Appendix G:

Geotechnical Report

IRVINE GEOTECHNICAL Inc

GEOLOGIC AND SOILS ENGINEERING EXPLORATION

PROPOSED RESIDENCE AND POOL

ARB. 22, PORTION OF SW ¼ NE ¼ SEC 4 T1S R14W

3003 NORTH RUNYON CANYON ROAD

LOS ANGELES, CALIFORNIA

FOR MANNY VALENCIA

IRVINE GEOTECHNICAL, INC. PROJECT NUMBER IC 16010-C

MARCH 11, 2016

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INTRODUCTION

This report has been prepared per our agreement and summarizes findings of Irvine Geotechnical's geologic and soils engineering exploration performed on the site. The purpose of this study is to evaluate the nature, distribution, engineering properties, relative stability, and geologic structure of the earth materials underlying the site with respect to the design and construction of the proposed project.

INTENT

It is the intent of this report to assist in the design and completion of the proposed project. The recommendations are intended to reduce geotechnical risks affecting the project. The professional opinions and advice presented in this report are based upon commonly accepted standards and are subject to the general conditions described in the NOTICE section of this report.

EXPLORATION

The scope of the field exploration was determined from our consultation with the client. The preliminary plans prepared by Ameen Ayoub Design Studio were considered prior to beginning work on this project. Exploration was conducted using techniques normally applied to this type of project in this setting. This report is limited to the area of the exploration and the proposed project as shown on the enclosed Geologic Map and cross sections. Conditions affecting portions of the property outside the area explored are beyond the scope of this report.

Exploration was conducted on February 9, 2016, with the aid of hand labor. It included excavating 8 test pits to a maximum depth of 5 feet. Samples of the earth materials were obtained and delivered to the soils engineering laboratory of Soil Labworks, LLC, for testing and analysis. Downhole observation of the earth materials was performed by the engineering geologist.

Office tasks included laboratory testing of selected soil samples, researching records on file at the City of Los Angeles, reviewing historical topographic maps and aerial photographs, preparing the Geologic Map and cross sections, and performing engineering analysis. Earth materials exposed in the test pits are described on the enclosed Log of Test Pits. Appendix I contains a discussion of the laboratory testing procedures and results.

The proposed project, surface geologic conditions, and the location of the test pits are shown on the Geologic Map. Subsurface distribution of the earth materials, projected geologic structure, and the proposed project are shown on Sections A to C. Sections A and B extended to the toe of slope form the basis for the enclosed stability calculations.

RESEARCH - PREVIOUS WORK

The building and grading records of the City of Los Angeles Department of Building and Safety (LADBS) were researched prior to preparing this report. Geotechnical reports pertaining to the subject property were not located in the City records.

The undersigned geotechnical engineer explored the subject property in 1998 for The J. Byer Group, Inc. (JBG), for the purposes of constructing a residence. Exploration consisted of excavating 5 test pits and geologic field mapping. The following report was reviewed:

> *Geologic and Soils Engineering Exploration, Proposed Residence, Section 4, T1S; R14W, 3003 Runyan [sic] Canyon Road, Los Angeles, California*, JB 17848-I, dated September 30, 1998.

Reference is made to previous reports for the subject property prepared by Parmelee-Schick and Associates, Inc., (PSA) in 1994. These reports were neither located nor reviewed. Logs of test pits and the results of testing by PSA are appended to the Byer report.

The recommended bearing material was the bedrock. The LADBS issued a conditional approval letter, Log # 26176, dated November 12, 1998. A copy of this letter is enclosed.

Irvine Geotechnical, Inc., has reviewed the referenced report by The J. Byer Group, Inc., generally concurs with their findings and recommendations, and accepts geotechnical responsibility for the use and inclusion of selected portions of the referenced report in the current study. Locations of test pits performed by JBG are shown approximately on the Geologic Map. Logs of test pits by JBG are enclosed for reference.

PROPOSED PROJECT

Information concerning the proposed project was provided by the client. The preliminary plans prepared by Ameen Ayoub Design Studio were a guide for exploring the site and preparing this report. It is proposed to construct a three-story residence along the ridge crest south of the existing residence with a basement and green roof deck. The residence will be notched into the slope and will be supported with retaining walls up to 13 feet high. A pool and deck are planned along the southern edge of the slope. A retaining wall, up to 10 feet high, is planned along the western portion of the existing driveway to widen the driveway for fire access. A tunnel from the existing residence is planned to access a wine cellar adjacent to the proposed residence. An onsite sewerage system is also planned. Grading will consist of removals for the basement levels and the placement of fill behind retaining walls and for landscaping and hardscape.

Formal plans have not been prepared and await the conclusions and recommendations of this report.

SITE DESCRIPTION

The subject property consists of a partially graded and developed hillside lot on the southern flank of the Santa Monica Mountains, in the Runyon Canyon Urban Wilderness portion of the City of Los Angeles, California. It is located on the west side of Runyon Canyon Road, about half of a mile south of Mulholland Drive and about three-quarters of a mile west of the Hollywood Freeway (U.S. Route 101). The site is developed with a one-story single-family residence with a carport attached to the west side of the dwelling. A pool and outdoor barbecue area are present in the front (north) yard of the residence. The surrounding area is generally undeveloped.

Topographically, the lot sits on the crest of a south-trending secondary ridge. The site configuration consists of a level building pad on the east-central portion and descending slopes to the west, south and east toward Runyon Canyon Road. Slopes as high as 340 vertical feet descend to the east and south and as high as 175 vertical feet descend to the west at an average gradient of about 1½:1 (H:V, 34 degrees), but are locally as steep as ½:1 (63 degrees), particularly along the road cuts on the upslope portion of hiking trail (Runyon Canyon Road). Physical relief within the property limits is about 160 feet. Past grading consisted of cutting along the eastern and southern portions of the lot to create the hiking trail and cutting on the central portion of the site to create the level building pad. The building pad and finished floor elevation is roughly 1123 feet (MSL).

Vegetation on the site consists of mature trees and a thick assemblage of cultured plants, grasses and shrubs. The front (north) and rear (south) yards are irrigated and well maintained. Surface drainage for the building pad is by sheetflow runoff down the contours of the land toward Runyon Canyon Road to the northeast. Surface drainage over the slope is by sheetflow runoff down the contours of the slope. Roof drainage consists of typical peaked roofing that directs drainage to gutters and downspouts that outlet to grade.

GROUNDWATER

Groundwater was not encountered during exploration. Seasonal fluctuations in groundwater levels may occur due to variations in climate, irrigation, and other factors not evident at the time of the exploration. Fluctuations in groundwater levels may also occur across the site.

EARTH MATERIALS

Fill

Fill, associated with previous site grading, blankets portions of the site to a maximum observed thickness of 1.5 feet in the vicinity of Test Pit 3. The fill may be thicker elsewhere onsite in areas not explored. The fill consists of sandy clay and clayey sand that is orange-brown, dark brown, moist, slightly porous to porous, firm/medium dense, and contains roots, rootlets, gravel, and cobbles to 6 inches in diameter.

Soil

Natural residual soil was encountered in 6 of the 8 Test Pits. The soil consist of silty sand and gravelly clay that is tan brown, dark brown, red orange-brown, dry to moist, loose to medium dense/stiff, and contains roots, rootlets, and gravel to 3 inches in diameter. The thickness of the soil observed is on the order of 6 inches.

Bedrock

Bedrock underlying the site and encountered in the test pits consists of sandstone and conglomerate of the Chico Formation and quartz diorite as mapped by T.W. Dibblee, (*Geologic Map of the Santa Monica Mountains and Vicinity,* CD Compilation, 2001). The quartz diorite and conglomerate bedrock are well exposed in road cuts and crops out in steep slopes.

GEOLOGIC STRUCTURE

The bedrock described is common to this area of the Santa Monica Mountains and the geologic structure is consistent with regional trends. The quartz diorite bedrock is generally massive and lacks significant structural planes.

Bedding planes mapped in the conglomerate generally strike northwest-southeast and dip 50 degrees to the northeast. This is consistent with regional mapping performed by Dibblee (2001), which shows bedding striking northwest and dipping 50 to 70 degrees to the northeast. Joint planes mapped in the quartz diorite are randomly-oriented and steeply dipping.

The bedding of the sedimentary bedrock and the massive nature of the quartz diorite bedrock are favorable for the gross stability of the site and proposed project. Recommendations to eliminate or support any unfavorably-oriented bedding are presented in the CONCLUSIONS AND RECOMMENDATIONS section of this report.

GENERAL SEISMIC CONSIDERATIONS

Southern California is located in an active seismic region and numerous known and undiscovered earthquake faults are present in the region. Hazards associated with fault rupture and earthquakes include direct affects such as strong ground shaking and ground rupture, as well as secondary effects such as liquefaction, landsliding and lurching. The United States Geological Survey (USGS), California Geologic Survey (CGS), Southern California Earthquake Center (SCEC), private consultants and universities have been studying earthquakes in southern California for several decades. Early studies were directed toward earthquake prediction and early warning of strong ground shaking. Research and practice have shown that earthquake prediction is not practical or sufficiently accurate to benefit the general public. Also, several recent and damaging earthquakes have occurred on faults that were unknown prior to rupture. Current standards and the California Building Code call for earthquake resistant design of structures as opposed to prediction.

Alquist-Priolo Fault Rupture Hazard Study Zone

California faults are classified as active, potentially active, or inactive. Faults from past geologic periods of mountain building that do not display any evidence of recent offset are considered “inactive” or “potentially active.” Faults that have historically produced earthquakes or show evidence of movement within the Holocene (past 11,000 years) are considered “active faults.” Active faults that are capable of causing large earthquakes may also cause ground rupture. The Alquist-Priolo Special Studies Zone Act of 1972 was enacted to protect structures from hazards associated with fault ground rupture. No known active faults cross the subject property and the site is not located within an Alquist-Priolo Fault Rupture Hazard Study Zone. The ground rupture hazard at the site is considered nil.

Building Code Seismic Coefficients

Seismic design parameters within the Building Code include amplification of the seismic forces on the structure depending on the soil type, distance to seismic source and intensity of shaking. The purpose of the code seismic design parameters is to prevent collapse of structures and loss of life during strong ground shaking. Cosmetic damage should be expected.

The site is located within two kilometers of a known seismic source (Hollywood fault). The following table lists the applicable seismic coefficients for the 2014 Los Angeles Building Code.

SEISMIC COEFFICIENTS (2014 Los Angeles Building Code)		
Latitude = 34.11333°N Longitude = 118.35044°W	Short Period (0.2s)	One-Second Period
Earth Materials and Site Class from Table 1613.5.2 and Section 1613.5.2	Bedrock – C	
Seismic Design Category from Table 1613.5.6(1) and 1613.5.6(2)	E	
Spectral Accelerations from Figures 1613.5 (1) through 1613.5(14)	S_s = 2.530 (g)	S_1 = 0.906 (g)
Site Coefficients from Tables 1613.5.3 (1) and 1613.5.3 (2)	F_A = 1.0	F_V = 1.3
Spectral Response Accelerations from Equations 16-36 and 16-37	S_{MS} = 2.530 (g)	S_{M1} = 1.178 (g)
Design Accelerations from Equations 16-38 and 16-39	S_{DS} = 1.687 (g)	S_{D1} = 0.785 (g)

Seismic Hazards

The principal seismic hazard to the subject property and proposed project is strong ground shaking from earthquakes produced by local faults. Modern, well-constructed buildings are designed to resist ground shaking through the use of shear panels, moment-resisting frames and reinforcement. Additional precautions may be taken to protect personal property and reduce the chance of injury, including strapping down water heaters and securing furniture and appliances. It is likely that the subject property will be shaken by future earthquakes produced in southern California. However, secondary effects such as surface rupture, lurching, liquefaction, consolidation, ridge shattering, and landsliding should not occur at the subject property.

Seismic Hazard Zones

The California State Legislature enacted the Seismic Hazards Mapping Act of 1990, which was prompted by damaging earthquakes in California, and was intended to protect public safety from the effects of strong ground shaking, liquefaction, landslides, and other earthquake-related hazards. The Seismic Hazards Mapping Act requires that the State Geologist delineate various "seismic hazards zones." The maps depicting the zones are released by the California Geological Survey.

The Seismic Hazards Mapping Act requires a site investigation by a certified engineering geologist and/or civil engineer with expertise in geotechnical engineering, for projects sited within a hazard zone. The investigation is to include recommendations for a "minimum level of mitigation" that should reduce the risk of ground failure during an earthquake to a level that does not cause the collapse of buildings for human occupancy. The Seismic Hazards Mapping Act does not require mitigation to a level of no ground failure and/or no structural damage.

Seismic Hazard Zone delineations are based on correlation of a combination of factors, including: surface distribution of soil deposits; physical relief; depth to historic high groundwater; shear strength of the soils; and occurrence of past seismic deformation. The subject property is located within the United States Geologic Survey, Hollywood Quadrangle. Seismic hazards within the Hollywood Quadrangle were evaluated by the CGS in their report, *"Seismic Hazard Zone Report for the Hollywood 7.5-minute Quadrangle, Los Angeles County, California,* Seismic Hazard Zone Report 026." According to the Seismic Hazard Zones Map, the site is within a zone of required investigation for earthquake-induced landsliding; the site is not, however, mapped within a zone of required investigation for liquefaction.

Ground Motion

Spectral accelerations at the site were determined for the Maximum Considered Earthquake (MCE) following the procedures in ASCE 7-10 and the 2014 Los Angeles Building Code. The computed PGA_M for this site is 0.962g. According to the USGS deaggregation website (https://geohazards.usgs.gov/deaggint/2008/), and using a ground motion with a 10 percent probability of exceedance in 50 years, the modal de-aggregated earthquake PGA and moment magnitude are 0.507g and 6.48 respectively. The modal distance to the ground motion source is 3.2 km. For a ground motion with a 2 percent probability of exceedance in 50 years, the modal de-aggregated earthquake PGA and moment magnitude are 0.9969g and 6.58, respectively. The modal distance to the ground motion source is 3.0 km.

SLOPE STABILITY

Gross Stability

Slopes affecting the subject property include a 340- foot-high slope between the ridge crest and the axis of the canyons. Sections A and B were extended to the toe of slope using the topography from the Local Topo Map to show the highest and steepest topography on the site. The gross stability of the slope shown in Sections A and B was calculated using a computerized version of the Simplified Bishop's method (SLIDE Version 6.038 developed by ROCSCIENCE, Inc.).

The seismic stability of the site was calculated in conformance with Southern California Earthquake Center (SCEC), 2002, "*Recommended Procedures for Implementation of DMG Special Publication 117* and California Geological Survey (CGS), Special Publication 117A, 2008 "*Guidelines for Evaluating and Mitigating Seismic Hazards in California.*" Using the screening procedure and for a maximum allowable displacement of 5 cm, the horizontal acceleration (Keq) is 0.288g.

The analysis shows that the subject property and existing slopes are will be grossly stable with a factor of safety in excess of 1.5 under static conditions and in excess of 1.0 under seismic conditions. The calculations use the shear tests of samples believed to represent the earth materials encountered during exploration. The cross sections and geologic structure used are the most critical for the slopes analyzed.

Surficial Stability

The proposed development is a planned along the ridge top and is remote to slopes that could be mantled by surficial deposits.

CONCLUSIONS AND RECOMMENDATIONS

General Findings

The conclusions and recommendations of this exploration are based upon 8 test pits, field geologic mapping, research of available records, consultation, years of experience observing similar properties in similar settings and review of the development plans. It is the finding of Irvine Geotechnical that construction of the proposed project is feasible from a geologic and soils engineering standpoint provided the advice and recommendations contained in this report are included in the plans and are implemented during construction.

The recommended bearing material for the proposed structures is the bedrock, which was encountered within 1 to 3 feet of the existing grade. The existing fill and soil are not considered suitable for foundation or slab support. The basement level of the residence is expected to penetrate the surficial materials to expose bedrock. Conventional foundations are considered appropriate to support portions of the proposed structures that are sufficiently embedded into bedrock and not near slopes. Deepened foundations are recommended to support portions of the proposed structures located on or near slopes to attain the Code-required setback and fully embed into the bedrock.

Geotechnical Issues

Geotechnical issues affecting the site include over-steepened cut slopes and potentially daylighted bedding in vertical excations.

Cut slopes in bedrock along Runyon Canyon Road (hiking trail) that are steeper than 1:1 (45 degrees) should be trimmed to 1:1 or be supported with retaining walls. A typical trim is shown on Section B.

The bedding observed in the conglomerate bedrock dips steeply (50 to 70 degrees) to the northwest. North-facing and east-facing excavations that expose unsupported (daylighted) bedding should be trimmed along bedding.

SITE PREPARATION

Surficial materials consisting of fill and soil are present on the pad site. Remedial grading is recommended to improve site conditions for support of slabs.

General Grading Specifications

The following guidelines may be used in preparation of the grading plan and job specifications. Irvine Geotechnical would appreciate the opportunity of reviewing the plans to ensure that these recommendations are included. The grading contractor should be provided with a copy of this report.

A. The site should be prepared to receive compacted fill by removing all vegetation, debris, and existing fill, and soil. The exposed excavated area should be observed by the soils engineer or geologist prior to placing compacted fill. The exposed grade should be scarified to a depth of six inches, moistened to optimum moisture content, and recompacted to 90 percent of the maximum density.

B. Fill, consisting of soil approved by the soils engineer, shall be placed in horizontal lifts and compacted in six-inch layers with suitable compaction equipment. The excavated onsite materials are considered satisfactory for reuse in the controlled fills. Any imported fill shall be observed by the soils engineer prior to use in fill areas. Rocks larger than six inches in diameter shall not be used in the fill.

C. The fill shall be compacted to at least 90 percent of the maximum laboratory density for the material used. Where cohesionless soil (less than 15 percent finer than 0.005 millimeters) is used for fill, it shall be compacted to a minimum of 95 percent relative compaction. The fill should be placed at a moisture content that is at or within 3 percent over optimum. The maximum density and optimum moisture content shall be determined by ASTM D 1557-12 or equivalent.

D. Field observation and testing shall be performed by the soils engineer during grading to assist the contractor in obtaining the required degree of compaction and the proper moisture content. Where compaction is less than required, additional compactive effort shall be made with adjustment of the moisture content, as necessary, until 90 percent compaction is obtained. One compaction test is required for each 500 cubic yards or two vertical feet of fill placed.

E. The site is currently being serviced by a private sewerage. Private sewage disposal systems generally consist of a septic tank and one or more cesspool or seepage pits. Any seepage pits or cesspools that are planned to be abandoned should be properly abandoned in conformance with the City's guidelines. As a minimum, the liner and debris should be removed to expose the bearing material. The void may then be filled with compacted fill or another approved material.

Fill Slopes

Fill slopes may be constructed at a 2:1 gradient and should be keyed and benched into bedrock or supported laterally by retaining walls. The base of all fill slopes and the axes of drainage courses require subdrains.

Cut Slopes

Cut slopes (trims) along Runyon Canyon Road (hiking trail) may be created at a 1:1 gradient. Any other cuts planned within the property may be programmed at a 2:1 gradient.

Excavation Characteristics

The test pits did encounter hard, cemented bedrock. Excavation difficulty is a function of the degree of weathering and amount of fracturing within the bedrock. The bedrock generally becomes harder and more difficult to excavate with increasing depth. Hard cemented layers are also known to occur at random locations and depths and may be encountered during foundation excavation. Should a hard cemented layer be encountered, coring or the use of jackhammers may be necessary.

SEWERAGE DISPOSAL

Sewers are not available to service the property. A private disposal system is being considered, pending an evaluation of the existing system. It is recommended that a civil engineer be retained to provide a design for the system. The system can be located as shown on the enclosed Geologic Map and Section C. Seepage pits should be sealed in the upper portion to avoid percolation into the surficial materials and provide the required 25-foot horizontal setback to contact between the competent bedrock and the mantling fill, soil, and weathered bedrock. Seepage pits should be excavated, bricked, and tested for percolation rate prior to obtaining a building permit. More than one seepage pit may be required.

The use of a private sewage disposal system on the subject property should not adversely affect the stability of the site or adjoining properties. Seepage pits should be observed by the project geologist prior to bricking and after placing the cap.

A private sewage disposal system should be considered temporary. Private systems require periodic maintenance and pumping to remain effective. The residence should be connected to the public sewer as soon as practical.

SWIMMING POOL

The proposed swimming pool is planned to be structurally integrated into the proposed residence. The pool should derive support entirely from the bedrock. This may require the use of a footing or the use of a deepened foundation system. All pool walls should be designed as free-standing. Pool walls supporting compacted fill and bedrock should be designed to resist an inward pressure of 35 pcf. If the spa is to be attached to the pool, the spa should be founded at the same depth as the portion of the pool it adjoins.

FOUNDATION DESIGN

General Conditions

The following foundation recommendations are minimum requirements. The structural engineer may require footings that are deeper, wider, or larger in diameter, depending on the final loads.

Spread Footings

Continuous and/or pad footings may be used to support the proposed structures provided they are founded in bedrock. Continuous footings should be a minimum of 12 inches in width. Pad footings should be a minimum of 24 inches square. The following chart contains the recommended allowable design parameters.

Bearing Material	Minimum Embedment Depth of Footing (Inches)	Vertical Bearing (psf)	Coefficient of Friction	Passive Earth Pressure (pcf)	Maximum Earth Pressure (psf)
Bedrock	12	4,000	0.50	500	6,000

Increases in the bearing value are allowable at a rate of 800 pounds per square foot for each additional foot of footing width or depth to a maximum of 6,000 pounds per square foot. For bearing calculations, the weight of the concrete in the footing may be neglected.

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

The on-site soils are non-expansive. Footings should be reinforced following the recommendations of the structural engineer. It is recommended that continuous footings be reinforced with a minimum of four #4 steel bars; two placed near the top and two near the bottom of the footings. Footings should be cleaned of all loose soil, moistened, free of shrinkage cracks and approved by the geologist and geotechnical engineer prior to placing forms, steel or concrete.

Footings should not be supported by retaining wall backfill or derive support within the active wedge behind the retaining wall. Foundations adjacent to basements should be deepened below a 1:1 plane projected up from the base of the retaining wall. Alternatively, foundations adjacent to basements may be designed as a grade beam and structurally connected to the wall.

Deepened Foundations - Friction Piles

Drilled, cast-in-place concrete friction piles are recommended to support the proposed structures where setback from the face of the descending slope is required. Piles should be a minimum of 24 inches in diameter and a minimum of 8 feet into bedrock. Piles may be assumed fixed at 3 feet into bedrock. For the vertical forces, the piles may be designed for a skin friction of 800 pounds per square foot for that portion of pile in contact with the bedrock. The friction value is for the total of dead and frequently applied live loads and may be increased by one third for short duration loading, which includes the effects of wind or seismic forces.

Deepened Foundations - Caissons

As an alternative, a caisson and grade beam foundation system may be used to support the proposed structures. Caissons should be a minimum of 3 feet into bedrock and 30 inches in diameter to allow for cleanout. Caissons may be designed for a bearing value of 6,000 pounds per square foot. Caissons require the bottom to be hand cleaned by a laborer and observed by the geologist. It is important to have casing available to prevent the caisson shafts from caving.

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

Lateral Design

The existing fill and soil on the site are subject to downhill creep. Caisson and/or pile shafts are subject to lateral loads due to the creep forces. Caisson and/or pile shafts should be designed for a lateral load of 1,000 pounds per linear foot for each foot of shaft exposed to the existing fill and soil.

Resistance to lateral loading may be provided by friction acting at the base of foundations (caissons only) and by passive earth pressure within the bedrock. An allowable coefficient of friction of 0.50 may be used with the dead load forces.

Passive earth pressure may be computed as an equivalent fluid having a density of 500 pounds per cubic foot. The maximum allowable earth pressure is 6,000 pounds per square foot. For design of isolated piles, the allowable passive and maximum earth pressures may be increased by 100 percent. Piles spaced more than 2½ pile diameters on center may be considered isolated.

All piles and caissons should be designed to resist lateral forces in conformance with Section 1810.2 of the Building Code. This may require tying the piles in two horizontal directions with grade beams, structural slabs or a structural pool shell.

Passive Pressure Reduction - Stacked Retaining Walls

Footings supporting structures upslope from a retaining wall should be founded in bedrock below a 1:1 plane projected up from the lower wall. This condition is considered a “stacked” condition. For retaining walls in a “stacked” condition, the passive earth pressure should be reduced from 500 pcf to 125 pcf. The passive earth pressure may be increased to 500 pcf below the elevation of the lowest adjacent retaining wall.

Foundation Settlement

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

¼ inch. Differential settlement is not anticipated for the pool supported in the bedrock as recommended above.

Foundation Setback

The Building Code requires that foundations be a sufficient depth to provide horizontal setback from a descending slope steeper than 3:1. The required setback is ⅓ the height of the slope with a minimum of five feet and a maximum of 40 feet measured horizontally from the base of the foundation to the slope face. The setback for pools is half that of other structures, or H/6 with a maximum of 20 feet. On the subject property, the slope descends below the building site at variable heights and gradients. Setback should be determined for each foundation element relative to its location on the slope.

Toe of Slope Clearance

The Building Code requires a level yard setback between the toe of an ascending slope and the rear wall of the proposed structure of one half the slope height to a maximum 15 feet clearance for slopes steeper than 3:1. For retained slopes, the face of the retaining wall is considered the toe of the slope.

RETAINING WALLS

General Design - Static Loading

Cantilevered retaining walls up to 13 feet high that support bedrock and approved retaining wall backfill, may be designed for an equivalent fluid pressures shown in the following table. Restrained walls that are pinned at the top by a non-yielding floor should be designed for an at-rest earth pressure. The recommended design at-rest earth pressure on restrained basement walls is an equivalent fluid pressure of 60 pcf.

DESIGN EARTH PRESSURES - CANTILEVERED WALLS

Surface Slope Gradient	Design EFP
Level	35
3:1	38
2:1	43

Seismic Surcharge

In conformance with the Building Code, retaining walls higher than 6 feet were considered for seismic loading for the design ground motion resulting from the Maximum Considered Earthquake. The horizontal coefficient of seismic increment (K_E) and seismic increment (P_E) were estimated following procedures by Sitar, N. et. al.,2010, (*Seismic Earth Pressures on Deep Building Basements,* SEAOC 2010 Convention Proceedings). Spectral accelerations at the site were determined for the Maximum Considered Earthquake (MCE) following the procedures in ASCE 7-10 and the 2014 Building Code. The computed PGA_M for this site is 0.962g. The horizontal coefficient of seismic increment (K_E) was assumed to be ⅓(PGA_M) = 0.321g.

The force required in addition to the static design force to raise the safety factor to at least 1.0 (P_E) was checked using a computerized version of the Mononobe-Okabe method. Ground motion was assumed to be 0.321g.

For 13-foot high cantilevered retaining walls, the static design force is equal to 3.633 kips (13ft^2 * 43 pcf /2). For 13-foot high restrained retaining walls, the static design force is equal to 5.070 kips (13ft^2 * 60 pcf /2). For a ground motion of 0.321g and a FS of

1.0, the enclosed calculations indicate an unbalanced force under seismic conditions from the Maximum Considered Earthquake is 3.018 kips.

For both the cantilevered and restrained design conditions, the static force is higher than the seismic forces and there is no seismic increment. Thus, for this project, a seismic surcharge need not be added.

Surcharge Loading

Retaining walls that are surcharged by traffic and/or structural loads should be designed to withstand the surcharge. For traffic within 10 feet of retaining walls, the recommended traffic surcharge is 100 psf, distributed evenly over the upper 10 feet of wall. Irvine Geotechnical would be happy to assist the structural engineer in evaluating the surcharge pressure and the point of application from concentrated structural loads.

Subdrain

The recommended design earth pressures assume a free-draining backfill and no buildup of hydrostatic pressures. Retaining walls should be provided with a subdrain or weepholes covered with a minimum of 12 inches of ¾ inch crushed gravel. Not all subdrain systems and pipes are approved by all Building Departments. It is recommended that the Building Department be consulted when using non-conventional systems. The subdrain system should discharge to the atmosphere or to an engineered sump via gravity. Surface drains should not be connected to the subdrain system.

Backfill

Retaining wall backfill should be compacted to a minimum of 90 percent of the maximum density as determined by ASTM D 1557-12. Where access between the retaining wall and the temporary excavation prevents the use of compaction equipment, retaining walls should be backfilled with ¾ inch crushed gravel to within 2 feet of the ground surface. Where the area between the wall and the excavation exceeds 18 inches, the gravel must be vibrated or wheel-rolled, and tested for compaction. The upper 2 feet of backfill above the gravel should consist of a compacted fill blanket to the surface. Retaining wall backfill should be capped with a paved surface drain or a concrete slab.

Foundation Design

Retaining wall footings may be sized per the FOUNDATION DESIGN section of this report.

Freeboard

Retaining walls surcharged by a sloping condition should be provided with a minimum of 12 inches of freeboard for slough protection. An open "V" drain should be placed behind the wall so that all upslope flows are directed around the structure to the street or an approved location.

TEMPORARY EXCAVATIONS

Temporary excavations will be required to construct the proposed retaining walls. The excavations could be up to 15 feet in height and will expose fill over bedrock. The fill should be trimmed to 1:1 for wall excavations. Where not surcharged by existing footings or structures, the bedrock is capable of maintaining vertical excavations up to 8 feet per the enclosed calculations. Where vertical excavations in the bedrock exceed 8 feet in height, the upper portion should be trimmed to 1:1 (45 degrees).

It should be noted that regardless of stability, excavations that remove lateral support from property lines or existing structures are not allowed by the Code. The following section from Chapter 33 of the Building Code governs temporary excavations:

3307.3 Temporary excavations and shoring.

3307.3.1 General. Excavations shall not remove the lateral support from a public way, from an adjacent property or from an existing structure. For the purpose of this section, the lateral support shall be considered to have been removed when any of the following conditions exist:

1. The excavation exposes any adverse geological formations, which would affect the lateral support of a public way or an adjacent structure.

2. The excavation extends below a plane extending downward at an angle of 45 degrees from the edge of the public way or an adjacent property.

Exception: Normal footing excavations not exceeding two feet in depth will not be construed as removing lateral support.

3. The excavation extends below a plane extending downward at an angle of 45 degrees from the bottom of an existing structure.

Shoring

Temporary shoring should be designed for an equivalent fluid pressure of 30 pounds per cubic foot per the enclosed calculations. Shoring may consist of cast-in-place concrete piles with wood lagging. Shoring piles should be a minimum of 12 inches in diameter and a minimum of 6 feet into bedrock below the base of the excavation. Piles may be assumed fixed 3 feet into bedrock below the base of the excavation. For the vertical forces, piles may be designed for a skin friction of 800 pounds per square foot for that portion of pile in contact with the bedrock. Soldier piles should be spaced a maximum of 10 feet on center.

The friction value is for the total of dead and frequently applied live loads and may be increased by one third for short duration loading, which includes the effects of wind or seismic forces. Resistance to lateral loading may be provided by passive earth pressure within the bedrock below the base of the excavation.

Passive earth pressure may be computed as an equivalent fluid having a density of 500 pounds per cubic foot. The maximum allowable earth pressure is 6,000 pounds per square foot. For design of isolated piles, the allowable passive and maximum earth pressures may be increased by 100 percent. Piles spaced more than 2½ pile diameters on center may be considered isolated.

CORROSION

The pH of the soils is near neutral and not a factor in corrosion. The chloride content is low and not a factor in design. The sulfate content is negligible and not a factor in concrete design. The resistivity indicates that the soils are corrosive to ferrous metals.

FLOOR SLABS, CONCRETE DECKING AND PAVING

Floor slabs and concrete decking should be cast over bedrock or an approved compacted fill cap. In areas of existing fill and soil, the ground should be prepared and the fill placed in conformance with the SITE PREPARATION section of this report.

Slabs should be at least 4 inches thick and reinforced with a minimum of #4 bars on 16 inch centers, each way. Care should be taken to cast the reinforcement near the center of the slab. For interior slabs and slabs with a floor covering, a moisture barrier is recommended. For performance and concrete curing, it recommended that the vapor barrier be 10-mil thick and placed over at least two inches of clean sand and then covered by at least two inches of clean sand. The topping sand is intended to prevent punctures during placement of the reinforcing steel and to and aid in the concrete cure.

Slabs which will be provided with a moisture-sensitive floor covering should be designed to resist moisture in conformance with ACI 302.2R-06 (*Guide for Concrete Slabs that Receive Moisture-Sensitive Flooring Material*). Specifications for under-slab vapor retarder/barrier are typically the responsibility of the architect or flooring specialist. We would be happy to assist the architect and/or flooring specialist on their specifications for moisture protection of slabs that are to receive moisture sensitive coverings.

Many agencies require floor slabs be constructed in conformance with the Green Building Code that requires slabs be poured directly on top of the vapor barrier, which is to be underlain by four inches of gravel. Since the vapor barrier is to be placed on the gravel, it is important to exercise care to prevent damaging the moisture barrier during construction. From a geotechnical engineering standpoint, a vapor barrier may be placed over 4 inches of gravel, provided that the vapor barrier is of sufficient strength to resist punctures and tearing. If plastic sheeting is used, this may require a greater than 10 mil thickness. Bentonitic barriers such as Miraclay or Volclay may also be used as long as they conform to the minimum requirements of durability, strength and waterproofing. Vapor barriers should conform to ASTM E 1745 and ACI 302.2R-06 (Guide for Concrete Slabs that Receive Moisture-Sensitive Flooring Materials).

Decking that caps a retaining wall should be provided with a flexible joint to allow for the normal one to two percent deflection of the retaining wall. Decking that does not cap a retaining wall should not be tied to the wall. The space between the wall and the deck will require periodic caulking to prevent moisture intrusion into the retaining wall backfill.

It should be noted that cracking of concrete floor slabs is very common during curing. The cracking occurs because concrete shrinks as it dries. Crack control joints which are commonly used in exterior decking to control such cracking are normally not used in interior slabs. The reinforcement recommended above is intended to reduce cracking and its proper placement is critical to the slab's performance. The minor shrinkage cracks which often form in interior slabs generally do not present a problem when carpeting, linoleum, or wood floor coverings are used. The slab cracks can, however, lead to surface cracks in brittle floor coverings such as ceramic tile. A mortar bed or slip sheet is recommended between the slab and tile to limit, the potential for cracking.

Slabs should be protected with a polyethylene plastic vapor barrier placed beneath the slab. This barrier is intended to prevent the upward migration of moisture from the subgrade soils through the porous concrete slab. It should be noted that vapor barriers are penetrated by any number of elements including water lines, drain lines, and footings. These barriers are therefore not completely watertight. It is recommended that a surface seal be placed on slabs which will receive a wood floor. The floor installer should be consulted regarding an adequate product.

Prior to placing paving, the existing fill and soil should be removed, the existing grade should be scarified to a depth of inches, moistened as required to obtain optimum moisture content, and recompacted to 90 percent of the maximum dry density, as determined by ASTM D 1557-12. Trench backfill below paving, should be compacted to 90 percent of the maximum dry density. Irrigation water should be prevented from migrating under paving. The following table shows the recommended pavement sections:

Service	Pavement Thickness (Inches)	Base Course (Inches)
Light Passenger Cars	3	0
Moderate Trucks (Storage, etc.)	4	0

DRAINAGE

Control of site drainage is important for the performance of the proposed project. Pad and roof drainage should be collected and transferred to the street or approved location in non-erosive drainage devices. Drainage should not be allowed to pond on the pad or against any foundation or retaining wall. Drainage should not be allowed to flow uncontrolled over any descending slope. Planters located within retaining wall backfill should be sealed to prevent moisture intrusion into the backfill. Planters located next to raised floor type construction also should be sealed to the depth of the footings. Drainage control devices require periodic cleaning, testing and maintenance to remain effective.

Because the site is within a designated hillside area and due to nearby slopes, onsite infiltration of surface runoff is not considered feasible.

WATERPROOFING

Interior and exterior retaining walls are subject to moisture intrusion, seepage, and leakage and should be waterproofed. Waterproofing paints, compounds, or sheeting can be effective if properly installed. Equally important is the use of a subdrain that daylights to the atmosphere. The subdrain should be covered with ¾ inch crushed gravel to help the collection of water. Yard areas above the wall should be sealed or properly drained to prevent moisture contact with the wall or saturation of wall backfill.

Construction of raised floor buildings where the grade under the floor has been lowered for joist clearance can also lead to moisture problems. Surface moisture can seep through the footing and pond in the underfloor area. Positive drainage away from the footings, waterproofing the footings, compaction of trench backfill and subdrains can help to reduce moisture intrusion.

PLAN REVIEW

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

SITE OBSERVATIONS DURING CONSTRUCTION

Please advise Irvine Geotechnical at least 24 hours prior to any required site visit. The agency approved plans and permits should be at the jobsite and available to our representative. The project consultant will perform the observation and post a notice at the jobsite of his visit and findings. This notice should be given to the agency inspector.

During construction, a number of reviews by this office are recommended to verify site geotechnical conditions and conformance with the intent of the recommendations for construction. Although not all possible geotechnical observation and testing services are required by the reviewing agency, the more site reviews requested, the lower the risk of future problems. It is recommended that all grading, foundation, and drainage excavations be seen by a representative of the geotechnical engineer PRIOR to placing fill, forms, pipe, concrete, or steel. Any fill which is placed should be approved, tested, and verified if used for engineering purposes. Temporary excavations should be observed by a representative of the Geotechnical Engineer.

The following site reviews are advised or required. Should the observations reveal any unforeseen hazards, the geologist/engineer will recommend treatment.

Pre-construction meeting	Advised
Temporary excavations	Required
Shoring pile and lagging installation	Required
Underpinning pile installation	Required
Bottom excavation for removals	Required
Keyway excavations and benching	Required
Subdrains	Required

Compaction of fill	Required
Foundation excavations	Required
Slab subgrade moisture barrier membrane	Advised
Slab subgrade rock placement	Advised
Slab steel placement	Advised
Subdrain and rock placement behind retaining walls	Required
Compaction of retaining wall backfill	Required
Compaction of utility trench backfill	Advised

Irvine Geotechnical requires at least a 24 hour notice prior to any required site visits. The approved plans and building/grading permits should be on the job and available to the project consultant.

FINAL INSPECTION

Many projects are required by the agency to have final geologic and soils engineering reports upon completion of the grading.

CONSTRUCTION SITE MAINTENANCE

It is the responsibility of the contractor to maintain a safe construction site. When excavations exist on a site, the area should be fenced and warning signs posted. All pile excavations must be properly covered and secured. Soil generated by foundation and subgrade excavations should be either removed from the site or properly placed as a certified compacted fill. Soil must not be spilled over any descending slope. Workers should not be allowed to enter any unshored trench excavations over five feet deep.

GENERAL CONDITIONS

This report and the exploration are subject to the following NOTICE. Please read the NOTICE carefully, it limits our liability.

NOTICE

In the event of any changes in the design or location of any structure, as outlined in this report, the conclusions and recommendations contained herein may not be considered valid unless the changes are reviewed by us and the conclusions and recommendations are modified or reaffirmed after such review.

The subsurface conditions, excavation characteristics, and geologic structure described herein and shown on the enclosed cross sections have been projected from excavations on the site as indicated and should in no way be construed to reflect any variations that may occur between these excavations or that may result from changes in subsurface conditions.

Fluctuations in the level of groundwater may occur due to variations in rainfall, temperature, irrigation, and other factors not evident at the time of the measurements reported herein. Fluctuations also may occur across the site. High groundwater levels can be extremely hazardous. Saturation of earth materials can cause subsidence or slippage of the site.

If conditions encountered during construction appear to differ from those disclosed herein, notify us immediately so we may consider the need for modifications. Compliance with the design concepts, specifications or recommendations during construction requires the review of the engineering geologist and geotechnical engineer during the course of construction.

THE EXPLORATION WAS PERFORMED ONLY ON A PORTION OF THE SITE, AND CANNOT BE CONSIDERED AS INDICATIVE OF THE PORTIONS OF THE SITE NOT EXPLORED.

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

THIS REPORT WAS PREPARED ON THE BASIS OF THE PRELIMINARY DEVELOPMENT PLAN OR CONCEPT FURNISHED. FINAL PLANS SHOULD BE REVIEWED BY THIS OFFICE AS ADDITIONAL GEOTECHNICAL WORK MAY BE REQUIRED.

Irvine Geotechnical appreciates the opportunity to provide our service on this project. Any questions concerning the data or interpretation of this report should be directed to the undersigned.

Respectfully submitted,
Irvine Geotechnical, Inc.

Jon A. Irvine
E.G. 1691/G.E. 2891
\\IGPAFC2\Final\ICprojects\IC16010 Valencia\IC16010 Valencia GSE.wpd

Enc: Appendix I - Laboratory Testing by Soil Labworks
Shear Test Diagrams (Plates B-1 through B-4)
Appendix II, LADBS Letters and Exploration & Testing by Others
Vicinity Map
Regional Geologic Map
Log of Test Pits (4 Pages)
Calculation Sheets (35)
Sections A & C
In pocket Geologic Map and Section B
Local Topo Map

xc: (5) Addressee
(1) Ameen Ayoub Design Studio, Attention: Ameen Ayoub

STATEMENT OF RESPONSIBILITY - SOIL TESTING BY SOIL LABWORKS, LLC

Laboratory testing by Soil Labworks, LLC, was performed under the supervision of the undersigned engineer. Irvine Geotechnical and Jon A. Irvine have reviewed the referenced laboratory testing report dated February 26, 2016, and the results appear to be reasonable for this area of the Santa Monica Mountains. Irvine Geotechnical and the undersigned engineer concur with the findings of Soil Labworks, LLC, and accept professional responsibility for utilizing the data.

145 N. Sierra Madre Blvd., Suite #1 • Pasadena • California • 91107 • Phone: 626-844-6641/Fax: 626-604-0394

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Respectfully submitted,
Irvine Geotechnical, Inc.

REGISTERED PROFESSIONAL ENGINEER
JON ALAN IRVINE
GE 2891
Exp. 6-30-16
GEOTECHNICAL
STATE OF CALIFORNIA

Jon A. Irvine
E.G. 1691/G.E. 2891
\\IGPAFC2\Final\ICprojects\IC16010 Valencia\IC16010 Valencia GSE.wpd

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SOIL LABWORKS LLC

SL16.2127
February 26, 2016

Irvine Geotechnical
145 N. Sierra Madre Boulevard
Suite 1
Pasadena, California 91107

Subject: Laboratory Testing

Site: 3003 Runyon Canyon Road
Los Angeles, California

Job: IRVINE/VALENCIA

Laboratory testing for the subject property was performed by Soil Labworks, LLC., under the supervision of the undersigned Engineer. Samples of the earth materials were obtained from the subject property by personnel of Irvine Geotechnical and transported to the laboratory of Soil Labworks for testing and analysis. The laboratory tests performed are described and results are attached.

Services performed by this facility for the subject property were conducted in a manner consistent with that level of care and skill ordinarily exercised by members of the profession currently practicing in the same locality under similar conditions.

Respectfully Submitted:

SOIL LABWORKS, LLC

JON A. IRVINE
G.E. 2891

REGISTERED PROFESSIONAL ENGINEER
JON ALAN IRVINE
GE 2891
Exp. 6-30-16
GEOTECHNICAL
STATE OF CALIFORNIA

Enc: Appendix

2500 Townsgate Road, Suite E, Westlake Village, California 91361
(805) 370-1338 FAX (805) 371-4693

APPENDIX

Laboratory Testing

Sample Retrieval - Hand Labor

Samples of earth materials were obtained by driving a thin-walled steel sampler with successive blows of a drop hammer. The earth material was retained in brass rings of 2.416 inches inside diameter and 1.00 inch height. The samples were stored in closefitting, water-tight containers for transportation to the laboratory.

Moisture Density

The field moisture content and dry density were determined for each of the soil samples. The dry density was determined in pounds per cubic foot following ASTM 2937-10. The moisture content was determined as a percentage of the dry soil weight conforming to ASTM 2216-10. The results are presented below in the following table. The percent saturation was calculated on the basis of an estimated specific gravity. Description of earth materials used in this report and shown on the attached Plates were provided by the client.

Test Pit/Boring No.	Sample Depth (Feet)	Soil Type	Dry Density (pcf)	Moisture Content (percent)	Percent Saturation (G_s=2.65)
TP1	2.5	Bedrock	107.5	12.2	60
TP2	2	Bedrock	110.5	10.8	58
TP2	4	Bedrock	109.9	12.0	63
TP3	1.5	Soil	102.7	21.2	92
TP3	4.5	Bedrock	115.3	11.3	69
TP4	2	Bedrock	106.3	7.9	38
TP4	4.5	Bedrock	114.5	8.6	51
TP5	2	Weathered Bedrock	104.9	15.9	73
TP5	4.5	Bedrock	117.9	9.2	61
TP6	5	Bedrock	110.3	13.4	71
TP7	4.5	Bedrock	115.0	7.9	48
TP8	3	Bedrock	123.7	3.4	27

Shear Strength

The peak and ultimate shear strengths of the soil and bedrock were determined by performing consolidated and drained direct shear tests in conformance with ASTM D3080/D3080M-11. The tests were performed in a strain-controlled machine manufactured by GeoMatic. The rate of deformation was 0.01 inches per minute. Samples were sheared under varying confining pressures, as shown on the "Shear Test Diagrams," B-Plates. The residual shear strength of the soil was determined by repeatedly shearing a sample under varying confining pressures in the direct shear machine. The rate of deformation for the last test at each confining pressure was 0.005 inches per minute. The moisture conditions during testing are shown on the following table and on the B-Plates. The samples indicated as saturated were artificially saturated in the laboratory. All saturated samples were sheared under submerged conditions.

Test Pit/ Boring No.	Sample Depth (Feet)	Dry Density (pcf)	As-Tested Moisture Content (percent)
TP3	4.5	115.3	20.7
TP4	4.5	114.5	22.8
TP5	4.5	117.9	19.8
TP3*	1.5	102.7	23.3

* Sample repeatedly sheared to determine residual strength.

SOIL LABWORKS LLC

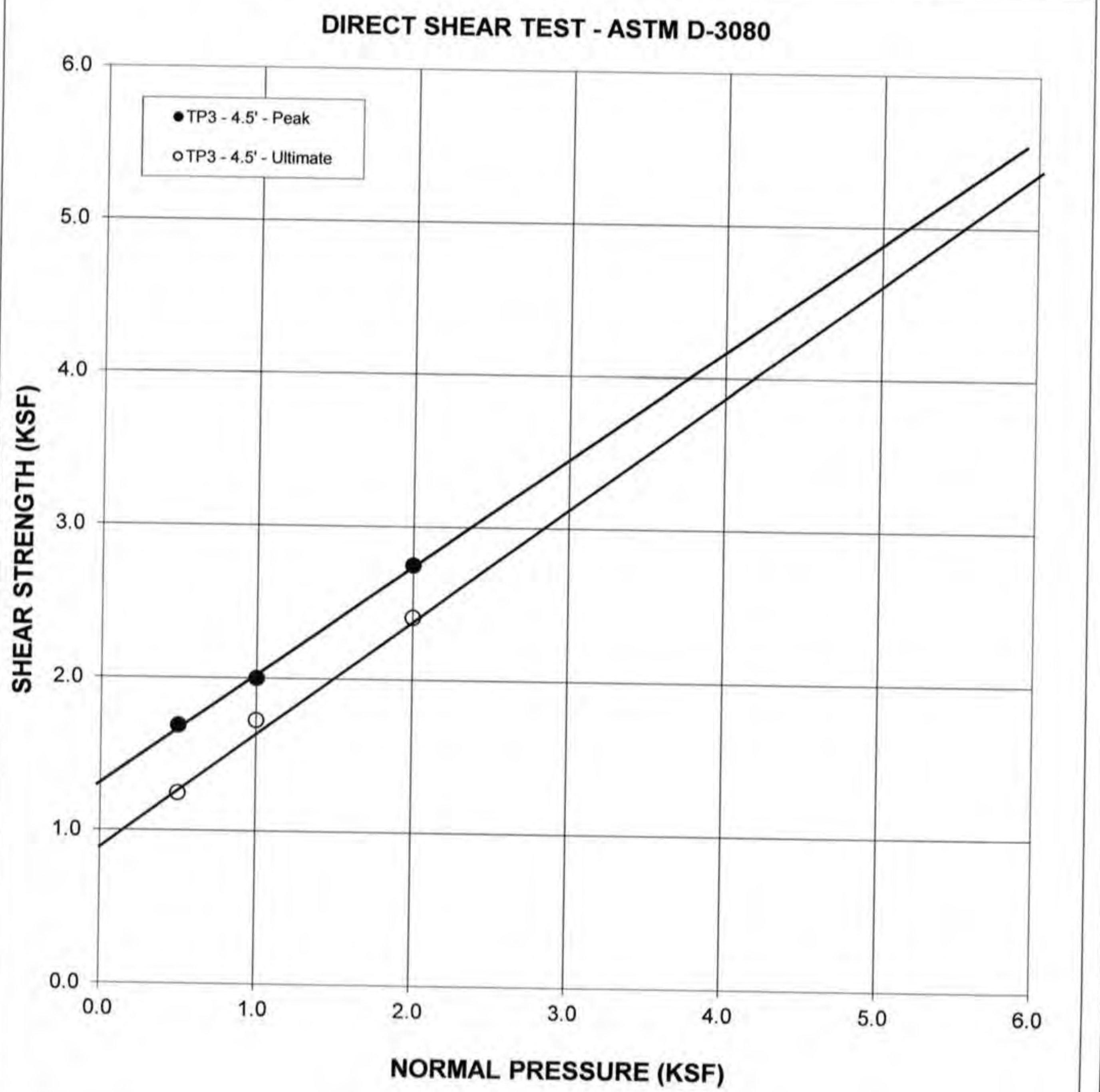
SHEAR DIAGRAM B-1

JN: **SL16.2127** CONSULTANT **JAI**
CLIENT: **Irvine/Valencia-3003 Runyon Canyon Rd**

EARTH MATERIAL: **BEDROCK**

	PEAK	ULTIMATE	
Phi Angle	**37**	**35.5**	**degrees**
Cohesion	**1310**	**890**	**psf**

Average Moisture Content	**20.7%**
Average Dry Density (pcf)	**115.3**
Percent Saturation	**100.0%**



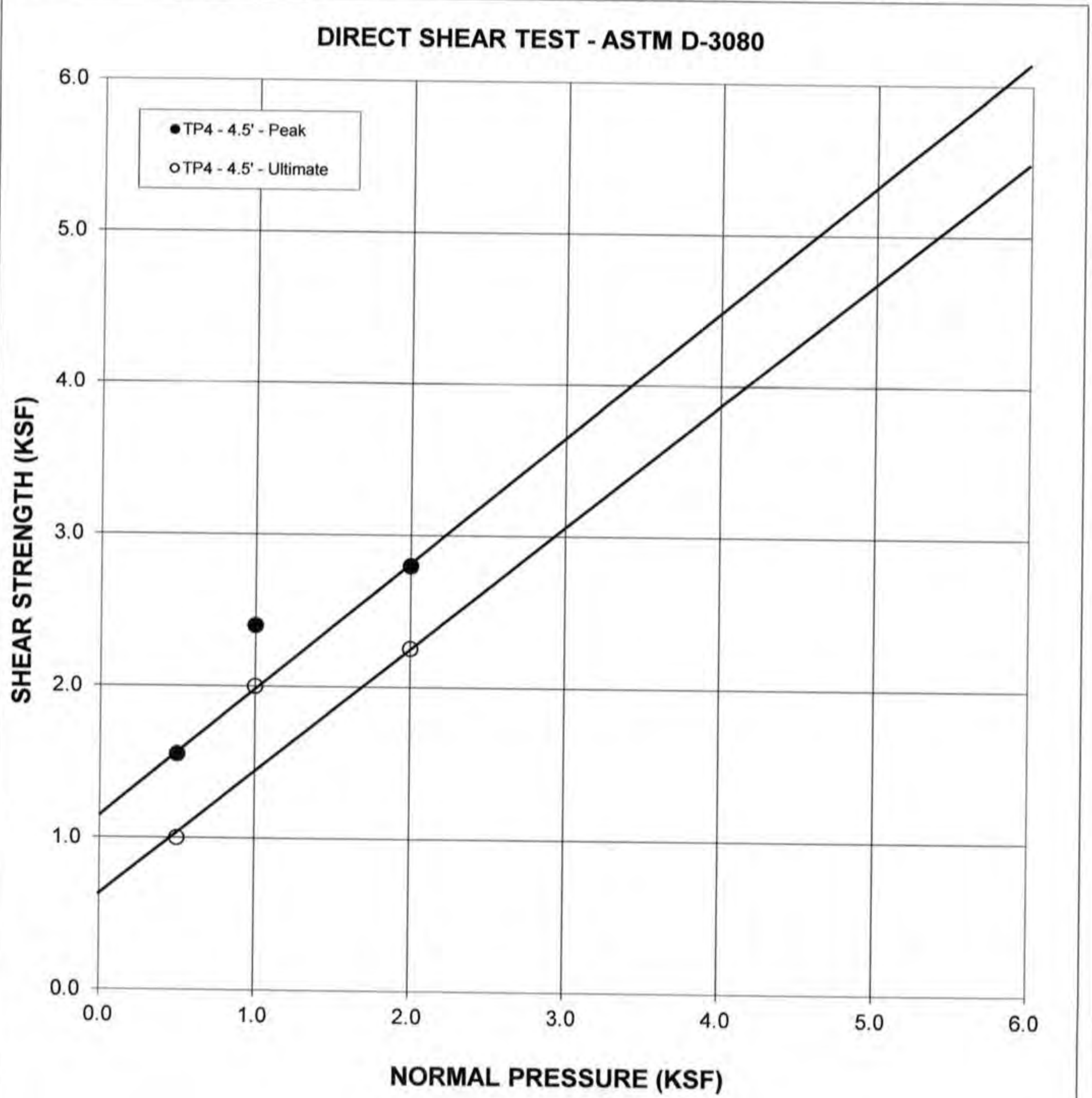
SHEAR DIAGRAM B-2

JN: **SL16.2127** CONSULTANT **JAI**
CLIENT: **Irvine/Valencia-3003 Runyon Canyon Rd**

EARTH MATERIAL: **BEDROCK**

	PEAK	ULTIMATE	
Phi Angle	39.5	39	degrees
Cohesion	1160	620	psf

Average Moisture Content	22.8%
Average Dry Density (pcf)	114.5
Percent Saturation	100.0%



SHEAR DIAGRAM B-3

SOIL LABWORKS LLC

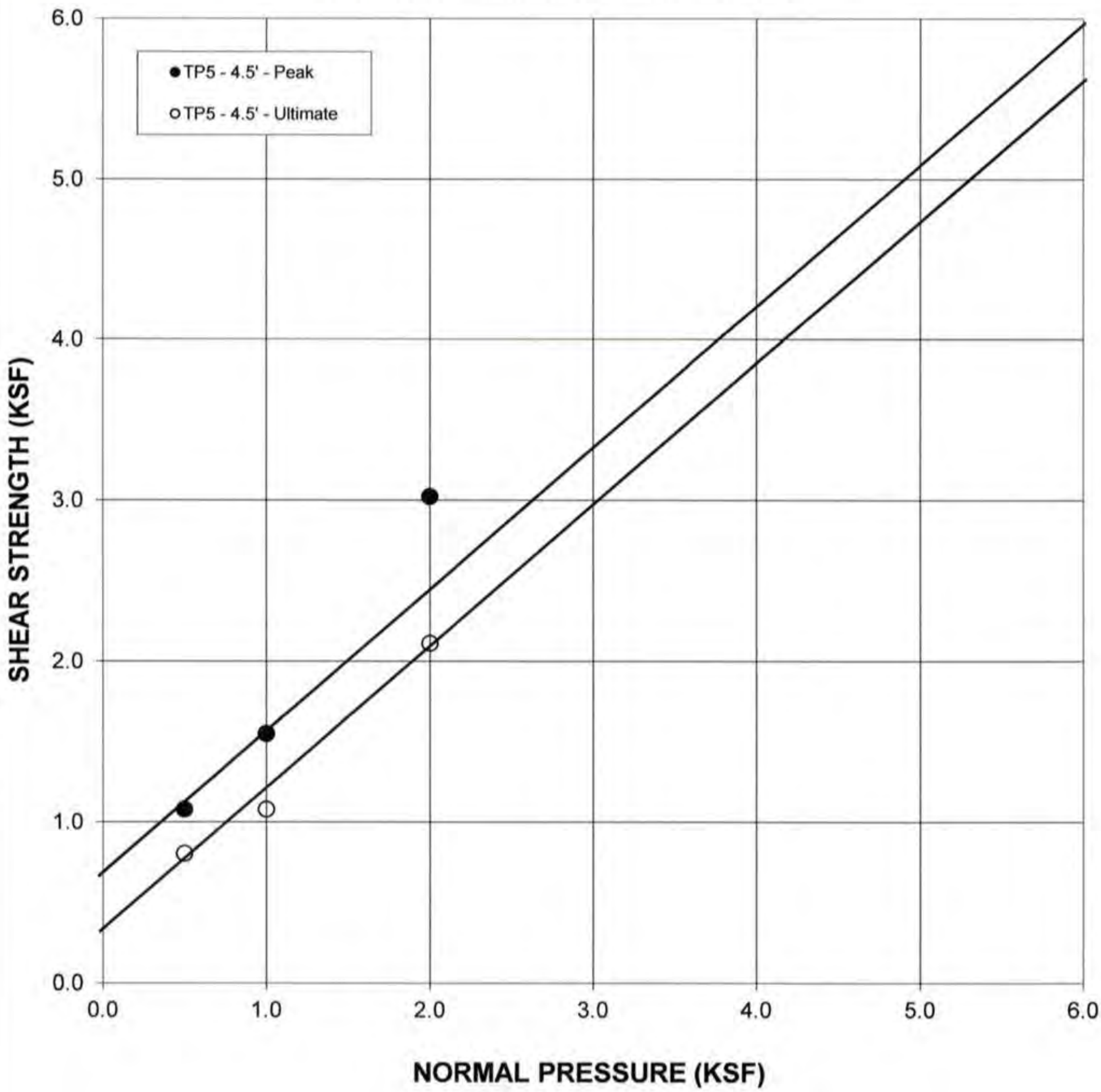
JN: **SL16.2127** CONSULTANT **JAI**
CLIENT: **Irvine/Valencia-3003 Runyon Canyon Rd**

EARTH MATERIAL: **BEDROCK**

	PEAK	ULTIMATE	
Phi Angle	**41**	**41**	**degrees**
Cohesion	**690**	**350**	**psf**

Average Moisture Content	**19.8%**
Average Dry Density (pcf)	**117.9**
Percent Saturation	**100.0%**

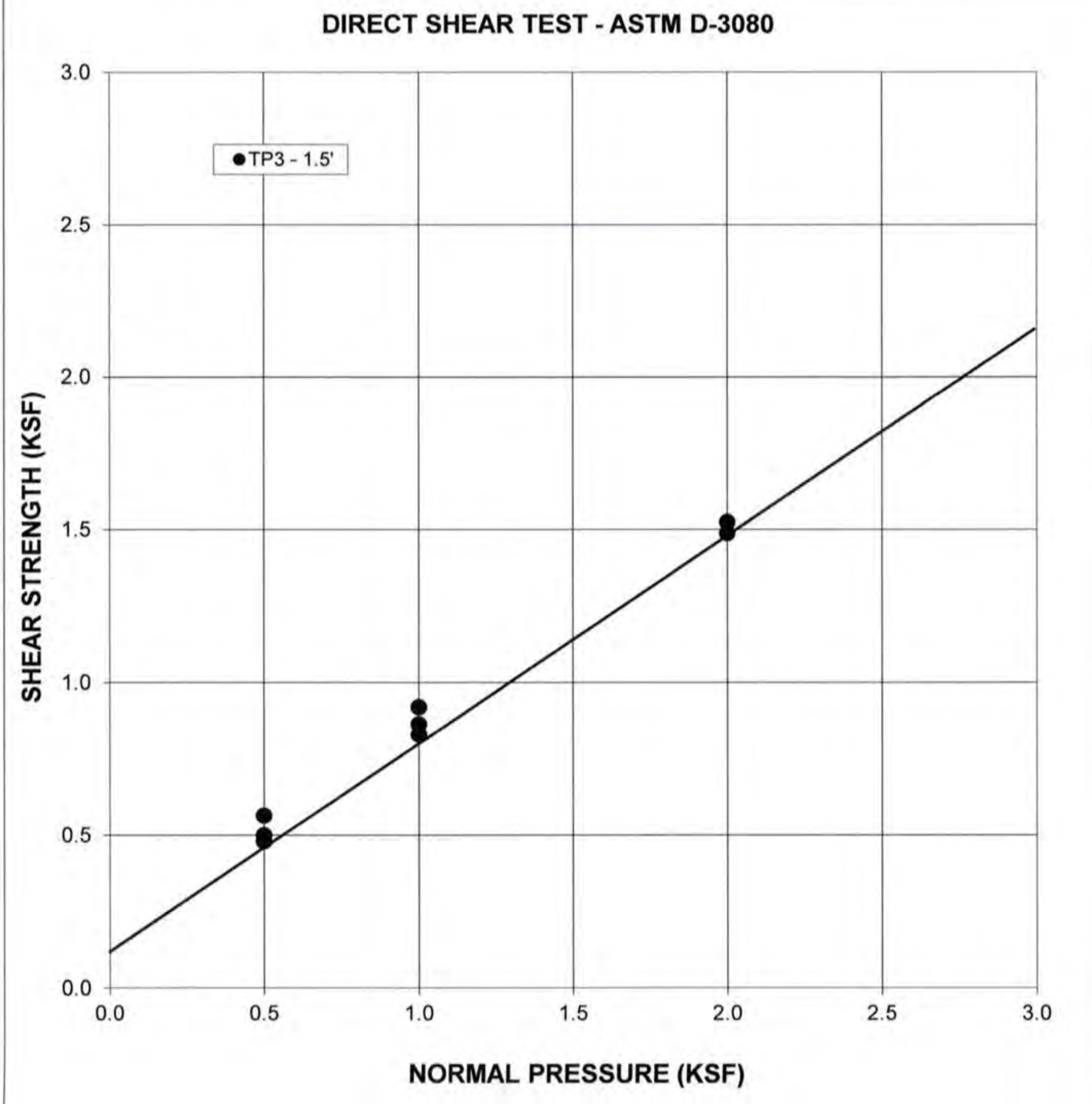
DIRECT SHEAR TEST - ASTM D-3080



SOIL LABWORKS LLC	SHEAR DIAGRAM B-4
	JN: **SL16.2127** CONSULTANT **JAI** CLIENT: **Irvine/Valencia-3003 Runyon Canyon Dr** EARTH MATERIAL: **SOIL**

Sample repeatedly sheared to determine residual strength.

	RESIDUAL			
Phi Angle	**34**	**degrees**	**Average Moisture Content**	**23.3%**
Cohesion	**120**	**psf**	**Average Dry Density (pcf)**	**102.7**
			Percent Saturation	**100.0%**



IRVINE GEOTECHNICAL Inc

RETAINING WALL

IC: **16010** CONSULT: **JAI**
CLIENT: **VALENCIA**

CALCULATION SHEET #

CALCULATE THE DESIGN MINIMUM EQUIVALENT FLUID PRESSURE (EFP) FOR PROPOSED RETAINING WALLS. THE WALL HEIGHT AND BACKSLOPE AND SURCHARGE CONDITIONS ARE LISTED BELOW. ASSUME THE BACKFILL IS SATURATED WITH NO EXCESS HYDROSTATIC PRESSURE. USE THE MONONOBE-OKABE METHOD FOR SEISMIC FORCES.

CALCULATION PARAMETERS

EARTH MATERIAL:	FILL	WALL HEIGHT	13 feet
SHEAR DIAGRAM:	JBG 1	BACKSLOPE ANGLE:	27 degrees
COHESION:	410 psf	SURCHARGE:	0 pounds
PHI ANGLE:	32 degrees	SURCHARGE TYPE:	U Uniform
DENSITY	135 pcf	INITIAL FAILURE ANGLE:	30 degrees
SAFETY FACTOR:	1	FINAL FAILURE ANGLE:	70 degrees
WALL FRICTION	0 degrees	INITIAL TENSION CRACK:	1 feet
CD (C/FS):	410.0 psf	FINAL TENSION CRACK:	50 feet

PHID = ATAN(TAN(PHI)/FS) = 32.0 degrees

HORIZONTAL PSEUDO STATIC SEISMIC COEFFICIENT (k_h) 0.321 %g

VERTICAL PSEUDO STATIC SEISMIC COEFFICIENT (k_v) 0 %g

CALCULATED RESULTS

CRITICAL FAILURE ANGLE	41 degrees
AREA OF TRIAL FAILURE WEDGE	162.0 square feet
TOTAL EXTERNAL SURCHARGE	0.0 pounds
WEIGHT OF TRIAL FAILURE WEDGE	21863.3 pounds
NUMBER OF TRIAL WEDGES ANALYZED	2050 trials
LENGTH OF FAILURE PLANE	21.2 feet
DEPTH OF TENSION CRACK	7.2 feet
HORIZONTAL DISTANCE TO UPSLOPE TENSION CRACK	16.0 feet
CALCULATED HORIZONTAL THRUST ON WALL	**3017.7 pounds**

THE CALCULATION INDICATES THAT FOR THE DESIGN GROUND MOTION, THE UNBALANCED FORCE ON RETAINING WALLS IS 3.018 KIPS.

IRVINE GEOTECHNICAL Inc

SHORING PILE

IC:	**16010**	CONSULT:	**JAI**
CLIENT:	**VALENCIA**		

CALCULATION SHEET #

CALCULATE THE DESIGN MINIMUM EQUIVALENT FLUID PRESSURE (EFP) FOR PROPOSED RETAINING WALLS. THE WALL HEIGHT AND BACKSLOPE AND SURCHARGE CONDITIONS ARE LISTED BELOW. ASSUME THE BACKFILL IS SATURATED WITH NO EXCESS HYDROSTATIC PRESSURE. USE THE MONONOBE-OKABE METHOD FOR SEISMIC FORCES.

CALCULATION PARAMETERS

EARTH MATERIAL:	BEDROCK	RETAINED LENGTH	15 feet
SHEAR DIAGRAM:	B-3	BACKSLOPE ANGLE:	45 degrees
COHESION:	690 psf	SURCHARGE:	1000 pounds
PHI ANGLE:	41 degrees	SURCHARGE TYPE:	U Uniform
DENSITY	145 pcf	INITIAL FAILURE ANGLE:	30 degrees
SAFETY FACTOR:	1.25	FINAL FAILURE ANGLE:	70 degrees
PILE FRICTION	0 degrees	INITIAL TENSION CRACK:	1 feet
CD (C/FS):	552.0 psf	FINAL TENSION CRACK:	50 feet

PHID = ATAN(TAN(PHI)/FS) = 34.8 degrees

HORIZONTAL PSEUDO STATIC SEISMIC COEFFICIENT (k_h) 0 %g

VERTICAL PSEUDO STATIC SEISMIC COEFFICIENT (k_v) 0 %g

CALCULATED RESULTS

CRITICAL FAILURE ANGLE	57 degrees
AREA OF TRIAL FAILURE WEDGE	141.1 square feet
TOTAL EXTERNAL SURCHARGE	11000.0 pounds
WEIGHT OF TRIAL FAILURE WEDGE	31463.8 pounds
NUMBER OF TRIAL WEDGES ANALYZED	2050 trials
LENGTH OF FAILURE PLANE	22.0 feet
DEPTH OF TENSION CRACK	8.5 feet
HORIZONTAL DISTANCE TO UPSLOPE TENSION CRACK	12.0 feet
CALCULATED THRUST ON PILE	**2046.7 pounds**
CALCULATED EQUIVALENT FLUID PRESSURE	**18.2 pcf**
DESIGN EQUIVALENT FLUID PRESSURE	**30.0 pcf**

THE CALCULATION INDICATES THAT THE PROPOSED SHORING PILES MAY MAY BE DESIGNED FOR AN EQUIVALENT FLUID PRESSURE OF 30 POUNDS PER CUBIC FOOT. THE FLUID PRESSURE SHOULD BE MULTIPLIED BY THE PILE SPACING.

IRVINE GEOTECHNICAL Inc

TEMPORARY EXCAVATION HEIGHT

IC: **16010** CONSULT: **JAI**
CLIENT: **VALENCIA**

CALCULATION SHEET #

CALCULATE THE HEIGHT TO WHICH TEMPORARY EXCAVATIONS ARE STABLE (NEGATIVE THRUST). THE EXCAVATION HEIGHT AND BACKSLOPE AND SURCHARGE CONDITIONS ARE LISTED BELOW. ASSUME THE EARTH MATERIAL IS SATURATED WITH NO EXCESS HYDROSTATIC PRESSURE.

CALCULATION PARAMETERS

EARTH MATERIAL:	BEDROCK	WALL HEIGHT:	8 feet
SHEAR DIAGRAM:	B-3	BACKSLOPE ANGLE:	45 degrees
COHESION:	690 psf	SURCHARGE:	0 pounds
PHI ANGLE:	41 degrees	SURCHARGE TYPE:	P Point
DENSITY:	145 pcf	INITIAL FAILURE ANGLE:	30 degrees
SAFETY FACTOR:	1.25	FINAL FAILURE ANGLE:	70 degrees
WALL FRICTION:	0 degrees	INITIAL TENSION CRACK:	1 feet
CD (C/FS):	552.0 psf	FINAL TENSION CRACK:	30 feet

PHID = ATAN(TAN(PHI)/FS) = 34.8 degrees

CALCULATED RESULTS

CRITICAL FAILURE ANGLE	52 degrees
AREA OF TRIAL FAILURE WEDGE	7.9 square feet
TOTAL EXTERNAL SURCHARGE	0.0 pounds
WEIGHT OF TRIAL FAILURE WEDGE	1139.7 pounds
NUMBER OF TRIAL WEDGES ANALYZED	1230 trials
LENGTH OF FAILURE PLANE	1.6 feet
DEPTH OF TENSION CRACK	7.7 feet
HORIZONTAL DISTANCE TO UPSLOPE TENSION CRACK	1.0 feet
CALCULATED HORIZONTAL THRUST	**-418.0 pounds**
CALCULATED EQUIVALENT FLUID PRESSURE	**-13.1 pcf**
MAXIMUM HEIGHT OF TEMPORARY EXCAVATION	**8.0 feet**

CONCLUSIONS:

THE CALCULATION INDICATES THAT THE TEMPORARY EXCAVATIONS IN BEDROCK UP TO 8 FEET HIGH HAVE A NEGATIVE THRUST AND ARE TEMPORARILY STABLE.

CITY OF LOS ANGELES

CALIFORNIA

RICHARD J. RIORDAN
MAYOR

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

ANDREW A. ADELMAN
GENERAL MANAGER

RICHARD E. HOLGUIN
EXECUTIVE OFFICER

November 12, 1998

Log # 26176
SOILS/GEOLOGY FILE - 2

Gary Ward
3839 Buena Park
Studio City, CA

TRACT: SN4T1SR14W
LOT: Arb 22
LOCATION: 3003 Runyon Canyon Rd.

CURRENT REFERENCE REPORT/LETTER(S)	REPORT NO.	DATE(S) OF DOCUMENT	PREPARED BY
Supplemental Report	17848-I	11/12/98	J. Byer Group
Geology/Soil Report	17848-I	09/30/98	J. Byer Group
Ovrszd Doc	17848-I	09/30/98	J. Byer Group

The referenced reports concerning a proposed single-family residence have been reviewed by the Grading Section of the Department of Building and Safety. According to the report dated 09/30/98, retaining walls will be up to 20 feet in height. An existing dwelling on the site will be converted to a guest house. There are existing street cut slopes that are steeper than 1:1. The reports are acceptable, provided the following conditions are complied with during site development:

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

2. All nonconforming street cut slopes shall be trim-graded back to a slope gradient no steeper than 1:1 or retained by a designed retaining wall, and provided with diverter drains at the top of the cut portion of the slope.

3. All new graded slopes shall be no steeper than 2:1, except as indicated in condition #2.

4. All recommendations of the reports which are in addition to or more restrictive than the conditions contained herein shall be incorporated into the plans.

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

6. A grading permit shall be obtained.

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

8. The geologist and soil engineer shall inspect all excavations to determine that conditions anticipated in the report have been encountered and to provide recommendations for the correction of hazards found during grading.

9. All man-made fill shall be compacted to a minimum 90 percent of the maximum dry density of the fill material per the latest version of ASTM D 1557; or 95 percent where less than 15 percent fines passes 0.005mm.

10. All roof and pad drainage shall be conducted to the street in an acceptable manner.

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

12. The rear yard retaining walls shall be provided with a minimum freeboard of 18 inches, as recommended.

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

14. Prior to issuance of the building permit, the design of the subdrainage system required to prevent possible hydrostatic pressure behind retaining walls shall be approved by the soils engineer and accepted by the Department. Installation of the subdrainage system shall be inspected and approved by the soils engineer and by the City grading inspector.

15. Footings adjacent to a descending slope steeper than 3:1 in gradient may be setback from the soil/bedrock contact a minimum distance of 20 feet, as recommended, in lieu of the setback prescribed by the Code.

16. Existing uncertified fill shall not be used for support of footings, concrete slabs or new fill.

17. Prior to the placing of compacted fill, a representative of the consulting Soils Engineer

shall inspect and approve the bottom excavations. He shall post a notice on the job site for the City Grading Inspector and the Contractor stating that the soil inspected meets the conditions of the report, but that no fill shall be placed until the City Grading Inspector has also inspected and approved the bottom excavations. A written certification to this effect shall be filed with the Department upon completion of the work. The fill shall be placed under the inspection and approval of the Foundation Engineer. A compaction report shall be submitted to the Department upon completion of the compaction.

18. Prior to the pouring of concrete, a representative of the consulting Soil Engineer shall inspect and approve the footing excavations. He shall post a notice on the job site for the City Building Inspector and the Contractor stating that the work so inspected meets the conditions of the report, but that no concrete shall be poured until the City Building Inspector has also inspected and approved the footing excavations. A written certification to this effect shall be filed with the Department upon completion of the work.

19. Buildings adjacent to ascending slopes shall be set back from the toe of the slope a level distance equal to one half the vertical height of the slope, but needs not to exceed 15 feet in accordance with Code Section 91.1806.4.2.

20. Pile caisson and/or isolated foundation ties are required by Code Section 91.1807.2. Exceptions and modification to this requirement are provided in Rule of General Application 662.

21. Pile and/or caisson shafts shall be designed for a lateral load of 1000 pounds per linear foot of shaft exposed to fill, soil and weathered bedrock.

22. The dwelling shall be connected to the public sewer or the geologist or soils engineer must submit specific recommendations for the location and depth of sealing for the proposed private sewage disposal system.

23. All friction pile or caisson drilling and installation shall be performed under the continuous inspection and approval of the soils engineer.

24. The design passive pressure shall be neglected for a portion of the pile with a set back distance (horizontal set back) less than five feet from the bedrock slope surface.

25. Retaining walls with a level backslope shall be designed for a minimum EFP of 43 PCF, as recommended. Retaining walls with a backslope not steeper than 1½:1 (horizontal to vertical) shall be designed for a minimum EFP of 55 PCF.

26. Grading shall be scheduled for completion prior to the start of the rainy season, or detailed temporary erosion control plans shall be filed in a manner satisfactory to the Department and the Department of Public Works, for any grading work in excess of 200 cu yd.

27. Prior to excavation, an initial inspection shall be called at which time sequence of shoring (if required), protection fences and dust and traffic control will be scheduled.

DANA PREVOST
Engineering Geologist I

ANDRZEJ T. SZPIKOWSKI
Geotechnical Engineer I

DP/ATS:dp/ats
26176
(213) 977-6329

cc: J. Byer Group
Hrand Safarian
LA District Office

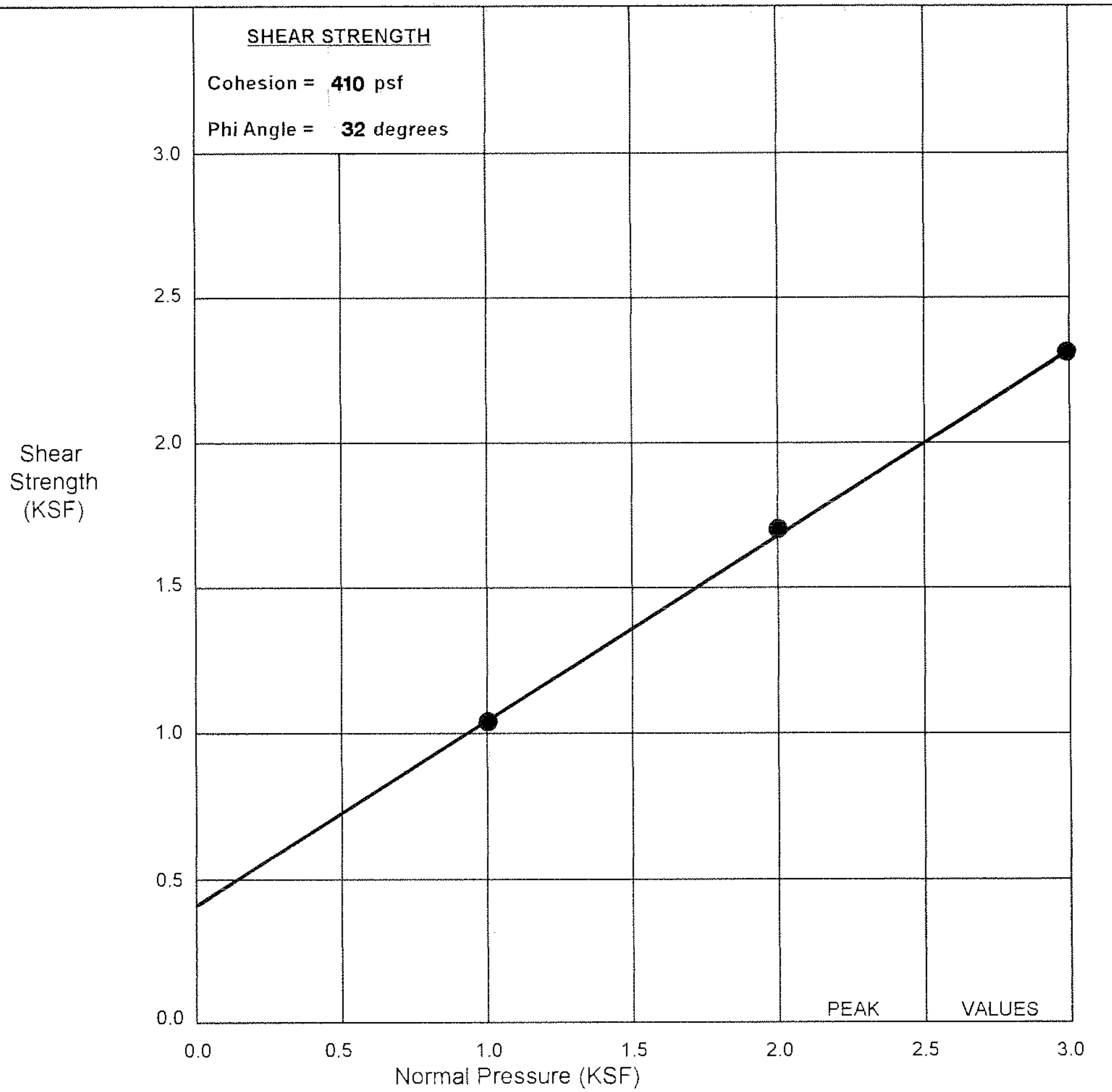
THE J. BYER GROUP, INC.
A GEOTECHNICAL CONSULTING FIRM
512 E. WILSON AVENUE SUITE 201, GLENDALE, CA 91206
818•549•9959 Tel 818•543•3747 Fax

SHEAR TEST DIAGRAM #1

JB: 17848-I STAFFORD & GLYNN

SAMPLE: **FUTURE COMPACTED FILL**

BULK SAMPLE REMOLDED TO 90% OF THE MAXIMUM DRY DENSITY



○ Direct Shear (Field Moisture)

● Direct Shear (Saturated)

Ave. Moisture Content (%) = **15.0**

Ave. Dry Density (pcf) = **118.8**

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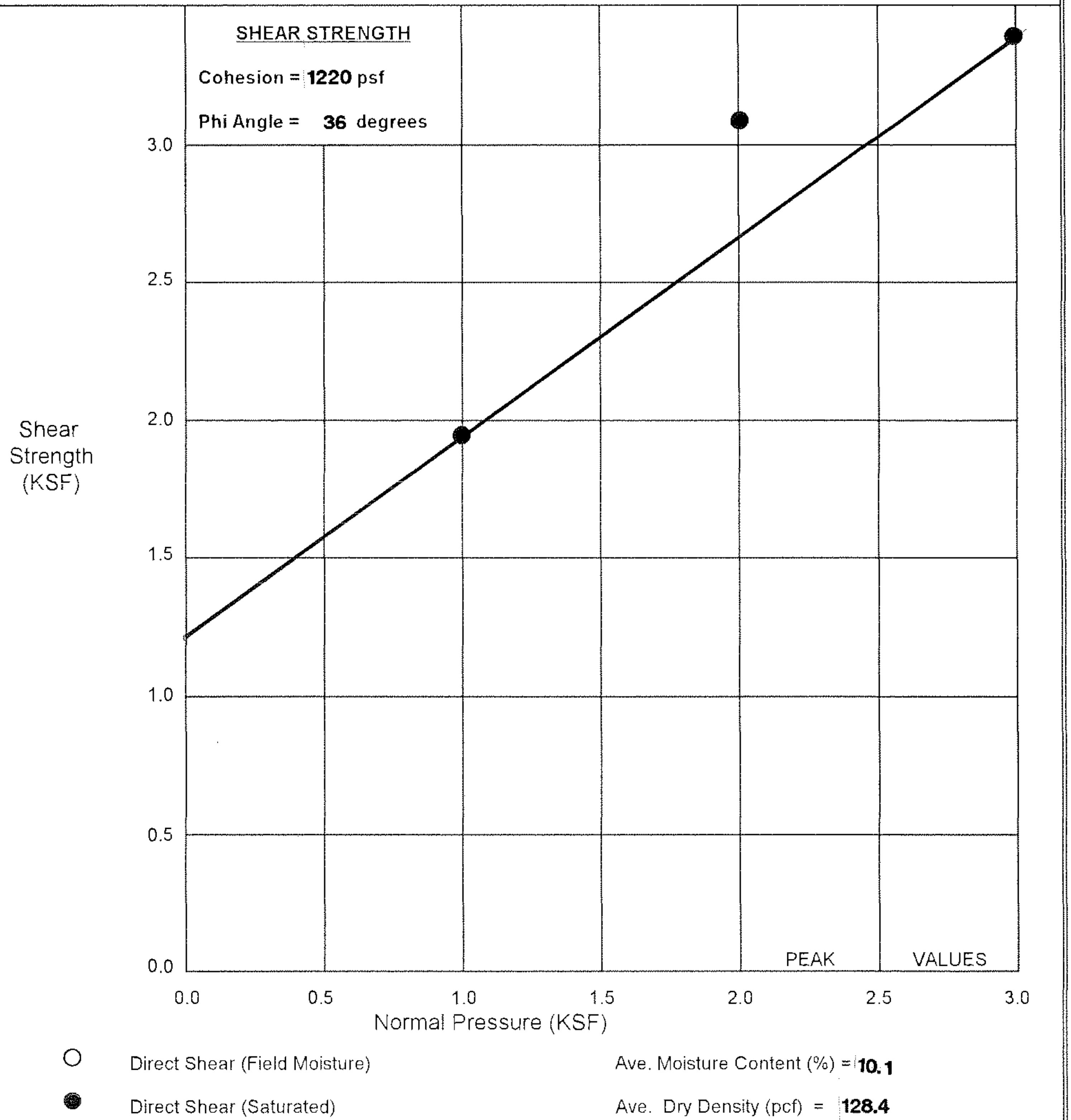
SHEAR TEST DIAGRAM #2

JB: 17848-I STAFFORD & GLYNN

SAMPLE: **GRANITE (TP4-3)**



Ave. Moisture Content (%) = **10.1**

Ave. Dry Density (pcf) = **128.4**

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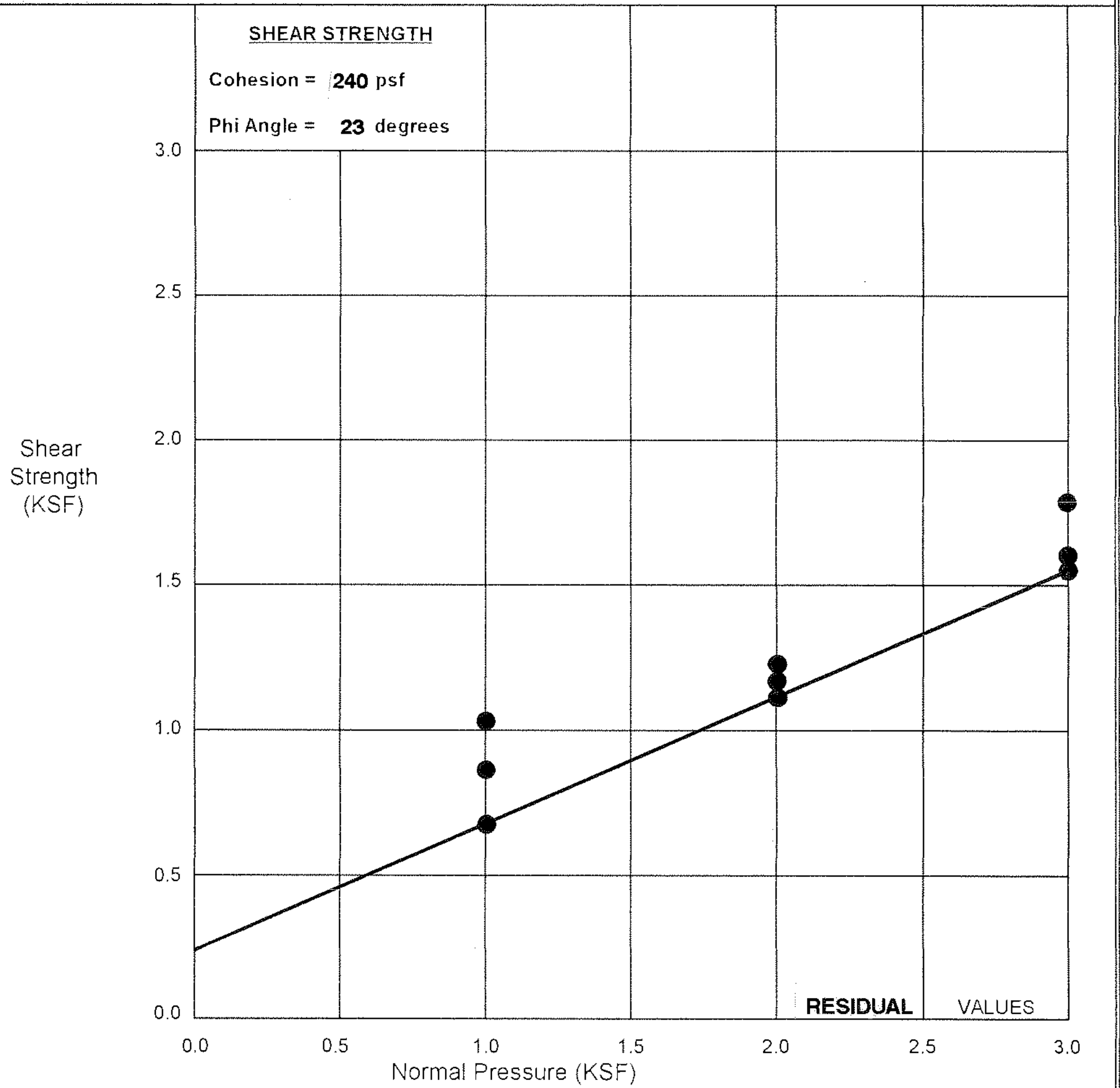
SHEAR TEST DIAGRAM #3

JB: 17848-I STAFFORD & GLYNN

SAMPLE: **SOIL (TP5-2)**

RING SAMPLE REPEATEDLY SHEARED



○ Direct Shear (Field Moisture)

● Direct Shear (Saturated)

Ave. Moisture Content (%) = **21.7**

Ave. Dry Density (pcf) = **104.8**

DIRECT SHEAR TEST

MTC ENGINEERING, INC.

PROJECT PSA/KODIAK

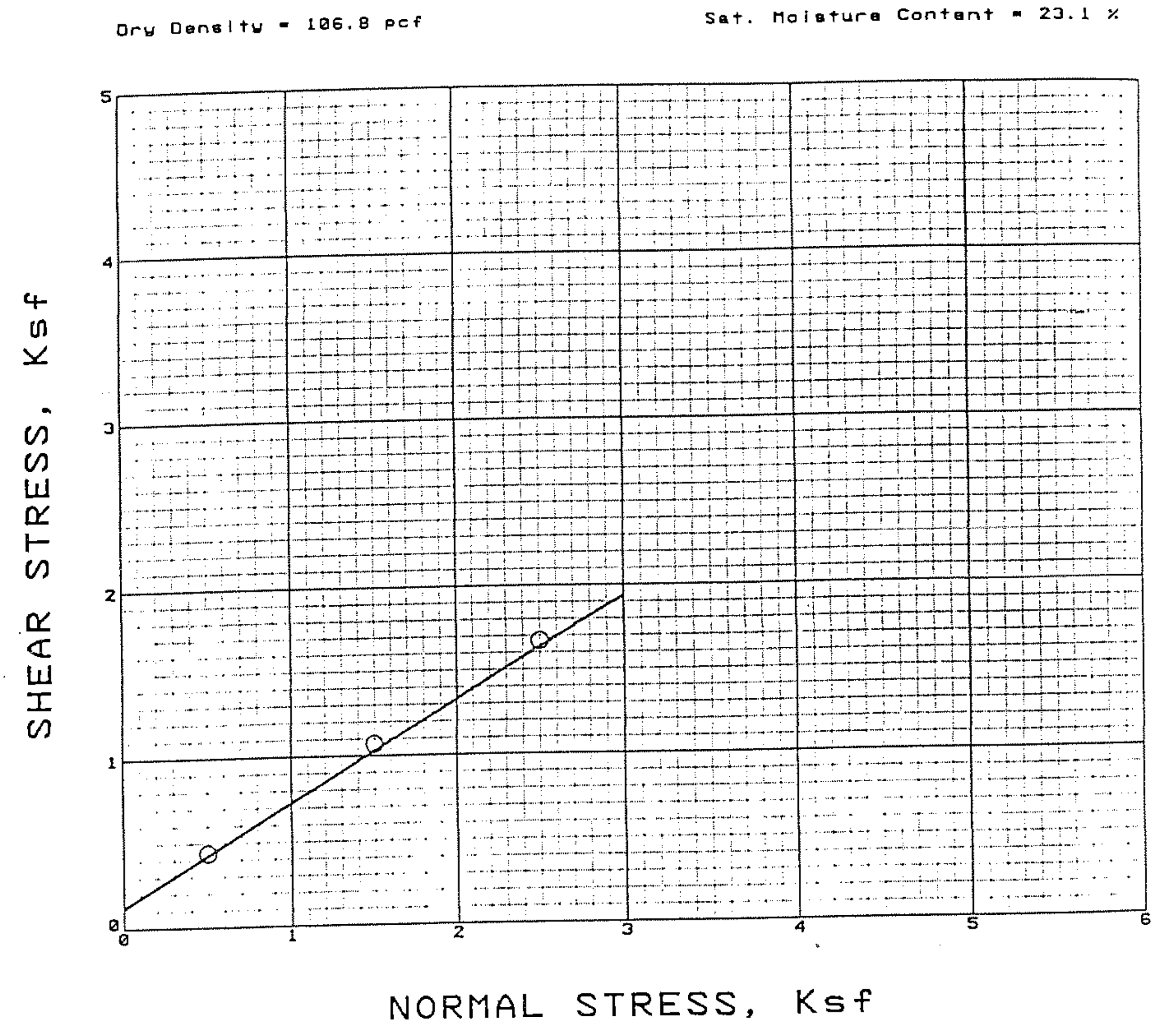
LOCATION Runyan Canyon Road

REMARKS

LOG NO. TP-8

DEPTH 6.0

CLIENT NO. MTC-94-012



○ Peak Values C(p) = 120 psf Phi(p) = 31.5 Degrees

Residual Values C(r) = psf Phi(r) = Degrees

Sample Description: Medium Broun Silty SAND

PLATE DS-1

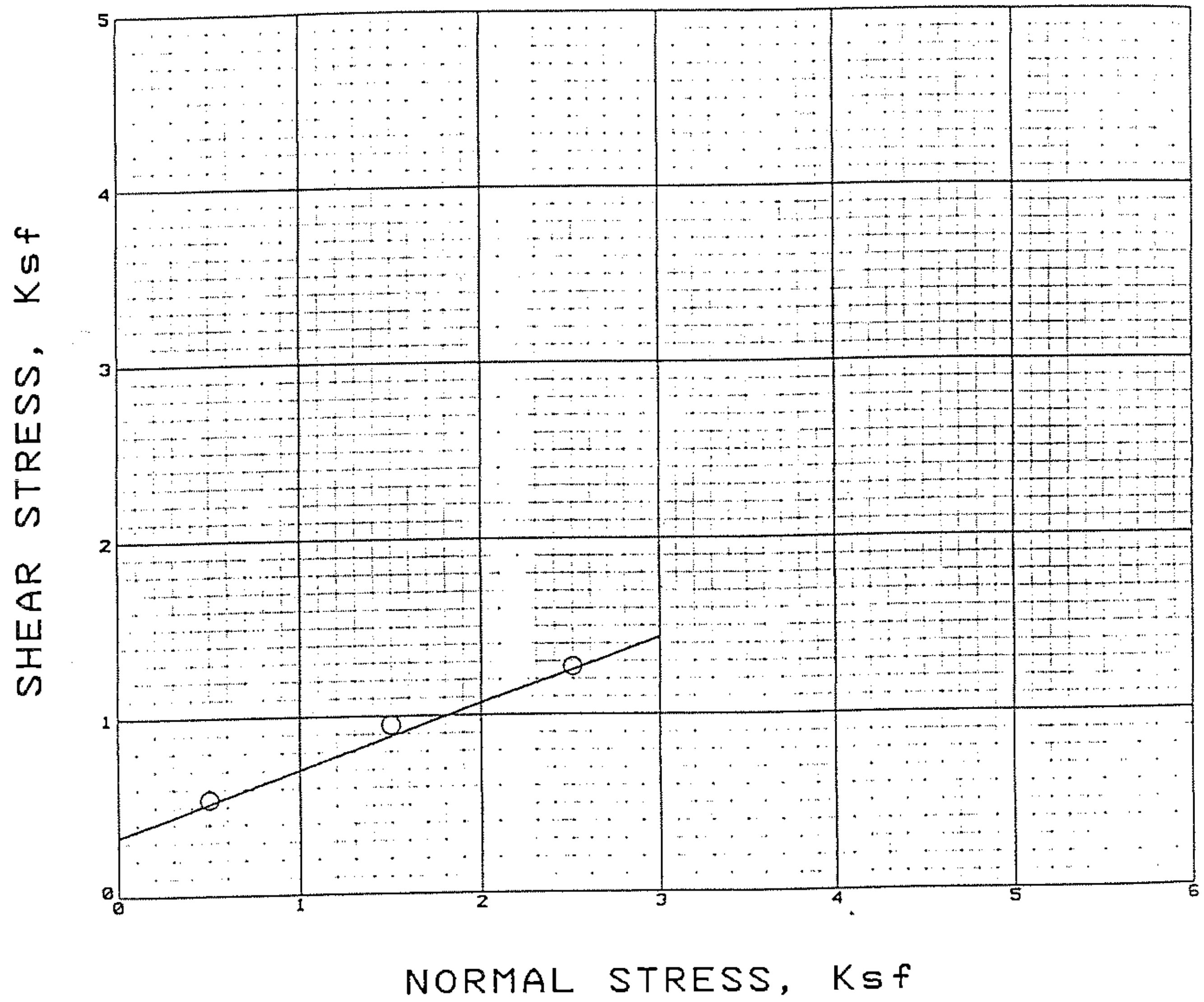
DIRECT SHEAR TEST

MTC ENGINEERING, INC.

PROJECT	PSA/KODIAK	LOG NO.	TP-8
LOCATION	Runyan Canyon Road	DEPTH	8.0
REMARKS		CLIENT NO.	MTC-94-012

Dry Density = 114.1 pcf

Sat. Moisture Content = 22.5 %



○ Peak Values	C(p) =	340	psf	Phi(p) =	20.0	Degrees
Residual Values	C(r) =		psf	Phi(r) =		Degrees

Sample Description: Medium Brown Silty SAND

PLATE DS-2

DIRECT SHEAR TEST

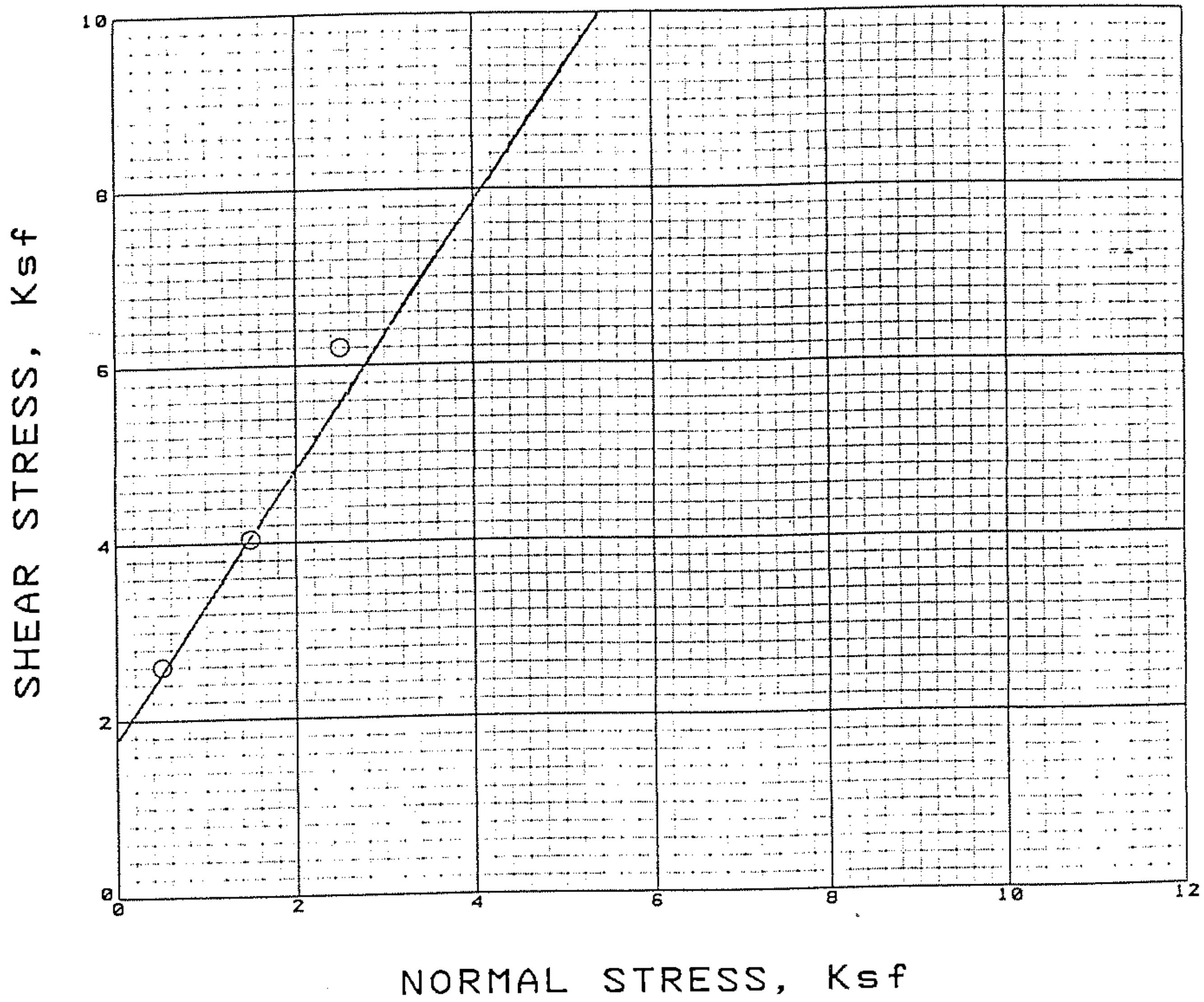
MTC ENGINEERING, INC.

PROJECT: PSA/KODIAK
LOCATION: Runyan Canyon Road
REMARKS:

LOG NO.: Slot Cut A
DEPTH: 0'
CLIENT NO.: MTC-94-012

Dry Density = 128.7 pcf

Sat. Moisture Content = 11.2 %



○ Peak Values	C(p) =	1800 psf	Phi(p) =	56.5	Degrees
Residual Values	C(r) =	psf	Phi(r) =		Degrees

Sample Description: Broun Conglomerate

PLATE DS-3

DIRECT SHEAR TEST

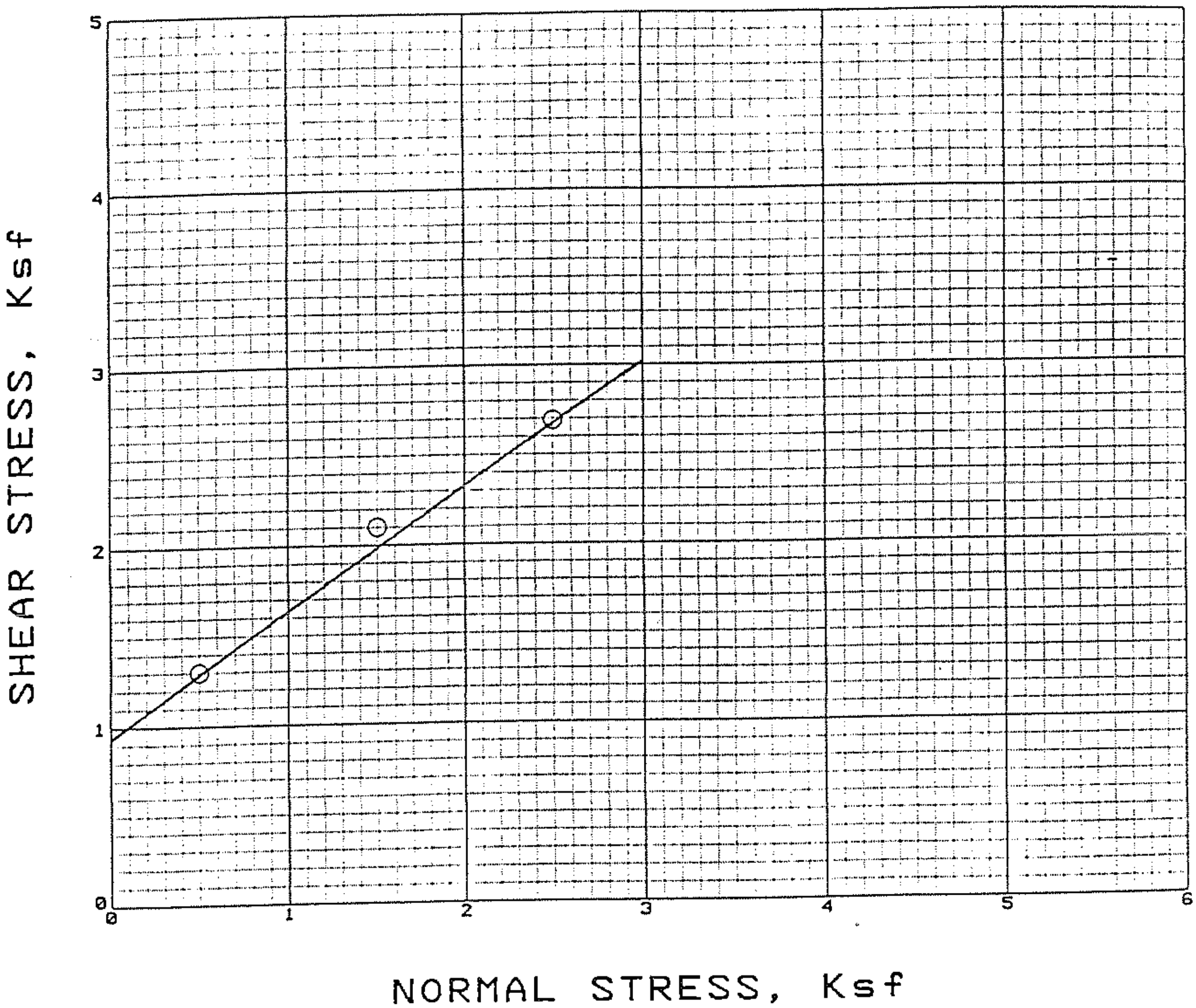
MTC ENGINEERING, INC.

PROJECT PSA/KODIAK
LOCATION Runyan Canyon Road
REMARKS

LOG NO. Slot Cut B
DEPTH 0'
CLIENT NO. MTC-94-012

Dry Density = 150.0 pcf

Sat. Moisture Content = 9.5 %



○ Peak Values C(p) = 950 psf Phi(p) = 35.0 Degrees

Ultimate Values C(r) = psf Phi(r) = Degrees

Sample Description: Gray Granite

PLATE DS-4

THE J. BYER GROUP, INC.
A GEOTECHNICAL CONSULTING FIRM
512 E. WILSON AVENUE SUITE 201, GLENDALE, CA 91206
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LOG OF TEST PITS

JB: 17848-I CLIENT: STAFFORD & GLYNN

GEOLOGIST: JAI DATE LOGGED: 9/3/98

REPORT DATE: 9/30/98

TEST PIT #1

SAMPLE DEPTH (feet)	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	DEPTH INTERVAL (feet)	EARTH MATERIAL	LITHOLOGIC DESCRIPTION
			0 - 1	FILL:	Silty Sand, brown, dry, slightly dense, rootlets
			1 - 2½	SOIL:	Clayey Sand, reddish brown, slightly moist to dry, minor roots
			2½ - 6	BEDROCK:	Conglomerate, hard, massive, boulders up to 12 inches in diameter, upper 2 feet of matrix very weathered grades to slightly weathered

End at 6 Feet; No Water; No Caving; Fill to 1 Foot.

TEST PIT #2

SAMPLE DEPTH (feet)	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	DEPTH INTERVAL (feet)	EARTH MATERIAL	LITHOLOGIC DESCRIPTION
			0 - 1	SLOPE WASH/FILL:	Silty Sand, light gray-brown, dry
			1 - 2	SOIL:	Clayey Sand, orange brown, dry, firm
			2 - 5	WEATHERED BEDROCK:	Sandstone, mottled red brown, gray, fractured, roots, very weathered
			5 - 7	BEDROCK:	Sandstone, orange-brown, hard, massive, moderately weathered

End at 7 Feet; No Water; No Caving; Fill to 1 Foot.

TEST PIT #3

SAMPLE DEPTH (feet)	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	DEPTH INTERVAL (feet)	EARTH MATERIAL	LITHOLOGIC DESCRIPTION
			0 - 1½	FILL:	Slope Wash, Gravelly Sand, medium brown, slightly dense
			1½ - 2	SOIL:	Silty Sand, brown, slightly moist, medium dense
			2 - 6	WEATHERED BEDROCK:	Sandstone, moderately hard, very fractured, roots, faulted
			6 - 8	BEDROCK:	Sandstone, moderately hard to hard, fractured, tight, moderately weathered, faulted

End at 8 Feet; No Water; No Caving; Fill to 1½ Feet.

NOTE: The stratification depths shown on the Log of Test Pits are approximate and are based upon visual classification of samples and cuttings. The actual depths may vary. Variations between test pits may also occur.

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LOG OF TEST PITS

JB: 17848-I CLIENT: STAFFORD & GLYNN

GEOLOGIST: JAI DATE LOGGED: 9/3/98

REPORT DATE: 9/30/98

TEST PIT #4

SAMPLE DEPTH (feet)	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	DEPTH INTERVAL (feet)	EARTH MATERIAL	LITHOLOGIC DESCRIPTION
			0 - ½	**SOIL:**	
			½ - 3	**BEDROCK:**	Granite, salt and pepper, hard, moderately weathered, massive

End at 3 Feet; No Water; No Caving; No Fill.

TEST PIT #5

SAMPLE DEPTH (feet)	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	DEPTH INTERVAL (feet)	EARTH MATERIAL	LITHOLOGIC DESCRIPTION
			0 - 1	**SLOPE WASH/FILL:**	
			1 - 2½	**SOIL:**	
			2½ - 7	**BEDROCK:**	Sandstone with faulted granite, red, brown, gray, tan, moderately hard to hard, massive, very to moderately weathered, fractured

*End at * Feet; No Water; No Caving; Fill to * Feet.*

NOTE: The stratification depths shown on the Log of Test Pits are approximate and are based upon visual classification of samples and cuttings. The actual depths may vary. Variations between test pits may also occur.

TABLE I

LOG OF TEST PITS

Test Pit Number	Depth (Feet)	Description
1	0 - 2	**Fill** : Silty to Gravelly Sand; brown, dry, slightly dense, roots
	2 - 4	**Soil** : Clayey Silt; reddish brown, dry, dense
	4 - 4½	**Bedrock** : Conglomerate; reddish borwn,, massive, very hard, non cemented
		End at 4-½ Feet. No Water; No Caving; Fill to 2 Feet.
2	0 - 2	**Fill** : Silty to Gravelly Sand; brown, dry, slightly dense, roots
	2 - 2½	**Soil** : Clayey Silt; reddish brown, dry, dense
	2½ - 3½	**Bedrock** : Conglomerate; reddish borwn,, massive, very hard, non cemeneted
		End at 3-½ Feet. No Water; No Caving; Fill to 2 Feet.
3	0 - ½	**Fill** : Gravelly Sand; brown, dry, loose, roots
	½ - 1½	**Bedrock** : Granite; dark brown, massive, cemented, very hard, fractured
		End at 1-½ Feet. No Water; No Caving; Fill to ½ Foot.
4	0 - 1	**Fill** : Gravelly Sand; brown, dry, loose, roots
	1 - 2	**Bedrock** : Conglomerate; dark borwn,, massive, very hard, non cemeneted
		End at 2 Feet. No Water; No Caving; Fill to 1 Foot.

TABLE I

LOG OF TEST PITS

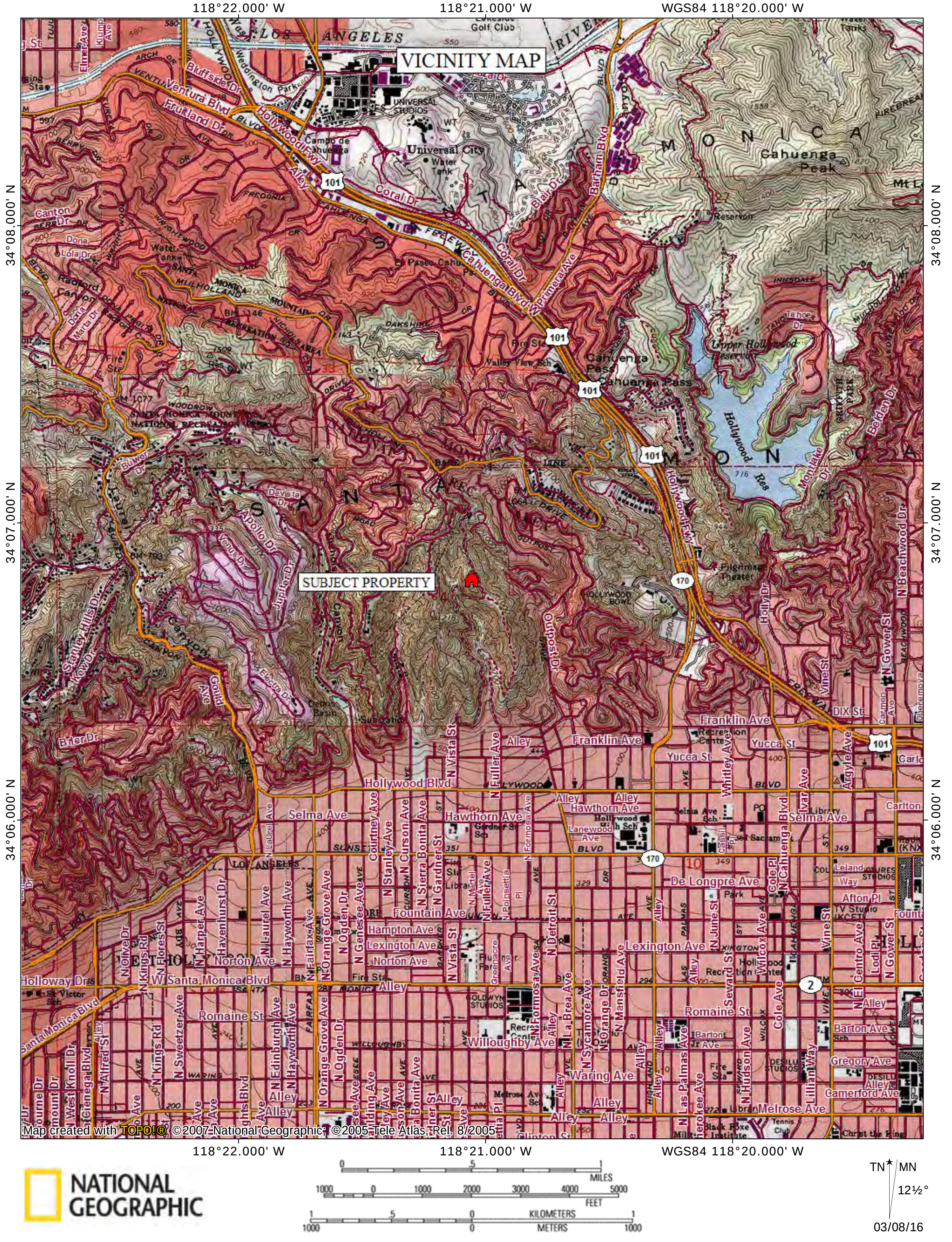
Test Pit Number	Depth (Feet)	Description
5	0 - 1	**Fill** : Gravelly Sand; brown, dry, loose, roots
	1 - 1½	**Soil** : Gravelly Sand; reddish brown, slightly moist, dense
	1½ - 3	**Bedrock** : Granite; gray, massive, hard, fractured, cemented
		End at 3 Feet. No Water; No Caving; Fill to 1 Foot.
6	0 - 1	**Fill** : Gravelly Sand; brown, dry, loose, roots
	1 - 2	**Soil** : Clayey Silt; reddish brown, dry, dense
	2 - 3	**Bedrock** : Conglomerate; reddish borwn,, massive, very hard, non cemeneted
		End at 3 Feet. No Water; No Caving; Fill to 1 Foot.
7	0 - 2½	**Fill** : Gravelly Sand; brown, dry, loose, roots
	2½ - 6½	**Soil :** Clayey Silt; reddish brown, slightly moist to dry, very dense
	6½ - 7	**Bedrock** : Conglomerate; reddish brown, massive, very hard
		End at 7 Feet. No Water; No Caving; Fill to 2½ Feet.

TABLE I

LOG OF TEST PITS

Test Pit Number	Depth (Feet)	Description
8	0 - 5	**Fill** : Gravelly Sand; brown, dry, loose, roots
	5 - 8½	**Soil** : Silty Sand; medium brown, dry, medium dense
	8½ -9	**Bedrock** : Conglomerate; borwn,, massive, very hard, non cemeneted
		End at 9 Feet. No Water; No Caving; Fill to 5 Feet.
9	0 - 3	**Fill** : Gravelly Sand; brown, dry, loose, roots
	3 - 5	**Soil** : Clayey Silt; reddish brown, slightly moist to dry, dense, occasional cobbles and boulders
	5 - 6	**Bedrock** : Conglomerate; reddish borwn,, massive, very hard, non cemeneted
		End at 6 Feet. No Water; No Caving; Fill to 3 Feet.
10	0 - 2½	**Fill** : Gravelly Sand; brown, dry, loose, roots
	2½ - 5	**Soil** : Clayey Sand; brown, slightly moist, very dense, cobbles
	5 - 8	**Bedrock** : Conglomerate; reddish brown, massive, very hard
		End at 8 Feet. No Water; No Caving; Fill to 2½ Feet.

TOPO! map printed on 03/08/16 from "Untitled.tpo"



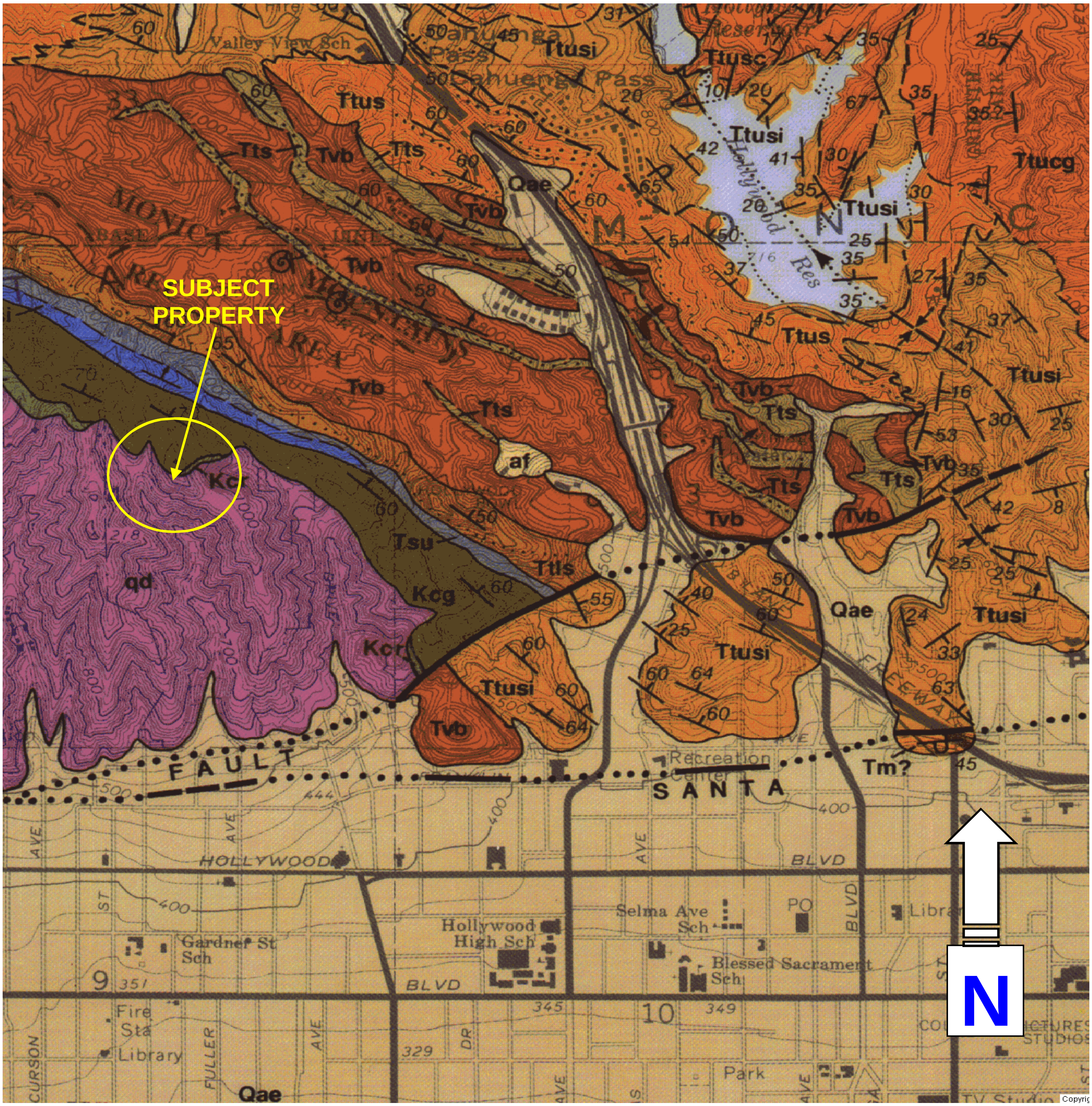
NATIONAL GEOGRAPHIC

IRVINE GEOTECHNICAL Inc

REGIONAL GEOLOGIC MAP

IC:	**16010**	CONSULT:	**CLC**
CLIENT	**VALENCIA**		
SCALE:	**1" = 1,000'**		

REFERENCE: Geologic Maps of the Santa Monica Mountains and Vicinity, CD Compilation T.W. Dibblee, 2001



LOG OF TEST PITS

IRVINE GEOTECHNICAL Inc

PROJECT IC16010 VALENCIA
DRILL DATE 2/9/2016
LOG DATE 2/9/2016
LOGGED BY KJONES
DRILL TYPE Hand Labor
DIAMETER 30 Inches

SURFACE ELEVATION 1104 feet
DRILLING CONTRACTOR Mike's Excavating Service
SURFACE CONDITIONS Ridge at southeastern corner of property

TEST PIT 1

Sample Type	Sample Depth (feet)	Blows per foot	Moisture (%)	Dry Unit Weight (pcf)	Saturation (%)	USCS Code	Elevation (feet)	Depth (feet)	Lithologic Description
						SM	1104.0	0	**SOIL:** Silty Sand, brown, dry, porous, loose
							1103.0	1	**WEATHERED BEDROCK:** Quartz Diorite, orange-brown, gray, white, coarse-grained, massive, fractured, moderately hard
R	2	N/A	12.2	107.5	60		1102.0	2	**BEDROCK:** Quartz Diorite, orange-brown, gray, white, coarse-grained, massive, slightly fractured, tight, moderately hard to hard
									END TP1 @ 2.5': No Water; No Caving; No Fill

SURFACE ELEVATION 1147 feet
DRILLING CONTRACTOR Mike's Excavating Service
SURFACE CONDITIONS Lawn at southern portion of building pad

TEST PIT 2

Sample Type	Sample Depth (feet)	Blows per foot	Moisture (%)	Dry Unit Weight (pcf)	Saturation (%)	USCS Code	Elevation (feet)	Depth (feet)	Lithologic Description
						SC	1147.0	0	**FILL:** Clayey Sand, orange-brown, moist, slightly porous to porous, medium dense, roots and rootlets, gravel to 3" in diameter
						SM	1146.0	1	**SOIL:** Silty Sand, dark brown, moist, porous, medium dense, roots and rootlets, gravel to 3" in diameter
R	2	N/A	10.8	110.5	58		1145.0	2	
							1144.0	3	**WEATHERED BEDROCK:** Quartz Diorite, orange-brown, gray, white, coarse-grained, massive, fractured, tight, moderately hard to hard
R	4	N/A	12.0	109.9	63		1143.0	4	**BEDROCK:** Quartz Diorite, orange-brown, gray, white, coarse-grained, massive, slightly fractured, tight, hard
									END TP2 @ 4': No Water; No Caving; Fill to 1'

IRVINE GEOTECHNICAL Inc

LOG OF TEST PITS

PROJECT IC16010 VALENCIA
DRILL DATE 2/9/2016
LOG DATE 2/9/2016
LOGGED BY KJONES
DRILL TYPE Hand Labor
DIAMETER 30 Inches

SURFACE ELEVATION 1108 feet
DRILLING CONTRACTOR Mike's Excavating Service
SURFACE CONDITIONS Lawn on slope at northeastern portion of property

TEST PIT 3

Sample Type	Sample Depth (feet)	Blows per foot	Moisture (%)	Dry Unit Weight (pcf)	Saturation (%)	USCS Code	Elevation (feet)	Depth (feet)	Lithologic Description
						CL	1108.0	0	**FILL:** Sandy Clay, dark brown, moist, slightly porous, firm, roots and rootlets, cobbles to 6" in diameter
R	1.5	N/A	21.2	102.7	92		1107.0	1	
						CL	1106.0	2	**SOIL:** Gravelly Clay, red-orange brown, moist, slightly porous, stiff, gravel to 1" in diameter
							1105.0	3	**WEATHERED BEDROCK:** Quartz Diorite, orange-brown, gray, white, coarse-grained, massive, fractured, tight, moderately hard
R	4.5	N/A	11.3	115.3	69		1104.0	4	**BEDROCK:** Quartz Diorite, orange-brown, gray, white, coarse-grained, massive, slightly fractured, tight, hard
									END TP3 @ 4.5': No Water; No Caving; Fill to 1.5'

SURFACE ELEVATION 1105 feet
DRILLING CONTRACTOR Mike's Excavating Service
SURFACE CONDITIONS Bare ground at northern portion of property, north of driveway entry

TEST PIT 4

Sample Type	Sample Depth (feet)	Blows per foot	Moisture (%)	Dry Unit Weight (pcf)	Saturation (%)	USCS Code	Elevation (feet)	Depth (feet)	Lithologic Description
						SM	1105.0	0	**SOIL:** Silty Sand, brown, dry, loose, roots and rootlets
							1104.0	1	**BEDROCK:** Conglomerate, brown, white, orange, massive, boulders up to 10" in diameter in Sandstone matrix, hard
R	2	N/A	7.9	106.3	38		1103.0	2	
							1102.0	3	
R	4	N/A	8.6	114.5	51		1101.0	4	
									END TP4 @ 4.5': No Water; No Caving; No Fill

IRVINE GEOTECHNICAL Inc

LOG OF TEST PITS

PROJECT IC16010 VALENCIA
DRILL DATE 2/9/2016
LOG DATE 2/9/2016
LOGGED BY KJONES
DRILL TYPE Hand Labor
DIAMETER 30 Inches

SURFACE ELEVATION 1100 feet
DRILLING CONTRACTOR Mike's Excavating Service
SURFACE CONDITIONS Bare ground on slope at western portion of property

TEST PIT 5

Sample Type	Sample Depth (feet)	Blows per foot	Moisture (%)	Dry Unit Weight (pcf)	Saturation (%)	USCS Code	Elevation (feet)	Depth (feet)	Lithologic Description
						SM	1100.0	0	**SOIL:** Silty Sand, orange-brown, dry, loose, porous, roots and rootlets
							1099.0	1	**WEATHERED BEDROCK:** Sandstone, brown, fine to medium-grained, moderately hard
R	2	N/A	15.9	104.9	73		1098.0	2	
							1097.0	3	**BEDROCK:** Sanstone, white, gray, brown, massive, fine to medium grained, hard
R	4.5	N/A	9.2	117.9	61		1096.0	4	
									END TP5 @ 4.5': No Water; No Caving; No Fill

SURFACE ELEVATION 1065 feet
DRILLING CONTRACTOR Mike's Excavating Service
SURFACE CONDITIONS Bare ground on slope at northwestern portion of property

TEST PIT 6

Sample Type	Sample Depth (feet)	Blows per foot	Moisture (%)	Dry Unit Weight (pcf)	Saturation (%)	USCS Code	Elevation (feet)	Depth (feet)	Lithologic Description
							1065.0	0	**BEDROCK:** Conglomerate, dark brown, orange, massive, cobbles up to 8" in diameter in a Sandstone matrix, hard
							1064.0	1	
							1063.0	2	
							1062.0	3	
							1061.0	4	
R	5	N/A	13.4	110.3	71		1060.0	5	
									END TP6 @ 5': No Water; No Caving; No Fill

IRVINE GEOTECHNICAL Inc

LOG OF TEST PITS

PROJECT IC16010 VALENCIA
DRILL DATE 2/9/2016
LOG DATE 2/9/2016
LOGGED BY KJONES
DRILL TYPE Hand Labor
DIAMETER 30 Inches

SURFACE ELEVATION 1080 feet
DRILLING CONTRACTOR Mike's Excavating Service
SURFACE CONDITIONS Bare ground on slope at southwestern portion of property

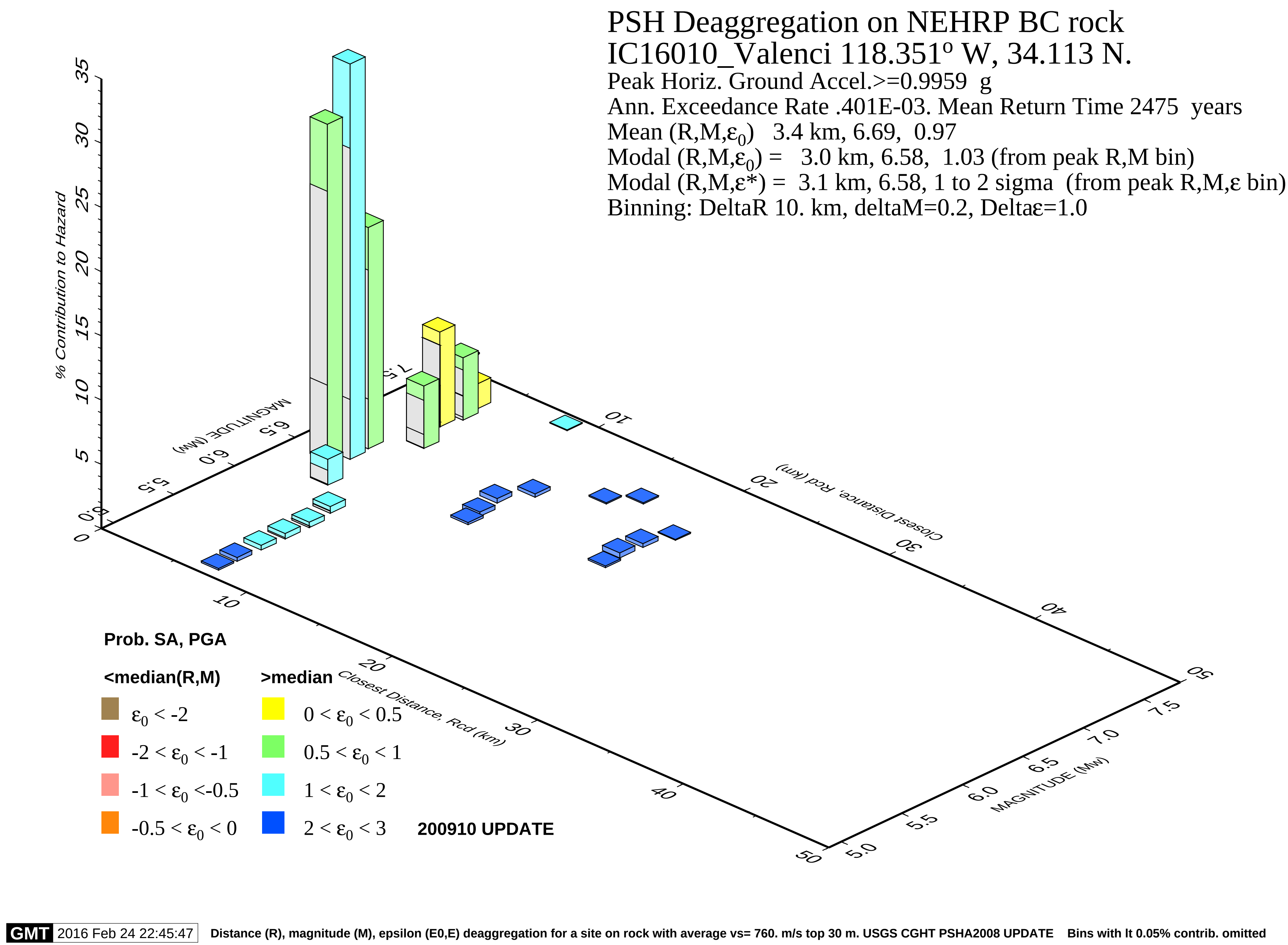
TEST PIT 7

Sample Type	Sample Depth (feet)	Blows per foot	Moisture (%)	Dry Unit Weight (pcf)	Saturation (%)	USCS Code	Elevation (feet)	Depth (feet)	Lithologic Description
						SM	1080.0	0	**SOIL:** Silty Sand, orange-brown, dry, loose, porous
							1079.0	1	**BEDROCK:** Quartz Diorite, orange-brown, white, coarse-grained, massive, moderately weathered, hard
							1078.0	2	
R	3.5	N/A	7.9	115.0	48		1077.0	3	
									END TP7 @ 3.5': No Water; No Caving; No Fill

SURFACE ELEVATION 1050 feet
DRILLING CONTRACTOR Mike's Excavating Service
SURFACE CONDITIONS Bare graound on slope at southwestern corner of property

TEST PIT 8

Sample Type	Sample Depth (feet)	Blows per foot	Moisture (%)	Dry Unit Weight (pcf)	Saturation (%)	USCS Code	Elevation (feet)	Depth (feet)	Lithologic Description
							1050.0	0	**BEDROCK:** Quartz Diorite, orange-brown, white, gray, black, coarse-grained, fractured, moderately weathered, hard
							1049.0	1	
							1048.0	2	
R	3	N/A	3.4	123.7	27		1047.0	3	
									END TP8 @ 3': No Water; No Caving; No Fill

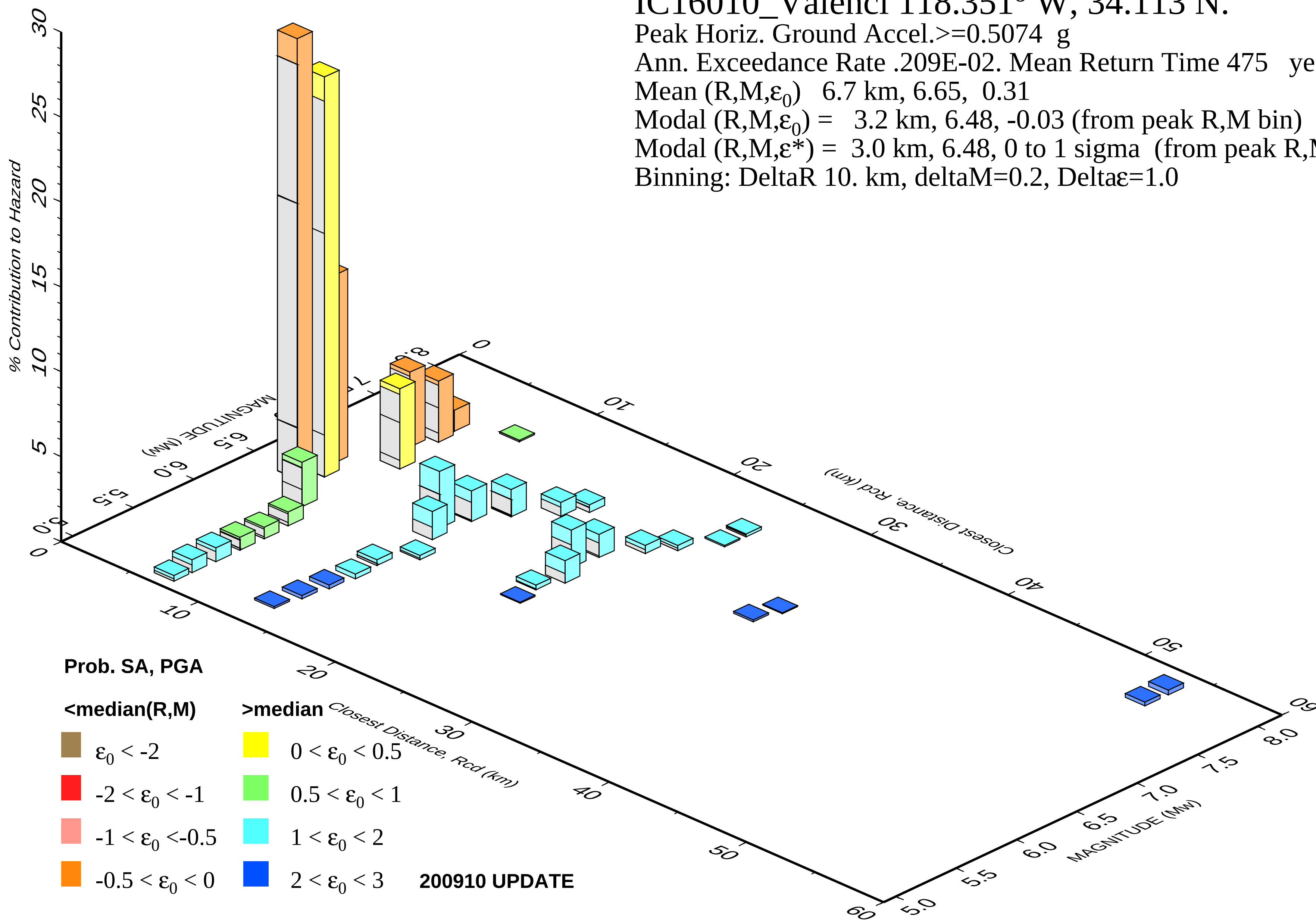


PSH Deaggregation on NEHRP BC rock
IC16010_Valenci 118.351° W, 34.113 N.
Peak Horiz. Ground Accel.>=0.9959 g
Ann. Exceedance Rate .401E-03. Mean Return Time 2475 years
Mean (R,M,ε0) 3.4 km, 6.69, 0.97
Modal (R,M,ε0) = 3.0 km, 6.58, 1.03 (from peak R,M bin)
Modal (R,M,ε*) = 3.1 km, 6.58, 1 to 2 sigma (from peak R,M,ε bin)
Binning: DeltaR 10. km, deltaM=0.2, Deltaε=1.0
% Contribution to Hazard
0
5
10
15
20
25
30
35
MAGNITUDE (Mw)
5.0
5.5
6.0
6.5
7.0
7.5
Closest Distance, Rcd (km)
10
20
30
40
50
Prob. SA, PGA
<median(R,M)
>median
ε0 < -2
-2 < ε0 < -1
-1 < ε0 <-0.5
-0.5 < ε0 < 0
0 < ε0 < 0.5
0.5 < ε0 < 1
1 < ε0 < 2
2 < ε0 < 3
200910 UPDATE
GMT 2016 Feb 24 22:45:47
Distance (R), magnitude (M), epsilon (E0,E) deaggregation for a site on rock with average vs= 760. m/s top 30 m. USGS CGHT PSHA2008 UPDATE Bins with lt 0.05% contrib. omitted

PSH Deaggregation on NEHRP BC rock

IC16010_Valenci 118.351° W, 34.113 N.

Peak Horiz. Ground Accel.>=0.5074 g
Ann. Exceedance Rate .209E-02. Mean Return Time 475 years
Mean (R,M,ε_0) 6.7 km, 6.65, 0.31
Modal (R,M,ε_0) = 3.2 km, 6.48, -0.03 (from peak R,M bin)
Modal (R,M,ε*) = 3.0 km, 6.48, 0 to 1 sigma (from peak R,M,ε bin)
Binning: DeltaR 10. km, deltaM=0.2, Deltaε=1.0



GMT 2016 Feb 24 22:48:18 **Distance (R), magnitude (M), epsilon (E0,E) deaggregation for a site on rock with average vs= 760. m/s top 30 m. USGS CGHT PSHA2008 UPDATE Bins with lt 0.05% contrib. omitted**

IRVINE GEOTECHNICAL Inc

SCREENING ACCELERATION

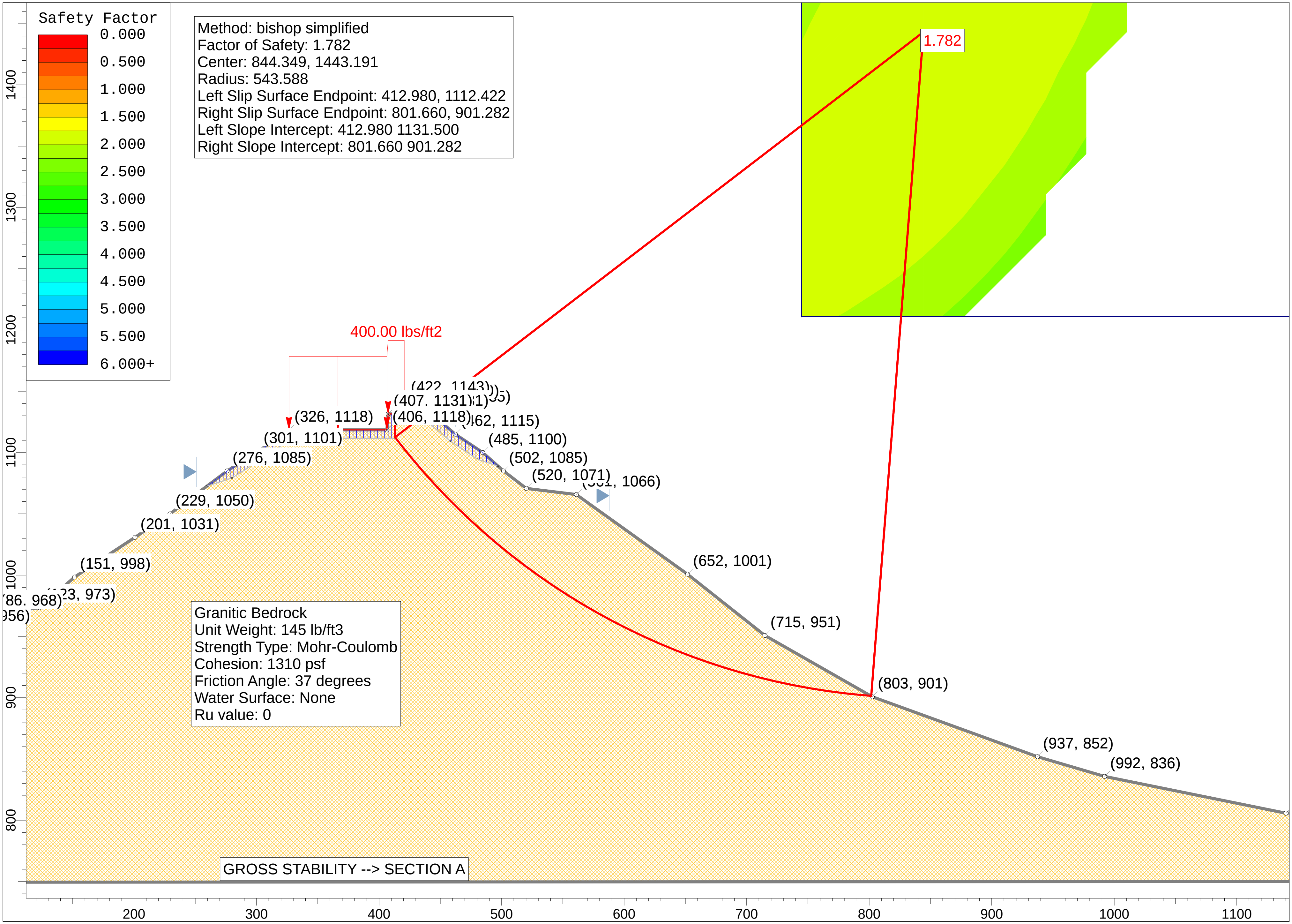
IC: **16010** CONSULT **CLC**
CLIENT **VALENCIA**

REFERENCES

CGS, SP117A, 2008 (Guidelines for Evaluating and Mitigating Seismic Hazards in California) & SCEC, 2002 (Recommended Procedures for Implementation of DMG Special Publication 117, Guidelines for Analyzing and Mitigating Landsliding in California)

Longitude	118.350	W
Latitude	34.113	N
Mean Return Time	475	years
Modal EQ Magnitude (M)	6.48	
Modal Source Distance (r)	3.2	km
Max. Horizontal Acceleration (MHA)	0.641	g
Significant Duration of Shaking ($D_{5\text{-}95}$)	9.08	secs
Modal Mean Period (T_m)	0.458	
Nonlinear Response Factor (NRF)	0.840	
Design Allowable Displacement	5	cm
Seismic Factor (f_{eq})	0.449	
Screening Acceleration (Keq)	**0.288**	**g**

CONCLUSIONS: The screening acceleration for determining the seismic slope stability is 0.288g.


Safety Factor
0.000
0.500
1.000
1.500
2.000
2.500
3.000
3.500
4.000
4.500
5.000
5.500
6.000+
Method: bishop simplified
Factor of Safety: 1.782
Center: 844.349, 1443.191
Radius: 543.588
Left Slip Surface Endpoint: 412.980, 1112.422
Right Slip Surface Endpoint: 801.660, 901.282
Left Slope Intercept: 412.980 1131.500
Right Slope Intercept: 801.660 901.282
1.782
400.00 lbs/ft2
(407, 1131)
(406, 1118)
(326, 1118)
(301, 1101)
(276, 1085)
(485, 1100)
(502, 1085)
(520, 1071)
(229, 1050)
(201, 1031)
(151, 998)
(652, 1001)
(715, 951)
(803, 901)
(937, 852)
(992, 836)
Granitic Bedrock
Unit Weight: 145 lb/ft3
Strength Type: Mohr-Coulomb
Cohesion: 1310 psf
Friction Angle: 37 degrees
Water Surface: None
Ru value: 0
GROSS STABILITY --> SECTION A
1400
1300
1200
1100
1000
900
800
200
300
400
500
600
700
800
900
1000
1100

Slide Analysis Information

VALENCIA - RUNYON

Project Summary

File Name: SectionAcalc.slim
Slide Modeler Version: 6.038
Project Title: VALENCIA - RUNYON
Analysis: GROSS STABILITY - SECTION A
Date Created: 3/11/2016, 8:36:14 AM

General Settings

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

Analysis Options

Analysis Methods Used

Bishop simplified

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

Groundwater Analysis

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

Random Numbers

Pseudo-random Seed: 10116
Random Number Generation Method: Park and Miller v.3

Surface Options

Surface Type: Circular

Search Method: Grid Search
Radius Increment: 10
Composite Surfaces: Disabled
Reverse Curvature: Create Tension Crack
Minimum Elevation: Not Defined
Minimum Depth: Not Defined

Loading

1 Distributed Load present

Distributed Load 1

Distribution: Constant
Magnitude [psf]: 400
Orientation: Vertical

Tension Crack

Tension crack Water level: filled with water

Material Properties

Property	Granitic Bedrock
Color	
Strength Type	Mohr-Coulomb
Unit Weight [lbs/ft3]	145
Cohesion [psf]	1310
Friction Angle [deg]	37
Water Surface	None
Ru Value	0

Global Minimums

Method: bishop simplified

FS: 1.781970
Center: 844.349, 1443.191
Radius: 543.588
Left Slip Surface Endpoint: 412.980, 1112.422
Right Slip Surface Endpoint: 801.660, 901.282
Left Slope Intercept: 412.980 1131.500
Right Slope Intercept: 801.660 901.282
Resisting Moment=1.44655e+009 lb-ft
Driving Moment=8.1177e+008 lb-ft
Total Slice Area=21041.7 ft2

Valid / Invalid Surfaces

Method: bishop simplified

Number of Valid Surfaces: 1982
Number of Invalid Surfaces: 2869

Error Codes:

Error Code -101 reported for 73 surfaces
Error Code -103 reported for 81 surfaces
Error Code -113 reported for 229 surfaces
Error Code -1000 reported for 2486 surfaces

Error Codes

The following errors were encountered during the computation:

-101 = Only one (or zero) surface / slope intersections.
-103 = Two surface / slope intersections, but one or more surface / nonslope external polygon intersections lie between them. This usually occurs when the slip surface extends past the bottom of the soil region, but may also occur on a benched slope model with two sets of Slope Limits.
-113 = Surface intersects outside slope limits.
-1000 = No valid slip surfaces are generated at a grid center. Unable to draw a surface.

Slice Data

Global Minimum Query (bishop simplified) - Safety Factor: 1.78197

Slice Number	Width [ft]	Weight [lbs]	Base Material	Base Cohesion [psf]	Base Friction Angle [degrees]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]
1	15.5472	75516.3	Granitic Bedrock	1310	37	1881.92	3353.53	2711.86	0	2711.86
2	15.5472	116288	Granitic Bedrock	1310	37	2632.6	4691.21	4487	0	4487
3	15.5472	127472	Granitic Bedrock	1310	37	2915.16	5194.72	5155.2	0	5155.2
4	15.5472	135086	Granitic Bedrock	1310	37	3133.57	5583.92	5671.68	0	5671.68
5	15.5472	143424	Granitic Bedrock	1310	37	3368.09	6001.83	6226.27	0	6226.27
6	15.5472	143996	Granitic Bedrock	1310	37	3448.7	6145.48	6416.88	0	6416.88
7	15.5472	144120	Granitic Bedrock	1310	37	3516.97	6267.13	6578.35	0	6578.35
8	15.5472	156673	Granitic Bedrock	1310	37	3842.3	6846.87	7347.65	0	7347.65
9	15.5472	176384	Granitic Bedrock	1310	37	4326.24	7709.23	8492.05	0	8492.05
10	15.5472	191960	Granitic Bedrock	1310	37	4731.99	8432.26	9451.54	0	9451.54
11	15.5472	190329	Granitic Bedrock	1310	37	4768.43	8497.2	9537.74	0	9537.74
12	15.5472	184375	Granitic Bedrock	1310	37	4705.71	8385.43	9389.43	0	9389.43
13	15.5472	176974	Granitic Bedrock	1310	37	4605.06	8206.07	9151.38	0	9151.38
14	15.5472	168197	Granitic Bedrock	1310	37	4467.1	7960.23	8825.17	0	8825.17
15	15.5472	158101	Granitic Bedrock	1310	37	4292.3	7648.75	8411.79	0	8411.79
16	15.5472	146189	Granitic Bedrock	1310	37	4068.07	7249.17	7881.57	0	7881.57
17	15.5472	131097	Granitic Bedrock	1310	37	3760.64	6701.35	7154.53	0	7154.53
18	15.5472	114650	Granitic Bedrock	1310	37	3411.36	6078.95	6328.61	0	6328.61
19	15.5472	97054.9	Granitic Bedrock	1310	37	3024.28	5389.18	5413.25	0	5413.25
20	15.5472	79662.7	Granitic Bedrock	1310	37	2631.81	4689.81	4485.16	0	4485.16
21	15.5472	66967.3	Granitic Bedrock	1310	37	2346.41	4181.23	3810.24	0	3810.24
22	15.5472	53879.8	Granitic Bedrock	1310	37	2043.72	3641.85	3094.48	0	3094.48
23	15.5472	39739.3	Granitic Bedrock	1310	37	1706.51	3040.95	2297.05	0	2297.05

24	15.5472	24561	Granitic Bedrock	1310	37	1334.16	2377.43	1416.53	0	1416.53
25	15.5472	8357.02	Granitic Bedrock	1310	37	925.938	1649.99	451.187	0	451.187

Interslice Data

Global Minimum Query (bishop simplified) - Safety Factor: 1.78197

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [degrees]
1	412.98	1112.42	11355.4	0	0
2	428.527	1093.08	34557.3	0	0
3	444.074	1075.4	72930.9	0	0
4	459.622	1059.17	111297	0	0
5	475.169	1044.2	147481	0	0
6	490.716	1030.36	181305	0	0
7	506.263	1017.53	209989	0	0
8	521.81	1005.63	233583	0	0
9	537.358	994.589	255000	0	0
10	552.905	984.336	274808	0	0
11	568.452	974.823	291151	0	0
12	583.999	966.006	301113	0	0
13	599.546	957.847	304566	0	0
14	615.094	950.312	301921	0	0
15	630.641	943.375	293696	0	0
16	646.188	937.01	280507	0	0
17	661.735	931.195	263086	0	0
18	677.282	925.913	242410	0	0
19	692.83	921.148	219534	0	0
20	708.377	916.884	195595	0	0
21	723.924	913.11	171603	0	0
22	739.471	909.817	147674	0	0
23	755.018	906.994	124636	0	0
24	770.566	904.634	103525	0	0
25	786.113	902.732	85477.1	0	0
26	801.66	901.282	0	0	0

List Of Coordinates

Distributed Load

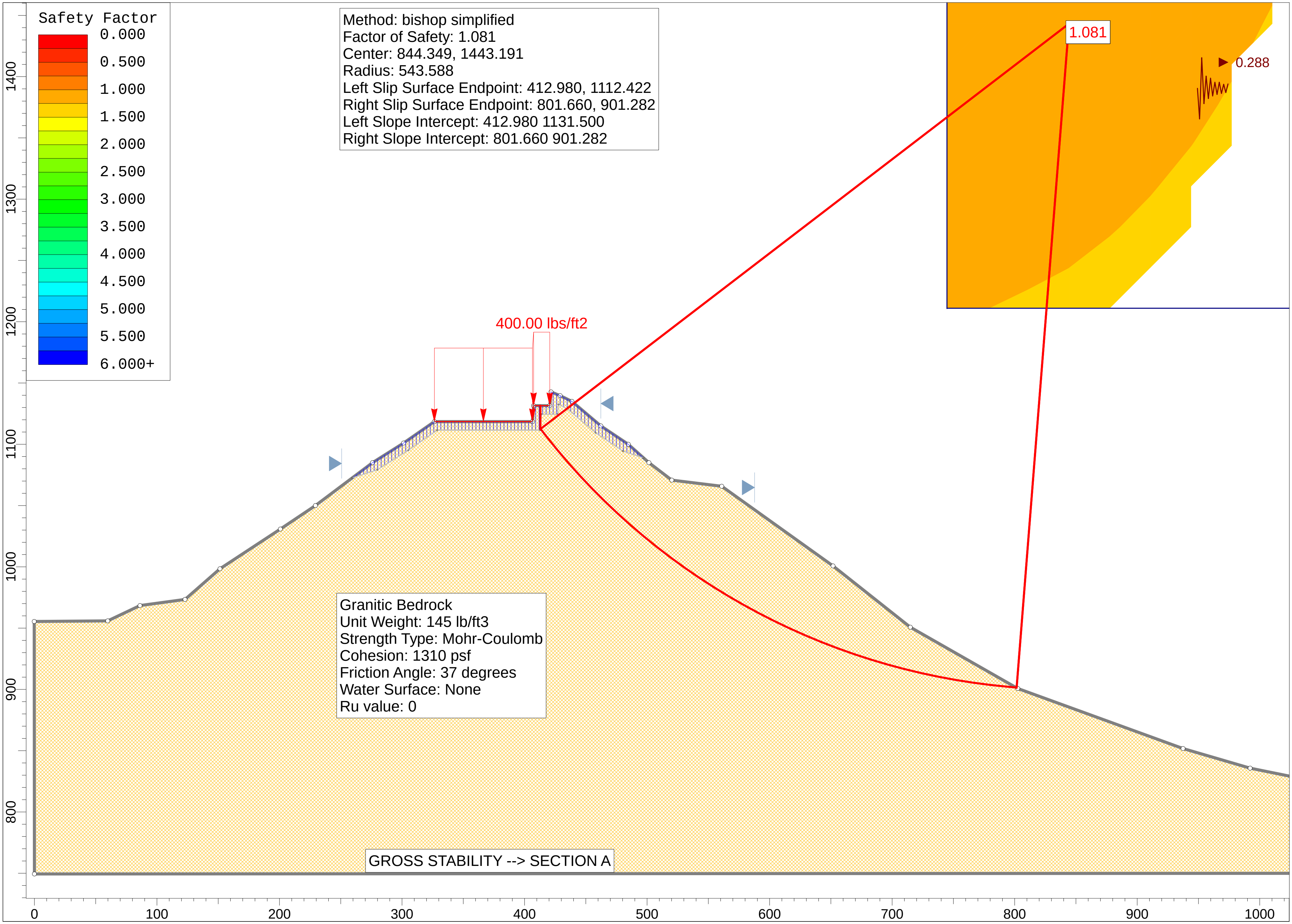
X	Y
420.606	1131.5
407.427	1131.5
406.427	1118.5
326.485	1118.5

Tension Crack

X	Y
259.42	1072.5
279.947	1079.23
305.176	1095.16
328.679	1111.5
412.909	1111.5
413.909	1124.5
427.013	1124.5
427.728	1132.57
434.808	1129.1
458.046	1109.4
480.379	1094.45
497.082	1088.94

External Boundary

X	Y
0.000317657	749.393
1160.87	750
1160.87	806.763
1140.17	805.763
992.17	835.763
937.44	851.791
802.57	900.763
714.87	950.763
651.77	1000.76
560.97	1065.76
520.17	1070.76
501.57	1085
484.67	1100
462.27	1115
438.67	1135
429.131	1139.68
421.606	1142.78
420.606	1131.5
407.427	1131.5
406.427	1118.5
326.485	1118.5
301.308	1101
275.97	1085
229.37	1050
200.812	1030.86
151.47	998.421
122.97	973.421
86.1699	968.421
59.8699	955.921
-0.107439	955.411


Safety Factor
0.000
0.500
1.000
1.500
2.000
2.500
3.000
3.500
4.000
4.500
5.000
5.500
6.000+
Method: bishop simplified
Factor of Safety: 1.081
Center: 844.349, 1443.191
Radius: 543.588
Left Slip Surface Endpoint: 412.980, 1112.422
Right Slip Surface Endpoint: 801.660, 901.282
Left Slope Intercept: 412.980 1131.500
Right Slope Intercept: 801.660 901.282
1.081
0.288
400.00 lbs/ft2
Granitic Bedrock
Unit Weight: 145 lb/ft3
Strength Type: Mohr-Coulomb
Cohesion: 1310 psf
Friction Angle: 37 degrees
Water Surface: None
Ru value: 0
GROSS STABILITY --> SECTION A
1400
1300
1200
1100
1000
900
800
0
100
200
300
400
500
600
700
800
900
1000

Slide Analysis Information

VALENCIA - RUNYON

Project Summary

File Name: SectionAcalc seis.slim
Slide Modeler Version: 6.038
Project Title: VALENCIA - RUNYON
Analysis: GROSS STABILITY - SECTION A
Date Created: 3/11/2016, 8:36:14 AM

General Settings

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

Analysis Options

Analysis Methods Used

Bishop simplified

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

Groundwater Analysis

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

Random Numbers

Pseudo-random Seed: 10116
Random Number Generation Method: Park and Miller v.3

Surface Options

Surface Type: Circular

Search Method: Grid Search
Radius Increment: 10
Composite Surfaces: Disabled
Reverse Curvature: Create Tension Crack
Minimum Elevation: Not Defined
Minimum Depth: Not Defined

Loading

Seismic Load Coefficient (Horizontal): 0.288
1 Distributed Load present

Distributed Load 1

Distribution: Constant
Magnitude [psf]: 400
Orientation: Vertical

Tension Crack

Tension crack Water level: filled with water

Material Properties

Property	Granitic Bedrock
Color	
Strength Type	Mohr-Coulomb
Unit Weight [lbs/ft3]	145
Cohesion [psf]	1310
Friction Angle [deg]	37
Water Surface	None
Ru Value	0

Global Minimums

Method: bishop simplified

FS: 1.080770
Center: 844.349, 1443.191
Radius: 543.588
Left Slip Surface Endpoint: 412.980, 1112.422
Right Slip Surface Endpoint: 801.660, 901.282
Left Slope Intercept: 412.980 1131.500
Right Slope Intercept: 801.660 901.282
Resisting Moment=1.28698e+009 lb-ft
Driving Moment=1.1908e+009 lb-ft
Total Slice Area=21041.7 ft2

Valid / Invalid Surfaces

Method: bishop simplified

Number of Valid Surfaces: 1982
Number of Invalid Surfaces: 2869

Error Codes:

Error Code -101 reported for 73 surfaces
Error Code -103 reported for 81 surfaces
Error Code -113 reported for 229 surfaces
Error Code -1000 reported for 2486 surfaces

Error Codes

The following errors were encountered during the computation:

-101 = Only one (or zero) surface / slope intersections.
-103 = Two surface / slope intersections, but one or more surface / nonslope external polygon intersections lie between them. This usually occurs when the slip surface extends past the bottom of the soil region, but may also occur on a benched slope model with two sets of Slope Limits.
-113 = Surface intersects outside slope limits.
-1000 = No valid slip surfaces are generated at a grid center. Unable to draw a surface.

Slice Data

Global Minimum Query (bishop simplified) - Safety Factor: 1.08077

Slice Number	Width [ft]	Weight [lbs]	Base Material	Base Cohesion [psf]	Base Friction Angle [degrees]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]
1	15.5472	75516.3	Granitic Bedrock	1310	37	2536.11	2740.95	1898.94	0	1898.94
2	15.5472	116288	Granitic Bedrock	1310	37	3585.94	3875.58	3404.64	0	3404.64
3	15.5472	127472	Granitic Bedrock	1310	37	4010.23	4334.14	4013.17	0	4013.17
4	15.5472	135086	Granitic Bedrock	1310	37	4350.58	4701.98	4501.3	0	4501.3
5	15.5472	143424	Granitic Bedrock	1310	37	4716.92	5097.91	5026.75	0	5026.75
6	15.5472	143996	Granitic Bedrock	1310	37	4869.76	5263.09	5245.95	0	5245.95
7	15.5472	144120	Granitic Bedrock	1310	37	5005.42	5409.71	5440.47	0	5440.47
8	15.5472	156673	Granitic Bedrock	1310	37	5510.03	5955.07	6164.23	0	6164.23
9	15.5472	176384	Granitic Bedrock	1310	37	6249.66	6754.44	7224.99	0	7224.99
10	15.5472	191960	Granitic Bedrock	1310	37	6884.68	7440.76	8135.78	0	8135.78
11	15.5472	190329	Granitic Bedrock	1310	37	6986.16	7550.43	8281.35	0	8281.35
12	15.5472	184375	Granitic Bedrock	1310	37	6941.48	7502.14	8217.27	0	8217.27
13	15.5472	176974	Granitic Bedrock	1310	37	6838.81	7391.18	8069.97	0	8069.97
14	15.5472	168197	Granitic Bedrock	1310	37	6678.12	7217.51	7839.55	0	7839.55
15	15.5472	158101	Granitic Bedrock	1310	37	6459.19	6980.9	7525.52	0	7525.52
16	15.5472	146189	Granitic Bedrock	1310	37	6161.97	6659.67	7099.23	0	7099.23
17	15.5472	131097	Granitic Bedrock	1310	37	5733.63	6196.74	6484.92	0	6484.92
18	15.5472	114650	Granitic Bedrock	1310	37	5235.22	5658.07	5770.08	0	5770.08
19	15.5472	97054.9	Granitic Bedrock	1310	37	4671.72	5049.06	4961.9	0	4961.9
20	15.5472	79662.7	Granitic Bedrock	1310	37	4092.39	4422.93	4131	0	4131
21	15.5472	66967.3	Granitic Bedrock	1310	37	3672.97	3969.64	3529.46	0	3529.46
22	15.5472	53879.8	Granitic Bedrock	1310	37	3220.81	3480.95	2880.94	0	2880.94

23	15.5472	39739.3	Granitic Bedrock	1310	37	2707.83	2926.54	2145.22	0	2145.22
24	15.5472	24561	Granitic Bedrock	1310	37	2131.78	2303.96	1319.03	0	1319.03
25	15.5472	8357.02	Granitic Bedrock	1310	37	1490.04	1610.39	398.633	0	398.633

Interslice Data

Global Minimum Query (bishop simplified) - Safety Factor: 1.08077

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [degrees]
1	412.98	1112.42	11355.4	0	0
2	428.527	1093.08	30422.6	0	0
3	444.074	1075.4	68354.2	0	0
4	459.622	1059.17	107888	0	0
5	475.169	1044.2	146558	0	0
6	490.716	1030.36	184137	0	0
7	506.263	1017.53	217206	0	0
8	521.81	1005.63	245652	0	0
9	537.358	994.589	273221	0	0
10	552.905	984.336	300965	0	0
11	568.452	974.823	326643	0	0
12	583.999	966.006	345898	0	0
13	599.546	957.847	358163	0	0
14	615.094	950.312	363646	0	0
15	630.641	943.375	362683	0	0
16	646.188	937.01	355731	0	0
17	661.735	931.195	343342	0	0
18	677.282	925.913	326239	0	0
19	692.83	921.148	305392	0	0
20	708.377	916.884	281892	0	0
21	723.924	913.11	256820	0	0
22	739.471	909.817	230647	0	0
23	755.018	906.994	204240	0	0
24	770.566	904.634	178662	0	0
25	786.113	902.732	155113	0	0
26	801.66	901.282	0	0	0

List Of Coordinates

Distributed Load

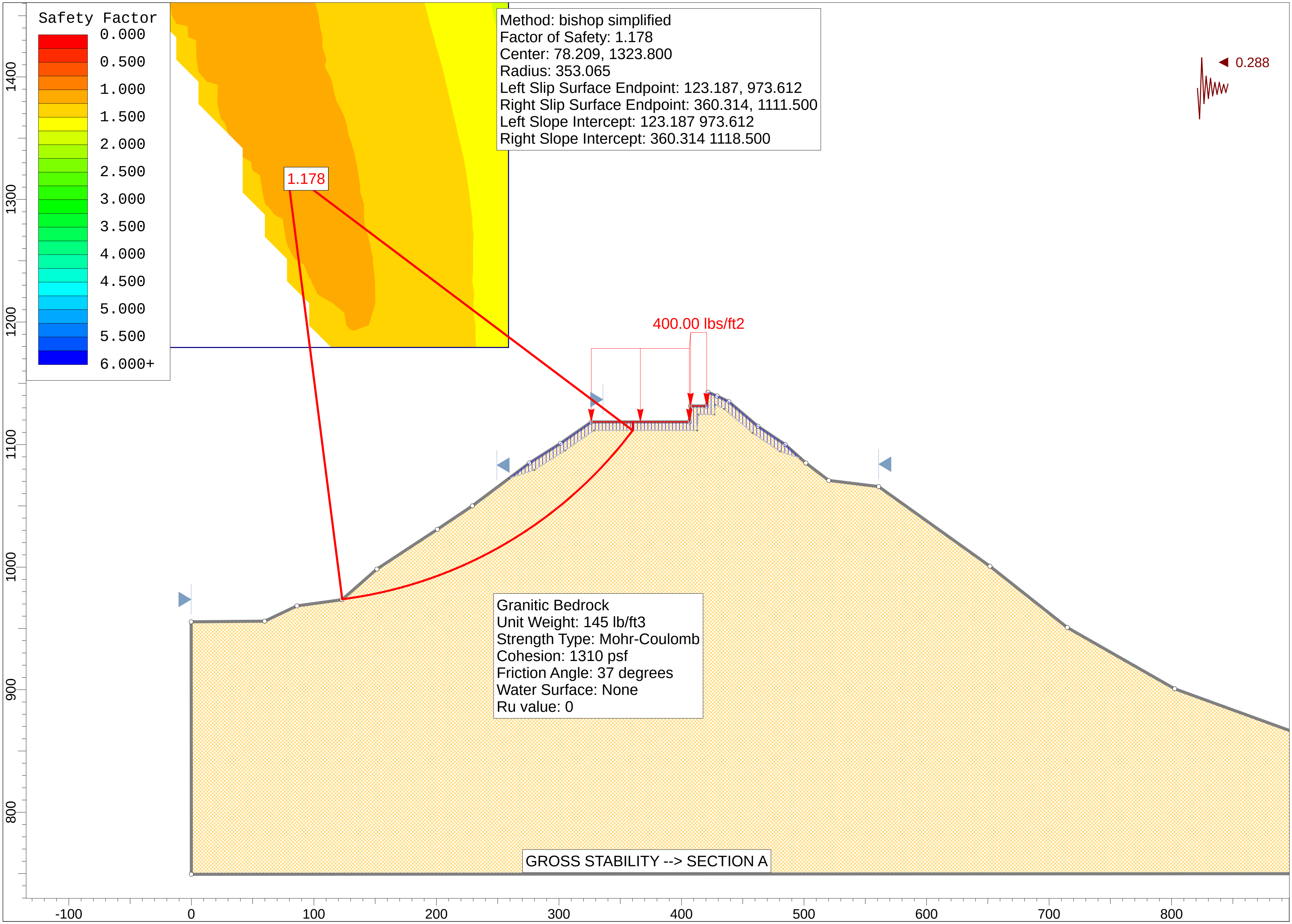
X	Y
420.606	1131.5
407.427	1131.5
406.427	1118.5
326.485	1118.5

Tension Crack

X	Y
259.42	1072.5
279.947	1079.23
305.176	1095.16
328.679	1111.5
412.909	1111.5
413.909	1124.5
427.013	1124.5
427.728	1132.57
434.808	1129.1
458.046	1109.4
480.379	1094.45
497.082	1088.94

External Boundary

X	Y
0.000317657	749.393
1160.87	750
1160.87	806.763
1140.17	805.763
992.17	835.763
937.44	851.791
802.57	900.763
714.87	950.763
651.77	1000.76
560.97	1065.76
520.17	1070.76
501.57	1085
484.67	1100
462.27	1115
438.67	1135
429.131	1139.68
421.606	1142.78
420.606	1131.5
407.427	1131.5
406.427	1118.5
326.485	1118.5
301.308	1101
275.97	1085
229.37	1050
200.812	1030.86
151.47	998.421
122.97	973.421
86.1699	968.421
59.8699	955.921
-0.107439	955.411



Safety Factor
0.000
0.500
1.000
1.500
2.000
2.500
3.000
3.500
4.000
4.500
5.000
5.500
6.000+
Method: bishop simplified
Factor of Safety: 1.178
Center: 78.209, 1323.800
Radius: 353.065
Left Slip Surface Endpoint: 123.187, 973.612
Right Slip Surface Endpoint: 360.314, 1111.500
Left Slope Intercept: 123.187 973.612
Right Slope Intercept: 360.314 1118.500
1.178
0.288
400.00 lbs/ft2
Granitic Bedrock
Unit Weight: 145 lb/ft3
Strength Type: Mohr-Coulomb
Cohesion: 1310 psf
Friction Angle: 37 degrees
Water Surface: None
Ru value: 0
GROSS STABILITY --> SECTION A
1400
1300
1200
1100
1000
900
800
-100
0
100
200
300
400
500
600
700
800

Slide Analysis Information

VALENCIA - RUNYON

Project Summary

File Name: SectionAcalc seis.slim
Slide Modeler Version: 6.038
Project Title: VALENCIA - RUNYON
Analysis: GROSS STABILITY - SECTION A
Date Created: 3/11/2016, 8:36:14 AM

General Settings

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

Analysis Options

Analysis Methods Used

Bishop simplified

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

Groundwater Analysis

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

Random Numbers

Pseudo-random Seed: 10116
Random Number Generation Method: Park and Miller v.3

Surface Options

Surface Type: Circular

Search Method: Grid Search
Radius Increment: 10
Composite Surfaces: Disabled
Reverse Curvature: Create Tension Crack
Minimum Elevation: Not Defined
Minimum Depth: Not Defined

Loading

Seismic Load Coefficient (Horizontal): 0.288
1 Distributed Load present

Distributed Load 1

Distribution: Constant
Magnitude [psf]: 400
Orientation: Vertical

Tension Crack

Tension crack Water level: filled with water

Material Properties

Property	Granitic Bedrock
Color	
Strength Type	Mohr-Coulomb
Unit Weight [lbs/ft3]	145
Cohesion [psf]	1310
Friction Angle [deg]	37
Water Surface	None
Ru Value	0

Global Minimums

Method: bishop simplified

FS: 1.177730
Center: 78.209, 1323.800
Radius: 353.065
Left Slip Surface Endpoint: 123.187, 973.612
Right Slip Surface Endpoint: 360.314, 1111.500
Left Slope Intercept: 123.187 973.612
Right Slope Intercept: 360.314 1118.500
Resisting Moment=3.88577e+008 lb-ft
Driving Moment=3.29938e+008 lb-ft
Total Slice Area=8767.12 ft2

Valid / Invalid Surfaces

Method: bishop simplified

Number of Valid Surfaces: 2625
Number of Invalid Surfaces: 2226

Error Codes:

Error Code -101 reported for 198 surfaces
Error Code -105 reported for 97 surfaces
Error Code -113 reported for 457 surfaces
Error Code -1000 reported for 1474 surfaces

Error Codes

The following errors were encountered during the computation:

-101 = Only one (or zero) surface / slope intersections.
-105 = More than two surface / slope intersections with no valid slip surface.
-113 = Surface intersects outside slope limits.
-1000 = No valid slip surfaces are generated at a grid center. Unable to draw a surface.

Slice Data

Global Minimum Query (bishop simplified) - Safety Factor: 1.17773

Slice Number	Width [ft]	Weight [lbs]	Base Material	Base Cohesion [psf]	Base Friction Angle [degrees]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]
1	9.48507	4793.67	Granitic Bedrock	1310	37	1316.07	1549.98	318.463	0	318.463
2	9.48507	14199.3	Granitic Bedrock	1310	37	1867.23	2199.09	1179.87	0	1179.87
3	9.48507	23238.5	Granitic Bedrock	1310	37	2378.5	2801.23	1978.93	0	1978.93
4	9.48507	30422	Granitic Bedrock	1310	37	2763.59	3254.76	2580.78	0	2580.78
5	9.48507	35846.2	Granitic Bedrock	1310	37	3033.62	3572.78	3002.81	0	3002.81
6	9.48507	40884.7	Granitic Bedrock	1310	37	3271.98	3853.51	3375.36	0	3375.36
7	9.48507	45528.5	Granitic Bedrock	1310	37	3479.29	4097.66	3699.35	0	3699.35
8	9.48507	49767.4	Granitic Bedrock	1310	37	3656.01	4305.79	3975.55	0	3975.55
9	9.48507	53644.5	Granitic Bedrock	1310	37	3805.52	4481.87	4209.22	0	4209.22
10	9.48507	57198.3	Granitic Bedrock	1310	37	3930.72	4629.33	4404.9	0	4404.9
11	9.48507	60310	Granitic Bedrock	1310	37	4026.11	4741.67	4553.98	0	4553.98
12	9.48507	63302.4	Granitic Bedrock	1310	37	4109.29	4839.64	4683.99	0	4683.99
13	9.48507	66507.2	Granitic Bedrock	1310	37	4197.11	4943.06	4821.24	0	4821.24
14	9.48507	69227.8	Granitic Bedrock	1310	37	4254.08	5010.16	4910.28	0	4910.28
15	9.48507	71418.5	Granitic Bedrock	1310	37	4278.99	5039.49	4949.2	0	4949.2
16	9.48507	73049.5	Granitic Bedrock	1310	37	4271.49	5030.66	4937.48	0	4937.48
17	9.48507	73464.9	Granitic Bedrock	1310	37	4202.15	4949	4829.11	0	4829.11
18	9.48507	72315.5	Granitic Bedrock	1310	37	4058.17	4779.43	4604.09	0	4604.09
19	9.48507	70495.7	Granitic Bedrock	1310	37	3883.9	4574.19	4331.72	0	4331.72
20	9.48507	68497	Granitic Bedrock	1310	37	3702.47	4360.51	4048.16	0	4048.16
21	9.48507	65945.6	Granitic Bedrock	1310	37	3498.19	4119.92	3728.89	0	3728.89
22	9.48507	61051.9	Granitic Bedrock	1310	37	3287.39	3871.66	3399.43	0	3399.43
23	9.48507	48409.7	Granitic Bedrock	1310	37	2747.82	3236.19	2556.14	0	2556.14
24	9.48507	33800.9	Granitic Bedrock	1310	37	2091.42	2463.13	1530.26	0	1530.26

25	9.48507	17913.7	Granitic Bedrock	1310	37	1422.32	1675.11	484.523	0	484.523

Interslice Data

Global Minimum Query (bishop simplified) - Safety Factor: 1.17773

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [degrees]
1	123.187	973.612	0	0	0
2	132.672	974.961	10653.1	0	0
3	142.158	976.575	22342.9	0	0
4	151.643	978.456	34451.6	0	0
5	161.128	980.61	46303	0	0
6	170.613	983.041	57407.1	0	0
7	180.098	985.756	67454.7	0	0
8	189.583	988.762	76174.2	0	0
9	199.068	992.065	83330.5	0	0
10	208.553	995.676	88720.7	0	0
11	218.038	999.605	92167.7	0	0
12	227.523	1003.86	93536.6	0	0
13	237.008	1008.46	92673.2	0	0
14	246.493	1013.42	89361.8	0	0
15	255.978	1018.75	83522.2	0	0
16	265.464	1024.48	75123.3	0	0
17	274.949	1030.63	64184.3	0	0
18	284.434	1037.22	50984	0	0
19	293.919	1044.29	36038.8	0	0
20	303.404	1051.88	19665.6	0	0
21	312.889	1060.02	2039.34	0	0
22	322.374	1068.77	-16469.2	0	0
23	331.859	1078.21	-34983.3	0	0
24	341.344	1088.4	-48952.1	0	0
25	350.829	1099.45	-55794.8	0	0
26	360.314	1111.5	1528.8	0	0

List Of Coordinates

Distributed Load

X	Y
420.606	1131.5
407.427	1131.5
406.427	1118.5
326.485	1118.5

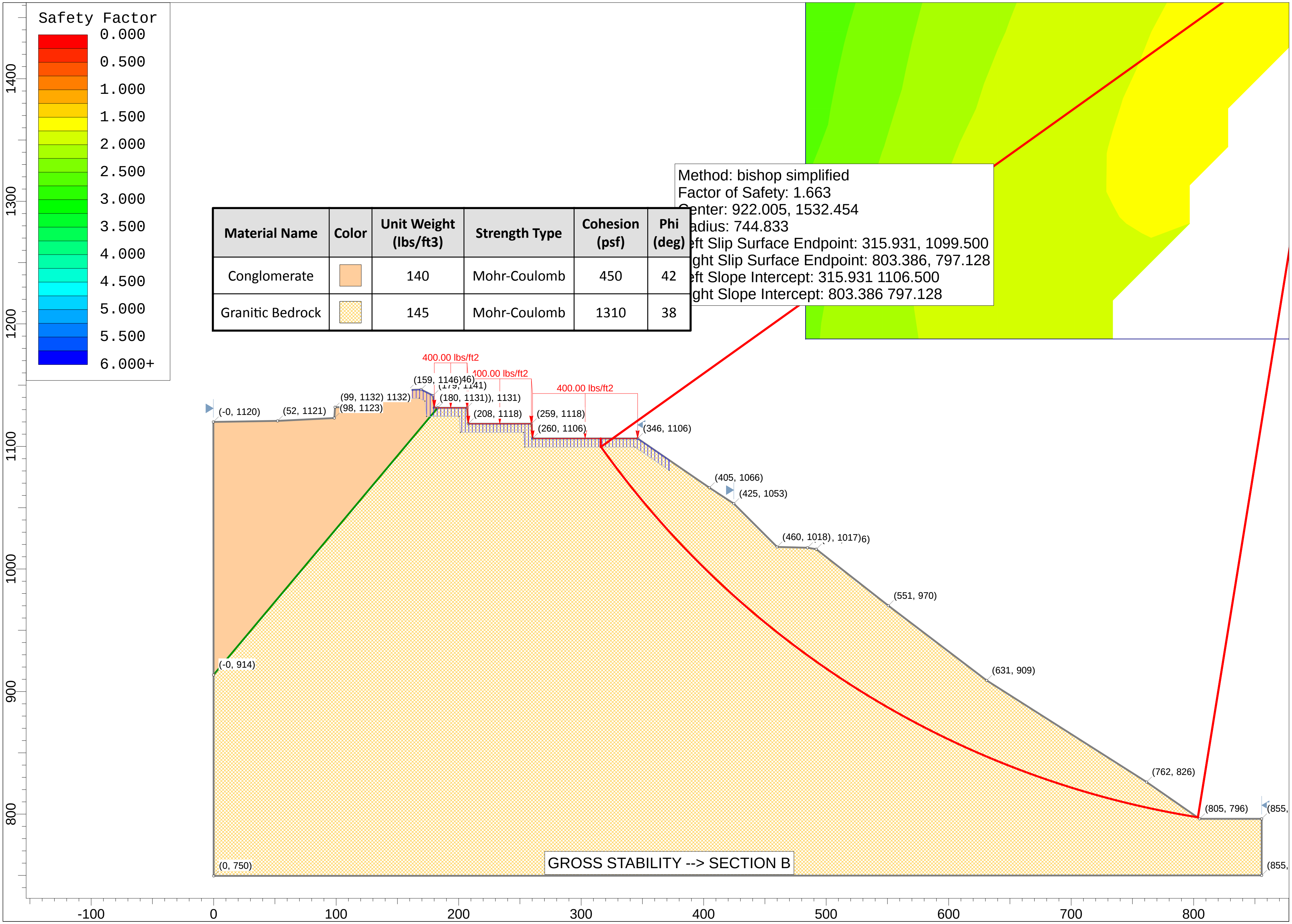
Tension Crack

X	Y

259.42	1072.5
279.947	1079.23
305.176	1095.16
328.679	1111.5
412.909	1111.5
413.909	1124.5
427.013	1124.5
427.728	1132.57
434.808	1129.1
458.046	1109.4
480.379	1094.45
497.082	1088.94

External Boundary

X	Y
0.000317657	749.393
1160.87	750
1160.87	806.763
1140.17	805.763
992.17	835.763
937.44	851.791
802.57	900.763
714.87	950.763
651.77	1000.76
560.97	1065.76
520.17	1070.76
501.57	1085
484.67	1100
462.27	1115
438.67	1135
429.131	1139.68
421.606	1142.78
420.606	1131.5
407.427	1131.5
406.427	1118.5
326.485	1118.5
301.308	1101
275.97	1085
229.37	1050
200.812	1030.86
151.47	998.421
122.97	973.421
86.1699	968.421
59.8699	955.921
-0.107439	955.411



Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)
Conglomerate		140	Mohr-Coulomb	450	42
Granitic Bedrock		145	Mohr-Coulomb	1310	38

Slide Analysis Information

VALENCIA - RUNYON

Project Summary

File Name: SectionBcalc.slim
Slide Modeler Version: 6.038
Project Title: VALENCIA - RUNYON
Analysis: GROSS STABILITY - SECTION B
Date Created: 3/11/2016, 8:36:14 AM

General Settings

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

Analysis Options

Analysis Methods Used

Bishop simplified

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

Groundwater Analysis

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

Random Numbers

Pseudo-random Seed: 10116
Random Number Generation Method: Park and Miller v.3

Surface Options

Surface Type: Circular

Search Method: Grid Search
Radius Increment: 10
Composite Surfaces: Disabled
Reverse Curvature: Create Tension Crack
Minimum Elevation: Not Defined
Minimum Depth: Not Defined

Loading

1 Distributed Load present

Distributed Load 1

Distribution: Constant
Magnitude [psf]: 400
Orientation: Vertical

Tension Crack

Tension crack Water level: filled with water

Material Properties

Property	Conglomerate	Granitic Bedrock
Color		
Strength Type	Mohr-Coulomb	Mohr-Coulomb
Unit Weight [lbs/ft3]	140	145
Cohesion [psf]	450	1310
Friction Angle [deg]	42	38
Water Surface	None	None
Ru Value	0	0

Global Minimums

Method: bishop simplified

FS: 1.663400
Center: 922.005, 1532.454
Radius: 744.833
Left Slip Surface Endpoint: 315.931, 1099.500
Right Slip Surface Endpoint: 803.386, 797.128
Left Slope Intercept: 315.931 1106.500
Right Slope Intercept: 803.386 797.128
Resisting Moment=2.65464e+009 lb-ft
Driving Moment=1.59591e+009 lb-ft
Total Slice Area=28157.3 ft2

Valid / Invalid Surfaces

Method: bishop simplified

Number of Valid Surfaces: 2889
Number of Invalid Surfaces: 1962

Error Codes:

Error Code -101 reported for 82 surfaces
Error Code -103 reported for 36 surfaces
Error Code -105 reported for 14 surfaces
Error Code -113 reported for 510 surfaces
Error Code -1000 reported for 1320 surfaces

Error Codes

The following errors were encountered during the computation:

-101 = Only one (or zero) surface / slope intersections.
-103 = Two surface / slope intersections, but one or more surface / nonslope external polygon intersections lie between them. This usually occurs when the slip surface extends past the bottom of the soil region, but may also occur on a benched slope model with two sets of Slope Limits.
-105 = More than two surface / slope intersections with no valid slip surface.
-113 = Surface intersects outside slope limits.
-1000 = No valid slip surfaces are generated at a grid center. Unable to draw a surface.

Slice Data

Global Minimum Query (bishop simplified) - Safety Factor: 1.6634

Slice Number	Width [ft]	Weight [lbs]	Base Material	Base Cohesion [psf]	Base Friction Angle [degrees]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]
1	19.4982	56644.8	Granitic Bedrock	1310	38	1437.3	2390.81	1383.37	0	1383.37
2	19.4982	123367	Granitic Bedrock	1310	38	2451.67	4078.1	3543	0	3543
3	19.4982	156044	Granitic Bedrock	1310	38	2971.58	4942.92	4649.91	0	4649.91
4	19.4982	178093	Granitic Bedrock	1310	38	3406.84	5666.94	5576.63	0	5576.63
5	19.4982	195954	Granitic Bedrock	1310	38	3784.72	6295.51	6381.15	0	6381.15
6	19.4982	209575	Granitic Bedrock	1310	38	4099.14	6818.51	7050.57	0	7050.57
7	19.4982	205633	Granitic Bedrock	1310	38	4115.41	6845.58	7085.21	0	7085.21
8	19.4982	205508	Granitic Bedrock	1310	38	4192.35	6973.56	7249.01	0	7249.01
9	19.4982	241459	Granitic Bedrock	1310	38	4912.44	8171.36	8782.14	0	8782.14
10	19.4982	256902	Granitic Bedrock	1310	38	5278.1	8779.59	9560.63	0	9560.63
11	19.4982	250255	Granitic Bedrock	1310	38	5241.08	8718.02	9481.84	0	9481.84
12	19.4982	241178	Granitic Bedrock	1310	38	5152.15	8570.09	9292.51	0	9292.51
13	19.4982	230396	Granitic Bedrock	1310	38	5023.57	8356.2	9018.71	0	9018.71
14	19.4982	218130	Granitic Bedrock	1310	38	4858.68	8081.92	8667.65	0	8667.65
15	19.4982	203800	Granitic Bedrock	1310	38	4645.3	7727	8213.37	0	8213.37
16	19.4982	187493	Granitic Bedrock	1310	38	4383.93	7292.23	7656.92	0	7656.92
17	19.4982	171734	Granitic Bedrock	1310	38	4124.23	6860.24	7104	0	7104
18	19.4982	158526	Granitic Bedrock	1310	38	3907.89	6500.38	6643.37	0	6643.37
19	19.4982	143637	Granitic Bedrock	1310	38	3649.52	6070.61	6093.29	0	6093.29
20	19.4982	127032	Granitic Bedrock	1310	38	3347.27	5567.85	5449.81	0	5449.81
21	19.4982	108758	Granitic Bedrock	1310	38	3000.95	4991.78	4712.46	0	4712.46

22	19.4982	88856	Granitic Bedrock	1310	38	2610.23	4341.85	3880.59	0	3880.59
23	19.4982	67328.5	Granitic Bedrock	1310	38	2173.94	3616.13	2951.72	0	2951.72
24	19.4982	42193.6	Granitic Bedrock	1310	38	1647.22	2739.98	1830.3	0	1830.3
25	19.4982	14318.1	Granitic Bedrock	1310	38	1046.45	1740.66	551.225	0	551.225

Interslice Data

Global Minimum Query (bishop simplified) - Safety Factor: 1.6634

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [degrees]
1	315.931	1099.5	1528.8	0	0
2	335.429	1073.43	9569.9	0	0
3	354.928	1049.55	46377.9	0	0
4	374.426	1027.55	90745.8	0	0
5	393.924	1007.19	137855	0	0
6	413.422	988.286	184669	0	0
7	432.92	970.697	228761	0	0
8	452.419	954.299	264703	0	0
9	471.917	938.993	293910	0	0
10	491.415	924.698	323671	0	0
11	510.913	911.343	348440	0	0
12	530.411	898.869	364525	0	0
13	549.91	887.225	372271	0	0
14	569.408	876.367	372251	0	0
15	588.906	866.256	365158	0	0
16	608.404	856.858	351769	0	0
17	627.903	848.145	333008	0	0
18	647.401	840.09	309815	0	0
19	666.899	832.671	282907	0	0
20	686.397	825.868	253205	0	0
21	705.895	819.663	221758	0	0
22	725.394	814.04	189743	0	0
23	744.892	808.986	158460	0	0
24	764.39	804.489	129346	0	0
25	783.888	800.54	104458	0	0
26	803.386	797.128	0	0	0

List Of Coordinates

Distributed Load

X	Y
180.07	1131.5
182.808	1131.5
206.87	1131.5
207.87	1118.5
259.37	1118.5

260.37	1106.5
346.085	1106.5

Tension Crack

X	Y
155.273	1137.68
159.915	1139.03
167.821	1139.3
172.489	1136.96
173.735	1124.5
200.388	1124.5
201.388	1111.5
252.929	1111.5
253.929	1099.5
343.914	1099.5
371.821	1080.35

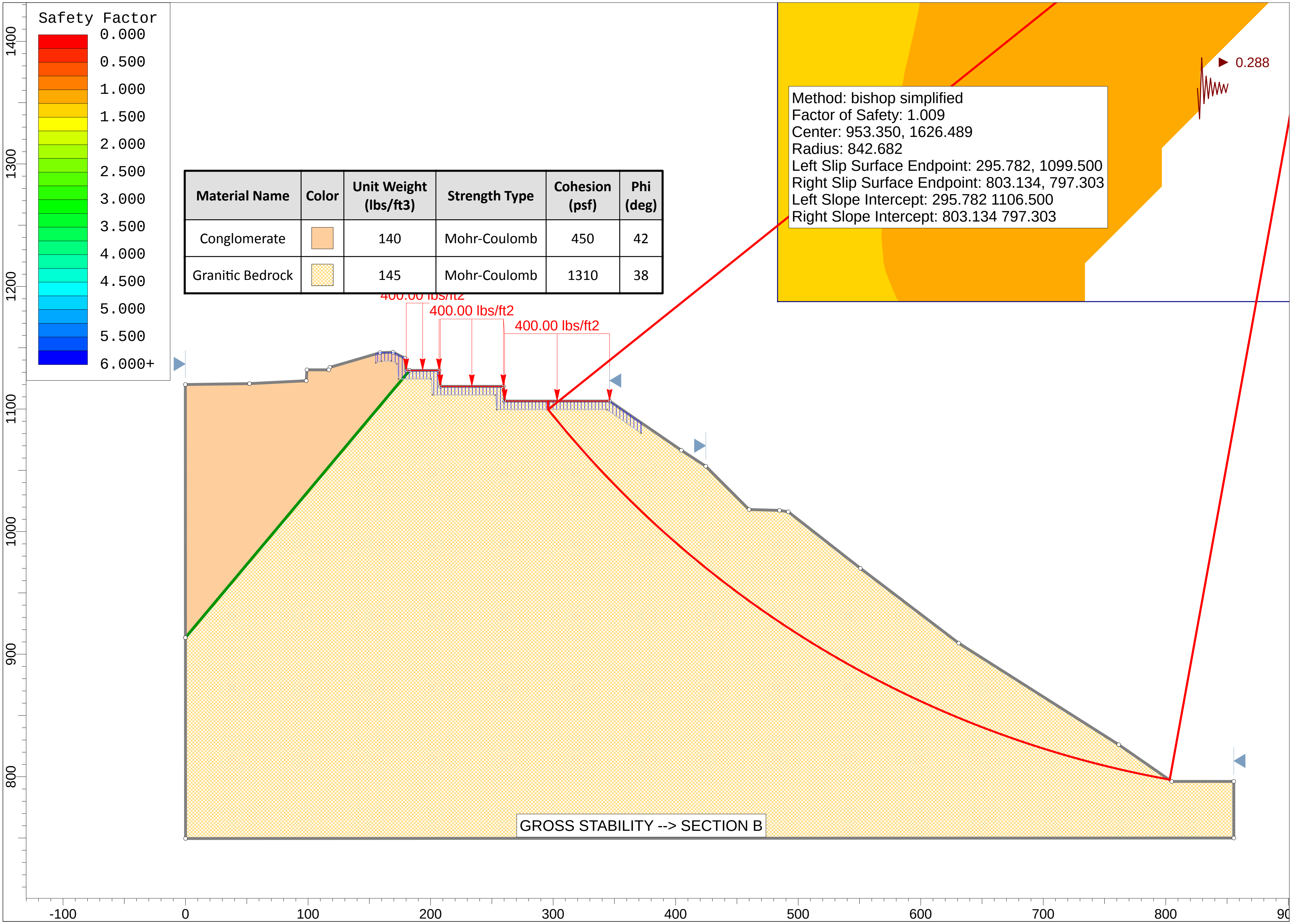
External Boundary

X	Y
0.000234115	749.552
855.499	750
855.499	796.146
804.8	796.146
761.6	826.146
631.002	909.051
550.744	970.064
491.9	1016.15
484.738	1017.32
459.9	1018
424.567	1053.33
404.627	1066.32
346.085	1106.5
260.37	1106.5
259.37	1118.5
207.87	1118.5
206.87	1131.5
182.808	1131.5
180.07	1131.5
179.07	1141.5
169.363	1146.35
158.8	1146
117.7	1134
116.9	1132
99.0651	1132
98.4699	1123.1
52.2	1120.8
-0.224083	1120

-0.0990529	913.52

Material Boundary

X	Y
-0.0990529	913.52
182.808	1131.5



Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)
Conglomerate		140	Mohr-Coulomb	450	42
Granitic Bedrock		145	Mohr-Coulomb	1310	38

Slide Analysis Information

VALENCIA - RUNYON

Project Summary

File Name: SectionBcalc seis.slim
Slide Modeler Version: 6.038
Project Title: VALENCIA - RUNYON
Analysis: GROSS STABILITY - SECTION B
Date Created: 3/11/2016, 8:36:14 AM

General Settings

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

Analysis Options

Analysis Methods Used

Bishop simplified

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

Groundwater Analysis

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

Random Numbers

Pseudo-random Seed: 10116
Random Number Generation Method: Park and Miller v.3

Surface Options

Surface Type: Circular

Search Method: Grid Search
Radius Increment: 10
Composite Surfaces: Disabled
Reverse Curvature: Create Tension Crack
Minimum Elevation: Not Defined
Minimum Depth: Not Defined

Loading

Seismic Load Coefficient (Horizontal): 0.288
1 Distributed Load present

Distributed Load 1

Distribution: Constant
Magnitude [psf]: 400
Orientation: Vertical

Tension Crack

Tension crack Water level: filled with water

Material Properties

Property	Conglomerate	Granitic Bedrock
Color		
Strength Type	Mohr-Coulomb	Mohr-Coulomb
Unit Weight [lbs/ft3]	140	145
Cohesion [psf]	450	1310
Friction Angle [deg]	42	38
Water Surface	None	None
Ru Value	0	0

Global Minimums

Method: bishop simplified

FS: 1.009040
Center: 953.350, 1626.489
Radius: 842.682
Left Slip Surface Endpoint: 295.782, 1099.500
Right Slip Surface Endpoint: 803.134, 797.303
Left Slope Intercept: 295.782 1106.500
Right Slope Intercept: 803.134 797.303
Resisting Moment=2.80537e+009 lb-ft
Driving Moment=2.78023e+009 lb-ft
Total Slice Area=30370.6 ft2

Valid / Invalid Surfaces

Method: bishop simplified

Number of Valid Surfaces: 2889
Number of Invalid Surfaces: 1962

Error Codes:

Error Code -101 reported for 82 surfaces
Error Code -103 reported for 36 surfaces
Error Code -105 reported for 14 surfaces
Error Code -113 reported for 510 surfaces
Error Code -1000 reported for 1320 surfaces

Error Codes

The following errors were encountered during the computation:

-101 = Only one (or zero) surface / slope intersections.
-103 = Two surface / slope intersections, but one or more surface / nonslope external polygon intersections lie between them. This usually occurs when the slip surface extends past the bottom of the soil region, but may also occur on a benched slope model with two sets of Slope Limits.
-105 = More than two surface / slope intersections with no valid slip surface.
-113 = Surface intersects outside slope limits.
-1000 = No valid slip surfaces are generated at a grid center. Unable to draw a surface.

Slice Data

Global Minimum Query (bishop simplified) - Safety Factor: 1.00904

Slice Number	Width [ft]	Weight [lbs]	Base Material	Base Cohesion [psf]	Base Friction Angle [degrees]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]
1	20.2941	56452.3	Granitic Bedrock	1310	38	1947.36	1964.97	838.32	0	838.32
2	20.2941	125586	Granitic Bedrock	1310	38	3431.63	3462.65	2755.27	0	2755.27
3	20.2941	184297	Granitic Bedrock	1310	38	4695.44	4737.89	4387.5	0	4387.5
4	20.2941	207961	Granitic Bedrock	1310	38	5268.5	5316.13	5127.62	0	5127.62
5	20.2941	223028	Granitic Bedrock	1310	38	5754.85	5806.87	5755.74	0	5755.74
6	20.2941	234965	Granitic Bedrock	1310	38	6182.1	6237.99	6307.53	0	6307.53
7	20.2941	240709	Granitic Bedrock	1310	38	6472.77	6531.28	6682.94	0	6682.94
8	20.2941	228453	Granitic Bedrock	1310	38	6331.76	6389	6500.8	0	6500.8
9	20.2941	236351	Granitic Bedrock	1310	38	6671.19	6731.5	6939.21	0	6939.21
10	20.2941	271240	Granitic Bedrock	1310	38	7697.18	7766.76	8264.28	0	8264.28
11	20.2941	271297	Granitic Bedrock	1310	38	7861.36	7932.43	8476.31	0	8476.31
12	20.2941	260468	Granitic Bedrock	1310	38	7737.7	7807.65	8316.6	0	8316.6
13	20.2941	247538	Granitic Bedrock	1310	38	7544.99	7613.2	8067.73	0	8067.73
14	20.2941	233497	Granitic Bedrock	1310	38	7307.6	7373.66	7761.13	0	7761.13
15	20.2941	217634	Granitic Bedrock	1310	38	7004.43	7067.75	7369.58	0	7369.58
16	20.2941	199812	Granitic Bedrock	1310	38	6629.16	6689.09	6884.93	0	6884.93
17	20.2941	180970	Granitic Bedrock	1310	38	6206.19	6262.29	6338.64	0	6338.64
18	20.2941	165916	Granitic Bedrock	1310	38	5875.41	5928.52	5911.44	0	5911.44
19	20.2941	150099	Granitic Bedrock	1310	38	5506.68	5556.46	5435.25	0	5435.25
20	20.2941	132561	Granitic Bedrock	1310	38	5069.78	5115.61	4870.95	0	4870.95
21	20.2941	113347	Granitic Bedrock	1310	38	4563.33	4604.58	4216.87	0	4216.87

22	20.2941	92496.8	Granitic Bedrock	1310	38	3985.72	4021.75	3470.89	0	3470.89
23	20.2941	70041	Granitic Bedrock	1310	38	3335.05	3365.2	2630.54	0	2630.54
24	20.2941	44075.4	Granitic Bedrock	1310	38	2546.2	2569.22	1611.72	0	1611.72
25	20.2941	14947	Granitic Bedrock	1310	38	1624.22	1638.9	420.972	0	420.972

Interslice Data

Global Minimum Query (bishop simplified) - Safety Factor: 1.00904

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [degrees]
1	295.782	1099.5	1528.8	0	0
2	316.076	1075.13	-1389.86	0	0
3	336.37	1052.51	27307.8	0	0
4	356.664	1031.44	77330	0	0
5	376.958	1011.76	130976	0	0
6	397.252	993.347	184173	0	0
7	417.546	976.083	235005	0	0
8	437.84	959.883	280949	0	0
9	458.134	944.671	316856	0	0
10	478.429	930.383	348395	0	0
11	498.723	916.963	380878	0	0
12	519.017	904.361	405939	0	0
13	539.311	892.537	421922	0	0
14	559.605	881.453	429186	0	0
15	579.899	871.076	428345	0	0
16	600.193	861.379	420037	0	0
17	620.487	852.334	405030	0	0
18	640.781	843.92	384262	0	0
19	661.075	836.116	358683	0	0
20	681.369	828.905	329111	0	0
21	701.663	822.27	296496	0	0
22	721.958	816.198	261936	0	0
23	742.252	810.676	226681	0	0
24	762.546	805.692	192134	0	0
25	782.84	801.237	160223	0	0
26	803.134	797.303	0	0	0

List Of Coordinates

Distributed Load

X	Y
180.07	1131.5
182.808	1131.5
206.87	1131.5
207.87	1118.5
259.37	1118.5

260.37	1106.5
346.085	1106.5

Tension Crack

X	Y
155.273	1137.68
159.915	1139.03
167.821	1139.3
172.489	1136.96
173.735	1124.5
200.388	1124.5
201.388	1111.5
252.929	1111.5
253.929	1099.5
343.914	1099.5
371.821	1080.35

External Boundary

X	Y
0.000234115	749.552
855.499	750
855.499	796.146
804.8	796.146
761.6	826.146
631.002	909.051
550.744	970.064
491.9	1016.15
484.738	1017.32
459.9	1018
424.567	1053.33
404.627	1066.32
346.085	1106.5
260.37	1106.5
259.37	1118.5
207.87	1118.5
206.87	1131.5
182.808	1131.5
180.07	1131.5
179.07	1141.5
169.363	1146.35
158.8	1146
117.7	1134
116.9	1132
99.0651	1132
98.4699	1123.1
52.2	1120.8
-0.224083	1120

-0.0990529	913.52

Material Boundary

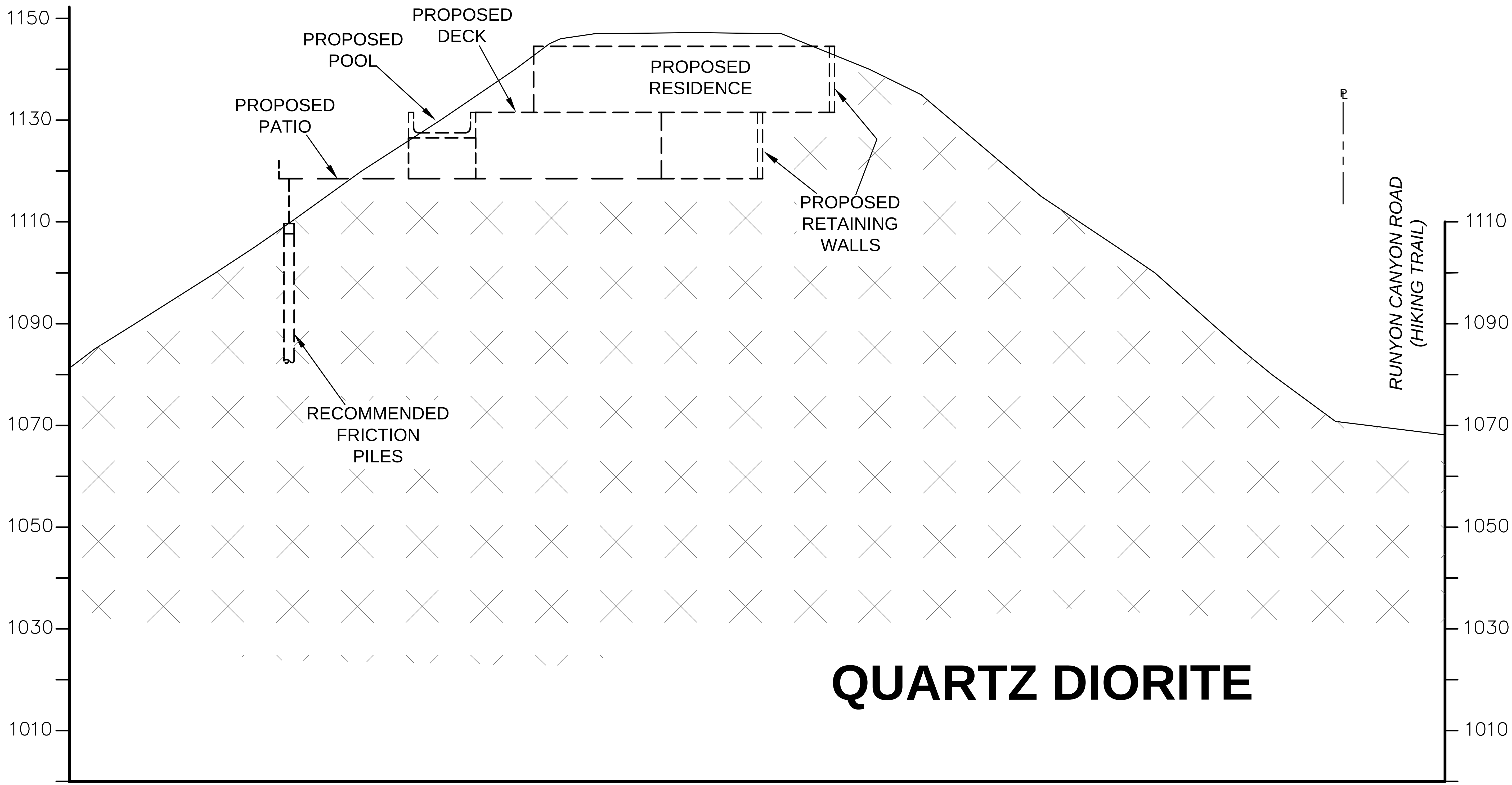
X	Y
-0.0990529	913.52
182.808	1131.5

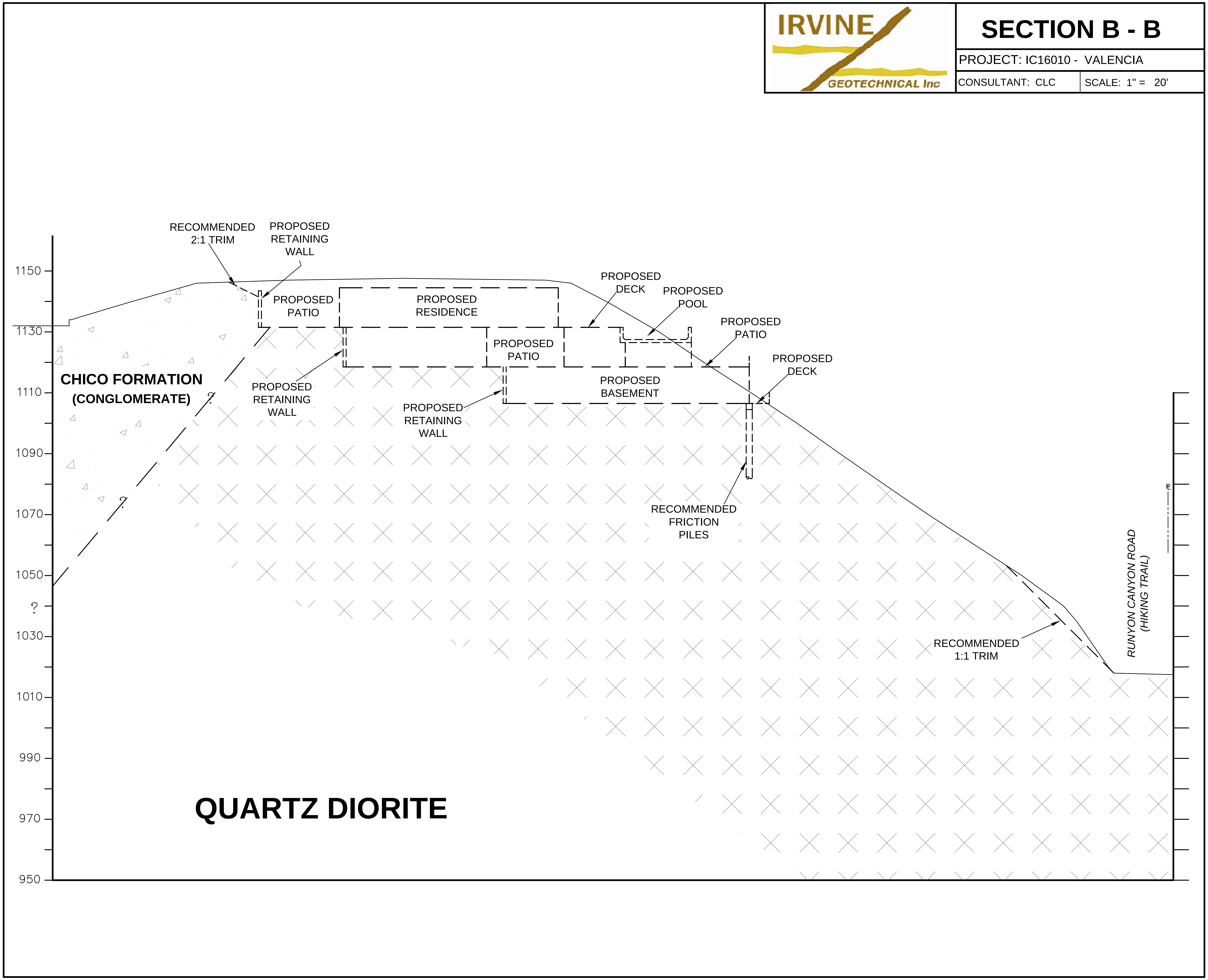
SECTION A - A

PROJECT: IC16010 - VALENCIA

CONSULTANT: CLC | SCALE: 1" = 20'

IRVINE GEOTECHNICAL Inc

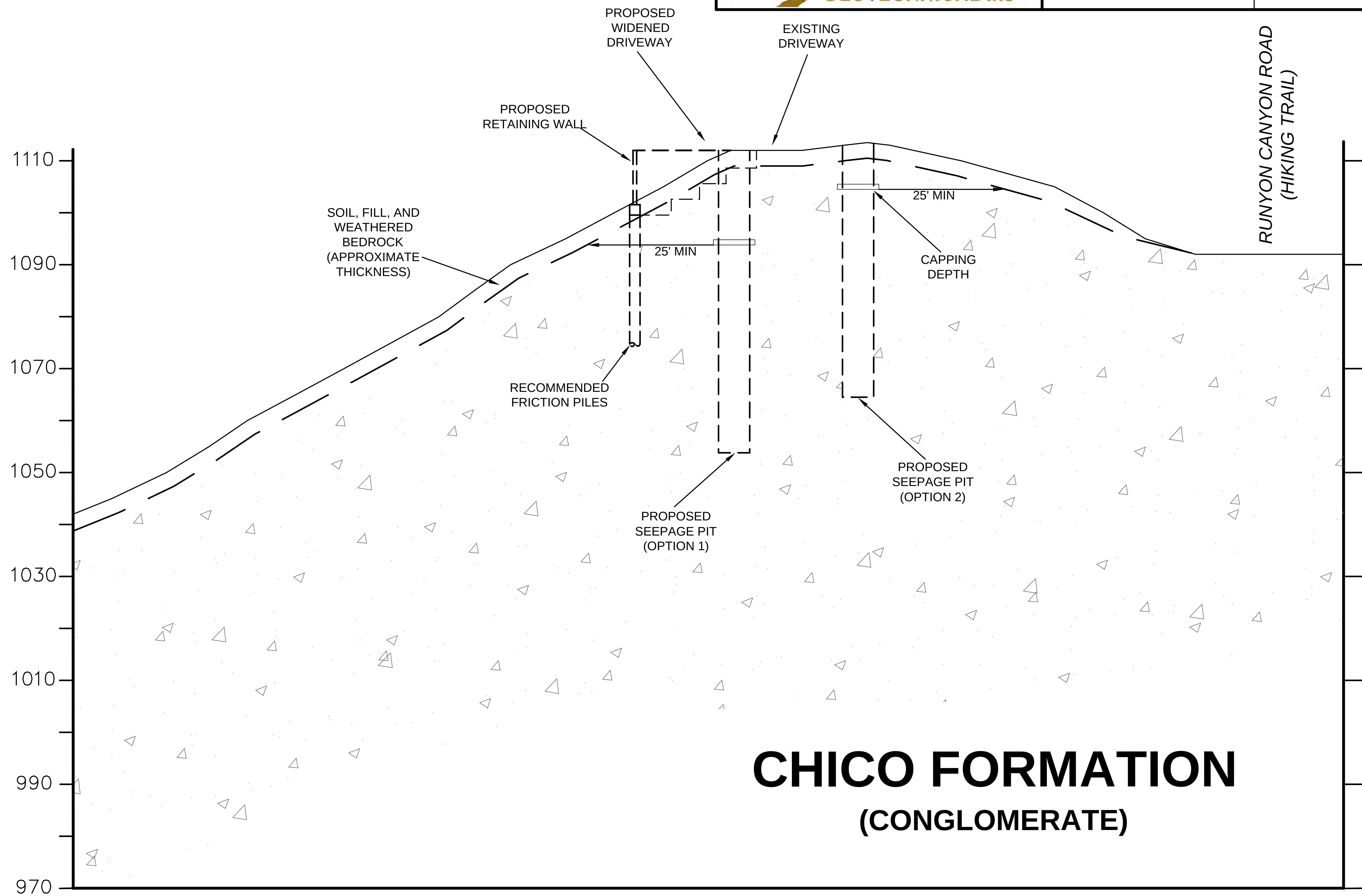


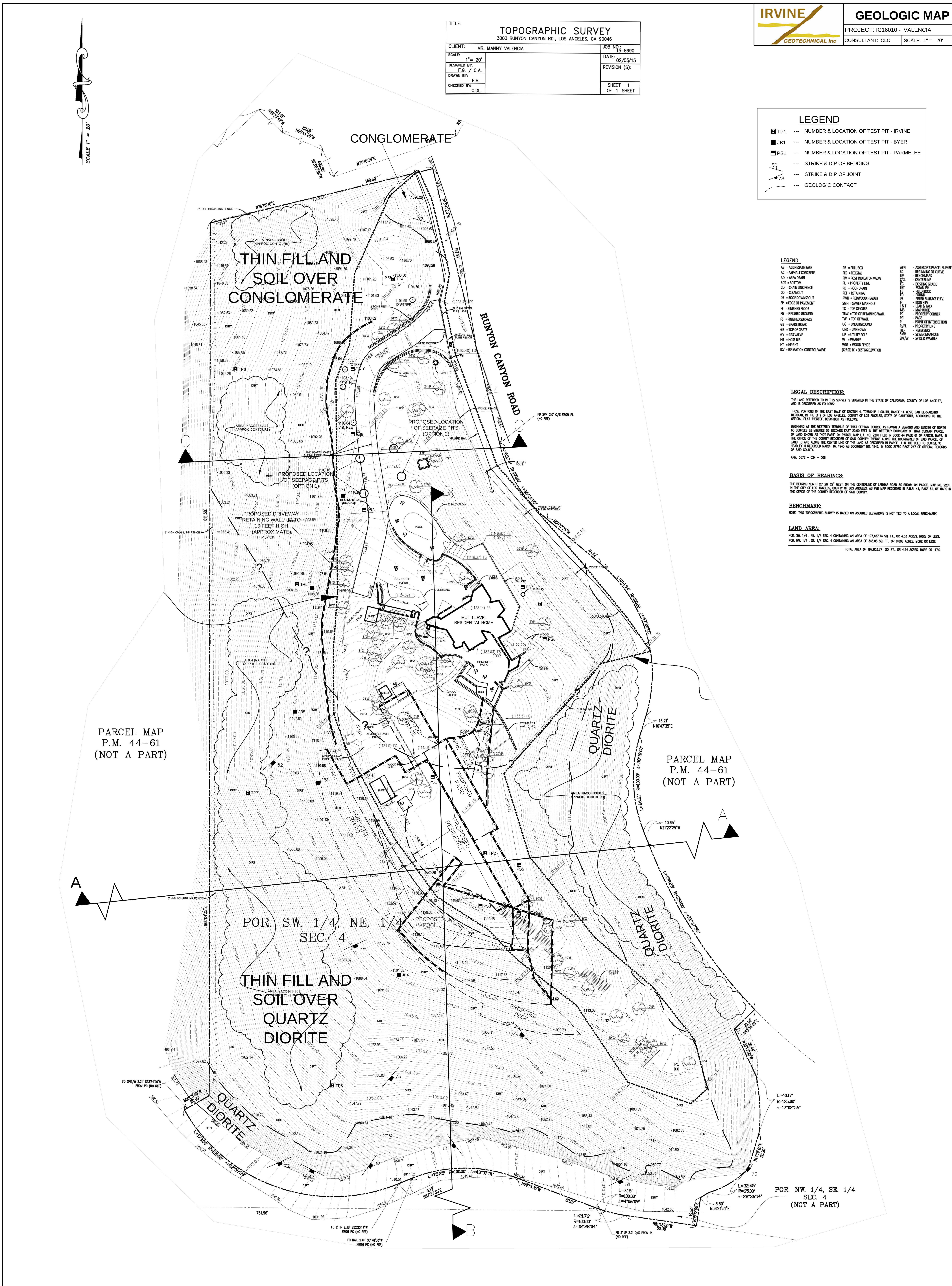


IRVINE
GEOTECHNICAL Inc
SECTION B - B
PROJECT: IC16010 - VALENCIA
CONSULTANT: CLC
SCALE: 1" = 20'
RECOMMENDED 2:1 TRIM
PROPOSED RETAINING WALL
PROPOSED PATIO
PROPOSED RESIDENCE
PROPOSED DECK
PROPOSED POOL
PROPOSED PATIO
PROPOSED DECK
PROPOSED PATIO
PROPOSED BASEMENT
PROPOSED RETAINING WALL
PROPOSED RETAINING WALL
RECOMMENDED FRICTION PILES
RECOMMENDED 1:1 TRIM
CHICO FORMATION
(CONGLOMERATE)
QUARTZ DIORITE
RUNYON CANYON ROAD
(HIKING TRAIL)
1150
1130
1110
1090
1070
1050
1030
1010
990
970
950

SECTION C - C

PROJECT: IC16010 - VALENCIA	
CONSULTANT: CLC	SCALE: 1" = 20'




GEOLOGIC MAP
IRVINE GEOTECHNICAL Inc
PROJECT: IC16010 - VALENCIA
CONSULTANT: CLC
SCALE: 1" = 20'
TOPOGRAPHIC SURVEY
3003 RUNYON CANYON RD., LOS ANGELES, CA 90046
CLIENT: MR. MANNY VALENCIA
JOB NO.: 15-8690
DATE: 02/05/15
SCALE 1" = 20'
LEGEND
TP1 --- NUMBER & LOCATION OF TEST PIT - IRVINE
JB1 --- NUMBER & LOCATION OF TEST PIT - BYER
PS1 --- NUMBER & LOCATION OF TEST PIT - PARMELEE
--- STRIKE & DIP OF BEDDING
--- STRIKE & DIP OF JOINT
--- GEOLOGIC CONTACT
CONGLOMERATE
THIN FILL AND SOIL OVER CONGLOMERATE
RUNYON CANYON ROAD
PROPOSED LOCATION OF SEEPAGE PITS (OPTION 1)
PROPOSED LOCATION OF SEEPAGE PITS (OPTION 2)
PROPOSED DRIVEWAY RETAINING WALL UP TO 10 FEET HIGH (APPROXIMATE)
MULTI-LEVEL RESIDENTIAL HOME
PROPOSED RESIDENCE
PROPOSED POOL
PROPOSED DECK
QUARTZ DIORITE
THIN FILL AND SOIL OVER QUARTZ DIORITE
PARCEL MAP P.M. 44-61 (NOT A PART)
POR. SW. 1/4, NE. 1/4 SEC. 4
POR. NW. 1/4, SE. 1/4 SEC. 4 (NOT A PART)
LEGAL DESCRIPTION:
BASIS OF BEARINGS:
BENCHMARK:
LAND AREA:
A
B
C

IRVINE GEOTECHNICAL Inc

LOCAL TOPO. MAP

PROJECT: IC16010 - VALENCIA

CONSULTANT: CLC

SCALE: 1" = 120'