GEOLOGIC AND SOILS ENGINEERING EXPLORATION UPDATE

Emergency Slope Remediation

Lot 7, Tract 26458

3929 Malibu Vista Drive

Malibu, Los Angeles County, California

for

Ms. Roit and Ms. Rickley

SG 7430-W **March 24, 2016**

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INTRODUCTION

The following report summarizes the findings of our geologic and soil engineering exploration update performed on a portion of the site. The purpose of this report is to evaluate the nature, distribution, engineering properties, and geologic structure of the earth materials underlying the site with respect to future emergency slope remediation.

Intent

It is the intent of this report to aid in the design and completion of the proposed project. Implementation of the "Conclusions and Recommendations" section of this report is intended to reduce certain risks associated with construction projects. The professional opinions and geotechnical advice contained in this report are subject to the general conditions described in the "Notice" section of this report.

EXPLORATION

The scope of this exploration is limited to the area of the proposed emergency slope remediation, as shown on the enclosed Geologic Map and Cross Section. Additional subsurface field

exploration was performed by the undersigned on March 10 and 11, 2016, utilizing a bucketauger drill rig. A 24-inch diameter 51-foot boring was drilled in the rear yard and downhole logged by the undersigned geologist (sampling performed by the geotechnical engineer) to determine the depth to bedrock and to obtain samples of the earth materials for laboratory testing. Office tasks included review of the referenced records and the preparation of this report. Procedures and results of the referenced and recent laboratory testing are presented in Appendix I, which contains a discussion of the testing procedures and results. Surface geologic conditions are shown on the enclosed Geologic Map. Subsurface distribution of the earth materials, and the proposed project are shown on the enclosed Sections.

PROPOSED PROJECT

Ongoing topographic comparisons made by the land surveyor indicate that the adjoining southerly property (18460 Coastline) has experienced movement for years. Recent survey readings indicate that the subject residence is now experiencing movement, therefore, it is proposed to construct an emergency row of soldier piles with a grade beam cap to enhance the existing stability of the level pad and residence. Studies, research, and photographic evidence have confirmed the non-conforming construction and grading (248 cubic yards of cut and cubic yards of fill) on the southerly property, including removal of lateral support frm the subject property.

The non-conforming construction includes unpermitted expansion to 18460 Coastline, which was specifically disallowed by DPW (due to its increase in the driving force on the slope face), an unpermitted subterranean pool equipment vault constructed of unreinforced masonry, a series of unpermitted non-conforming railroad-tie retaining walls were utilized to extend the top of the slope

(18460 Coastline) outward by backfilling the walls, and a series of unpermitted railroad tie platform steps backfilled on the descending slope to the lower lot. The leak in the pool equipment resulted in additional infiltration into the fill. The previously demolished pool had been filled allowing water from the pool to infiltrate into the fill and over the slope face. The excessive moisture in the fill (18460 Coastline) has likely included moisture migration laterally onto the subject property. Excessive moisture in the fill result in differential movement. On the adjoining southerly site, there was not an approved drainage plan implemented for the existing unpermitted work. An SWPCP was apparently not properly maintained.

The series of unrepaired slope failures on the southerly property and the subsequent movement, has negatively impacted the subject property. The proposed emergency pile cap is to be designed to act as a grade beam between the recommended soldier piles, further enhancing the stability of the existing subject level pad and residence, and is the most effective means to prevent further movement of the pad and residence. The soldier piles with cap and water feature is required as it will reduce the cost of the stabilization project by decreasing the number and diameter of piles, provides for reasonable use of the area created by the construction of the soldier piles and grade beam cap while increasing stability by providing an axial load on the piles, and prevents infiltration of site irrigation/rainfall into the underlying fill (for footprint area). The proposed construction reduces the surcharge on the underlying earth materials at the top of the slope by not backfilling a retaining wall with compacted fill which is contraindicated.

The proposed project does not intend to and does not address the existing failures located downslope which will likely continue as long as the area is affected by the unpermitted structures, illegal grading, illegal retaining walls, non-permitted drainage, and lack of proper

compaction for fill placed in the rear yard area remains unaddressed (18460 Coastline).

RESEARCH

Research at the Department of Building and Safety was performed in preparation of this report. The following is a summary of information on file:

"Final Compaction Report for Tract 26458," prepared by the Donald R. Warren Company, dated February 6, 1962;

"Geologic report for a deck located at 3925 Malibu Vista Drive," prepared by Mountain Geology, Inc., dated October 2, 1987;

Letter prepared by E. D. Michael, Consulting Geologist, dated February 24, 1993;

"Geotechnical Investigation of Cut Slope Stability, Station No. 214, 18541 Pacific Coast Highway, Malibu, California," prepared by Leighton and Associates, Inc., dated July 6, 1993;

"Memorandum, Estimate on a Tieback Restraint System, prepared by CalTrans, dated October 25, 1996. "Ultimate factor of safety will be increased from the presently assumed value of 1.00 to approximately 1.19 (2 tier tieback) and 1.24 (3 tier tieback) through the wall toe (attachment A-1 to A-11).";

Preliminary Geologic Report for 3929 Malibu Vista Drive, prepared by E. D. Michael, dated December 15, 1996;

"Memorandum, Office of Structural Foundations/Roadway South, "Horizontal Drains", prepared by CalTrans, dated August 12, 1997;

"Active Landslide, Pacific Coast Highway at Topanga Canyon Boulevard," prepared by the County of Los Angeles, dated October 30, 1997;

"Tieback wall at PCH & Topanga Canyon Blvd.," prepared by the State of California, dated April 10, 1998;

"Active Landslide, Pacific Coast Highway & Topanga Canyon Boulevard," prepared by the State of California Department of Transportation, dated April 14, 1998;

"Geotechnical Investigation for Proposed Replacement Residence, Lot 6, Tract 26458," prepared by Hakimian Engineering, dated May 14, 1998. Report concluded that the factors of safety are adequate for the construction of a pile-supported residence;

"Foundation Recommendations & Wall Design," prepared by the State of California, dated September 14, 1998;

"Tieback wall at PCH & Topanga Canyon Blvd.," prepared by the State of California, dated October 6, 1998;

"Slope Review - PCH KP 65.3," prepared by the State of California, dated January 13, 1999. Due to additional bulging at the toe of the slope;

Letter to Ella Khierkhahi of Lockwood-Singh & Associates, prepared by the State of California, dated February 17, 1999;

Letter to Christopher Harris from Orlance Lee (Caltrans), prepared by the State of California, dated March 1, 1999;

"Project Plans for Construction on State Highway in Los Angeles County Near Malibu, Route 1/27 Junction, KP 65.3, PM 40.8, Contract No. 07-181804, prepared by CalTrans, dated March 3, 1999;

Work Plan for Installing and Monitoring Inclinometers and Perform Geologic Review for State Route 1, Topanga Canyon Landslide," prepared by URS Greiner Woodward Clyde, dated July 16, 1999;

"Geotechnical Data report prepared for 3929 Malibu Vista Drive," by URS Greiner Woodward Clyde, dated May 15, 2000;

"Geotechnical Engineering and Geologic Investigation and Report for Existing One-Story Addition, at 3925 Malibu Vista Drive, Los Angeles County, California," prepared by Ralph Stone and Company, Inc., dated September 7, 2007;

Soils Engineering Review Sheet, County of Los Angeles, B.P. P.C. No. 61100057, dated November 29, 2007;

Geologic Review Sheet, County of Los Angeles, B.P. P.C. No. 61100057, dated December 24, 2007;

"Addendum No. 1. Response to County Geologic and Soils Engineering Review Sheets to Geotechnical Engineering and Geologic Investigation and Report for Existing One-Story Addition, at 3925 Malibu Vista Drive, Los Angeles County, California," prepared by Ralph Stone and Company, Inc., dated March 28, 2008;

"Engineering Geologic Exploration Update, Emergency Slope Remediation, Lot 7, Tract 26458, 3929 Malibu Vista Drive, Malibu, Los Angeles County, California," prepared by SGI dated February 10, 2016;

County of Los Angeles Department of Public Works, Geotechnical and Materials Engineering

Division, Geologic and Soils Engineering Review Sheet, PC No. 1602230057, dated March 7, 2016.

The responses to the referenced review letter are contained herein and provided as a separate attachment.

Slope stabilization work performed by CalTrans included installation of a system of rows of tiebacks with walers and 270-foot long horizontal drains at the toe of the offsite cut slope. The tie-backs/walers and dewatering horizontal drains increased the pre-existing factor of safety, however, did not achieve a 1.5 factor of safety. The walers were recently observed and do not have any signs of distress such as cracking or deflection.

SITE DESCRIPTION

The subject property consists of a partially graded lot located west of the southwestern portion of Malibu Vista Drive, in the Coastline area of Malibu, Los Angeles County, California. The site is presently occupied by a single family residence with an attached two-car garage. Past grading associated with construction of the level pad consisted of placing fill as a part of the original tract development. The rear yard slope descends below the level pad and residence at approximately a 1.5 gradient to the gently sloping rear vacant lot. Below the site, the cut slope descends at approximately a 1:1 gradient to Pacific Coast Highway. The cut slope was provided with 4 concrete drainage terraces. Vegetation on the site consists of domestic trees, shrubs, and groundcover. Drainage from the descending rear yard portion of the site flows down the contours over the rear yard slope. Seeps, springs, and groundwater were not encountered during our exploration.

EARTH MATERIALS

Fill

The compacted fill on the level pad was placed in 1961 and 1962 as a part of the development of Tract 26458, under the observation of the Donald R. Warren Company. Fill was encountered to a depth of 17.5 feet in the boring. The fill consists of sandy silt and silty sand with clay binder which is medium brown, slightly dense, moist to wet, and contains occasional rocks.

Alluvial Terrace

The alluvial terrace encountered in the test pits consists of sandy silt and silty sand with clay binder which is medium reddish brown, slightly porous, dense, and contains rounded pebbles and cobbles. The nearly level contact between the alluvial terrace and bedrock was encountered in the recent boring at a depth of 26 feet.

Bedrock

Bedrock underlying the site was described as interbedded Chico Martinez sandstone, siliceous siltstone, shale, and claystone. The bedding planes mapped in the cut slope above the gas station (under construction) generally strike N27W to N69W and dip 23 to 34 degrees to the northeast. The referenced reports describe the bedding planes as dipping northeast. The report prepared by RTF&A dated June 1, 2006 states that the bedding planes within the competent bedrock "generally strike northwest and dip north 50 degrees."

Landslide

The historic landslide located at the toe of the descending cut slopes initially experienced periodic shallow slides. Slope movement eventually encroached from the Station property at the toe

of the cut slope eastward to the adjoining residential properties. The slope reportedly experienced additional movement on July 21, 1971 after the 1971 San Fernando earthquake, causing "slope cracking." Following the 1971 movement, additional movement reportedly occurred in early 1980 following the heavy winter rains of 1977-78. Slide removal was performed in 1980 under the supervision of Robert Stone & Associates for the owner of the gas station. The Leighton report states, "No significant slide movement or further headward encroachment in the upper area, however, appears to have occurred since about 1985." CalTrans performed stabilization in 2000, consisting of a waler/tieback retaining system. The waler/tieback wall consists of 560 linear feet with concrete lagging in seven levels. The reported design resulted in an increase in the factor of safety from the pre-existing 1.0 to the current 1.16 to 1.40. Recent observation of the exposed waler walls during mapping indicates that the walls are free of any signs of distress such as cracking or deflection. The easterly portion of the waler wall is obstructed with debris and could not be observed.

SEISMIC CONDITIONS

General

The Southern California region is located within a tectonically active portion of the earth's crust which has produced both small and sizeable earthquakes throughout recorded history and before. As the earth's crust continuously adjusts itself, stresses and strains are built up along discontinuities, referred to as faults. Faults can be generally classified as active, potentially active, or inactive. Faults are considered active if they have produced seismic activity within the past 11,000 years. Faults are considered potentially active if there has been seismic activity along the fault between 11,000 and 1,000,000 years. Inactive faults have not produced any seismic activity within the past 1,000,000 years. In an effort to better inform the public regarding seismic risk,

the State of California passed the Alquist-Priolo Special Studies Act in 1972 following the 1971 San Fernando Earthquake. Active faults within the state were identified and zones were established limiting construction within the zones.

Following the damaging 1989 Loma Prieta Earthquake, the state enacted the Seismic Hazard Mapping Act (SHMA) in 1990. The Department of Conservation was empowered to prepare a set of maps designating areas within Los Angeles and a portion of Ventura Counties which are susceptible to seismic slope instability and liquefaction. Recently, real estate disclosure laws have been modified to require disclosure if a property is affected by the Alquist-Priolo Earthquake Fault Zoning Act and the Seismic Hazard Mapping Act. As of March 1, 1998, either the Local Option Real Estate Transfer disclosure Statement or The Natural Hazard Disclosure Statement is required for disclosures. The subject property is not located within any special studies zone (Alquist-Priolo Act, 1972) and no known active fault crosses the site. Active and potentially active faults in the vicinity of the subject property are listed in the following Table I. Following the 1994 Northridge Earthquake, the Department of Conservation, Division of Mines and Geology established areas which are considered to be susceptible to seismically-induced slope failure and liquefaction. These seismic safety zones were published as a series of maps, initially released in 1996. Strong ground motion associated with large earthquakes can cause slopes to become unstable and experience slumping, landsliding and/or block failure.

The following table lists known active faults within the southern California area which could theoretically produce a sizable earthquake during the expected occupancy period of the property. UBC categories have been established for active faults in accordance with Table 16-U in the 1997 UBC. Faults within category A exhibit magnitudes greater than or equal to 7.0 and slip rates greater

than or equal to 5mm/year and have a high rate of seismic activity. Category B faults exhibit magnitudes up to magnitude 7.0, but with slip rates less than 5mm/year.

The following fault distances were obtained using GPS Visualizer and EQFault.

Fault	**UBC Category**	**Distance from Site** (miles)	**Maximum Credible Earthquake** (Richter Magnitude)*	**Risk of Earthquake during Occupancy**
San Andreas	A	43.2	8.0	moderate
Newport-Inglewood	B	11.9	6.9	low to moderate
Malibu	B	1.9	6.7	low
Hollywood	B	10.3	6.7	low
Raymond	B	21.3	6.5	low to moderate
Sierra Madre	B	20.8	6.7	moderate
Santa Susana	B	19.8	6.6	low to moderate
Compton Thrust	B	14.9	6.3	low to moderate
Simi-Santa Rosa	B	22.1	6.7	low
Verdugo	B	19.4	6.7	low
Elysian Park Thrust	B	21.0	6.7	moderate
Palos Verdes	B	5.3	7.1	low
Satna Monica	B	2.2	6.8	low
Unknown fault	?	?	?	moderate

Table I - Active Faults within the Los Angeles - Ventura County area

Data obtained from Los Angeles County Seismic Safety Element, 1990; Annual Technical Report, July 1994, Southern California Earthquake Center; Seismic Hazards Study of Ventura County, 1975; and ICBO publication, Maps of Known Active Fault Near-Source Zones, California Division of Mines and Geology, 1998.

HISTORIC EARTHQUAKES

1971 San Fernando Earthquake

On February 9, 1971 a Richter Magnitude 6.4 earthquake occurred along a frontal fault system of the San Gabriel Mountains. In general, one-story buildings performed substantially better than two-story buildings and much better than combination one and two-story buildings. There was no noticeable difference between the performance of concrete-slab floors and wood-joist floors. Considerable damage was experienced by unreinforced masonry structures. Local characteristics of the underlying soils played a significant role in structural performance during the earthquake.

1994 Northridge Earthquake

The subject property is located approximately 15.0 miles southeast of the epicenter of the January 17, 1994 Northridge earthquake which measured 6.7 on the Richter magnitude scale. The subject property experienced strong ground shaking during the earthquake, however no secondary effects caused by the earthquake, such as liquefaction, seismically-induced landsliding or differential settlement were observed at the site.

FUTURE SEISMICITY

All of southern California is subject to periodic ground shaking from earthquake activity. Sites and structures can experience significant damage during strong seismic shaking. Foundation conditions and the seismic/structural design of the structure greatly affect how the structures will perform

during earthquake loading. Significant damage can occur to the site and structures during a strong seismic event. Strong ground shaking can also cause movement of the earth materials on the site which may not be predictable. The principal seismic hazard to the site from a geologic standpoint is strong ground shaking.

Seismic Design

The seismic factors listed in the following table can be used in the structural design. The seismic factors were determined based on the findings of the field exploration and in accordance with 2013 California Building Code and 2014 City of Los Angeles Building Code.

Seismic Factors	Value	Reference
Site Class	D	Chapter 20 of ASCE 7
Mapped Spectral Response Acceleration at 0.2 second Period (Ss)	2.260g	Figure 1613.3.1(1)/ CBC
Mapped Spectral Response Acceleration at 1.0 second Period (S_1)	0.834g	Figure 1613.3.1(2)/ CBC
Site Coefficient Fa	1.0	Table 1613.3.3(1)/CBC
Site Coefficient Fv	1.3	Table 1613.3.3(2)/CBC
Maximum Considered Earthquake Spectral Response Acceleration at 0.2 second Period (Sms)	2.260g	Equation 16-37/CBC
Maximum Considered Earthquake Spectral Response Acceleration at 1.0 second Period (Sm_1)	1.252g	Equation 16-38/CBC
Design Spectral Response Acceleration at 0.2 second Period (Sds)	1.506g	Equation 16-39/CBC
Design Spectral Response Acceleration at 1.0 second Period (Sd_1)	0.834g	Equation 16-40/CBC
Seismic Design Category	D	Chapter 20 of ASCE 7

SLOPE STABILITY

The enclosed stability calculations indicate that the descending slope has a factor of safety of 1.08 to 1.4. Higher factors of safety exist further back from the top of the descending fill slope. A 1.5 Factor of Safety line has been plotted on the enclosed Section B-B'. The factor of safetynear the top of the descending slope will remain less than a 1.5, however, the proposed row of soldier piles will locally enhance the factor of safety for the level pad and residence. It is not feasible to increase the factor of safety for the entire subject property to a 1.5 without the involvement of the adjoining properties. The piles are to be embedded below the 1.5 factor of safety line. This line is located on Cross Section B-B' and is thirty to forty-one feet (30 to 41 feet) below the house pad elevation.

CONCLUSIONS AND RECOMMENDATIONS

Based upon the research, exploration, laboratory testing, and engineering analysis it is the opinion of SGI that construction of the emergency soldier piles/grade beam cap and appurtenant water features and deck is feasible from a geologic and soils engineering standpoint, provided the advice and recommendations contained in this report are included in the plans and are properly implemented during construction.

The recommended bearing material for the row of soldier piles/cap is the competent bedrock, encountered at approximately 26 feet in the Boring. The existing tiebacks with walers and horizontal drains constructed by Caltrans at the lower portion of the descending cut slope have increased the factor of safety, however, the Caltans repair did not attain a 1.5 factor of safety.

Chemical Testing

The existing earth materials are considered to be inert, therefore, chemical testing is not considered to be applicable for the foundation design.

111 Statement

Provided the recommendations in this report are incorporated into design and implemented during construction, the proposed row of soldier piles/cap will be safe from future geologic hazards such as landsliding, settlement, or slippage. The proposed soldier piles with cap will not adversely affect the geologic stability of adjacent properties. The proposed structures are to be properly embedded into competent bedrock and designed for lateral forces above the point of fixity, per the enclosed calculations.

The regional landslides have been previously shown and described in the referenced reports and are shown on the enclosed Geologic Map. The intent of the recommendations contained in this report is not to stabilize the landslides, as they are remote to the proposed development. The intent of this report is to increase the stability of the graded level pad and residence with the proposed piles/structures.

Soldier Piles

The proposed row of soldier piles should be placed below the "1.5 Factor of Safety Line" as shown on Geologic Cross Section B-B'. The minimum recommended soldier pile diameter is 36 inch. All soldier piles should extend below the "1.5 Factor of Safety Line" a minimum of 20 feet. The vertical capacity of the soldier piles should be based upon a skin friction value of seven hundred pounds per square foot (700 psf) per foot of shaft extending into bedrock below the "1.5 Factor of Safety Line."

The soldier piles must be tied in one direction with a grade beam ("pile cap"). Soldier piles shall be designed to resist a creep force of 1,000 per foot of depth above the 1.5 factor of safety line. Soldier piles shall be placed under the continuous review of the project Geologist/Geotechnical Engineer.

Lateral Load Design

Lateral loads may be resisted by passive resistance within the bedrock located below the "1.5 Factor of Safety Line". The passive resistance may be assumed to act as a fluid with a density of seven hundred pounds per cubic foot (700 pcf). The maximum earth pressure that may be used is eight thousand pounds per square foot (8,000 psf). Pile foundations are considered isolated when separated by a distance equal to three pile diameters. The allowable passive earth pressure may be doubled where piles are spaced more than 3 diameters on center.

Proposed Soldier Pile Cap

The proposed pile cap and appurtenant water feature and deck may be constructed using a free-standing shell design. The pile cap must derive support entirely from the competent bedrock which will require soldier piles. The wall should be designed for an inward pressure of 60 pounds per cubic foot. The pile cap must be supported by the recommended row of soldier piles. The pile cap bottom must be provided with a subdrain system with a 20-mil liner to collect water, to prevent infiltration into the underlying earth materials. The subdrain system must be connected to a sump pump to direct drainage to the street.

Foundation Setback

The Building Code requires that foundations be a sufficient depth to provide a horizontal setback from the descending slope. The required setback is 1/3 the height of the slope with a minimum of

five feet and a maximum of 40 feet from the base of the foundation to the slope face.

Excavation Characteristics

The boring encountered hard to excavate bedrock, which will require coring for the deep foundation excavations.

Foundation Settlement

Settlement of the proposed foundation system is expected to occur on initial application of loading. A settlement of ¼ to ½-inch may be anticipated, however the differential settlement should not exceed ¼-inch.

DRAINAGE

The proposed project drainage must be collected and transferred to the street in non-erosive drainage devices. Drainage must not be allowed to pond on the pad or against any foundation. Drainage must be prevented from flowing over any slope in a concentrated form.

PLAN REVIEW

Formal plans ready for submittal to the Building Department must be reviewed by SGI. Any change in scope of the project may require additional work.

SITE OBSERVATION

It is required that all foundation excavations be observed by the geologist prior to placing forms, concrete, or steel. Should the observations reveal any unforeseen hazard, the geologist will provide

additional recommendations.

CONSTRUCTION SITE MAINTENANCE

It is the responsibility of the contractor to maintain a safe construction site per OSHA requirements.

Please call this office with any questions. This report and the exploration are subject to the following NOTICE. Please read the Notice carefully, as it limits our liability.

NOTICE

In the event of any changes in the design or location of any structure, as outlined in this report, the conclusions and recommendations contained herein may not be considered valid unless the changes are reviewed by us and the conclusions and recommendations are modified or reaffirmed after such review. The subsurface conditions, excavation characteristics, and geologic structure described herein and shown on the enclosed cross section have been projected from excavations on the site as indicated and should in no way be construed to reflect any variations that may occur between these excavations or that may result from changes in subsurface conditions. Fluctuations in the level of groundwater may occur due to variations in rainfall, temperature, irrigation, and other factors not evident at the time of the measurements reported herein. Fluctuations also may occur across the site. High groundwater levels can be extremely hazardous. Saturation of earth materials can cause subsidence or slippage of the site.

If conditions encountered during construction appear to differ from those disclosed herein, notify us immediately so we may consider the need for modifications. Compliance with the design concepts, specifications or recommendations during construction requires the review of the engineering geologist engineer during the course of construction. The exploration was performed only on a portion of the site, and cannot be considered as indicative of the portions of the site not explored.

This report is issued and made for the sole use and benefit of the client, is not transferable and is as of the exploration date. Any liability in connection herewith shall not exceed the fee for the exploration. No warranty, expressed or implied, is made or intended in connection with the above exploration or by the furnishing of this report or by any other oral or written statement.

This report was prepared on the basis of the preliminary development plan furnished. Final plans should be reviewed by this office as additional geotechnical work may be required.

Schick Geotechnical, Inc. has reviewed, concurs with, and accepts responsibility for the enclosed laboratory testing and slope stability analyses.

Respectfully submitted,

Wayne Schick
C.E.G. 1300

Gary C. Masterman
R.G.E. 567

Enc:
Appendix I - Laboratory Testing
Slope Stability Analyses
Boring Log
Pocket: Geologic Map and Section B

xc: (3) Addressee

EXPLORATION LOG

PROJECT NAME:	Schick - Roit & Rickley	EXCAVATION:	B 01
PROJECT NUMBER:	4624CA-0216	EXPLORATION EQUIPMENT:	Limited Access Drill Rig
LOGGED BY: GCM & JWS	DATE: 3/10&11/16	ELEVATION: 100.00	TOTAL DEPTH: 51'
COMMENTS:	Back yard area, 6' s/o & 9.5' e/e SEC of residence		

Depth (ft.)	Sample: Bulk	Sample: Ring	Sample: Blows per ft.	Dry Unit Wt. (pcf)	Moisture (%)	Lithology	LITHOLOGIC DESCRIPTION
0							FILL, Silty Sand, brown, moist, medium dense, fine to medium grained
2		■	13	115.7	11.8		mottled red brown to yellow tan
4		■	22	122.7	9.0		Clayey Sand, red brown, moist, medium to coarse with gravels and cobbles, loose to medium dense, horizontal contact
6		■	18	125.0	7.4		Clayey Gravel, brown, moist, medium dense, gravels to cobble size
8							dark brown lense, Silty Sand
							becoming denser
10		■	30	130.4	7.6		
12							Silty Sand/Sandy Clay, tan to yellow brown, moist, dense
14							adding water to aid in drilling

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Figure E.1

EXPLORATION LOG

PROJECT NAME:	Schick - Roit & Rickley	EXCAVATION:	B 01
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Depth (ft.)	Sample: Bulk	Sample: Ring	Sample: Blows per ft.	Dry Unit Wt. (pcf)	Moisture (%)	Lithology	LITHOLOGIC DESCRIPTION
14							boulders and cobbles
16		■	38	126.9	11.4		Silty Gravel, yellow tan to gray, moist, dense, gravel to three inches, stopped using water to advance the hole
18		■	46	114.4	11.9		SOIL, Silty Sand, dark brown, moist, medium dense, fine to medium grained, with some gravel to 1", porous, flat contact ALLUVIUM, (Qal), Clayey Sand, reddish brown to dark yellow brown, moist, dense, medium grained, gravel and cobbles to 6" diameter
20							BEDROCK, Conglomerate, yellow tan, weathered
22							yellow tan, more sand
24		■	27	105.3	17.0		gray tan, very weathered, with occassional pebble
26							Siliceous Siltstone, yellow brown, moderately weathered, massive
28							

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Figure E.1

EXPLORATION LOG

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Depth (ft.)	Sample: Bulk	Sample: Ring	Sample: Blows per ft.	Dry Unit Wt. (pcf)	Moisture (%)	Lithology	LITHOLOGIC DESCRIPTION
28							
							Conglomerate, yellow tan, slightly weathered, moderately hard
30		■	49	121.7	8.0		
							medium orange brown, moderately hard
32							harder
34							
		■	59	124.8	6.0		massive
36							Conglomerate, hard, massive, rounded gravels and cobbles
38							Siliceous Siltstone, dark grey, hard, massive, required coring bucket, slightly fractured
40							
42							

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Figure E.1

EXPLORATION LOG

PROJECT NAME:	Schick - Roit & Rickley	EXCAVATION:	B 01
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LOGGED BY: GCM & JWS	DATE: 3/10&11/16	ELEVATION: 100.00	TOTAL DEPTH: 51'
COMMENTS:	Back yard area, 6' s/o & 9.5' e/e SEC of residence		

Depth (ft.)	Sample: Bulk	Sample: Ring	Sample: Blows per ft.	Dry Unit Wt. (pcf)	Moisture (%)	Lithology	LITHOLOGIC DESCRIPTION
42							
44							
46							
48							
50							
							End at 51', No Water, No Caving, Fill to 17.5'
52							
54							
56							

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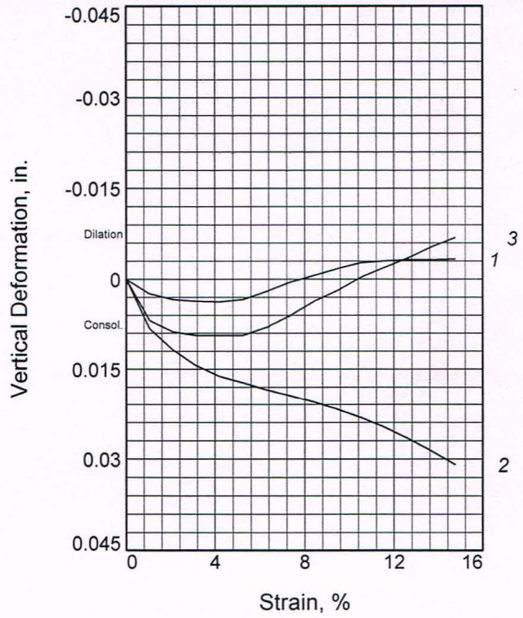
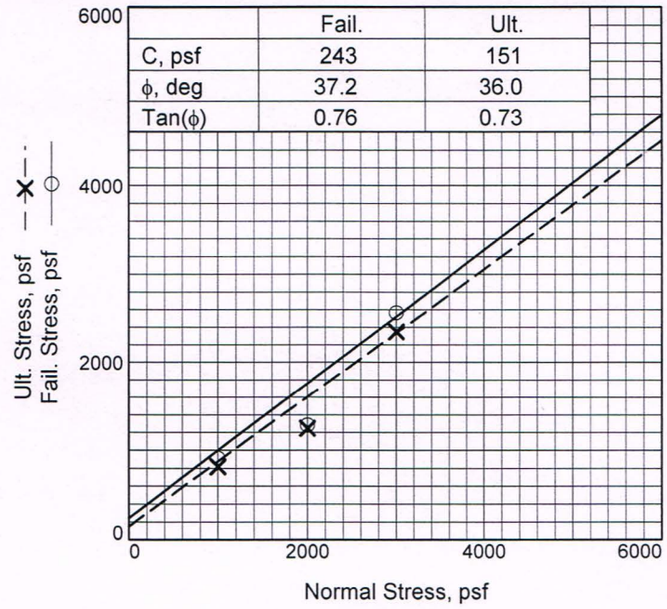
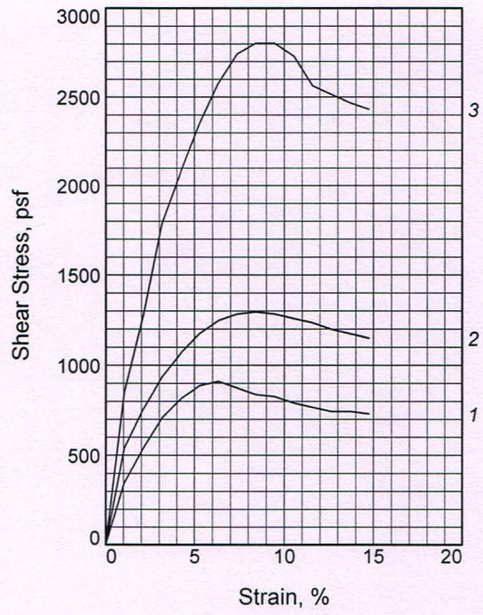
Figure E.1





	Fail.	Ult.
C, psf	243	151
ϕ, deg	37.2	36.0
Tan(ϕ)	0.76	0.73



	Sample No.	1	2	3
Initial	Water Content, %	17.0	17.0	17.0
	Dry Density, pcf	110.8	111.8	115.6
	Saturation, %	87.9	90.3	99.9
	Void Ratio	0.5214	0.5074	0.4585
	Diameter, in.	2.38	2.38	2.38
	Height, in.	1.00	1.00	1.00
At Test	Water Content, %	19.4	18.8	17.2
	Dry Density, pcf	110.8	111.8	115.6
	Saturation, %	100.6	100.3	101.5
	Void Ratio	0.5214	0.5074	0.4585
	Diameter, in.	2.38	2.38	2.38
	Height, in.	1.00	1.00	1.00
	Normal Stress, psf	1000	2000	3000
	Fail. Stress, psf	910	1281	2563
	Strain, %	6.3	7.4	11.6
	Ult. Stress, psf	814	1245	2347
	Strain, %	4.2	6.3	5.3
	Strain rate, in./min.	0.01	0.01	0.01

Sample Type: Ring
Description: BEDROCK, Conglomerate, yellow tan, weathered

Specific Gravity= 2.7
Remarks:

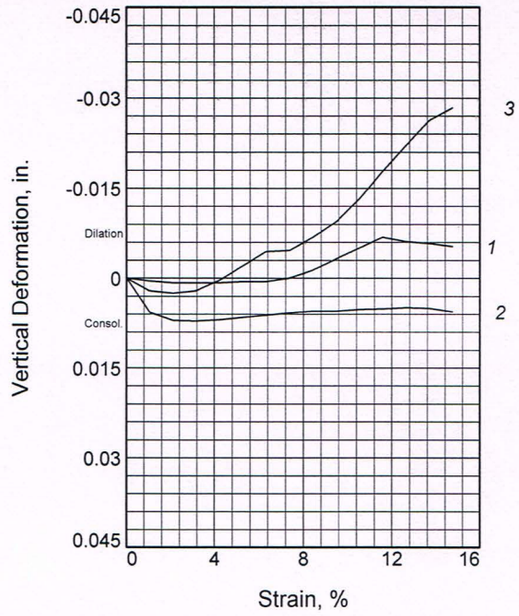
Client: Schick - Roit

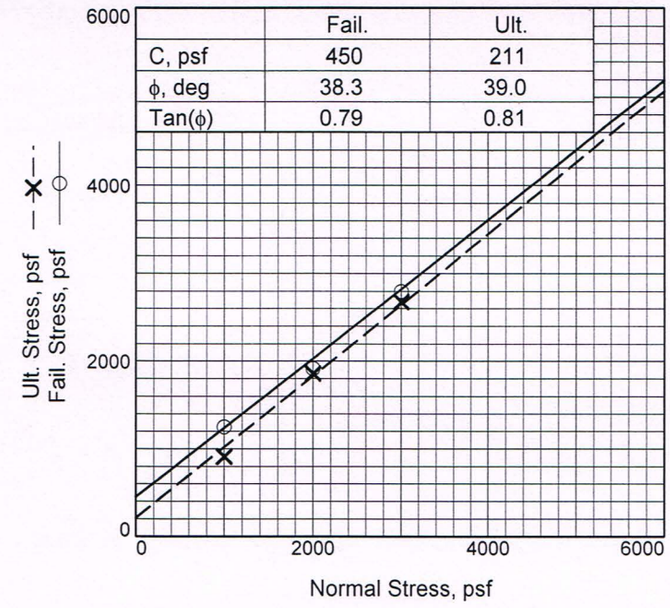
Project: Schick - Roit & Rickley

Source of Sample: B 01 **Depth:** 25
Sample Number: 7
Proj. No.: 4624CA-0216 **Date Sampled:** 3/10/16

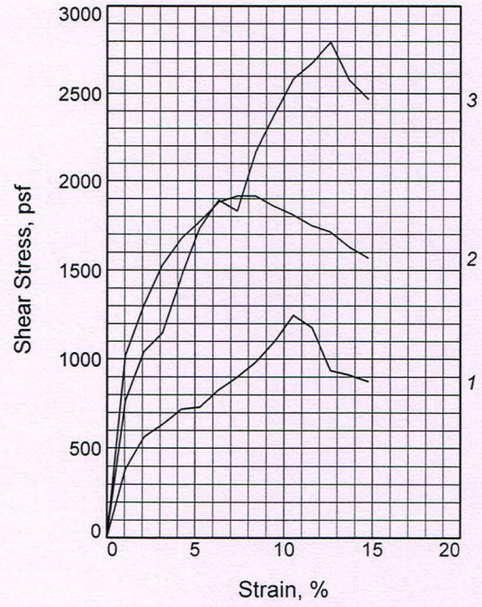
DIRECT SHEAR TEST REPORT
PROFESSIONAL GEOTECHNICAL CONSULTANTS, INC.
ARIZONA CALIFORNIA COLORADO NEVADA

Figure S.1





	Fail.	Ult.
C, psf	450	211
ϕ, deg	38.3	39.0
Tan(ϕ)	0.79	0.81



Sample No.		1	2	3
Initial	Water Content, %	7.9	7.9	7.9
	Dry Density, pcf	110.3	118.8	129.5
	Saturation, %	40.6	51.2	71.2
	Void Ratio	0.5288	0.4190	0.3012
	Diameter, in.	2.38	2.38	2.38
	Height, in.	1.00	1.00	1.00
At Test	Water Content, %	19.5	15.4	11.3
	Dry Density, pcf	110.3	118.8	129.5
	Saturation, %	99.6	99.2	100.9
	Void Ratio	0.5288	0.4190	0.3012
	Diameter, in.	2.38	2.38	2.38
	Height, in.	1.00	1.00	1.00
Normal Stress, psf		1000	2000	3000
Fail. Stress, psf		1247	1916	2794
Strain, %		10.5	7.4	12.6
Ult. Stress, psf		910	1856	2674
Strain, %		13.7	9.5	11.6
Strain rate, in./min.		0.01	0.01	0.01

Sample Type: Ring
Description: Conglomerate, yellow tan, slightly weathered, moderately hard

Specific Gravity= 2.7
Remarks:

Client: Schick - Roit

Project: Schick - Roit & Rickley

Source of Sample: B 01 **Depth:** 30
Sample Number: 8
Proj. No.: 4624CA-0216 **Date Sampled:** 3/10/16

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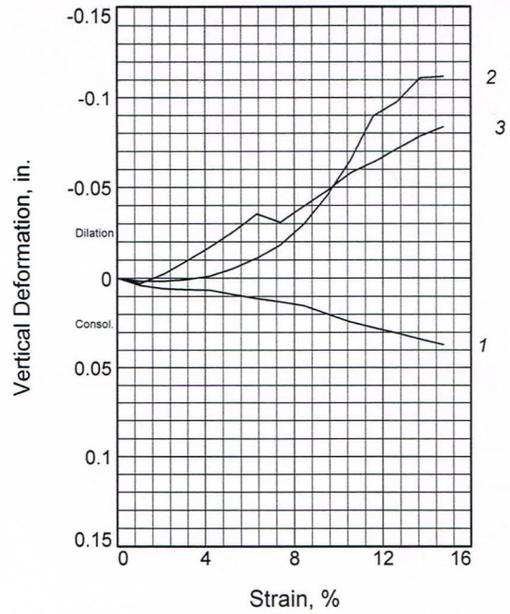
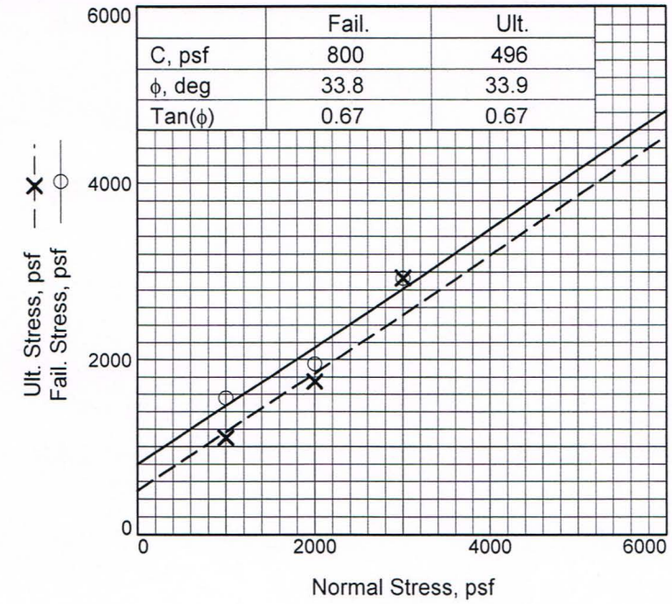
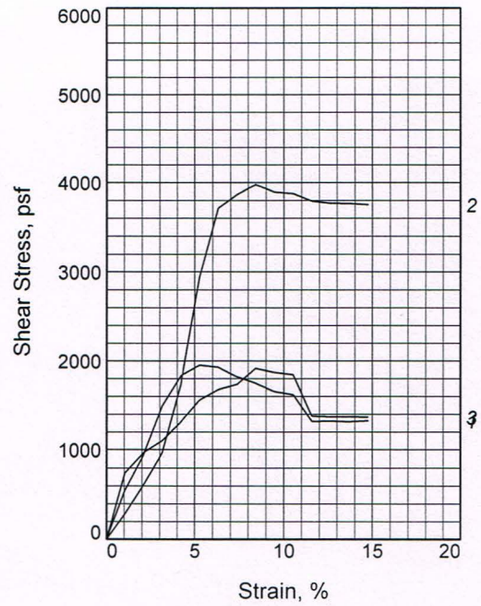
PROFESSIONAL GEOTECHNICAL CONSULTANTS, INC.
ARIZONA CALIFORNIA COLORADO NEVADA

Figure S.2





	Fail.	Ult.
C, psf	800	496
ϕ, deg	33.8	33.9
Tan(ϕ)	0.67	0.67



Sample No.		1	2	3
Initial	Water Content, %	6.0	6.0	6.0
	Dry Density, pcf	126.2	136.3	125.5
	Saturation, %	48.0	68.1	46.9
	Void Ratio	0.3357	0.2363	0.3435
	Diameter, in.	2.38	2.38	2.38
	Height, in.	1.00	1.00	1.00
At Test	Water Content, %	12.5	8.8	12.7
	Dry Density, pcf	126.2	136.3	125.5
	Saturation, %	100.5	100.7	100.1
	Void Ratio	0.3357	0.2363	0.3435
	Diameter, in.	2.38	2.38	2.38
	Height, in.	1.00	1.00	1.00
Normal Stress, psf		2000	3000	1000
Fail. Stress, psf		1952	2934	1557
Strain, %		5.3	5.3	5.3
Ult. Stress, psf		1748	2934	1102
Strain, %		8.4	5.3	3.2
Strain rate, in./min.		0.01	0.01	0.01

Sample Type: Ring
Description: Conglomerate, yellow tan, slightly weathered, moderately hard

Specific Gravity= 2.7
Remarks:

Client: Schick - Roit

Project: Schick - Roit & Rickley

Source of Sample: B 01 **Depth:** 35
Sample Number: 9
Proj. No.: 4624CA-0216 **Date Sampled:** 3/10/16

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PROFESSIONAL GEOTECHNICAL CONSULTANTS, INC.
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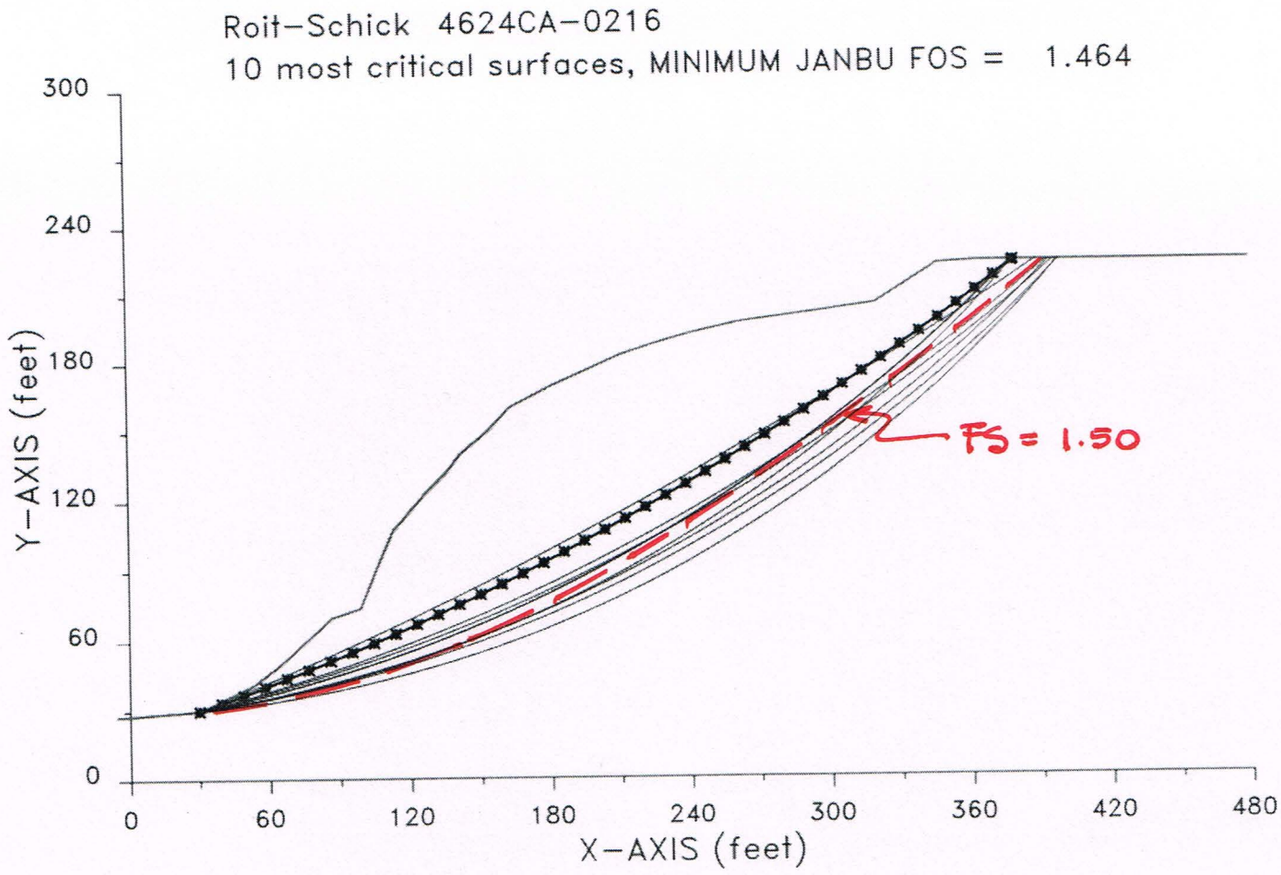
Figure S.3

462415 3-22-16 21:36



XSTABL File: 462415 3-22-16 21:36

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*****************************************
*              X S T A B L              *
*                                       *
*        Slope Stability Analysis       *
*               using the               *
*            Method of Slices           *
*                                       *
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*****************************************
```

Problem Description : Roit-Schick 4624CA-0216

SEGMENT BOUNDARY COORDINATES
---

22 SURFACE boundary segments

Segment No.	x-left (ft)	y-left (ft)	x-right (ft)	y-right (ft)	Soil Unit Below Segment
1	.0	28.0	30.0	30.0	1
2	30.0	30.0	53.0	41.0	1
3	53.0	41.0	65.0	50.0	1
4	65.0	50.0	87.0	70.0	1
5	87.0	70.0	99.0	74.0	1
6	99.0	74.0	106.0	91.0	1
7	106.0	91.0	113.0	107.0	1
8	113.0	107.0	126.0	122.0	1
9	126.0	122.0	136.0	132.0	1
10	136.0	132.0	142.0	140.0	1
11	142.0	140.0	154.0	150.0	1
12	154.0	150.0	163.0	160.0	1
13	163.0	160.0	182.0	170.0	1
14	182.0	170.0	211.0	183.0	1
15	211.0	183.0	223.0	187.0	1
16	223.0	187.0	240.0	192.0	1
17	240.0	192.0	262.0	197.0	1
18	262.0	197.0	320.0	205.0	1
19	320.0	205.0	345.0	221.0	1
20	345.0	221.0	346.0	222.0	1

21	346.0	222.0	364.0	223.0	1
22	364.0	223.0	480.0	223.0	1

ISOTROPIC Soil Parameters
---

1 Soil unit(s) specified

Soil Unit No.	Unit Weight Moist (pcf)	Unit Weight Sat. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Parameter Ru	Water Surface Constant (psf)	No.
1	132.0	132.0	496.0	33.90	.000	.0	0

A critical failure surface searching method, using a random technique for generating CIRCULAR surfaces has been specified.

25 trial surfaces will be generated and analyzed.

25 Surfaces initiate from each of 1 points equally spaced along the ground surface between x = 30.0 ft
and x = 30.0 ft

Each surface terminates between x = 370.0 ft
and x = 470.0 ft

Unless further limitations were imposed, the minimum elevation at which a surface extends is y = 30.0 ft

10.0 ft line segments define each trial failure surface.

ANGULAR RESTRICTIONS

The first segment of each failure surface will be inclined within the angular range defined by :

Lower angular limit := -45.0 degrees

Upper angular limit := 26.0 degrees

Factors of safety have been calculated by the :

* * * * * SIMPLIFIED JANBU METHOD * * * * *

The 10 most critical of all the failure surfaces examined are displayed below - the most critical first

Failure surface No. 1 specified by 42 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	30.00	30.00
2	39.42	33.34
3	48.82	36.76
4	58.19	40.27
5	67.53	43.84
6	76.83	47.50
7	86.11	51.24
8	95.35	55.05
9	104.56	58.95
10	113.74	62.91
11	122.89	66.96
12	132.00	71.08
13	141.07	75.28
14	150.11	79.56
15	159.12	83.91
16	168.08	88.34
17	177.01	92.84
18	185.90	97.42
19	194.75	102.08
20	203.56	106.80
21	212.34	111.60
22	221.07	116.48
23	229.76	121.43
24	238.41	126.45
25	247.01	131.54
26	255.57	136.71
27	264.09	141.95
28	272.57	147.26
29	280.99	152.64
30	289.38	158.09
31	297.71	163.61
32	306.00	169.20
33	314.25	174.86
34	322.44	180.60
35	330.59	186.40
36	338.69	192.26

37	346.73	198.20
38	354.73	204.20
39	362.68	210.27
40	370.57	216.41
41	378.42	222.61
42	378.89	223.00

** Corrected JANBU FOS = 1.464 ** (Fo factor = 1.020)

Failure surface No. 2 specified by 42 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	30.00	30.00
2	39.78	32.10
3	49.52	34.34
4	59.23	36.73
5	68.91	39.27
6	78.54	41.95
7	88.13	44.78
8	97.68	47.75
9	107.18	50.86
10	116.64	54.12
11	126.04	57.51
12	135.40	61.05
13	144.70	64.73
14	153.94	68.54
15	163.12	72.50
16	172.25	76.59
17	181.31	80.82
18	190.31	85.19
19	199.24	89.69
20	208.10	94.32
21	216.89	99.09
22	225.61	103.98
23	234.25	109.01
24	242.82	114.17
25	251.31	119.45
26	259.72	124.86
27	268.05	130.40
28	276.29	136.06
29	284.45	141.85
30	292.51	147.76
31	300.49	153.78
32	308.38	159.93
33	316.18	166.19
34	323.88	172.58
35	331.48	179.07
36	338.98	185.68
37	346.39	192.40
38	353.69	199.23
39	360.89	206.17

40	367.98	213.22
41	374.97	220.37
42	377.46	223.00

** Corrected JANBU FOS = 1.467 ** (Fo factor = 1.034)

Failure surface No. 3 specified by 42 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	30.00	30.00
2	39.77	32.11
3	49.52	34.37
4	59.22	36.77
5	68.90	39.31
6	78.53	42.00
7	88.12	44.83
8	97.67	47.81
9	107.17	50.92
10	116.62	54.18
11	126.03	57.58
12	135.38	61.11
13	144.68	64.79
14	153.92	68.60
15	163.11	72.56
16	172.24	76.64
17	181.30	80.87
18	190.30	85.23
19	199.24	89.72
20	208.10	94.34
21	216.90	99.10
22	225.62	103.98
23	234.27	109.00
24	242.85	114.14
25	251.35	119.42
26	259.77	124.81
27	268.10	130.34
28	276.36	135.98
29	284.53	141.75
30	292.61	147.64
31	300.60	153.65
32	308.51	159.77
33	316.32	166.02
34	324.03	172.38
35	331.65	178.85
36	339.18	185.44
37	346.60	192.14
38	353.93	198.94
39	361.15	205.86
40	368.27	212.88
41	375.28	220.01
42	378.14	223.00

** Corrected JANBU FOS = 1.468 ** (Fo factor = 1.034)

Failure surface No. 4 specified by 42 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	30.00	30.00
2	39.88	31.56
3	49.73	33.29
4	59.54	35.19
5	69.33	37.27
6	79.07	39.52
7	88.77	41.94
8	98.43	44.53
9	108.04	47.28
10	117.61	50.21
11	127.12	53.30
12	136.57	56.57
13	145.96	59.99
14	155.30	63.58
15	164.57	67.33
16	173.77	71.25
17	182.90	75.33
18	191.96	79.56
19	200.94	83.96
20	209.84	88.51
21	218.67	93.22
22	227.40	98.08
23	236.06	103.10
24	244.62	108.26
25	253.09	113.58
26	261.46	119.04
27	269.74	124.65
28	277.92	130.40
29	286.00	136.30
30	293.97	142.34
31	301.83	148.51
32	309.59	154.83
33	317.23	161.28
34	324.76	167.86
35	332.17	174.57
36	339.46	181.42
37	346.63	188.39
38	353.68	195.48
39	360.60	202.70
40	367.40	210.03
41	374.06	217.49
42	378.82	223.00

** Corrected JANBU FOS = 1.483 ** (Fo factor = 1.039)

Failure surface No. 5 specified by 42 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	30.00	30.00
2	39.26	33.78
3	48.49	37.61
4	57.71	41.49
5	66.91	45.42
6	76.08	49.40
7	85.23	53.43
8	94.37	57.50
9	103.48	61.63
10	112.56	65.80
11	121.63	70.02
12	130.67	74.29
13	139.69	78.61
14	148.69	82.98
15	157.66	87.39
16	166.61	91.86
17	175.53	96.37
18	184.43	100.93
19	193.31	105.53
20	202.16	110.18
21	210.99	114.88
22	219.79	119.63
23	228.57	124.43
24	237.32	129.27
25	246.04	134.16
26	254.74	139.09
27	263.41	144.07
28	272.05	149.10
29	280.67	154.17
30	289.26	159.29
31	297.82	164.46
32	306.36	169.67
33	314.87	174.92
34	323.34	180.22
35	331.79	185.57
36	340.22	190.96
37	348.61	196.40
38	356.97	201.88
39	365.31	207.41
40	373.61	212.98
41	381.89	218.60
42	388.30	223.00

** Corrected JANBU FOS = 1.499 ** (Fo factor = 1.013)

Failure surface No. 6 specified by 43 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	30.00	30.00
2	39.65	32.61
3	49.28	35.32
4	58.87	38.14
5	68.43	41.07
6	77.96	44.10
7	87.46	47.24
8	96.92	50.49
9	106.34	53.84
10	115.72	57.29
11	125.07	60.85
12	134.37	64.51
13	143.64	68.28
14	152.86	72.14
15	162.04	76.11
16	171.17	80.19
17	180.26	84.36
18	189.30	88.63
19	198.29	93.01
20	207.24	97.48
21	216.13	102.06
22	224.97	106.73
23	233.76	111.50
24	242.49	116.37
25	251.18	121.33
26	259.80	126.39
27	268.37	131.55
28	276.88	136.80
29	285.33	142.14
30	293.72	147.58
31	302.05	153.11
32	310.32	158.74
33	318.53	164.45
34	326.67	170.26
35	334.74	176.16
36	342.75	182.14
37	350.70	188.22
38	358.57	194.38
39	366.38	200.63
40	374.12	206.97
41	381.78	213.39
42	389.37	219.90
43	392.92	223.00

** Corrected JANBU FOS = 1.505 ** (Fo factor = 1.027)

Failure surface No. 7 specified by 43 coordinate points

Point No.	x-surf (ft)	y-surf (ft)

1	30.00	30.00
2	39.70	32.41
3	49.38	34.94
4	59.03	37.58
5	68.64	40.33
6	78.22	43.20
7	87.76	46.19
8	97.27	49.28
9	106.74	52.49
10	116.18	55.81
11	125.57	59.24
12	134.92	62.78
13	144.23	66.43
14	153.50	70.19
15	162.72	74.07
16	171.89	78.05
17	181.02	82.14
18	190.09	86.33
19	199.12	90.64
20	208.09	95.05
21	217.01	99.56
22	225.88	104.19
23	234.69	108.91
24	243.45	113.74
25	252.15	118.68
26	260.79	123.72
27	269.37	128.86
28	277.88	134.10
29	286.34	139.44
30	294.73	144.88
31	303.05	150.42
32	311.31	156.05
33	319.50	161.79
34	327.63	167.62
35	335.68	173.55
36	343.66	179.57
37	351.57	185.69
38	359.41	191.90
39	367.18	198.20
40	374.87	204.60
41	382.48	211.08
42	390.01	217.65
43	395.99	223.00

** Corrected JANBU FOS = 1.517 ** (Fo factor = 1.028)

Failure surface No. 8 specified by 43 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	30.00	30.00

2	39.86	31.69
3	49.69	33.53
4	59.49	35.52
5	69.25	37.66
6	78.99	39.96
7	88.68	42.41
8	98.34	45.00
9	107.95	47.75
10	117.53	50.65
11	127.05	53.69
12	136.53	56.88
13	145.95	60.22
14	155.33	63.70
15	164.65	67.33
16	173.91	71.11
17	183.11	75.03
18	192.25	79.09
19	201.32	83.29
20	210.33	87.63
21	219.27	92.11
22	228.14	96.73
23	236.93	101.49
24	245.65	106.38
25	254.30	111.41
26	262.86	116.57
27	271.35	121.86
28	279.75	127.29
29	288.06	132.84
30	296.29	138.53
31	304.43	144.34
32	312.48	150.27
33	320.43	156.33
34	328.29	162.52
35	336.05	168.82
36	343.72	175.25
37	351.28	181.79
38	358.74	188.45
39	366.09	195.22
40	373.34	202.11
41	380.49	209.11
42	387.52	216.22
43	394.02	223.00

** Corrected JANBU FOS = 1.524 ** (Fo factor = 1.036)

Failure surface No. 9 specified by 44 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	30.00	30.00
2	39.89	31.50
3	49.75	33.15

4	59.58	34.96
5	69.39	36.93
6	79.16	39.06
7	88.89	41.35
8	98.59	43.79
9	108.25	46.38
10	117.86	49.14
11	127.43	52.04
12	136.95	55.10
13	146.42	58.32
14	155.84	61.68
15	165.20	65.20
16	174.50	68.86
17	183.75	72.68
18	192.93	76.64
19	202.04	80.75
20	211.09	85.01
21	220.07	89.41
22	228.98	93.96
23	237.81	98.65
24	246.57	103.48
25	255.25	108.45
26	263.84	113.55
27	272.35	118.80
28	280.78	124.18
29	289.12	129.70
30	297.37	135.35
31	305.53	141.14
32	313.59	147.05
33	321.56	153.09
34	329.43	159.27
35	337.20	165.56
36	344.87	171.98
37	352.43	178.52
38	359.88	185.19
39	367.23	191.97
40	374.47	198.87
41	381.60	205.89
42	388.61	213.02
43	395.50	220.26
44	398.03	223.00

** Corrected JANBU FOS = 1.542 ** (Fo factor = 1.038)

Failure surface No.10 specified by 44 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	30.00	30.00
2	39.95	30.99
3	49.88	32.17
4	59.79	33.53

5	69.67	35.07
6	79.52	36.79
7	89.34	38.70
8	99.12	40.78
9	108.86	43.05
10	118.55	45.49
11	128.20	48.12
12	137.80	50.92
13	147.35	53.89
14	156.84	57.04
15	166.27	60.37
16	175.64	63.87
17	184.94	67.54
18	194.17	71.38
19	203.33	75.39
20	212.42	79.57
21	221.42	83.92
22	230.35	88.43
23	239.19	93.11
24	247.94	97.94
25	256.60	102.94
26	265.17	108.10
27	273.64	113.41
28	282.01	118.88
29	290.28	124.50
30	298.45	130.28
31	306.51	136.20
32	314.45	142.27
33	322.29	148.49
34	330.00	154.84
35	337.60	161.34
36	345.08	167.98
37	352.44	174.76
38	359.66	181.67
39	366.76	188.71
40	373.73	195.88
41	380.57	203.18
42	387.27	210.61
43	393.83	218.15
44	397.89	223.00

** Corrected JANBU FOS = 1.558 ** (Fo factor = 1.043)

The following is a summary of the TEN most critical surfaces

Problem Description : Roit-Schick 4624CA-0216

Modified	Correction	Initial	Terminal	Available

	JANBU FOS	Factor	x-coord (ft)	x-coord (ft)	Strength (lb)
1.	1.464	1.020	30.00	378.89	1.318E+06
2.	1.467	1.034	30.00	377.46	1.601E+06
3.	1.468	1.034	30.00	378.14	1.604E+06
4.	1.483	1.039	30.00	378.82	1.746E+06
5.	1.499	1.013	30.00	388.30	1.282E+06
6.	1.505	1.027	30.00	392.92	1.608E+06
7.	1.517	1.028	30.00	395.99	1.684E+06
8.	1.524	1.036	30.00	394.02	1.855E+06
9.	1.542	1.038	30.00	398.03	1.944E+06
10.	1.558	1.043	30.00	397.89	2.080E+06

* * * END OF FILE * * *

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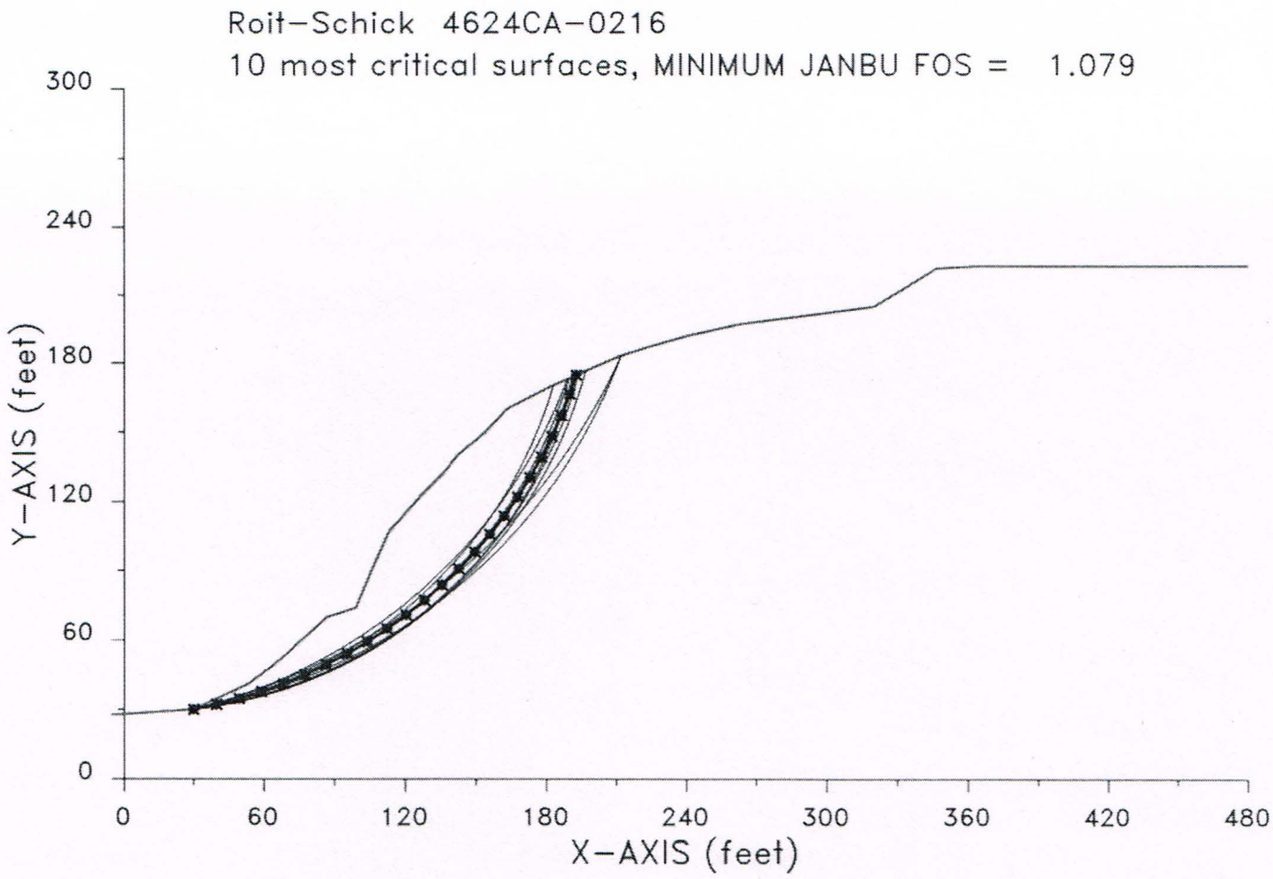

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*****************************************
*              X S T A B L              *
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*               using the               *
*            Method of Slices           *
*                                       *
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Problem Description : Roit-Schick 4624CA-0216

SEGMENT BOUNDARY COORDINATES
---

22 SURFACE boundary segments

Segment No.	x-left (ft)	y-left (ft)	x-right (ft)	y-right (ft)	Soil Unit Below Segment
1	.0	28.0	30.0	30.0	1
2	30.0	30.0	53.0	41.0	1
3	53.0	41.0	65.0	50.0	1
4	65.0	50.0	87.0	70.0	1
5	87.0	70.0	99.0	74.0	1
6	99.0	74.0	106.0	91.0	1
7	106.0	91.0	113.0	107.0	1
8	113.0	107.0	126.0	122.0	1
9	126.0	122.0	136.0	132.0	1
10	136.0	132.0	142.0	140.0	1
11	142.0	140.0	154.0	150.0	1
12	154.0	150.0	163.0	160.0	1
13	163.0	160.0	182.0	170.0	1
14	182.0	170.0	211.0	183.0	1
15	211.0	183.0	223.0	187.0	1
16	223.0	187.0	240.0	192.0	1
17	240.0	192.0	262.0	197.0	1
18	262.0	197.0	320.0	205.0	1
19	320.0	205.0	345.0	221.0	1
20	345.0	221.0	346.0	222.0	1
21	346.0	222.0	364.0	223.0	1
22	364.0	223.0	480.0	223.0	1

```
          --------------------------
          ISOTROPIC Soil Parameters
          --------------------------
           1 Soil unit(s) specified

          Soil   Unit Weight   Cohesion  Friction    Pore Pressure
Water
          Unit  Moist    Sat.  Intercept   Angle  Parameter  Constant
Surface
           No.  (pcf)   (pcf)    (psf)     (deg)      Ru      (psf)
No.

            1   132.0   132.0     496.0    33.90      .000         .0
0

          A critical failure surface searching method, using a random
          technique for generating CIRCULAR surfaces has been specified.

            100 trial surfaces will be generated and analyzed.

           100 Surfaces initiate from each of   1 points equally spaced
          along the ground surface between  x =     30.0 ft
                                      and  x =     30.0 ft

          Each surface terminates between   x =    182.0 ft
                                     and   x =    400.0 ft

          Unless further limitations were imposed, the minimum elevation
          at which a surface extends is  y =     30.0 ft

             10.0 ft line segments define each trial failure surface.

          ---------------------
          ANGULAR RESTRICTIONS
          ---------------------

            The first segment of each failure surface will be inclined
            within the angular range defined by :

                    Lower angular limit :=   -45.0 degrees
                    Upper angular limit :=    26.0 degrees

                Factors of safety have been calculated by the :

          * * * * *   SIMPLIFIED JANBU METHOD   * * * * *

          The 10 most critical of all the failure surfaces examined
          are displayed below - the most critical first

          Failure surface No. 1 specified by 24 coordinate points
                 Point      x-surf      y-surf
                  No.        (ft)        (ft)
                   1         30.00       30.00
                   2         39.77       32.11
```

3	49.44	34.68
4	58.97	37.70
5	68.35	41.16
6	77.56	45.06
7	86.58	49.39
8	95.38	54.14
9	103.94	59.30
10	112.26	64.85
11	120.31	70.79
12	128.06	77.10
13	135.52	83.77
14	142.65	90.78
15	149.44	98.12
16	155.88	105.77
17	161.95	113.71
18	167.65	121.93
19	172.95	130.41
20	177.85	139.13
21	182.33	148.07
22	186.38	157.21
23	190.01	166.53
24	192.79	174.84

** Corrected JANBU FOS = 1.079 ** (Fo factor = 1.056)

Failure surface No. 2 specified by 24 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	30.00	30.00
2	39.78	32.10
3	49.44	34.66
4	58.98	37.67
5	68.36	41.14
6	77.57	45.04
7	86.58	49.38
8	95.37	54.14
9	103.93	59.32
10	112.23	64.89
11	120.26	70.85
12	128.00	77.18
13	135.43	83.88
14	142.53	90.92
15	149.29	98.29
16	155.69	105.97
17	161.72	113.94
18	167.37	122.20
19	172.62	130.71
20	177.46	139.46
21	181.88	148.43
22	185.86	157.60
23	189.41	166.95
24	191.85	174.41

** Corrected JANBU FOS = 1.080 ** (Fo factor = 1.056)

Failure surface No. 3 specified by 24 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	30.00	30.00
2	39.78	32.06
3	49.46	34.60
4	59.00	37.60
5	68.38	41.06
6	77.58	44.98
7	86.58	49.33
8	95.36	54.12
9	103.90	59.33
10	112.17	64.94
11	120.17	70.95
12	127.86	77.34
13	135.23	84.10
14	142.27	91.21
15	148.95	98.65
16	155.26	106.40
17	161.19	114.45
18	166.72	122.78
19	171.84	131.37
20	176.54	140.20
21	180.81	149.25
22	184.63	158.49
23	187.99	167.90
24	189.67	173.44

** Corrected JANBU FOS = 1.080 ** (Fo factor = 1.056)

Failure surface No. 4 specified by 25 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	30.00	30.00
2	39.88	31.56
3	49.66	33.62
4	59.33	36.18
5	68.85	39.23
6	78.21	42.77
7	87.37	46.78
8	96.31	51.25
9	105.02	56.17
10	113.45	61.54
11	121.61	67.33
12	129.46	73.53
13	136.98	80.12
14	144.15	87.09
15	150.95	94.41
16	157.38	102.08
17	163.40	110.06
18	169.00	118.34
19	174.18	126.90
20	178.91	135.71
21	183.18	144.75
22	186.98	154.00

23	190.31	163.43
24	193.14	173.02
25	193.68	175.23

** Corrected JANBU FOS = 1.081 ** (Fo factor = 1.060)

Failure surface No. 5 specified by 25 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	30.00	30.00
2	39.88	31.54
3	49.67	33.57
4	59.35	36.09
5	68.89	39.09
6	78.27	42.57
7	87.45	46.51
8	96.43	50.91
9	105.18	55.75
10	113.68	61.03
11	121.89	66.73
12	129.82	72.83
13	137.42	79.33
14	144.69	86.19
15	151.60	93.42
16	158.15	100.98
17	164.30	108.86
18	170.06	117.04
19	175.39	125.50
20	180.30	134.21
21	184.76	143.16
22	188.76	152.33
23	192.30	161.68
24	195.37	171.20
25	196.82	176.64

** Corrected JANBU FOS = 1.082 ** (Fo factor = 1.060)

Failure surface No. 6 specified by 25 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	30.00	30.00
2	39.91	31.37
3	49.72	33.28
4	59.42	35.71
5	68.98	38.65
6	78.36	42.11
7	87.55	46.06
8	96.51	50.51
9	105.21	55.42
10	113.65	60.80
11	121.78	66.62
12	129.58	72.87
13	137.04	79.54
14	144.13	86.59
15	150.83	94.01
16	157.12	101.78

17	162.99	109.88
18	168.41	118.28
19	173.37	126.97
20	177.86	135.90
21	181.87	145.06
22	185.37	154.43
23	188.37	163.97
24	190.85	173.66
25	190.92	174.00

** Corrected JANBU FOS = 1.083 ** (Fo factor = 1.062)

Failure surface No. 7 specified by 23 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	30.00	30.00
2	39.76	32.19
3	49.39	34.86
4	58.88	38.01
5	68.20	41.64
6	77.33	45.72
7	86.24	50.26
8	94.92	55.24
9	103.33	60.65
10	111.46	66.47
11	119.29	72.69
12	126.79	79.30
13	133.96	86.27
14	140.77	93.59
15	147.20	101.25
16	153.24	109.22
17	158.88	117.48
18	164.09	126.02
19	168.87	134.80
20	173.20	143.81
21	177.08	153.03
22	180.49	162.43
23	182.94	170.42

** Corrected JANBU FOS = 1.088 ** (Fo factor = 1.056)

Failure surface No. 8 specified by 26 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	30.00	30.00
2	39.80	31.98
3	49.51	34.36
4	59.12	37.15
5	68.59	40.34
6	77.93	43.93
7	87.11	47.90
8	96.11	52.25
9	104.92	56.98
10	113.53	62.07
11	121.92	67.52
12	130.07	73.31

13	137.97	79.44
14	145.60	85.90
15	152.96	92.67
16	160.03	99.74
17	166.80	107.11
18	173.25	114.75
19	179.37	122.65
20	185.16	130.80
21	190.61	139.19
22	195.69	147.80
23	200.41	156.62
24	204.76	165.62
25	208.73	174.80
26	212.00	183.33

** Corrected JANBU FOS = 1.089 ** (Fo factor = 1.054)

Failure surface No. 9 specified by 24 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	30.00	30.00
2	39.63	32.68
3	49.14	35.78
4	58.51	39.28
5	67.71	43.19
6	76.74	47.50
7	85.57	52.19
8	94.18	57.27
9	102.57	62.71
10	110.72	68.51
11	118.60	74.66
12	126.21	81.15
13	133.53	87.96
14	140.55	95.09
15	147.25	102.51
16	153.62	110.22
17	159.65	118.19
18	165.33	126.42
19	170.65	134.89
20	175.59	143.59
21	180.15	152.49
22	184.32	161.58
23	188.09	170.84
24	188.90	173.09

** Corrected JANBU FOS = 1.092 ** (Fo factor = 1.051)

Failure surface No.10 specified by 26 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	30.00	30.00
2	39.64	32.66
3	49.18	35.67
4	58.60	39.02
5	67.89	42.72
6	77.04	46.75

7	86.04	51.11
8	94.87	55.80
9	103.53	60.80
10	112.00	66.12
11	120.27	71.74
12	128.33	77.66
13	136.17	83.87
14	143.77	90.36
15	151.14	97.13
16	158.25	104.16
17	165.10	111.44
18	171.69	118.97
19	177.99	126.73
20	184.01	134.72
21	189.73	142.92
22	195.15	151.32
23	200.26	159.92
24	205.05	168.70
25	209.52	177.64
26	212.13	183.38

** Corrected JANBU FOS = 1.092 ** (Fo factor = 1.048)

The following is a summary of the TEN most critical surfaces

Problem Description : Roit-Schick 4624CA-0216

	Modified JANBU FOS	Correction Factor	Initial x-coord (ft)	Terminal x-coord (ft)	Available Strength (lb)
1.	1.079	1.056	30.00	192.79	3.998E+05
2.	1.080	1.056	30.00	191.85	3.959E+05
3.	1.080	1.056	30.00	189.67	3.874E+05
4.	1.081	1.060	30.00	193.68	4.466E+05
5.	1.082	1.060	30.00	196.82	4.660E+05
6.	1.083	1.062	30.00	190.92	4.454E+05
7.	1.088	1.056	30.00	182.94	3.451E+05
8.	1.089	1.054	30.00	212.00	5.132E+05
9.	1.092	1.051	30.00	188.90	3.407E+05
10.	1.092	1.048	30.00	212.13	4.552E+05

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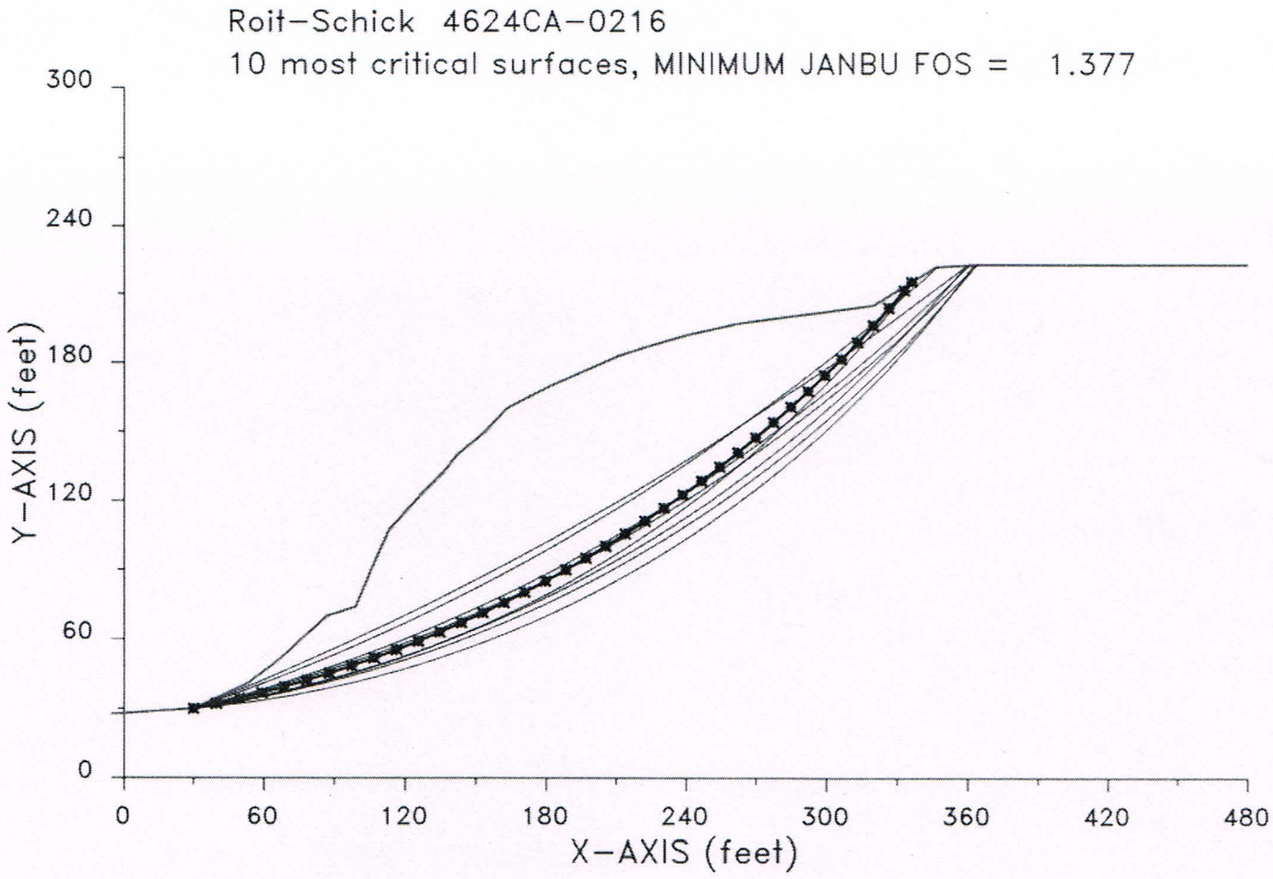

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*          X S T A B L                  *
*                                       *
*      Slope Stability Analysis         *
*            using the                  *
*         Method of Slices              *
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```

Problem Description : Roit-Schick 4624CA-0216

SEGMENT BOUNDARY COORDINATES
---

22 SURFACE boundary segments

Segment No.	x-left (ft)	y-left (ft)	x-right (ft)	y-right (ft)	Soil Unit Below Segment
1	.0	28.0	30.0	30.0	1
2	30.0	30.0	53.0	41.0	1
3	53.0	41.0	65.0	50.0	1
4	65.0	50.0	87.0	70.0	1
5	87.0	70.0	99.0	74.0	1
6	99.0	74.0	106.0	91.0	1
7	106.0	91.0	113.0	107.0	1
8	113.0	107.0	126.0	122.0	1
9	126.0	122.0	136.0	132.0	1
10	136.0	132.0	142.0	140.0	1
11	142.0	140.0	154.0	150.0	1
12	154.0	150.0	163.0	160.0	1
13	163.0	160.0	182.0	170.0	1
14	182.0	170.0	211.0	183.0	1
15	211.0	183.0	223.0	187.0	1
16	223.0	187.0	240.0	192.0	1
17	240.0	192.0	262.0	197.0	1
18	262.0	197.0	320.0	205.0	1
19	320.0	205.0	345.0	221.0	1
20	345.0	221.0	346.0	222.0	1

21	346.0	222.0	364.0	223.0	1
22	364.0	223.0	480.0	223.0	1

ISOTROPIC Soil Parameters
---

1 Soil unit(s) specified

Soil Unit No.	Unit Weight Moist (pcf)	Sat. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Parameter Ru	Water Constant (psf)	Surface No.
1	132.0	132.0	496.0	33.90	.000	.0	0

A critical failure surface searching method, using a random technique for generating CIRCULAR surfaces has been specified.

25 trial surfaces will be generated and analyzed.

25 Surfaces initiate from each of 1 points equally spaced along the ground surface between x = 30.0 ft
and x = 30.0 ft

Each surface terminates between x = 320.0 ft
and x = 450.0 ft

Unless further limitations were imposed, the minimum elevation at which a surface extends is y = 30.0 ft

10.0 ft line segments define each trial failure surface.

ANGULAR RESTRICTIONS

The first segment of each failure surface will be inclined within the angular range defined by :

Lower angular limit := -45.0 degrees
Upper angular limit := 26.0 degrees

Factors of safety have been calculated by the :

* * * * * SIMPLIFIED JANBU METHOD * * * * *

The 10 most critical of all the failure surfaces examined
are displayed below - the most critical first

Failure surface No. 1 specified by 38 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	30.00	30.00
2	39.78	32.10
3	49.51	34.38
4	59.21	36.84
5	68.85	39.49
6	78.44	42.31
7	87.98	45.32
8	97.46	48.50
9	106.88	51.86
10	116.23	55.40
11	125.52	59.11
12	134.73	62.99
13	143.87	67.05
14	152.94	71.28
15	161.92	75.67
16	170.81	80.24
17	179.62	84.97
18	188.34	89.86
19	196.97	94.92
20	205.50	100.14
21	213.93	105.52
22	222.26	111.05
23	230.49	116.74
24	238.60	122.59
25	246.60	128.58
26	254.49	134.72
27	262.27	141.01
28	269.92	147.45
29	277.46	154.03
30	284.86	160.74
31	292.14	167.60
32	299.29	174.59
33	306.31	181.71
34	313.20	188.97
35	319.94	196.35
36	326.55	203.86
37	333.01	211.49
38	336.16	215.34

** Corrected JANBU FOS = 1.377 ** (Fo factor = 1.038)

Failure surface No. 2 specified by 38 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	30.00	30.00
2	39.77	32.11
3	49.51	34.40
4	59.20	36.87
5	68.84	39.53
6	78.43	42.36
7	87.97	45.37
8	97.45	48.55
9	106.86	51.91
10	116.22	55.45
11	125.51	59.16
12	134.72	63.04
13	143.86	67.09
14	152.93	71.31
15	161.91	75.70
16	170.82	80.26
17	179.63	84.98
18	188.36	89.86
19	196.99	94.91
20	205.53	100.11
21	213.97	105.47
22	222.31	110.99
23	230.55	116.67
24	238.67	122.49
25	246.69	128.47
26	254.60	134.59
27	262.39	140.86
28	270.06	147.27
29	277.62	153.83
30	285.04	160.52
31	292.35	167.35
32	299.52	174.32
33	306.57	181.41
34	313.48	188.64
35	320.25	196.00
36	326.89	203.48
37	333.39	211.08
38	337.72	216.34

** Corrected JANBU FOS = 1.379 ** (Fo factor = 1.038)

Failure surface No. 3 specified by 39 coordinate points

Point No.	x-surf (ft)	y-surf (ft)

1	30.00	30.00
2	39.42	33.34
3	48.81	36.79
4	58.16	40.34
5	67.47	44.00
6	76.73	47.76
7	85.95	51.63
8	95.13	55.60
9	104.27	59.67
10	113.36	63.84
11	122.40	68.11
12	131.39	72.49
13	140.33	76.96
14	149.22	81.54
15	158.06	86.22
16	166.85	90.99
17	175.58	95.86
18	184.26	100.83
19	192.88	105.90
20	201.45	111.06
21	209.95	116.32
22	218.40	121.67
23	226.78	127.12
24	235.11	132.66
25	243.37	138.29
26	251.57	144.02
27	259.70	149.84
28	267.77	155.75
29	275.77	161.74
30	283.70	167.83
31	291.57	174.01
32	299.36	180.27
33	307.09	186.62
34	314.74	193.06
35	322.32	199.58
36	329.83	206.19
37	337.26	212.88
38	344.62	219.65
39	347.18	222.07

** Corrected JANBU FOS = 1.388 ** (Fo factor = 1.024)

Failure surface No. 4 specified by 38 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	30.00	30.00
2	39.88	31.56
3	49.72	33.33
4	59.52	35.31

5	69.28	37.51
6	78.98	39.91
7	88.64	42.53
8	98.23	45.35
9	107.76	48.38
10	117.22	51.62
11	126.61	55.05
12	135.93	58.69
13	145.16	62.53
14	154.31	66.57
15	163.36	70.81
16	172.33	75.24
17	181.20	79.86
18	189.96	84.68
19	198.62	89.68
20	207.17	94.87
21	215.60	100.24
22	223.92	105.79
23	232.12	111.53
24	240.18	117.43
25	248.12	123.51
26	255.93	129.76
27	263.60	136.18
28	271.13	142.76
29	278.51	149.50
30	285.75	156.41
31	292.84	163.46
32	299.77	170.67
33	306.54	178.02
34	313.16	185.52
35	319.61	193.16
36	325.89	200.94
37	332.01	208.85
38	337.38	216.12

** Corrected JANBU FOS = 1.391 ** (Fo factor = 1.043)

Failure surface No. 5 specified by 40 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	30.00	30.00
2	39.65	32.61
3	49.27	35.35
4	58.85	38.22
5	68.38	41.23
6	77.88	44.38
7	87.33	47.65
8	96.73	51.06
9	106.08	54.60
10	115.38	58.27

11	124.63	62.06
12	133.83	65.99
13	142.97	70.05
14	152.05	74.23
15	161.08	78.54
16	170.04	82.98
17	178.94	87.54
18	187.78	92.22
19	196.54	97.03
20	205.24	101.96
21	213.87	107.01
22	222.43	112.18
23	230.92	117.47
24	239.33	122.88
25	247.66	128.41
26	255.92	134.05
27	264.10	139.81
28	272.19	145.68
29	280.21	151.66
30	288.13	157.76
31	295.98	163.96
32	303.73	170.27
33	311.40	176.70
34	318.97	183.23
35	326.45	189.86
36	333.84	196.60
37	341.14	203.44
38	348.33	210.38
39	355.43	217.42
40	360.72	222.82

** Corrected JANBU FOS = 1.417 ** (Fo factor = 1.031)

Failure surface No. 6 specified by 40 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	30.00	30.00
2	39.26	33.78
3	48.49	37.63
4	57.69	41.55
5	66.85	45.54
6	75.99	49.60
7	85.10	53.73
8	94.18	57.93
9	103.22	62.19
10	112.24	66.53
11	121.21	70.93
12	130.16	75.40
13	139.07	79.94
14	147.95	84.54

15	156.79	89.21
16	165.60	93.95
17	174.37	98.76
18	183.10	103.63
19	191.80	108.56
20	200.45	113.57
21	209.07	118.63
22	217.66	123.77
23	226.20	128.97
24	234.70	134.23
25	243.17	139.55
26	251.59	144.94
27	259.97	150.40
28	268.31	155.91
29	276.61	161.49
30	284.87	167.14
31	293.08	172.84
32	301.25	178.61
33	309.38	184.44
34	317.46	190.33
35	325.50	196.28
36	333.49	202.29
37	341.43	208.36
38	349.33	214.49
39	357.19	220.68
40	359.79	222.77

** Corrected JANBU FOS = 1.422 ** (Fo factor = 1.017)

Failure surface No. 7 specified by 41 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	30.00	30.00
2	39.70	32.41
3	49.37	34.97
4	59.00	37.66
5	68.59	40.50
6	78.14	43.48
7	87.64	46.60
8	97.09	49.86
9	106.50	53.26
10	115.85	56.79
11	125.15	60.47
12	134.40	64.28
13	143.59	68.23
14	152.71	72.31
15	161.78	76.52
16	170.79	80.87
17	179.73	85.35
18	188.60	89.96

19	197.40	94.71
20	206.14	99.58
21	214.80	104.58
22	223.38	109.71
23	231.89	114.96
24	240.32	120.34
25	248.67	125.84
26	256.94	131.46
27	265.13	137.21
28	273.23	143.07
29	281.24	149.05
30	289.16	155.16
31	296.99	161.37
32	304.73	167.71
33	312.38	174.15
34	319.93	180.71
35	327.38	187.38
36	334.74	194.15
37	341.99	201.04
38	349.14	208.03
39	356.19	215.12
40	363.13	222.32
41	363.75	222.99

** Corrected JANBU FOS = 1.426 ** (Fo factor = 1.033)

Failure surface No. 8 specified by 41 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	30.00	30.00
2	39.86	31.69
3	49.68	33.56
4	59.47	35.62
5	69.21	37.86
6	78.91	40.29
7	88.57	42.90
8	98.17	45.69
9	107.72	48.66
10	117.20	51.82
11	126.63	55.15
12	136.00	58.66
13	145.29	62.35
14	154.52	66.21
15	163.67	70.24
16	172.74	74.45
17	181.73	78.83
18	190.64	83.37
19	199.45	88.09
20	208.18	92.97
21	216.82	98.02

22	225.35	103.22
23	233.79	108.59
24	242.13	114.12
25	250.35	119.80
26	258.47	125.64
27	266.48	131.63
28	274.37	137.77
29	282.15	144.06
30	289.80	150.49
31	297.33	157.07
32	304.74	163.79
33	312.02	170.65
34	319.17	177.64
35	326.18	184.77
36	333.06	192.03
37	339.79	199.42
38	346.39	206.93
39	352.85	214.57
40	359.16	222.33
41	359.48	222.75

** Corrected JANBU FOS = 1.430 ** (Fo factor = 1.041)

Failure surface No. 9 specified by 41 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	30.00	30.00
2	39.89	31.50
3	49.74	33.18
4	59.57	35.06
5	69.35	37.13
6	79.09	39.39
7	88.79	41.83
8	98.43	44.47
9	108.03	47.29
10	117.57	50.30
11	127.04	53.49
12	136.45	56.87
13	145.80	60.42
14	155.08	64.16
15	164.28	68.08
16	173.40	72.18
17	182.44	76.45
18	191.40	80.89
19	200.27	85.51
20	209.04	90.31
21	217.73	95.27
22	226.31	100.40
23	234.79	105.69
24	243.17	111.15

25	251.44	116.77
26	259.60	122.55
27	267.65	128.49
28	275.58	134.58
29	283.39	140.82
30	291.08	147.22
31	298.64	153.76
32	306.08	160.45
33	313.38	167.28
34	320.55	174.26
35	327.58	181.37
36	334.47	188.61
37	341.22	195.99
38	347.82	203.50
39	354.28	211.13
40	360.59	218.89
41	363.79	222.99

** Corrected JANBU FOS = 1.445 ** (Fo factor = 1.042)

Failure surface No.10 specified by 41 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	30.00	30.00
2	39.95	30.99
3	49.88	32.21
4	59.77	33.64
5	69.64	35.28
6	79.46	37.15
7	89.24	39.23
8	98.98	41.53
9	108.66	44.04
10	118.28	46.76
11	127.84	49.69
12	137.33	52.84
13	146.75	56.19
14	156.10	59.75
15	165.36	63.51
16	174.54	67.48
17	183.63	71.64
18	192.63	76.01
19	201.53	80.57
20	210.32	85.33
21	219.01	90.29
22	227.59	95.43
23	236.05	100.76
24	244.39	106.27
25	252.61	111.97
26	260.70	117.84
27	268.66	123.90

28	276.49	130.12
29	284.17	136.52
30	291.71	143.09
31	299.11	149.82
32	306.36	156.71
33	313.45	163.76
34	320.39	170.96
35	327.16	178.31
36	333.77	185.82
37	340.22	193.46
38	346.49	201.25
39	352.60	209.17
40	358.52	217.23
41	362.52	222.92

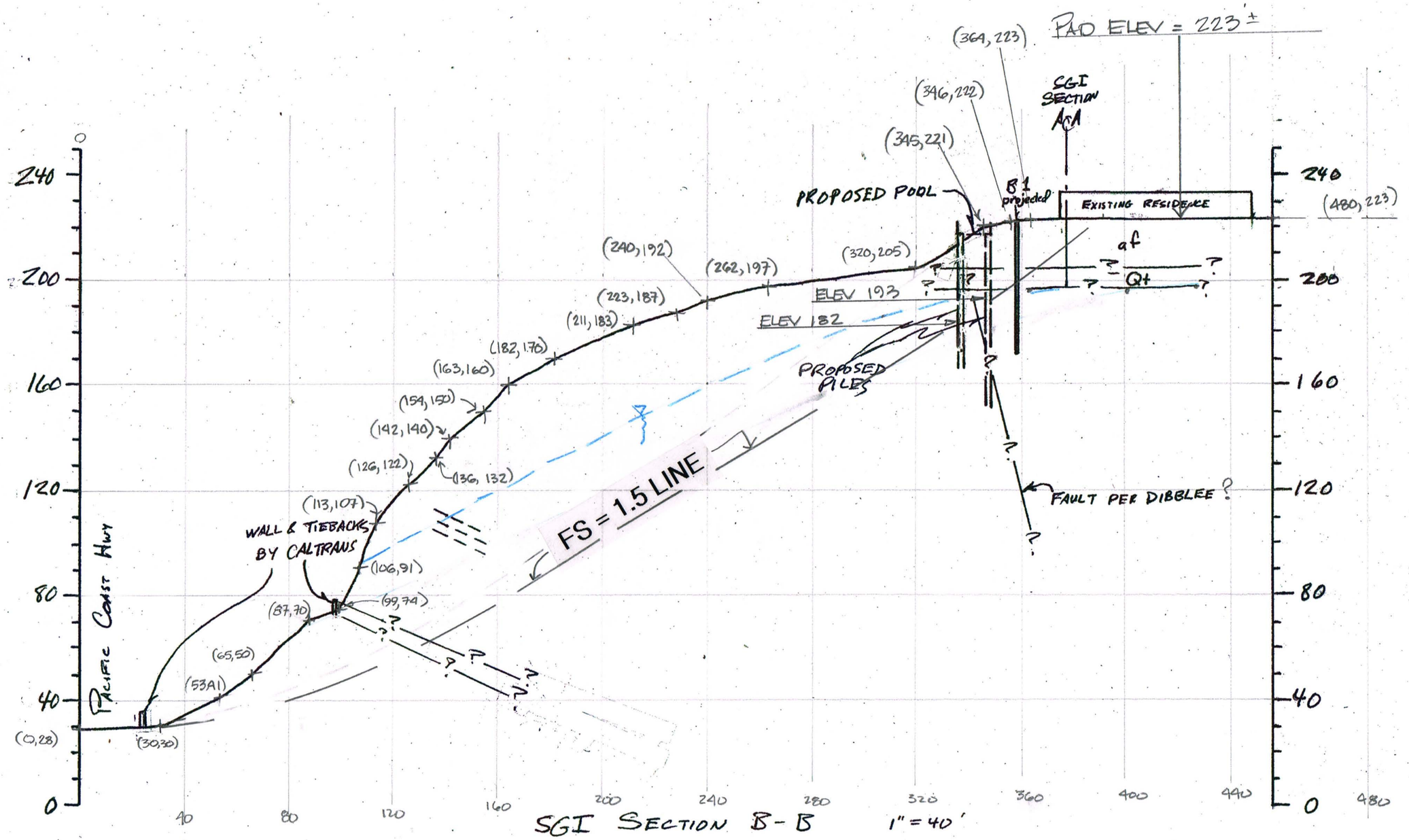
** Corrected JANBU FOS = 1.458 ** (Fo factor = 1.047)

The following is a summary of the TEN most critical surfaces

Problem Description : Roit-Schick 4624CA-0216

	Modified JANBU FOS	Correction Factor	Initial x-coord (ft)	Terminal x-coord (ft)	Available Strength (lb)
1.	1.377	1.038	30.00	336.16	1.292E+06
2.	1.379	1.038	30.00	337.72	1.296E+06
3.	1.388	1.024	30.00	347.18	1.087E+06
4.	1.391	1.043	30.00	337.38	1.406E+06
5.	1.417	1.031	30.00	360.72	1.343E+06
6.	1.422	1.017	30.00	359.79	1.082E+06
7.	1.426	1.033	30.00	363.75	1.410E+06
8.	1.430	1.041	30.00	359.48	1.538E+06
9.	1.445	1.042	30.00	363.79	1.620E+06
10.	1.458	1.047	30.00	362.52	1.728E+06

* * * END OF FILE * * *



SGI SECTION B-B 1" = 40'

SCHICK GEOTECHNICAL, INC.

Geology and Soils Engineering

SG-7430-W

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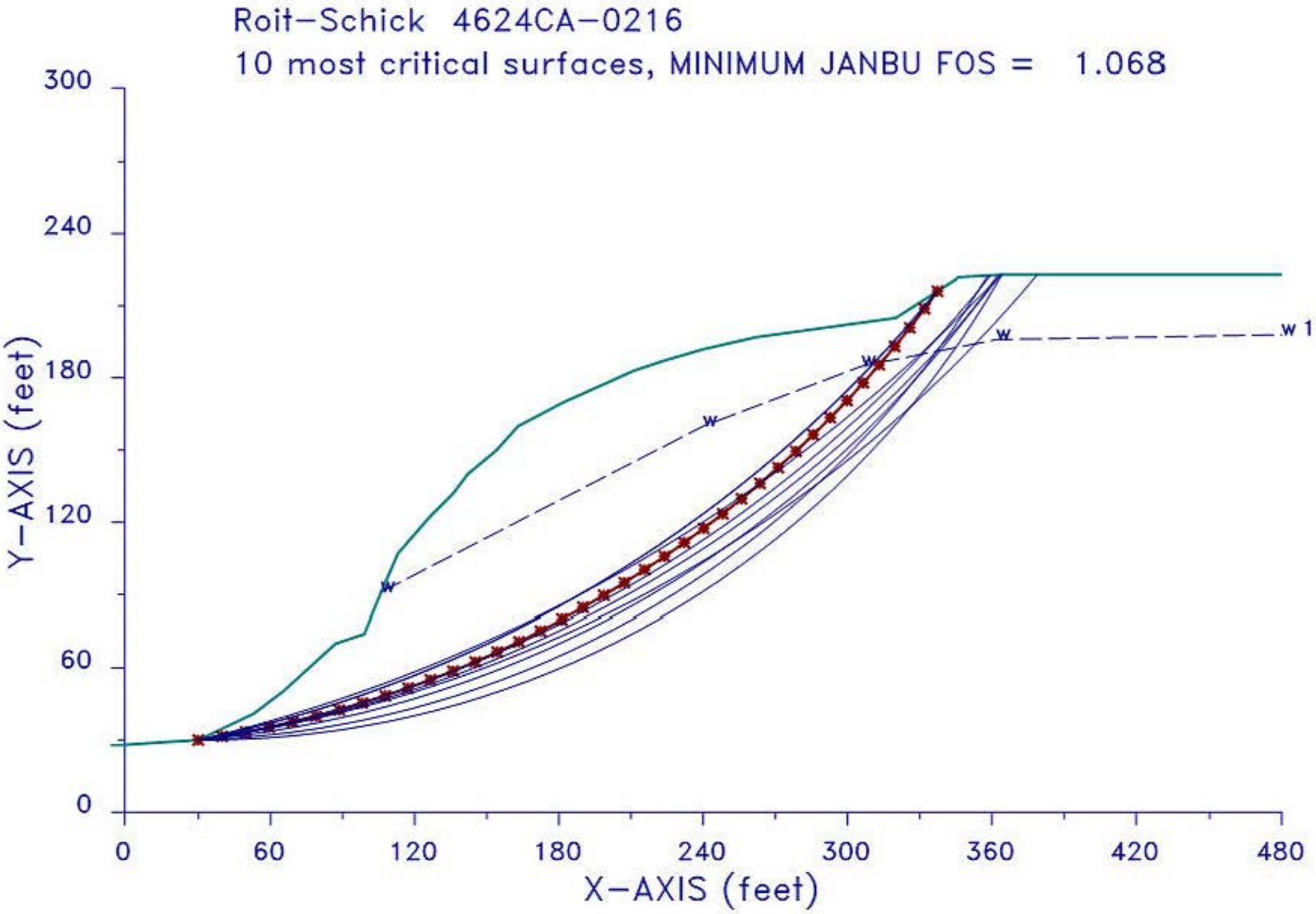

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*****************************************
*          X S T A B L                  *
*                                       *
*      Slope Stability Analysis         *
*            using the                  *
*         Method of Slices              *
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Problem Description : Roit-Schick 4624CA-0216

SEGMENT BOUNDARY COORDINATES
---

22 SURFACE boundary segments

Segment No.	x-left (ft)	y-left (ft)	x-right (ft)	y-right (ft)	Soil Unit Below Segment
1	.0	28.0	30.0	30.0	1
2	30.0	30.0	53.0	41.0	1
3	53.0	41.0	65.0	50.0	1
4	65.0	50.0	87.0	70.0	1
5	87.0	70.0	99.0	74.0	1
6	99.0	74.0	106.0	91.0	1
7	106.0	91.0	113.0	107.0	1
8	113.0	107.0	126.0	122.0	1
9	126.0	122.0	136.0	132.0	1
10	136.0	132.0	142.0	140.0	1
11	142.0	140.0	154.0	150.0	1
12	154.0	150.0	163.0	160.0	1
13	163.0	160.0	182.0	170.0	1
14	182.0	170.0	211.0	183.0	1
15	211.0	183.0	223.0	187.0	1
16	223.0	187.0	240.0	192.0	1
17	240.0	192.0	262.0	197.0	1
18	262.0	197.0	320.0	205.0	1
19	320.0	205.0	345.0	221.0	1
20	345.0	221.0	346.0	222.0	1
21	346.0	222.0	364.0	223.0	1
22	364.0	223.0	480.0	223.0	1

ISOTROPIC Soil Parameters
---

1 Soil unit(s) specified

Soil Unit No.	Weight Moist (pcf)	Sat. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Parameter Ru	Water Constant (psf)	Surface No.
1	132.0	132.0	496.0	33.90	.000	.0	1

1 Water surface(s) have been specified

Unit weight of water = 62.40 (pcf)

Water Surface No. 1 specified by 5 coordinate points

****
PHREATIC SURFACE,
****

Point No.	x-water (ft)	y-water (ft)
1	106.00	91.00
2	240.00	160.00
3	306.00	185.00
4	362.00	196.00
5	480.00	198.00

A critical failure surface searching method, using a random technique for generating CIRCULAR surfaces has been specified.

25 trial surfaces will be generated and analyzed.

25 Surfaces initiate from each of 1 points equally spaced along the ground surface between x = 30.0 ft
and x = 30.0 ft

Each surface terminates between x = 320.0 ft
and x = 450.0 ft

Unless further limitations were imposed, the minimum elevation at which a surface extends is y = 30.0 ft

10.0 ft line segments define each trial failure surface.

ANGULAR RESTRICTIONS

The first segment of each failure surface will be inclined within the angular range defined by :

Lower angular limit := -45.0 degrees
Upper angular limit := 26.0 degrees

Factors of safety have been calculated by the :

* * * * * SIMPLIFIED JANBU METHOD * * * * *

The 10 most critical of all the failure surfaces examined
are displayed below - the most critical first

Failure surface No. 1 specified by 38 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	30.00	30.00
2	39.88	31.56
3	49.72	33.33
4	59.52	35.31
5	69.28	37.51
6	78.98	39.91
7	88.64	42.53
8	98.23	45.35
9	107.76	48.38
10	117.22	51.62
11	126.61	55.05
12	135.93	58.69
13	145.16	62.53
14	154.31	66.57
15	163.36	70.81
16	172.33	75.24
17	181.20	79.86
18	189.96	84.68
19	198.62	89.68
20	207.17	94.87
21	215.60	100.24
22	223.92	105.79
23	232.12	111.53
24	240.18	117.43
25	248.12	123.51
26	255.93	129.76
27	263.60	136.18
28	271.13	142.76
29	278.51	149.50
30	285.75	156.41
31	292.84	163.46
32	299.77	170.67
33	306.54	178.02
34	313.16	185.52
35	319.61	193.16
36	325.89	200.94
37	332.01	208.85
38	337.38	216.12

** Corrected JANBU FOS = 1.068 ** (Fo factor = 1.043)

Failure surface No. 2 specified by 38 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	30.00	30.00
2	39.78	32.10
3	49.51	34.38
4	59.21	36.84
5	68.85	39.49
6	78.44	42.31
7	87.98	45.32
8	97.46	48.50
9	106.88	51.86

10	116.23	55.40
11	125.52	59.11
12	134.73	62.99
13	143.87	67.05
14	152.94	71.28
15	161.92	75.67
16	170.81	80.24
17	179.62	84.97
18	188.34	89.86
19	196.97	94.92
20	205.50	100.14
21	213.93	105.52
22	222.26	111.05
23	230.49	116.74
24	238.60	122.59
25	246.60	128.58
26	254.49	134.72
27	262.27	141.01
28	269.92	147.45
29	277.46	154.03
30	284.86	160.74
31	292.14	167.60
32	299.29	174.59
33	306.31	181.71
34	313.20	188.97
35	319.94	196.35
36	326.55	203.86
37	333.01	211.49
38	336.16	215.34

** Corrected JANBU FOS = 1.078 ** (Fo factor = 1.038)

Failure surface No. 3 specified by 38 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	30.00	30.00
2	39.77	32.11
3	49.51	34.40
4	59.20	36.87
5	68.84	39.53
6	78.43	42.36
7	87.97	45.37
8	97.45	48.55
9	106.86	51.91
10	116.22	55.45
11	125.51	59.16
12	134.72	63.04
13	143.86	67.09
14	152.93	71.31
15	161.91	75.70
16	170.82	80.26
17	179.63	84.98
18	188.36	89.86
19	196.99	94.91
20	205.53	100.11
21	213.97	105.47
22	222.31	110.99
23	230.55	116.67
24	238.67	122.49

25	246.69	128.47
26	254.60	134.59
27	262.39	140.86
28	270.06	147.27
29	277.62	153.83
30	285.04	160.52
31	292.35	167.35
32	299.52	174.32
33	306.57	181.41
34	313.48	188.64
35	320.25	196.00
36	326.89	203.48
37	333.39	211.08
38	337.72	216.34

** Corrected JANBU FOS = 1.080 ** (Fo factor = 1.038)

Failure surface No. 4 specified by 41 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	30.00	30.00
2	39.99	30.46
3	49.96	31.18
4	59.92	32.14
5	69.84	33.35
6	79.74	34.81
7	89.59	36.52
8	99.40	38.48
9	109.15	40.68
10	118.85	43.12
11	128.48	45.80
12	138.04	48.73
13	147.53	51.89
14	156.94	55.29
15	166.25	58.93
16	175.47	62.79
17	184.60	66.89
18	193.61	71.21
19	202.52	75.76
20	211.31	80.53
21	219.98	85.52
22	228.52	90.72
23	236.92	96.14
24	245.19	101.76
25	253.32	107.59
26	261.29	113.62
27	269.11	119.85
28	276.78	126.27
29	284.28	132.89
30	291.61	139.69
31	298.77	146.67
32	305.76	153.82
33	312.56	161.15
34	319.18	168.65
35	325.60	176.31
36	331.84	184.13
37	337.87	192.11
38	343.71	200.23
39	349.33	208.49

40	354.75	216.90
41	358.28	222.68

** Corrected JANBU FOS = 1.083 ** (Fo factor = 1.052)

Failure surface No. 5 specified by 41 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	30.00	30.00
2	39.95	30.99
3	49.88	32.21
4	59.77	33.64
5	69.64	35.28
6	79.46	37.15
7	89.24	39.23
8	98.98	41.53
9	108.66	44.04
10	118.28	46.76
11	127.84	49.69
12	137.33	52.84
13	146.75	56.19
14	156.10	59.75
15	165.36	63.51
16	174.54	67.48
17	183.63	71.64
18	192.63	76.01
19	201.53	80.57
20	210.32	85.33
21	219.01	90.29
22	227.59	95.43
23	236.05	100.76
24	244.39	106.27
25	252.61	111.97
26	260.70	117.84
27	268.66	123.90
28	276.49	130.12
29	284.17	136.52
30	291.71	143.09
31	299.11	149.82
32	306.36	156.71
33	313.45	163.76
34	320.39	170.96
35	327.16	178.31
36	333.77	185.82
37	340.22	193.46
38	346.49	201.25
39	352.60	209.17
40	358.52	217.23
41	362.52	222.92

** Corrected JANBU FOS = 1.088 ** (Fo factor = 1.047)

Failure surface No. 6 specified by 42 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	30.00	30.00
2	40.00	30.06
3	49.99	30.39
4	59.98	30.98
5	69.94	31.83

6	79.88	32.94
7	89.78	34.31
8	99.65	35.94
9	109.47	37.83
10	119.24	39.97
11	128.95	42.37
12	138.59	45.02
13	148.16	47.93
14	157.65	51.09
15	167.05	54.49
16	176.36	58.14
17	185.57	62.03
18	194.68	66.16
19	203.67	70.53
20	212.55	75.13
21	221.30	79.97
22	229.93	85.03
23	238.42	90.32
24	246.76	95.82
25	254.96	101.55
26	263.01	107.48
27	270.90	113.63
28	278.62	119.98
29	286.18	126.53
30	293.56	133.28
31	300.76	140.22
32	307.78	147.34
33	314.60	154.65
34	321.24	162.13
35	327.67	169.79
36	333.91	177.61
37	339.93	185.59
38	345.75	193.72
39	351.35	202.01
40	356.73	210.44
41	361.88	219.01
42	364.15	223.00

** Corrected JANBU FOS = 1.092 ** (Fo factor = 1.055)

Failure surface No. 7 specified by 41 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	30.00	30.00
2	39.86	31.69
3	49.68	33.56
4	59.47	35.62
5	69.21	37.86
6	78.91	40.29
7	88.57	42.90
8	98.17	45.69
9	107.72	48.66
10	117.20	51.82
11	126.63	55.15
12	136.00	58.66
13	145.29	62.35
14	154.52	66.21
15	163.67	70.24
16	172.74	74.45

17	181.73	78.83
18	190.64	83.37
19	199.45	88.09
20	208.18	92.97
21	216.82	98.02
22	225.35	103.22
23	233.79	108.59
24	242.13	114.12
25	250.35	119.80
26	258.47	125.64
27	266.48	131.63
28	274.37	137.77
29	282.15	144.06
30	289.80	150.49
31	297.33	157.07
32	304.74	163.79
33	312.02	170.65
34	319.17	177.64
35	326.18	184.77
36	333.06	192.03
37	339.79	199.42
38	346.39	206.93
39	352.85	214.57
40	359.16	222.33
41	359.48	222.75

** Corrected JANBU FOS = 1.092 ** (Fo factor = 1.041)

Failure surface No. 8 specified by 41 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	30.00	30.00
2	39.89	31.50
3	49.74	33.18
4	59.57	35.06
5	69.35	37.13
6	79.09	39.39
7	88.79	41.83
8	98.43	44.47
9	108.03	47.29
10	117.57	50.30
11	127.04	53.49
12	136.45	56.87
13	145.80	60.42
14	155.08	64.16
15	164.28	68.08
16	173.40	72.18
17	182.44	76.45
18	191.40	80.89
19	200.27	85.51
20	209.04	90.31
21	217.73	95.27
22	226.31	100.40
23	234.79	105.69
24	243.17	111.15
25	251.44	116.77
26	259.60	122.55
27	267.65	128.49
28	275.58	134.58

29	283.39	140.82
30	291.08	147.22
31	298.64	153.76
32	306.08	160.45
33	313.38	167.28
34	320.55	174.26
35	327.58	181.37
36	334.47	188.61
37	341.22	195.99
38	347.82	203.50
39	354.28	211.13
40	360.59	218.89
41	363.79	222.99

** Corrected JANBU FOS = 1.095 ** (Fo factor = 1.042)

Failure surface No. 9 specified by 42 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	30.00	30.00
2	39.90	31.44
3	49.76	33.06
4	59.60	34.86
5	69.40	36.84
6	79.17	39.00
7	88.89	41.33
8	98.57	43.84
9	108.21	46.52
10	117.79	49.38
11	127.32	52.41
12	136.79	55.61
13	146.21	58.98
14	155.56	62.52
15	164.84	66.23
16	174.06	70.11
17	183.21	74.16
18	192.28	78.37
19	201.27	82.74
20	210.18	87.28
21	219.01	91.97
22	227.75	96.83
23	236.40	101.84
24	244.96	107.01
25	253.43	112.34
26	261.80	117.81
27	270.06	123.44
28	278.23	129.21
29	286.29	135.14
30	294.23	141.20
31	302.07	147.41
32	309.80	153.76
33	317.41	160.25
34	324.89	166.88
35	332.26	173.64
36	339.51	180.54
37	346.62	187.56
38	353.61	194.71
39	360.47	201.99
40	367.20	209.39

41	373.79	216.91
42	378.94	223.00

** Corrected JANBU FOS = 1.115 ** (Fo factor = 1.041)

Failure surface No.10 specified by 41 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	30.00	30.00
2	39.70	32.41
3	49.37	34.97
4	59.00	37.66
5	68.59	40.50
6	78.14	43.48
7	87.64	46.60
8	97.09	49.86
9	106.50	53.26
10	115.85	56.79
11	125.15	60.47
12	134.40	64.28
13	143.59	68.23
14	152.71	72.31
15	161.78	76.52
16	170.79	80.87
17	179.73	85.35
18	188.60	89.96
19	197.40	94.71
20	206.14	99.58
21	214.80	104.58
22	223.38	109.71
23	231.89	114.96
24	240.32	120.34
25	248.67	125.84
26	256.94	131.46
27	265.13	137.21
28	273.23	143.07
29	281.24	149.05
30	289.16	155.16
31	296.99	161.37
32	304.73	167.71
33	312.38	174.15
34	319.93	180.71
35	327.38	187.38
36	334.74	194.15
37	341.99	201.04
38	349.14	208.03
39	356.19	215.12
40	363.13	222.32
41	363.75	222.99

** Corrected JANBU FOS = 1.117 ** (Fo factor = 1.033)

The following is a summary of the TEN most critical surfaces

Problem Description : Roit-Schick 4624CA-0216

	Modified JANBU FOS	Correction Factor	Initial x-coord (ft)	Terminal x-coord (ft)	Available Strength (lb)
1.	1.068	1.043	30.00	337.38	1.081E+06
2.	1.078	1.038	30.00	336.16	1.012E+06
3.	1.080	1.038	30.00	337.72	1.016E+06
4.	1.083	1.052	30.00	358.28	1.342E+06
5.	1.088	1.047	30.00	362.52	1.292E+06
6.	1.092	1.055	30.00	364.15	1.445E+06
7.	1.092	1.041	30.00	359.48	1.176E+06
8.	1.095	1.042	30.00	363.79	1.229E+06
9.	1.115	1.041	30.00	378.94	1.334E+06
10.	1.117	1.033	30.00	363.75	1.104E+06

* * * END OF FILE * * *

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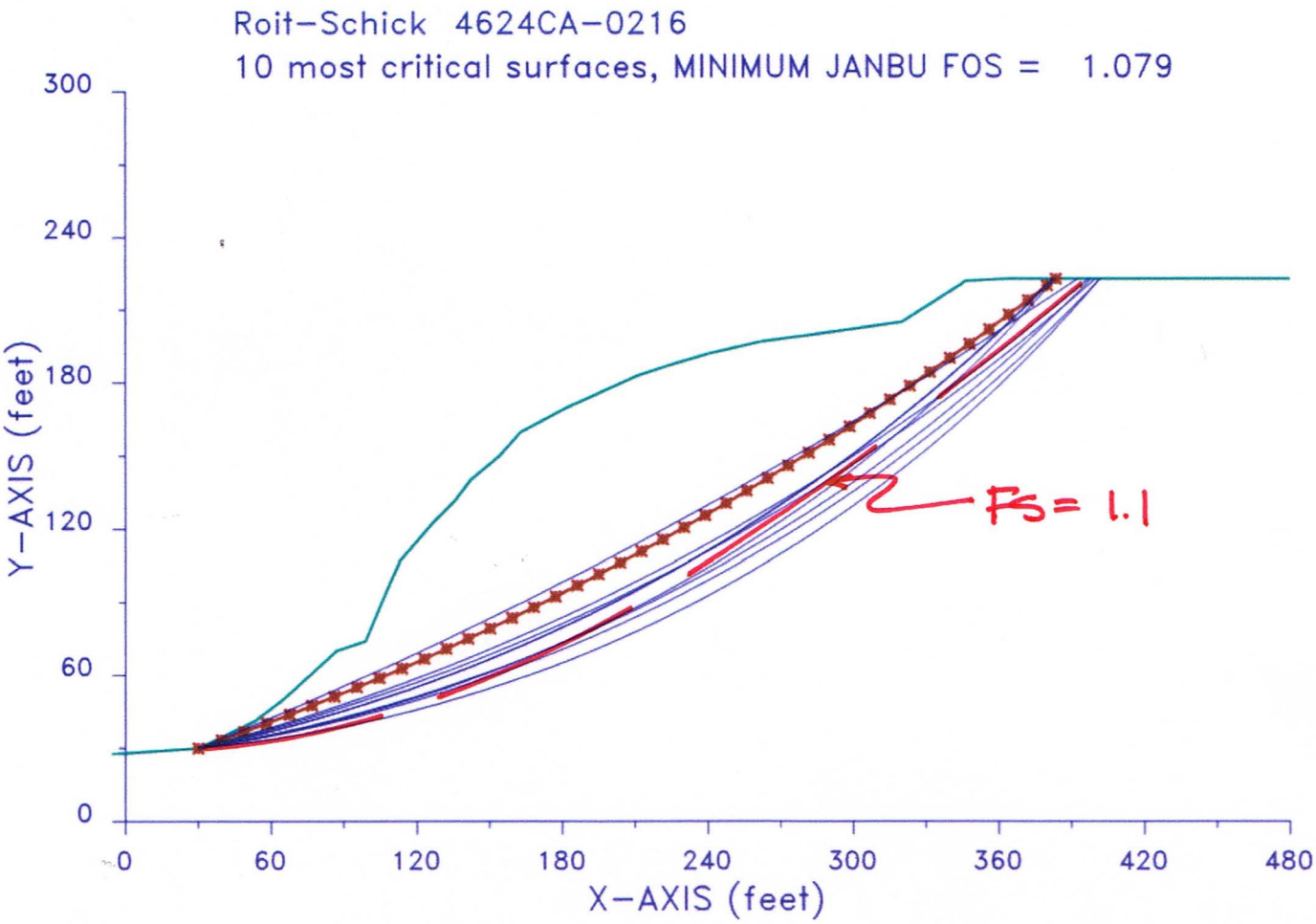

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*            using the                  *
*         Method of Slices              *
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Problem Description : Roit-Schick 4624CA-0216

SEGMENT BOUNDARY COORDINATES
---

22 SURFACE boundary segments

Segment No.	x-left (ft)	y-left (ft)	x-right (ft)	y-right (ft)	Soil Unit Below Segment
1	.0	28.0	30.0	30.0	1
2	30.0	30.0	53.0	41.0	1
3	53.0	41.0	65.0	50.0	1
4	65.0	50.0	87.0	70.0	1
5	87.0	70.0	99.0	74.0	1
6	99.0	74.0	106.0	91.0	1
7	106.0	91.0	113.0	107.0	1
8	113.0	107.0	126.0	122.0	1
9	126.0	122.0	136.0	132.0	1
10	136.0	132.0	142.0	140.0	1
11	142.0	140.0	154.0	150.0	1
12	154.0	150.0	163.0	160.0	1
13	163.0	160.0	182.0	170.0	1
14	182.0	170.0	211.0	183.0	1
15	211.0	183.0	223.0	187.0	1
16	223.0	187.0	240.0	192.0	1
17	240.0	192.0	262.0	197.0	1
18	262.0	197.0	320.0	205.0	1
19	320.0	205.0	345.0	221.0	1
20	345.0	221.0	346.0	222.0	1
21	346.0	222.0	364.0	223.0	1
22	364.0	223.0	480.0	223.0	1

ISOTROPIC Soil Parameters
---

1 Soil unit(s) specified

Soil Unit No.	Unit Weight Moist (pcf)	Sat. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Parameter Ru	Water Constant (psf)	Surface No.
1	132.0	132.0	496.0	33.90	.000	.0	0

A critical failure surface searching method, using a random
technique for generating CIRCULAR surfaces has been specified.

25 trial surfaces will be generated and analyzed.

25 Surfaces initiate from each of 1 points equally spaced
along the ground surface between x = 30.0 ft
and x = 30.0 ft

Each surface terminates between x = 370.0 ft
and x = 470.0 ft

Unless further limitations were imposed, the minimum elevation
at which a surface extends is y = 30.0 ft

10.0 ft line segments define each trial failure surface.

ANGULAR RESTRICTIONS

The first segment of each failure surface will be inclined
within the angular range defined by :

Lower angular limit := -45.0 degrees
Upper angular limit := 26.0 degrees

Factors of safety have been calculated by the :

* * * * * SIMPLIFIED JANBU METHOD * * * * *

The 10 most critical of all the failure surfaces examined
are displayed below - the most critical first

Failure surface No. 1 specified by 42 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	30.00	30.00
2	39.42	33.34
3	48.82	36.76
4	58.19	40.27
5	67.53	43.84
6	76.83	47.50
7	86.11	51.24
8	95.35	55.05
9	104.56	58.95
10	113.74	62.91
11	122.89	66.96
12	132.00	71.08
13	141.07	75.28
14	150.11	79.56
15	159.12	83.91
16	168.08	88.34
17	177.01	92.84
18	185.90	97.42
19	194.75	102.08
20	203.56	106.80
21	212.34	111.60
22	221.07	116.48

23	229.76	121.43
24	238.41	126.45
25	247.01	131.54
26	255.57	136.71
27	264.09	141.95
28	272.57	147.26
29	280.99	152.64
30	289.38	158.09
31	297.71	163.61
32	306.00	169.20
33	314.25	174.86
34	322.44	180.60
35	330.59	186.40
36	338.69	192.26
37	346.73	198.20
38	354.73	204.20
39	362.68	210.27
40	370.57	216.41
41	378.42	222.61
42	378.89	223.00

** Corrected JANBU FOS = 1.464 ** (Fo factor = 1.020)

Failure surface No. 2 specified by 42 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	30.00	30.00
2	39.78	32.10
3	49.52	34.34
4	59.23	36.73
5	68.91	39.27
6	78.54	41.95
7	88.13	44.78
8	97.68	47.75
9	107.18	50.86
10	116.64	54.12
11	126.04	57.51
12	135.40	61.05
13	144.70	64.73
14	153.94	68.54
15	163.12	72.50
16	172.25	76.59
17	181.31	80.82
18	190.31	85.19
19	199.24	89.69
20	208.10	94.32
21	216.89	99.09
22	225.61	103.98
23	234.25	109.01
24	242.82	114.17
25	251.31	119.45
26	259.72	124.86
27	268.05	130.40
28	276.29	136.06
29	284.45	141.85
30	292.51	147.76
31	300.49	153.78
32	308.38	159.93
33	316.18	166.19

34	323.88	172.58
35	331.48	179.07
36	338.98	185.68
37	346.39	192.40
38	353.69	199.23
39	360.89	206.17
40	367.98	213.22
41	374.97	220.37
42	377.46	223.00

** Corrected JANBU FOS = 1.467 ** (Fo factor = 1.034)

Failure surface No. 3 specified by 42 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	30.00	30.00
2	39.77	32.11
3	49.52	34.37
4	59.22	36.77
5	68.90	39.31
6	78.53	42.00
7	88.12	44.83
8	97.67	47.81
9	107.17	50.92
10	116.62	54.18
11	126.03	57.58
12	135.38	61.11
13	144.68	64.79
14	153.92	68.60
15	163.11	72.56
16	172.24	76.64
17	181.30	80.87
18	190.30	85.23
19	199.24	89.72
20	208.10	94.34
21	216.90	99.10
22	225.62	103.98
23	234.27	109.00
24	242.85	114.14
25	251.35	119.42
26	259.77	124.81
27	268.10	130.34
28	276.36	135.98
29	284.53	141.75
30	292.61	147.64
31	300.60	153.65
32	308.51	159.77
33	316.32	166.02
34	324.03	172.38
35	331.65	178.85
36	339.18	185.44
37	346.60	192.14
38	353.93	198.94
39	361.15	205.86
40	368.27	212.88
41	375.28	220.01
42	378.14	223.00

** Corrected JANBU FOS = 1.468 ** (Fo factor = 1.034)

Failure surface No. 4 specified by 42 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	30.00	30.00
2	39.88	31.56
3	49.73	33.29
4	59.54	35.19
5	69.33	37.27
6	79.07	39.52
7	88.77	41.94
8	98.43	44.53
9	108.04	47.28
10	117.61	50.21
11	127.12	53.30
12	136.57	56.57
13	145.96	59.99
14	155.30	63.58
15	164.57	67.33
16	173.77	71.25
17	182.90	75.33
18	191.96	79.56
19	200.94	83.96
20	209.84	88.51
21	218.67	93.22
22	227.40	98.08
23	236.06	103.10
24	244.62	108.26
25	253.09	113.58
26	261.46	119.04
27	269.74	124.65
28	277.92	130.40
29	286.00	136.30
30	293.97	142.34
31	301.83	148.51
32	309.59	154.83
33	317.23	161.28
34	324.76	167.86
35	332.17	174.57
36	339.46	181.42
37	346.63	188.39
38	353.68	195.48
39	360.60	202.70
40	367.40	210.03
41	374.06	217.49
42	378.82	223.00

** Corrected JANBU FOS = 1.483 ** (Fo factor = 1.039)

Failure surface No. 5 specified by 42 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	30.00	30.00
2	39.26	33.78
3	48.49	37.61
4	57.71	41.49
5	66.91	45.42
6	76.08	49.40
7	85.23	53.43
8	94.37	57.50

9	103.48	61.63
10	112.56	65.80
11	121.63	70.02
12	130.67	74.29
13	139.69	78.61
14	148.69	82.98
15	157.66	87.39
16	166.61	91.86
17	175.53	96.37
18	184.43	100.93
19	193.31	105.53
20	202.16	110.18
21	210.99	114.88
22	219.79	119.63
23	228.57	124.43
24	237.32	129.27
25	246.04	134.16
26	254.74	139.09
27	263.41	144.07
28	272.05	149.10
29	280.67	154.17
30	289.26	159.29
31	297.82	164.46
32	306.36	169.67
33	314.87	174.92
34	323.34	180.22
35	331.79	185.57
36	340.22	190.96
37	348.61	196.40
38	356.97	201.88
39	365.31	207.41
40	373.61	212.98
41	381.89	218.60
42	388.30	223.00

** Corrected JANBU FOS = 1.499 ** (Fo factor = 1.013)

Failure surface No. 6 specified by 43 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	30.00	30.00
2	39.65	32.61
3	49.28	35.32
4	58.87	38.14
5	68.43	41.07
6	77.96	44.10
7	87.46	47.24
8	96.92	50.49
9	106.34	53.84
10	115.72	57.29
11	125.07	60.85
12	134.37	64.51
13	143.64	68.28
14	152.86	72.14
15	162.04	76.11
16	171.17	80.19
17	180.26	84.36
18	189.30	88.63
19	198.29	93.01

20	207.24	97.48
21	216.13	102.06
22	224.97	106.73
23	233.76	111.50
24	242.49	116.37
25	251.18	121.33
26	259.80	126.39
27	268.37	131.55
28	276.88	136.80
29	285.33	142.14
30	293.72	147.58
31	302.05	153.11
32	310.32	158.74
33	318.53	164.45
34	326.67	170.26
35	334.74	176.16
36	342.75	182.14
37	350.70	188.22
38	358.57	194.38
39	366.38	200.63
40	374.12	206.97
41	381.78	213.39
42	389.37	219.90
43	392.92	223.00

** Corrected JANBU FOS = 1.505 ** (Fo factor = 1.027)

Failure surface No. 7 specified by 43 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	30.00	30.00
2	39.70	32.41
3	49.38	34.94
4	59.03	37.58
5	68.64	40.33
6	78.22	43.20
7	87.76	46.19
8	97.27	49.28
9	106.74	52.49
10	116.18	55.81
11	125.57	59.24
12	134.92	62.78
13	144.23	66.43
14	153.50	70.19
15	162.72	74.07
16	171.89	78.05
17	181.02	82.14
18	190.09	86.33
19	199.12	90.64
20	208.09	95.05
21	217.01	99.56
22	225.88	104.19
23	234.69	108.91
24	243.45	113.74
25	252.15	118.68
26	260.79	123.72
27	269.37	128.86
28	277.88	134.10
29	286.34	139.44

30	294.73	144.88
31	303.05	150.42
32	311.31	156.05
33	319.50	161.79
34	327.63	167.62
35	335.68	173.55
36	343.66	179.57
37	351.57	185.69
38	359.41	191.90
39	367.18	198.20
40	374.87	204.60
41	382.48	211.08
42	390.01	217.65
43	395.99	223.00

** Corrected JANBU FOS = 1.517 ** (Fo factor = 1.028)

Failure surface No. 8 specified by 43 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	30.00	30.00
2	39.86	31.69
3	49.69	33.53
4	59.49	35.52
5	69.25	37.66
6	78.99	39.96
7	88.68	42.41
8	98.34	45.00
9	107.95	47.75
10	117.53	50.65
11	127.05	53.69
12	136.53	56.88
13	145.95	60.22
14	155.33	63.70
15	164.65	67.33
16	173.91	71.11
17	183.11	75.03
18	192.25	79.09
19	201.32	83.29
20	210.33	87.63
21	219.27	92.11
22	228.14	96.73
23	236.93	101.49
24	245.65	106.38
25	254.30	111.41
26	262.86	116.57
27	271.35	121.86
28	279.75	127.29
29	288.06	132.84
30	296.29	138.53
31	304.43	144.34
32	312.48	150.27
33	320.43	156.33
34	328.29	162.52
35	336.05	168.82
36	343.72	175.25
37	351.28	181.79
38	358.74	188.45
39	366.09	195.22

40	373.34	202.11
41	380.49	209.11
42	387.52	216.22
43	394.02	223.00

** Corrected JANBU FOS = 1.524 ** (Fo factor = 1.036)

Failure surface No. 9 specified by 44 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	30.00	30.00
2	39.89	31.50
3	49.75	33.15
4	59.58	34.96
5	69.39	36.93
6	79.16	39.06
7	88.89	41.35
8	98.59	43.79
9	108.25	46.38
10	117.86	49.14
11	127.43	52.04
12	136.95	55.10
13	146.42	58.32
14	155.84	61.68
15	165.20	65.20
16	174.50	68.86
17	183.75	72.68
18	192.93	76.64
19	202.04	80.75
20	211.09	85.01
21	220.07	89.41
22	228.98	93.96
23	237.81	98.65
24	246.57	103.48
25	255.25	108.45
26	263.84	113.55
27	272.35	118.80
28	280.78	124.18
29	289.12	129.70
30	297.37	135.35
31	305.53	141.14
32	313.59	147.05
33	321.56	153.09
34	329.43	159.27
35	337.20	165.56
36	344.87	171.98
37	352.43	178.52
38	359.88	185.19
39	367.23	191.97
40	374.47	198.87
41	381.60	205.89
42	388.61	213.02
43	395.50	220.26
44	398.03	223.00

** Corrected JANBU FOS = 1.542 ** (Fo factor = 1.038)

Failure surface No.10 specified by 44 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	30.00	30.00
2	39.95	30.99
3	49.88	32.17
4	59.79	33.53
5	69.67	35.07
6	79.52	36.79
7	89.34	38.70
8	99.12	40.78
9	108.86	43.05
10	118.55	45.49
11	128.20	48.12
12	137.80	50.92
13	147.35	53.89
14	156.84	57.04
15	166.27	60.37
16	175.64	63.87
17	184.94	67.54
18	194.17	71.38
19	203.33	75.39
20	212.42	79.57
21	221.42	83.92
22	230.35	88.43
23	239.19	93.11
24	247.94	97.94
25	256.60	102.94
26	265.17	108.10
27	273.64	113.41
28	282.01	118.88
29	290.28	124.50
30	298.45	130.28
31	306.51	136.20
32	314.45	142.27
33	322.29	148.49
34	330.00	154.84
35	337.60	161.34
36	345.08	167.98
37	352.44	174.76
38	359.66	181.67
39	366.76	188.71
40	373.73	195.88
41	380.57	203.18
42	387.27	210.61
43	393.83	218.15
44	397.89	223.00

** Corrected JANBU FOS = 1.558 ** (Fo factor = 1.043)

The following is a summary of the TEN most critical surfaces
Problem Description : Roit-Schick 4624CA-0216

	Modified JANBU FOS	Correction Factor	Initial x-coord (ft)	Terminal x-coord (ft)	Available Strength (lb)
1.	1.464	1.020	30.00	378.89	1.318E+06
2.	1.467	1.034	30.00	377.46	1.601E+06
3.	1.468	1.034	30.00	378.14	1.604E+06
4.	1.483	1.039	30.00	378.82	1.746E+06
5.	1.499	1.013	30.00	388.30	1.282E+06
6.	1.505	1.027	30.00	392.92	1.608E+06
7.	1.517	1.028	30.00	395.99	1.684E+06
8.	1.524	1.036	30.00	394.02	1.855E+06
9.	1.542	1.038	30.00	398.03	1.944E+06
10.	1.558	1.043	30.00	397.89	2.080E+06

* * * END OF FILE * * *

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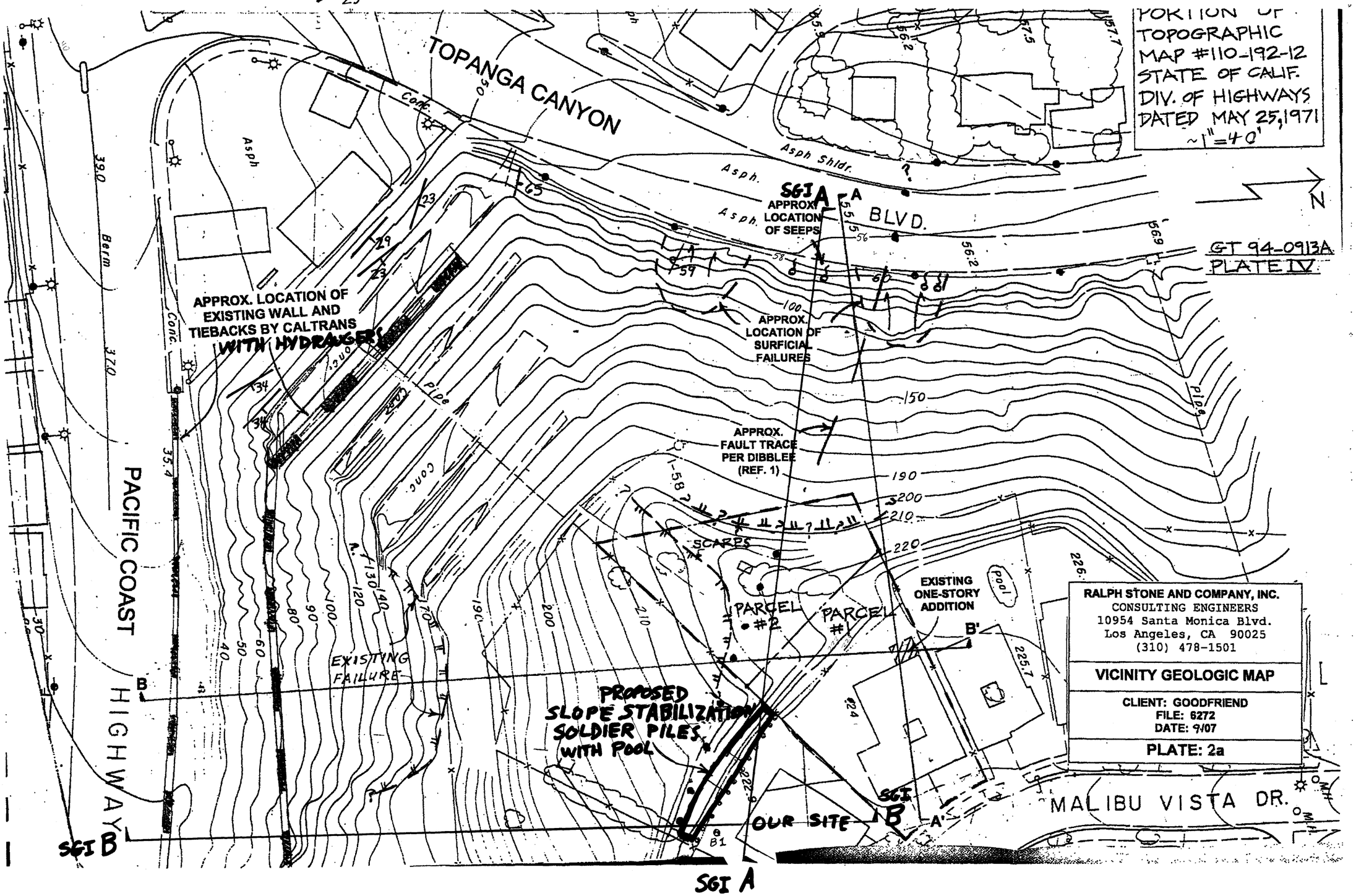
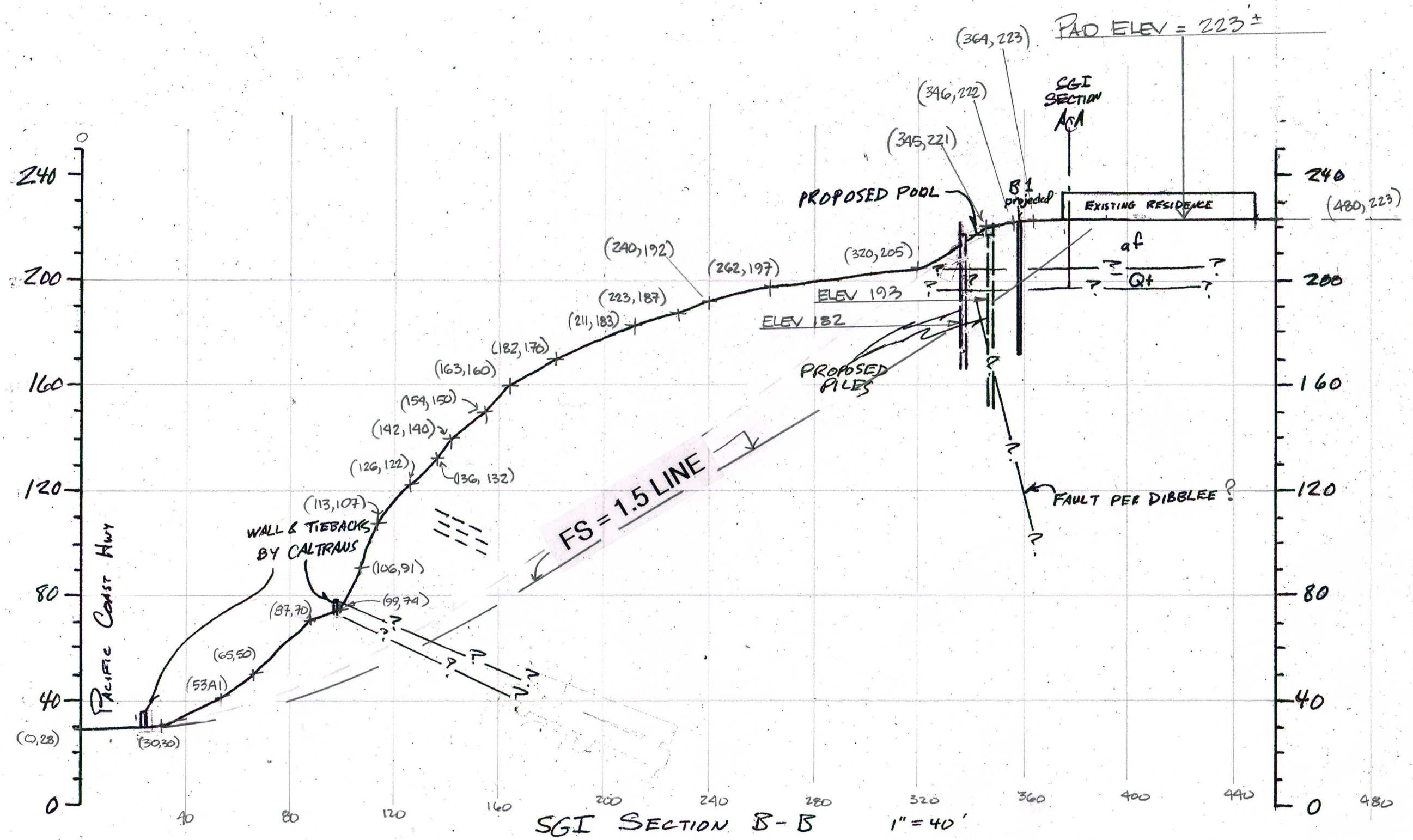
GEOLOGIC MAP

23 STRIKE AND DIP OF BEDDING

B1 ● LOCATION AND NUMBER OF BORINGS



SG 7430-W



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