GeoConcepts, Inc.

Geology • Geotechnical Engineering

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UPDATE GEOLOGIC AND SOILS
ENGINEERING INVESTIGATION

Proposed Single Family Residence

24677 Dry Canyon Cold Creek

Calabasas, California

for

Nate Otto

P.O. Box 261

Palm Springs, CA 92263

Project 2922

November 4, 2004

UPDATE GEOLOGIC AND SOILS ENGINEERING INVESTIGATION

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INTRODUCTION

GeoConcepts, Inc. has agreed to assume the responsibility as the engineering geologist and soils engineer of record for the proposed project. California GeoSystems, Inc. was the prior geology and soils engineering consultant of record. Their reports dated August 2, 1988 and June 10, 2004 were reviewed and the geologic and soils engineering recommendations are agreed to and accepted by GeoConcepts, Inc., except for the noted changes herein for the proposed project.

This report presents the results of an Update Geologic and Soils Engineering Investigation based upon the currently proposed grading plan. The purpose of this investigation has been to ascertain the subsurface conditions pertaining to the proposed project. Review of the project included reconnaissance mapping, description of earth materials, determine geologic structure, engineering analyses and preparation of this report. Results of the project include findings, conclusions and appropriate recommendations covering the proposed project.

SCOPE

The scope of this investigation includes the following:

- Review of preliminary plans by JSA.
- Review of (2) borings. Explorations were backfilled with the excavated materials but not compacted.
- Preparation of the enclosed Geologic Map and Cross Sections (see Appendix I).
- Review of reference materials and available public reports at the County of Los Angeles (see Appendix IV).
- Presentation of findings, conclusions and recommendations for the proposed project.

JSA prepared the topographic base map utilized in this investigation. Preliminary grading plans were prepared by JSA and utilized as a base map for this investigation. It consists of one sheet plotted to a scale of one-inch equals thirty feet.

The scope of this investigation is limited to the project area explored as depicted on the Geologic Map. This report is not a comprehensive evaluation of the entire property. This report has not been prepared for use by other parties or for other purposes, and may not contain sufficient information for other than the intended use. Prior to use by others, GeoConcepts, Inc. should be consulted to determine if additional work is required. If construction is delayed more than one year, this office should be contacted to verify current site conditions and prepare an update report.

PROPOSED DEVELOPMENT

It is our understanding that the site will be developed with a single-family residence and detached garage.

Grading will consist of conventional cut and fill methods to create a level building pad and driveway. Final building and grading plans have not been prepared and await the conclusions and recommendations of this investigation.

SITE DESCRIPTION

Location and Description

Access to the property is via Dry Canyon Cold Creek from Mulholland Highway (see Location Map). The site was vacant. Grading on the site has created a steep cut slope about (25) feet high and descending dumped fill slopes to create a level pad area.

The pad has a light to moderately dense growth of vegetation consisting of grasses, shrubs and trees. Vegetation is moderately dense to dense in the natural areas consisting of ground cover, shrubs and trees.

Topography

Topographically, the property is situated on the nose of a northeast trending ridge within the northeast portion of the Santa Monica Mountains. The property essentially consists of a near-level pad cut into the hillside with ascending slopes to the west and descending slopes to the south, east and north. Maximum topographic relief in the development area is about (150) feet. Ascending slopes from the pad have a general gradient of 2:1 or less, (horizontal to vertical) with the exception of the approximate (25) foot high cut slope adjacent to the pad area. Descending slopes display a general gradient of 2:1 or less, (horizontal to vertical). Details of the topography are depicted on the Location Map and Geologic Map in Appendix I.

Drainage

Surface water at the site consists of direct precipitation onto the property and runoff from surrounding slopes to the west. Much of this water drains as sheet flow down descending slopes to low-lying areas and/or offsite.

Groundwater

No active surface groundwater seeps or springs were observed on the subject site. The subsurface exploration did not encounter groundwater to a depth of (50) feet. Seasonal fluctuations of groundwater levels may occur by varying amounts of rainfall, irrigation and recharge.

SUMMARY OF FINDINGS

Previous Works

GeoSystems, Inc. prepared a Preliminary Soils and Engineering Geologic Investigation covering the subject site dated August 8, 1988. GeoSystems, Inc. prepared an Updated Soils Engineering-Geologic Report covering the subject site dated June 10, 2004. The proposed development was similar to the currently proposed development. It is our understanding the reports and previous grading plans were reviewed and approved by the County of Los Angeles.

Stratigraphy

The site is underlain by sedimentary rocks of Miocene time that are covered by Holocene earth materials and artificial fill. The earth materials encountered on the subject property are briefly described below. Approximate depths and more detailed descriptions are given in the enclosed Exploration Logs (see Appendix II).

Fill (Af)

Previous grading has resulted in fill placement on the subject site. Fill materials were presumably placed during cutting for the existing pad. The fill consists primarily of cut sandstone and siltstone. The approximate limit of the existing fill is shown on the attached geologic map and cross sections.

Native Soil (Qs)

Native soil reported by GeoSystems consists of silty sands with sandstone fragments.

Quaternary Alluvium (Qal)

Alluvial deposits reported by GeoSystems consisted of clayey and silty sands.

Bedrock (Tt)

Bedrock exposed on-site and underlying the Holocene deposits is assigned to the Topanga Formation of Miocene time. It consists of sandstone and siltstone beds. The sandstone beds are orange brown, slightly moist, well bedded dense. Siltstone beds are interbedded with the sandstone and they are gray, slightly moist, thinly bedded and dense. The contact between the artificial fill and bedrock is approximately located on the geologic map.

Geologic Structure

The local area has been uplifted and tilted by past tectonic forces forming an east-west trending homocline that is inclined to the north. At the site, the bedrock structure is undulating and folded, and similar to the local structure.

The bedrock if fold with a general northern strikes and south. No dominant patterns of adversely orientated fractures or joints were observed during the subsurface investigation.

Critical anticipated bedrock structure is depicted on the geologic cross sections. Preliminary geologic data indicates the proposed development is favorable from the standpoint of geology and soils engineering, Cross Sections A and B.

Seismicity

No known active fault is anticipated to daylight beneath the proposed residence. Therefore, ground rupture due to fault movement is not anticipated. There are several active and/or potentially active faults within Los Angeles County. Therefore, any future movement on these faults could possibly affect the structure due to seismic shaking. However, all of Southern California is in a seismically active region. The time, location, and/or magnitude of fault movement or an earthquake can not be accurately predicted.

Ground motion caused by an earthquake is likely to occur at the site during the lifetime of the development due to the proximity of several active and potentially active faults. A computer program for the deterministic prediction of peak horizontal acceleration from digitized California faults was utilized and is provided in the Appendix II. Generally, on a regional scale, quantitative predictions of ground motion values are linked to peak acceleration and repeatable acceleration, which is a response to earthquake magnitudes relative to the fault distance from the subject property.

This seismic evaluation is designed to provide the client with current, rational and believable seismic data that could affect the property during the lifetime of the proposed improvements. The minimum design acceleration for a project is listed in the Unified Building Code. It is recommended that the structural design of the proposed dwelling be based on current design acceleration practices of similar projects in the area.

Landslides

Ancient or recent bedrock landslides were not observed on the property. Also, no recent surficial slope failures or slumps were observed in the natural areas within the proposed project area. Surficial slumping and erosion was observed within the dumped fill on the property.

Slope Stability

Stability analysis was performed for the proposed slopes depicted on cross sections A. Gross stability analysis indicates that the proposed slope is grossly stable, refer to Appendix II for calculations.

CONCLUSIONS

1. Based on the results of this investigation and a thorough review of the proposed development, as discussed, the project is suitable for the intended use providing the following recommendations are incorporated into the design and subsequent construction of the project. Also, the development must be performed in an acceptable manner conforming to building code requirements of the controlling governing agency.

2. Based on the State of California Seismic Hazard Maps, the subject site is not located within a liquefaction or landslide hazard zone.

3. The geotechnical input for the UBC seismic design parameters are: Fault Type B (Malibu Coast), Fault Distance (4.7) kilometers and Soil Type SC.

4. Cracks were observed within the fill at the southeast portion of the existing pad area.

5. Based upon field observations, laboratory testing and analysis, the bedrock found in the exploration should possess sufficient strength to support the residence, garage and compacted fill.

Building Setbacks

Standard requirements from the governmental reviewing agency for building setbacks are applicable. Generally, footings adjacent to a descending slope steeper than 3:1 in gradient shall be located a distance one-third of the vertical height of the slope with a minimum of five (5) feet and a maximum of forty (40) feet measured horizontally from the slope face. Where the slope is steeper than 1:1 (horizontal to vertical), the required setback shall be measured from an imaginary plane at (45) degrees to the horizontal, projected upward from the toe of the slope. Buildings adjacent to ascending slopes shall be set back from the toe of the slope a level distance equal to one half the vertical height of the slope, but need not exceed 15 feet.

RECOMMENDATIONS

Specific

1. The existing fill should be removed from the slope and pad, or removed and replaced as compacted fill.
2. To create a uniform building pad for the residence and garage, the existing fill and soil should be removed and replaced as compacted fill. In addition, the proposed removals should extend a minimum of four feet below the proposed foundations.
3. The proposed garage and residence should be supported on foundations embedded into compacted fill.
4. The homeowner shall maintain the site as outlined in the Drainage and Maintenance Section.

Drainage and Maintenance

The site shall be maintained as outlined in the General Specifications in Appendix III below.

Grading and Earthwork

Proposed grading will consist of removal the existing dumped fill and compacted fill placement for the proposed driveway and building pads. All grading shall be carried forth as outlined in the GRADING SPECIFICATIONS section in Appendix III.

Foundations

It is recommended that the proposed structure be founded into compacted fill. All foundations shall maintain the required code setback from any slope.

The minimum continuous footing size is (12) inches wide and (24) inches deep into the compacted fill, measured from the lowest adjacent grade of compacted fill. Continuous footings may be proportioned, using a bearing value of (1500) pounds per square foot. Column footings placed into the compacted fill may be proportioned, using a bearing value of (2000) pounds per square foot, and should be a minimum of (2) feet in width and (24) inches deep, below the lowest adjacent grade of compacted fill

All continuous footings shall be reinforced with a minimum of (4) #(5) bars, two placed near the top and two near the bottom. Reinforcing recommendations are minimums and may be revised by the structural engineer.

The bearing values given above are net bearing values; the weight of concrete below grade may be neglected. These bearing values may be increased by one-third (1/3) for temporary loads, such as, wind and seismic forces.

All footing excavation depths will be measured from the lowest adjacent grade of recommended bearing material. Footing depths will not be measured from any proposed elevations or grades. Any foundation excavations that are not the recommended depth into the recommended bearing materials will not be acceptable to this office.

Lateral loads may be resisted by friction at the base of the conventional foundations and by passive resistance within the compacted fill. A coefficient of friction of (0.3) may be used between the foundations and the compacted fill. The passive resistance may be assumed to act as a fluid with a density of (300) pounds per cubic foot. A maximum passive earth pressure of (4500) pounds per square foot may be assumed. For isolated poles, the allowable passive earth pressure may be doubled.

Settlement

Settlement of the proposed residence will occur.

Settlement of (1/4) to (1/2) inches between walls, within 20 feet or less, of each other, and under similar loading conditions, are considered normal. Total settlement on the order of (1/2) inches should be anticipated.

Excavations

Excavations ranging in vertical height up to (5) feet will be required for the grading. Conventional excavation equipment may be used to make these excavations. Excavations should expose fill. These soils should be trimmed back at 1:1 (h:v) gradient. This should be verified by the project soils engineer during construction so that modifications can be made if variations in the soil occur.

All excavations should be stabilized within 30 days of initial excavation. If this time is exceeded, the project soils engineer must be notified, and modifications, such as shoring or slope trimming may be required. Water should not be allowed to pond on top of the excavation, nor to flow toward it. All excavations should be protected from inclement weather. Excavations should be kept moist, not saturated, to reduce the potential for raveling and sloughing during construction. No vehicular surcharge should be allowed within three feet (3') of the top of cut.

Retaining Walls

Cantilever retaining walls should be designed to resist an active earth pressure such as that exerted by compacted backfill or retained slope. The active earth pressure should be taken as equivalent to the pressure exerted by a fluid weighing per the following table.

Surface Slope of Retained Material Horizontal to Vertical	Equivalent Fluid Weight lb/ft.
Level	30
5 to 1	32
4 to 1	35
3 to 1	38
2 to 1	43
1½ to 1	55
1 to 1	80

The wall pressure stated assumes that the wall has been backfilled as outlined in the wall backfill section in Appendix III.

Foundation design parameters, as given in the preceding section, may be used for retaining walls.

Slabs on Grade

Slabs on grade should be reinforced with minimum #4 reinforcing bars, placed at (16) inches on center each way. Floor slabs underlain by (4) inches of crusher-run base, compacted into place by mechanical means may be supported directly on compacted fill.

A plastic vapor barrier should protect floors that may be affected by moisture. This barrier should be placed on a one inch (1") layer of sand to help prevent punctures in the vapor barrier and to aid in the cure of the concrete.

Footing trench spoils should either be removed from the slab areas or compacted into place by mechanical means and tested for compaction.

Exterior slabs planned adjacent to descending slopes should be provided with a thickened edge. The thickened edge should be a minimum of (12) inches wide and (24) inches deep and two #4 bars. Slabs should be provided with proper control joints. Typical concrete shrinkage can result in cracks and gaps along control joints and where slabs connect with structures. The gaps will require periodic caulking to limit infiltration of moisture.

Provisions for controlling shrinkage cracks should be incorporated into the design and construction of the foundation system and slabs. Therefore, concrete slabs should have sufficient control joint spaced at a maximum of approximately 8 feet. Two-car garage slab should be quartered or saw cut slabs to mitigate cracking and isolated from the stem wall footing. These recommendations are considered as minimum unless superceded by the structural engineer.

Sewage

A detailed septic report shall be provided after the percolation testing.

REVIEWS

Plan Review and Plan Notes

The final grading, building, and/or structural plans shall be reviewed and approved by the consultants to ensure that all recommendations are incorporated into the design or shown as notes on the plan.

The final plans should reflect the following:

1. The Preliminary Geologic and Soils Engineering Investigation by GeoConcepts, Inc. is a part of the plans.

2. Plans must be reviewed and signed by the soils engineer and geologist.

3. The project soils engineer and/or geologist must review all grading.

4. The project soils engineer and/or geologist shall review all foundations.

5. All seepage pits shall be field inspected, downhole logged and approved by the project engineering geologist

Construction Review

Reviews will be required to verify all geologic and geotechnical work. It is required that all footing excavations, seepage pits, and grading be reviewed by this office. This office should be notified at least **two working days** in advance of any field reviews so that staff personnel may be made available.

The property owner should take an active role in project safety by assigning responsibility and authority to individuals qualified in appropriate construction safety principles and practices. Generally, site safety should be assigned to the general contractor or construction manager that is in control of the site and has the required expertise, which includes but not limited to construction means, methods and safety precautions.

LIMITATIONS

General

Findings, conclusions and recommendations contained in this report are based upon the surface mapping, subsurface exploration, data analyses, and specific information as described and past experience. Earth materials and conditions immediately adjacent to, or beneath those observed may have different characteristics, such as, earth type, physical properties and strength. Therefore, no representations are made as to the nature, quality, or extent of latent earth materials. Site conditions can and do change from those that were first envisioned. During construction, if subsurface conditions differ from those encountered in the described exploration, this office should be advised immediately so that appropriate action can be taken.

Findings, conclusions and recommendations presented herein are based on experience and background. Therefore, findings, conclusions and recommendations are professional opinions and are not meant to indicate a control of nature.

Expansive soils were encountered on the subject property. Design for foundations, slabs on grade, and retaining walls have been provided to mitigate this soil condition. These designs do not guarantee or warrant that cracking will not occur.

This limited report provides information regarding the geologic findings on the subject property. It is not designed to provide a guarantee that the site will be free of hazards in the future, such as, landslides, slippage, differential settlement, debris flows, seepage, concentrated drainage or flooding. Hillside properties are subject to hazards, which are not found with flatland properties.

It may not be possible to eliminate all hazards, but homeowners must maintain their property and improve deficiencies.

This report may not be copied. If you wish additional copies, you may order them from this office.

111 Statement

It is the finding of this corporation, based upon the subsurface data that the proposed project will be safe from landslide, settlement or slippage and will not adversely affect adjacent property, provided this corporation's recommendations and those of the County of Los Angeles and Uniform Building Code are followed and maintained.

CONSTRUCTION NOTICE

Construction can be difficult. Recommendations contained herein are based upon surface reconnaissance and subsurface explorations deemed suitable by your consultants.

It is this Corporation's aim to advise you through this report of the general site conditions, suitability for construction, and overall stability. It must be understood that the opinions are based upon testing, analysis, and interpretation thereof.

Quantities for foundation concrete and steel may be estimated, based on the findings given in this report. However, you must be aware that depths and magnitudes will most likely vary between the explorations given in the report.

We appreciate the opportunity of serving you on this project. If you have any questions concerning this report, please contact the undersigned.

Respectfully submitted,
GEOCONCEPTS, INC.

Scott J. Walter
Project Engineer
GE 2476

Robert L. Sousa
Project Geologist
CEG 1315

SJW/RLS: -2922-1

Distribution: (6) Addressee

APPENDIX I

SITE INFORMATION

Location Map

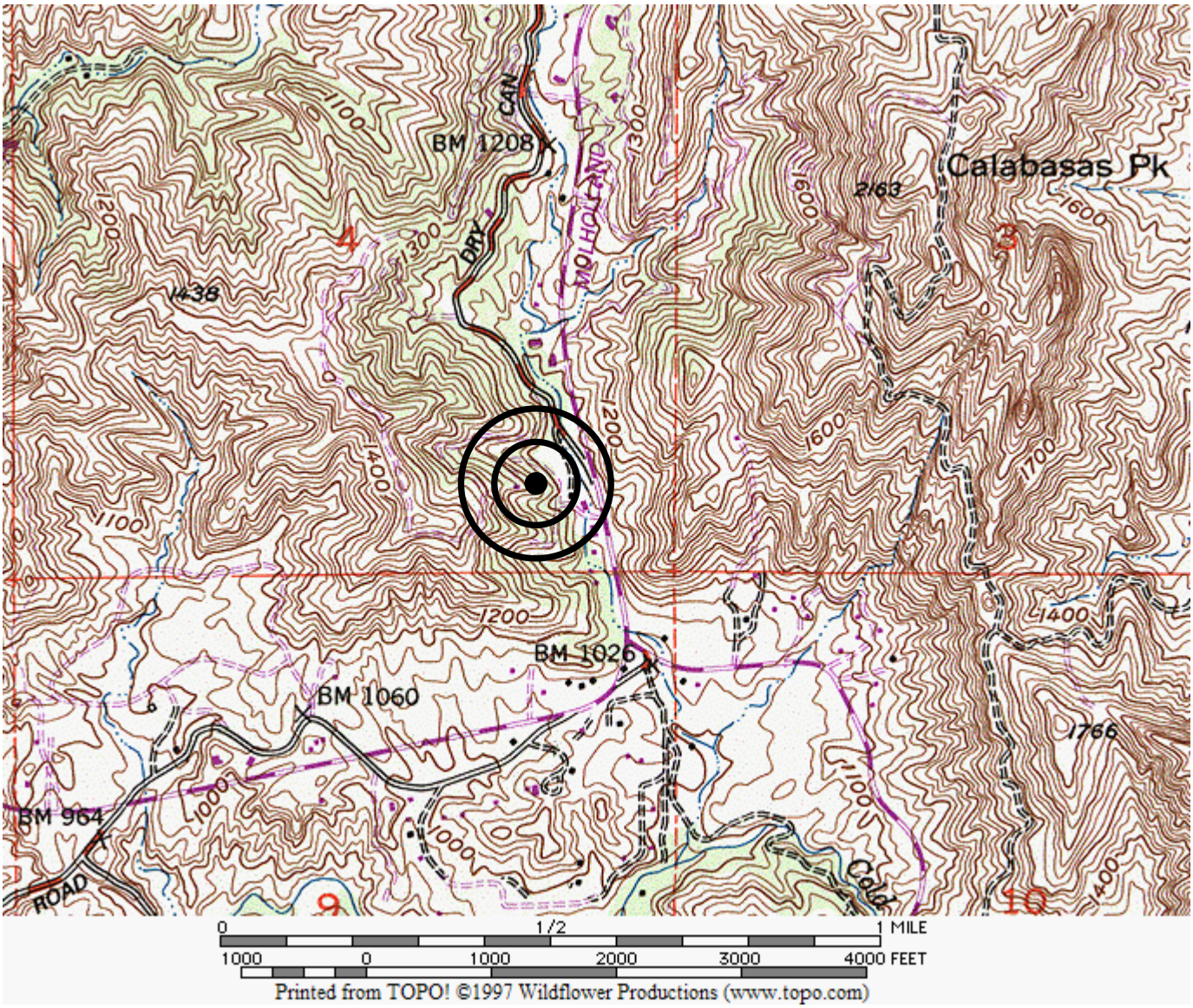
Geologic Maps

Cross Sections

Field Exploration

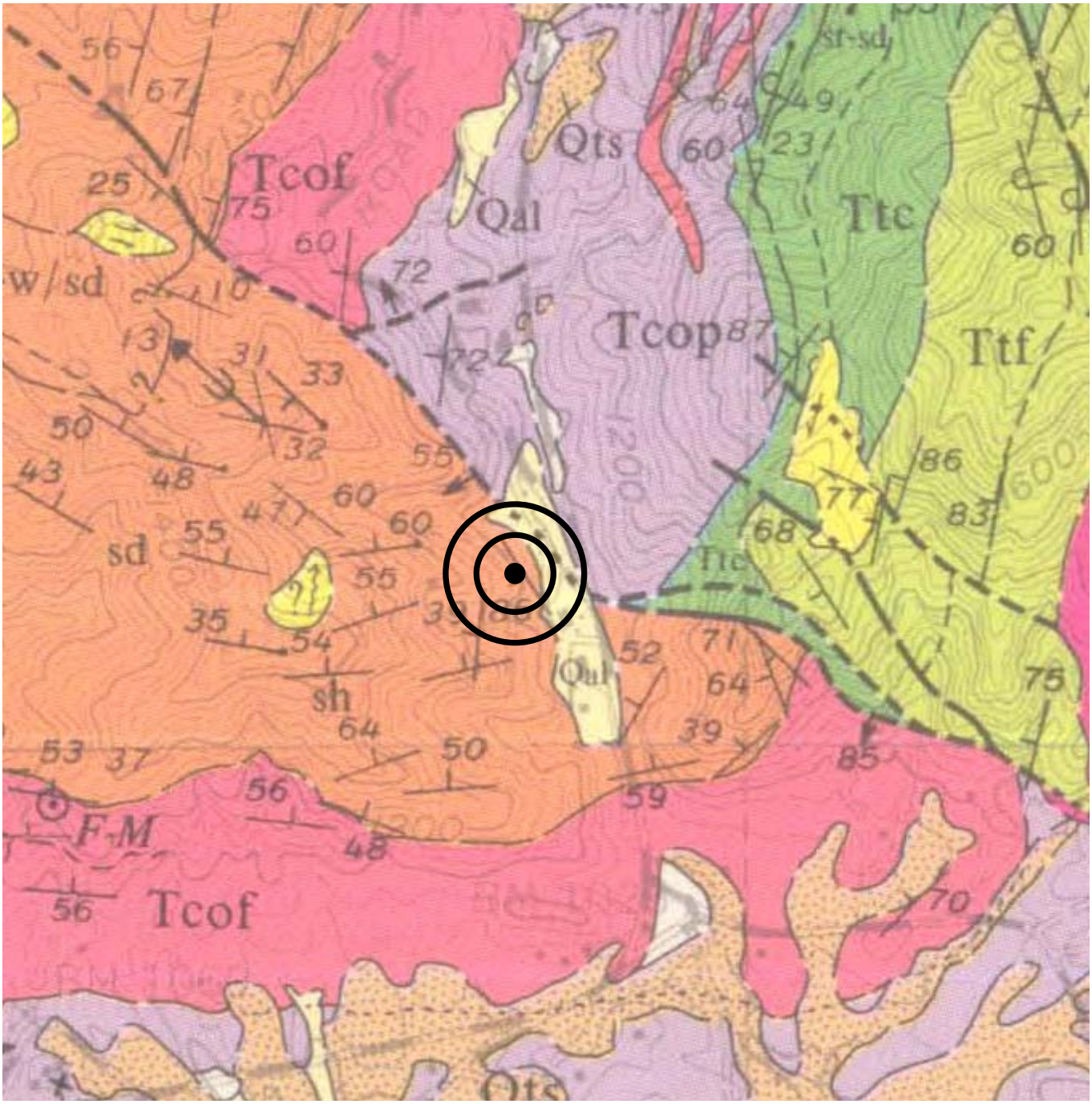
Borings 1 through 2
Explorations by Others

LOCATION



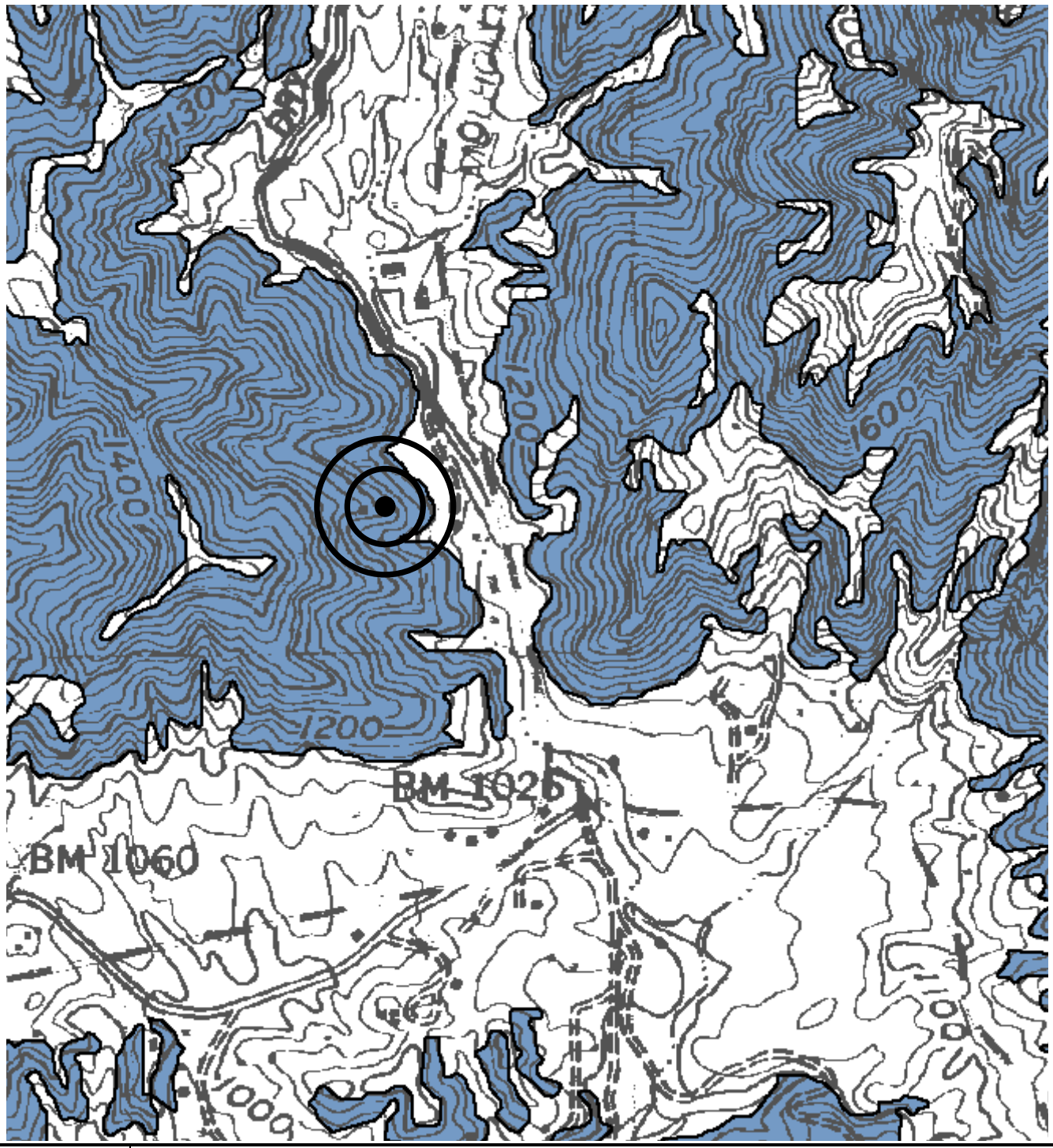
Reference:	TOPO	Scale As Shown
Project Address:	24677 Dry Canyon Cold Creek Road Calabasas, California	

REGIONAL GEOLOGIC MAP

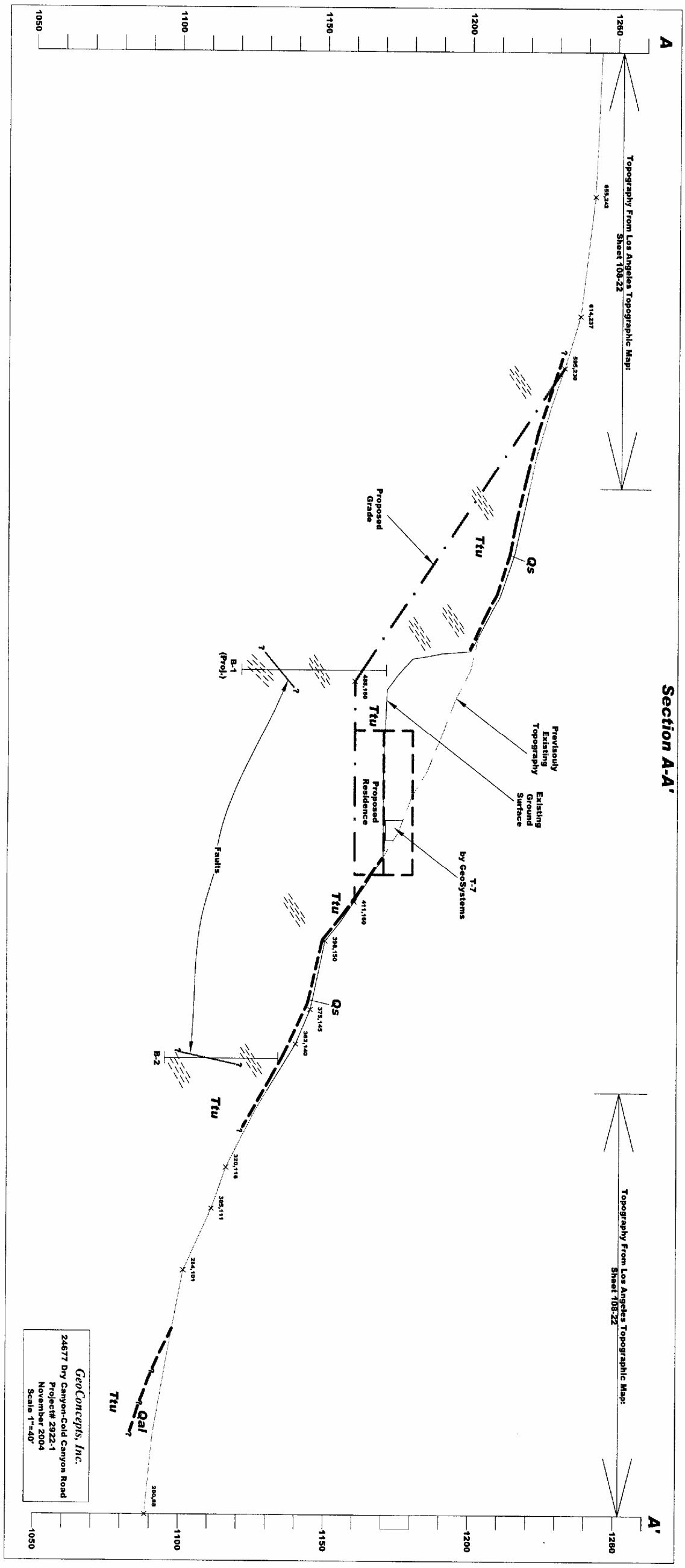


Reference:	Yerkes, R.F., and Campbell, R.H., 1980, Geologic Map of East-Central Santa Monica Mountains Scale: 1" = 2000'
Project Address:	24677 Dry Canyon Cold Creek Road Calabasas, California

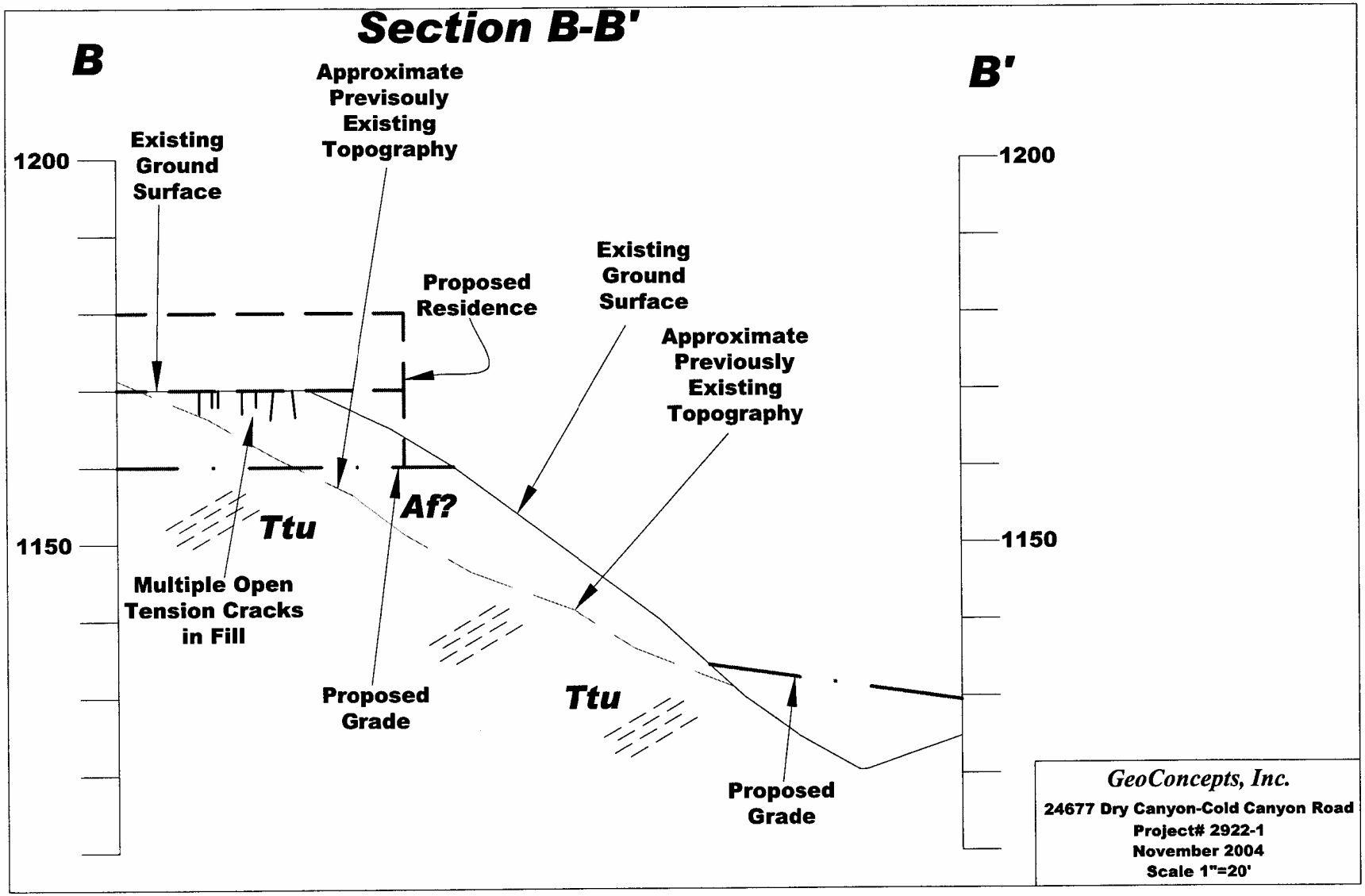
SEISMIC HAZARD MAP



Reference:	State of California Seismic Hazard Map of the Malibu Beach Quadrangle	Scale: 1" = 2000'
Project Address:	24677 Dry Canyon Cold Creek Road Calabasas, California	



GeoConcepts, Inc.
24677 Dry Canyon-Cold Canyon Road
Project# 2922-1
November 2004
Scale 1"=40'


Section B-B'
B
B'
1200
1150
Existing Ground Surface
Approximate Previsouly Existing Topography
Proposed Residence
Existing Ground Surface
Approximate Previously Existing Topography
Ttu
Af?
Multiple Open Tension Cracks in Fill
Proposed Grade
Ttu
Proposed Grade
1200
1150
GeoConcepts, Inc.
24677 Dry Canyon-Cold Canyon Road
Project# 2922-1
November 2004
Scale 1"=20'

Field Exploration

A field exploration of the site was conducted in September, 2004. The soils and geologic conditions were mapped by a representative of this office (refer to Exploration Logs). Subsurface exploration was performed by a drill rig trenching into the underlying earth materials. Explorations were excavated to a maximum depth of (50) feet. The Geologic Map in Appendix I depicts locations of the subsurface explorations.

BORING: B - 1

ADDRESS: 24677 Dry Canyon-Cold Creek Road

PROJECT NO.: 2922

DATE LOGGED: September 16, 2004

LOGGED BY: SB

ATTITUDES (b - bedding, j - joint, s - shear, f - fault)	WATER CONTENT, %	UNIT DRY WEIGHT, PCF	BLOWS/FOOT	SAMPLES	DEPTH, FT	GRAPHIC LOG	DESCRIPTION
							0.0 - 50.0' **BEDROCK; Tt,**
@ 2.0' 190, 37W - b							@ 2.0' sandstone and siltstone, orangish-brown and brown, slightly moist, well-bedded, slightly oxidized, highly fractured, moderately weathered, gypsum crystals in fractures.
					5		@ 2.5' decrease in fracturing.
							@ 6.0' siltstone, dark orangish-brown, slightly moist, well-bedded.
							@ 7.0' sandstone, buff, slightly moist, moderately-cemented, dense, hard; gypsum veinlets, discontinuous, undulatory.
					10		
@ 11.0' 174, 42W - b							@ 11.0' sandstone, reddish-brown, slightly moist, medium-grained, thick-bedded,
							@ 11.5' siltstone, gray, slightly moist, thinly-bedded, well-bedded.
							@ 12.5 - 15.0' sandstone, buff, slightly moist, medium-grained, weakly-cemented, thick-bedded.
					15		@ 15.0' siltstone, brown and gray, slightly moist, well-bedded.
							@ 15.5' sandstone lens, buff, slightly moist, discontinuous, 12" long, 3" thick.
@ 17.5' 163, 40W - b							
					20		@ 19.5' sandstone, buff, slightly moist, interbedded with siltstone, dark brown, slightly moist.
@ 22.5' 168, 43W - b							@ 22.5' siltstone, gray, slightly moist, thinly-bedded, well-bedded, slightly fractured, gypsum crystals.
					25		
							@ 23.5-31.0' sandstone, buff, slightly moist, medium- to coarse-grained, massive, hard, dense, moderately-cemented, thick-bedded; from 30.0' to 31.0' increase in hardness, well-cemented.

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Sheet 1 of 2

BORING: B - 1

ADDRESS: 24677 Dry Canyon-Cold Creek Road

PROJECT NO.: 2922

DATE LOGGED: September 16, 2004

LOGGED BY: SB

ATTITUDES b - bedding j - joint s - shear f - fault	WATER CONTENT, %	UNIT DRY WEIGHT, PCF	BLOWS/FOOT	SAMPLES	DEPTH, FT	GRAPHIC LOG	DESCRIPTION
@ 31.0' 160, 41W - b @ 34.5' 270, 35S - b NW side of hole below the fault @ 36.0' 257, 28S - b NW side of hole below the fault @ 37.0' 076, 74SE - f @ 43.0' 162, 46W - b @ 45.0' 171, 46W - b					35 40 45 50 55		@ 31.0 - 32.0' siltstone, light brown, orangish-brown, and gray, slightly moist, thin-bedded, slightly undulatory. @ 32.0 - 33.0' muddy siltstone, dark brown, slightly moist. @ 33.0 - 37.0' fault, ¼" thick, sandstone, white and orangish-brown, slightly moist, iron-oxide staining. @ 33.5' SE side of hole above the fault is sandstone, light reddish-brown to buff, slightly moist, massive, medium- to coarse-grained, poorly-cemented, truncated by steeply-dipping fault; NW side of hole below the fault is sandstone, buff, massive, slightly moist, truncated by steeply-dipping fault. @ 36.0' sandstone, buff, slightly moist, massive, coarse-grained, thick-bedded. @ 37.0' pebbly sandstone, buff, slightly moist, moderately-cemented. @ 39.0' sandstone, buff, slightly moist, locally fractured, massive, moderately- to well-cemented, medium dense, moderately hard. @ 42.0' silty sandstone, orangish-brown to brown, slightly moist, fine-grained, slightly undulatory. @ 43.0' siltstone and sandstone fine-grained, orangish-brown and buff, slightly moist. @ 44.0' siltstone, dark brown to black, slightly moist, slightly foliate. @ 45.5 - 50.0' sandstone, buff, slightly moist, medium- to coarse-grained.
							Total Depth 50.0 Feet. No Groundwater. No Caving.

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Sheet 2 of 2

BORING: B - 2

ADDRESS: 24677 Dry Canyon-Cold Creek Road PROJECT NO.: 2922

DATE LOGGED: September 16, 2004 LOGGED BY: SB

ATTITUDES b - bedding j - joint s - shear f - fault	WATER CONTENT, %	UNIT DRY WEIGHT, PCF	BLOWS/FOOT	SAMPLES	DEPTH, FT	GRAPHIC LOG	DESCRIPTION
							0.0 - 39.0' **BEDROCK; Tt,**
							@ 3.0' siltstone and sandstone, brown to orangish-brown, slightly moist, moderately weathered, moderately fractured, few roots.
					5		
@7.0' 175, 28W - b							@ 6.0' siltstone and sandstone, decrease in weathering.
							@ 9.0' sandstone, buff and reddish-brown, slightly moist, medium-grained, poorly-cemented; interbedded with siltstone, dark brown and orangish-brown, slightly moist, moderately fractured, slightly weathered, few small roots.
					10		@ 11.0' sandstone, buff, slightly moist, dense.
							@ 11.5' siltstone, brown to orangish-brown, slightly moist.
							@ 13.5' sandstone, buff and reddish-brown, slightly moist, medium-grained, poorly-cemented; interbedded with siltstone, dark brown and orangish-brown, slightly moist, moderately fractured, slightly weathered; gypsum crystal veinlets, undulatory, discontinuous.
@ 15.0' 171, 29W - b					15		
							@ 17.0' sandstone, orangish-brown, slightly moist, massive, thick-bedded.
							@ 18.0' siltstone, dark brown, slightly moist; interbedded with sandstone, orangish-brown, slightly moist.
					20		
@ 22.5' 166, 39W - b							@ 22.0' sandstone layer, buff, slightly moist, ~8" thick.
							@ 22.5' siltstone, dark brown, slightly moist, well-bedded, 1.5" thick; truncated by fault.
@ 24.0' 175, 79W - f @ 24.0' 176, 46W - b							@ 22.5 - 26.5' ¼" thick fault, sandy with minor fines, white colored, slightly moist; clay gouge locally at

GeoConcepts, Inc.

Sheet 1 of 2

BORING: B - 2

ADDRESS: 24677 Dry Canyon-Cold Creek Road

PROJECT NO.: 2922

DATE LOGGED: September 16, 2004

LOGGED BY: SB

ATTITUDES b - bedding j - joint s - shear f - fault	WATER CONTENT, %	UNIT DRY WEIGHT, PCF	BLOWS/FOOT	SAMPLES	DEPTH, FT	GRAPHIC LOG	DESCRIPTION
@ 29.0' 210, 47W - b					30 35		lowest point of fault trace in hole, no slickenlines. @ 24.0' east of fault and below fault; siltstone, dark brown and orangish-brown, slightly moist, moderately weathered, truncated by fault. @ 26.5' siltstone, brown, slightly moist to locally moist, weathered, gypsum crystals. @ 27.0' siltstone, dark brown, slightly moist, slightly foliate. @ 28.0' poorly-bedded; gypsum crystal veinlets, discontinuous.
					40 45		Total Depth 39.0 Feet. No Groundwater. No Caving. Downhole logged on ladder to 29.0 Feet.

GeoConcepts, Inc.

Sheet 2 of 2

GEO SYSTEMS, INC.

JOB NO. 88-638

LOGGED BY SBM

TRENCH LOG NO. 1-4

PROJECT 24600 DRY CYN/COLD CREE

DATE 7/11/88

LITHOLOGY	BEDDING	FAULTING	JOINTS
T-1, T-3, T-4 1) SOIL-SILTY SAND, FINE GRAIN, FIRM, POROUS, DRY WITH SANDSTONE BLOCKS TO 2' DIAMETOR, (ANGULAR) 2) BEDROCK-SANDSTONE/SILTSTONE, TAN BROWN FIRM MODERATE TO WELL CEMENTED SANDSTONE, AND WELL BEDDED MODERATE CEMENTED GREY BROWN SILTSTONES, SLIGHT TO MODERATE FRACTURES, DRY, DENSE. (Tu) T-2 ARTIFICAL FILL-SILTY SAND, MEDIUM BROWN, LOOSE, ABUNDANT WOOD FRAGMENTS AND OPEN AIR POCKETS (FR M RECENT BRUSHING) Qal-SANDSTONE BOULDERS IN SILTY SAND MATRIX POROUS DRY, SLIGHTLY DENSE, BOULDERS VERY WELL CEMENTED, A UNDANT ROOTS			

SCALE 1"=5'

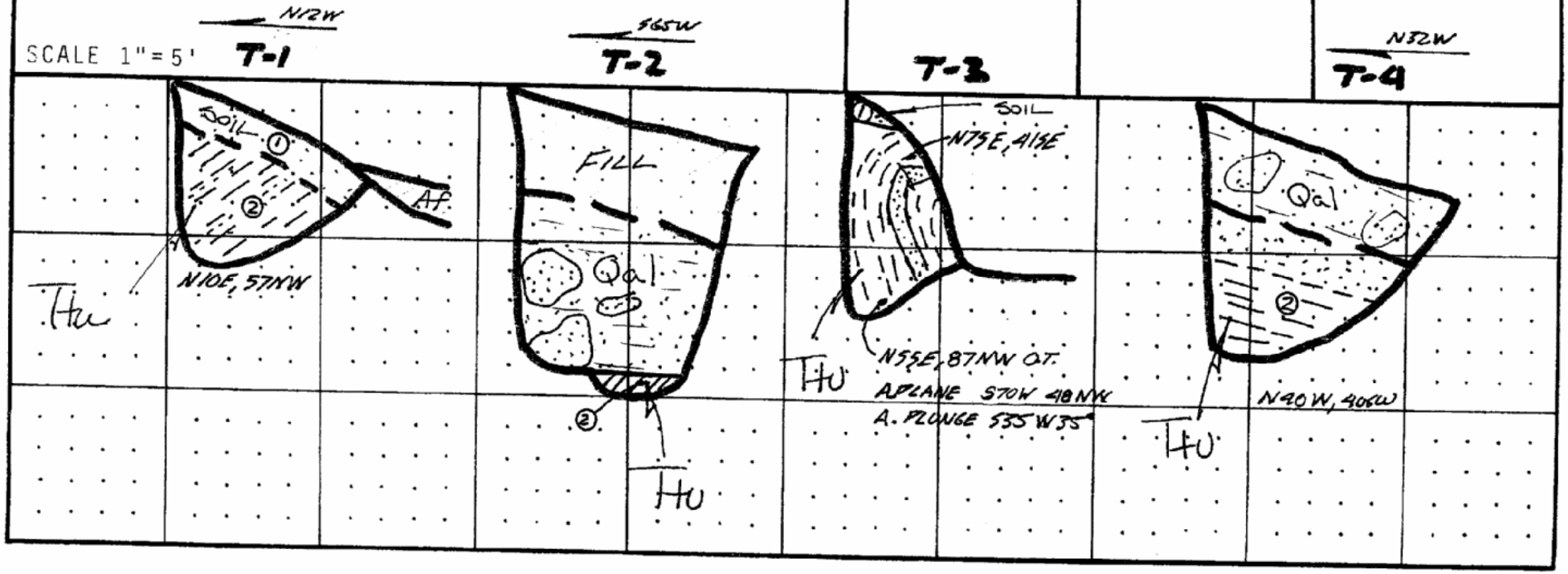


PLATE 1

GEO SYSTEMS, INC.

JOB NO. 88-638

LOGGED BY SBM

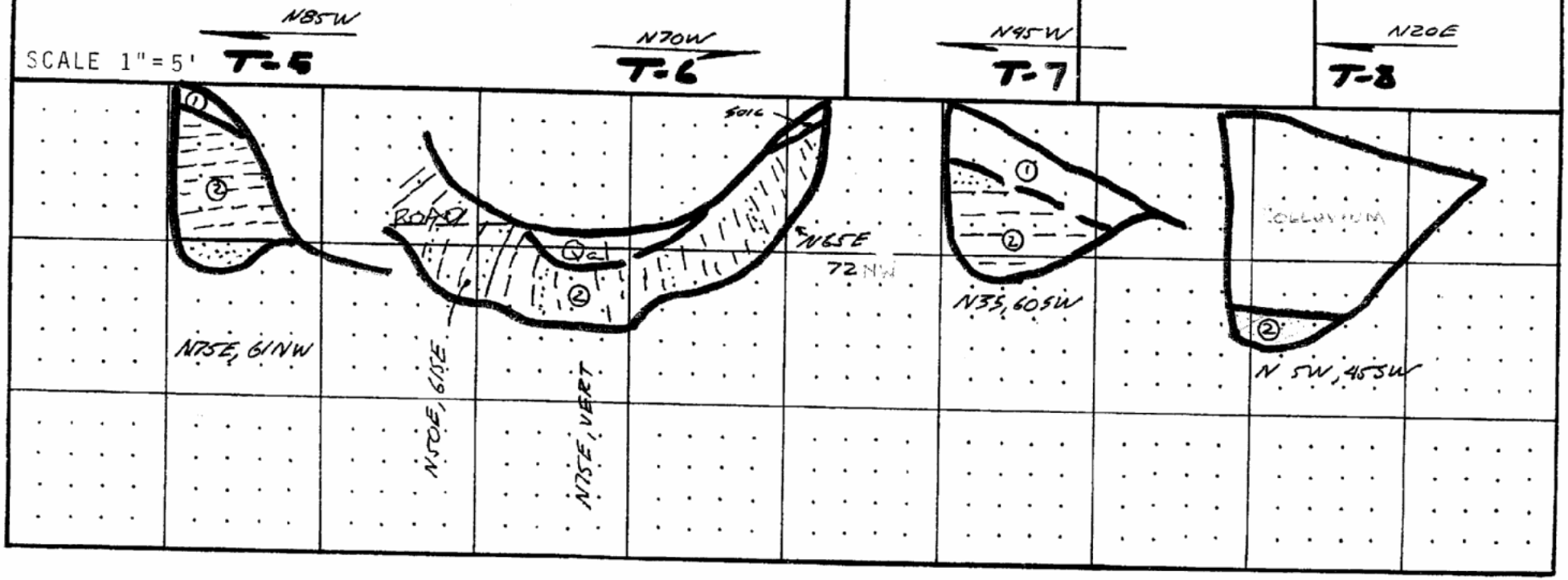
TRENCH LOG NO. 5-8

PROJECT 24600 DRY CYN/COLD CRE

DATE 7/11/88

LITHOLOGY	BEDDING	FAULTING	JOINTS
COLLUVIUM- FROM SMALL SURFICIAL FAILURE SANDSTONE BLOCKS IN SILTY SAND MATRIX, DRY, POROUS, FIRM 1) SOIL-(SAME AS T-1) 2) BEDROCK-(SAME AS T-1)			

SCALE 1"=5'



PLATE

GEO SYSTEMS, INC.

JOB NO. 88-638

LOGGED BY SBM

TRENCH LOG NO. 9-11

PROJECT 24600 DRY CYN/COLD CRE

DATE 7/11/88

LITHOLOGY	BEDDING	FAULTING	JOINTS
ARTIFICAL FILL- FIRM, SILTY SAND. Qal-ANGULAR SANDSTONE BLOCKS IN BROWN SANDSTONE AND MATRIX DAMP FIRM, POROUS 1) SOIL-(SAME AS T-1) 2) BEDROCK-(SAME AS T-1)			

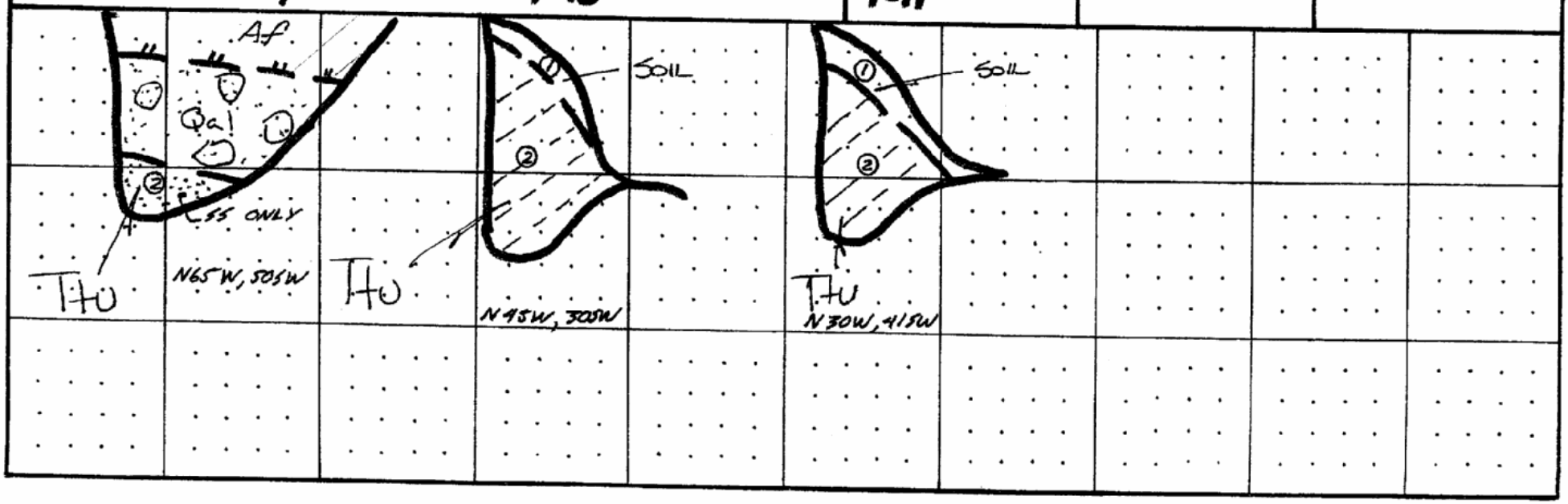


PLATE 13

APPENDIX II

ENGINEERING ANALYSIS

Bearing Capacity

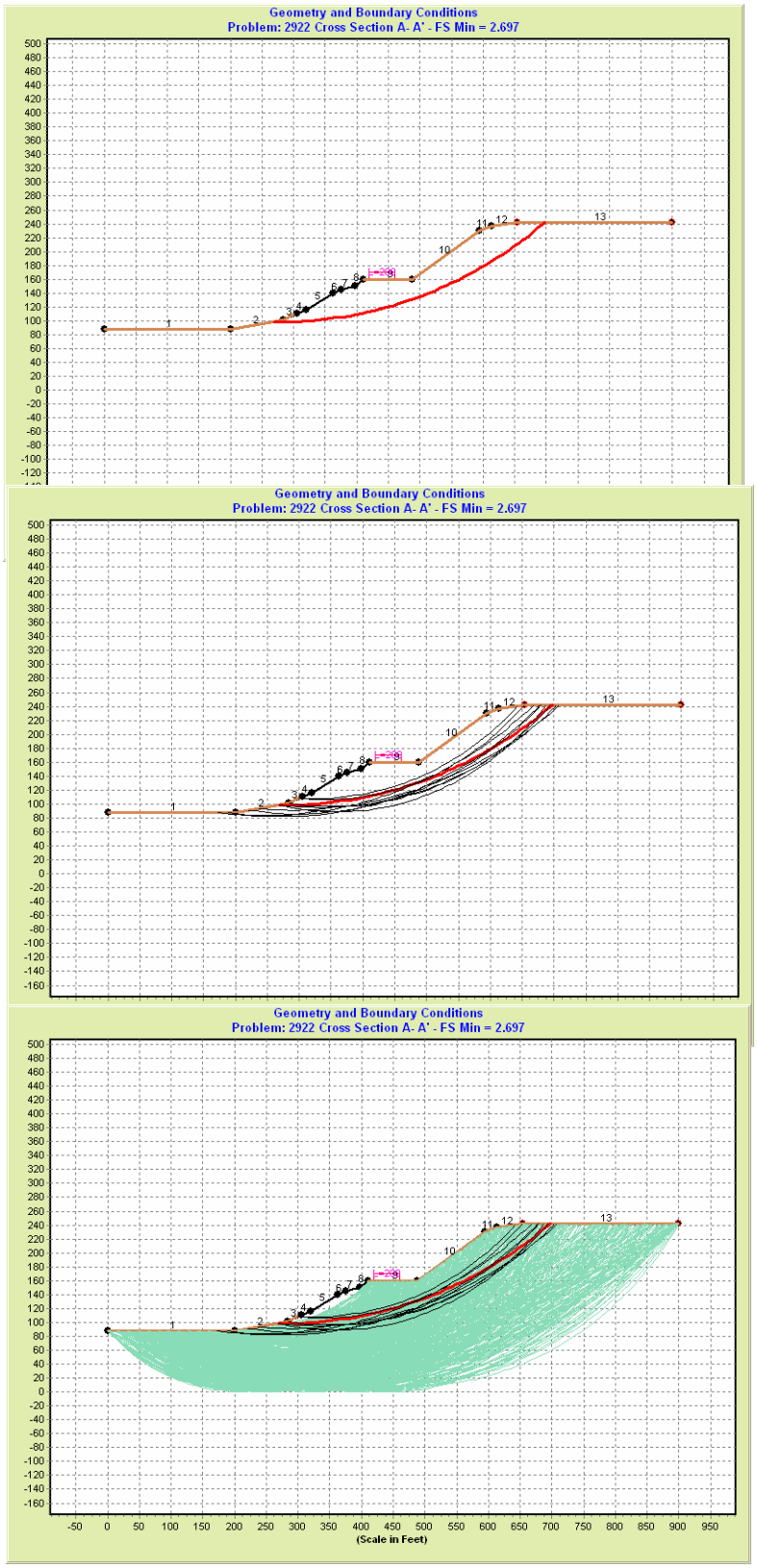
Lateral Design

Slope Stability

Seismic Evaluation

Stability analysis was performed using the Bishop's Simplified Method for circular surfaces. Circular analysis was performed based upon the favorable orientation of the bedrock.

The shear strength parameters are based upon laboratory testing of samples from the explorations placed on the subject site. The ultimate shear strength parameters were used in the analysis.


Geometry and Boundary Conditions
Problem: 2922 Cross Section A- A' - FS Min = 2.697
Geometry and Boundary Conditions
Problem: 2922 Cross Section A- A' - FS Min = 2.697
Geometry and Boundary Conditions
Problem: 2922 Cross Section A- A' - FS Min = 2.697
(Scale in Feet)

** PCSTABL6 **

by
Purdue University

1

--Slope Stability Analysis--
Simplified Janbu, Simplified Bishop
or Spencer`s Method of Slices

Run Date:
Time of Run:
Run By:
Input Data Filename: run.in
Output Filename: result.out
Unit: ENGLISH
Plotted Output Filename: result.plt

PROBLEM DESCRIPTION 2922 Cross Section A- A'

BOUNDARY COORDINATES

13 Top Boundaries
13 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	88.00	200.00	88.00	1
2	200.00	88.00	284.00	101.00	1
3	284.00	101.00	305.00	111.00	1
4	305.00	111.00	320.00	116.00	1
5	320.00	116.00	362.00	140.00	1
6	362.00	140.00	375.00	145.00	1
7	375.00	145.00	398.00	150.00	1
8	398.00	150.00	411.00	160.00	1
9	411.00	160.00	488.00	160.00	1
10	488.00	160.00	595.00	230.00	1
11	595.00	230.00	614.00	237.00	1
12	614.00	237.00	655.00	242.00	1
13	655.00	242.00	900.00	242.00	1

1

ISOTROPIC SOIL PARAMETERS

1 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	100.0	110.0	400.0	38.0	0.00	0.0	0

1

BOUNDARY LOAD(S)

1 Load(s) Specified

Load No.	X-Left (ft)	X-Right (ft)	Intensity (psf)	Deflection (deg)

1	420.00	460.00	200.0	0.0

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

1

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

1000 Trial Surfaces Have Been Generated.

50 Surfaces Initiate From Each Of 20 Points Equally Spaced
Along The Ground Surface Between X = 0.00 ft.
and X = 300.00 ft.

Each Surface Terminates Between X = 410.00 ft.
and X = 900.00 ft.

Unless Further Limitations Were Imposed, The Minimum Elevation
At Which A Surface Extends Is Y = 0.00 ft.

10.00 ft. Line Segments Define Each Trial Failure Surface.

1

Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Examined. They Are Ordered - Most Critical
First.

* * Safety Factors Are Calculated By The Modified Bishop Method * *

Failure Surface Specified By 48 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	268.42	98.59
2	278.42	98.49
3	288.42	98.54
4	298.42	98.74
5	308.41	99.08
6	318.40	99.57
7	328.38	100.21
8	338.35	101.00
9	348.31	101.93
10	358.25	103.01
11	368.17	104.23
12	378.08	105.60
13	387.96	107.12
14	397.82	108.78
15	407.66	110.58
16	417.47	112.53
17	427.25	114.63
18	436.99	116.87
19	446.70	119.25
20	456.38	121.77
21	466.02	124.44
22	475.62	127.25
23	485.17	130.20
24	494.68	133.29
25	504.15	136.52
26	513.56	139.89

27	522.93	143.39
28	532.24	147.04
29	541.50	150.82
30	550.70	154.73
31	559.84	158.78
32	568.92	162.97
33	577.94	167.29
34	586.90	171.74
35	595.79	176.32
36	604.61	181.03
37	613.36	185.87
38	622.03	190.85
39	630.64	195.94
40	639.16	201.17
41	647.61	206.51
42	655.98	211.99
43	664.27	217.58
44	672.48	223.30
45	680.60	229.13
46	688.63	235.09
47	696.57	241.16
48	697.64	242.00

Circle Center At X = 280.1 ; Y = 777.8 and Radius, 679.3

*** 2.697 ***

Individual data on the 60 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Force Norm (lbs)	Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	10.0	822.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	5.6	1150.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	4.4	1557.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	10.0	6844.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	6.6	6963.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6	3.4	4281.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7	10.0	14456.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0
8	1.6	2575.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0
9	8.4	15462.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10	10.0	22961.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0
11	10.0	27746.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0
12	9.9	32358.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0
13	3.8	13391.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
14	6.2	23047.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0
15	6.8	26615.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0
16	3.1	12297.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0
17	9.9	39918.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
18	9.9	40373.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0
19	0.2	725.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
20	9.7	42519.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
21	3.3	15967.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0
22	6.5	31113.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0
23	2.5	11952.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0
24	7.2	33435.2	0.0	0.0	0.0	0.0	0.0	0.0	1449.1
25	9.7	43128.1	0.0	0.0	0.0	0.0	0.0	0.0	1949.2
26	9.7	40733.9	0.0	0.0	0.0	0.0	0.0	0.0	1942.4
27	9.7	38208.9	0.0	0.0	0.0	0.0	0.0	0.0	1935.2
28	3.6	13656.4	0.0	0.0	0.0	0.0	0.0	0.0	724.0
29	6.0	21900.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
30	9.6	32780.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0
31	9.6	29885.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
32	2.8	8301.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0
33	6.7	20033.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
34	9.5	30820.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
35	9.4	33370.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0
36	9.4	35725.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0
37	9.3	37885.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0

38	9.3	39850.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
39	9.2	41621.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
40	9.1	43199.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0
41	9.1	44586.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0
42	9.0	45784.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0
43	9.0	46795.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0
44	8.1	43368.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0
45	0.8	4243.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0
46	8.8	46955.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
47	8.7	45232.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0
48	0.6	3277.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0
49	8.0	39315.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
50	8.6	38810.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
51	8.5	34957.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0
52	8.4	31046.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0
53	7.4	24097.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0
54	1.0	2980.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0
55	8.3	22558.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
56	8.2	17691.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
57	8.1	12817.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0
58	8.0	7944.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
59	7.9	3078.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0
60	1.1	44.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0

** PCSTABL6 **

by
Purdue University

1

--Slope Stability Analysis--
Simplified Janbu, Simplified Bishop
or Spencer`s Method of Slices

Run Date:
Time of Run:
Run By:
Input Data Filename: run.in
Output Filename: result.out
Unit: ENGLISH
Plotted Output Filename: result.plt

PROBLEM DESCRIPTION 2922 Cross Section A- A'

BOUNDARY COORDINATES

13 Top Boundaries
13 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	88.00	200.00	88.00	1
2	200.00	88.00	284.00	101.00	1
3	284.00	101.00	305.00	111.00	1
4	305.00	111.00	320.00	116.00	1
5	320.00	116.00	362.00	140.00	1
6	362.00	140.00	375.00	145.00	1
7	375.00	145.00	398.00	150.00	1
8	398.00	150.00	411.00	160.00	1
9	411.00	160.00	488.00	160.00	1
10	488.00	160.00	595.00	230.00	1
11	595.00	230.00	614.00	237.00	1
12	614.00	237.00	655.00	242.00	1
13	655.00	242.00	900.00	242.00	1

1

ISOTROPIC SOIL PARAMETERS

1 Type(s) of Soil

Soil Type	Total Unit Wt.	Saturated Unit Wt.	Cohesion Intercept	Friction Angle	Pore Pressure	Pressure Constant	Piez. Surface

No.	(pcf)	(pcf)	(psf)	(deg)	Param.	(psf)	No.
1	100.0	110.0	400.0	38.0	0.00	0.0	0

1

BOUNDARY LOAD(S)

1 Load(s) Specified

Load No.	X-Left (ft)	X-Right (ft)	Intensity (psf)	Deflection (deg)
1	420.00	460.00	200.0	0.0

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

A Horizontal Earthquake Loading Coefficient
Of0.150 Has Been Assigned

A Vertical Earthquake Loading Coefficient
Of0.000 Has Been Assigned

Cavitation Pressure = 0.0 (psf)

1

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

1000 Trial Surfaces Have Been Generated.

50 Surfaces Initiate From Each Of 20 Points Equally Spaced Along The Ground Surface Between X = 0.00 ft.
and X = 300.00 ft.

Each Surface Terminates Between X = 410.00 ft.
and X = 900.00 ft.

Unless Further Limitations Were Imposed, The Minimum Elevation At Which A Surface Extends Is Y = 0.00 ft.

10.00 ft. Line Segments Define Each Trial Failure Surface.

1

Following Are Displayed The Ten Most Critical Of The Trial Failure Surfaces Examined. They Are Ordered - Most Critical First.

* * Safety Factors Are Calculated By The Modified Bishop Method * *

Failure Surface Specified By 48 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	268.42	98.59
2	278.42	98.49

3	288.42	98.54
4	298.42	98.74
5	308.41	99.08
6	318.40	99.57
7	328.38	100.21
8	338.35	101.00
9	348.31	101.93
10	358.25	103.01
11	368.17	104.23
12	378.08	105.60
13	387.96	107.12
14	397.82	108.78
15	407.66	110.58
16	417.47	112.53
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18	436.99	116.87
19	446.70	119.25
20	456.38	121.77
21	466.02	124.44
22	475.62	127.25
23	485.17	130.20
24	494.68	133.29
25	504.15	136.52
26	513.56	139.89
27	522.93	143.39
28	532.24	147.04
29	541.50	150.82
30	550.70	154.73
31	559.84	158.78
32	568.92	162.97
33	577.94	167.29
34	586.90	171.74
35	595.79	176.32
36	604.61	181.03
37	613.36	185.87
38	622.03	190.85
39	630.64	195.94
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41	647.61	206.51
42	655.98	211.99
43	664.27	217.58
44	672.48	223.30
45	680.60	229.13
46	688.63	235.09
47	696.57	241.16
48	697.64	242.00

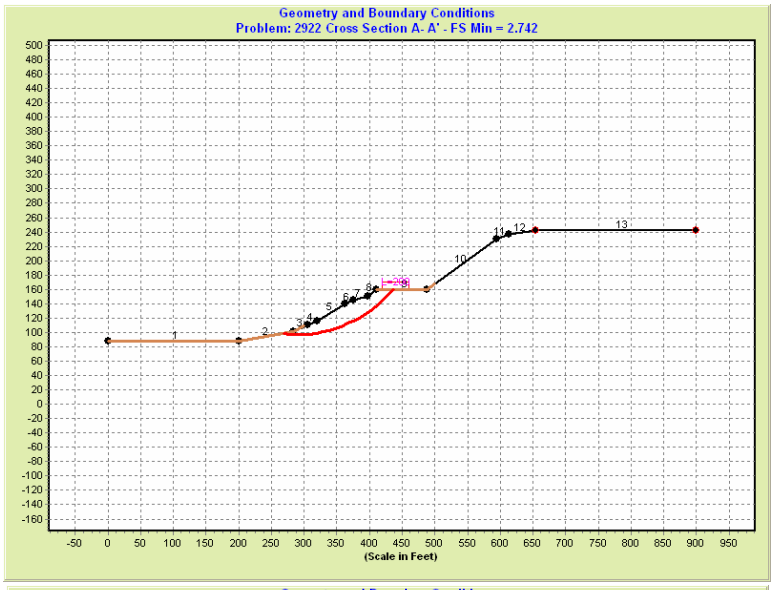
Circle Center At X = 280.1 ; Y = 777.8 and Radius, 679.3

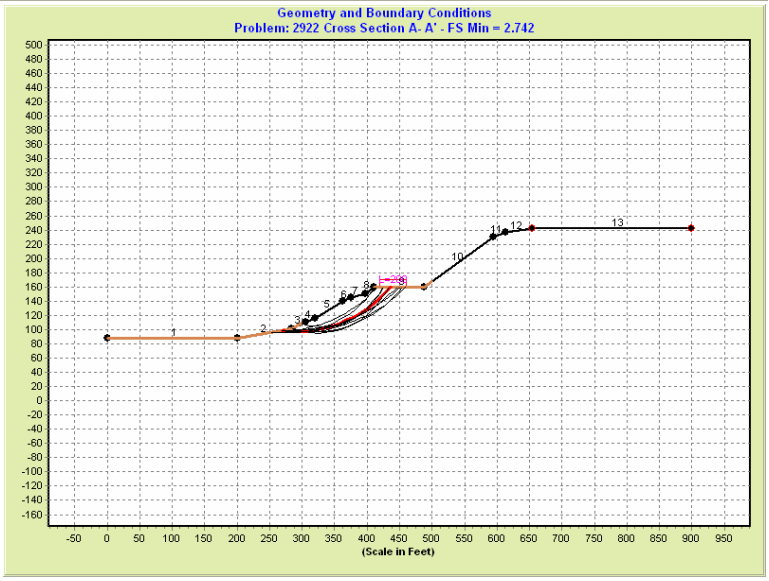
*** 1.828 ***

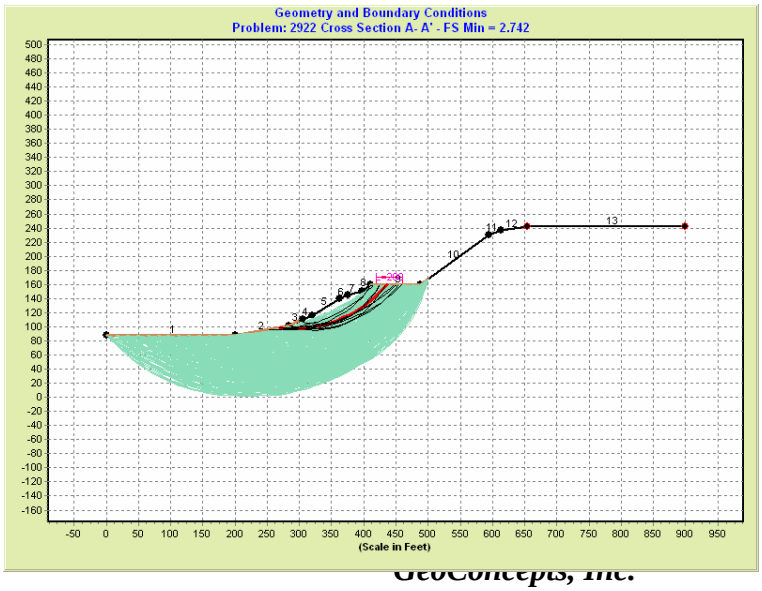
Individual data on the 60 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Force Norm (lbs)	Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	10.0	822.4	0.0	0.0	0.0	0.0	123.4	0.0	0.0
2	5.6	1150.8	0.0	0.0	0.0	0.0	172.6	0.0	0.0
3	4.4	1557.1	0.0	0.0	0.0	0.0	233.6	0.0	0.0
4	10.0	6844.4	0.0	0.0	0.0	0.0	1026.7	0.0	0.0
5	6.6	6963.6	0.0	0.0	0.0	0.0	1044.5	0.0	0.0
6	3.4	4281.7	0.0	0.0	0.0	0.0	642.3	0.0	0.0
7	10.0	14456.8	0.0	0.0	0.0	0.0	2168.5	0.0	0.0
8	1.6	2575.8	0.0	0.0	0.0	0.0	386.4	0.0	0.0
9	8.4	15462.7	0.0	0.0	0.0	0.0	2319.4	0.0	0.0
10	10.0	22961.9	0.0	0.0	0.0	0.0	3444.3	0.0	0.0
11	10.0	27746.5	0.0	0.0	0.0	0.0	4162.0	0.0	0.0
12	9.9	32358.4	0.0	0.0	0.0	0.0	4853.8	0.0	0.0
13	3.8	13391.0	0.0	0.0	0.0	0.0	2008.7	0.0	0.0
14	6.2	23047.3	0.0	0.0	0.0	0.0	3457.1	0.0	0.0
15	6.8	26615.5	0.0	0.0	0.0	0.0	3992.3	0.0	0.0
16	3.1	12297.3	0.0	0.0	0.0	0.0	1844.6	0.0	0.0

17	9.9	39918.1	0.0	0.0	0.0	0.0	5987.7	0.0	0.0
18	9.9	40373.7	0.0	0.0	0.0	0.0	6056.1	0.0	0.0
19	0.2	725.2	0.0	0.0	0.0	0.0	108.8	0.0	0.0
20	9.7	42519.0	0.0	0.0	0.0	0.0	6377.9	0.0	0.0
21	3.3	15967.4	0.0	0.0	0.0	0.0	2395.1	0.0	0.0
22	6.5	31113.4	0.0	0.0	0.0	0.0	4667.0	0.0	0.0
23	2.5	11952.6	0.0	0.0	0.0	0.0	1792.9	0.0	0.0
24	7.2	33435.2	0.0	0.0	0.0	0.0	5015.3	0.0	1449.1
25	9.7	43128.1	0.0	0.0	0.0	0.0	6469.2	0.0	1949.2
26	9.7	40733.9	0.0	0.0	0.0	0.0	6110.1	0.0	1942.4
27	9.7	38208.9	0.0	0.0	0.0	0.0	5731.3	0.0	1935.2
28	3.6	13656.4	0.0	0.0	0.0	0.0	2048.5	0.0	724.0
29	6.0	21900.1	0.0	0.0	0.0	0.0	3285.0	0.0	0.0
30	9.6	32780.5	0.0	0.0	0.0	0.0	4917.1	0.0	0.0
31	9.6	29885.2	0.0	0.0	0.0	0.0	4482.8	0.0	0.0
32	2.8	8301.6	0.0	0.0	0.0	0.0	1245.2	0.0	0.0
33	6.7	20033.2	0.0	0.0	0.0	0.0	3005.0	0.0	0.0
34	9.5	30820.0	0.0	0.0	0.0	0.0	4623.0	0.0	0.0
35	9.4	33370.9	0.0	0.0	0.0	0.0	5005.6	0.0	0.0
36	9.4	35725.8	0.0	0.0	0.0	0.0	5358.9	0.0	0.0
37	9.3	37885.3	0.0	0.0	0.0	0.0	5682.8	0.0	0.0
38	9.3	39850.1	0.0	0.0	0.0	0.0	5977.5	0.0	0.0
39	9.2	41621.0	0.0	0.0	0.0	0.0	6243.1	0.0	0.0
40	9.1	43199.3	0.0	0.0	0.0	0.0	6479.9	0.0	0.0
41	9.1	44586.7	0.0	0.0	0.0	0.0	6688.0	0.0	0.0
42	9.0	45784.9	0.0	0.0	0.0	0.0	6867.7	0.0	0.0
43	9.0	46795.5	0.0	0.0	0.0	0.0	7019.3	0.0	0.0
44	8.1	43368.9	0.0	0.0	0.0	0.0	6505.3	0.0	0.0
45	0.8	4243.6	0.0	0.0	0.0	0.0	636.5	0.0	0.0
46	8.8	46955.1	0.0	0.0	0.0	0.0	7043.3	0.0	0.0
47	8.7	45232.7	0.0	0.0	0.0	0.0	6784.9	0.0	0.0
48	0.6	3277.8	0.0	0.0	0.0	0.0	491.7	0.0	0.0
49	8.0	39315.0	0.0	0.0	0.0	0.0	5897.3	0.0	0.0
50	8.6	38810.0	0.0	0.0	0.0	0.0	5821.5	0.0	0.0
51	8.5	34957.5	0.0	0.0	0.0	0.0	5243.6	0.0	0.0
52	8.4	31046.8	0.0	0.0	0.0	0.0	4657.0	0.0	0.0
53	7.4	24097.8	0.0	0.0	0.0	0.0	3614.7	0.0	0.0
54	1.0	2980.7	0.0	0.0	0.0	0.0	447.1	0.0	0.0
55	8.3	22558.1	0.0	0.0	0.0	0.0	3383.7	0.0	0.0
56	8.2	17691.1	0.0	0.0	0.0	0.0	2653.7	0.0	0.0
57	8.1	12817.4	0.0	0.0	0.0	0.0	1922.6	0.0	0.0
58	8.0	7944.1	0.0	0.0	0.0	0.0	1191.6	0.0	0.0
59	7.9	3078.5	0.0	0.0	0.0	0.0	461.8	0.0	0.0
60	1.1	44.6	0.0	0.0	0.0	0.0	6.7	0.0	0.0


Geometry and Boundary Conditions
Problem: 2922 Cross Section A- A' - FS Min = 2.742
(Scale in Feet)


Geometry and Boundary Conditions
Problem: 2922 Cross Section A- A' - FS Min = 2.742
(Scale in Feet)


Geometry and Boundary Conditions
Problem: 2922 Cross Section A- A' - FS Min = 2.742
(Scale in Feet)

** PCSTABL6 **

by
Purdue University

1

--Slope Stability Analysis--
Simplified Janbu, Simplified Bishop
or Spencer`s Method of Slices

Run Date:
Time of Run:
Run By:
Input Data Filename: run.in
Output Filename: result.out
Unit: ENGLISH
Plotted Output Filename: result.plt

PROBLEM DESCRIPTION 2922 Cross Section A- A'

BOUNDARY COORDINATES

13 Top Boundaries
13 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	88.00	200.00	88.00	1
2	200.00	88.00	284.00	101.00	1
3	284.00	101.00	305.00	111.00	1
4	305.00	111.00	320.00	116.00	1
5	320.00	116.00	362.00	140.00	1
6	362.00	140.00	375.00	145.00	1
7	375.00	145.00	398.00	150.00	1
8	398.00	150.00	411.00	160.00	1
9	411.00	160.00	488.00	160.00	1
10	488.00	160.00	595.00	230.00	1
11	595.00	230.00	614.00	237.00	1
12	614.00	237.00	655.00	242.00	1
13	655.00	242.00	900.00	242.00	1

1

ISOTROPIC SOIL PARAMETERS

1 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	100.0	110.0	400.0	38.0	0.00	0.0	0

1

BOUNDARY LOAD(S)

1 Load(s) Specified

Load No.	X-Left (ft)	X-Right (ft)	Intensity (psf)	Deflection (deg)

1	420.00	460.00	200.0	0.0

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

1

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

600 Trial Surfaces Have Been Generated.

30 Surfaces Initiate From Each Of 20 Points Equally Spaced
Along The Ground Surface Between X = 0.00 ft.
and X = 300.00 ft.

Each Surface Terminates Between X = 410.00 ft.
and X = 500.00 ft.

Unless Further Limitations Were Imposed, The Minimum Elevation
At Which A Surface Extends Is Y = 0.00 ft.

10.00 ft. Line Segments Define Each Trial Failure Surface.

1

Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Examined. They Are Ordered - Most Critical
First.

* * Safety Factors Are Calculated By The Modified Bishop Method * *

Failure Surface Specified By 20 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	268.42	98.59
2	278.38	97.72
3	288.38	97.35
4	298.38	97.47
5	308.36	98.10
6	318.29	99.21
7	328.16	100.82
8	337.94	102.92
9	347.60	105.50
10	357.12	108.56
11	366.48	112.08
12	375.65	116.07
13	384.61	120.51
14	393.34	125.39
15	401.82	130.69
16	410.02	136.41
17	417.93	142.53
18	425.52	149.04
19	432.79	155.91
20	436.69	160.00

Circle Center At X = 290.9 ; Y = 298.3 and Radius, 200.9

*** 2.742 ***

Individual data on the 27 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Force Norm (lbs)	Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	10.0	1200.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	5.6	1656.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	4.4	2018.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	10.0	8052.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	6.6	7778.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6	3.4	4554.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7	9.9	15026.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0
8	1.7	2791.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0
9	8.2	14839.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10	9.8	21108.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0
11	9.7	23963.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0
12	9.5	26149.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0
13	4.9	14204.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0
14	4.5	13274.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0
15	8.5	25067.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0
16	0.7	1899.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0
17	9.0	24935.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
18	8.7	21903.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0
19	4.7	10548.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
20	3.8	8391.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0
21	8.2	18488.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0
22	1.0	2233.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0
23	6.9	13963.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
24	2.1	3432.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
25	5.5	7362.4	0.0	0.0	0.0	0.0	0.0	0.0	1104.9
26	7.3	5463.2	0.0	0.0	0.0	0.0	0.0	0.0	1452.3
27	3.9	798.1	0.0	0.0	0.0	0.0	0.0	0.0	781.4

** PCSTABL6 **

by
Purdue University

1

--Slope Stability Analysis--
Simplified Janbu, Simplified Bishop
or Spencer`s Method of Slices

Run Date:
Time of Run:
Run By:
Input Data Filename: run.in
Output Filename: result.out
Unit: ENGLISH
Plotted Output Filename: result.plt

PROBLEM DESCRIPTION 2922 Cross Section A- A'

BOUNDARY COORDINATES

13 Top Boundaries
13 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	88.00	200.00	88.00	1
2	200.00	88.00	284.00	101.00	1
3	284.00	101.00	305.00	111.00	1
4	305.00	111.00	320.00	116.00	1
5	320.00	116.00	362.00	140.00	1
6	362.00	140.00	375.00	145.00	1
7	375.00	145.00	398.00	150.00	1
8	398.00	150.00	411.00	160.00	1
9	411.00	160.00	488.00	160.00	1
10	488.00	160.00	595.00	230.00	1
11	595.00	230.00	614.00	237.00	1
12	614.00	237.00	655.00	242.00	1
13	655.00	242.00	900.00	242.00	1

1

ISOTROPIC SOIL PARAMETERS

1 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	100.0	110.0	400.0	38.0	0.00	0.0	0

1

BOUNDARY LOAD(S)

1 Load(s) Specified

Load No.	X-Left (ft)	X-Right (ft)	Intensity (psf)	Deflection (deg)
1	420.00	460.00	200.0	0.0

NOTE - Intensity Is Specified As A Uniformly Distributed

Force Acting On A Horizontally Projected Surface.

A Horizontal Earthquake Loading Coefficient
Of0.150 Has Been Assigned

A Vertical Earthquake Loading Coefficient
Of0.000 Has Been Assigned

Cavitation Pressure = 0.0 (psf)

1

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

600 Trial Surfaces Have Been Generated.

30 Surfaces Initiate From Each Of 20 Points Equally Spaced
Along The Ground Surface Between X = 0.00 ft.
and X = 300.00 ft.

Each Surface Terminates Between X = 410.00 ft.
and X = 500.00 ft.

Unless Further Limitations Were Imposed, The Minimum Elevation
At Which A Surface Extends Is Y = 0.00 ft.

10.00 ft. Line Segments Define Each Trial Failure Surface.

1

Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Examined. They Are Ordered - Most Critical
First.

* * Safety Factors Are Calculated By The Modified Bishop Method * *

Failure Surface Specified By 20 Coordinate Points

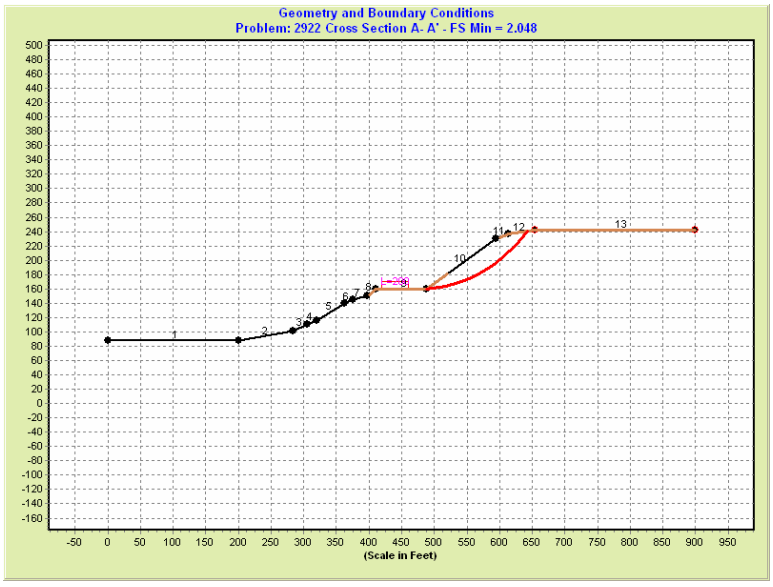
Point No.	X-Surf (ft)	Y-Surf (ft)
1	268.42	98.59
2	278.38	97.72
3	288.38	97.35
4	298.38	97.47
5	308.36	98.10
6	318.29	99.21
7	328.16	100.82
8	337.94	102.92
9	347.60	105.50
10	357.12	108.56
11	366.48	112.08
12	375.65	116.07
13	384.61	120.51
14	393.34	125.39
15	401.82	130.69
16	410.02	136.41
17	417.93	142.53
18	425.52	149.04
19	432.79	155.91
20	436.69	160.00

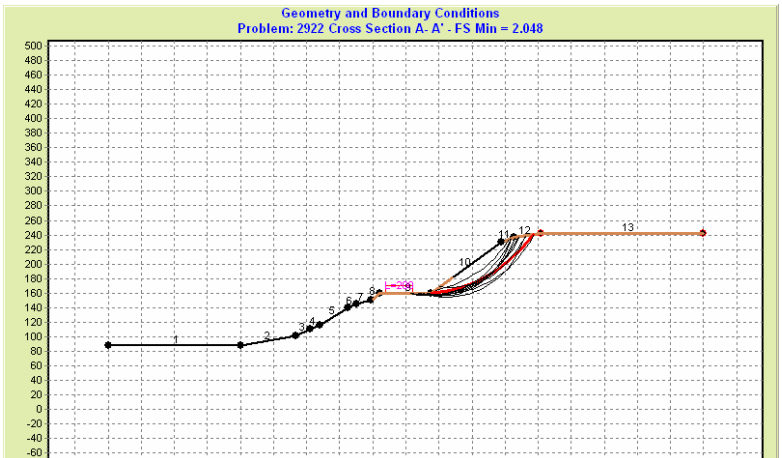
Circle Center At X = 290.9 ; Y = 298.3 and Radius, 200.9

*** 1.950 ***

Individual data on the 27 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Force Norm (lbs)	Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	10.0	1200.3	0.0	0.0	0.0	0.0	180.1	0.0	0.0
2	5.6	1656.2	0.0	0.0	0.0	0.0	248.4	0.0	0.0
3	4.4	2018.4	0.0	0.0	0.0	0.0	302.8	0.0	0.0
4	10.0	8052.8	0.0	0.0	0.0	0.0	1207.9	0.0	0.0
5	6.6	7778.2	0.0	0.0	0.0	0.0	1166.7	0.0	0.0
6	3.4	4554.5	0.0	0.0	0.0	0.0	683.2	0.0	0.0
7	9.9	15026.6	0.0	0.0	0.0	0.0	2254.0	0.0	0.0
8	1.7	2791.5	0.0	0.0	0.0	0.0	418.7	0.0	0.0
9	8.2	14839.1	0.0	0.0	0.0	0.0	2225.9	0.0	0.0
10	9.8	21108.3	0.0	0.0	0.0	0.0	3166.2	0.0	0.0
11	9.7	23963.3	0.0	0.0	0.0	0.0	3594.5	0.0	0.0
12	9.5	26149.7	0.0	0.0	0.0	0.0	3922.5	0.0	0.0
13	4.9	14204.8	0.0	0.0	0.0	0.0	2130.7	0.0	0.0
14	4.5	13274.6	0.0	0.0	0.0	0.0	1991.2	0.0	0.0
15	8.5	25067.3	0.0	0.0	0.0	0.0	3760.1	0.0	0.0
16	0.7	1899.9	0.0	0.0	0.0	0.0	285.0	0.0	0.0
17	9.0	24935.2	0.0	0.0	0.0	0.0	3740.3	0.0	0.0
18	8.7	21903.3	0.0	0.0	0.0	0.0	3285.5	0.0	0.0
19	4.7	10548.1	0.0	0.0	0.0	0.0	1582.2	0.0	0.0
20	3.8	8391.9	0.0	0.0	0.0	0.0	1258.8	0.0	0.0
21	8.2	18488.6	0.0	0.0	0.0	0.0	2773.3	0.0	0.0
22	1.0	2233.3	0.0	0.0	0.0	0.0	335.0	0.0	0.0
23	6.9	13963.1	0.0	0.0	0.0	0.0	2094.5	0.0	0.0
24	2.1	3432.1	0.0	0.0	0.0	0.0	514.8	0.0	0.0
25	5.5	7362.4	0.0	0.0	0.0	0.0	1104.4	0.0	1104.9
26	7.3	5463.2	0.0	0.0	0.0	0.0	819.5	0.0	1452.3
27	3.9	798.1	0.0	0.0	0.0	0.0	119.7	0.0	781.4





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by
Purdue University

1

--Slope Stability Analysis--
Simplified Janbu, Simplified Bishop
or Spencer`s Method of Slices

Run Date:
Time of Run:
Run By:
Input Data Filename: run.in
Output Filename: result.out
Unit: ENGLISH
Plotted Output Filename: result.plt

PROBLEM DESCRIPTION 2922 Cross Section A- A'

BOUNDARY COORDINATES

13 Top Boundaries
13 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	88.00	200.00	88.00	1
2	200.00	88.00	284.00	101.00	1
3	284.00	101.00	305.00	111.00	1
4	305.00	111.00	320.00	116.00	1
5	320.00	116.00	362.00	140.00	1
6	362.00	140.00	375.00	145.00	1
7	375.00	145.00	398.00	150.00	1
8	398.00	150.00	411.00	160.00	1
9	411.00	160.00	488.00	160.00	1
10	488.00	160.00	595.00	230.00	1
11	595.00	230.00	614.00	237.00	1
12	614.00	237.00	655.00	242.00	1
13	655.00	242.00	900.00	242.00	1

1

ISOTROPIC SOIL PARAMETERS

1 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	100.0	110.0	400.0	38.0	0.00	0.0	0

1

BOUNDARY LOAD(S)

1 Load(s) Specified

Load No.	X-Left (ft)	X-Right (ft)	Intensity (psf)	Deflection (deg)

1	420.00	460.00	200.0	0.0

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

1

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

600 Trial Surfaces Have Been Generated.

30 Surfaces Initiate From Each Of 20 Points Equally Spaced
Along The Ground Surface Between X = 400.00 ft.
and X = 520.00 ft.

Each Surface Terminates Between X = 600.00 ft.
and X = 900.00 ft.

Unless Further Limitations Were Imposed, The Minimum Elevation
At Which A Surface Extends Is Y = 0.00 ft.

10.00 ft. Line Segments Define Each Trial Failure Surface.

1

Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Examined. They Are Ordered - Most Critical
First.

* * Safety Factors Are Calculated By The Modified Bishop Method * *

Failure Surface Specified By 19 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	488.42	160.28
2	498.39	161.07
3	508.31	162.34
4	518.16	164.08
5	527.91	166.29
6	537.55	168.96
7	547.05	172.08
8	556.38	175.66
9	565.54	179.67
10	574.50	184.12
11	583.23	188.99
12	591.73	194.27
13	599.96	199.95
14	607.91	206.02
15	615.56	212.46
16	622.90	219.25
17	629.90	226.39
18	636.56	233.85
19	641.86	240.40

Circle Center At X = 476.7 ; Y = 369.7 and Radius, 209.8

*** 2.048 ***

Individual data on the 20 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Force Norm (lbs)	Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	10.0	2854.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	9.9	8269.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	9.8	13095.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	9.8	17298.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	9.6	20854.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6	9.5	23748.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7	9.3	25974.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0
8	9.2	27535.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0
9	9.0	28445.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10	8.7	28724.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
11	8.5	28403.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
12	3.3	10979.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0
13	5.0	16190.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0
14	8.0	24094.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0
15	6.1	16633.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0
16	1.6	3943.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
17	7.3	15983.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0
18	7.0	10993.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
19	6.7	6142.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0
20	5.3	1565.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

** PCSTABL6 **

by
Purdue University

1

--Slope Stability Analysis--
Simplified Janbu, Simplified Bishop
or Spencer`s Method of Slices

Run Date:
Time of Run:
Run By:
Input Data Filename: run.in
Output Filename: result.out
Unit: ENGLISH
Plotted Output Filename: result.plt

PROBLEM DESCRIPTION 2922 Cross Section A- A'

BOUNDARY COORDINATES

13 Top Boundaries
13 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	88.00	200.00	88.00	1
2	200.00	88.00	284.00	101.00	1
3	284.00	101.00	305.00	111.00	1
4	305.00	111.00	320.00	116.00	1
5	320.00	116.00	362.00	140.00	1
6	362.00	140.00	375.00	145.00	1
7	375.00	145.00	398.00	150.00	1
8	398.00	150.00	411.00	160.00	1
9	411.00	160.00	488.00	160.00	1
10	488.00	160.00	595.00	230.00	1
11	595.00	230.00	614.00	237.00	1
12	614.00	237.00	655.00	242.00	1
13	655.00	242.00	900.00	242.00	1

1

ISOTROPIC SOIL PARAMETERS

1 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	100.0	110.0	400.0	38.0	0.00	0.0	0

1

BOUNDARY LOAD(S)

1 Load(s) Specified

Load No.	X-Left (ft)	X-Right (ft)	Intensity (psf)	Deflection (deg)

1	420.00	460.00	200.0	0.0

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

A Horizontal Earthquake Loading Coefficient
Of0.150 Has Been Assigned

A Vertical Earthquake Loading Coefficient
Of0.000 Has Been Assigned

Cavitation Pressure = 0.0 (psf)

1

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

600 Trial Surfaces Have Been Generated.

30 Surfaces Initiate From Each Of 20 Points Equally Spaced
Along The Ground Surface Between X = 400.00 ft.
and X = 520.00 ft.

Each Surface Terminates Between X = 600.00 ft.
and X = 900.00 ft.

Unless Further Limitations Were Imposed, The Minimum Elevation
At Which A Surface Extends Is Y = 0.00 ft.

10.00 ft. Line Segments Define Each Trial Failure Surface.

1

Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Examined. They Are Ordered - Most Critical
First.

* * Safety Factors Are Calculated By The Modified Bishop Method * *

Failure Surface Specified By 19 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	488.42	160.28
2	498.39	161.07
3	508.31	162.34
4	518.16	164.08
5	527.91	166.29
6	537.55	168.96
7	547.05	172.08
8	556.38	175.66
9	565.54	179.67
10	574.50	184.12
11	583.23	188.99
12	591.73	194.27
13	599.96	199.95
14	607.91	206.02
15	615.56	212.46
16	622.90	219.25

17	629.90	226.39
18	636.56	233.85
19	641.86	240.40

Circle Center At X = 476.7 ; Y = 369.7 and Radius, 209.8

*** 1.529 ***

Individual data on the 20 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Force Norm (lbs)	Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	10.0	2854.3	0.0	0.0	0.0	0.0	428.2	0.0	0.0
2	9.9	8269.6	0.0	0.0	0.0	0.0	1240.4	0.0	0.0
3	9.8	13095.3	0.0	0.0	0.0	0.0	1964.3	0.0	0.0
4	9.8	17298.3	0.0	0.0	0.0	0.0	2594.8	0.0	0.0
5	9.6	20854.4	0.0	0.0	0.0	0.0	3128.2	0.0	0.0
6	9.5	23748.4	0.0	0.0	0.0	0.0	3562.3	0.0	0.0
7	9.3	25974.3	0.0	0.0	0.0	0.0	3896.1	0.0	0.0
8	9.2	27535.7	0.0	0.0	0.0	0.0	4130.4	0.0	0.0
9	9.0	28445.0	0.0	0.0	0.0	0.0	4266.8	0.0	0.0
10	8.7	28724.1	0.0	0.0	0.0	0.0	4308.6	0.0	0.0
11	8.5	28403.2	0.0	0.0	0.0	0.0	4260.5	0.0	0.0
12	3.3	10979.5	0.0	0.0	0.0	0.0	1646.9	0.0	0.0
13	5.0	16190.3	0.0	0.0	0.0	0.0	2428.5	0.0	0.0
14	8.0	24094.4	0.0	0.0	0.0	0.0	3614.2	0.0	0.0
15	6.1	16633.7	0.0	0.0	0.0	0.0	2495.1	0.0	0.0
16	1.6	3943.2	0.0	0.0	0.0	0.0	591.5	0.0	0.0
17	7.3	15983.7	0.0	0.0	0.0	0.0	2397.6	0.0	0.0
18	7.0	10993.2	0.0	0.0	0.0	0.0	1649.0	0.0	0.0
19	6.7	6142.3	0.0	0.0	0.0	0.0	921.3	0.0	0.0
20	5.3	1565.0	0.0	0.0	0.0	0.0	234.8	0.0	0.0

Please note that fault distances between EQFAULT and UBCSEIS are different. The distances use in the EQFAULT program is based on the closest distance to seismogenic rupture. The distances use in the UBCSEIS program is based on the closest distance to the surface projection of the rupture area.

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*                    *
*    E Q F A U L T   *
*                    *
*    Version 3.00    *
*                    *
**********************

     DETERMINISTIC ESTIMATION OF
PEAK ACCELERATION FROM DIGITIZED FAULTS


JOB NUMBER: 2922


JOB NAME: 24677 Dry Canyon-Cold Creek Road

CALCULATION NAME: Test Run Analysis

FAULT-DATA-FILE NAME: CDMGFLTE.DAT


SITE COORDINATES:
   SITE LATITUDE:  34.1058
   SITE LONGITUDE:  118.6614

SEARCH RADIUS:   50  mi

ATTENUATION RELATION:  15) Campbell & Bozorgnia (1997 Rev.) - Soft Rock
   UNCERTAINTY (M=Median, S=Sigma): M       Number of Sigmas:  0.0
   DISTANCE MEASURE:  cdist
   SCOND:   0
   Basement Depth:  5.00 km     Campbell SSR:  1     Campbell SHR:  0
   COMPUTE PEAK HORIZONTAL ACCELERATION

FAULT-DATA FILE USED:  CDMGFLTE.DAT


MINIMUM DEPTH VALUE (km):  3.0
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EQFAULT SUMMARY

DETERMINISTIC SITE PARAMETERS

ABBREVIATED FAULT NAME	APPROXIMATE DISTANCE mi (km)	ESTIMATED MAX. EARTHQUAKE EVENT MAXIMUM EARTHQUAKE MAG.(Mw)	PEAK SITE ACCEL. g	EST. SITE INTENSITY MOD.MERC.
MALIBU COAST	4.5(7.2)	6.7	0.581	X
ANACAPA-DUME	7.0(11.2)	7.3	0.487	X
SANTA MONICA	7.1(11.5)	6.6	0.383	X
PALOS VERDES	11.2(18.0)	7.1	0.265	IX
NORTHRIDGE (E. Oak Ridge)	13.9(22.3)	6.9	0.209	VIII
HOLLYWOOD	14.4(23.1)	6.4	0.145	VIII
SIMI-SANTA ROSA	15.7(25.3)	6.7	0.156	VIII
SANTA SUSANA	16.7(26.8)	6.6	0.134	VIII
NEWPORT-INGLEWOOD (L.A.Basin)	17.4(28.0)	6.9	0.141	VIII
SIERRA MADRE (San Fernando)	18.8(30.2)	6.7	0.121	VII
OAK RIDGE (Onshore)	19.0(30.5)	6.9	0.137	VIII
VERDUGO	19.3(31.1)	6.7	0.116	VII
HOLSER	20.4(32.8)	6.5	0.093	VII
COMPTON THRUST	21.2(34.1)	6.8	0.109	VII
SAN GABRIEL	22.6(36.4)	7.0	0.108	VII
SAN CAYETANO	24.0(38.6)	6.8	0.091	VII
SIERRA MADRE	25.0(40.2)	7.0	0.099	VII
RAYMOND	25.2(40.5)	6.5	0.068	VI
ELYSIAN PARK THRUST	26.3(42.3)	6.7	0.073	VII
VENTURA - PITAS POINT	32.4(52.1)	6.8	0.058	VI
OAK RIDGE(Blind Thrust Offshore)	33.7(54.2)	6.9	0.059	VI
CHANNEL IS. THRUST (Eastern)	35.0(56.3)	7.4	0.080	VII
SANTA YNEZ (East)	35.5(57.1)	7.0	0.058	VI
CLAMSHELL-SAWPIT	36.2(58.3)	6.5	0.038	V
MONTALVO-OAK RIDGE TREND	36.7(59.1)	6.6	0.041	V
WHITTIER	37.8(60.8)	6.8	0.045	VI
M.RIDGE-ARROYO PARIDA-SANTA ANA	39.3(63.2)	6.7	0.039	V
SAN ANDREAS - Mojave	41.1(66.1)	7.1	0.051	VI
SAN ANDREAS - 1857 Rupture	41.1(66.1)	7.8	0.093	VII
RED MOUNTAIN	42.0(67.6)	6.8	0.038	V
SAN ANDREAS - Carrizo	42.1(67.7)	7.2	0.054	VI
SAN JOSE	44.4(71.5)	6.5	0.028	V
SANTA CRUZ ISLAND	49.5(79.7)	6.8	0.030	V

-END OF SEARCH- 33 FAULTS FOUND WITHIN THE SPECIFIED SEARCH RADIUS.

THE MALIBU COAST FAULT IS CLOSEST TO THE SITE.
IT IS ABOUT 4.5 MILES (7.2 km) AWAY.

LARGEST MAXIMUM-EARTHQUAKE SITE ACCELERATION: 0.5814 g

APPENDIX III

SPECIFICATIONS

Drainage and Maintenance

Maintenance of hillside residences must be performed to avoid serious damage and/or instability to improvements. Most hillside problems are associated with or triggered by water. Therefore, a comprehensive drainage system should be designed and incorporated into the final plans. In addition, pad areas should be maintained and planted in a way that will allow this drainage system to function as intended. The following are specific drainage, maintenance, and landscaping recommendations.

Pad Drainage

Positive pad drainage should be incorporated into the final plans. All drainage from the roof and pad should be directed so that water does not pond adjacent to the foundations or flow toward them. All drainage from the site should be collected and directed via non-erosive devices to a location approved by the building official. Planters placed adjacent to the structures should be designed to drain away from the structure. Area drains, subdrains, weep holes, roof gutters and downspouts should be inspected periodically to ensure that they are not clogged with debris or damaged. If blockage or damage is evident, have it corrected.

Landscaping (Planting)

All slopes should be maintained with a dense growth of plants, ground-covering vegetation, shrubs and trees that possess dense, deep root structures and require a minimum of irrigation. Plants surrounding the development should be of a variety that requires a minimum of watering. It is recommended that a landscape architect be consulted regarding planting adjacent to improvements. It will be the responsibility of the property owner to maintain the planting. Alterations of planting schemes should be reviewed by the landscape architect.

Irrigation

An adequate irrigation system is required to sustain landscaping. Over-watering resulting in runoff and/or ground saturation must be avoided. Irrigation systems must be adjusted to account for natural rainfall conditions. Any leaks or defective sprinklers must be repaired immediately. To mitigate erosion and saturation, automatic sprinkling systems must be adjusted for rainy seasons. A landscape architect should be consulted to determine the best times for landscape watering and the maximum amount of water usage.

Pools

Leakage from a swimming pool or plumbing can produce a perched groundwater condition that may cause instability or damage to improvements. All plumbing should be leak-free.

Retaining Walls

Walls to be backfilled must be reviewed by the project Soils Engineer prior to commencement of the backfilling operation.

1. The back of the wall shall be waterproofed with Miradri (or approved equivalent).
2. Adequate drainage is required behind the wall to minimize the buildup of hydrostatic pressures. A perforated pipe, with perforations placed down, shall be installed at the base of the wall footing. The pipe shall be encased in at least one foot (1') of three-quarter inch (3/4") gravel. The pipe shall exit outside the building.
3. A continuous vertical drain, consisting of a gravel blanket six inches (6") thick or geotextile vertical drainage system, shall be placed along the back side of the wall from top to bottom.
4. After the wall backdrain system has been placed and the back side of the wall has been waterproofed, fill may be placed, if sufficient room allows, in layers not exceeding four inches (4") in thickness and compacted to 90 percent of the maximum density, as determined by ASTM D 1557. Where cohesionless soil having less than (15) percent finer than (0.005) millimeters is used for fill, the fill material shall be compacted to a minimum of (95) percent of the maximum dry density.
5. Where space does not permit compaction of material behind the wall, a granular backfill shall be used. This granular backfill shall consist of one-half inch (1/2") to three-quarter inch (3/4") of crushed rock.
6. All granular free-draining wall backfills shall be capped with a clayey compacted soil within the upper two feet (2') of the wall for a depth of two feet (2'). This compacted material should start below the required wall freeboard.
7. A concrete-lined swale drain should be placed behind any retaining wall that can intercept surface runoff from upslope areas. This surface runoff shall be transferred to an area approved by the building official.
8. A minimum freeboard of (2) feet shall be maintained at all times. Any slough, debris or trash should be removed immediately. Swales shall be maintained, sealing any and all cracks or repairing breaks that occur over the life of the swale.

Hillside Grading

1. Prior to commencement of work, a pregrading meeting shall be held. Participants at this meeting will be the contractor, the owner or his representative, and the soils engineer. The purpose of this meeting is to avoid any misunderstanding of any recommendations set forth in this report that could cause delays in the project.

2. Prior to the commencement of grading a surveyor should be retained to layout the proposed grading. This should, as a minimum, consist of locating all proposed keys, tops of cuts, toe of fills, stability fills, setbacks, easements and areas requiring over excavation of the cut portions of any building pads. All staking shall be setback from the proposed grading area at least five feet (5').

3. Sidehill fills should have a key placed at the toe of the proposed fill slope. This key should be cut a minimum of three feet into the bedrock. The base of the key shall be sloped back into the hill. Where slopes are steeper than 5:1 (5 horizontal to 1 vertical), horizontal benches shall be cut into bedrock in order to provide both lateral and vertical stability.

4. Sidehill fills shall have backdrains installed at the compacted fill/bedrock contact to prevent future porewater pressure buildup. Backdrains shall be placed in accordance with the BACKDRAINS section below.

5. All areas to receive compacted fill, including all removal areas, keys, and benches, shall be reviewed and approved by the soils engineer, or his representative, prior to placing the compacted fill.

6. The grade that is determined to be satisfactory for the support of the filled ground shall then be scarified to a depth of at least (6) inches and moistened as required. The scarified ground should be compacted to at least (90) percent of the maximum laboratory density.

   Materials excavated uphill from where fills are to be placed, shall not be cast over the slope into the fill area. Materials shall be channeled down a ramp to the area to receive compacted fill and then spread in horizontal layers. As compacted fills are placed, this ramp will be trimmed out to expose the dense, tight materials approved by the soils engineer. The minimum vertical height of the bench in approved materials shall be (3) feet. This will maintain the proper benching, as fill is placed up the slope. The ramp will be shifted periodically during the grading operations to allow for complete removal of the loose fill materials and for the proper benching.

7. The fill soils shall consist of select materials approved by the project soils engineer, or his representative. These materials may be obtained from the excavation areas and any other approved sources, and by blending soils from one or more sources. The material used shall be free from organic vegetable matter and other deleterious substances, and shall not contain rocks greater than (8) inches in diameter nor of a quantity sufficient to make compaction difficult.

8. The suitable fill material shall be placed in approximately level layers (6) inches thick, and moistened as required. Each layer shall be thoroughly mixed to ensure uniformity of moisture in each layer.

   When the moisture content of the fill is (3) percent or more below the optimum moisture content, as specified by the soils engineer, water shall be added and thoroughly mixed in until the moisture content is within (3) percent of the optimum moisture content.

   When the moisture content of the fill is (3) percent or more above the optimum moisture content, as specified by the soils engineer, the fill material shall be aerated by scarifying, or shall be blended with additional materials and thoroughly mixed until the moisture content is within (3) percent or less of the optimum moisture content.

   Each layer of fill material shall be compacted to a minimum of (90) percent of the maximum dry density as determined by ASTM D 1557, using approved compaction equipment. Where cohesionless soil having less than (15) percent finer than (0.005) millimeters is used for fill, the fill material shall be compacted to a minimum of (95) percent of the maximum dry density.

9. Review of the fill placement should be provided by the soils engineer, or his representative, during the progress of grading. In general, density tests will be made at intervals not exceeding (2) feet of fill height, or every (500) cubic yards of fill placed.

10. The contractor shall be required to obtain a minimum compaction of (90) percent out to the finished face of 2:1 fill slopes. If the slope is to be graded at 1½:1, a minimum compaction of (92) percent is required. Compaction on slopes may be achieved by over building the slope and cutting back to the compacted core or by direct compaction of the slope face with suitable equipment. Direct compaction on the slope faces shall be accomplished by back-rolling the slopes in (3) foot to (4) foot increments of elevation gain.

11. During the inclement part of the year, or during periods when rain is threatening, all fill that has been spread and awaits compaction shall be compacted before stopping work for the day or before stopping because of inclement weather. These fills, once compacted, shall have the surfaces sloped to drain to an area where water can be removed.

    Work may start again, after the rainy period, once the site has been reviewed by the soils engineer and he has given his authorization to resume. Loose materials not compacted prior to the rain shall be removed and aerated so that the moisture content of these fills will be within (3) percent of the optimum moisture content.

    Surface materials previously compacted before the rain shall be scarified, brought to the proper moisture content and recompacted prior to placing additional fill, if deemed necessary by the soils engineer.

Backdrains

To minimize the potential for future porewater pressure buildup behind the proposed compacted fill, backdrains shall be installed at the compacted fill/bedrock. Backdrains shall consist of (4) inch perforated pipes; placed with perforations down. The pipe should be encased with at least (1) foot of gravel around the pipe. The minimum cover on the pipe should be (1) foot. The gravel should consist of (3/4) inch to (1) inch crushed rock. The first drain shall be placed no higher than (3) feet above the front cut of the key excavation. Additional backdrains shall be placed at intervals roughly equivalent to (10) feet of vertical rise in elevation, or where deemed necessary by the project soils engineer.

Each drain shall be placed into a trench excavated along the back of a horizontal bench at the bedrock contact. The trench bottom shall slope downward to each exit drain with a minimum gradient of (2) percent. The exit pipe shall consist of a (4) inch diameter non-perforated pipe. This pipe need not be encased in gravel. It shall exit at a minimum gradient of (2) percent to the finished face of the fill slope. A cutoff wall consisting of concrete or soil cement shall, be placed at the junction of the perforated pipe and the exit drains to stop seepage and force the water being removed into the perforated pipe.

APPENDIX IV

REFERENCES

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5. Monahan, Edward J., PE, Construction of and on Compacted Fills (Wiley & Sons, New York :1986).
6. Naval Facilities Engineering Command Foundations and Earth Structures - Design Manual 7.02 (Naval Publications and Forms Center, Philadelphia :1986).
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