0	229.112
0	142.448
0	129.644
0	90

Material Boundary

X	Y
0	129.644
7.938	129.644
12.282	128.742
16.747	129.751
21.868	128.716
24.089	128.716
37.485	129.423
41.749	129.423
45.684	128.313
49.191	129.044
51.285	129.524
54.842	129.524
58.929	128.767
61.578	128.767
76.816	130.911
81.66	130.911
84.536	130.054
86.983	130.054
87.993	130.407
92.357	130.104
93.366	130.104
99.068	130.104
111.657	131.416
114.836	130.735
116.274	130.735

119.68	131.744
120.992	131.744
124.902	130.836
125.76	130.836
131.815	132.602
136.255	132.602
148.566	132.602
153.41	131.643
158.078	131.643
165.924	133.283
170.969	133.283
173.518	133.661
185.905	134.469
190.698	133.384
197.838	133.384
210.553	134.368
222.991	135.68
236.009	135.68
242.997	137.219
246.302	136.865
247.336	136.865
260.455	136.536
263.018	136.298
266.191	136.298
274.638	137.132
277.11	137.132
278.13	136.708
282.398	136.708
286.508	137.208
300.189	137.794

November 3, 2015
W.O. 6489

APPENDIX B

EQUIVALENT FLUID PRESSURE CALCULATIONS

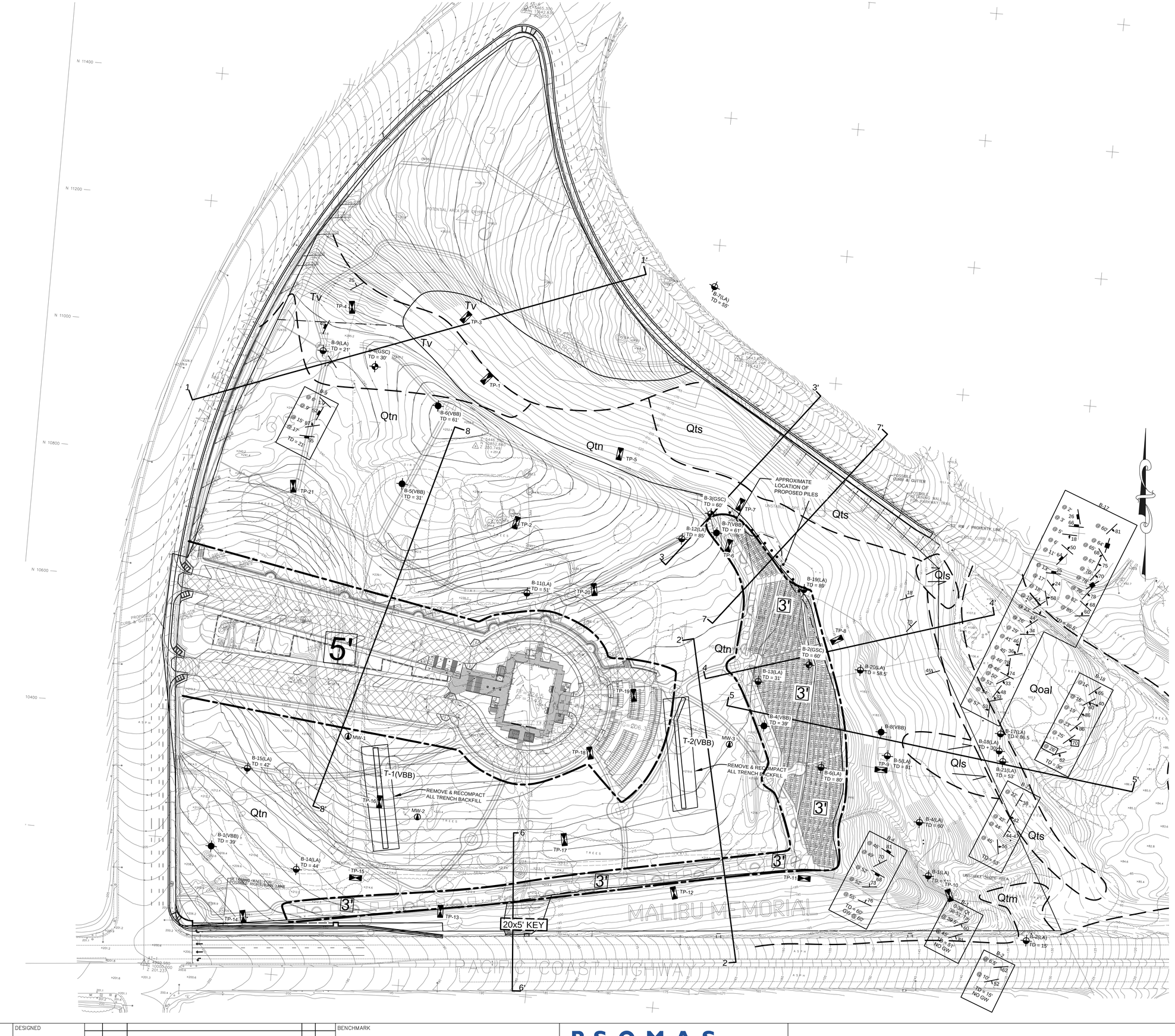
November 3, 2015
W.O. 6489

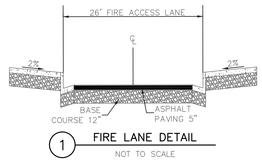
APPENDIX B

EQUIVALENT FLUID PRESSURE CALCULATIONS

The equivalent fluid pressure analyses considers a retained height based on proposed pile locations and slip surfaces determined from factor-of-safety searches included in Appendix A. Resisting forces are found using XStabl and utilized to calculate the equivalent fluid pressure on the piles. All output and calculations are included in this appendix. The table below summarizes the results of this analysis.

Summary of EFP Analysis	
Cross-Section	**EFP (pcf)**
3-3'	36.6
7-7'	38.3





1 FIRE LANE DETAIL
NOT TO SCALE

EXPLANATION

af	ARTIFICIAL FILL
Qal	ALLUVIUM
Qts	STREAM DEPOSITS
Qoal	OLDER ALLUVIUM
Qls	LANDSLIDE
Qtn	NON-MARINE TERRACE DEPOSITS
Qtm	MARINE TERRACE DEPOSITS
Tcv	VAQUEROS FORMATION
Tv	CONEJO VOLCANICS FORMATION
Ts	SESPE FORMATION
	BEDDING ATTITUDE
	JOINT ATTITUDE
	SHEAR ATTITUDE
	"RUPTURE SURFACE" ATTITUDE
	APPROXIMATE GEOLOGIC CONTACT
	APPROXIMATE LOCATION OF RECOMMENDED PILES
6 6'	LINE OF GEOLOGIC SECTION
TP-21	APPROXIMATE LOCATION OF TEST PIT
B-1	APPROXIMATE LOCATION OF BORING BY GEOSOILS CONSULTANTS, INC.
B-1(LA)	APPROXIMATE LOCATION OF BORING BY LEIGHTON AND ASSOCIATES
B-1(VBB)	APPROXIMATE LOCATION OF BORING BY VAN BEVEREN & RUTELO
MW-3	APPROXIMATE LOCATION OF GROUND WATER WELL
T-1	APPROXIMATE LOCATION OF FAULT TRENCH BY VAN BEVEREN & RUTELO
T-8	APPROXIMATE LOCATION OF SEISMIC TRENCH BY LEIGHTON & ASSOCIATES
	APPROXIMATE LOCATION OF SUBDRAIN
	APPROXIMATE LIMITS OF OVER-EXCAVATION
5'	APPROXIMATE DEPTH OF OVER-EXCAVATION
20x5' KEY	RECOMMENDED 20x5' KEY

NOTE:
PRIOR TO THE PLACEMENT OF CONCRETE SLABS, THE SLAB SUBGRADE SOILS SHALL BE PRE-MOISTENED TO AT LEAST 5% OVER THE OPTIMUM MOISTURE CONTENT TO THE DEPTH SPECIFIED BY THE GEOTECHNICAL ENGINEER. THE PRE-MOISTENED SOILS SHOULD BE TESTED AND VERIFIED TO BE BY THE GEOTECHNICAL ENGINEER WITHIN ONE DAY PRIOR TO THE PLACEMENT OF THE MOISTURE BARRIER AND SAND.

GSC GeoSoils Consultants Inc.
6634 Valjean Avenue
Van Nuys, CA 91406

GEOLOGIC MAP
MALIBU MEMORIAL
4000 MALIBU CANYON ROAD
V.T.M. 69653
GREEN ACRES, LLC

WORK ORDER	DATE	SCALE
6489	9/2011	1" = 50'

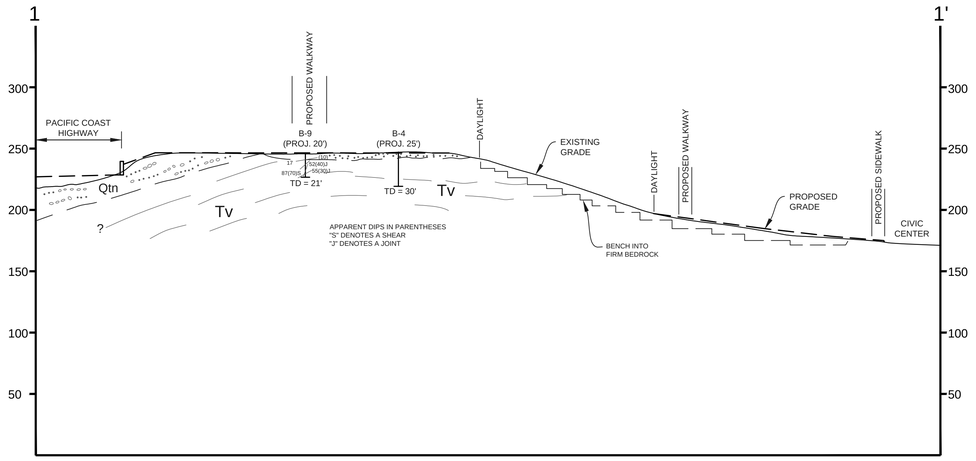
REVISED 11/15 — PLATE 1

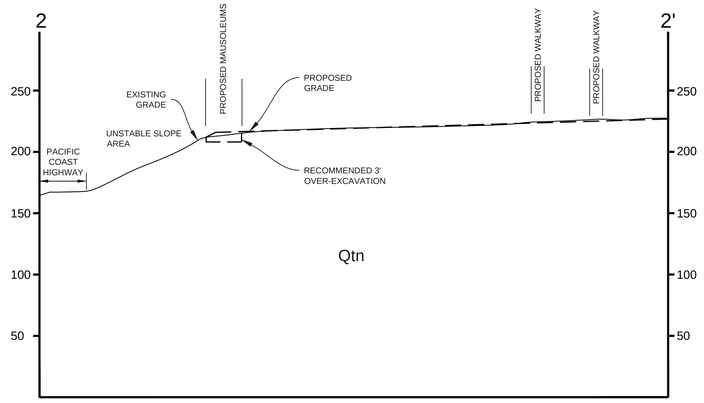
DESIGNED							BENCHMARK
DRAFTED							
CHECKED							
SEAL	REV	DATE	DESCRIPTION	BY	APP'D	ELEV.	ADJUSTMENT

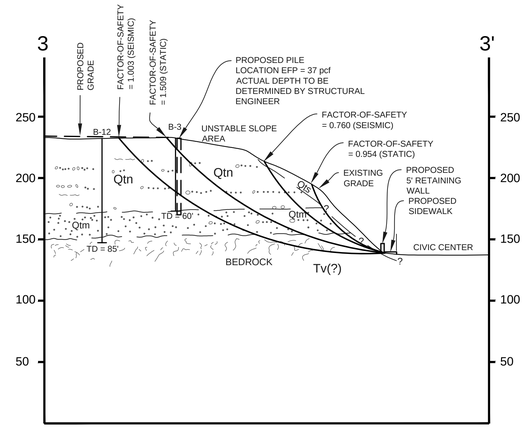
PSOMAS
555 South Flower Street, Suite 4400
Los Angeles, CA 90071
(213) 223-1400 (213) 223-1444 fax
www.psomas.com

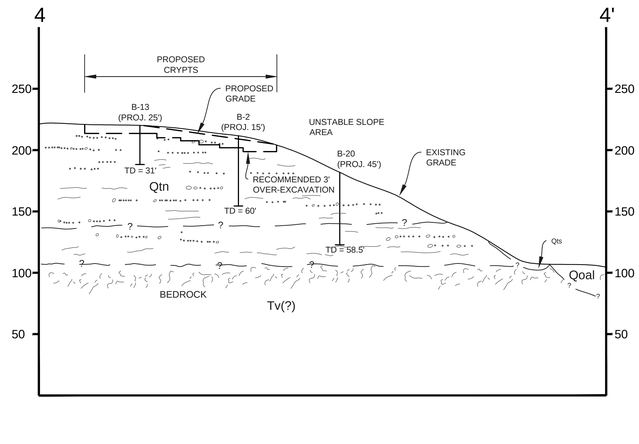
DATE:
SCALE:
PROJECT NUMBER:
SHEET
OF

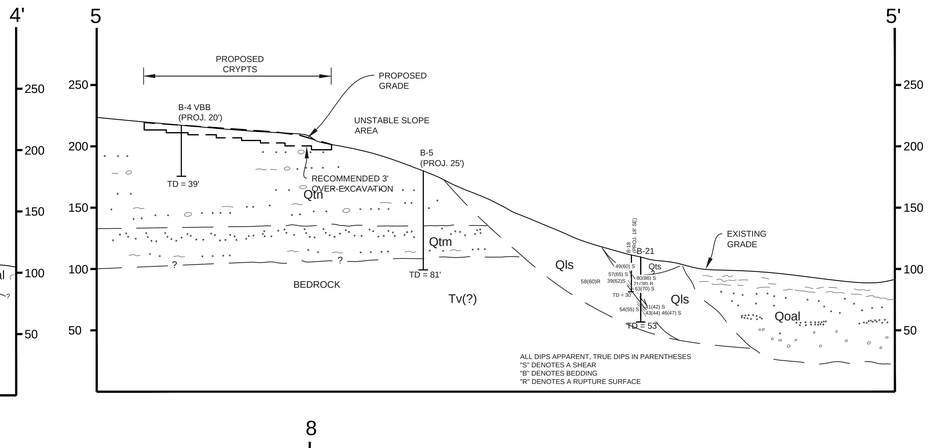
X:\001 w-o\gis-cad\6489\incoming\11-4-15\C-GRAD-CEMETERY_temp.dwg, 11/9/2015 1:32:02 PM, ARCH full bleed E (36.00 x 48.00 Inches)

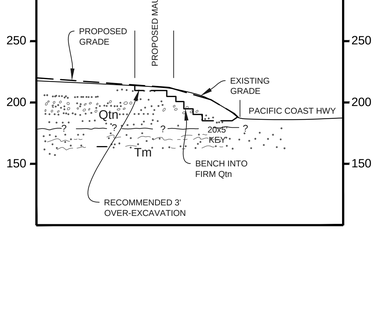


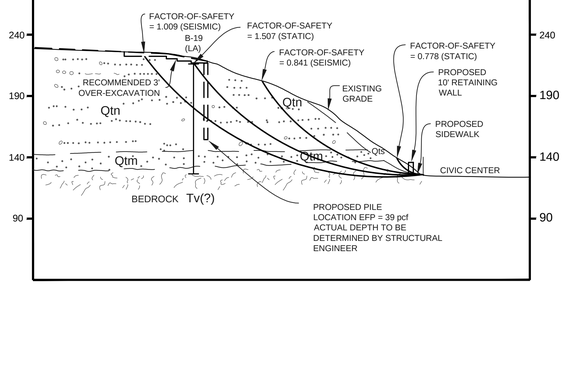


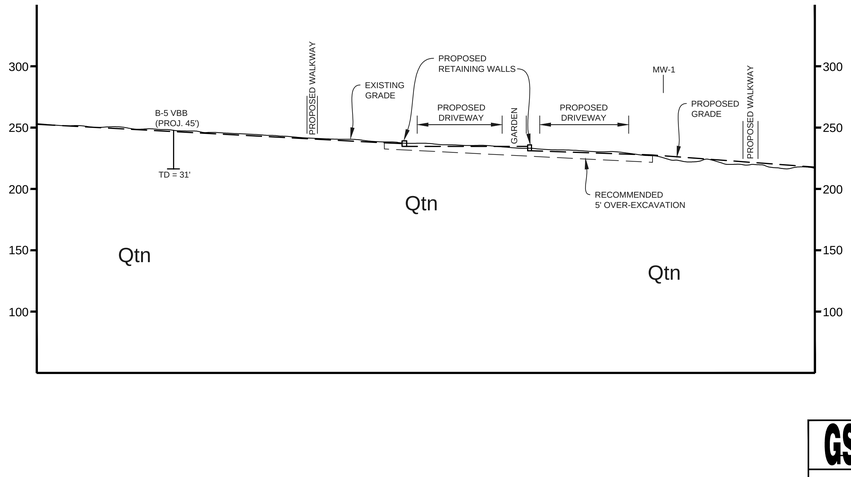












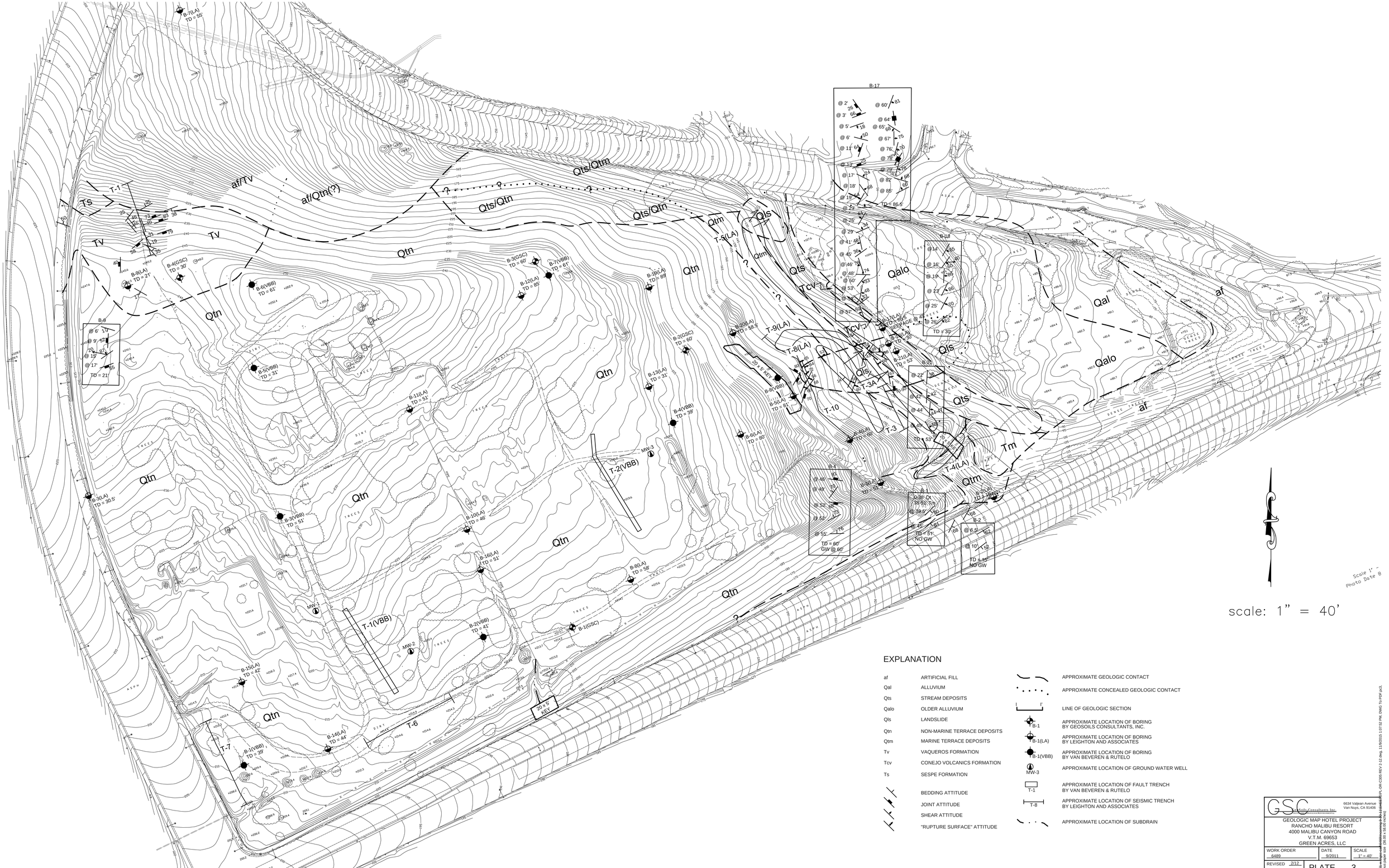
GSC GeoSoils Consultants Inc.
6634 Valjean Avenue
Van Nuys, CA 91406

GEOLOGIC CROSS-SECTIONS
MALIBU MEMORIAL
4000 MALIBU CANYON ROAD
V.T.M. 69653
GREEN ACRES, LLC

WORK ORDER	DATE	SCALE
6489	11/2015	1" = 50'

REVISED

PLATE 2



scale: 1" = 40'

Scale 1" = 40'
Photo Date 8

EXPLANATION

af	ARTIFICIAL FILL
Qal	ALLUVIUM
Qts	STREAM DEPOSITS
Qalo	OLDER ALLUVIUM
Qls	LANDSLIDE
Qtn	NON-MARINE TERRACE DEPOSITS
Qtm	MARINE TERRACE DEPOSITS
Tv	VAQUEROS FORMATION
Tcv	CONEJO VOLCANICS FORMATION
Ts	SESPE FORMATION
	BEDDING ATTITUDE
	JOINT ATTITUDE
	SHEAR ATTITUDE
	"RUPTURE SURFACE" ATTITUDE

	APPROXIMATE GEOLOGIC CONTACT
	APPROXIMATE CONCEALED GEOLOGIC CONTACT
I'	LINE OF GEOLOGIC SECTION
B-1	APPROXIMATE LOCATION OF BORING BY GEOSOILS CONSULTANTS, INC.
B-1(LA)	APPROXIMATE LOCATION OF BORING BY LEIGHTON AND ASSOCIATES
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T-8	APPROXIMATE LOCATION OF SEISMIC TRENCH BY LEIGHTON AND ASSOCIATES
	APPROXIMATE LOCATION OF SUBDRAIN

GSC Geotechnical Consultants Inc.
6634 Valjean Avenue
Van Nuys, CA 91406

GEOLOGIC MAP HOTEL PROJECT
RANCHO MALIBU RESORT
4000 MALIBU CANYON ROAD
V.T.M. 69653
GREEN ACRES, LLC

WORK ORDER	DATE	SCALE
6489	9/2011	1" = 40'
REVISED 2/12	PLATE 3	

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