APPENDIX C

GEOLOGY AND SOILS REPORTS

GEOLOGIC AND GEOTECHNICAL ENGINEERING REVIEW
OF PROPOSED ON-SITE WASTE WATER TREATMENT SYSTEM,
Rancho Malibu Resort, Tentative Tract Map 69653,
4000 Malibu Canyon Road,
Malibu, California
for

Green Acres, LLC

April 2, 2012 W.O. 6489

MDN 13857

GeoSoils Consultants Inc.

GeoSoils Consultants Inc.
GEOTECHNICAL GEOLOGIC ENVIRONMENTAL

April 2, 2012
W.O. 6489

GREEN ACRES, LLC
P.O. Box 6528
Malibu, California 90265

Attention: Mr. Bruce McBride

Subject: Geologic and Geotechnical Engineering Review of Proposed On-Site Waste Water Treatment System, Rancho Malibu Resort, Tentative Tract Map 69653, 4000 Malibu Canyon Road, Malibu, California

Dear Mr. McBride:

As requested, GeoSoils Consultants, Inc. (GSC) has reviewed the proposed On-Site Waste Water Treatment System for the subject site. The purpose of this report is to provide geotechnical engineering recommendations relative to the discharge of treated wastewater on the slope areas within the site.

PROPOSED ONSITE WASTEWATER TREATMENT SYSTEM

The proposed system was designed by Ensitu Engineering, Inc. and consists of a membrane bioreactor to treat the effluent to tertiary levels. Treated effluent will be suitable for recycled water uses such as irrigation for landscape and non-edible plants, commercial air conditioning and cooling, or recycled plumbing use.

MDN 13857

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

The general processes of the proposed treatment system include the following: collection, primary settling, screening, flow equalization, anoxic treatment, aerobic treatment, membrane filtration, ultraviolet disinfection, and subsurface disposal. The proposed system utilizes underground fiberglass tanks for wastewater processing, reducing the above ground facility area. The above ground equipment area for the system contains the MBR processing equipment as well as ancillary equipment such as aeration blowers, odor control units, and UV disinfection units.

Application of treated effluent to subsurface drip fields is proposed. Subsurface drip irrigation will be installed in various separate zones around the project with the purpose of disposing of treated effluent but also providing irrigation to landscape plants. Subsurface drip irrigation tubing is installed 12 inches below ground surface. Generally, wastewater flows are expected to fluctuate on seasonal, weekly, and daily basis. Both the peak seasonal and peak daily flows become the design flow basis for the treatment processes. The treatment system and disposal fields will be designed to accommodate all flows from the project.

The treated effluent will be dispersed over a total of 134,000 square feet that includes the natural slope areas around the northern and eastern parts of the site. The proposed dispersal area is shown as cross hatching on Plate 1. The peak flow from the site is approximately 39,045 gallons per day, with an average flow of 26,030 gallons per day. On a square foot basis, peak flow is approximately 0.29 gallon per day per square foot, with an average daily flow of 0.19 gallon per day per square foot. A 40,000 gallon equalization tank is also proposed on the site to contain effluent and smooth out the peaks and troughs between peak and low flow conditions.

Percolation rates for the site were determined by another consultant. A total of 49 tests were run on shallow pits across the site. The results indicate maximum percolation rate of 6 minutes per inch and a minimum rate of 58 minutes per inch. The average rate is approximately 23.2 minutes per inch.

SCOPE OF SERVICES

Our scope of services consisted of the following:

- Review of previous reports prepared for the subject site.
- Excavated, sampled, and logged 21 backhoe test pits at select locations across the site.
- Laboratory testing on samples obtained by from the backhoe test pits.
- Engineering analyses.
- Preparation of this report.

GEOLOGIC CONDITIONS

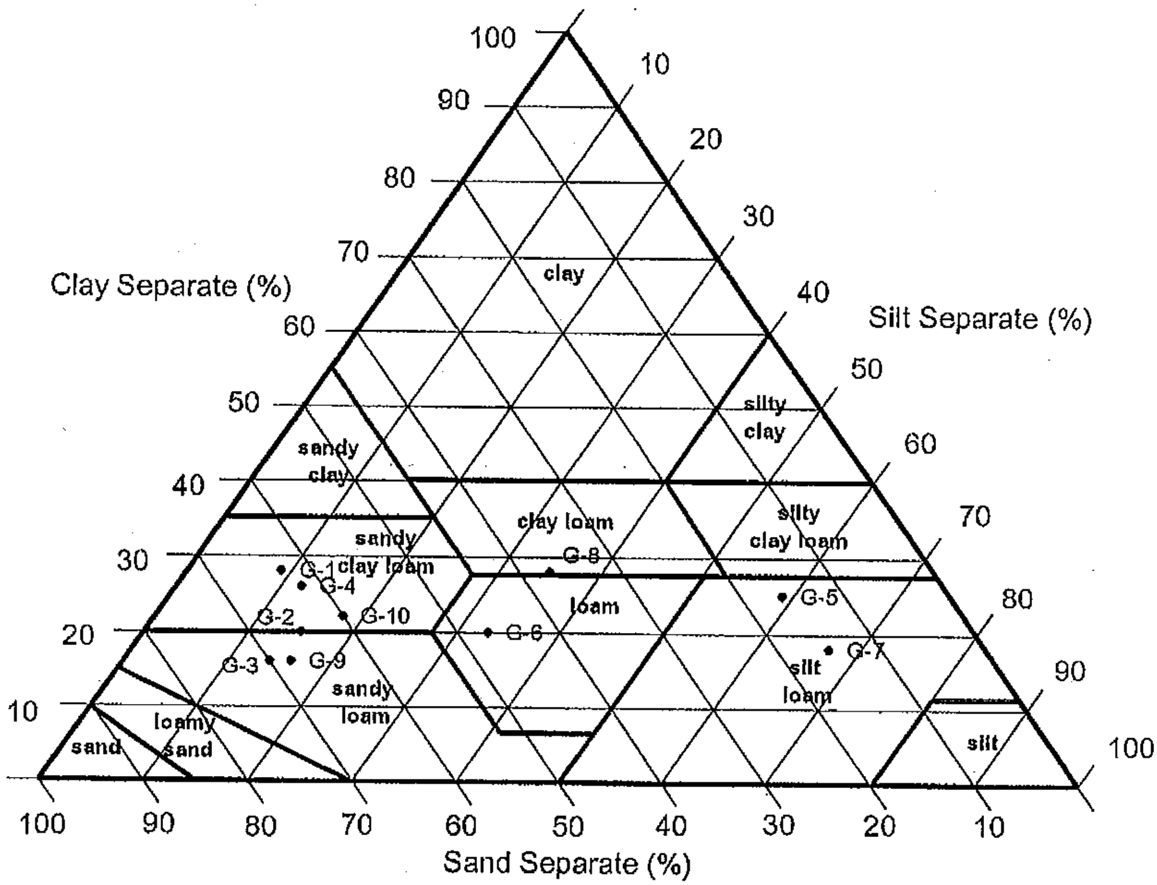
The geologic conditions on the site are discussed in detail in the referenced reports. In summary, the site is underlain by both marine and non-marine terrace deposits, which overlie bedrock of the Monterey, Trancus, Conejo Vocanics, Vasqueros, and Sespe Formations. The non-marine terrace deposits underlie the majority of the site and consist of interbedded silts, clays and sands, with occasional gravel and cobbles. Based on review of Appendix D of the Van Beveren and Butelo report (Reference 6), the terrace deposits on the site are at least 100K years old, and may be as old at 200K years.

Although the reports by Leighton and Associates (References 4 and 5) indicate many different bedrock types on the site, only the Sespe, Vaqueros and a small area of Conejo Volcanics are exposed at the surface. In addition, the proposed drip system will be located mostly in areas underlain by terrace deposits, with a minor amount of the system located in areas of volcanic rocks at the northwest corner of the site.

A total of 38 sieve analyses and hydrometer tests were performed on samples obtained from the backhoe test pits. The results of the laboratory testing are presented in Appendix A. Samples were obtained in the upper 1 to 2 feet of each test pit. In addition, samples were obtained at depth in the test pits where a potential for different soil types below the area of proposed seepage. The purpose of the sampling was to determine the soil types in accordance with the USDA classification system, as well as to determine if confining layers exist in the test pits. In addition, the upper soil zone was classified using Table 4-3 of the USEPA Onsite Wastewater Treatment Systems Manual and the results are included on the test pit logs. The results of the sieve and hydrometer tests are presented on Plates G-1 through G-38, Gradation Test Diagrams. In addition, each gradation test is plotted on the USGA soils triangle as shown on Figures 1 through 4. The results of the soils classification are also presented on Table 1.

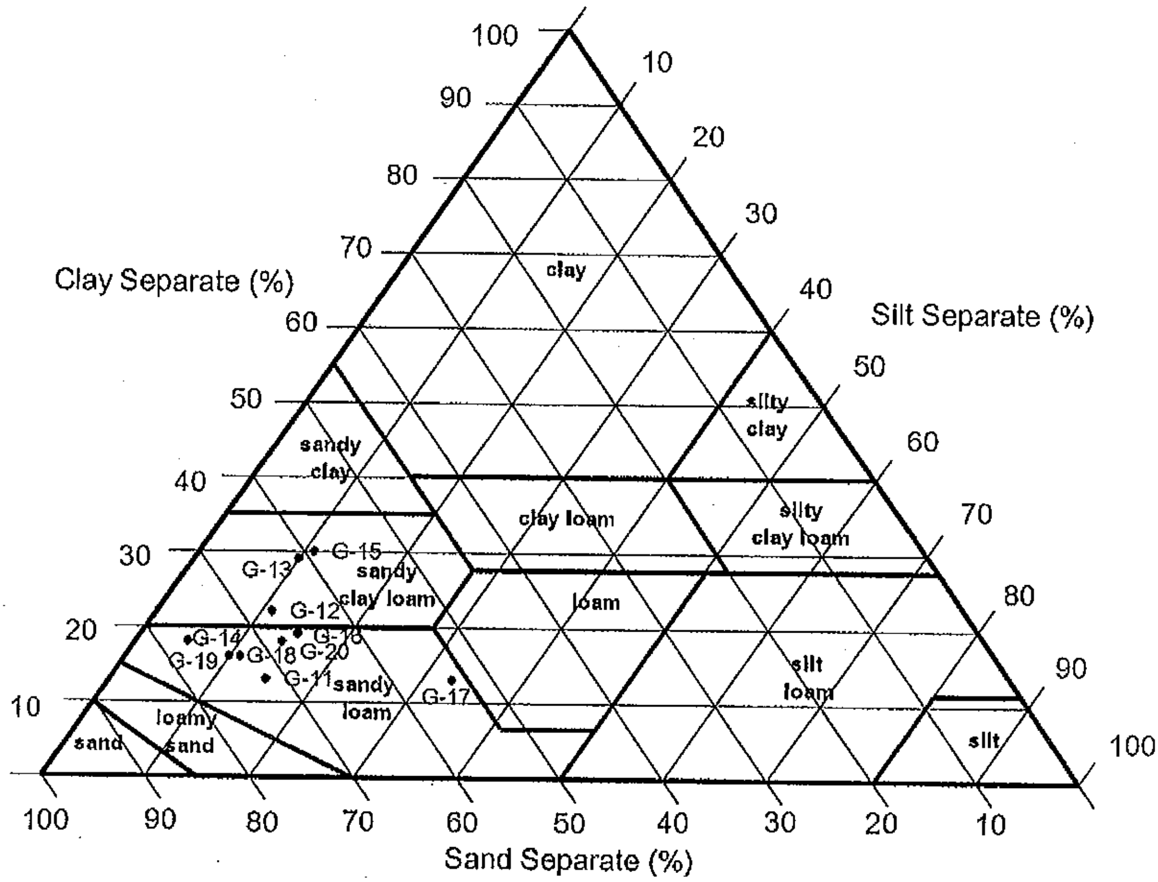
The results of the soils classification indicates that the onsite soil falls mainly in the sandy loam to sandy clay loam category. These samples were taken in areas underlain by terrace deposits, which make up the geologic conditions on the majority of the site, and are considered to be representative of the soils to be used for percolation. Two samples indicated higher clay contents and are classified as sandy clay and clay loam. The clay content in the upper part of the test pits is most likely petogenic in origin, having formed from weathering of the terrace deposits. As indicated by Dr. Roy Shlemon in Appendix D of the Van Bevern and Butelo report, the terrace deposits are at least 100K year old. The

USDA SOIL CLASSIFICATION
SAMPLES G-1 THROUGH G-10



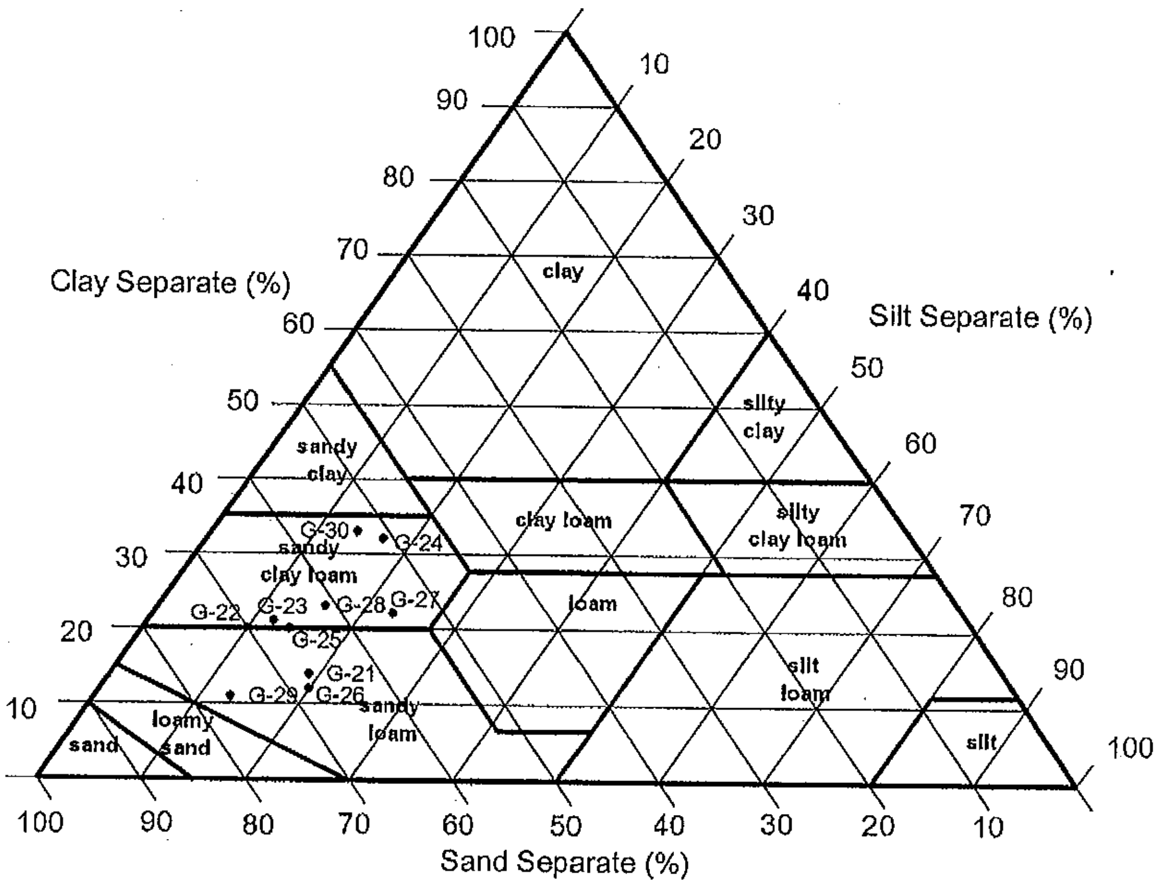
GSC GeoSoils Consultants Inc. GEOTECHNICAL•GEOLOGIC•ENVIRONMENTAL	USDA SOIL CLASSIFICATION TRIANGLE 4000 MALIBU CANYON ROAD V.T.M. 69653 GREEN ACRES, LLC	
	DATE 4/2012	W.O. NO. 6489
	Geotechnical•Geologic•Environmental	FIGURE 1

USDA SOIL CLASSIFICATION
SAMPLES G-11 THROUGH G-20



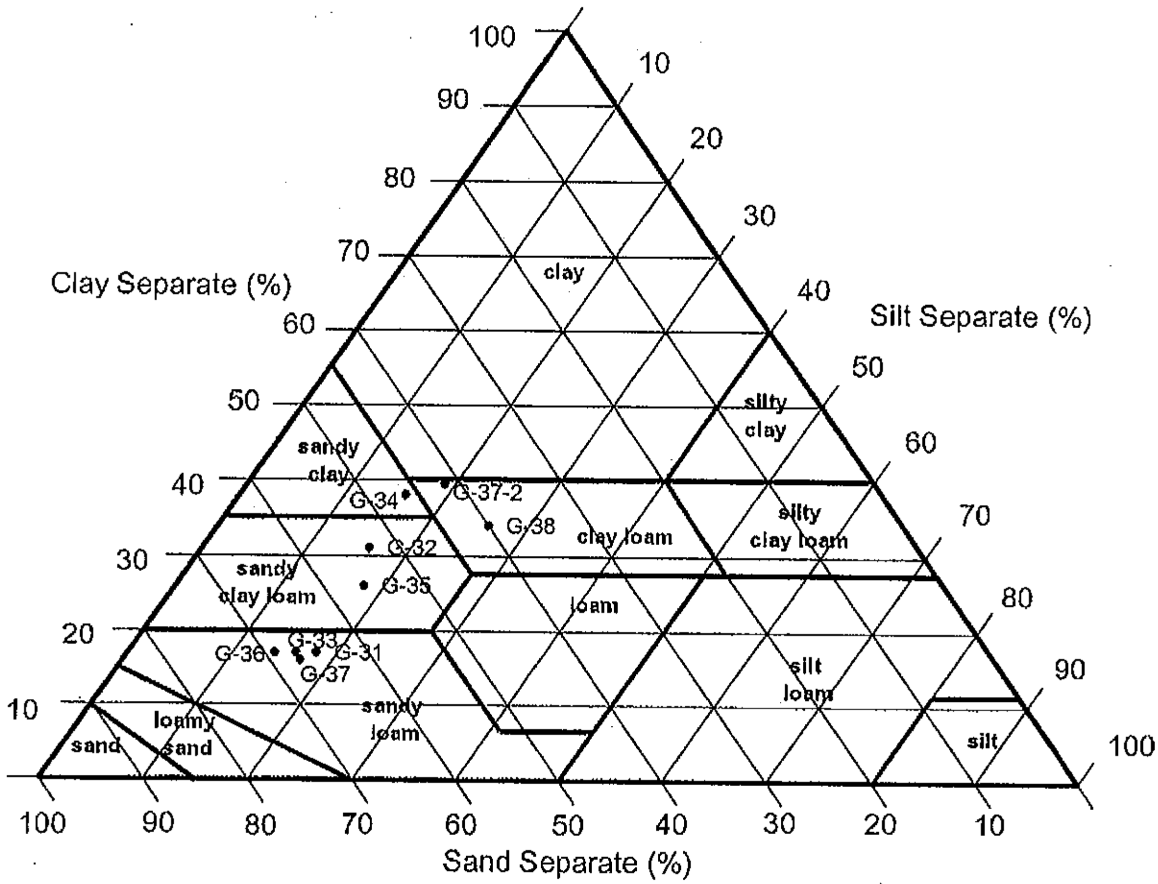
GSC GeoSoils Consultants Inc. GEOTECHNICAL•GEOLOGIC•ENVIRONMENTAL	USDA SOIL CLASSIFICATION TRIANGLE 4000 MALIBU CANYON ROAD V.T.M. 69653 GREEN ACRES, LLC
	DATE 4/2012 W.O. NO. 6489
	Geotechnical•Geologic•Environmental FIGURE 2

USDA SOIL CLASSIFICATION
SAMPLES G-21 THROUGH G-30



GSC GeoSoils Consultants Inc. GEOTECHNICAL•GEOLOGIC•ENVIRONMENTAL	USDA SOIL CLASSIFICATION TRIANGLE 4000 MALIBU CANYON ROAD V.T.M. 69653 GREEN ACRES, LLC
	DATE 4/2012 W.O. NO. 6489
	Geotechnical•Geologic•Environmental FIGURE 3

USDA SOIL CLASSIFICATION
SAMPLES G-31 THROUGH G-38



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USDA SOIL CLASSIFICATION TRIANGLE
4000 MALIBU CANYON ROAD
V.T.M. 69653
GREEN ACRES, LLC

DATE 4/2012	W.O. NO. 6489

Geotechnical•Geologic•Environmental

FIGURE 4

ENSITU ENGINEERING INC
www.ensitu.com
Ensitu Engineering Inc.
685 Main Street Suite A
Morro Bay, CA 93442
tel: 805.772.0150
fax: 805.772.0813

Design Hydraulic and Organic Loading Rates

Project:	Designed By:	Design Date:
Address:	Checked By:	Check Date:

Test Pit Number	Sample Depth #1 ft	USDA Soil Classification	Maximum Percolation Rate (EPA) gal/ft²-day	Sample Depth #2 ft	USDA Soil Classification	Maximum Percolation Rate (EPA) gal/ft²-day	Design Percolatio Rate: Average Flow gal/ft²-day	Design Percolatio Rate: Peak Flow gal/ft²-day
TP-1	1'-2'	Sandy Loam, Blocky, Weak	0.7	5'-6'	Sandy Loam, Massive, Structureless	0.6	–	–
TP-2	1'-2'	Sandy Loam, Blocky, Strong	1	3'	Sandy Clay Loam, Blocky, Moderate	0.3	–	–
TP-3	1'-2'	Silt Loam, Blocky, Weak	0.6	4'-5'	Silt Loam (Bedrock)	0.8	0.19	0.29
TP-4	1'-2'	Loam, Massive, Structureless	0.5				0.19	0.29
TP-5	1'-2'	Sandy Loam, Blocky, Moderate	1	2'-3'	Sandy Clay Loam, Blocky, Moderate to Strong	0.3	–	–
TP-6	1'-2'	Sandy Loam, Blocky, Weak	0.7	2'-3'	Sandy Clay Loam, Blocky, Strong	0.3	–	–
TP-7	6'-7'	Sandy Clay Loam, Blocky, Moderate	0.3				–	–
TP-8	1'-2'	Sandy Clay Loam, Blocky, Moderate	0.3				0.19	0.29
TP-9	1'-2'	Sandy Loam, Blocky, Moderate	0.5	5'-6'	Sandy Loam, Massive, Structureless	0.5	0.19	0.29
TP-10	1'-2'	Sandy Loam, Massive, Structureless	0.5				0.19	0.29
TP-11	1'-2'	Sandy Loam, Massive, Structureless	0.5	13'	Sandy Loam, Massive, Structureless	0.5	0.19	0.29
TP-12	1'-2'	Sandy Loam, Massive, Structureless	0.5	10'	Sandy Loam/Sandy Clay Loam, Massive, Structureless	0.5	–	–
TP-13	1'-2'	Sandy Clay Loam, Massive, Structureless	0				–	–
TP-14	1'-2'	Sandy Clay Loam, Massive, Structureless	0	5'-6'	Sandy Loam/Sandy Clay Loam, Massive, Structureless	0.5	–	–
TP-15	1'-2'	Sandy Loam, Blocky, Moderate	1	4'	Sandy Clay Loam, Blocky, Weak	0	–	–
TP-16	1'-2'	Sandy Loam, Blocky, Moderate to Strong	1				–	–
TP-17	1'-2'	Sandy Clay Loam, Blocky, Strong	0.3	10'	Sandy Loam, Massive, Structureless	0.5	–	–
TP-18	1'-2'	Sandy Clay Loam, Blocky, Strong	0.3	10'	Sandy Loam, Massive, Structureless	0.5	–	–
TP-19	1'-2'	Sandy Clay, Blocky, Strong	0	7'	Sandy Clay Loam, Massive, Structureless	0	–	–
TP-20	1'-2'	Sandy Loam, Blocky, Strong	1				–	–
TP-21	1'-2'	Sandy Clay Loam/Clay Loam, Blocky, Moderate to Strong	0.3	10'	Clay Loam, Massive, Structureless	0	–	–

TABLE 1

results of the previously excavated borings indicate that the clay content decreases with depth.

In addition, a few of the samples fall into the silt loam classification. These samples were obtained at the northwestern corner of the site and are representative for the soil that overlies the volcanic rocks in the area.

Previous consultants have also performed soils classifications on the subject site. The report by Van Beveren and Butelo included fault trenching on the site. Van Beveren and Butelo retained the services of Dr. Roy J. Shlemon and Associates, Inc. to perform geomorphic observations and soil-stratigraphic measurements. A copy of the fault trench log is included herein and the location of the trench is shown on Plate 2. In addition, a copy of Appendix D by Dr. Shlemon is included as Appendix C. Table 1 of Dr. Shlemon's report includes detailed soil descriptions. It should be noted that Dr. Shlemon's descriptions are from soils that have formed on the level parts of the site, thus representing a stable geomorphic surface for soil development. As a result, the soils on the level areas on the site are much more developed (structure and higher clay content) than the soils that overlie the slope areas.

Groundwater

Previous borings were excavated on the site by GSC (Reference 2). Groundwater was not encountered in any of the borings, excavated to a maximum depth of 60 feet below existing grades. In addition, all of the borings excavated by VBB indicated "Groundwater Not Encountered". The borings by VBB extended to a maximum depth of approximately 61 feet. Borings by Leighton and Associates were excavated in 1989. Of the 21 borings excavated by LA, seepage was encountered in Boring B-3 at 23 feet, in B-15 at 36 feet, and in B-4 ponding water was observed at a depth of 60 feet.

A hydrogeologist has been retained to determine the affect of the proposed system on groundwater as well as groundwater mounding.

Separation to Restrictive Layers

The soils tests discussed above are considered to be representative of the soils to be used for percolation testing (Figures 1 through 4). Based on review of the soils classifications, the majority of the site falls into the sandy loam to sandy clay loam category in areas underlain by terrace deposits. Terrace deposits also make up the geologic conditions below most of the site. Review of the gradation analyses indicates only minor variations within the upper 15 feet in the terrace deposits. Therefore, the restrictive layers are not present within the terrace deposits. However, the project engineer should review the results of the laboratory testing to determine if the soil at depth has an adverse affect on the calculated percolation rates. For example, the upper soil in Test Pit TP-19 consists of a sandy clay loam. However, at a depth of 7 feet in the same test pit, the soil consists of a sandy clay loam. In addition, review of the previously excavated boring logs indicates that the terrace deposits contain less clay below a depth of approximately 10 to 15 feet; therefore, the potential for restrictive layers below the zone of percolation is considered low.

As discussed above, the northwestern corner of the property is underlain by bedrock. The test pits excavated in this area encountered highly fractured and weathered rock to depths of 10 feet. Therefore, restrictive layers were not observed in the test pits.

SLOPE STABILITY ANALYSES

As stated above, peak discharge on the slope areas will be approximately 0.29 gallon per day. The majority of this will be absorbed through evapotranspiration. However, during heavy rain events, evapotranspiration may be very low to zero, and the discharged effluent may contribute to the rainfall amounts on the site. Therefore, we have performed surficial slope stability analyses to determine the worst-case conditions for the slope. The analyses were performed using the infinite slope method, based on a four foot thick zone of saturation.

A total of seven shear tests were performed on samples of the surficial soil obtained from the test pits. Surficial slope stability analyses were performed for each shear test to determine the factor of safety of existing slopes and to determine the maximum slope angle that meets a factor of safety of 1.5. The results of the analyses are presented in Appendix B and indicate factors of safety at or above 1.5 for the existing slopes, with the exception of a portion of the slope above Pacific Coast Highway. The results of the shear testing in this area indicated a lower cohesion. As a result, this slope does not meet a factor of safety of 1.5 for surficial stability and should not be used for percolation of effluent. The approximate area that should not be used is shown on Plate 1. In addition, no portions of the descending slopes that are steeper than a 2:1 gradient should be considered for percolation of effluent.

Other parts of the slope are at flatter angles and the results of the analyses indicated factors of safety at 1.5 for the actual slope gradient in the area of the test pit excavations, such as in the area of Test Pit TP-7 and TP-10.

The percolation of effluent is not considered to have an adverse affect on gross stability, since it is considered unlikely that water would migrate more than a few feet into the slopes.

CONCLUSIONS AND RECOMMENDATIONS

The Onsite Wastewater Treatment System proposed for the site is feasible from a geotechnical standpoint. The majority of the water will be absorbed through evapotranspiration and will not result in saturation of the slope. Considering the peak discharge of 0.29 gallons per square foot per day, this amount will have little additional impact over rainfall on the slope during heavy winter rains.

Based on the slope stability analyses, the recommended dispersal is acceptable except for the location shown on Plate 1. In addition, no portions of the descending slopes that are steeper than a 2:1 gradient should be considered for percolation of effluent.

The recommendations presented in References 1 and 2 remain applicable. Since the slope area will be used for percolation, no additional irrigation should be applied.

"111" STATEMENT

It is GSC's opinion that the building site will be safe from the hazards of landslide, settlement or slippage. Furthermore, the completed development will not adversely affect the stability of the adjacent properties nor be adversely affected by adjacent properties.

LIMITATIONS

The findings and recommendations of this report were prepared in accordance with generally accepted professional geotechnical engineering principles and practice for the City of Malibu at this time. We make no other warranty, either express or implied. The conclusions and recommendations contained in this report are based on site conditions disclosed in our subsurface investigation and the referenced reports. However, soil/rock conditions can vary significantly between borings, test pits, and natural outcrops, therefore, further refinements of our recommendations contained herein may be necessary due to changes in the building plans or what is encountered during site grading.

Since our investigation was based on the site conditions observed, selective laboratory testing, and engineering analysis, the conclusions and recommendations contained herein are professional opinions. Further, these opinions have been derived in accordance with standard engineering practices, and no warranty is expressed or implied.

If the conditions encountered during grading are not consistent with the findings presented in this report, or if proposed construction is moved from the location investigated, this office shall be notified immediately so that the condition or change can be evaluated and appropriate action taken.

CLOSURE

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

Very truly yours,

GEOSOILS CONSULTANTS, INC.

REGISTERED PROFESSIONAL ENGINEER KAREN L. MILLER No. 2257 Exp. 3/31/14 GEOTECHNICAL STATE OF CALIFORNIA

KAREN L. MILLER
GE 2257

CERTIFIED ENGINEERING GEOLOGIST RUDY F. RUBERTI No. 1708 STATE OF CALIFORNIA

RUDY F. RUBERTI
CEG 1708

KLM.RFR.W:Geol & Geot Eng Review

Encl: References
Plate 1, Test Pit Location Map
Plate 2, Geologic Map
Plate 3, Geologic Cross-Sections
Appendix A, Field Exploration Procedures and Laboratory Test Results
Plates TP-1 through TP-21, Test Pit Logs
Plates A-1 through A-10, Boring Logs (9-8-11)
Plates SH-1 through SH-7, Shear Test Diagrams
Plates G-1 through G-38, Gradation Test Diagrams
Appendix B, Surficial Slope Stability Analyses
Appendix C, Soil-Geomorphic Assessment of Sediment Age by Dr. Roy J. Schlemon
Logs of Trenches 1 and 2 (Van Beveren and Butelo)

cc: (2) Addressee
(3) Ensitu Engineering, Inc.
Attention: John Yaroslaski

MDN 13857

REFERENCES

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

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

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

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

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

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

APPENDIX A

FIELD EXPLORATION PROCEDURES

AND LABORATORY TEST RESULTS

APPENDIX A

FIELD EXPLORATION PROCEDURES

AND LABORATORY TEST RESULTS

Our test pits were excavated with a rubber tire backhoe, operated by an independent drilling company working under subcontract to GSC. Samples were obtained via the California ring sampler.

A geologist from our firm continuously observed the test pits and classified the soils encountered by visual examination in accordance with the Unified Soil Classification System and USDA system, and collected representative soil samples. Ring samples were obtained by driving a ring sampler attached to the backhoe bucket. Soil samples were retained in a series of brass rings, each having an inside diameter of 2.36 (6.0 centimeter) and a height of 1.00 inch (2.54 centimeter). The ring samples were stored in close-fitting, moisture-tight containers and later transported to our laboratory for further visual examination and testing, as deemed necessary. After the tests pits were completed, the borehole was backfilled with soil cuttings.

The enclosed *Test Pit Lots* describes the vertical sequence of soils and materials encountered in each excavation, based primarily on our field classifications and supported by our subsequent laboratory examination and testing. Where a soil contact was observed to be gradational, our log indicates the average contact depth. Where a soil type changed between sample intervals, we inferred the contact depth. Our log also graphically indicates the sample type, sample number, and approximate depth of each soil sample obtained from the test pits, as well as any laboratory tests performed on these soil samples. If any groundwater was encountered in a excavation, the approximate groundwater depth is depicted on the test pit log.

Appendix A

LABORATORY TESTING PROCEDURES

Moisture-Density

The field moisture content and dry unit weights were determined for each undisturbed ring sample obtained from our subsurface exploration. Once the dry unit weights had been determined, in-place densities of underlying soil profile were estimated. In those cases where ring samples were obtained, the moisture content and dry unit weights are presented on the following table.

Direct Shear Tests

Shear tests were performed in a strain-control type Direct Shear Machine. The samples were sheared under varying confining loads in order to determine the Coulomb shear strength parameters: cohesion (c), and angle of internal friction (ϕ) for peak and residual strength conditions. The samples were tested in an artificially saturated condition. The results are plotted and a linear approximation is drawn of the failure curve. Results are shown on the Shear Test Diagrams included with these appendices, as Plates SH-1 through SH-7.

Grain-Size Analysis

Washed sieve analysis of selected representative samples were performed for grain-size determination in accordance with California Test 202. A graphical grain size distribution curve is shown on Plates G-1 to G-38.

The grain size analysis of the minus 200 sieve material was performed for selected samples. The analysis was performed using standard hydrometer methods in accordance with California Test 203.

GeoSoils Consultants Inc.

RELATIVE COMPACTION DETERMINATION WORKSHEET

CLIENT : Green Acres, LLC   WORK ORDER NO : 6489   DATE : 03/15/12

SAMPLE	WET DENSITY (PCF)	MOISTURE %	DRY DENSITY (PCF)	MAXIMUM DENSITY (PCF)	OPTIMUM MOISTURE %	RELATIVE COMPACTION	NOTES
TP-5 @ 0.5	121.8	5.0	115.9				
TP-7 @ 0.5	118.7	15.1	103.2				
TP-8 @ 2.0	132.0	13.1	116.7				
TP-10 @ 3.0	125.9	6.6	118.1				
TP-11 @ 2.0	111.7	5.5	105.8				
TP-12 @ 3.0	114.2	5.2	108.6				
TP-14 @ 5.0	119.8	6.9	112.0				
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SHEET: 1 of 3

GeoSoils Consultants Inc.

RELATIVE COMPACTION DETERMINATION
WORKSHEET

CLIENT : Green Acres, LLC WORK ORDER NO : 6489 DATE : 03/15/12

SAMPLE	WET DENSITY (PCF)	MOISTURE %	DRY DENSITY (PCF)	MAXIMUM DENSITY (PCF)	OPTIMUM MOISTURE %	RELATIVE COMPACTION	NOTES
TP-1 @ 1.0		9.6					
TP-1 @ 2 - 3.0		10.0					
TP-2 @ 1.0		3.8					
TP-2 @ 3.0		7.9					
TP-3 @ 0.5		13.6					
TP-3 @ 4 - 5.0		10.7					
TP-3,4 @ 2.0		10.7					
TP-4 @ 2.0		16.0					
TP-5 @ 1.0		4.9					
TP-5 @ 2.0		9.7					
TP-6 @ 1.0		3.2					
TP-6 @ 2.0		7.6					
TP-6 @ 5.0		10.1					
TP-7 @ 6.0		5.9					
TP-8 @ 2.0		10.5					
TP-9 @ 2.0		6.0					
TP-9 @ 5.0		17.2					
TP-10 @ 2.0		6.4					
TP-11 @ 2.0		5.5					
TP-11 @ 13.0		9.2					
TP-12 @ 2.0		4.4					

SHEET: 2 of 3

GeoSoils Consultants Inc.

RELATIVE COMPACTION DETERMINATION WORKSHEET

CLIENT : Green Acres, LLC   WORK ORDER NO : 6489   DATE : 03/15/12

SAMPLE	WET DENSITY (PCF)	MOISTURE %	DRY DENSITY (PCF)	MAXIMUM DENSITY (PCF)	OPTIMUM MOISTURE %	RELATIVE COMPACTION	NOTES
TP-12 @ 10.0		7.3					
TP-13 @ 2.0		6.7					
TP-14 @ 2.0		9.9					
TP-14 @ 5.0		6.9					
TP-15 @ 2.0		2.9					
TP-15 @ 3.0		9.9					
TP-15 @ 4.0		8.0					
TP-15 @ 10.0		7.9					
TP-16 @ 2.0		2.9					
TP-17 @ 2.0		8.7					
TP-17 @ 10.0		6.6					
TP-18 @ 2.0		7.8					
TP-18 @ 10.0		5.8					
TP-19 @ 2.0		10.5					
TP-19 @ 7.0		7.9					
TP-20 @ 2.0		5.7					
TP-20 @ 3.0		11.2					
TP-20 @ 5.0		7.6					
TP-20 @ 10.0		6.1					
TP-21 @ 2.0		11.8					
TP-21 @ 10.0		14.8					

SHEET: 3 of 3

MDN 13857

TEST PIT LOG 1

GEOSOILS CONSULTANTS, INC.

CLIENT: Green Acres
ADDRESS:
ELEVATION:
LOGGED BY: L.P.
WORK ORDER NO.: 6489
DATE: 3-6-12

Depth	Material Type	Material Description	Comments
0'-15'	Terrace Deposits (Qtn)	@ 0-5', Reddish-brown (5YR, 4/4) to brown (7.5YR, 4/3), sandy loam, moderately dense, moist, porous; at 2-5', blocky, weak @ 5-6', Light-brown, sandy loam, moderately dense, slightly moist, massive, structureless @ 6-15', Reddish-brown, sandy clay loam, moderately dense, moist porous, massive, structureless @ 15', Clean, sandy zone	

Scale: H: 1"= 5' V: 1"= 5' Pit Orient.: N -S Natural Slope: Angle 3:1 --- T. D. 15'

Illustration

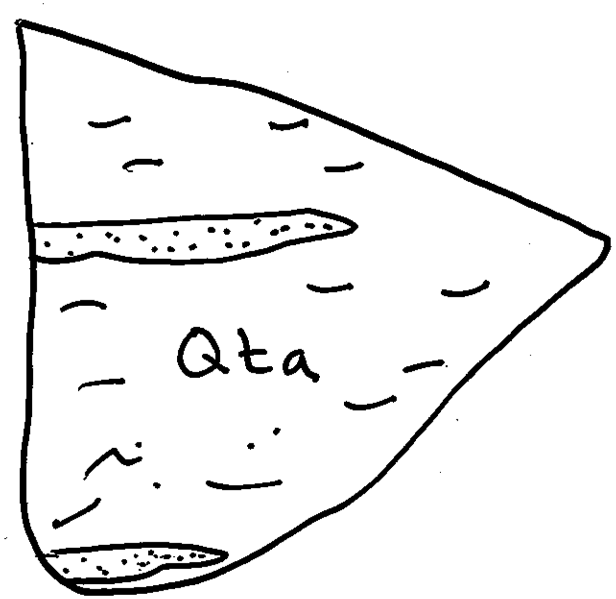


Plate TP-1

MDN 13857

TEST PIT LOG 2

GEOSOILS CONSULTANTS, INC.

CLIENT: Green Acres
ADDRESS:

ELEVATION:
LOGGED BY: L.P.

WORK ORDER NO.: 6489
DATE: 3-6-12

Depth	Material Type	Material Description	Comments
0'-15'	Terrace Deposits (Qtn)	@ 0-2', Dark yellowish-brown, sandy loam with occasional cobbles, blocky, strong @ 2-15', Dark brown (7.5 YR/3/3), sandy clay loam, dense, blocky, moderate, @ 2'-9' and 9'-15', weak @ 9', Cobble zone	

Scale: H: 1"= 5' V: 1"= 5' Pit Orient.: N -S Natural Slope: Angle 0 --- T. D. 15'

Illustration

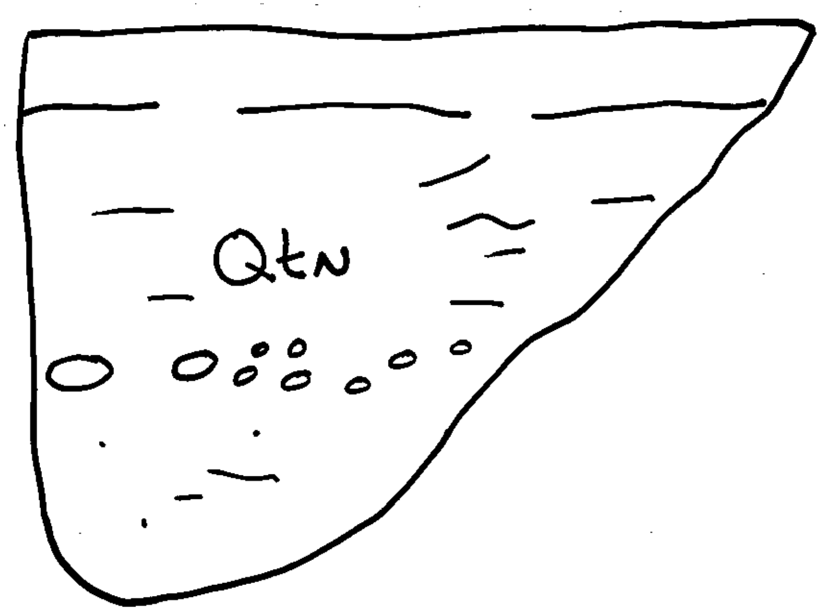


Plate TP-2

MDN 13857

TEST PIT LOG 3

GEOSOILS CONSULTANTS, INC.

CLIENT: Green Acres

ADDRESS:

ELEVATION:

LOGGED BY: L.P.

WORK ORDER NO.: 6489

DATE: 3-6-12

Depth	Material Type	Material Description	Comments
0-1'	Colluvium (Qcol)	Dark brown (10YR, 3/3) silt loam with abundant bedrock (basalt) fragment, porous, blocky, weak	
1'-15'	Bedrock: Vaqueros Formation (Tv)	Orange-brown basalt, moderately hard, very fractured & weathered, hard from 10'-15'	

Scale: H: 1"= 5' V: 1"= 5' Pit Orient.: N- S Natural Slope: Angle 2.5:1 T. D. 15'

Illustration

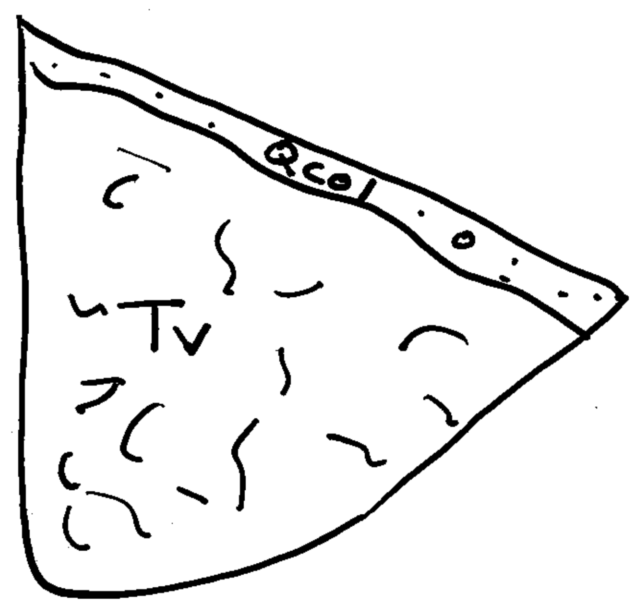


Plate TP-3

MDN 13857

TEST PIT LOG 4

GEOSOILS CONSULTANTS, INC.

CLIENT: Green Acres
ADDRESS:

ELEVATION:
LOGGED BY: L.P.

WORK ORDER NO.: 6489
DATE: 3-6-12

Depth	Material Type	Material Description	Comments
0-3'	Colluvium (Qcol)	Very dark grayish-brown (2.5Y, 3/2) loam with abundant bedrock fragments, porous, massive, structureless	
3'-15'	Bedrock: Vagueros Formation(Tv)	Orange-brown basalt, moderately hard, very fractured & weathered, hard From 10'-15'	

Scale: H: 1"= 5' V: 1"= 5' Pit Orient.: N -S Natural Slope: Angle 3:1 T. D. 15'

Illustration

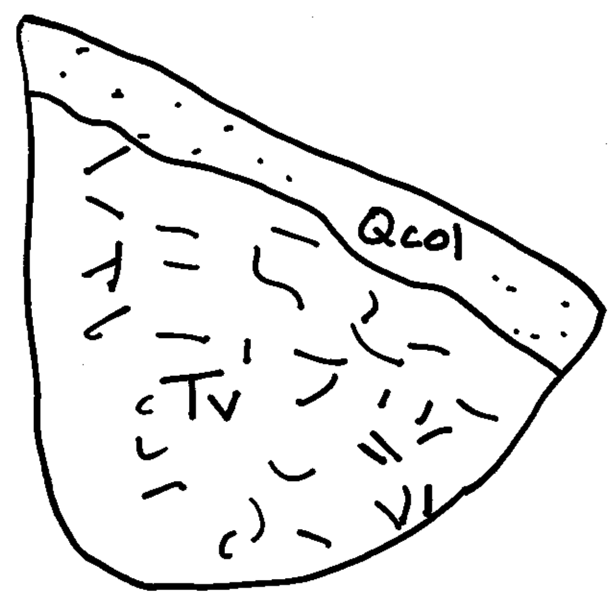


Plate TP-4

MDN 13857

TEST PIT LOG 5

GEOSOILS CONSULTANTS, INC.

CLIENT: Green Acres
ADDRESS:

ELEVATION:
LOGGED BY: L.P.

WORK ORDER NO.: 6489
DATE: 3-6-12

Depth	Material Type	Material Description	Comments
0-2'	Colluvium (Qcol)	Dark yellowish-brown (10YR, 3/4) sandy loam, porous, blocky, moderate	
2'-15'	Terrace Deposits (Qtn)	Brown (7.5 YR, 4/3) sandy clay loam, dense, slightly porous, blocky, moderate to strong from 2'-4' @ 4'-15', massive @ 10' and 14', clean sand zones	

Scale: H: 1"= 5' V: 1"= 5' Pit Orient.: N -S Natural Slope: Angle 3:1 T. D. 15'

Illustration

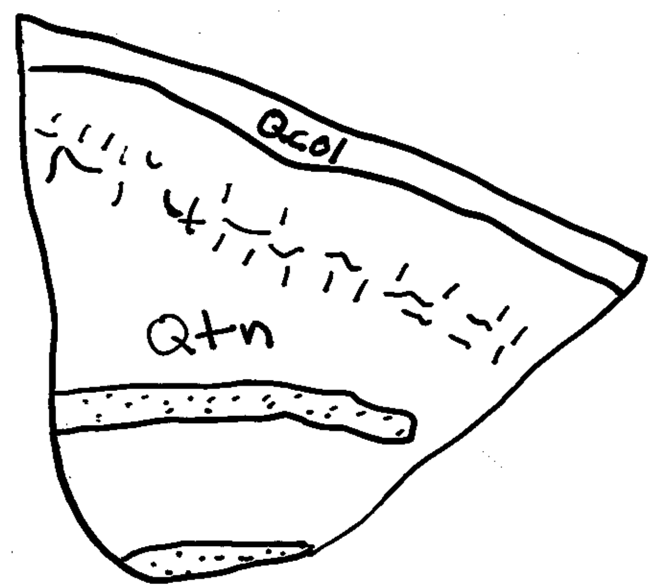


Plate TP5

TEST PIT LOG 6

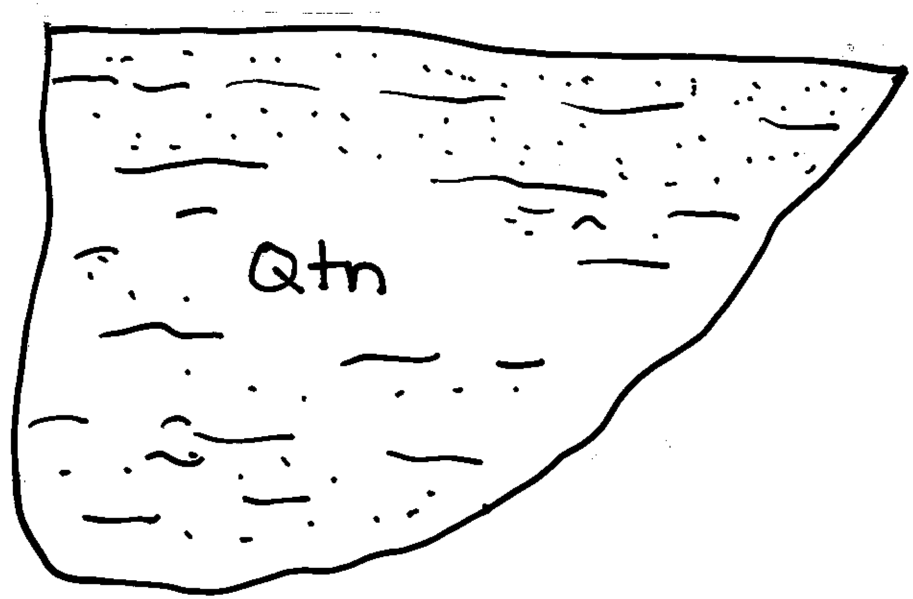
GEOSOILS CONSULTANTS, INC.

CLIENT: Green Acres
ADDRESS:
ELEVATION:
LOGGED BY: L.P.
WORK ORDER NO.: 6489
DATE: 3-6-12

Depth	Material Type	Material Description	Comments
0'-15'	Terrace Deposits (Qtn)	@ 0-1.5', (10YR, 5/3) sandy loam, loose to moderately firm, dry, porous, blocky, weak @ 1.5-4', Yellowish-brown (10 YR, 5/4) sandy clay loam, moderately dense, porous, blocky, strong @ 4-6', Brown (7.5 YR, 4/4) sandy clay loam, dense to very dense, blocky, weak to moderately strong @ 10-15', Slightly less clayey	

Scale: H: 1"= 5' V: 1"= 5' Pit Orient.: 4N -S Natural Slope: Angle 0' ---- T. D. 15'

Illustration



TEST PIT LOG 7

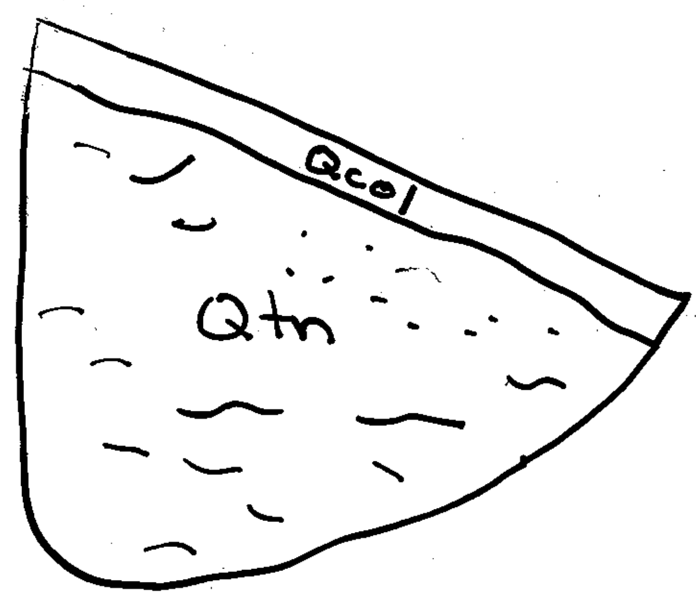
GEOSOILS CONSULTANTS, INC.

CLIENT: Green Acres
ADDRESS:
ELEVATION:
LOGGED BY: L.P.
WORK ORDER NO.: 6489
DATE: 3-6-12

Depth	Material Type	Material Description	Comments
0'-1'	Colluvium (Qcol)	Gray-brown, silty loam, porous, dry massive, structureless	
1'-15'	Terrace Deposits (Qtn)	Reddish-brown (5 YR, 4/3), sandy clay loam, dense to very dense, moist, blocky, moderate (below 4', massive) @ 6-9', Sandy loam, structureless, massive @9'-15' slightly less clayey	

Scale: H: 1"= 5' V: 1"= 5' Pit Orient.: N 73 E Natural Slope: Angle 3:1- T. D. 15'

Illustration



MDN 13857

TEST PIT LOG 8

GEOSOILS CONSULTANTS, INC.

CLIENT: Green Acres
ADDRESS:
ELEVATION:
LOGGED BY: L.P.
WORK ORDER NO.: 6489
DATE: 3-6-12

Depth	Material Type	Material Description	Comments
0-1'	Colluvium (Qcol)	Gray-brown, silty loam, loose, porous, dry, massive, structureless	
1'-15'	Terrace Deposits (Qtn)	Yellowish-red (5 YR, 4/6), sandy clay loam, dense, moist, blocky, moderate from 2'-4' massive from 4'-15'	

Scale: H: 1"= 5' V: 1"= 5' Pit Orient.: ____ Natural Slope: Angle 3:1 T. D. 15'

Illustration

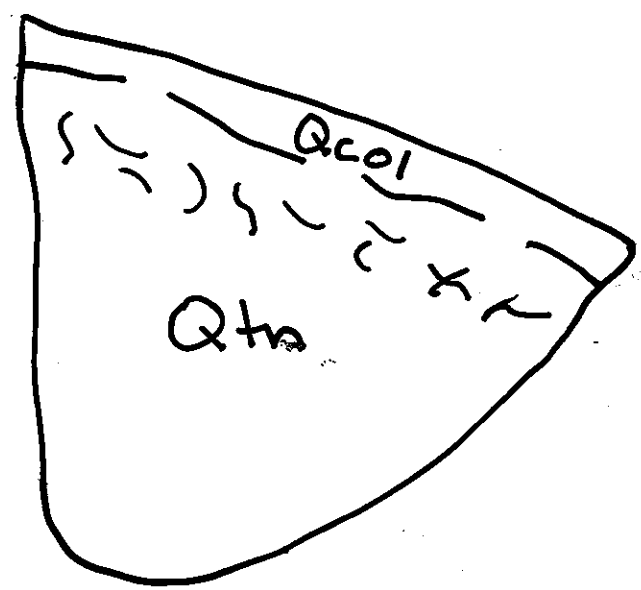


Plate TP-8

TEST PIT LOG 9

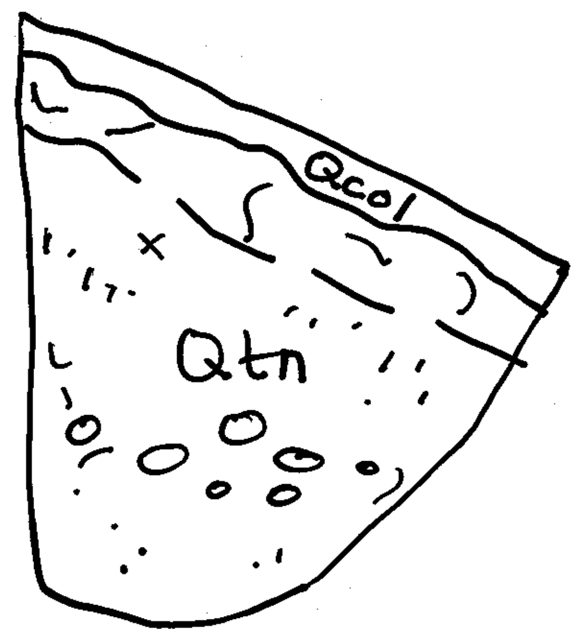
GEOSOILS CONSULTANTS, INC.

CLIENT: Green Acres
ADDRESS:
ELEVATION:
LOGGED BY: L.P.
WORK ORDER NO.: 6489
DATE: 3-8-12

Depth	Material Type	Material Description	Comments
0-1'	Colluvium (Qcol)	Dark brown loam, single grain, dry, loose to moderately dense, massive, structureless	
1-16'	Terrace Deposits (Qtn)	@ 1-3', Dark yellowish-brown (10 YR, 3/6) sandy loam, blocky, moderate, moderately dense to dense, moist @ 10', Cobble zone @ 3-16', Sandy loam, single grain, structureless, massive, moderately dense to dense, slightly moist, scattered cobble	

Scale: H: 1"= 5' V: 1"= 5' Pit Orient Natural Slope: Angle 2.5':1 T. D. 15'

Illustration



MDN 13857

TEST PIT LOG 10

GEOSOILS CONSULTANTS, INC.

CLIENT: Green Acres
ELEVATION:
WORK ORDER NO.: 6489
ADDRESS:
LOGGED BY: L.P.
DATE: 3-8-12

Depth	Material Type	Material Description	Comments
0'-15'	Terrace Deposits (Qtn)	Yellow-brown, fine, sandy loam, massive, structureless, slightly moist, dense @ 5-15', Fine SAND with occasional cobble (diameter ~6"), massive	

Scale: H: 1"= 5' V: 1"= 5' Pit Orient.: N -S Natural Slope: Angle 2:1 --- T. D. 15'

Illustration

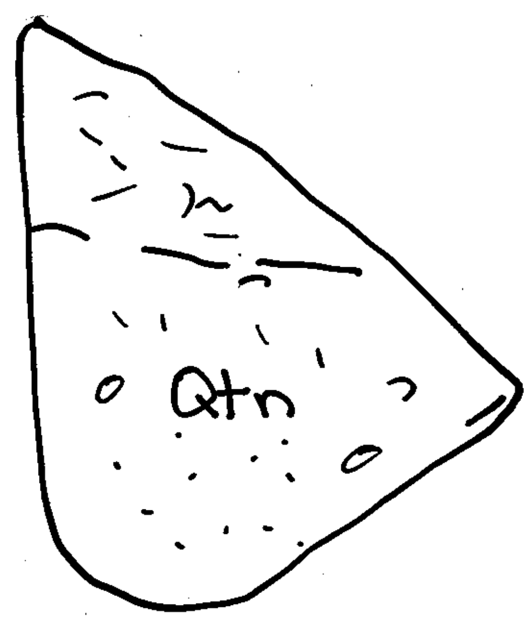


Plate TP-10

MDN 13857

TEST PIT LOG 11

GEOSOILS CONSULTANTS, INC.

CLIENT: Green Acres
ADDRESS:
ELEVATION:
LOGGED BY: L.P.
WORK ORDER NO.: 6489
DATE: 3-8-12

Depth	Material Type	Material Description	Comments
0-3'	Colluvium (Qcol)	Strong brown (7.5 YR, 5/8) sandy loam with abundant gravel to 4", loose to moderately dense, massive, structureless, slightly moist	
3'-15'	Terrace Deposits (Qtn)	Strong brown (7.5 YR, 4/6) sandy loam, dense ,moist, massive, abundant cobbles from 3-8'	

Scale: H:____ V:____ Pit Orient.: E-W Natural Slope: Angle 2:1 ---- T. D. 15'

Illustration

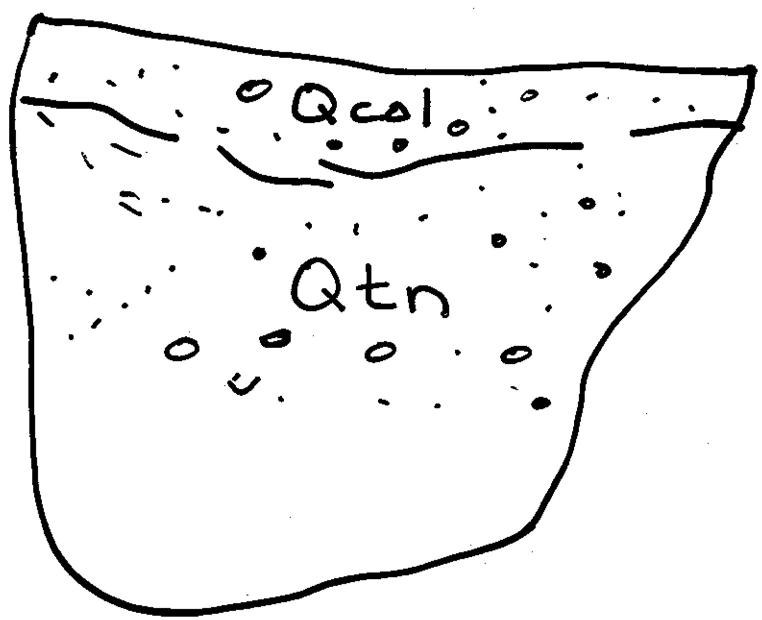


Plate TP-11

TEST PIT LOG 12

GEOSOILS CONSULTANTS, INC.

CLIENT: Green Acres
ADDRESS:

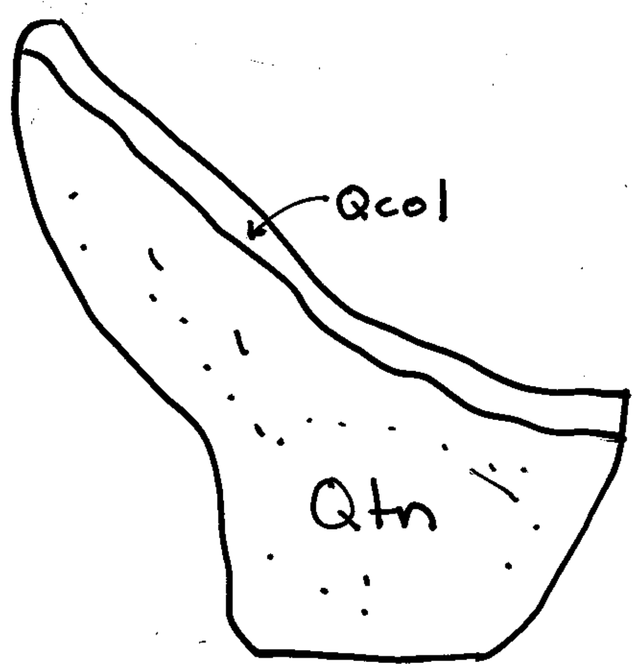
ELEVATION:
LOGGED BY: L.P.

WORK ORDER NO.: 6489
DATE: 3-8-12

Depth	Material Type	Material Description	Comments
0-1'	Colluvium (Qcol)	Brown, silty, loam, massive, structureless, loose, dry	
1'-15'	Terrace Deposits (Qtn)	Brown (7.5 YR, 4/5) to dark yellowish-brown (10 YR, 4/6) sandy loam, slightly moist, dense, massive, structureless, sandy clay loam at 7-10'	

Scale: H: 1"= 5' V: 1"= 5' Pit Orient.: N -S Natural Slope: Angle 1.5':1 T. D. 15'

Illustration



TEST PIT LOG 13

GEOSOILS CONSULTANTS, INC.

CLIENT: Green Acres
ADDRESS:

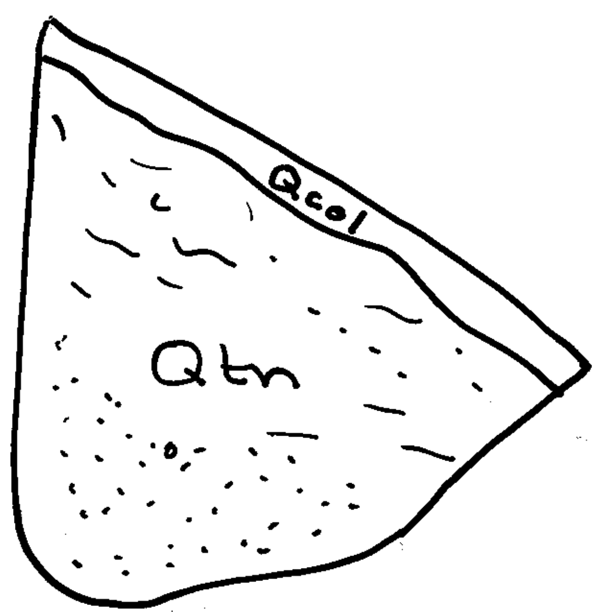
ELEVATION:
LOGGED BY: L.P.

WORK ORDER NO.: 6489
DATE: 3-8-12

Depth	Material Type	Material Description	Comments
0-1’	Colluvium (Qcal)	Brown, silt loam, massive, loose, dry	
1’-15’	Terrace Deposits (Qtn)	Dark yellow-brown (10 YR, 4/6) sandy clay loam, dense, moist, massive, structureless @ 8’-15’ less clay content more fine sand	

Scale: H: 1”= 5’ V: 1”= 5’ Pit Orient.: N -S Natural Slope: Angle 2:1 T. D. 15’

Illustration



MDN 13857

TEST PIT LOG 14

GEOSOILS CONSULTANTS, INC.

CLIENT: Green Acres
ADDRESS:
ELEVATION:
LOGGED BY: L.P.
WORK ORDER NO.: 6489
DATE: 3-8-12

Depth	Material Type	Material Description	Comments
0-15'	Terrace Deposits (Qtn)	@ 0-3', Strong brown (7.5 YR, 4/6) sandy clay loam, moderately dense, slightly moist, massive, structureless @ 3-15', Brown (7.5 YR, 4/4) sandy loam, sandy clay loam, dense, moist, massive, structureless	

Scale: H: 1"= 5' V: 1"= 5' Pit Orient.: ____ Natural Slope: Angle 0 T. D. 15'

Illustration

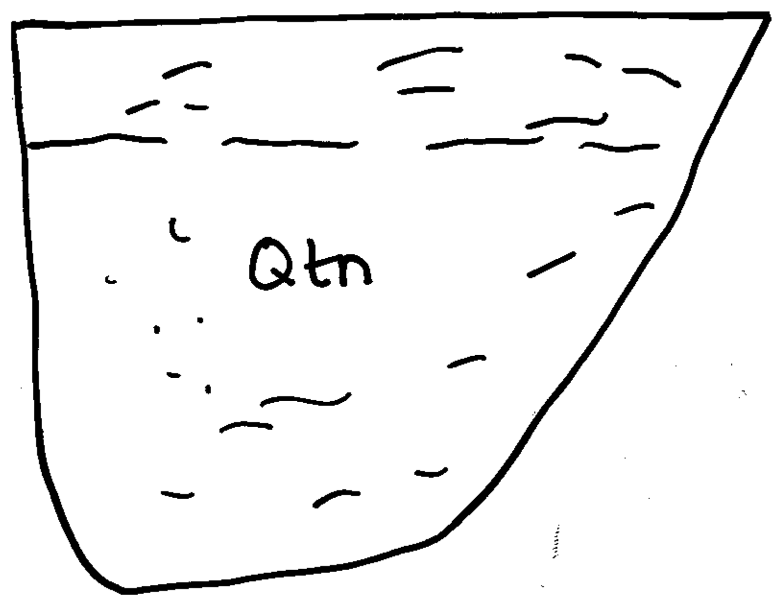


Plate TP-14

TEST PIT LOG 15

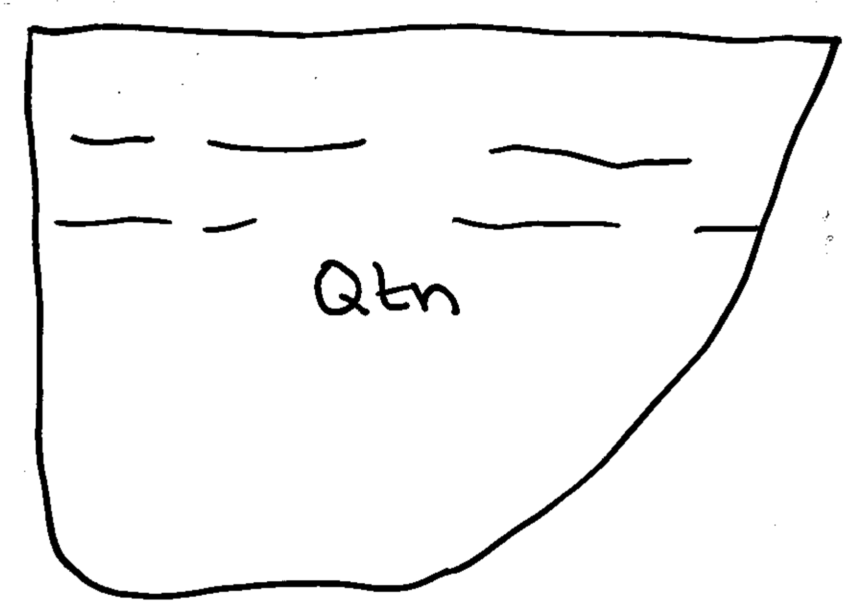
GEOSOILS CONSULTANTS, INC.

CLIENT: Green Acres
ADDRESS:
ELEVATION:
LOGGED BY: L.P.
WORK ORDER NO.: 6489
DATE: 3-8-12

Depth	Material Type	Material Description	Comments
0-15'	Terrace Deposits (Qtn)	@ 0-3', Yellowish-brown (10 YR, 5/4) to dark yellowish-brown (10 YR, 4/4) sandy loam, very porous, blocky, moderate, moderately dense, dry @ 3-5', Dark yellowish-brown (10 YR, 4/4) to brown (7.5 YR, 4/4) sandy clay loam, porous, blocky, weak, structureless, dense, moist @ 5-15', Brown (7.5 YR, 4/4) sandy clay loam, slightly porous, blocky and weak @ 506', massive and structureless @ 6-13'	

Scale: H: 1"= 5' V: 1"= 5' Pit Orient.: E-W Natural Slope: Angle 0-- T. D. 15'

Illustration



MDN 13857

TEST PIT LOG 16

GEOSOILS CONSULTANTS, INC.

CLIENT: Green Acres
ADDRESS:

ELEVATION:
LOGGED BY: L.P.

WORK ORDER NO.: 6489
DATE: 3-8-12

Depth	Material Type	Material Description	Comments
0-1.5'	Artificial Fill (af)	Gray-brown SAND, electrical shading	
1.5'-15'	Terrace Deposits (Qtn)	Dark brown (7.5 YR, 3/4) sandy loam, dense, moist, blocky, moderate to strong	

Scale: H: 1"= 5' V: 1"= 5' Pit Orient.: N-S Natural Slope: Angle 0 T. D. 15'

Illustration

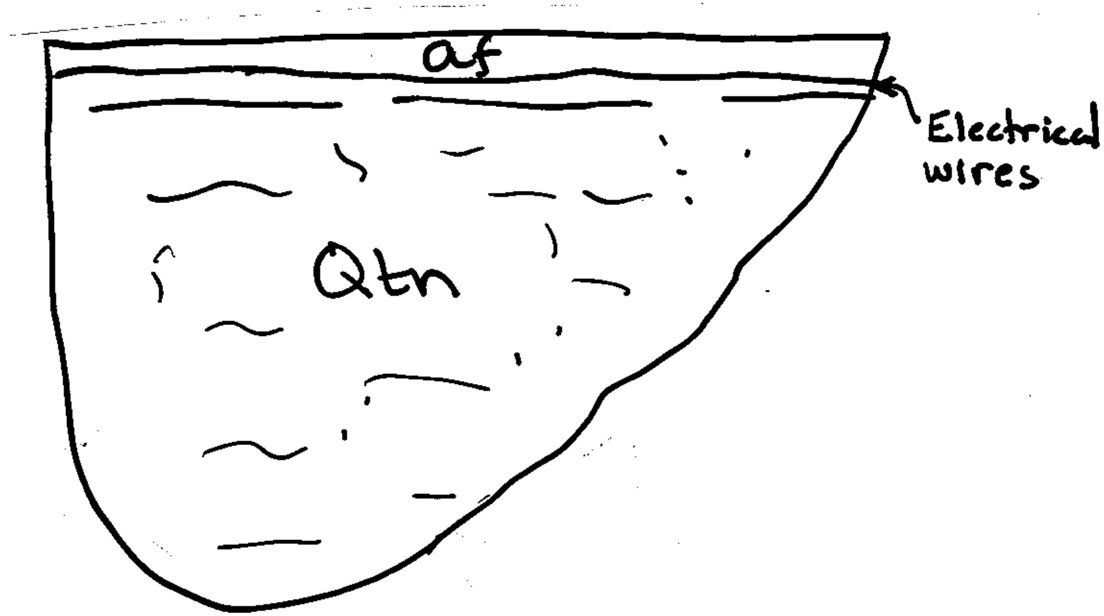


Plate TP-16

TEST PIT LOG 17

GEOSOILS CONSULTANTS, INC.

CLIENT: Green Acres
ADDRESS:

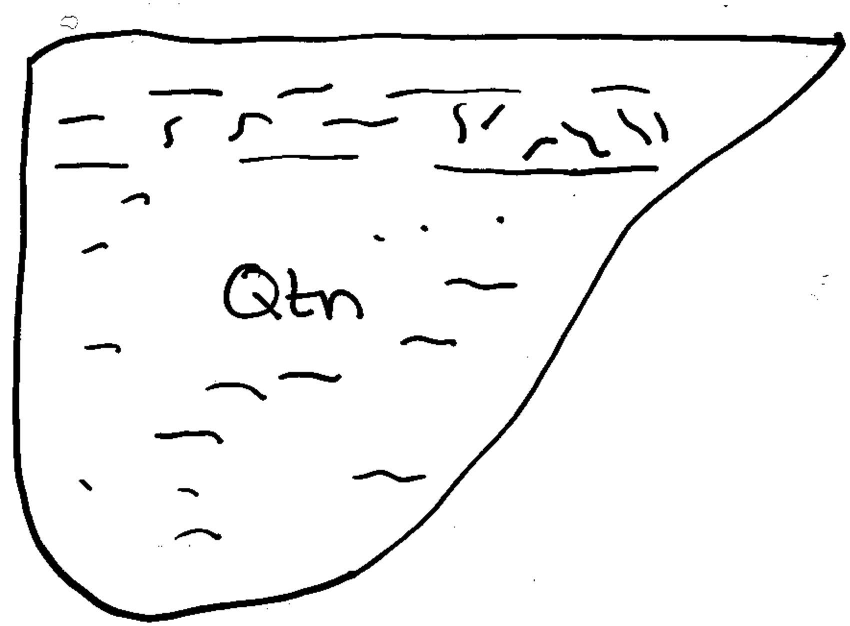
ELEVATION:
LOGGED BY: L.P.

WORK ORDER NO.: 6489
DATE: 3-13-12

Depth	Material Type	Material Description	Comments
0-15'	Terrace Deposits (Qtn)	@ 0-1', Light-brown, silt loam, loose to moderately dense, moist, massive @ 1-15', Dark brown (7.5 YR, ¾) to brown (7.5 YR, 4/4) sandy clay loam, moderately dense to dense, moist, porous @ 1-3', blocky, strong @ 3-15', massive, less clay @ 10-15', Sandy loam, massive, structureless	Bulk sample @ 2' and 10'

Scale: H: 1"= 5' V: 1"= 5' Pit Orient.: N -S Natural Slope: Angle T. D. 15'

Illustration



MDN 13857

TEST PIT LOG 18

GEOSOILS CONSULTANTS, INC.

CLIENT: Green Acres
ADDRESS:
ELEVATION:
LOGGED BY: L.P.
WORK ORDER NO.: 6489
DATE: 3-13-12

Depth	Material Type	Material Description	Comments
0-15'	Terrace Deposits (Qtn)	@ 0-1', Loam, loose to moderately dense, dry, structureless @ 1-3', Dark yellowish-brown (10 YR, 3/6) sandy clay loam, moderately dense to dense, moist, blocky, strong , porous @ 3-5', Sandy clay loam, dense, moist, blocky, moderate to strong, porous @ 5', Loamy, fine SAND, moderately dense, structureless @ 5-13', Brown (7.5 YR, 4/4) sandy loam, dense, porous, moist, massive @ 13-15', Sandy loam, massive	

Scale: H: 1"= 5' V: 1"= 5' Pit Orient.: N -W Natural Slope: Angle 0 T. D. 15'

Illustration

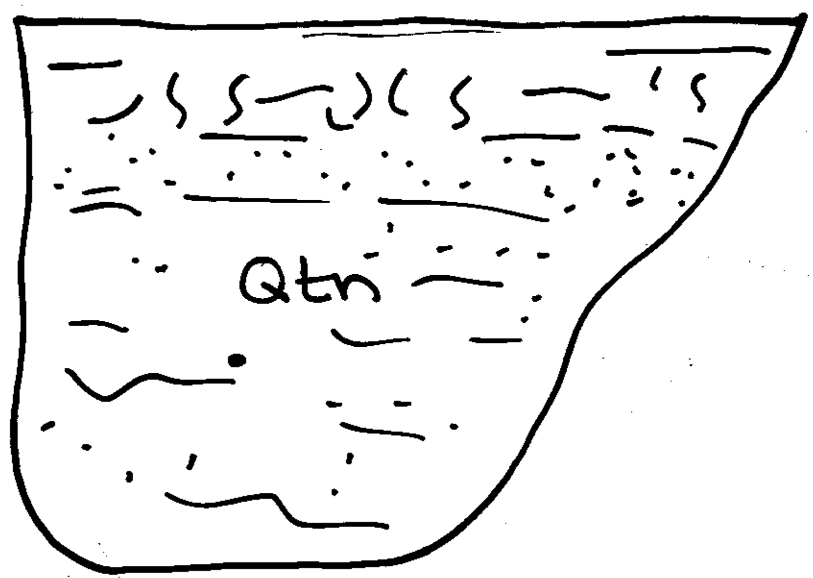


Plate TP-18

MDN 13857

GEOSOILS CONSULTANTS, INC.

TEST PIT LOG 19

CLIENT: Green Acres
ADDRESS:
ELEVATION:
LOGGED BY: L.P.
WORK ORDER NO.: 6489
DATE: 3-13-12

Depth	Material Type	Material Description	Comments
0-15'	Terrace Deposits (Qtn)	@ 0-1', Light-brown, silt loam, loose to moderately dense, dry, structureless, porous @ 1-3', Dark yellowish-brown (10 YR, 4/6) sandy clay , dense, moist, blocky, strong, porous @ 3-15', Blocky, moderate @ 7', Strong brown (7.5 YR, 5/8) sandy clay loam, dense, massive, structureless, porous @ 7-13', Pockets of sand within sandy clay loam 13-15', Sandy loam, massive	

Scale: H: 1"= 5' V: 1"= 5' Pit Orient.: N-S Natural Slope: Angle 0 T. D. 15'

Illustration

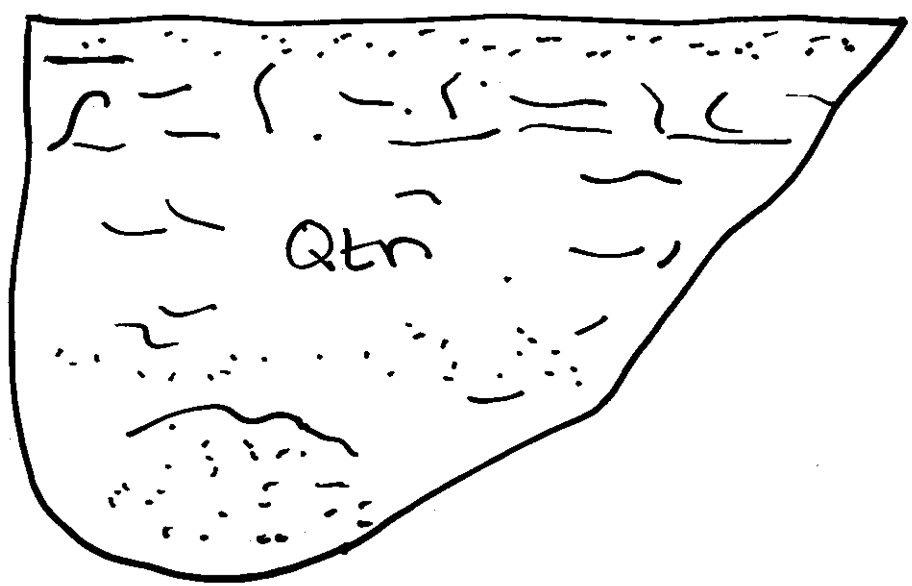


Plate TP-19

MDN 13857

TEST PIT LOG 20

GEOSOILS CONSULTANTS, INC.

CLIENT: Green Acres
ADDRESS:
ELEVATION:
LOGGED BY: L.P.
WORK ORDER NO.: 6489
DATE: 3-13-12

Depth	Material Type	Material Description	Comments
0-15'	Terrace Deposits (Qtn)	@ 0-2', Brown (7.5 YR, 4/4) sandy loam, moderately dense, slightly moist, blocky, moderate @ 2-4', Brown (7.5 YR, 4/4) sandy loam, dense, moist, blocky, moderate to strong, porous @ 4-7', Dark yellowish-brown (10 YR, 3/6), sandy clay loam, dense, slightly moist, massive, structureless, porous @ 7-15', Brown (7.5 YR, 4/4) light-brown, fine SAND, dense, slightly moist, increasing sand content with depth, very sandy @ 10'-15', massive, porous, scattered cobble	

Scale: H: 1"= 5' V: 1"= 5' Pit Orient.: N -S Natural Slope: Angle 0 T. D. 15'

Illustration

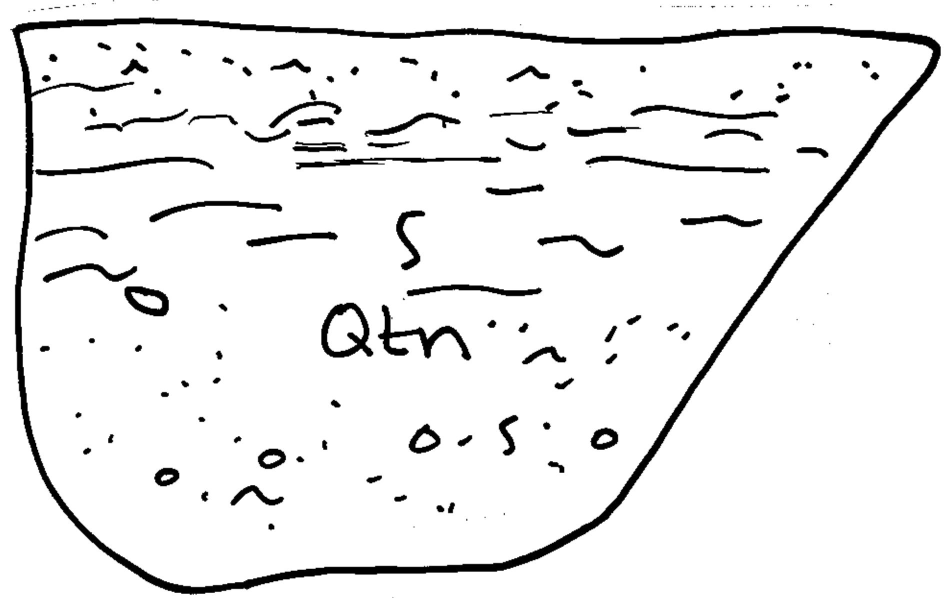


Plate TP-20

TEST PIT LOG 21

GEOSOILS CONSULTANTS, INC.

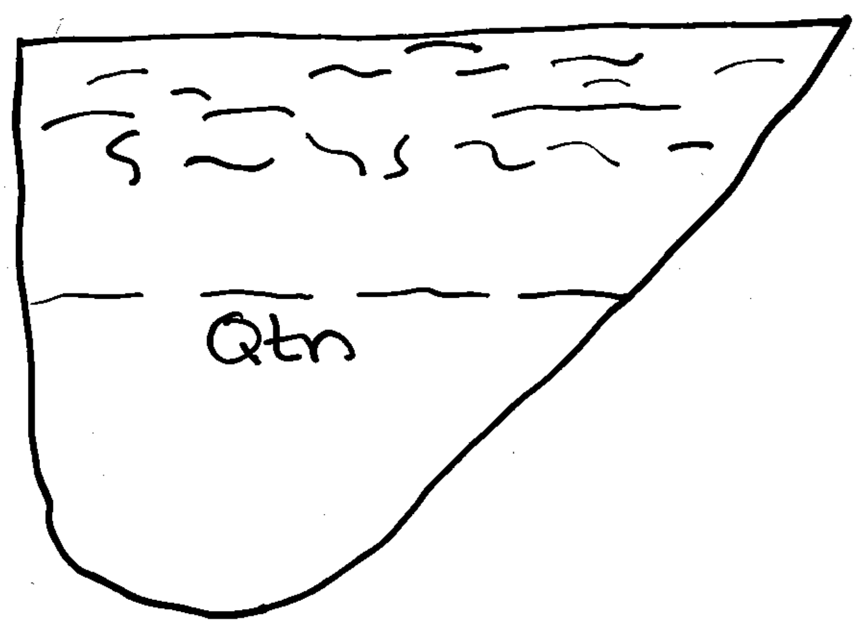
CLIENT: Green Acres | ELEVATION: | WORK ORDER NO.: 6489

ADDRESS: | LOGGED BY: L.P. | DATE: 3-13-12

Depth	Material Type	Material Description	Comments
0-15'	Terrace Deposits (Qtn)	@ 1-3', Very dark grayish-brown (10 YR, 3/2) sandy clay loam and clay loam, top 1' loose, moderately dense, porous, numerous roots, blocky, moderate to strong @ 3-7', Orange-brown, sandy clay loam, dense, moist, @ 3-5', blocky, moderate @ 7-9', Orange-brown, fine, sandy loam, dense, granular, weak @ 9-11', Dark brown (7.5 YR, 3/4) clay loam, dense, moist, massive, structureless @ 11-15', Fine sandy loam	

Scale: H: 1"= 5' V: 1"= 5' Pit Orient.: N -S Natural Slope: Angle 0--- T. D. 15'

Illustration



GEOTECHNICAL BORING LOG

PROJECT NAME Green Acres | W.O. NO. 6489
DRILLING COMPANY Choice | DATE STARTED: 9-8-11 | BORING NO. B-1-11
TYPE OF DRILL RIG LAR | LOGGED BY RLC | SHEET 1 OF 2
DRILLING METHOD Hollow Stem | HAMMER WEIGHT (LBS) 140 | GROUND ELEVATION (FT)
DIAMETER OF HOLE 8 | DROP (IN) 30 | GW ELEVATION
BORING LOCATION:

DEPTH (FT)	SAMPLE TYPE	BLOWS/ 6 IN.	GEOTECHNICAL DESCRIPTION	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	OTHER TESTS
			0-2', ALLUVIUM (Qal) Gray-brown, silty SAND, scattered gravel			
			2-36', TERRACE (Qt)			
5						
10	California Ring	50	@ 10', Orange-brown, very fine to medium SAND, slightly moist, dense @ 10-20', Occasional pebble-cobbles	5.3	106.6	Cons
15						
20	California Ring	34/50	@ 20', Orange-brown, very fine to medium SAND, slightly moist, dense	3.3	117.2	DS
25						

LEGEND

- Standard Penetration Test
- California Ring
- Rock Core
- Bulk Sample
- Shelby Tube
- Water Seepage
- Groundwater

SIEVE: GRAIN SIZE ANALYSIS
MAX: MAXIMUM DRY DENSITY
DS: DIRECT SHEAR
CONS: CONSOLIDATION
HYDR: HYDROMETER ANALYSIS
EXPAN: EXPANSION INDEX
CHEM: CHEMICAL TESTS

PLATE A-1

GeoSoils Consultants, Inc.
GEOTECHNICAL * GEOLOGIC * ENVIRONMENTAL

GEOTECHNICAL BORING LOG

PROJECT NAME Green Acres
W.O. NO. 6489
DRILLING COMPANY Choice
DATE STARTED: 9-8-11
BORING NO. B-1-11
TYPE OF DRILL RIG LAR
LOGGED BY RLC
SHEET 2 OF 2
DRILLING METHOD Hollow Stem
HAMMER WEIGHT (LBS) 140
GROUND ELEVATION (FT)
DIAMETER OF HOLE 8
DROP (IN) 30
GW ELEVATION
BORING LOCATION:

DEPTH (FT)	SAMPLE TYPE	BLOWS/ 6 IN.	GEOTECHNICAL DESCRIPTION	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	OTHER TESTS
	California Ring	23/37/49	@ 30', Orange-brown, slightly silty, very fine to medium SAND, scattered, very coarse grains, slightly moist to moist, dense	5.9	122.7	Cons
35						
			36-50', BEDROCK: Monterey Formation			
40	California Ring	39/50 for 3"	@ 40', Light brown, fine to medium SANDSTONE, slightly moist, dense	1.0	107.4	DS
45						
50	California Ring	50 for 4"	@ 50', No recovery	-----	-----	
			T.D. @ 50' No groundwater			
55						

LEGEND

- Standard Penetration Test
- California Ring
- Rock Core
- Bulk Sample
- Shelby Tube
- Water Seepage
- Groundwater

SIEVE: GRAIN SIZE ANALYSIS
MAX: MAXIMUM DRY DENSITY
DS: DIRECT SHEAR
CONS: CONSOLIDATION
HYDR: HYDROMETER ANALYSIS
EXPAN: EXPANSION INDEX
CHEM: CHEMICAL TESTS

PLATE A-2

GeoSoils Consultants, Inc.
GEOTECHNICAL * GEOLOGIC * ENVIRONMENTAL

GEOTECHNICAL BORING LOG

PROJECT NAME: Green Acres — W.O. NO. 6489
DRILLING COMPANY: Choice — DATE STARTED: 9-8-11 — BORING NO. B-2-11
TYPE OF DRILL RIG: LAR — LOGGED BY: RLC — SHEET 1 OF 3
DRILLING METHOD: Hollow Stem — HAMMER WEIGHT (LBS): 140 — GROUND ELEVATION (FT):
DIAMETER OF HOLE: 8 — DROP (IN): 30 — GW ELEVATION:
BORING LOCATION:

DEPTH (FT)	SAMPLE TYPE	BLOWS/ 6 IN.	GEOTECHNICAL DESCRIPTION	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	OTHER TESTS
			0-2', ALLUVIUM (Qal) Light brown, very fine to medium, sandy SILT, dry, loose			
	Bulk Sample		**2-60', TERRACE (Qt)**			Max Expan
5	California Ring	23/24/25	@ 5', Orange-brown, very fine to medium SAND with gravel, slightly moist to dry (rock in sampler tip)	3.1	------	
10	California Ring	30/32/45	@ 10', Red-brown, fine to very coarse SAND, scattered pebbles, moist, dense	5.0	122.3	DS
15	California Ring	50 for 5"	@ 15', Red-brown, fine to very coarse SAND, scattered pebbles, moist, dense @ 16-27', Scattered pebbles-cobbles	6.0	-----	
20	California Ring	50 for 3"	@ 20', No recovery	-----	------	
25						

LEGEND

- Standard Penetration Test
- California Ring
- Rock Core
- Bulk Sample
- Shelby Tube
- Water Seepage
- Groundwater

SIEVE: GRAIN SIZE ANALYSIS
MAX: MAXIMUM DRY DENSITY
DS: DIRECT SHEAR
CONS: CONSOLIDATION
HYDR: HYDROMETER ANALYSIS
EXPAN: EXPANSION INDEX
CHEM: CHEMICAL TESTS

PLATE A-3

GeoSoils Consultants, Inc.
GEOTECHNICAL * GEOLOGIC * ENVIRONMENTAL

GEOTECHNICAL BORING LOG

PROJECT NAME: Green Acres
W.O. NO. 6489
DRILLING COMPANY: Choice
DATE STARTED: 9-8-11
BORING NO. B-2-11
TYPE OF DRILL RIG: LAR
LOGGED BY: RLC
SHEET 2 OF 3
DRILLING METHOD: Hollow Stem
HAMMER WEIGHT (LBS): 140
GROUND ELEVATION (FT):
DIAMETER OF HOLE: 8
DROP (IN): 30
GW ELEVATION:
BORING LOCATION:

DEPTH (FT)	SAMPLE TYPE	BLOWS/ 6 IN.	GEOTECHNICAL DESCRIPTION	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	OTHER TESTS
	California Ring	18/15/20	@ 30', Red-brown, slightly silty, very fine to coarse SAND, moist, dense	10.9	120.6	DS
35						
40	California Ring	18/33/45	@ 40', Red-brown, slightly silty, very fine to coarse SAND, moist, dense	7.0	130.0	
45						
50	California Ring	33/50	@ 50', Red-brown, silty, very fine to medium SAND, minor clay, moist, dense	8.2	120.8	
55						

LEGEND

- Standard Penetration Test
- California Ring
- Rock Core
- Bulk Sample
- Shelby Tube
- Water Seepage
- Groundwater

SIEVE: GRAIN SIZE ANALYSIS
MAX: MAXIMUM DRY DENSITY
DS: DIRECT SHEAR
CONS: CONSOLIDATION
HYDR: HYDROMETER ANALYSIS
EXPAN: EXPANSION INDEX
CHEM: CHEMICAL TESTS

PLATE A-4

GeoSoils Consultants, Inc.
GEOTECHNICAL * GEOLOGIC * ENVIRONMENTAL

GEOTECHNICAL BORING LOG

PROJECT NAME Green Acres
W.O. NO. 6489
DRILLING COMPANY Choice
DATE STARTED: 9-8-11
BORING NO. B-2-11
TYPE OF DRILL RIG LAR
LOGGED BY RLC
SHEET 3 OF 3
DRILLING METHOD Hollow Stem
HAMMER WEIGHT (LBS) 140
GROUND ELEVATION (FT)
DIAMETER OF HOLE 8
DROP (IN) 30
GW ELEVATION
BORING LOCATION:

DEPTH (FT)	SAMPLE TYPE	BLOWS/ 6 IN.	GEOTECHNICAL DESCRIPTION	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	OTHER TESTS
		21/37/ 50 for 5"	@ 60', Orange-brown, very fine to very coarse SAND, moist, slightly cemented, dense	7.8	123.7	
			T.D. @ 60' No groundwater			
65						
70						
75						
80						
85						

LEGEND

- Standard Penetration Test
- California Ring
- Rock Core
- Bulk Sample
- Shelby Tube
- Water Seepage
- Groundwater

SIEVE: GRAIN SIZE ANALYSIS
MAX: MAXIMUM DRY DENSITY
DS: DIRECT SHEAR
CONS: CONSOLIDATION
HYDR: HYDROMETER ANALYSIS
EXPAN: EXPANSION INDEX
CHEM: CHEMICAL TESTS

PLATE A-5

GeoSoils Consultants, Inc.
GEOTECHNICAL * GEOLOGIC * ENVIRONMENTAL

GEOTECHNICAL BORING LOG

PROJECT NAME Green Acres
W.O. NO. 6489
DRILLING COMPANY Choice
DATE STARTED: 9-8-11
BORING NO. B-3-11
TYPE OF DRILL RIG LAR
LOGGED BY RLC
SHEET 1 OF 3
DRILLING METHOD Hollow Stem
HAMMER WEIGHT (LBS) 140
GROUND ELEVATION (FT)
DIAMETER OF HOLE 8
DROP (IN) 30
GW ELEVATION
BORING LOCATION:

DEPTH (FT)	SAMPLE TYPE	BLOWS/ 6 IN.	GEOTECHNICAL DESCRIPTION	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	OTHER TESTS
			0-2', ALLUVIUM (Qal) Gray-brown, sandy SILT, dry, loose			
			2-60', TERRACE (Qt)			
5	California Ring	28/30/43	@ 5', Red-brown, silty, fine to medium SAND, scattered, very small gravel, slightly moist to moist, dense	6.6	124.4	Cons
	Bulk Sample					Max Expan
10						
15	California Ring	50 for 5"	@ 15', No recovery	-----	-----	
20	California Ring	16/18/27	@ 20', Orange-brown, silty, very fine to medium SAND, moist, dense	7.3	123.7	Cons DS
25	California Ring	35/50	@ 25', Orange-brown, silty, very fine to medium SAND, moist, dense	6.8	120.5	

LEGEND

- Standard Penetration Test
- California Ring
- Rock Core
- Bulk Sample
- Shelby Tube
- Water Seepage
- Groundwater

SIEVE: GRAIN SIZE ANALYSIS
MAX: MAXIMUM DRY DENSITY
DS: DIRECT SHEAR
CONS: CONSOLIDATION
HYDR: HYDROMETER ANALYSIS
EXPAN: EXPANSION INDEX
CHEM: CHEMICAL TESTS

PLATE A-6

GeoSoils Consultants, Inc.
GEOTECHNICAL * GEOLOGIC * ENVIRONMENTAL

GEOTECHNICAL BORING LOG

PROJECT NAME Green Acres | W.O. NO. 6489
DRILLING COMPANY Choice | DATE STARTED: 9-8-11 | BORING NO. B-3-11
TYPE OF DRILL RIG LAR | LOGGED BY RLC | SHEET 2 OF 3
DRILLING METHOD Hollow Stem | HAMMER WEIGHT (LBS) 140 | GROUND ELEVATION (FT)
DIAMETER OF HOLE 8 | DROP (IN) 30 | GW ELEVATION
BORING LOCATION:

DEPTH (FT)	SAMPLE TYPE	BLOWS/ 6 IN.	GEOTECHNICAL DESCRIPTION	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	OTHER TESTS
35	California Ring	29/32/44	@ 35', Orange-brown, very fine to coarse occasional small gravel and very coarse grains, slightly moist to moist, dense	4.1	123.3	Cons DS
40						
45	California Ring	26/50 for 5"	@ 45', Light brown, very fine to medium SAND, moist, dense	3.3	106.2	
50						
55	California Ring	36/37/ 50 for 2"	@ 55', Light to medium brown, very fine to medium SAND, caliche veins, moist, dense	7.8	118.6	DS

LEGEND

Standard Penetration Test
California Ring
Rock Core
Bulk Sample
Shelby Tube
Water Seepage
Groundwater

SIEVE: GRAIN SIZE ANALYSIS
MAX: MAXIMUM DRY DENSITY
DS: DIRECT SHEAR
CONS: CONSOLIDATION
HYDR: HYDROMETER ANALYSIS
EXPAN: EXPANSION INDEX
CHEM: CHEMICAL TESTS

PLATE A-7

GeoSoils Consultants, Inc.
GEOTECHNICAL * GEOLOGIC * ENVIRONMENTAL

GEOTECHNICAL BORING LOG

PROJECT NAME Green Acres			W.O. NO. 6489
DRILLING COMPANY Choice	DATE STARTED: 9-8-11		BORING NO. B-3-11
TYPE OF DRILL RIG LAR	LOGGED BY RLC		SHEET 3 OF 3
DRILLING METHOD Hollow Stem	HAMMER WEIGHT (LBS) 140		GROUND ELEVATION (FT)
DIAMETER OF HOLE 8	DROP (IN) 30		GW ELEVATION

BORING LOCATION:

DEPTH (FT)	SAMPLE TYPE	BLOWS/ 6 IN.	GEOTECHNICAL DESCRIPTION	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	OTHER TESTS
		50 for 3"	@ 60', No recovery	-----	-----	
			T.D. @ 60' No groundwater			
65						
70						
75						
80						
85						

LEGEND

- Standard Penetration Test
- California Ring
- Rock Core
- Bulk Sample
- Shelby Tube
- Water Seepage
- Groundwater

SIEVE:	GRAIN SIZE ANALYSIS
MAX:	MAXIMUM DRY DENSITY
DS:	DIRECT SHEAR
CONS:	CONSOLIDATION
HYDR:	HYDROMETER ANALYSIS
EXPAN:	EXPANSION INDEX
CHEM:	CHEMICAL TESTS

PLATE A-8

GeoSoils Consultants, Inc.
GEOTECHNICAL * GEOLOGIC * ENVIRONMENTAL

GEOTECHNICAL BORING LOG

PROJECT NAME Green Acres | W.O. NO. 6489
DRILLING COMPANY Choice | DATE STARTED: 9-8-11 | BORING NO. B-4-11
TYPE OF DRILL RIG LAR | LOGGED BY RLC | SHEET 1 OF 2
DRILLING METHOD Hollow Stem | HAMMER WEIGHT (LBS) 140 | GROUND ELEVATION (FT)
DIAMETER OF HOLE 8 | DROP (IN) 30 | GW ELEVATION
BORING LOCATION:

DEPTH (FT)	SAMPLE TYPE	BLOWS/ 6 IN.	GEOTECHNICAL DESCRIPTION	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	OTHER TESTS
0	Bulk Sample		**0-5', ALLUVIUM (Qal)** Medium brown-gray, silty SAND, dry to slightly moist, slightly dense			Max Expan
5	Bulk Sample / California Ring	15/17/18	**5-30', BEDROCK: Vaqueros Formation** @ 5', Orange-gray, silty, fine SANDSTONE, moist, dense	6.7	118.0	
10	California Ring	13/18/25	@ 10', Orange-gray, sandy SILTSTONE to silty SANDSTONE, moist, dense	17.5	104.6	DS
15	California Ring	33/36/49	@ 15', Brown-gray, silty SANDSTONE, carbonate veins, slightly cemented, moist, dense	10.3	115.0	Cons
20	California Ring	31/50 for 5"	@ 20', Gray-black, silty, fine SANDSTONE, carbonate veins, moderate cement, moist, dense	9.5	113.6	DS
25	California Ring	50	@ 25', Gray-green, very fine to medium SANDSTONE, small gravel, carbonate deposits, moderate cement, moist, very dense	9.1	111.0	

LEGEND

- Standard Penetration Test
- California Ring
- Rock Core
- Bulk Sample
- Shelby Tube
- Water Seepage
- Groundwater

SIEVE: GRAIN SIZE ANALYSIS
MAX: MAXIMUM DRY DENSITY
DS: DIRECT SHEAR
CONS: CONSOLIDATION
HYDR: HYDROMETER ANALYSIS
EXPAN: EXPANSION INDEX
CHEM: CHEMICAL TESTS

PLATE A-9

GeoSoils Consultants, Inc.
GEOTECHNICAL * GEOLOGIC * ENVIRONMENTAL

GEOTECHNICAL BORING LOG

PROJECT NAME: Green Acres		W.O. NO. 6489	
DRILLING COMPANY: Choice	DATE STARTED: 9-8-11	BORING NO. B-4-11	
TYPE OF DRILL RIG: LAR	LOGGED BY: RLC	SHEET 2 OF 2	
DRILLING METHOD: Hollow Stem	HAMMER WEIGHT (LBS): 140	GROUND ELEVATION (FT):	
DIAMETER OF HOLE: 8	DROP (IN): 30	GW ELEVATION:	
BORING LOCATION:			

DEPTH (FT)	SAMPLE TYPE	BLOWS/ 6 IN.	GEOTECHNICAL DESCRIPTION	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	OTHER TESTS
	California Ring	50 for 4"	@ 30', Gray-green, very fine to medium SANDSTONE, small gravel, carbonate deposits, moderate cement, moist, very dense	10.3	105.8	DS
			T.D. @ 30' No groundwater			
35						
40						
45						
50						
55						

LEGEND

Standard Penetration Test	Shelby Tube	SIEVE:	GRAIN SIZE ANALYSIS
California Ring	Water Seepage	MAX:	MAXIMUM DRY DENSITY
Rock Core	Groundwater	DS:	DIRECT SHEAR
Bulk Sample		CONS:	CONSOLIDATION
		HYDR:	HYDROMETER ANALYSIS
		EXPAN:	EXPANSION INDEX
		CHEM:	CHEMICAL TESTS

PLATE A-10

GeoSoils Consultants, Inc.
GEOTECHNICAL * GEOLOGIC * ENVIRONMENTAL

Green Acres, LLC
W.O.: 6489

Date of Test: 3/12

Sample: **TP-5 @ 6.0"**

GeoSoils Consultants, Inc.

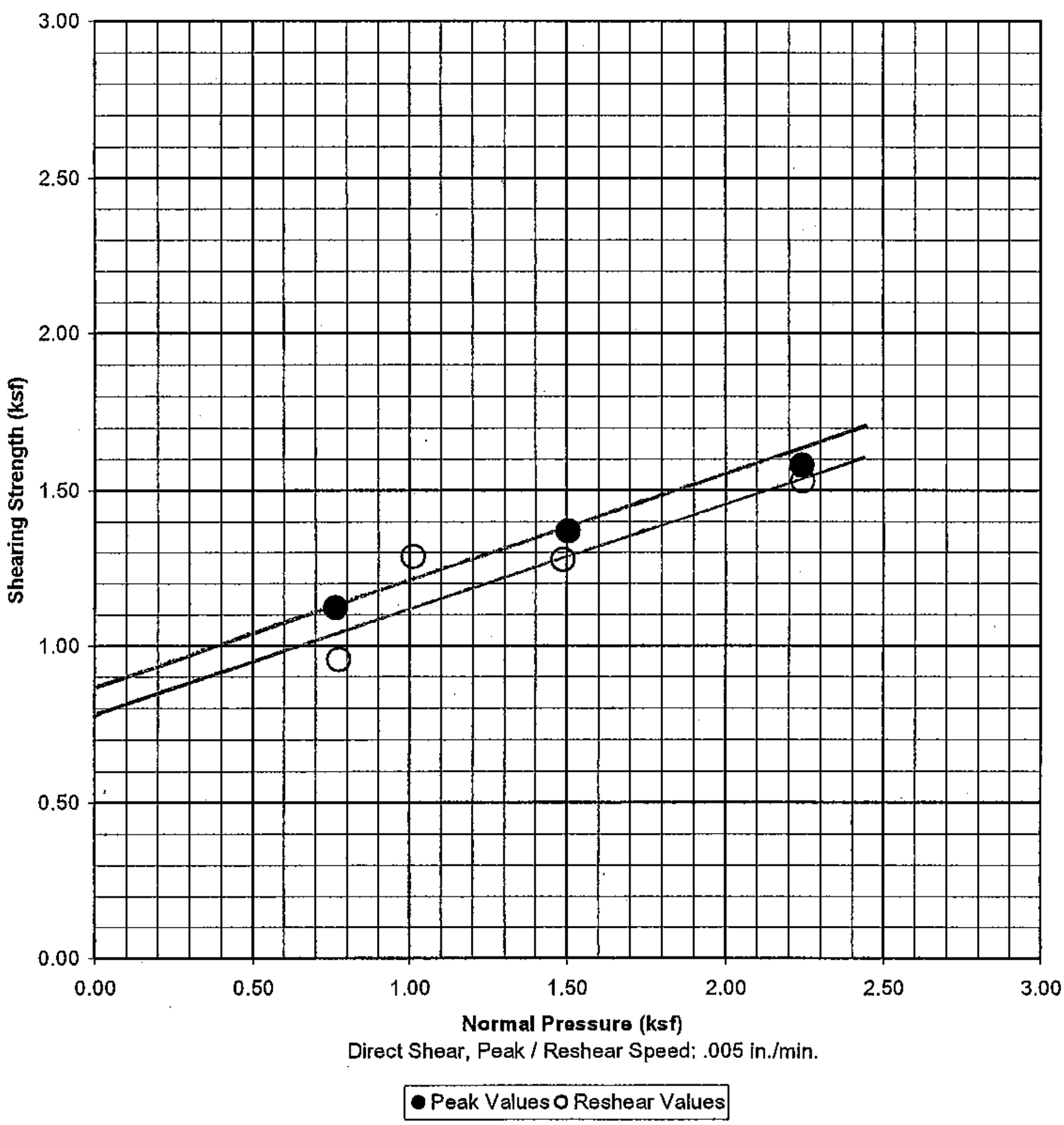
Geotechnical Engineering * Engineering Geology

PLATE SH-1

Shear Test Diagram

Peak
C(psf): 870 Phi (degrees): 18.5

Reshear
C(psf): 790 Phi (degrees): 18.5



Undisturbed **Natural** Shear-Saturated

BROWN SANDY LOAM.

17.5% Saturated Moisture Content

6489.19

Green Acres, LLC
W.O.: 6489

Date of Test: 3/12

Sample: **TP-7 @ 6.0"**

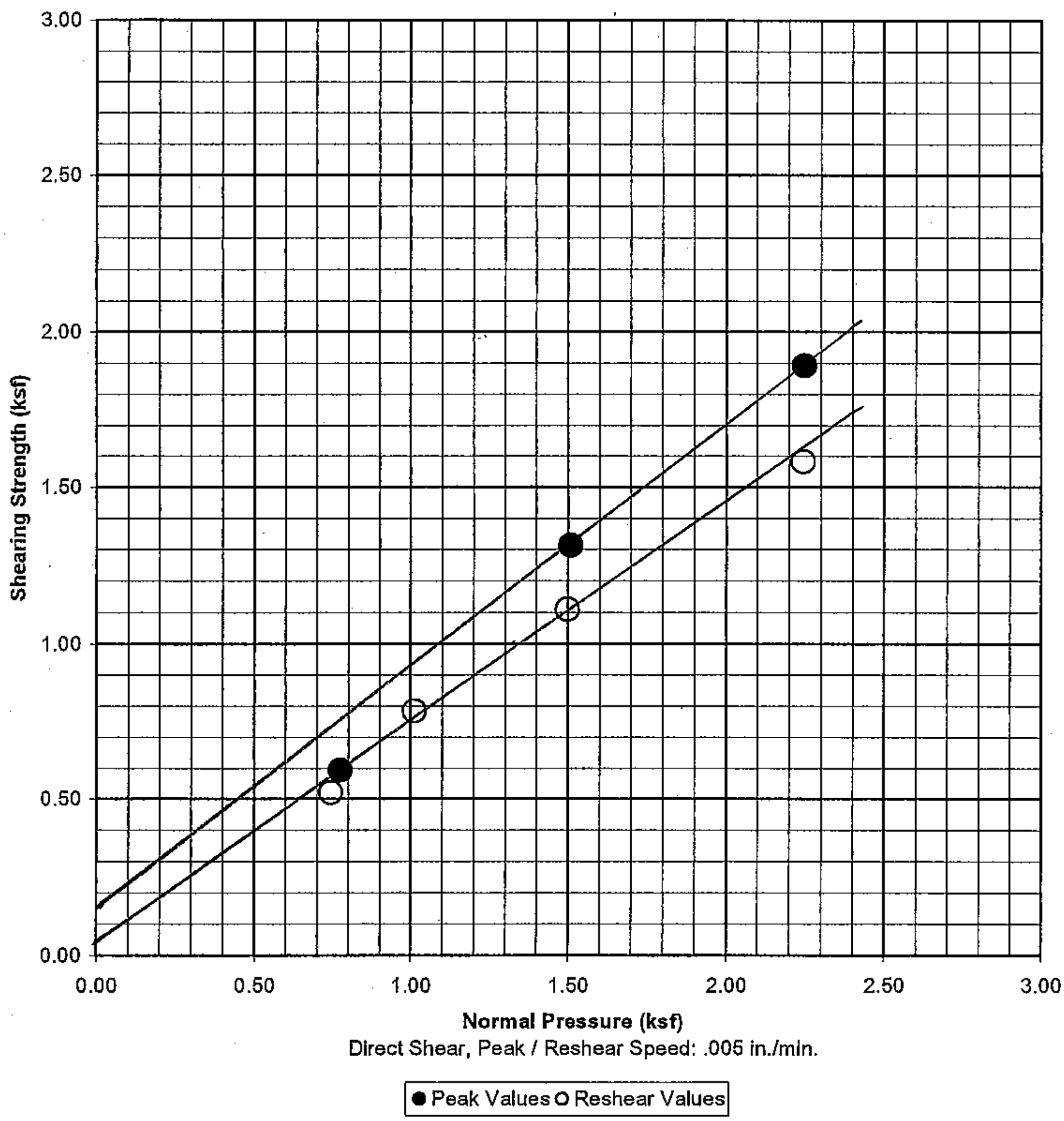
GeoSoils Consultants, Inc.

Geotechnical Engineering * Engineering Geology

PLATE SH-2

Shear Test Diagram
Peak
C(psf): 160 Phi (degrees): 37.5

Reshear
C(psf): 50 Phi (degrees): 35.0



Undisturbed **Natural** Shear-Saturated

REDDISH-BROWN, SANDY LOAM.

17.9% Saturated Moisture Content

Green Acres, LLC
W.O.: 6489

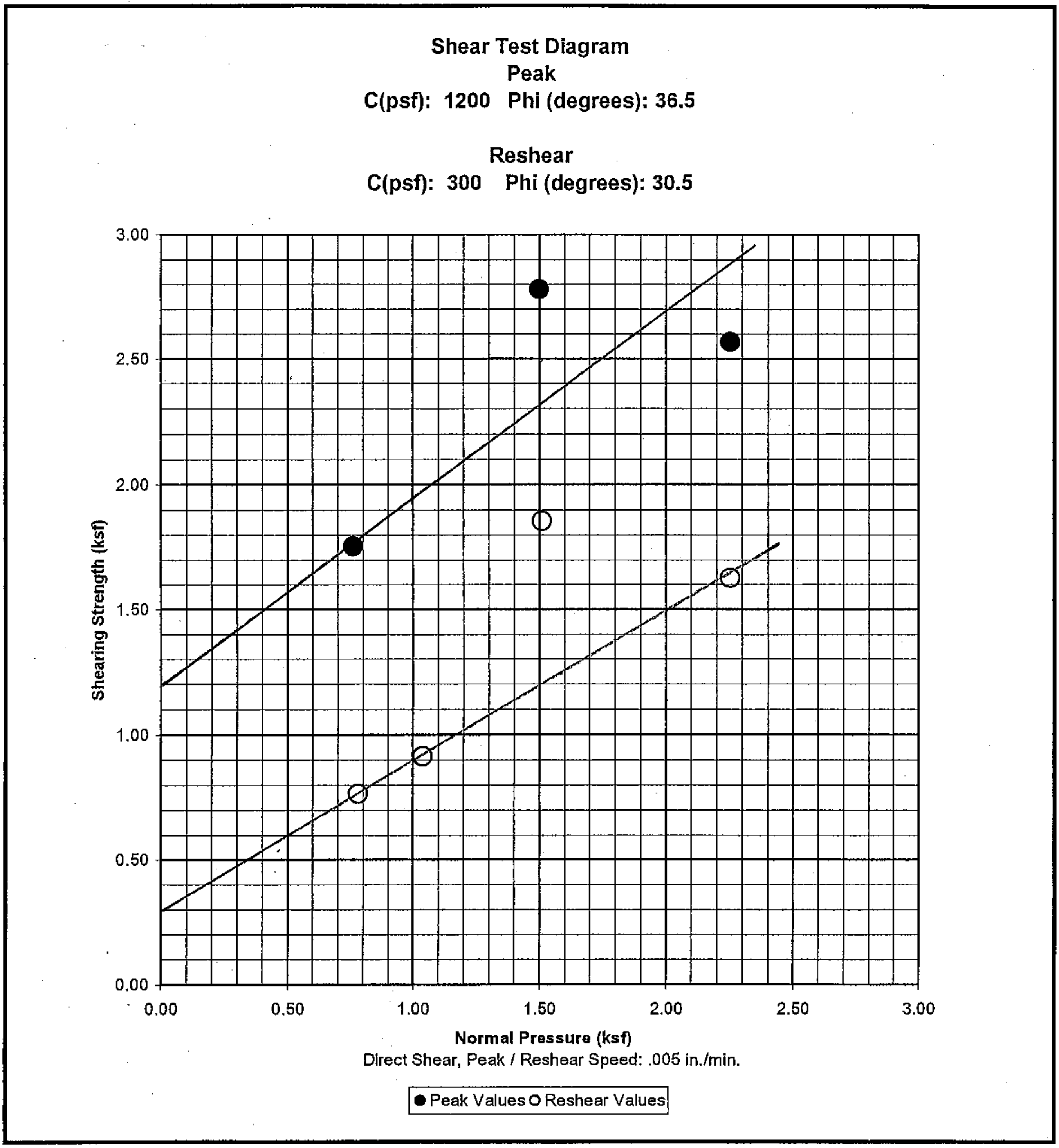
Date of Test: 3/12

Sample: **TP-8 @ 2.0'**

GeoSoils Consultants, Inc.

PLATE SH-3

Geotechnical Engineering * Engineering Geology



Undisturbed **Natural** Shear-Saturated

GREY-BROWN, SILTY LOAM.

23.4% Saturated Moisture Content

6489.21

Green Acres, LLC
W.O.: 6489

Date of Test: 3/12

Sample: **TP-10 @ 3.0'**

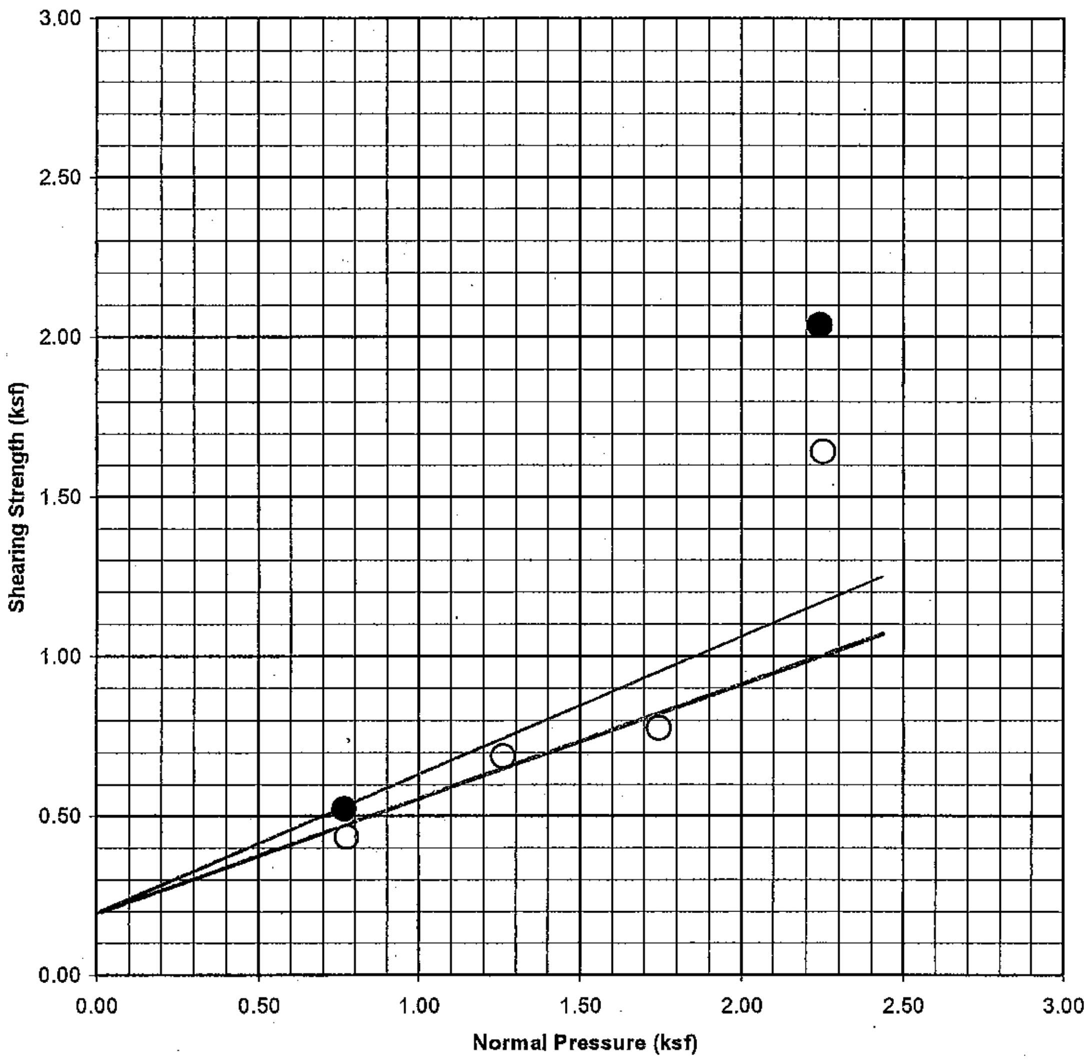
GeoSoils Consultants, Inc.

Geotechnical Engineering * Engineering Geology

Shear Test Diagram

Peak
C(psf): 200 Phi (degrees): 23.0

Reshear
C(psf): 200 Phi (degrees): 19.5



Direct Shear, Peak / Reshear Speed: .005 in./min.

● Peak Values ○ Reshear Values

Undisturbed **Natural** Shear-Saturated

YELLOW-BROWN, SANDY LOAM.

18.7% Saturated Moisture Content

Green Acres, LLC
W.O.: 6489

Date of Test: 3/12

Sample: **TP-11 @ 2.0'**

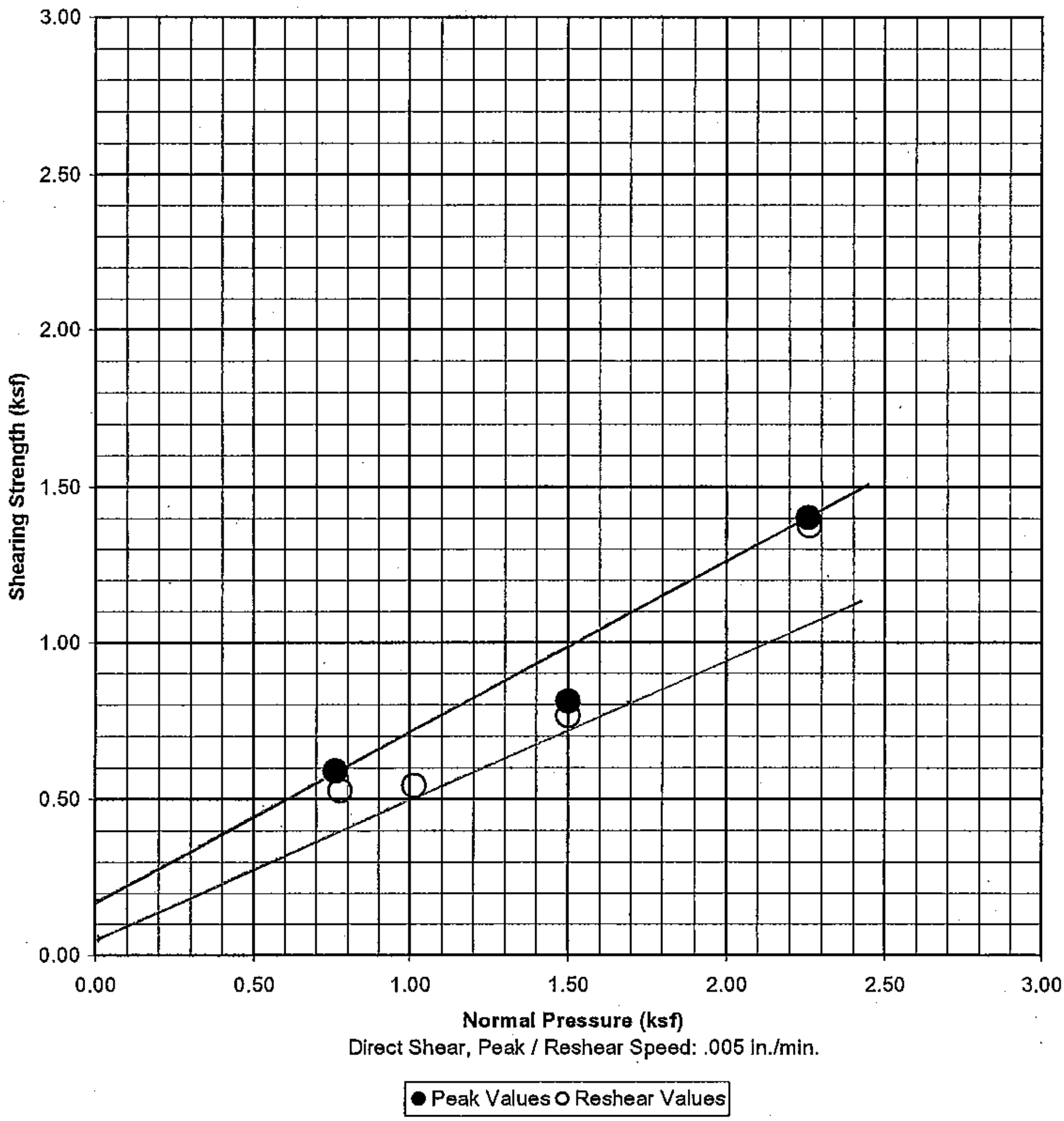
GeoSoils Consultants, Inc.

Geotechnical Engineering * Engineering Geology

PLATE SH-5

Shear Test Diagram
Peak
C(psf): 180 Phi (degrees): 28.5

Reshear
C(psf): 50 Phi (degrees): 24.0



Undisturbed **Natural** Shear-Saturated

STRONG-BROWN, SANDY LOAM.

21.0% Saturated Moisture Content

6489.23

Green Acres, LLC
W.O.: 6489

Date of Test: 3/12

Sample: **TP-12 @ 3.0'**

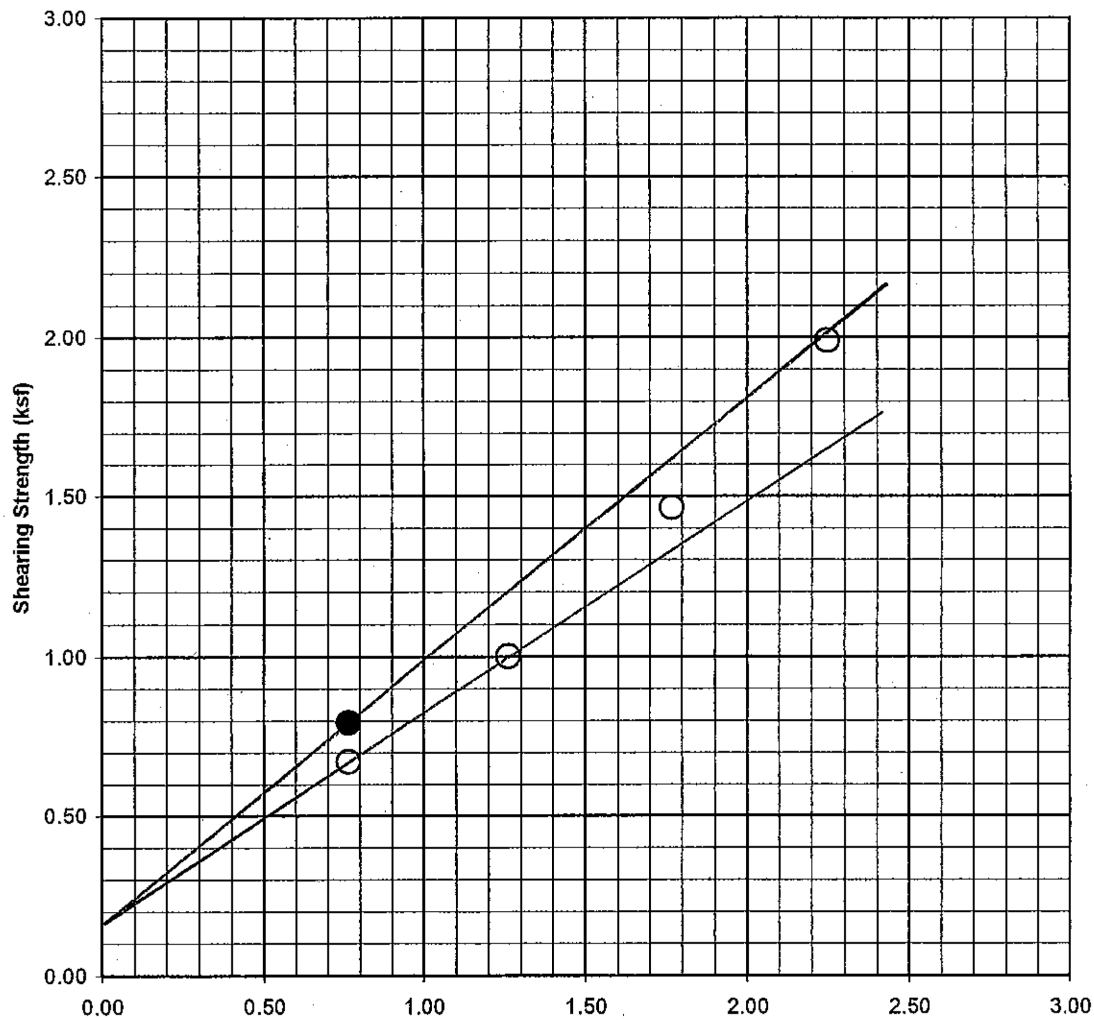
GeoSoils Consultants, Inc.

Geotechnical Engineering * Engineering Geology

PLATE SH-6

Shear Test Diagram
Peak
C(psf): 180 Phi (degrees): 39.0

Reshear
C(psf): 180 Phi (degrees): 33.0



Normal Pressure (ksf)
Direct Shear, Peak / Reshear Speed: .005 in./min.

● Peak Values ○ Reshear Values

Undisturbed **Natural** Shear-Saturated

BROWN TO DARK-BROWN, SANDY LOAM / SANDY CLAY LOAM.

17.2% Saturated Moisture Content

Green Acres, LLC
W.O.: 6489

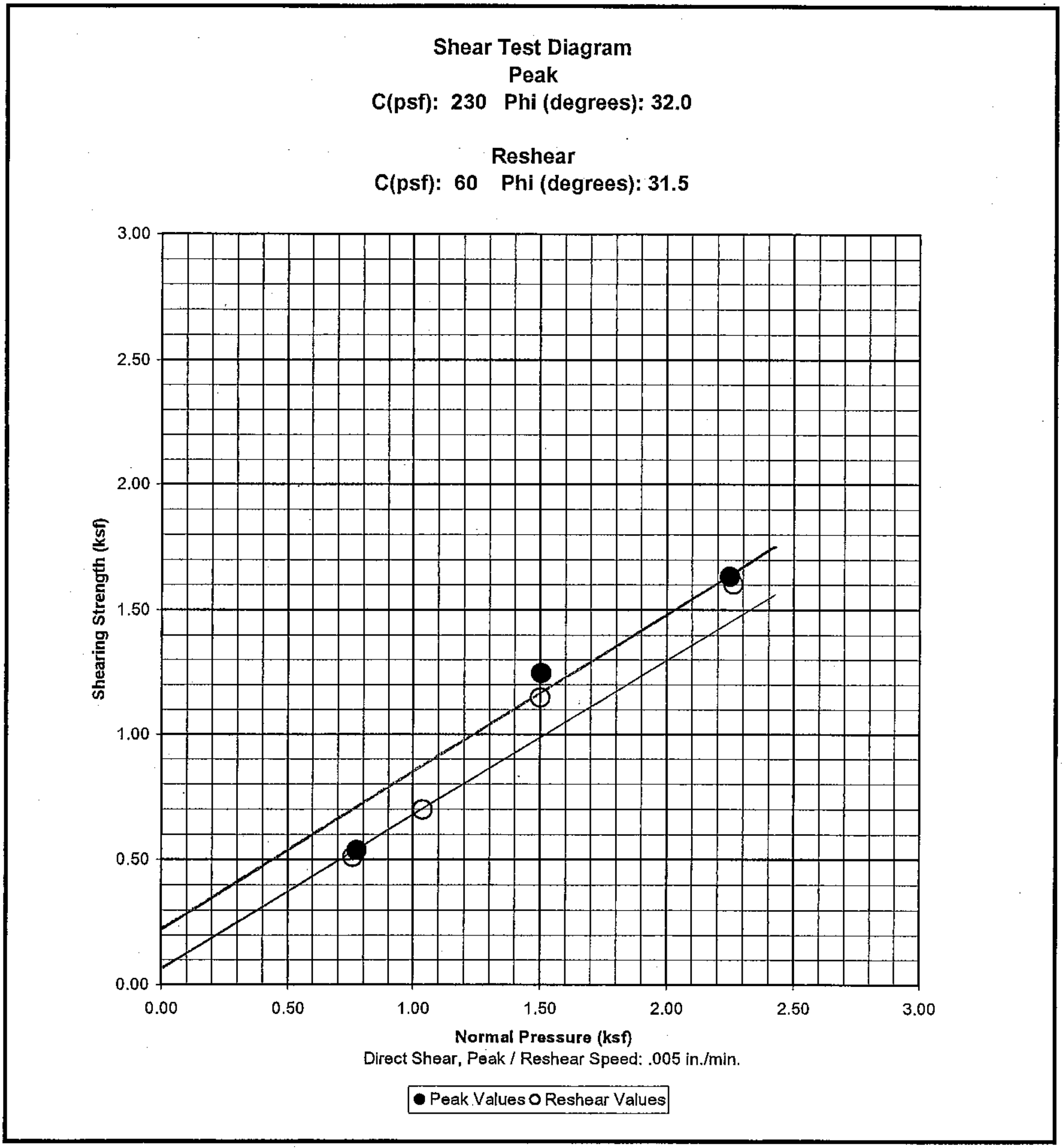
Date of Test: 3/12

Sample: **TP-14 @ 5.0'**

GeoSoils Consultants, Inc.

Geotechnical Engineering * Engineering Geology

PLATE SH-7



Undisturbed **Natural** Shear-Saturated

BROWN,, SANDY LOAM.

18.0% Saturated Moisture Content

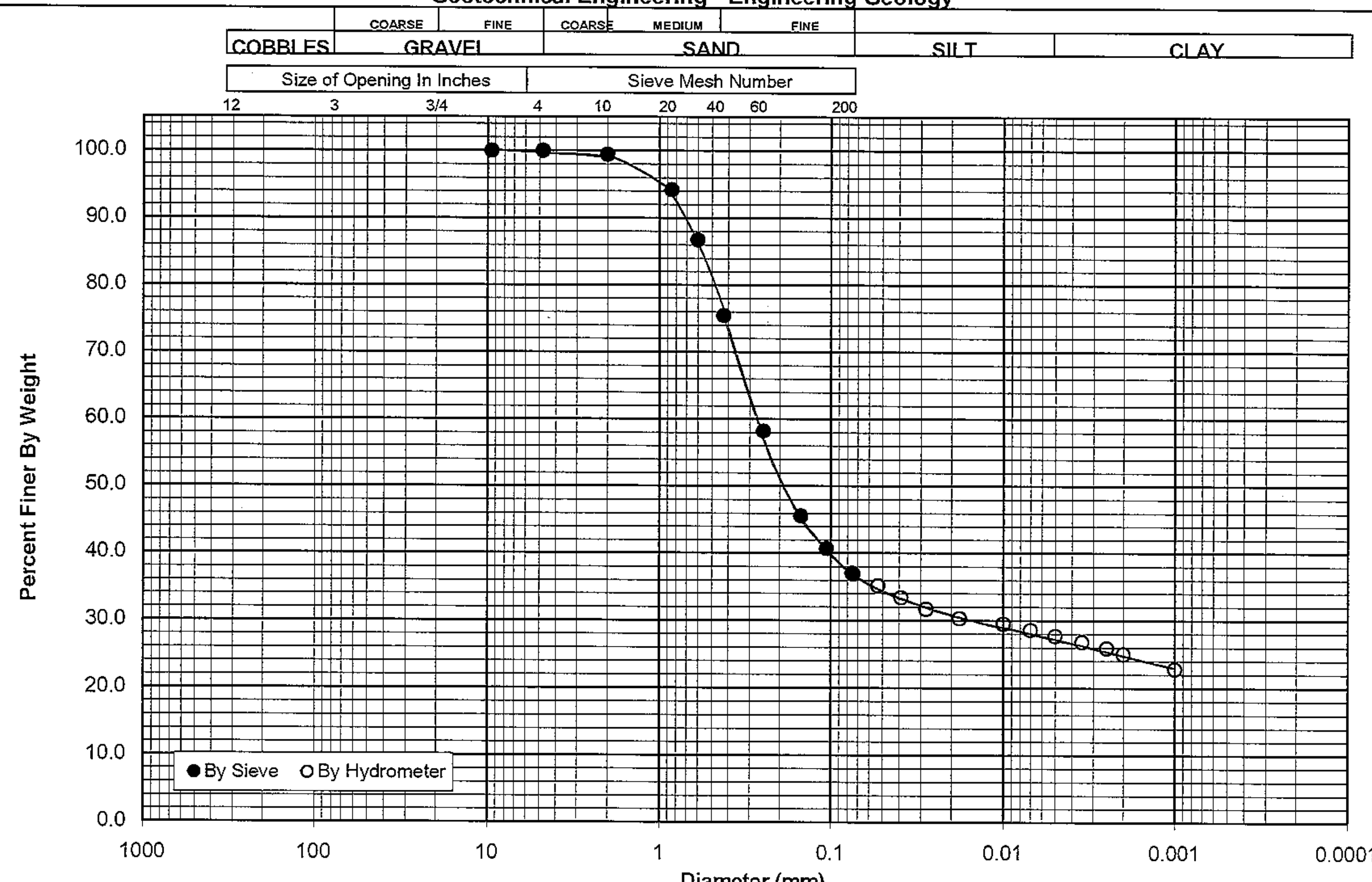
Green Acres, LLC
W.O. 6489

Date of Test: 3/12

GeoSoils Consultants, Inc.

Geotechnical Engineering * Engineering Geology

Moisture (%): 9.6
Liquid Limit (%):
Plastic Limit (%):
Plasticity Index :



Grain Size Analysis

TP- 1 @ 1.0 - 2.0'
SANDY CLAY LOAM.

SH6489.1

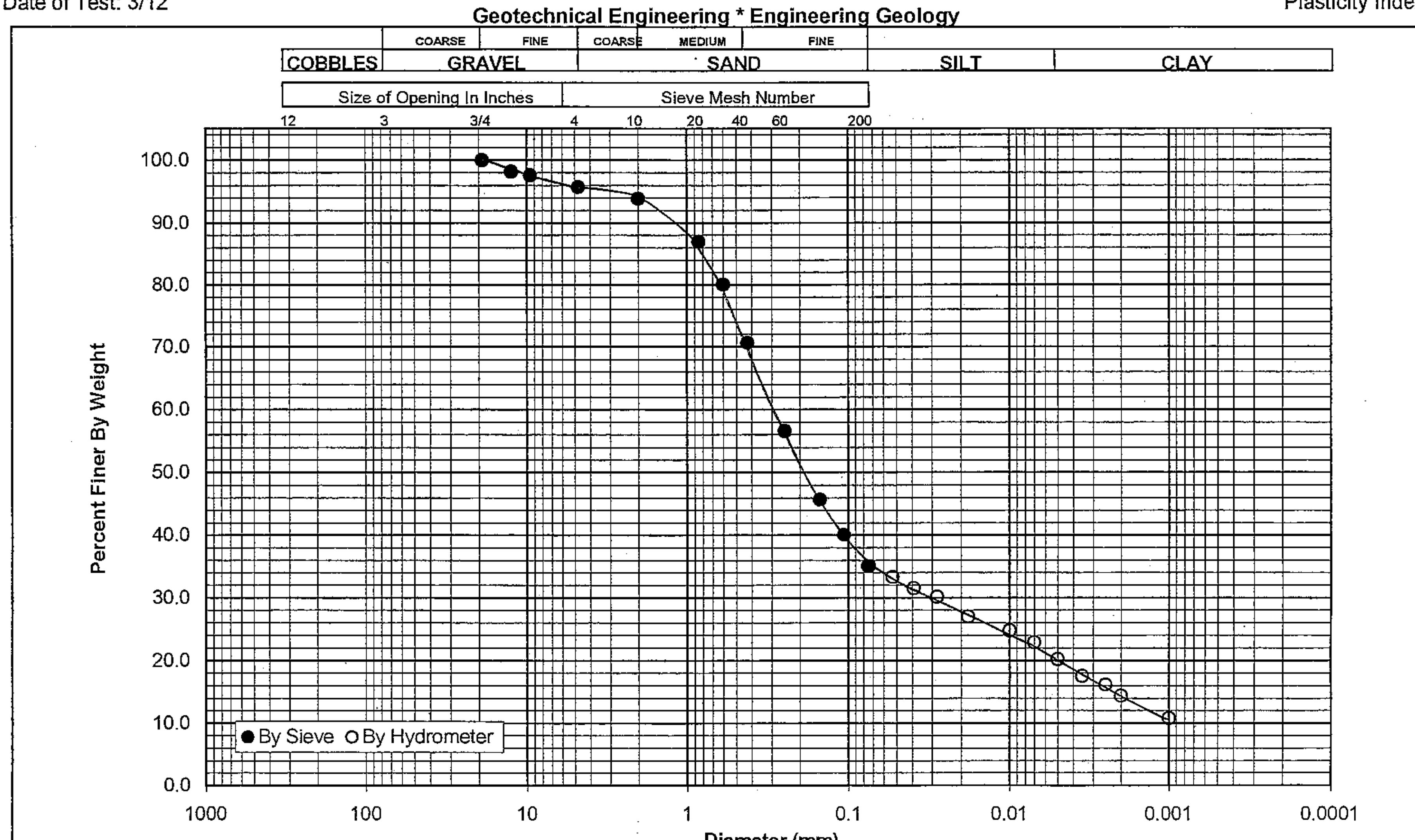
Plate G-1

Green Acres, LLC
W.O. 6489

Date of Test: 3/12

GeoSoils Consultants, Inc.

Moisture (%): 10.0
Liquid Limit (%):
Plastic Limit (%):
Plasticity Index :



Grain Size Analysis

TP-1 @ 2.0 - 3.0'
SANDY CLAY LOAM / SANDY LOAM.

SH6489.2

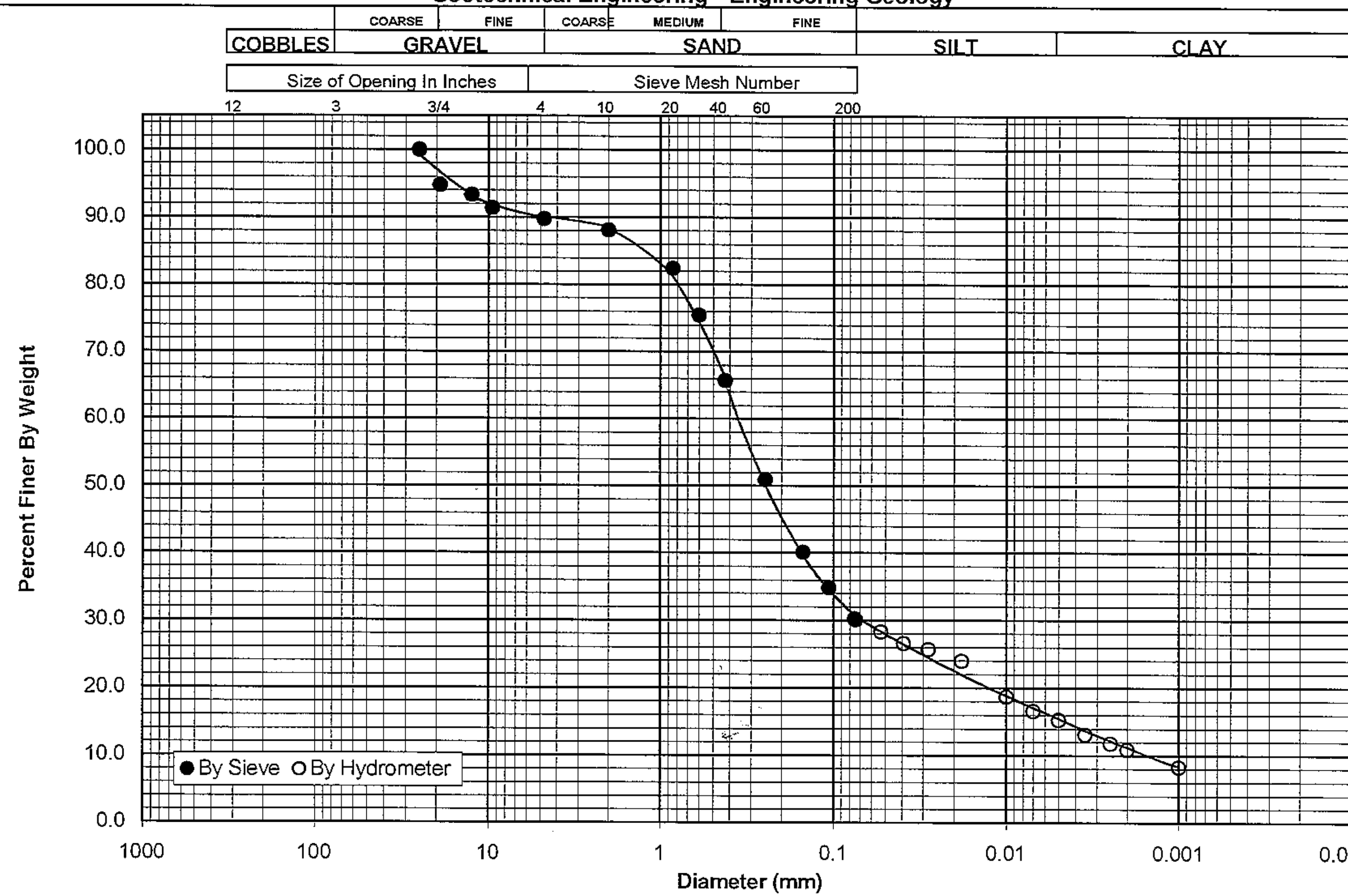
Green Acres, LLC
W.O. 6489

Date of Test: 3/12

GeoSoils Consultants, Inc.

Geotechnical Engineering * Engineering Geology

Moisture (%): 3.8
Liquid Limit (%):
Plastic Limit (%):
Plasticity Index :



Grain Size Analysis

TP-2 @ 1.0 - 2.0'
SANDY LOAM.

SH6489.3

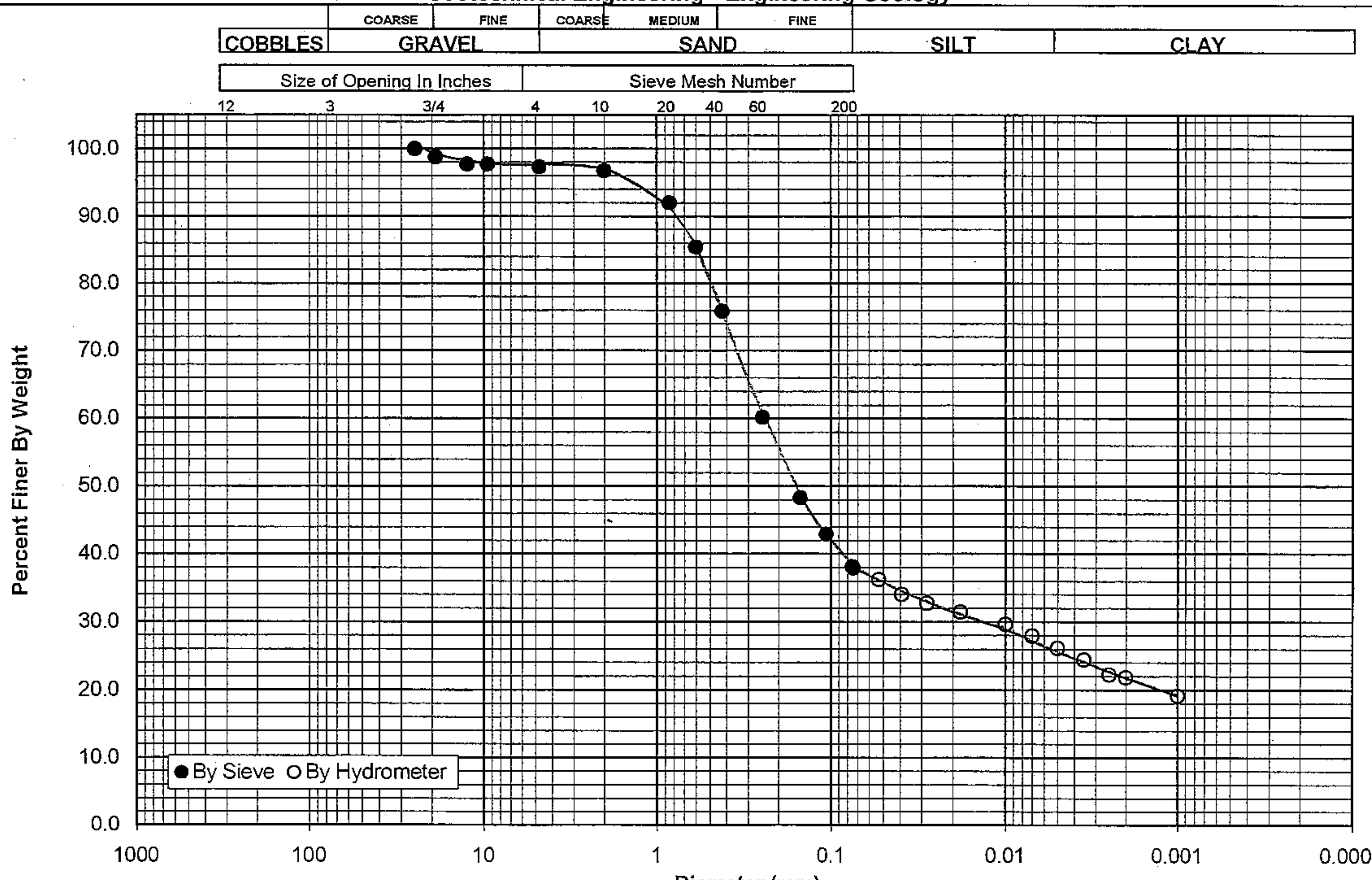
Green Acres, LLC
W.O. 6489

Date of Test: 3/12

GeoSoils Consultants, Inc.

Geotechnical Engineering * Engineering Geology

Moisture (%): 7.9
Liquid Limit (%):
Plastic Limit (%):
Plasticity Index :



Grain Size Analysis

TP-2 @ 3.0'
SANDY CLAY LOAM.

SH6489.4

Plate G-4

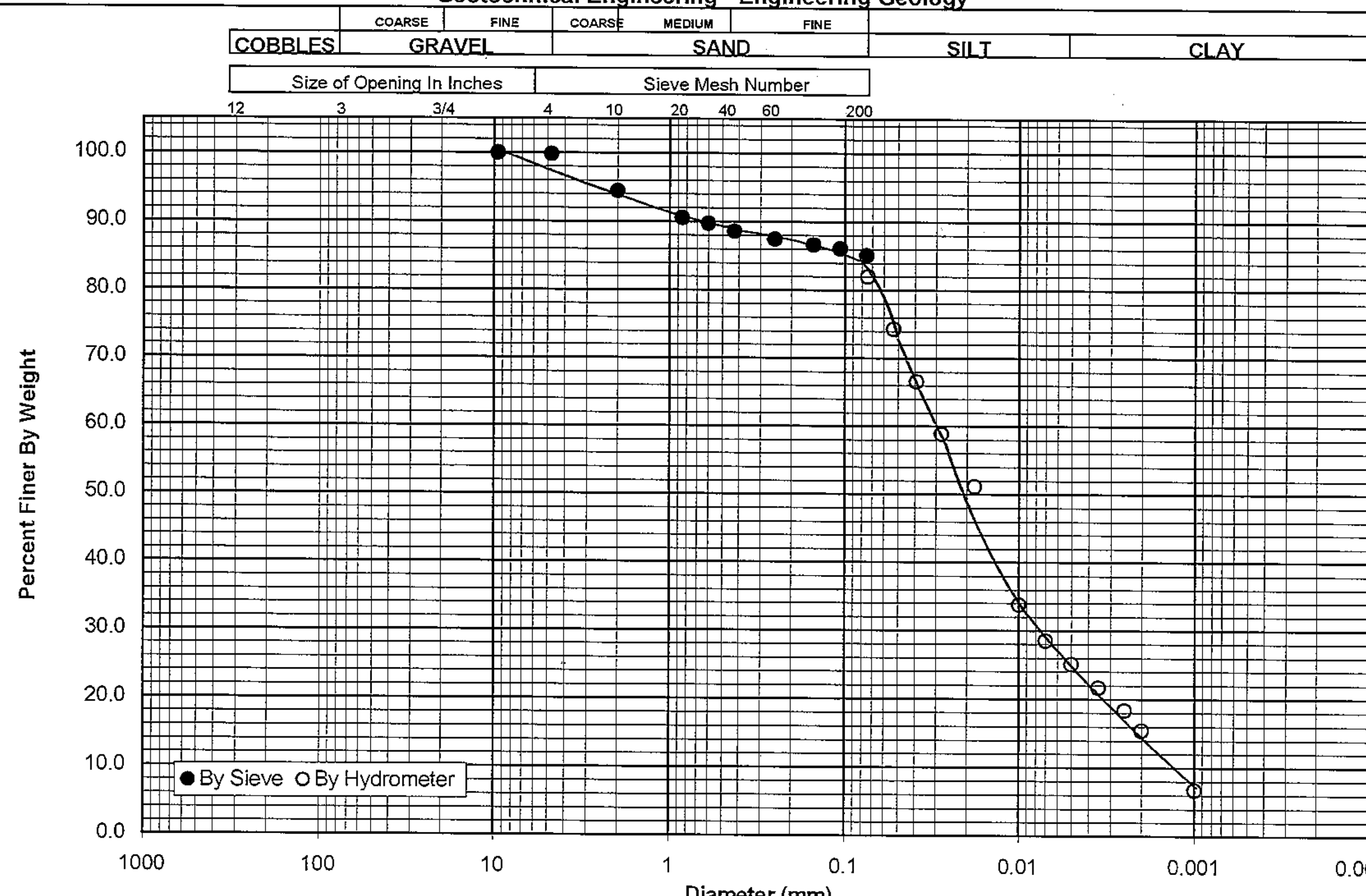
Green Acres, LLC
W.O. 6489

Date of Test: 3/12

GeoSoils Consultants, Inc.

Geotechnical Engineering * Engineering Geology

Moisture (%): 13.6
Liquid Limit (%):
Plastic Limit (%):
Plasticity Index :



Grain Size Analysis

TP-3 @ 1.0 - 2.0'
SILT LOAM.

SH6489.5

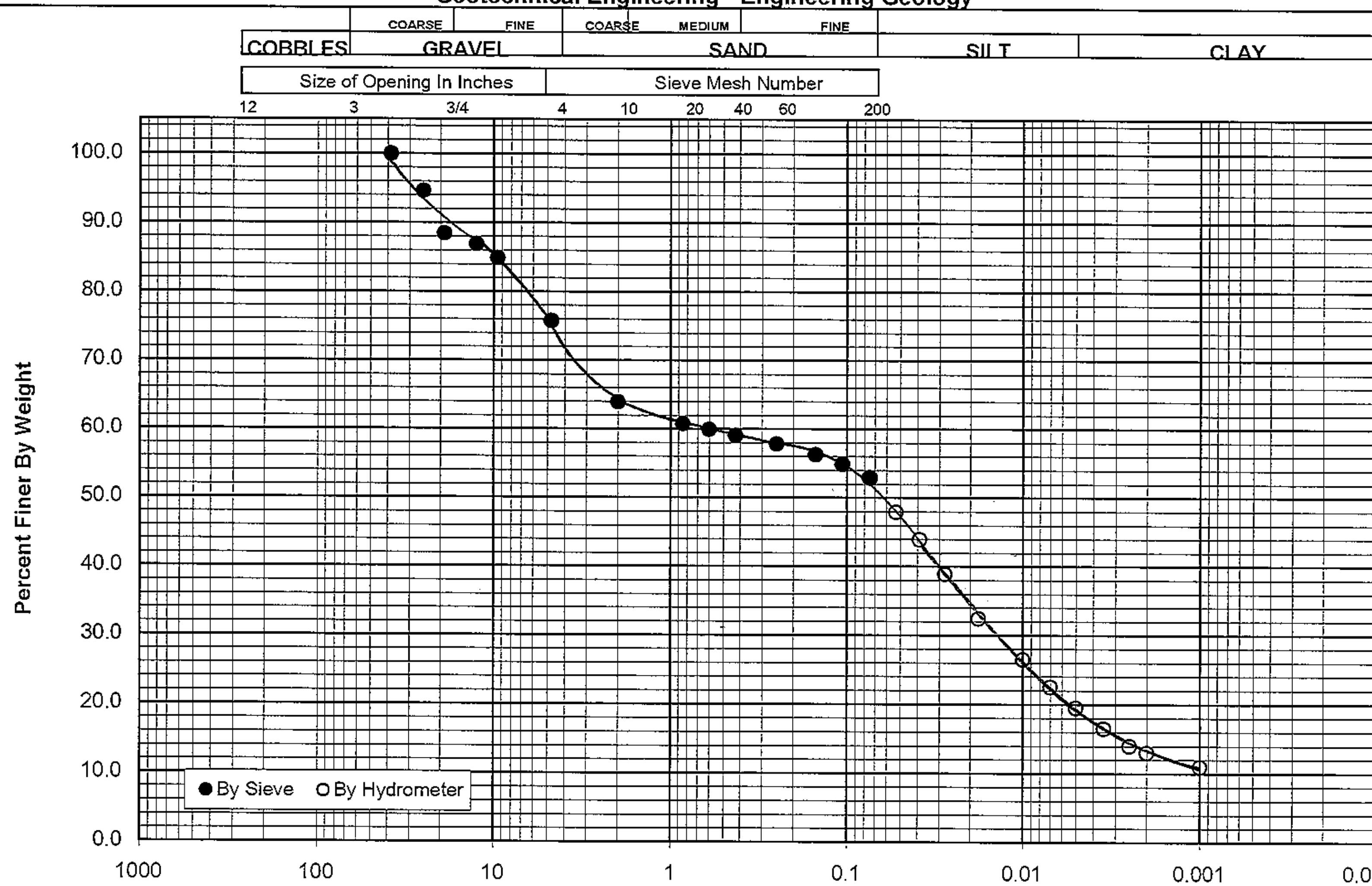
Green Acres, LLC
W.O. 6489

Date of Test: 3/12

GeoSoils Consultants, Inc.

Geotechnical Engineering * Engineering Geology

Moisture (%): 10.7
Liquid Limit (%):
Plastic Limit (%):
Plasticity Index :



Grain Size Analysis

TP-4 @ 1.0 - 2.0'
LOAM.

SH6489.6

Plate G-6

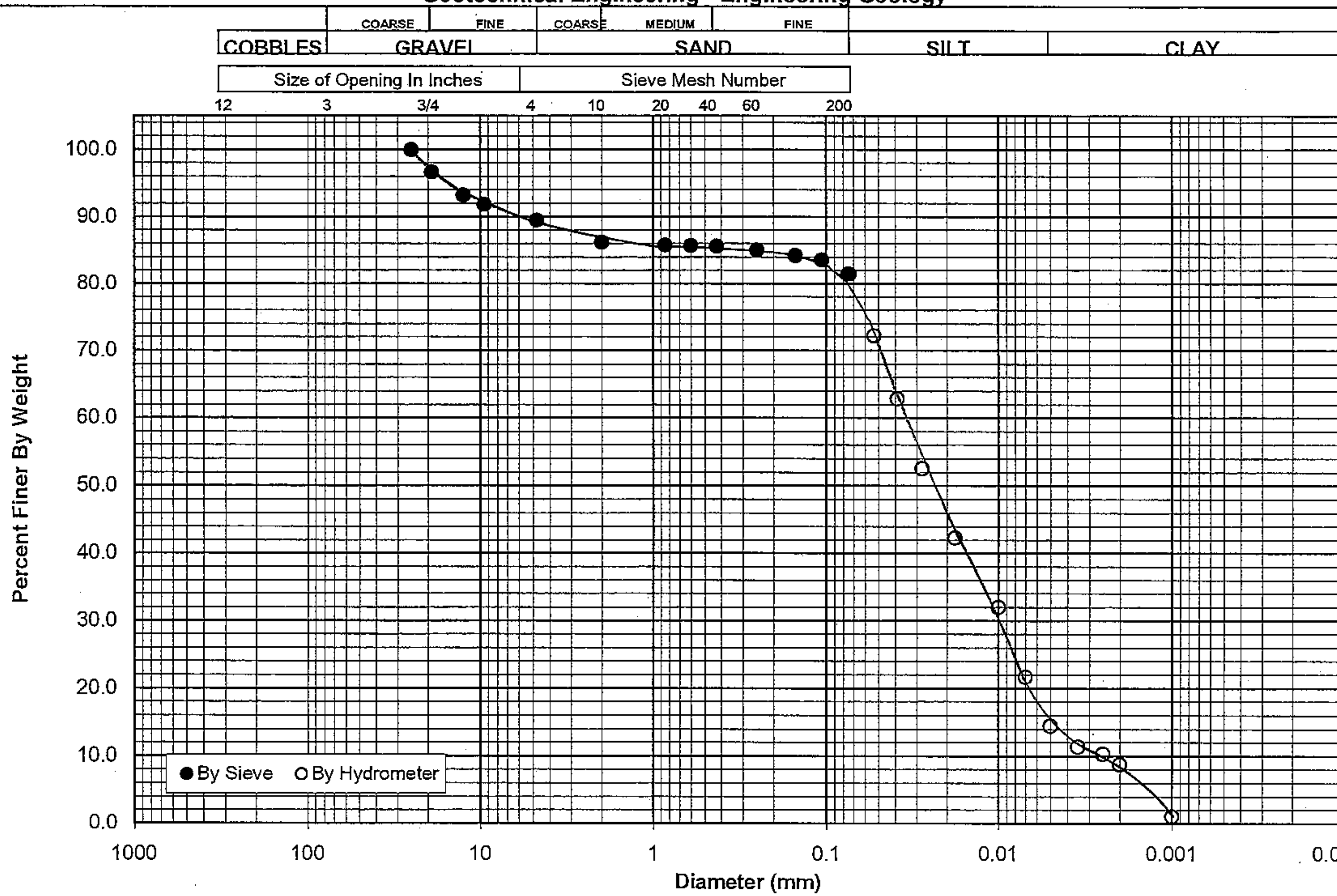
Green Acres, LLC
W.O. 6489

Date of Test: 3/12

GeoSoils Consultants, Inc.

Geotechnical Engineering * Engineering Geology

Moisture (%): 10.7
Liquid Limit (%):
Plastic Limit (%):
Plasticity Index :



Grain Size Analysis

TP- 3 @ 4.0 - 5.0'
SILT LOAM.

SH6489.7

Plate G-7

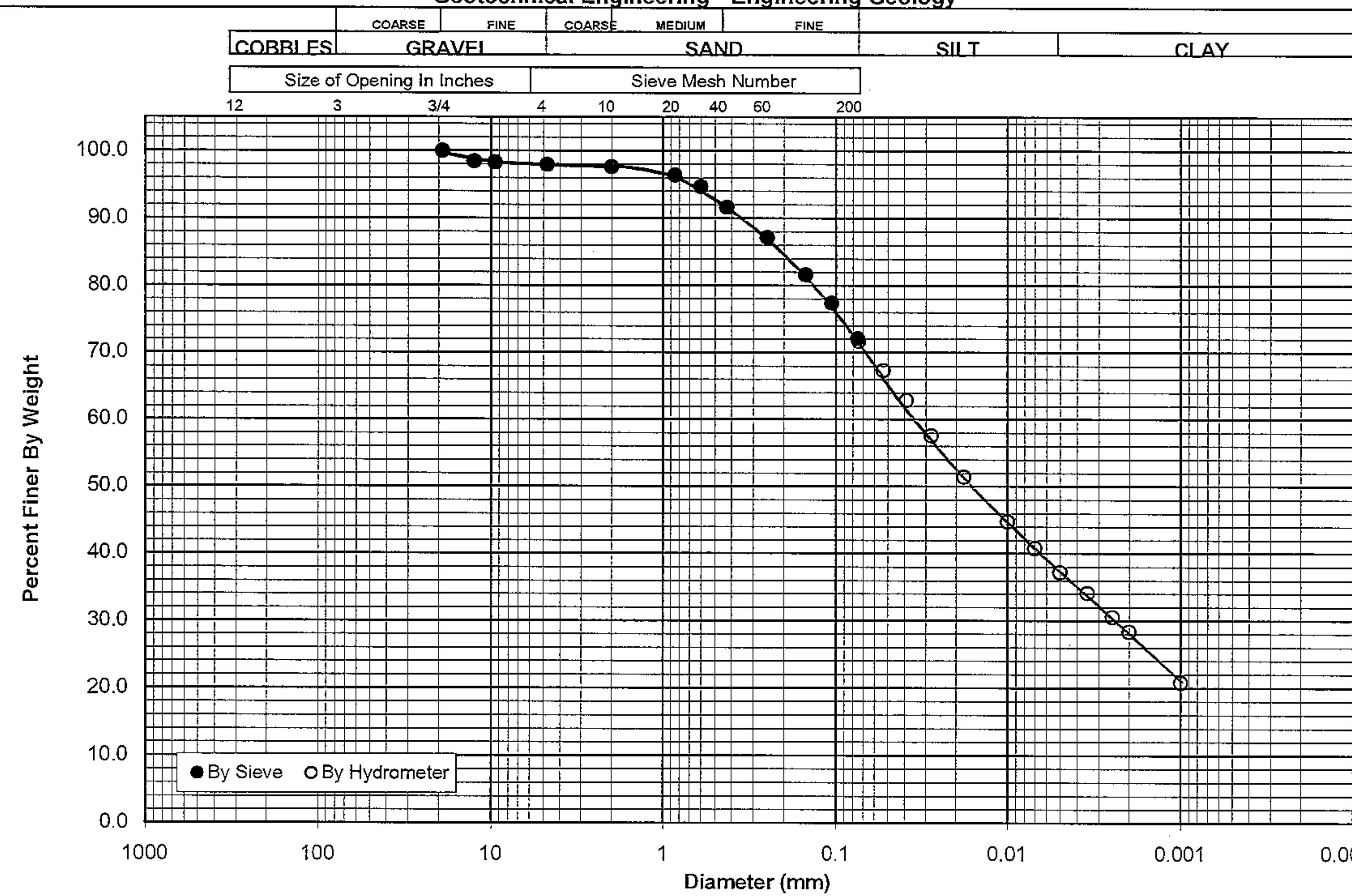
Green Acres, LLC
W.O. 6489

Date of Test: 3/12

GeoSoils Consultants, Inc.

Geotechnical Engineering * Engineering Geology

Moisture (%): 16.0
Liquid Limit (%):
Plastic Limit (%):
Plasticity Index :



Grain Size Analysis

TP-4 @ 4.0 - 5.0'
CLAY LOAM.

SH6489.8

Plate G-8

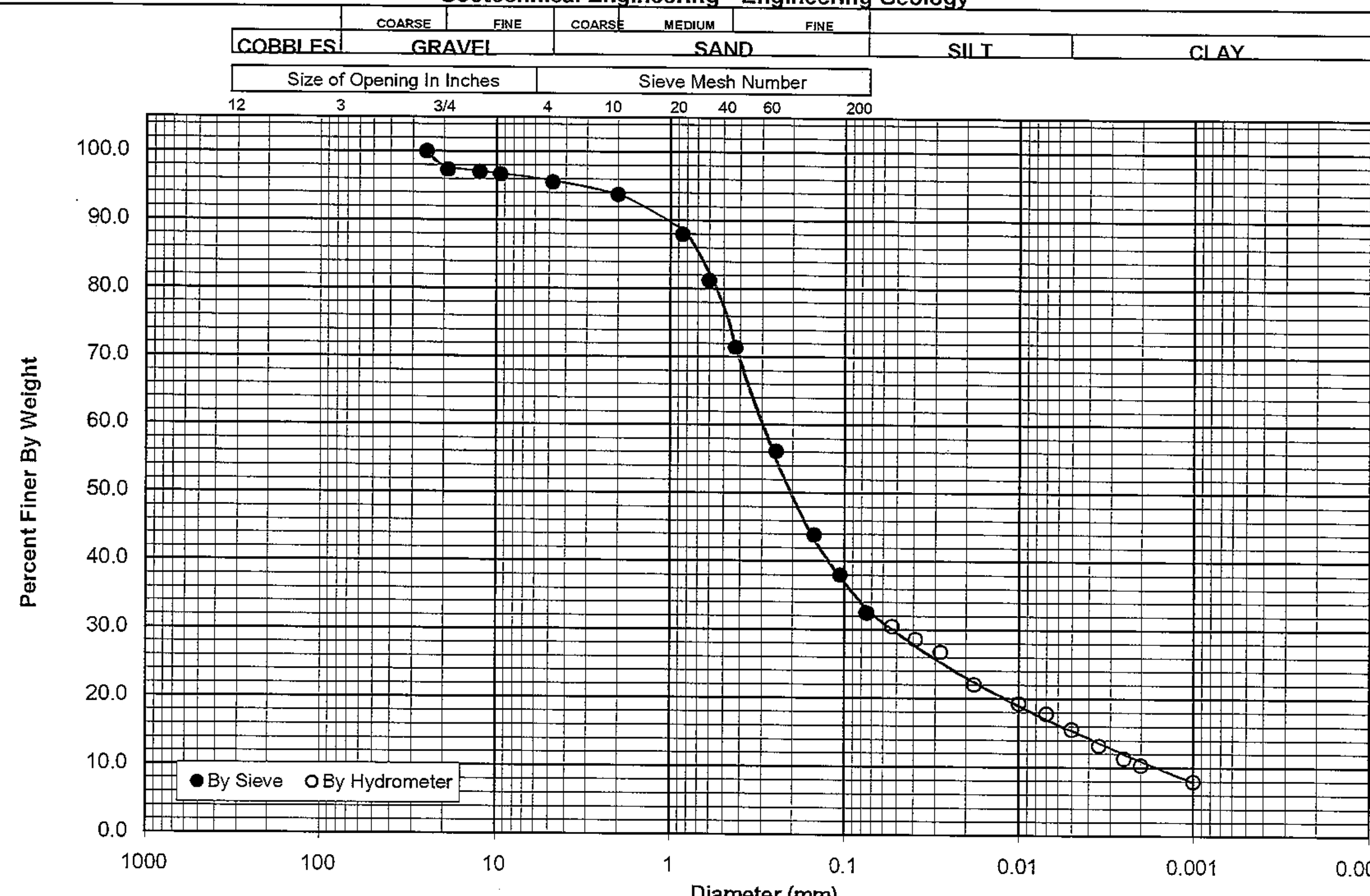
Green Acres, LLC
W.O. 6489

Date of Test: 3/12

GeoSoils Consultants, Inc.

Geotechnical Engineering * Engineering Geology

Moisture (%): 5.0
Liquid Limit (%):
Plastic Limit (%):
Plasticity Index :



Grain Size Analysis

TP- 5 @ 1.0 - 2.0'
SANDY LOAM.

SH6489.9

Plate G-9

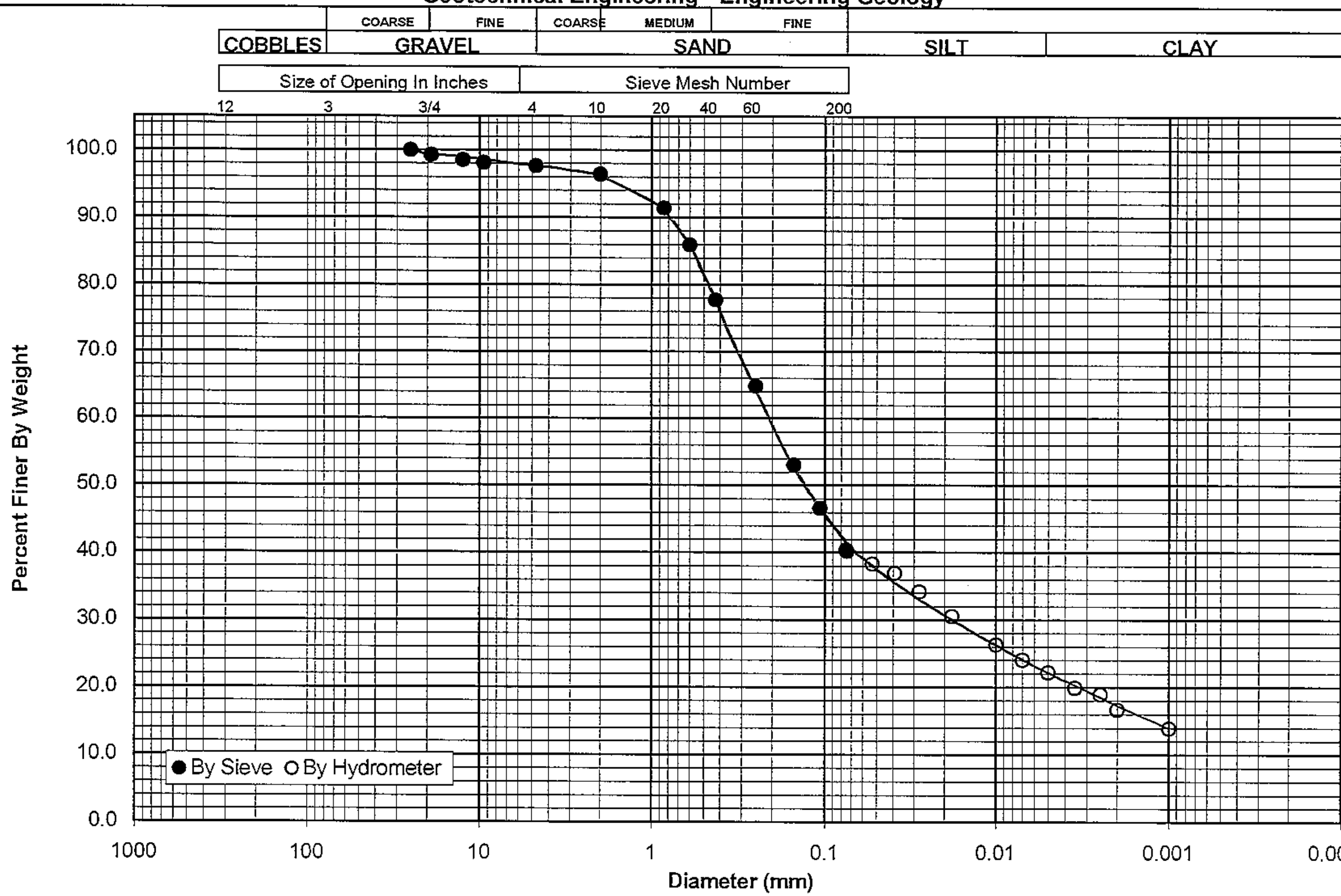
Green Acres, LLC
W.O. 6489

Date of Test: 3/12

GeoSoils Consultants, Inc.

Geotechnical Engineering * Engineering Geology

Moisture (%): 9.7
Liquid Limit (%):
Plastic Limit (%):
Plasticity Index :



Grain Size Analysis

TP-5 @ 2.0 - 3.0'
SANDY CLAY LOAM.

SH6489.10

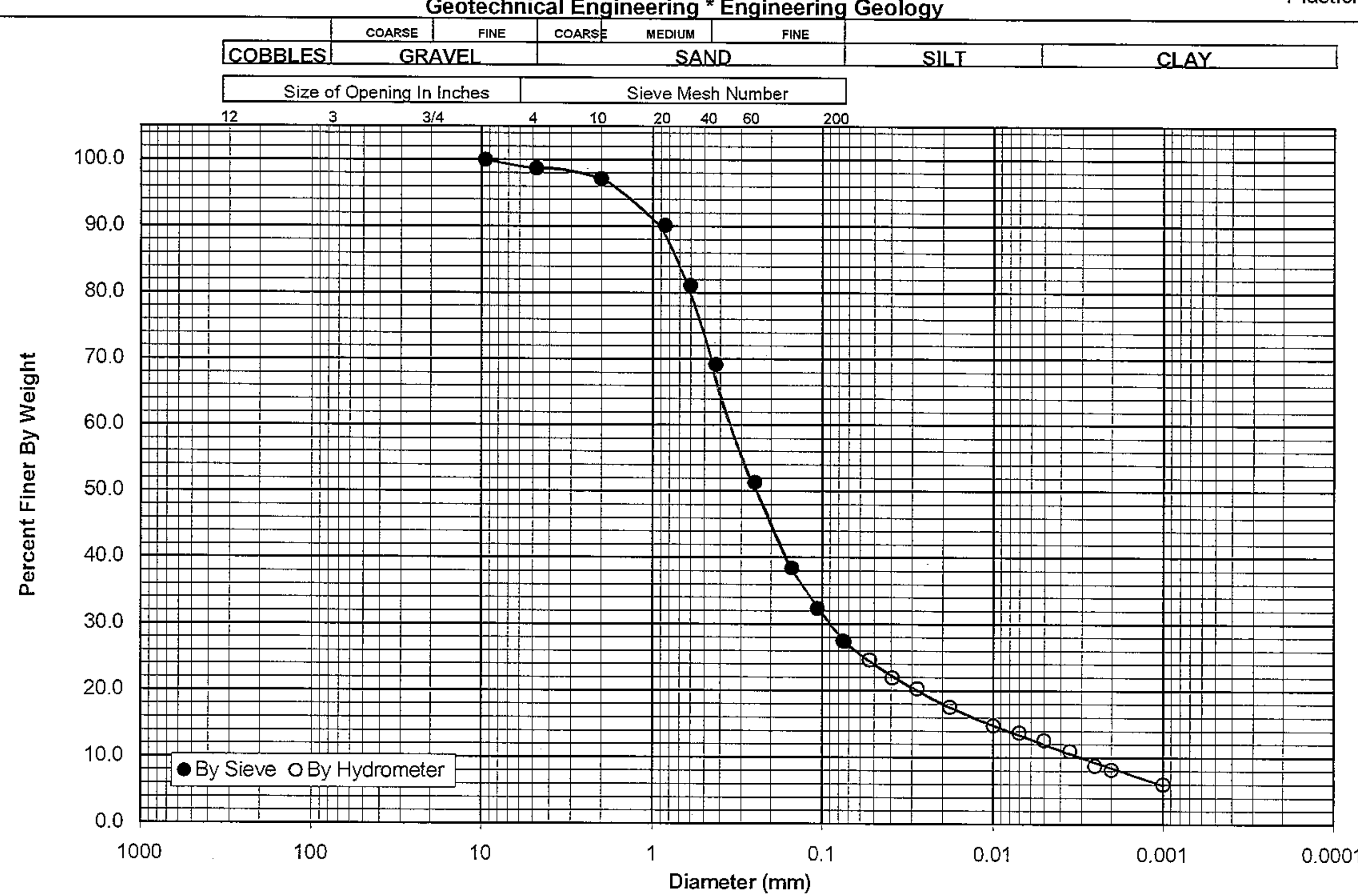
Plate G-10

Green Acres, LLC
W.O. 6489

Date of Test: 3/12

GeoSoils Consultants, Inc.

Moisture (%): 3.2
Liquid Limit (%):
Plastic Limit (%):
Plasticity Index :



Grain Size Analysis

TP-6 @ 1.0 - 2.0'
SANDY LOAM.

SH6489.11

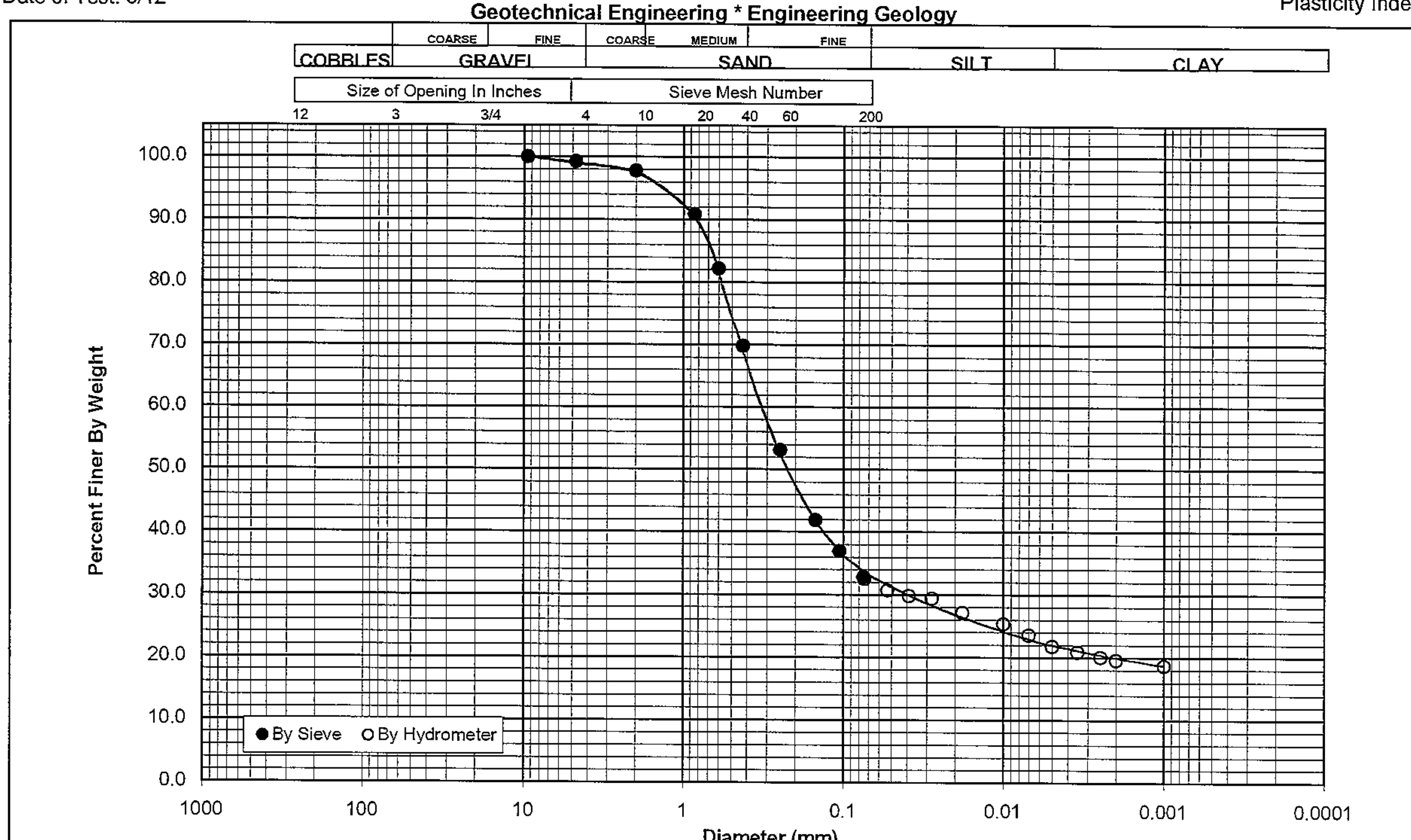
Plate G-11

Green Acres, LLC
W.O. 6489

Date of Test: 3/12

GeoSoils Consultants, Inc.

Moisture (%): 9.7
Liquid Limit (%):
Plastic Limit (%):
Plasticity Index :



Grain Size Analysis

TP- 6 @ 2.0 - 3.0'
SANDY CLAY LOAM.

SH6489.12

Plate G-12

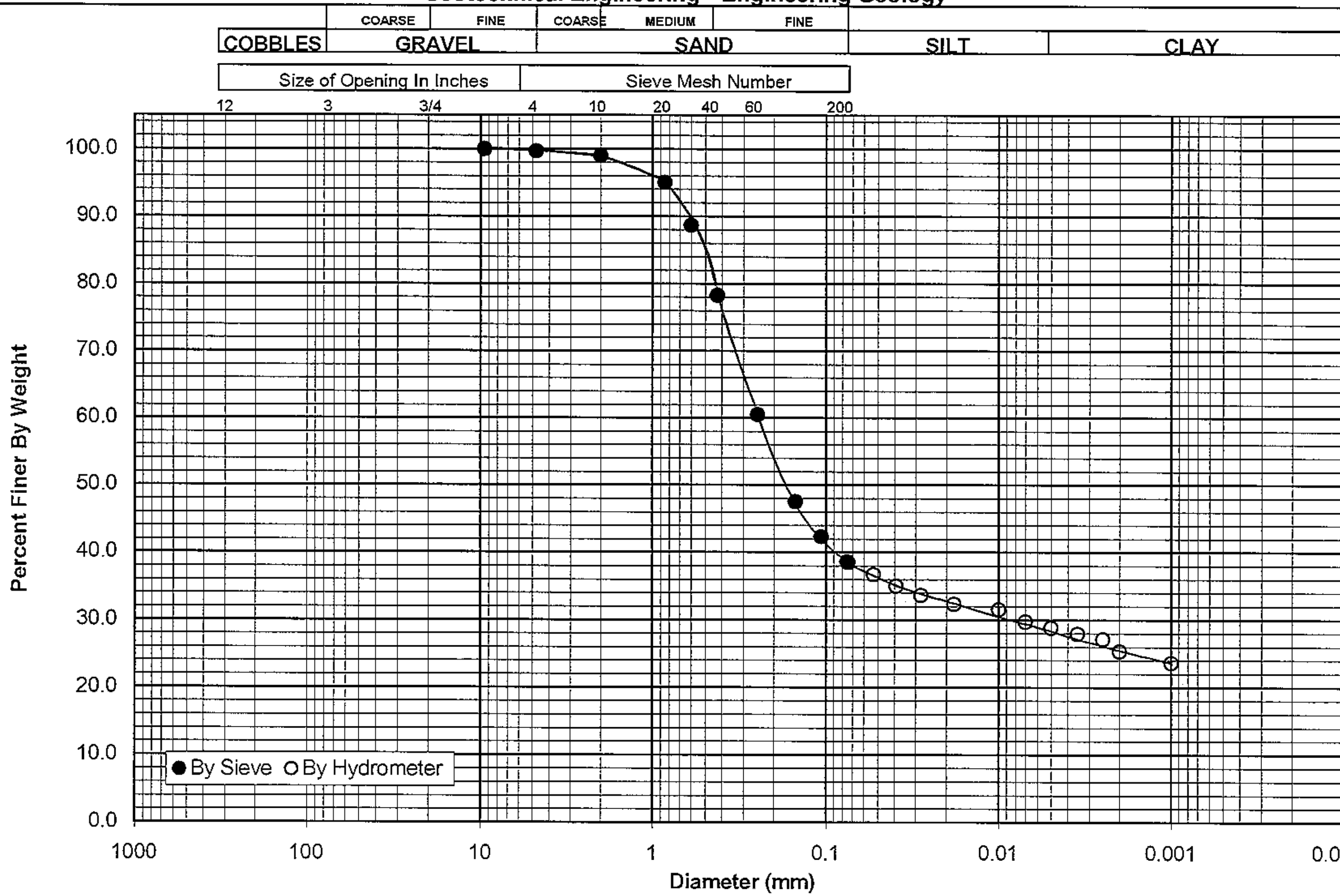
Green Acres, LLC
W.O. 6489

Date of Test: 3/12

GeoSoils Consultants, Inc.

Geotechnical Engineering * Engineering Geology

Moisture (%): 10.1
Liquid Limit (%):
Plastic Limit (%):
Plasticity Index :



Grain Size Analysis

TP-6 @ 5.0 - 6.0'
SANDY CLAY LOAM.

SH6489.13

Plate G-13

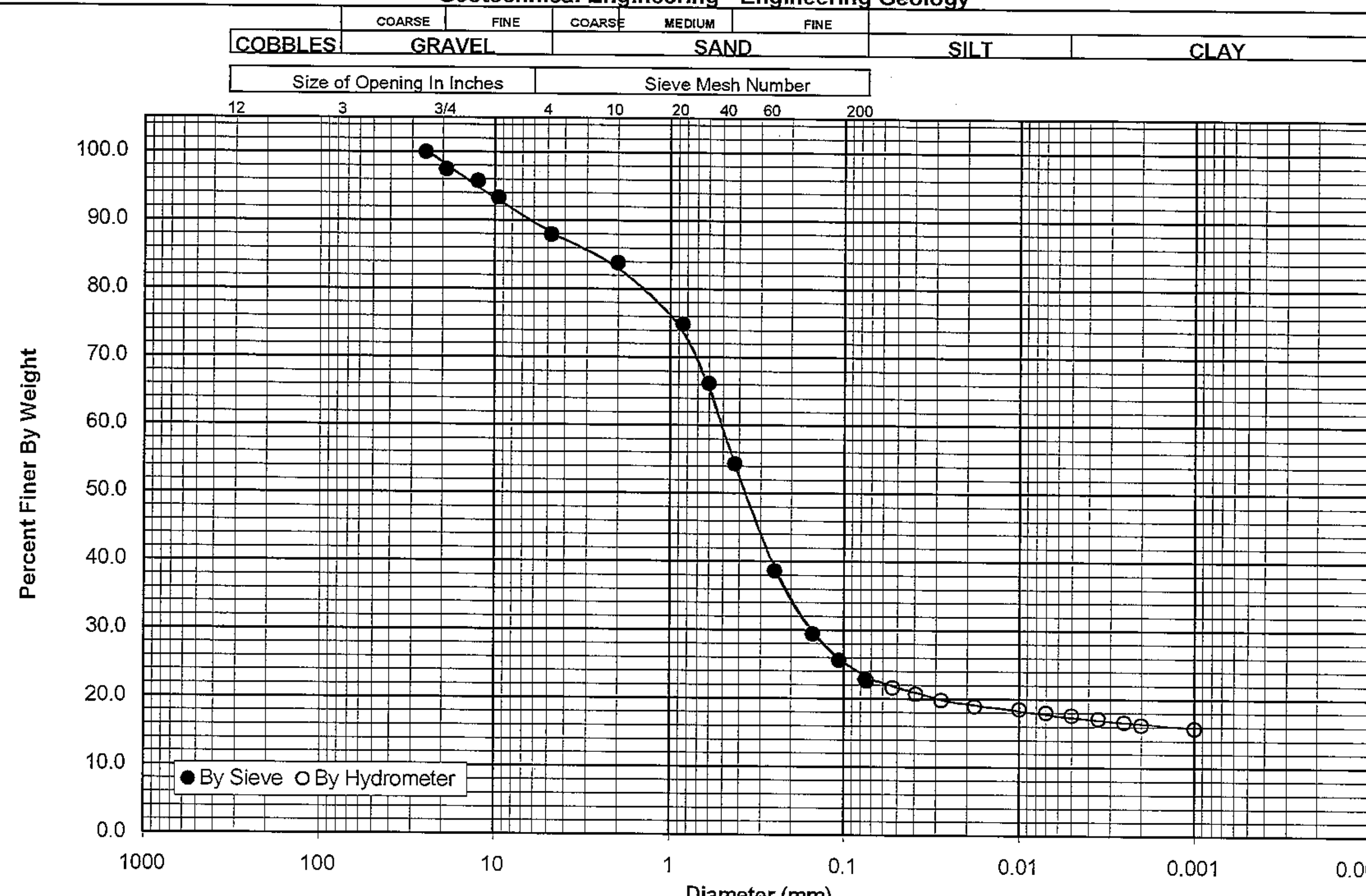
Green Acres, LLC
W.O. 6489

Date of Test: 3/12

GeoSoils Consultants, Inc.

Geotechnical Engineering * Engineering Geology

Moisture (%): 5.9
Liquid Limit (%):
Plastic Limit (%):
Plasticity Index :



Grain Size Analysis

TP-7 @ 6.0 - 7.0'
SANDY LOAM.

SH6489.14

Plate G-14

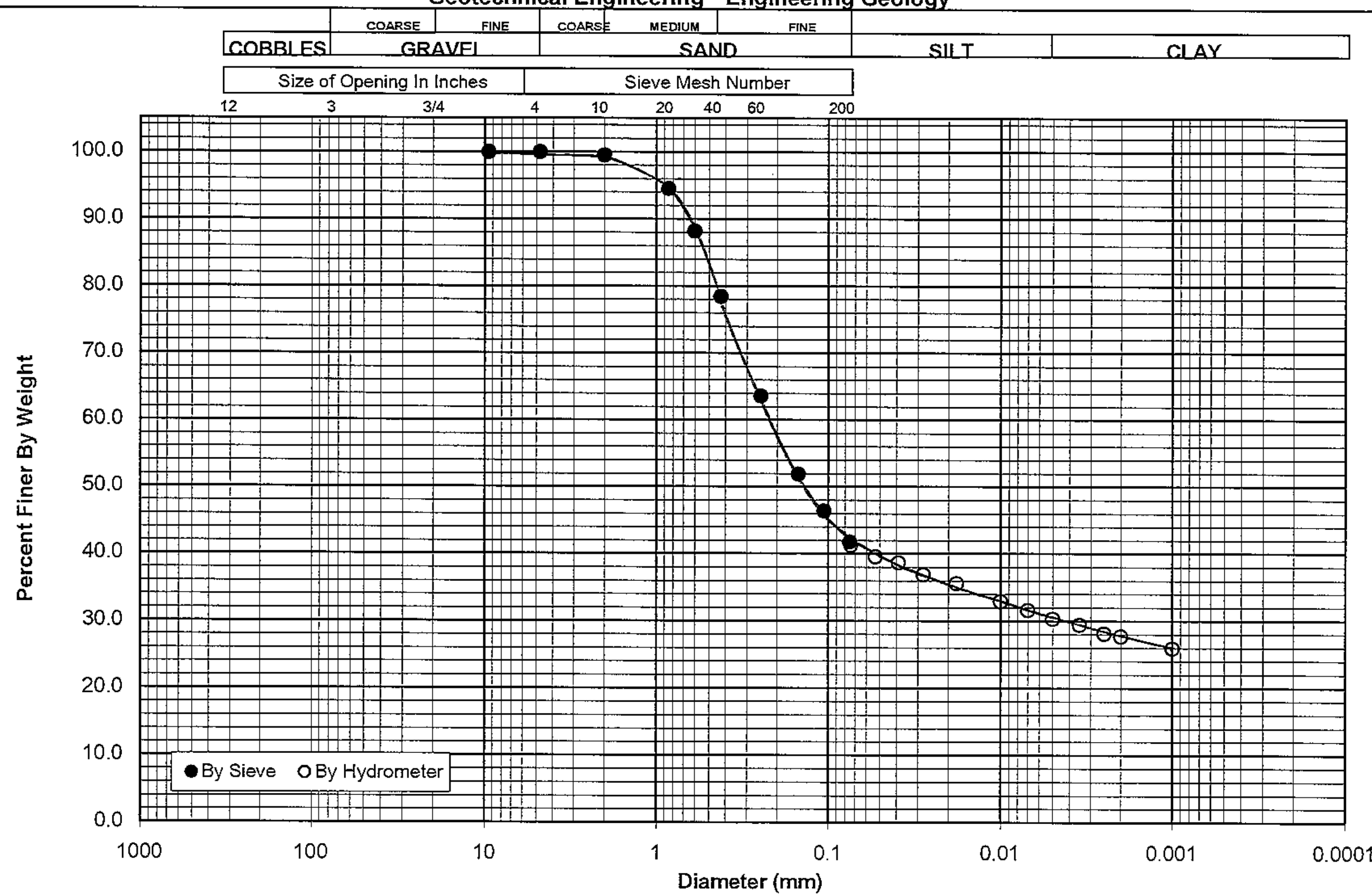
Green Acres, LLC
W.O. 6489

Date of Test: 3/12

GeoSoils Consultants, Inc.

Geotechnical Engineering * Engineering Geology

Moisture (%): 10.5
Liquid Limit (%):
Plastic Limit (%):
Plasticity Index :



Grain Size Analysis

TP-8 @ 1.0 - 2.0'
SANDY CLAY LOAM.

SH6489.15

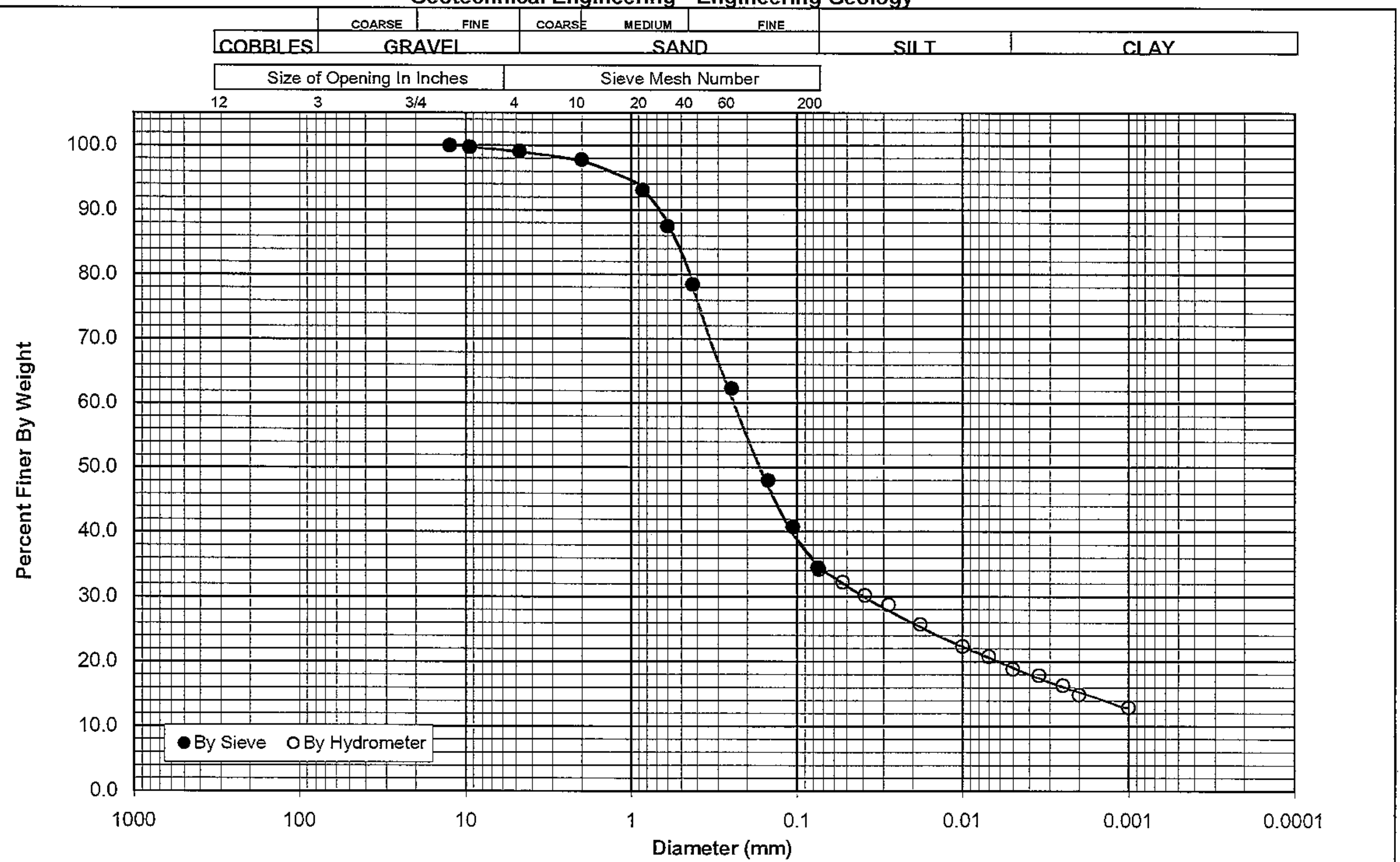
Green Acres, LLC
W.O. 6489

Date of Test: 3/12

GeoSoils Consultants, Inc.

Geotechnical Engineering * Engineering Geology

Moisture (%): 6.0
Liquid Limit (%):
Plastic Limit (%):
Plasticity Index :



Grain Size Analysis

TP- 9 @ 1.0 - 2.0'
SANDY LOAM.

SH6489.16

Plate G-16

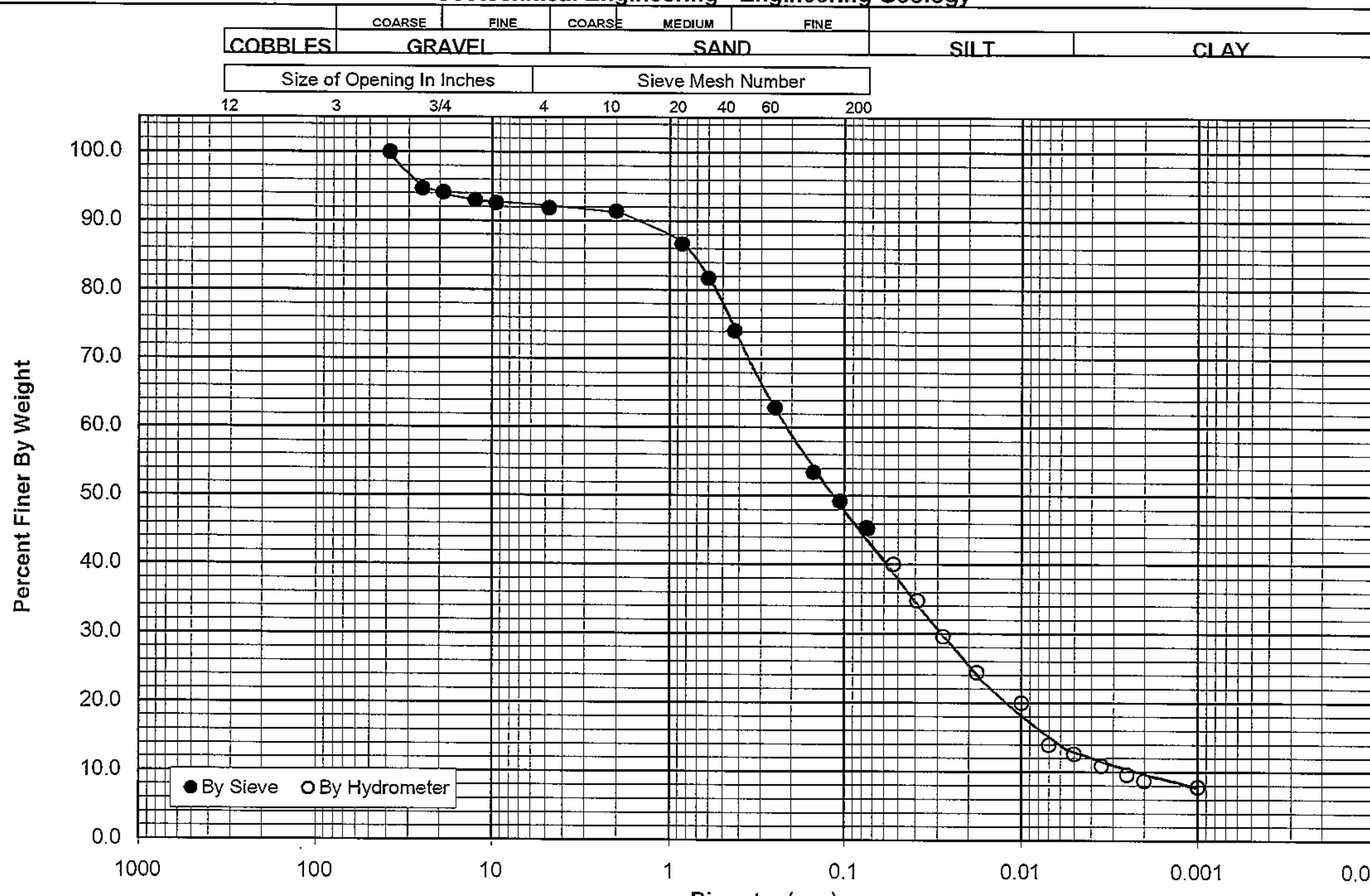
Green Acres, LLC
W.O. 6489

Date of Test: 3/12

GeoSoils Consultants, Inc.

Geotechnical Engineering * Engineering Geology

Moisture (%): 5.1
Liquid Limit (%):
Plastic Limit (%):
Plasticity Index :



Grain Size Analysis

TP-9 @ 5.0 - 6.0'
SANDY LOAM.

SH6489.17

Plate G-17

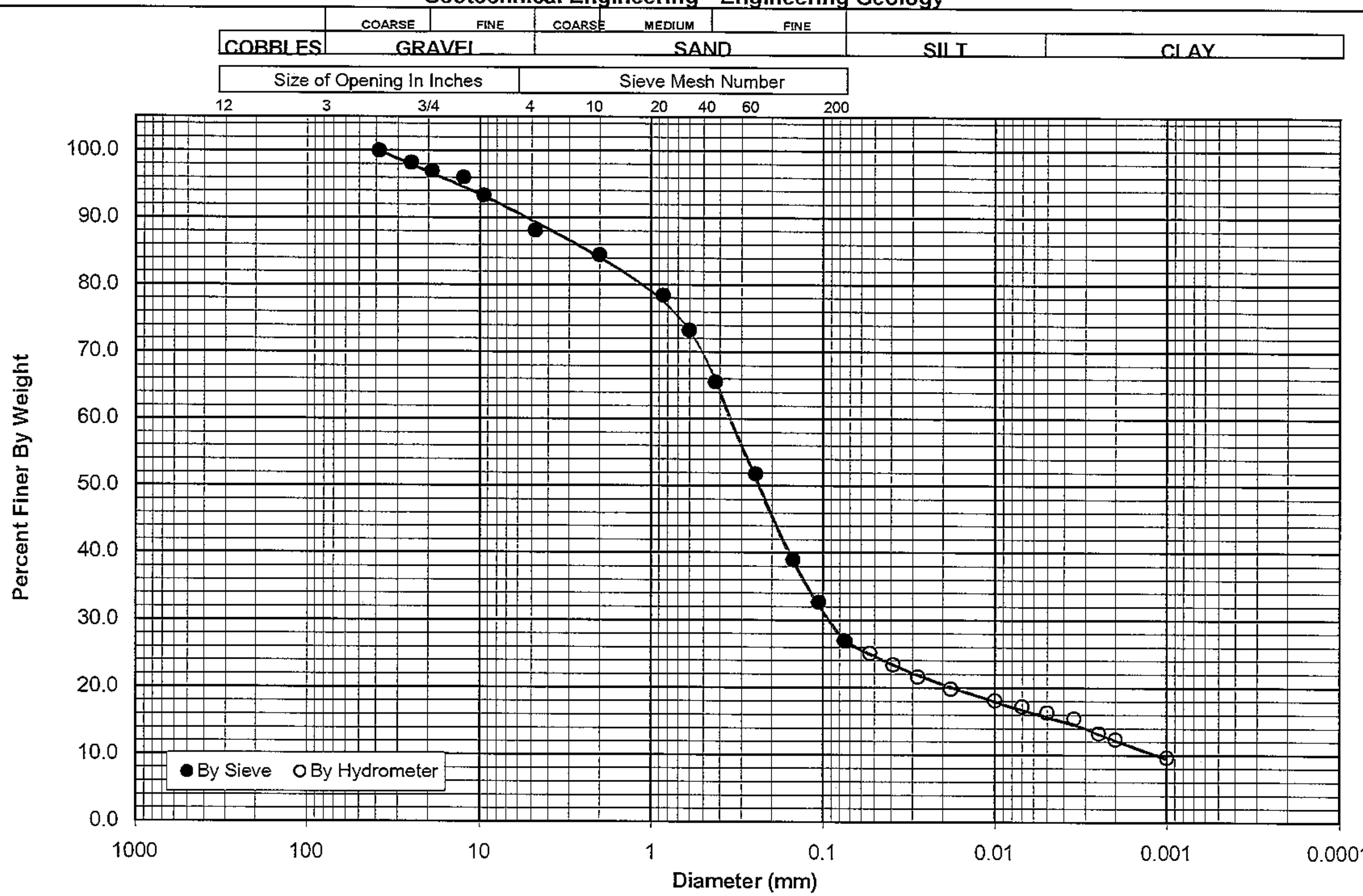
Green Acres, LLC
W.O. 6489

Date of Test: 3/12

GeoSoils Consultants, Inc.

Geotechnical Engineering * Engineering Geology

Moisture (%): 6.4
Liquid Limit (%):
Plastic Limit (%):
Plasticity Index :



Grain Size Analysis

TP-10 @ 1.0 - 2.0'
SANDY LOAM.

SH6489.18

Plate G-18

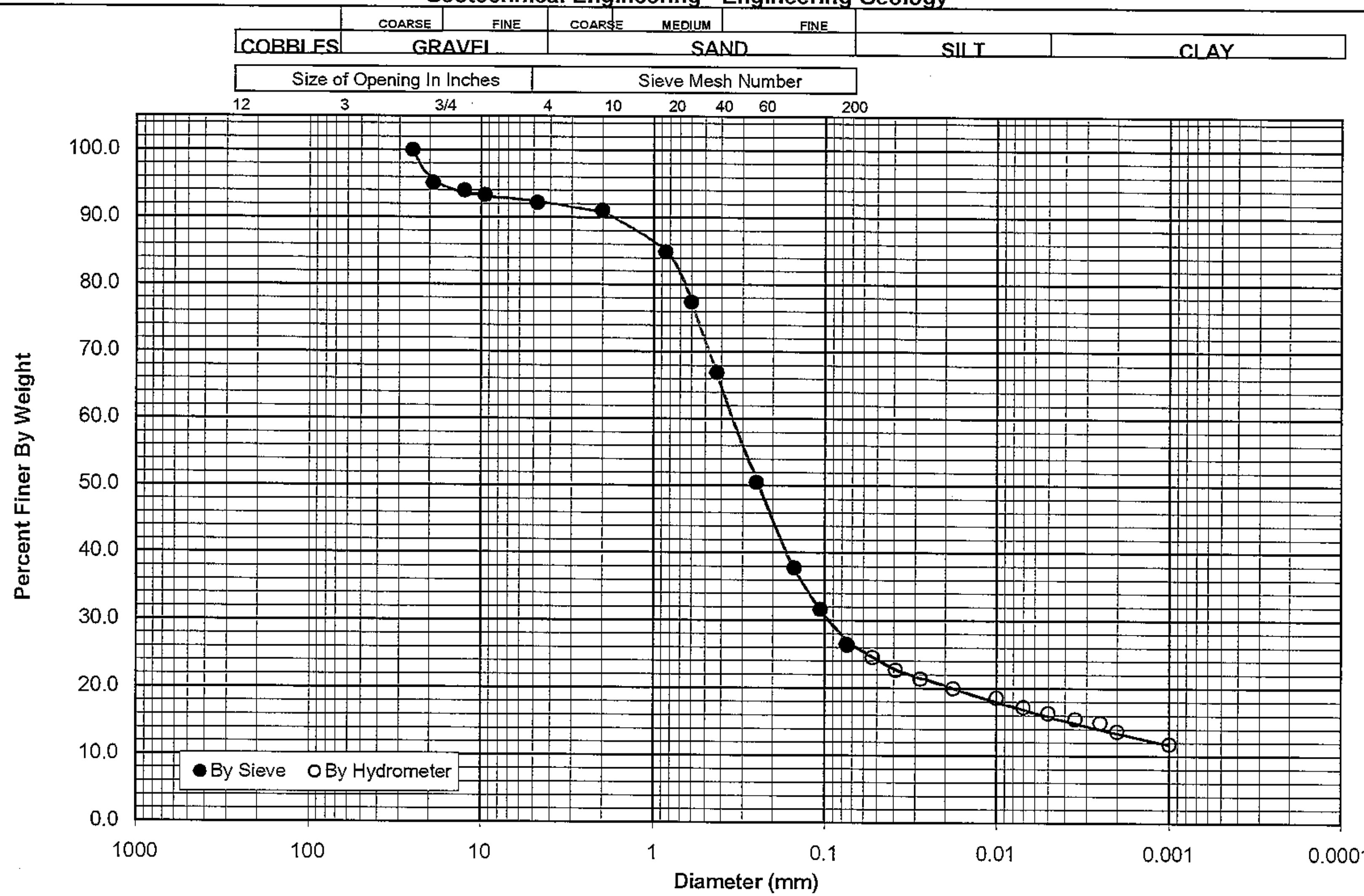
Green Acres, LLC
W.O. 6489

Date of Test: 3/12

GeoSoils Consultants, Inc.

Geotechnical Engineering * Engineering Geology

Moisture (%): 5.5
Liquid Limit (%):
Plastic Limit (%):
Plasticity Index :



Grain Size Analysis

TP-11 @ 1.0 - 2.0'
SANDY LOAM.

SH6489.19

Plate G-19

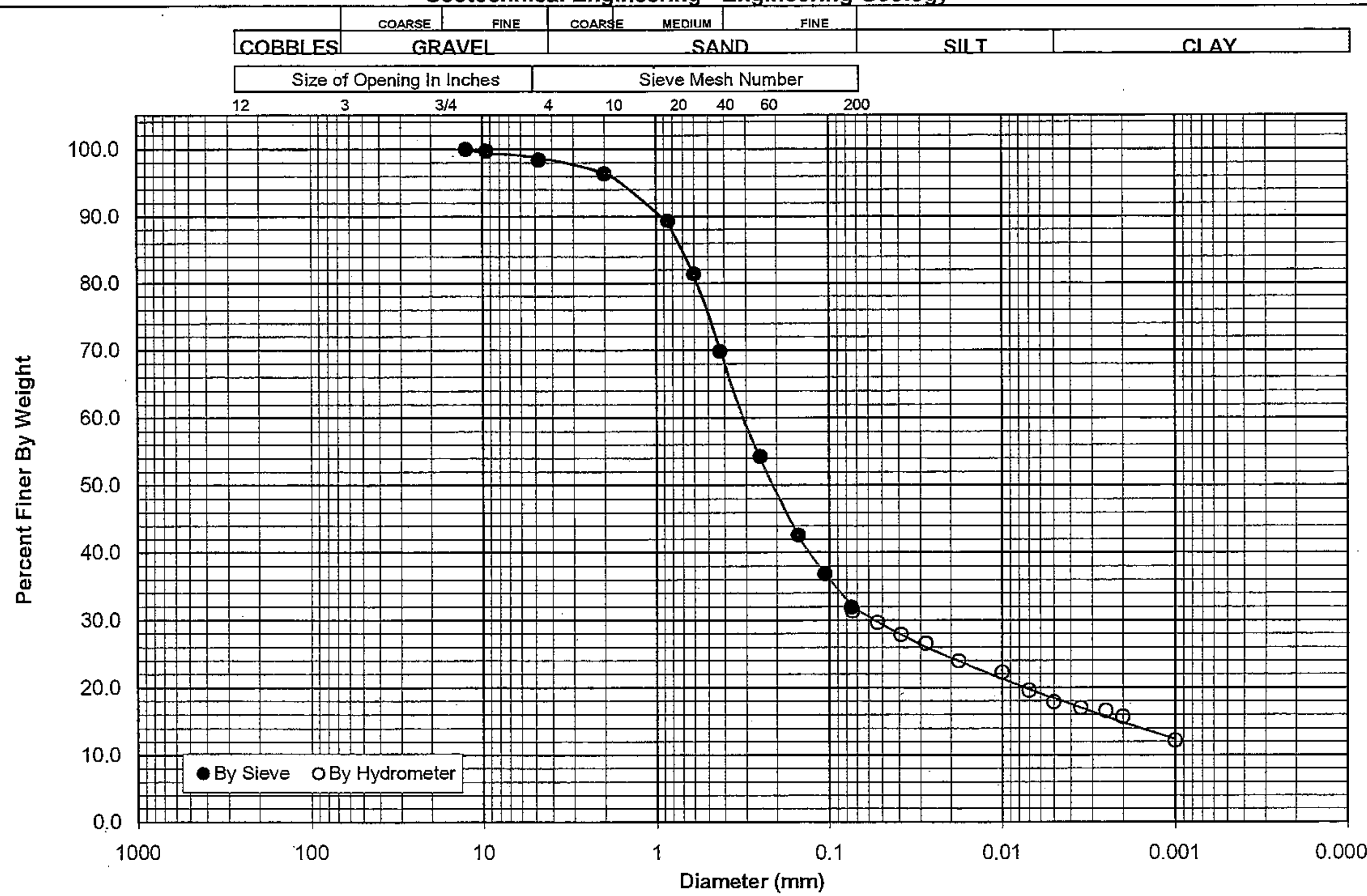
Green Acres, LLC
W.O. 6489

Date of Test: 3/12

GeoSoils Consultants, Inc.

Geotechnical Engineering * Engineering Geology

Moisture (%): 9.2
Liquid Limit (%):
Plastic Limit (%):
Plasticity Index :



Grain Size Analysis

TP-11 @ 13.0'
SANDY LOAM.

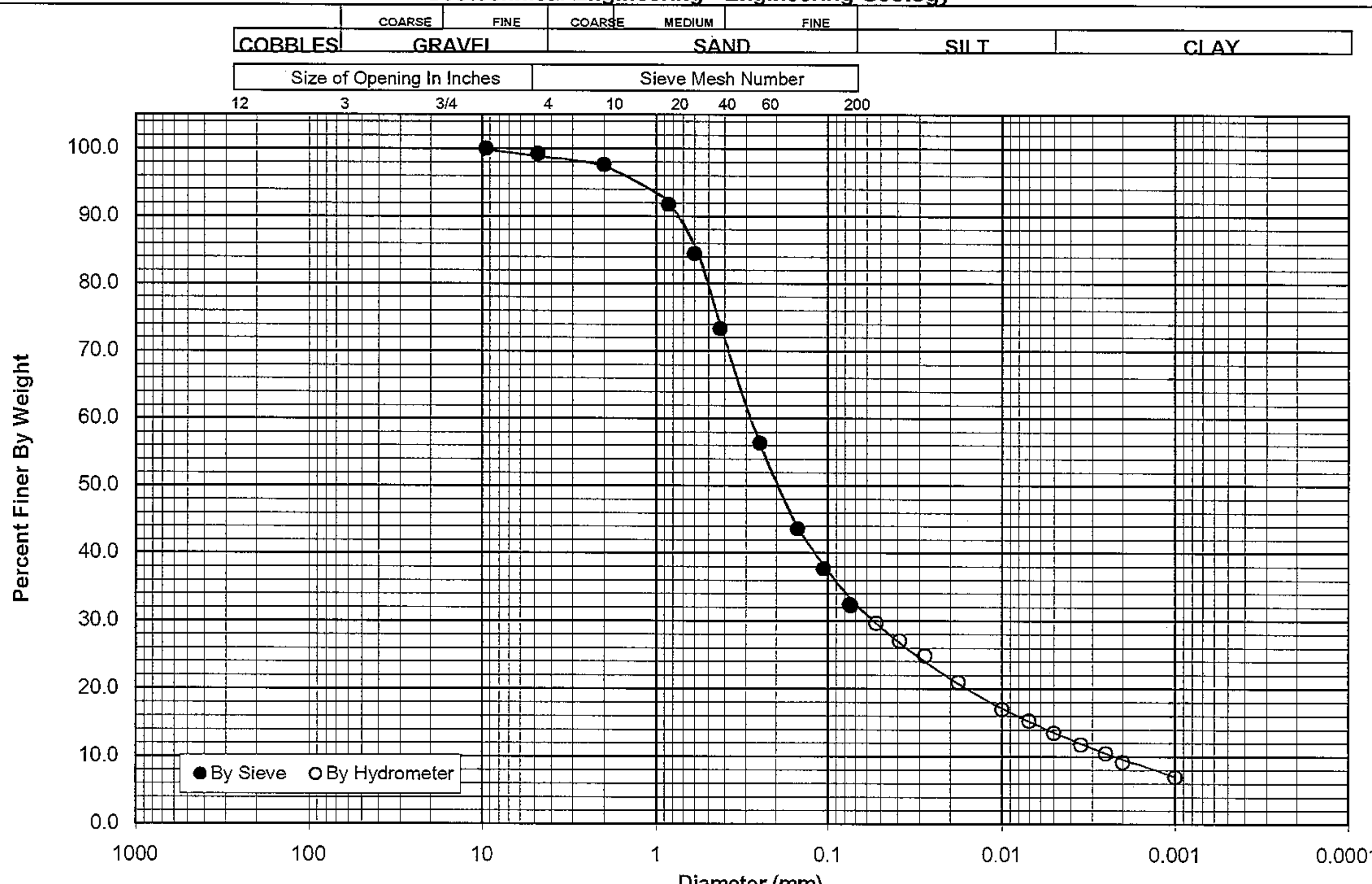
Green Acres, LLC
W.O. 6489

Date of Test: 3/12

GeoSoils Consultants, Inc.

Geotechnical Engineering * Engineering Geology

Moisture (%): 4.4
Liquid Limit (%):
Plastic Limit (%):
Plasticity Index :



Grain Size Analysis

TP-12 @ 1.0 - 2.0'
SANDY LOAM.

SH6489.21

Plate G-21

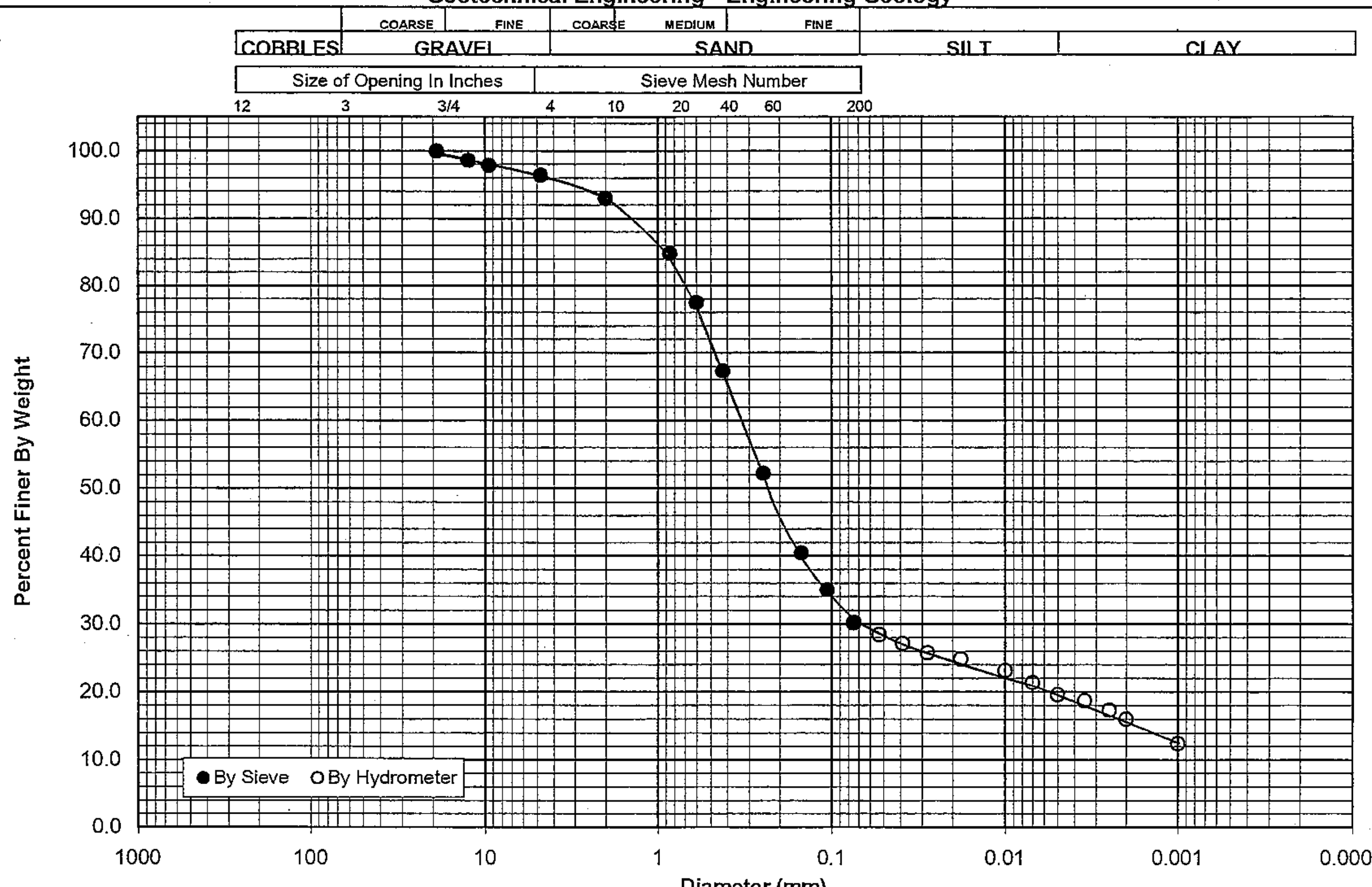
Green Acres, LLC
W.O. 6489

Date of Test: 3/12

GeoSoils Consultants, Inc.

Geotechnical Engineering * Engineering Geology

Moisture (%): 7.3
Liquid Limit (%):
Plastic Limit (%):
Plasticity Index :



Grain Size Analysis

TP- 12 @ 10.0'
SANDY LOAM / SANDY CLAY LOAM.

SH6489.22

Plate G-22

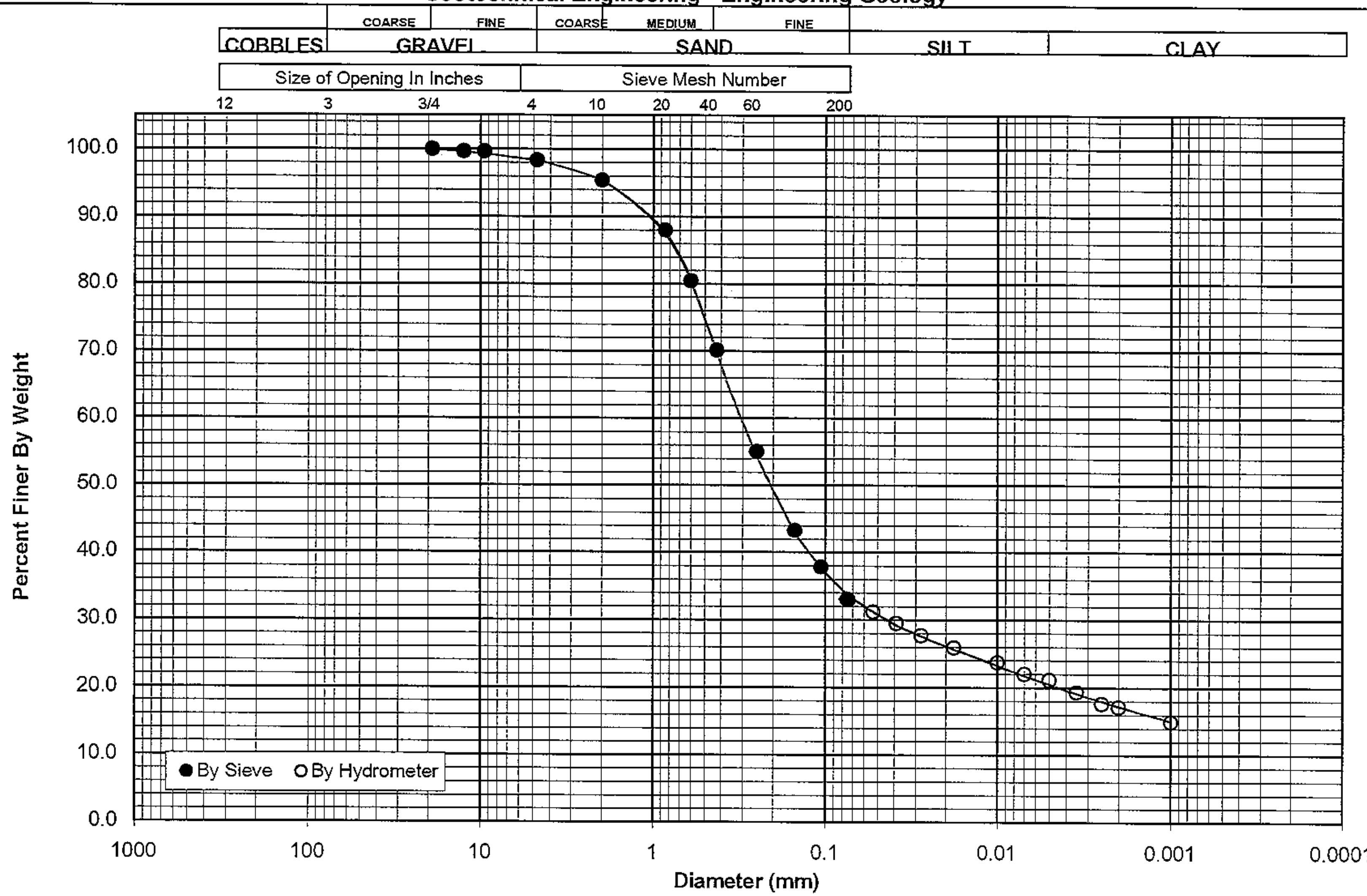
Green Acres, LLC
W.O. 6489

Date of Test: 3/12

GeoSoils Consultants, Inc.

Geotechnical Engineering * Engineering Geology

Moisture (%): 6.7
Liquid Limit (%):
Plastic Limit (%):
Plasticity Index :



Grain Size Analysis

TP-13 @ 1.0 - 2.0'
SANDY CLAY LOAM.

SH6489.23

Plate G-23

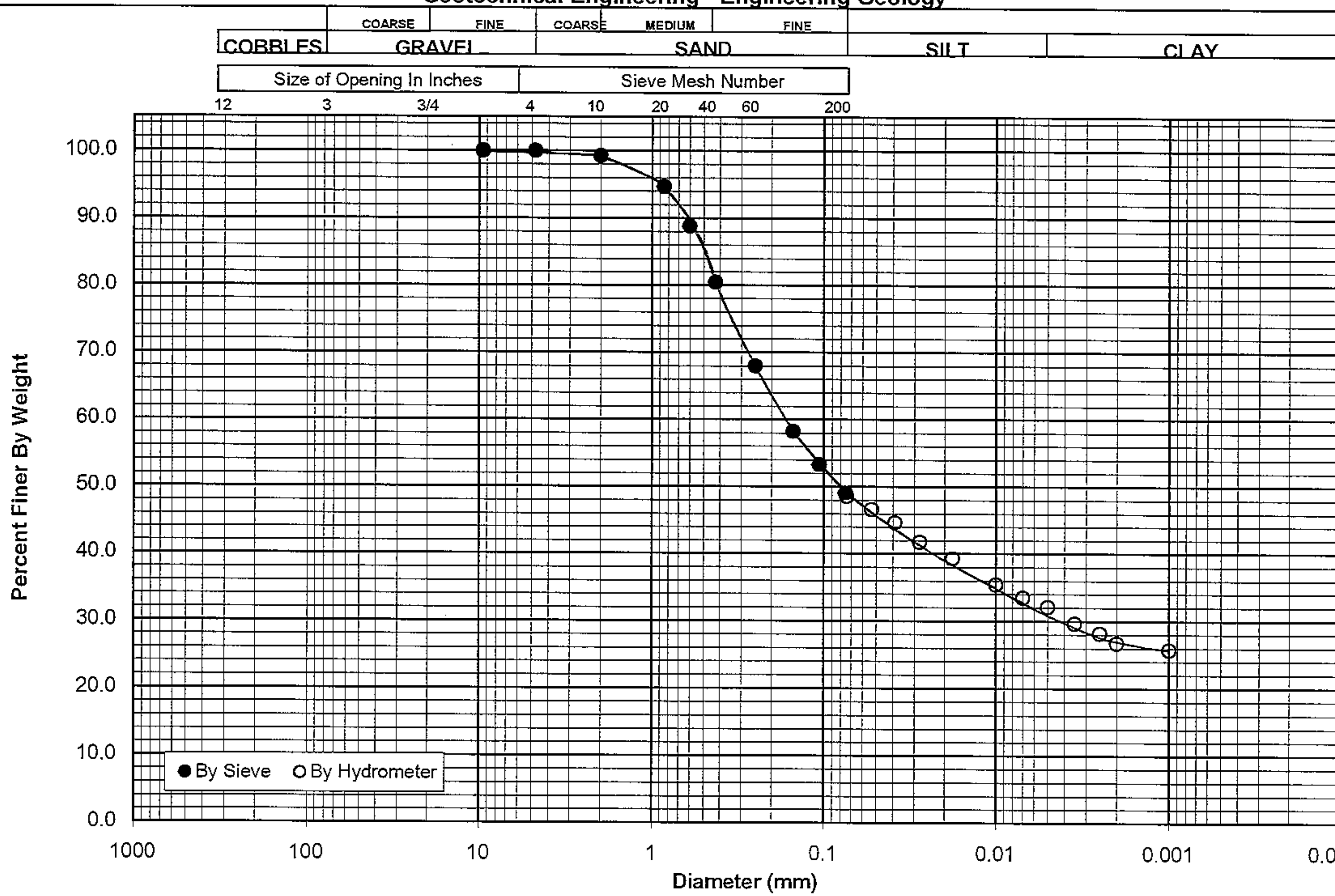
Green Acres, LLC
W.O. 6489

Date of Test: 3/12

GeoSoils Consultants, Inc.

Geotechnical Engineering * Engineering Geology

Moisture (%): 9.9
Liquid Limit (%):
Plastic Limit (%):
Plasticity Index :



Grain Size Analysis

TP- 14 @ 1.0 - 2.0'
SANDY CLAY LOAM.

SH6489.24

Plate G-24

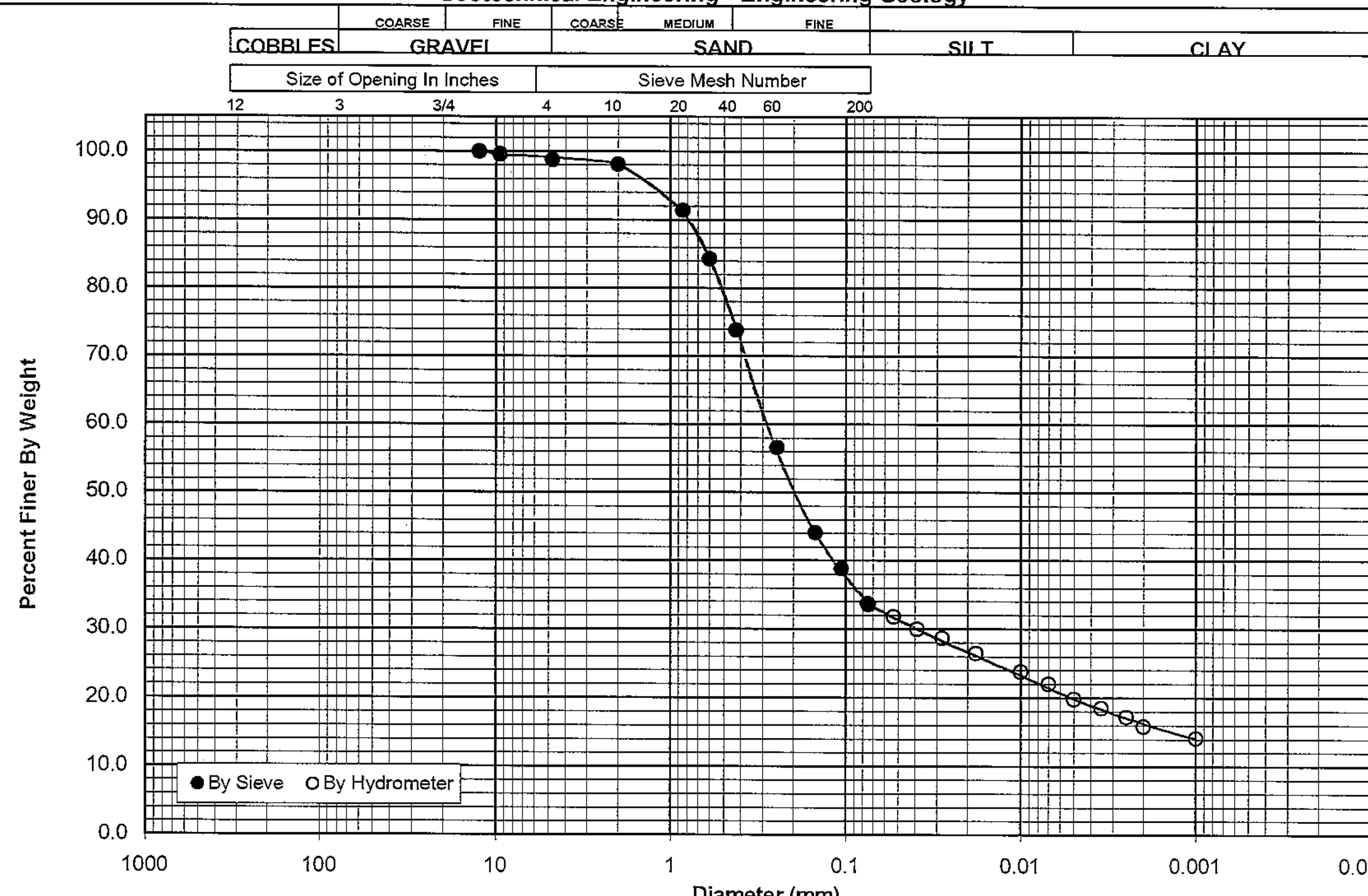
Green Acres, LLC
W.O. 6489

Date of Test: 3/12

GeoSoils Consultants, Inc.

Geotechnical Engineering * Engineering Geology

Moisture (%): 6.9
Liquid Limit (%):
Plastic Limit (%):
Plasticity Index :



Grain Size Analysis

TP-14 @ 5.0 - 6.0'
SANDY LOAM / SANDY CLAY LOAM.

SH6489.25

Plate G-25

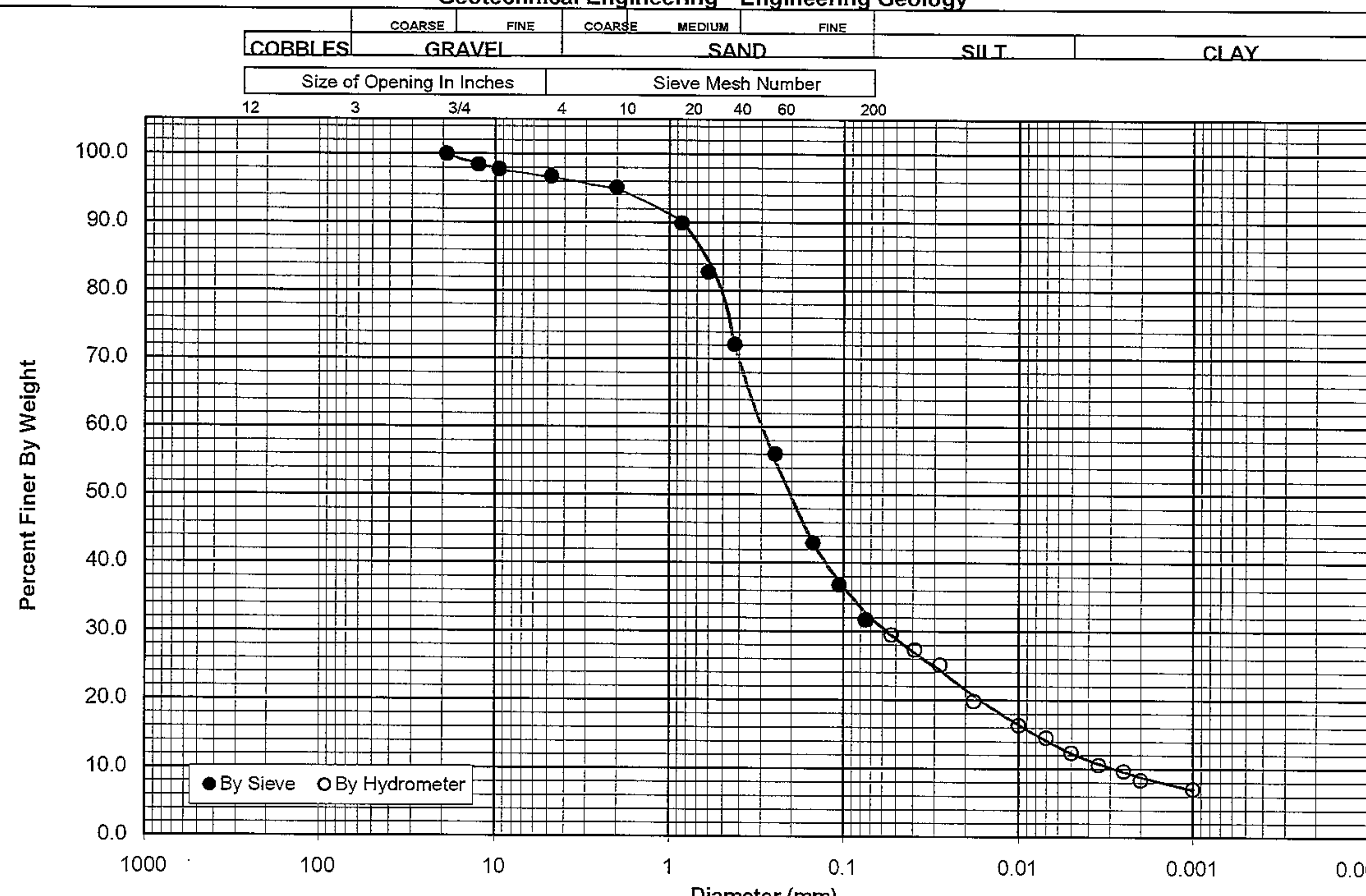
Green Acres, LLC
W.O. 6489

Date of Test: 3/12

GeoSoils Consultants, Inc.

Geotechnical Engineering * Engineering Geology

Moisture (%): 2.9
Liquid Limit (%):
Plastic Limit (%):
Plasticity Index :



Grain Size Analysis

TP-15 @ 1.0 - 2.0'
SANDY LOAM.

SH6489.26

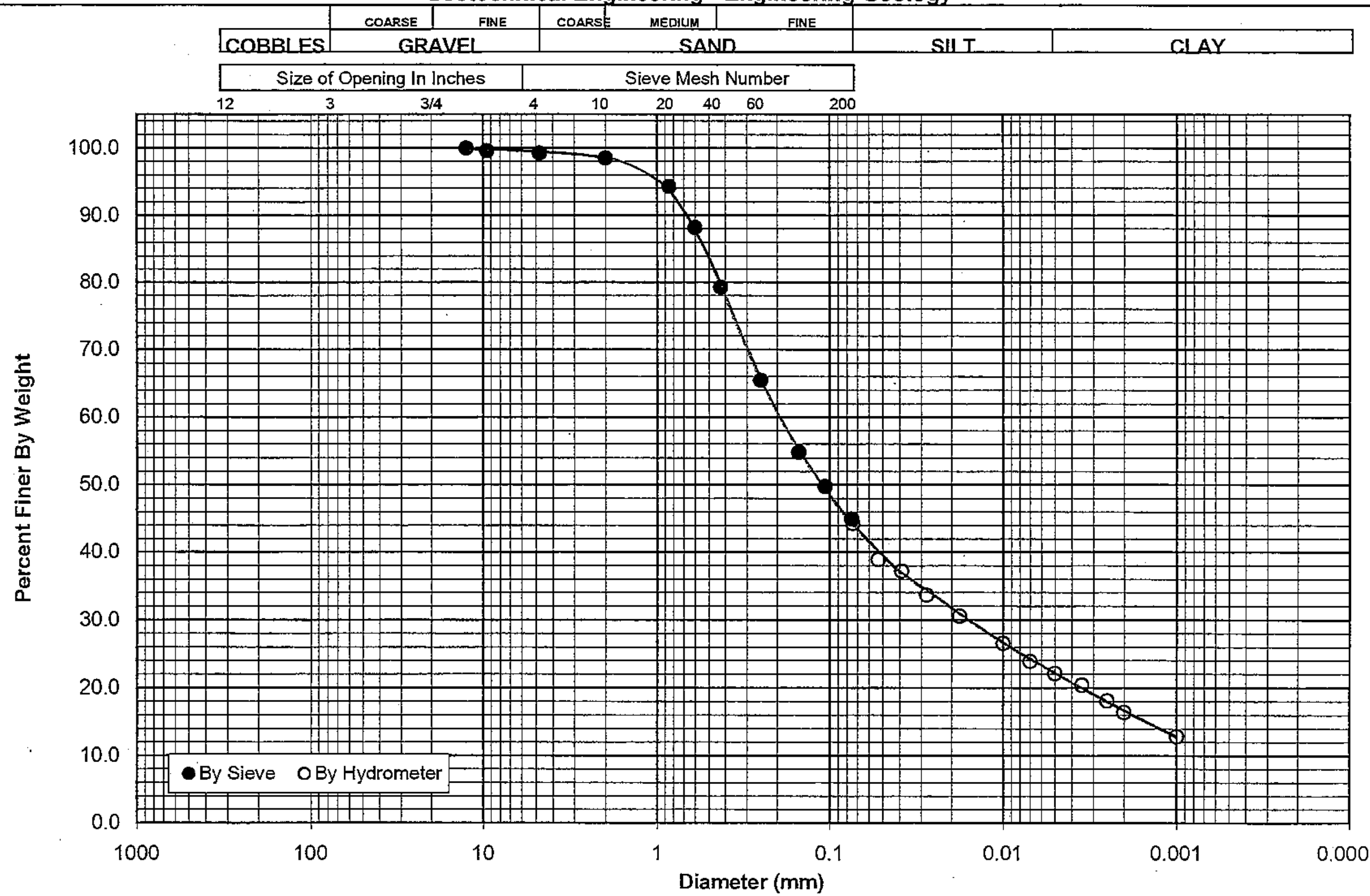
Green Acres, LLC
W.O. 6489

Date of Test: 3/12

GeoSoils Consultants, Inc.

Geotechnical Engineering * Engineering Geology

Moisture (%): 8.0
Liquid Limit (%):
Plastic Limit (%):
Plasticity Index :



Grain Size Analysis

TP- 15 @ 4.0'
SANDY CLAY LOAM.

SH6489.27

Plate G-27

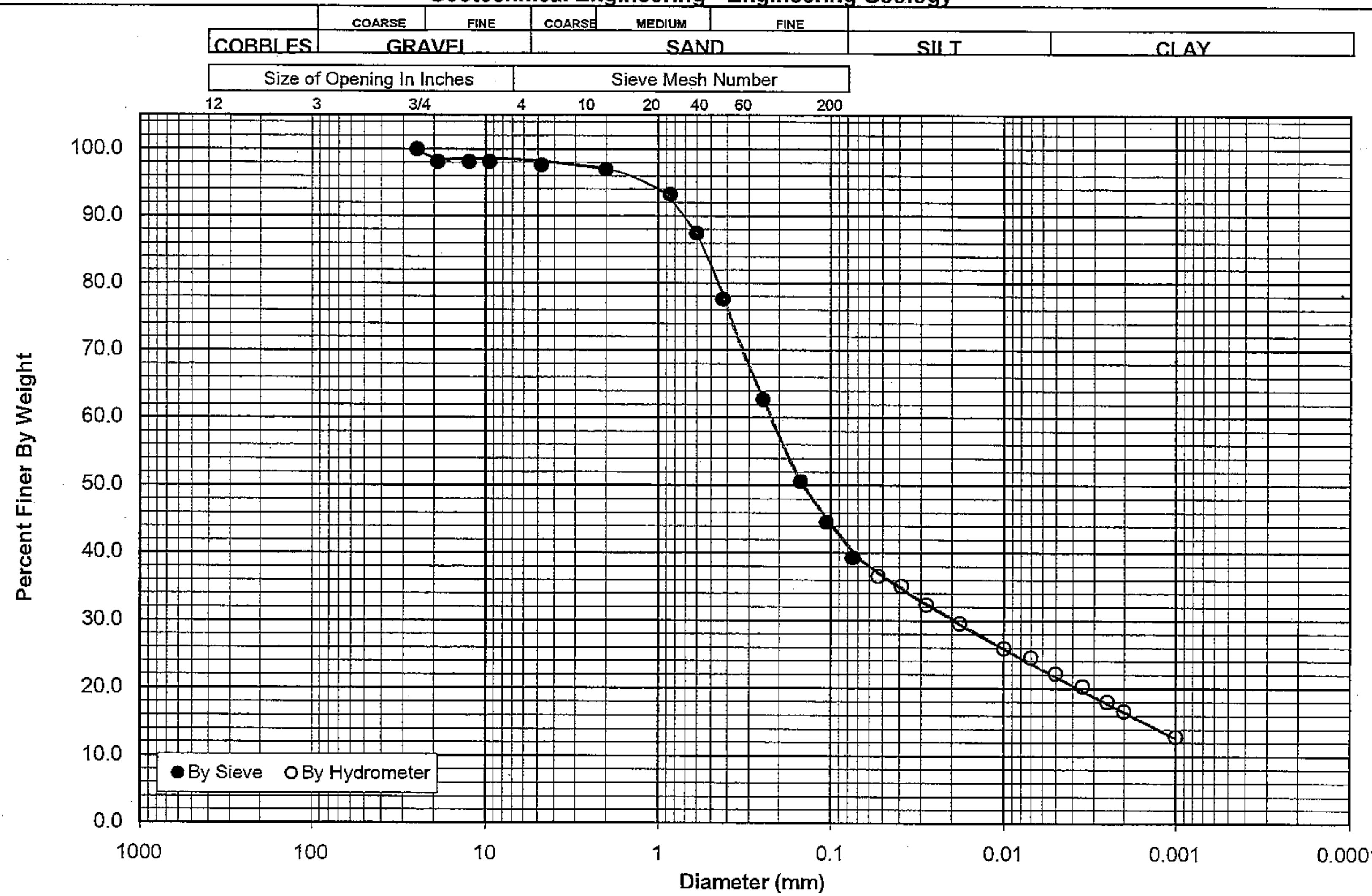
Green Acres, LLC
W.O. 6489

Date of Test: 3/12

GeoSoils Consultants, Inc.

Geotechnical Engineering * Engineering Geology

Moisture (%): 7.9
Liquid Limit (%):
Plastic Limit (%):
Plasticity Index :



Grain Size Analysis

TP- 15 @ 10.0'
SANDY CLAY LOAM.

SH6489.28

Plate G-28

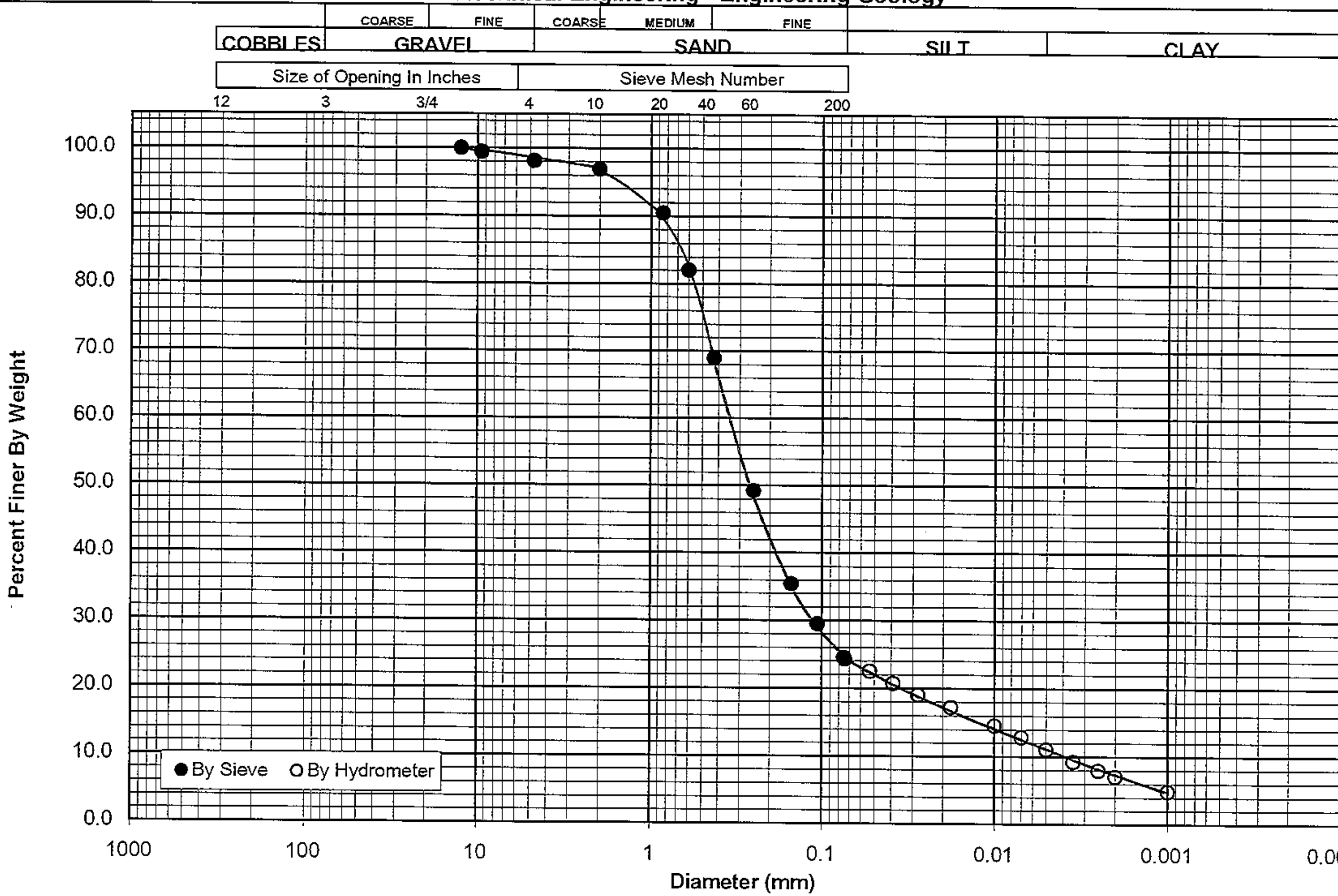
Green Acres, LLC
W.O. 6489

Date of Test: 3/12

GeoSoils Consultants, Inc.

Geotechnical Engineering * Engineering Geology

Moisture (%): 2.9
Liquid Limit (%):
Plastic Limit (%):
Plasticity Index :



Grain Size Analysis

TP-16 @ 1.0 - 2.0'
SANDY LOAM.

SH6489.29

Plate G-29

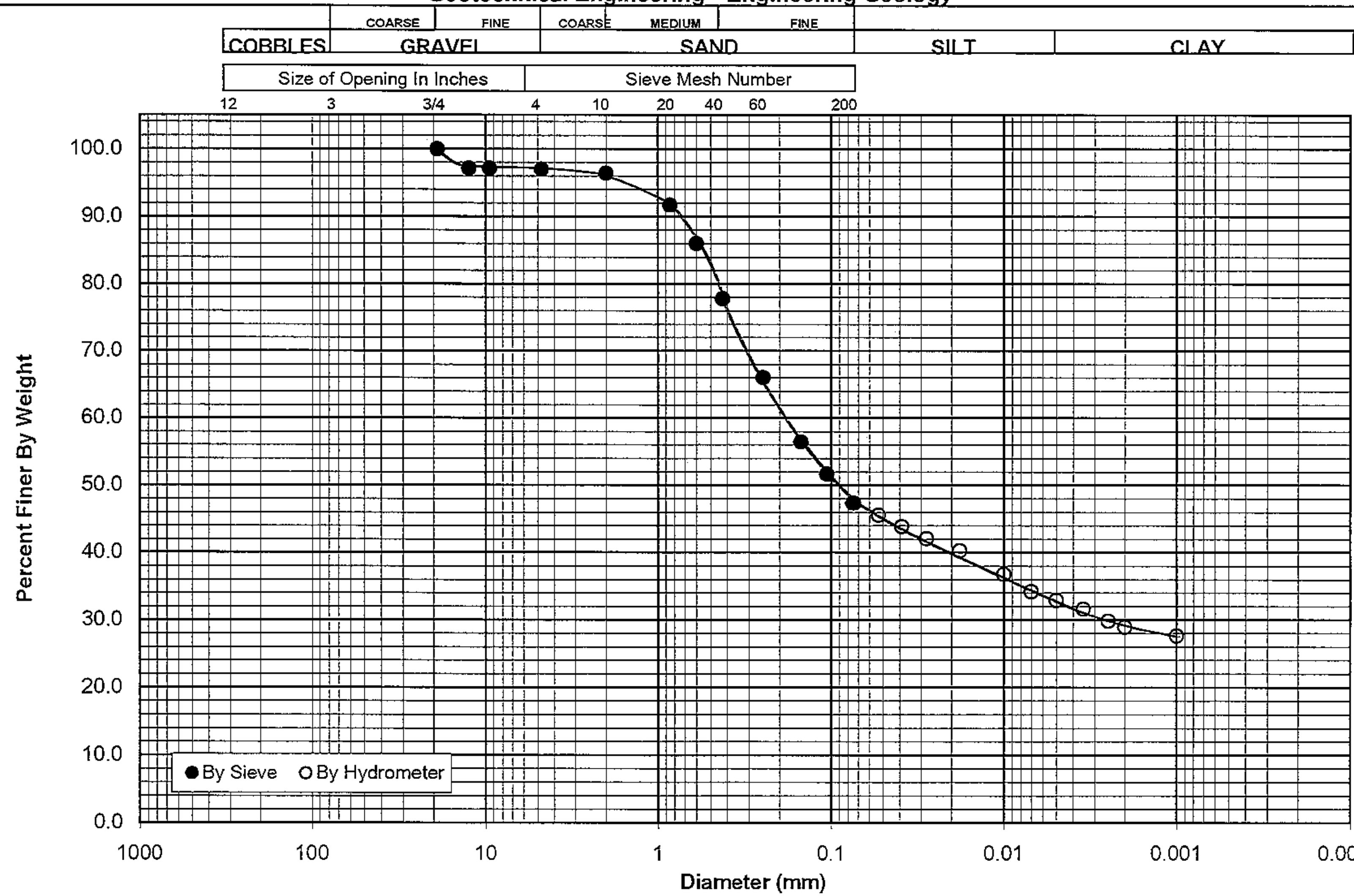
Green Acres, LLC
W.O. 6489

Date of Test: 3/12

GeoSoils Consultants, Inc.

Geotechnical Engineering * Engineering Geology

Moisture (%): 8.7
Liquid Limit (%):
Plastic Limit (%):
Plasticity Index :



Grain Size Analysis

TP-17 @ 1.0 - 2.0'
SANDY CLAY LOAM.

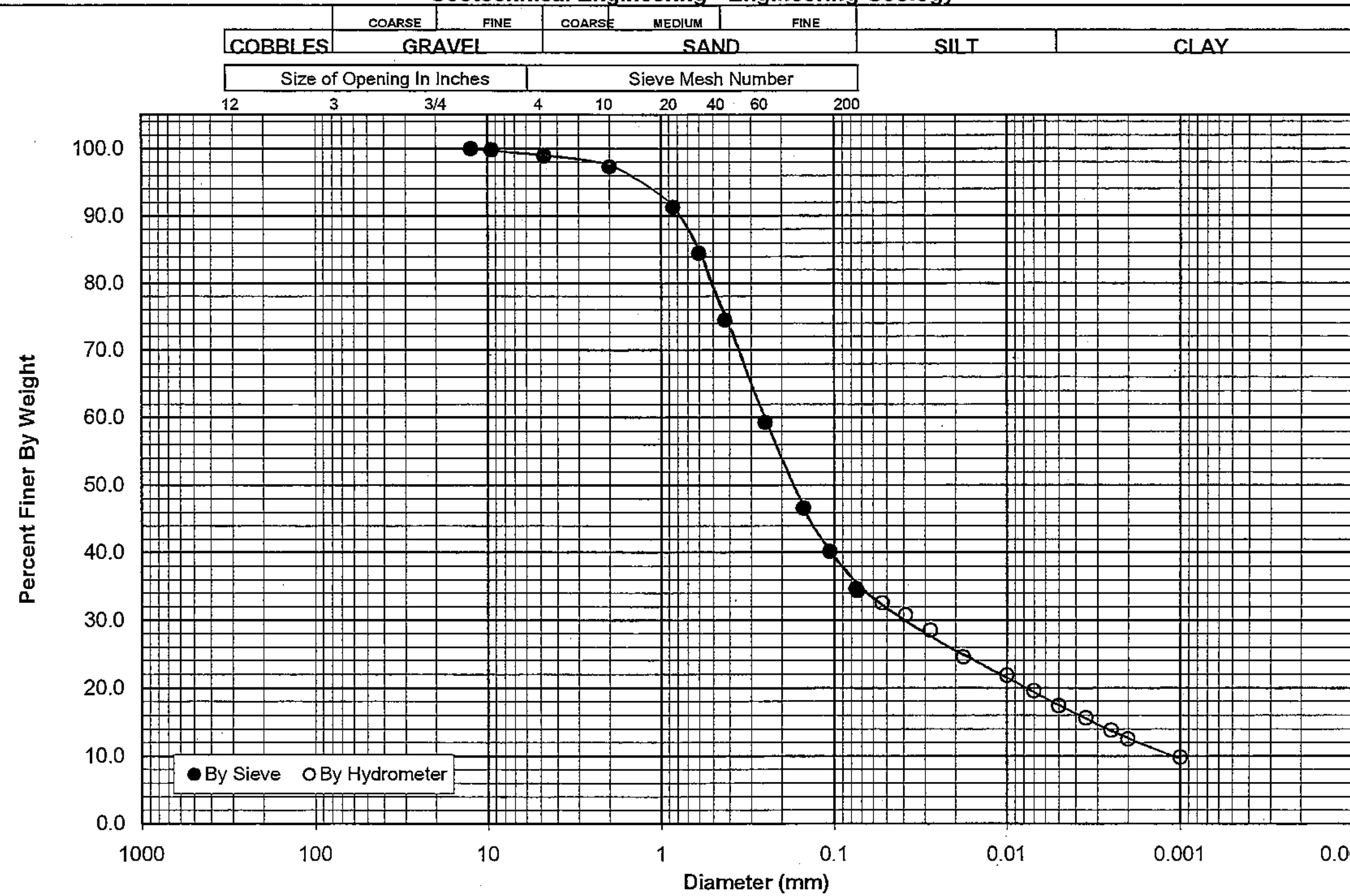
Green Acres, LLC
W.O. 6489

Date of Test: 3/12

GeoSoils Consultants, Inc.

Geotechnical Engineering * Engineering Geology

Moisture (%): 6.6
Liquid Limit (%):
Plastic Limit (%):
Plasticity Index :



Grain Size Analysis

TP-17 @ 10.0'
SANDY LOAM.

SH6489.31

Plate G-31

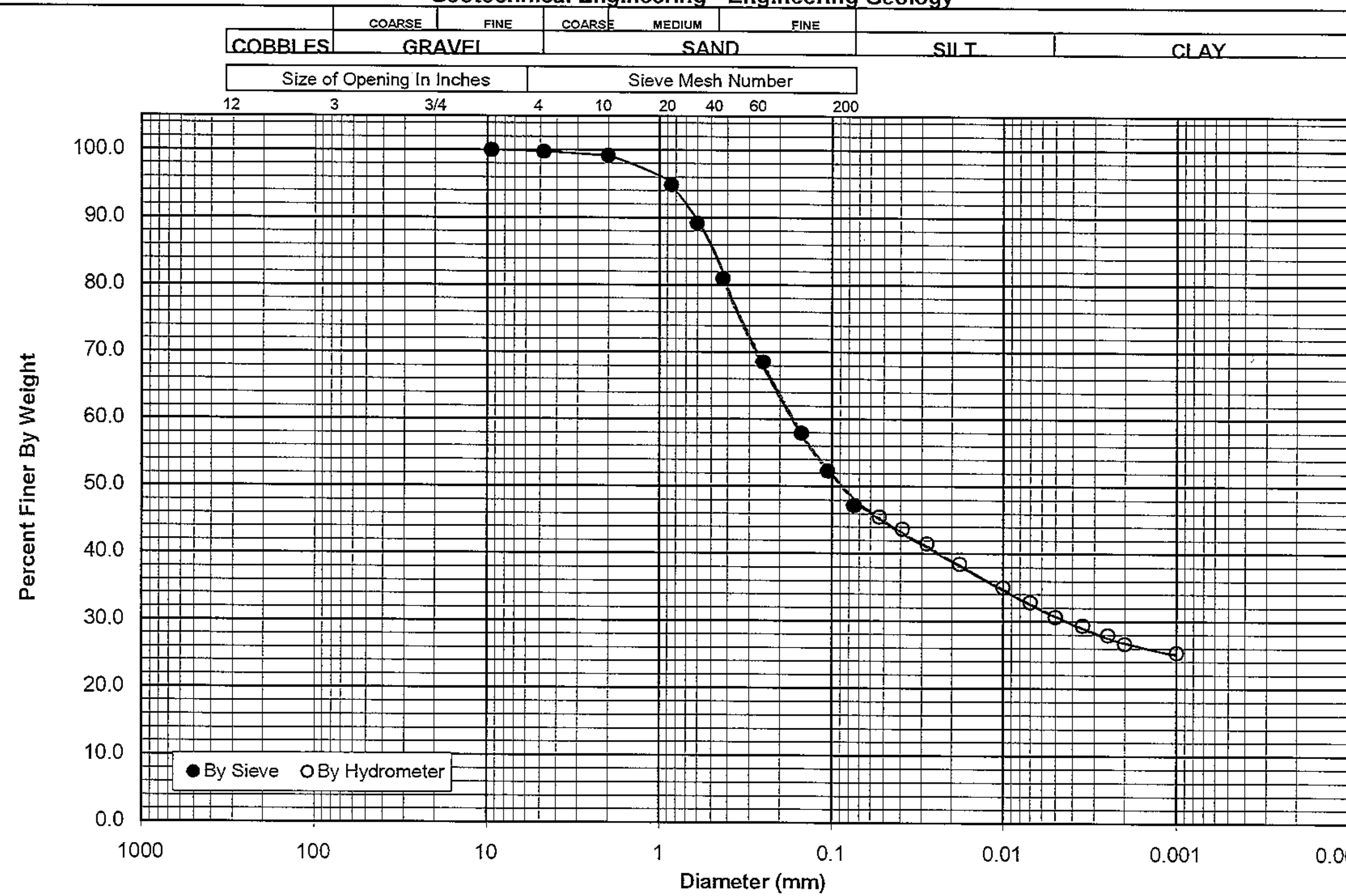
Green Acres, LLC
W.O. 6489

Date of Test: 3/12

GeoSoils Consultants, Inc.

Geotechnical Engineering * Engineering Geology

Moisture (%): 7.8
Liquid Limit (%):
Plastic Limit (%):
Plasticity Index :



Grain Size Analysis

TP-18 @ 1.0 - 2.0'
SANDY CLAY LOAM.

SH6489.32

Plate G-32

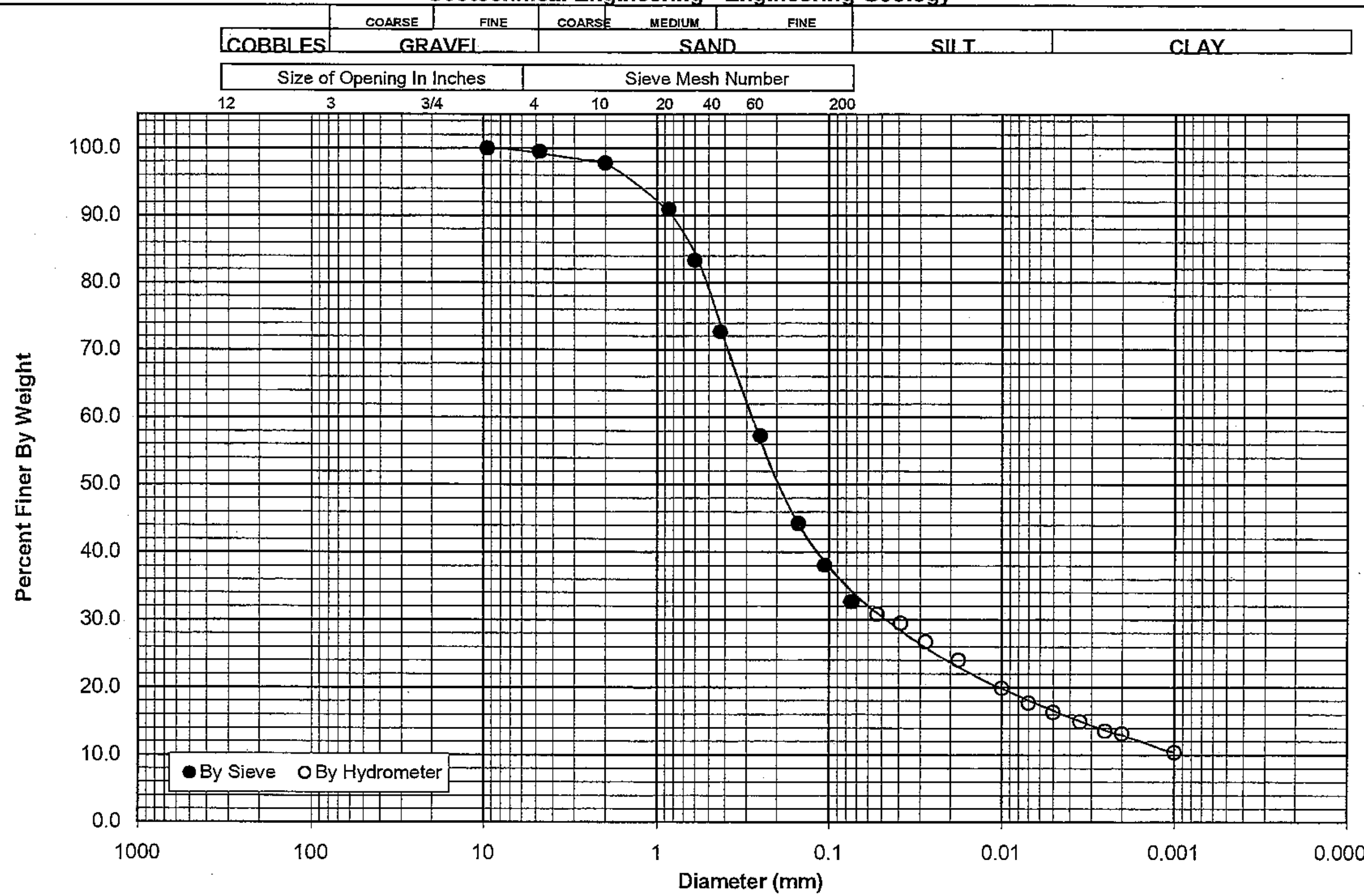
Green Acres, LLC
W.O. 6489

Date of Test: 3/12

GeoSoils Consultants, Inc.

Geotechnical Engineering * Engineering Geology

Moisture (%): 5.8
Liquid Limit (%):
Plastic Limit (%):
Plasticity Index :



Grain Size Analysis

TP-18 @ 10.0'
SANDY LOAM.

SH6489.33

Plate G-33

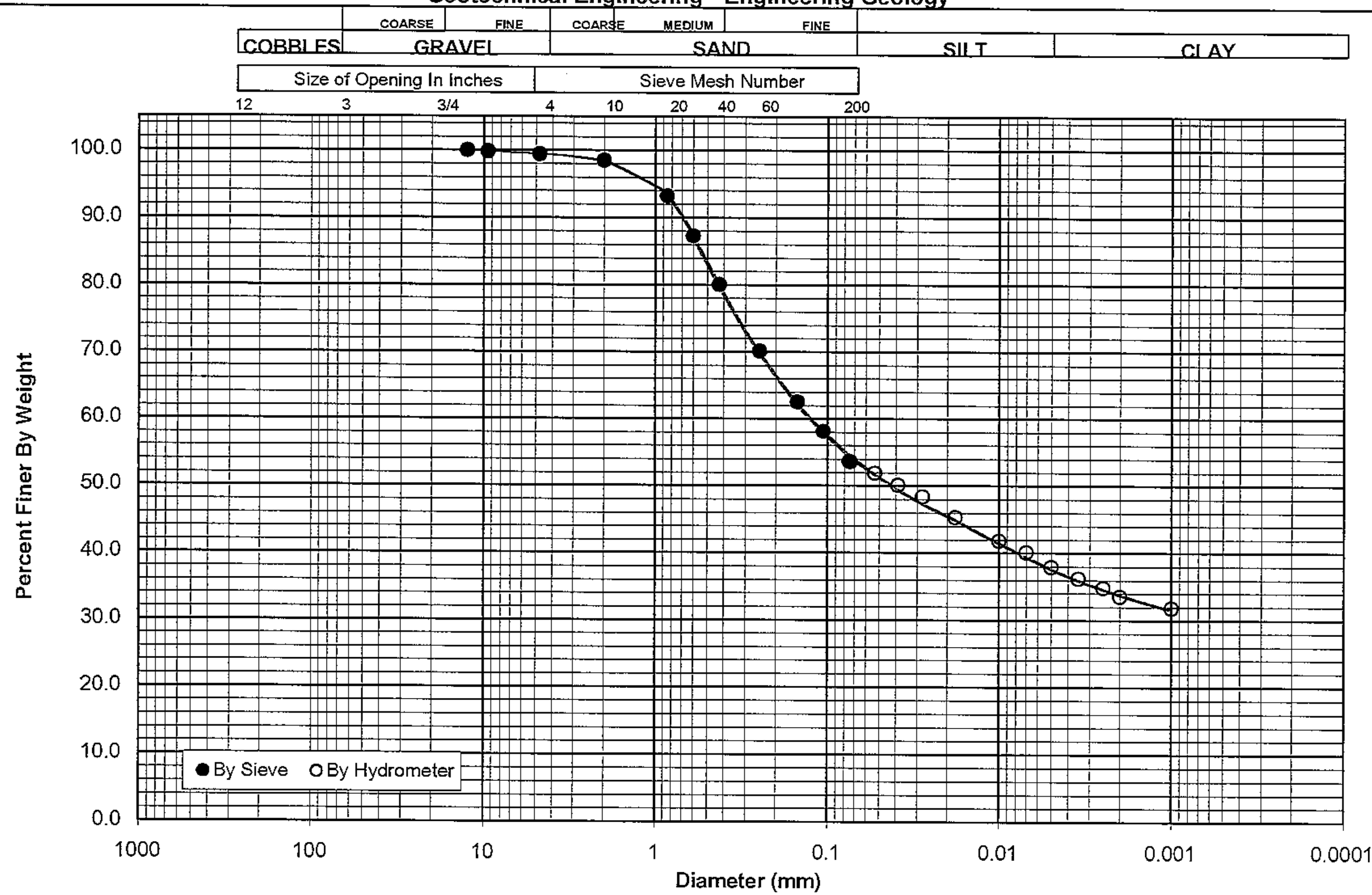
Green Acres, LLC
W.O. 6489

Date of Test: 3/12

GeoSoils Consultants, Inc.

Geotechnical Engineering * Engineering Geology

Moisture (%): 10.5
Liquid Limit (%):
Plastic Limit (%):
Plasticity Index :



Grain Size Analysis

TP-19 @ 1.0 - 2.0'
SANDY CLAY.

SH6489.34

Plate G-34

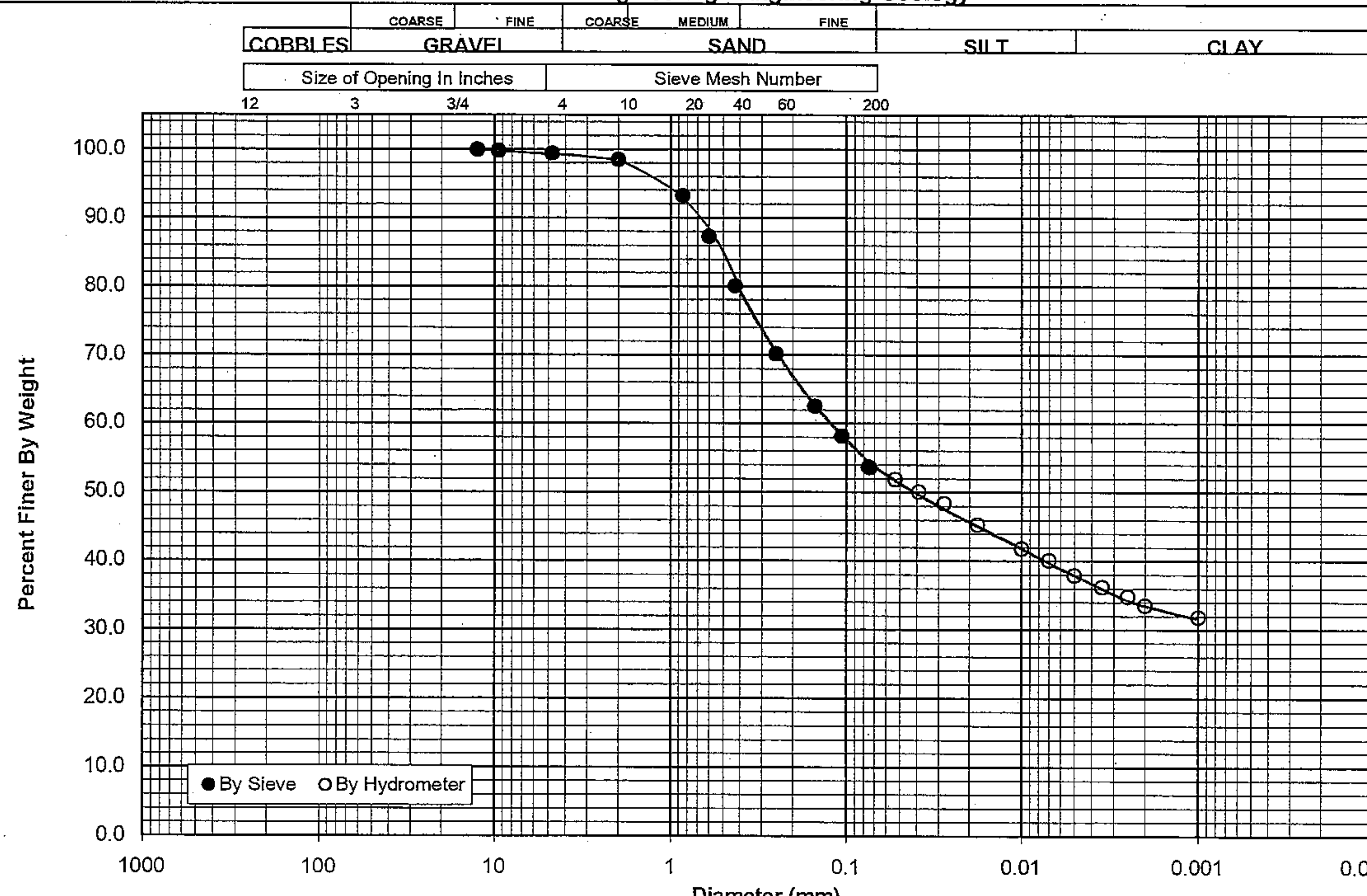
Green Acres, LLC
W.O. 6489

Date of Test: 3/12

GeoSoils Consultants, Inc.

Geotechnical Engineering * Engineering Geology

Moisture (%): 10.5
Liquid Limit (%):
Plastic Limit (%):
Plasticity Index :



Grain Size Analysis

TP-19 @ 7.0'
SANDY CLAY LOAM.

SH6489.35

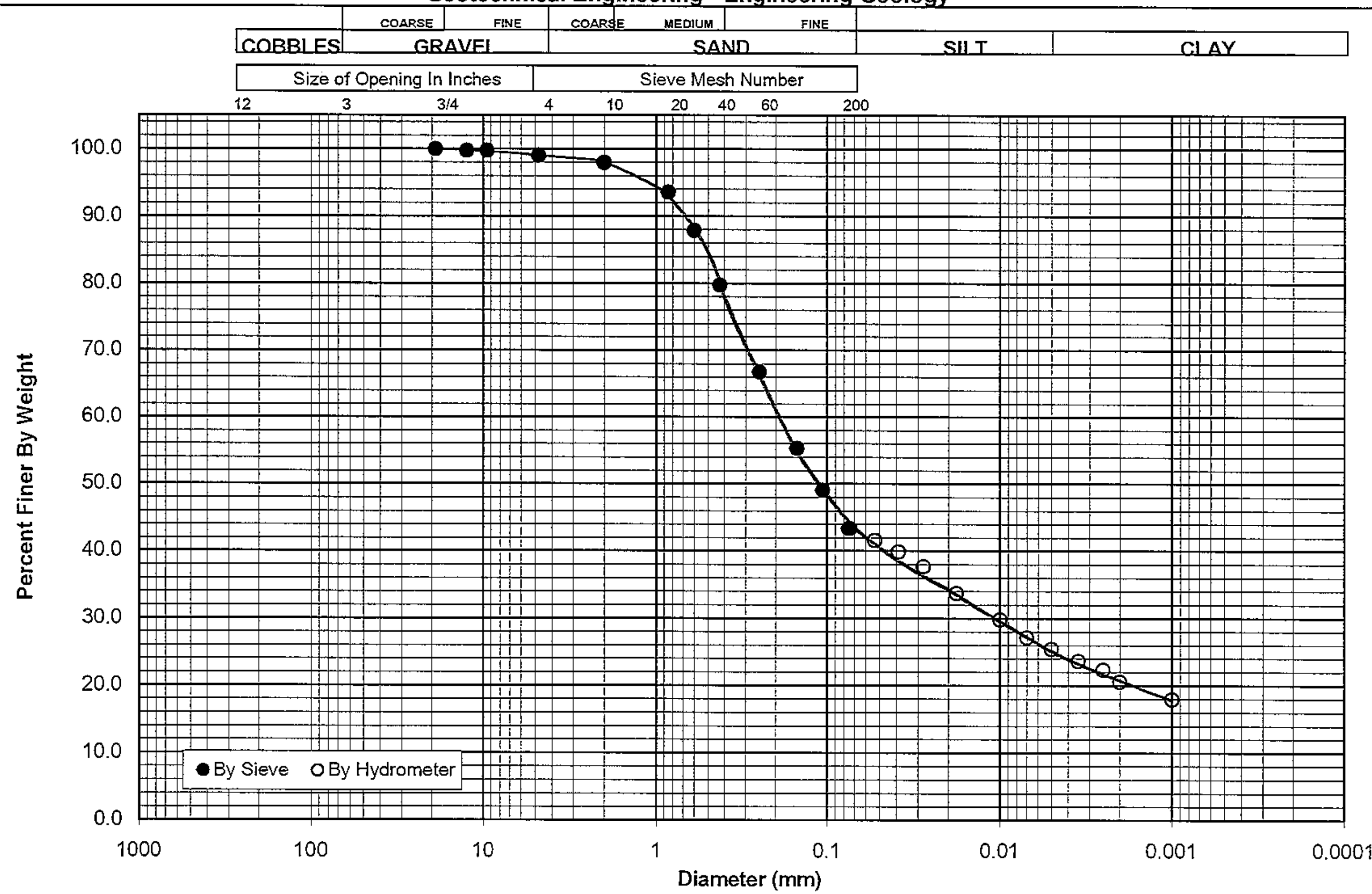
Green Acres, LLC
W.O. 6489

Date of Test: 3/12

GeoSoils Consultants, Inc.

Geotechnical Engineering * Engineering Geology

Moisture (%): 7.9
Liquid Limit (%):
Plastic Limit (%):
Plasticity Index :



Grain Size Analysis

TP-20 @ 1.0 - 2.0'
SANDY LOAM.

SH6489.36

Plate G-36

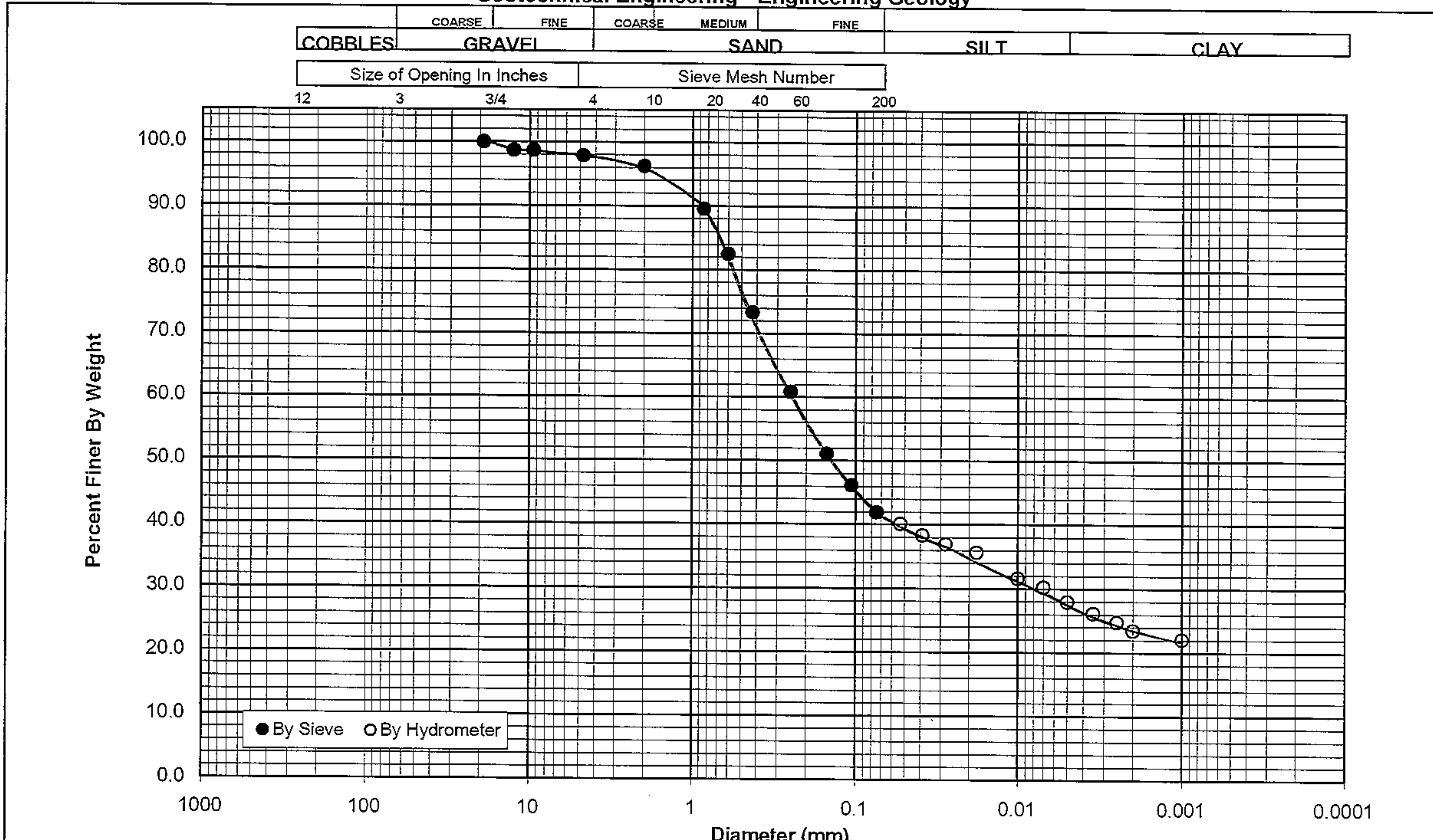
Green Acres, LLC
W.O. 6489

Date of Test: 3/12

GeoSoils Consultants, Inc.

Geotechnical Engineering * Engineering Geology

Moisture (%): 11.8
Liquid Limit (%):
Plastic Limit (%):
Plasticity Index :



Grain Size Analysis

TP-21 @ 1.0 - 2.0'
SANDY CLAY LOAM.

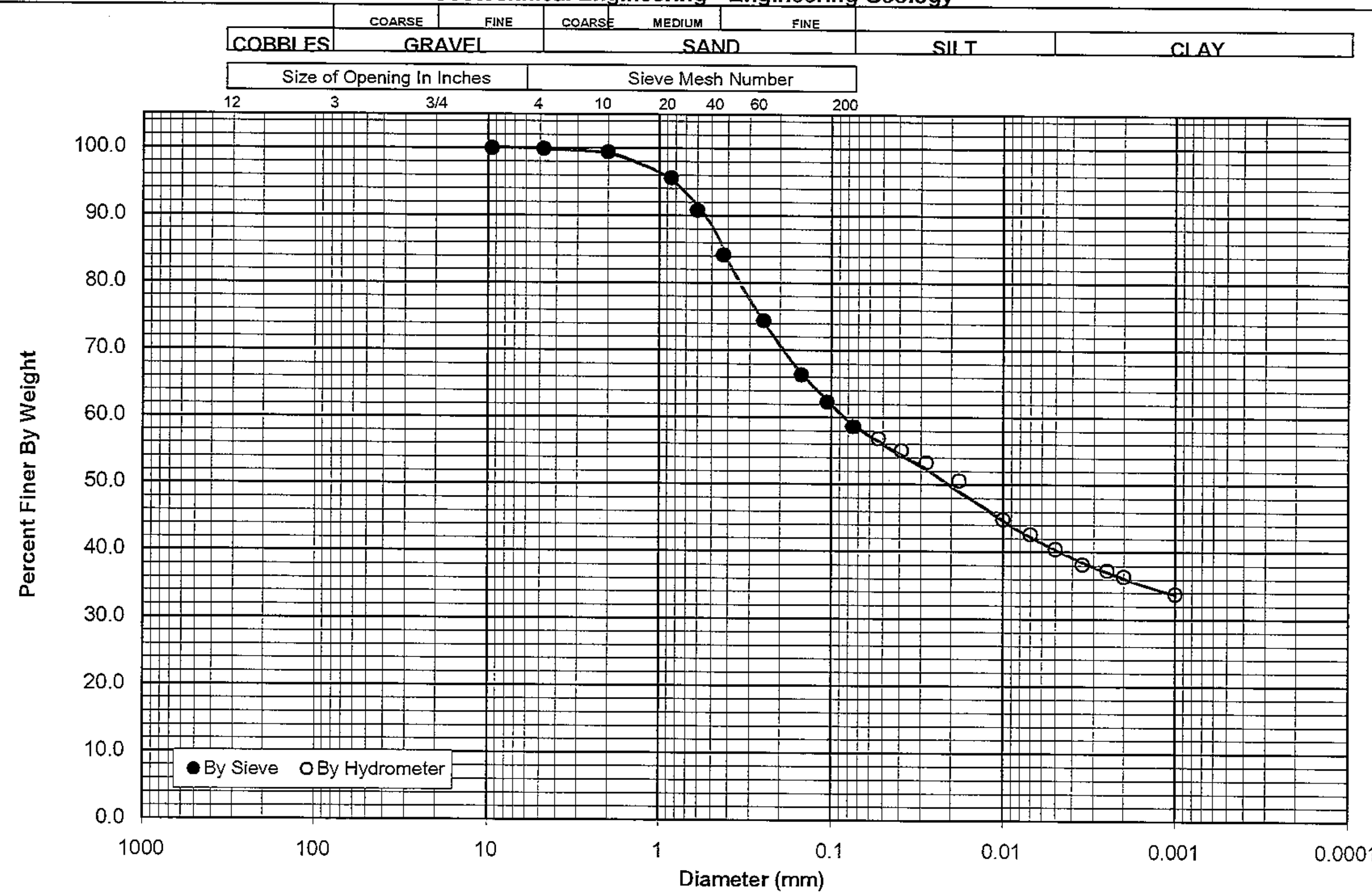
Green Acres, LLC
W.O. 6489

Date of Test: 3/12

GeoSoils Consultants, Inc.

Geotechnical Engineering * Engineering Geology

Moisture (%): 11.8
Liquid Limit (%):
Plastic Limit (%):
Plasticity Index :



Grain Size Analysis

TP-21 @ 1.0 - 2.0'
CLAY LOAM.

SH6489.37-2

Plate G-37-2

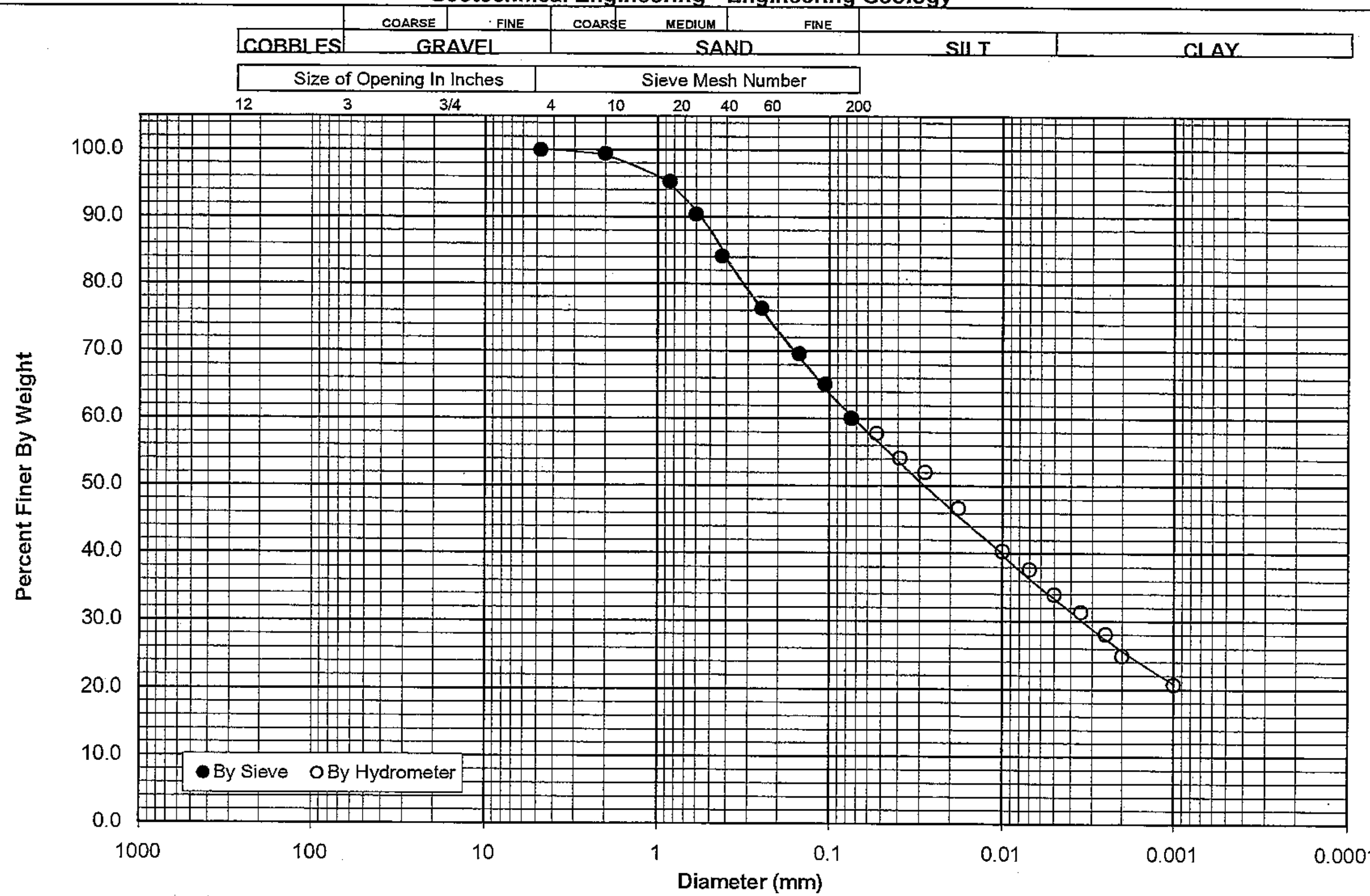
Green Acres, LLC
W.O. 6489

Date of Test: 3/12

GeoSoils Consultants, Inc.

Geotechnical Engineering * Engineering Geology

Moisture (%): 14.8
Liquid Limit (%):
Plastic Limit (%):
Plasticity Index :



Grain Size Analysis

TP-21 @ 10.0'
CLAY LOAM.

SH6489.38

Plate G-38

April 2, 2012
W.O. 6489

APPENDIX B

SURFICIAL SLOPE STABILITY ANALYSES

SURFICIAL SLOPE STABILITY

2:1 Slope, TP-5 @ .5'

Project Name: Green Acres, LLC
Work Order No.: 6489
Date: Mar-12

Assume
1) Saturation to slope surface
2) Sufficient permeability to establish water flow

			Use in analysis
W_w=	Unit weight of water (pcf)		62.4
W_s=	Saturated soil unit weight (pcf)		130.0
Z=	Thickness of unstable surficial deposits (ft)		4.0
α=	Slope angle (degrees)		26.6
c=	Cohesion (psf)		790
ϕ=	Friction angle (degrees)		18.5
P_w=	Water pressure head (ft) =	$Z \cos 2\alpha$	2.40
U=	Pore Water Pressure (psf) =	$W_w Z \cos 2\alpha$	149.52

F_d= Driving force
F_r= Resisting force

F.S.= Factor-of-safety

$$F_d = 0.5\,(Z)\,W_s \sin 2\alpha = \mathbf{208.19}$$

$$F_r = Z\,(W_s - W_w)\cos^2\alpha \tan\phi + c = \mathbf{862.34}$$

$$F.S. = F_r / F_d = \mathbf{4.14}$$

SURFICIAL SLOPE STABILITY

Critical Slope Angle, TP-7 @ .5'

Project Name: Green Acres, LLC
Work Order No.: 6489
Date: Mar-12

Assume
1) Saturation to slope surface
2) Sufficient permeability to establish water flow

			Use in analysis
W_w=	Unit weight of water (pcf)		62.4
W_s=	Saturated soil unit weight (pcf)		130.0
Z=	Thickness of unstable surficial deposits (ft)		4.0
α=	Slope angle (degrees)		17.4
c=	Cohesion (psf)		50
ϕ=	Friction angle (degrees)		35
P_w=	Water pressure head (ft) =	$Z \cos 2\alpha$	3.28
U=	Pore Water Pressure (psf) =	$W_w Z \cos 2\alpha$	204.96

F_d= Driving force

F_r= Resisting force

F.S.= Factor-of-safety

F_d= $0.5\,(Z)\,W_s \sin 2\alpha$ = **148.39**

F_r= $Z\,(W_s - W_w) \cos^2\alpha \tan\phi + c$ = **222.40**

F.S.= F_r / F_d = 1.50

SURFICIAL SLOPE STABILITY

2:1 Slope, TP-8 @ 2'

Project Name: Green Acres, LLC
Work Order No.: 6489
Date: Mar-12

Assume
1) Saturation to slope surface
2) Sufficient permeability to establish water flow

			Use in analysis
W_w=	Unit weight of water (pcf)		62.4
W_s=	Saturated soil unit weight (pcf)		130.0
Z=	Thickness of unstable surficial deposits (ft)		4.0
α=	Slope angle (degrees)		26.6
c=	Cohesion (psf)		300
ϕ=	Friction angle (degrees)		30.5
P_w=	Water pressure head (ft) =	$Z \cos 2\alpha$	2.40
U=	Pore Water Pressure (psf) =	$W_w Z \cos 2\alpha$	149.52

F_d= Driving force
F_r= Resisting force

F.S.= Factor-of-safety

$$F_d = 0.5\,(Z)\,W_s \sin 2\alpha = \mathbf{208.19}$$

$$F_r = Z\,(W_s - W_w)\cos^2\alpha \tan\phi + c = \mathbf{427.34}$$

$$\text{F.S.} = F_r / F_d = \mathbf{2.05}$$

SURFICIAL SLOPE STABILITY

Critical Slope Angle, TP-10 @ 3'

Project Name: Green Acres, LLC
Work Order No.: 6489
Date: Mar-12

Assume
1) Saturation to slope surface
2) Sufficient permeability to establish water flow

			Use in analysis
W_w=	Unit weight of water (pcf)		62.4
W_{s}=	Saturated soil unit weight (pcf)		130.0
Z=	Thickness of unstable surficial deposits (ft)		4.0
α=	Slope angle (degrees)		23
c=	Cohesion (psf)		200
ϕ=	Friction angle (degrees)		19.5
P_{w}=	Water pressure head (ft) =	$Z \cos 2\alpha$	2.78
U=	Pore Water Pressure (psf) =	$W_w Z \cos 2\alpha$	173.39

F_d= Driving force

F_r= Resisting force

F.S.= Factor-of-safety

F_d= $0.5\,(Z)\,W_s \sin 2\alpha$ = **187.03**

F_r= $Z\,(W_s - W_w) \cos^2\alpha \tan\phi + c$ = **281.13**

F.S.= F_r / F_d = 1.50

SURFICIAL SLOPE STABILITY

Critical Slope Angle, TP-11 @ 2'

Project Name: Green Acres, LLC
Work Order No.: 6489
Date: Mar-12

Assume
1) Saturation to slope surface
2) Sufficient permeability to establish water flow

			Use in analysis
W_w=	Unit weight of water (pcf)		62.4
W_s=	Saturated soil unit weight (pcf)		130.0
Z=	Thickness of unstable surficial deposits (ft)		4.0
α=	Slope angle (degrees)		12.5
c=	Cohesion (psf)		50
ϕ=	Friction angle (degrees)		24
P_w=	Water pressure head (ft) =	$Z \cos 2\alpha$	3.63
U=	Pore Water Pressure (psf) =	$W_w Z \cos 2\alpha$	226.21

F_d= Driving force

F_r= Resisting force

F.S.= Factor-of-safety

F_d= $0.5 (Z) W_s \sin 2\alpha$ = **109.88**

F_r= $Z (W_s - W_w) \cos^2\alpha \tan\phi + c$ = **164.75**

F.S.= F_r / F_d = **1.50**

SURFICIAL SLOPE STABILITY

2:1 Slope, TP-12 @ 3'

Project Name: Green Acres, LLC
Work Order No.: 6489
Date: Mar-12

Assume
1) Saturation to slope surface
2) Sufficient permeability to establish water flow

			Use in analysis
$W_w =$	Unit weight of water (pcf)		62.4
$W_s =$	Saturated soil unit weight (pcf)		130.0
$Z =$	Thickness of unstable surficial deposits (ft)		4.0
$\alpha =$	Slope angle (degrees)		26.6
$c =$	Cohesion (psf)		180
$\phi =$	Friction angle (degrees)		33
$P_w =$	Water pressure head (ft) =	$Z \cos 2\alpha$	2.40
$U =$	Pore Water Pressure (psf) =	$W_w Z \cos 2\alpha$	149.52

$F_d =$ Driving force

$F_r =$ Resisting force

F.S.= Factor-of-safety

$$\mathbf{F_d} = 0.5\,(Z)\,W_s \sin 2\alpha = \mathbf{208.19}$$

$$\mathbf{F_r} = Z\,(W_s - W_w)\cos^2\alpha \tan\phi + c = \mathbf{320.39}$$

$$\mathbf{F.S.} = \mathbf{F_r / F_d} = \boxed{\mathbf{1.54}}$$

SURFICIAL SLOPE STABILITY

Critical Slope Angle, TP-14 @ 5'

Project Name: Green Acres, LLC
Work Order No.: 6489
Date: Mar-12

Assume
1) Saturation to slope surface
2) Sufficient permeability to establish water flow

			Use in analysis
W_w=	Unit weight of water (pcf)		62.4
W_s=	Saturated soil unit weight (pcf)		130.0
Z=	Thickness of unstable surficial deposits (ft)		4.0
α=	Slope angle (degrees)		16.5
c=	Cohesion (psf)		60
ϕ=	Friction angle (degrees)		31.5
P_w=	Water pressure head (ft) =	$Z \cos 2\alpha$	3.35
U=	Pore Water Pressure (psf) =	$W_w Z \cos 2\alpha$	209.33

F_d= Driving force

F_r= Resisting force

F.S.= Factor-of-safety

F_d= $0.5 (Z) W_s \sin 2\alpha$ = **141.61**

F_r= $Z (W_s - W_w) \cos^2\alpha \tan\phi + c$ = **212.34**

F.S.= F_r / F_d = **1.50**

April 2, 2012
W.O. 6489

APPENDIX C

SOIL-GEOMORPHIC ASSESSMENT OF SEDIMENT AGE BY DR. ROY J. SCHLEMON

ROY J. SHLEMON & ASSOCIATES, INC.
Geologic and Environmental Consultants

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Newport Beach, CA 92659-0620
USA
Tel: 949-675-2696
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E-mail: rshlemon@jps.net

Quaternary Geology
Economic Geomorphology
Soil Stratigraphy
Geoarchaeology

APPENDIX D

SOIL-GEOMORPHIC ASSESSMENT OF SEDIMENT AGE, PROPOSED RANCHO MALIBU RESORT, MALIBU, CALIFORNIA

INTRODUCTION

This report summarizes geomorphic observations and soil-stratigraphic measurements and descriptions concerning the age of sediments as exposed in trenches at the proposed Rancho Malibu Resort in Malibu, California. The investigation was commissioned by Van Beveren & Butelo (VB&B; Glendale) on behalf of Weintraub Financial Services (Malibu).

The main purposes of this investigation are four-fold:

1. To provide background information about the extent, geomorphic expression and relative activity of the Malibu Coast fault in this area;

2. To assist VB&B in dating on-site sediments by reconnaissance geomorphic and soil-stratigraphic observations;

3. To provide internal quality assurance (QA) by review of the VB&B draft report and logs; and

4. To document the age of sediments by formal measurement of a representative soil-stratigraphic section exposed on the west wall of VB&B Trench 1.

Site trench-placement observations and formal soil-stratigraphic measurements were carried out in June and July 2007. Pertinent location and geologic maps and trench logs are given in the VB&B report and hence are referred to, but not replicated in this document. Logistical support was kindly provided by VB&B Principal Engineering Geologist, J. Butelo and Ms. S. Baltzer. Soil-stratigraphic terminology follows that of the Natural Resources Conservation Service (Soil Survey Staff, 1975; Soil Survey Division Staff, 1993); Birkeland (1999) and Schaetzl and Anderson (2005). Applications of soil-stratigraphy to fault-activity assessments are summarized in Shlemon (1986) and Birkeland et al. (1991).

INVESTIGATION BACKGROUND

As documented in the VB&B narrative, previous investigators postulated that the site may be underlain by one or more splays of the Malibu Coastal fault (MCF; VB&B Fig. 4). Of interest is whether or not the MCF is "active" (Holocene) according to present State of California definition. The fault trace across the site has no obvious geomorphic expression other than a possible escarpment bordering the southern edge of the property; but this also coincides with cuts for alignment of the Pacific Coast Highway (VB&B Fig. 6).

Previous site investigations (Leighton & Associates [L&A], 1989) exposed a fault zone on the eastern edge of the property. The fault cut bedrock and extended upward into overlying Quaternary-age, regressive marine deposits. L&A observed, however, that overlying continental deposits were undisplaced. The age of the unbroken sediments was judged to be pre-Holocene. Nevertheless, for conservatism, L&A recommended setback zones for habitable structures until such time when sufficient site-specific investigations could verify sediment age.

GEOMORPHIC SETTING

The proposed Malibu Resort lies on an elevated, gently south-sloping geomorphic surface ("terrace") that is devoid of scarps or other lineaments usually indicative of through-going active faults. The terrace surface is ~220 ft above present sea level; and its northern boundary is now incised by modern channels that generally drain to the east and west, respectively, before trending to the ocean (VB&B Fig. 6; Cross-Section C-C'). Accordingly, the site surface no longer receives upslope sediments and, other than local bioturbation and possible periodic eolian influx, has been relatively stable and therefore subject to a long period of weathering and soil (pedogenic profile) development.

DEPOSITIONAL ENVIRONMENT AND AGE OF NEAR-SURFACE SEDIMENTS

In order to expose and date near-surface sediments, VB&B emplaced two trenches across any reasonable projection of the underlying MCF (VB&B Fig. 2). The VB&B logs document that the near-surface sediments are not displaced and, additionally, are amenable to relative age assessment by reconstruction of paleo-depositional environment and by relative soil-profile development.

The site trenches were ~140-ft (T-1) and 180-ft (T-2) long, and typically ~20 to 25-ft deep (VB&B Fig. 2). In conjunction with the L&A (1999) data, the VB&B trench and boring logs show that the site bedrock is mainly the Tertiary Monterey formation, which is truncated by a now-buried wave-cut platform at an elevation of ~150 ft, or about 70 ft below the terrace surface (VB&B Cross-Section C-C', Figure 3.3).

The platform is overlain by a ~10 to 15-ft thick sequence of regressive marine sediments as identified in both the L&A and VB&B boring logs (Cross-Section C-C'). As depicted in the boring logs and as observed in the VB&B trenches, the overlying non-marine sediments are mainly prograding and intercalated, fining-upward fluvial channels near the base that grade upward into at least a ~20-ft thick, locally derived sequence of mud- and debris flows. This sedimentation pattern typically reflects platform deposition engendered by world-wide, climatically controlled, glacio-eustatic changes of sea level. Given the >150-ft elevation of these deposits, they likely record deposition at least ~150 ka ago (marine isotope stage [MIS] 6) and probably ~250 ka ago (MIS 8).

SOIL-STRATIGRAPHIC AGE ASSESSMENTS

A minimum age for the near-surface site trenches is also provided by the relative development of the *in situ* weathering profile (pedogenic soils). Accordingly, a representative ~5.0-ft thick soil section was measured and described from station 0+10 on the west wall of Trench T-1 (Table 1). As removed or compacted. Additionally, the application of fertilizer and related soil amendments has further altered the original surface. Although not present at the measured section, local root-filling carbonates are common within a few feet of the surface. These, too, are likely products of nursery operations rather than of "natural" pedogensis. Nevertheless, as documented in Table 1, at least five discrete argillic (Bt) horizons are recognized. Combined, the characteristics of these horizons indicate that the soil is very strongly developed, formed on a long-stable geomorphic surface, is a relict paleosol, and represents at least ~100 ka of weathering (MIS 5).

The soil parent material varies in texture (grain size) owing to lateral facies changes within the underlying fluvial sediments and intercalated mud- and debris-flows. Most argillic horizons, however, are pebbly clay loams that give rise to medium angular blocky to locally medium columnar structure. Illuvial clay films are typically few to common, and thin to moderately thick, dark-reddish brown (Munsell 2.5YR 3/3). These translocated clays coat ped faces, bridge mineral grains and fill root pores (see, for example, horizon Bt2; Table 1).

Based on correlation with numerically dated geomorphic surfaces and relict paleosols dated in similar Mediterranean climatic regimes (Shlemon, 1985; Birkeland, 1999), the surface profiles reflect at least ~100 ka of weathering (MIS 5). More likely, the relict paleosol is polygenetic and has undergone more than one epoch of "interglacial" weathering. Indeed, based on the very strong profile development, the Rancho Malibu soil may well be ~200 ka old. The underlying sediments are inherently older.

SUMMARY AND CONCLUSIONS

The Malibu Coastal fault has previously been mapped or otherwise inferred to underlie a portion of the proposed Rancho Malibu Resort in Malibu, California. A previous Leighton (L&A, 1999) investigation located the fault, verified that it cut Monterey formation bedrock and immediately overlying regressive deposits. L&A also showed, however, that overlying, prograding continental sediments were not displaced.

Three supporting lines of evidence indicate that the site surface is at least ~100 ka old:

1. Geomorphically, the site terrace, ~200 ft above sea level," is inherently "old,", for it is a relict surface, cut off from overland flow and therefore no longer receives sediments.

2. Post, marine-platform sediments are grossly fining-upward, ranging from basal fluvial channels and overbank deposits to intercalated mud- and debris-flows. This sequence is typically associated with glacio-eustatic, sea-level fluctuations, here most likely indicating that last site regional deposition occurred at least ~150 ka ago (MIS 6).

3. The surface soil profile is very strongly developed relict paleosol with multiple argillic horizons. The soil represents at least ~100 ka (MIS 5) and more likely ~200 ka (MIS 7) of weathering.

According to the VB&B logs, the ~20-25-ft of sediments, underlying the relict paleosol, are demonstrably unbroken. Thus, based on three corroborating lines of evidence -- the geomorphic setting, the reconstruction of depositional environments, and the relative soil-profile development -- last displacement of the MCF in the Rancho Malibu Resort area took place well before ~100 ka ago.

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Roy J. Shlemon, Ph.D.

September 2007

PG: 2867
CPG: 1766
CPESC: 2167

Table 1

SOIL-STRATIGRAPHIC MEASUREMENT AND DESCRIPTION

VB&B Trench 1, West Wall, Station 0+10

Depth (ft)	Horizon	Description
0.0 – 0.7	Bt1	Brown to dark brown (10YR 4/3) to dark brown (7.5YR 3/3) when moist sandy clay loam; very strong medium angular blocky to moderate medium columnar structure; extremely hard, very firm, slightly sticky, plastic; common fine vertical roots; common thin, dark brown (7.5YR 3/3) clay films bridging mineral grains, lining ped faces and filling root pores; abrupt smooth boundary.
0.7 – 1.8	Bt2	Light reddish brown (5YR 6/4) to dark reddish brown (5YR 3/3) when moist pebbly sandy loam; fine to medium moderate angular blocky structure grading to fine, weak subangular blocky structure near base; extremely hard, very firm, slightly sticky, slightly plastic; few medium vertical roots; common fine pores; few to common dark-reddish brown (2.5YR 3/3) clay films bridging mineral grains, lining ped faces and filling root pores; gradual wavy boundary.
1.8 – 2.5	Bt3	Brown (7.5YR 5/4) to dark brown (7.5YR 3/4) when moist pebbly sandy loam; massive to weak medium angular blocky structure; extremely hard, very firm, slightly sticky and slightly plastic; common thin, reddish brown (5YR 3/3) clay films bridging mineral grains and lining ped faces; structure decreasing near base; gradual wavy boundary.
2.5 – 4.3	Bt4	Brown to dark brown (7.5YR 4/4) to reddish brown (5YR 4/3) when moist loamy sand; weak fine angular blocky structure grading to massive near base; locally granular; extremely hard, extremely firm, slightly sticky and plastic; common vertical rootlets near top of horizon; locally few vertical, moderately thick root channels with reduced

Table 1 (continued)

Depth (ft)	Horizon	Description
		margins to ~1-inch diameter; decreasing with depth; few thin reddish brown (5YR 4/3) lay films bridging mineral grains and lining ped faces decreasing near base; common manganese stains lining root channels near base; few discontinuous, angular-clast stone lines near base; gradual smooth to abrupt smooth boundary.
4.3 – 5.0	Bt5-C	Brown (7.5YR 5/4) to reddish brown (5YR 4/3) when moist gravelly loamy sand; massive to weak medium subangular blocky structure; very hard, firm, slightly sticky, plastic; few thin, dark reddish brown (5YR 3/3) clay films lining ped faces; discontinuous, common angular clasts of mixed lithology to ~0.5-in. dia., increasing near base; common fine manganese stains on ped faces decreasing near base; base of upper bench cut; base of measured section.

Notes:

1. Section measured and described by RJS and SB, 10 July 2007.
2. *Geomorphic Setting:* High-level surface underlain by prograding continental deposits observed in VB&B trenches. North boundary of regional surface (terrace) is now cut-off from modern deposition by locally incised channels. The modern surface is therefore "relict;" for it no longer receives overland flow. Possible periodic eolian influx during sea-level regression is no longer reflected in surface profile owing to local disturbance by former nursery operations. Measured section shows that original organic (A) horizons are now truncated or entirely removed; thus exposing the upper argillic (Bt1) horizon.
3. *Stratigraphic Setting*: Trenches (see VB&B logs) expose near-surface, discontinuous, locally derived mud- and debris-flows; matrix supported. The lower deposits are increasingly fluvial with discontinuous, grossly fining-upward channel deposits and local, intercalated mud-flows. VB&B and Leighton borings penetrate underlying regressive marine deposits overlying wave cut platform across Monterey and other "bedrock" units (see VB&B report).
4. *Soil Age*: At measured section, the upper ~5 ft exposes a very strongly developed relict paleosol characterized by ~5+ ft of multiple argillic horizons. Reddish-brown, thin to moderately thick clay films are common to locally many. Based on relative development, the relict paleosol is at least ~100 ka old (MIS 5) and reasonably ~200 ka old (MIS 7). The underlying sediments form a regionally climatically controlled, grossly fining-upward sequence and are inherently older. VB&B logs show that all trench sediments are demonstrably unbroken, thus providing a minimum age for last surface displacement of inferred underlying faults.

EXPLANATION

TP-21 APPROXIMATE LOCATION OF TEST PIT

GSC GeoSoils Consultants Inc.
GEOTECHNICAL•GEOLOGIC•ENVIRONMENTAL
6634 Valjean Avenue
Van Nuys, CA 91406

TEST PIT LOCATION MAP
RANCHO MALIBU RESORT
4000 MALIBU CANYON ROAD
V.T.M. 69653
GREEN ACRES, LLC

WORK ORDER	DATE	SCALE
6489	4/2012	1" = 50'

REVISED

PLATE 1

MON 13857

X:\2001 w.o\gsc-cad\6489\Current\Plate 1, Test Pit Location Map 4-12.dwg
PThomson, HP DesignJet 1050C by HP HPGL2.pc3, Custom 1: 50 x 36 in.

GSC GeoSoils Consultants Inc.
GEOTECHNICAL•GEOLOGIC•ENVIRONMENTAL
6634 Valjean Avenue
Van Nuys, CA 91406

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

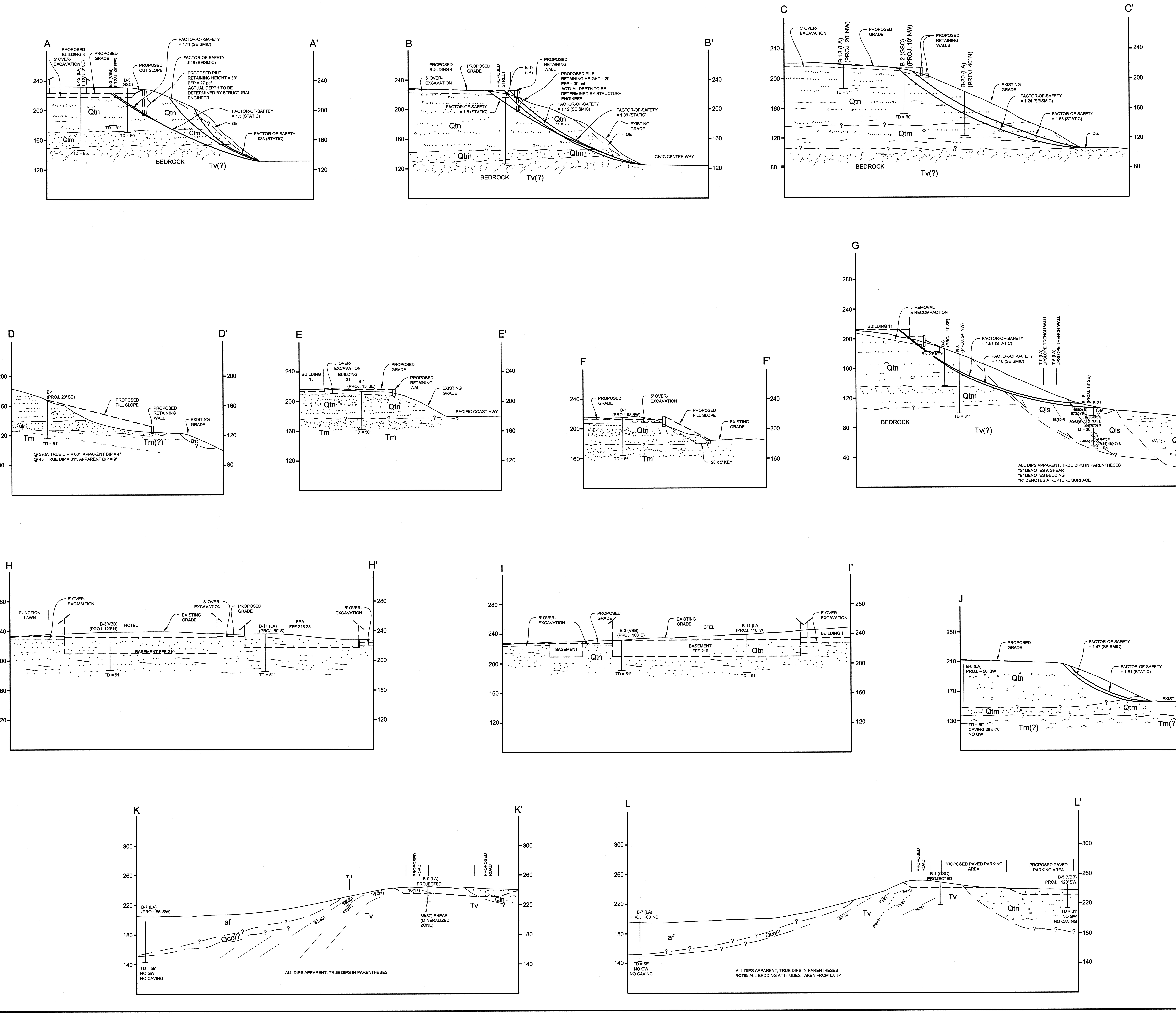
WORK ORDER	DATE	SCALE
6489	9/2011	1" = 50'

REVISED 3/12

PLATE 2

MON 13857

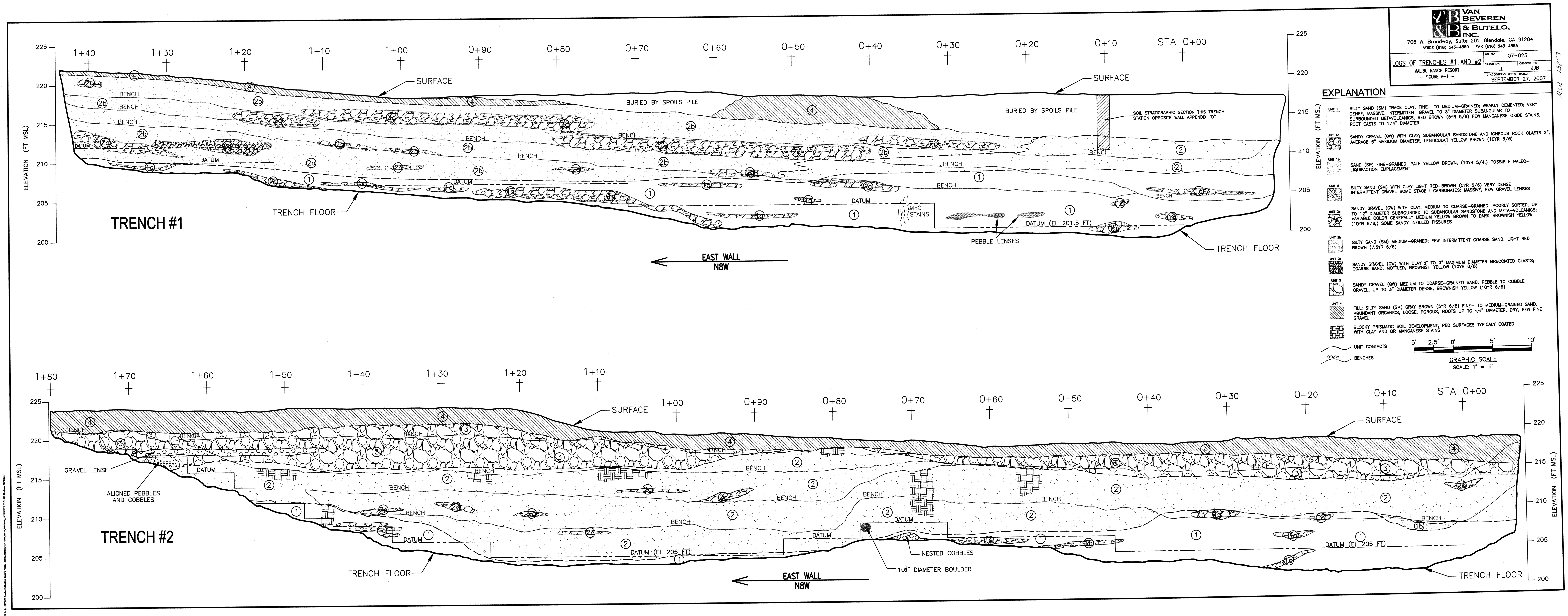
X:\2001 w.o\gsc-cad\6489\Current\Plate 1, Geo Map 3-12.dwg, 3/30/2012 11:48:14 AM, PThomson, HP DesignJet 1050C by HP HPGL2.pc3, Custom 1: 50 x 36 in.



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

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

WORK ORDER	DATE	SCALE
6489	9/2011	1" = 40'
REVISED 4/12	PLATE 3	


VAN BEVEREN & BUTELO, INC.
706 W. Broadway, Suite 201, Glendale, CA 91204
VOICE (818) 543-4560 FAX (818) 543-4565
LOGS OF TRENCHES #1 AND #2
MALIBU RANCH RESORT
- FIGURE A-1 -
JOB NO. 07-023
DRAWN BY: LL
CHECKED BY: JJB
TO ACCOMPANY REPORT DATED: SEPTEMBER 27, 2007
MDN 13857
EXPLANATION
UNIT 1
SILTY SAND (SM) TRACE CLAY, FINE- TO MEDIUM-GRAINED; WEAKLY CEMENTED; VERY DENSE, MASSIVE, INTERMITTENT GRAVEL TO 3" DIAMETER SUBANGULAR TO SURBOUNDED METAVOLCANICS, RED BROWN (5YR 5/6) FEW MANGANESE OXIDE STAINS, ROOT CASTS TO 1/4" DIAMETER
UNIT 1a
SANDY GRAVEL (GW) WITH CLAY; SUBANGULAR SANDSTONE AND IGNEOUS ROCK CLASTS 2"; AVERAGE 6" MAXIMUM DIAMETER, LENTICULAR YELLOW BROWN (10YR 6/6)
UNIT 1b
SAND (SP) FINE-GRAINED, PALE YELLOW BROWN, (10YR 5/4,) POSSIBLE PALEO-LIQUIFACTION EMPLACEMENT
UNIT 2
SILTY SAND (SM) WITH CLAY LIGHT RED-BROWN (5YR 5/6) VERY DENSE INTERMITTENT GRAVEL SOME STAGE I CARBONATES; MASSIVE, FEW GRAVEL LENSES
UNIT 2a
SANDY GRAVEL (GW) WITH CLAY, MEDIUM TO COARSE-GRAINED, POORLY SORTED, UP TO 12" DIAMETER SUBROUNDED TO SUBANGULAR SANDSTONE AND META-VOLCANICS; VARIABLE COLOR GENERALLY MEDIUM YELLOW BROWN TO DARK BROWNISH YELLOW (10YR 6/6,) SOME SANDY INFILLED FISSURES
UNIT 2b
SILTY SAND (SM) MEDIUM-GRANED; FEW INTERMITTENT COARSE SAND, LIGHT RED BROWN (7.5YR 5/6)
UNIT 2c
SANDY GRAVEL (GW) WITH CLAY ½" TO 3" MAXIMUM DIAMETER BRECCIATED CLASTS; COARSE SAND, MOTTLED, BROWNISH YELLOW (10YR 6/8)
UNIT 3
SANDY GRAVEL (GW) MEDIUM TO COARSE-GRAINED SAND, PEBBLE TO COBBLE GRAVEL, UP TO 3" DIAMETER DENSE, BROWNISH YELLOW (10YR 6/6)
UNIT 4
FILL: SILTY SAND (SM) GRAY BROWN (5YR 6/6) FINE- TO MEDIUM-GRAINED SAND, ABUNDANT ORGANICS, LOOSE, POROUS, ROOTS UP TO 1/2" DIAMETER, DRY, FEW FINE GRAVEL
BLOCKY PRISMATIC SOIL DEVELOPMENT, PED SURFACES TYPICALY COATED WITH CLAY AND OR MANGANESE STAINS
UNIT CONTACTS
BENCH
BENCHES
5' 2.5' 0' 5' 10'
GRAPHIC SCALE
SCALE: 1" = 5'
TRENCH #1
ELEVATION (FT MSL)
1+40 1+30 1+20 1+10 1+00 0+90 0+80 0+70 0+60 0+50 0+40 0+30 0+20 0+10 STA 0+00
SURFACE
BURIED BY SPOILS PILE
SOIL STRATIGRAPHIC SECTION THIS TRENCH STATION OPPOSITE WALL APPENDIX "D"
DATUM
MnO STAINS
DATUM (EL 201.5 FT)
PEBBLE LENSES
TRENCH FLOOR
EAST WALL
N8W
TRENCH #2
1+80 1+70 1+60 1+50 1+40 1+30 1+20 1+10 1+00 0+90 0+80 0+70 0+60 0+50 0+40 0+30 0+20 0+10 STA 0+00
GRAVEL LENSE
ALIGNED PEBBLES AND COBBLES
NESTED COBBLES
10" DIAMETER BOULDER
DATUM (EL 205 FT)
TRENCH FLOOR
EAST WALL
N8W

RESPONSE TO COMMENTS OF THE CITY OF MALIBU
GEOTECHNICAL REVIEW SHEET DATED OCTOBER 31, 2007,
AND UPDATED GEOLOGIC AND GEOTECHNICAL ENGINEERING REPORT,
Rancho Malibu Resort,
Tentative Tract Map 69653,
4000 Malibu Canyon Road
Malibu, California

for

Green Acres LLC

September 15, 2011 W.O. 6489

MDN 13562

GeoSoils Consultants Inc.

GeoSoils Consultants Inc.
GEOTECHNICAL GEOLOGIC ENVIRONMENTAL

September 15, 2011
W.O. 6489

GREEN ACRES, LLC
P.O. Box 6528
Malibu, California 90265

Attention: Mr. Bruce McBride

Subject: Response to Comments of the City of Malibu Geotechnical Review Sheet Dated October 31, 2007, and Updated Geologic and Geotechnical Engineering Report, Rancho Malibu Resort, Tentative Tract Map 69653, 4000 Malibu Canyon Road, Malibu, California

Dear Mr. McBride:

As requested, GeoSoils Consultants, Inc. (GSC) has prepared this response to the City of Malibu Geotechnical Review Sheet dated October 31, 2007. The review sheet addresses the Van Beveren and Butelo, Inc. report dated September 27, 2007 (Reference 12). In preparing this response, we have reviewed the referenced reports; excavated, sampled, and logged four hollow stem auger borings on the site; performed laboratory testing and engineering analyses; and prepared this report.

CHANGE OF CONSULTANTS AND REVIEW OF PREVIOUS REPORTS

GSC has reviewed the referenced reports by Van Beveren and Butelo, Inc. (VBB) and Leighton and Associates, Inc (LA). We accept the data in the reports and the geotechnical responsibility for the subject site.

MDN 13562

SCOPE OF SERVICES

Our scope of services consisted of reviewing the referenced reports, transferring available geologic data from the referenced reports onto the current development plan, drilling four hollow stem auger borings on the site, laboratory testing, engineering analyses, and preparation of this report (including an item-by-item response to the comments within the City of Malibu Geotechnical Review Sheet dated October 31, 2007). The locations of the new borings are shown on the geologic map.

An item-by-item response to the City of Malibu Geotechnical Review Sheet dated October 31, 2007 is included in Appendix A. Boring logs are included in Appendix B and laboratory test results are included in Appendix C. The results of the slope stability analyses are included in Appendix D. Seismic analyses are included in Appendix E and copies of boring logs and laboratory data from previous consultants are included in Appendices F and G.

PROPOSED DEVELOPMENT

Proposed development of the site will consist of constructing a three story hotel with a basement, 21 detached structures (casitas), swimming pools, retaining walls, street and parking areas, and hardscape and landscape areas. The plans were prepared by Psomas Engineering and are included herein as Plate 1, Geologic Map. Site grading will include a cut/fill operation to create level building pads and street grades. Retaining walls to a maximum height of approximately 22 feet are proposed within the development. In addition, grading will be performed to repair existing erosion gullies on portions of the descending slopes below the site.

PREVIOUS STUDIES

Previous studies have been performed on the subject property by Leighton and Associates, Inc. (LA) and by Van Beveren and Butelo, Inc. (VBB) (references). The work by LA included excavating, sampling, and logging of 21 bucket auger borings. The locations of the borings are shown on Plate 1 and copies of the boring logs are included in Appendix F. In addition, LA excavated numerous fault trenches across the site. The approximate locations of the trenches are shown on Plate 1. Based on the trenching, Leighton and Associates established a fault setback zone in the southern end of the property for a portion of the Malibu Coast Fault.

Van Beveren and Butelo, Inc. was the last consultant to work on the subject project and the City of Malibu Geotechnical Review Sheet addresses their report dated September 27, 2007. VBB excavated, sampled, and logged 8 bucket auger borings across the site. The locations of the borings are shown on Plate 1 and copies of the boring logs and laboratory test results are included in Appendix G.

VBB also excavated trenches across the previously established setback zone by Leighton and Associates. The trench exposed non-marine terrace deposits, which were determined to be continuous and unbroken by faults. The soils within the trenches were observed and dated by Dr. Ron Shlemon. Dr. Shlemon determined that the age of the unbroken sediments were at least 100K years old, and may be as old as 200K. Since these sediments are not affected by fault offset, the previously setback zone was eliminated by VBB.

As stated above, GeoSoils Consultants, Inc. has reviewed the referenced reports by the previous consultants that have worked on the site. We accept their results and accept geotechnical responsibility for the subject property.

SUMMARY OF GEOLOGIC CONDITOINS

The geologic conditions on the site are discussed in detail in the referenced reports. In summary, the site is underlain by both marine and non-marine terrace deposits, which overlie bedrock of the Monterey, Trancus, Conejo Vocanics, Vasqueros, and Sespe Formations. The terrace deposits underlie the majority of the site and consist of interbedded silts, clays and sands, with occasional gravel and cobbles. Based on review of Appendix D of the VBB report, the terrace deposits on the site are at least 100K years old, and may be as old at 200K years.

Although the reports by LA indicate many different bedrock types on the site, only the Sespe, Vaqueros and a small area of Conejo Vocanics are exposed at the surface. Other bedrock types were encountered in the borings by LA. Geologic structure in the rock, where observed in the borings by the previous consultants, generally dips to the north at steep angles and is favorable relative to the existing slopes and proposed development. However, the bedding is highly variable and dips steeply to the south at the southeastern part of the site. Due to the thickness of the overlying terrace deposits, the structure within the bedrock has little, if any, affect on the proposed development.

A landslide is located along the eastern part of the site. Borings drilled by Leighton and Associates indicates that the base of the landslide extends well below the existing ground surface to the east of the site and is covered with older alluvium. A smaller landslide is mapped at the bottom of the slope along the eastern side of the site, and is well outside the limits of grading.

SEISMICITY

Seismic Design Parameters

Although there are no active faults on or in close proximity to the property, the property, as with all of Southern California, is located in a region subject to periodic earthquake-induced ground shaking. Planned improvements should incorporate earthquake-resistant design. Seismic design criteria are presented in the following section.

Updated Seismic Design Parameters

The following are updated seismic design parameters for the subject site based on the 2009 International Building Code (IBC), Section 1613.

2009 IBC Section 1613, Earthquake Loads	
Site Class Definition (Table 1613.5.2)	D
Mapped Spectral Response Acceleration Parameter, S_s (Figure 1613.5(3) for 0.2 second)	2.311
Mapped Spectral Response Acceleration Parameter, S_1 (Figure 1613.5(4) for 1.0 second)	0.926
Site Coefficient F_a (Table 1613.5.3(1) short period)	1.0
Site Coefficient F_v (Table 1613.5.3(2) 1-second period)	1.5
Adjusted Maximum Considered Earthquake Spectral Response Acceleration Parameter S_{MS} (Eq. 16-37)	2.311
Adjusted Maximum Considered Earthquake Spectral Response Acceleration Parameter S_{M1} (Eq. 16-38)	1.389
Design Spectral Response Acceleration Parameter, S_{DS} (Eq. 16-39)	1.541
Design Spectral Response Acceleration Parameter, S_{D1} (Eq. 16-40)	0.926
Notes: 1. Site Class Designation: Class D is recommended based on subsurface condition. 2. Ss, SMs, and SDs are spectral response accelerations for the period of 0.2 second. 3. S1, SM1, and SD1 are spectral response accelerations for the period of 1.0 second.	

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

Seismic Hazards

Liquefaction

There are no state-designated liquefaction hazard zones on the site. Underlying material consists of terrace deposits and bedrock and are not subject to liquefaction.

Earthquake-Induced Landslide Zones

Based on review of the Seismic Hazard Zone map for the Malibu Beach Quadrangle, the slope areas on the site are located within zones of potential seismic slope instability. As a result, slope stability analyses were performed and the results are included in Appendix D.

SLOPE STABILITY

Additional slope stability analyses have been performed at part of this study. The analyses were based on laboratory test results obtained during our additional subsurface exploration. The site is generally surrounded by descending natural slopes. The highest and steepest slopes are located along the north side of the site. Geologic Cross-Sections A-A', B-B', and C-C' are located in this area and have been analyses for stability. The results of the analyses are presented in Appendix D and indicate factors of safety below minimum code values for Sections A-A' and B-B'. As a result, additional mitigation is required in this area and piles are currently proposed to protect the proposed development adjacent to these slope areas. Additional discussion is provided in Appendices A and D.

CONCLUSIONS

It is our professional opinion that proposed development is feasible from a geologic and soil engineering viewpoint. Safe and stable development of this land can be accomplished as long as recommendations included within this report are incorporated into final tract design and implemented during final grading and construction. Final design and construction should be performed according to City Code and Permits. Most earth materials on the parcel will excavate with moderate to heavy duty ripping using heavy duty grading equipment. Excavated material will produce good quality fill.

"111" STATEMENT

It is GSC's opinion that the building site will be safe from the hazards of landslide, settlement or slippage. Furthermore, the completed development will not adversely affect the stability of the adjacent properties nor be adversely affected by adjacent properties.

RECOMMENDATIONS

1. Removals/Reprocessing

The on site soils are suitable for structural support, provided that the following recommendations are followed. The upper 5 feet of the terrace deposits on the site are generally loose and should be removed down to competent terrace deposits in areas of proposed grading. Removals should extend at least five feet below proposed structures, streets and hardscape areas. The removals should extend a minimum distance of five feet beyond the building footprint, or a distance equal to the depth of fill placement, whichever is greater. The proposed basement for the main hotel will extend at least 20 feet below existing grade and removals below the basement are not required; however, all basement subgrades should be observed by the Project Geologist.

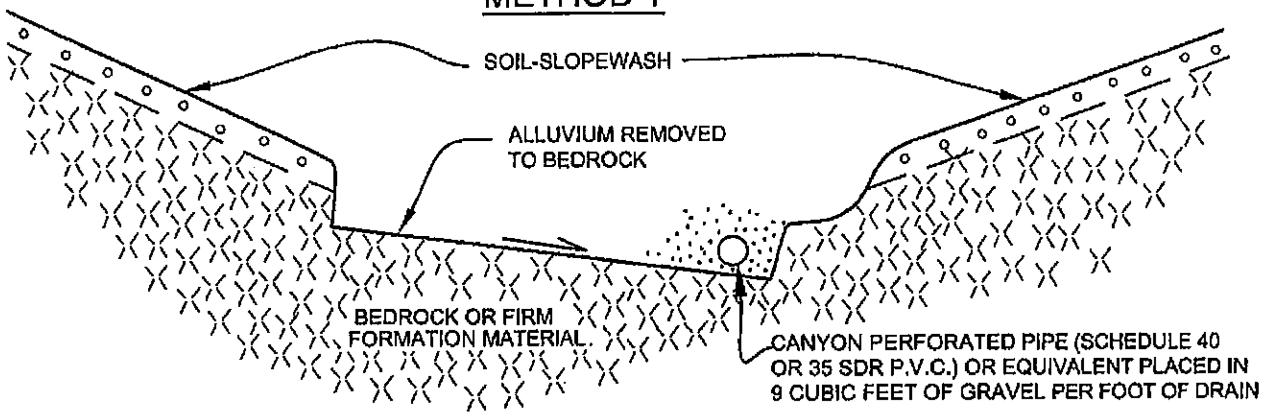
Subdrainage

1. Subdrain systems should be provided in all canyon bottoms and stabilization fills prior to fill placement (see Figure 1). Since the area of proposed development is relatively flat, subdrains are not required; however, subdrains are required in the two erosion areas on the site (see Sections F-F' and G-G').

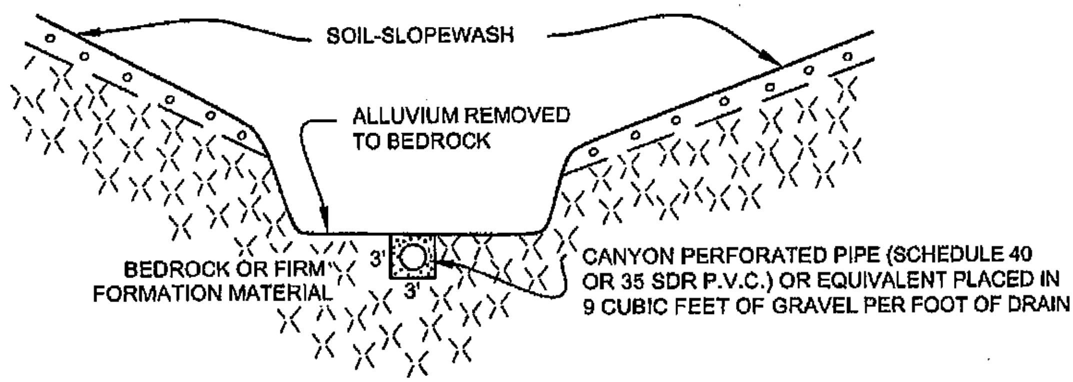
2. Filter material should be Class 2 permeable filter, or No. 2 and No. 3 concrete aggregate gradations per standard specifications for Public Works construction, or approved equivalent, inspected and tested to verify its suitability. The filter should be clean with a wide range of sizes.

3. Subdrain pipe material should consist of PVC Schedule 40 or D-2729 or an equivalent recommended by the Geotechnical Engineer. "Accordion" type pipe and similar products are not acceptable for use as subdrains or backdrains on this project.

METHOD 1

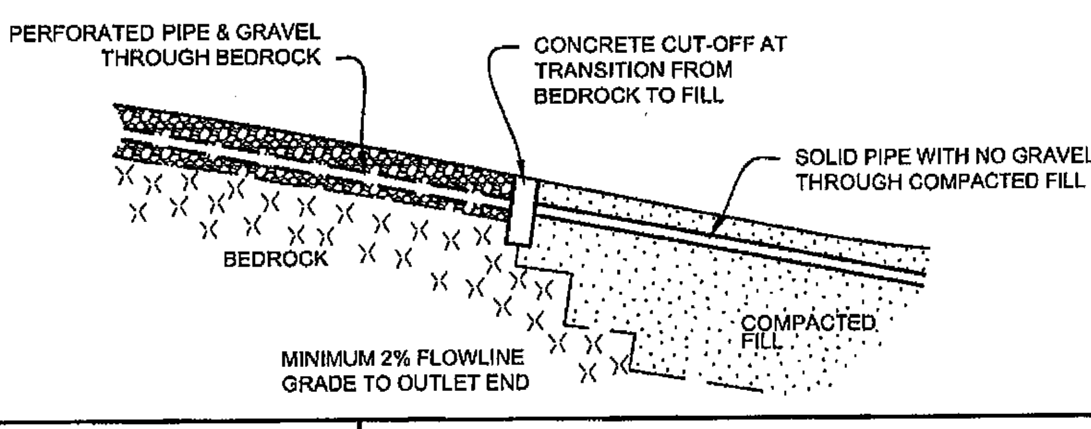


METHOD 2



GRAVEL TO CONFORM TO STATE OF CALIFORNIA DEPT. OF PUBLIC WORKS STANDARD SPECIFICATIONS FOR CLASS 2 PERMEABLE MATERIAL AS ALTERNATE 3/4" GRAVEL MAY BE USED SURROUNDED WITH GEOTEXTILE FILTER FABRIC APPROVED BY THE GEOTECHNICAL ENGINEER.
(NOTE: CITY OF LOS ANGELES DOES NOT ALLOW GEOTEXTILE FABRIS WRAP AROUND SUBDRAIN SYSTEMS.)

LONGITUDINAL SECTION



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CANYON SUBDRAIN DESIGN & CONSTRUCTION METHODS	
DATE 9/2011	W.O. NO. 6489
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FORM 87/7-1

4. Subdrains should be placed in all canyon bottoms. During grading, the Engineering Geologist should evaluate the necessity of additional drain placement.

5. All subdrainage system should be inspected by the Engineering Geologist.

Slopes

Fill Slopes

A. Fill slopes are proposed at a maximum slope ratio of 2:1 (horizontal:vertical) between benches, to a maximum anticipated height of approximately 50 feet.

B. Fill slopes should be built in accordance with recommendations included in the Grading Guidelines section of this report.

Cut Slopes

The following recommendations apply to proposed cut slope.

A. All permanent major cut slopes are planned at a gradient of 2:1 or flatter.

B. Cut slopes exposing terrace deposits should not be affected by rock structure. The terrace units are rather massive and bedding is only represented by lineation of sand to gravel-sized particles. No true bedding planes exist in the terrace deposits (Qt).

FOUNDATION RECOMMENDATIONS

Foundation recommendations in this report are considered preliminary. Final foundation design recommendations should be determined at the completion of grading, based on expansion and chemical testing determined on final grade samples. For convenience, the following preliminary foundation recommendations may be used. These recommendations should be finalized at the end of future final pad and street grading.

Conventional and post-tensioned foundations may be used on the tract. All foundations should meet current City of Malibu setback requirements.

Foundation Criteria

1. An allowable soil bearing pressure of 1,500 pounds per square foot, including dead and real live loads, can be utilized for design of conventional foundations into compacted fill or terrace deposits. The above bearing value may be increased by one-third when considering short duration seismic or wind loads. Footings are recommended to be continuous and should have a minimum width of 18 inches and a minimum embedment depth of 18 inches for one and two story structures. Footings for three-story structures should have a minimum width of 18 inches and a minimum embedment depth of 24 inches.

   The allowable bearing value may be increased by 20 percent for each additional foot below the minimum 18 inches depth recommended, plus 7 percent for each additional foot wider than the minimum 18 inches width recommended up to a maximum value of 3,000 pounds per square foot.

2. A friction coefficient for concrete on compacted soil/terrace deposits of 0.3 and a lateral (passive) bearing value of 200 pounds per square foot, per foot of depth, may be employed to resist lateral loads. When combining passive pressure and frictional resistance, the passive pressure component should be reduced by one-third. For design of isolated piles, the allowable passive pressure may be increased by 100 percent (see Table A for other conventional foundation recommendations).

3. In order to minimize the potential effects of seismic activity, expansive soils, secondary settlement and hydroconsolidation or hydrocompression, we recommend the following alternative foundation systems, i.e., post-tensioned slab foundations, be used.

Post-Tensioned Slab Foundation

Anticipated surficial differential movement across the building pad areas included in this report in the form of settlement or heave could be in the order of 1 to 2 inches. These post-tensioned slabs should be designed in accordance with the recommendations of either the California Foundation Slab Method or Post-Tensioning Institute. The slabs should be designed for at least one inch of surficial differential movement (i.e., at least 1 inch in a 30-foot span) for low expansion index (EI) soil, and at least two inches of surficial differential movement for medium EI soil. Based on review of laboratory data for the on-site materials, the average soil modulus of subgrade reaction, K, to be used for design is 100 pounds per cubic inch. Specific recommendations for the design of *California Foundation Slab* and *Post Tension Institute* methods are presented below.

A surface bearing value of 1,000 pounds per square foot can also be used in design.

1. **California Foundation Slab (Spanability) Method**

   It is recommended that slabs be designed for a free span of 15 feet regardless of the expansion index of the soil. From a soil expansion/shrinkage standpoint, a common contributing factor to distress of structures using post-tensioned slabs is fluctuation of moisture in soils underlying the perimeter of the slab, compared to the center, causing a "dishing" or "arching" of the slabs. To mitigate this possibility, a combination of soil presaturation and construction of a perimeter "cut off" wall should be employed.

   All slab foundation areas should be moisture conditioned to at least optimum moisture, but no more than 5 percent above optimum moisture for a depth of at least 12 inches below subgrade low EI soil, and 18 inches for medium EI soil. A continuous perimeter curtain wall should extend to a depth of at least 12 inches below exterior grade for low EI soil, and 18 inches for medium EI soil to preserve this moisture. The cut-off walls may be integrated into the slab design or independent of the slab and should be a minimum of 6 (six) inches wide.

2. **<u>Post-Tensioning Institute Method</u>**

Post-tensioned slabs should have sufficient stiffness to resist excessive bending due to non-uniform swell and shrinkage of subgrade soils. The differential movement can occur at the corner, edge, or center of slab. The potential for differential uplift can be evaluated using design specifications of the Post-Tensioning Institute. The following table presents suggested minimum coefficients to be used in the Post-Tensioning Institute design method.

Suggested Coefficients	
Thornthwaite Moisture Index	-20 in/yr
Depth to Constant Soil Suction	9 (feet)
Constant Soil Suction: (pf)	3.8

The coefficients are considered minimums and may not be adequate to represent worst case conditions such as adverse drainage, excess watering, and/or improper landscaping and maintenance. The above parameters are applicable provided structures have gutters and downspouts, yard drains, and positive drainage is maintained away from structure perimeters. Also, the values may not be adequate if the soils below the foundation become saturated or dry such that shrinkage occurs. The parameters are provided with the expectation that subgrade soils below the foundations are maintained in a relatively uniform moisture condition. Responsible irrigation of landscaping adjacent to the foundation must be practiced since over-irrigation of landscaping can cause problems. Therefore, it is important that information regarding drainage, site maintenance, settlements and affects of expansive soils be considered.

Based on the above parameters, the following values were obtained from the Post Tensioning Institute Design manual. If a stiffer slab is desired, higher values of y_m may be warranted.

Expansion Index of Soil Subgrade	Low EI	Medium EI
e_m center lift	9.0 feet	8.5 feet
e_m edge lift	4.7 feet	4.5 feet
Y_m center lift	0.34 inch	0.56 inch
Y_m edge lift	0.48 inch	0.77 inch

Deepened footings/edges around the slab perimeter must be used as indicated above to minimize non-uniform surface moisture migration (from an outside source) beneath the slab. An edge depth of at least 12 inches should be considered for low EI soil and 18 inches for medium EI soil. The bottom of the deepened footing/edge should be designed to resist tension, using cable or reinforcement per the Structural Engineer.

Retaining Walls

The following recommendations should be followed for retaining wall design and construction:

The equivalent fluid pressures recommended are based on the assumption of a uniform backfill and no build-up of hydrostatic pressure behind the wall. To prevent the build-up of lateral soil pressures in excess of the recommended design pressures, overcompaction of the fill behind the wall should be avoided. This can be accomplished by placement of the backfill above a 45-degree plane projected upward from the base of the wall, in lifts not exceeding eight inches in loose depth and compacting with hand-operated or small, self-propelled vibrating plates. (Note: Placement of free-draining material in this zone could also prevent the build-up of lateral soils pressures). All walls must conform to City of Malibu Building Code setback requirements.

1. Conventional (Yielding) Retaining Walls

All recommendations for active lateral earth pressures contained herein assume that the anticipated retaining structures are in tight contact with the competent materials that they are supposed to support. The earth support system must be sufficiently stiff to hold horizontal movements in the soil to less that one percent of the height of the vertical face, but should be free-standing to the point that they yield at the top at least 0.1 percent of the height of the wall.

2. **Earth Pressure on Conventional Retaining Walls**

The earth pressures of walls retaining self-draining, granular materials, compacted fill or undisturbed bedrock material shall be assumed equal to that exerted by an equivalent fluid having a density not less than shown in the following table:

Backfill Slope (Horizontal to Vertical)	Equivalent Fluid Density (pcf)
Level	45
5:1	46
4:1	47
3:1	48
2:1	50

3. **Restrained (Non-Yielding) Walls**

Earth pressures will be greater on walls where yielding at the top of the wall is limited to less than 1/1000 the height of the wall either by stiffness (i.e., return walls, etc.) or structural floor network prior to backfilling. Utilizing the recommended backfill compaction of 90 percent Modified Proctor Density per ASTM D-1557-09, we recommend the following equivalent fluid density for non-yielding walls:

Backfill Slope (Horizontal to Vertical	Equivalent Fluid Density (pcf)
Level	65
2:1	70

Basement walls for the main structure will retain up to 23± feet. Calculations presented in Appendix H indicate the values provided above are adequate for design.

4. **Wall Seismicity**

The current seismic design criteria for this project is as follows:

From NavFac: $P_{ae} = 3/8\gamma H^2 k_n$
$K_n = 0.2$ H = Height of wall

$\gamma = 120$ pcf

$P_e = 3/8(120 \text{ pcf})(0.2)H^2 = 9H^2$

P_e acts at 0.6H above the wall base.

5. **General**

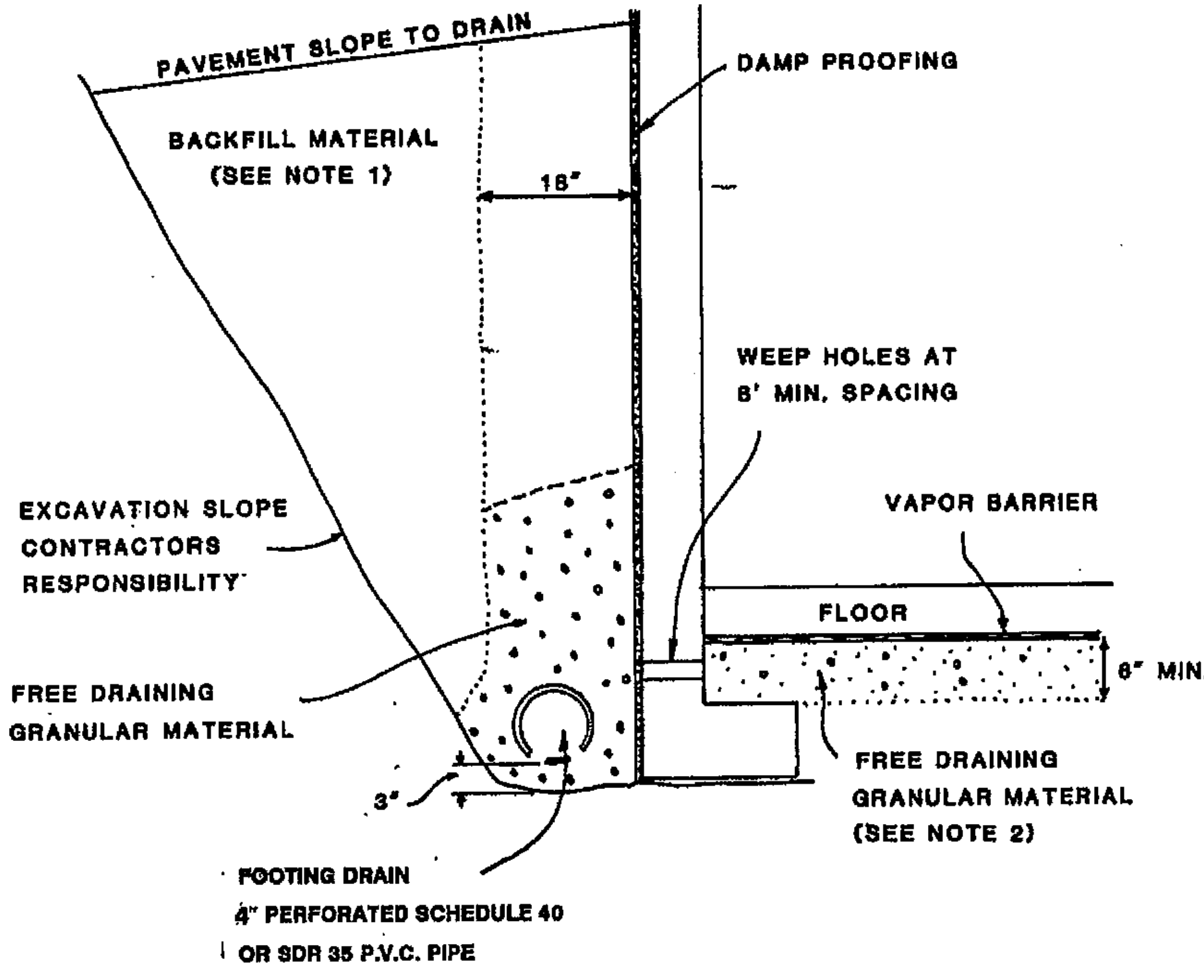
a. Any anticipated, superimposed loading (i.e., upper retaining walls, other structures, etc.) shall be considered in the wall design per Figures 11 and 12 of the NavFac manual.

b. If water is allowed to saturate the backfill, the lateral pressure could exceed the active pressure recommended. Clayey or expansive soils should not be used for backfilling behind retaining walls.

c. A vertical component equal to one-third of the horizontal force so obtained may be assumed at the plane of application of force.

The depth of the retained earth shall be the vertical distance below the ground surface, measured at the wall face for stem design or measured at the heel of the footing for overturning and sliding.

d. The walls should be constructed with a minimum 4-inch perforated drainpipe in a gravel envelope at the bottom and behind the wall. A one-foot thick zone of crushed gravel should be placed behind the wall to within two feet of the surface. On-site soil may be used for the remainder of the backfill and should be compacted to 90 percent relative compaction as determined by ASTM Test Designation D-1557-09. All proposed subterranean walls should be waterproofed and back drained (see Figure 2).



BACKFILLED WALL

NOTE NO.1 – IF WET CONDITIONS RENDER ON-SITE SOIL UNSUITABLE FOR REQUIRED DEGREE OF COMPACTION , BACKFILL THE ZONE SHOWN ABOVE WITH FREE DRAINING GRANULAR SOIL WITH NOT MORE THAN 5% (BY WEIGHT BASED ON MINUS 3/4" PORTION PASSING NO.200 SIEVE (BY WET SIEVING) WITH NO PLASTIC FINES.

NOTE NO.2 – FREE DRAINING GRANULAR MATERIAL BENEATH FLOOR SLAB SHOULD BE HYDRAULICALLY CONNECTED TO THE FOOTING DRAIN.

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	DATE 9/20114 W.O. NO. 6489
	Geotechnical • Geologic • Environmental Figure 2

FORM 88/13

e. A concrete-lined swale is recommended to be placed behind retaining walls that can intercept surface runoff from upslope areas. This surface runoff shall be transferred to an approved drainage channel via non-erosive drainage devices.

Swimming Pool/Spa

The following guidelines may be used for preliminary pool design:

1) Design for expansive soil conditions and to be freestanding.

2) Provide a hydrostatic pressure relief valve.

3) Pool decking should be cast free of the swimming pool/spa and water stops should be provided between the bond beam and the deck.

4) The entire pool bottom and spa (where support is relied upon) should be in same bearing material, such as entirely within compacted fill or terrace deposits.

5) The pool/spa should be designed for any possible surcharge loading, from structures or retaining walls.

6) In the case of a spa being planned structurally continuous with the pool shell, spa should either be designed to be entirely supported by the pool shell (i.e., cantilevered or the spa support be derived at a depth comparable to that of the pool (i.e., deep). The Structural Engineer should exercise extreme care in this area. The transition area between the pool and spa is a common area for cracks to develop.

7) In many cases, we have found pool contractors who commonly use standard detail sheets instead of having a Structural Engineer design a pool for the specific criteria recommended. These detail sheets usually incorporate details for several site conditions and can be confusing as to exactly which detail is appropriate. Typical

"standard detail" may no conform to the criteria recommendations. As such, we strongly discourage the use of standard detail sheets. Instead, the Structural Engineer should prepare a specific design and details to conform to the criteria in this report, as well as other structural criteria. The detail should also consider provisions for deck construction.

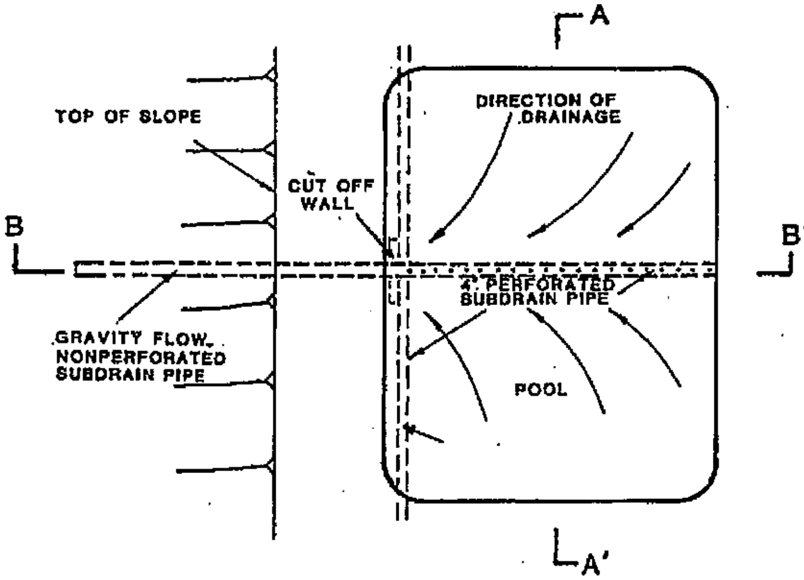
We further recommend that the Structural Engineer review steel once in-place and leave a memorandum at the job site, indicating for the benefit of the concerned parties (e.g., owner and City) if it is appropriate to proceed further. Deputy inspection of gunite placement is advised.

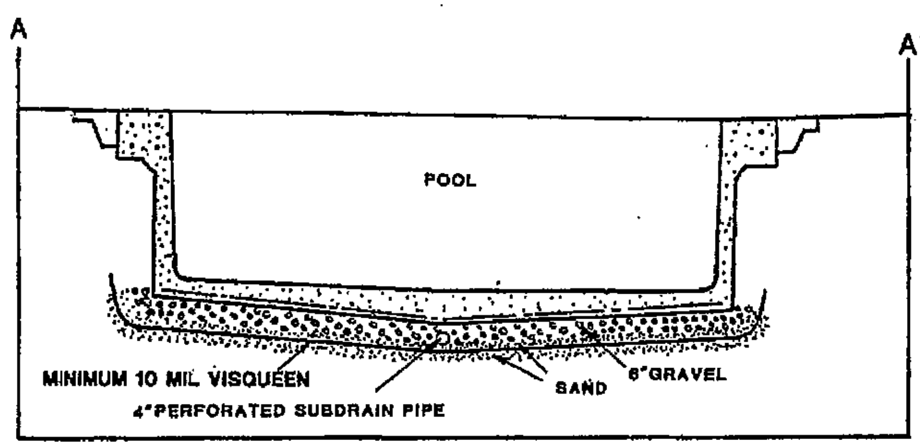
8) Prior to placement of steel, the pool excavation must be observed by a Geologist or Geotechnical Engineer.

9) Surface drainage around the pool should be adequately provided to keep water away from the slope. Water should not be allowed to pond and seep into the ground. Surface water shall be collected and conducted through non-erosive devices to the street, storm drain, or other approved watercourse disposal area.

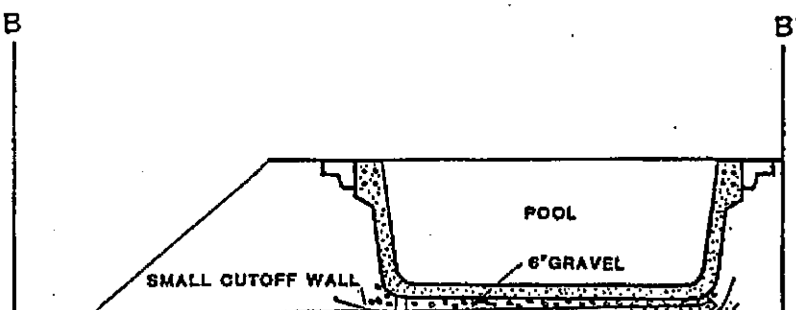
10) Leakage from the swimming pool or any of the appurtenant plumbing could create an artificial groundwater condition which could have a deleterious effect on underlying soil and/or descending slope area. Therefore, it is imperative that all plumbing and pool features be absolutely leak-free. If a leak-free system cannot be guaranteed, then it is recommended that a subdrain system be placed under the pool (see attached Figure 3). If gravity flow outlet is not possible for the subdrain, all leakage water should be directed to a low sump pit and provided with automatic pump.

A typical pool subdrain system is shown on Figure 3 (Note: Alternative subdrain designs may be used to achieve the required objectives). The proposed subdrain system consists of a six-inch thick gravel blanket overlaying a Visqueen vapor barrier (i.e., sandwiched between two-inch layers of sand) and perforated/non-perforated





MINIMUM 10 MIL
VISQUEEN SANDWICHED IN 2+ OF SAND (Ie TO PREVENT D IAGE TO VISQUEEN FROM ROCKS IN GRAVEL OR UNDERLYING FILL/ BEDROCK MATERIAL)



6" GRAVEL SUB-BASE, OVER VISQUEEN, WITH 4" DIA. PERFORATED PIPE LONGITUDINAL CONNECTED TO 4" DIA. PERFORATED PIPE TRANSVERSE. CONNECT TRANSVERSE PIPE TO 4" NON-PERFORATED PIPE AT LOW POINT & OUTLET OR TO SLUMP PUMP AREA.

NOTE: NOT TO SCALE

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TYPICAL POOL SUBDRAIN SYSTEM

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Figure 3

FORM 87/9-3

pipe. A Visqueen vapor barrier is sandwiched between the layers of sand, and the gravel blanket is placed on top of the Visqueen (i.e., the sand is used to protect the Visqueen from rock punctures from the gravel and/or underlying fill/soil). Perforated pipe (four-inch diameter) is placed on top of the Visqueen in two directions across the pool (i.e., longitudinal and transverse). These pipes should be placed within the lowest areas of the pool. The perforated pipes are then connected to a four-inch diameter non-perforated pipe. (Note: A small cut-off concrete wall should be placed between the perforated pipe and the non-perforated pipe). The non-perforated pipe should then be outletted, via gravity flow, to the slope face. (Note: If a sump area is used rather than a gravity flow pipe, the sump area should be designed to allow the owner or maintenance personnel to readily inspect for possible leakage and to pump out any unwanted water that may accumulate within the sump area).

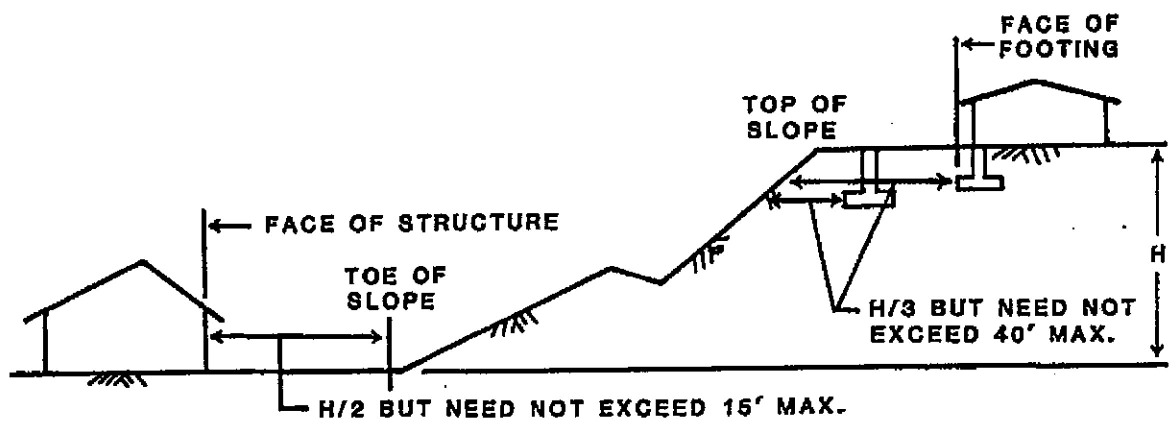
11) Should any subdrain pipes (i.e., such as a yard drain system) be broken or impacted during construction of the pool system, or any structure, these pipes should be repaired and/or rerouted where necessary to restore their intended function, (i.e., to provide proper drainage).

Deepened Foundation

Deepened foundations are required for support of retaining walls along the tops of slope, as well as for piles necessary to increase the safety factor along the north-facing slope area. The approximate locations of the piles for slope stability are shown on Plate 1. The piles should be designed by the Project Structural Engineer.

Setback Requirements: Structures adjacent to slopes shall meet the City of Malibu setback requirements (Figure 4).

Pile Type: In our opinion, support for the proposed structure may be derived from drilled cast-in-place, reinforced concrete piles (i.e., caissons) designed for frictional resistance.



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REQUIRED SLOPE SETBACK DESIGN

DATE 9/2011 | W.O. NO. 6489

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Figure 4

FORM 87/7-9

Bearing Soils and Tip Depths: We recommend that all piles extend a sufficient depth to develop adequate compressive, uplift, lateral capacities skin friction. We recommend that all piles extend a minimum depth of 5 feet below the required setback requirement plane into the underlying terrace deposits. The pile loading for the proposed structures was not available at the time of report submittal; therefore, anticipated pile depths cannot be estimated and should be reviewed by GSC prior to construction.

Pile Capacity - Compressive Frictional Resistance: An allowable frictional resistance of 600 psf, per foot of depth into competent terrace deposits should be used for pile design.

Pile Capacity - Lateral (Preliminary): Lateral loads, which may be imposed on the piles by wind or seismic forces, are resisted primarily by the horizontal bearing support of soils adjacent to the pile shafts. The lateral capacity of a pile depends on its length, stiffness in the direction of loading, and degree of fixity at the head, as well as on the adjacent soil properties.

For preliminary design purposes, the passive earth pressures for terrace material may be computed as an equivalent fluid having a density of 200 pounds per cubic foot (pcf), with a maximum earth pressure of 2,000 pounds per square foot (psf). The lateral capacity of each individual pile is a function of the length and diameter; therefore, once the structural engineer has determined the required pile loading for the proposed structures, the lateral pile capacities should be reevaluated by GSC.

Pile Strength: The allowable pile capacities are derived from the supporting strength of the soil, which could exceed the structural strength of the pile itself, therefore, the structural strength of the pile should be considered to pre-empt the allowable soil bearing capacity. The project structural engineer should verify that the compressive and tensile strength of the concrete pile could accommodate the recommended capacities.

Estimated Settlements: We estimate that total post-construction settlements of pile-supported structural elements will not exceed ½ inch. Differential settlements between adjacent piles could approach ¼ inch.

Additional Lateral Resistance: Besides the aforementioned lateral resistance provided by the pile shafts, additional resistance is provided by passive earth pressure acting against other embedded structural elements. We recommend using the values shown in Table I for allowable passive pressure (equivalent fluid weight) and coefficient of friction, which is in addition to the passive lateral pressure. The above values may be increased by one-third for short duration wind and seismic forces.

When combining passive pressure and frictional resistance the passive component should be reduced by one-third. For design of isolated piles, the allowable passive pressure may be increased by 100 percent.

TABLE I LATERAL RESISTANCE			
Soil Type	Allowable Passive Pressure (pcf)	Maximum Allowable Passive Pressure (psf/ft)	Coefficient of Friction (Concrete/soil)
Terrace Deposits	200	2000	0.30

Surface Water Control: All surface water should be collected and conducted to the street or approved watercourse via non-erosive devices.

Inspection - General: We recommend that the Geotechnical Engineer or Geologist be present in the field during construction to confirm the soil conditions prior to steel and concrete placement. The City Inspector should also observe the excavation.

Concrete Placement: In lieu of removing standing water in the pile excavation prior to placing concrete (i.e., pumping water), the concrete may be placed by the tremmie method to displace collected water. The solid tremmie tube shall be long enough to reach to bottom of the excavation. When concrete is being placed, the solid tremmie tube must be kept full of concrete at all times, with the lower end emersed in the concrete just deposited. The concrete shall at no time be placed through the water.

When water is present at the bottom of the drilled pile holes to a depth of 3 inches or more, a concrete mix with strength of 1,000 pounds per square inch over the design strength, shall be tremmied up from the bottom. An admixture that reduces the problem of segregation of paste/aggregates and dilution of paste shall be included.

Drilling Safety: The following drilling safety guidelines should be followed during pile installation:

- It is the Contractor's responsibility to provide a safe working area during drilling operations;
- The Geotechnical Engineer should observe all excavations to verify that the caissons are founded at the required depth and recommended bearing material;
- All drilled piles should be adequately covered if the excavation is not poured immediately after excavation.

GRADING GUIDELINES

These specifications present the usual and minimum requirements for grading operations performed under the control of GeoSoils Consultants, Inc.

No deviation from these specifications would be allowed, except where specifically superseded in the preliminary geology and geotechnical report, or in other written communication signed by the Geotechnical Engineer or Engineering Geologist.

1. General

A. The Geotechnical Engineer and Engineering Geologist is the Owner's or Builder's representative on the project. For the purpose of these specifications, supervision by the Geotechnical Engineer or Engineering Geologist includes that inspection performed by any person or persons employed by, and responsible to, the licensed Geotechnical Engineer or Engineering Geologist signing the Geotechnical report.

B. All clearing, site preparation or earthwork performed on the project should be conducted by the Contractor under the observation of the Geotechnical Engineer or Engineering Geologist.

C. It is the Contractor's responsibility to prepare the ground surface to receive the fills to the satisfaction of the Geotechnical Engineer or Engineering Geologist and to place, spread, mix, water, and compact the fill in accordance with the specifications of the Geotechnical Engineer or Engineering Geologist. The Contractor should also remove all material considered unsatisfactory by the Geotechnical Engineer or Engineering Geologist.

D. It is also the Contractor's responsibility to have suitable and sufficient compaction equipment on the jobsite to handle the amount of fill being placed. If necessary, excavation equipment would be shut down to permit completion of compaction. Sufficient watering apparatus would also be provided by the Contractor, with due consideration for the fill material, rate of placement and time of year.

E. A final report should be issued by the Geotechnical Engineer and Engineering Geologist attesting to the Contractor's conformance with these specifications.

F. At all times, safety will have precedence over production work. All municipal, State, and Osha Safety guidelines should be allowed beneath unshored vertical cuts, within unshored trenches with vertical walls in excess of four feet high, or in any unsafe working environment. If an unsafe job condition is noted by a GeoSoils Consultants, Inc. representative, it would be brought to the attention of the Grading Contractor's foreman, the on-site developer's representative, or both. Once this condition is noted, it should be corrected as soon as possible, or work related to the unsafe condition may be terminated.

2. **Site Preparation**

A. All vegetation and deleterious material, such as rubbish, should be disposed of off-site. This removal must be conducted prior to placing fill.

B. The Contractor should locate all subsurface features (i.e. sewage disposal systems, basements, pipelines, wells, etc.) on the site, or on the grading plan, to the best of his knowledge prior to preparing the ground surface.

C. Soil or rock materials determined by the Geotechnical Engineer as being unsuitable for placement in compacted fills should be removed and wasted from the site. Any material incorporated as a part of a compacted fill must be approved by the Geotechnical Engineer.

D. After the ground surface to receive fill has been cleared, it should be scarified, disced, or bladed by the Contractor until it is uniform and free from ruts, hollows, hummocks or other uneven features which may prevent uniform compaction.

The scarified ground surface should then be brought to at least optimum moisture, but not more than 120 percent of optimum moisture, mixed as required, and compacted as specified. If the scarified zone is greater than 12 inches in depth, the excess should be removed and placed in lifts restricted to 6 to 8 inches.

Prior to placing fill, the ground surface to receive fill should be inspected and approved by the Geotechnical Engineer.

E. Any underground structures such as cesspools, cisterns, mining shafts, tunnels, septic tanks, wells, pipelines or other not located prior to grading are to be removed or treated in a manner prescribed by the Geotechnical Engineer.

3. **Compacted Fills**

A. Material imported or excavated on the property may be utilized in the fill, provided such material has been determined to be suitable by the Geotechnical Engineer. Roots, tree branches and other deleterious matter missed during clearing should be removed from the fill as directed by the Geotechnical Engineer.

B. Unless otherwise prohibited by the governing code, rock, brick, concrete, or asphalt fragments less than six inches in diameter may be utilized in the fill, provided:

1. they are not placed in concentrated pockets;
2. there is a sufficient percentage of fine-grained material to surround the rocks;
3. the distribution of the rocks is supervised by the Geotechnical Engineer.

C. Rocks greater than six inches in diameter should be taken off-site, or placed in accordance with the recommendations of the Geotechnical Engineer in fill areas designated as suitable for rock disposal.

D. Material that is spongy, subject to decay, or otherwise considered unsuitable should not be used in the compacted fill.

E. Representative samples of materials to be utilized as compacted fill should be analyzed in the laboratory by the Geotechnical Engineer to determine their physical properties. If any material other than that previously tested is encountered during grading, the appropriate analysis of this material should be conducted by the Geotechnical Engineer as soon as possible.

F. Material used in the compacting process should be evenly spread in thin lifts not to exceed six to eight inches in thickness, watered, processed and compacted to obtain a uniformly dense layer. The fill should be placed and compacted on a horizontal plane, unless otherwise approved by the Geotechnical Engineer. This includes material placed for slope repairs, and utility trench backfills on slope areas.

G. Each layer should be compacted to at least a minimum of 90 percent of the maximum density in compliance with the testing method specified by the controlling governmental agency (in general, ASTM D-1557-09 would be used). For all fills greater than 40 feet in vertical thickness, the portion of the fill below a depth of 40 feet should be placed at a relative compaction of at least 95 percent.

If compaction to a lesser percentage is authorized by the controlling governmental agency because of a specific land use or geotechnical condition, the area to receive fill compacted to less than 90 percent should either be delineated on the grading plan or appropriate reference made to the area in the geotechnical report.

H. All fill must be brought to a moisture content of at least optimum moisture, but should not exceed 120 percent of optimum moisture. If excessive moisture in the fill results in failing tests or an unacceptable "pumping" condition, then the fill should be allowed to dry until the moisture content is within the necessary range to meet above compaction requirements, or should be removed or reworked until acceptable conditions are obtained.

I. If the moisture content or relative compaction varies from that required by the Geotechnical Engineer, the Contractor should rework the fill until it is in accordance with the requirements of the Geotechnical Engineer. If a compaction test indicates that the fill meets or exceeds the minimum required relative compaction but is below optimum moisture content, then the fill should be reworked until it meets the moisture content requirements.

J. All fills should be keyed and benched through all topsoils, slopewash, alluvium or creep affected or other unsuitable materials, into sound bedrock or firm material where the slope receiving fill is steeper than a ratio of five horizontal to vertical (i.e., in accordance with the recommendations of the Geotechnical Engineer). The standard acceptable bench height is four feet into suitable material.

K. The key for sidehill fills should be a minimum of 20 feet within bedrock or firm materials, unless otherwise specified by the Geotechnical Engineer.

L. Drainage terraces and subdrainage devices should be constructed in compliance with the ordinances of the controlling governmental agency, or with the recommendations of the Geotechnical Engineer and Engineering Geologist.

M. The Contractor will be required to obtain a minimum relative compaction of 90 percent out to the finish slope face of 2:1 fill slopes. This may be achieved by either overbuilding the slope a minimum of five feet, and cutting back to the compacted core, or by direct compaction of the slope face with suitable equipment, or by any other procedure which produces the required compaction.

If a method other than overbuilding and cutting back to the compacted core is to be employed, slope tests would be made by the Geotechnical Engineer during construction of the slopes to determine if the required compaction is being achieved. Each day the Contractor will receive a copy of the Geotechnical Engineer's "Daily Field Engineering Report" which will indicate the results of field density tests for that day. Where failing tests occur or other field problems arise, the Contractor may be notified of such conditions by written communication from the Geotechnical Engineer in the form of a conference memorandum, to avoid any misunderstanding arising from oral communication.

If the method of achieving the required slope compaction selected by the Contractor fails to produce the necessary results, the Contractor should rework or rebuild such slopes until the required degree of compaction is obtained, at no additional cost to the Owner or Geotechnical Engineer.

N. All fill slopes should be planted or protected from erosion by methods specified in the geotechnical report, or required by the controlling governmental agency.

O. Fill-over-cut slopes should be properly keyed through topsoil, colluvium or creep material into firm materials, and the transition should be stripped of all soil prior to placing fill. The fill portion of the slope should be founded on a key to be determined by the Geotechnical Engineer.

4. <u>**Cut Slopes**</u>

A. The Engineering Geologist should observe all cut slopes excavated in rock, lithified, or formation material at vertical intervals not exceeding ten feet.

B. If any conditions not anticipated in the preliminary report such as perched water, seepage, lenticular or confined strata of a potentially adverse nature, unfavorably inclined bedding, joints or faults planes, or areas of unstable material are encountered during grading, these conditions should be analyzed by the Engineering Geologist and Geotechnical Engineer, and recommendations should be made to treat these problems.

C. Cut slopes that face in the same direction as the prevailing drainage should be protected by a non-erosive interceptor swale placed at the top of the slope.

D. Unless otherwise specified in the geotechnical and geological report, no cut slopes should be excavated higher or steeper than that allowed by the ordinances of controlling governmental agencies.

E. Drainage terraces should be constructed in compliance with the ordinances of controlling governmental agencies, or with the recommendations of the Geotechnical Engineer or Engineering Geologist.

5. **Grading Control**

A. Inspection of the fill placement should be provided by the Geotechnical Engineer during the progress of grading.

B. In general, density tests should be made at intervals not exceeding two vertical feet of fill height or every 500 to 1000 cubic yards of fill placed. These criteria will vary depending on soil conditions and the size of the job. In any event, an adequate number of field density tests should be made to verify that the required compaction is being achieved.

C. Density tests should also be made on the surface material to receive fill as required by the Geotechnical Engineer.

D. All cleanout, processed ground to receive fill, key excavations, subdrains and rock disposal should be inspected by the Geotechnical Engineer prior to placing any fill. It should be the Contractor's responsibility to notify the Geotechnical Engineer when such areas are ready for inspection.

In most jurisdictions, these items must also be inspected by a representative of the controlling governmental agency prior to fill placement.

6. **Construction Considerations**

A. Erosion control measures, when necessary, should be provided by the Contractor during grading and prior to the completion and construction of permanent drainage controls.

B. Upon completion of grading and termination of inspections by the Geotechnical Engineer, no further filling or excavating, including that necessary for footings, foundations, large tree wells, retaining walls, or other features should be performed without observation of the Geotechnical Engineer or Engineering Geologist.

C. Care should be taken by the Contractor during final grading to preserve any berms, drainage terraces, interceptor swales, or other devices of a permanent nature on or adjacent to the property.

Temporary Excavation

Where the necessary space is available, temporary unsurcharged embankments may be sloped back without shoring. The slope should not be cut steeper than the following gradient:

Height	Temporary Gradient (Horizontal:Vertical)
0 - 5'	Near-Vertical
>5'	1:1

In areas where soils with little or no binder are encountered, shoring or flatter excavation slopes shall be made.

These recommended temporary excavations do not preclude local raveling or sloughing.

All applicable requirements of the California Construction and General Industry Safety Orders, the Occupational Safety and Health Act, and the Construction Safety Act should be met.

Where sloped embankments are used, the top of the slope should be barricaded to prevent equipment and heavy storage loads within five feet of the top of the slope. If the temporary construction embankments are to be maintained for long periods, berms should be constructed along the top of the slope to prevent runoff water from eroding the slope faces.

Our personnel should observe the soils exposed in the temporary backcut slopes during excavation so that modifications of the slopes can be made if variations in the soil conditions occur.

Drainage/Landscape Maintenance

Water should not be allowed to pond or seep into the ground, or flow over slopes in a concentrated manner. Roof gutters and yard drains should be provided. Pad drainage should be directed toward the street or any approved watercourse area swale via non-erosive channel, pipe and/or dispersion devices.

Surface water should not be allowed to drain towards a descending slope, as it may locally have an adverse affect on surficial slope stability. Likewise, over watering should also be avoided near slope areas, as it too may have a deleterious effect of surficial slope stability.

LIMITATIONS

The findings and recommendations of this report were prepared in accordance with generally accepted professional geotechnical engineering principles and practice for the City of Malibu at this time. We make no other warranty, either express or implied. The conclusions and recommendations contained in this report are based on site conditions disclosed in our subsurface investigation and the referenced reports. However, soil/rock conditions can vary significantly between borings, test pits, and natural outcrops, therefore, further refinements of our recommendations contained herein may be necessary due to changes in the building plans or what is encountered during site grading.

The recommendations provided in this report are applicable for preliminary development planning for the subject project provided that surface water will be kept from infiltrating into the subgrade adjacent to the house foundation systems. This may include, but not be limited to rain water, roof water, landscape water and/or leaky plumbing. The site is to be fine graded at the completion of construction to include positive drainage away from the structures and roof water will be collected via gutters, downspouts, and transported to the street in buried drainpipes.

Since our investigation was based on the site conditions observed, selective laboratory testing, and engineering analysis, the conclusions and recommendations contained herein are professional opinions. Further, these opinions have been derived in accordance with standard engineering practices, and no warranty is expressed or implied.

If the conditions encountered during grading are not consistent with the findings presented in this report, or if proposed construction is moved from the location investigated, this office shall be notified immediately so that the condition or change can be evaluated and appropriate action taken.

CLOSURE

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

Very truly yours,

GEOSOILS CONSULTANTS, INC.

REGISTERED PROFESSIONAL ENGINEER
KAREN L. MILLER
No. 2257
Exp. 3/31/12
GEOTECHNICAL
STATE OF CALIFORNIA

CERTIFIED ENGINEERING GEOLOGIST
RUDY F. RUBERTI
No. 1708
STATE OF CALIFORNIA

KAREN L. MILLER
GE 2257

RUDY F. RUBERTI
CEG 1708

RON L. CASTRUITA
Staff Engineering Geologist

KLM.RFR.RLC.W:Rsp to Malibu Rev dtd 10-31-07

Encl: References
City of Malibu Geotechnical Review Sheet dated October 31, 2007
Plate 1, Geologic Map
Plate 2, Geologic Cross-Sections
Table A, Foundation and Slab Recommendations
Appendix A, Response to City of Malibu Review Sheet dated October 31, 2007
Appendix B, Field Exploration Procedures
    Plates A-1 through A-10
Appendix C, Laboratory Test Results
    Plates SH-1 through SH-13
    Plates C-1 through C-6
Appendix D, Slope Stability Analyses
Appendix E, Seismic Analyses
Appendix F, Boring Logs and Laboratory Test Results by Leighton and Associates
Appendix G, Boring Logs and Laboratory Test Results by Van Beveren and Butelo
Appendix H, Equivalent Fluid Pressure (EFP) Analyses

cc: (5) Addressee

MDN 13562

REFERENCES

1. Association of Engineering Geologist dated 1982, "*Geologic Maps, Santa Monica Mountains, Los Angeles, California*", compiled by the City of Los Angeles.

2. California Code of Regulations, Title 14, Article 10, Section 3721, Seismic Hazards Mapping, Division of Mines and Geology.

3. Campbell, K.W. and Bozorgnia Y. (1994), Near-Source Attenuation of Peak Horizontal Acceleration from Worldwide Accelerograms Recorded from 1957 to 1993, Proceedings, 5th U.S. National Conference on Earthquake Engineering, Volume 3, Earthquake Engineering Research Institute, pp. 283-292.

4. R.F. Yerkes and R.H. Campbell, Department of the Interior, United States Geological Survey. "*Geologic Map of East-Central Santa Monica Mountains, Los Angeles County, California,*" Map I-1146, Prepared in Cooperation with Los Angeles County, California

5. Jerome A. Treiman dated February 9, 2007, "*Splays Associated with the Malibu Coast Fault Zone at Winter Mesa,*" Malibu, Los Angeles County, California, California Geological Survey, Supplement #1 to Fault Evaluation Report FER-229

6. California Division of Mines and Geology, "*Fault Evaluation Report FER-46,*" June 16, 1977

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

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

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

10. Petersen, M.D., Bryant, W.A., Cramer, C.H., Cao, T., Reichle, M.S., Frankel, A.D., Lienkaemper, J.J., McCrory, P.A., and Schwartz, D.P., 1996, "Probabilistic Seismic Hazard Assessment for the State of California," California Division Mines and Geology, Open File Report 96-08.

REFERENCES (cont'd)

11. Southern California Earthquake Center dated March 1999, "*Recommended Procedures for Implementation of DMG Special Publication 117 Guidelines for Analyzing and Mitigating Liquefaction in California*", pages 28 - 32.

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

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PLANNING REVIEW

GEOTECHNICAL REVIEW SHEET

Project Information

Date: October 31, 2007		**Review Log #:**	**2852**
Site Address:	4000 Malibu Canyon Road		
Lot/Tract/PM #:	n/a	**Planning #:**	**CDP 07-083** **TTM 07-001** **CUP 07-010**
Applicant/Contact:	David Maffit, dmaffit@weintraubfs.com	**BPC/GPC #:**	
Contact Phone #:	310-457-8971 **Fax #:** 310-457-8128	**Planner:**	**Stefanie Edmondson**
Project Type:	Rancho Malibu Resort Development		

Submittal Information

Consultant(s) / Report Date(s): *(Current submittal(s) in Bold.)*	Van Beveren & Butelo, Inc. (Butelo, CEG 1315; Langhaar, RGE 2647): **9-27-07** Roy J. Shlemon & Associates, Inc.: **September 2007** (Included as Appendix D in the referenced Van Beveren & Butelo report) References reviewed by the Consultant: Leighton and Associates, Inc.: 3-28-90, 2-6-90, 8-4-89
Previous Reviews:	None; Ref: Los Angeles County reviews dated 3-6-90, 3-1-90, 12-8-89, 11-29-89

Review Findings

Coastal Development Review

☐ **APPROVED** from a geotechnical perspective.

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

Building Plan-Check Stage

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

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

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

Remarks

The referenced report and plans were reviewed by the City from a geotechnical perspective. Based upon the submitted information, the project comprises a new hotel resort, consisting of a main 3-story hotel with a basement, parking structure, swimming pool/spa, 21 individual casitas, retail and surface parking, access roads, drives, and fire lanes, storm drains and utilities, and landscaping/flatwork. (Buildings 1-21: 118,420 square feet; Basement: 82,077 square feet; Main Hotel: 57,568 square feet; Three-Level Parking Garage: 143,640 square feet.) Grading will consist of 54,000 yards of R & R; 156,100 yards of exempt understructure grading, 5,100 yards of exempt safety grading for the fire department; and 62,260 yards of non-exempt grading. 220,400 yards will be exported. Shoring will be required for the basement and parking structure excavations. A new onsite wastewater treatment system (OWTS) will be installed on the property.

The City of Malibu Building and Safety Department implemented the policy of requiring geotechnical consultants to submit electronic geotechnical reports (on CD Rom) for review beginning January 1, 2006. Geotechnical responses shall conform to this policy, which can be viewed on the City's website: http://www.malibu-ca.gov/index.cfm?fuseaction=detail&navid=82&cid=7247.

Review Comments:

1. Please pay the City of Malibu the balance due on the attached fee form as well as an additional deposit of $1,250.00 upon submittal of the response to this review letter (total due the City of Malibu is **$2,493.13**).
2. Please clearly depict the four groundwater wells on the Geotechnical Map. Only three monitoring wells are shown.
3. Groundwater was not encountered in the eight borings excavated by the Consultant. Please explain the 2 foot thick zone of wet clay at 15 feet in Boring 4.
4. Bedrock was encountered at 55 feet in Boring 6. The Consultant states that bedrock was not encountered in their borings. Please clarify.
5. Please clearly depict the earth units across the site on the Geotechnical Map. Can bedrock units be delineated, based on the number of borings that penetrated bedrock, as well as exposures on the slopes around the site? Leighton's geologic map included bedrock units.
6. Please include all bedding data from the Leighton borings on the Geotechnical Map.
7. Please plot all the trenches excavated by Leighton on the Geotechnical Map.
8. Please plot all bedding data mapped by Leighton across the site on the Geotechnical Map.
9. The Consultant discusses a fault exposed in a trench excavated across the mapped trace of the Malibu Coast Fault in the eastern portion of the site. They observed the fault only in the bedrock and basal marine terrace deposits. They concluded that the fault was inactive, yet established a setback zone in the project area. The undersigned engineering geologic reviewer acknowledges that the fault is not active based on the most recent investigation and analyses. However, different bedrock units are apparent across the site from north to south (Monterey Formation, Vaqueros Formation, Conejo Volcanics), suggesting that fault(s) could exist under or adjacent to the proposed development. While fault rupture hazard is low on the site, severe seismic shaking and, possibly, antithetic movement along these faults, as schematically illustrated on regional geologic maps presented in this report, due to an earthquake event on the Malibu Coast Fault, could adversely affect the proposed hotel development. Please discuss, and provide appropriate mitigation measures regarding the proposed development to conform to the Malibu Building Code (prevent catastrophic failure of structures and loss of life).
10. Please plot Leighton borings LB-3, LB-7, and LB-21 on the Geotechnical Map.
11. Please provide bedding data to substantiate the south-dipping structure depicted on Cross-Section A-A'. Regional maps by the USGS and Dibblee appear to show north to northeast-dipping bedding in this area.
12. Please provide bedding data to justify the west-dipping structure on Cross-Section B-B'.
13. What is the basis for the anticlinal fold in the Monterey Formation depicted on Cross-Section C-C'?
14. The grading plans indicate that a fill slope with minor cut is proposed immediately above the landslide

depicted on Cross-Section B-B'. The Project Geotechnical Consultant shall review the grading plan and update the Geologic Map and Cross-Sections to reflect the currently proposed grading plan. Additional recommendations shall be provided, as necessary, as well as slope stability analyses of the proposed conditions.

15. The Project Geotechnical Consultant needs to provide a finding in accordance with Section 111 of the Malibu Building Code.

16. The Project Geotechnical Consultant/hydrogeologic consultant must demonstrate that the effluent from the proposed private wastewater treatment system (leach fields, seepage pits, or drip irrigation systems) will not adversely affect the stability of the subject site or adjacent properties in accordance with Section 111 of the Malibu Building Code. Geologic cross section(s) shall be provided which depict the proposed development, proposed wastewater treatment system, anticipated paths of effluent, and capping depths of seepage pits (if applicable). The Project Engineering Geologist shall provide sufficient hydrogeologic data to substantiate their conclusions regarding the effects of effluent on groundwater levels under the site, the potential for mounding of groundwater, and the potential for effluent to daylight on slopes. In addition, the Consultant shall consider the effects of water from irrigation across the site on groundwater levels. The supporting geologic discussion shall include interpretations of geologic structure, stratigraphy (specifically, lithologic changes across the site that could affect hydraulic conductivities across the site), and discontinuities such as contacts, fractures, faults, clay seams, and joint systems. Highest anticipated groundwater levels, taking into account the effluent from the private wastewater treatment system and irrigation, shall be utilized in the slope stability analyses on hillside sites. If the analyses indicate that there is an adverse affect due to a rise in groundwater levels on or down-gradient from the site, then the Project Geotechnical Consultant shall provide recommendations for mitigation, and/or the Project Applicant shall consider relocation or redesign of effluent disposal facilities that mitigate the rise in groundwater.

17. Please provide a percolation test report for the proposed OWTS for review. Is there evidence of higher groundwater levels in the shallower soils? What type of system will be proposed?

18. In accordance with Chapter 18.4(D) of the City's Local Coastal Plan-Local Implementation Plan (LCP-LIP), the proposed OWTS shall be evaluated for cumulative impacts on groundwater levels, including the impact (if any) on down-gradient OWTS. A cumulative impact analysis shall be submitted and approved by City geotechnical staff and the City Environmental Health Specialist, Andrew Sheldon.

19. Section 6.2.1 of the City of Malibu's geotechnical guidelines requires that direct shear tests be performed in accordance with ASTM procedures, and, if the rate of deformation exceeds 0.005 inches per minute, the Project Geotechnical Consultant needs to provide data to demonstrate that the rate is sufficiently slow for drained conditions. Since the rate of deformation was not specified, the Project Geotechnical Consultant needs to provide data to demonstrate that the tests were performed as drained tests.

20. Peak shear strength parameters were used in the slope stability analyses. There are exceptions, but generally ultimate shear strength parameters are required for slope stability analyses to comply with the City's geotechnical guidelines. Furthermore, shear strength data from previous studies (Leighton and seismic hazard report) were used. The tests used in these previous studies may not comply with current standards, and therefore, the shear strength data may not be acceptable. The Project Geotechnical Consultant needs to review their shear strength selection, revise their selection to meet the requirements of the City's geotechnical guidelines, and provide a discussion to support their selection. Also, provide the shear-displacement diagrams for the tests performed during this study. Slope stability analyses should be re-run with revised shear strength parameters, as appropriate.

21. The Project Geotechnical Consultant has presented the shear strength data on composite plots. The data appear to be a mixture of results on samples soaked and samples at natural moisture contents. These data for soaked and natural moisture contents should be presented on separate plots.

22. Static safety factors must equal or exceed 1.5. Rounding values up that are less than 1.5 is not acceptable.

Thus, the results for Section B-B' (gross) does not meet the requirements of the City's geotechnical guidelines, and mitigations measures must be provided.

23. The slope stability analyses need to include the effects of the surcharge loading of the structure on the computed safety factor.

24. The critical failure surfaces (those with the lowest computed safety factors) for static and seismic conditions need to be plotted on the geologic cross sections in accordance with Section 6.2.3.1 of the City's geotechnical guidelines.

Building Plan-Check Stage Review Comments:

1. Please clarify the last sentence on page 15 ("is" or "is not").

2. In accordance with Section 5.1 (bottom of page 15 and top of page 16) of the City's geotechnical guidelines, please provide information that satisfies the requirement concerning (1) significant historic earthquakes including epicenter distances, earthquake magnitudes, and estimated intensity at the site and (2) a quantitative evaluation of ground shaking that may be associated with the Malibu Coast fault. The seismic evaluation needs to include peak and repeatable high ground accelerations, and duration of strong shaking.

3. Section 4.3.4 of the City's geotechnical guidelines calls for geologic cross sections when basement, retaining wall, or temporary/permanent excavations exceed 10 feet or when an excavation extends below a 1(H):1(V) from adjacent foundations. Please provide at least two sections traversing buildings in orthogonal directions (free-standing, cantilever retaining walls orthogonal to the wall). The sections should depict the proposed and existing grades, proposed and existing foundations, basement (garage) sidewalls, adjacent structures and improvements, property lines, groundwater level (if any), locations of exploratory excavations, and soil units.

4. The Project Geotechnical Consultant needs to discuss the potential for seismically induced settlement in accordance with the requirements of the City's geotechnical guidelines.

5. The Project Geotechnical Consultant needs to discuss the potential for hydroconsolidation settlement in accordance with the requirements of the City's geotechnical guidelines.

6. The Project Geotechnical Consultant needs to discuss the soil expansion potential in accordance with the requirements of the City's geotechnical guidelines.

7. The Project Geotechnical Consultant needs to clarify whether the recommended passive and sliding resistances are allowable or ultimate values and if the values are allowable, provide the safety factor, along with supporting calculations, used to generate allowable values. Safety factors must exceed 1.5. The Consultant needs to refer to Section 7.1.1 of the City's geotechnical guidelines relative to the amount of cohesion that may be used in computing the passive resistance, the need for shear test results on saturated samples at low effective overburden pressures, and the required safety factor when the lateral resistance is increased for short-duration loadings. Revise recommendations as necessary.

8. The Project Geotechnical Consultant has recommended a backdrain for the basement retaining wall. There appears to be no suitable discharge point for gravity flow of this drain. In accordance with Section 3.8.4.3, the Consultant needs to include alternative discharge recommendations for outletting this drain.

9. The Project Geotechnical Consultant needs to provide recommendations in accordance with Section 7.3.1 of the City's geotechnical guidelines to waterproof subterranean walls and floors.

10. The scope of the project includes swimming pools. Please provide geotechnical recommendations for swimming pools/spas, including those for drainage and lateral earth pressures acting on the walls of the swimming pool in accordance with Section 7.1.3 of the City's geotechnical guidelines.

11. Please depict limits and depths of over-excavation and structural fill to be placed on the grading plan, and cross sectional view of the proposed building area. Cut and fill yardages are to be indicated on the cover sheet of the plans.

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

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

Engineering Geology Review by: Christopher Dean 10/31/07

Christopher Dean, C.E.G. #1751, Exp. 9-30-08
Engineering Geology Reviewer (x306)
Date

Geotechnical Engineering Review by: Christopher Dean for 10/31/07

Leland M. Kraft, Jr., G.E. # 484, Exp. 6-30-08
Geotechnical Engineering Reviewer (805-444-1943)
Date

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

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

City of Malibu

– GEOTECHNICAL –

NOTES FOR BUILDING PLAN-CHECK

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

1. One set of grading, retaining wall, swimming pool, parking garage, hotel, shoring, casitas, and OWTS plans, incorporating the Geotechnical Consultant's recommendations and items in this review sheet, must be submitted to City geotechnical staff for review. **Additional review comments may be raised at that time that may require a response.**
2. Show the name, address, and phone number of the Geotechnical Consultant(s) on the cover sheet of the Building Plans.
3. Include the following note on Grading and Foundation Plans: "*Subgrade soils shall be tested for Expansion Index prior to pouring footings or slabs; Foundation Plans shall be reviewed and revised by the Geotechnical Consultant, as appropriate.*"
4. Include the following note on the Foundation Plans: "*All foundation excavations must be observed and approved by the Geotechnical Consultant prior to placement of reinforcing steel.*"
5. The Foundation Plans for the proposed project shall clearly depict the embedment material and minimum depth of embedment for the foundations in accordance with the Geotechnical Consultant's recommendations.
6. Foundation setback distances from descending slopes shall be in accordance with Section 1806.5 of the Malibu Building Code, or the requirements of the Geotechnical Consultant's recommendations, whichever are more stringent. Show minimum foundation setback distances on the foundation plans, as applicable.
7. Show the onsite wastewater treatment system on the Site Plan.
8. Please contact the Building and Safety Department regarding the submittal requirements for a grading and drainage plan review.
9. A comprehensive Site Drainage Plan, incorporating the Geotechnical Consultant's recommendations, shall be included in the Plans. Show all area drains, outlets, and non-erosive drainage devices on the Plans. Water shall not be allowed to flow uncontrolled over descending slopes.

Grading Plans (as Applicable)

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

Retaining Walls (As Applicable)

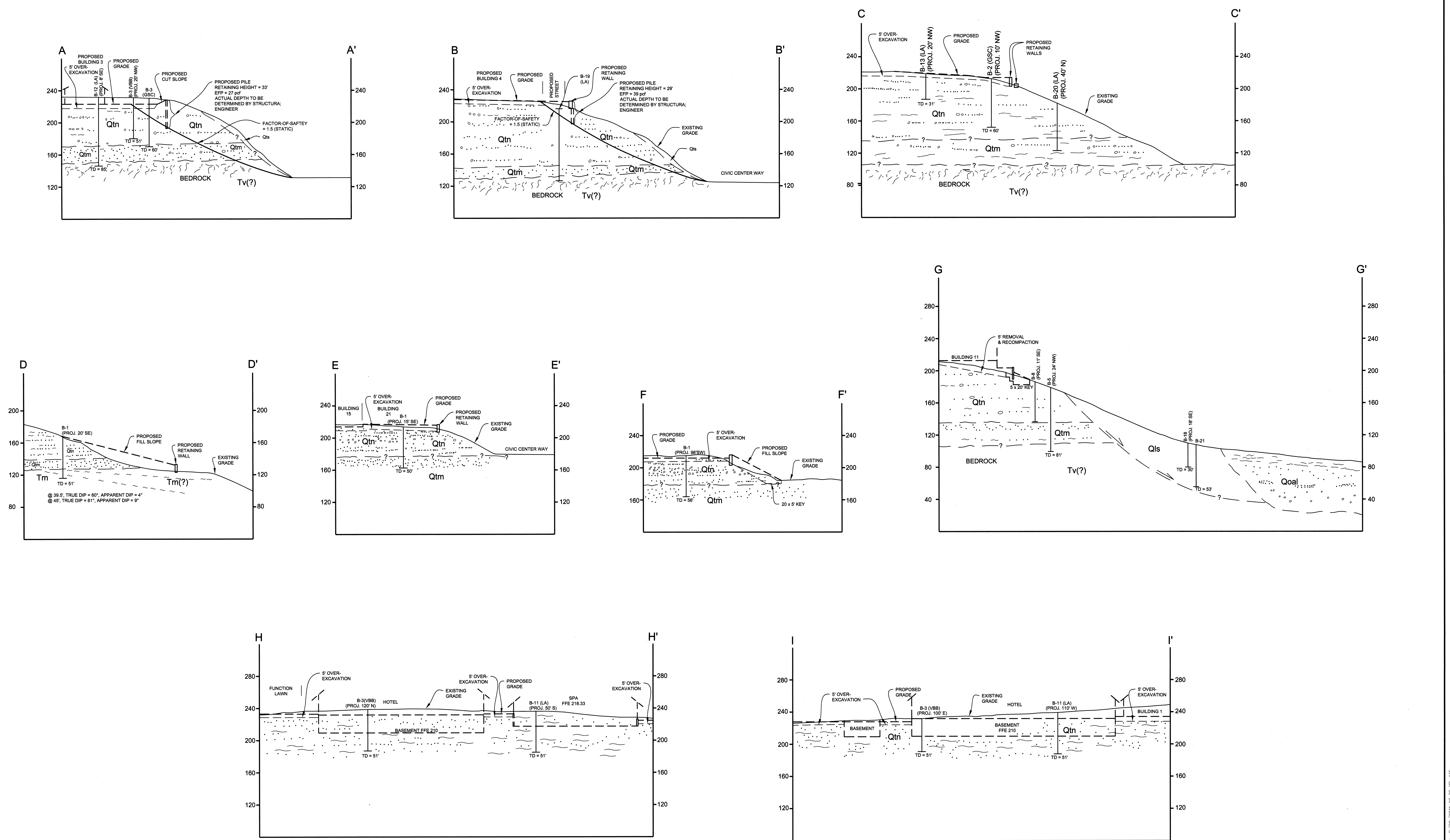
1. Show retaining wall backdrain and backfill design, as recommended by the Geotechnical Consultant, on the Plans.
2. Retaining walls separate from a residence require separate permits. Contact the Building and Safety Department for permit information. One set of retaining wall plans shall be submitted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

Swimming Pools (as Applicable)

1. If City of Malibu Standard Swimming Pool Plans are utilized, indicate which details on 96-12 detail sheet will be used by placing an "X" through details which are NOT applicable to the project.

Guidelines for geotechnical reports (dated February 2002) are available on the City of Malibu web site: http://www.ci.malibu.ca.us/index.cfm?fuseaction=nav&navid=30.


EXPLANATION
af ARTIFICIAL FILL
Qal ALLUVIUM
Qalo OLDER ALLUVIUM
Qls LANDSLIDE
Qtn NON-MARINE TERRACE DEPOSITS
Qtm MARINE TERRACE DEPOSITS
Tv VAQUEROS FORMATION
Tcv CONEJO VOLCANICS FORMATION
Ts SESPE FORMATION
BEDDING ATTITUDE
JOINT ATTITUDE
SHEAR ATTITUDE
APPROXIMATE GEOLOGIC CONTACT
APPROXIMATE CONCEALED GEOLOGIC CONTACT
LINE OF GEOLOGIC SECTION
B-1 APPROXIMATE LOCATION OF BORING BY GEOSOILS CONSULTANTS, INC.
B-1(LA) APPROXIMATE LOCATION OF BORING BY LEIGHTON AND ASSOCIATES
B-1(VBB) APPROXIMATE LOCATION OF BORING BY VAN BEVEREN & RUTELO
MW-3 APPROXIMATE LOCATION OF GROUND WATER WELL
T-1 APPROXIMATE LOCATION OF FAULT TRENCH BY VAN BEVEREN & RUTELO
T-8 APPROXIMATE LOCATION OF SEISMIC TRENCH BY LEIGHTON AND ASSOCIATES
APPROXIMATE LOCATION OF SUBDRAIN
5' APPROXIMATE DEPTH OF REMOVALS
scale: 1" = 40'
CIVIC CENTER WAY
APPROXIMATE LOCATION OF PROPOSED PILES
GSC GeoSoils Consultants Inc.
GEOTECHNICAL•GEOLOGIC•ENVIRONMENTAL
6634 Valjean Avenue
Van Nuys, CA 91406
GEOLOGIC MAP
RANCHO MALIBU RESORT
4000 MALIBU CANYON ROAD
V.T.M. 69653
GREEN ACRES, LLC
WORK ORDER 6489
DATE 9/2011
SCALE 1" = 40'
REVISED
PLATE 1



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

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

WORK ORDER	DATE	SCALE
6489	9/2011	1" = 40'

REVISED

PLATE 2

TABLE A

FOUNDATION AND SLAB RECOMMENDATIONS

ONE AND TWO-STORY RESIDENTIAL BUILDINGS

	Expansion Index 0-50 Low Expansion	Expansion Index 51-90 Medium Expansion	Expansion Index 91-130 High Expansion
1-Story Footings	All footings 12" deep. Four No. 4 bars, two top and two bottom; footings continuous.	Exterior footings 18" deep. Interior footings 15" deep. Four No. 4 bars, two top and two bottom; footings continuous.	Exterior footings 24" deep. Interior footings 18" deep. Four No. 4 bars: two top and two bottom. Footings continuous.
2-Story Footings	All footings 18" deep; continuous. Four No. 4 bars, two top and two bottom.	All footings 18" deep; continuous. Four No. 4 bars, two top and two bottom.	All footings 24" deep; continuous. Four No. 4 bars: two top and two bottom.
Garage Door Grade Beam	12" deep. Four No. 4 bars, two top and two bottom.	18" deep. Four No. 4 bars, two top and two bottom.	24" deep. Four No. 4 bars: two top and two bottom.
Living Area Floor Slabs	4" thick. No. 4 bars at 16" both ways at mid-height. Six mil Visqueen vapor barrier sandwiched between, 1" sand layers.	4" thick. No. 4 bars at 16" both ways at mid-height. Slab steel should be doweled into exterior footings. Six mil Visqueen vapor barrier sandwiched between two, 2" sand layers.	4" thick. No. 4 bars at 16" both ways at mid-height. Six mil Visqueen vapor barrier sandwiched between two, 2" sand layers. Slab steel should be doweled into exterior footings.
Garage Floor Slabs	4" thick. No. 4 bars at 16" both ways at mid-height and ¼ slabs. Isolate from stem wall footings. No moisture barrier required. 2" sand base required.	4" thick. No. 4 bars at 16" both ways at mid-height and ¼ slabs. Isolate from stem wall footings. No moisture barrier required. 4" sand base required.	4" thick. No. 4 bars at 16" both ways at mid-height and ¼ slabs. Isolate from stem wall footings. No moisture barrier required. 4" sand base required.
Pre-soaking of Living Area and Garage Slab Soils	No pre-soaking required. Pre-moisten soil prior to pouring concrete.	Soak 18" depth to 5% above optimum moisture content.	Soak to 24" depth to 5% above optimum moisture content.

Note: An allowable soil bearing value of 1500 pounds per square foot, including dead and live loads, may be used for design of footings and foundation founded at the recommended depths. All footings should have a minimum width of 15 inches and should be continuous. A friction coefficient for concrete on natural and compacted soil of 0.4, and a lateral soils bearing value of 250 pounds per square foot, per foot of depth, may be employed to resist lateral loads. When combining passive pressure and frictional resistance, the passive pressure component should be reduced by one third.

If wire mesh is provided for slabs under Medium and High expansion soils, then No. 3 bars at 24" on center dowels should be provided in exterior footings and bent 3' into slabs. The bent bars are not allowed between <u>floating</u> slabs and footings.

APPENDIX A

RESPONSE TO THE CITY OF MALIBU GEOTECHNICAL REVIEW SHEET

DATED OCTOBER 31, 2007

APPENDIX A

RESPONSE TO THE CITY OF MALIBU GEOTECHNICAL REVIEW SHEET

DATED OCTOBER 31, 2007

The following is an item-by-item response to the City of Malibu Geotechnical Review Sheet dated October 31, 2007. Each comment within the review sheet is presented below, followed by our responses.

Comment 1

Please pay the City of Malibu the balance due on the attached fee form as well as an additional deposit of $1,250.00 upon submittal of the response to this review letter (total due the City of Malibu is $2,493.13).

Response to Comment 1

It is our understanding that this fee has been paid by the client.

Comment 2

Please clearly depict the four groundwater wells on the Geotechnical Map. Only three monitoring wells are shown.

Response to Comment 2

Based on a discussion with representatives of Bio-Solution, there only appears to be three wells on the site. All wells should be properly abandoned prior to grading.

Comment 3

Groundwater was not encountered in the eight borings excavated by the Consultant. Please explain the 2 foot thick zone of wet clay at 15 feet in Boring 4.

Response to Comment 3

Groundwater was not encountered in any of the new borings excavated on the site by GSC. Based on review of the boring log, the zone of wet clay at 15 feet in B-4 may be the result of a perched groundwater condition at the time the boring was excavated.

Appendix A

Comment 4

Bedrock was encountered at 55 feet in Boring 6. The Consultant states that bedrock was not encountered in their borings. Please clarify.

Response to Comment 4

Bedrock was encountered in numerous borings excavated on the site, including Borings B-1-11 and B-4-11, excavated by GSC (see Appendices C, F, and G).

Comment 5

Please clearly depict the earth units across the site on the Geotechnical Map. Can bedrock units be delineated, based on the number of borings that penetrated bedrock, as well as exposures on the slopes around the site? Leighton's geologic map included bedrock units.

Response to Comment 5

The geologic map has been modified to show all appropriate geologic contacts. Surface contacts are shown on the geologic map; however, due to the thickness of the terrace deposits and high variability in the bedrock units in the borings by LA, we did not attempt to show contacts that are concealed by thick terrace deposits, as the accuracy of the contacts would be limited. In addition, the bedrock units below the site do not have an impact on site development.

Comment No. 6

Please include all bedding data from the Leighton borings on the Geotechnical Map.

Response to Comment No. 6

It should be noted that the copy of the geologic map by Leighton and Associates obtained from the City is of poor quality and determining the location of the borings and trenches is difficult. Where possible, the requested data is shown on the geologic map. As a reference, a copy of the geologic map by LA is included herein (see Appendix F).

Appendix A

Comment 7

Please plot all the trenches excavated by Leighton on the Geotechnical Map.

Response to Comment 7

As stated above, the copy of the geologic map from the LA report is difficult to read and we are not able to determine the location of all the trenches. Where possible, the requested data is shown on the geologic map.

Comment 8

Please plot all bedding data mapped by Leighton across the site on the Geotechnical Map.

Response to Comment 8

The requested data is shown on the geologic map.

Comment 9

The Consultant discusses a fault exposed in a trench excavated across the mapped trace of the Malibu Coast Fault in the eastern portion of the site. They observed the fault only in the bedrock and basal marine terrace deposits. They concluded that the fault was inactive, yet established a setback zone in the project area. The undersigned engineering geologic reviewer acknowledges that the fault is not active based on the most recent investigation and analyses. However, different bedrock units are apparent across the site from north to south (Monterey Formation, Vaqueros Formation, Conejo Volcanics), suggesting that fault(s) could exist under or adjacent to the proposed development. While fault rupture hazard is low on the site, severe seismic shaking and, possibly, antithetic movement along these faults, as schematically illustrated on regional geologic maps presented in this report, due to an earthquake event on the Malibu Coast Fault, could adversely affect the proposed hotel development. Please discuss and provide appropriate mitigation measures regarding the proposed development to conform to the Malibu Building Code (prevent catastrophic failure of structures and loss of life).

Appendix A

Response to Comment 9

The possibility of additional faults below the terrace deposits cannot be ruled out. However, based on review of the previously excavated trench logs, surface rupture has not occurred on the site in at least 100K years. Sediments exposed in Trench T-7 by LA, which crosses the fault shown by LA, are continuous and unbroken across the mapped location of the fault. In addition, the two trenches excavated by VBB also exposed unbroken sediments that crossed the previously mapped location of the fault. As discussed above, the soil that overlies these sediments are at least 100K and possibly much older. Since this appears to be the most likely location of a fault on the site and this fault is clearly inactive, the potential for additional surface rupture is considered equally unlikely. However, the site is located within a seismically active area and is subject to strong ground shaking during the life of the project. Therefore, the structures should be adequately designed to resist damage during a strong earthquake. Additional information regarding seismic conditions on the site is discussed in Appendix E.

Comment 10

Please plot Leighton borings LB-3, LB-7, and LB-21 on the Geotechnical Map.

Response to Comment 10

As stated above, the geologic map by LA is of poor quality and is very difficult to read. We have added all boring to our geologic map that we can find on the LA map. A copy of the geologic map by LA is included herein as a reference.

Comment 11

Please provide bedding data to substantiate the south-dipping structure depicted on Cross-Section A-A'. Regional maps by the USGS and Dibblee appear to show north to northeast-dipping bedding in this area.

Appendix A

Response to Comment 11

The geologic data from the previous consultants has been added to the geologic map. Based on their data, bedding is highly variable and some south dipping bedding was observed along the southeast part of the site in LA borings B-1 and B-2.

Comment 12

Please provide bedding data to justify the west-dipping structure on Cross-Section B-B'.

Response to Comment 12

A new geologic cross-section has been prepared in this area (see Section G-G'). The geologic conditions on the section were based on nearby borings by LA. Geologic structure in this area is highly variable, as shown on the section. Bedding dips mostly to the north with a slight component that dips to the east.

Comment 13

What is the basis for the anticlinal fold in the Monterey Formation depicted on Cross-Section C-C'?

Response to Comment 13

Although we do not have a cross-section is the same area, the anticline shown on Section C-C' by VBB appears to be based on the variation in bedding attitudes from Borings B-1, B-2, and B-4 by LA. Borings B-1 and B-2 show bedding dipping steeply to the south, whereas Boring B-4 shows bedding dipping steeply to the north.

Comment 14

The grading plans indicate that a fill slope with minor cut is proposed immediately above the landslide depicted on Cross-Section B-B'. The Project Geotechnical Consultant shall review the grading plan and update the Geologic Map and Cross-Sections to reflect the currently proposed grading plan. Additional recommendations shall be provided, as necessary, as well as slope stability analyses of the proposed conditions.

Appendix A

Response to Comment 14

Geologic Cross-Section G-G' passes through the subject area. The previous analyses by VBB assumed that the landslide material would fail and analyzes the resulting slope without the landslide in place. We feel that these analyses are too conservative, as the landslide deposits extend 40 to 60 feet below the existing older alluvium at the bottom of the slope. As a result, the landslide is basically buttressed by the alluvium. The descending naturally slope in this area is flatter than a 2:1 gradient. Therefore, we recommend a minimum 20 foot wide by 5 foot deep keyway long the toe of the proposed slope (see Section G-G'). During grading, mapping should be performed to ensure that the area of the proposed key is founded into firm, stable material.

Comment 15

The Project Geotechnical Consultant needs to provide a finding in accordance with Section 111 of the Malibu Building Code.

Response to Comment 15

Acknowledged and provided under the Conclusions section of this report.

Comment 16

The Project Geotechnical Consultant/hydrogeologist consultant must demonstrate that the effluent from the proposed private wastewater treatment system (leach field, seepage pits, or drip irrigation systems) will not adversely affect the stability of the subject site or adjacent properties in accordance with Section 111 of the Malibu Building Code. Geologic cross section(s) shall be provided which depict the proposed development, proposed wastewater treatment system, anticipated paths of effluent, and capping depths of seepage pits (if applicable). The Project Engineering Geologist shall provide sufficient hydrogeologic data to substantiate their conclusions regarding the effects of effluent on groundwater levels under the site, the potential for mounding of groundwater, and the potential for effluent to daylight on slopes. In addition, the Consultant shall consider the effects of water from irrigation across the site on groundwater levels. The supporting geologic discussion shall include interpretations of geologic structure, stratigraphy (specifically, lithologic changes across the site that could affect hydraulic conductivities across the site), and discontinuities such as contacts fractures, faults, clay seams, and joint systems. Highest anticipated

Appendix A

groundwater levels, taking into account the effluent from the private wastewater treatment system and irrigation, shall be utilized in the slope stability analyses on hillside sites. If the analyses indicate that there is an adverse affect due to a rise in groundwater levels on or down-gradient from the site, then the Project Geotechnical Consultant shall provide recommendations for mitigation, and/or Project Applicant shall consider relocation or redesign of effluent disposal facilities that mitigate the rise in groundwater.

Response to Comment 16

On site sewage disposal is not currently proposed on the subject site. At this time, it is intended to use the City of Malibu's proposed treatment facility, which is still in the planning stages.

Comment 17

Please provide a percolation test report for the proposed OWTS for review. Is there evidence of higher groundwater levels in the shallower soils? What type of system will be proposed?

Response 17

See *Response to Comment 16.*

Comment 18

In accordance with Chapter 18.4(D) of the City's Local Coastal Plan-Local Implementation Plan (LCP-LIP), the proposed OWTS shall be evaluated for cumulative impacts on groundwater levels, including the impact (if any) on down-gradient OWTS. A cumulative impact analysis shall be submitted and approved by City geotechnical staff and the City Environmental Health Specialist, Andrew Sheldon.

Response to Comment 18

See *Response to Comment 16.*

Appendix A

Comment 19

Section 6.2.1 of the City of Malibu's geotechnical guidelines requires that direct shear tests be performed in accordance with ASTM procedures, and, if the rate of deformation exceeds 0.005 inches per minute, the Project Geotechnical Consultant needs to provide data to demonstrate that the rate is sufficiently slow for drained conditions. Since the rate of deformation was not specified, the Project Geotechnical Consultant needs to provide data to demonstrate that the tests were performed as drained tests.

Response to Comment 19

Additional shear testing was performed by GSC on samples obtained from our recent exploration. The shear tests were run in accordance with the current ASTM procedures. The results are included in Appendix C.

Comment 20

Peak shear strength parameters were used in the slope stability analyses. There are exceptions, but generally ultimate shear strength parameters are required for slope stability analyses to comply with the City's geotechnical guidelines. Furthermore, shear strength data from previous studies (Leighton seismic hazard report) were used. The tests used in these previous studies may not comply with current standards, and therefore, the shear strength data may not be acceptable. The Project Geotechnical Consultant needs to review their shear strength selection, revise their selection to meet the requirement of the City's geotechnical guidelines, and provide a discussion to support their selection. Also, provide the shear-displacement diagrams for the tests performed during this study. Slope stability analyses should be re-run with revised shear strength parameters, as appropriate.

Response to Comment 20

Additional stability analyses were performed as part of this study. The analyses were based on new shear strength data obtained from our recent subsurface exploration and laboratory testing. The results of the analyses indicate that the steeper portions of the north-facing slope in the area of Sections A-A' and B-B' have a factor of safety below minimum code values. As a result, additional stability analyses were performed to determine the location of the failure surface with a 1.5 factor of safety. The outer edge of the slope, as well as the proposed retaining walls, should be supported on piles. The piles should be designed to extend below the critical failure surface. Recommendations are presented in Appendix D.

Comment 21

The Project Geotechnical Consultant has presented the shear strength data on composite plots. The data appear to be a mixture of results on samples soaked and samples at natural moisture contents. These data for soaked and natural moisture contents should be presented on separate plots.

Response to Comment 21

The slope stability has been performed on new shear strength data obtained by GSC. All samples were soaked prior to testing.

Comment 22

Static safety factors must be equal or exceed 1.5. Rounding values up that are less than 1.5 is not acceptable. Thus, the results for Section B-B' (gross) does not meet the requirements of the City's geotechnical guidelines, and mitigations measures must be provided.

Response to Comment 22

As stated above under Comment 14, the previous analyses performed by VBB assumed complete failure (removal) of the landslide deposits and analyses of the resulting slope. Based on view of available data and as shown on Section G-G', the landslide extends 40 to 60 feet below the existing older alluvium. Therefore, the complete removal of the landslide does not appear to be appropriate. Since the existing slope is flatter than a 2:1 gradient, additional analyses have not been performed.

Comment 23

The slope stability analyses need to include the effects of the surcharged loading of the structure on the computed safety factor.

Appendix A

Response to Comment 23

Acknowledged. Surcharge loading was considered in the analyses, where appropriate.

Comment 24

The critical failure surfaces (those with the lowest computed safety factors) for static and seismic conditions need to be plotted on the geologic cross sections in accordance with Section 6.2.3.1 of the City's geotechnical guidelines.

Response to Comment 24

Critical failure surfaces are shown on the geologic cross-sections.

BUILDING PLAN-CHECK STAGE REVIEW COMMENTS

Comment 1

Please clarify the last sentence on page 15 ("is" or "is not").

Response to Comment 1

The site is not located within 1,000 feet of a landfill.

Comment 2

In accordance with Section 5.1 (bottom of page 15 and top of page 16) of the City's geotechnical guidelines, please provide information that satisfies the requirement concerning (1) significant historic earthquakes including epicenter distances, earthquake magnitudes, and estimated intensity at the site and (2) a quantitative evaluation of ground shaking that may be associated with the Malibu Coast fault. The seismic evaluation needs to include peak and repeatable high ground accelerations, and duration of strong shaking.

Appendix A

Response to Comment 2

In accordance with City guidelines, a study of historical earthquakes has been performed utilizing the computer program EQSearch. The results are included in Appendix E and includes the distance from the site, earthquake magnitude, and intensity. In order to obtain information regarding the Malibu Coast Fault, the computer program EQFAULT was utilized. This indicated a peak ground acceleration of 0.86g and maximum earthquake magnitude of 6.7. The repeatable ground acceleration is considered to be 0.56g.

Comment 3

Section 4.3.4 of the City's geotechnical guidelines calls for geologic cross sections when basement, retaining wall, or temporary/permanent excavations exceed 10 feet or when an excavation extends below a 1(H):1(V) from adjacent foundations. Please provide at least two sections traversing buildings in orthogonal directions (free-standing, cantilever retaining walls orthogonal to the wall). The sections should depict the proposed and existing grades, proposed and existing foundations, basement (garage) sidewalls, adjacent structures and improvements, property lines, groundwater level (if any), locations of exploratory excavations, and soil units.

Response to Comment 3

Two geologic cross-sections have been provided through the proposed hotel basement (Sections H-H' and I-I'). There are no existing structures on the property and there is adequate area to excavate the basement in accordance with the Temporary Excavation Recommendations section in the report. As shown on the geologic cross-sections, there are proposed structures that fall within a 1:1 projection of the bottom of the basement; therefore, the basement walls should be designed to support additional loading from adjacent (proposed) structures.

Comment 4

The Project geotechnical Consultant needs to discuss the potential for seismically induced settlement in accordance with the requirements of the City's geotechnical guidelines.

Appendix A

Response to Comment 4

Based upon the recent field exploration, the blow counts were mostly 50±. Groundwater was not encountered in the boring; however, to accommodate the conversion from ring samples to SPT samples, we are considering the blow counts to be less than 30. Therefore, the anticipated seismic settlement per City guidelines is 0.5 inch.

Comment 5

The Project Geotechnical Consultant needs to discuss the potential for hydroconsolidation settlement in accordance with the requirements of the City's geotechnical guidelines.

Response to Comment 5

From the recent borings, six consolidation tests were performed. The results are presented in Appendix B. As indicated, two exhibited slight swelling upon the addition of water and two showed minor hydroconsolidation (i.e. less 2%). The remaining tests did nothing upon the addition of water. Therefore, it is our professional opinion hydroconsolidation does not pose a hazard to the site.

Comment 6

The Project Geotechnical Consultant needs to discuss the soil expansion potential in accordance with the requirements of the City's geotechnical guidelines.

Response to Comment 6

Three expansion tests were performed in accordance with ASTM D-4829-08. The results are included in Appendix C. As indicated, the on-site materials have a medium expansion potential.

Appendix A

Comment 7

The Project Geotechnical Consultant needs to clarify whether the recommended passive and sliding resistances are allowable or ultimate values and if the values are allowable, provide the safety factor, along with supporting calculations, used to generate allowable values. Safety factors must exceed 1.5. The Consultant needs to refer to Section 7.1.1 of the City's geotechnical guidelines relative to the amount of cohesion that may be used in computing the passive resistance, the need for shear test results on saturated samples at low effective overburden pressures, and the required safety factor when the lateral resistance is increased for short-duration loadings. Revise recommendations as necessary.

Response to Comment 7

Utilizing a friction angle of 25 (Plate SH-2 in Appendix C) and a zero cohesion:

$$
\begin{array}{llllll}
Pp & = & \gamma \tan^2 (45+{}^{\phi}/_{2}) & & & \gamma=125\ \text{pcf} \\
 & = & 125 \tan^2 (45+12.5) & = & 308\ \text{pcf} & \\
FS & = & 1.5 & & & \\
P_{Pallow} & = & {}^{308}/_{1.5} & = & 205\ \text{pcf} &
\end{array}
$$

Use a passive pressure equal to 200 pcf.

Comment 8

The Project Geotechnical Consultant has recommended a backdrain for the basement retaining wall. There appears to be no suitable discharge point for gravity flow of this drain. In accordance with Section 2.8.4.3, the Consultant needs to include alternative discharge recommendations for outletting this drain.

Response to Comment 8

A possible subdrain outlet may be run out from the basement area to the proposed basin at the southwest corner of the site, as the bottom of the basement is about three feet higher than the bottom of the basin. If this is not feasible due to conflicts with utility lines, etc., then it may be necessary to connect the basement subdrains to a sump pump.

Appendix A

Comment 9

The Project Geotechnical Consultant needs to provide recommendations in accordance with Section 7.3.1 of the City's geotechnical guidelines to waterproof subterranean walls and floors.

Response to Comment 9

The walls should be constructed with a minimum 4-inch perforated pipe in a gravel envelope at the bottom and behind the wall. A one foot thick zone of crushed gravel should be placed behind the wall to within two feet of the surface. On site compacted soil may be used for the remainder of the backfill. A waterproofing expert should also be consulted.

Comment 10

The scope of the project includes swimming pools. Please provide geotechnical recommendations for swimming pools/spas, including those for drainage and lateral earth pressures acting on the walls of the swimming pool in accordance with Section 7.1.3 of the City's geotechnical guidelines.

Response to Comment 10

Swimming pool recommendations are provided in the main body of this report.

Comment 11

Please depict limits and depths of over-excavation and structural fill to be placed on the grading plan, and cross sectional view of the proposed building area. Cut and fill yardages are to be indicated on the cover sheet of the plans.

Response to Comment 11

The approximate depths of removals are shown on the geologic map.

Appendix A

Comment 12

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

Response to Comment 12

Acknowledged.

APPENDIX B

FIELD EXPLORATION PROCEDURES

APPENDIX B

FIELD EXPLORATION PROCEDURES

Our exploratory borings were drilled with a truck-mounted drill rig operated by an independent drilling company working under subcontract to GSC. Four borings were drilled (designated B-1-11 through B-4-11) utilizing an 8-inch diameter hollow stem auger drill rig. Samples were obtained via the California ring sampler.

A geologist from our firm continuously observed the borings and classified the soils encountered by visual examination in accordance with the Unified Soil Classification System, and collected representative soil samples. Ring samples were obtained by driving a ring sampler with the Kelly bar. Soil samples were retained in a series of brass rings, each having an inside diameter of 2.36 (6.0 centimeter) and a height of 1.00 inch (2.54 centimeter). The ring samples were stored in close-fitting, moisture-tight containers and later transported to our laboratory for further visual examination and testing, as deemed necessary. After the boring was completed, the borehole was backfilled with soil cuttings.

The enclosed *Boring Logs* describes the vertical sequence of soils and materials encountered in each boring, based primarily on our field classifications and supported by our subsequent laboratory examination and testing. Where a soil contact was observed to be gradational, our log indicates the average contact depth. Where a soil type changed between sample intervals, we inferred the contact depth. Our log also graphically indicates the blow count, sample type, sample number, and approximate depth of each soil sample obtained from the borings, as well as any laboratory tests performed on these soil samples. If any groundwater was encountered in a borehole, the approximate groundwater depth is depicted on the boring log.

BORING LOGS

GEOTECHNICAL BORING LOG

PROJECT NAME: Green Acres
W.O. NO.: 6489
DRILLING COMPANY: Choice
DATE STARTED: 9-8-11
BORING NO.: B-1-11
TYPE OF DRILL RIG: LAR
LOGGED BY: RLC
SHEET 1 OF 2
DRILLING METHOD: Hollow Stem
HAMMER WEIGHT (LBS): 140
GROUND ELEVATION (FT):
DIAMETER OF HOLE: 8
DROP (IN): 30
GW ELEVATION:
BORING LOCATION:

DEPTH (FT)	SAMPLE TYPE	BLOWS/ 6 IN.	GEOTECHNICAL DESCRIPTION	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	OTHER TESTS
			0-2', ALLUVIUM (Qal) Gray-brown, silty SAND, scattered gravel			
			2-36', TERRACE (Qt)			
5						
10	California Ring	50	@ 10', Orange-brown, very fine to medium SAND, slightly moist, dense @ 10-20', Occasional pebble-cobbles	5.3	106.6	Cons
15						
20	California Ring	34/50	@ 20', Orange-brown, very fine to medium SAND, slightly moist, dense	3.3	117.2	DS
25						

LEGEND

- Standard Penetration Test
- California Ring
- Rock Core
- Bulk Sample
- Shelby Tube
- Water Seepage
- Groundwater

SIEVE: GRAIN SIZE ANALYSIS
MAX: MAXIMUM DRY DENSITY
DS: DIRECT SHEAR
CONS: CONSOLIDATION
HYDR: HYDROMETER ANALYSIS
EXPAN: EXPANSION INDEX
CHEM: CHEMICAL TESTS

PLATE A-1

GeoSoils Consultants, Inc.
GEOTECHNICAL * GEOLOGIC * ENVIRONMENTAL

GEOTECHNICAL BORING LOG

PROJECT NAME: Green Acres
W.O. NO.: 6489
DRILLING COMPANY: Choice
DATE STARTED: 9-8-11
BORING NO.: B-1-11
TYPE OF DRILL RIG: LAR
LOGGED BY: RLC
SHEET 2 OF 2
DRILLING METHOD: Hollow Stem
HAMMER WEIGHT (LBS): 140
GROUND ELEVATION (FT):
DIAMETER OF HOLE: 8
DROP (IN): 30
GW ELEVATION:
BORING LOCATION:

DEPTH (FT)	SAMPLE TYPE	BLOWS/ 6 IN.	GEOTECHNICAL DESCRIPTION	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	OTHER TESTS
30	California Ring	23/37/49	@ 30', Orange-brown, slightly silty, very fine to medium SAND, scattered, very coarse grains, slightly moist to moist, dense	5.9	122.7	Cons
35						
36			**36-50', BEDROCK: Monterey Formation**			
40	California Ring	39/50 for 3"	@ 40', Light brown, fine to medium SANDSTONE, slightly moist, dense	1.0	107.4	DS
45						
50	California Ring	50 for 4"	@ 50', No recovery	-----	-----	
			T.D. @ 50' No groundwater			
55						

LEGEND

- Standard Penetration Test
- California Ring
- Rock Core
- Bulk Sample
- Shelby Tube
- Water Seepage
- Groundwater

SIEVE: GRAIN SIZE ANALYSIS
MAX: MAXIMUM DRY DENSITY
DS: DIRECT SHEAR
CONS: CONSOLIDATION
HYDR: HYDROMETER ANALYSIS
EXPAN: EXPANSION INDEX
CHEM: CHEMICAL TESTS

PLATE A-2

GeoSoils Consultants, Inc.
GEOTECHNICAL * GEOLOGIC * ENVIRONMENTAL

GEOTECHNICAL BORING LOG

PROJECT NAME Green Acres — W.O. NO. 6489
DRILLING COMPANY Choice — DATE STARTED: 9-8-11 — BORING NO. B-2-11
TYPE OF DRILL RIG LAR — LOGGED BY RLC — SHEET 1 OF 3
DRILLING METHOD Hollow Stem — HAMMER WEIGHT (LBS) 140 — GROUND ELEVATION (FT)
DIAMETER OF HOLE 8 — DROP (IN) 30 — GW ELEVATION
BORING LOCATION:

DEPTH (FT)	SAMPLE TYPE	BLOWS/ 6 IN.	GEOTECHNICAL DESCRIPTION	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	OTHER TESTS
			0-2', ALLUVIUM (Qal) Light brown, very fine to medium, sandy SILT, dry, loose			
	Bulk Sample		**2-60', TERRACE (Qt)**			Max Expan
5	California Ring	23/24/25	@ 5', Orange-brown, very fine to medium SAND with gravel, slightly moist to dry (rock in sampler tip)	3.1	-----	
10	California Ring	30/32/45	@ 10', Red-brown, fine to very coarse SAND, scattered pebbles, moist, dense	5.0	122.3	DS
15	California Ring	50 for 5"	@ 15', Red-brown, fine to very coarse SAND, scattered pebbles, moist, dense @ 16-27', Scattered pebbles-cobbles	6.0	-----	
20	California Ring	50 for 3"	@ 20', No recovery	-----	-----	
25						

LEGEND

- Standard Penetration Test
- California Ring
- Rock Core
- Bulk Sample
- Shelby Tube
- Water Seepage
- Groundwater

SIEVE: GRAIN SIZE ANALYSIS
MAX: MAXIMUM DRY DENSITY
DS: DIRECT SHEAR
CONS: CONSOLIDATION
HYDR: HYDROMETER ANALYSIS
EXPAN: EXPANSION INDEX
CHEM: CHEMICAL TESTS

PLATE A-3

GeoSoils Consultants, Inc.
GEOTECHNICAL * GEOLOGIC * ENVIRONMENTAL

GEOTECHNICAL BORING LOG

PROJECT NAME Green Acres		W.O. NO. 6489	
DRILLING COMPANY Choice	DATE STARTED: 9-8-11	BORING NO. B-2-11	
TYPE OF DRILL RIG LAR	LOGGED BY RLC	SHEET 2 OF 3	
DRILLING METHOD Hollow Stem	HAMMER WEIGHT (LBS) 140	GROUND ELEVATION (FT)	
DIAMETER OF HOLE 8	DROP (IN) 30	GW ELEVATION	
BORING LOCATION:			

DEPTH (FT)	SAMPLE TYPE	BLOWS/ 6 IN.	GEOTECHNICAL DESCRIPTION	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	OTHER TESTS
	California Ring	18/15/20	@ 30', Red-brown, slightly silty, very fine to coarse SAND, moist, dense	10.9	120.6	DS
35						
40	California Ring	18/33/45	@ 40', Red-brown, slightly silty, very fine to coarse SAND, moist, dense	7.0	130.0	
45						
50	California Ring	33/50	@ 50', Red-brown, silty, very fine to medium SAND, minor clay, moist, dense	8.2	120.8	
55						

LEGEND

- Standard Penetration Test
- California Ring
- Rock Core
- Bulk Sample
- Shelby Tube
- Water Seepage
- Groundwater

SIEVE:	GRAIN SIZE ANALYSIS
MAX:	MAXIMUM DRY DENSITY
DS:	DIRECT SHEAR
CONS:	CONSOLIDATION
HYDR:	HYDROMETER ANALYSIS
EXPAN:	EXPANSION INDEX
CHEM:	CHEMICAL TESTS

PLATE A-4

GeoSoils Consultants, Inc.

GEOTECHNICAL * GEOLOGIC * ENVIRONMENTAL

GEOTECHNICAL BORING LOG

PROJECT NAME Green Acres
DRILLING COMPANY Choice
TYPE OF DRILL RIG LAR
DRILLING METHOD Hollow Stem
DIAMETER OF HOLE 8
BORING LOCATION:

DATE STARTED: 9-8-11
LOGGED BY RLC
HAMMER WEIGHT (LBS) 140
DROP (IN) 30

W.O. NO. 6489
BORING NO. B-2-11
SHEET 3 OF 3
GROUND ELEVATION (FT)
GW ELEVATION

DEPTH (FT)	SAMPLE TYPE	BLOWS/ 6 IN.	GEOTECHNICAL DESCRIPTION	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	OTHER TESTS
	California Ring	21/37/ 50 for 5"	@ 60', Orange-brown, very fine to very coarse SAND, moist, slightly cemented, dense	7.8	123.7	
			T.D. @ 60' No groundwater			
65						
70						
75						
80						
85						

LEGEND
- Standard Penetration Test
- California Ring
- Rock Core
- Bulk Sample
- Shelby Tube
- Water Seepage
- Groundwater

SIEVE: GRAIN SIZE ANALYSIS
MAX: MAXIMUM DRY DENSITY
DS: DIRECT SHEAR
CONS: CONSOLIDATION
HYDR: HYDROMETER ANALYSIS
EXPAN: EXPANSION INDEX
CHEM: CHEMICAL TESTS

PLATE A-5

GeoSoils Consultants, Inc.
GEOTECHNICAL * GEOLOGIC * ENVIRONMENTAL

GEOTECHNICAL BORING LOG

PROJECT NAME Green Acres
W.O. NO. 6489
DRILLING COMPANY Choice
DATE STARTED: 9-8-11
BORING NO. B-3-11
TYPE OF DRILL RIG LAR
LOGGED BY RLC
SHEET 1 OF 3
DRILLING METHOD Hollow Stem
HAMMER WEIGHT (LBS) 140
GROUND ELEVATION (FT)
DIAMETER OF HOLE 8
DROP (IN) 30
GW ELEVATION
BORING LOCATION:

DEPTH (FT)	SAMPLE TYPE	BLOWS/ 6 IN.	GEOTECHNICAL DESCRIPTION	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	OTHER TESTS
			0-2', ALLUVIUM (Qal) Gray-brown, sandy SILT, dry, loose			
			2-60', TERRACE (Qt)			
5	California Ring	28/30/43	@ 5', Red-brown, silty, fine to medium SAND, scattered, very small gravel, slightly moist to moist, dense	6.6	124.4	Cons
	Bulk Sample					Max Expan
10						
15	California Ring	50 for 5"	@ 15', No recovery	-----	-----	
20	California Ring	16/18/27	@ 20', Orange-brown, silty, very fine to medium SAND, moist, dense	7.3	123.7	Cons DS
25	California Ring	35/50	@ 25', Orange-brown, silty, very fine to medium SAND, moist, dense	6.8	120.5	

LEGEND

- Standard Penetration Test
- California Ring
- Rock Core
- Bulk Sample
- Shelby Tube
- Water Seepage
- Groundwater

SIEVE: GRAIN SIZE ANALYSIS
MAX: MAXIMUM DRY DENSITY
DS: DIRECT SHEAR
CONS: CONSOLIDATION
HYDR: HYDROMETER ANALYSIS
EXPAN: EXPANSION INDEX
CHEM: CHEMICAL TESTS

PLATE A-6

GeoSoils Consultants, Inc.
GEOTECHNICAL * GEOLOGIC * ENVIRONMENTAL

GEOTECHNICAL BORING LOG

PROJECT NAME Green Acres | W.O. NO. 6489
DRILLING COMPANY Choice | DATE STARTED: 9-8-11 | BORING NO. B-3-11
TYPE OF DRILL RIG LAR | LOGGED BY RLC | SHEET 2 OF 3
DRILLING METHOD Hollow Stem | HAMMER WEIGHT (LBS) 140 | GROUND ELEVATION (FT)
DIAMETER OF HOLE 8 | DROP (IN) 30 | GW ELEVATION
BORING LOCATION:

DEPTH (FT)	SAMPLE TYPE	BLOWS/ 6 IN.	GEOTECHNICAL DESCRIPTION	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	OTHER TESTS
35	California Ring	29/32/44	@ 35', Orange-brown, very fine to coarse occasional small gravel and very coarse grains, slightly moist to moist, dense	4.1	123.3	Cons DS
40						
45	California Ring	26/50 for 5"	@ 45', Light brown, very fine to medium SAND, moist, dense	3.3	106.2	
50						
55	California Ring	36/37/ 50 for 2"	@ 55', Light to medium brown, very fine to medium SAND, caliche veins, moist, dense	7.8	118.6	DS

LEGEND

- Standard Penetration Test
- California Ring
- Rock Core
- Bulk Sample
- Shelby Tube
- Water Seepage
- Groundwater

SIEVE: GRAIN SIZE ANALYSIS
MAX: MAXIMUM DRY DENSITY
DS: DIRECT SHEAR
CONS: CONSOLIDATION
HYDR: HYDROMETER ANALYSIS
EXPAN: EXPANSION INDEX
CHEM: CHEMICAL TESTS

PLATE A-7

GeoSoils Consultants, Inc.
GEOTECHNICAL * GEOLOGIC * ENVIRONMENTAL

GEOTECHNICAL BORING LOG

PROJECT NAME Green Acres
W.O. NO. 6489
DRILLING COMPANY Choice
DATE STARTED: 9-8-11
BORING NO. B-3-11
TYPE OF DRILL RIG LAR
LOGGED BY RLC
SHEET 3 OF 3
DRILLING METHOD Hollow Stem
HAMMER WEIGHT (LBS) 140
GROUND ELEVATION (FT)
DIAMETER OF HOLE 8
DROP (IN) 30
GW ELEVATION
BORING LOCATION:

DEPTH (FT)	SAMPLE TYPE	BLOWS/ 6 IN.	GEOTECHNICAL DESCRIPTION	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	OTHER TESTS
	California Ring	50 for 3"	@ 60', No recovery	-----	-----	
			T.D. @ 60' No groundwater			
65						
70						
75						
80						
85						

LEGEND

- Standard Penetration Test
- California Ring
- Rock Core
- Bulk Sample
- Shelby Tube
- Water Seepage
- Groundwater

SIEVE: GRAIN SIZE ANALYSIS
MAX: MAXIMUM DRY DENSITY
DS: DIRECT SHEAR
CONS: CONSOLIDATION
HYDR: HYDROMETER ANALYSIS
EXPAN: EXPANSION INDEX
CHEM: CHEMICAL TESTS

PLATE A-8

GeoSoils Consultants, Inc.
GEOTECHNICAL * GEOLOGIC * ENVIRONMENTAL

GEOTECHNICAL BORING LOG

PROJECT NAME Green Acres
W.O. NO. 6489
DRILLING COMPANY Choice
DATE STARTED: 9-8-11
BORING NO. B-4-11
TYPE OF DRILL RIG LAR
LOGGED BY RLC
SHEET 1 OF 2
DRILLING METHOD Hollow Stem
HAMMER WEIGHT (LBS) 140
GROUND ELEVATION (FT)
DIAMETER OF HOLE 8
DROP (IN) 30
GW ELEVATION
BORING LOCATION:

DEPTH (FT)	SAMPLE TYPE	BLOWS/ 6 IN.	GEOTECHNICAL DESCRIPTION	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	OTHER TESTS
0	Bulk Sample		**0-5', ALLUVIUM (Qal)** Medium brown-gray, silty SAND, dry to slightly moist, slightly dense			Max Expan
5	Bulk Sample; California Ring	15/17/18	**5-30', BEDROCK: Vaqueros Formation** @ 5', Orange-gray, silty, fine SANDSTONE, moist, dense	6.7	118.0	
10	California Ring	13/18/25	@ 10', Orange-gray, sandy SILTSTONE to silty SANDSTONE, moist, dense	17.5	104.6	DS
15	California Ring	33/36/49	@ 15', Brown-gray, silty SANDSTONE, carbonate veins, slightly cemented, moist, dense	10.3	115.0	Cons
20	California Ring	31/50 for 5"	@ 20', Gray-black, silty, fine SANDSTONE, carbonate veins, moderate cement, moist, dense	9.5	113.6	DS
25	California Ring	50	@ 25', Gray-green, very fine to medium SANDSTONE, small gravel, carbonate deposits, moderate cement, moist, very dense	9.1	111.0	

LEGEND

- Standard Penetration Test
- California Ring
- Rock Core
- Bulk Sample
- Shelby Tube
- Water Seepage
- Groundwater

SIEVE: GRAIN SIZE ANALYSIS
MAX: MAXIMUM DRY DENSITY
DS: DIRECT SHEAR
CONS: CONSOLIDATION
HYDR: HYDROMETER ANALYSIS
EXPAN: EXPANSION INDEX
CHEM: CHEMICAL TESTS

PLATE A-9

GeoSoils Consultants, Inc.
GEOTECHNICAL * GEOLOGIC * ENVIRONMENTAL

GEOTECHNICAL BORING LOG

PROJECT NAME: Green Acres
W.O. NO.: 6489
DRILLING COMPANY: Choice
DATE STARTED: 9-8-11
BORING NO.: B-4-11
TYPE OF DRILL RIG: LAR
LOGGED BY: RLC
SHEET 2 OF 2
DRILLING METHOD: Hollow Stem
HAMMER WEIGHT (LBS): 140
GROUND ELEVATION (FT):
DIAMETER OF HOLE: 8
DROP (IN): 30
GW ELEVATION:
BORING LOCATION:

DEPTH (FT)	SAMPLE TYPE	BLOWS/ 6 IN.	GEOTECHNICAL DESCRIPTION	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	OTHER TESTS
	California Ring	50 for 4"	@ 30', Gray-green, very fine to medium SANDSTONE, small gravel, carbonate deposits, moderate cement, moist, very dense	10.3	105.8	DS
			T.D. @ 30' No groundwater			
35						
40						
45						
50						
55						

LEGEND

- Standard Penetration Test
- California Ring
- Rock Core
- Bulk Sample
- Shelby Tube
- Water Seepage
- Groundwater

SIEVE: GRAIN SIZE ANALYSIS
MAX: MAXIMUM DRY DENSITY
DS: DIRECT SHEAR
CONS: CONSOLIDATION
HYDR: HYDROMETER ANALYSIS
EXPAN: EXPANSION INDEX
CHEM: CHEMICAL TESTS

PLATE A-10

GeoSoils Consultants, Inc.
GEOTECHNICAL * GEOLOGIC * ENVIRONMENTAL

September 15, 2011
W.O. 6489

APPENDIX C

LABORATORY TESTING PROCEDURES

LABORATORY RESULTS

APPENDIX C

LABORATORY TESTING PROCEDURES

Moisture-Density

The field moisture content and dry unit weights were determined for each undisturbed ring sample obtained from our subsurface exploration. Once the dry unit weights had been determined, in-place densities of underlying soil profile were estimated. In those cases where ring samples were obtained, the moisture content and dry unit weights are presented on the Boring Logs B-1 through B-4.

Compaction Tests

Compaction tests were performed to determine to moisture density relationships of the typical surficial soils encountered on the site. The laboratory standard used was in accordance with ASTM Test Designation D-1557-02. A summary of the compaction test results is shown in Table C-1.

TABLE C-1
COMPACTION TEST RESULTS

Boring No. And Sample Depth	Description	Maximum Dry Density (psf)	Optimum Moisture (%)	Expansion Index
B-2 @ 5'	Reddish Brown Clayey Sandy SILT with Gravel	125.5	11.0	Medium
B-3 @ 8-10"	Reddish Brown Clayey Sandy SILT with Gravel	124.0	11.0	Medium
B-4 @ 5-10'	Brown, Slightly Sandy, Clayey SILT with Gravel	117.0	15.5	Medium

Direct Shear Tests

Shear tests were performed in a strain-control type Direct Shear Machine. The samples were sheared under varying confining loads in order to determine the Coulomb shear strength parameters: cohesion (c), and angle of internal friction (ϕ) for peak and residual strength conditions. The samples were tested in an artificially saturated condition. The

Appendix C

results are plotted and a linear approximation is drawn of the failure curve. Results are shown on the Shear Test Diagrams included with these appendices, as Plates SH-1 through SH-13. Shear tests performed on undisturbed ring samples are presented on Plates SH-1 to SH-10. Shear tests were performed on samples remolded to 90 percent relative compaction and the results are shown in Plates SH-11 through SH-13.

Consolidation Test

Consolidation tests were performed on selected ring samples to develop data for settlement studies. The tests were performed primarily on materials which would be considered to be most susceptible to consolidation under increased loading. Loads were applied to the sample in several increments in geometric progression, and the resulting deformation was recorded at selected time intervals. Porous stones were placed in contact with the top and bottom of each specimen to permit the release and addition of pore fluid. Inundation of the sample was performed at an approximate load one ton per square foot. Results of the consolidation test are shown on Plates C-1 through C-6.

Expansion Index Tests

To determine the expansion potential of the on-site soils, expansion index tests were performed. The results are included in the above table.

LABORATORY RESULTS

Green Acres, LLC
W.O.: 6489

Date of Test: 9/11

Sample: **B-1 @ 20.0'**

GeoSoils Consultants, Inc.

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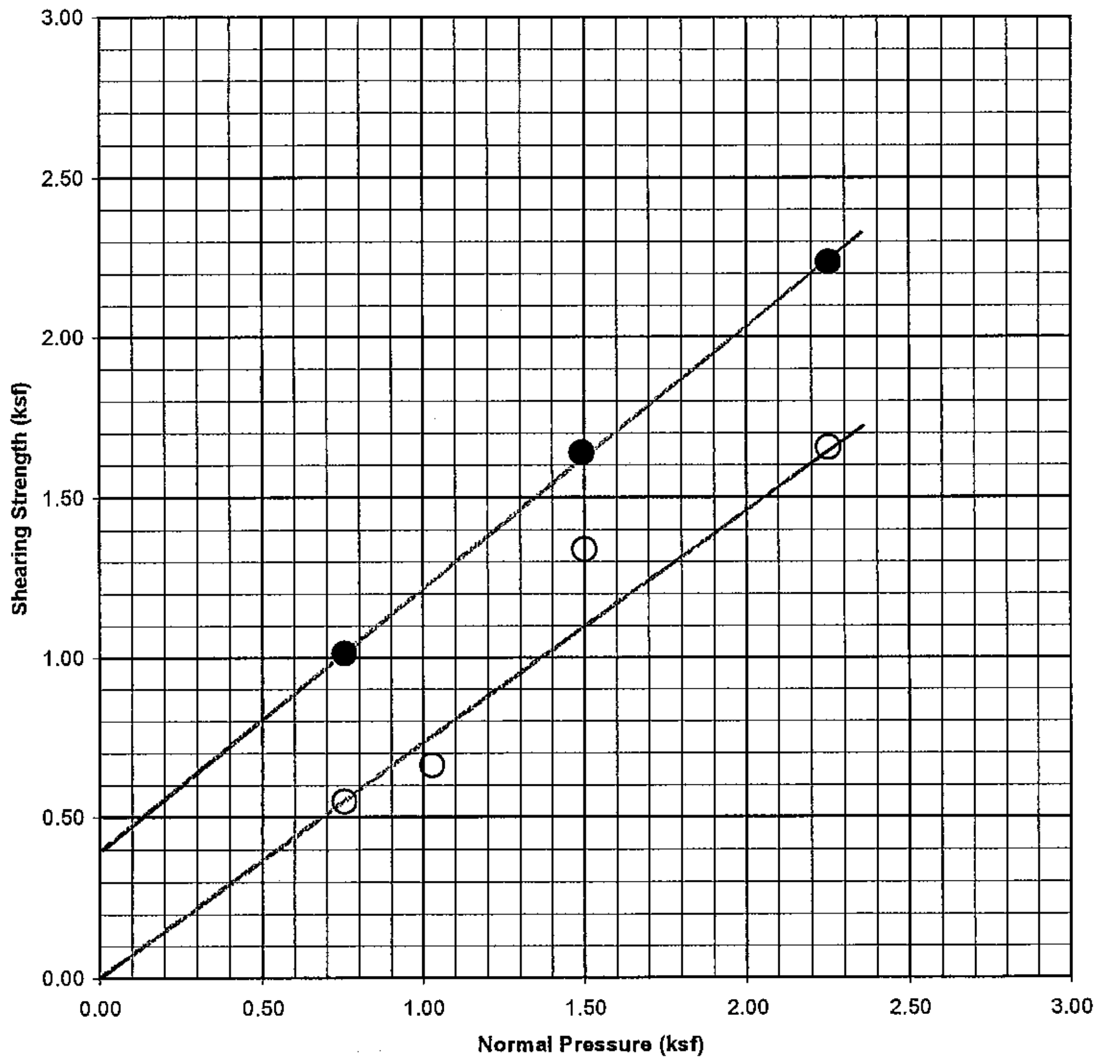
PLATE SH-1

Shear Test Diagram
Peak
C(psf): 400 Phi (degrees): 39.0

Reshear
C(psf): 0 Phi (degrees): 36.0



Direct Shear, Peak / Reshear Speed: .005 in./min.

● Peak Values O Reshear Values

Undisturbed **Natural** Shear-Saturated

Orange-brown, silty, very fine to fine SAND, w/ some coarse sand.

18.9% Saturated Moisture Content

Green Acres, LLC
W.O.: 6489

Date of Test: 9/11

Sample: **B-1 @ 40.0'**

GeoSoils Consultants, Inc.

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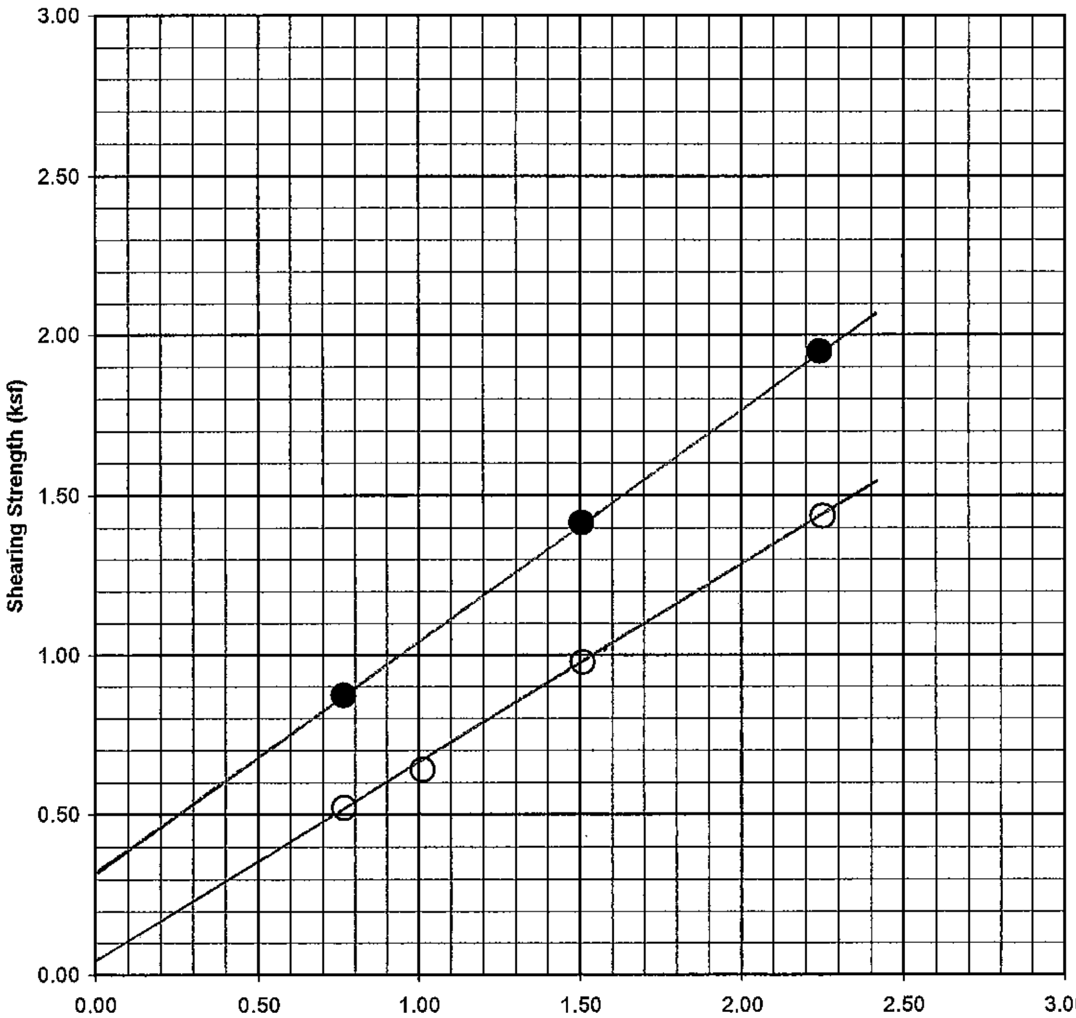
PLATE SH-2

Shear Test Diagram
Peak
C(psf): 320 Phi (degrees): 35.5

Reshear
C(psf): 50 Phi (degrees): 31.5



Normal Pressure (ksf)
Direct Shear, Peak / Reshear Speed: .005 in./min.

● Peak Values O Reshear Values

Undisturbed **Natural** Shear-Saturated

Light orange-brown, very fine to fine SAND.

21.9% Saturated Moisture Content

Green Acres, LLC
W.O.: 6489

Date of Test: 9/11

Sample: **B-2 @ 10.0'**

GeoSoils Consultants, Inc.

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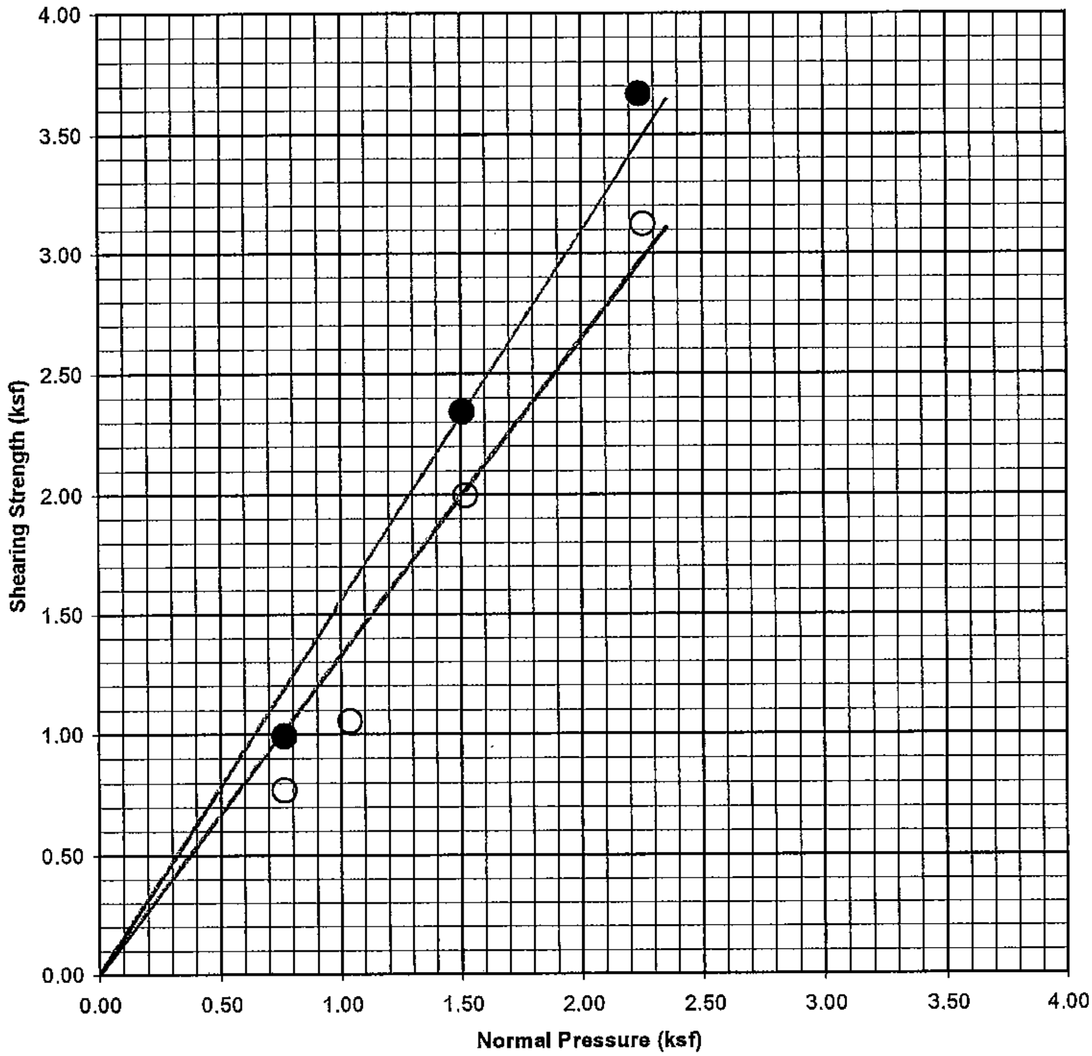
PLATE SH-3

Shear Test Diagram
Peak
C(psf): 0 Phi (degrees): 57.0

Reshear
C(psf): 0 Phi (degrees): 52.5



Direct Shear, Peak / Reshear Speed: .005 in./min.

● Peak Values ○ Reshear Values

Undisturbed **Natural** Shear-Saturated

Red-brown, silty, very fine to coarse SAND, w/ rock fragments.

16.7% Saturated Moisture Content

Green Acres, LLC
W.O.: 6489

Date of Test: 9/11

Sample: **B-2 @ 30.0'**

GeoSoils Consultants, Inc.

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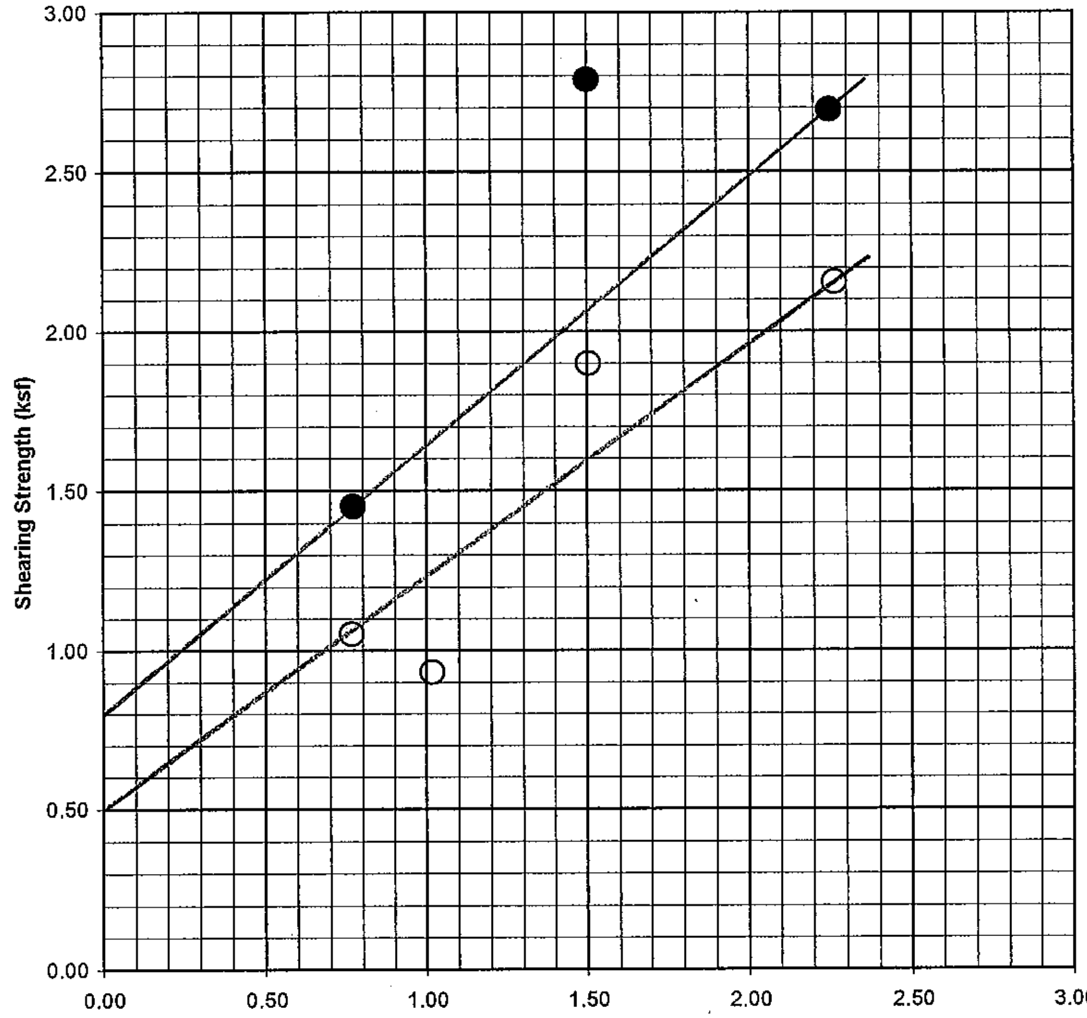
PLATE SH-4

Shear Test Diagram
Peak
C(psf): 800 Phi (degrees): 40.0

Reshear
C(psf): 500 Phi (degrees): 36.0



Direct Shear, Peak / Reshear Speed: .001 in./min.

● Peak Values ○ Reshear Values

Undisturbed **Natural** Shear-Saturated

Orange-brown, silty, sandy CLAY.

19.9% Saturated Moisture Content

Green Acres, LLC
W.O.: 6489

GeoSoils Consultants, Inc.

PLATE SH-5

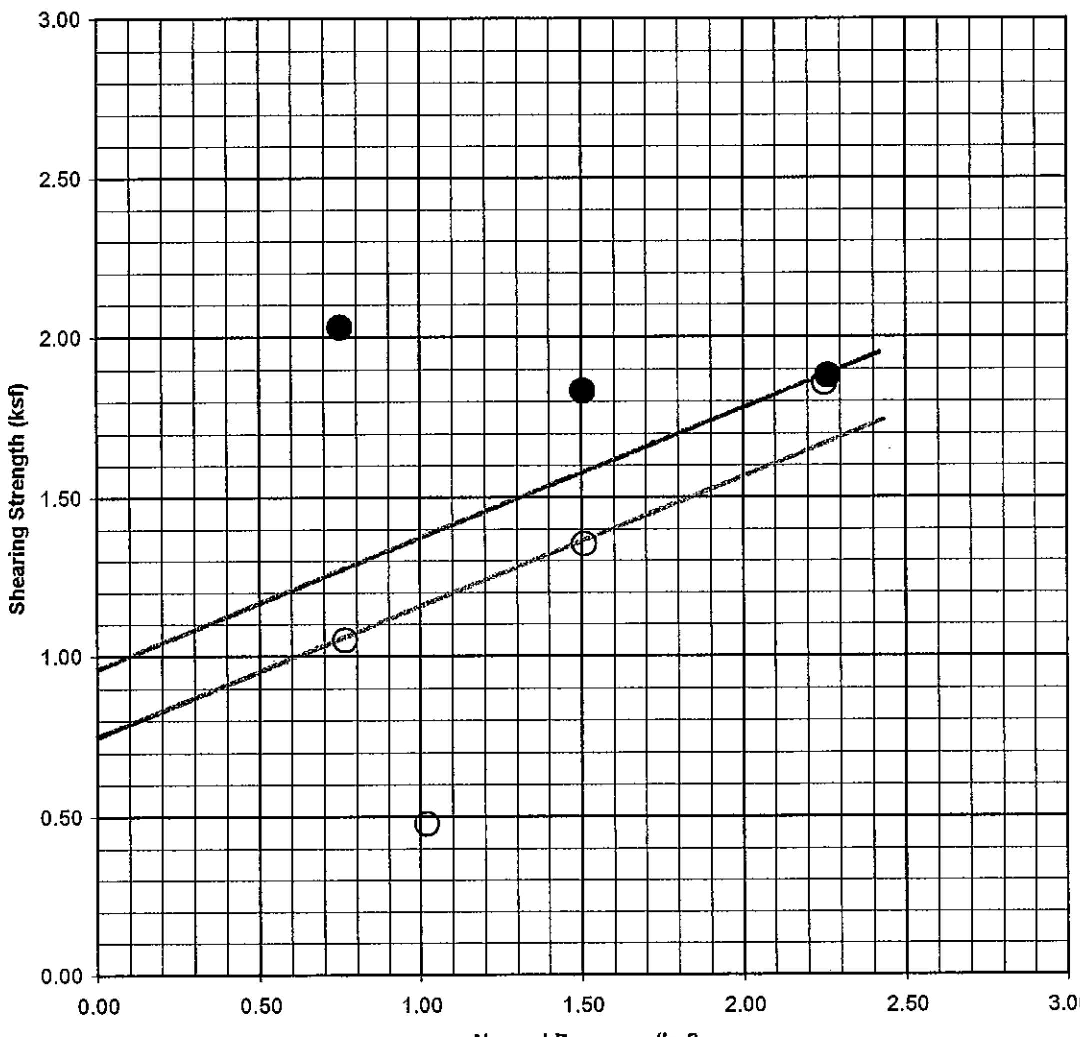
Geotechnical Engineering * Engineering Geology

Date of Test: 9/11

Sample: **B-3 @ 20.0'**

Shear Test Diagram
Peak
C(psf): 960 Phi (degrees): 22.0

Reshear
C(psf): 750 Phi (degrees): 22.0



Direct Shear, Peak / Reshear Speed: .001 in./min.

● Peak Values ○ Reshear Values

Undisturbed **Natural** Shear-Saturated

Orange-brown, sandy, slightly clayey SILT.

19.8% Saturated Moisture Content

Green Acres, LLC
W.O.: 6489

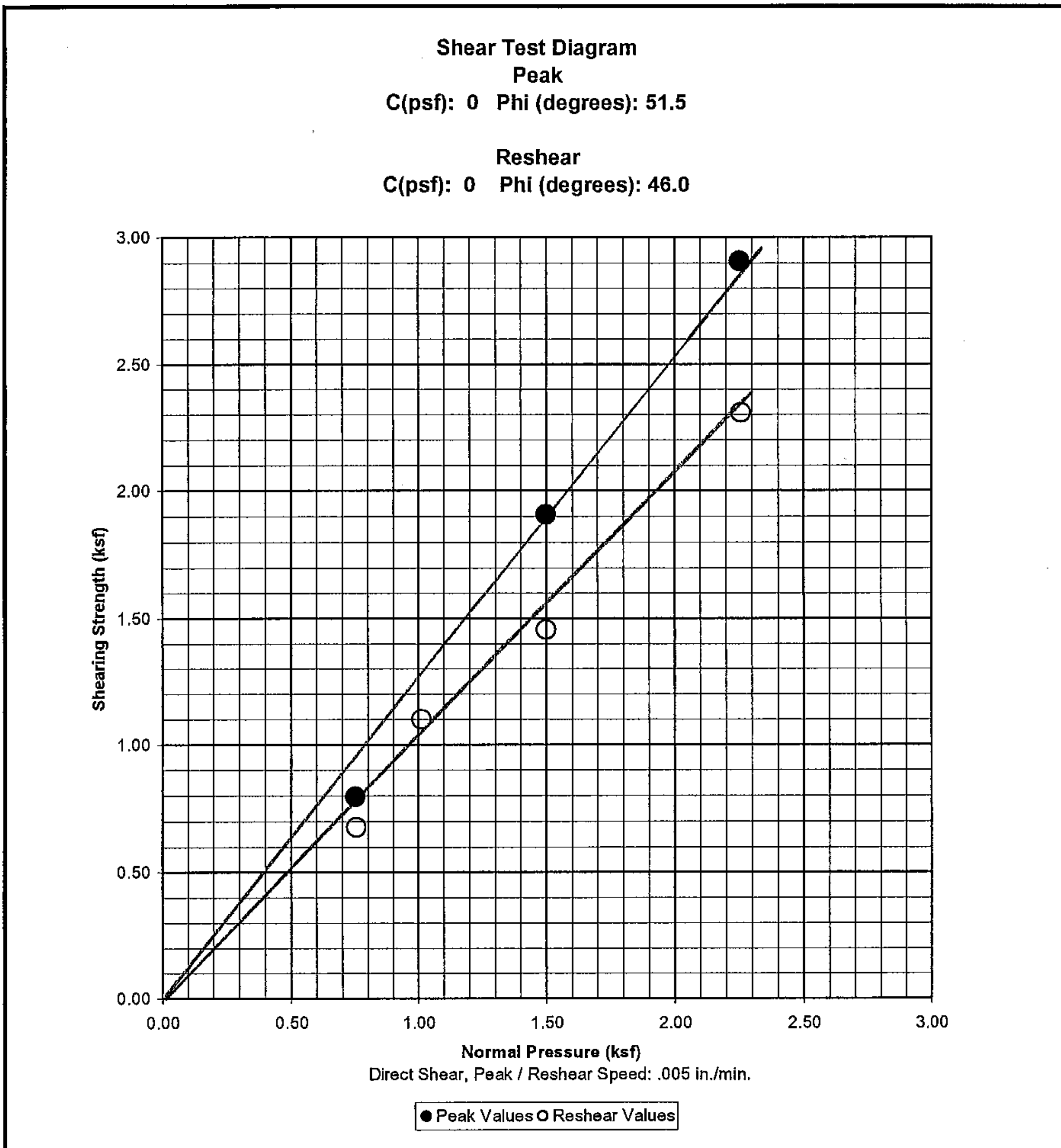
Date of Test: 9/11

Sample: **B-3 @ 35.0'**

GeoSoils Consultants, Inc.

Geotechnical Engineering * Engineering Geology

PLATE SH-6



Undisturbed **Natural** Shear-Saturated

Orange-brown, silty, very fine to coarse SAND.

17.3% Saturated Moisture Content

Green Acres, LLC
W.O.: 6489

Date of Test: 9/11

Sample: **B-3 @ 55.0'**

PLATE SH-7

GeoSoils Consultants, Inc.

Geotechnical Engineering * Engineering Geology

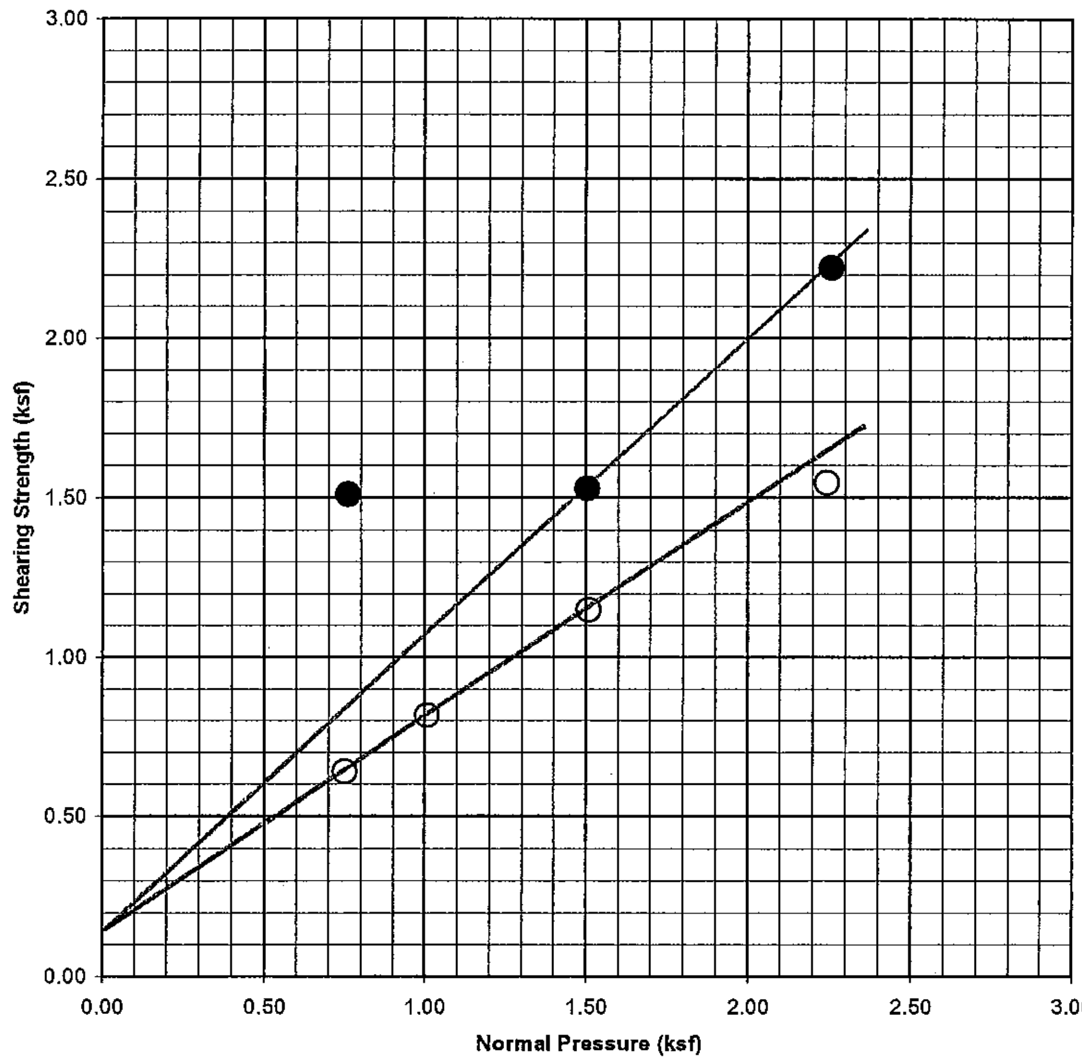
Shear Test Diagram

Peak

C(psf): 150 Phi (degrees): 42.5

Reshear

C(psf): 150 Phi (degrees): 33.5



Direct Shear, Peak / Reshear Speed: .001 in./min.

● Peak Values ○ Reshear Values

Undisturbed **Natural** Shear-Saturated

Orange-brown, sandy SILT.

17.1% Saturated Moisture Content

Green Acres, LLC
W.O.: 6489

Date of Test: 9/11

Sample: B-4 @ 10.0'

GeoSoils Consultants, Inc.

Geotechnical Engineering * Engineering Geology

PLATE SH-8

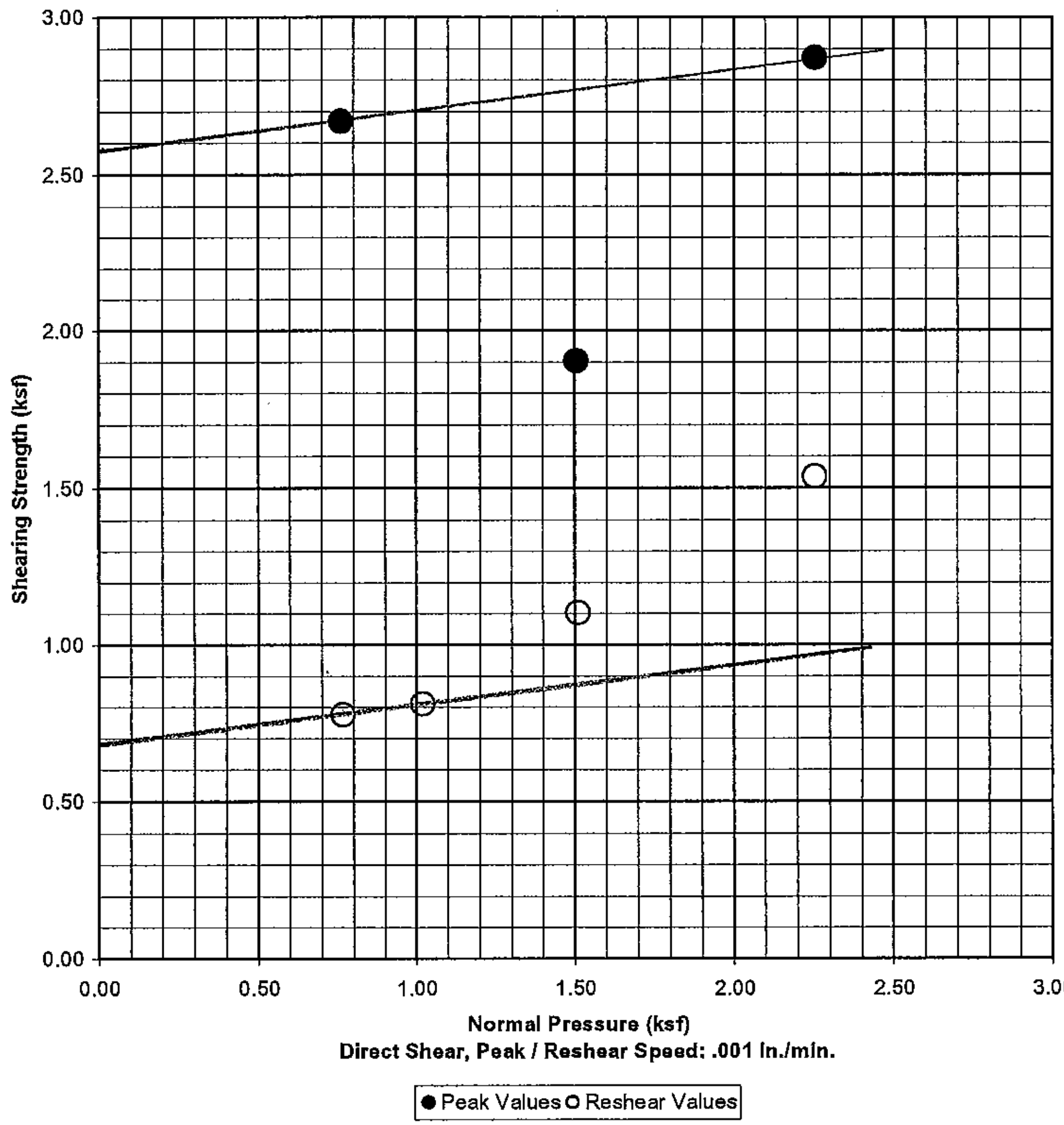
Shear Test Diagram

Peak

C(psf): 2580 Phi (degrees): 7.5

Reshear

C(psf): 690 Phi (degrees): 7.0



Undisturbed **Natural** Shear-Saturated

Orange-brown / green-brown, silty CLAY.

27.2% Saturated Moisture Content

Green Acres, LLC
W.O.: 6489

Date of Test: 9/11

Sample: **B-4 @ 20.0'**

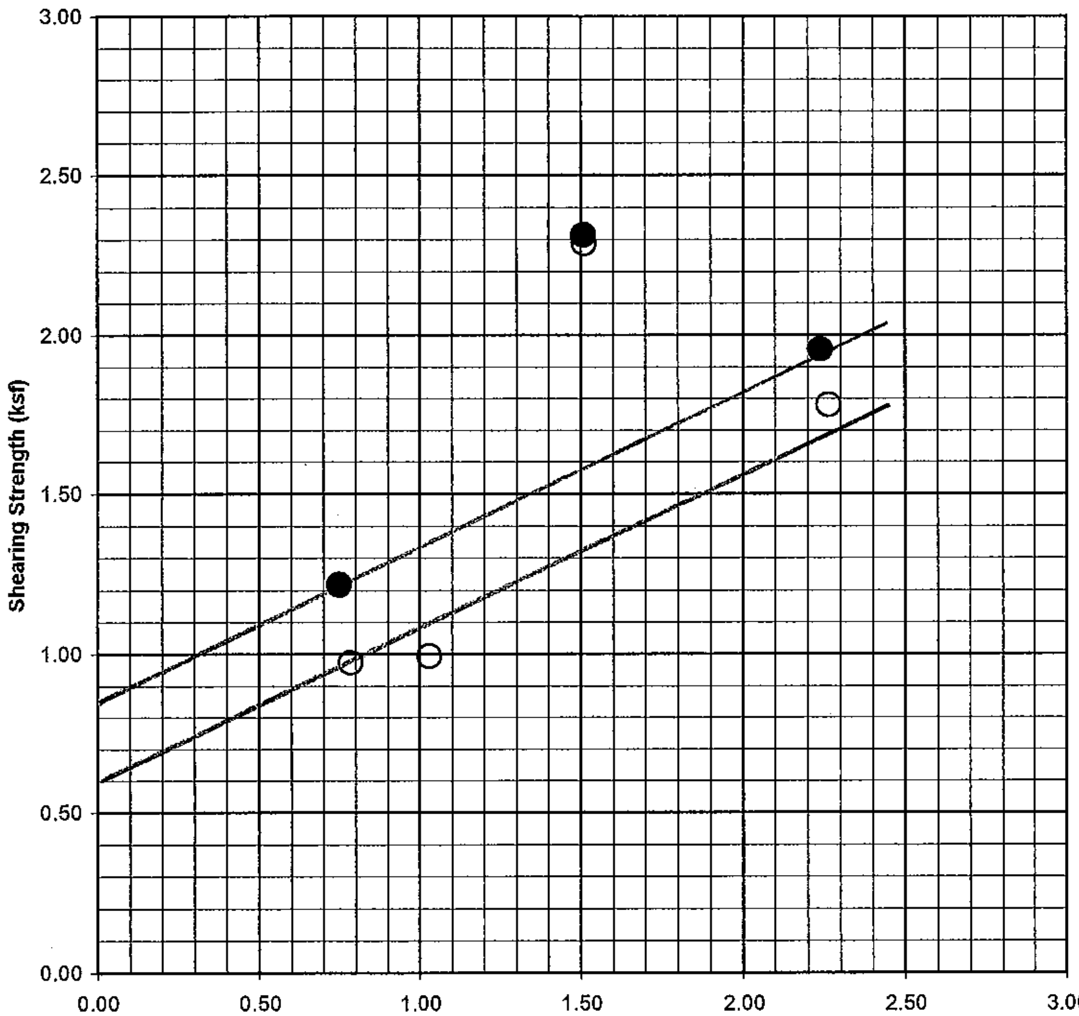
GeoSoils Consultants, Inc.

Geotechnical Engineering * Engineering Geology

PLATE SH-9

Shear Test Diagram
Peak
C(psf): 850 Phi (degrees): 26.0

Reshear
C(psf): 600 Phi (degrees): 25.5



Normal Pressure (ksf)
Direct Shear, Peak / Reshear Speed: .001 in./min.

● Peak Values O Reshear Values

Undisturbed **Natural** Shear-Saturated

Brown, sandy SILT, w/ rock fragments.

25.0% Saturated Moisture Content

Green Acres, LLC
W.O.: 6489

Date of Test: 9/11

Sample: **B-4 @ 30.0'**

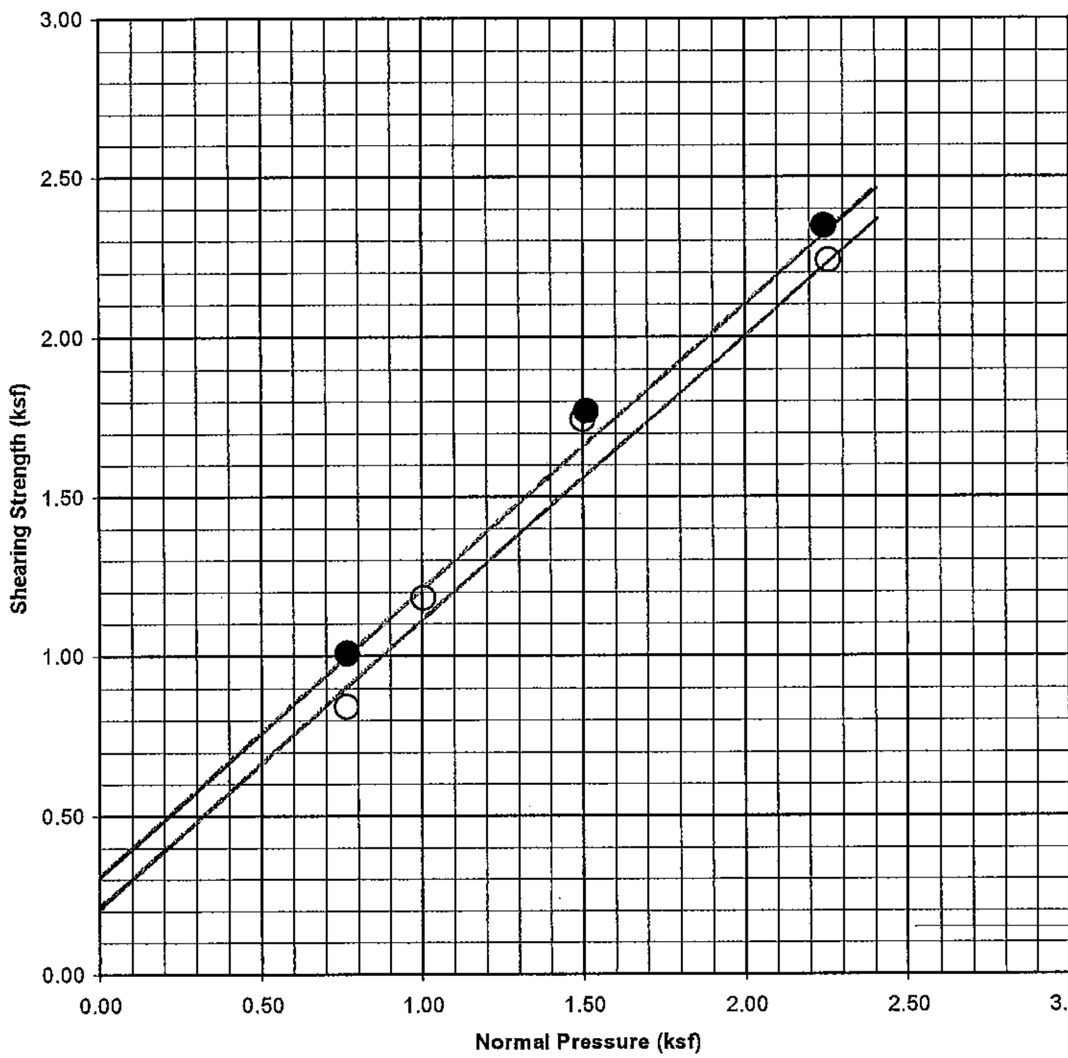
GeoSoils Consultants, Inc.

Geotechnical Engineering * Engineering Geology

PLATE SH-10

Shear Test Diagram
Peak
C(psf): 310 Phi (degrees): 41.5

Reshear
C(psf): 210 Phi (degrees): 41.5



Direct Shear, Peak / Reshear Speed: .001 in./min.

● Peak Values ○ Reshear Values

Undisturbed **Natural** Shear-Saturated

Brown, sandy SILT, w/ rock fragments.

23.2% Saturated Moisture Content

Green Acres, LLC
W.O.: 6489

Date of Test: 9/11

Sample: **B-2 @ 0 - 5.0'**

GeoSoils Consultants, Inc.

Geotechnical Engineering * Engineering Geology

PLATE SH-11

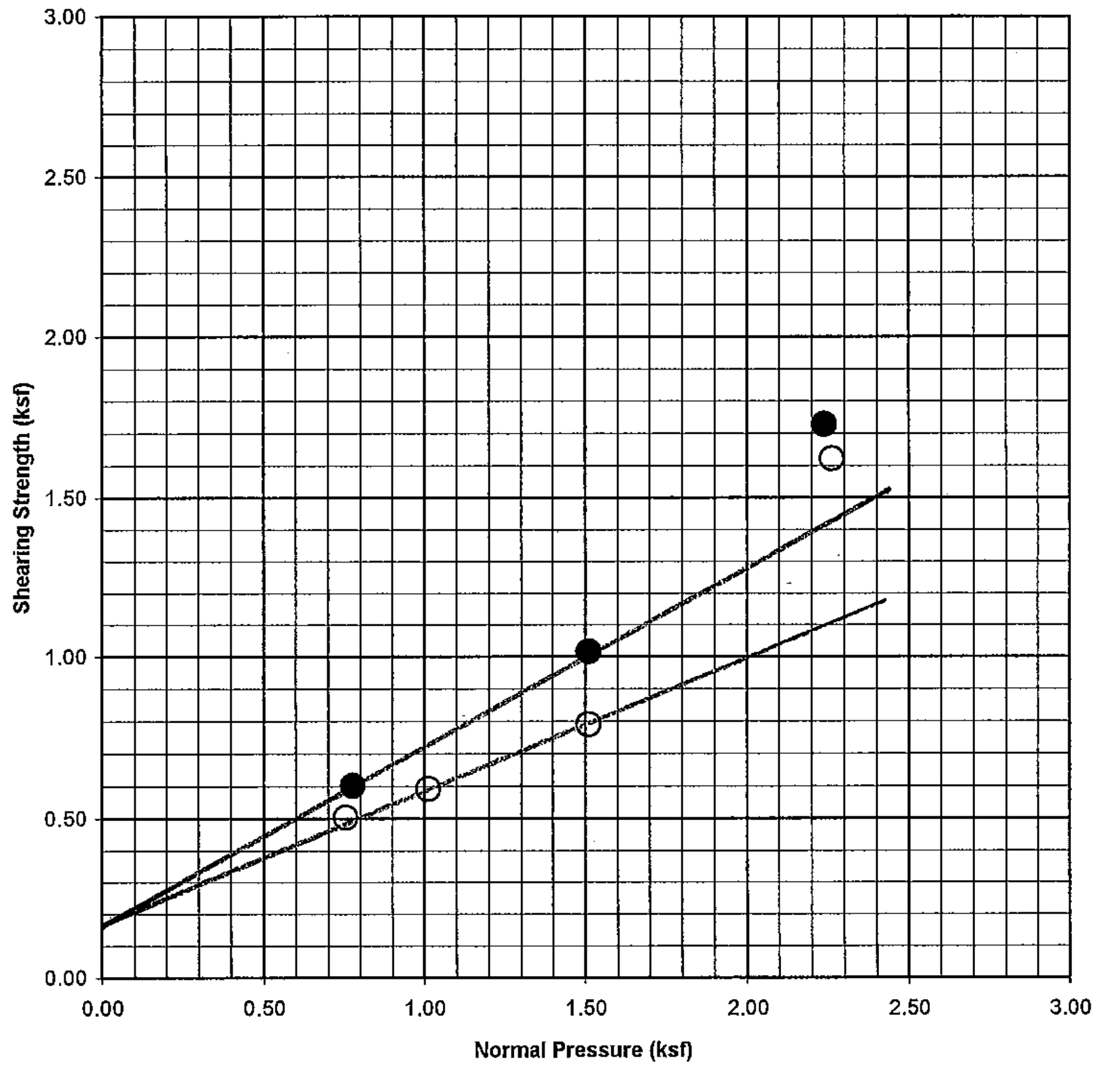
Shear Test Diagram

Peak

C(psf): **170** Phi (degrees): **29.0**

Reshear

C(psf): **170** Phi (degrees): **22.5**



Direct Shear, Peak / Reshear Speed: .001 in./min.

● Peak Values ○ Reshear Values

Sample **Remolded** to 90% Relative Density, Saturated.
Rem. Dry Density = 113.0 PCF

Red-brown, clayey, sandy SILT.

MAX: 125.5 PCF: 11.0%

17.7% Saturated Moisture Content

Green Acres, LLC
W.O.: 6489

Date of Test: 9/11

Sample: **B-3 @ 8.0 - 10.0'**

PLATE SH-12

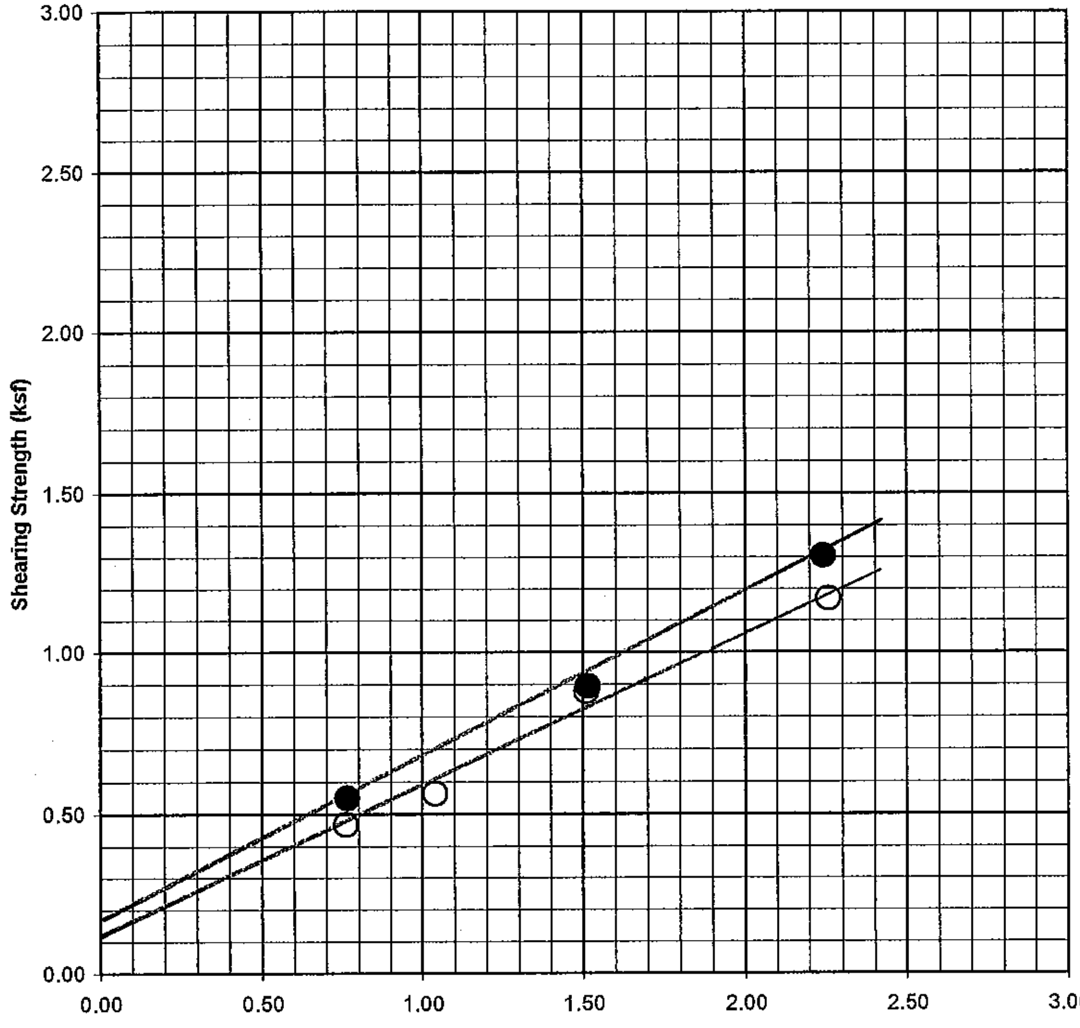
GeoSoils Consultants, Inc.

Geotechnical Engineering * Engineering Geology

Shear Test Diagram

Peak
C(psf): **170** Phi (degrees): **27.0**

Reshear
C(psf): **120** Phi (degrees): **25.0**



Direct Shear, Peak / Reshear Speed: .001 in./min.

● Peak Values O Reshear Values

Sample **Remolded** to 90% Relative Density, Saturated.
Remolded Dry Density = 111.6 PCF

Orange-brown, clayey, sandy SILT.

MAX: 124.0 PCF: 11.0%

18.6% Saturated Moisture Content
6489.12

Green Acres, LLC
W.O.: 6489

Date of Test: 9/11

Sample: **B-4 @ 5.0 - 10.0'**

GeoSoils Consultants, Inc.

Geotechnical Engineering * Engineering Geology

PLATE SH-13

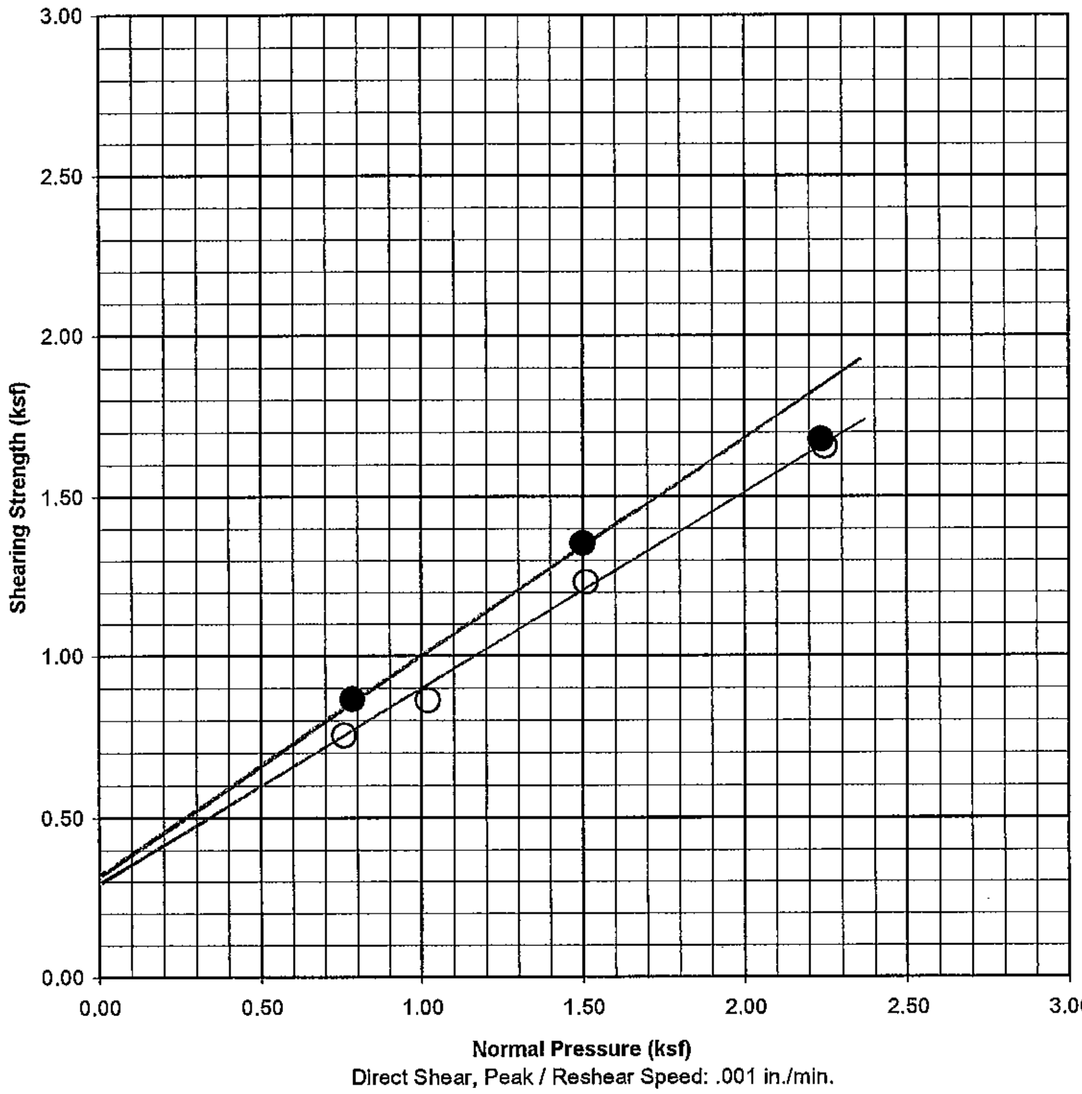
Shear Test Diagram

Peak

C(psf): **320** Phi (degrees): **34.0**

Reshear

C(psf): **300** Phi (degrees): **31.0**



Sample **Remolded** to 90% Relative Density, Saturated.
Rem. Dry Density = 105.3 PCF

Brown, slightly sandy, clayey, sandy SILT.

MAX: 117 PCF: 15.5%

23.9% Saturated Moisture Content

6489.13

Green Acres, LLC
W.O.: 6489

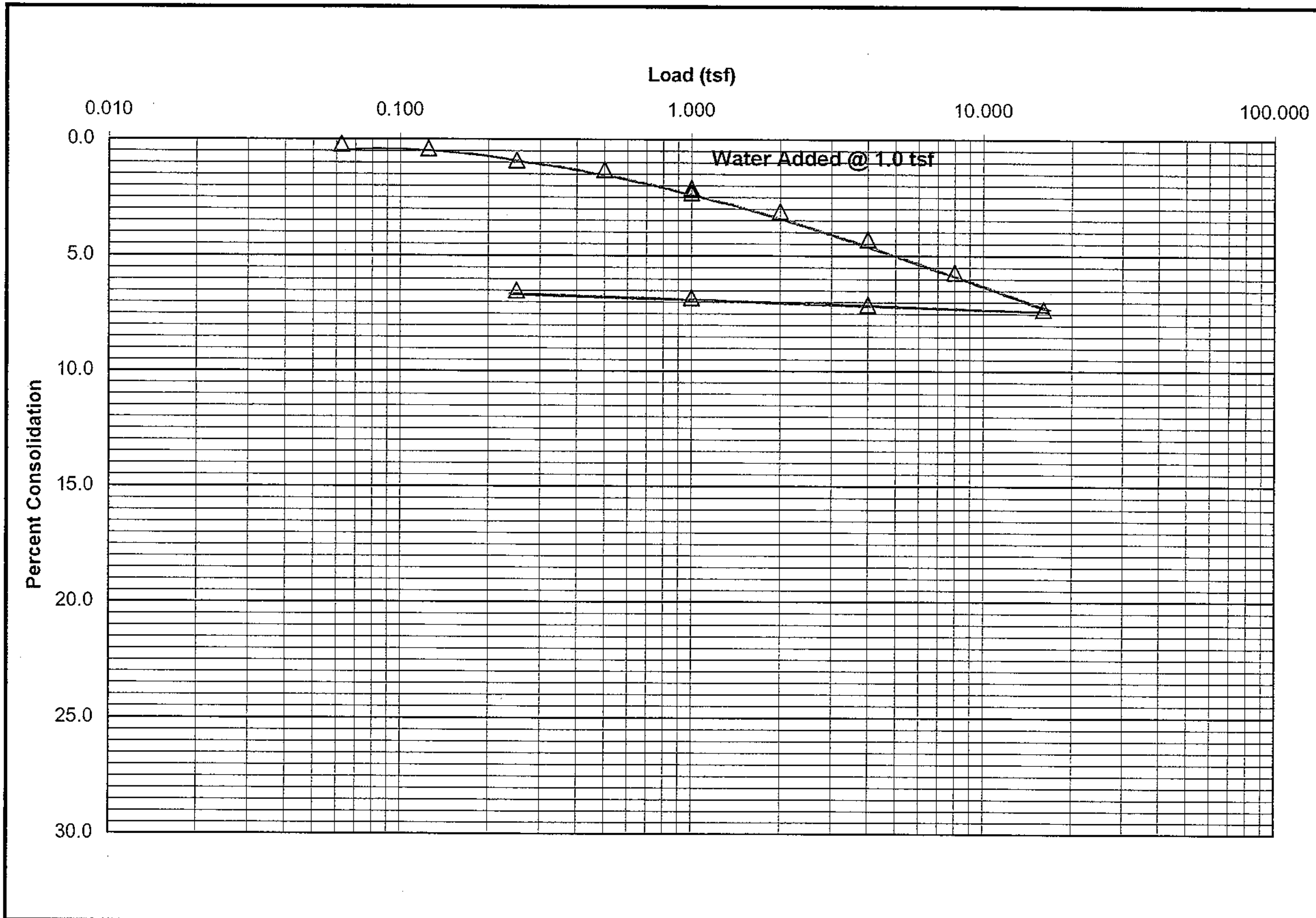
Date of Test: 9/11

GeoSoils Consultants, Inc.

Geotechnical Engineering * Engineering Geology

Moisture(%)
Before: 5.3 After: 13.3

Sample(in.)
Height: 1.00 Diameter: 2.36



B-1 @ 10.0'
Orange-brown, sandy SILT.

Consolidation Diagram

C6489.1

Plate C-1

Green Acres, LLC
W.O.: 6489

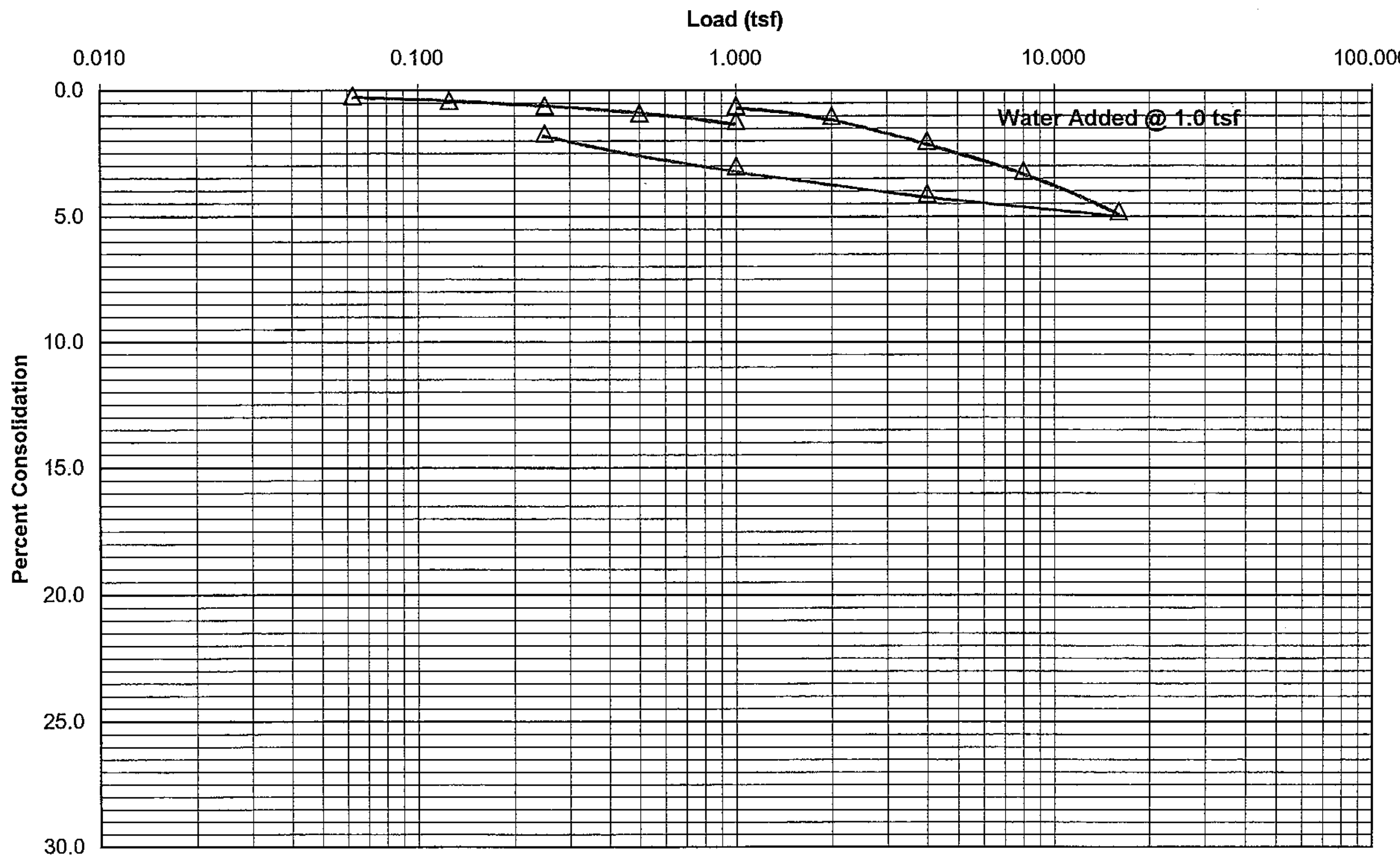
Date of Test: 9/11

GeoSoils Consultants, Inc.

Geotechnical Engineering * Engineering Geology

Moisture(%)
Before: 5.9 After: 12.4

Sample(in.)
Height: 1.00 Diameter: 2.36



B-1 @ 30.0'
Orange-brown, sandy SILT.

Consolidation Diagram

C6489.2

Plate C-2

Green Acres, LLC
W.O.: 6489

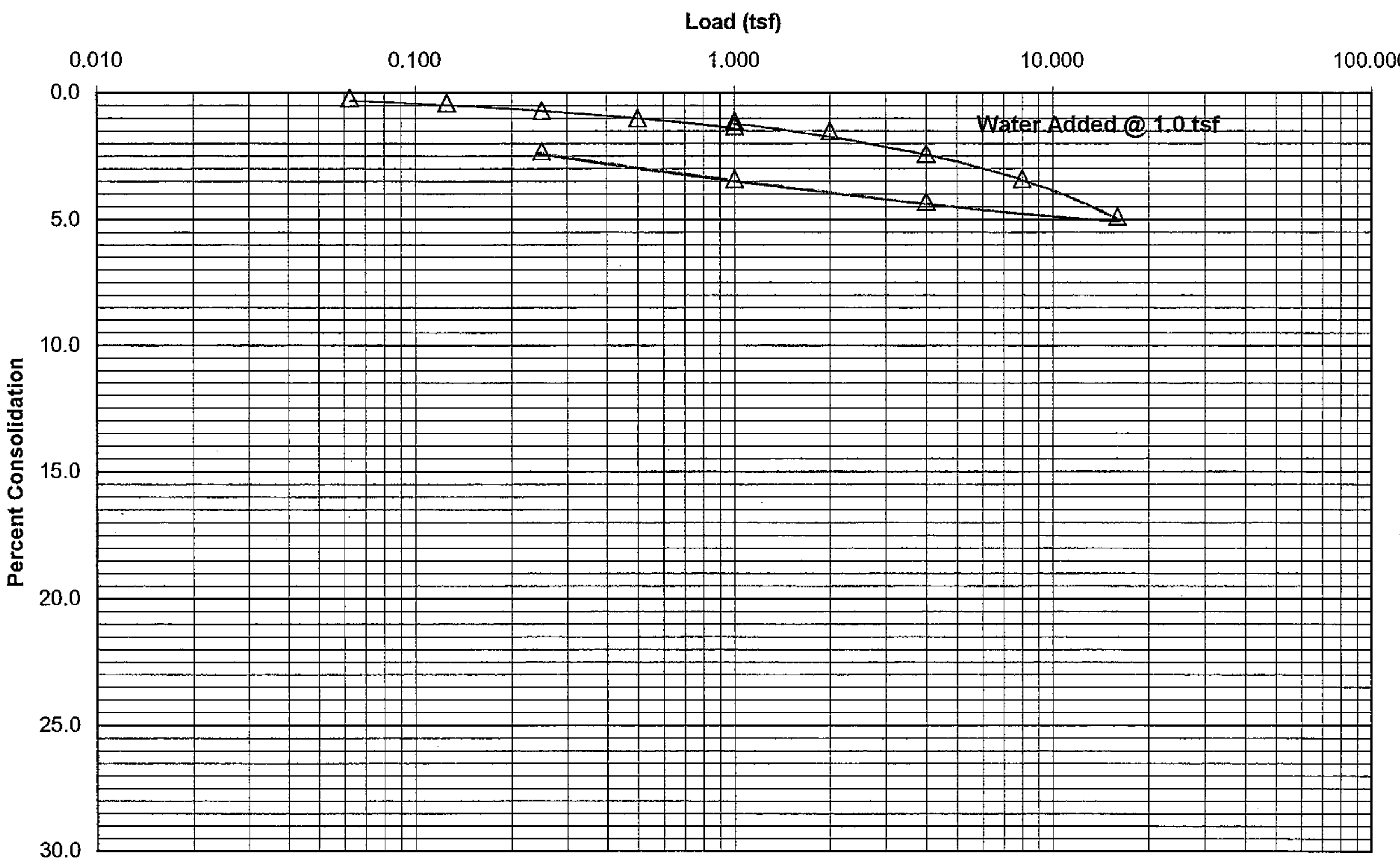
Date of Test: 9/11

GeoSoils Consultants, Inc.

Geotechnical Engineering * Engineering Geology

Moisture(%)
Before: 6.6 After: 12.3

Sample(in.)
Height: 1.00 Diameter: 2.36



B-3 @ 5.0'
Orange-brown, sandy SILT.

Consolidation Diagram

C6489.3

Plate C-3

Green Acres, LLC
W.O.: 6489

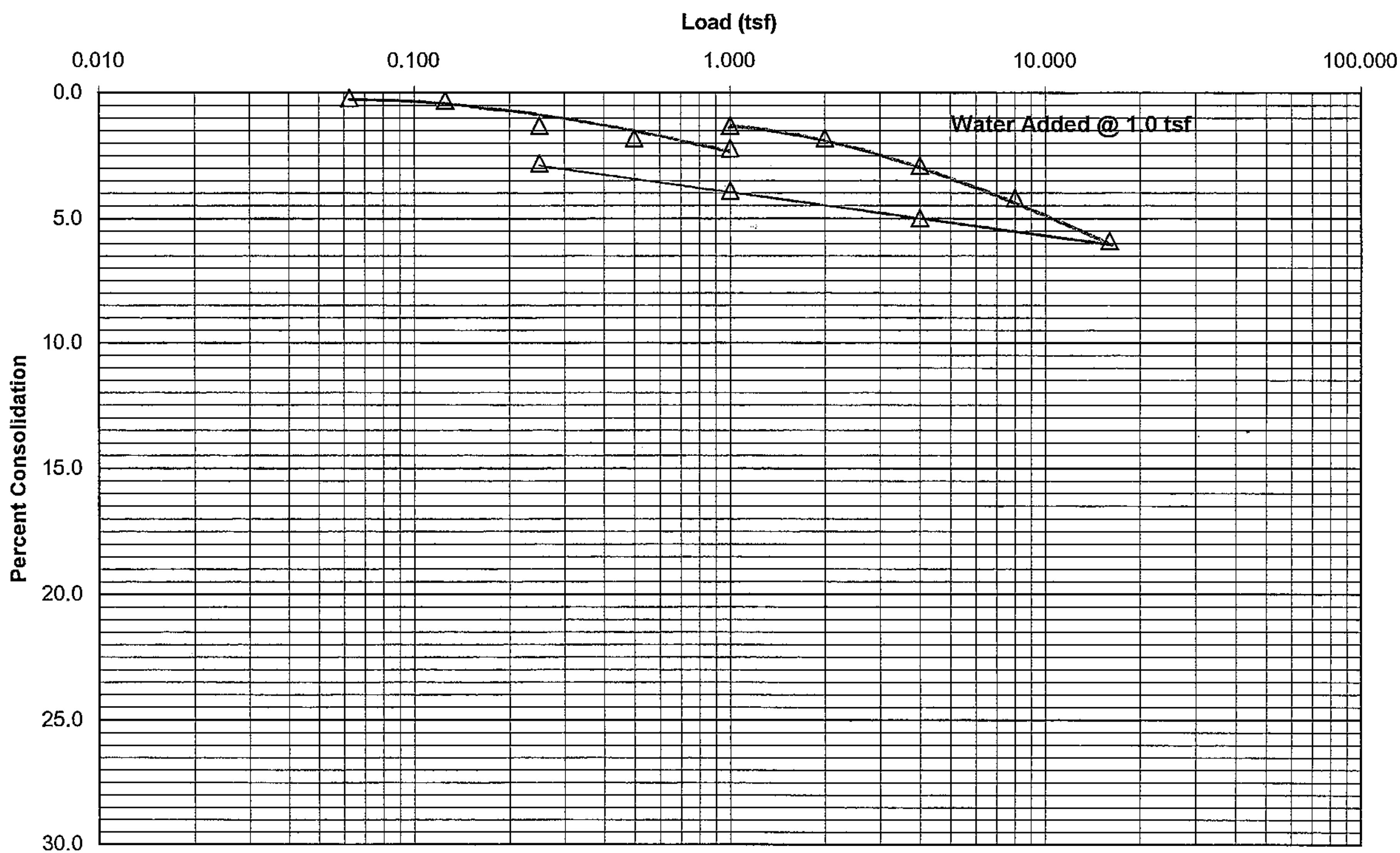
Date of Test: 9/11

GeoSoils Consultants, Inc.

Geotechnical Engineering * Engineering Geology

Moisture(%)
Before: 7.3 After: 13.8

Sample(in.)
Height: 1.00 Diameter: 2.36



B-3 @ 20.0'
Orange-brown, sandy, slightly clayey SILT.

Consolidation Diagram

C6489.4

Plate C-4

Green Acres, LLC
W.O.: 6489

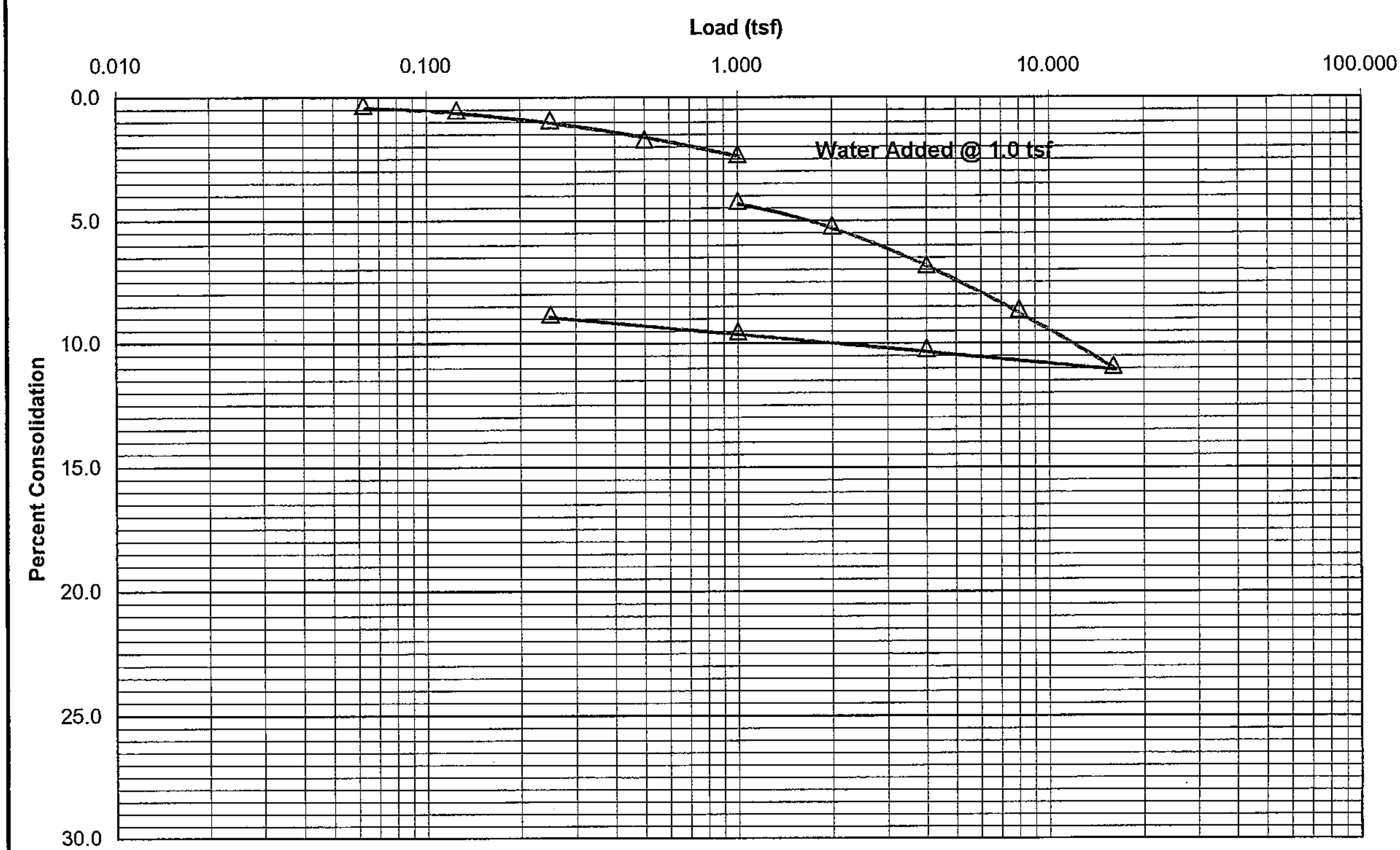
Date of Test: 9/11

GeoSoils Consultants, Inc.

Geotechnical Engineering * Engineering Geology

Moisture(%)
Before: 4.1 After: 14.3

Sample(in.)
Height: 1.00 Diameter: 2.36



B-3 @ 35.0'
Orange-brown, silty, fine SAND.

Consolidation Diagram

C6489.5

Plate C-5

Green Acres, LLC
W.O.: 6489

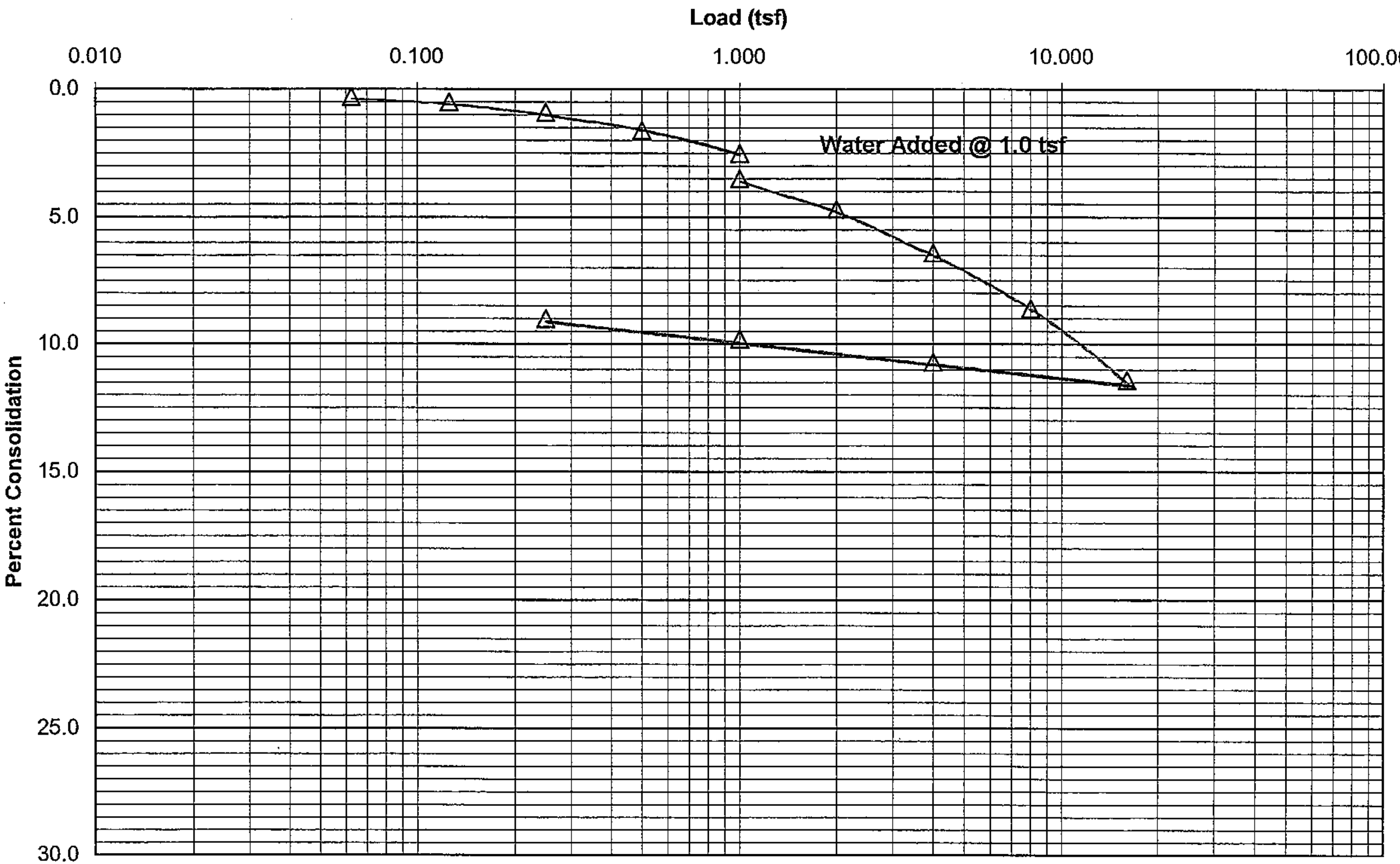
Date of Test: 9/11

GeoSoils Consultants, Inc.

Geotechnical Engineering * Engineering Geology

Moisture(%)
Before: 10.3 After: 17.8

Sample(in.)
Height: 1.00 Diameter: 2.36



B-4 @ 15.0'
Green-brown, sandy SILT, w/ rock fragments.

Consolidation Diagram

C6489.6

Plate C-6

September 15, 2011
W.O. 6489

APPENDIX D

SLOPE STABILITY ANALYSES

September 15, 2011
W.O. 6489

APPENDIX D

SLOPE STABILITY ANALYSES

1.0 Introduction

GSTABL7 is a 2-dimensional, limit equilibrium slope stability program developed by Garry H. Gregory, P.E., which works in conjunction with STEDwin, a Graphical User Interface developed by Harald W. Van Aller, P.E., to provide a Slope Stability Analysis System.

GSTABL7 with STEDwin is a powerful, comprehensive slope stability analysis system. The current release of GSTABL7□ with STEDwin□ is Version 2.005, and is a full 32-bit program (allows long file names, etc) .

2.0 General information

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

1. The Stability of Slopes, by E.N. Bromhead, Surrey University Press, Chapman and Hall, NY, 374 pages, ISBN 0 412 01061 5 (1985).

2. Rock Slope Engineering, by E. Hoek and J.W. Bray, Inst. of Mining and Metrallurgy, London, England, Third Edition, 358 pages, ISBN 0900488 573 (1981).

3. Landslides: Analysis and Control, by R.L. Schuster and R.J. Krizek (editors), Special Report 176, Transportation Research Board, National Academy of Sciences, 234 pages, ISBN 0 309 02804 3 (1978).

Appendix D

3.0 GSTABL7 Features

Analysis Options

Analysis by GLE (General Limit Equilibrium) Method of Slices

- Provides complete force and moment equilibrium
- Includes an option for satisfying Force and Moment equilibrium separately
- Robust search of multiple trial failure surfaces or individual user-specified failure surface. Any shape failure surface, including circular arc, block, wedge, and random, is supported. Up to 20 boxes may now be used to generate block surfaces.
- Includes both **Spencer and Morgenstern-Price** type analyses
- Seven "ki" functions for variation of side-force angles along the failure surface
  - Constant
  - Bi-Linear
  - Half-Sine
  - Clipped-Sine
  - Semi-Parabolic with LN function
  - Semi-Parabolic with Log function
  - User Specified
- User-input Lambda Coefficient (adjusts side-force angle function magnitude)
- Option of adjusting trial Lambda during iterations of factor of safety (FS) calculations

Appendix D

Analysis by Modified Bishop and Simplified Janbu Method of Slices

Circular, random, and sliding block search routines are available for analysis. A specified surface may be input as a point-to-point surface. A single circular surface may also be generated by inputting the circle center, radius, and segment length, or by specifying the circle center, boundary number and coordinates of the beginning point (toe of slope, etc) and segment length for analysis by the Modified Bishop or GLE method. Use of the Janbu empirical coefficients with the Simplified Janbu method for multiple-surface searches or for a specified single surface may be applied.

Soil Options

- Up to 20 isotropic soil options may be included in the analysis
- Up to 20 soil types may be assigned **Nonlinear Undrained Shear Strength** (NONLIN).
- Up to 20 soil types may be assigned **Curved Phi Envelope** (strength envelope line curves through zero at zero normal stress).
- Up to 20 soil types may be analyzed using the **Fiber-Reinforced Soil** (FIBER) option.
- Analysis of the slope with **Anisotropic soil strength properties**. Up to 20 soil types and 20 direction ranges for each soil type may be used. This function may be used to model tension cracks or bedding planes, as well as different soil strengths in different directions. The **tension cracks may be modeled with no water, or with water in the cracks**. Tension cracks and bedding planes can be modeled anywhere in the soil profile without having to add additional lines. The user can specify any range in the anisotropic soil option to ignore the Anisotropic

soil properties and use the current phi and/or c being calculated in other options such as NONLIN and CURVED. The Aniso function can also be used in conjunction with the nonlinear undrained shear strength option to accurately model soils using models such as the SHANSEP method.

- Any soil unit weight may be used. This allows analysis with lightweight fill materials such as Geofoam.

Stabilizing Elements Options

Options for analysis of stabilizing elements in the slope include piers/piles, tiebacks, soil nails, planar reinforcement (geotextiles/geogrids), and applied forces, as described below. ALL ANALYSIS METHODS, INCLUDING GLE, BISHOP, AND JANBU ARE AVAILABLE FOR ALL STABILIZING ELEMENT OPTIONS.

- Analysis of up to **50 rows of Piers/Piles** in the slope. Piers/piles can be located on surface as well as subsurface boundaries.
- Analysis of up to **50 rows of Tiebacks** or surface point loads on the slope.
- Analysis of up to **50 rows of Soil Nails** in the slope
- Analysis of up to **50 layers of Planar Reinforcement** (geotextiles/geogrids) in the slope
- Option of including up to **50 Applied Forces** in the slope. Applied Forces may consist of both stabilizing and destabilizing forces

Loads Options

- Analysis of the slope with up to 10 boundary (surcharge) loads, anywhere on the ground surface.

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- Pseudo-Static earthquake or similar seismic-loading analysis using horizontal and vertical coefficients, and a seismic pore pressure factor. The seismic pore pressure factor option can be turned "on" or "off" when using the horizontal and vertical coefficients.
- When using the pseudo-static earthquake option, the "Yield Coefficient" (k_y) is automatically calculated. The k_y value is then used in a simplified Newmark sliding block analysis to determine the probable maximum permanent displacement of the slope during an earthquake. This new feature is a significant improvement over the pseudo-static analysis alone, for earthquake considerations.

Water Options

- Up to 10 phreatic water surfaces, with up to 40 points defining each surface may be included in the analysis. The user may select the "vertical" or "perpendicular" method (or anywhere in between) of calculating the pressure head on the slice bases from the phreatic surface, by inputting a "pore-pressure inclination factor."
- Both a pore pressure ratio (r_u) and a pore pressure constant may be included for any soil.

4.0 Input Data

Input data includes the following items:

1. Unit weight, cohesion, friction angle of bedrock material, alluvium and fill.
2. Slope geometry, surcharge boundary loads and water surface elevations.
3. Water level conditions for full basin and rapid draw down conditions.

Appendix D

4. Pseudo-static earthquake loading.

5.0 Output information

- Comprehensive output of all input items, as well as output of the analysis results.
- The output includes tables of base stresses for a Bishop or Janbu analysis, and tables of side forces, vertical shear forces, force angles, thrust-line ratio, and base stresses for a GLE analysis.
- Factors-of-safety for indicated slip surfaces.
- Plots with critical surfaces and factors-of-safety.

6.0 Slope Stability Analysis

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

- Geologic Cross-Section A-A': Mode 1 – Circular Failure Analysis
- Geologic Cross Section A-A': Mode 2 - Circular Failure Analysis, Search for 1.5/1.1 Factor of Safety Surface
- Geologic Cross Section A-A': Mode 3 - EFP Calculations
- Geologic Cross Section B-B': Mode 1- Circular Failure Analysis
- Geologic Cross Section B-B': Mode 2- Circular Failure Analysis, Search for 1.5 Factor of Safety Surface
- Geologic Cross Section B-B': Mode 3- EFP Calculations
- Geologic Cross Section C-C': Mode 1-Circular Failure Analysis

Appendix D

Soil Parameters

Soil properties used in the slope stability analyses were obtained by creating shear summary diagrams that represent the various shear parameters for each material type. The shear summary diagrams are included at the end of this appendix as Plates SH-1A through SH-2B. The parameters used in the slope stability calculations can be found in the table below.

TABLE D-1 SHEAR TEST DATA SUMMARY					
Soil Description	Peak Values		Resheared Values		Unit Weight (pcf)
	c (psf)	ϕ (degrees)	c (psf)	ϕ (degrees)	
Bedrock	310	30	100	32.5	130
Terrace Deposits (Qt)	300	35	100	34.5	130

7.0 Results

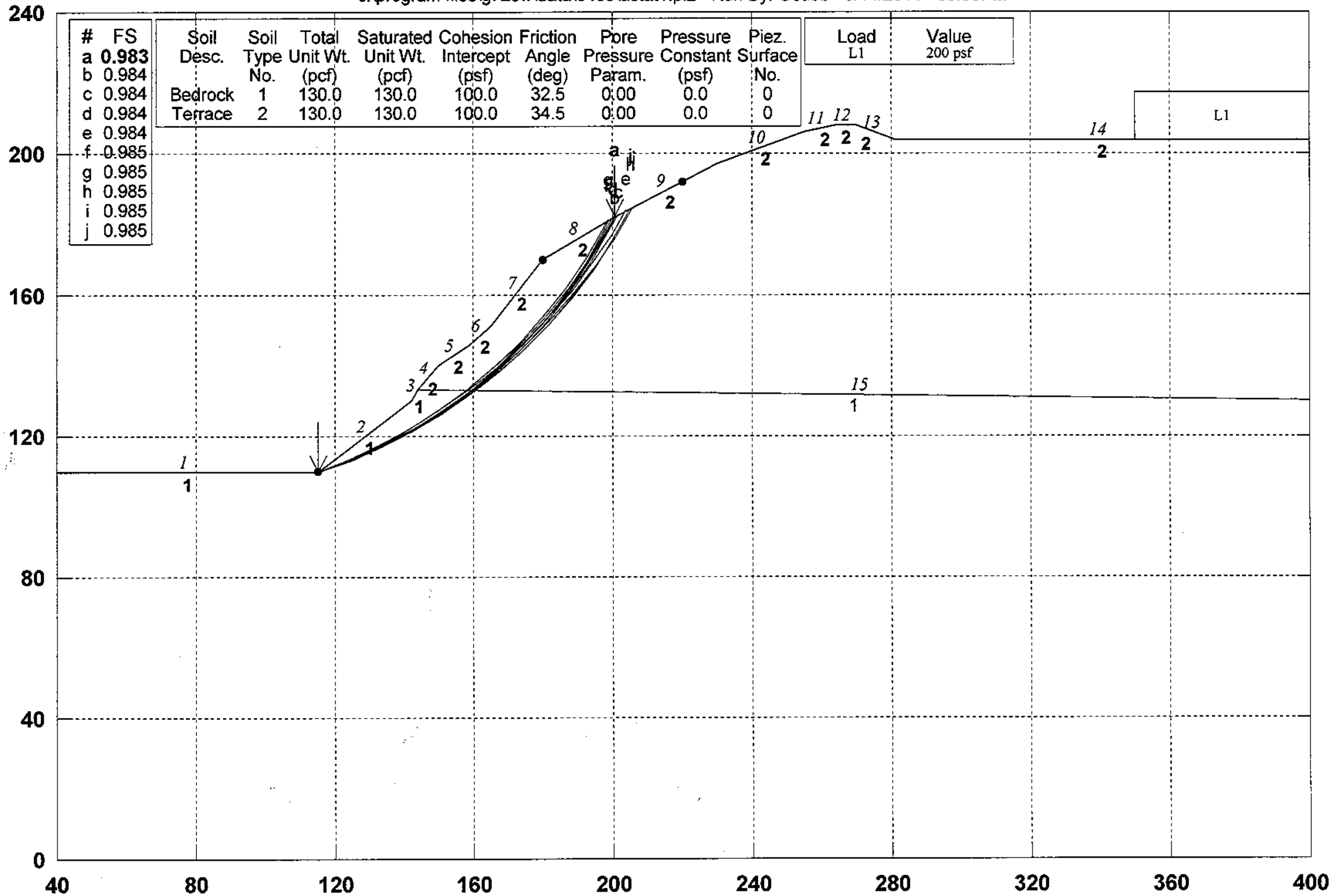
The results of slope stability analyses (including graphical plots and output data) are included at the end of this appendix. The results of the analyses are presented in Table B-2.

Cross-Section	Mode	Description	Factor-of-Safety		Notes
			Static	Seismic	
A-A'	1	Circular Failure Analysis	.98	.95	
A-A'	2	Circular Failure Analysis, Search for 1.5/1.1 Factor of Safety Surface	1.50	1.11	
A-A'	3	EFP Calculations	NA	NA	EP=27 pcf, Retaining Height=33 feet
B-B'	1	Circular Failure Analysis	1.39	1.12	
B-B'	2	Circular Failure Analysis, Search for 1.5 Factor of Safety Surface	1.51	NA	
B-B'	3	EFP Calculations	NA	NA	EFP=39 pcf, Retaining Height=29 feet
C-C'	1	Circular Failure Analysis	1.65	1.24	

A pseudo-static coefficient of 0.2 was used in the seismic analyses.

6489, Green Acres LLC, Section A, Static, Circular

c:\program files\g72sw\data\6489\astat1.pl2 Run By: Gcubb 9/14/2011 03:53PM



GSTABL7 v.2 FSmin=0.983

Safety Factors Are Calculated By The Modified Bishop Method

GSTABL7

```
                          ***  GSTABL7  ***
              ** GSTABL7 by Garry H. Gregory, P.E. **
   ** Original Version 1.0, January 1996; Current Version 2.004, June 2003 **
             (All Rights Reserved-Unauthorized Use Prohibited)
*********************************************************************************
                  SLOPE STABILITY ANALYSIS SYSTEM
       Modified Bishop, Simplified Janbu, or GLE Method of Slices.
       (Includes Spencer & Morgenstern-Price Type Analysis)
       Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
       Nonlinear Undrained Shear Strength, Curved Phi Envelope,
       Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
       Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.
*********************************************************************************
Analysis Run Date:         9/14/2011
Time of Run:               03:53PM
Run By:                    Gcubb
Input Data Filename:       C:\Program Files\G72SW\Data\6489\Astat1.in
Output Filename:           C:\Program Files\G72SW\Data\6489\Astat1.OUT
Unit System:               English
Plotted Output Filename:   C:\Program Files\G72SW\Data\6489\Astat1.PLT
PROBLEM DESCRIPTION:   6489, Green Acres LLC,
                       Section A, Static, Circular
BOUNDARY COORDINATES
   14 Top   Boundaries
   15 Total Boundaries
Boundary     X-Left      Y-Left      X-Right     Y-Right     Soil Type
   No.        (ft)        (ft)        (ft)        (ft)       Below Bnd
   1          40.00      110.00      115.00      110.00          1
   2         115.00      110.00      142.00      130.00          1
   3         142.00      130.00      144.00      133.00          1
   4         144.00      133.00      150.00      140.00          2
   5         150.00      140.00      159.00      146.00          2
   6         159.00      146.00      165.00      151.00          2
   7         165.00      151.00      180.00      170.00          2
   8         180.00      170.00      200.00      182.00          2
   9         200.00      182.00      230.00      197.00          2
  10         230.00      197.00      255.00      206.00          2
  11         255.00      206.00      264.00      208.00          2
  12         264.00      208.00      270.00      208.00          2
  13         270.00      208.00      281.00      204.00          2
  14         281.00      204.00      400.00      204.00          2
  15         144.00      133.00      400.00      130.00          1
Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)
ISOTROPIC SOIL PARAMETERS
 2 Type(s) of Soil
Soil  Total  Saturated  Cohesion  Friction   Pore    Pressure   Piez.
Type Unit Wt. Unit Wt.  Intercept   Angle   Pressure Constant  Surface
 No.  (pcf)    (pcf)      (psf)     (deg)    Param.    (psf)     No.
  1   130.0    130.0      100.0     32.5     0.00       0.0      0
  2   130.0    130.0      100.0     34.5     0.00       0.0      0
BOUNDARY LOAD(S)
    1 Load(s) Specified
Load        X-Left       X-Right      Intensity     Deflection
 No.         (ft)         (ft)          (psf)          (deg)
  1         350.00       400.00         200.0           0.0
NOTE - Intensity Is Specified As A Uniformly Distributed
       Force Acting On A Horizontally Projected Surface.
A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Circular Surfaces, Has Been Specified.
1600 Trial Surfaces Have Been Generated.
  40 Surface(s) Initiate(s) From Each Of   40 Points Equally Spaced
Along The Ground Surface Between   X = 115.00(ft)
                            and    X = 115.00(ft)
Each Surface Terminates Between    X = 180.00(ft)
                            and    X = 220.00(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.
Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Modified Bishop Method * *
Total Number of Trial Surfaces Attempted = 1600
Number of Trial Surfaces With Valid FS = 1600
Statistical Data On All Valid FS Values:
FS Max = 1.677 FS Min = 0.983 FS Ave = 1.125
Standard Deviation = 0.101 Coefficient of Variation = 8.96 %
Failure Surface Specified By 13 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	115.000	110.000
2	124.429	113.332
3	133.607	117.302
4	142.490	121.893
5	151.038	127.083
6	159.210	132.847
7	166.967	139.157
8	174.273	145.985
9	181.094	153.299
10	187.396	161.063
11	193.152	169.240
12	198.332	177.794
13	200.674	182.337

Circle Center At X = 71.206 ; Y = 248.944 ; and Radius = 145.682
Factor of Safety
*** 0.983 ***
Individual data on the 20 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	9.4	2238.5	0.0	0.0	0.	0.	0.0	0.0	0.0
2	9.2	6044.9	0.0	0.0	0.	0.	0.0	0.0	0.0
3	8.4	8096.6	0.0	0.0	0.	0.	0.0	0.0	0.0
4	0.5	548.4	0.0	0.0	0.	0.	0.0	0.0	0.0
5	1.5	1867.5	0.0	0.0	0.	0.	0.0	0.0	0.0
6	6.0	9257.8	0.0	0.0	0.	0.	0.0	0.0	0.0
7	1.0	1833.1	0.0	0.0	0.	0.	0.0	0.0	0.0
8	8.0	13926.6	0.0	0.0	0.	0.	0.0	0.0	0.0
9	0.2	304.0	0.0	0.0	0.	0.	0.0	0.0	0.0
10	0.0	60.0	0.0	0.0	0.	0.	0.0	0.0	0.0
11	5.8	10075.1	0.0	0.0	0.	0.	0.0	0.0	0.0
12	2.0	3552.4	0.0	0.0	0.	0.	0.0	0.0	0.0
13	7.3	14767.0	0.0	0.0	0.	0.	0.0	0.0	0.0
14	5.7	12892.0	0.0	0.0	0.	0.	0.0	0.0	0.0
15	1.1	2504.9	0.0	0.0	0.	0.	0.0	0.0	0.0
16	6.3	12590.3	0.0	0.0	0.	0.	0.0	0.0	0.0
17	5.8	8239.4	0.0	0.0	0.	0.	0.0	0.0	0.0
18	5.2	3992.2	0.0	0.0	0.	0.	0.0	0.0	0.0
19	1.7	452.7	0.0	0.0	0.	0.	0.0	0.0	0.0
20	0.7	42.5	0.0	0.0	0.	0.	0.0	0.0	0.0

Failure Surface Specified By 13 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	115.000	110.000
2	124.362	113.514
3	133.477	117.628
4	142.304	122.326
5	150.808	127.588
6	158.952	133.391
7	166.702	139.711
8	174.025	146.521

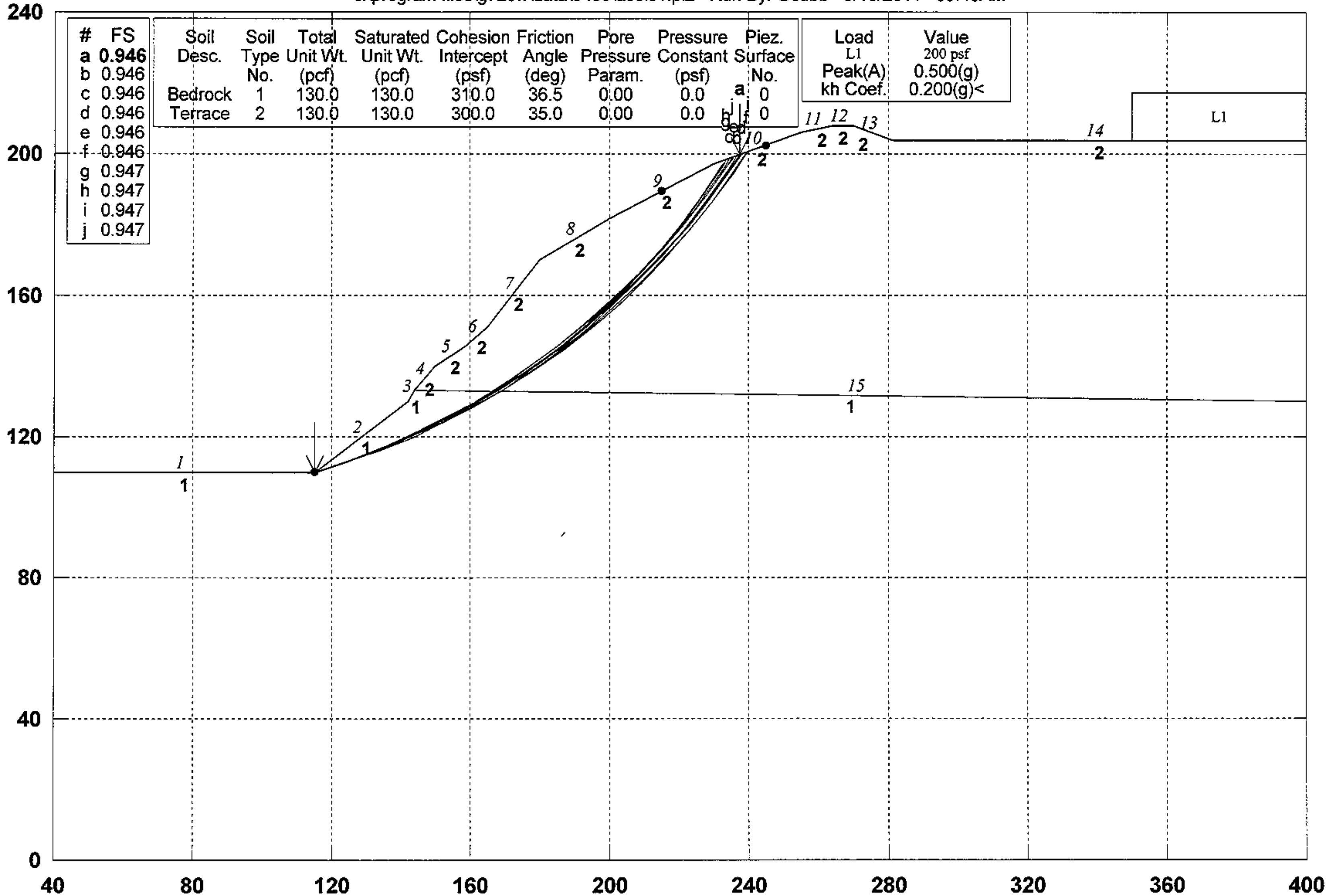
```
     9          180.890      153.792
    10          187.268      161.494
    11          193.132      169.594
    12          198.457      178.058
    13          200.813      182.407
Circle Center At X =     65.658 ; Y =    255.705 ; and Radius =    153.833
       Factor of Safety
      ***    0.984   ***
Failure Surface Specified By 13 Coordinate Points
  Point       X-Surf       Y-Surf
   No.         (ft)         (ft)
     1          115.000      110.000
     2          124.483      113.174
     3          133.718      117.011
     4          142.657      121.492
     5          151.257      126.595
     6          159.474      132.295
     7          167.267      138.562
     8          174.596      145.365
     9          181.425      152.669
    10          187.720      160.440
    11          193.449      168.636
    12          198.583      177.218
    13          201.341      182.670
Circle Center At X =     74.981 ; Y =    245.336 ; and Radius =    141.129
       Factor of Safety
      ***    0.984   ***
Failure Surface Specified By 13 Coordinate Points
  Point       X-Surf       Y-Surf
   No.         (ft)         (ft)
     1          115.000      110.000
     2          124.357      113.527
     3          133.464      117.659
     4          142.280      122.378
     5          150.769      127.664
     6          158.894      133.493
     7          166.620      139.843
     8          173.914      146.684
     9          180.744      153.987
    10          187.082      161.722
    11          192.900      169.856
    12          198.174      178.352
    13          200.163      182.081
Circle Center At X =     65.839 ; Y =    254.602 ; and Radius =    152.731
       Factor of Safety
      ***    0.984   ***
Failure Surface Specified By 13 Coordinate Points
  Point       X-Surf       Y-Surf
   No.         (ft)         (ft)
     1          115.000      110.000
     2          124.335      113.587
     3          133.436      117.731
     4          142.270      122.417
     5          150.804      127.628
     6          159.009      133.346
     7          166.853      139.548
     8          174.308      146.213
     9          181.346      153.316
    10          187.943      160.832
    11          194.074      168.732
    12          199.716      176.989
    13          203.871      183.936
Circle Center At X =     60.350 ; Y =    266.174 ; and Radius =    165.460
       Factor of Safety
      ***    0.984   ***
Failure Surface Specified By 13 Coordinate Points
  Point       X-Surf       Y-Surf
```

```
  No.        (ft)        (ft)
   1        115.000     110.000
   2        124.376     113.476
   3        133.494     117.584
   4        142.309     122.306
   5        150.781     127.618
   6        158.871     133.496
   7        166.541     139.913
   8        173.754     146.839
   9        180.478     154.241
  10        186.680     162.085
  11        192.333     170.334
  12        197.409     178.950
  13        198.479     181.087
Circle Center At X =    68.841 ; Y =   248.891 ; and Radius =   146.361
       Factor of Safety
      ***    0.985   ***
Failure Surface Specified By 13 Coordinate Points
  Point      X-Surf      Y-Surf
  No.        (ft)        (ft)
   1        115.000     110.000
   2        124.497     113.130
   3        133.736     116.958
   4        142.665     121.461
   5        151.234     126.616
   6        159.396     132.392
   7        167.107     138.760
   8        174.323     145.683
   9        181.005     153.123
  10        187.116     161.039
  11        192.621     169.387
  12        197.491     178.121
  13        199.016     181.410
Circle Center At X =    77.681 ; Y =   239.198 ; and Radius =   134.479
       Factor of Safety
      ***    0.985   ***
Failure Surface Specified By 14 Coordinate Points
  Point      X-Surf      Y-Surf
  No.        (ft)        (ft)
   1        115.000     110.000
   2        124.451     113.267
   3        133.670     117.141
   4        142.618     121.606
   5        151.257     126.644
   6        159.549     132.232
   7        167.461     138.348
   8        174.959     144.965
   9        182.010     152.056
  10        188.585     159.590
  11        194.657     167.536
  12        200.199     175.859
  13        205.189     184.526
  14        205.233     184.617
Circle Center At X =    69.545 ; Y =   256.836 ; and Radius =   153.711
       Factor of Safety
      ***    0.985   ***
Failure Surface Specified By 14 Coordinate Points
  Point      X-Surf      Y-Surf
  No.        (ft)        (ft)
   1        115.000     110.000
   2        124.368     113.500
   3        133.509     117.554
   4        142.391     122.149
   5        150.982     127.267
   6        159.251     132.890
   7        167.168     138.999
   8        174.705     145.571
```

```
   9         181.835       152.583
  10         188.533       160.009
  11         194.773       167.823
  12         200.535       175.996
  13         205.796       184.500
  14         206.090       185.045
Circle Center At X =    61.369 ; Y =    267.902 ; and Radius =    166.761
       Factor of Safety
      ***    0.985    ***
Failure Surface Specified By 14 Coordinate Points
  Point       X-Surf        Y-Surf
   No.         (ft)          (ft)
   1         115.000       110.000
   2         124.469       113.216
   3         133.704       117.050
   4         142.667       121.486
   5         151.316       126.505
   6         159.615       132.084
   7         167.527       138.200
   8         175.018       144.825
   9         182.055       151.930
  10         188.606       159.485
  11         194.645       167.456
  12         200.143       175.808
  13         205.078       184.506
  14         205.099       184.549
Circle Center At X =    71.122 ; Y =    254.751 ; and Radius =    151.255
       Factor of Safety
      ***    0.985    ***
          **** END OF GSTABL7 OUTPUT ****
```

6489, Green Acres LLC, Section A, Seismic, Circular

c:\program files\g72sw\data\6489\aseis1.pl2 Run By: Gcubb 9/15/2011 09:43AM



GSTABL7 v.2 FSmin=0.946

Safety Factors Are Calculated By The Modified Bishop Method

GSTABL7

***** GSTABL7 *****

** GSTABL7 by Garry H. Gregory, P.E. **
** Original Version 1.0, January 1996; Current Version 2.004, June 2003 **

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

Analysis Run Date: 9/15/2011
Time of Run: 10:46AM
Run By: Gcubb
Input Data Filename: C:\Program Files\G72SW\Data\6489\aseis1.in
Output Filename: C:\Program Files\G72SW\Data\6489\aseis1.OUT
Unit System: English
Plotted Output Filename: C:\Program Files\G72SW\Data\6489\aseis1.PLT
PROBLEM DESCRIPTION: 6489, Green Acres LLC,
Section A, Seismic, Circular

BOUNDARY COORDINATES
14 Top Boundaries
15 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	40.00	110.00	115.00	110.00	1
2	115.00	110.00	142.00	130.00	1
3	142.00	130.00	144.00	133.00	1
4	144.00	133.00	150.00	140.00	2
5	150.00	140.00	159.00	146.00	2
6	159.00	146.00	165.00	151.00	2
7	165.00	151.00	180.00	170.00	2
8	180.00	170.00	200.00	182.00	2
9	200.00	182.00	230.00	197.00	2
10	230.00	197.00	255.00	206.00	2
11	255.00	206.00	264.00	208.00	2
12	264.00	208.00	270.00	208.00	2
13	270.00	208.00	281.00	204.00	2
14	281.00	204.00	400.00	204.00	2
15	144.00	133.00	400.00	130.00	1

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

ISOTROPIC SOIL PARAMETERS
2 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	130.0	130.0	310.0	36.5	0.00	0.0	0
2	130.0	130.0	300.0	35.0	0.00	0.0	0

BOUNDARY LOAD(S)
1 Load(s) Specified

Load No.	X-Left (ft)	X-Right (ft)	Intensity (psf)	Deflection (deg)
1	350.00	400.00	200.0	0.0

NOTE - Intensity Is Specified As A Uniformly Distributed
Force Acting On A Horizontally Projected Surface.
Specified Peak Ground Acceleration Coefficient (A) = 0.500(g)
Specified Horizontal Earthquake Coefficient (kh) = 0.200(g)
Specified Vertical Earthquake Coefficient (kv) = 0.000(g)
Specified Seismic Pore-Pressure Factor = 0.000
A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Circular Surfaces, Has Been Specified.
1600 Trial Surfaces Have Been Generated.
40 Surface(s) Initiate(s) From Each Of 40 Points Equally Spaced

```
Along The Ground Surface Between  X = 115.00(ft)
                              and  X = 115.00(ft)
Each Surface Terminates Between   X = 215.00(ft)
                             and   X = 245.00(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.
Following Are Displayed The Ten Most Critical Of The Trial
      Failure Surfaces Evaluated. They Are
      Ordered - Most Critical First.
      * * Safety Factors Are Calculated By The Modified Bishop Method * *
      Total Number of Trial Surfaces Attempted =  1600
      Number of Trial Surfaces With Valid FS = 1600
      Statistical Data On All Valid FS Values:
         FS Max =   1.402   FS Min =   0.946   FS Ave =    1.109
         Standard Deviation =    0.127   Coefficient of Variation =   11.44 %
      Failure Surface Specified By 17 Coordinate Points
        Point       X-Surf       Y-Surf
         No.         (ft)         (ft)
          1        115.000      110.000
          2        124.534      113.017
          3        133.924      116.457
          4        143.150      120.315
          5        152.194      124.581
          6        161.038      129.249
          7        169.664      134.308
          8        178.054      139.748
          9        186.193      145.558
         10        194.063      151.727
         11        201.650      158.243
         12        208.937      165.091
         13        215.909      172.259
         14        222.554      179.732
         15        228.858      187.495
         16        234.807      195.533
         17        237.648      199.753
      Circle Center At X =     52.440 ; Y =    324.304 ; and Radius =   223.249
             Factor of Safety
            ***    0.946   ***
           Individual data on the     25  slices
```

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	9.5	2507.3	0.0	0.0	0.	0.	501.5	0.0	0.0
2	9.4	7083.5	0.0	0.0	0.	0.	1416.7	0.0	0.0
3	8.1	9305.8	0.0	0.0	0.	0.	1861.2	0.0	0.0
4	1.1	1612.4	0.0	0.0	0.	0.	322.5	0.0	0.0
5	0.9	1309.6	0.0	0.0	0.	0.	261.9	0.0	0.0
6	6.0	11207.8	0.0	0.0	0.	0.	2241.6	0.0	0.0
7	2.2	4753.3	0.0	0.0	0.	0.	950.7	0.0	0.0
8	6.8	15354.9	0.0	0.0	0.	0.	3071.0	0.0	0.0
9	2.0	4804.5	0.0	0.0	0.	0.	960.9	0.0	0.0
10	4.0	9755.3	0.0	0.0	0.	0.	1951.1	0.0	0.0
11	2.0	5159.1	0.0	0.0	0.	0.	1031.8	0.0	0.0
12	2.7	7580.5	0.0	0.0	0.	0.	1516.1	0.0	0.0
13	8.4	27481.1	0.0	0.0	0.	0.	5496.2	0.0	0.0
14	1.9	7164.4	0.0	0.0	0.	0.	1432.9	0.0	0.0
15	6.2	22953.7	0.0	0.0	0.	0.	4590.7	0.0	0.0
16	7.9	28069.2	0.0	0.0	0.	0.	5613.8	0.0	0.0
17	5.9	20021.0	0.0	0.0	0.	0.	4004.2	0.0	0.0
18	1.6	5335.4	0.0	0.0	0.	0.	1067.1	0.0	0.0
19	7.3	21768.4	0.0	0.0	0.	0.	4353.7	0.0	0.0
20	7.0	17709.1	0.0	0.0	0.	0.	3541.8	0.0	0.0
21	6.6	13493.3	0.0	0.0	0.	0.	2698.7	0.0	0.0
22	6.3	9210.2	0.0	0.0	0.	0.	1842.0	0.0	0.0
23	1.1	1254.4	0.0	0.0	0.	0.	250.9	0.0	0.0

24	4.8	3487.1	0.0	0.0	0.	0.	697.4	0.0	0.0
25	2.8	590.5	0.0	0.0	0.	0.	118.1	0.0	0.0

Failure Surface Specified By 17 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	115.000	110.000
2	124.589	112.839
3	134.030	116.134
4	143.303	119.877
5	152.387	124.059
6	161.259	128.672
7	169.901	133.704
8	178.292	139.144
9	186.413	144.979
10	194.245	151.196
11	201.771	157.782
12	208.973	164.719
13	215.834	171.994
14	222.339	179.589
15	228.474	187.486
16	234.223	195.668
17	236.563	199.363

Circle Center At X = 60.519 ; Y = 311.615 ; and Radius = 208.847

Factor of Safety

*** 0.946 ***

Failure Surface Specified By 17 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	115.000	110.000
2	124.568	112.909
3	133.984	116.276
4	143.226	120.095
5	152.273	124.355
6	161.104	129.047
7	169.698	134.160
8	178.035	139.682
9	186.096	145.600
10	193.861	151.901
11	201.313	158.569
12	208.435	165.589
13	215.209	172.945
14	221.620	180.620
15	227.653	188.595
16	233.294	196.852
17	234.346	198.564

Circle Center At X = 59.583 ; Y = 309.463 ; and Radius = 207.018

Factor of Safety

*** 0.946 ***

Failure Surface Specified By 17 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	115.000	110.000
2	124.519	113.065
3	133.894	116.544
4	143.107	120.432
5	152.141	124.720
6	160.978	129.401
7	169.601	134.465
8	177.993	139.903
9	186.139	145.704
10	194.022	151.856
11	201.627	158.349
12	208.940	165.170
13	215.947	172.305
14	222.634	179.740
15	228.988	187.462
16	234.996	195.456

```
    17        238.037      199.893
Circle Center At X =    49.973 ; Y =   328.288 ; and Radius =   227.767
       Factor of Safety
      ***    0.946    ***
Failure Surface Specified By 17 Coordinate Points
  Point       X-Surf       Y-Surf
   No.         (ft)         (ft)
    1         115.000      110.000
    2         124.511      113.090
    3         133.873      116.604
    4         143.068      120.535
    5         152.078      124.874
    6         160.883      129.613
    7         169.467      134.742
    8         177.813      140.252
    9         185.902      146.130
   10         193.720      152.366
   11         201.250      158.946
   12         208.478      165.858
   13         215.387      173.086
   14         221.966      180.618
   15         228.199      188.437
   16         234.076      196.528
   17         235.754      199.072
Circle Center At X =    50.927 ; Y =   323.372 ; and Radius =   222.785
       Factor of Safety
      ***    0.946    ***
Failure Surface Specified By 17 Coordinate Points
  Point       X-Surf       Y-Surf
   No.         (ft)         (ft)
    1         115.000      110.000
    2         124.581      112.864
    3         134.020      116.165
    4         143.298      119.897
    5         152.394      124.051
    6         161.290      128.619
    7         169.966      133.591
    8         178.405      138.957
    9         186.588      144.704
   10         194.499      150.822
   11         202.120      157.297
   12         209.435      164.115
   13         216.429      171.262
   14         223.087      178.723
   15         229.396      186.482
   16         235.341      194.523
   17         239.229      200.323
Circle Center At X =    57.507 ; Y =   319.785 ; and Radius =   217.521
       Factor of Safety
      ***    0.946    ***
Failure Surface Specified By 17 Coordinate Points
  Point       X-Surf       Y-Surf
   No.         (ft)         (ft)
    1         115.000      110.000
    2         124.581      112.864
    3         134.009      116.199
    4         143.259      119.997
    5         152.310      124.249
    6         161.139      128.945
    7         169.725      134.072
    8         178.045      139.619
    9         186.080      145.572
   10         193.811      151.915
   11         201.217      158.634
   12         208.281      165.712
   13         214.986      173.132
   14         221.315      180.874
```

```
   15        227.252      188.921
   16        232.782      197.253
   17        233.349      198.206
Circle Center At X =    62.064 ; Y =    304.581 ; and Radius =   201.653
       Factor of Safety
      ***    0.947   ***
Failure Surface Specified By 17 Coordinate Points
  Point       X-Surf       Y-Surf
   No.         (ft)         (ft)
    1        115.000      110.000
    2        124.600      112.800
    3        134.047      116.079
    4        143.317      119.829
    5        152.388      124.039
    6        161.235      128.700
    7        169.838      133.799
    8        178.173      139.324
    9        186.220      145.260
   10        193.959      151.594
   11        201.370      158.308
   12        208.434      165.386
   13        215.134      172.809
   14        221.452      180.560
   15        227.374      188.619
   16        232.883      196.965
   17        233.687      198.327
Circle Center At X =    64.086 ; Y =    302.394 ; and Radius =   199.017
       Factor of Safety
      ***    0.947   ***
Failure Surface Specified By 17 Coordinate Points
  Point       X-Surf       Y-Surf
   No.         (ft)         (ft)
    1        115.000      110.000
    2        124.582      112.862
    3        134.023      116.158
    4        143.304      119.880
    5        152.406      124.022
    6        161.310      128.574
    7        169.997      133.527
    8        178.450      138.871
    9        186.650      144.594
   10        194.581      150.685
   11        202.226      157.132
   12        209.569      163.919
   13        216.596      171.035
   14        223.290      178.463
   15        229.640      186.189
   16        235.630      194.196
   17        239.975      200.591
Circle Center At X =    57.018 ; Y =    321.586 ; and Radius =   219.387
       Factor of Safety
      ***    0.947   ***
Failure Surface Specified By 17 Coordinate Points
  Point       X-Surf       Y-Surf
   No.         (ft)         (ft)
    1        115.000      110.000
    2        124.502      113.115
    3        133.856      116.653
    4        143.041      120.605
    5        152.041      124.965
    6        160.836      129.724
    7        169.409      134.872
    8        177.743      140.399
    9        185.822      146.293
   10        193.628      152.543
   11        201.146      159.136
   12        208.362      166.060
```

```
    13          215.260        173.299
    14          221.828        180.841
    15          228.051        188.668
    16          233.917        196.767
    17          235.334        198.920
Circle Center At X =    50.222 ; Y =   323.653 ; and Radius =   223.257
       Factor of Safety
      ***     0.947   ***
          **** END OF GSTABL7 OUTPUT ****
```

6489, Green Acres LLC, Section A, Static, Circular, 1.5 Search

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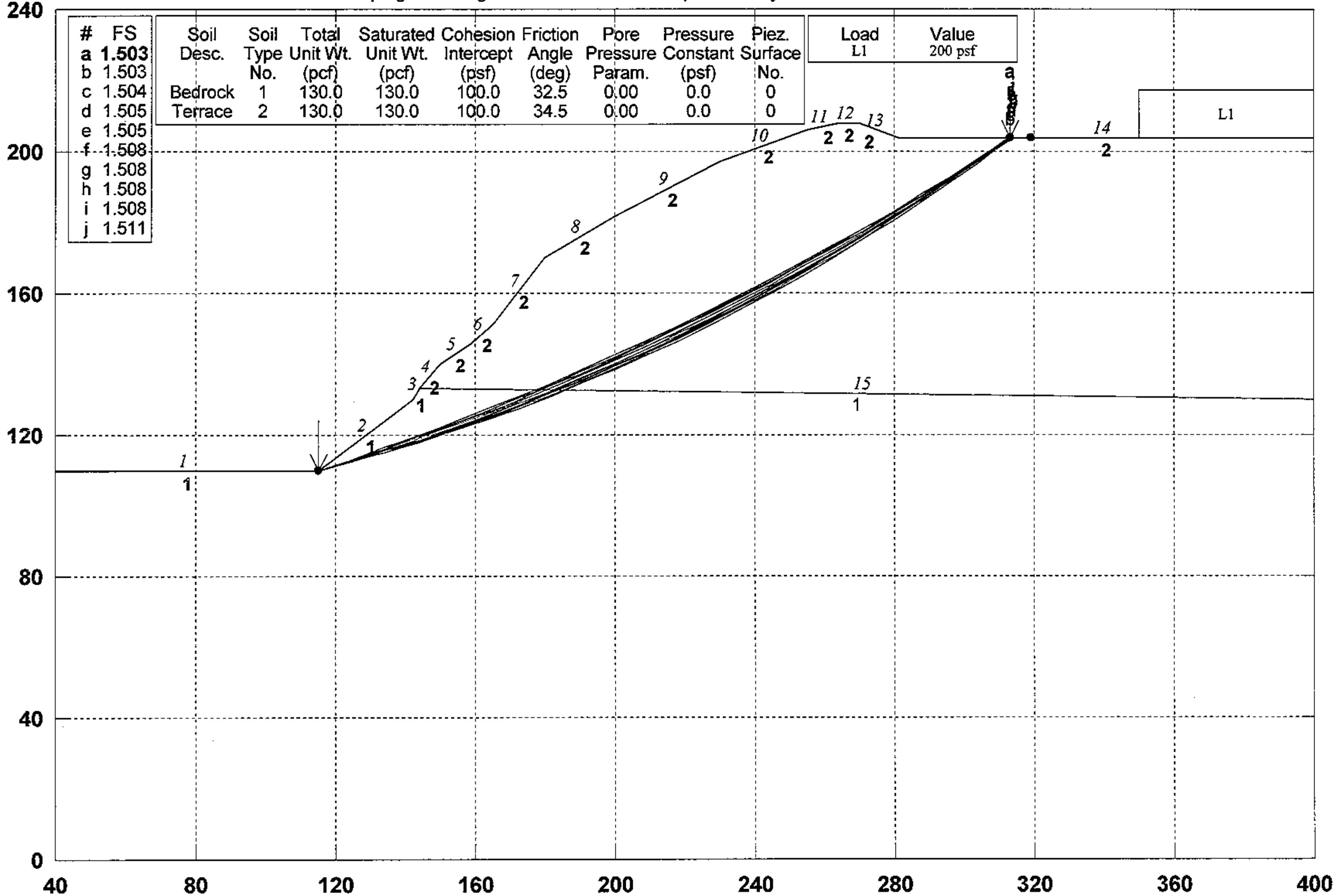

GSTABL7 v.2 FSmin=1.503

Safety Factors Are Calculated By The Modified Bishop Method

GSTABL7

***** GSTABL7 *****

** GSTABL7 by Garry H. Gregory, P.E. **
** Original Version 1.0, January 1996; Current Version 2.004, June 2003 **

****

SLOPE STABILITY ANALYSIS SYSTEM

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

****

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Analysis Run Date:        9/14/2011
Time of Run:              03:55PM
Run By:                   Gcubb
Input Data Filename:      C:\Program Files\G72SW\Data\6489\Astat1.5.in
Output Filename:          C:\Program Files\G72SW\Data\6489\Astat1.5.OUT
Unit System:              English
Plotted Output Filename:  C:\Program Files\G72SW\Data\6489\Astat1.5.PLT
PROBLEM DESCRIPTION:  6489, Green Acres LLC,
                      Section A, Static, Circular, 1.5 Search
```

BOUNDARY COORDINATES
Note: User origin value specified.
Add 40.00 to X-values and 0.00 to Y-values listed.

14 Top Boundaries
15 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	40.00	110.00	115.00	110.00	1
2	115.00	110.00	142.00	130.00	1
3	142.00	130.00	144.00	133.00	1
4	144.00	133.00	150.00	140.00	2
5	150.00	140.00	159.00	146.00	2
6	159.00	146.00	165.00	151.00	2
7	165.00	151.00	180.00	170.00	2
8	180.00	170.00	200.00	182.00	2
9	200.00	182.00	230.00	197.00	2
10	230.00	197.00	255.00	206.00	2
11	255.00	206.00	264.00	208.00	2
12	264.00	208.00	270.00	208.00	2
13	270.00	208.00	281.00	204.00	2
14	281.00	204.00	400.00	204.00	2
15	144.00	133.00	400.00	130.00	1

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

ISOTROPIC SOIL PARAMETERS
2 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	130.0	130.0	100.0	32.5	0.00	0.0	0
2	130.0	130.0	100.0	34.5	0.00	0.0	0

BOUNDARY LOAD(S)
1 Load(s) Specified

Load No.	X-Left (ft)	X-Right (ft)	Intensity (psf)	Deflection (deg)
1	350.00	400.00	200.0	0.0

NOTE - Intensity Is Specified As A Uniformly Distributed
Force Acting On A Horizontally Projected Surface.
A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Circular Surfaces, Has Been Specified.
1600 Trial Surfaces Have Been Generated.
40 Surface(s) Initiate(s) From Each Of 40 Points Equally Spaced
Along The Ground Surface Between X = 115.00(ft)
and X = 115.00(ft)

```
Each Surface Terminates Between   X = 313.00(ft)
                          and     X = 319.00(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.
Following Are Displayed The Ten Most Critical Of The Trial
      Failure Surfaces Evaluated. They Are
      Ordered - Most Critical First.
      * * Safety Factors Are Calculated By The Modified Bishop Method * *
      Total Number of Trial Surfaces Attempted =  1600
      Number of Trial Surfaces With Valid FS = 1600
      Statistical Data On All Valid FS Values:
         FS Max =   2.778   FS Min =   1.503   FS Ave =   2.043
         Standard Deviation =    0.412   Coefficient of Variation =   20.14 %
      Failure Surface Specified By 24 Coordinate Points
```

Point No.	X-Surf (ft)	Y-Surf (ft)
1	115.000	110.000
2	124.645	112.642
3	134.244	115.445
4	143.795	118.407
5	153.296	121.528
6	162.743	124.806
7	172.134	128.242
8	181.467	131.833
9	190.739	135.580
10	199.947	139.480
11	209.089	143.533
12	218.162	147.738
13	227.163	152.093
14	236.091	156.598
15	244.943	161.251
16	253.716	166.051
17	262.407	170.996
18	271.015	176.085
19	279.538	181.317
20	287.971	186.690
21	296.315	192.203
22	304.565	197.854
23	312.720	203.642
24	313.207	204.000

```
      Circle Center At X =   -38.745 ; Y =   690.154 ; and Radius =   600.180
             Factor of Safety
            ***   1.503   ***
           Individual data on the    36  slices
```

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	9.6	2822.2	0.0	0.0	0.	0.	0.0	0.0	0.0
2	9.6	8305.9	0.0	0.0	0.	0.	0.0	0.0	0.0
3	7.8	10566.8	0.0	0.0	0.	0.	0.0	0.0	0.0
4	1.8	3084.5	0.0	0.0	0.	0.	0.0	0.0	0.0
5	0.2	383.7	0.0	0.0	0.	0.	0.0	0.0	0.0
6	6.0	13291.5	0.0	0.0	0.	0.	0.0	0.0	0.0
7	3.3	8616.8	0.0	0.0	0.	0.	0.0	0.0	0.0
8	5.7	16003.7	0.0	0.0	0.	0.	0.0	0.0	0.0
9	3.7	11387.4	0.0	0.0	0.	0.	0.0	0.0	0.0
10	2.3	7288.7	0.0	0.0	0.	0.	0.0	0.0	0.0
11	7.1	26508.1	0.0	0.0	0.	0.	0.0	0.0	0.0
12	7.9	36058.2	0.0	0.0	0.	0.	0.0	0.0	0.0
13	1.5	7417.1	0.0	0.0	0.	0.	0.0	0.0	0.0
14	1.8	8923.8	0.0	0.0	0.	0.	0.0	0.0	0.0
15	7.5	39235.3	0.0	0.0	0.	0.	0.0	0.0	0.0
16	9.2	49887.8	0.0	0.0	0.	0.	0.0	0.0	0.0
17	0.1	293.8	0.0	0.0	0.	0.	0.0	0.0	0.0
18	9.1	50514.3	0.0	0.0	0.	0.	0.0	0.0	0.0

19	9.1	50926.8	0.0	0.0	0.	0.	0.0	0.0	0.0
20	9.0	50805.7	0.0	0.0	0.	0.	0.0	0.0	0.0
21	2.8	16035.2	0.0	0.0	0.	0.	0.0	0.0	0.0
22	6.1	34077.1	0.0	0.0	0.	0.	0.0	0.0	0.0
23	8.9	48170.5	0.0	0.0	0.	0.	0.0	0.0	0.0
24	8.8	45969.9	0.0	0.0	0.	0.	0.0	0.0	0.0
25	1.3	6570.8	0.0	0.0	0.	0.	0.0	0.0	0.0
26	7.4	36529.1	0.0	0.0	0.	0.	0.0	0.0	0.0
27	1.6	7527.6	0.0	0.0	0.	0.	0.0	0.0	0.0
28	6.0	26745.4	0.0	0.0	0.	0.	0.0	0.0	0.0
29	1.0	4228.3	0.0	0.0	0.	0.	0.0	0.0	0.0
30	8.5	30334.2	0.0	0.0	0.	0.	0.0	0.0	0.0
31	1.5	4274.3	0.0	0.0	0.	0.	0.0	0.0	0.0
32	7.0	17700.5	0.0	0.0	0.	0.	0.0	0.0	0.0
33	8.3	15785.0	0.0	0.0	0.	0.	0.0	0.0	0.0
34	8.3	9622.3	0.0	0.0	0.	0.	0.0	0.0	0.0
35	8.2	3447.9	0.0	0.0	0.	0.	0.0	0.0	0.0
36	0.5	11.4	0.0	0.0	0.	0.	0.0	0.0	0.0

Failure Surface Specified By 24 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	115.000	110.000
2	124.671	112.543
3	134.296	115.256
4	143.872	118.139
5	153.395	121.190
6	162.863	124.408
7	172.273	127.793
8	181.621	131.342
9	190.906	135.057
10	200.124	138.934
11	209.272	142.973
12	218.347	147.173
13	227.347	151.532
14	236.269	156.049
15	245.109	160.723
16	253.866	165.552
17	262.536	170.534
18	271.118	175.669
19	279.607	180.954
20	288.002	186.387
21	296.300	191.968
22	304.498	197.695
23	312.594	203.565
24	313.172	204.000

Circle Center At X = -24.368 ; Y = 659.713 ; and Radius = 567.104

Factor of Safety

*** 1.503 ***

Failure Surface Specified By 24 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	115.000	110.000
2	124.615	112.748
3	134.186	115.646
4	143.711	118.692
5	153.187	121.887
6	162.612	125.229
7	171.983	128.717
8	181.300	132.352
9	190.558	136.131
10	199.757	140.053
11	208.893	144.119
12	217.965	148.327
13	226.970	152.675
14	235.906	157.163
15	244.771	161.791
16	253.563	166.555

17	262.279	171.456
18	270.918	176.493
19	279.478	181.663
20	287.956	186.967
21	296.350	192.402
22	304.659	197.967
23	312.879	203.660
24	313.354	204.000

Circle Center At X = -56.433 ; Y = 728.026 ; and Radius = 641.363

Factor of Safety

*** 1.504 ***

Failure Surface Specified By 24 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	115.000	110.000
2	124.525	113.045
3	134.011	116.210
4	143.456	119.494
5	152.859	122.898
6	162.218	126.421
7	171.532	130.062
8	180.798	133.821
9	190.017	137.697
10	199.185	141.689
11	208.302	145.797
12	217.367	150.020
13	226.377	154.358
14	235.332	158.809
15	244.230	163.373
16	253.069	168.050
17	261.848	172.838
18	270.566	177.736
19	279.221	182.745
20	287.812	187.863
21	296.338	193.090
22	304.796	198.424
23	313.187	203.864
24	313.391	204.000

Circle Center At X = -120.663 ; Y = 863.730 ; and Radius = 789.713

Factor of Safety

*** 1.505 ***

Failure Surface Specified By 24 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	115.000	110.000
2	124.576	112.879
3	134.111	115.895
4	143.601	119.046
5	153.046	122.333
6	162.443	125.753
7	171.790	129.307
8	181.085	132.995
9	190.327	136.814
10	199.514	140.765
11	208.643	144.846
12	217.713	149.057
13	226.722	153.397
14	235.669	157.865
15	244.551	162.459
16	253.366	167.181
17	262.113	172.027
18	270.790	176.998
19	279.396	182.091
20	287.928	187.307
21	296.384	192.644
22	304.764	198.102
23	313.065	203.678

24	313.531	204.000

Circle Center At X = -82.102 ; Y = 782.936 ; and Radius = 701.207

Factor of Safety
*** 1.505 ***

Failure Surface Specified By 24 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	115.000	110.000
2	124.544	112.985
3	134.048	116.095
4	143.510	119.331
5	152.929	122.690
6	162.303	126.174
7	171.630	129.781
8	180.908	133.510
9	190.137	137.361
10	199.314	141.334
11	208.438	145.427
12	217.507	149.640
13	226.520	153.972
14	235.475	158.422
15	244.371	162.991
16	253.205	167.675
17	261.978	172.476
18	270.686	177.392
19	279.328	182.423
20	287.904	187.567
21	296.411	192.823
22	304.848	198.191
23	313.214	203.670
24	313.704	204.000

Circle Center At X = -106.698 ; Y = 835.659 ; and Radius = 758.769

Factor of Safety
*** 1.508 ***

Failure Surface Specified By 24 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	115.000	110.000
2	124.618	112.737
3	134.192	115.624
4	143.720	118.660
5	153.200	121.843
6	162.629	125.174
7	172.005	128.651
8	181.326	132.274
9	190.589	136.041
10	199.792	139.953
11	208.934	144.007
12	218.011	148.203
13	227.022	152.539
14	235.964	157.016
15	244.835	161.631
16	253.634	166.384
17	262.357	171.273
18	271.003	176.297
19	279.570	181.455
20	288.055	186.747
21	296.457	192.169
22	304.774	197.722
23	313.003	203.404
24	313.839	204.000

Circle Center At X = -55.908 ; Y = 728.825 ; and Radius = 641.992

Factor of Safety
*** 1.508 ***

Failure Surface Specified By 24 Coordinate Points

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

1	115.000	110.000
2	124.503	113.114
3	133.968	116.341
4	143.394	119.681
5	152.779	123.132
6	162.123	126.695
7	171.424	130.369
8	180.680	134.153
9	189.890	138.048
10	199.054	142.051
11	208.169	146.164
12	217.235	150.384
13	226.250	154.712
14	235.212	159.148
15	244.122	163.689
16	252.976	168.336
17	261.775	173.089
18	270.516	177.945
19	279.199	182.906
20	287.823	187.969
21	296.385	193.135
22	304.885	198.402
23	313.322	203.770
24	313.674	204.000

Circle Center At X = -141.828 ; Y = 909.775 ; and Radius = 840.000
Factor of Safety
*** 1.508 ***

Failure Surface Specified By 24 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	115.000	110.000
2	124.682	112.500
3	134.319	115.173
4	143.905	118.018
5	153.440	121.034
6	162.919	124.220
7	172.339	127.574
8	181.698	131.097
9	190.993	134.786
10	200.220	138.641
11	209.377	142.660
12	218.460	146.842
13	227.467	151.186
14	236.396	155.691
15	245.242	160.354
16	254.003	165.174
17	262.677	170.151
18	271.261	175.281
19	279.751	180.565
20	288.146	185.999
21	296.442	191.582
22	304.637	197.313
23	312.728	203.189
24	313.803	204.000

Circle Center At X = -19.925 ; Y = 652.583 ; and Radius = 559.107
Factor of Safety
*** 1.508 ***

Failure Surface Specified By 24 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	115.000	110.000
2	124.525	113.045
3	134.011	116.209
4	143.458	119.491
5	152.862	122.890
6	162.223	126.406
7	171.540	130.039

8	180.811	133.788
9	190.035	137.651
10	199.209	141.630
11	208.333	145.723
12	217.406	149.929
13	226.425	154.247
14	235.390	158.678
15	244.299	163.220
16	253.150	167.873
17	261.943	172.636
18	270.676	177.509
19	279.347	182.489
20	287.956	187.578
21	296.500	192.773
22	304.979	198.075
23	313.392	203.481
24	314.177	204.000

Circle Center At X = -124.406 ; Y = 875.296 ; and Radius = 801.868

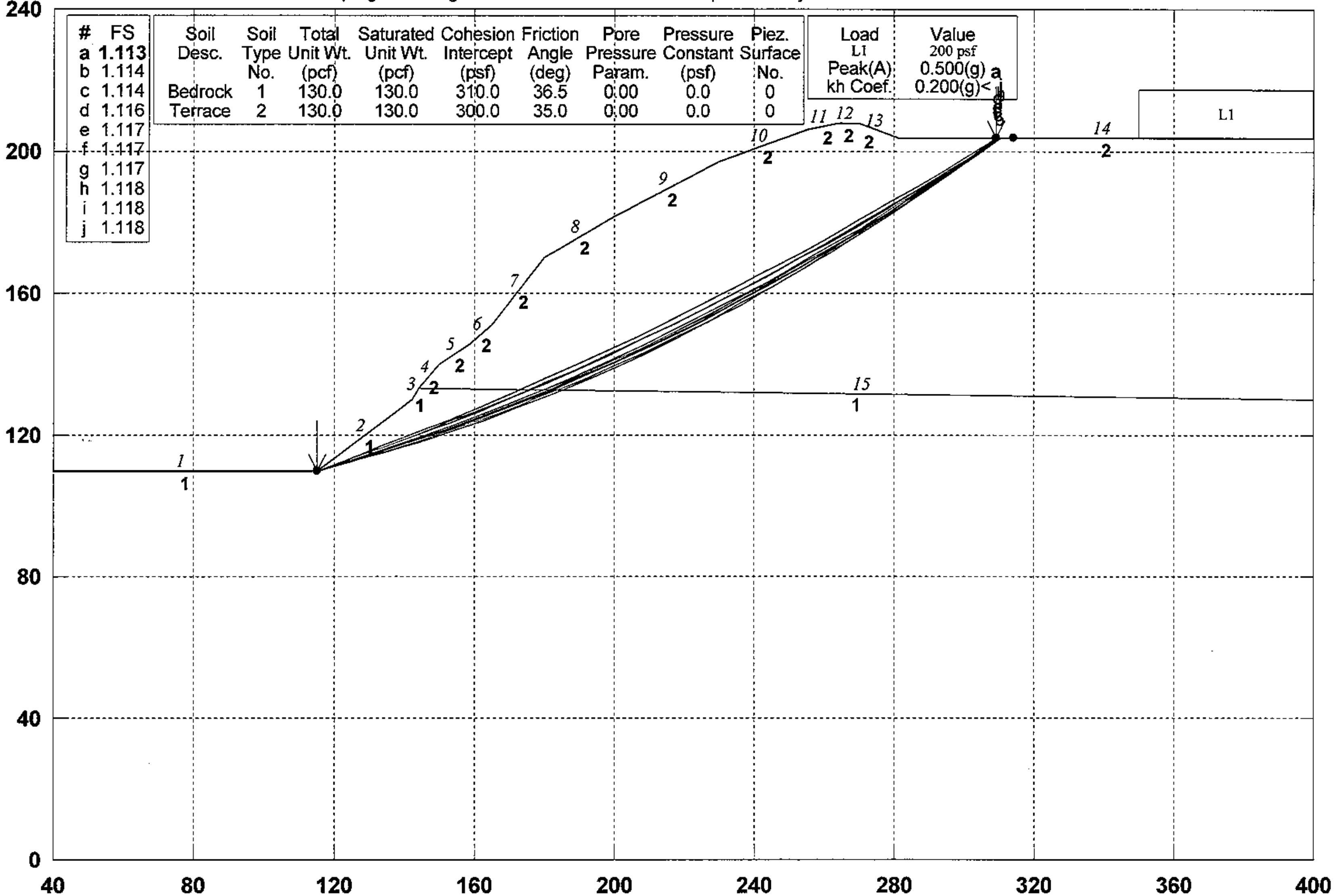
Factor of Safety

*** 1.511 ***

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

6489, Green Acres LLC, Section A, Seismic, Circular, 1.1 Search

c:\program files\g72sw\data\6489\aseis1.1search.pl2 Run By: Gcubb 9/15/2011 10:50AM



GSTABL7 v.2 FSmin=1.113
Safety Factors Are Calculated By The Modified Bishop Method

GSTABL7

*** **GSTABL7** ***

** GSTABL7 by Garry H. Gregory, P.E. **

** Original Version 1.0, January 1996; Current Version 2.004, June 2003 **

****

SLOPE STABILITY ANALYSIS SYSTEM

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

****

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Analysis Run Date:        9/15/2011
Time of Run:              10:50AM
Run By:                   Gcubb
Input Data Filename:      C:\Program Files\G72SW\Data\6489\aseis1.1search.in
Output Filename:          C:\Program Files\G72SW\Data\6489\aseis1.1search.OUT
Unit System:              English
Plotted Output Filename:  C:\Program Files\G72SW\Data\6489\aseis1.1search.PLT
PROBLEM DESCRIPTION:  6489, Green Acres LLC,
                      Section A, Seismic, Circular, 1.1 Search
```

BOUNDARY COORDINATES

Note: User origin value specified.
Add 40.00 to X-values and 0.00 to Y-values listed.

14 Top Boundaries
15 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	40.00	110.00	115.00	110.00	1
2	115.00	110.00	142.00	130.00	1
3	142.00	130.00	144.00	133.00	1
4	144.00	133.00	150.00	140.00	2
5	150.00	140.00	159.00	146.00	2
6	159.00	146.00	165.00	151.00	2
7	165.00	151.00	180.00	170.00	2
8	180.00	170.00	200.00	182.00	2
9	200.00	182.00	230.00	197.00	2
10	230.00	197.00	255.00	206.00	2
11	255.00	206.00	264.00	208.00	2
12	264.00	208.00	270.00	208.00	2
13	270.00	208.00	281.00	204.00	2
14	281.00	204.00	400.00	204.00	2
15	144.00	133.00	400.00	130.00	1

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

ISOTROPIC SOIL PARAMETERS

2 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	130.0	130.0	310.0	36.5	0.00	0.0	0
2	130.0	130.0	300.0	35.0	0.00	0.0	0

BOUNDARY LOAD(S)

1 Load(s) Specified

Load No.	X-Left (ft)	X-Right (ft)	Intensity (psf)	Deflection (deg)
1	350.00	400.00	200.0	0.0

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

Specified Peak Ground Acceleration Coefficient (A) = 0.500(g)
Specified Horizontal Earthquake Coefficient (kh) = 0.200(g)
Specified Vertical Earthquake Coefficient (kv) = 0.000(g)
Specified Seismic Pore-Pressure Factor = 0.000

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

1600 Trial Surfaces Have Been Generated.
40 Surface(s) Initiate(s) From Each Of 40 Points Equally Spaced
Along The Ground Surface Between X = 115.00(ft)
and X = 115.00(ft)
Each Surface Terminates Between X = 309.00(ft)
and X = 314.00(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.
Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Modified Bishop Method * *
Total Number of Trial Surfaces Attempted = 1600
Number of Trial Surfaces With Valid FS = 1600
Statistical Data On All Valid FS Values:
FS Max = 2.169 FS Min = 1.113 FS Ave = 1.581
Standard Deviation = 0.349 Coefficient of Variation = 22.07 %
Failure Surface Specified By 23 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	115.000	110.000
2	124.623	112.719
3	134.199	115.601
4	143.724	118.645
5	153.197	121.850
6	162.614	125.215
7	171.972	128.739
8	181.269	132.422
9	190.503	136.261
10	199.670	140.257
11	208.768	144.407
12	217.794	148.711
13	226.747	153.168
14	235.622	157.775
15	244.418	162.533
16	253.132	167.438
17	261.761	172.491
18	270.304	177.690
19	278.757	183.032
20	287.118	188.517
21	295.386	194.144
22	303.556	199.909
23	309.150	204.000

Circle Center At X = -40.559 ; Y = 678.911 ; and Radius = 589.795
Factor of Safety
*** 1.113 ***
Individual data on the 35 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	9.6	2757.9	0.0	0.0	0.	0.	551.6	0.0	0.0
2	9.6	8109.8	0.0	0.0	0.	0.	1622.0	0.0	0.0
3	7.8	10408.3	0.0	0.0	0.	0.	2081.7	0.0	0.0
4	1.7	2897.1	0.0	0.0	0.	0.	579.4	0.0	0.0
5	0.3	505.2	0.0	0.0	0.	0.	101.0	0.0	0.0
6	6.0	13062.4	0.0	0.0	0.	0.	2612.5	0.0	0.0
7	3.2	8210.7	0.0	0.0	0.	0.	1642.1	0.0	0.0
8	5.8	15977.3	0.0	0.0	0.	0.	3195.5	0.0	0.0
9	3.6	10775.1	0.0	0.0	0.	0.	2155.0	0.0	0.0
10	2.4	7551.1	0.0	0.0	0.	0.	1510.2	0.0	0.0
11	7.0	25368.6	0.0	0.0	0.	0.	5073.7	0.0	0.0
12	8.0	36095.4	0.0	0.0	0.	0.	7219.1	0.0	0.0
13	1.3	6305.6	0.0	0.0	0.	0.	1261.1	0.0	0.0
14	0.3	1650.8	0.0	0.0	0.	0.	330.2	0.0	0.0
15	8.9	45391.4	0.0	0.0	0.	0.	9078.3	0.0	0.0

16	9.2	48613.8	0.0	0.0	0.	0.	9722.8	0.0	0.0
17	0.3	1783.2	0.0	0.0	0.	0.	356.6	0.0	0.0
18	8.8	47628.3	0.0	0.0	0.	0.	9525.7	0.0	0.0
19	9.0	49379.5	0.0	0.0	0.	0.	9875.9	0.0	0.0
20	9.0	49106.3	0.0	0.0	0.	0.	9821.3	0.0	0.0
21	3.3	17837.7	0.0	0.0	0.	0.	3567.5	0.0	0.0
22	5.6	30472.8	0.0	0.0	0.	0.	6094.6	0.0	0.0
23	8.8	46256.7	0.0	0.0	0.	0.	9251.3	0.0	0.0
24	8.7	43922.9	0.0	0.0	0.	0.	8784.6	0.0	0.0
25	1.9	9151.7	0.0	0.0	0.	0.	1830.3	0.0	0.0
26	6.8	31852.3	0.0	0.0	0.	0.	6370.5	0.0	0.0
27	2.2	10064.3	0.0	0.0	0.	0.	2012.9	0.0	0.0
28	6.0	25210.1	0.0	0.0	0.	0.	5042.0	0.0	0.0
29	0.3	1198.2	0.0	0.0	0.	0.	239.6	0.0	0.0
30	8.5	28562.7	0.0	0.0	0.	0.	5712.5	0.0	0.0
31	2.2	6018.5	0.0	0.0	0.	0.	1203.7	0.0	0.0
32	6.1	13910.9	0.0	0.0	0.	0.	2782.2	0.0	0.0
33	8.3	13616.5	0.0	0.0	0.	0.	2723.3	0.0	0.0
34	8.2	7407.4	0.0	0.0	0.	0.	1481.5	0.0	0.0
35	5.6	1487.5	0.0	0.0	0.	0.	297.5	0.0	0.0

Failure Surface Specified By 23 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	115.000	110.000
2	124.562	112.927
3	134.080	115.994
4	143.552	119.201
5	152.975	122.548
6	162.349	126.032
7	171.669	129.654
8	180.936	133.414
9	190.146	137.309
10	199.298	141.339
11	208.390	145.503
12	217.419	149.801
13	226.384	154.232
14	235.283	158.794
15	244.113	163.486
16	252.874	168.308
17	261.563	173.259
18	270.178	178.336
19	278.717	183.540
20	287.178	188.870
21	295.561	194.323
22	303.862	199.899
23	309.777	204.000

Circle Center At X = -79.014 ; Y = 760.922 ; and Radius = 679.221

Factor of Safety

*** 1.114 ***

Failure Surface Specified By 23 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	115.000	110.000
2	124.596	112.815
3	134.145	115.782
4	143.647	118.901
5	153.097	122.169
6	162.495	125.588
7	171.837	129.155
8	181.121	132.870
9	190.346	136.732
10	199.507	140.740
11	208.604	144.892
12	217.634	149.189
13	226.595	153.628
14	235.484	158.210
15	244.299	162.931

16	253.038	167.792
17	261.699	172.791
18	270.279	177.927
19	278.777	183.199
20	287.190	188.604
21	295.516	194.143
22	303.753	199.813
23	309.633	204.000

Circle Center At X = -57.536 ; Y = 715.854 ; and Radius = 629.943

Factor of Safety

*** 1.114 ***

Failure Surface Specified By 23 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	115.000	110.000
2	124.400	113.412
3	133.766	116.917
4	143.096	120.513
5	152.391	124.202
6	161.649	127.982
7	170.870	131.853
8	180.052	135.814
9	189.194	139.866
10	198.296	144.007
11	207.357	148.238
12	216.376	152.559
13	225.351	156.967
14	234.283	161.464
15	243.170	166.049
16	252.012	170.721
17	260.807	175.480
18	269.554	180.325
19	278.254	185.257
20	286.905	190.273
21	295.505	195.375
22	304.055	200.561
23	309.601	204.000

Circle Center At X = -226.669 ; Y = 1065.882 ; and Radius = 1015.110

Factor of Safety

*** 1.116 ***

Failure Surface Specified By 23 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	115.000	110.000
2	124.661	112.583
3	134.273	115.340
4	143.834	118.272
5	153.339	121.377
6	162.787	124.654
7	172.174	128.103
8	181.496	131.721
9	190.751	135.508
10	199.936	139.463
11	209.048	143.584
12	218.083	147.869
13	227.038	152.318
14	235.912	156.929
15	244.700	161.701
16	253.400	166.631
17	262.009	171.719
18	270.524	176.962
19	278.943	182.359
20	287.262	187.908
21	295.479	193.608
22	303.591	199.455
23	309.660	204.000

Circle Center At X = -22.310 ; Y = 643.002 ; and Radius = 550.405

Factor of Safety
*** 1.117 ***
Failure Surface Specified By 23 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	115.000	110.000
2	124.468	113.219
3	133.898	116.548
4	143.288	119.986
5	152.638	123.533
6	161.945	127.189
7	171.210	130.953
8	180.430	134.824
9	189.605	138.803
10	198.732	142.888
11	207.812	147.079
12	216.842	151.375
13	225.821	155.776
14	234.749	160.281
15	243.624	164.890
16	252.444	169.601
17	261.209	174.415
18	269.917	179.331
19	278.568	184.348
20	287.160	189.465
21	295.691	194.681
22	304.161	199.997
23	310.379	204.000

Circle Center At X = -156.894 ; Y = 925.281 ; and Radius = 859.424
Factor of Safety
*** 1.117 ***
Failure Surface Specified By 23 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	115.000	110.000
2	124.677	112.519
3	134.306	115.220
4	143.882	118.102
5	153.401	121.164
6	162.862	124.404
7	172.260	127.822
8	181.591	131.416
9	190.854	135.185
10	200.044	139.128
11	209.158	143.244
12	218.192	147.530
13	227.145	151.986
14	236.012	156.609
15	244.790	161.398
16	253.477	166.352
17	262.069	171.469
18	270.563	176.747
19	278.956	182.183
20	287.245	187.777
21	295.428	193.525
22	303.500	199.427
23	309.515	204.000

Circle Center At X = -13.943 ; Y = 625.175 ; and Radius = 531.066
Factor of Safety
*** 1.117 ***
Failure Surface Specified By 23 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	115.000	110.000
2	124.578	112.874
3	134.112	115.891
4	143.599	119.052

5	153.038	122.355
6	162.426	125.800
7	171.761	129.386
8	181.041	133.112
9	190.264	136.977
10	199.427	140.981
11	208.530	145.121
12	217.569	149.399
13	226.542	153.812
14	235.448	158.360
15	244.285	163.041
16	253.050	167.854
17	261.742	172.799
18	270.358	177.875
19	278.897	183.079
20	287.357	188.411
21	295.736	193.870
22	304.031	199.455
23	310.568	204.000

Circle Center At X = -71.136 ; Y = 747.783 ; and Radius = 664.390

Factor of Safety

*** 1.118 ***

Failure Surface Specified By 23 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	115.000	110.000
2	124.475	113.197
3	133.912	116.506
4	143.309	119.926
5	152.665	123.456
6	161.979	127.097
7	171.249	130.848
8	180.474	134.707
9	189.653	138.676
10	198.784	142.752
11	207.867	146.936
12	216.900	151.226
13	225.881	155.623
14	234.810	160.126
15	243.685	164.734
16	252.505	169.446
17	261.269	174.262
18	269.976	179.181
19	278.623	184.203
20	287.211	189.326
21	295.738	194.550
22	304.203	199.875
23	310.592	204.000

Circle Center At X = -151.122 ; Y = 914.324 ; and Radius = 847.206

Factor of Safety

*** 1.118 ***

Failure Surface Specified By 23 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	115.000	110.000
2	124.611	112.762
3	134.176	115.680
4	143.692	118.752
5	153.158	121.978
6	162.570	125.356
7	171.926	128.887
8	181.223	132.568
9	190.460	136.400
10	199.634	140.380
11	208.742	144.509
12	217.782	148.785
13	226.751	153.206

14	235.648	157.772
15	244.470	162.481
16	253.214	167.332
17	261.879	172.325
18	270.461	177.457
19	278.960	182.727
20	287.372	188.135
21	295.695	193.677
22	303.928	199.354
23	310.437	204.000

Circle Center At X = -50.815 ; Y = 705.003 ; and Radius = 617.676

Factor of Safety

*** 1.118 ***

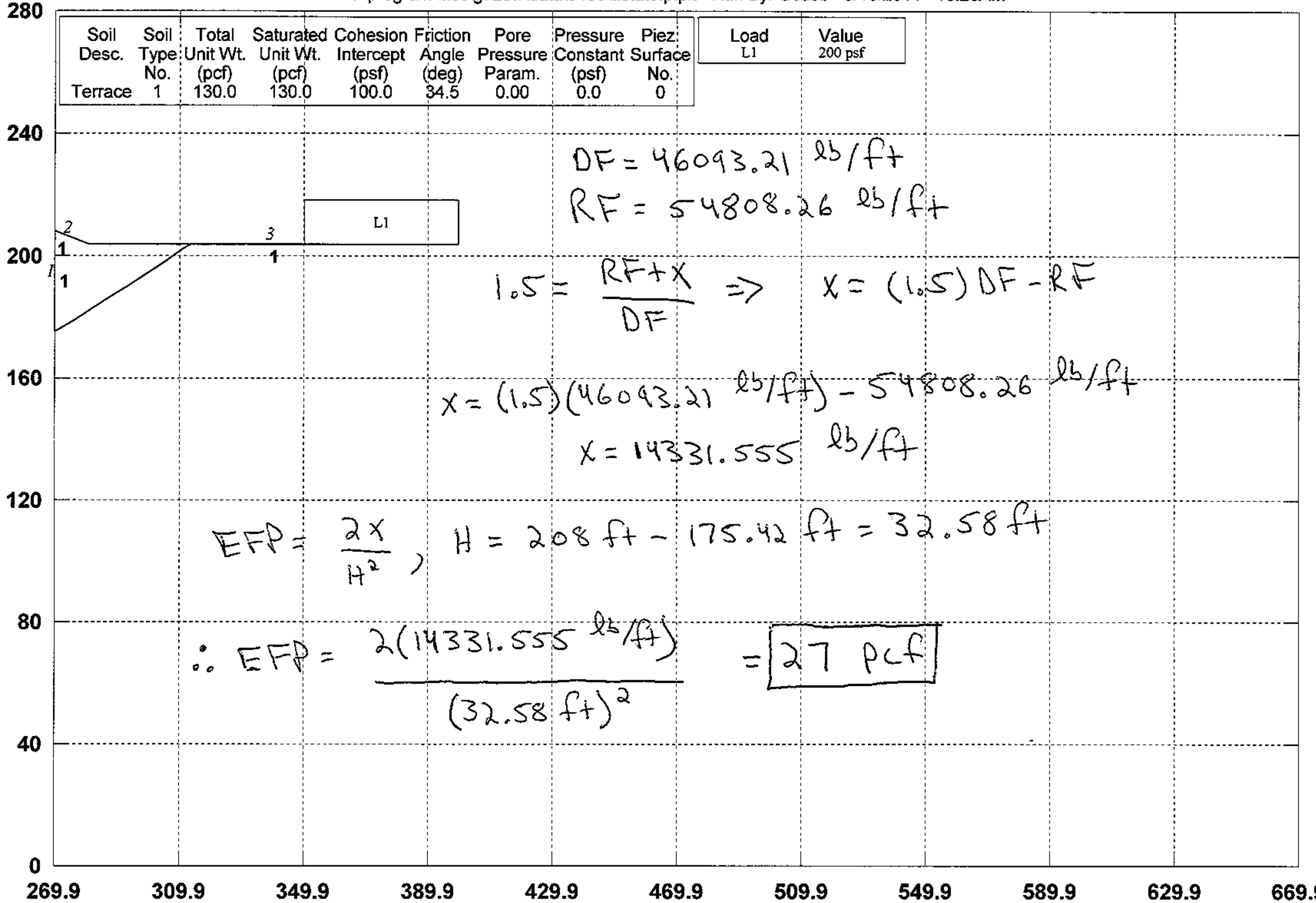
**** END OF GSTABL7 OUTPUT ****

6489, Green Acres LLC, Section A, Static, EFP

c:\program files\g72sw\data\6489\astatefp.plt   Run By: Gcubb   9/15/2011   10:25AM

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
Terrace	1	130.0	130.0	100.0	34.5	0.00	0.0	0

Load	Value
L1	200 psf



$DF = 46093.21$ lb/ft

$RF = 54808.26$ lb/ft

$1.5 = \frac{RF + X}{DF} \Rightarrow X = (1.5)DF - RF$

$X = (1.5)(46093.21 \text{ lb/ft}) - 54808.26 \text{ lb/ft}$

$X = 14331.555$ lb/ft

$EFP = \frac{2X}{H^2}, \quad H = 208 \text{ ft} - 175.42 \text{ ft} = 32.58 \text{ ft}$

$\therefore EFP = \frac{2(14331.555 \text{ lb/ft})}{(32.58 \text{ ft})^2} = \boxed{27 \text{ pcf}}$

GSTABL7 v.2 FSmin=1.189

Factor Of Safety Is Calculated By The Modified Bishop Method

GSTABL7

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                              ***  GSTABL7  ***
                   ** GSTABL7 by Garry H. Gregory, P.E. **
    ** Original Version 1.0, January 1996; Current Version 2.004, June 2003 **
               (All Rights Reserved-Unauthorized Use Prohibited)
*********************************************************************************
                      SLOPE STABILITY ANALYSIS SYSTEM
        Modified Bishop, Simplified Janbu, or GLE Method of Slices.
        (Includes Spencer & Morgenstern-Price Type Analysis)
        Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
        Nonlinear Undrained Shear Strength, Curved Phi Envelope,
        Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
        Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.
*********************************************************************************
 Analysis Run Date:          9/15/2011
 Time of Run:                10:25AM
 Run By:                     Gcubb
 Input Data Filename:        C:\Program Files\G72SW\Data\6489\astatefp.in
 Output Filename:            C:\Program Files\G72SW\Data\6489\astatefp.OUT
 Unit System:                English
 Plotted Output Filename:  C:\Program Files\G72SW\Data\6489\astatefp.PLT
 PROBLEM DESCRIPTION:  6489, Green Acres LLC,
                       Section A, Static, EFP
 BOUNDARY COORDINATES
      Note: User origin value specified.
      Add 269.90 to X-values and 0.00 to Y-values listed.

     3 Top   Boundaries
     3 Total Boundaries
 Boundary      X-Left      Y-Left     X-Right     Y-Right     Soil Type
    No.         (ft)        (ft)        (ft)        (ft)      Below Bnd
     1         269.90      175.42      270.00      208.00         1
     2         270.00      208.00      281.00      204.00         1
     3         281.00      204.00      400.00      204.00         1
 Default Y-Origin = 0.00(ft)
 Default X-Plus Value = 0.00(ft)
 Default Y-Plus Value = 0.00(ft)
ISOTROPIC SOIL PARAMETERS
  1 Type(s) of Soil
 Soil  Total  Saturated  Cohesion Friction   Pore   Pressure   Piez.
 Type Unit Wt. Unit Wt. Intercept   Angle  Pressure Constant Surface
  No.  (pcf)    (pcf)     (psf)     (deg)   Param.    (psf)     No.
   1   130.0    130.0     100.0     34.5    0.00       0.0      0
BOUNDARY LOAD(S)
     1 Load(s) Specified
 Load          X-Left       X-Right      Intensity      Deflection
  No.           (ft)         (ft)          (psf)           (deg)
   1          350.00       400.00         200.0           0.0
 NOTE - Intensity Is Specified As A Uniformly Distributed
        Force Acting On A Horizontally Projected Surface.
 SPECIFIED FAILURE SURFACE GEOMETRY PARAMETERS:
 XO =    -38.745(ft)   YO =    690.154(ft)   XPI =    269.900(ft)   YPI =    175.420(ft)
 Initiation Boundary No. =   1   Segment Length =    7.000(ft)
 Calculated Radius =   600.177(ft)
 Circular Trial Failure Surface Generated With  9 Coordinate Points
   Point       X-Surf       Y-Surf
    No.         (ft)         (ft)
     1         269.900      175.420
     2         275.882      179.055
     3         281.822      182.759
     4         287.718      186.532
     5         293.569      190.374
     6         299.376      194.284
     7         305.136      198.261
     8         310.850      202.305
     9         313.186      204.000
 BACK-CALCULATED CIRCULAR SURFACE PARAMETERS:
 Circle Center At X =   -38.741(ft) ; Y =   690.148(ft); and Radius =   600.170(ft)
```

* * Factor Of Safety Is Calculated By The Modified Bishop Method * *
Factor Of Safety For The Preceding Specified Surface = 1.189

Table 1 - Individual Data on the 10 Slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	0.1	211.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	5.9	22683.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	5.1	16153.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	0.8	2297.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	5.9	14834.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6	5.9	11826.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7	5.8	8809.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0
8	5.8	5786.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0
9	5.7	2760.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10	2.3	257.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Table 2 - Base Stress Data on the 10 Slices

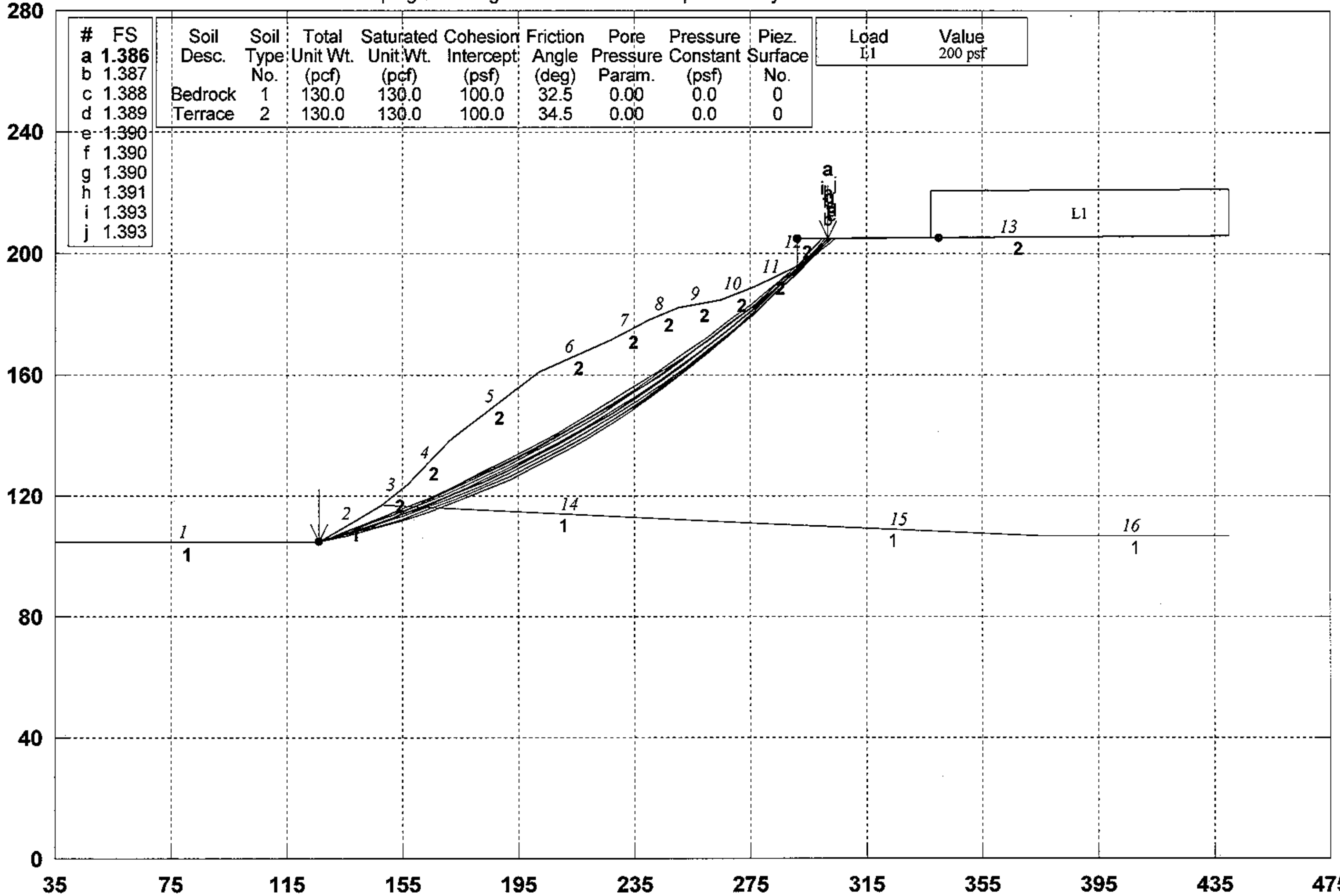
Slice No. *	Alpha (deg)	X-Coord. Slice Cntr (ft)	Base Leng. (ft)	Available Shear Strength (psf)	Mobilized Shear Stress (psf)
1	31.28	269.95	0.12	1149.50	938.29
2	31.28	272.94	6.88	2035.46	1711.22
3	31.95	278.44	6.03	1668.04	1417.27
4	31.95	281.41	0.97	1485.30	1254.84
5	32.62	284.77	7.00	1335.31	1142.35
6	33.29	290.64	7.00	1079.43	927.24
7	33.95	296.47	7.00	822.61	702.93
8	34.62	302.26	7.00	564.96	469.70
9	35.29	307.99	7.00	306.64	227.85
10	35.96	312.02	2.89	123.80	52.36

Sum of the Resisting Forces (including Pier/Pile, Tieback, Reinforcing
Soil Nail, and Applied Forces if applicable) = 54808.26 (lbs)
Average Available Shear Strength (including Tieback, Pier/Pile, Reinforcing,
Soil Nail, and Applied Forces if applicable) = 1056.32(psf)
Sum of the Driving Forces = 46093.21 (lbs)
Average Mobilized Shear Stress = 888.35(psf)
Total length of the failure surface = 51.89(ft)
CAUTION - Factor Of Safety Is Calculated By The Modified Bishop
Method. This Method Is Valid Only If The Failure Surface
Approximates A Circular Arc.

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

6489, Green Acres LLC, Section B, Circular, Static

c:\program files\g72sw\data\6489\bstat1.pl2 Run By: Gcubb 9/14/2011 03:11PM



GSTABL7 v.2 FSmin=1.386

Safety Factors Are Calculated By The Modified Bishop Method

GSTABL7

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                         ***  GSTABL7  ***
                ** GSTABL7 by Garry H. Gregory, P.E. **
   ** Original Version 1.0, January 1996; Current Version 2.004, June 2003 **
             (All Rights Reserved-Unauthorized Use Prohibited)
*********************************************************************************
                 SLOPE STABILITY ANALYSIS SYSTEM
       Modified Bishop, Simplified Janbu, or GLE Method of Slices.
       (Includes Spencer & Morgenstern-Price Type Analysis)
       Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
       Nonlinear Undrained Shear Strength, Curved Phi Envelope,
       Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
       Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.
*********************************************************************************
Analysis Run Date:          9/14/2011
Time of Run:                03:11PM
Run By:                     Gcubb
Input Data Filename:        C:\Program Files\G72SW\Data\6489\Bstat1.in
Output Filename:            C:\Program Files\G72SW\Data\6489\Bstat1.OUT
Unit System:                English
Plotted Output Filename:    C:\Program Files\G72SW\Data\6489\Bstat1.PLT
PROBLEM DESCRIPTION:    6489, Green Acres LLC,
                        Section B, Circular, Static
BOUNDARY COORDINATES
   13 Top   Boundaries
   16 Total Boundaries
Boundary     X-Left     Y-Left     X-Right    Y-Right    Soil Type
   No.        (ft)       (ft)       (ft)       (ft)      Below Bnd
    1         35.00     105.00     126.00     105.00         1
    2        126.00     105.00     148.00     117.00         1
    3        148.00     117.00     157.00     124.00         2
    4        157.00     124.00     171.00     138.00         2
    5        171.00     138.00     202.00     161.00         2
    6        202.00     161.00     226.00     171.00         2
    7        226.00     171.00     240.00     178.00         2
    8        240.00     178.00     250.00     182.00         2
    9        250.00     182.00     265.00     185.00         2
   10        265.00     185.00     276.00     189.00         2
   11        276.00     189.00     291.00     196.00         2
   12        291.00     196.00     291.10     205.00         2
   13        291.10     205.00     440.00     206.00         2
   14        148.00     117.00     280.00     111.00         1
   15        280.00     111.00     375.00     107.00         1
   16        375.00     107.00     440.00     107.00         1
Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)
ISOTROPIC SOIL PARAMETERS
  2 Type(s) of Soil
Soil  Total  Saturated  Cohesion Friction   Pore   Pressure   Piez.
Type Unit Wt. Unit Wt. Intercept  Angle  Pressure Constant  Surface
 No.  (pcf)    (pcf)     (psf)    (deg)   Param.   (psf)      No.
  1   130.0    130.0     100.0    32.5    0.00      0.0       0
  2   130.0    130.0     100.0    34.5    0.00      0.0       0
BOUNDARY LOAD(S)
    1 Load(s) Specified
Load        X-Left      X-Right     Intensity     Deflection
 No.         (ft)        (ft)         (psf)          (deg)
  1         337.00      440.00        200.0           0.0
NOTE - Intensity Is Specified As A Uniformly Distributed
       Force Acting On A Horizontally Projected Surface.
A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Circular Surfaces, Has Been Specified.
1600 Trial Surfaces Have Been Generated.
  40 Surface(s) Initiate(s) From Each Of    40 Points Equally Spaced
Along The Ground Surface Between  X = 126.00(ft)
                             and  X = 126.00(ft)
Each Surface Terminates Between   X = 291.10(ft)
```

and X = 340.00(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.
Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Modified Bishop Method * *
Total Number of Trial Surfaces Attempted = 1600
Number of Trial Surfaces With Valid FS = 1600
Statistical Data On All Valid FS Values:
FS Max = 2.721 FS Min = 1.386 FS Ave = 1.909
Standard Deviation = 0.361 Coefficient of Variation = 18.89 %
Failure Surface Specified By 22 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	126.000	105.000
2	135.639	107.664
3	145.207	110.572
4	154.697	113.722
5	164.105	117.113
6	173.423	120.742
7	182.646	124.606
8	191.768	128.704
9	200.783	133.033
10	209.684	137.590
11	218.467	142.371
12	227.125	147.374
13	235.654	152.596
14	244.047	158.033
15	252.298	163.682
16	260.404	169.538
17	268.358	175.599
18	276.155	181.861
19	283.790	188.318
20	291.259	194.968
21	298.556	201.805
22	301.870	205.072

Circle Center At X = 26.270 ; Y = 484.843 ; and Radius = 392.717
Factor of Safety
*** 1.386 ***
Individual data on the 33 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	9.6	1625.0	0.0	0.0	0.	0.	0.0	0.0	0.0
2	9.6	4663.3	0.0	0.0	0.	0.	0.0	0.0	0.0
3	2.8	1889.4	0.0	0.0	0.	0.	0.0	0.0	0.0
4	6.7	6089.4	0.0	0.0	0.	0.	0.0	0.0	0.0
5	2.3	2684.4	0.0	0.0	0.	0.	0.0	0.0	0.0
6	5.0	7219.0	0.0	0.0	0.	0.	0.0	0.0	0.0
7	2.1	3606.1	0.0	0.0	0.	0.	0.0	0.0	0.0
8	6.9	14428.7	0.0	0.0	0.	0.	0.0	0.0	0.0
9	2.4	5868.7	0.0	0.0	0.	0.	0.0	0.0	0.0
10	9.2	24633.7	0.0	0.0	0.	0.	0.0	0.0	0.0
11	9.1	27712.0	0.0	0.0	0.	0.	0.0	0.0	0.0
12	9.0	30333.4	0.0	0.0	0.	0.	0.0	0.0	0.0
13	1.2	4305.2	0.0	0.0	0.	0.	0.0	0.0	0.0
14	7.7	26949.7	0.0	0.0	0.	0.	0.0	0.0	0.0
15	8.8	29744.5	0.0	0.0	0.	0.	0.0	0.0	0.0
16	7.5	24367.8	0.0	0.0	0.	0.	0.0	0.0	0.0
17	1.1	3545.3	0.0	0.0	0.	0.	0.0	0.0	0.0
18	8.5	26286.6	0.0	0.0	0.	0.	0.0	0.0	0.0
19	4.3	12944.2	0.0	0.0	0.	0.	0.0	0.0	0.0
20	4.0	11618.9	0.0	0.0	0.	0.	0.0	0.0	0.0
21	6.0	16050.6	0.0	0.0	0.	0.	0.0	0.0	0.0

22	2.3	5776.9	0.0	0.0	0.	0.	0.0	0.0	0.0
23	8.1	17554.9	0.0	0.0	0.	0.	0.0	0.0	0.0
24	4.6	7917.4	0.0	0.0	0.	0.	0.0	0.0	0.0
25	3.4	4928.2	0.0	0.0	0.	0.	0.0	0.0	0.0
26	7.6	8884.5	0.0	0.0	0.	0.	0.0	0.0	0.0
27	0.2	145.7	0.0	0.0	0.	0.	0.0	0.0	0.0
28	7.6	5721.7	0.0	0.0	0.	0.	0.0	0.0	0.0
29	7.2	2614.9	0.0	0.0	0.	0.	0.0	0.0	0.0
30	0.1	74.3	0.0	0.0	0.	0.	0.0	0.0	0.0
31	0.2	208.9	0.0	0.0	0.	0.	0.0	0.0	0.0
32	7.3	6297.8	0.0	0.0	0.	0.	0.0	0.0	0.0
33	3.3	698.8	0.0	0.0	0.	0.	0.0	0.0	0.0

Failure Surface Specified By 22 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	126.000	105.000
2	135.548	107.973
3	145.028	111.156
4	154.435	114.549
5	163.764	118.149
6	173.012	121.955
7	182.173	125.964
8	191.243	130.176
9	200.217	134.587
10	209.092	139.196
11	217.862	144.000
12	226.524	148.997
13	235.073	154.185
14	243.505	159.560
15	251.816	165.121
16	260.002	170.865
17	268.059	176.789
18	275.982	182.889
19	283.769	189.164
20	291.415	195.609
21	298.916	202.222
22	302.009	205.073

Circle Center At X = -3.272 ; Y = 537.182 ; and Radius = 451.102

Factor of Safety

*** 1.387 ***

Failure Surface Specified By 22 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	126.000	105.000
2	135.604	107.786
3	145.139	110.800
4	154.600	114.040
5	163.981	117.503
6	173.277	121.189
7	182.482	125.095
8	191.593	129.218
9	200.602	133.557
10	209.506	138.109
11	218.300	142.871
12	226.977	147.841
13	235.534	153.016
14	243.966	158.393
15	252.267	163.968
16	260.433	169.740
17	268.460	175.704
18	276.343	181.857
19	284.077	188.196
20	291.658	194.717
21	299.082	201.417
22	302.953	205.080

Circle Center At X = 13.812 ; Y = 509.838 ; and Radius = 420.095

Factor of Safety

*** 1.388 ***

Failure Surface Specified By 22 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	126.000	105.000
2	135.506	108.104
3	144.947	111.402
4	154.318	114.891
5	163.616	118.571
6	172.838	122.439
7	181.979	126.495
8	191.035	130.736
9	200.003	135.160
10	208.878	139.767
11	217.659	144.554
12	226.339	149.518
13	234.917	154.658
14	243.388	159.973
15	251.749	165.458
16	259.997	171.113
17	268.127	176.935
18	276.137	182.921
19	284.024	189.070
20	291.783	195.378
21	299.413	201.843
22	303.080	205.080

Circle Center At X = -21.315 ; Y = 572.356 ; and Radius = 490.024

Factor of Safety

*** 1.389 ***

Failure Surface Specified By 22 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	126.000	105.000
2	135.688	107.479
3	145.306	110.218
4	154.846	113.216
5	164.301	116.470
6	173.665	119.979
7	182.932	123.739
8	192.093	127.748
9	201.142	132.003
10	210.074	136.501
11	218.880	141.238
12	227.556	146.212
13	236.094	151.418
14	244.488	156.852
15	252.733	162.512
16	260.821	168.392
17	268.748	174.488
18	276.508	180.796
19	284.094	187.311
20	291.501	194.029
21	298.725	200.944
22	302.816	205.079

Circle Center At X = 39.233 ; Y = 464.533 ; and Radius = 369.855

Factor of Safety

*** 1.390 ***

Failure Surface Specified By 22 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	126.000	105.000
2	135.745	107.243
3	145.418	109.779
4	155.010	112.606
5	164.512	115.722
6	173.916	119.124
7	183.213	122.808

8	192.394	126.772
9	201.450	131.011
10	210.375	135.522
11	219.159	140.301
12	227.795	145.344
13	236.274	150.644
14	244.590	156.199
15	252.733	162.003
16	260.698	168.050
17	268.476	174.335
18	276.061	180.852
19	283.445	187.595
20	290.622	194.559
21	297.585	201.736
22	300.624	205.064

Circle Center At X = 56.829 ; Y = 428.114 ; and Radius = 330.435

Factor of Safety

*** 1.390 ***

Failure Surface Specified By 22 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	126.000	105.000
2	135.445	108.286
3	144.826	111.749
4	154.141	115.387
5	163.385	119.200
6	172.557	123.184
7	181.653	127.340
8	190.669	131.666
9	199.602	136.160
10	208.449	140.821
11	217.208	145.647
12	225.874	150.636
13	234.446	155.787
14	242.919	161.098
15	251.291	166.566
16	259.559	172.191
17	267.721	177.970
18	275.772	183.900
19	283.711	189.981
20	291.535	196.209
21	299.240	202.583
22	302.139	205.074

Circle Center At X = -44.303 ; Y = 609.796 ; and Radius = 532.750

Factor of Safety

*** 1.390 ***

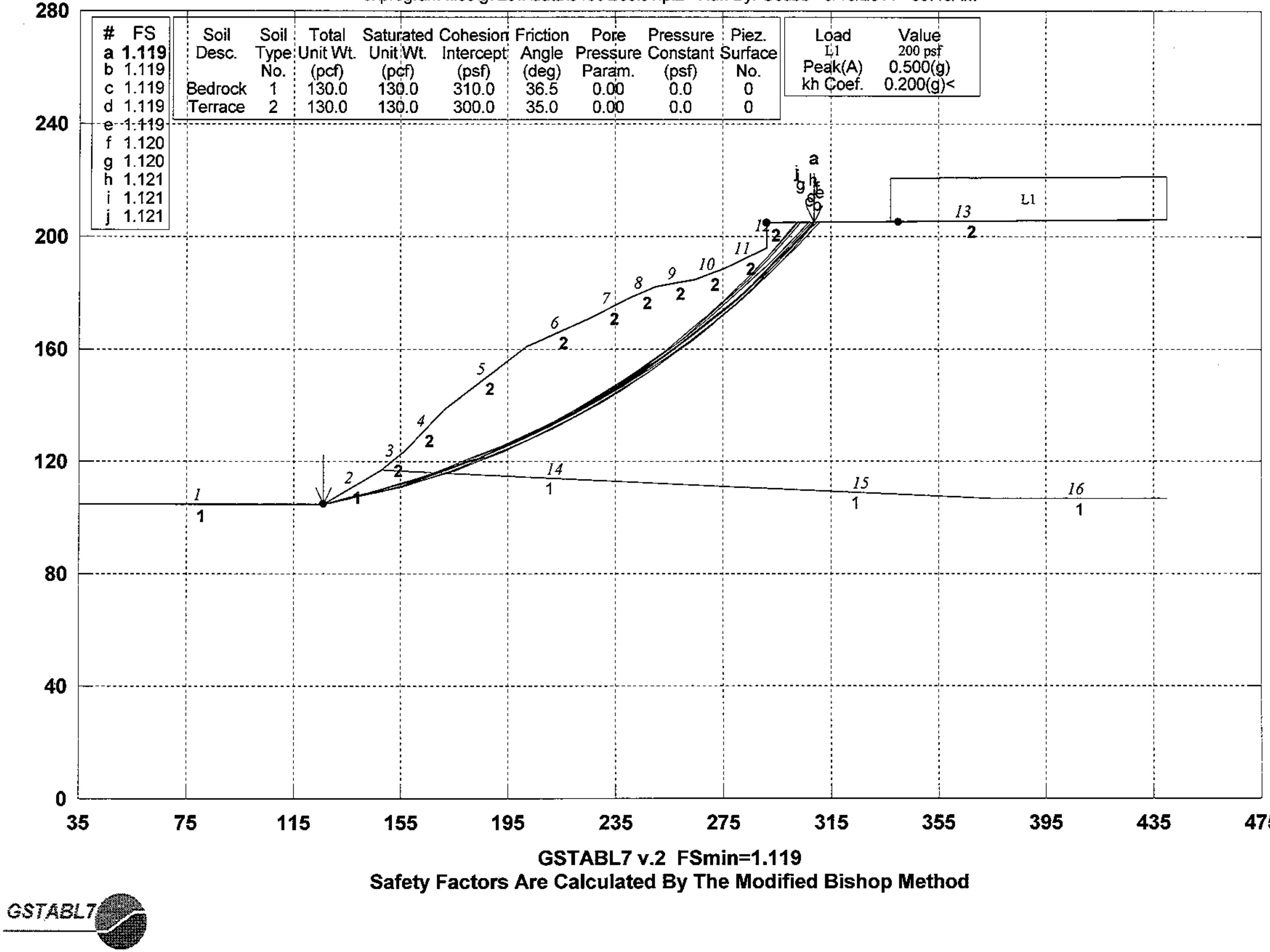
Failure Surface Specified By 22 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	126.000	105.000
2	135.743	107.251
3	145.416	109.790
4	155.008	112.615
5	164.513	115.725
6	173.920	119.115
7	183.223	122.784
8	192.413	126.727
9	201.481	130.942
10	210.420	135.425
11	219.222	140.171
12	227.879	145.177
13	236.383	150.437
14	244.727	155.949
15	252.904	161.706
16	260.906	167.703
17	268.726	173.935
18	276.358	180.398

```
    19        283.794     187.084
    20        291.028     193.988
    21        298.054     201.104
    22        301.744     205.071
Circle Center At X =    55.306 ; Y =   433.508 ; and Radius =   336.028
       Factor of Safety
      ***    1.391   ***
Failure Surface Specified By 22 Coordinate Points
  Point       X-Surf      Y-Surf
   No.         (ft)        (ft)
     1        126.000     105.000
     2        135.793     107.023
     3        145.515     109.367
     4        155.154     112.029
     5        164.700     115.007
     6        174.144     118.297
     7        183.474     121.895
     8        192.680     125.798
     9        201.754     130.002
    10        210.684     134.502
    11        219.462     139.293
    12        228.077     144.370
    13        236.521     149.727
    14        244.784     155.359
    15        252.858     161.260
    16        260.733     167.423
    17        268.402     173.841
    18        275.855     180.508
    19        283.085     187.416
    20        290.084     194.559
    21        296.845     201.927
    22        299.532     205.057
Circle Center At X =    69.493 ; Y =   403.512 ; and Radius =   303.814
       Factor of Safety
      ***    1.393   ***
Failure Surface Specified By 22 Coordinate Points
  Point       X-Surf      Y-Surf
   No.         (ft)        (ft)
     1        126.000     105.000
     2        135.467     108.220
     3        144.873     111.617
     4        154.213     115.189
     5        163.484     118.936
     6        172.684     122.856
     7        181.809     126.947
     8        190.855     131.209
     9        199.820     135.639
    10        208.701     140.237
    11        217.494     145.000
    12        226.196     149.927
    13        234.804     155.016
    14        243.315     160.266
    15        251.727     165.674
    16        260.035     171.238
    17        268.238     176.958
    18        276.333     182.830
    19        284.316     188.852
    20        292.184     195.023
    21        299.936     201.341
    22        304.364     205.089
Circle Center At X =   -40.903 ; Y =   611.399 ; and Radius =   533.195
       Factor of Safety
      ***    1.393   ***
          **** END OF GSTABL7 OUTPUT ****
```

6489, Green Acres LLC, Section B, Circular, Seismic

c:\program files\g72sw\data\6489\bseis1.pl2 Run By: Gcubb 9/15/2011 09:46AM



GSTABL7 v.2 FSmin=1.119

Safety Factors Are Calculated By The Modified Bishop Method

GSTABL7

***** GSTABL7 *****

** GSTABL7 by Garry H. Gregory, P.E. **
** Original Version 1.0, January 1996; Current Version 2.004, June 2003 **

****

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

****

Analysis Run Date: 9/15/2011
Time of Run: 09:46AM
Run By: Gcubb
Input Data Filename: C:\Program Files\G72SW\Data\6489\bseis1.in
Output Filename: C:\Program Files\G72SW\Data\6489\bseis1.OUT
Unit System: English
Plotted Output Filename: C:\Program Files\G72SW\Data\6489\bseis1.PLT
PROBLEM DESCRIPTION: 6489, Green Acres LLC,
Section B, Circular, Seismic

BOUNDARY COORDINATES
13 Top Boundaries
16 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	35.00	105.00	126.00	105.00	1
2	126.00	105.00	148.00	117.00	1
3	148.00	117.00	157.00	124.00	2
4	157.00	124.00	171.00	138.00	2
5	171.00	138.00	202.00	161.00	2
6	202.00	161.00	226.00	171.00	2
7	226.00	171.00	240.00	178.00	2
8	240.00	178.00	250.00	182.00	2
9	250.00	182.00	265.00	185.00	2
10	265.00	185.00	276.00	189.00	2
11	276.00	189.00	291.00	196.00	2
12	291.00	196.00	291.10	205.00	2
13	291.10	205.00	440.00	206.00	2
14	148.00	117.00	280.00	111.00	1
15	280.00	111.00	375.00	107.00	1
16	375.00	107.00	440.00	107.00	1

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

ISOTROPIC SOIL PARAMETERS
2 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	130.0	130.0	310.0	36.5	0.00	0.0	0
2	130.0	130.0	300.0	35.0	0.00	0.0	0

BOUNDARY LOAD(S)
1 Load(s) Specified

Load No.	X-Left (ft)	X-Right (ft)	Intensity (psf)	Deflection (deg)
1	337.00	440.00	200.0	0.0

NOTE - Intensity Is Specified As A Uniformly Distributed
Force Acting On A Horizontally Projected Surface.
Specified Peak Ground Acceleration Coefficient (A) = 0.500(g)
Specified Horizontal Earthquake Coefficient (kh) = 0.200(g)
Specified Vertical Earthquake Coefficient (kv) = 0.000(g)
Specified Seismic Pore-Pressure Factor = 0.000
A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Circular Surfaces, Has Been Specified.
1600 Trial Surfaces Have Been Generated.

```
  40 Surface(s) Initiate(s) From Each Of    40 Points Equally Spaced
Along The Ground Surface Between  X = 126.00(ft)
                             and  X = 126.00(ft)
Each Surface Terminates Between   X = 291.10(ft)
                            and   X = 340.00(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.
Following Are Displayed The Ten Most Critical Of The Trial
      Failure Surfaces Evaluated. They Are
      Ordered - Most Critical First.
      * * Safety Factors Are Calculated By The Modified Bishop Method * *
      Total Number of Trial Surfaces Attempted =  1600
      Number of Trial Surfaces With Valid FS = 1600
      Statistical Data On All Valid FS Values:
         FS Max =   2.216   FS Min =   1.119   FS Ave =   1.524
         Standard Deviation =   0.315   Coefficient of Variation =   20.66 %
      Failure Surface Specified By 23 Coordinate Points
```

Point No.	X-Surf (ft)	Y-Surf (ft)
1	126.000	105.000
2	135.801	106.986
3	145.538	109.263
4	155.203	111.830
5	164.787	114.684
6	174.282	117.823
7	183.678	121.244
8	192.969	124.943
9	202.145	128.918
10	211.199	133.165
11	220.121	137.680
12	228.905	142.459
13	237.543	147.498
14	246.026	152.793
15	254.348	158.338
16	262.500	164.129
17	270.477	170.161
18	278.269	176.427
19	285.871	182.924
20	293.277	189.645
21	300.478	196.583
22	307.469	203.733
23	308.745	205.118

```
      Circle Center At X =    64.343 ; Y =   434.458 ; and Radius =   335.177
             Factor of Safety
            ***    1.119    ***
           Individual data on the    34  slices
```

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	9.8	2140.5	0.0	0.0	0.	0.	428.1	0.0	0.0
2	9.7	6173.3	0.0	0.0	0.	0.	1234.7	0.0	0.0
3	2.5	2156.6	0.0	0.0	0.	0.	431.3	0.0	0.0
4	7.2	8359.4	0.0	0.0	0.	0.	1671.9	0.0	0.0
5	1.8	2617.3	0.0	0.0	0.	0.	523.5	0.0	0.0
6	7.8	14545.5	0.0	0.0	0.	0.	2909.1	0.0	0.0
7	4.1	9921.7	0.0	0.0	0.	0.	1984.3	0.0	0.0
8	2.1	5571.6	0.0	0.0	0.	0.	1114.3	0.0	0.0
9	3.3	9358.6	0.0	0.0	0.	0.	1871.7	0.0	0.0
10	9.4	29791.1	0.0	0.0	0.	0.	5958.2	0.0	0.0
11	9.3	33527.6	0.0	0.0	0.	0.	6705.5	0.0	0.0
12	9.0	36102.2	0.0	0.0	0.	0.	7220.4	0.0	0.0
13	0.1	606.4	0.0	0.0	0.	0.	121.3	0.0	0.0
14	9.1	37550.8	0.0	0.0	0.	0.	7510.2	0.0	0.0
15	8.9	36270.9	0.0	0.0	0.	0.	7254.2	0.0	0.0
16	5.9	23306.4	0.0	0.0	0.	0.	4661.3	0.0	0.0

17	2.9	11352.4	0.0	0.0	0.	0.	2270.5	0.0	0.0
18	8.6	33275.0	0.0	0.0	0.	0.	6655.0	0.0	0.0
19	2.5	9302.1	0.0	0.0	0.	0.	1860.4	0.0	0.0
20	6.0	22165.1	0.0	0.0	0.	0.	4433.0	0.0	0.0
21	4.0	13993.8	0.0	0.0	0.	0.	2798.8	0.0	0.0
22	4.3	14439.0	0.0	0.0	0.	0.	2887.8	0.0	0.0
23	8.2	23794.7	0.0	0.0	0.	0.	4758.9	0.0	0.0
24	2.5	6393.6	0.0	0.0	0.	0.	1278.7	0.0	0.0
25	5.5	12748.2	0.0	0.0	0.	0.	2549.6	0.0	0.0
26	5.5	11211.7	0.0	0.0	0.	0.	2242.3	0.0	0.0
27	2.3	4134.3	0.0	0.0	0.	0.	826.9	0.0	0.0
28	7.6	12014.7	0.0	0.0	0.	0.	2402.9	0.0	0.0
29	5.1	6368.4	0.0	0.0	0.	0.	1273.7	0.0	0.0
30	0.1	167.4	0.0	0.0	0.	0.	33.5	0.0	0.0
31	2.2	4626.4	0.0	0.0	0.	0.	925.3	0.0	0.0
32	7.2	11163.8	0.0	0.0	0.	0.	2232.8	0.0	0.0
33	7.0	4479.1	0.0	0.0	0.	0.	895.8	0.0	0.0
34	1.3	114.2	0.0	0.0	0.	0.	22.8	0.0	0.0

Failure Surface Specified By 23 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	126.000	105.000
2	135.775	107.111
3	145.486	109.498
4	155.125	112.158
5	164.686	115.089
6	174.160	118.289
7	183.540	121.755
8	192.819	125.485
9	201.988	129.476
10	211.041	133.724
11	219.970	138.226
12	228.769	142.978
13	237.430	147.977
14	245.946	153.218
15	254.311	158.698
16	262.517	164.412
17	270.559	170.356
18	278.430	176.524
19	286.124	182.913
20	293.634	189.516
21	300.954	196.328
22	308.080	203.344
23	309.789	205.126

Circle Center At X = 56.150 ; Y = 452.051 ; and Radius = 354.010

Factor of Safety

*** 1.119 ***

Failure Surface Specified By 23 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	126.000	105.000
2	135.788	107.048
3	145.510	109.388
4	155.158	112.018
5	164.723	114.935
6	174.197	118.138
7	183.570	121.622
8	192.835	125.386
9	201.983	129.425
10	211.006	133.736
11	219.896	138.315
12	228.644	143.159
13	237.244	148.262
14	245.688	153.620
15	253.967	159.228
16	262.075	165.082
17	270.003	171.176

18	277.746	177.504
19	285.296	184.061
20	292.646	190.842
21	299.790	197.839
22	306.722	205.047
23	306.775	205.105

Circle Center At X = 62.490 ; Y = 432.970 ; and Radius = 334.063

Factor of Safety

*** 1.119 ***

Failure Surface Specified By 23 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	126.000	105.000
2	135.825	106.864
3	145.586	109.036
4	155.274	111.513
5	164.880	114.293
6	174.394	117.374
7	183.806	120.751
8	193.108	124.422
9	202.290	128.384
10	211.343	132.631
11	220.258	137.161
12	229.027	141.968
13	237.640	147.049
14	246.090	152.397
15	254.368	158.007
16	262.465	163.875
17	270.375	169.994
18	278.088	176.359
19	285.598	182.962
20	292.896	189.798
21	299.977	196.859
22	306.832	204.140
23	307.691	205.111

Circle Center At X = 71.535 ; Y = 418.836 ; and Radius = 318.527

Factor of Safety

*** 1.119 ***

Failure Surface Specified By 23 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	126.000	105.000
2	135.809	106.946
3	145.556	109.180
4	155.233	111.700
5	164.832	114.505
6	174.344	117.591
7	183.761	120.956
8	193.074	124.597
9	202.276	128.511
10	211.359	132.695
11	220.315	137.144
12	229.135	141.856
13	237.813	146.825
14	246.341	152.048
15	254.711	157.520
16	262.916	163.236
17	270.949	169.192
18	278.803	175.382
19	286.471	181.801
20	293.947	188.442
21	301.223	195.302
22	308.295	202.372
23	310.897	205.133

Circle Center At X = 64.898 ; Y = 438.718 ; and Radius = 339.266

Factor of Safety

*** 1.119 ***

Failure Surface Specified By 23 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	126.000	105.000
2	135.840	106.779
3	145.620	108.868
4	155.329	111.263
5	164.957	113.963
6	174.496	116.965
7	183.936	120.266
8	193.266	123.863
9	202.479	127.752
10	211.565	131.929
11	220.515	136.390
12	229.319	141.132
13	237.970	146.148
14	246.459	151.434
15	254.777	156.985
16	262.916	162.795
17	270.867	168.859
18	278.624	175.170
19	286.178	181.722
20	293.522	188.510
21	300.649	195.525
22	307.551	202.761
23	309.667	205.125

Circle Center At X = 74.455 ; Y = 418.181 ; and Radius = 317.395

Factor of Safety

*** 1.120 ***

Failure Surface Specified By 22 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	126.000	105.000
2	135.826	106.857
3	145.586	109.036
4	155.268	111.536
5	164.863	114.354
6	174.360	117.486
7	183.748	120.929
8	193.018	124.680
9	202.160	128.734
10	211.163	133.086
11	220.017	137.734
12	228.714	142.670
13	237.243	147.890
14	245.596	153.389
15	253.763	159.159
16	261.736	165.196
17	269.505	171.492
18	277.063	178.040
19	284.400	184.834
20	291.510	191.866
21	298.385	199.128
22	303.662	205.084

Circle Center At X = 74.641 ; Y = 403.897 ; and Radius = 303.278

Factor of Safety

*** 1.120 ***

Failure Surface Specified By 23 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	126.000	105.000
2	135.857	106.684
3	145.654	108.691
4	155.379	111.018
5	165.023	113.663
6	174.575	116.622
7	184.025	119.893

```
     8        193.363      123.472
     9        202.578      127.355
    10        211.661      131.539
    11        220.602      136.018
    12        229.391      140.788
    13        238.019      145.843
    14        246.476      151.179
    15        254.754      156.789
    16        262.844      162.668
    17        270.737      168.808
    18        278.424      175.204
    19        285.897      181.849
    20        293.148      188.735
    21        300.169      195.856
    22        306.953      203.203
    23        308.609      205.118
Circle Center At X =    79.574 ; Y =    406.366 ; and Radius =   304.921
       Factor of Safety
      ***    1.121    ***
Failure Surface Specified By 22 Coordinate Points
  Point       X-Surf      Y-Surf
   No.         (ft)        (ft)
     1        126.000      105.000
     2        135.818      106.902
     3        145.567      109.125
     4        155.239      111.667
     5        164.821      114.526
     6        174.305      117.698
     7        183.679      121.181
     8        192.934      124.969
     9        202.059      129.060
    10        211.044      133.448
    11        219.881      138.129
    12        228.559      143.098
    13        237.069      148.350
    14        245.402      153.878
    15        253.548      159.678
    16        261.500      165.742
    17        269.248      172.064
    18        276.784      178.637
    19        284.100      185.454
    20        291.188      192.508
    21        298.040      199.792
    22        302.696      205.078
Circle Center At X =    73.163 ; Y =    404.314 ; and Radius =   303.942
       Factor of Safety
      ***    1.121    ***
Failure Surface Specified By 22 Coordinate Points
  Point       X-Surf      Y-Surf
   No.         (ft)        (ft)
     1        126.000      105.000
     2        135.823      106.871
     3        145.579      109.067
     4        155.257      111.586
     5        164.845      114.426
     6        174.334      117.582
     7        183.712      121.052
     8        192.971      124.832
     9        202.098      128.918
    10        211.084      133.305
    11        219.920      137.987
    12        228.596      142.961
    13        237.101      148.221
    14        245.426      153.760
    15        253.563      159.573
    16        261.503      165.653
    17        269.236      171.993
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   18          276.753         178.587
   19          284.048         185.428
   20          291.111         192.507
   21          297.935         199.816
   22          302.529         205.077
Circle Center At X =     74.732 ; Y =    401.164 ; and Radius =    300.568
       Factor of Safety
      ***     1.121    ***
          **** END OF GSTABL7 OUTPUT ****
```
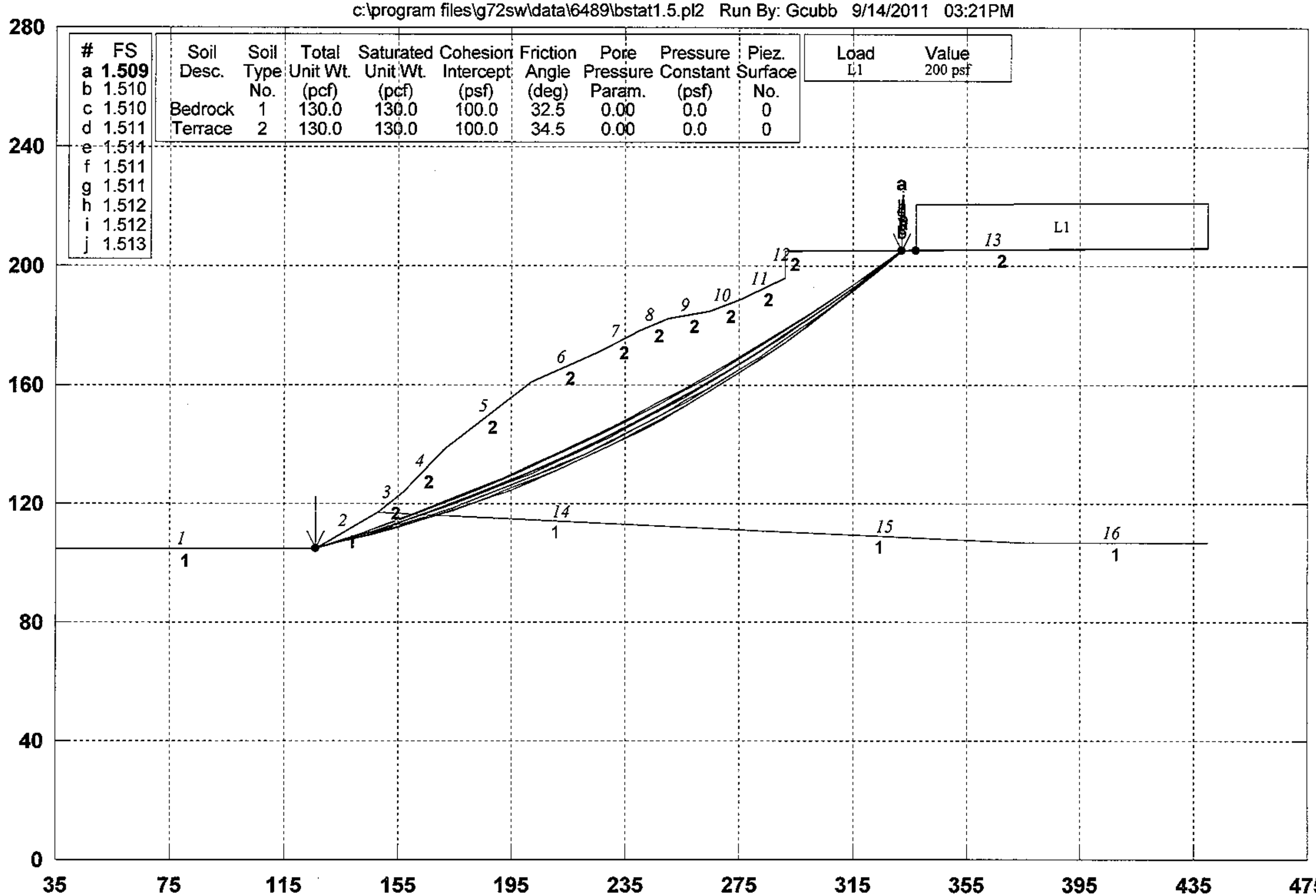

6489, Green Acres LLC, Section B, Circular, Static, 1.5 Search

c:\program files\g72sw\data\6489\bstat1.5.pl2 Run By: Gcubb 9/14/2011 03:21PM



GSTABL7 v.2 FSmin=1.509

Safety Factors Are Calculated By The Modified Bishop Method

GSTABL7

***** GSTABL7 *****

** GSTABL7 by Garry H. Gregory, P.E. **
** Original Version 1.0, January 1996; Current Version 2.004, June 2003 **

****

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

****

Analysis Run Date: 9/14/2011
Time of Run: 03:21PM
Run By: Gcubb
Input Data Filename: C:\Program Files\G72SW\Data\6489\bstat1.5.in
Output Filename: C:\Program Files\G72SW\Data\6489\bstat1.5.OUT
Unit System: English
Plotted Output Filename: C:\Program Files\G72SW\Data\6489\bstat1.5.PLT
PROBLEM DESCRIPTION: 6489, Green Acres LLC,
Section B, Circular, Static, 1.5 Search

BOUNDARY COORDINATES
13 Top Boundaries
16 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	35.00	105.00	126.00	105.00	1
2	126.00	105.00	148.00	117.00	1
3	148.00	117.00	157.00	124.00	2
4	157.00	124.00	171.00	138.00	2
5	171.00	138.00	202.00	161.00	2
6	202.00	161.00	226.00	171.00	2
7	226.00	171.00	240.00	178.00	2
8	240.00	178.00	250.00	182.00	2
9	250.00	182.00	265.00	185.00	2
10	265.00	185.00	276.00	189.00	2
11	276.00	189.00	291.00	196.00	2
12	291.00	196.00	291.10	205.00	2
13	291.10	205.00	440.00	206.00	2
14	148.00	117.00	280.00	111.00	1
15	280.00	111.00	375.00	107.00	1
16	375.00	107.00	440.00	107.00	1

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

ISOTROPIC SOIL PARAMETERS
2 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	130.0	130.0	100.0	32.5	0.00	0.0	0
2	130.0	130.0	100.0	34.5	0.00	0.0	0

BOUNDARY LOAD(S)
1 Load(s) Specified

Load No.	X-Left (ft)	X-Right (ft)	Intensity (psf)	Deflection (deg)
1	337.00	440.00	200.0	0.0

NOTE - Intensity Is Specified As A Uniformly Distributed
Force Acting On A Horizontally Projected Surface.
A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Circular Surfaces, Has Been Specified.
1600 Trial Surfaces Have Been Generated.
40 Surface(s) Initiate(s) From Each Of 40 Points Equally Spaced
Along The Ground Surface Between X = 126.00(ft)
and X = 126.00(ft)
Each Surface Terminates Between X = 332.00(ft)

and X = 337.00(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.
Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Modified Bishop Method * *
Total Number of Trial Surfaces Attempted = 1600
Number of Trial Surfaces With Valid FS = 1600
Statistical Data On All Valid FS Values:
FS Max = 2.598 FS Min = 1.509 FS Ave = 1.969
Standard Deviation = 0.355 Coefficient of Variation = 18.05 %
Failure Surface Specified By 25 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	126.000	105.000
2	135.644	107.646
3	145.241	110.454
4	154.791	113.421
5	164.289	116.548
6	173.734	119.834
7	183.123	123.277
8	192.452	126.877
9	201.720	130.633
10	210.924	134.544
11	220.061	138.608
12	229.128	142.824
13	238.124	147.192
14	247.045	151.710
15	255.890	156.376
16	264.655	161.190
17	273.338	166.150
18	281.937	171.255
19	290.449	176.503
20	298.872	181.893
21	307.204	187.423
22	315.442	193.091
23	323.584	198.897
24	331.628	204.839
25	332.199	205.276

Circle Center At X = -27.204 ; Y = 682.213 ; and Radius = 597.198
Factor of Safety
*** 1.509 ***
Individual data on the 36 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	9.6	1638.5	0.0	0.0	0.	0.	0.0	0.0	0.0
2	9.6	4776.1	0.0	0.0	0.	0.	0.0	0.0	0.0
3	2.8	1924.2	0.0	0.0	0.	0.	0.0	0.0	0.0
4	6.8	6422.5	0.0	0.0	0.	0.	0.0	0.0	0.0
5	2.2	2686.9	0.0	0.0	0.	0.	0.0	0.0	0.0
6	6.5	10201.8	0.0	0.0	0.	0.	0.0	0.0	0.0
7	0.8	1450.5	0.0	0.0	0.	0.	0.0	0.0	0.0
8	6.7	14768.7	0.0	0.0	0.	0.	0.0	0.0	0.0
9	2.7	6986.6	0.0	0.0	0.	0.	0.0	0.0	0.0
10	9.4	26796.9	0.0	0.0	0.	0.	0.0	0.0	0.0
11	9.3	30779.0	0.0	0.0	0.	0.	0.0	0.0	0.0
12	9.3	34456.5	0.0	0.0	0.	0.	0.0	0.0	0.0
13	0.3	1099.4	0.0	0.0	0.	0.	0.0	0.0	0.0
14	8.9	35047.3	0.0	0.0	0.	0.	0.0	0.0	0.0
15	9.1	35688.6	0.0	0.0	0.	0.	0.0	0.0	0.0
16	5.9	22988.9	0.0	0.0	0.	0.	0.0	0.0	0.0
17	3.1	12072.0	0.0	0.0	0.	0.	0.0	0.0	0.0
18	9.0	34855.2	0.0	0.0	0.	0.	0.0	0.0	0.0

19	1.9	7283.4	0.0	0.0	0.	0.	0.0	0.0	0.0
20	7.0	27003.3	0.0	0.0	0.	0.	0.0	0.0	0.0
21	3.0	11108.5	0.0	0.0	0.	0.	0.0	0.0	0.0
22	5.9	21259.8	0.0	0.0	0.	0.	0.0	0.0	0.0
23	8.8	28795.5	0.0	0.0	0.	0.	0.0	0.0	0.0
24	0.3	1062.6	0.0	0.0	0.	0.	0.0	0.0	0.0
25	8.3	24656.7	0.0	0.0	0.	0.	0.0	0.0	0.0
26	2.7	7466.5	0.0	0.0	0.	0.	0.0	0.0	0.0
27	5.9	16125.1	0.0	0.0	0.	0.	0.0	0.0	0.0
28	8.5	21996.9	0.0	0.0	0.	0.	0.0	0.0	0.0
29	0.6	1374.1	0.0	0.0	0.	0.	0.0	0.0	0.0
30	0.1	307.0	0.0	0.0	0.	0.	0.0	0.0	0.0
31	7.8	25887.2	0.0	0.0	0.	0.	0.0	0.0	0.0
32	8.3	22120.4	0.0	0.0	0.	0.	0.0	0.0	0.0
33	8.2	15934.3	0.0	0.0	0.	0.	0.0	0.0	0.0
34	8.1	9734.0	0.0	0.0	0.	0.	0.0	0.0	0.0
35	8.0	3531.4	0.0	0.0	0.	0.	0.0	0.0	0.0
36	0.6	16.1	0.0	0.0	0.	0.	0.0	0.0	0.0

Failure Surface Specified By 25 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	126.000	105.000
2	135.660	107.585
3	145.274	110.337
4	154.839	113.254
5	164.352	116.336
6	173.811	119.583
7	183.212	122.992
8	192.552	126.563
9	201.830	130.295
10	211.041	134.187
11	220.184	138.237
12	229.256	142.445
13	238.254	146.808
14	247.174	151.327
15	256.016	155.999
16	264.775	160.824
17	273.450	165.798
18	282.037	170.923
19	290.535	176.194
20	298.940	181.612
21	307.251	187.174
22	315.464	192.879
23	323.577	198.725
24	331.588	204.711
25	332.319	205.277

Circle Center At X = -18.756 ; Y = 665.264 ; and Radius = 578.663

Factor of Safety

*** 1.510 ***

Failure Surface Specified By 25 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	126.000	105.000
2	135.566	107.913
3	145.090	110.962
4	154.569	114.147
5	164.002	117.468
6	173.386	120.922
7	182.720	124.510
8	192.002	128.231
9	201.230	132.085
10	210.402	136.069
11	219.516	140.185
12	228.570	144.430
13	237.563	148.803
14	246.492	153.305
15	255.356	157.934

16	264.154	162.689
17	272.882	167.569
18	281.540	172.574
19	290.125	177.701
20	298.636	182.951
21	307.072	188.321
22	315.430	193.812
23	323.708	199.421
24	331.906	205.148
25	332.083	205.275

Circle Center At X = -73.183 ; Y = 776.270 ; and Radius = 700.198

Factor of Safety

*** 1.510 ***

Failure Surface Specified By 25 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	126.000	105.000
2	135.717	107.363
3	145.386	109.912
4	155.005	112.648
5	164.569	115.569
6	174.075	118.674
7	183.519	121.961
8	192.898	125.431
9	202.208	129.080
10	211.446	132.909
11	220.608	136.915
12	229.692	141.097
13	238.693	145.454
14	247.608	149.983
15	256.435	154.684
16	265.169	159.554
17	273.807	164.592
18	282.346	169.795
19	290.784	175.163
20	299.116	180.692
21	307.341	186.381
22	315.454	192.227
23	323.452	198.229
24	331.333	204.384
25	332.433	205.278

Circle Center At X = 8.423 ; Y = 609.729 ; and Radius = 518.243

Factor of Safety

*** 1.511 ***

Failure Surface Specified By 25 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	126.000	105.000
2	135.636	107.675
3	145.226	110.507
4	154.769	113.496
5	164.262	116.641
6	173.701	119.941
7	183.086	123.395
8	192.413	127.003
9	201.679	130.762
10	210.882	134.673
11	220.020	138.735
12	229.091	142.945
13	238.091	147.304
14	247.019	151.809
15	255.871	156.460
16	264.647	161.255
17	273.342	166.194
18	281.955	171.274
19	290.484	176.495
20	298.927	181.854

21	307.280	187.351
22	315.543	192.985
23	323.712	198.753
24	331.785	204.654
25	332.612	205.279

Circle Center At X = -32.456 ; Y = 694.512 ; and Radius = 610.437

Factor of Safety

*** 1.511 ***

Failure Surface Specified By 25 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	126.000	105.000
2	135.541	107.995
3	145.041	111.119
4	154.497	114.370
5	163.909	117.748
6	173.275	121.253
7	182.593	124.884
8	191.860	128.640
9	201.077	132.520
10	210.240	136.524
11	219.349	140.652
12	228.401	144.901
13	237.395	149.273
14	246.329	153.765
15	255.202	158.377
16	264.012	163.108
17	272.758	167.957
18	281.437	172.924
19	290.049	178.007
20	298.591	183.206
21	307.063	188.519
22	315.462	193.947
23	323.787	199.486
24	332.037	205.138
25	332.234	205.276

Circle Center At X = -91.538 ; Y = 814.626 ; and Radius = 742.221

Factor of Safety

*** 1.511 ***

Failure Surface Specified By 25 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	126.000	105.000
2	135.763	107.166
3	145.477	109.537
4	155.140	112.114
5	164.745	114.894
6	174.290	117.878
7	183.769	121.062
8	193.179	124.447
9	202.515	128.029
10	211.774	131.809
11	220.950	135.784
12	230.040	139.951
13	239.040	144.311
14	247.945	148.860
15	256.752	153.596
16	265.458	158.517
17	274.056	163.622
18	282.546	168.908
19	290.921	174.372
20	299.179	180.012
21	307.315	185.825
22	315.327	191.809
23	323.210	197.962
24	330.961	204.280
25	332.132	205.276

Circle Center At X = 28.559 ; Y = 567.374 ; and Radius = 472.530
Factor of Safety
*** 1.511 ***
Failure Surface Specified By 25 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	126.000	105.000
2	135.775	107.107
3	145.503	109.426
4	155.178	111.956
5	164.795	114.695
6	174.351	117.643
7	183.840	120.797
8	193.259	124.157
9	202.603	127.720
10	211.866	131.486
11	221.046	135.452
12	230.138	139.616
13	239.137	143.977
14	248.039	148.533
15	256.840	153.280
16	265.536	158.218
17	274.123	163.343
18	282.596	168.654
19	290.952	174.148
20	299.187	179.822
21	307.296	185.673
22	315.276	191.699
23	323.124	197.897
24	330.835	204.264
25	332.007	205.275

Circle Center At X = 33.891 ; Y = 556.046 ; and Radius = 460.355
Factor of Safety
*** 1.512 ***
Failure Surface Specified By 25 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	126.000	105.000
2	135.559	107.936
3	145.077	111.005
4	154.550	114.206
5	163.978	117.540
6	173.359	121.005
7	182.690	124.601
8	191.970	128.327
9	201.197	132.182
10	210.369	136.166
11	219.485	140.277
12	228.542	144.516
13	237.539	148.881
14	246.475	153.371
15	255.346	157.985
16	264.153	162.723
17	272.892	167.583
18	281.563	172.565
19	290.163	177.668
20	298.691	182.891
21	307.145	188.232
22	315.524	193.690
23	323.825	199.266
24	332.048	204.956
25	332.499	205.278

Circle Center At X = -79.305 ; Y = 790.561 ; and Radius = 715.642
Factor of Safety
*** 1.512 ***
Failure Surface Specified By 25 Coordinate Points

Point X-Surf Y-Surf

No.	(ft)	(ft)
1	126.000	105.000
2	135.721	107.345
3	145.395	109.878
4	155.018	112.598
5	164.586	115.504
6	174.097	118.595
7	183.545	121.871
8	192.928	125.328
9	202.243	128.967
10	211.485	132.786
11	220.651	136.783
12	229.738	140.958
13	238.742	145.308
14	247.661	149.831
15	256.490	154.527
16	265.226	159.393
17	273.866	164.428
18	282.407	169.629
19	290.846	174.995
20	299.179	180.523
21	307.403	186.212
22	315.515	192.059
23	323.512	198.063
24	331.392	204.220
25	332.694	205.279

Circle Center At X = 9.947 ; Y = 607.432 ; and Radius = 515.661

Factor of Safety

*** 1.513 ***

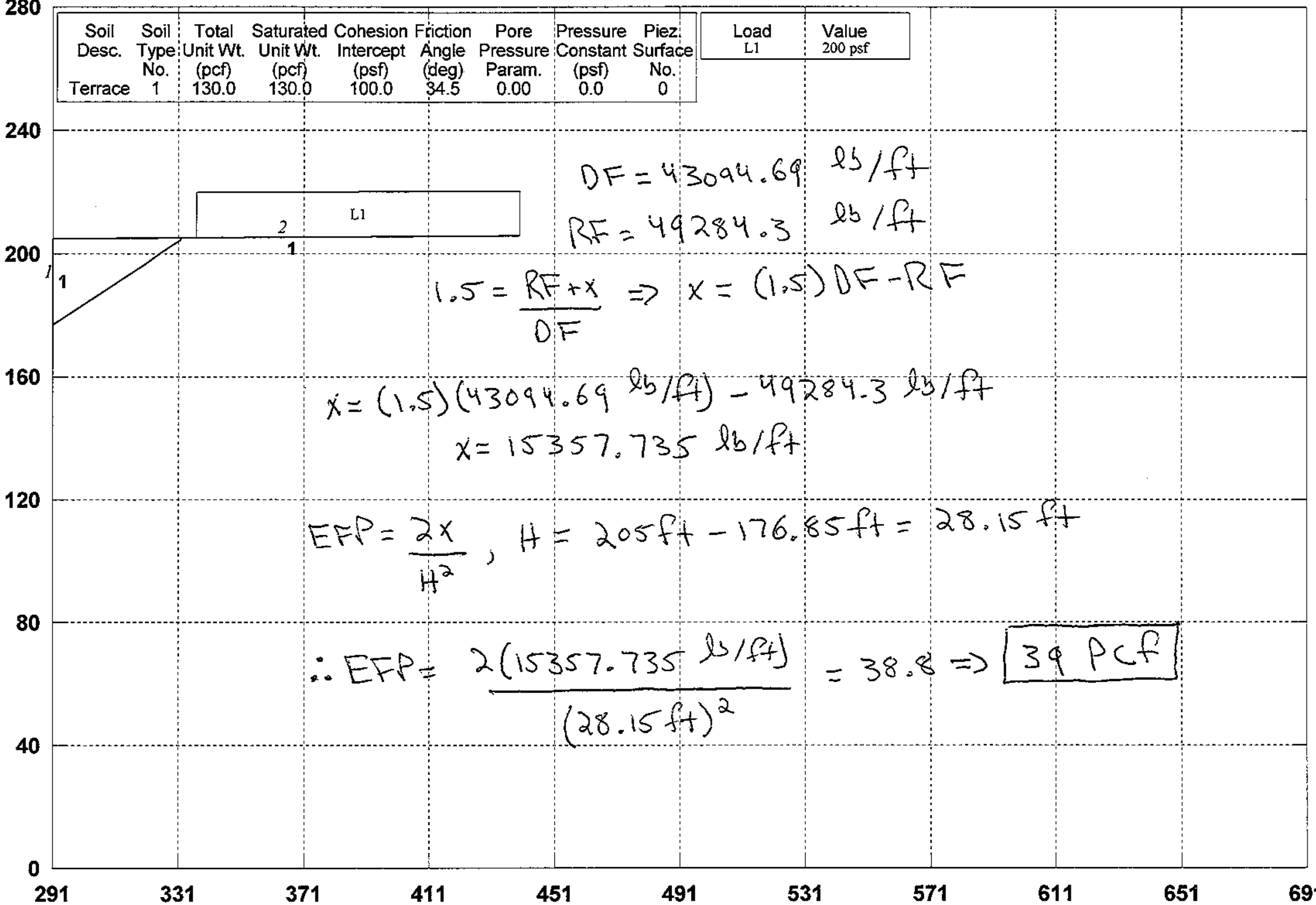
**** END OF GSTABL7 OUTPUT ****

6489, Green Acres LLC, Section B, Circular, Static, EFP

c:\program files\g72sw\data\6489\bstatefp.plt Run By: Gcubb 9/15/2011 07:58AM

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
Terrace	1	130.0	130.0	100.0	34.5	0.00	0.0	0

Load	Value
L1	200 psf



$DF = 43094.69$ lb/ft

$RF = 49284.3$ lb/ft

$$1.5 = \frac{RF + x}{DF} \Rightarrow x = (1.5)DF - RF$$

$$x = (1.5)(43094.69 \text{ lb/ft}) - 49284.3 \text{ lb/ft}$$

$$x = 15357.735 \text{ lb/ft}$$

$$EFP = \frac{2x}{H^2}, \quad H = 205\text{ft} - 176.85\text{ft} = 28.15\text{ ft}$$

$$\therefore EFP = \frac{2(15357.735 \text{ lb/ft})}{(28.15\text{ ft})^2} = 38.8 \Rightarrow \boxed{39 \text{ pcf}}$$

GSTABL7 v.2 FSmin=1.144

Factor Of Safety Is Calculated By The Modified Bishop Method

GSTABL7

*** **GSTABL7** ***
** GSTABL7 by Garry H. Gregory, P.E. **
** Original Version 1.0, January 1996; Current Version 2.004, June 2003 **

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

```
Analysis Run Date:         9/15/2011
Time of Run:               07:58AM
Run By:                    Gcubb
Input Data Filename:       C:\Program Files\G72SW\Data\6489\bstatefp.in
Output Filename:           C:\Program Files\G72SW\Data\6489\bstatefp.OUT
Unit System:               English
Plotted Output Filename:   C:\Program Files\G72SW\Data\6489\bstatefp.PLT
PROBLEM DESCRIPTION:  6489, Green Acres LLC,
                      Section B, Circular, Static, EFP
```

BOUNDARY COORDINATES
2 Top Boundaries
2 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	291.00	176.85	291.10	205.00	1
2	291.10	205.00	440.00	206.00	1

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

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	130.0	130.0	100.0	34.5	0.00	0.0	0

BOUNDARY LOAD(S)
1 Load(s) Specified

Load No.	X-Left (ft)	X-Right (ft)	Intensity (psf)	Deflection (deg)
1	337.00	440.00	200.0	0.0

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

SPECIFIED FAILURE SURFACE GEOMETRY PARAMETERS:
XO = -27.204(ft) YO = 682.213(ft) XPI = 291.000(ft) YPI = 176.850(ft)
Initiation Boundary No. = 1 Segment Length = 7.000(ft)
Calculated Radius = 597.198(ft)
Circular Trial Failure Surface Generated With 9 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	291.000	176.850
2	296.902	180.614
3	302.759	184.448
4	308.570	188.350
5	314.336	192.319
6	320.055	196.356
7	325.726	200.460
8	331.348	204.630
9	332.199	205.276

BACK-CALCULATED CIRCULAR SURFACE PARAMETERS:
Circle Center At X = -27.203(ft) ; Y = 682.213(ft); and Radius = 597.198(ft)
* * Factor Of Safety Is Calculated By The Modified Bishop Method * *
Factor Of Safety For The Preceding Specified Surface = 1.144
Table 1 - Individual Data on the 9 Slices
Water Water Tie Tie Earthquake

Slice No.	Width (ft)	Weight (lbs)	Force Top (lbs)	Force Bot (lbs)	Force Norm (lbs)	Force Tan (lbs)	Force Hor (lbs)	Force Ver (lbs)	Surcharge Load (lbs)
1	0.1	182.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	5.8	19802.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	5.9	17152.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	5.8	14127.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	5.8	11094.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6	5.7	8057.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7	5.7	5017.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0
8	5.6	1978.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0
9	0.9	35.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Table 2 - Base Stress Data on the 9 Slices

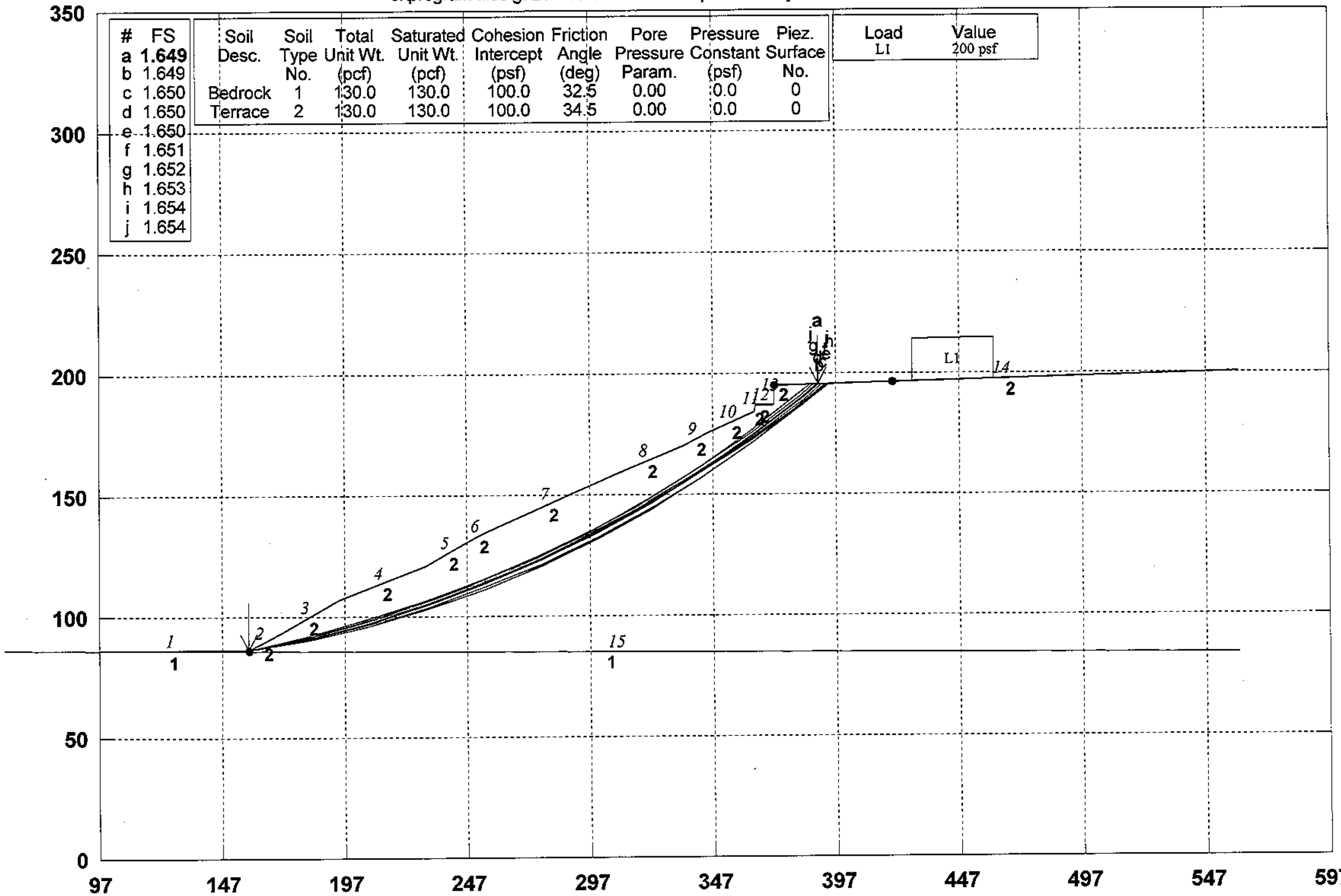
Slice No. *	Alpha (deg)	X-Coord. Slice Cntr (ft)	Base Leng. (ft)	Available Shear Strength (psf)	Mobilized Shear Stress (psf)
1	32.53	291.05	0.12	979.02	827.46
2	32.53	294.00	6.88	1768.06	1547.52
3	33.20	299.83	7.00	1516.34	1341.90
4	33.88	305.66	7.00	1261.67	1124.95
5	34.55	311.45	7.00	1006.20	898.81
6	35.22	317.20	7.00	750.09	663.78
7	35.89	322.89	7.00	493.46	420.19
8	36.56	328.54	7.00	236.45	168.36
9	37.23	331.77	1.07	88.30	20.06

Sum of the Resisting Forces (including Pier/Pile, Tieback, Reinforcing Soil Nail, and Applied Forces if applicable) = 49284.30 (lbs)
Average Available Shear Strength (including Tieback, Pier/Pile, Reinforcing, Soil Nail, and Applied Forces if applicable) = 984.34(psf)
Sum of the Driving Forces = 43094.69 (lbs)
Average Mobilized Shear Stress = 860.72(psf)
Total length of the failure surface = 50.07(ft)
CAUTION - Factor Of Safety Is Calculated By The Modified Bishop Method. This Method Is Valid Only If The Failure Surface Approximates A Circular Arc.

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

6489, Green Acres LLC, Section C, Circular, Static

c:\program files\g72sw\data\6489\cstat1.pl2 Run By: Gcubb 9/15/2011 04:24PM



GSTABL7 v.2 FSmin=1.649

Safety Factors Are Calculated By The Modified Bishop Method

GSTABL7

*** **GSTABL7** ***

** GSTABL7 by Garry H. Gregory, P.E. **
** Original Version 1.0, January 1996; Current Version 2.004, June 2003 **

****

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

****

Analysis Run Date: 9/15/2011
Time of Run: 04:24PM
Run By: Gcubb
Input Data Filename: C:\Program Files\G72SW\Data\6489\cstat1.in
Output Filename: C:\Program Files\G72SW\Data\6489\cstat1.OUT
Unit System: English
Plotted Output Filename: C:\Program Files\G72SW\Data\6489\cstat1.PLT
PROBLEM DESCRIPTION: 6489, Green Acres LLC,
Section C, Circular, Static

BOUNDARY COORDINATES
14 Top Boundaries
15 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	97.00	86.00	158.00	86.00	1
2	158.00	86.00	170.00	92.50	2
3	170.00	92.50	195.00	107.00	2
4	195.00	107.00	230.00	121.00	2
5	230.00	121.00	249.00	132.00	2
6	249.00	132.00	255.00	135.00	2
7	255.00	135.00	306.00	158.00	2
8	306.00	158.00	335.00	170.00	2
9	335.00	170.00	346.00	176.00	2
10	346.00	176.00	364.00	184.00	2
11	364.00	184.00	364.10	187.00	2
12	364.10	187.00	372.00	187.00	2
13	372.00	187.00	372.10	195.00	2
14	372.10	195.00	560.00	200.00	2
15	58.00	86.00	560.00	84.00	1

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

ISOTROPIC SOIL PARAMETERS
2 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	130.0	130.0	100.0	32.5	0.00	0.0	0
2	130.0	130.0	100.0	34.5	0.00	0.0	0

BOUNDARY LOAD(S)
1 Load(s) Specified

Load No.	X-Left (ft)	X-Right (ft)	Intensity (psf)	Deflection (deg)
1	428.00	461.00	200.0	0.0

NOTE - Intensity Is Specified As A Uniformly Distributed
Force Acting On A Horizontally Projected Surface.
A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Circular Surfaces, Has Been Specified.
1600 Trial Surfaces Have Been Generated.
40 Surface(s) Initiate(s) From Each Of 40 Points Equally Spaced
Along The Ground Surface Between X = 158.00(ft)
and X = 158.00(ft)
Each Surface Terminates Between X = 372.10(ft)
and X = 420.00(ft)

Unless Further Limitations Were Imposed, The Minimum Elevation
At Which A Surface Extends Is Y = 0.00(ft)
25.00(ft) Line Segments Define Each Trial Failure Surface.
Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Modified Bishop Method * *
Total Number of Trial Surfaces Attempted = 1600
Number of Trial Surfaces With Valid FS = 1600
Statistical Data On All Valid FS Values:
FS Max = 2.948 FS Min = 1.649 FS Ave = 2.119
Standard Deviation = 0.351 Coefficient of Variation = 16.58 %
Failure Surface Specified By 12 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	158.000	86.000
2	182.508	90.938
3	206.727	97.135
4	230.595	104.574
5	254.046	113.237
6	277.019	123.099
7	299.451	134.134
8	321.284	146.314
9	342.458	159.604
10	362.918	173.971
11	382.609	189.375
12	389.617	195.466

Circle Center At X = 75.322 ; Y = 560.706 ; and Radius = 481.852
Factor of Safety
*** 1.649 ***
Individual data on the 23 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	12.0	3184.1	0.0	0.0	0.	0.	0.0	0.0	0.0
2	12.5	10486.5	0.0	0.0	0.	0.	0.0	0.0	0.0
3	12.5	17606.3	0.0	0.0	0.	0.	0.0	0.0	0.0
4	11.7	20902.9	0.0	0.0	0.	0.	0.0	0.0	0.0
5	23.3	47147.1	0.0	0.0	0.	0.	0.0	0.0	0.0
6	0.6	1290.3	0.0	0.0	0.	0.	0.0	0.0	0.0
7	18.4	44739.5	0.0	0.0	0.	0.	0.0	0.0	0.0
8	5.0	13746.9	0.0	0.0	0.	0.	0.0	0.0	0.0
9	1.0	2644.2	0.0	0.0	0.	0.	0.0	0.0	0.0
10	22.0	61805.9	0.0	0.0	0.	0.	0.0	0.0	0.0
11	22.4	62324.7	0.0	0.0	0.	0.	0.0	0.0	0.0
12	6.5	17505.9	0.0	0.0	0.	0.	0.0	0.0	0.0
13	15.3	37972.7	0.0	0.0	0.	0.	0.0	0.0	0.0
14	13.7	29499.7	0.0	0.0	0.	0.	0.0	0.0	0.0
15	7.5	14321.2	0.0	0.0	0.	0.	0.0	0.0	0.0
16	3.5	6531.8	0.0	0.0	0.	0.	0.0	0.0	0.0
17	16.9	25795.6	0.0	0.0	0.	0.	0.0	0.0	0.0
18	1.1	1317.3	0.0	0.0	0.	0.	0.0	0.0	0.0
19	0.1	138.4	0.0	0.0	0.	0.	0.0	0.0	0.0
20	7.9	9258.0	0.0	0.0	0.	0.	0.0	0.0	0.0
21	0.1	128.5	0.0	0.0	0.	0.	0.0	0.0	0.0
22	10.5	13491.3	0.0	0.0	0.	0.	0.0	0.0	0.0
23	7.0	2689.9	0.0	0.0	0.	0.	0.0	0.0	0.0

Failure Surface Specified By 12 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	158.000	86.000
2	182.457	91.182
3	206.631	97.557
4	230.462	105.110
5	253.895	113.822
6	276.873	123.672

7	299.340	134.637
8	321.242	146.691
9	342.527	159.804
10	363.143	173.945
11	383.041	189.080
12	390.667	195.494

Circle Center At X = 65.270 ; Y = 584.992 ; and Radius = 507.535

Factor of Safety

*** 1.649 ***

Failure Surface Specified By 12 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	158.000	86.000
2	182.445	91.238
3	206.610	97.644
4	230.440	105.203
5	253.880	113.897
6	276.875	123.707
7	299.372	134.609
8	321.320	146.580
9	342.668	159.590
10	363.367	173.610
11	383.368	188.608
12	391.721	195.522

Circle Center At X = 61.880 ; Y = 595.264 ; and Radius = 518.255

Factor of Safety

*** 1.650 ***

Failure Surface Specified By 12 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	158.000	86.000
2	182.441	91.256
3	206.596	97.701
4	230.407	105.319
5	253.817	114.092
6	276.771	123.999
7	299.212	135.016
8	321.088	147.117
9	342.347	160.273
10	362.936	174.453
11	382.808	189.622
12	389.738	195.469

Circle Center At X = 63.416 ; Y = 586.246 ; and Radius = 509.109

Factor of Safety

*** 1.650 ***

Failure Surface Specified By 12 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	158.000	86.000
2	182.568	90.628
3	206.861	96.532
4	230.812	103.697
5	254.356	112.103
6	277.430	121.727
7	299.969	132.542
8	321.913	144.520
9	343.201	157.628
10	363.776	171.829
11	383.582	187.085
12	393.480	195.569

Circle Center At X = 82.317 ; Y = 556.478 ; and Radius = 476.527

Factor of Safety

*** 1.650 ***

Failure Surface Specified By 12 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	158.000	86.000

2	182.626	90.305
3	206.977	95.969
4	230.975	102.973
5	254.549	111.297
6	277.625	120.914
7	300.133	131.795
8	322.003	143.907
9	343.169	157.212
10	363.564	171.670
11	383.127	187.235
12	392.455	195.542

Circle Center At X = 93.237 ; Y = 530.288 ; and Radius = 448.984

Factor of Safety

*** 1.651 ***

Failure Surface Specified By 12 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	158.000	86.000
2	182.375	91.553
3	206.463	98.247
4	230.208	106.068
5	253.559	114.997
6	276.463	125.016
7	298.871	136.102
8	320.732	148.230
9	341.998	161.374
10	362.622	175.504
11	382.557	190.590
12	388.368	195.433

Circle Center At X = 52.926 ; Y = 604.381 ; and Radius = 528.923

Factor of Safety

*** 1.652 ***

Failure Surface Specified By 12 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	158.000	86.000
2	182.355	91.642
3	206.444	98.330
4	230.221	106.052
5	253.643	114.793
6	276.666	124.538
7	299.246	135.267
8	321.343	146.962
9	342.913	159.600
10	363.918	173.157
11	384.318	187.608
12	394.624	195.599

Circle Center At X = 40.346 ; Y = 650.246 ; and Radius = 576.382

Factor of Safety

*** 1.653 ***

Failure Surface Specified By 12 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	158.000	86.000
2	182.307	91.847
3	206.347	98.706
4	230.080	106.566
5	253.462	115.412
6	276.454	125.230
7	299.014	136.002
8	321.104	147.709
9	342.684	160.330
10	363.716	173.844
11	384.165	188.226
12	393.736	195.576

Circle Center At X = 31.385 ; Y = 666.757 ; and Radius = 594.398

Factor of Safety

*** 1.654 ***

Failure Surface Specified By 12 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	158.000	86.000
2	182.393	91.475
3	206.492	98.128
4	230.238	105.945
5	253.576	114.907
6	276.452	124.993
7	298.810	136.179
8	320.597	148.438
9	341.764	161.742
10	362.258	176.059
11	382.033	191.355
12	386.756	195.390

Circle Center At X = 58.194 ; Y = 588.596 ; and Radius = 512.410

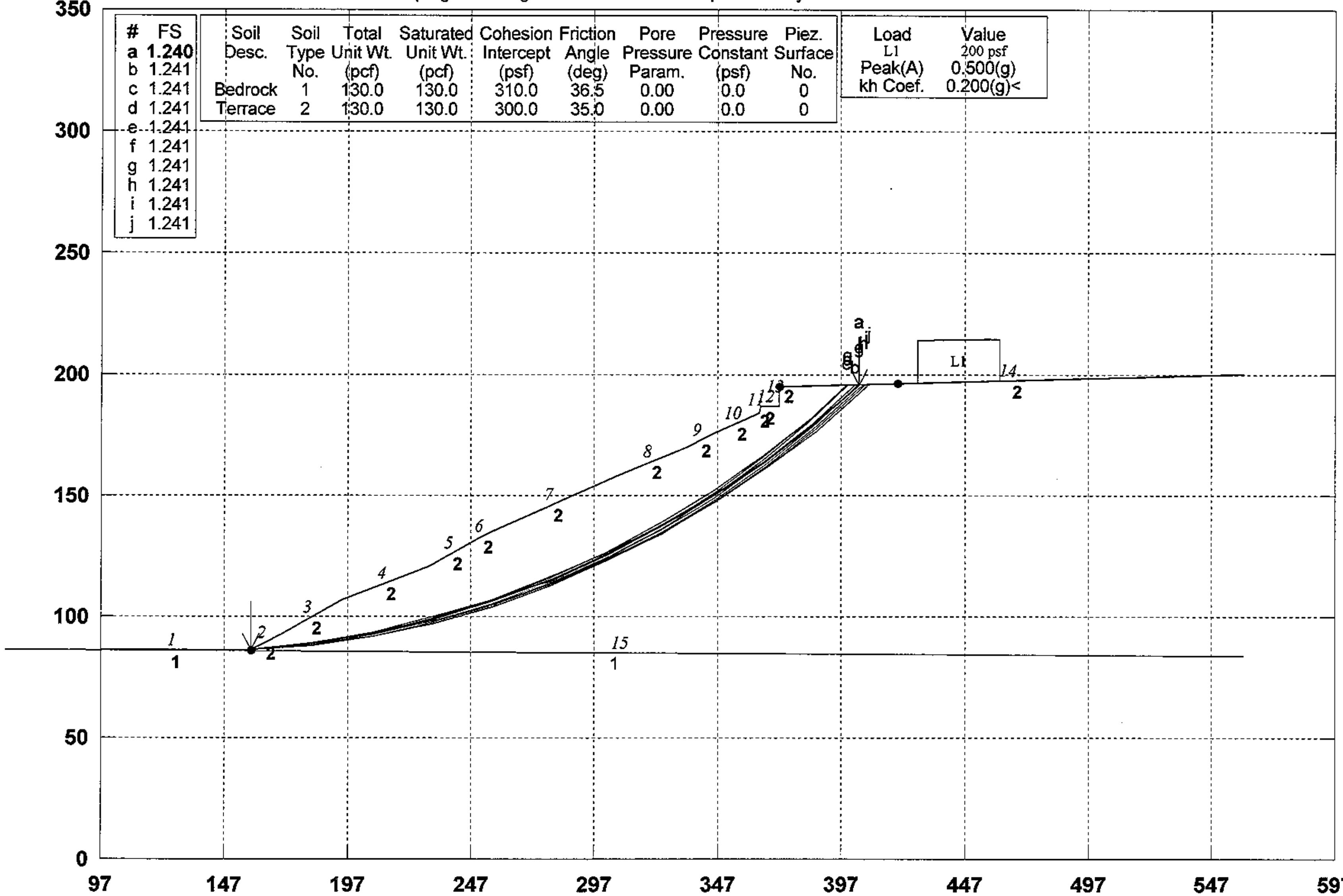
Factor of Safety

*** 1.654 ***

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

6489, Green Acres LLC, Section C, Circular, Seismic

c:\program files\g72sw\data\6489\cseis1.pl2   Run By: Gcubb   9/15/2011   04:26PM



GSTABL7 v.2 FSmin=1.240

Safety Factors Are Calculated By The Modified Bishop Method

GSTABL7

*** **GSTABL7** ***

** GSTABL7 by Garry H. Gregory, P.E. **
** Original Version 1.0, January 1996; Current Version 2.004, June 2003 **

****

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

****

Analysis Run Date: 9/15/2011
Time of Run: 04:26PM
Run By: Gcubb
Input Data Filename: C:\Program Files\G72SW\Data\6489\cseis1.in
Output Filename: C:\Program Files\G72SW\Data\6489\cseis1.OUT
Unit System: English
Plotted Output Filename: C:\Program Files\G72SW\Data\6489\cseis1.PLT
PROBLEM DESCRIPTION: 6489, Green Acres LLC,
Section C, Circular, Seismic

BOUNDARY COORDINATES
Note: User origin value specified.
Add 97.00 to X-values and 0.00 to Y-values listed.

14 Top Boundaries
15 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	97.00	86.00	158.00	86.00	1
2	158.00	86.00	170.00	92.50	2
3	170.00	92.50	195.00	107.00	2
4	195.00	107.00	230.00	121.00	2
5	230.00	121.00	249.00	132.00	2
6	249.00	132.00	255.00	135.00	2
7	255.00	135.00	306.00	158.00	2
8	306.00	158.00	335.00	170.00	2
9	335.00	170.00	346.00	176.00	2
10	346.00	176.00	364.00	184.00	2
11	364.00	184.00	364.10	187.00	2
12	364.10	187.00	372.00	187.00	2
13	372.00	187.00	372.10	195.00	2
14	372.10	195.00	560.00	200.00	2
15	58.00	86.00	560.00	84.00	1

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

ISOTROPIC SOIL PARAMETERS
2 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	130.0	130.0	310.0	36.5	0.00	0.0	0
2	130.0	130.0	300.0	35.0	0.00	0.0	0

BOUNDARY LOAD(S)
1 Load(s) Specified

Load No.	X-Left (ft)	X-Right (ft)	Intensity (psf)	Deflection (deg)
1	428.00	461.00	200.0	0.0

NOTE - Intensity Is Specified As A Uniformly Distributed
Force Acting On A Horizontally Projected Surface.
Specified Peak Ground Acceleration Coefficient (A) = 0.500(g)
Specified Horizontal Earthquake Coefficient (kh) = 0.200(g)
Specified Vertical Earthquake Coefficient (kv) = 0.000(g)
Specified Seismic Pore-Pressure Factor = 0.000
A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Circular Surfaces, Has Been Specified.

1600 Trial Surfaces Have Been Generated.
40 Surface(s) Initiate(s) From Each Of 40 Points Equally Spaced
Along The Ground Surface Between X = 158.00(ft)
and X = 158.00(ft)
Each Surface Terminates Between X = 372.10(ft)
and X = 420.00(ft)
Unless Further Limitations Were Imposed, The Minimum Elevation
At Which A Surface Extends Is Y = 0.00(ft)
25.00(ft) Line Segments Define Each Trial Failure Surface.
Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Modified Bishop Method * *
Total Number of Trial Surfaces Attempted = 1600
Number of Trial Surfaces With Valid FS = 1600
Statistical Data On All Valid FS Values:
FS Max = 2.341 FS Min = 1.240 FS Ave = 1.631
Standard Deviation = 0.301 Coefficient of Variation = 18.45 %
Failure Surface Specified By 12 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	158.000	86.000
2	182.838	88.845
3	207.455	93.201
4	231.761	99.051
5	255.664	106.375
6	279.076	115.144
7	301.908	125.326
8	324.077	136.883
9	345.498	149.772
10	366.093	163.945
11	385.783	179.348
12	404.424	195.860

Circle Center At X = 123.871 ; Y = 493.857 ; and Radius = 409.282
Factor of Safety
*** 1.240 ***
Individual data on the 23 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	12.0	3998.0	0.0	0.0	0.	0.	799.6	0.0	0.0
2	12.8	13540.2	0.0	0.0	0.	0.	2708.0	0.0	0.0
3	12.2	21427.4	0.0	0.0	0.	0.	4285.5	0.0	0.0
4	12.5	28161.3	0.0	0.0	0.	0.	5632.3	0.0	0.0
5	22.5	60307.7	0.0	0.0	0.	0.	12061.5	0.0	0.0
6	1.8	5190.0	0.0	0.0	0.	0.	1038.0	0.0	0.0
7	17.2	56738.6	0.0	0.0	0.	0.	11347.7	0.0	0.0
8	6.0	22033.3	0.0	0.0	0.	0.	4406.7	0.0	0.0
9	0.7	2493.6	0.0	0.0	0.	0.	498.7	0.0	0.0
10	23.4	90754.9	0.0	0.0	0.	0.	18151.0	0.0	0.0
11	22.8	91335.7	0.0	0.0	0.	0.	18267.1	0.0	0.0
12	4.1	16321.7	0.0	0.0	0.	0.	3264.3	0.0	0.0
13	18.1	69485.3	0.0	0.0	0.	0.	13897.1	0.0	0.0
14	10.9	39151.2	0.0	0.0	0.	0.	7830.2	0.0	0.0
15	10.5	35823.3	0.0	0.0	0.	0.	7164.7	0.0	0.0
16	0.5	1691.4	0.0	0.0	0.	0.	338.3	0.0	0.0
17	18.0	55431.8	0.0	0.0	0.	0.	11086.4	0.0	0.0
18	0.1	298.5	0.0	0.0	0.	0.	59.7	0.0	0.0
19	2.0	6149.6	0.0	0.0	0.	0.	1229.9	0.0	0.0
20	5.9	15931.1	0.0	0.0	0.	0.	3186.2	0.0	0.0
21	0.1	291.1	0.0	0.0	0.	0.	58.2	0.0	0.0
22	13.7	37686.2	0.0	0.0	0.	0.	7537.2	0.0	0.0
23	18.6	19404.9	0.0	0.0	0.	0.	3881.0	0.0	0.0

Failure Surface Specified By 12 Coordinate Points

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

1	158.000	86.000
2	182.893	88.310
3	207.579	92.261
4	231.949	97.836
5	255.898	105.011
6	279.319	113.755
7	302.110	124.028
8	324.172	135.786
9	345.409	148.978
10	365.726	163.546
11	385.035	179.426
12	402.464	195.808

Circle Center At X = 135.621 ; Y = 462.848 ; and Radius = 377.512

Factor of Safety

*** 1.241 ***

Failure Surface Specified By 12 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	158.000	86.000
2	182.883	88.416
3	207.548	92.497
4	231.882	98.226
5	255.778	105.576
6	279.125	114.514
7	301.820	124.999
8	323.759	136.986
9	344.844	150.418
10	364.979	165.236
11	384.074	181.373
12	398.897	195.713

Circle Center At X = 134.708 ; Y = 456.469 ; and Radius = 371.200

Factor of Safety

*** 1.241 ***

Failure Surface Specified By 12 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	158.000	86.000
2	182.826	88.945
3	207.419	93.438
4	231.683	99.459
5	255.523	106.986
6	278.846	115.989
7	301.560	126.433
8	323.576	138.277
9	344.809	151.474
10	365.174	165.974
11	384.593	181.719
12	399.828	195.738

Circle Center At X = 123.582 ; Y = 483.173 ; and Radius = 398.661

Factor of Safety

*** 1.241 ***

Failure Surface Specified By 12 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	158.000	86.000
2	182.900	88.234
3	207.590	92.159
4	231.955	97.757
5	255.882	105.002
6	279.260	113.860
7	301.980	124.290
8	323.937	136.245
9	345.029	149.667
10	365.156	164.495
11	384.227	180.660
12	399.734	195.735

Circle Center At X = 137.857 ; Y = 451.497 ; and Radius = 366.052

Factor of Safety
*** 1.241 ***
Failure Surface Specified By 13 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	158.000	86.000
2	182.909	88.131
3	207.621	91.918
4	232.025	97.343
5	256.013	104.382
6	279.479	113.005
7	302.318	123.172
8	324.429	134.839
9	345.713	147.954
10	366.075	162.458
11	385.426	178.288
12	403.678	195.371
13	404.128	195.852

Circle Center At X = 138.516 ; Y = 460.384 ; and Radius = 374.890
Factor of Safety
*** 1.241 ***
Failure Surface Specified By 12 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	158.000	86.000
2	182.797	89.182
3	207.365	93.806
4	231.622	99.856
5	255.485	107.312
6	278.871	116.148
7	301.702	126.333
8	323.900	137.834
9	345.388	150.611
10	366.094	164.620
11	385.947	179.814
12	404.557	195.864

Circle Center At X = 115.953 ; Y = 511.958 ; and Radius = 428.029
Factor of Safety
*** 1.241 ***
Failure Surface Specified By 13 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	158.000	86.000
2	182.905	88.179
3	207.614	91.982
4	232.021	97.393
5	256.023	104.389
6	279.515	112.939
7	302.398	123.007
8	324.573	134.551
9	345.946	147.520
10	366.425	161.859
11	385.922	177.507
12	404.355	194.397
13	405.791	195.896

Circle Center At X = 137.172 ; Y = 467.482 ; and Radius = 382.051
Factor of Safety
*** 1.241 ***
Failure Surface Specified By 13 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	158.000	86.000
2	182.890	88.339
3	207.583	92.250
4	231.977	97.718
5	255.976	104.721
6	279.483	113.231

7	302.404	123.214
8	324.646	134.629
9	346.119	147.430
10	366.739	161.567
11	386.421	176.982
12	405.086	193.613
13	407.385	195.939

Circle Center At X = 133.580 ; Y = 479.540 ; and Radius = 394.297

Factor of Safety

*** 1.241 ***

Failure Surface Specified By 13 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	158.000	86.000
2	182.871	88.536
3	207.540	92.590
4	231.914	98.149
5	255.902	105.190
6	279.414	113.687
7	302.361	123.608
8	324.657	134.917
9	346.219	147.570
10	366.965	161.520
11	386.817	176.715
12	405.701	193.098
13	408.631	195.972

Circle Center At X = 129.079 ; Y = 492.887 ; and Radius = 407.914

Factor of Safety

*** 1.241 ***

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

Green Acres, LLC
W.O.: 6489

Date of Test: 9/11

Sample: **Summery, Qt**

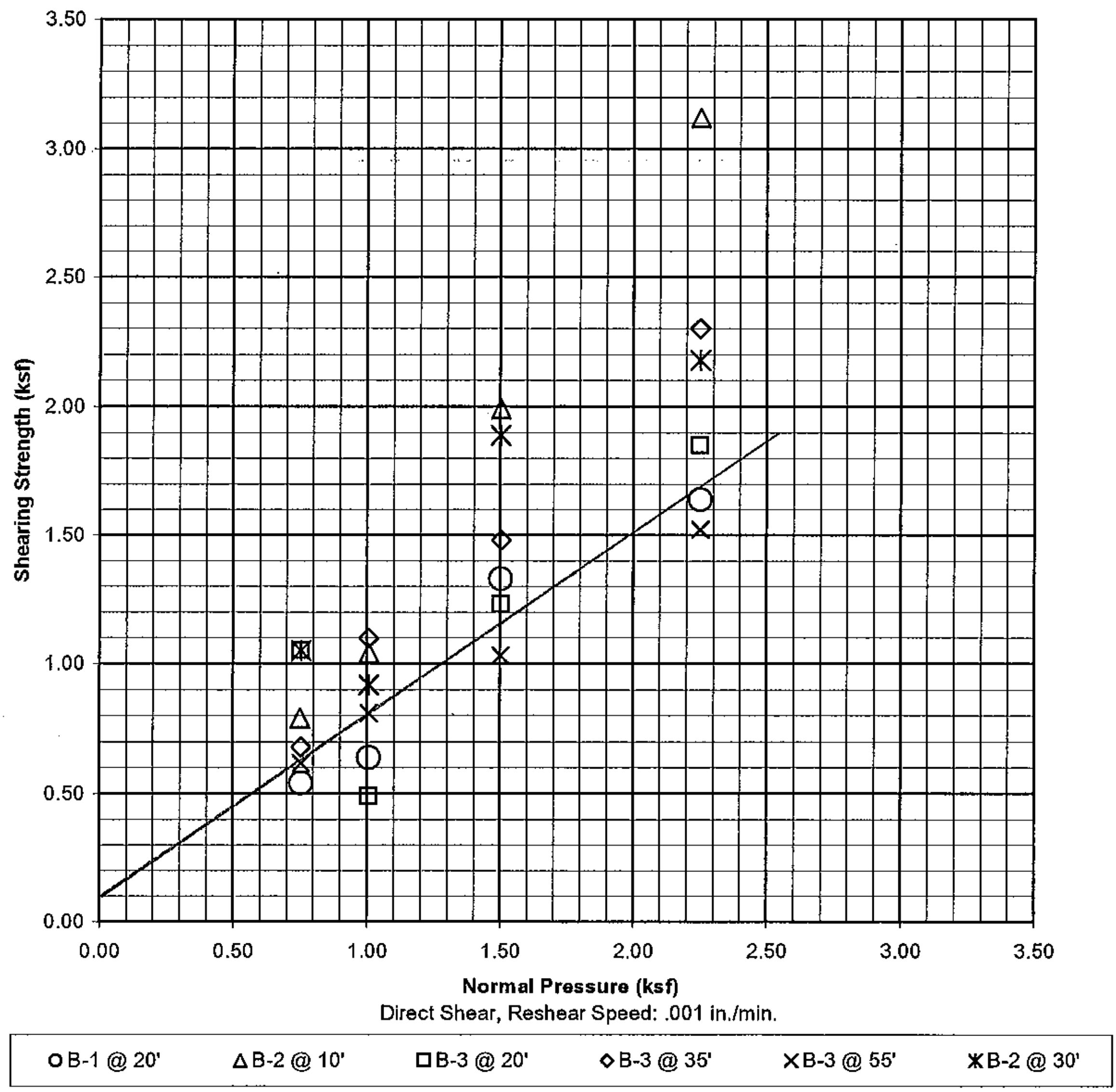
GeoSoils Consultants, Inc.

Geotechnical Engineering * Engineering Geology

PLATE SH-1A

Shear Test Diagram
Summery

Reshear Values
C(psf): 100 Phi (degrees): 34.5



Undisturbed **Natural Reshear Summery** Saturated

Green Acres, LLC
W.O.: 6489

Date of Test: 9/11

Sample: **Summery, Bedrock**

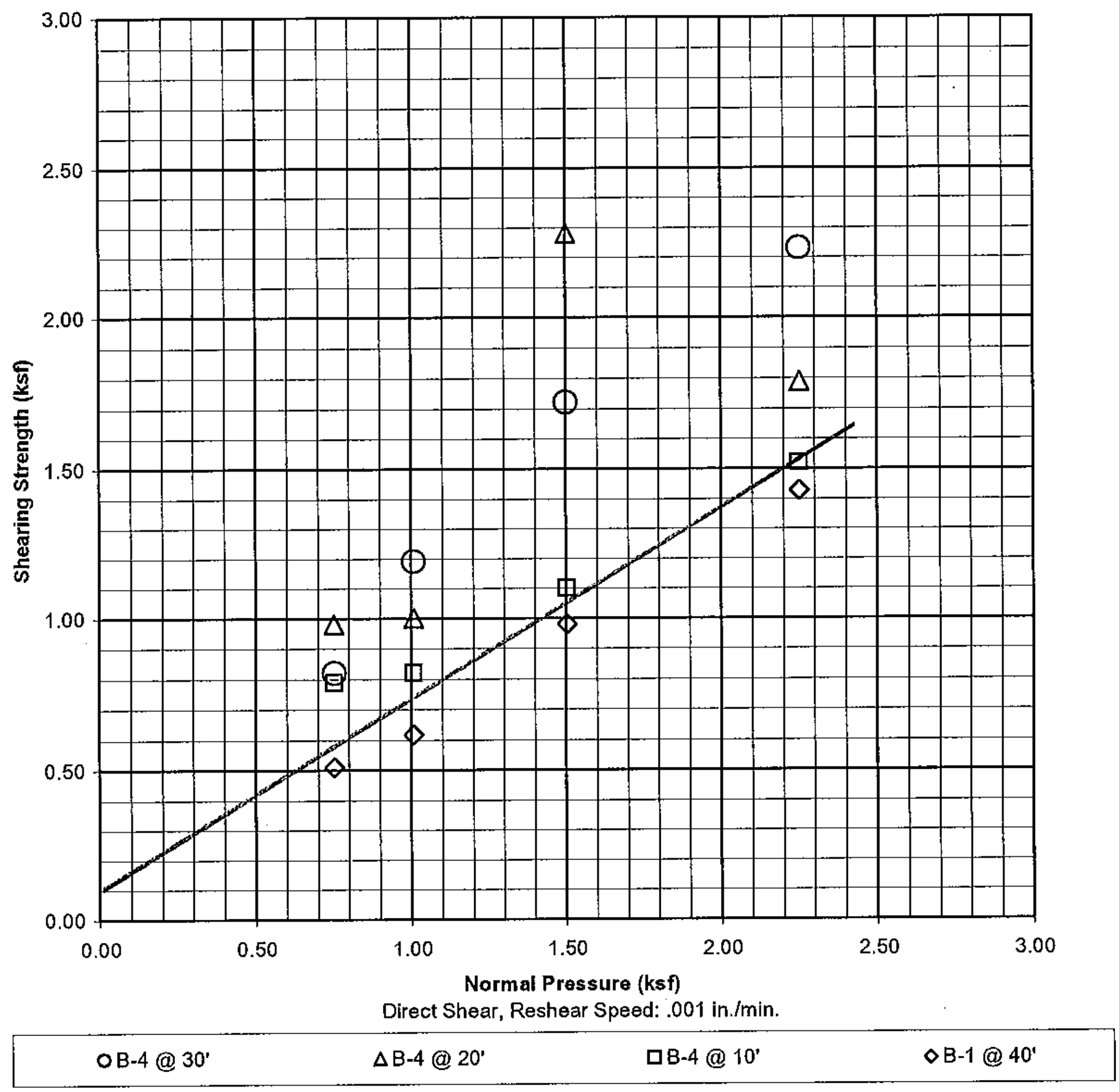
GeoSoils Consultants, Inc.

Geotechnical Engineering * Engineering Geology

PLATE SH-2A

Shear Test Diagram
Summery

Reshear Values
C(psf): 100 Phi (degrees): 32.5



Undisturbed **Natural Reshear Summery** Saturated

Green Acres, LLC
W.O.: 6489

Date of Test: 9/11

Sample: **Summery, Qt**

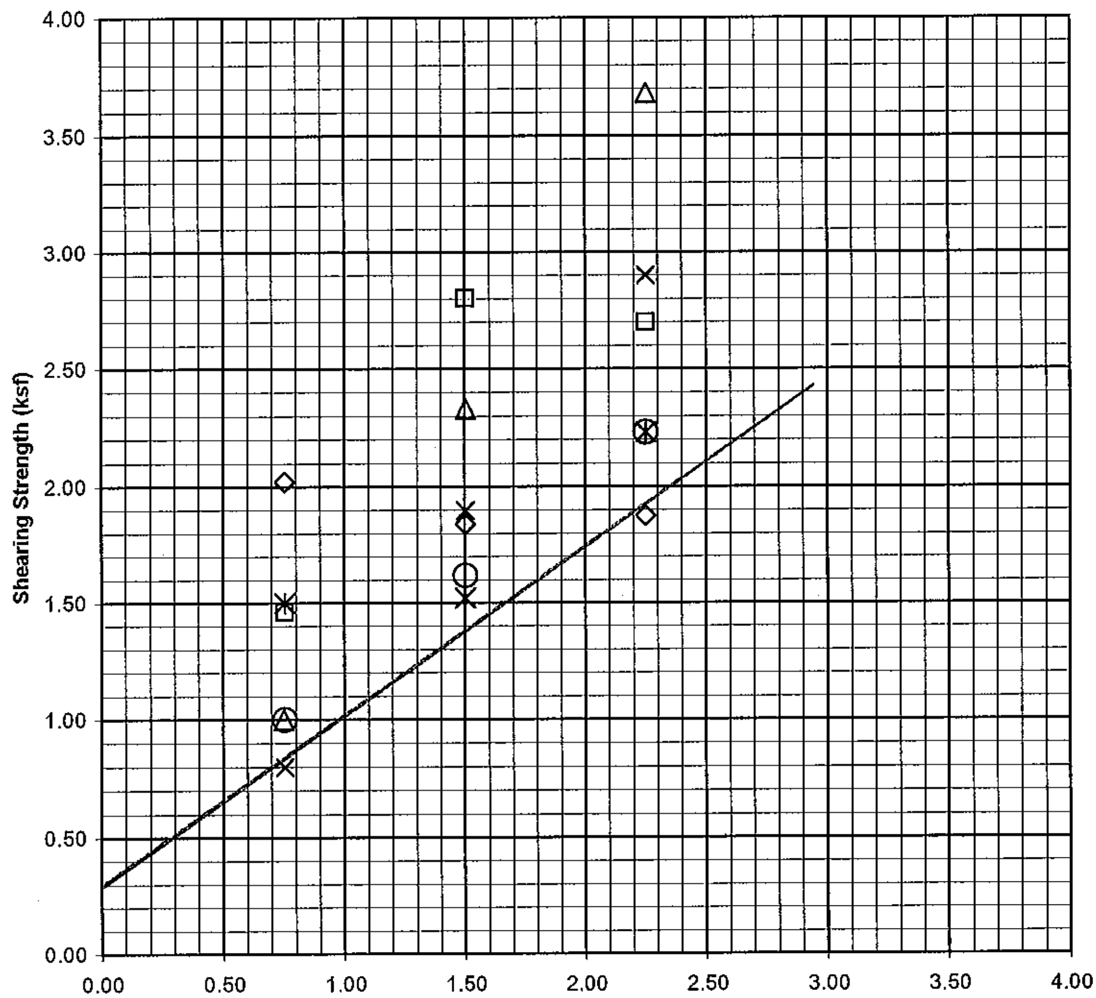
GeoSoils Consultants, Inc.

Geotechnical Engineering * Engineering Geology

PLATE SH-1B

Shear Test Diagram
Summery

Peak Values
C(psf): 300 Phi (degrees): 35.0



Normal Pressure (ksf)
Direct Shear, Peak Speed: .001 in./min.

○ B-1 @ 20' △ B-2 @ 10' □ B-2 @ 30' ◇ B-3 @ 20' ✕ B-3 @ 35' ✱ B-3 @ 55'

Undisturbed **Natural Peak Summery** Saturated

Green Acres, LLC
W.O.: 6489

Date of Test: 9/11

Sample: **Summery, Bedrock**

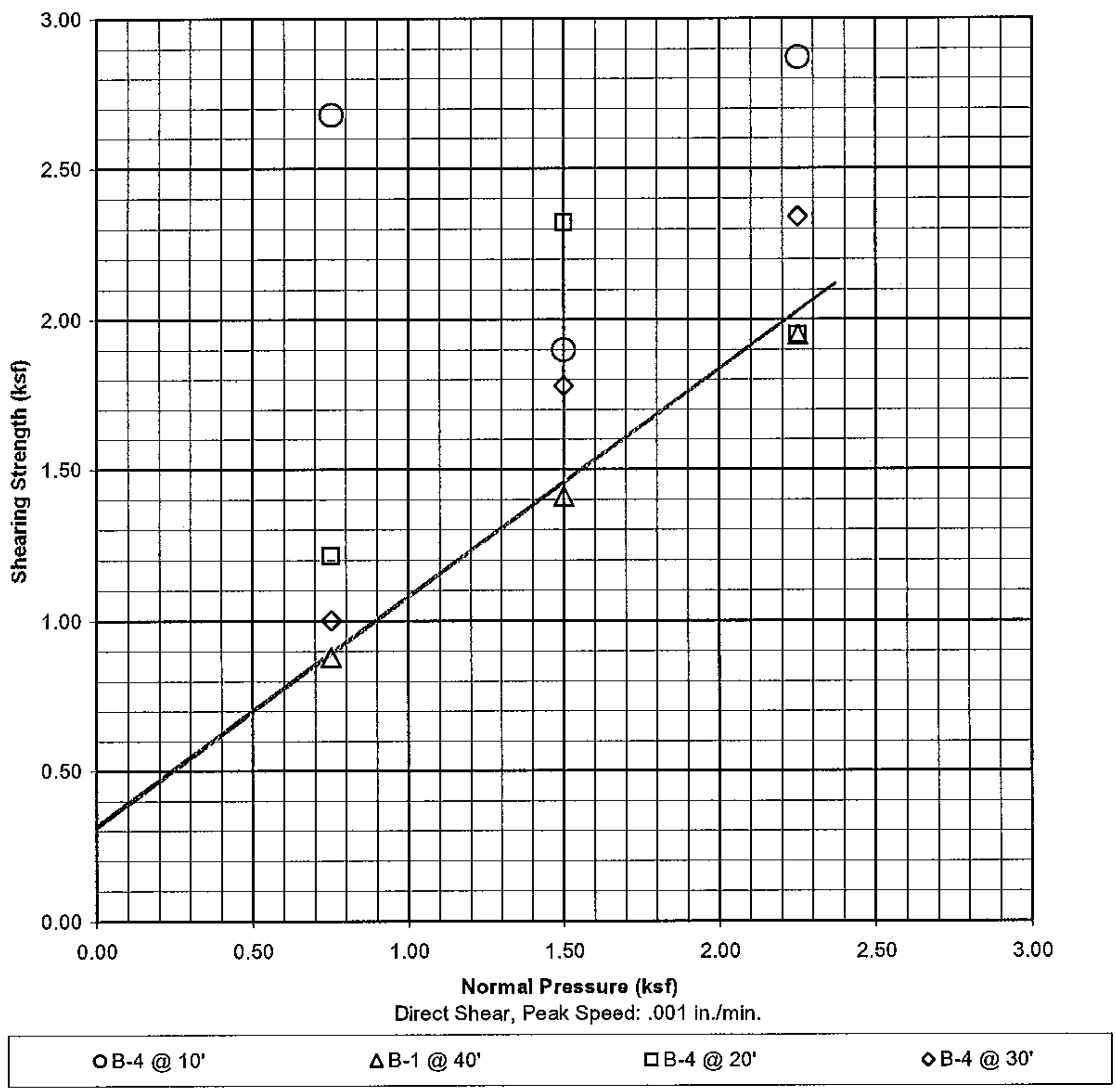
GeoSoils Consultants, Inc.

Geotechnical Engineering * Engineering Geology

PLATE SH-2B

Shear Test Diagram
Summery

Peak Values
C(psf): 310 Phi (degrees): 36.5



Undisturbed **Natural Peak Summery** Saturated

September 15, 2011
W.O. 6489

APPENDIX E

SEISMIC ANALYSES

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*************************
*                       *
*    E Q S E A R C H    *
*                       *
*     Version 3.00      *
*                       *
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ESTIMATION OF
PEAK ACCELERATION FROM
CALIFORNIA EARTHQUAKE CATALOGS

```
JOB NUMBER: 6489
                                                    DATE: 09-15-2011

JOB NAME: Green Acres

EARTHQUAKE-CATALOG-FILE NAME: ALLQUAKE.DAT

MAGNITUDE RANGE:
   MINIMUM MAGNITUDE:  5.00
   MAXIMUM MAGNITUDE:  9.00

SITE COORDINATES:
   SITE LATITUDE:  34.3400
   SITE LONGITUDE:  118.7015

SEARCH DATES:
          START DATE:   1850
          END DATE:   2011

SEARCH RADIUS:
          100.0 mi
          160.9 km

ATTENUATION RELATION:  25) Campbell & Bozorgnia (1997 Rev.) - Soft Rock
   UNCERTAINTY (M=Median, S=Sigma): S       Number of Sigmas:  1.0
   ASSUMED SOURCE TYPE:  DS [SS=Strike-slip, DS=Reverse-slip, BT=Blind-thrust]
   SCOND:   1  Depth Source:  A
   Basement Depth:  5.00 km     Campbell SSR:  1      Campbell SHR:  0
   COMPUTE PEAK HORIZONTAL ACCELERATION

MINIMUM DEPTH VALUE (km):  3.0
```

EARTHQUAKE SEARCH RESULTS

Page 1

FILE CODE	LAT. NORTH	LONG. WEST	DATE	TIME (UTC) H M Sec	DEPTH (km)	QUAKE MAG.	SITE ACC. g	SITE MM INT.	APPROX. DISTANCE mi [km]
GSP	34.3260	118.6980	01/17/1994	233330.7	9.0	5.60	0.764	XI	1.0(1.6)
GSP	34.3770	118.6980	01/18/1994	004308.9	11.0	5.20	0.422	X	2.6(4.1)
GSP	34.3690	118.6720	04/26/1997	103730.7	16.0	5.10	0.378	IX	2.6(4.2)
GSB	34.3790	118.7110	01/19/1994	210928.6	14.0	5.50	0.556	X	2.7(4.4)
GSP	34.3940	118.6690	06/26/1995	084028.9	13.0	5.00	0.278	IX	4.2(6.7)
GSP	34.3780	118.6180	01/19/1994	211144.9	11.0	5.10	0.252	IX	5.4(8.7)
DMG	34.3000	118.6000	04/04/1893	1940 0.0	0.0	6.00	0.451	X	6.4(10.3)
GSP	34.3050	118.5790	01/29/1994	112036.0	1.0	5.10	0.194	VIII	7.4(11.9)
GSB	34.3010	118.5650	01/17/1994	204602.4	9.0	5.20	0.187	VIII	8.2(13.2)
GSP	34.2130	118.5370	01/17/1994	123055.4	18.0	6.70	0.301	IX	12.8(20.7)
DMG	34.3080	118.4540	02/09/1971	144346.7	6.2	5.20	0.097	VII	14.3(23.0)
GSP	34.2310	118.4750	03/20/1994	212012.3	13.0	5.30	0.099	VII	14.9(24.1)
DMG	34.4110	118.4010	02/09/1971	14 1 8.0	8.0	5.80	0.115	VII	17.8(28.7)
DMG	34.4110	118.4010	02/09/1971	14 041.8	8.4	6.40	0.171	VIII	17.8(28.7)
DMG	34.4110	118.4010	02/09/1971	141028.0	8.0	5.30	0.076	VII	17.8(28.7)
DMG	34.4110	118.4010	02/09/1971	14 244.0	8.0	5.80	0.115	VII	17.8(28.7)
DMG	34.0000	118.5000	08/04/1927	1224 0.0	0.0	5.00	0.033	V	26.1(42.1)
MGI	34.0000	118.5000	11/19/1918	2018 0.0	0.0	5.00	0.033	V	26.1(42.1)
DMG	34.0650	119.0350	02/21/1973	144557.3	8.0	5.90	0.066	VI	26.9(43.3)
DMG	33.9500	118.6320	08/31/1930	04036.0	0.0	5.20	0.037	V	27.2(43.8)
PAS	33.9440	118.6810	01/01/1979	231438.9	11.3	5.00	0.031	V	27.4(44.0)
MGI	34.0000	119.0000	12/14/1912	0 0 0.0	0.0	5.70	0.050	VI	29.0(46.7)
PAS	33.9190	118.6270	01/19/1989	65328.8	11.9	5.00	0.028	V	29.4(47.3)
DMG	34.7000	119.0000	10/23/1916	254 0.0	0.0	5.50	0.040	V	30.1(48.4)
MGI	34.0800	118.2600	07/16/1920	18 8 0.0	0.0	5.00	0.025	V	30.9(49.8)
DMG	34.5190	118.1980	08/23/1952	10 9 7.1	13.1	5.00	0.025	V	31.2(50.2)
MGI	34.0000	118.3000	09/03/1905	540 0.0	0.0	5.30	0.030	V	32.8(52.8)
T-A	34.8300	118.7500	11/27/1852	0 0 0.0	0.0	7.00	0.108	VII	33.9(54.6)
T-A	34.0000	118.2500	01/10/1856	0 0 0.0	0.0	5.00	0.021	IV	34.9(56.1)
T-A	34.0000	118.2500	03/26/1860	0 0 0.0	0.0	5.00	0.021	IV	34.9(56.1)
MGI	34.1000	118.1000	07/11/1855	415 0.0	0.0	6.30	0.052	VI	38.1(61.4)
DMG	34.8670	118.9330	09/21/1941	1953 7.2	0.0	5.20	0.021	IV	38.7(62.3)
DMG	34.8000	119.1000	09/05/1883	1230 0.0	0.0	6.00	0.040	V	39.0(62.8)
PAS	34.0730	118.0980	10/04/1987	105938.2	8.2	5.30	0.022	IV	39.1(62.9)
GSP	34.2620	118.0020	06/28/1991	144354.5	11.0	5.40	0.023	IV	40.3(64.8)
DMG	34.9000	118.9000	10/23/1916	244 0.0	0.0	6.00	0.038	V	40.3(64.8)
PAS	34.0610	118.0790	10/01/1987	144220.0	9.5	5.90	0.035	V	40.4(65.1)
DMG	34.9000	118.9500	08/01/1952	13 430.0	0.0	5.10	0.018	IV	41.2(66.2)
PAS	34.9430	118.7430	06/10/1988	23 643.0	6.8	5.40	0.022	IV	41.7(67.1)
T-A	34.9200	118.9200	05/23/1857	0 0 0.0	0.0	5.00	0.016	IV	41.9(67.5)
T-A	34.9200	118.9200	01/20/1857	0 0 0.0	0.0	5.00	0.016	IV	41.9(67.5)
DMG	33.8500	118.2670	03/11/1933	1425 0.0	0.0	5.00	0.016	IV	42.0(67.5)
DMG	34.9500	118.8670	07/21/1952	121936.0	0.0	5.30	0.019	IV	43.1(69.4)
DMG	34.1000	119.4000	05/19/1893	035 0.0	0.0	5.50	0.023	IV	43.2(69.5)
DMG	34.9320	118.9760	03/01/1963	02557.9	13.9	5.00	0.015	IV	43.7(70.4)
DMG	34.9410	118.9870	11/15/1961	53855.5	10.7	5.00	0.014	IV	44.5(71.7)
DMG	35.0000	118.8330	07/23/1952	181351.0	0.0	5.20	0.016	IV	46.2(74.3)
DMG	35.0000	118.8330	07/23/1952	75319.0	0.0	5.40	0.019	IV	46.2(74.3)
DMG	33.7830	118.2500	11/14/1941	84136.3	0.0	5.40	0.019	IV	46.3(74.5)
MGI	34.0000	118.0000	12/25/1903	1745 0.0	0.0	5.00	0.013	III	46.4(74.7)
DMG	34.2000	117.9000	08/28/1889	215 0.0	0.0	5.50	0.020	IV	46.7(75.2)
DMG	34.5000	119.5000	06/29/1926	2321 0.0	0.0	5.50	0.020	IV	46.8(75.3)
DMG	34.5000	119.5000	08/05/1930	1125 0.0	0.0	5.00	0.013	III	46.8(75.3)

EARTHQUAKE SEARCH RESULTS

FILE CODE	LAT. NORTH	LONG. WEST	DATE	TIME (UTC) H M Sec	DEPTH (km)	QUAKE MAG.	SITE ACC. g	SITE MM INT.	APPROX. DISTANCE mi [km]
DMG	34.9830	118.9830	05/23/1954	235243.0	0.0	5.10	0.014	IV	47.2(75.9)
DMG	35.0000	119.0000	07/21/1952	12 531.0	0.0	6.40	0.038	V	48.6(78.2)
DMG	35.0000	119.0000	02/16/1919	1557 0.0	0.0	5.00	0.012	III	48.6(78.2)
DMG	35.0000	119.0170	01/12/1954	233349.0	0.0	5.90	0.025	V	49.0(78.8)
DMG	35.0000	119.0170	07/21/1952	115214.0	0.0	7.70	0.105	VII	49.0(78.8)
DMG	35.0000	119.0330	07/21/1952	12 2 0.0	0.0	5.60	0.020	IV	49.3(79.3)
DMG	34.3670	119.5830	07/01/1941	75054.8	0.0	5.90	0.024	V	50.3(80.9)
DMG	33.7830	118.1330	10/02/1933	91017.6	0.0	5.40	0.016	IV	50.4(81.0)
DMG	33.9860	119.4750	08/06/1973	232917.0	16.9	5.00	0.012	III	50.5(81.3)
DMG	34.0000	119.5000	02/18/1926	1818 0.0	0.0	5.00	0.011	III	51.3(82.6)
PAS	33.6710	119.1110	09/04/1981	155050.3	5.0	5.30	0.014	IV	51.8(83.3)
DMG	33.7500	118.0830	03/11/1933	323 0.0	0.0	5.00	0.011	III	54.0(86.8)
DMG	33.7500	118.0830	03/11/1933	230 0.0	0.0	5.10	0.011	III	54.0(86.8)
DMG	33.7500	118.0830	03/11/1933	910 0.0	0.0	5.10	0.011	III	54.0(86.8)
DMG	33.7500	118.0830	03/13/1933	131828.0	0.0	5.30	0.013	III	54.0(86.8)
DMG	33.7500	118.0830	03/11/1933	2 9 0.0	0.0	5.00	0.011	III	54.0(86.8)
DMG	35.1330	118.7670	07/21/1952	194122.0	0.0	5.50	0.015	IV	54.9(88.3)
DMG	35.1500	118.6330	01/27/1954	141948.0	0.0	5.00	0.010	III	56.1(90.2)
T-A	34.5000	119.6700	06/01/1893	12 0 0.0	0.0	5.00	0.010	III	56.3(90.5)
PAS	34.3470	119.6960	08/13/1978	225453.4	12.8	5.10	0.011	III	56.7(91.2)
DMG	33.7000	118.0670	03/11/1933	85457.0	0.0	5.10	0.010	III	57.2(92.0)
DMG	33.7000	118.0670	03/11/1933	51022.0	0.0	5.10	0.010	III	57.2(92.0)
DMG	35.1830	118.6500	07/21/1952	151358.0	0.0	5.10	0.010	III	58.3(93.8)
DMG	33.6830	118.0500	03/11/1933	658 3.0	0.0	5.50	0.014	IV	58.7(94.5)
GSP	34.1400	117.7000	02/28/1990	234336.6	5.0	5.20	0.011	III	58.8(94.6)
DMG	34.1180	119.7020	07/05/1968	04517.2	5.9	5.20	0.011	III	59.1(95.2)
GSP	35.1490	119.1040	05/28/1993	044740.6	21.0	5.20	0.010	III	60.3(97.1)
DMG	35.2170	118.8170	07/23/1952	1317 5.0	0.0	5.70	0.015	IV	60.9(98.0)
DMG	35.2330	118.5330	07/21/1952	174244.0	0.0	5.10	0.009	III	62.4(100.4)
MGI	34.3000	119.8000	07/03/1925	1638 0.0	0.0	5.30	0.011	III	62.7(100.9)
MGI	34.3000	119.8000	07/03/1925	1821 0.0	0.0	5.30	0.011	III	62.7(100.9)
DMG	34.3000	119.8000	06/29/1925	144216.0	0.0	6.25	0.023	IV	62.7(100.9)
DMG	34.3000	117.6000	07/30/1894	512 0.0	0.0	6.00	0.019	IV	62.9(101.2)
DMG	33.6170	118.0170	03/14/1933	19 150.0	0.0	5.10	0.009	III	63.5(102.1)
T-A	34.4200	119.8200	00/00/1862	0 0 0.0	0.0	5.70	0.014	IV	64.0(102.9)
DMG	33.6170	117.9670	03/11/1933	154 7.8	0.0	6.30	0.022	IV	65.3(105.0)
DMG	34.2700	117.5400	09/12/1970	143053.0	8.0	5.40	0.010	III	66.4(106.9)
DMG	35.3000	118.8000	12/23/1905	2223 0.0	0.0	5.00	0.008	II	66.5(107.0)
DMG	33.5750	117.9830	03/11/1933	518 4.0	0.0	5.20	0.009	III	67.0(107.7)
DMG	35.3110	118.4990	07/25/1952	1313 8.2	2.8	5.00	0.007	II	68.0(109.5)
DMG	35.3150	118.5160	07/25/1952	194323.7	11.2	5.70	0.013	III	68.1(109.6)
DMG	35.3170	118.4940	07/25/1952	19 944.6	5.5	5.70	0.013	III	68.5(110.2)
DMG	34.3000	117.5000	07/22/1899	2032 0.0	0.0	6.50	0.024	V	68.6(110.3)
DMG	35.3330	118.6000	07/31/1952	12 9 9.0	0.0	5.80	0.014	III	68.8(110.7)
DMG	35.3330	118.9170	08/22/1952	224124.0	0.0	5.80	0.013	III	69.6(112.1)
GSP	35.2100	118.0660	07/11/1992	181416.2	10.0	5.70	0.012	III	70.0(112.7)
DMG	35.3670	118.5830	07/23/1952	03832.0	0.0	6.10	0.016	IV	71.2(114.6)
DMG	35.3670	118.5830	07/23/1952	31923.0	0.0	5.00	0.007	II	71.2(114.6)
DMG	35.3830	118.8500	07/29/1952	7 347.0	0.0	6.10	0.016	IV	72.5(116.7)
MGI	34.0000	117.5000	12/16/1858	10 0 0.0	0.0	7.00	0.033	V	72.5(116.7)
MGI	33.8000	117.6000	04/22/1918	2115 0.0	0.0	5.00	0.006	II	73.2(117.8)
DMG	35.4000	118.8170	07/29/1952	8 146.0	0.0	5.10	0.007	II	73.5(118.2)
DMG	34.2000	117.4000	07/22/1899	046 0.0	0.0	5.50	0.009	III	74.9(120.5)

EARTHQUAKE SEARCH RESULTS

FILE CODE	LAT. NORTH	LONG. WEST	DATE	TIME (UTC) H M Sec	DEPTH (km)	QUAKE MAG.	SITE ACC. g	SITE MM INT.	APPROX. DISTANCE mi [km]
DMG	33.2910	119.1930	10/24/1969	82912.1	10.0	5.10	0.006	II	77.7(125.1)
DMG	34.0000	120.0170	04/01/1945	234342.0	0.0	5.40	0.008	III	78.7(126.7)
DMG	35.5000	118.7000	01/06/1905	1430 0.0	0.0	5.00	0.006	II	80.1(128.9)
DMG	33.6990	117.5110	05/31/1938	83455.4	10.0	5.50	0.008	III	81.2(130.7)
MGI	34.1000	117.3000	07/15/1905	2041 0.0	0.0	5.30	0.007	II	81.7(131.5)
DMG	33.2670	119.4500	11/18/1947	2159 3.0	0.0	5.00	0.005	II	85.6(137.8)
DMG	34.0000	117.2500	07/23/1923	73026.0	0.0	6.25	0.014	III	86.2(138.7)
DMG	33.7000	117.4000	05/13/1910	620 0.0	0.0	5.00	0.005	II	86.6(139.4)
DMG	33.7000	117.4000	04/11/1910	757 0.0	0.0	5.00	0.005	II	86.6(139.4)
DMG	33.7000	117.4000	05/15/1910	1547 0.0	0.0	6.00	0.011	III	86.6(139.4)
DMG	35.6000	118.8000	06/30/1926	1331 0.0	0.0	5.00	0.005	II	87.2(140.3)
DMG	35.3000	119.8000	01/09/1857	16 0 0.0	0.0	7.90	0.047	VI	90.9(146.3)
DMG	33.9000	117.2000	12/19/1880	0 0 0.0	0.0	6.00	0.010	III	91.0(146.5)
DMG	34.2000	117.1000	09/20/1907	154 0.0	0.0	6.00	0.010	III	91.9(147.9)
DMG	34.7000	120.3000	01/12/1915	431 0.0	0.0	5.50	0.006	II	94.3(151.7)
DMG	34.7000	120.3000	07/31/1902	920 0.0	0.0	5.50	0.006	II	94.3(151.7)
MGI	34.6000	120.4000	07/28/1902	657 0.0	0.0	6.30	0.012	III	98.3(158.2)
MGI	34.6000	120.4000	08/01/1902	330 0.0	0.0	6.30	0.012	III	98.3(158.2)
DMG	34.2670	116.9670	08/29/1943	34513.0	0.0	5.50	0.006	II	99.1(159.4)

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-END OF SEARCH- 125 EARTHQUAKES FOUND WITHIN THE SPECIFIED SEARCH AREA.

TIME PERIOD OF SEARCH: 1850 TO 2011

LENGTH OF SEARCH TIME: 162 years

THE EARTHQUAKE CLOSEST TO THE SITE IS ABOUT 1.0 MILES (1.6 km) AWAY.

LARGEST EARTHQUAKE MAGNITUDE FOUND IN THE SEARCH RADIUS: 7.9

LARGEST EARTHQUAKE SITE ACCELERATION FROM THIS SEARCH: 0.764 g

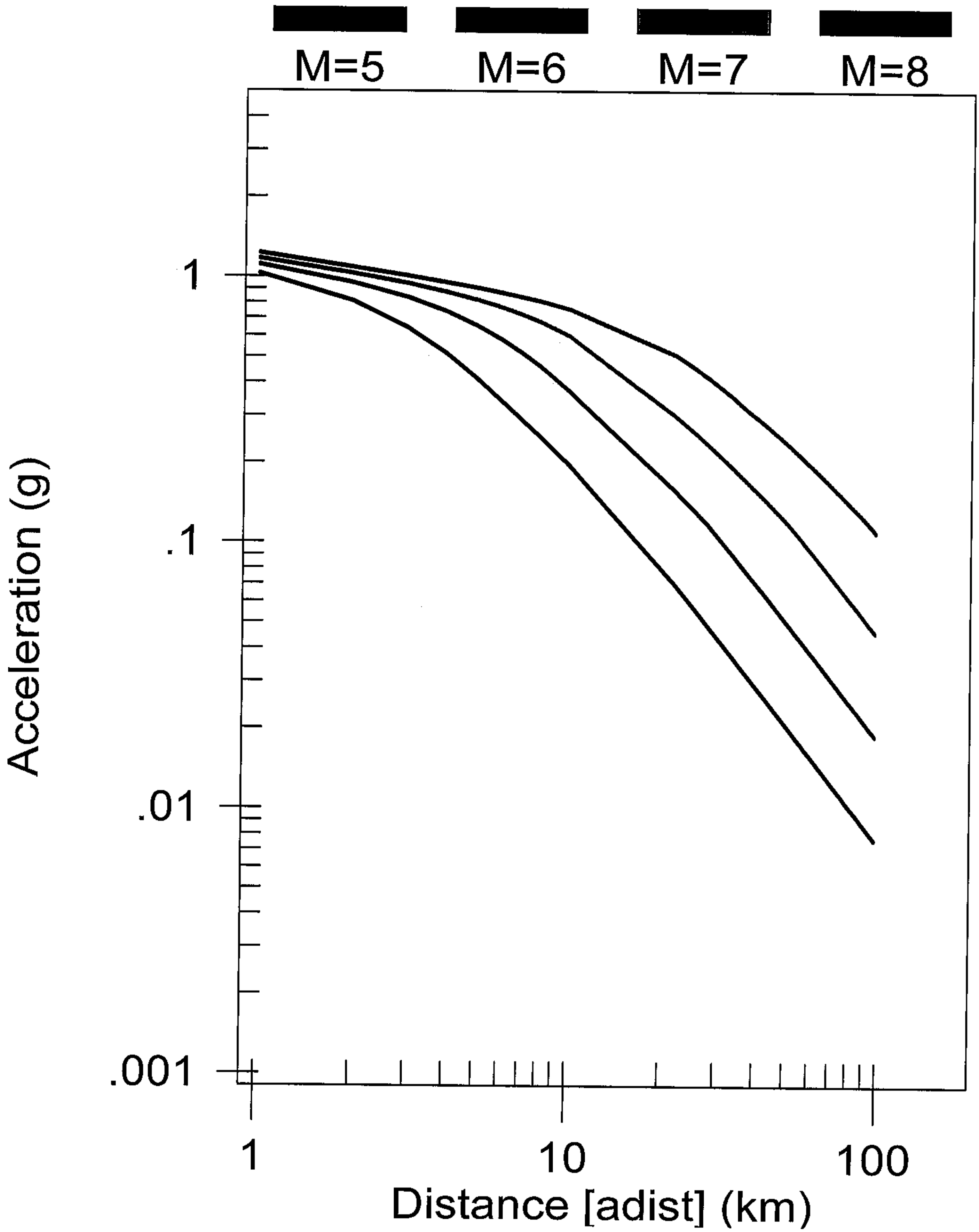
COEFFICIENTS FOR GUTENBERG & RICHTER RECURRENCE RELATION:
a-value= 1.522
b-value= 0.372
beta-value= 0.856

TABLE OF MAGNITUDES AND EXCEEDANCES:

Earthquake Magnitude	Number of Times Exceeded	Cumulative No. / Year
4.0	125	0.77160
4.5	125	0.77160
5.0	125	0.77160
5.5	51	0.31481
6.0	23	0.14198
6.5	6	0.03704
7.0	4	0.02469
7.5	2	0.01235

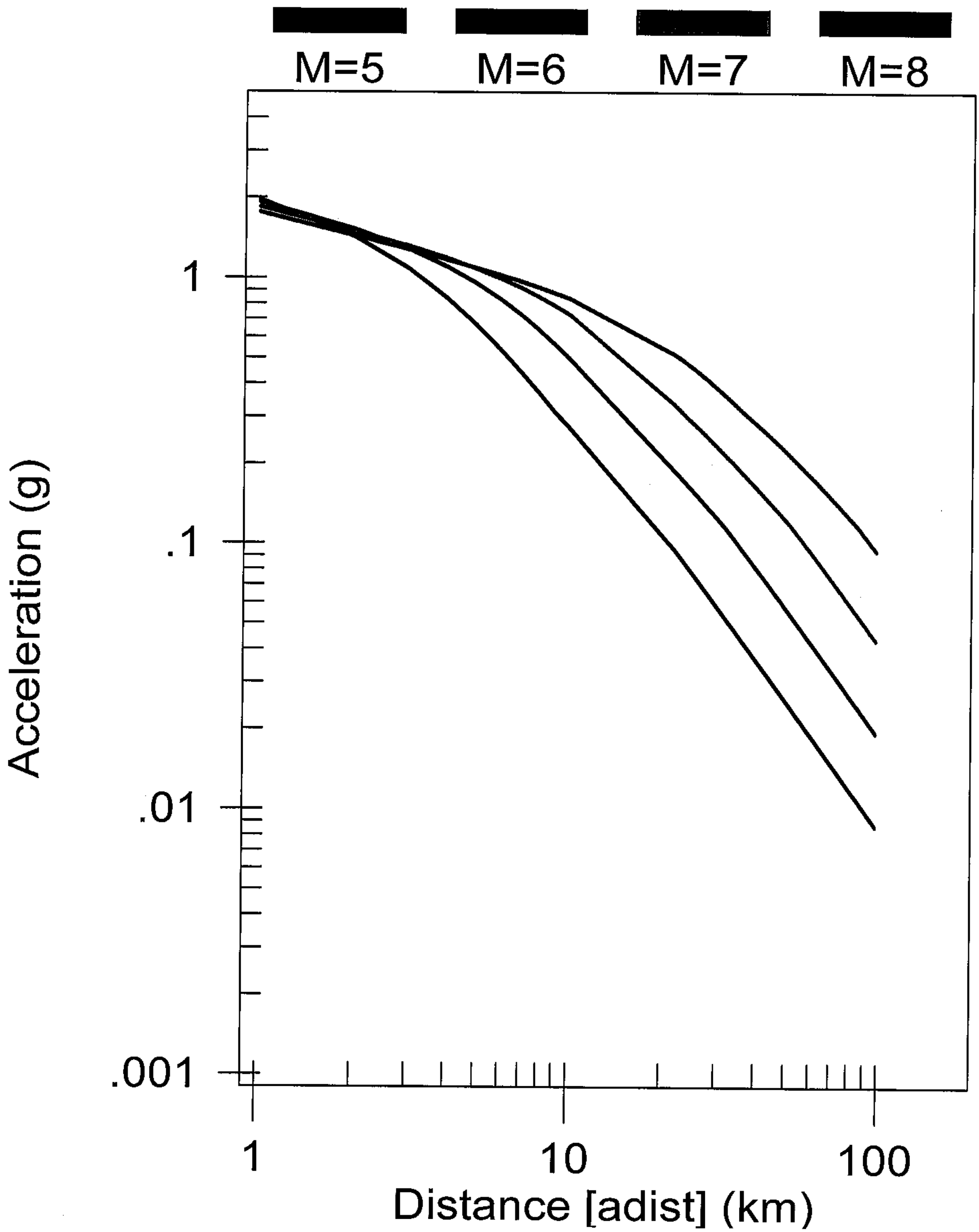
STRIKE-SLIP FAULTS

25) Campbell & Bozorgnia (1997 Rev.) - Soft Rock



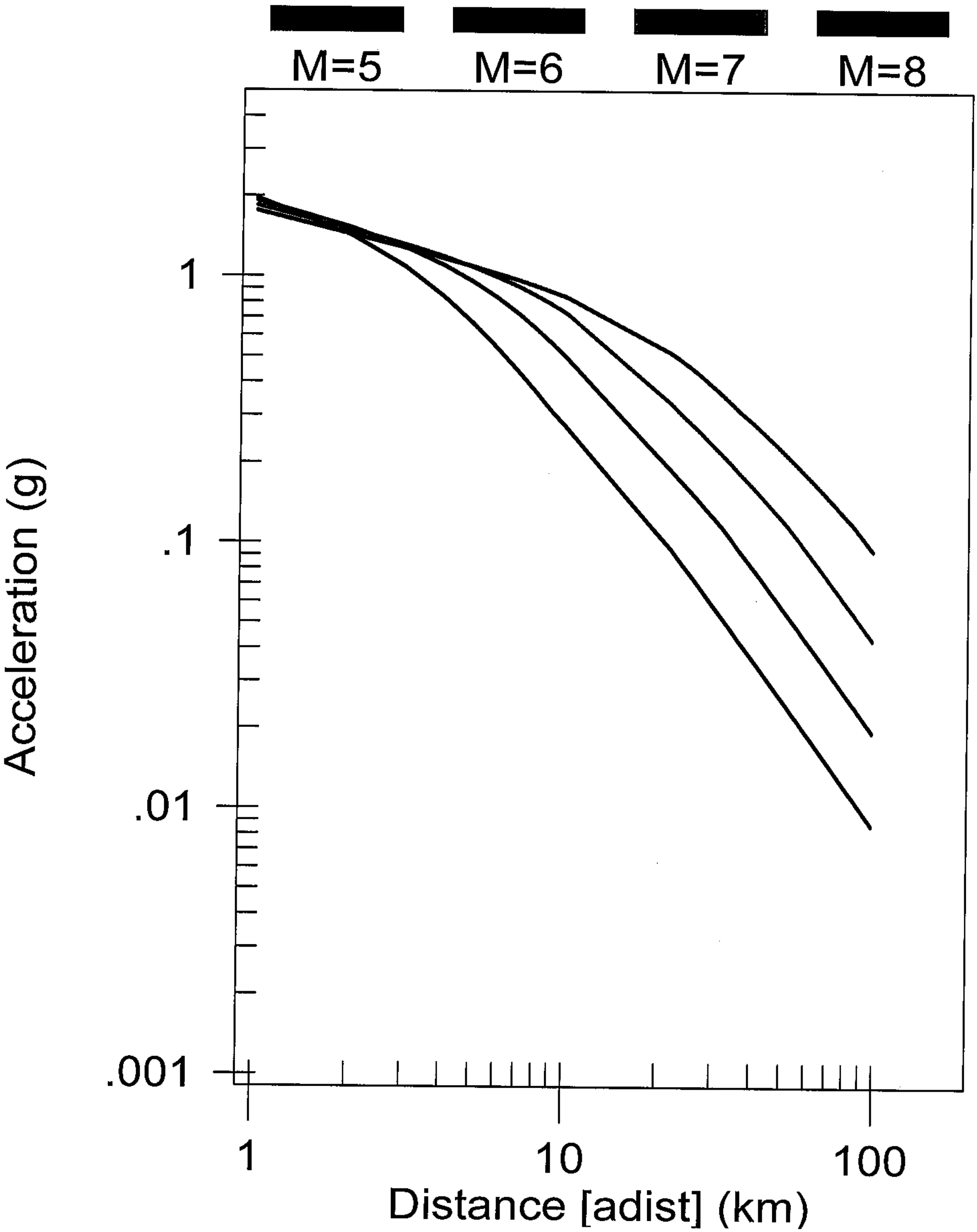
DIP-SLIP FAULTS

25) Campbell & Bozorgnia (1997 Rev.) - Soft Rock



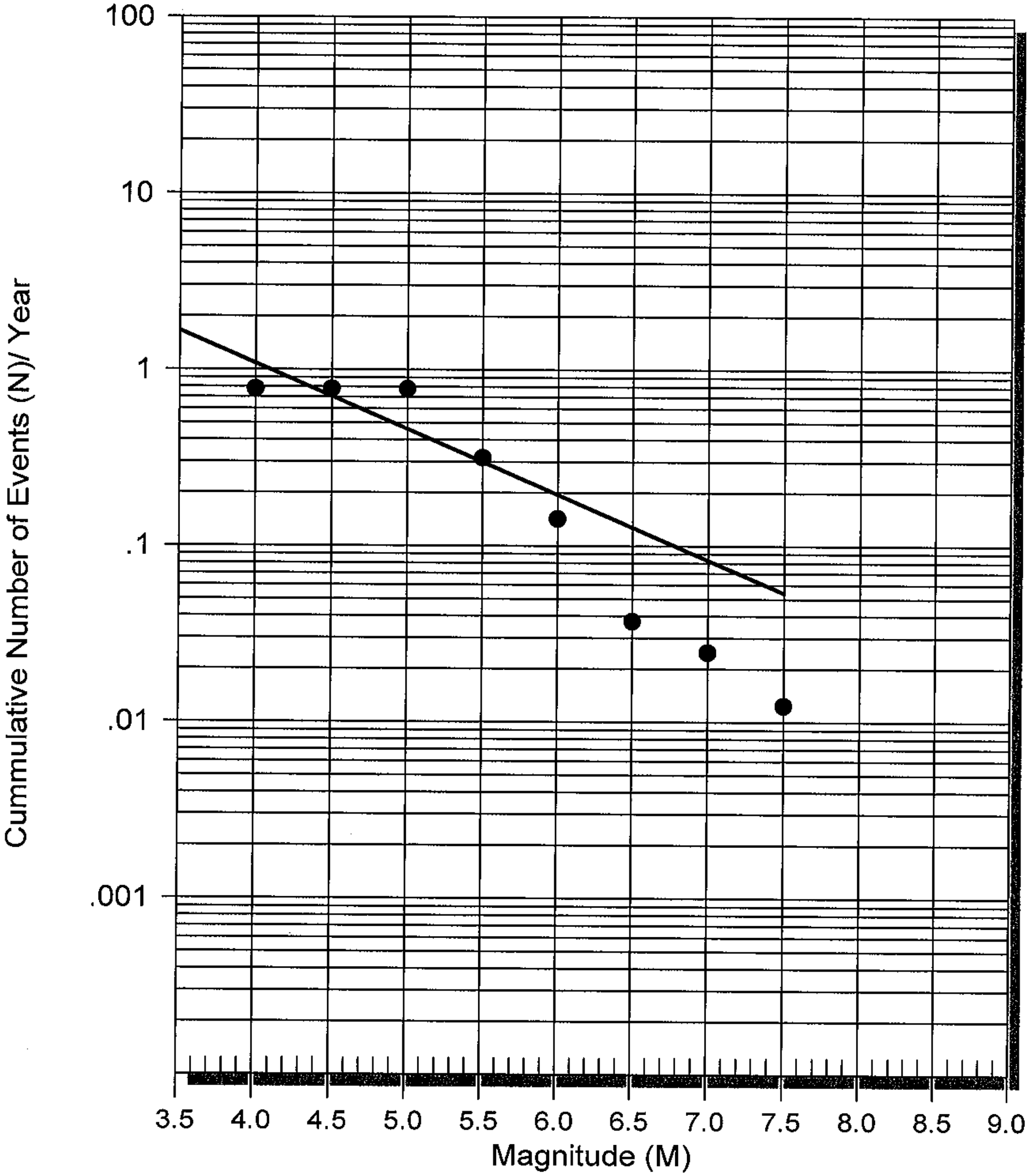
BLIND-THRUST FAULTS

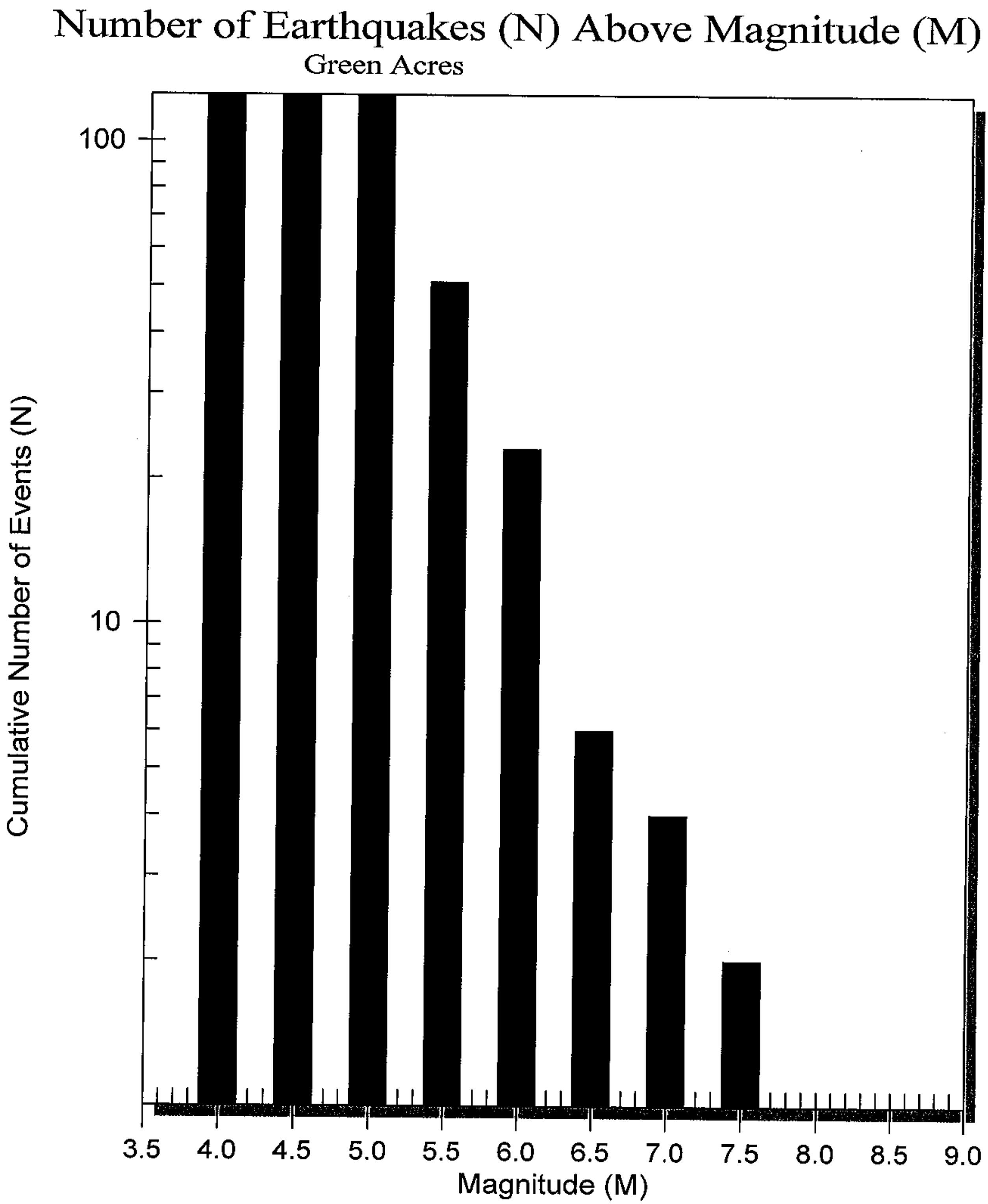
25) Campbell & Bozorgnia (1997 Rev.) - Soft Rock



EARTHQUAKE RECURRENCE CURVE

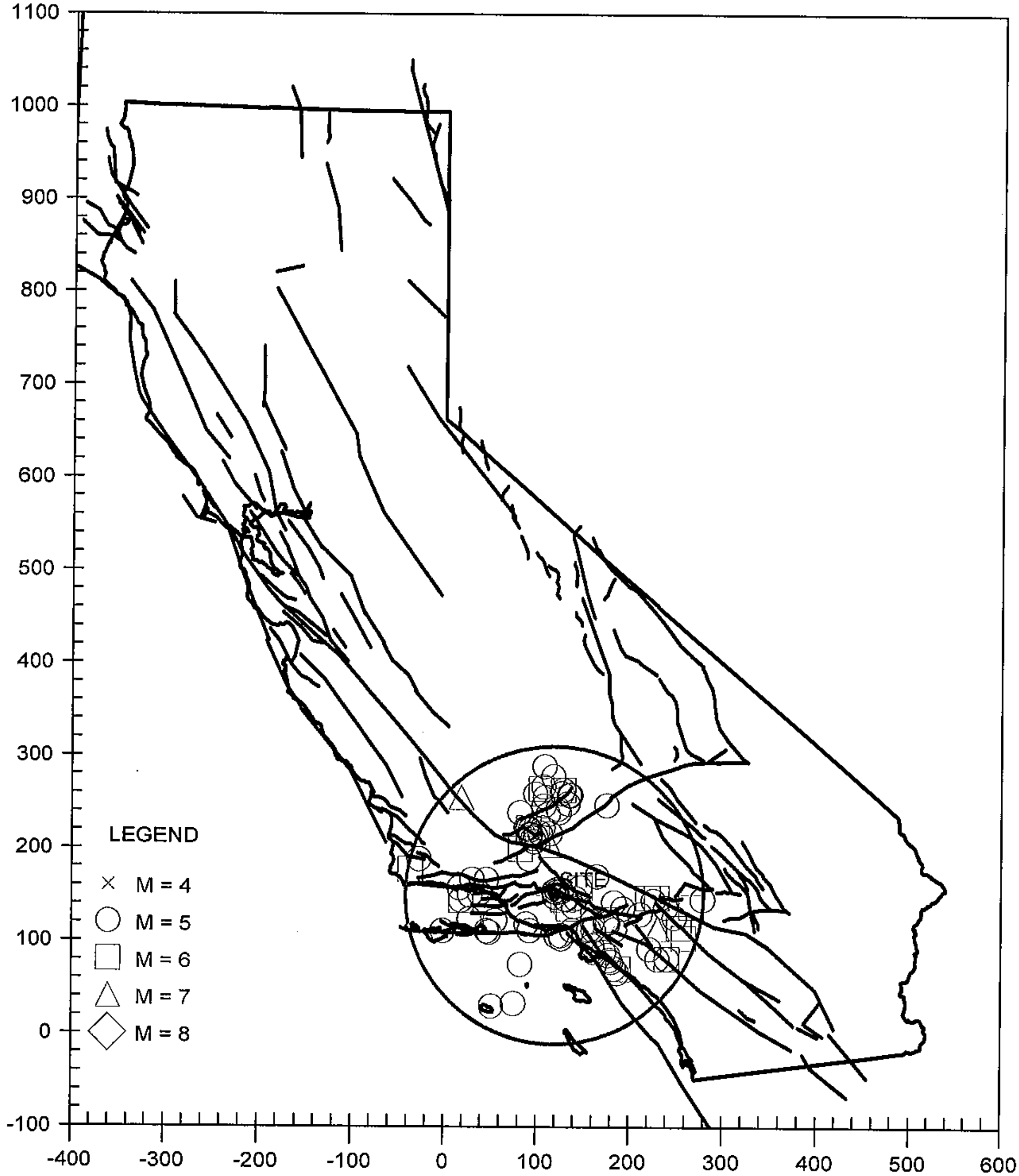
Green Acres




Number of Earthquakes (N) Above Magnitude (M)
Green Acres
100
10
Cumulative Number of Events (N)
3.5
4.0
4.5
5.0
5.5
6.0
6.5
7.0
7.5
8.0
8.5
9.0
Magnitude (M)

EARTHQUAKE EPICENTER MAP

Green Acres



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*                     *
*    E Q F A U L T    *
*                     *
*    Version 3.00     *
*                     *
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DETERMINISTIC ESTIMATION OF
PEAK ACCELERATION FROM DIGITIZED FAULTS

JOB NUMBER: 6489

DATE: 09-15-2011

JOB NAME: Green Acres

CALCULATION NAME: 6489 Green Acres Analysis

FAULT-DATA-FILE NAME: CDMGFLTE.DAT

SITE COORDINATES:
SITE LATITUDE: 34.0362
SITE LONGITUDE: 118.7015

SEARCH RADIUS: 100 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: 1
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

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	2.1(3.3)	6.7	0.860	XI
ANACAPA-DUME	2.6(4.2)	7.3	0.789	XI
SANTA MONICA	3.4(5.5)	6.6	0.674	XI
PALOS VERDES	9.6(15.4)	7.1	0.306	IX
HOLLYWOOD	17.1(27.5)	6.4	0.112	VII
NORTHRIDGE (E. Oak Ridge)	17.5(28.1)	6.9	0.154	VIII
NEWPORT-INGLEWOOD (L.A.Basin)	19.0(30.5)	6.9	0.127	VIII
SIMI-SANTA ROSA	19.1(30.8)	6.7	0.118	VII
COMPTON THRUST	20.2(32.5)	6.8	0.117	VII
SANTA SUSANA	21.8(35.1)	6.6	0.090	VII
OAK RIDGE (Onshore)	22.8(36.7)	6.9	0.105	VII
SIERRA MADRE (San Fernando)	24.0(38.7)	6.7	0.084	VII
VERDUGO	24.3(39.1)	6.7	0.083	VII
HOLSER	25.4(40.8)	6.5	0.067	VI
SAN CAYETANO	27.7(44.6)	6.8	0.073	VII
ELYSIAN PARK THRUST	27.8(44.8)	6.7	0.067	VI
SAN GABRIEL	27.9(44.9)	7.0	0.082	VII
RAYMOND	28.1(45.3)	6.5	0.057	VI
SIERRA MADRE	29.6(47.7)	7.0	0.077	VII
OAK RIDGE(Blind Thrust Offshore)	31.3(50.3)	6.9	0.066	VI
CHANNEL IS. THRUST (Eastern)	32.6(52.4)	7.4	0.089	VII
VENTURA - PITAS POINT	33.4(53.7)	6.8	0.055	VI
MONTALVO-OAK RIDGE TREND	36.2(58.3)	6.6	0.041	V
SANTA YNEZ (East)	39.2(63.1)	7.0	0.050	VI
WHITTIER	39.3(63.3)	6.8	0.042	VI
CLAMSHELL-SAWPIT	40.1(64.5)	6.5	0.033	V
M.RIDGE-ARROYO PARIDA-SANTA ANA	41.1(66.2)	6.7	0.037	V
RED MOUNTAIN	42.8(68.8)	6.8	0.037	V
SAN ANDREAS - Mojave	46.4(74.7)	7.1	0.043	VI
SAN ANDREAS - 1857 Rupture	46.4(74.7)	7.8	0.078	VII
SAN JOSE	46.7(75.1)	6.5	0.026	V
SANTA CRUZ ISLAND	46.7(75.2)	6.8	0.032	V
SAN ANDREAS - Carrizo	47.3(76.1)	7.2	0.046	VI
CHINO-CENTRAL AVE. (Elsinore)	52.1(83.8)	6.7	0.025	V
NEWPORT-INGLEWOOD (Offshore)	54.6(87.8)	6.9	0.029	V
CUCAMONGA	54.6(87.9)	7.0	0.030	V
BIG PINE	55.5(89.3)	6.7	0.023	IV
GARLOCK (West)	56.2(90.4)	7.1	0.033	V
PLEITO THRUST	57.3(92.2)	7.2	0.032	V
NORTH CHANNEL SLOPE	60.8(97.8)	7.1	0.027	V

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.
SANTA YNEZ (West)	61.8(99.5)	6.9	0.024	IV
ELSINORE-GLEN IVY	62.3(100.2)	6.8	0.021	IV
SANTA ROSA ISLAND	69.0(111.1)	6.9	0.019	IV
CORONADO BANK	69.2(111.3)	7.4	0.031	V
SAN ANDREAS - Southern	69.8(112.4)	7.4	0.031	V
SAN ANDREAS - San Bernardino	69.8(112.4)	7.3	0.028	V
SAN JACINTO-SAN BERNARDINO	69.8(112.4)	6.7	0.017	IV
WHITE WOLF	70.3(113.2)	7.2	0.023	IV
CLEGHORN	73.4(118.1)	6.5	0.013	III
ELSINORE-TEMECULA	82.1(132.2)	6.8	0.014	IV
SAN JACINTO-SAN JACINTO VALLEY	83.9(135.0)	6.9	0.015	IV
NORTH FRONTAL FAULT ZONE (West)	84.7(136.3)	7.0	0.015	IV
LOS ALAMOS-W. BASELINE	88.5(142.4)	6.8	0.012	III
HELENDALE - S. LOCKHARDT	94.3(151.8)	7.1	0.015	IV
GARLOCK (East)	94.7(152.4)	7.3	0.018	IV
ROSE CANYON	96.3(154.9)	6.9	0.012	III
LENWOOD-LOCKHART-OLD WOMAN SPRGS	97.9(157.6)	7.3	0.017	IV
LIONS HEAD	99.2(159.6)	6.6	0.008	III

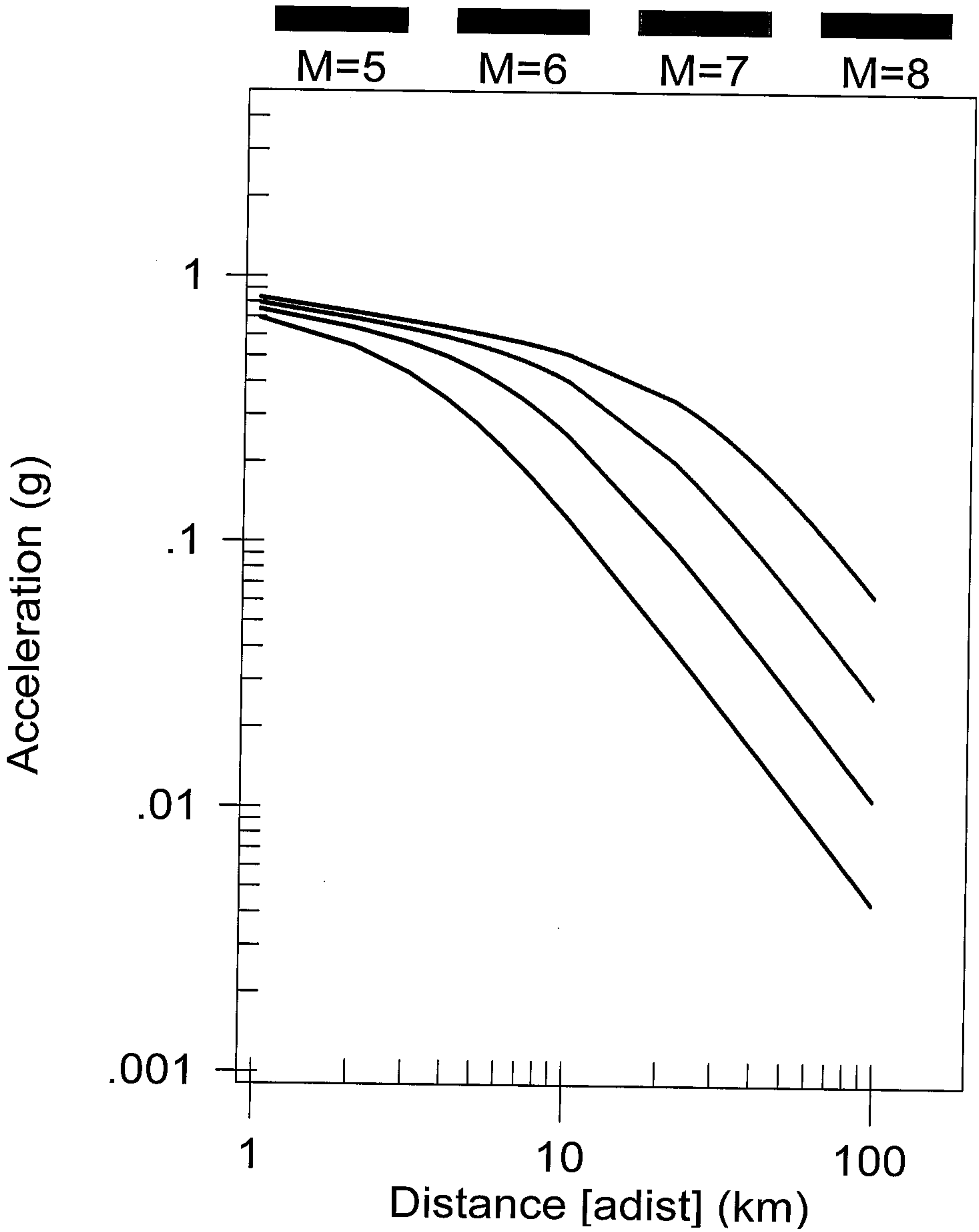
-END OF SEARCH- 58 FAULTS FOUND WITHIN THE SPECIFIED SEARCH RADIUS.

THE MALIBU COAST FAULT IS CLOSEST TO THE SITE.
IT IS ABOUT 2.1 MILES (3.3 km) AWAY.

LARGEST MAXIMUM-EARTHQUAKE SITE ACCELERATION: 0.8595 g

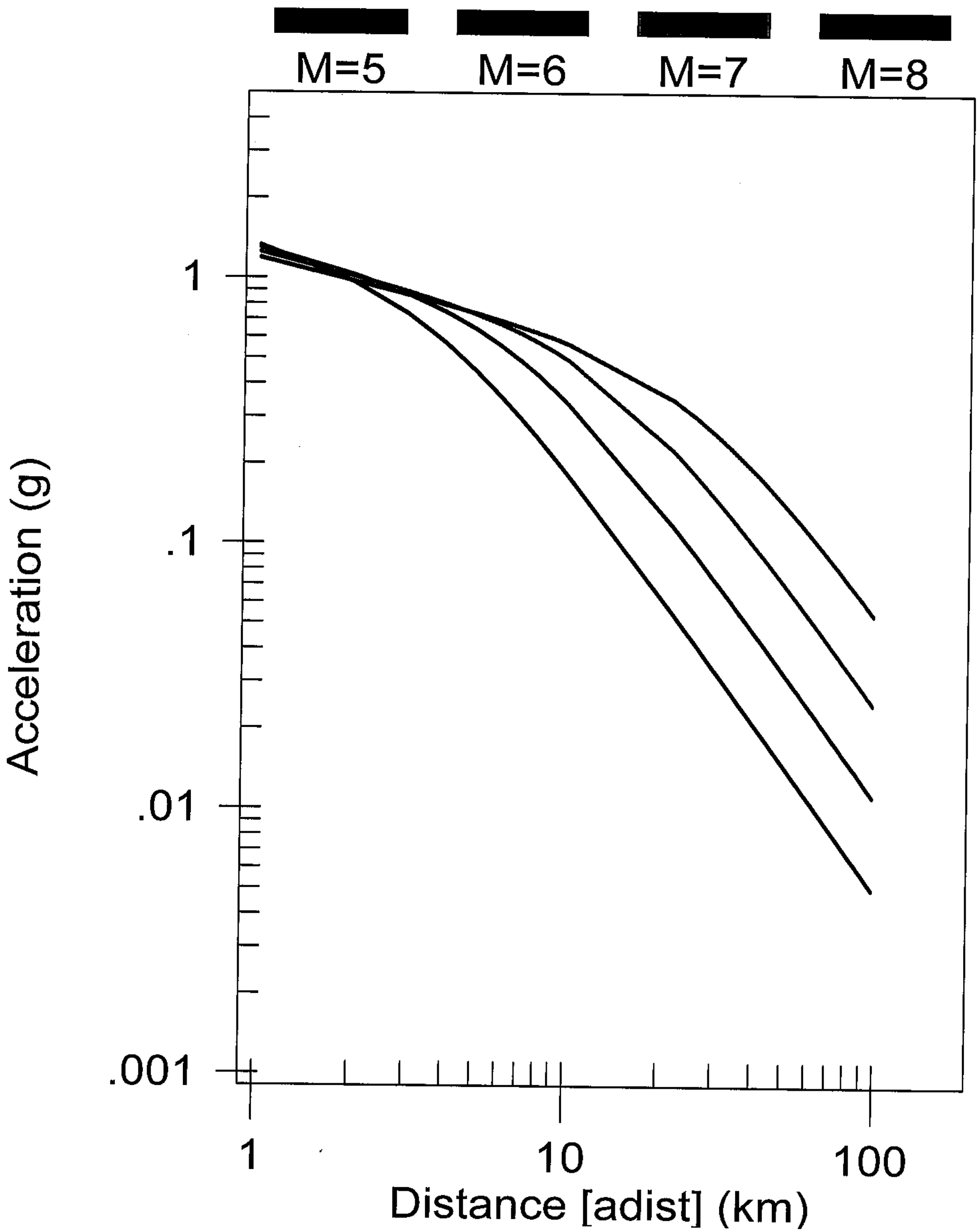
STRIKE-SLIP FAULTS

15) Campbell & Bozorgnia (1997 Rev.) - Soft Rock



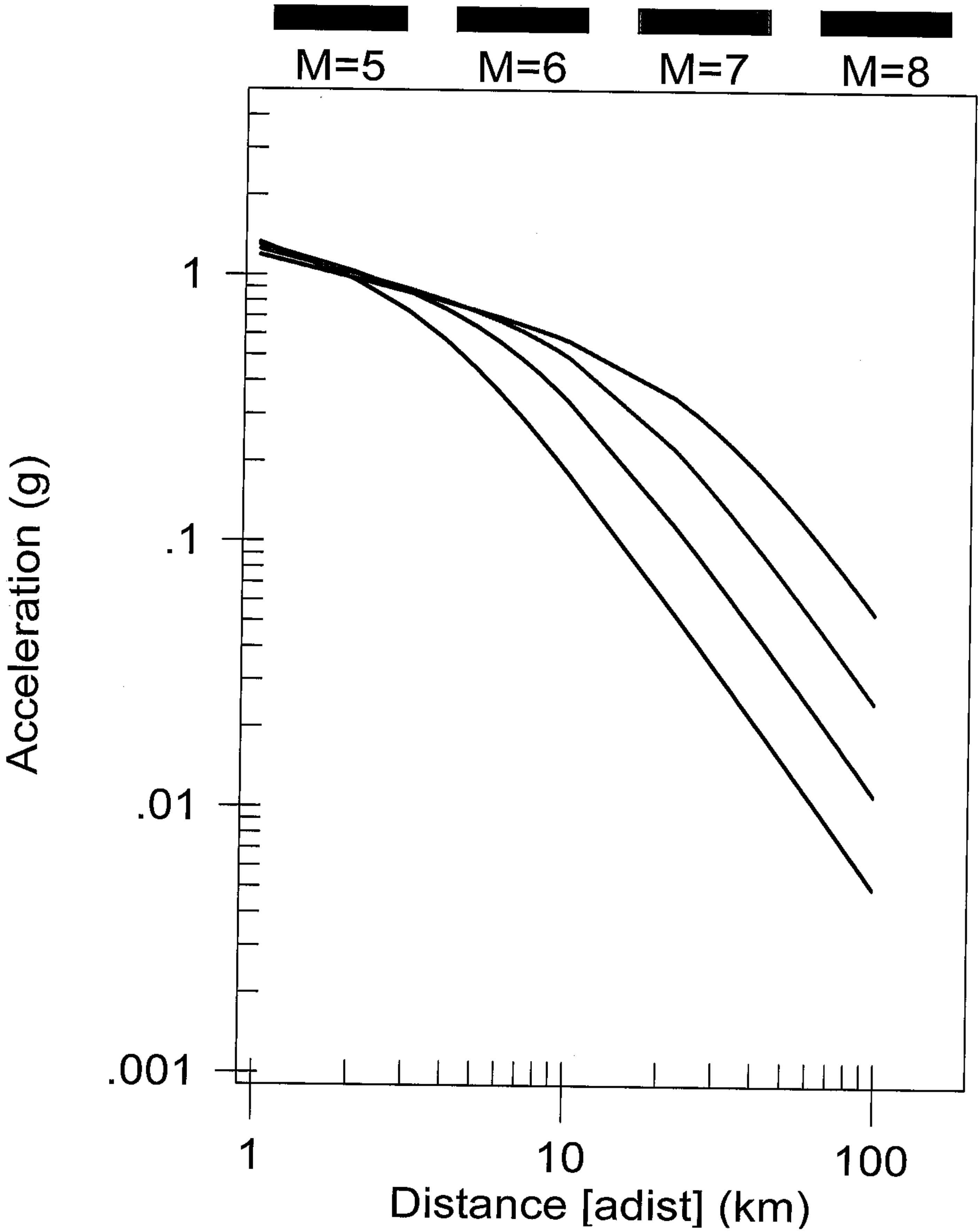
DIP-SLIP FAULTS

15) Campbell & Bozorgnia (1997 Rev.) - Soft Rock



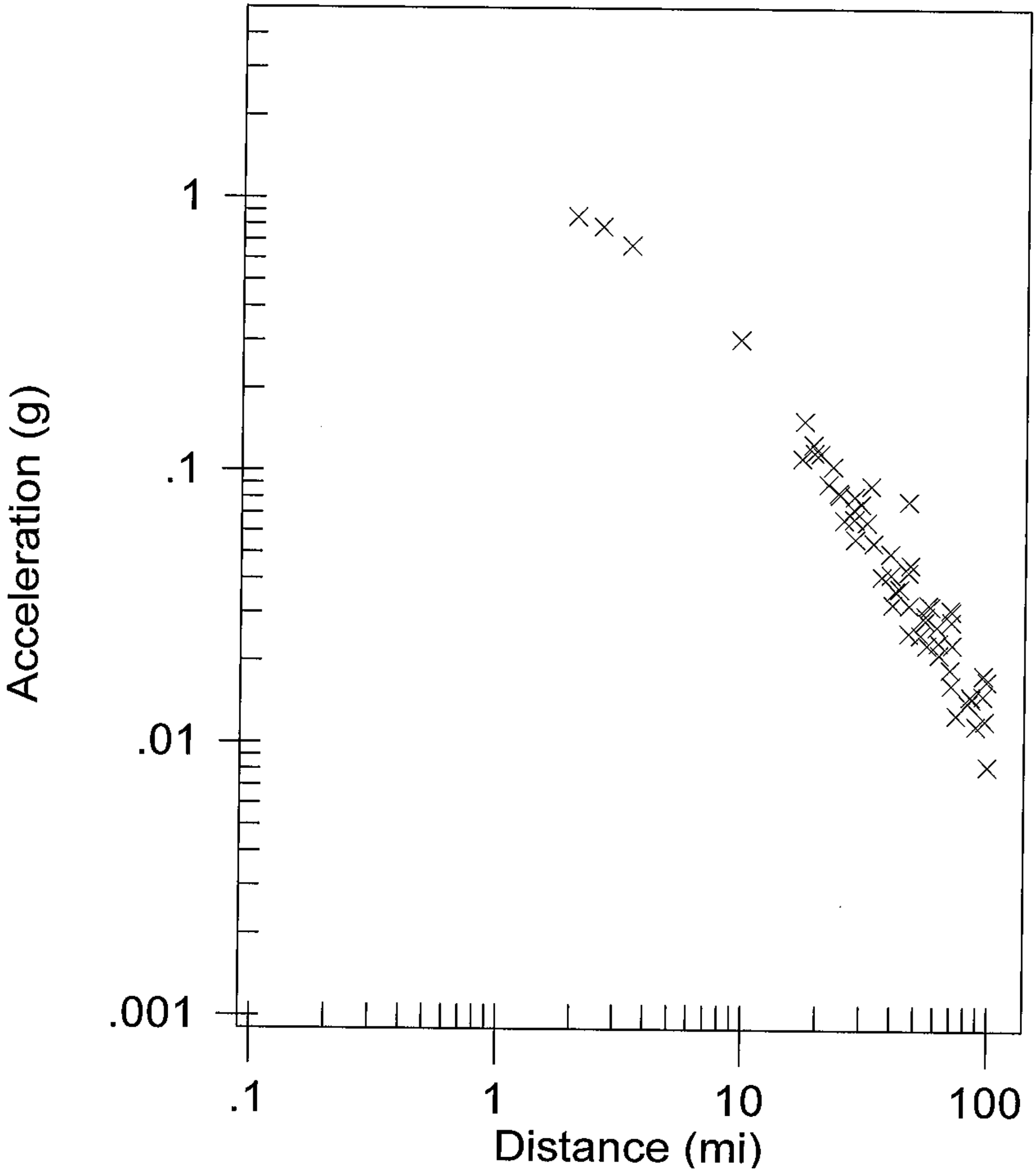
BLIND-THRUST FAULTS

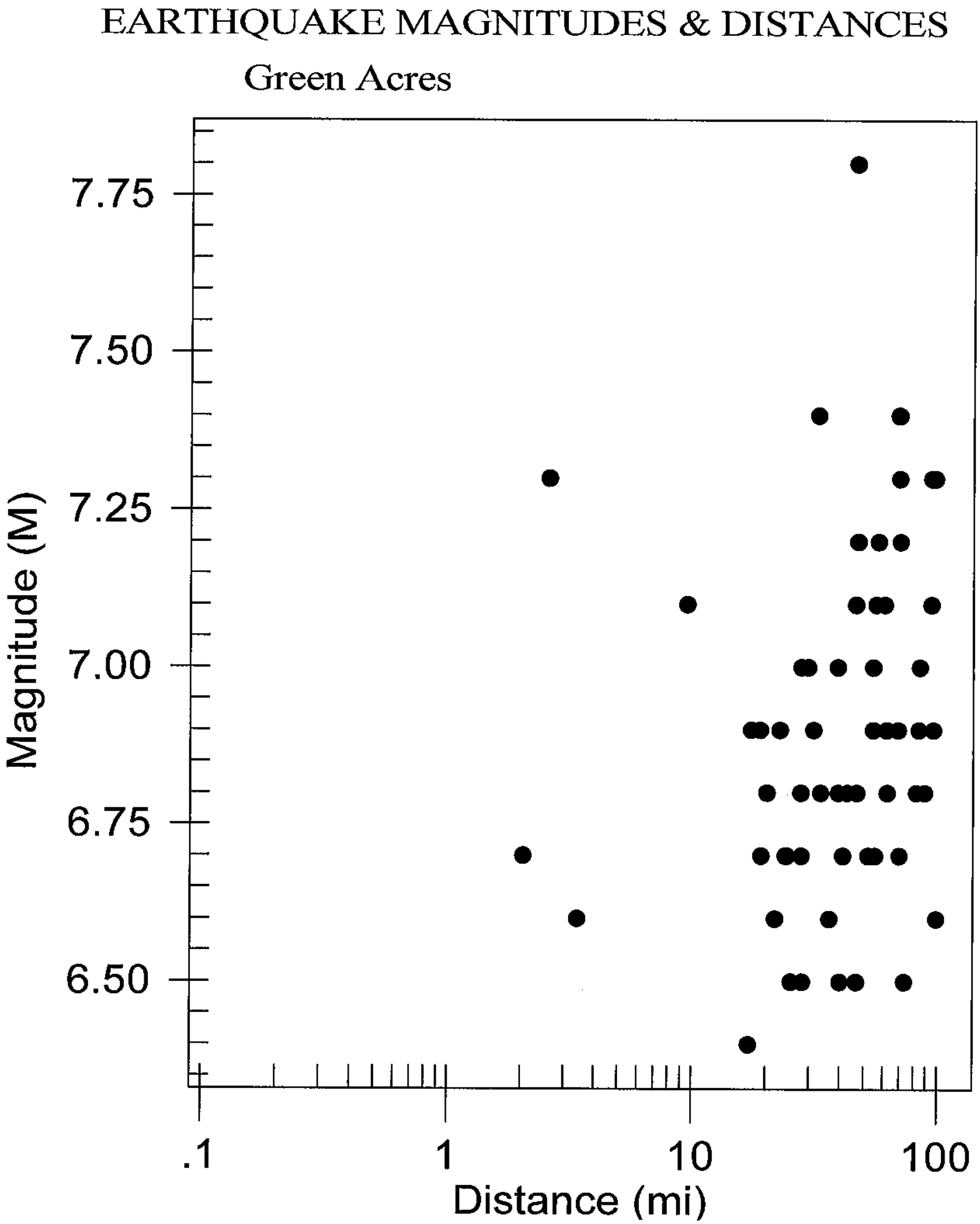
15) Campbell & Bozorgnia (1997 Rev.) - Soft Rock



MAXIMUM EARTHQUAKES

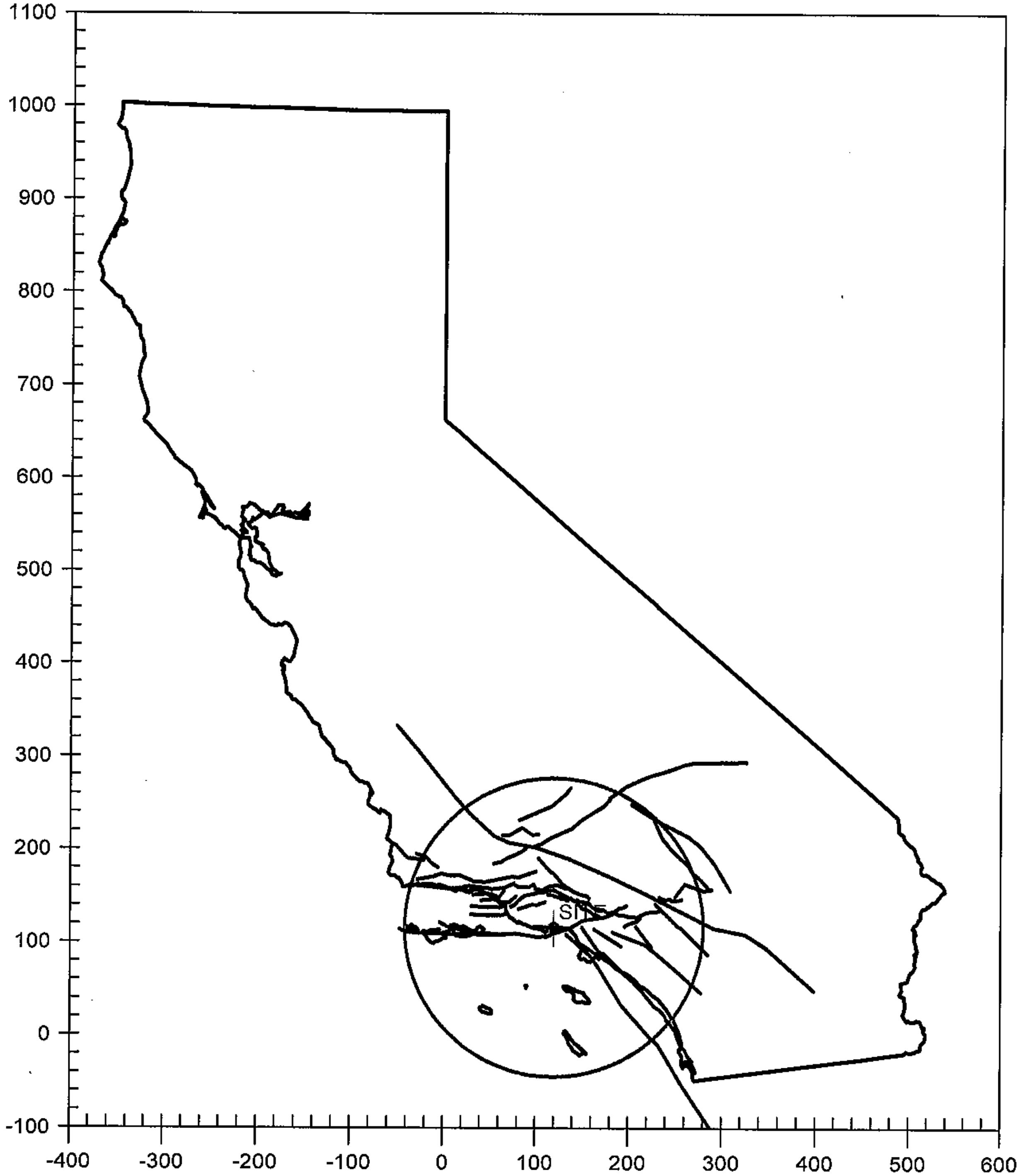
Green Acres




EARTHQUAKE MAGNITUDES & DISTANCES
Green Acres
7.75
7.50
7.25
7.00
6.75
6.50
Magnitude (M)
.1
1
10
100
Distance (mi)

CALIFORNIA FAULT MAP

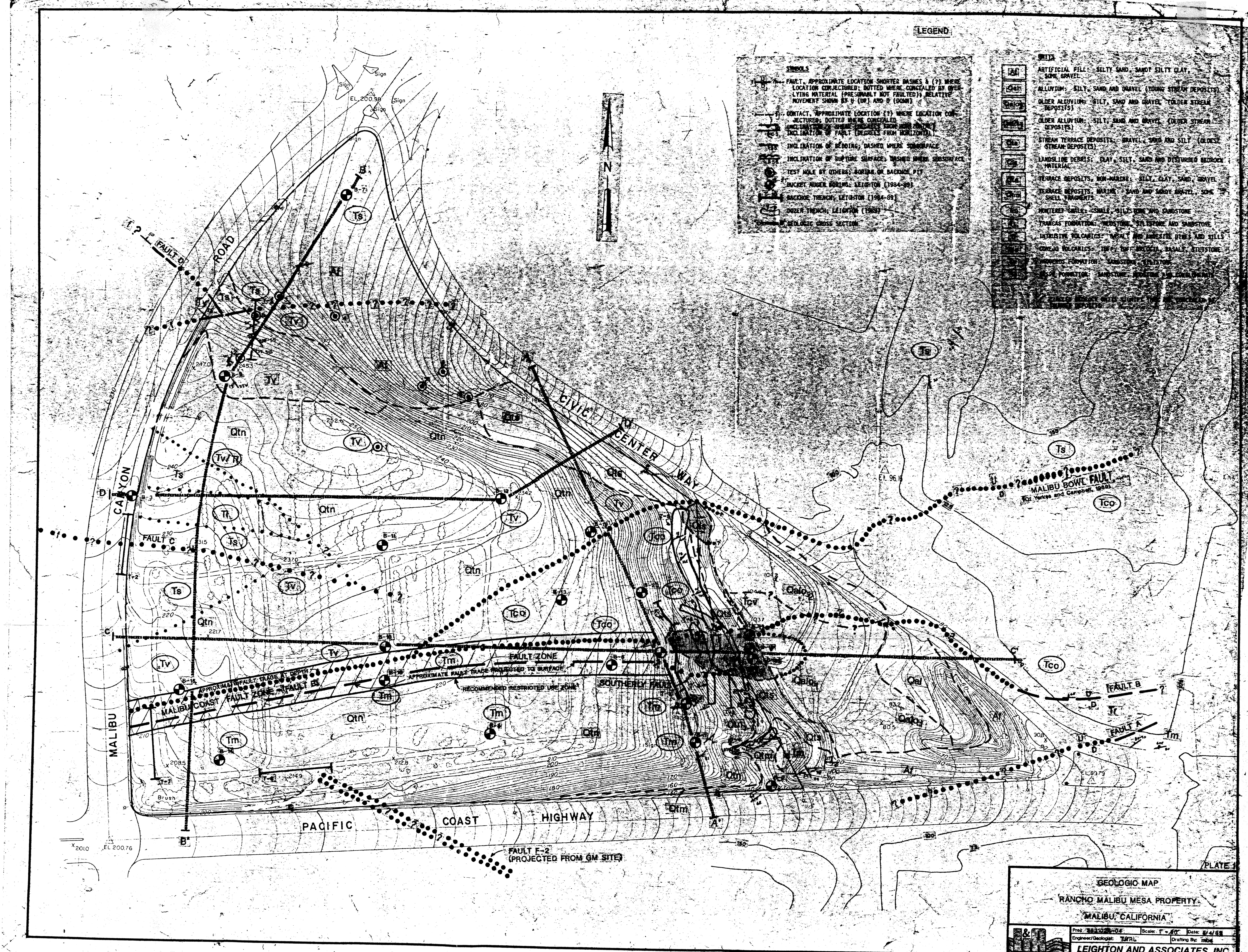
Green Acres



September 15, 2011
W.O. 6489

APPENDIX F

BORING AND TEST PIT LOGS BY LEIGHTON AND ASSOCIATES


LEGEND
SYMBOLS
FAULT, APPROXIMATE LOCATION SHORTER DASHES & (?) WHERE LOCATION CONJECTURED; DOTTED WHERE CONCEALED BY OVERLYING MATERIAL (PRESUMABLY NOT FAULTED); RELATIVE MOVEMENT SHOWN BY U (UP) AND D (DOWN)
CONTACT, APPROXIMATE LOCATION (?) WHERE LOCATION CONJECTURED; DOTTED WHERE CONCEALED
INCLINATION OF FAULT (DEGREES FROM HORIZONTAL)
INCLINATION OF BEDDING; DASHED WHERE SUBSURFACE
INCLINATION OF RUPTURE SURFACE; DASHED WHERE SUBSURFACE
TEST HOLE BY OTHERS; BORING OR BACKHOE PIT
BUCKET AUGER BORING; LEIGHTON (1984-88)
BACKHOE TRENCH; LEIGHTON (1984-88)
DOZER TRENCH; LEIGHTON (1988)
GEOLOGIC CROSS SECTION
UNITS
ARTIFICIAL FILL: SILTY SAND, SANDY SILTY CLAY, SOME GRAVEL
ALLUVIUM: SILT, SAND AND GRAVEL (YOUNG STREAM DEPOSITS)
OLDER ALLUVIUM: SILT, SAND AND GRAVEL (OLDER STREAM DEPOSITS)
OLDER ALLUVIUM: SILT, SAND AND GRAVEL (OLDER STREAM DEPOSITS)
STREAM TERRACE DEPOSITS: GRAVEL, SAND AND SILT (OLDEST STREAM DEPOSITS)
LANDSLIDE DEBRIS: CLAY, SILT, SAND AND DISTURBED BEDROCK MATERIAL
TERRACE DEPOSITS, NON-MARINE: SILT, CLAY, SAND, GRAVEL
TERRACE DEPOSITS, MARINE: SAND AND SANDY GRAVEL, SOME SHELL FRAGMENTS
MONTEREY SHALE: SHALE, SILTSTONE AND SANDSTONE
TRANCAS FORMATION: MUDSTONE, SILTSTONE AND SANDSTONE
INTRUSIVE VOLCANICS: BASALT AND ANDESITE DIKES AND SILLS
CONEJO VOLCANICS: TUFF, TUFF BRECCIA, BASALT, SILTSTONE
N
MALIBU CANYON ROAD
CIVIC CENTER WAY
PACIFIC COAST HIGHWAY
FAULT D
FAULT C
FAULT B
FAULT A
FAULT ZONE
SOUTHERLY FAULT
MALIBU COAST FAULT ZONE (FAULT B)
APPROXIMATE FAULT TRACE PROJECTED TO SURFACE
RECOMMENDED RESTRICTED USE ZONE
MALIBU BOWL FAULT
FAULT F-2 (PROJECTED FROM GM SITE)
Qtn
Tv
Ts
Tm
Tco
Af
Qal
Qalo
EL 200.76
EL 96.6
PLATE 1
GEOLOGIC MAP
RANCHO MALIBU MESA PROPERTY
MALIBU, CALIFORNIA
Scale: 1" = 60'
Engineer/Geologist:
Drafting By:
LEIGHTON AND ASSOCIATES, INC.

APPENDIX B

SUMMARY LOGS OF EXPLORATORY EXCAVATIONS

Boreholes B-1 through B-6, Inclusive

Type: 24" diameter bucket-auger
Contractor: Roy Brothers Drilling
Location: Refer to Revised Geologic Map

B-1 Drilled: 12/12/84. Elevation top of hole: 169'± (3' below natural grade).

0-28' Nonmarine terrace deposits: clayey to silty, fine- to medium-grained sand; rusty brown, damp to moist, some caliche stringers.

28'-38' Probable marine terrace deposits: pebbly medium- to coarse-grained sand; light brown, dry to damp, loose and caving. Hole cased from 8' to 38.5'.

38'-51' Monterey Formation: siliceous siltstone and silty claystone; gray, brown, iron-stained fracture surfaces, moist, some caliche and sheared clay surfaces. Bedding attitudes: N45E, 60SE @ 39.5'; N45E, 81SE @ 45'. Bulk sample obtained from 50' depth.

Total depth: 51'; no ground water encountered.

B-2 Drilled: 12/14/84. Elevation top of hole: 133'

0-2' Soil zone: fine- to medium-grained sandy clay, clayey sand; medium brown, moist.

2'-5' Probable marine terrace deposits: gravelly clayey sand; orange-brown, with some rounded cobbles.

5'-15' Monterey Formation: interbedded silty fine sandstone and cherty siliceous siltstone, light to dark brown, very fractured, locally weathered. Bedding attitudes: N57E, 62SE @ 6.5'; N52E 68SE @ 10'. Bulk sample obtained from 13' depth.

Total depth: 15'; no ground water or caving.

B-3 Drilled: 12/17/84. Elevation top of hole: 223'

0-19' Nonmarine terrace deposits: clayey fine sand, sandy clay, with some gravel and sandstone fragments @ 14'±; light brown to red-brown, moist to very moist.

19'-30.5' Volcanic bedrock: clayey sandy silt with less weathered fragments of basaltic rock fragments; dark brown, olive-greenish brown, moist to very moist. Probable mixture of volcanic rock and sandstone. Boring not downhole logged due to seepage @ 23' and caving. Bulk sample obtained from 28' depth.

Total depth: 30.5'

B-4 Drilled: 1/28/85. Elevation top of hole: 176'

0-2' Soil zone: Clayey sand, with some gravel and cobbles, dark brown, loose, porous, moist, abundant roots.

2'-44'± Terrace deposits (nonmarine, grading to marine near base): sandy clay, reddish brown, mottled with dark brown; medium-grained sand with cobbles, loose, very friable @ depth; caving (hole cased from 4.5' to 45').

44'-60' Monterey Formation: interbedded clayey and siliceous siltstone; dark gray, black, highly fractured, broken, crudely bedded, with orange-brown iron staining and calcite veins along fractures. Some slickensides along bedding. Bedding/joint attitudes: JN83W, 81N @ 46'; BN36E, 70N @ 49'; JN86W, 68S; BN64E, 73N @ 52'; BN88E, 76N @ 55'.

Total depth: 60'. Water ponding at bottom of hole.

B-5 Drilled: 2/6/85. Elevation top of hole: 183.5'

0'-45' Nonmarine terrace deposits: clayey sand, with horizontal layers or lenses of gravel and cobbles; brown to orange-brown, slightly porous, damp. Fine-grained sand, loose and friable below 15'±.

45'-55.5' Probable marine terrace deposits: clayey sand; brown to orange-brown, with iron-stain mottling, loose and caving below 45' (hole cased from 14' to 54.5').

55.5'-81' Bedrock (probable Conejo* volcanics): sandy siltstone, siliceous siltstone, clayey siltstone; gray, brown, firm, damp, locally very hard (brecciated siliceous shale). Extensively sheared from 73'-79' on east side of hole; in massive clayey siltstone, with gypsum and calcite veins. Petroliferous odor below 73'. Minor seepage at 55.5'. Bulk samples obtained from 66' to 71' depth.

Total depth: 81'

B-6 Drilled: 2/23/85. Elevation top of hole: 206'±

0-58'± Nonmarine terrace deposits: clayey to silty sand, with some gravel-size rock fragments; tan to rusty brown, slightly moist to moist, moderately dense.

58'-70' Probable marine terrace deposits: relatively cleaner, less moist sand than above, contains some gravel and cobbles; hole cased from 29.5' to 70' due to caving in marine terrace section.

70'-80' Bedrock (probable Conejo* volcanics): clayey siltstone, silty claystone and minor silty sandstone; dark gray, black, light gray (sandy stringers), slightly moist, massive, generally sheared. Boring not downhole logged; bulk sample of bedrock obtained. No apparent ground water encountered.

Total depth: 80'

* Reclassified as Monterey Formation (current report)

GEOTECHNICAL BORING LOG

DATE 1/4/89 DRILL HOLE NO. B-7 SHEET 1 OF 2

PROJECT EAI/Malibu PROJECT NO. 3831025-04

DRILLING CO. Tri-Valley Drilling TYPE OF RIG Bucket Auger

HOLE DIAMETER 24" DRIVE WEIGHT 2600 lbs.-25'; 1600 lbs.-45'; 800 lbs.-69' DROP 12 IN.

ELEVATION TOP OF HOLE 198' REF. OR DATUM See Geotechnical Map, Plate 1

LOGGED BY DGS

SAMPLED BY DGS

DEPTH FEET	GRAPHIC LOG	ATTITUDES	TUBE SAMPLE NO.	BLOWS PER FOOT	DRY DENSITY PCF	MOISTURE CONTENT, %	SOIL CLASS. (U.S.C.S.)	GEOTECHNICAL DESCRIPTION
0							SM	SILTY SAND: Yellow-brown, slightly moist, dense, fine- to medium-grained, subangular sandstone fragments (ARTIFICIAL FILL)
			1	BAG				
5								@ 5.0' - clayey, yellow-brown mottled with dark brown, dense
			2	8	117	10.5		
								@ 9.0' - medium brown, siltier
10								@10.0' - few reddish brown siltstone fragments, dense
			3	4	110	8.5		
								@12.0' - moist
15								@15.0' - Silty Sand, as above, dense
			4	4	113	9.9		
								@19.0' - thin bed of dark brown clayey sand
20								@20.0' - Silty Sand, yellow-brown, mottled with dark brown clayey sand, dense
			5	3	123	11.5		
								@22.0' - few volcanic fragments
							CL	SANDY SILTY CLAY: Medium-brown with some dark brown mottling, moist, firm, small sandstone, siltstone and volcanic fragments (ARTIFICIAL FILL)
25			6	6	121	6.2		
30								

GEOTECHNICAL BORING LOG

DATE 1/4/89 DRILL HOLE No. B-7 SHEET 2 OF 2
PROJECT EAI/Malibu PROJECT No. 3831025-04
DRILLING Co. Tri-Valley Drilling TYPE OF RIG Bucket Auger
HOLE DIAMETER 24" DRIVE WEIGHT 2600 lbs.-25'; 1600 lbs.-45'; 800 lbs.-69' DROP 12 IN.
ELEVATION TOP OF HOLE 198' REF. OR DATUM See Geotechnical Map, Plate 1

LOGGED BY DGS
SAMPLED BY DGS

FEET	TUBE SAMPLE No.	BLOWS PER FOOT	DRY DENSITY PCF	MOISTURE CONTENT, %	SOIL CLASS. (U.S.C.S.)	GEOTECHNICAL DESCRIPTION
	7	3 for 6"	106	17.6	CL	SANDY SILTY CLAY: Mottled medium and dark brownish-gray, moist, firm, plastic, few sandstone, siltstone and fewer volcanic fragments
						@32.0' - increasing dark brownish-gray
						@33.0' - medium-brown, sandstone fragments
	9	BAG				
35						@35.0' - Sandy Silty Clay, medium-brown, firm
	8	6	120	14.6		
40						@40.0' - increased amount of sandstone fragments, some green volcanic fragments, very firm
	10	6	114	14.6		
	11	BAG				
					SM	CLAYEY SILTY SAND: Medium yellow-brown, moist, dense, medium- to coarse-grained (probable soil zone)
45	12	27	122	11.3		SANDSTONE: Yellow-gray, mottled greenish-gray and orange, moist, firm, coarse-grained, few pebbles, clayey matrix, few roots (SESPE FORMATION)
						@48.5' - maroon siltstone bed, thin
						@49.0' - hard, light yellow-brown, massive
50	13	40 for 7"	108	9.2		
	14	BAG				
55	15	40 for 8" No Recovery				NOTES: Total Depth - 55.0' No caving No seepage
60						

GEOTECHNICAL BORING LOG

DATE 1/4/89 DRILL HOLE No. B-8 SHEET 1 OF 2

PROJECT EAI /Malibu PROJECT No. 3831025-04

DRILLING Co. Tri-Valley Drilling TYPE OF RIG Bucket Auger

HOLE DIAMETER 24" DRIVE WEIGHT 2600 lbs.-25'; 1600 lbs.-45'; 800 lbs.-69' DROP 12 IN.

ELEVATION TOP OF HOLE 216' REF. OR DATUM See Geotechnical Map, Plate 1

LOGGED BY DGS

SAMPLED BY DGS

DEPTH FEET	GRAPHIC LOG	ATTITUDES	TUBE SAMPLE No.	BLOWS PER FOOT	DRY DENSITY PCF	MOISTURE CONTENT, %	SOIL CLASS. (U.S.C.S.)	GEOTECHNICAL DESCRIPTION
0							SM	SILTY SAND: Orange-brown, top 2' medium reddish-brown, slightly moist, top 2' moist, dense, slightly cemented, porous, friable, few rounded pebbles, sand, medium-grained, poorly sorted (TERRACE DEPOSITS, NON-MARINE)
			1	BAG				
5			2	6	108	5.7		
10			3	5	109	8.1		@10.0' - Silty Sand, as above
15								@15.0' - Silty Sand, as above
			4	5	107	9.9		
								@18.0' - moist, irregular, discontinuous, small iron stained joints
20								@20.0' - Silty Sand, as above
			5	4	120	9.2		
								@22.0' - coarse sand, less silty
			6	8	111	9.0		
25								@25.0' - Silty Sand, as above
30								

GEOTECHNICAL BORING LOG

DATE 1/4/89 DRILL HOLE No. B-8 SHEET 2 OF 2

PROJECT EAI/Malibu PROJECT No. 3831025-04

DRILLING Co. Tri-Valley Drilling TYPE OF RIG Bucket Auger

HOLE DIAMETER 24" DRIVE WEIGHT 2600 lbs.-25'; 1600 lbs.-45'; 800 lbs.-69' DROP 12 IN.

ELEVATION TOP OF HOLE 216' REF. OR DATUM See Geotechnical Map, Plate 1

LOGGED BY DGS

SAMPLED BY DGS

DEPTH FEET	ATTITUDES	TUBE SAMPLE NO.	BLOWS PER FOOT	DRY DENSITY PCF	MOISTURE CONTENT, %	SOIL CLASS. (U.S.C.S.)	GEOTECHNICAL DESCRIPTION
30		7	7	111	11.7	SM	SILTY SAND: Orange-brown, moist, dense, slightly cemented, few rounded pebbles, porous, friable, sand medium-grained, poorly sorted (TERRACE DEPOSITS, NON-MARINE)
							@33.0' - pebble lens, abundant rounded pebbles, mostly sandstone, few quartzite
35							@35.0' - Silty Sand, as above
		8	7	113	6.0		
							@39.0' - carbonate stringers
40		9	14	106	12.4		
45						SP	SAND: Light yellow-tan, slightly moist, loose, fine- to medium-grained, well sorted, unconsolidated small shell fragments (TERRACE DEPOSITS, MARINE)
		10	24	101	1.3		
		11	BAG				
50							(continued 1/25/89 with drilling mud, due to caving)
							@51.0' - rounded pebbles and cobbles
							SILTSTONE: Light tan to light purple-gray, moist, hard, silicified, fractured, limonite stains on fractures and bedding planes (MONTEREY FORMATION)
55	B:dipping 60°	12	62 for 5"	66.7	50.3		
		13	62 for 11"	68.8	48.2		@56.0' - diatomaceous
		14	60 for 10"	70.6	48.3		
		15	60 for 7"	73.8	49.9		NOTE: Total depth - 58.0' No seepage Caving 45-50' Dip in Monterey Formation from unoriented core
60							

GEOTECHNICAL BORING LOG

DATE 1/10/89 DRILL HOLE No. B-9 SHEET 1 OF 1

PROJECT EAI/Malibu PROJECT No. 3831025-04

DRILLING CO. Tri-Valley Drilling TYPE OF RIG Bucket Auger

HOLE DIAMETER 24" DRIVE WEIGHT 2600 lbs.-25'; 1600 lbs.-45'; 800 lbs.-69' DROP 12 IN.

ELEVATION TOP OF HOLE 244' REF. OR DATUM See Geotechnical Map, Plate 1

LOGGED BY DGS, TJ

SAMPLED BY DGS

Depth Feet	Graphic Log (N S)	Attitudes	Tube Sample No.	Blows Per Foot	Dry Density PCF	Moisture Content, %	Soil Class. (U.S.C.S.)	Geotechnical Description
0							ML	SANDY CLAYEY SILT: Dark medium-brown, moist to slightly moist, firm, porous, rootlets (SOIL) @ 2.0' - yellowish orange-brown, very firm, few gypsum crystals approx. ¼" thick Contact approximately 5', very gradational
			1	BAG				
5		B:N37W, 17SW	2	7	94.6	18.8		SILTSTONE: Yellowish-orange-brown, slightly moist, very firm, very sheared, highly weathered, random small polished surfaces, gypsum (VAQUEROS FORMATION) @ 8.0' - volcanic bedding (hard to distinguish), irregular, discontinuous, light brown, clayey, crumbly, 2" to 3" thick limonite staining
		J:N02E, 52NW						
10			3	6 4 rings dist.	74.6	23.2		@11.0' - very sheared, striations on random surfaces @12.0' - increasing gypsum @13-17'- mineralized zone, 4" to 5" thick dark limonite staining, abundant gypsum, jarosite @13.5' - striations more regular, plunging 20°, N80W
15		MZ:N45E, 87NW	4	8	104	18.0		@16.0' - surrounding siltstone gray mottled with orange limonite stain, regular pattern of elongated blotches oriented approximately vertical @16.5' - bedding not detected, striations on joints
		J:N70E, 55SE						
			5	BAG				
20			6	6	99.0	22.3		
25								NOTES: Total Depth - 21.0' No caving No seepage Downhole logged to total depth

GEOTECHNICAL BORING LOG

DATE 1/10/89 DRILL HOLE NO. B-10 SHEET 1 OF 2

PROJECT EAI/Malibu PROJECT NO. 3B31025-04

DRILLING CO. Tri-Valley Drilling TYPE OF RIG Bucket Auger

HOLE DIAMETER 24" DRIVE WEIGHT 2600 lbs.-25'; 1600 lbs.-45'; 800 lbs.-69' DROP 12 IN.

ELEVATION TOP OF HOLE 224' REF. OR DATUM See Geotechnical Map, Plate 1

LOGGED BY DGS

SAMPLED BY DGS

DEPTH FEET	GRAPHIC LOG	ATTITUDES	TUBE SAMPLE NO.	BLOWS PER FOOT	DRY DENSITY PCF	MOISTURE CONTENT, %	SOIL CLASS. (U.S.C.S.)	GEOTECHNICAL DESCRIPTION
							SM	SILTY SAND: First 4' dark brown, below 4' orange-brown, slightly moist, very dense, porous, slightly cemented, few rounded pebbles and cobbles, friable, sand poorly sorted (TERRACE DEPOSITS, NON-MARINE)
			1	BAG				
			2	9	113	8.0		
5								
								@ 9.0' - abundant rounded cobbles and pebbles
10								@10.0' - sandier, light orange-brown
			3	10	113	0.9		
								@13.0' - less pebbles
15								@15.0' - Silty Sand, orange-brown (as above)
			4	8	111	5.6		
20								@20.0' - Silty Sand, as above
			5	6	110	5.8		
25								@25.0' - Silty Sand, more pebbles
			6	13	107	6.0		
30								

GEOTECHNICAL BORING LOG

DATE 1/10/89 DRILL HOLE No. B-10 SHEET 2 OF 2

PROJECT EAI/Malibu PROJECT No. 3831025-04

DRILLING Co. Tri-Valley Drilling TYPE OF RIG Bucket Auger

HOLE DIAMETER 24" DRIVE WEIGHT 2600 lbs.-25'; 1600 lbs.-45'; 800 lbs.-69' DROP 12 IN.

ELEVATION TOP OF HOLE 224' REF. OR DATUM See Geotechnical Map, Plate 1

LOGGED BY DGS

SAMPLED BY DGS

Depth Feet	Graphic Log	Attitudes	Tube Sample No.	Blows Per Foot	Dry Density PCF	Moisture Content, %	Soil Class. (U.S.C.S.)	Geotechnical Description
30			7	15	116	5.7	SM	SILTY SAND: Orange-brown, slightly moist, dense, fine- to medium-grained, slightly cemented, porous, scattered rounded pebbles, friable
								@33.0' - moist
35			8	7	107	11.0		
								@39.0' - sandier
40			9	21	103	2.0	SP	SAND: Yellow-brown, moist, loose, fine- to medium-grained, well sorted, sparse shell fragments (TERRACE DEPOSITS, MARINE)
			10	BAG				@41.0' - gravelly
45			11	42	99	3.8		
								NOTES: Total Depth - 46.0' Caving at bottom No seepage
50								

GEOTECHNICAL BORING LOG

DATE 1/10/89 DRILL HOLE NO. B-11 SHEET 1 OF 2

PROJECT EAI /Malibu PROJECT NO. 3831025-04

DRILLING CO. Tri-Valley Drilling TYPE OF RIG Bucket Auger

HOLE DIAMETER 24" DRIVE WEIGHT 2600 lbs.-25'; 1600 lbs.-45'; 800 lbs.-69' DROP 12 IN.

ELEVATION TOP OF HOLE 236' REF. OR DATUM See Geotechnical Map, Plate 1

LOGGED BY DGS

SAMPLED BY DGS

Depth Feet	Graphic Log	Attitudes	Tube Sample No.	Blows Per Foot	Dry Density PCF	Moisture Content, %	Soil Class. (U.S.C.S.)	Geotechnical Description
0							SP	GRAVELLY CLAYEY SAND: Medium-brown, top 2' dark brown, slightly moist, very dense, abundant rounded pebbles, carbonate stringers (TERRACE DEPOSITS, NON-MARINE)
			1	BAG				
							SM	
5			2	14	120	9.5		SILTY SAND: Orange-brown, slightly moist, dense, slightly cemented, porous, few scattered rounded cobbles and pebbles
								@7-9' - abundant cobbles, few subangular
10			3	7	105	9.8		@10.0' - siltier
								@12.5' - sand bed, 5" thick, fine-grained
15			4	8	110	8.2		@15.5'-17.0' - sandier, few angular cobbles at top of bed
20			5	13	118	5.7		@20.0' - Silty Sand
25			6	31	119	5.9		@26.0' - sandstone boulder
								@26.0'-30.0' - sand and gravel, moderately loose, caving
30								

GEOTECHNICAL BORING LOG

DATE 1/10/89 DRILL HOLE NO. B-11 SHEET 2 OF 2
PROJECT EAI /Malibu PROJECT NO. 3831025-04
DRILLING CO. Tri-Valley Drilling TYPE OF RIG Bucket Auger
HOLE DIAMETER 24" DRIVE WEIGHT 2600 lbs.-25'; 1600 lbs.-45'; 800 lbs.-69' DROP 12 IN.
ELEVATION TOP OF HOLE 236' REF. OR DATUM See Geotechnical Map, Plate 1

LOGGED BY DGS
SAMPLED BY DGS

DEPTH FEET	GRAPHIC LOG	ATTITUDES	TUBE SAMPLE NO.	BLOWS PER FOOT	DRY DENSITY PCF	MOISTURE CONTENT, %	SOIL CLASS. (U.S.C.S.)	GEOTECHNICAL DESCRIPTION
30			7	24	118	4.9	SM	SILTY SAND: Orange-brown, slightly moist, dense, slightly cemented, porous, friable, rounded pebbles and cobbles, fine- to coarse-grained, poorly sorted
								@33.0' - siltier
35								@35.0' - Silty Sand, as above
			8	40	112	8.8		
40								@40.0' - sand and pebble bed
			9	33	108	4.3		
								@43.0' - moist
45								@45.0' - Silty Sand, moist
			10	50 for 10"	102	9.3		
50			11	43	105	6.8		
55								NOTE: Total Depth - 51.0' Caving from 26.0' to approx. 30.0' Downhole logged to 26.0' No seepage

GEOTECHNICAL BORING LOG

DATE 1/11/89 DRILL HOLE NO. B-12 SHEET 1 OF 3

PROJECT EAI/Malibu PROJECT NO. 3831025-04

DRILLING CO. Tri-Valley Drilling TYPE OF RIG Bucket Auger

HOLE DIAMETER 24" DRIVE WEIGHT 2600 lbs.-25'; 1600 lbs.-45'; 800 lbs.-69' DROP 12 IN.

ELEVATION TOP OF HOLE 233' REF. OR DATUM See Geotechnical Map, Plate 1

LOGGED BY DGS

SAMPLED BY DGS

DEPTH FEET	GRAPHIC LOG	ATTITUDES	TUBE SAMPLE NO.	BLOWS PER FOOT	DRY DENSITY PCF	MOISTURE CONTENT, %	SOIL CLASS. (U.S.C.S.)	GEOTECHNICAL DESCRIPTION
0							SM	SILTY SAND: Medium brown to 4.0' then orange-brown, slightly moist, dense, slightly cemented, porous, rounded pebbles, friable (TERRACE DEPOSITS, NON-MARINE)
5			1	8	115	10.9		
10			2	6	112	11.0		@10.0' - Silty Sand, as above
15			3	8	112	8.9		@15.0' - Sandy Gravel bed, moist, sand coarser
								@19.0' - cobbles
20			4	7	117	6.8		@20.0' - Silty Sand with pebbles
25			5	9	112	6.6		@25.0' - Silty Sand, few pebbles
30								

DATE 1/11/89 DRILL HOLE NO. B-12 SHEET 2 OF 3

PROJECT EAI/Malibu PROJECT NO. 3831025-04

DRILLING CO. Tri-Valley Drilling TYPE OF RIG Bucket Auger

HOLE DIAMETER 24" DRIVE WEIGHT 2600 lbs.-25'; 1600 lbs.-45'; 800 lbs.-69' DROP 12 IN.

ELEVATION TOP OF HOLE 233' REF. OR DATUM See Geotechnical Map, Plate 1

LOGGED BY DGS

SAMPLED BY DGS

DEPTH FEET	GRAPHIC LOG	ATTITUDES	TUBE SAMPLE NO.	BLOWS PER FOOT	DRY DENSITY PCF	MOISTURE CONTENT, %	SOIL CLASS. (U.S.C.S.)	GEOTECHNICAL DESCRIPTION
30			6	17	118	8.6	SM	SILTY SAND: Orange-brown, moist, dense, porous, slightly cemented, friable
35			7	14	113	8.7		@36.0' - Sandstone cobbles
								@39.0' - Sandstone boulder, more silt, darker
40			8	21	115	7.5		@40.0' - Silty Sand, siltier, darker
45			9	50 for 11"	105	11.0		@45.0' - Silty Sand, orangish-brown
								@47.0' - sandier, light orange-brown, more pebbles, sand, poorly sorted
50			10	50 for 11"	108	8.0		@50.0' - Silty Sand, orange-brown
								@52.0' - caliche stringers
55			11	45	112	7.2		@55.0' - Silty Sand, few pebbles
								@58.0' - Sandstone boulder
60								

DATE 1/11/89 DRILL HOLE NO. B-12 SHEET 3 OF 3
PROJECT EAI/Malibu PROJECT NO. 3831025-04
DRILLING CO. Tri-Valley Drilling TYPE OF RIG Bucket Auger
HOLE DIAMETER 24" DRIVE WEIGHT 2600 lbs.-25'; 1600 lbs.-45'; 800 lbs.-69' DROP 12 IN.
ELEVATION TOP OF HOLE 233' REF. OR DATUM See Geotechnical Map, Plate 1

LOGGED BY DGS, TJ
SAMPLED BY DGS

DEPTH FEET	GRAPHIC LOG	ATTITUDES	TUBE SAMPLE NO.	BLOWS PER FOOT	DRY DENSITY PCF	MOISTURE CONTENT, %	SOIL CLASS. (U.S.C.S.)	GEOTECHNICAL DESCRIPTION
60							SM	SILTY SAND: Orange-brown, slightly moist, dense, porous, slightly cemented, rounded pebbles, few cobbles, friable
								@63.0' - Sandstone boulder
65								@65.0' - Silty Sand, as above
			12	31	118	11.4		
70							SP	SAND: Light yellow-brown, slightly moist, loose, unconsolidated, fine-medium-grained, well sorted, shell fragments (TERRACE DEPOSITS, MARINE)
								(1/25/89 - continue with drilling mud)
								@74.0' - abundant magnetite
75								
								@78.0' - rounded pebbles, few cobbles
80								@80.0' - abundant cobbles
			13	47	104.2	23.5		SILTSTONE: Dark greenish-gray, slightly moist, very firm, fissile, small striated surfaces (VAQUEROS FORMATION)
			14	30	105.7	22.4		
			15	36	105.4	23.4		@82.0' - reddish-brown translucent mineral coatings on surfaces, possible pyrite mineralization
85			16	32	107.8	21.9		@83.0' - Siltstone/Claystone - very sheared
								NOTE: Total Depth - 85.0' Caving from 72.0' to 80.0' No seepage

GEOTECHNICAL BORING LOG

DATE 1/11/89 DRILL HOLE NO. B-13 SHEET 1 OF 2

PROJECT EAI/Malibu PROJECT NO. 3831025-04

DRILLING CO. Tri-Valley Drilling TYPE OF RIG Bucket Auger

HOLE DIAMETER 24" DRIVE WEIGHT 2600 lbs.-25'; 1600 lbs.-45'; 800 lbs.-69' DROP 12 IN.

ELEVATION TOP OF HOLE 218' REF. OR DATUM See Geotechnical Map, Plate 1

LOGGED BY DGS

SAMPLED BY DGS

Depth Feet	Graphic Log	Attitudes	Tube Sample No.	Blows Per Foot	Dry Density PCF	Moisture Content, %	Soil Class. (U.S.C.S.)	Geotechnical Description
0							SM	SILTY SAND: Orange-brown, (top 6" medium-brown), slightly moist, dense, porous, slightly cemented, fine- to coarse-grained, poorly sorted, friable, rounded pebbles, few cobbles (TERRACE DEPOSITS, NON-MARINE)
5			1	9	116	7.7		
			2	BAG				
10								@10.0' - Silty Sand, as above
			3		114	7.0		
15								@15.0' - coarse-grained Sand, some silt
			4	6	107	6.8		@15.0'-18.0' - gravelly sand
			5	BAG				
								@19.0' - moist
20								@20.0' - Silty Sand, fine- to medium-grained, moist
			6	4	114	12.2		
25								@25.0' - Silty Sand, as above
			7	11	106	6.3		
30								@30.0' - sandier, coarser

GEOTECHNICAL BORING LOG

DATE 1/11/89 DRILL HOLE No. B-13 SHEET 2 OF 2
PROJECT EAI /Malibu PROJECT No. 3831025-04
DRILLING Co. Tri-Valley Drilling TYPE OF RIG Bucket Auger
HOLE DIAMETER 24" DRIVE WEIGHT 2600 lbs.-25'; 1600 lbs.-45'; 800 lbs.-69' DROP 12 IN.
ELEVATION TOP OF HOLE 218' REF. OR DATUM See Geotechnical Map, Plate 1

DEPTH FEET	GRAPHIC LOG	ATTITUDES	TUBE SAMPLE No.	BLOWS PER FOOT	DRY DENSITY PCF	MOISTURE CONTENT, %	SOIL CLASS. (U.S.C.S.)	GEOTECHNICAL DESCRIPTION LOGGED BY DGS SAMPLED BY DGS
30			8	9	106	4.4	SM	SILTY SAND: Orange-brown, moist, dense, porous, slightly cemented, fine- to medium-grained, poorly sorted, friable, rounded pebbles, few cobbles
								NOTE: Total Depth - 31.0' No caving No seepage
35								

GEOTECHNICAL BORING LOG

DATE 1/20/89 DRILL HOLE No. B-14 SHEET 1 OF 2

PROJECT EAI/Malibu PROJECT No. 3831025-04

DRILLING Co. Tri-Valley Drilling TYPE OF RIG Bucket Auger

HOLE DIAMETER 24" DRIVE WEIGHT 2600 lbs.-25'; 1600 lbs.-45'; 800 lbs.-69' DROP 12 IN.

ELEVATION TOP OF HOLE 212' REF. OR DATUM See Geotechnical Map, Plate 1

LOGGED BY DGS, TJ

SAMPLED BY DGS

DEPTH FEET	GRAPHIC LOG	ATTITUDES	TUBE SAMPLE No.	BLOWS PER FOOT	DRY DENSITY PCF	MOISTURE CONTENT, %	SOIL CLASS. (U.S.C.S.)	GEOTECHNICAL DESCRIPTION
0							SM	SILTY SAND: Orange-brown, slightly moist, dense, slightly cemented, porous, friable (TERRACE DEPOSITS, NON-MARINE)
								@ 3.0' - few small pebbles
5			1	15	118.3	8.6		@ 6.0' - very dense
10			2	12	110.8	14.2		@11.0' - very porous, small root casts
15			3	9	113.5	8.3		@15.0' - streaks of black MnO mineralization, old root casts mineralized
20			4	12	110.7	13.7		
25			5	15	111.4	8.2		@25.0' - sandstone pebbles
30								

DATE 1/26/89 DRILL HOLE No. B-14 SHEET 2 OF 2

PROJECT EAI/Malibu PROJECT No. 3831025-04

DRILLING Co. Tri-Valley Drilling TYPE OF RIG Bucket Auger

HOLE DIAMETER 24" DRIVE WEIGHT 2600 lbs.-25'; 1600 lbs.-45'; 800 lbs.-69' DROP 12 IN.

ELEVATION TOP OF HOLE 212' REF. OR DATUM See Geotechnical Map, Plate 1

LOGGED BY DGS, TJ

SAMPLED BY DGS

Depth Feet	Graphic Log	Attitudes	Tube Sample No.	Blows Per Foot	Dry Density PCF	Moisture Content, %	Soil Class. (U.S.C.S.)	Geotechnical Description
30			6	15	108.1	3.8	SP	SAND: Light orange-brown, slightly moist, slightly firm, loose with depth, fine-grained, well sorted (TERRACE DEPOSITS, MARINE)
								@33.0' - light yellow-brown, very loose, few small shell fragments
35			7	14	101.3	1.2		
								@37.0' - caving, continue with mud
								@38.0' - rounded pebbles, few cobbles
40			8	50 for 10"	94.2	17.2		SILTSTONE: Very light tan, light greenish-gray, light purple gray, slightly moist, hard, thin-bedded, limonite stains along bedding and fractures, silicified, cherty (MONTEREY FORMATION)
		B:dipping 62°	9	50 for 10"	94.6	14.6		
		B:dipping 60°	10	18	75.2	44.7		@42.0' - diatomaceous, small striated surfaces
			11	27	74.6	44.9		
45								NOTE: Total Depth - 44.0' Caving at 37.0' No seepage Dips in Monterey Formation from unoriented core samples
50								

GEOTECHNICAL BORING LOG

DATE 1/26/89 DRILL HOLE No. B-15 SHEET 1 OF 2

PROJECT EAI/ Malibu PROJECT No. 3831025-04

DRILLING Co. Tri-Valley Drilling TYPE OF RIG Bucket Auger

HOLE DIAMETER 24" DRIVE WEIGHT 2600 lbs.-25'; 1600 lbs.-45'; 800 lbs.-69' DROP 12 IN.

ELEVATION TOP OF HOLE 216' REF. OR DATUM See Geotechnical Map, Plate 1

DEPTH FEET	GRAPHIC LOG	ATTITUDES	TUBE SAMPLE No.	BLOWS PER FOOT	DRY DENSITY PCF	MOISTURE CONTENT, %	SOIL CLASS. (U.S.C.S.)	GEOTECHNICAL DESCRIPTION LOGGED BY DGS, TJ SAMPLED BY DGS
0							SM	SILTY SAND: Orange-brown, slightly moist, very dense, slightly cemented, friable, porous, few small pebbles (TERRACE DEPOSITS, NON-MARINE)
5			1	11				
								@ 8.0' - sandier, more pebbles
10								@10.0' - less pebbles
			2	10	113.9	7.0		
15			3	8	111.4	7.6		
								@18.0' - more moisture
20			4	5	111.5	13.5		@21.0' - siltier
25			5	11	117.3	9.0		@26.0' - sandier
30							SP	SAND: Light orange-brown to light yellow-brown, moist, loose, few shell fragments, fine-grained, well-sorted (TERRACE DEPOSITS, MARINE)

GEOTECHNICAL BORING LOG

DATE 1/26/89 DRILL HOLE No. B-15 SHEET 2 OF 2

PROJECT EAI /Malibu PROJECT No. 3831025-04

DRILLING CO. Tri-Valley Drilling TYPE OF RIG Bucket Auger

HOLE DIAMETER 24" DRIVE WEIGHT 2600 lbs.-25'; 1600 lbs.-45'; 800 lbs.-69' DROP 12 IN

ELEVATION TOP OF HOLE ____ REF. OR DATUM See Geotechnical Map, Plate 1

LOGGED BY DGS

SAMPLED BY DGS

Depth Feet	Graphic Log	Attitudes	Tube Sample No.	Blows Per Foot	Dry Density PCF	Moisture Content, %	Soil Class. (U.S.C.S.)	Geotechnical Description
30			6	11			SP	SAND: Light yellow-brown, moist, loose, medium-grained, well-sorted
								@34.0' - rounded pebbles and cobbles
35								@36.0' - wet, many cobbles, seepage on south side
								SILTSTONE: Greenish-gray, purple-brown, orange, moist, very firm, very sheared, limonite stains, undulating polished surfaces (VAQUEROS FORMATION)
			7	47	74.8	28.8		
			8	32	71.6	42.3		@39.0' - consistently dark brown
40			9	27	78.8	38.6		
			10	21	78.8	34.4		

NOTE: Total Depth - 42.0'
No caving
Seepage at 36.0'

GEOTECHNICAL BORING LOG

DATE 1/26/89 DRILL HOLE No. B-16 SHEET 1 OF 2
PROJECT EAI /Malibu PROJECT No. 3831025-04
DRILLING Co. Tri-Valley Drilling TYPE OF RIG Bucket Auger
HOLE DIAMETER 24" DRIVE WEIGHT 2600 lbs.-25'; 1600 lbs.-45'; 800 lbs.-69' DROP 12 IN.
ELEVATION TOP OF HOLE 222' REF. OR DATUM See Geotechnical Map, Plate 1

LOGGED BY DGS
SAMPLED BY DGS

DE.TH FEET	GRAPHIC LOG	ATTITUDES	TUBE SAMPLE No.	BLOWS PER FOOT*	DRY DENSITY PCF	MOISTURE CONTENT, %	SOIL CLASS. (U.S.C.S.)	GEOTECHNICAL DESCRIPTION
							SM	SILTY SAND: Orange-brown, top 2.5' dark orange-brown, slightly moist, dense, slightly cemented, friable, porous, few pebbles (TERRACE DEPOSITS, NON-MARINE)
								@ 4.0' - sandstone pebbles
			1	7	109.1	9.5		
								@ 9.0' - few cobbles, light orange-brown, sandier
10			2	8	110.7	8.4		
								@14.0' - pebbles, few cobbles
.5								
								@19.0' - siltier, root clasts with carbonate
20			3	9	118.5	6.7		
								@24.0' - more moisture
25								
30								

GEOTECHNICAL BORING LOG

DATE 1/26/89 DRILL HOLE No. B-16 SHEET 2 OF 2

PROJECT EAI /Malibu PROJECT No. 3831025-04

DRILLING CO. Tri-Valley Drilling TYPE OF RIG Bucket Auger

HOLE DIAMETER 24" DRIVE WEIGHT 2600 lbs.-25'; 1600 lbs.-45'; 800 lbs.-69' DROP 12 IN.

ELEVATION TOP OF HOLE 222' REF. OR DATUM See Geotechnical Map, Plate 1

LOGGED BY DGS

SAMPLED BY DGS

DEPTH FEET	GRAPHIC LOG	ATTITUDES	TUBE SAMPLE No.	BLOWS PER FOOT	DRY DENSITY PCF	MOISTURE CONTENT, %	SOIL CLASS. (U.S.C.S.)	GEOTECHNICAL DESCRIPTION
30			4	13	107.8	6.0	SM	SILTY SAND: Orange-brown, moist, dense, slightly cemented, friable, porous
35								
							SP	SAND: Light yellow-brown, moist, loose, fine-grained, well sorted (TERRACE DEPOSITS, MARINE)
								@39.0' - continue with mud
40								
								@44.0' - few pebbles, abundant shell fragments
								@44.5' - cobbles
45								
								CLAYSTONE: Greenish-gray, orange, moist, plastic, stiff, undulating polished surfaces, minor black mineralization. very sheared, polished surfaces, Laboratory Classified as MH (MONTEREY FORMATION)
			5	16	73.9	47.0		
		B:dipping 50°	6	26	74.7	46.6		SILTSTONE: light purplish-gray, moist, hard, silicified, sheared, fractured
			7	50 for 9"	75.1	47.5		
50			8	50 for 5"	124.4	12.7		
								NOTE: Total Depth - 51.0' Caving from 39.0' to 44.0' No seepage Dip in Monterey Formation from unoriented cores
55								
60								

GEOTECHNICAL BORING LOG

DATE 4/19/89 DRILL HOLE No. B-17 SHEET 1 OF 3

PROJECT EAI/ Malibu PROJECT No. 3831025-04

DRILLING CO. Tri-Valley Drilling TYPE OF RIG Bucket Auger

HOLE DIAMETER 24" DRIVE WEIGHT 2550#-22.5'; 1550#-45.5'; 750#-67';1050#-86.5' DROP 12 IN.

ELEVATION TOP OF HOLE 110' REF. OR DATUM See Geotechnical Map, Plate 1

LOGGED BY DGS, TJ

SAMPLED BY DGS

DEPTH FEET	GRAPHIC LOG (W E)	ATTITUDES	TUBE SAMPLE No.	BLOWS PER FOOT	DRY DENSITY PCF	MOISTURE CONTENT, %	SOIL CLASS. (U.S.C.S.)	GEOTECHNICAL DESCRIPTION
							SM	SILTY SAND: Reddish-brown, moist, dense, cobbles (ARTIFICIAL FILL)
		J:N35W, 26SW	1	BAG				TUFF: Light yellow to white, mottled orange, slightly moist, very firm to hard, sheared, limonite stained of fractures, hydrothermally altered, gypsum crystals up to 2" diameter, random polished surfaces (CONEJO VOLCANICS)
		J:N07E, 66NW						@ 3.0' - joints polished
		GS:N71E, 18SE						
		GS:N75W, 50NE	2	4				@ 5.5' - discontinuous gypsum seam
								@ 6.5' - gypsum seam with limonite and polished surface
								@ 8.5' - large gypsum crystals with limonite
10								@10.0' - hard, little limonite
		J:N02E, 64NW	3	10				@11.0' - abundant limonite, joint with polished surface
		J:N07E, 25NW						
15			4	3				@15.0' - abundant limonite, random gypsum seams, 1/8" thick inclusions of moist claystone, firm, hard cemented fragments
								@16.0' - probable fault contact (Fault B)
		F:N64W, 24NE						CLAYSTONE: Bluish-gray, moist, firm, extremely sheared irregular sharp fault contact, undulating polished surfaces (East side approximately horizontal, West side approximately 45 degrees to the west) (TRANCAS FORMATION)
		F:N35W, 68NE	5	4				
		MS:N30E, 54NW						
			6	BAG				@16.5' - striations
20								@18.0' - discontinuous, siliceous zone, ½' thick, 1' long
			7	4				@20.0' - hard, some gypsum
								@21.5' - plastic clay
		S:N88E, 70NW						@24.0' - white mineralized zones 1/8" thick
25								@25.0' - dark bluish-gray, moist, very firm, plastic
		S:N30E, 44NW	8	7				
		S:N66E, 34NW						@29.0' - hard, brittle, siliceous fragments
30								

GEOTECHNICAL BORING LOG

DATE 4/19/89 DRILL HOLE No. B-17 SHEET 2 OF 3

PROJECT EAI/Malibu PROJECT No. 3831025-04

DRILLING CO. Tri-Valley Drilling TYPE OF RIG Bucket Auger

HOLE DIAMETER 24" DRIVE WEIGHT 2550#-22.5'; 1550#-45.5'; 750#-67';1050#-86.5' DROP 12 IN.

ELEVATION TOP OF HOLE 110' REF. OR DATUM See Geotechnical Map, Plate 1

LOGGED BY DGS, TJ

SAMPLED BY DGS

DEPTH FEET	ATTITUDES	TUBE SAMPLE NO.	BLOWS PER FOOT	DRY DENSITY PCF	MOISTURE CONTENT, %	SOIL CLASS. (U.S.C.S.)	GEOTECHNICAL DESCRIPTION
30		9	9				CLAYSTONE: Dark bluish-gray, moist, very firm, plastic, very sheared
							@33.0' - harder pieces in clayey matrix have polished surfaces
							@34.0' - fragments 1/8" to 3"
35							@35.0' - light gray mineralization
		10	6				
							@37.0' - matrix contains pods of subrounded to subangular sandstone fragments 1/4" to 1"
		11	BAG				
40	S:N13W, 46SW	12	8				
45	S:N54E, 36NW	45 13	7				@45.0' - hard silicified bed, minor seepage on top, brittle, jointed
	J:N18W, 78SW	46					
	S:N82W, 74NE	48					@48.0' - polished shear
50	S:N38E, 33SE	50 14	20				@50.0' - thin siliceous zone
							@51.0' - harder, mottled with light gray, mineralization
							@53.0' - thin siliecous zone
	S:N10E, 48SE	53					
	S:N53E, 33NW	54					@54.0' - polished surfaces, hard, less plastic
55		15	24				
							@56.5' - thin siliceous zone, discontinuous
	S:N20W, 53SW	57					
60							

DATE 4/19/89 DRILL HOLE No. B-17 SHEET 3 OF 3

PROJECT EAI/Malibu PROJECT No. 3831025-04

DRILLING CO. Tri-Valley Drilling TYPE OF RIG Bucket Auger

HOLE DIAMETER 24" DRIVE WEIGHT 2550#-22.5'; 1550#-45.5'; 750#-67'; 1050#-86.5' DROP 12 IN.

ELEVATION TOP OF HOLE 110' REF. OR DATUM See Geotechnical Map, Plate 1

LOGGED BY DGS, TJ

SAMPLED BY DGS

DEPTH FEET	GRAPHIC LOG (W E)	ATTITUDES	TUBE SAMPLE No.	BLOWS PER FOOT	DRY DENSITY PCF	MOISTURE CONTENT, %	SOIL CLASS. (U.S.C.S.)	GEOTECHNICAL DESCRIPTION
60		S:N20E, 81SE 64	16	23				CLAYSTONE: Dark bluish-gray, moist, very firm to hard, very sheared, slightly plastic to plastic, undulating polished surfaces
		S:N8W, 90 64						
		S:N58W, 68SW 65						@64.0' - some striations
65			17	25				
		S:N-S, 75E 67						
								@68.5'-70.0' - silica mineralization, discontinuous zone
70								
								@72.5' - rounded pebbles with polished surfaces, 3/4" diameter
75			18	35				@75.0' - slightly plastic, prominent shear, near vertical, undulating
		S:N15E, 70SW 76						@77.0' - siliceous zone
		S:N30E, 90 78						
		S:N15E, 78SE 79						
80								
		S:N75W, 68NE 82						@82.0' - moist, hard fragments in clay matrix
85		S:N62E, 60NW 85	19	20				
90								NOTE: Total Depth 86.5' No caving Minor seepage at 45.0' Downhole logged to Total Depth

GEOTECHNICAL BORING LOG

DATE 4/20/89 DRILL HOLE No. B-18 SHEET 1 OF 1

PROJECT EAI/Malibu PROJECT No. 3831025-04

DRILLING CO. Tri-Valley Drilling TYPE OF RIG Bucket Auger

HOLE DIAMETER 24" DRIVE WEIGHT 2550#-22.5'; 1550#-45.5'; 750#-67';1050#-86.5' DROP 12 IN

ELEVATION TOP OF HOLE 110' REF. OR DATUM See Geotechnical Map, Plate 1

LOGGED BY DGS, TJ

SAMPLED BY DGS

DEPTH FEET	ATTITUDES	TUBE SAMPLE No.	BLOWS PER FOOT	DRY DENSITY PCF	MOISTURE CONTENT, %	SOIL CLASS. (U.S.C.S.)	GEOTECHNICAL DESCRIPTION
0						SM	SILTY SAND: Orange-brown, slightly moist, very dense, scattered rounded pebbles and cobbles (LANDSLIDE DEBRIS)
14	14 S:N30E, 65SE						@14.0' - on west side and 19.0' on east side - shear
15							@15.0' - east side of hole very sharp contact, roots growing along contact, striations
16	16 S: N38E, 60SE Striations Plunge 40° trending N89E						@16.0' - MnO stain along shear approximately ½" thick
19	19 J:N3E, 86SE						
19							TUFF: Yellowish-white, mottled-orange, slightly moist, very firm, sheared, altered, limonite, gypsum, spars MnO stain (CONEJO VOLCANICS/LANDSLIDE DEBRIS)
20.5		1	BAG				
23	23 S: Gen. N25E, 45SE						
24							@24.0' on west side of boring and 26.0' on east side - scattered gypsum crystals, polished surfaces, 6" zone of inclusions of claystone above, 6" zone of inclusions of tuff below
25	25 Shear: N28E, 70SE						
26	Shear: N50E, 62SE						CLAYSTONE: Bluish-gray, slightly moist, firm, slightly plastic, very sheared, pulverized (TRANCAS FORMATION/LANDSLIDE DEBRIS)
27.5		2	BAG				
30							

NOTE: Total Depth - 30.0'
No caving
No seepage
Downhole logged to Total Depth

GEOTECHNICAL BORING LOG

DATE 4/20/89 DRILL HOLE No. B-19 SHEET 1 OF 3

PROJECT EAI/Malibu PROJECT No. 3831025-04

DRILLING Co. Tri-Valley Drilling TYPE OF RIG Bucket Auger

HOLE DIAMETER 24" DRIVE WEIGHT 2550#-22.5'; 1550#-45.5'; 750#-67'; 1050#-87'; 1350#-89' DROP 12 IN.

ELEVATION TOP OF HOLE 215' REF. OR DATUM See Geotechnical Map, Plate 1

LOGGED BY CH, TJ

SAMPLED BY CH

Depth Feet	Graphic Log	Attitudes	Tube Sample No.	Blows per Foot	Dry Density PCF	Moisture Content, %	Soil Class. (U.S.C.S.)	Geotechnical Description
0							SC	CLAYEY SAND: Medium-brown, moist, dense, root hairs, slightly porous, slightly plastic, fine- to medium grained, rounded pebbles (COLLUVIAL SOIL)
							SM	SILTY SAND: Orangish-brown, moist, loose to moderately dense, fine-grained, slightly plastic, black organic blebs (TERRACE DEPOSITS, NON-MARINE)
5								
10			1	BAG				@10.0' - dense, cemented, friable, occasional subangular to subrounded gravel to 1"
			2	4				
								@12.0' - few subrounded cobbles
								@14.0' - gravel and cobbly fine- to coarse grained sand, well sorted
15								@15.0' - medium brown, mottled with olive brown, few reddish-brown soft siltstone fragments
								@18.0' - very moist, angular cobbles
								@19.0' - orangish-brown
20							SP	SAND: Orangish-brown, moist, dense, very fine-grained, few angular cobbles
			3	6				
							SM	SILTY SAND: Orangish-brown, moist, medium- to coarse-grained, slightly cemented, friable
								@21.0'-23.0' - numerous rounded gravels and cobbles
25								@25.0' - medium-brown, moist to very moist, fine- to medium-grained, slightly plastic
								@29.0' - few angular sandstone cobbles
30								

GEOTECHNICAL BORING LOG

DATE 4/20/89 DRILL HOLE No. B-19 SHEET 2 OF 3

PROJECT EAI/Malibu PROJECT No. 3831025-04

DRILLING Co. Tri-Valley Drilling TYPE OF RIG Bucket Auger

HOLE DIAMETER 24" DRIVE WEIGHT 2550#-22.5'; 1550#-45.5'; 750#-67'; 1050#-87'; 1350#-89' DROP 12 IN.

ELEVATION TOP OF HOLE 215' REF. OR DATUM See Geotechnical Map, Plate 1

LOGGED BY CH, TJ

SAMPLED BY CH

DEPTH FEET	GRAPHIC LOG	ATTITUDES	TUBE SAMPLE No.	BLOWS PER FOOT	DRY DENSITY PCF	MOISTURE CONTENT, %	SOIL CLASS. (U.S.C.S.)	GEOTECHNICAL DESCRIPTION
30			4	15			SP	SAND: Yellowish to orangish-brown, moist, dense, fine- to medium grained with some coarse sand and few gravel, slightly cemented, friable
							SM	SILTY SAND: Orangish-brown, moist, fine- to medium-grained
								@34.0' - Yellowish-brown, fine-grained, slightly plastic
35								@36.0' - medium- to coarse-grained sand
								@38.0' - well rounded gravel and cobbles
								@39.0' - medium-brown
40			5	7				@40.0' - orangish-brown, moist, dense, fine- to medium grained, slightly cemented, friable
								@40.5' - dark orange-brown, fine-grained
								@44.0' - orange-brown, moist, fine- to medium-grained
45								@45.0'- dark orange-brown, boulders and cobbles
								@49.0' - medium-brown, fine- to medium-grained
50			6	30				@50.0' - light to medium orange-brown, moist, dense, fine- to coarse-grained, poorly sorted
								@53.0' - few cobbles
								@54.0' - dark orange-brown, fine- to medium-grained
55								
								@57.0' - orange-brown, fine-grained
60								

GEOTECHNICAL BORING LOG

DATE 4/20/89 DRILL HOLE NO. B-19 SHEET 3 OF 3

PROJECT EAI /Malibu PROJECT NO. 3831025-04

DRILLING CO. Tri-Valley Drilling TYPE OF RIG Bucket Auger

HOLE DIAMETER 24" DRIVE WEIGHT 2550#-22.5'; 1550#-45.5'; 750#-67';1050#-87'; 1350#-89' DROP 12 IN.

ELEVATION TOP OF HOLE 215' REF. OR DATUM See Geotechnical Map, Plate 1

LOGGED BY CH, TJ

SAMPLED BY CH

DEPTH FEET	GRAPHIC LOG	ATTITUDES	TUBE SAMPLE NO.	BLOWS PER FOOT	DRY DENSITY PCF	MOISTURE CONTENT, %	SOIL CLASS. (U.S.C.S.)	GEOTECHNICAL DESCRIPTION
60–70 (65)			7	33			SM	SILTY SAND: Orange-brown to medium-brown, moist, dense, fine- to medium-grained, carbonate stringers @61.0' - medium-brown, slightly plastic @62.0' - few cobbles @63.0' - medium-grained sand, some gravel @64.0' - medium-brown @65.0' - medium-brown, moist, fine-grained, slightly plastic @66.0' - some gravel and cobbles @68.0' - orange-brown, fine- to medium grained moist
70–84 (75, 80)			8	11			SP	SAND: Medium-brown, moist, loose, fine- to medium-grained (TERRACE DEPOSITS, MARINE) @75.0' - tan to yellow-brown, fine- to medium-grained, well sorted, unconsolidated @80.0' - abundant cobbles
84–89 (85)			9 10 11 12	11 17 25 50				SANDSTONE: Light yellow-brown, moist, very firm, clayey matrix, fine- to medium grained, poorly sorted, weathered, 1" thick sheared greenish-gray, clayey siltstone bed (probable VAQUEROS FORMATION) @86.0' - hard, well-cemented @87.0' - few pebbles and gravels @88.0' - 2" thick sheared dark gray to green-gray clayey siltstone bed @89.0' - green-gray
90								NOTE: Total Depth - 89.0' Caving @ 70.0' Drilling mud used below 75.0'

GEOTECHNICAL BORING LOG

DATE 4/21/89 DRILL HOLE No. B-20 SHEET 1 OF 2

PROJECT EAI /Malibu PROJECT No. 3831025-04

DRILLING Co. Tri-Valley Drilling TYPE OF RIG Bucket Auger

HOLE DIAMETER 24" DRIVE WEIGHT 2550#-22.5'; 1550#-45.5'; 750#-67'; 1050#-87'; 1350#-89' DROP 12 IN.

ELEVATION TOP OF HOLE 186' REF. OR DATUM See Geotechnical Map, Plate 1

DEPTH FEET	GRAPHIC LOG	ATTITUDES	TUBE SAMPLE No.	BLOWS PER FOOT	DRY DENSITY PCF	MOISTURE CONTENT, %	SOIL CLASS. (U.S.C.S.)	GEOTECHNICAL DESCRIPTION LOGGED BY CH, TJ SAMPLED BY CH
0							SM	SILTY SAND: Orange-brown, moist, fine-grained, well sorted (TERRACE DEPOSITS, NON-MARINE)
5								
10			1	5				@10.0' - dense fine- to medium-grained, slightly cemented, friable
								@13.0' - some angular to rounded gravel and cobbles
15								@17.0' - fine-grained
20			2	7				@20.0' - fine-grained sand, few cobbles, slightly porous, slightly plastic, few roots
25								@27.0' - carbonate stringers
30								

GEOTECHNICAL BORING LOG

DATE 4-21-89 DRILL HOLE No. B-20 SHEET 2 OF 2

PROJECT EAI/Malibu PROJECT No. 3831025-04

DRILLING CO. Tri-Valley Drilling TYPE OF RIG Bucket Auger

HOLE DIAMETER 24" DRIVE WEIGHT 2550#-22.5'; 1550#-45.5'; 750#-67'; 1050#-87'; 1350#-89' DROP 12 IN.

ELEVATION TOP OF HOLE 186' REF. OR DATUM See Geotechnical Map, Plate 1

LOGGED BY CH, TJ

SAMPLED BY CH

DEPTH FEET	GRAPHIC LOG	ATTITUDES	TUBE SAMPLE No.	BLOWS PER FOOT	DRY DENSITY PCF	MOISTURE CONTENT, %	SOIL CLASS. (U.S.C.S.)	GEOTECHNICAL DESCRIPTION
30							SM	SILTY SAND: Orange-brown to medium-brown, moist, dense, slightly cemented, friable, fine- to coarse-grained sand, few pebbles to 1" diameter
35								@35.0' - medium-brown, slightly mottled, organic fragments, carbonate blebs
40			4	14				@40.0' - orange-brown, moist, dense, slight calcium carbonate cementation, friable, fine-grained, slightly plastic @40.5' - orange to red-brown, medium-grained
							SP	SAND: Tan to yellow-brown, dry to slightly moist, unconsolidated, fine- to medium-grained, well-sorted (TERRACE DEPOSITS, MARINE)
45								
50								@52.0' - few cobbles
55								TUFF: Rust-orange, moist, hard, abundant limonite and manganese oxide staining, sheared (CONEJO VOLCANICS)
			5	41				
				No Recovery				SILTSTONE: Blue-gray, very moist, sheared and plastic
			6	50				
			7	Bag				
			8	Bag				NOTE: Total Depth - 58.5' Caving at 42.0' No seepage Drilling mud used below 42.0'
60								

GEOTECHNICAL BORING LOG

DATE 4/21/89 DRILL HOLE NO. B-21 SHEET 1 OF 2

PROJECT EAI/Malibu PROJECT NO. 3831025-04

DRILLING CO. Tri-Valley Drilling TYPE OF RIG Bucket Auger

HOLE DIAMETER 24" DRIVE WEIGHT 2550#-22.5'; 1550#-45.5'; 750#-67'; 1050#-87'; 1350#-89' DROP 12 IN.

ELEVATION TOP OF HOLE 112' REF. OR DATUM See Geotechnical Map, Plate 1

LOGGED BY CH, TJ

SAMPLED BY CH

DEPTH FEET	GRAPHIC LOG	ATTITUDES	TUBE SAMPLE NO.	BLOWS PER FOOT	DRY DENSITY PCF	MOISTURE CONTENT, %	SOIL CLASS. (U.S.C.S.)	GEOTECHNICAL DESCRIPTION
0							ML	SANDY CLAYEY SILT: Dark-brown, moist, moderately firm, organics, roots and root hairs, occasional pebbles, carbonate stringers (COLLUVIAL SOIL) @3.5' - Irregular contact dipping 18 degrees east
5							ML	SANDY SILT: Dark red-brown, slightly moist, dense, yellow, red and white mottling, roots, slightly porous, pebbles, cobbles (LANDSLIDE DEBRIS) @ 8.0' - 2' thick subhorizontal cobble zone @ 9.5' - 4" subhorizontal pebble bed
10							SM	SILTY SAND: Dark red-brown, slightly moist, dense, pebbles and cobbles, slightly porous, roots
15								@15.0' - dark red-brown, yellow, and white mottling, dense, roots, 1' cobble bed @16.0' - orange to medium-brown, slightly plastic
20		B:N2E, 38SE						@20.0' - 6" medium- to coarse-grained, subhorizontal sand bed @21.0' - orange-brown, fine-grained @21.5' - 4" thick erosional channel bed, medium- to coarse sand with pebbles
25								@25.0' - yellow-brown, coarse grained, cemented, slightly friable, subhorizontal gradational contact @27.0' - dark orange-brown, occasional pebbles @28.0' - red-brown, moist, fine-grained, few gravel and cobbles, slightly plastic
30								

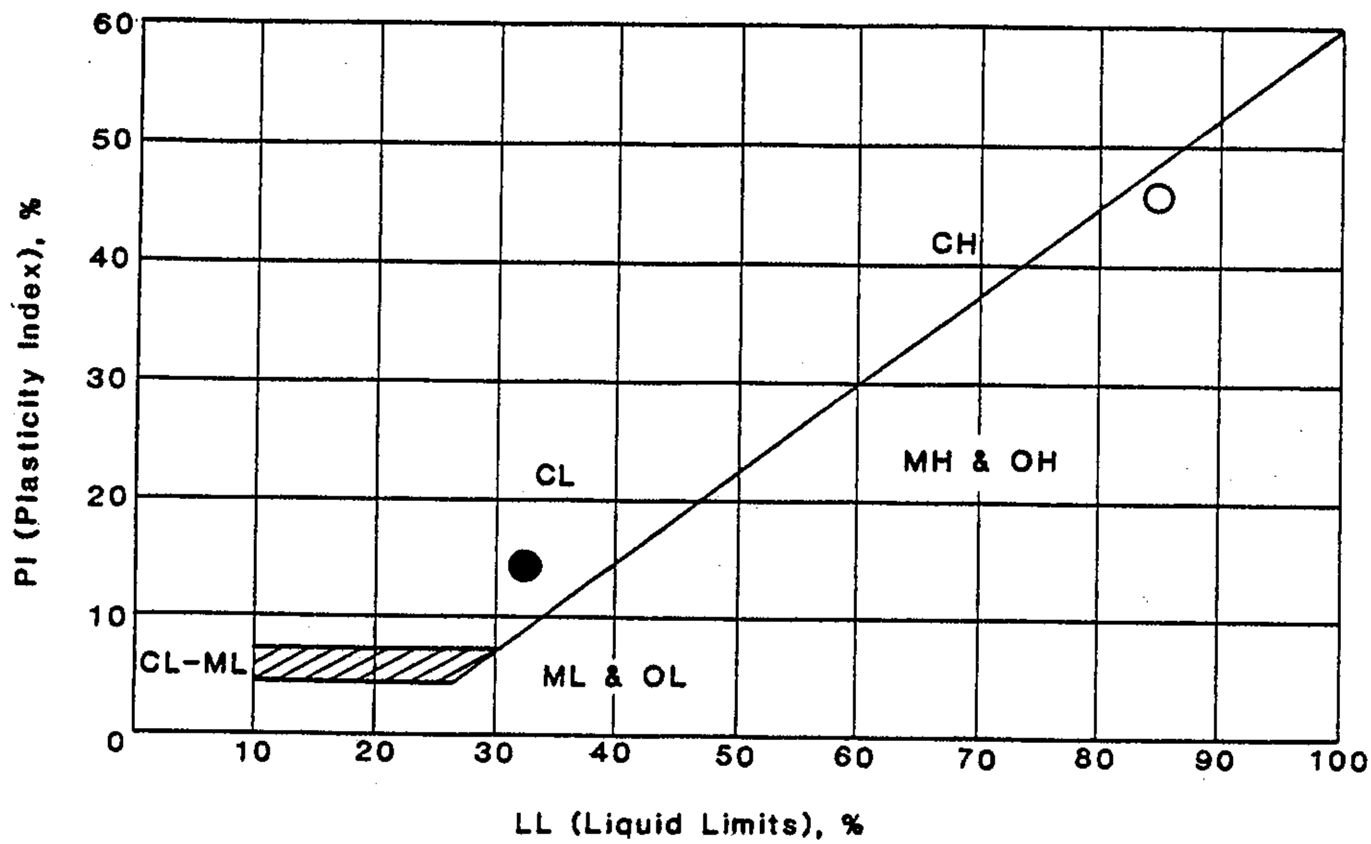
GEOTECHNICAL BORING LOG

DATE 4/21/89 DRILL HOLE No. B-21 SHEET 2 OF 2
PROJECT EAI/Malibu PROJECT No. 3831025-04
DRILLING CO. Tri-Valley Drilling TYPE OF RIG Bucket Auger
HOLE DIAMETER 24" DRIVE WEIGHT 2550#-22.5'; 1550#-45.5'; 750#-67'; 1050#-87'; 1350#-89' DROP 12 IN.
ELEVATION TOP OF HOLE 112' REF. OR DATUM See Geotechnical Map, Plate 1

LOGGED BY CH, TJ
SAMPLED BY CH

Depth Feet	Graphic Log (W E)	Attitudes	Tube Sample No.	Blows Per Foot	Dry Density PCF	Moisture Content, %	Soil Class. (U.S.C.S.)	Geotechnical Description
30							SM	SILTY SAND: Red-brown, moist, moderately dense, fine-grained, slightly plastic, occasional rounded gravel and cobbles
								@34.0' - numerous volcanic and quartzite pebbles in a coarse-grained sandy matrix, loose and friable to 37'
35								
40								@40.0-41.0' - irregular contact clipping, east
		S:N3E, 42SE					SP	SAND: Light gray, moist, unconsolidated, fine- to medium-grained, friable, intermixed with silty sand - as above 41.5' TO 42.0' - irregular contact
		S:N3E, 44-47SE					SM	SILTY SAND: Yellow-brown to orange-brown, cobbles 6" to 1' thick @42.5' - 1" to 2" thick zone of sheared, yellow-brown volcanic tuff underlain by friable marine terrace sand, 6" thick @45.0' - contact with polished striated surface striations oriented 45°S 88E
45		S:N32W, 55NE	1	7				SILTSTONE: Mottled with discontinuous light gray sandstone lenses, numerous undulations polished surfaces (TRANCAS FORMATION/LANDSLIDE DEBRIS) @48.0' - pyrite, mineralization @51.0' - light blue @52.0' - plastic, polished surfaces, slightly mottled with sand
50			2					
			3	25				
55								NOTE: Total Depth - 53.0' No seepage Caving from 43.0' to 45.0' Downhole logged to 48.0'

SYMBOL	SAMPLE NO.	SAMPLE LOCATION	FIELD MOISTURE (%)	LL (%)	PL (%)	PI (%)	U.S.C.S.
●	11	B-7 @ 43' (Artificial fill)	--	31.7	17.3	14.4	CL
○	5	B-16 @ 47' (Claystone, Monterey Formation	47.0	85.1	39.2	45.9	MH



ATTERBERG LIMITS TEST RESULTS

Project No. 3831025-04

Project Name EAI/RANCHO MALIBU MESA

Date 8/78 Figure No. D-1

3005 688

SAMPLE LOCATION	SOLUBLE SULFATE (PPM)	COMPACTED MOISTURE (%)	COMPACTED DRY DENSITY (pcf)	FINAL MOISTURE (%)	VOLUMETRIC SWELL (%)	EXPANSION INDEX	EXPANSIVE CLASSIFICATION
B-9 @ 18' (Vagueros Formation)	6000	14.7	94.7	32.6	11.7	117	High
B-10 @ 4'-6' (Non-marine Terrace)	180	8.5	115	16.3	1.1	11	Very Low

TEST METHOD:

UBC Test Method 29-2

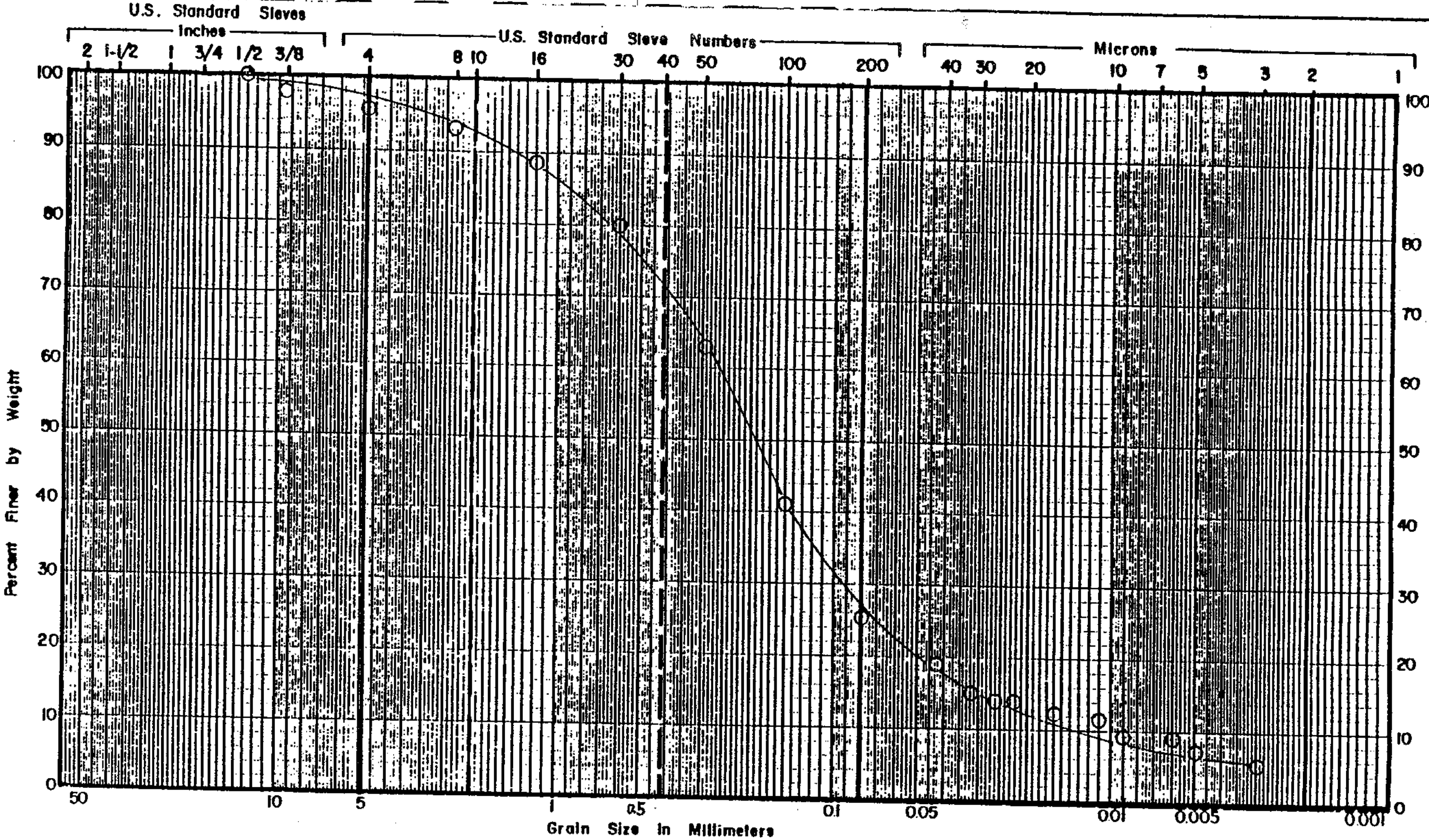
EXPANSION INDEX AND SOLUBLE SULFATE TEST RESULTS

Project No. 3831025-04

Project Name EAI/RANCHO MALIBU MESA

Date 8/89 Figure No. D-2

3020688



Gravel		Sand			Silt	Clay
Coarse	Fine	Coarse	Medium	Fine		

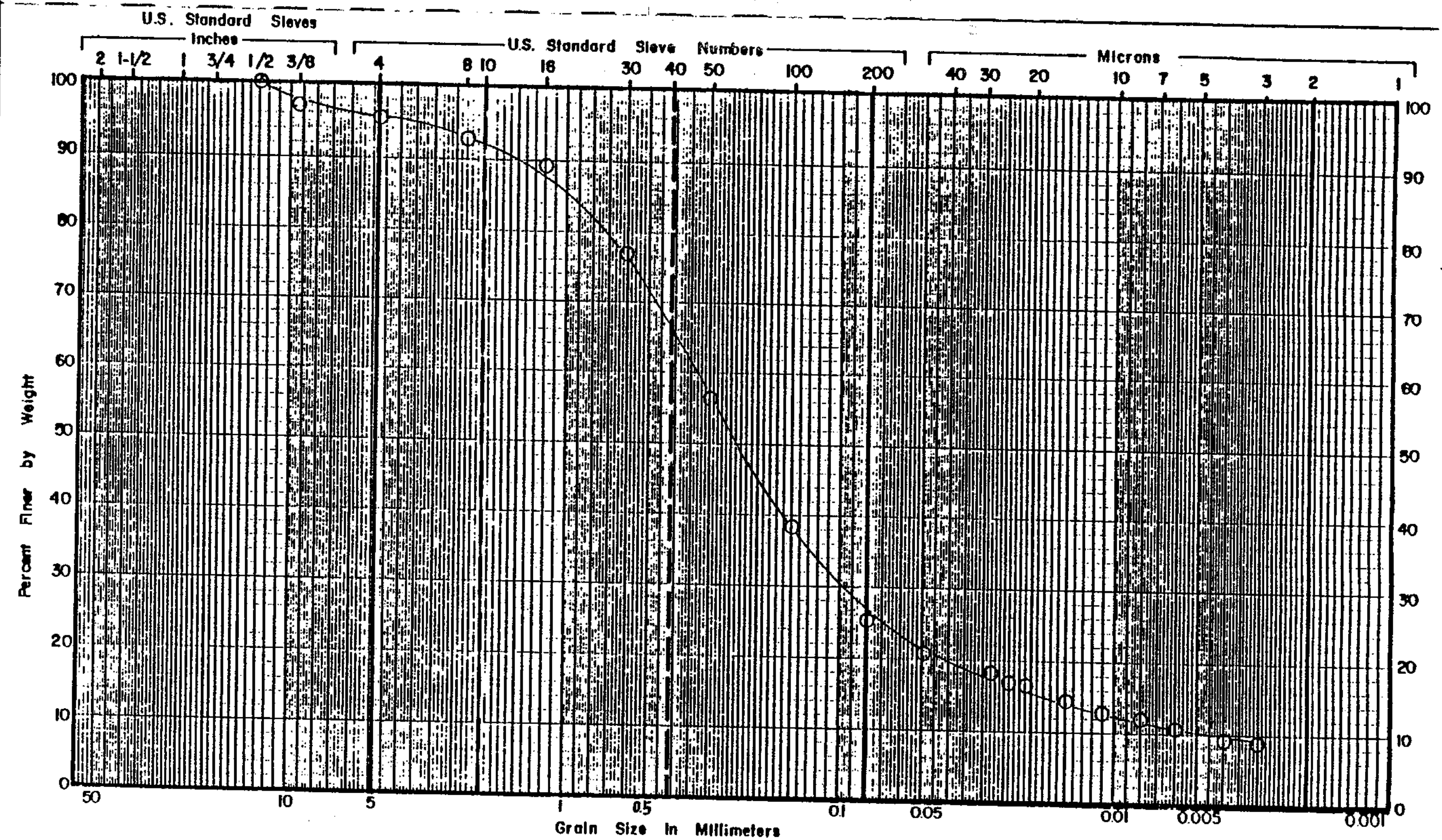
Symbol	Sample Location	Sample No.	Field Moisture (%)	LL (%)	PI (%)	Activity PI/-2u	Cu D_{60}/D_{10}	Cc $\frac{(D_{30})^2}{D_{10} \times D_{60}}$	Percent Passing No. 200	Percent Finer than 2μ	U.S.C.S.
O	10 @ 25' (Qtn)	6	6.0	--	--	---	19.3	2.4	27	---	SM

GRADATION TEST RESULTS

Project No. 3831025-04

Project Name EAI/RANCHO MALIBU MESA

Date 8/89 Figure No. D-3

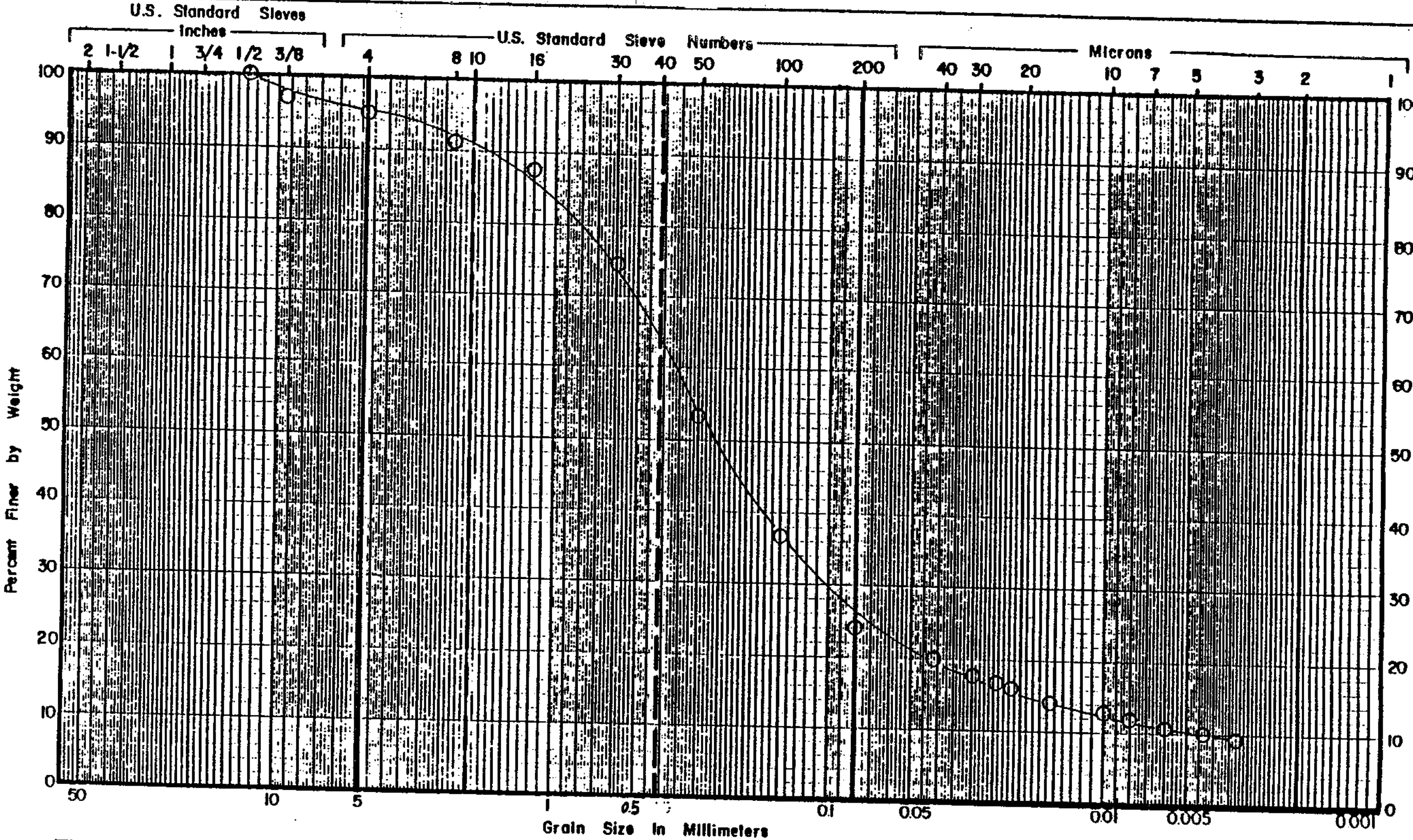


Gravel		Sand			Silt	Clay
Coarse	Fine	Coarse	Medium	Fine		

Symbol	Sample Location	Sample No.	Field Moisture (%)	LL (%)	PI (%)	Activity PI/-2u	Cu D_{60}/D_{10}	Cc $\frac{(D_{30})^2}{D_{10} \times D_{60}}$	Percent Passing No. 200	Percent Finer than 2µ	U.S.C.S.
O	B-11 @ 35' (Qtn.)	8	8.8	--	--	---	73.3	6.5	27	--	SM

GRADATION TEST RESULTS

Project No. 3831025-04
Project Name EAI/RANCHO MALIBU MESA
Date 8/89



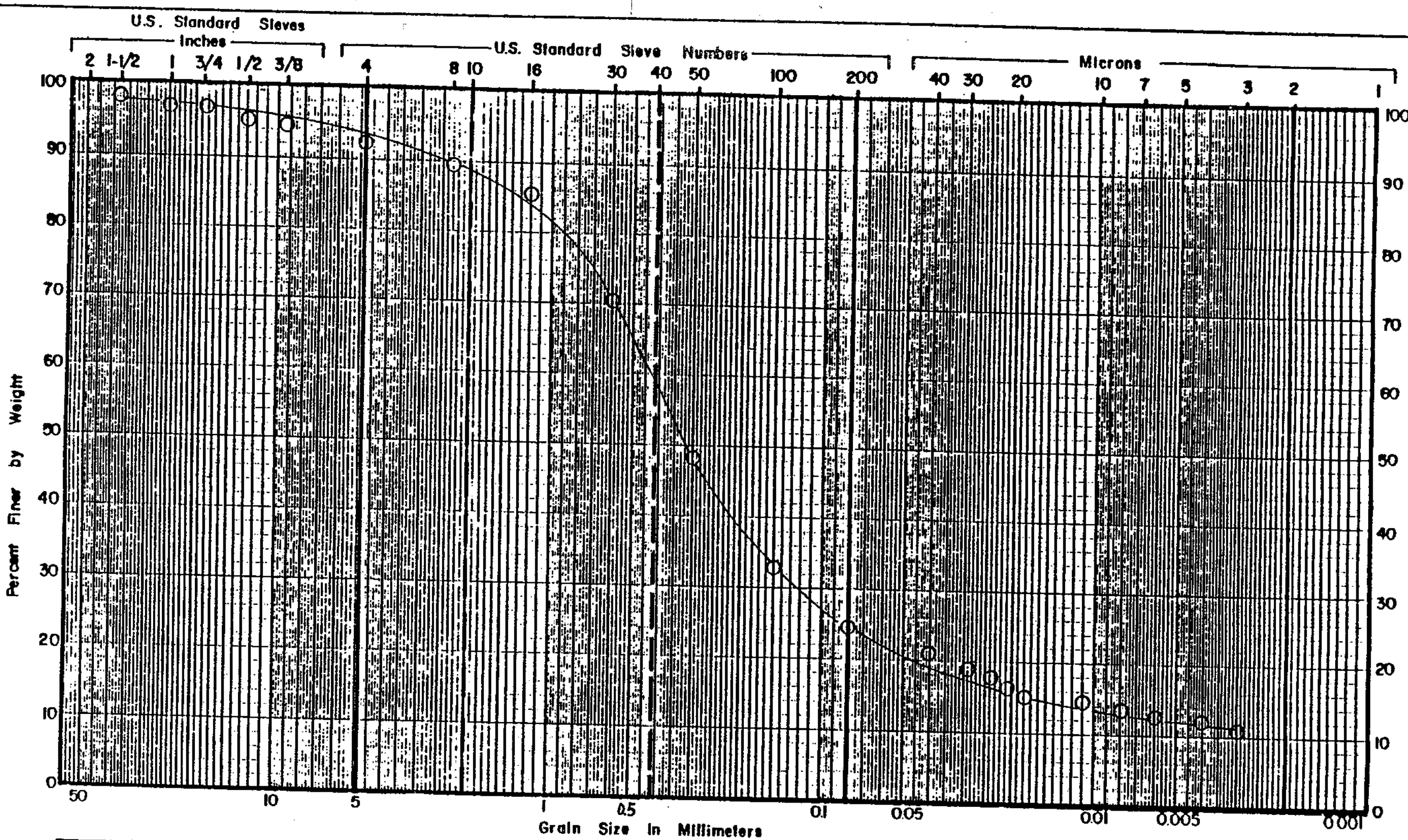
Gravel		Sand			Silt	Clay
Coarse	Fine	Coarse	Medium	Fine		

Symbol	Sample Location	Sample No.	Field Moisture (%)	LL (%)	PI (%)	Activity PI/-2u	Cu D_{60}/D_{10}	Cc $\frac{(D_{30})^2}{D_{10} \times D_{60}}$	Percent Passing No. 200	Percent Finer than 2μ	U.S.C.S.
O	B-12 @ 45' (Qtn.)	9	11.0	--	--	---	83.7	6.5	26	--	SM

GRADATION TEST RESULTS

Project No. 3831025-06

Project Name EAI/RANCHO MALIBU MESA

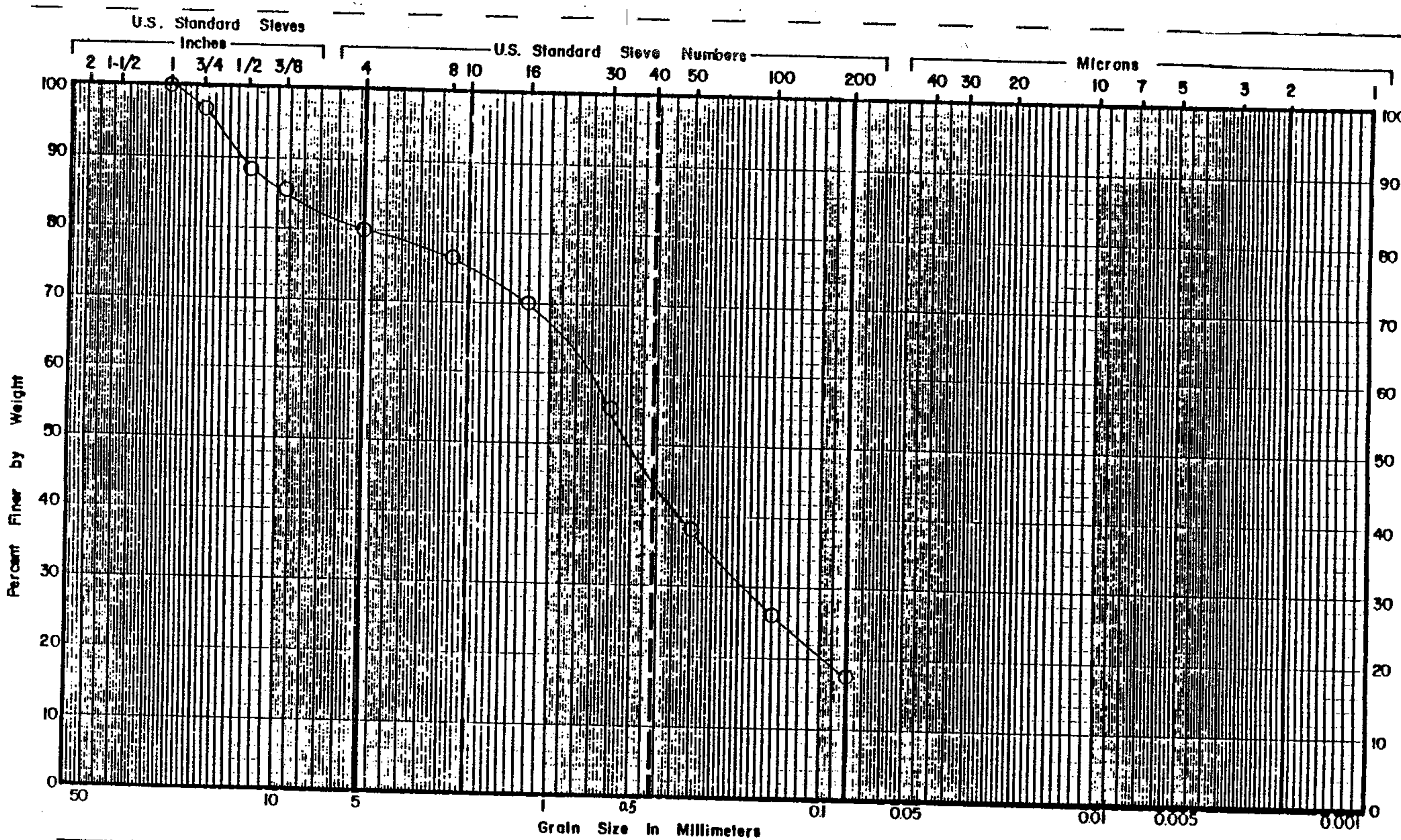


Gravel		Sand			Silt	Clay
Coarse	Fine	Coarse	Medium	Fine		

Symbol	Sample Location	Sample No.	Field Moisture (%)	LL (%)	PI (%)	Activity PI/-2u	Cu D_{60}/D_{10}	Cc $\frac{(D_{30})^2}{D_{10} \times D_{60}}$	Percent Passing No. 200	Percent Finer than 2µ	U.S.C.S.
O	B-13 @ 7' (Qtn.)	2	---	--	--	---	307	25.2	25	---	SM

GRADATION TEST RESULTS

Project No. 3831025-04
Project Name EAI/RANCHO MALIBU MESA

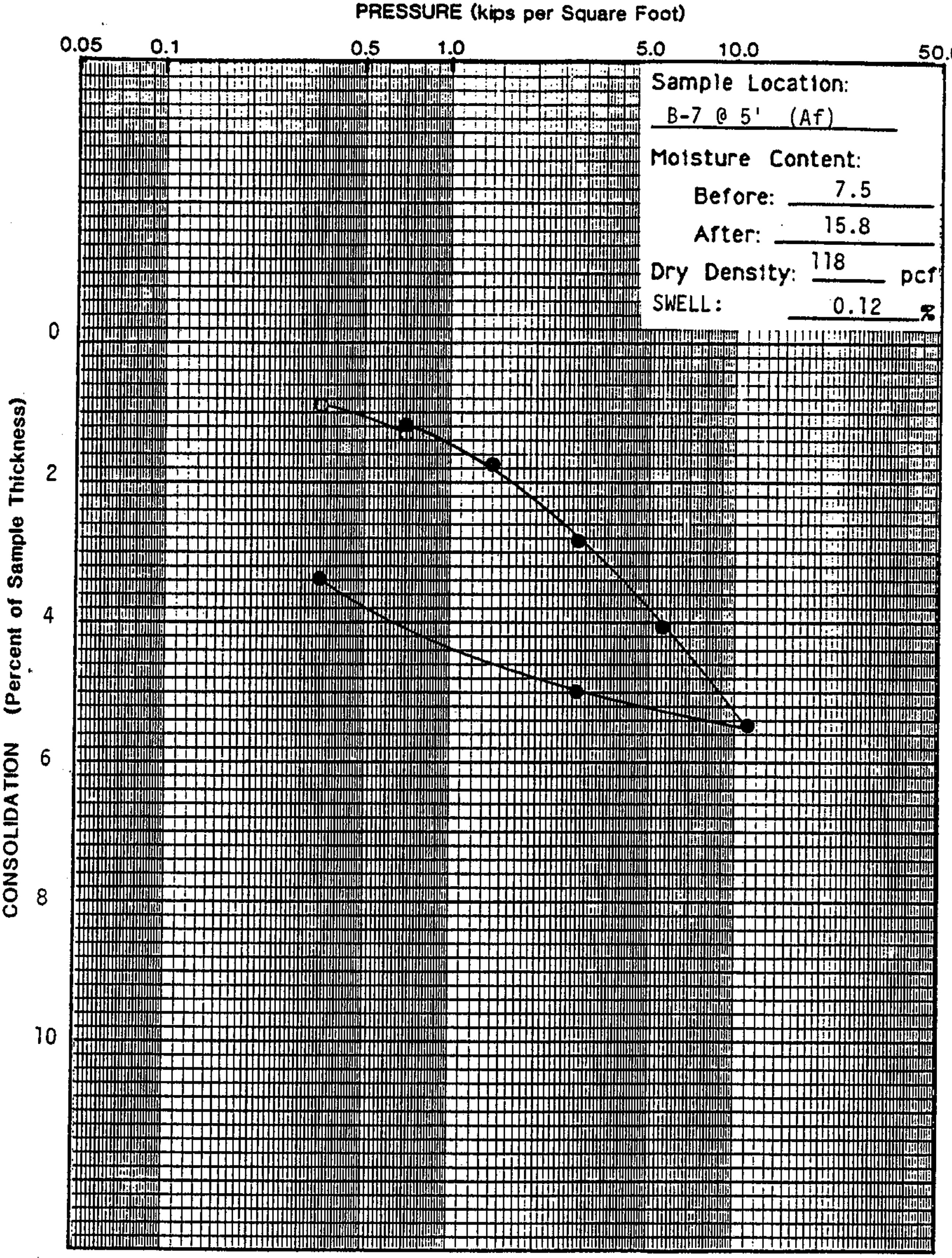


Gravel		Sand			Silt	Clay
Coarse	Fine	Coarse	Medium	Fine		

Symbol	Sample Location	Sample No.	Field Moisture (%)	LL (%)	PI (%)	Activity PI/-2u	Cu D_{60}/D_{10}	Cc $\frac{(D_{30})^2}{D_{10} \times D_{60}}$	Percent Passing No.200	Percent Finer than 2μ	U.S.C.S.
O	B-13 @ 17' (Qtn.)	5	--	--	--	---	---	---	17.5	--	SM

GRADATION TEST RESULTS

Project No. 3831025-04
Project Name EAI/RANCHO MALIBU MESA
Date 8/89 Figure No. D-7

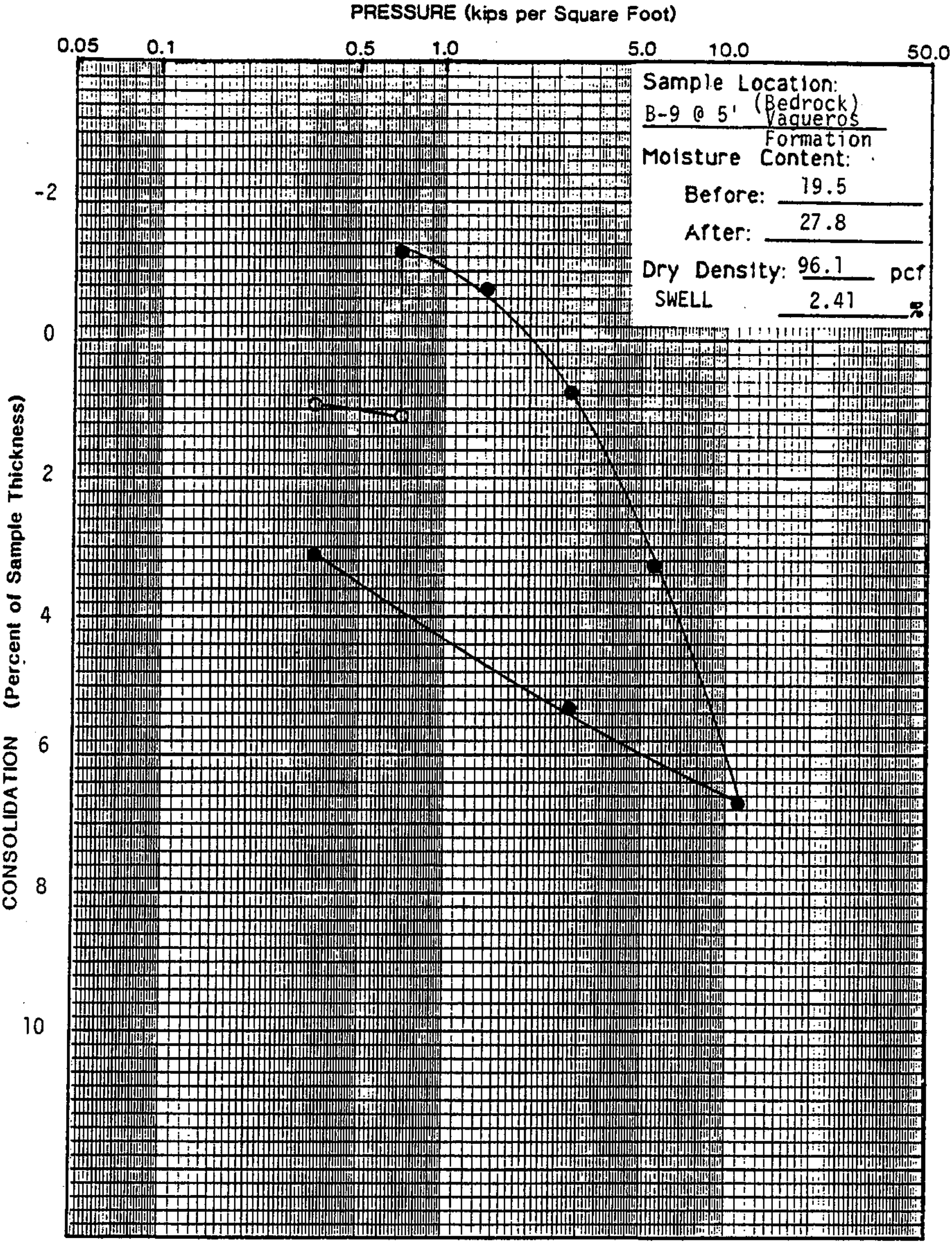


○ Indicates Sample at Field Moisture

● Indicates Sample After Saturation

CONSOLIDATION - PRESSURE CURVE	Project No. 3831025-04 Project Name EAI/RANCHO MALIBU MESA Date 8/89 Figure No. D-8

3010 188

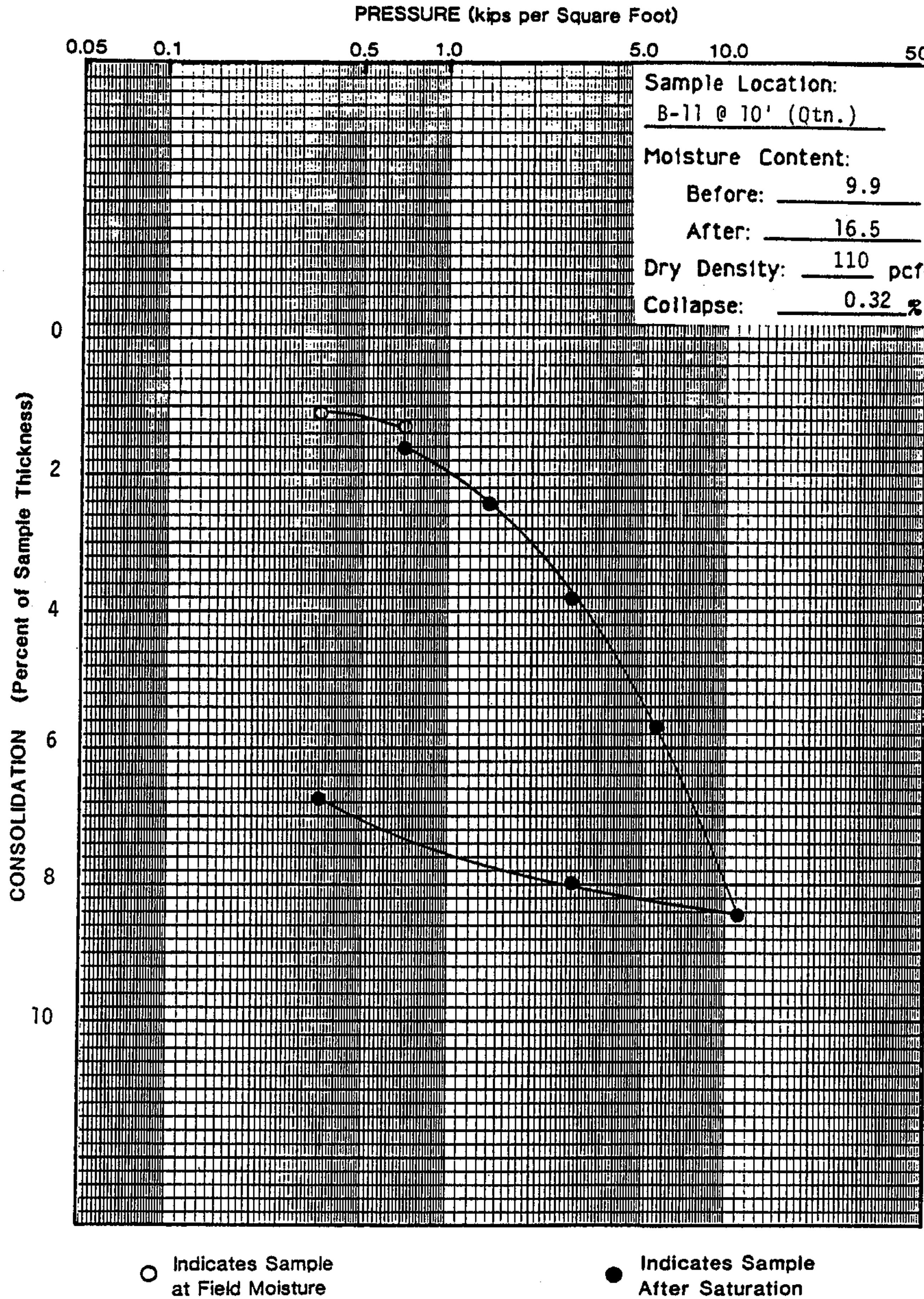


○ Indicates Sample at Field Moisture

● Indicates Sample After Saturation

CONSOLIDATION - PRESSURE CURVE	Project No. 3831025-04 Project Name EAI/RANCHO MALIBU MESA Date 8/89 Figure No. D-9

3010 188



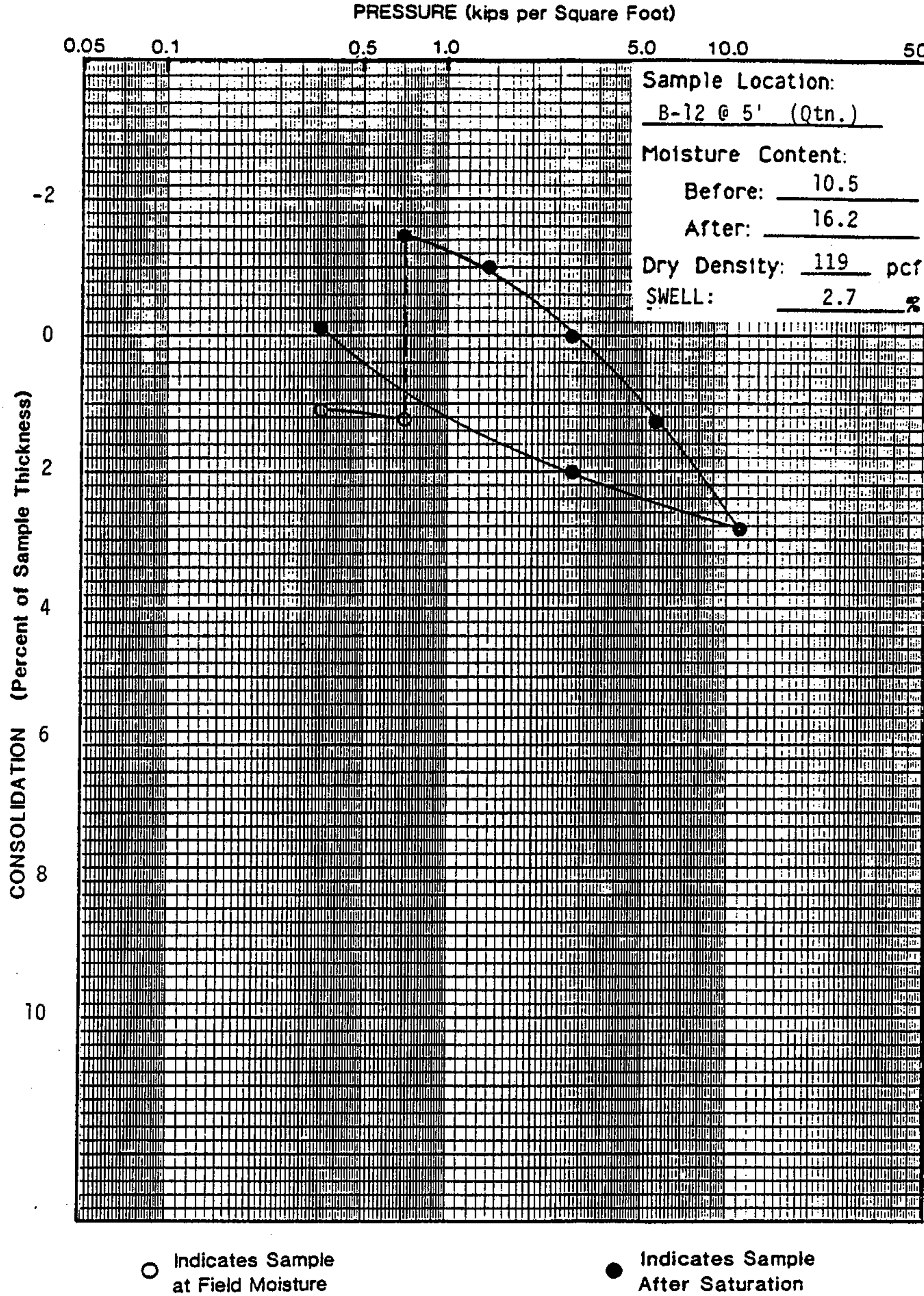
CONSOLIDATION - PRESSURE CURVE

Project No. 3831025-04

Project Name EAI/RANCHO MALIBU MESA

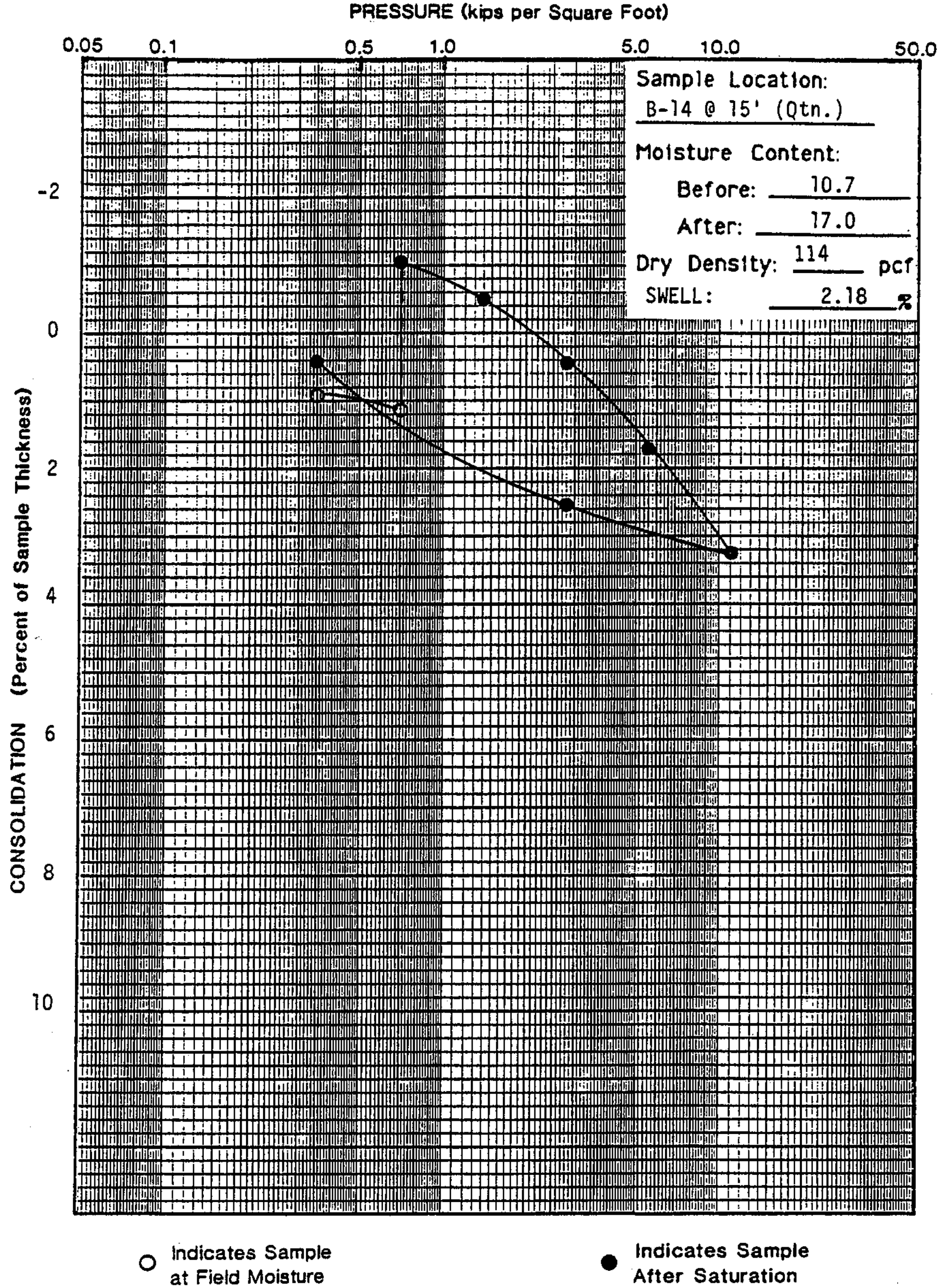
Date 8/89 Figure No. D-10

3010 188



CONSOLIDATION - PRESSURE CURVE	Project No. 3831025-04 Project Name EAI/RANCHO MALIBU MESA Date 8/89 Figure No. D-11

3010 188



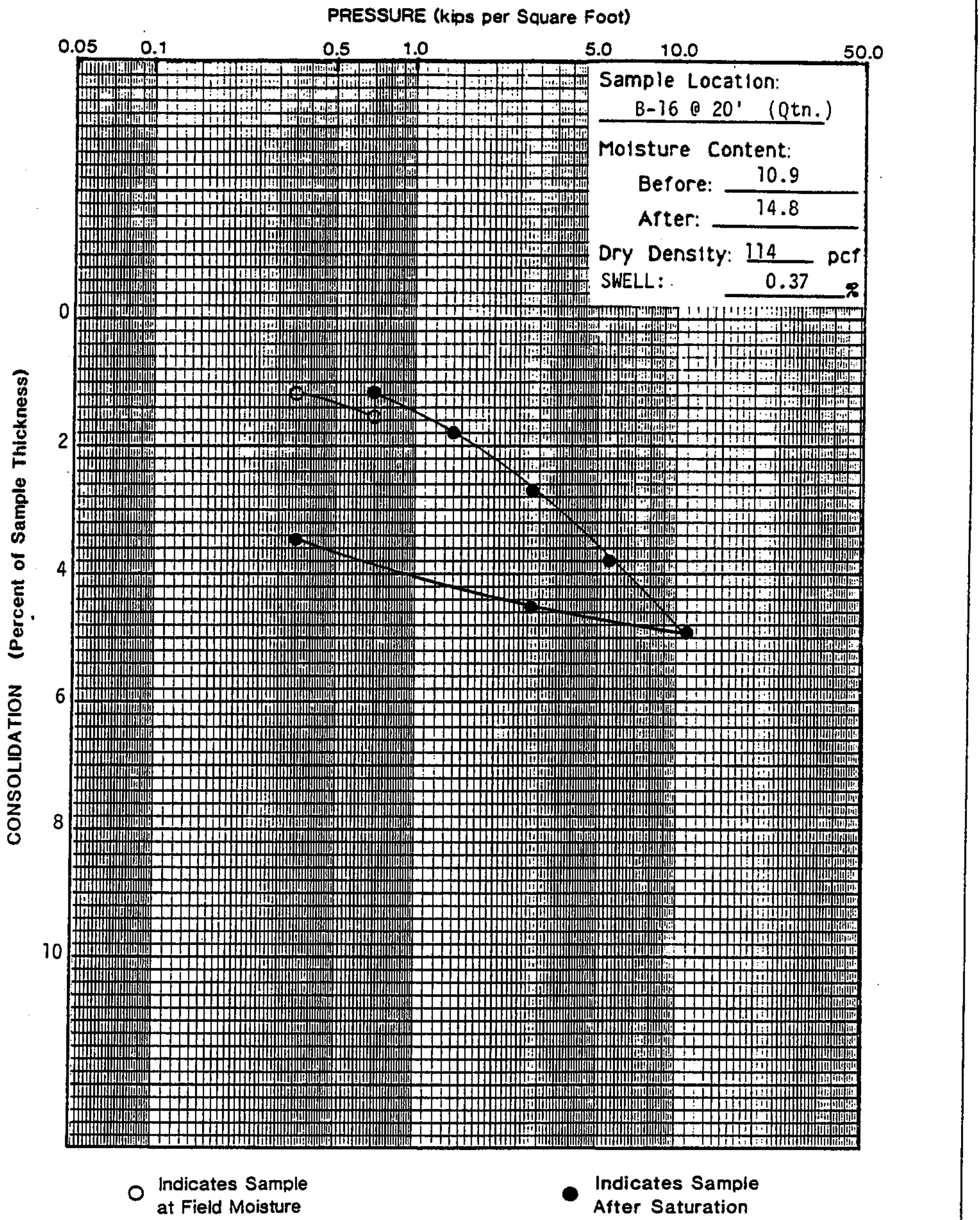
CONSOLIDATION – PRESSURE CURVE

Project No. 3831025-04

Project Name EAI/RANCHO MALIBU MESA

Date 8/89 Figure No. D-12

3010 188



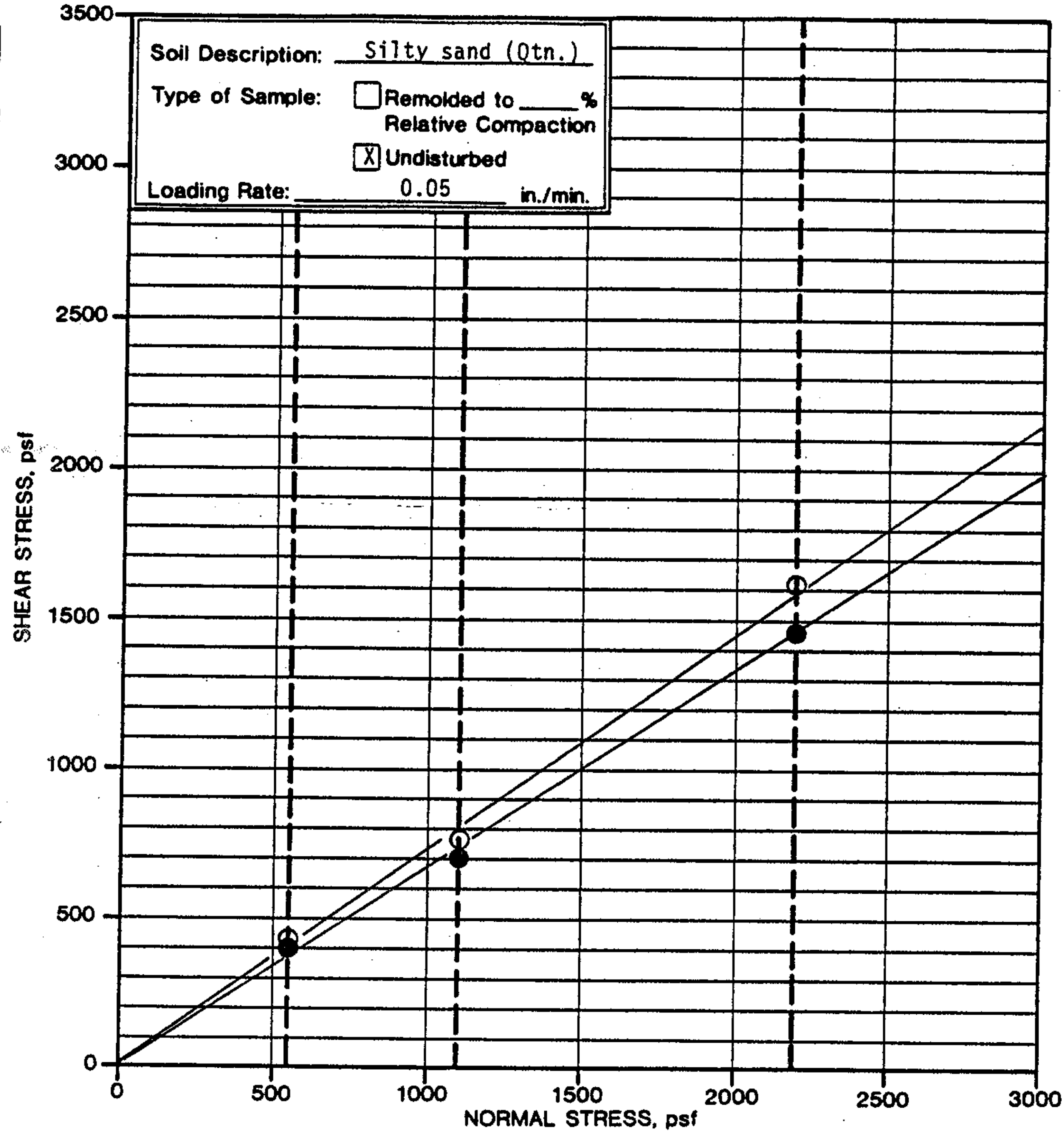
CONSOLIDATION - PRESSURE CURVE

Project No. 3831025-04

Project Name EAI/RANCHO MALIBU MESA

Date 8/89 Figure No. D-13

3010 188

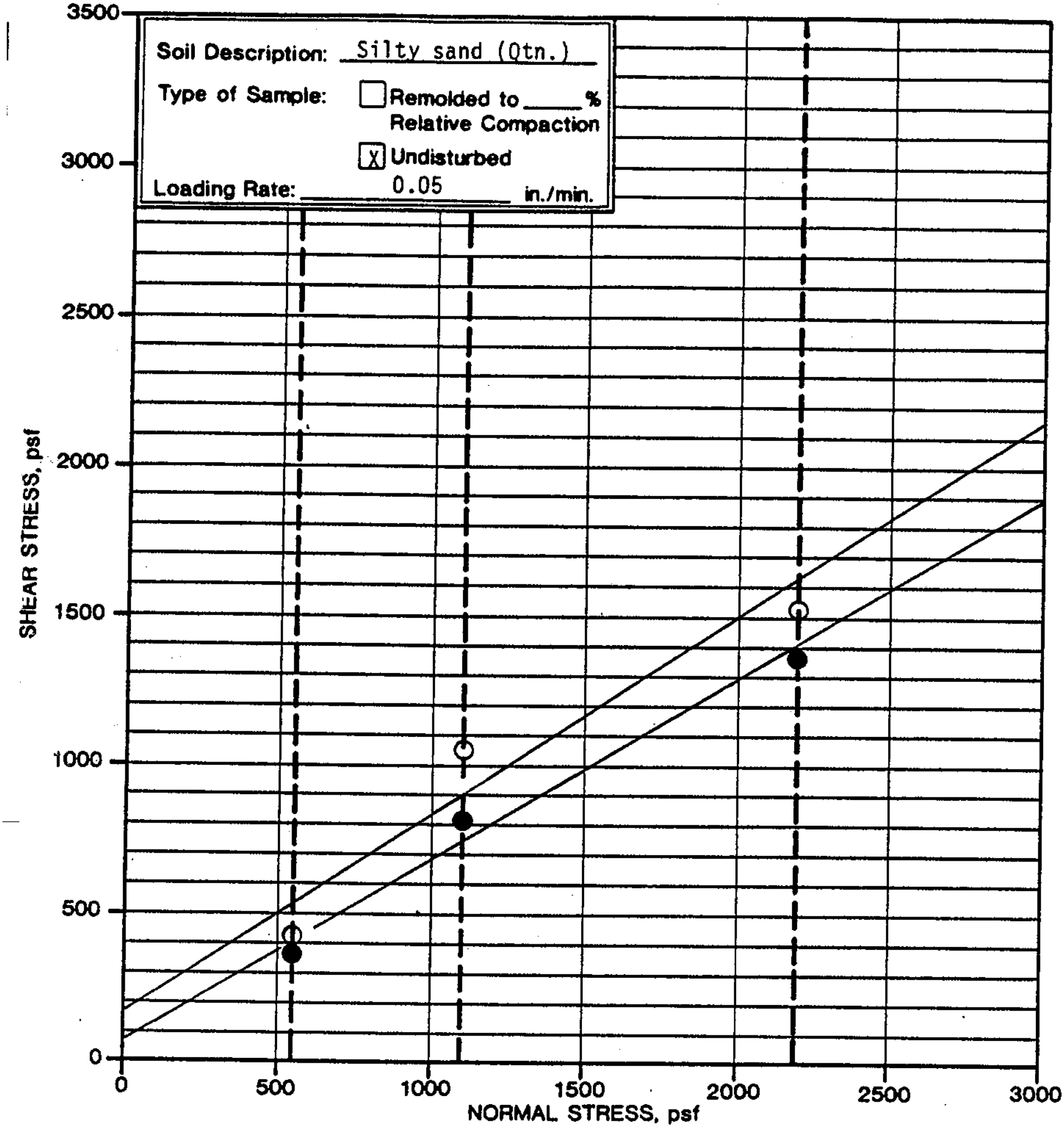


Sample Location	Symbol	Average Moisture Contents Before	Average Moisture Contents After	Friction Angle	Cohesion	Remarks
B-8 @ 15'	○	6.7	15.8	36°	10 (psf)	PEAK
B-8 @ 15'	●	6.7	15.8	33.5°	10	ULTIMATE

DIRECT SHEAR TEST RESULTS

Project No. 3831025-04
Project Name EAI/RANCHO MALIBU MESA
Date 8/89 Figure No. D-14

3015 1088

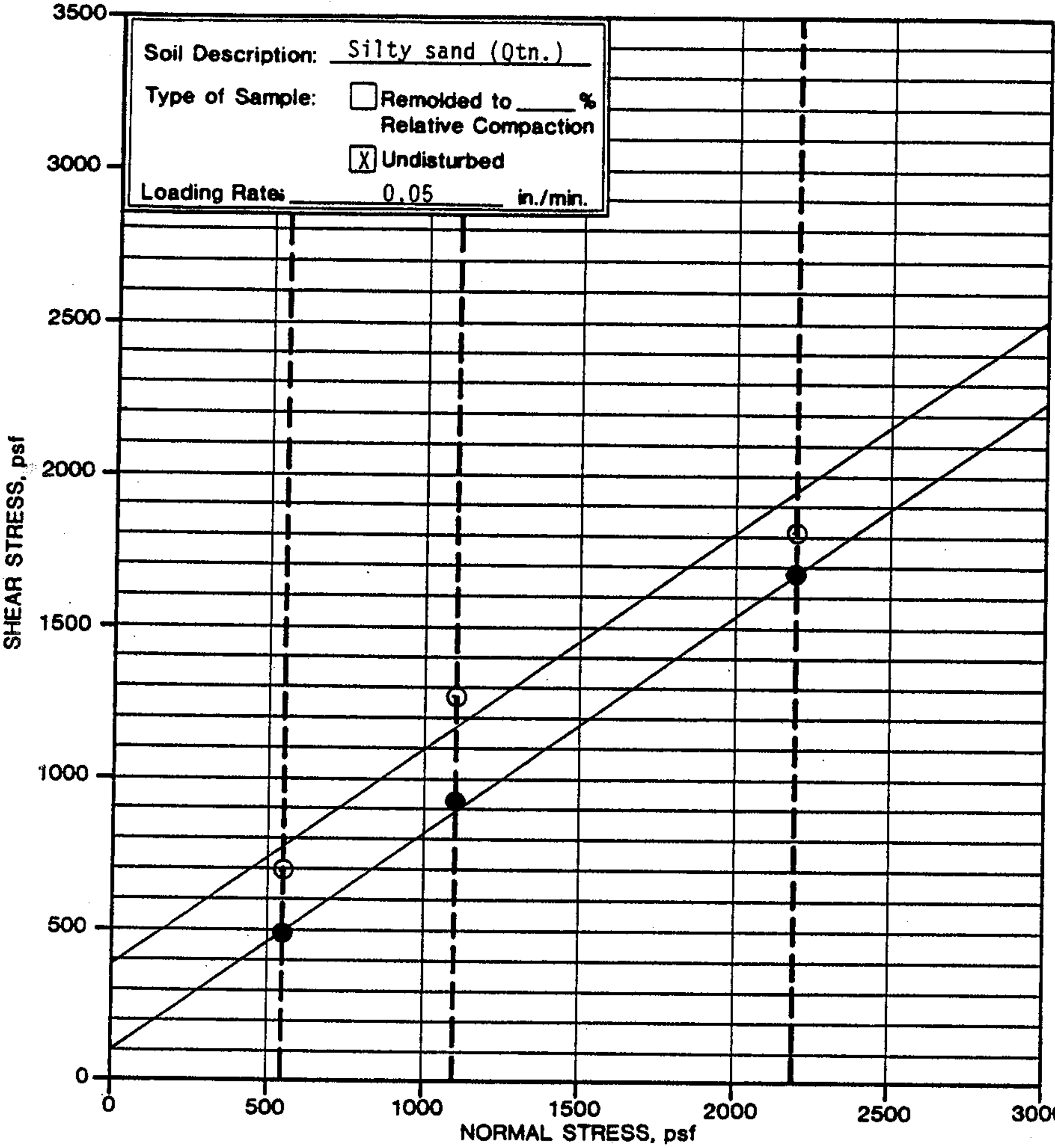


Sample Location	Symbol	Average Moisture Contents Before	Average Moisture Contents After	Friction Angle	Cohesion	Remarks
B-12 @ 10'	○	9.7	16.5	33°	165 (psf)	PEAK
B-12 @ 10'	●	9.7	16.5	31°	70	ULTIMATE

DIRECT SHEAR TEST RESULTS

Project No. 3831025-04
Project Name EAI/RANCHO MALIBU MESA
Date 8/89 Figure No. D-15

3015 1088

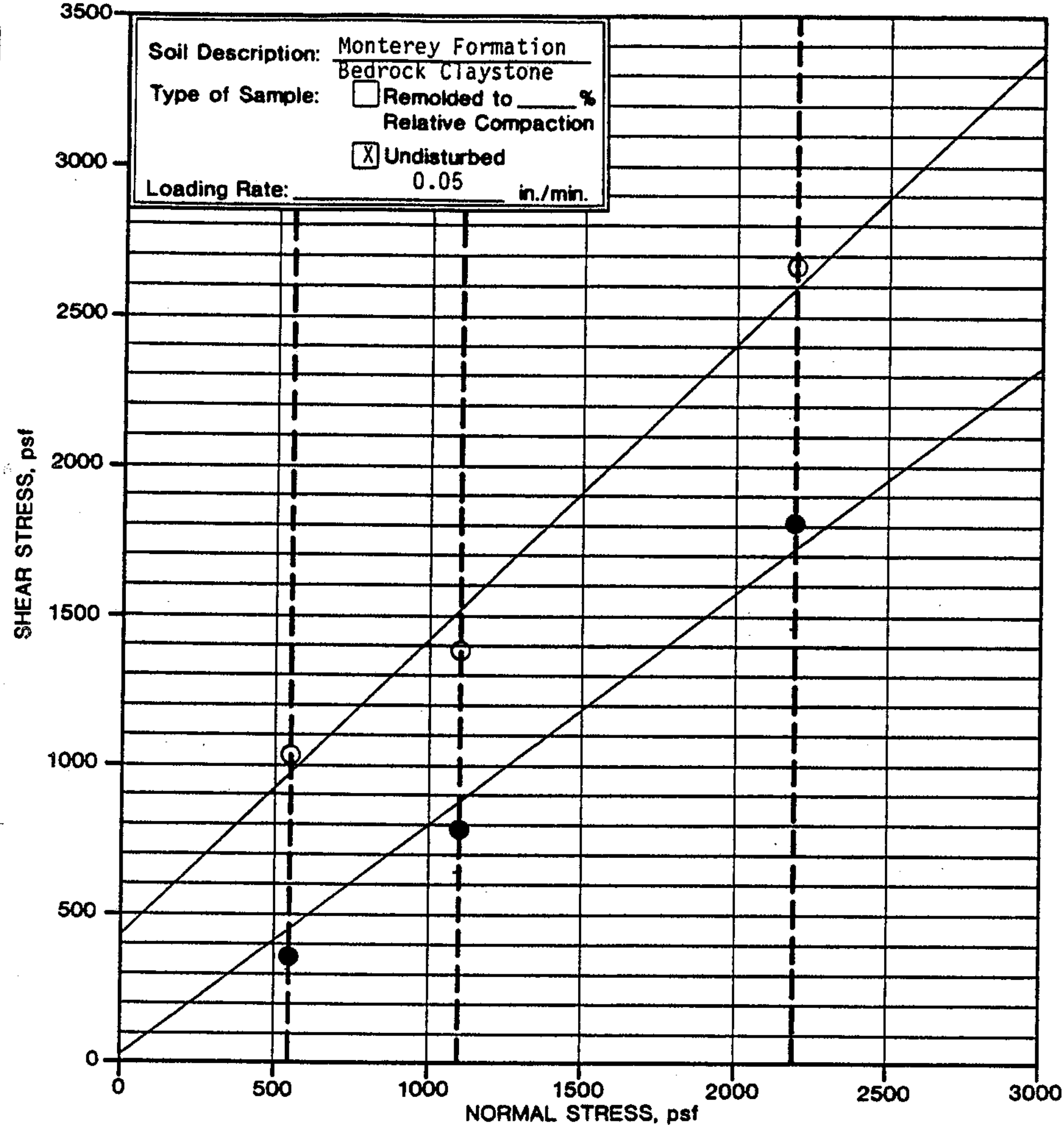


Sample Location	Symbol	Average Moisture Contents Before	Average Moisture Contents After	Friction Angle	Cohesion	Remarks
B-13 @ 20'	○	15.9	18.8	35°	390 (psf)	PEAK
B-13 @ 20'	●	15.9	18.8	35°	100	ULTIMATE

DIRECT SHEAR TEST RESULTS

Project No. 3831025-04
Project Name EAI/RANCHO MALIBU MESA
Date 8/89 Figure No. D-16

3015 1088



Sample Location	Symbol	Average Moisture Contents Before	After	Friction Angle	Cohesion	Remarks
B-16 @ 47'	○	51.3	52.9	44°	440 (psf)	PEAK
B-16 @ 47'	●	51.3	52.9	37°	30	ULTIMATE

DIRECT SHEAR TEST RESULTS

Project No. 3831025-04
Project Name EAI/RANCHO MALIBU MESA
Date 8/89 Figure No. D-17

3015 1088

September 15, 2011
W.O. 6489

APPENDIX G

BORING AND LABORATORY TEST RESULTS BY VAN BEVEREN AND BUTELO

BORING 1

Date Drilled: June 27, 2007
Equipment Used: 24" Diameter Bucket

Depth to Water: Not Encountered
Driving Weight & Drop: 2,500 pounds (0 to 25 feet)
1,000 pounds (> 25 feet)

SURFACE ELEVATION: 210 feet MSL*

ELEVATION (feet)	DEPTH (feet)	MOISTURE (% of dry wt.)	DRY DENSITY (pcf)	N VALUE (SPT)	BLOW COUNT (blows / 12-inches)	SAMPLE LOCATION	DESCRIPTION
							TERRACE DEPOSITS SM - SILTY SAND - fine, porous, brown
		3.6	105		5	⋈	
		9.6	108		8	⋈	trace clay, not porous, reddish brown [40% Passing No. 200 Sieve]
205	5						
		9.6	117		6	⋈	trace fine gravel
		11.8	122		6	⋈	
200	10						
		10.5	107		5	⋈	
195	15						
		10.1	121		6	⋈	
190	20						
		7.7	119		7	⋈	trace cobble (up to 6" in size)
							yellowish brown
185	25						
		12.8	117		5	⋈	reddish brown
							SP - SAND - fine, light yelowish brown
180	30						
		1.9	101		9	⋈	[3 % Passing No. 200 Sieve]
175	35						
		3.7	112		23	⋈	some gravel and cobbles (up to 10" in size)
							END OF BORING AT 39 FEET.
170	40						

(Continued on next page)

LOG OF BORING

Job No: 07-023 By: BL Date: 7-13-2007 Checked: Printed: 9-27-07 [LOG FOR FIELD: 07-023.GPJ]

The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

VAN BEVEREN & BUTELO, INC.

FIGURE A-2.1a

BORING 1
(Continued)

Date Drilled: June 27, 2007
Equipment Used: 24" Diameter Bucket

Depth to Water: Not Encountered
Driving Weight & Drop: 2,500 pounds (0 to 25 feet)
1,000 pounds (> 25 feet)

SURFACE ELEVATION: 210 feet MSL*

ELEVATION (feet)	DEPTH (feet)	MOISTURE (% of dry wt.)	DRY DENSITY (pcf)	N VALUE (SPT)	BLOW COUNT (blows / 12-inches)	SAMPLE LOCATION
165	45					
160	50					
155	55					
150	60					
145	65					
140	70					
135	75					
130	80					

Notes:

1. Fill not encountered.
2. Some caving from depths of 29 to 39 feet (up to 36 inches in diameter).
3. Groundwater not encountered.
4. Boring backfilled with soil cuttings and tamped.

* Elevations refter to datum of reference survey; see Figure 2.

The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

Job No: 07-023 By: BL Date: 7-13-2007 Checked: [signature] Printed: 9-27-07 [LOG FOR FIELD; 07-023.GPJ]

LOG OF BORING

VAN BEVEREN & BUTELO, INC.

FIGURE A-2.1b

BORING 2

Date Drilled: June 27, 2007
Equipment Used: 24" Diameter Bucket

Depth to Water: Not Encountered
Driving Weight & Drop: 2,500 pounds (0 to 25 feet)
1,000 pounds (> 25 feet)

SURFACE ELEVATION: 216 feet MSL*

ELEVATION (feet)	DEPTH (feet)	MOISTURE (% of dry wt.)	DRY DENSITY (pcf)	N VALUE (SPT)	BLOW COUNT (blows / 12-inches)	SAMPLE LOCATION	Description
215							**TERRACE DEPOSITS** SM - SILTY SAND - fine, few rootlets, slightly porous, reddish brown
		7.4	113		9	⋈	
		6.6	117		10	⋈	trace clay
	5						
210		4.6	97		9	⋈	not porous
		7.2	106		8	⋈	
	10						
205		3.2	122		16	⋈	few gravel
	15						
200		7.5	101		7	⋈	some mottling
	20						
195		12.3	117		5	⋈	
	25						
190		7.2	114		5	⋈	porous (up to 1/4 inch)
	30						
185		5.2	101		11	⋈	not porous
	35						
180		7.9	117		8	⋈	
	40						

(Continued on next page)

LOG OF BORING

VAN BEVEREN & BUTELO, INC.

FIGURE A-2.2a

The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

Job No: 07-023 By: BL Date: 7-13-2007 Checked: [signature] Printed: 9-27-07 [LOG FOR FIELD; 07-023.GPJ]

BORING 2
(Continued)

Date Drilled: June 27, 2007
Equipment Used: 24" Diameter Bucket

Depth to Water: Not Encountered
Driving Weight & Drop: 2,500 pounds (0 to 25 feet)
1,000 pounds (> 25 feet)

SURFACE ELEVATION: 216 feet MSL*

ELEVATION (feet)	DEPTH (feet)	MOISTURE (% of dry wt.)	DRY DENSITY (pcf)	N VALUE (SPT)	BLOW COUNT (blows / 12-inches)	SAMPLE LOCATION
175		0.9	101		13	
170	45					
165	50					
160	55					
155	60					
150	65					
145	70					
140	75					
	80					

END OF BORING AT 41 FEET.

Notes:

1. Fill not encountered.
2. Some caving from depths of 39 to 41 feet (up to 36 inches in diameter).
3. Groundwater not encountered.
4. Boring backfilled with soil cuttings and tamped.

The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

Job No: 07-023 By: BL Date: 7-13-2007 Checked: JC Printed: 9-27-07 [LOG FOR FIELD; 07-023.GPJ]

LOG OF BORING

VAN BEVEREN & BUTELO, INC.

FIGURE A-2.2b

BORING 3

Date Drilled: June 28, 2007
Equipment Used: 24" Diameter Bucket

Depth to Water: Not Encountered
Driving Weight & Drop: 2,500 pounds (0 to 25 feet)
1,000 pounds (26 to 45 feet)
750 pounds (>45 feet)

SURFACE ELEVATION: 234 feet MSL*

ELEVATION (feet)	DEPTH (feet)	MOISTURE (% of dry wt.)	DRY DENSITY (pcf)	N VALUE (SPT)	BLOW COUNT (blows / 12-inches)	SAMPLE LOCATION	DESCRIPTION
							FILL SM - SILTY SAND
							TERRACE DEPOSITS SM - SILTY SAND - fine, reddish brown
		7.6	110		12	X	
230	5	4.8	111		8	X	trace clay
		4.7	109		8	X	
225	10						
		6.6	106		10	X	
		8.4	119		8	X	
220	15	11.1	102		8	X	porous
		7.4	109		8	X	not porous
215	20	8.9	112		9	X	slightly porous
210	25	9.4	104		6	X	[28% Passing No. 200 Sieve]
205	30	10.5	111		6	X	not porous, few gravel [36% Passing No 200 Sieve]
200	35	9.8	104		8	X	
195	40						

(Continued on next page)

LOG OF BORING

Job No: 07-023 By: BL Date: 7-13-2007 Checked: [signature] Printed: 9-27-07 [LOG FOR FIELD: 07-023.GPJ]

The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

VAN BEVEREN & BUTELO, INC.

FIGURE A-2.3a

BORING 3
(Continued)

Date Drilled: June 28, 2007
Equipment Used: 24" Diameter Bucket

Depth to Water: Not Encountered
Driving Weight & Drop: 2,500 pounds (0 to 25 feet)
1,000 pounds (26 to 45 feet)
750 pounds (>45 feet)

SURFACE ELEVATION: 234 feet MSL*

ELEVATION (feet)	DEPTH (feet)	MOISTURE (% of dry wt.)	DRY DENSITY (pcf)	N VALUE (SPT)	BLOW COUNT (blows / 12-inches)	SAMPLE LOCATION	DESCRIPTION
		12.7	119		6		
190	45				6		
185	50				23		SP-SM - SAND - fine, some silt, light yellowish brown
							END OF BORING AT 51 FEET.
180	55						
175	60						
170	65						
165	70						
160	75						
155	80						

Notes:

1. Fill encountered to depth of 8".
2. No caving.
3. Groundwater not encountered.
4. Boring backfilled with soil cutting and tamped.

The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

Job No: 07-023 By: BL Date: 7-13-2007 Checked: Printed: 9-27-07 [LOG FOR FIELD: 07-023.GPJ]

LOG OF BORING

VAN BEVEREN & BUTELO, INC.

FIGURE A-2.3b

BORING 4

Date Drilled: June 28, 2007
Equipment Used: 24" Diameter Bucket

Depth to Water: Not Encountered
Driving Weight & Drop: 2,500 pounds (0 to 25 feet)
1,000 pounds (> 25 feet)

SURFACE ELEVATION: 215 feet MSL*

ELEVATION (feet)	DEPTH (feet)	MOISTURE (% of dry wt.)	DRY DENSITY (pcf)	N VALUE (SPT)	BLOW COUNT (blows / 12-inches)	SAMPLE LOCATION	DESCRIPTION
							TERRACE DEPOSITS SM - SILTY SAND - fine, light greyish brown
		7.5	111		7	⧓	reddish brown
210	5	3.5	89		6	⧓	
							some subrounded cobbles to 4" in diameter
		5.6	119		8	⧓	Increased gravel up to 3/4" in diameter, slightly darker reddish brown
205	10	4.4	122		15	⧓	Clayey sand layer 4" thick horizontal
200	15	10.3	115		9	⧓	Wet and clayey in 2 foot thick zone
							yellowish to reddish brown
195	20					⧓	layer of sandy gravel from 20 to 22 feet
190	25						8" diameter cobbles
		10.7	109		9	⧓	
185	30	13.1	122		9	⧓	trace clay, color orange to dark yellow brown [core bucket used from 32 to 39 feet]
180	35	17.4	111		5	⧓	
175	40						END OF BORING AT 39 FEET.

(Continued on next page)

The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

Job No: 07-023 By: BL Date: 7-13-2007 Checked: JM Printed: 9-27-07 [LOG FOR FIELD; 07-023.GPJ]

LOG OF BORING

VAN BEVEREN & BUTELO, INC.

FIGURE A-2.4a

BORING 4
(Continued)

Date Drilled: June 28, 2007
Equipment Used: 24" Diameter Bucket

Depth to Water: Not Encountered
Driving Weight & Drop: 2,500 pounds (0 to 25 feet)
1,000 pounds (> 25 feet)

SURFACE ELEVATION: 215 feet MSL*

ELEVATION (feet)	DEPTH (feet)	MOISTURE (% of dry wt.)	DRY DENSITY (pcf)	N VALUE (SPT)	BLOW COUNT (blows / 12-inches)	SAMPLE LOCATION
170	45					
165	50					
160	55					
155	60					
150	65					
145	70					
140	75					
135	80					

Notes:

1. Fill not encountered.
2. No caving.
3. Groundwater not encountered.
4. Boring backfilled with soil cuttings and tamped.

Job No: 07-023 By: BL Date: 7-13-2007 Checked: ✓ Printed: 9-27-07 [LOG FOR FIELD; 07-023.GPJ]

The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

LOG OF BORING

VAN BEVEREN & BUTELO, INC.

FIGURE A-2.4b

BORING 5

Date Drilled: June 29, 2007
Equipment Used: 24" Diameter Bucket

Depth to Water: Not Encountered
Driving Weight & Drop: 2,500 pounds (0 to 25 feet)
1,000 pounds (> 25 feet)

SURFACE ELEVATION: 246 feet MSL*

ELEVATION (feet)	DEPTH (feet)	MOISTURE (% of dry wt.)	DRY DENSITY (pcf)	N VALUE (SPT)	BLOW COUNT (blows / 12-inches)	SAMPLE LOCATION	DESCRIPTION
245							**TERRACE DEPOSITS** SM - SILTY SAND - fine, some gravel (up to ½" in size), reddish brown
		7.1	99		5	⋈	
240	5	7.4	116		7	⋈	
		8.7	111		6	⋈	few gravel, trace clay, porous
235	10	9.3	107		8	⋈	not porous
		11.2	124		7	⋈	
230	15	10.0	124		7	⋈	
							some gravel
225	20	7.5	109		4	⋈	
220	25	6.4	106		5	⋈	
215	30	7.2	104		6	⋈	
							END OF BORING AT 31 FEET.
210	35						
	40						

Notes:

1. Fill not encountered.
2. No caving.
3. Groundwater not encountered.
4. Boring backfilled with soil cutting and tamped.

LOG OF BORING

VAN BEVEREN & BUTELO, INC.

FIGURE A-2.5

The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

Job No: 07-023 By: BL Date: 7-13-2007 Checked: [handwritten initials] Printed: 9-27-07 [LOG FOR FIELD; 07-023.GPJ]

BORING 6

Date Drilled: July 2, 2007
Equipment Used: 24" Diameter Bucket

Depth to Water: Not Encountered
Driving Weight & Drop: 2,500 pounds (0 to 25 feet)
1,000 pounds (26 to 45 feet)
750 pounds (>45 feet)

SURFACE ELEVATION: 252 feet MSL*

ELEVATION (feet)	DEPTH (feet)	MOISTURE (% of dry wt.)	DRY DENSITY (pcf)	N VALUE (SPT)	BLOW COUNT (blows / 12-inches)	SAMPLE LOCATION	DESCRIPTION
							TERRACE DEPOSITS SM - SILTY SAND - fine, some gravel (up to ½" in size), reddish brown, 14" topsoil, porous in upper 14", rootlets
250		6.2	121		7	⧓	
							gravel to 3/4"
	5	7.2	113		11	⧓	
245		9.0	116		9	⧓	some gravel (up to 1" diameter) [27% Passing No. 200 Sieve]
	10	8.8	112		6	⧓	porous, some clay
240							
	15	11.4	108		8	⧓	CL - SANDY CLAY - reddish brown, manganese stained
235							cobbles to 4½" diameter, subangular to subrounded, rootlets
	20	5.6	117		5	⧓	SM - SILTY SAND - some clay, yellow brown to red brown
230							
	25	4.8	119		9	⧓	
225							SC - CLAYEY SAND - fine, reddish brown
	30	13.9	107		12	⧓	
220							SM - SILTY SAND - fine, some gravel (up to 3" in size), reddish brown
	35	2.1	106		21	⧓	
215							
	40						

(Continued on next page)

LOG OF BORING

The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated.
It is not warranted to be representative of subsurface conditions at other locations and times.

Job No: 07-023 By: BL Date: 7-13-2007 Checked: JL Printed: 9-27-07 [LOG FOR FIELD; 07-023.GPJ]

VAN BEVEREN & BUTELO, INC.

FIGURE A-2.6a

BORING 6
(Continued)

Date Drilled: July 2, 2007
Equipment Used: 24" Diameter Bucket

Depth to Water: Not Encountered
Driving Weight & Drop: 2,500 pounds (0 to 25 feet)
1,000 pounds (26 to 45 feet)
750 pounds (>45 feet)

SURFACE ELEVATION: 252 feet MSL*

ELEVATION (feet)	DEPTH (feet)	MOISTURE (% of dry wt.)	DRY DENSITY (pcf)	N VALUE (SPT)	BLOW COUNT (blows / 12-inches)	SAMPLE LOCATION	Description
		19.1	109		8	⧓	some clay, some gravel (up to ½" in size), mottled brown and dark brown
210							
	45	10.4	96		12	⧓	
205							
	50	18.6	102		23	⧓	CL - SANDY CLAY - some gravel (up to ½" in size), mottled brown and dark brown
200							
	55	16.7	91		22	⧓	**BEDROCK** Conejo volcanics, weathered basalt, gray, friable
195							
	60	21.7	101		19	⧓	increasing sand [LL=43, PI=30]
190							**END OF BORING AT 61 FEET.**
	65						
185							
	70						
180							
	75						
175							
	80						

Notes:

1. Fill not encountered.
2. No caving.
3. Groundwater not encountered.
4. Boring backfilled with soil cuttings and tamped.

Job No: 07-023 By: BL Date: 7-13-2007 Checked: ✓ Printed: 9-27-07 [LOG FOR FIELD: 07-023.GPJ]

The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

LOG OF BORING

VAN BEVEREN & BUTELO, INC.

FIGURE A-2.6b

BORING 7

Date Drilled: July 2, 2007
Equipment Used: 24" Diameter Bucket

Depth to Water: Not Encountered
Driving Weight & Drop: 2,500 pounds (0 to 25 feet)
1,000 pounds (26 to 45 feet)
750 pounds (>45 feet)

SURFACE ELEVATION: 231 feet MSL*

ELEVATION (feet)	DEPTH (feet)	MOISTURE (% of dry wt.)	DRY DENSITY (pcf)	N VALUE (SPT)	BLOW COUNT (blows / 12-inches)	SAMPLE LOCATION	Description
230							**FILL** SM - SILTY SAND - fine, abundant gravel and cobbles, greyish brown
							TERRACE DEPOSITS SM - SILTY SAND - fine, reddish brown
		7.3	121		10	⋈	
225	5	8.6	109		5	⋈	some gravel (up to 1½ " in size), slightly porous
		3.8	104		6	⋈	not porous
220	10	5.2	101		7	⋈	some gravel (up to ½" in size)
215	15	5.0	103		5	⋈	porous
210	20	5.7	112		7	⋈	
205	25	4.8	103		7	⋈	
200	30	5.2	113		13	⋈	not porous
195	35	10.1	103		10	⋈	
	40						

(Continued on next page)

LOG OF BORING

Job No: 07-023 By: BL Date: 7-13-2007 Checked: [signature] Printed: 9-27-07 [LOG FOR FIELD: 07-023.GPJ]

The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

VAN BEVEREN & BUTELO, INC.

FIGURE A-2.7a

BORING 7
(Continued)

Date Drilled: July 2, 2007
Equipment Used: 24" Diameter Bucket

Depth to Water: Not Encountered
Driving Weight & Drop: 2,500 pounds (0 to 25 feet)
1,000 pounds (26 to 45 feet)
750 pounds (>45 feet)

SURFACE ELEVATION: 231 feet MSL*

ELEVATION (feet)	DEPTH (feet)	MOISTURE (% of dry wt.)	DRY DENSITY (pcf)	N VALUE (SPT)	BLOW COUNT (blows / 12-inches)	SAMPLE LOCATION	
190		4.2	116		11	⋈	some gravel (up to 1" in size)
185	45	6.4	104		13	⋈	trace clay
180	50	2.8	103		21	⋈	
175	55	7.0	96		26	⋈	porous
170	60	5.6	102		16	⋈	END OF BORING AT 61 FEET.
165	65						
160	70						
155	75						
	80						

Notes:

1. Fill soils encountered to a depth of 1 foot.
2. No caving.
3. Groundwater not encountered.
4. Boring backfilled with soil cutting and tamped.

Job No: 07-023 By: BL Date: 7-13-2007 Checked: ✓ Printed: 9-27-07 [LOG FOR FIELD: 07-023.GPJ]

The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

LOG OF BORING

VAN BEVEREN & BUTELO, INC.

FIGURE A-2.7b

BORING 8

Date Drilled: July 6, 2007
Equipment Used: 24" Diameter Bucket

Depth to Water: Not Encountered
Driving Weight & Drop: 2,500 pounds (0 to 25 feet)
1,000 pounds (26 to 45 feet)
750 pounds (>45 feet)

SURFACE ELEVATION: 184 feet MSL*

ELEVATION (feet)	DEPTH (feet)	MOISTURE (% of dry wt.)	DRY DENSITY (pcf)	N VALUE (SPT)	BLOW COUNT (blows / 12-inches)	SAMPLE LOCATION	DESCRIPTION
	0						**TERRACE DEPOSITS** SM - SILTY SAND - fine, some cobbles (up to 6" in size), reddish brown
		8.8	114	5		⧓	
180							
	5	7.6	108	5		⧓	no cobbles, some gravel (up to 1/4" in size)
		13.0	122	7		⧓	slightly porous
175							
	10	3.9	115	8		⧓	not porous
170							
	15	5.2	108	6		⧓	some gravel (up to 1 " in size)
165							
	20	6.9	109	9		⧓	slightly porous
160							
	25	4.2	114	11		⧓	not porous
155							
	30	3.6	118	15		⧓	
150							
	35	4.3	105	11		⧓	some gravel (up to ½" in size)
145							
	40						

(Continued on next page)

LOG OF BORING

VAN BEVEREN & BUTELO, INC.

FIGURE A-2.8a

Job No: 07-023 By: BL Date: 7-13-2007 Checked: ✓ Printed: 9-27-07 [LOG FOR FIELD: 07-023.GPJ]

The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

BORING 8
(Continued)

Date Drilled: July 6, 2007
Equipment Used: 24" Diameter Bucket

Depth to Water: Not Encountered
Driving Weight & Drop: 2,500 pounds (0 to 25 feet)
1,000 pounds (26 to 45 feet)
750 pounds (>45 feet)

SURFACE ELEVATION: 184 feet MSL*

ELEVATION (feet)	DEPTH (feet)	MOISTURE (% of dry wt.)	DRY DENSITY (pcf)	N VALUE (SPT)	BLOW COUNT (blows / 12-inches)	SAMPLE LOCATION	
		3.2	107		10		
140	45						END OF BORING AT 42 FEET.
135	50						
130	55						
125	60						
120	65						
115	70						
110	75						
105	80						

END OF BORING AT 42 FEET.

Notes:

1. Fill not encountered.
2. Some caving at 41 to 42 feet.
3. Groundwater not encountered.
4. Boring backfilled with soil cutting and tamped.

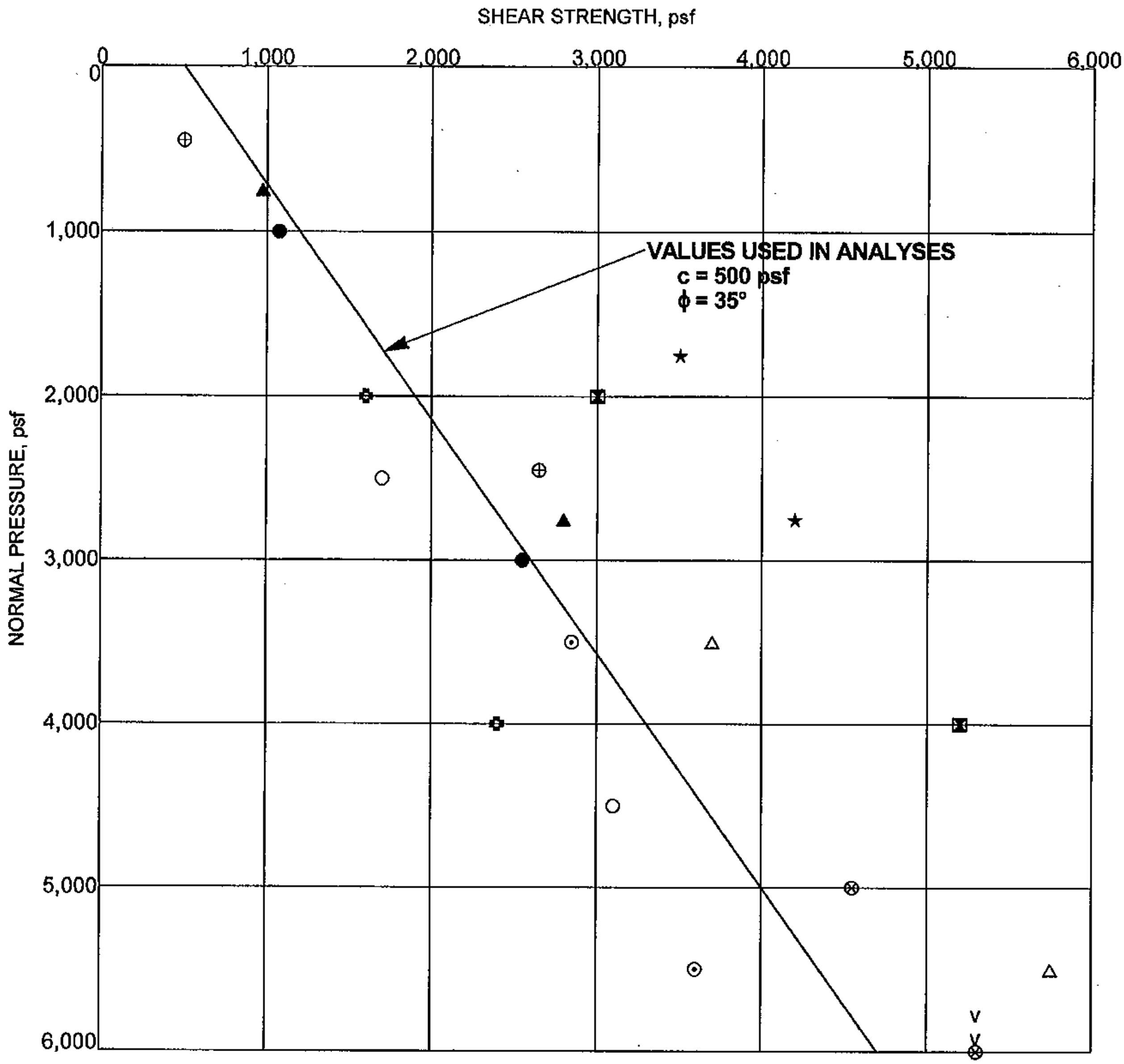
Job No: 07-023 By: BL Date: 7-13-2007 Checked: Printed: 9-27-07 [LOG FOR FIELD; 07-023.GPJ]

The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

LOG OF BORING

VAN BEVEREN & BUTELO, INC.

FIGURE A-2.8b



NOTE: "*" indicates sample was soaked to near saturation prior to testing.

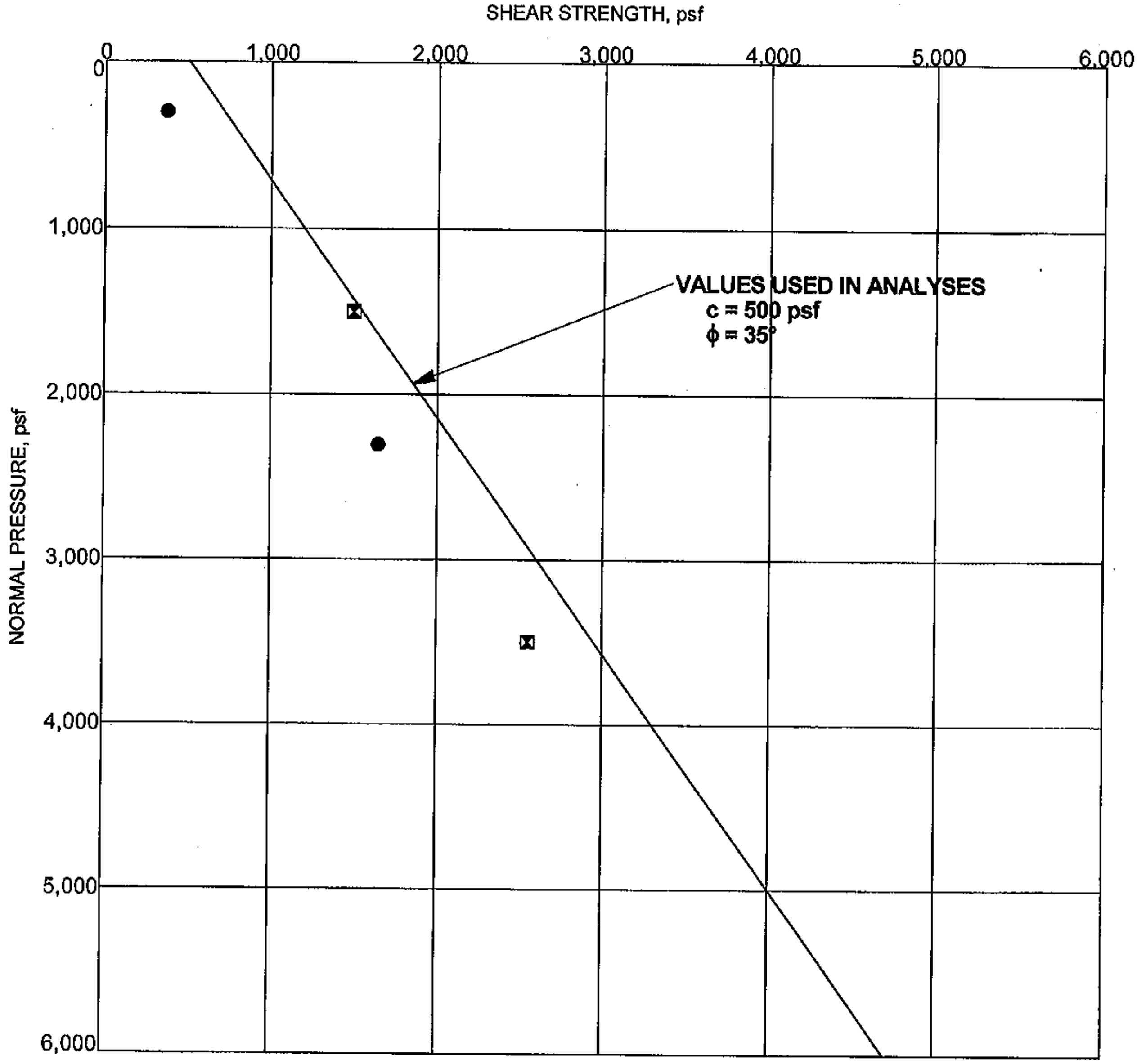
	Specimen Identification	Classification	c	ϕ	
●	Boring 1 at 10.5 feet	SILTY SAND	338	36	*
⊠	Boring 1 at 20.5 feet	SILTY SAND	800	48	
▲	Boring 3 at 7.5 feet	SILTY SAND	291	42	*
★	Boring 3 at 17.5 feet	SILTY SAND	2275	35	
⊙	Boring 4 at 35.5 feet	SILTY SAND	1538	21	*
✣	Boring 5 at 20.5 feet	SILTY SAND	800	22	*
○	Boring 5 at 30.5 feet	SILTY SAND	-50	35	*
△	Boring 6 at 40.5 feet	SANDY SILT	113	46	*
⊗	Boring 6 at 60.5 feet	WEATHERED BASALT	2675	21	*
⊕	Boring 7 at 4.5 feet	SILTY SAND	16	47	*

DIRECT SHEAR TEST DATA
UNDISTURBED SAMPLES, PEAK STRENGTH

VAN BEVEREN & BUTELO, INC.

FIGURE A-4.1a

DIRECT SHEAR 6_10 07-023.GPJ VB B.GDT 9/28/07



NOTE: "*" indicates sample was soaked to near saturation prior to testing.

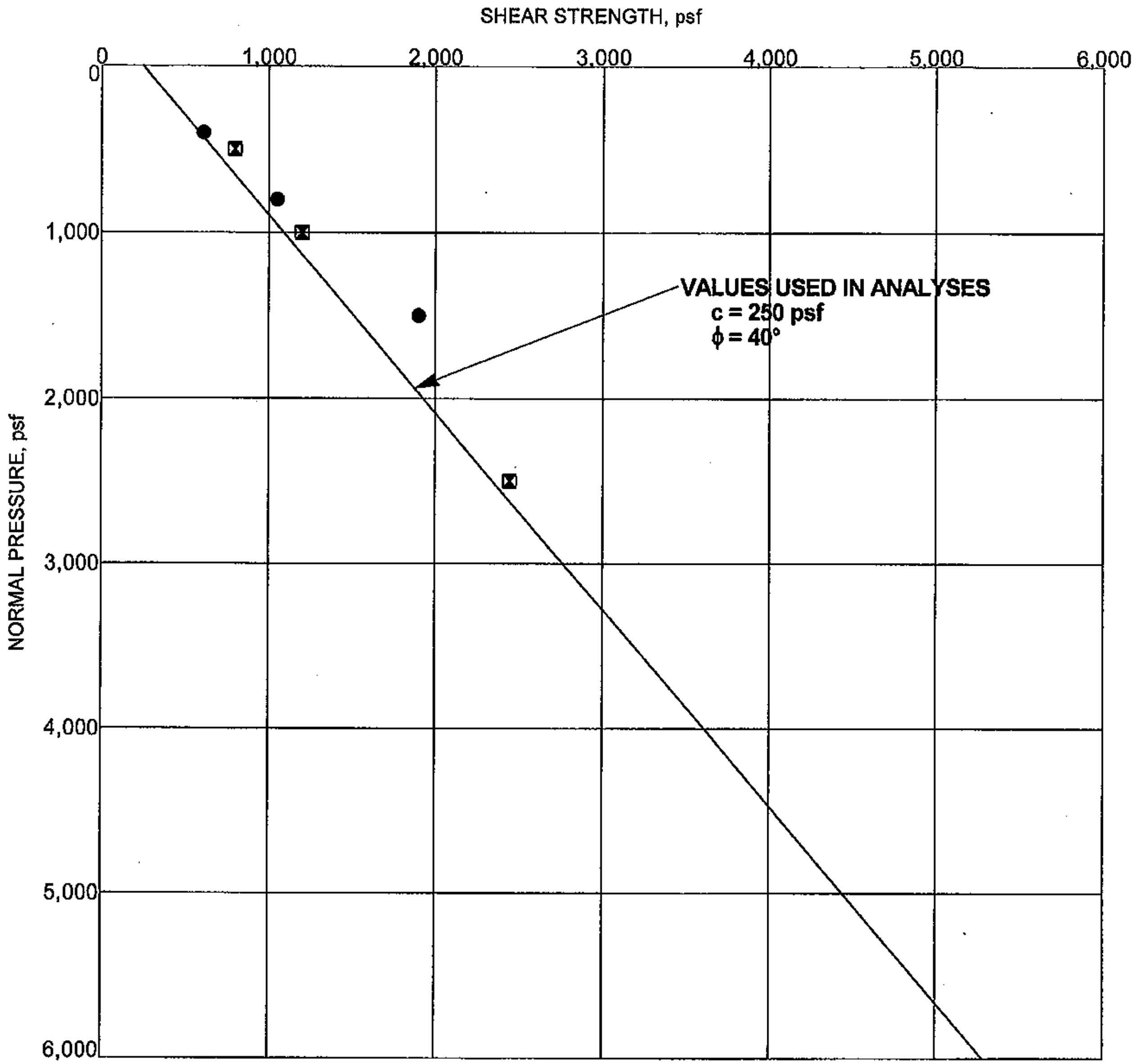
	Specimen Identification	Classification	c	ϕ	
●	Boring 8 at 2.5 feet	SILTY SAND	178	33	*
⊠	Boring 8 at 15.5 feet	SILTY SAND	713	28	*

DIRECT SHEAR TEST DATA
UNDISTURBED SAMPLES, PEAK STRENGTH

VAN BEVEREN & BUTELO, INC.

FIGURE A-4.1b

DIRECT SHEAR 6 10 07-023.GPJ VB B.GDT 9/28/07



NOTE: "*" indicates sample was soaked to near saturation prior to testing.

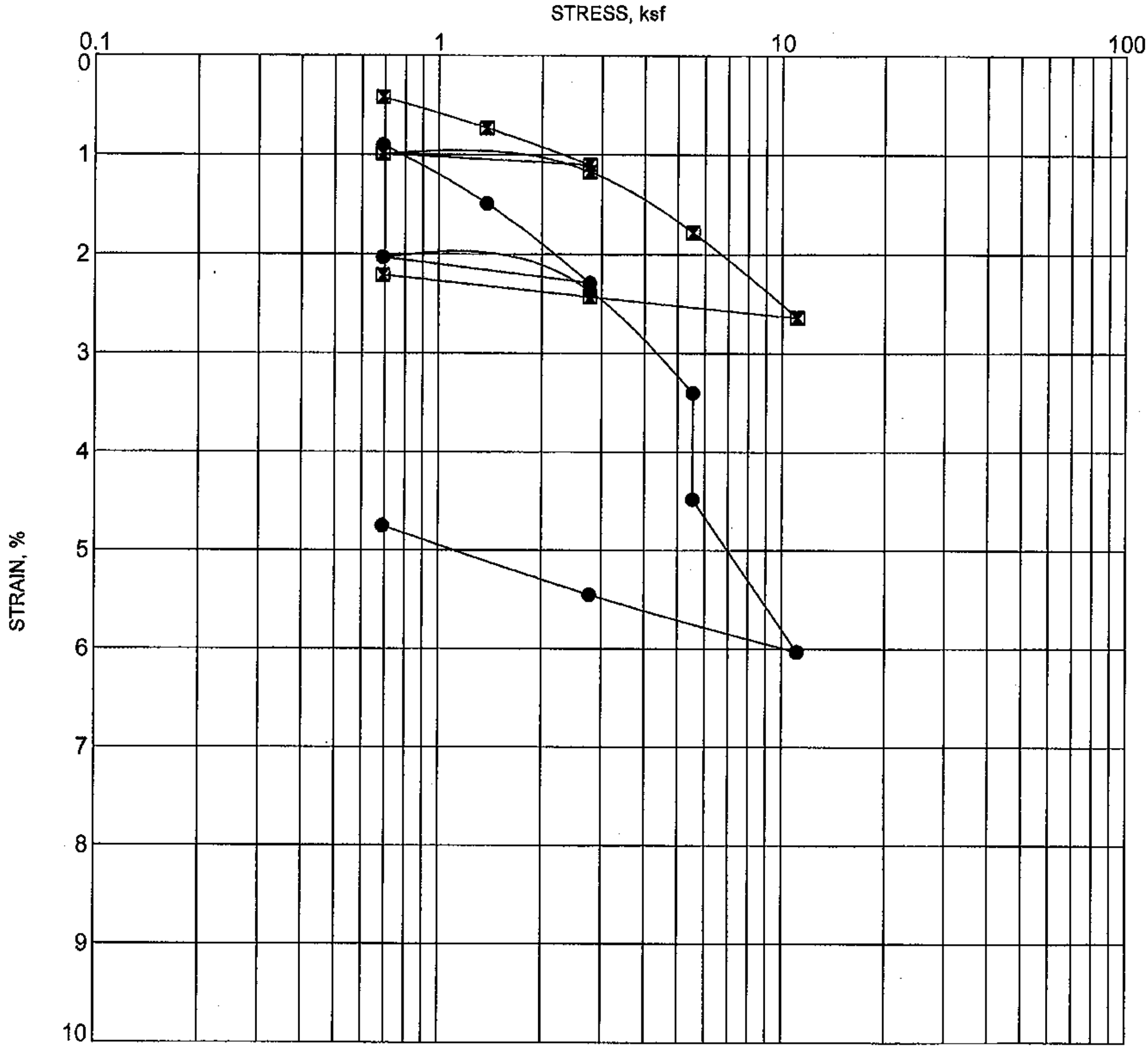
	Specimen Identification	Classification	c	ϕ	
●	Boring 1 at 4 to 7 feet	SILTY SAND	127	50	*
⊠	Boring 5 at 13 to 15 feet	SILTY SAND	381	40	*

DIRECT SHEAR TEST DATA
REMOLDED SAMPLES (90%), PEAK STRENGTH

VAN BEVEREN & BUTELO, INC.

DIRECT SHEAR 6 10 07-023.GPJ VB B.GDT 9/27/07

FIGURE A-4.2



NOTE: Samples tested at field moisture content

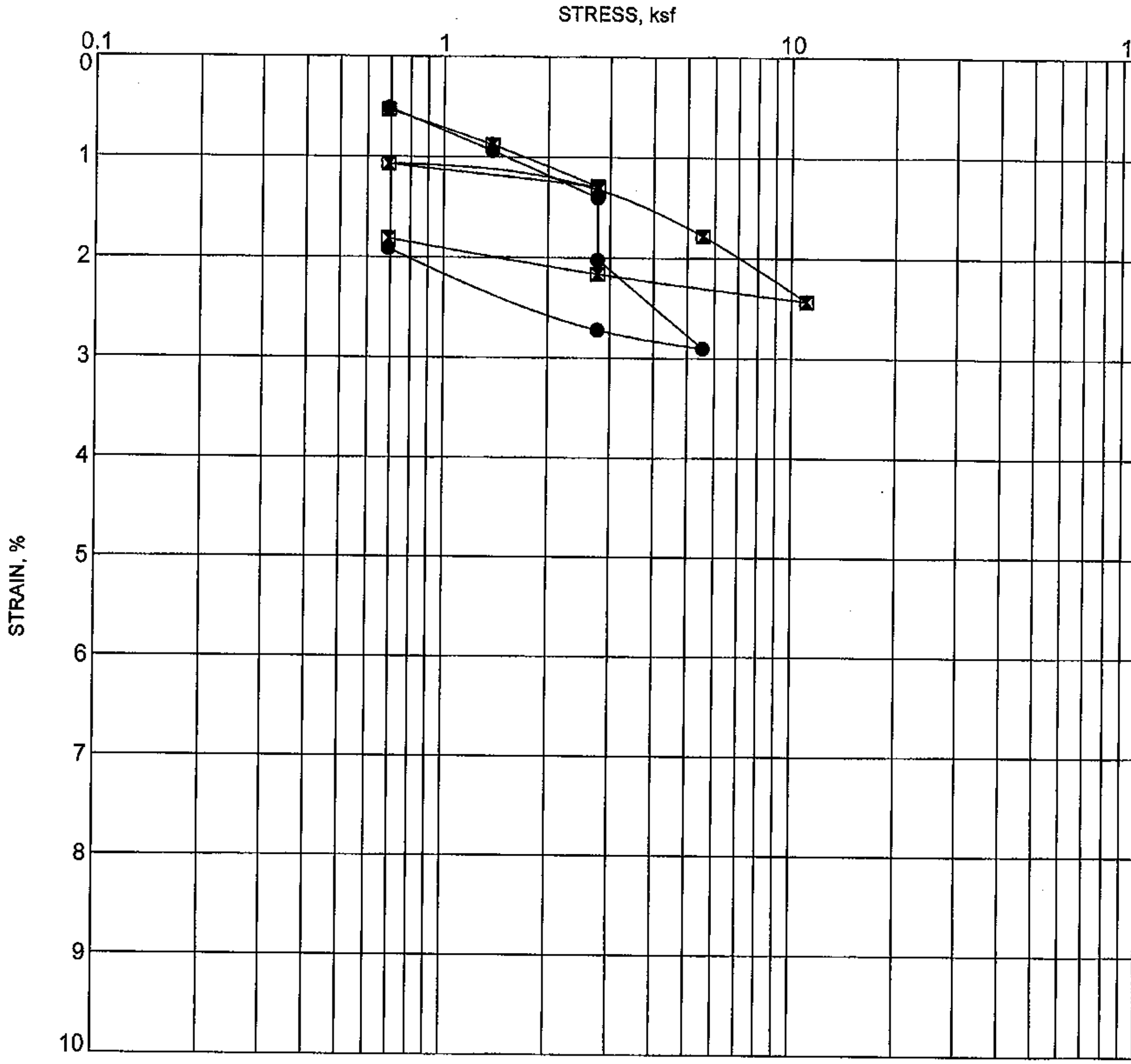
	Specimen Identification	Classification
●	**Boring 1 at 10.5 feet**	**SILTY SAND**
⊠	**Boring 1 at 25.5 feet**	**SILTY SAND**

* 5.54 ksf

CONSOLIDATION TEST DATA

VAN BEVEREN & BUTELO, INC.

CONSOL10 07-023.GPJ VB_B.GDT 9/27/07



NOTE: Samples tested at field moisture content

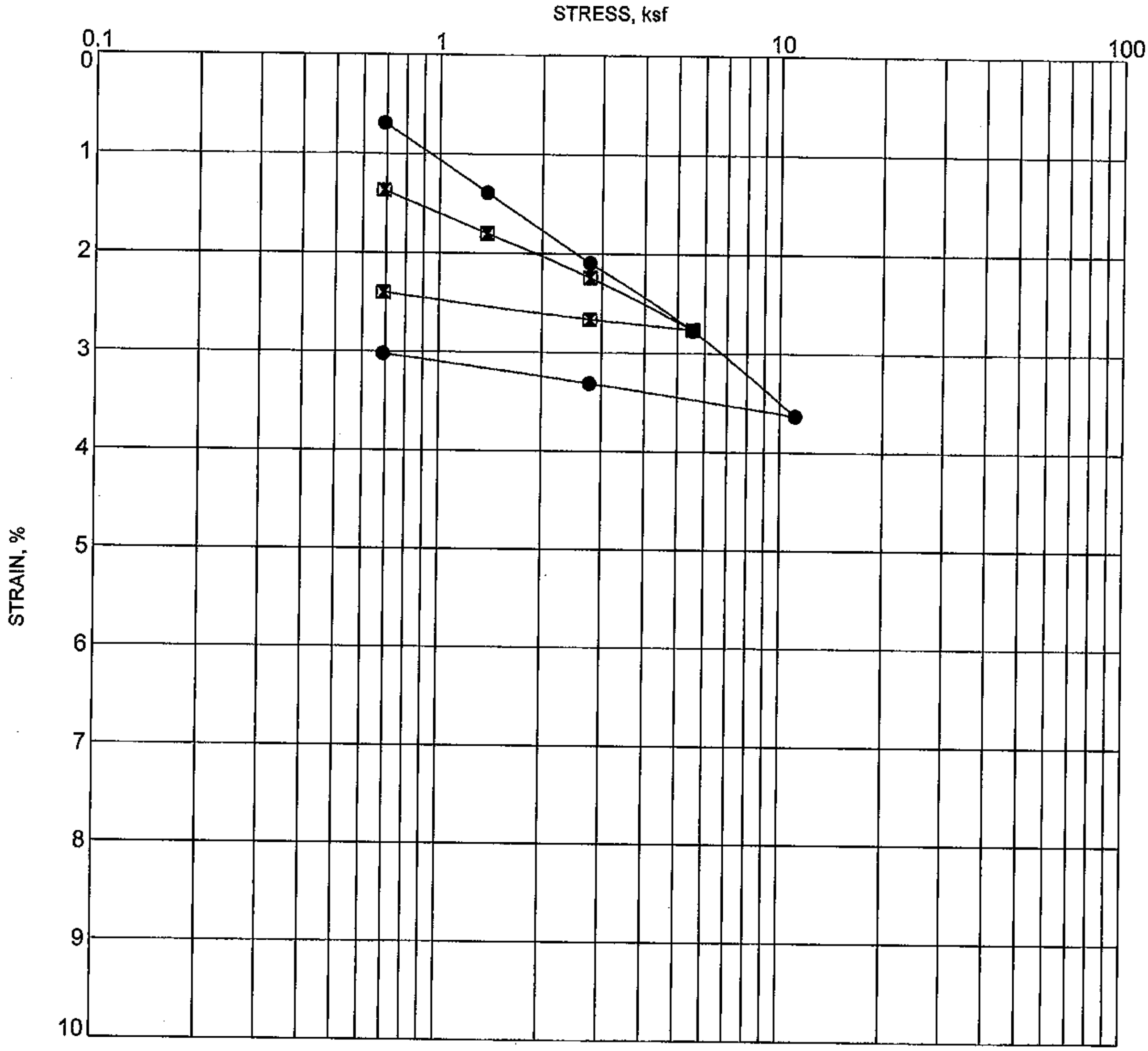
	Specimen Identification	Classification
●	**Boring 2 at 3.5 feet**	**SILTY SAND**
⊠	**Boring 3 at 17.5 feet**	**SILTY SAND**

* 2.77 ksf

CONSOLIDATION TEST DATA

VAN BEVEREN & BUTELO, INC.

FIGURE A-5.2



NOTE: Samples tested at field moisture content

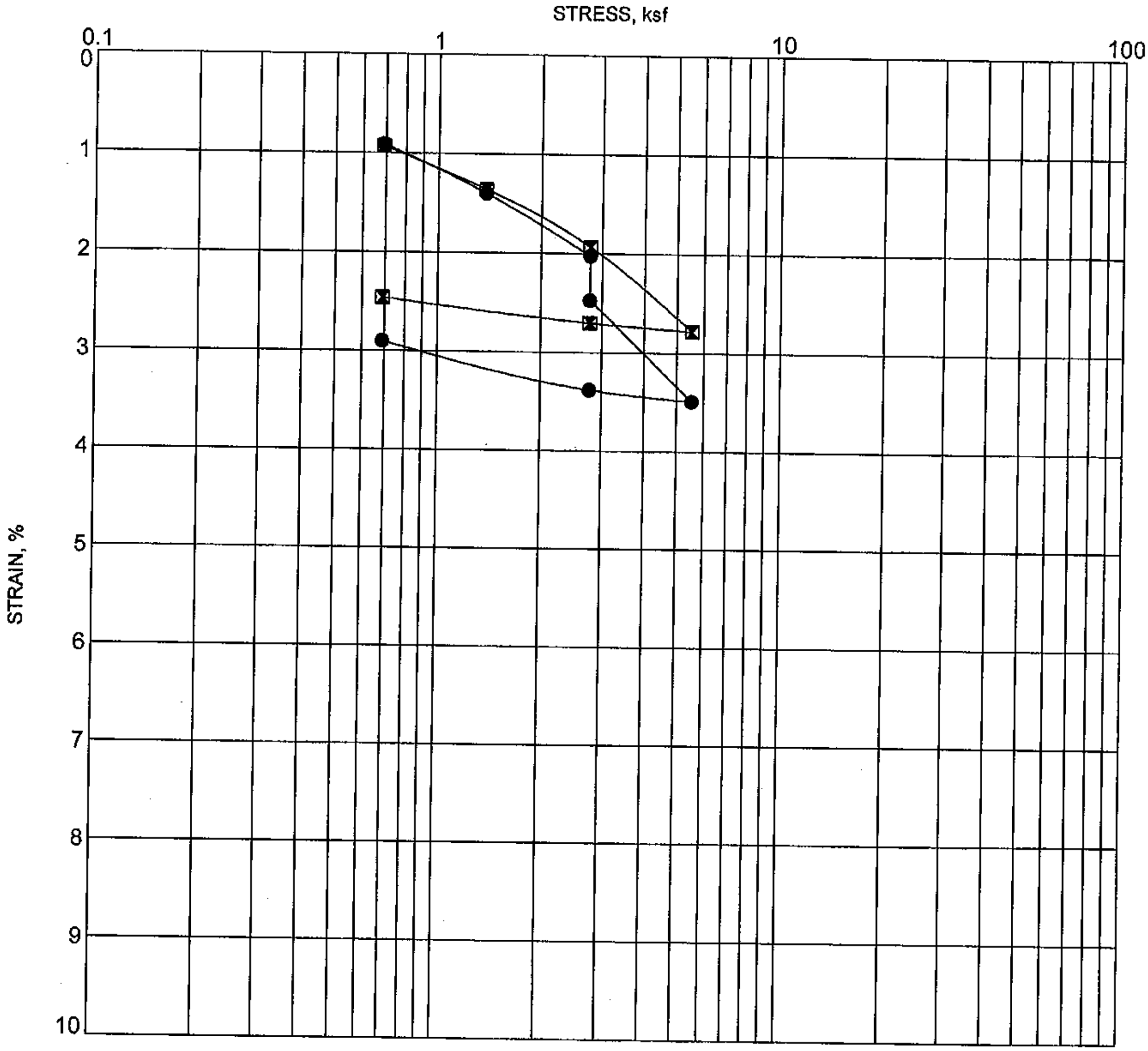
	Specimen Identification	Classification
●	**Boring 3 at 30.5 feet**	**SILTY SAND**
⊠	**Boring 4 at 2.5 feet**	**SILTY SAND**

CONSOLIDATION TEST DATA

VAN BEVEREN & BUTELO, INC.

FIGURE A-5.3

CONSOL10 07-023.GPJ VB B.GDT 9/27/07



NOTE: Samples tested at field moisture content

	Specimen Identification	Classification
●	**Boring 1 at 4 to 7 feet**	**SILTY SAND**
⊠	**Boring 3 at 2 to 4 feet**	**SILTY SAND**

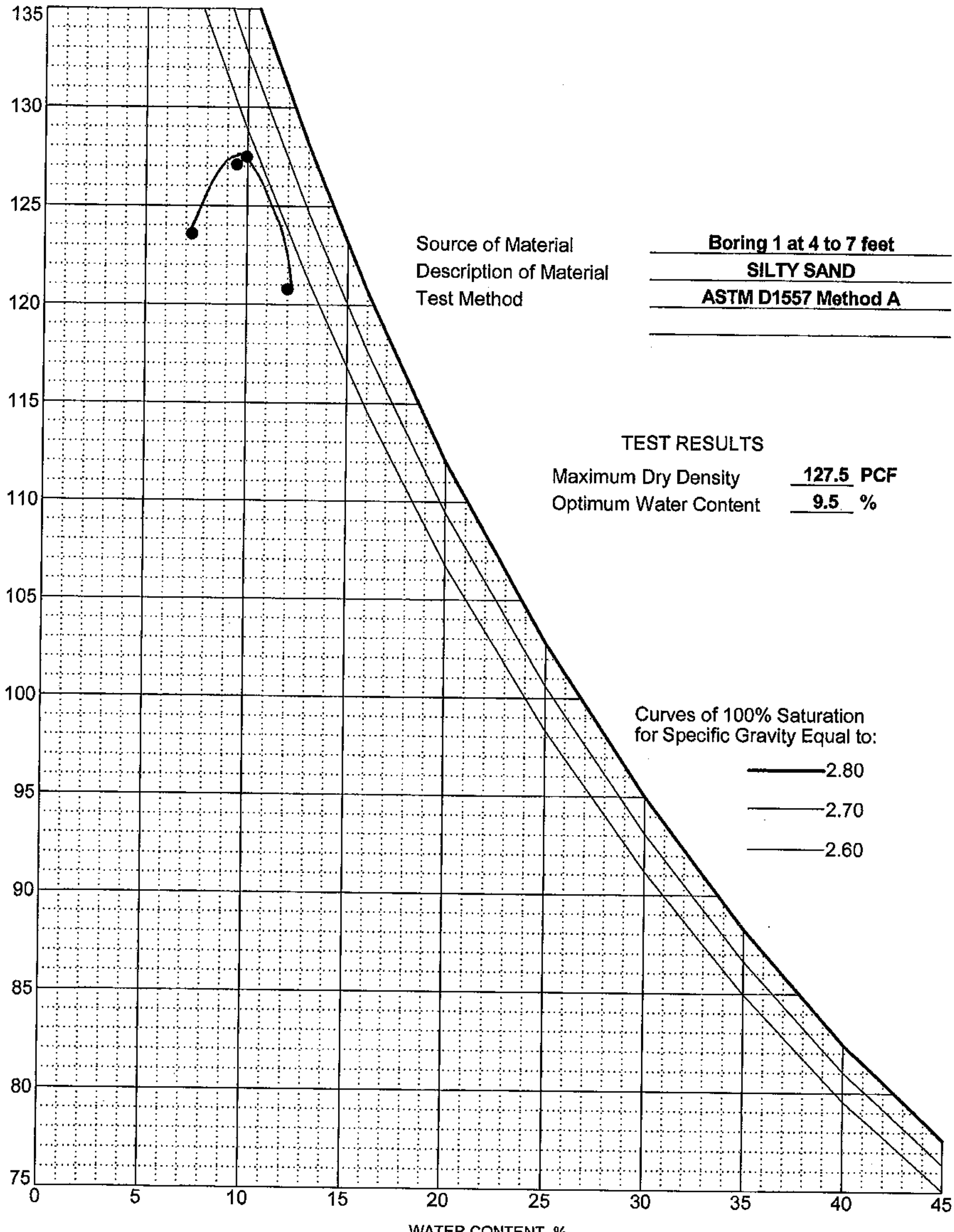
* 2.77 ksf

CONSOLIDATION TEST DATA

VAN BEVEREN & BUTELO, INC.

FIGURE A-5.4

CONSOL10 07-023.GPJ VB B.GDT 9/27/07

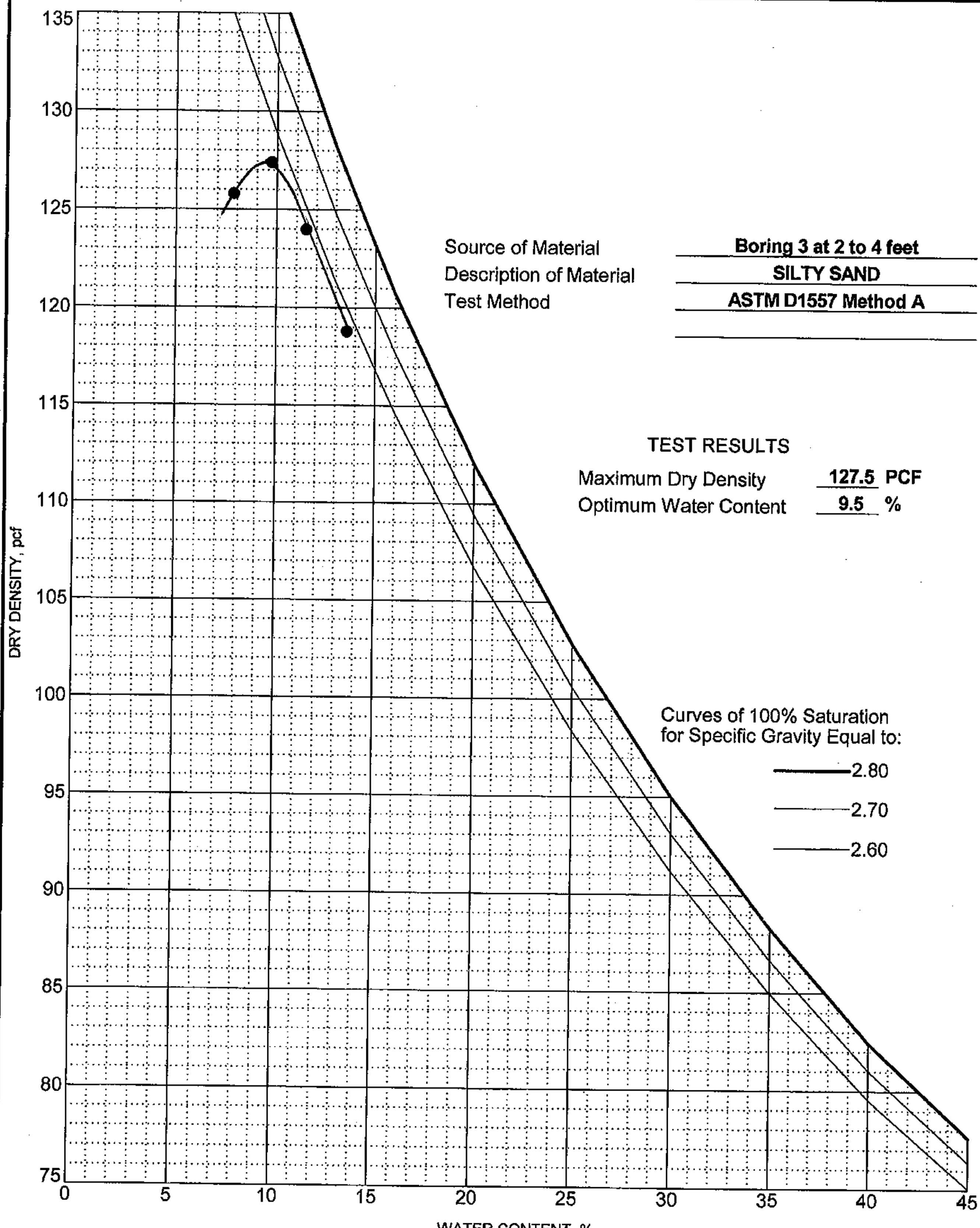


COMPACTION TEST DATA

VAN BEVEREN & BUTELO, INC.

FIGURE A-6.1

COMPACTION PARA 07-023.GPJ VB B.GDT 9/27/07



Source of Material	**Boring 3 at 2 to 4 feet**
Description of Material	**SILTY SAND**
Test Method	**ASTM D1557 Method A**

TEST RESULTS

Maximum Dry Density **127.5** PCF

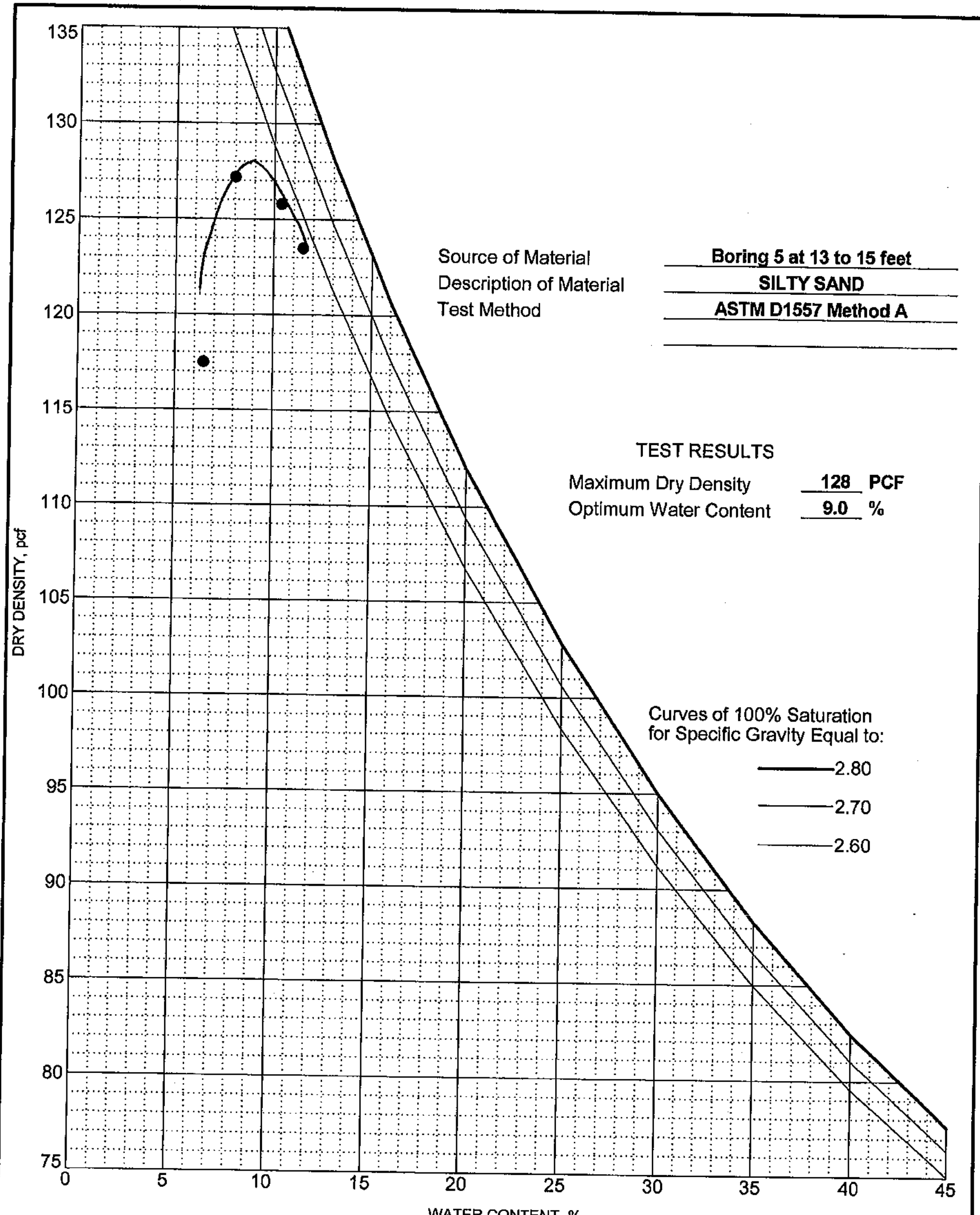
Optimum Water Content **9.5** %

COMPACTION TEST DATA

VAN BEVEREN & BUTELO, INC.

FIGURE A-6.2

COMPACTION PARA 07-023.GPJ VB B.GDT 9/27/07



COMPACTION TEST DATA

COMPACTION_PARA 07-023.GPJ VB-B.GDT 9/27/07

VAN BEVEREN & BUTELO, INC.

FIGURE A-6.3

R - VALUE DATA SHEET

P.N. 07-023
Rancho Malibu

PROJECT NUMBER 34767 BORING NUMBER: B-1 @ 4'-7'

SAMPLE DESCRIPTION: Brown Sandy Clay

Item	SPECIMEN a	SPECIMEN b	SPECIMEN c
Mold Number	4	5	6
Water added, grams	50	72	122
Initial Test Water, %	11.2	13.2	17.6
Compact Gage Pressure,psi	120	50	30
Exudation Pressure, psi	562	390	141
Height Sample, Inches	2.38	2.59	2.64
Gross Weight Mold, grams	3059	3105	3118
Tare Weight Mold, grams	1977	1975	1976
Sample Wet Weight, grams	1082	1130	1142
Expansion, Inches x 10exp-4	44	4	0
Stability 2,000 lbs (160psi)	22 / 52	52 / 117	70 / 155
Turns Displacement	3.72	3.78	4.47
R-Value Uncorrected	58	20	2
R-Value Corrected	55	21	2
Dry Density, pcf	123.9	116.8	111.4
DESIGN CALCULATION DATA			
Traffic Index Assumed:	4.0	4.0	4.0
G.E. by Stability	0.46	0.81	1.00
G. E. by Expansion	1.47	0.13	0.00

Equilibrium R-Value 12 by EXUDATION

Examined & Checked: 7 /17/ 07

REMARKS:
Gf = 1.25
0.0% Retained on the 3/4" Sieve.

Steven R. Marvin, RCE 30659

The data above is based upon processing and testing samples as received from the field. Test procedures in accordance with latest revisions to Department of Transportation, State of California, Materials & Research Test Method No. 301.

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FIGURE A-7.1

R-VALUE GRAPHICAL PRESENTATION

PROJECT NO. 34767 P.D. 07-023

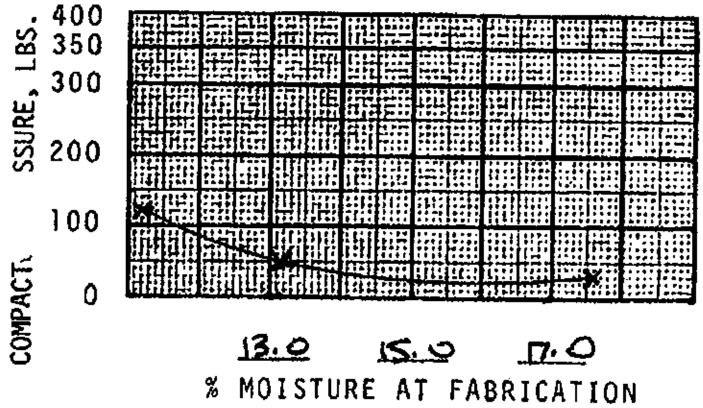
BORING NO. B-1 @ 4'-7' Rancho Malibu

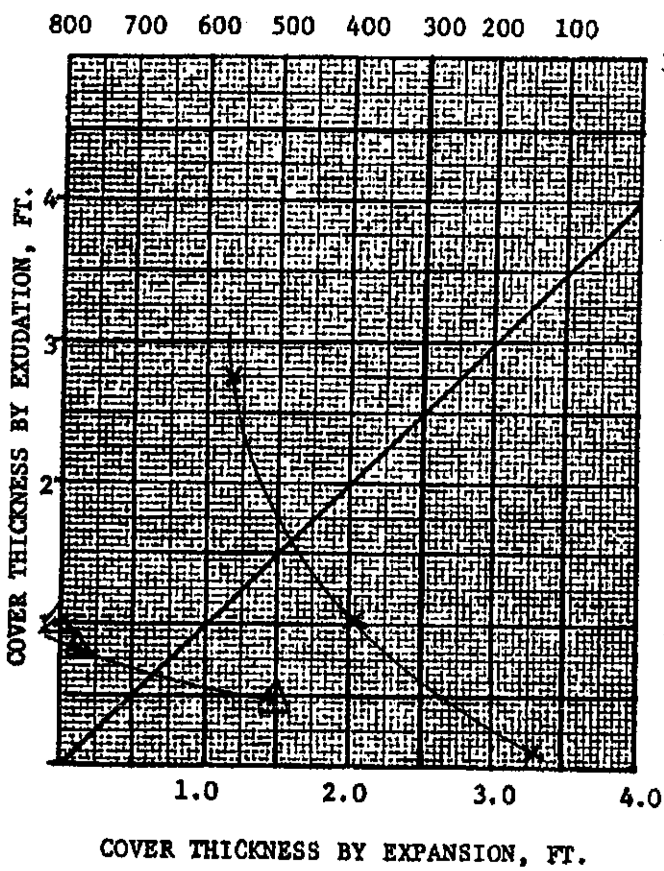
DATE 7-17-07

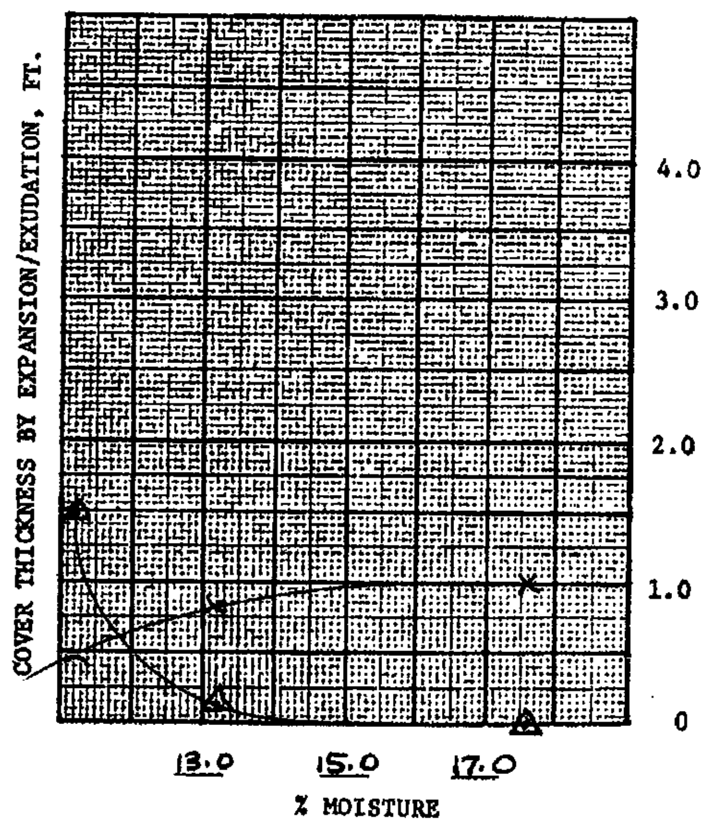
TRAFFIC INDEX Assume 4.0

R-VALUE BY EXUDATION 12

R-VALUE BY EXPANSION 2







R-VALUE vs. EXUD. PRES.

T by EXUDATION

EXUD. T vs. EXPAN. T

T by EXPANSION

REMARKS

GF=1.25

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FIGURE A-7.2

R - VALUE DATA SHEET

P.N. 07-023
Rancho Malibu

PROJECT NUMBER 34767 BORING NUMBER: B-5 @ 13'-15'

SAMPLE DESCRIPTION: Brown Sandy Clay

Item	SPECIMEN		
	a	b	c
Mold Number	7	8	9
Water added, grams	70	120	41
Initial Test Water, %	14.7	19.2	12.1
Compact Gage Pressure,psi	75	30	160
Exudation Pressure, psi	456	146	631
Height Sample, Inches	2.43	2.67	2.41
Gross Weight Mold, grams	3061	3094	2883
Tare Weight Mold, grams	1968	1964	1789
Sample Wet Weight, grams	1093	1130	1094
Expansion, Inches x 10exp-4	40	0	80
Stability 2,000 lbs (160psi)	45 / 117	65 / 154	29 / 78
Turns Displacement	2.99	4.68	2.94
R-Value Uncorrected	24	2	47
R-Value Corrected	23	2	45
Dry Density, pcf	118.8	107.5	122.7
	DESIGN	CALCULATION	DATA
Traffic Index Assumed:	4.0	4.0	4.0
G.E. by Stability	0.79	1.00	0.56
G. E. by Expansion	1.33	0.00	2.67

Equilibrium R-Value	12 by EXUDATION	Examined & Checked: 7 /17/ 07

REMARKS: Gf = 1.25
0.0% Retained on the
3/4" Sieve.

Steven R. Marvin RCE 30659

The data above is based upon processing and testing samples as received from the field. Test procedures in accordance with latest revisions to Department of Transportation, State of California, Materials & Research Test Method No. 301.

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FIGURE A-7.3

R-VALUE GRAPHICAL PRESENTATION

PROJECT NO. 34767
P.D. 07-023

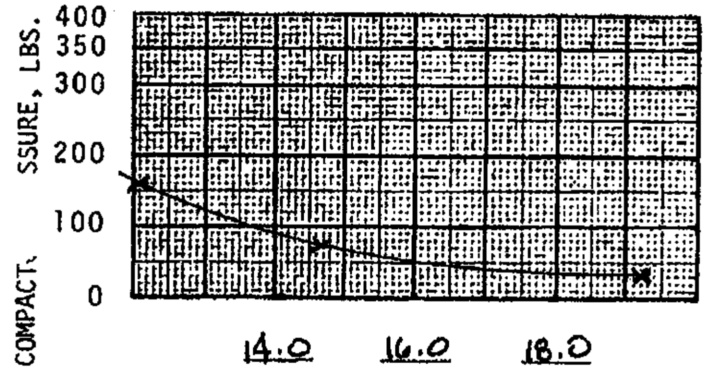
BORING NO. B-5 @ 13'-15'
Rancho Malibu

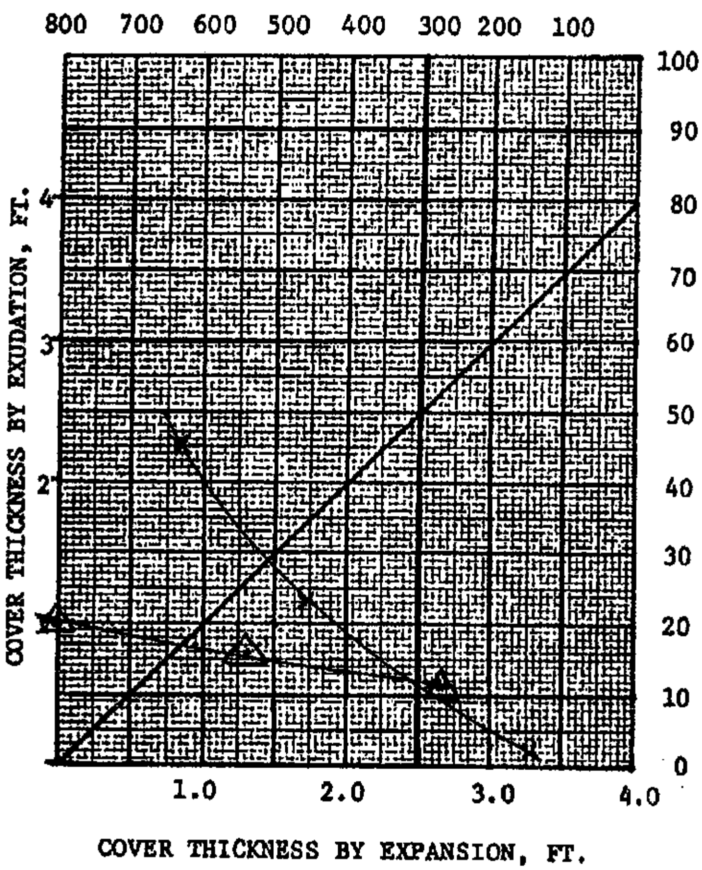
DATE 7-17-07

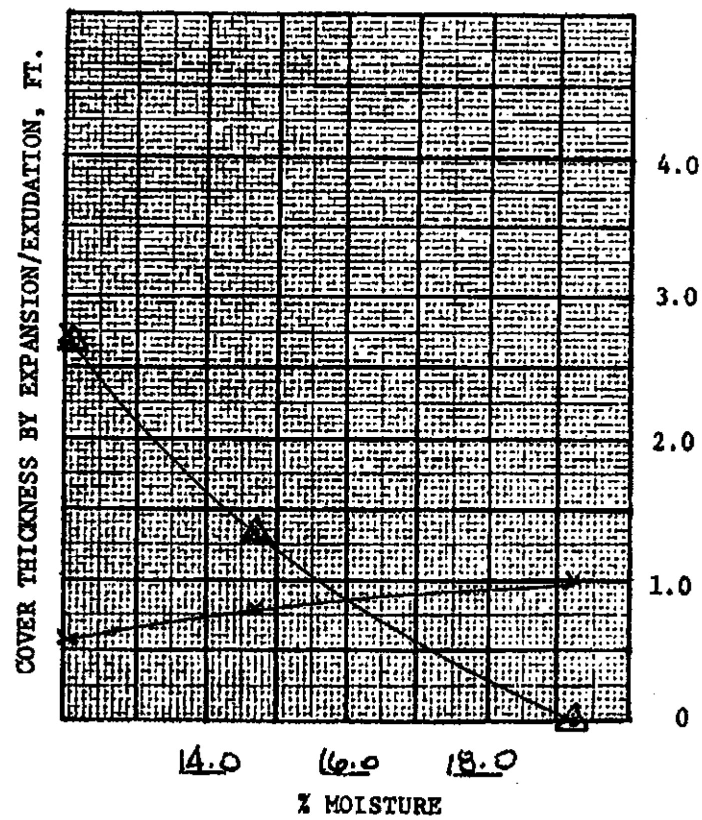
TRAFFIC INDEX Assume 4.0

R-VALUE BY EXUDATION 12

R-VALUE BY EXPANSION







R-VALUE vs. EXUD. PRES.

T by EXUDATION

EXUD. T vs. EXPAN. T

T by EXPANSION

REMARKS

GF=1.25

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FIGURE A-7.4

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July 23, 2007

Van Beveren & Butelo, Inc.
Attention: Victor Langharr
706 W. Broadway, Suite 201
Glendale, CA 91204

Atlantic Job No.: 2007-066

Subject: Soil Chemistry Analysis for Van Beveren & Butelo, Inc. Job # 07-023
4 Samples: B-1@ 1-3', B-3@ 2-4', B-7@ 2.5' and B-5@ 2.5' (Rancho Malibu)

Sample Number	As Rec'd Resistivity (ohm-cm)	[1]Minimum Resistivity (ohm-cm)	[2]pH	[3]Sulfate %	[3]Chloride %	(As Rec'd) Description
B-1	33,600	4,800	5.87	0.0044	0.0133	Medium Brown, moist
B-3	2,200	1,000	7.73	0.0130	0.0105	Medium Brown, moist
B-7	72,000	1,600	6.76	0.0062	0.0180	Light Brown Gravely, dry
B-5	4,400	1,400	7.04	0.0033	0.0213	Medium Brown, moist

NOTE: SAMPLES WERE ANALYZED IN ACCORDANCE WITH THE FOLLOWING METHODS.
1. MINIMUM RESISTIVITY DETERMINED BY SOIL BOX METHOD. (PER ASTM G-57)
2. PH MEASURED BY POTENTIOMETRIC METHOD USING STANDARD ELECTRODES. (PER CAL TRANS. #643)
3. CHLORIDE AND SULFATE WERE ANALYZED IN ACCORDANCE WITH EPA METHODS FOR CHEMICAL ANALYSIS FOR WATER AND WASTE, NO: 300 EPA-600/4-79-020. CONCENTRATION BY WEIGHT OF DRY SOIL.

CONCLUSIONS:

Material	Corrosion Class	Recommendation
Concrete	Negligible for Sulfate exposure and Chloride exposure, pH is neutral to basic. (UBC Table 19-A-4)	-Type II Portland cement for concrete with a maximum water cement ratio of 0.50 and a minimum of 3 inches of cover over steel reinforcement. It is suggested that a 6 mil polyethylene barrier be placed between concrete slabs and soil to reduce intrusion of moisture, and chlorides into the concrete slabs.
Steel Cast/Ductile Iron Mortar Coated Steel	Moderately to Mildly Corrosive	- Install corrosion monitoring and cathodic protection for buried ferrous metal piping. - Provide electrical continuity along steel and ductile iron piping, to facilitate the installation of corrosion monitoring and cathodic protection, if required in the future. - Electrically isolate underground metal piping from above grade piping and other metallic structures. - Use separate ground rods for grounding interior piping.
Copper Piping	Corrosive Not tested for Ammonia NOTE: The soils were not tested for ammonium. Even trace amounts of ammonium can cause failure of copper piping.	- Overhead plumbing is the most effective method of corrosion control. - Copper pipes should not be installed in soils, which may contain ammonia without cathodic protection. - If Copper pipes are installed below ground, the soils should be tested for ammonia and Keldahl nitrogen. - Electrical isolation between hot and cold water lines and between buried copper and steel piping and structural steel should be maintained. - If ammonia is present, coat and cathodically protect any buried copper piping.

FIGURE A-8.1

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The test results and recommendations are based on the samples submitted, which may not be representative of overall site conditions. Additional sampling may be required to more fully characterize soil conditions.

Sincerely,
ATLANTIC CONSULTANTS, INC.

Kerri M. Howell

Kerri M. Howell, P.E.
President

FIGURE A-8.2

APPENDIX H

EQUIVALENT FLUID PRESSURE (EFP) ANALYSES

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* ACTIVE WEDGE ANALYSIS (DETERMINATION OF WALL EFP) *
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PROJECT NAME:Green Acres

VERTICAL HEIGHT OF WALL = 23 FEET
HEIGHT OF SLOPE ABOVE WALL = .1 FEET

ANGLE OF WALL W/ HORIZONTAL = 90 DEGREES
SLOPE ANGLE ABOVE WALL = .1 DEGREES
FACTOR OF SAFETY = 1.5

SHEAR STRENGTH PARAMETERS :

UNIT WEIGHT = 130 PCF
COHESION = 100 PSF
FRICTION ANGLE = 34.5 DEGREES

ANGLE	WEIGHT	SLIP L	PA	EFP
30	59737	46	-8516	-48.29289
31	57392	44	-7209	-40.87835
32	55181	43	-6000	-34.02453
33	53090	42	-4882	-27.68096
34	51110	41	-3845	-21.80328
35	49229	40	-2884	-16.35227
36	47440	39	-1992	-11.29333
37	45736	38	-1164	-6.595746
38	44109	37	-394	-2.232154
39	42553	36	321	1.821782
40	41063	35	985	5.587861
41	39634	35	1602	9.085566
42	38262	34	2174	12.33236
43	36942	33	2705	15.34392
44	35671	33	3197	18.13435
45	34445	32	3652	20.71632
46	33261	32	4073	23.10123
47	32116	31	4461	25.29931
48	31009	30	4817	27.31981
49	29935	30	5143	29.17097
50	28894	30	5441	30.86021
51	27883	29	5712	32.39418
52	26901	29	5956	33.77877
53	25945	28	6175	35.01925
54	25013	28	6369	36.12024
55	24106	28	6539	37.08581
56	23220	27	6686	37.91946
57	22355	27	6810	38.62417
58	21509	27	6912	39.2025
59	20682	26	6992	39.65647
60	19872	26	7051	39.9877
61	19078	26	7088	40.19736
62	18299	26	7103	40.28616
63	17535	25	7098	40.25449
64	16784	25	7071	40.1022
65	16047	25	7023	39.82879

66	15321	25	6953	39.43335
67	14606	25	6861	38.91454
68	13902	24	6748	38.27051
69	13208	24	6612	37.49903
70	12523	24	6453	36.59738
71	11846	24	6270	35.56232
72	11178	24	6064	34.39013
73	10518	24	5832	33.07649
74	9864	23	5575	31.61649
75	9217	23	5290	30.00465