CRAIG CROTTY
ARBOR CULTURE LLC

March 14, 2016

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Regarding: **Proposed subdivision for four single family residence parcels at Oak Glen, Glendale, CA 91206**

INDIGENOUS TREE REPORT

Subject: This study is to identify ordinance regulated indigenous trees located in and around a proposed subdivision and construction site. The property is to be divided into four parcels. Indigenous trees located within the site are identified, measured, rated for health and structure, discussed for potential encroachment, and located on a tree plan. Subdivision encroachment is due to construction of a new roadway terminus and planned demolition of the southerly residence. Appraisals are provided for trees with proposed encroachments.

Summary: Two regulated Oaks (#8-#9) would be removed due to impact from proposed grading and placement of a proposed cul-de-sac roadway. Oak #8 is in reasonably good condition and should be mitigated if approved for removal. Oak #9 is in very poor condition, nearly dead. Oak #9 should be removed due to condition regardless of proposed construction.

Oak #1 is encroached by proposed demolition of the existing south residence and construction of two new homes. This tee should be fenced for protection prior to site work. It may require monitoring during demolition and new construction.

Two other trees (#10-#11) are possibly encroached due to grading for the roadway. Encroachment is defined as any work within the tree dripline (farthest leaves) plus one foot beyond. Grading will possibly enter the protection zone area due to slope and distance.

No other protected indigenous tree on or near this site is anticipated to experience negative impacts as a result of the proposal. Oaks located above the site (top of slope) are not encroached: #2-#3-#4-#5-#6-#7. Oaks located at the north end residence are not encroached: #12-#13-#14-#15-#16-#17.

SUMMARY

Tree No. Species	Trunk Size	Condition	Encroachment
#1 *Quercus agrifolia*	11-11 in. dia.	Good health/structure	Encroached/Protect.
#2 *Quercus agrifolia*	14 in. dia.	Fair health/structure	Not encroached.
#3 *Quercus agrifolia*	12-13 in. dia.	Fair health/ structure	Not encroached.
#4 *Quercus agrifolia*	20 in. dia.	Good health/structure	Not encroached.
#5 *Quercus agrifolia*	19 in. dia.	Fair health/Good structure	Not encroached.
#6 *Quercus agrifolia*	23 in. dia.	Good health/structure	Not encroached.
#7 *Quercus agrifolia*	4-3 in. dia.	Fair health/structure	Not encroached.
#8 *Quercus agrifolia*	20 in. dia.	Fair health/good structure	Remove/ encroached.
#9 *Quercus agrifolia*	16 in. dia.	Poor health/poor structure	Remove/Encroached.
#10 *Quercus agrifolia*	17 in. dia.	Fair health/structure	Probable grading encroached.
#11 *Quercus agrifolia*	6 in. dia.	Poor health/structure	Possible grading encroached.
#12 *Quercus agrifolia*	10-10 in. dia.	Fair health/poor structure	Not encroached.
#13 *Quercus berberidifolia*	7-6-6 in. dia.	Good health/structure	Not encroached.
#14 *Quercus agrifolia*	15 in. dia.	Good health/structure	Not encroached.
#15 *Quercus agrifolia*	24-26 in. dia.	Good health/fair structure	Not encroached.
#16 *Quercus agrifolia*	26-15 in. dia.	Good health/structure	Not encroached.
#17 *Quercus agrifolia*	16 in. dia.	Poor health/structure	Not encroached.

Description: A development proposal removes and replaces one existing residence (southerly) and retains the north residence without any proposed site work.

Oak #1 is encroached by proposed demolition of the existing south residence and construction of two new homes. This tee should be fenced for protection prior to site work. It may require monitoring during demolition and new construction.

Oaks (#8-#9) would be removed due to impact from proposed grading and placement of a proposed cul-de-sac roadway. Oak #8 is in reasonably good condition and should be mitigated if approved for removal. Oak #9 is in very poor condition, nearly dead. Oak #9 should be removed due to condition regardless of proposed construction.

Two other trees (#10-#11) are possibly encroached due to grading for the roadway. Encroachment is defined as any work within the tree dripline (farthest leaves) plus one foot beyond. Grading will possibly enter this protection zone area due to slope and distance. These two trees should be fenced and monitored for grading encroachment.

No tree at the top of slope is encroached, #2 through #7
No tree in and around the north residence would be encroached by construction. These include Oaks #12 through #17.

Appraised Cost Removals:

- #8 Oak (removal) $11,996. Eleven thousand nine hundred ninety six dollars.
- #9 Oak (removal) no mitigation.

Appraised Cost Encroachments (to remain but if damaged):

- #1 Oak (encroach) $7,641. Seven thousand six hundred forty one dollars
- #10 Oak (encroach) $9,110. Nine thousand one hundred ten dollars
- #11 Oak (encroach) $1,094. One thousand ninety four dollars

Appraisal Method:

The tree is appraised using the trunk formula method in Guide for Tree and Plant Appraisal, 9th Edition, by the Council of Tree and Landscape Appraisers, published by the International Society of Arboriculture and companion Species Classification and Group Assignment supplemental booklet by the Western Chapter of the International Society of Arboriculture, 2004

Report Method:

The regulated indigenous site trees are identified and recorded for approximate location, size, and condition in this report. Trunk diameters are measured at 4.5 feet above grade except where low branching would skew results, in which case diameters are measured at the narrowest point on the trunk below low branching. Tree heights and crown spreads are estimated. All sizes are estimated where private access issues exist.

Recommendations:

FENCING:

- Temporary chain link fencing should be placed between the site and Oaks #1-#10-#11.
- Chain link should be at least five feet in height and attached to steel poles driven into the soil.

ADDITIONAL NOTES:

- Work near Oak #1should be accessed by existing pavement.
- Materials and worker access should be outside all tree protection zones.
- New trenching for sewer, water, or electrical should be routed outside tree protection zones.

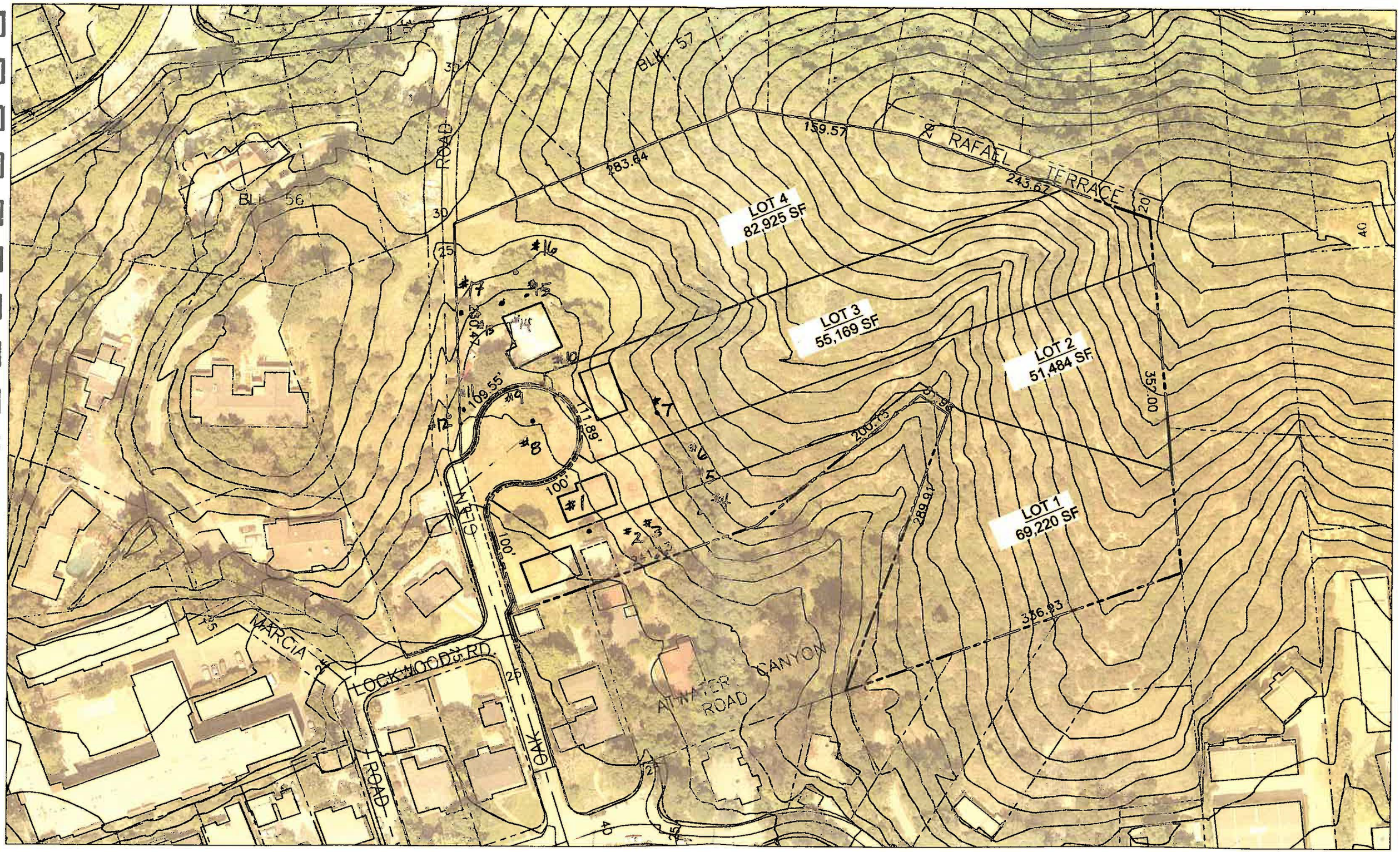
Craig Crotty

Craig Crotty, Consulting Arborist

Supplemental Information:

- Tree Plan,Tree Data Oaks #1-#17, Photos, Assumptions and Limiting Conditions

2942 Oak Glen Road - PRELIMINARY PARCEL MAP



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FIELD DATA SHEET-VISUAL INSPECTION FROM GRADE

TREE NUMBER	1	2	3	4	5
TRUNK DIAMETER (INCHES)	11-11	14	12-13	20	19
CROWN SPREAD (N-S-E-W in FEET)	18-5-18-19	25-8-12-10	6-15-21-18	22-20-24-25	14-21-20-24
HEIGHT (ESTIMATE in FEET)	28	28	24	32	36
PHYSICAL CONDITION					
TRUNK LEAN		X	X		
TRUNK CAVITY					
TRUNK WOUND					
DAMAGED / DEAD STRUCTURAL ROOT					
FILL SOIL AT ROOT CROWN		X	X	X	
WEAK TRUNK / BRANCH ATTACH					
PREVIOUS FAILURES					
BRANCH CAVITY					
BRANCH WOUND	X	X	X		
EXCESSIVE END WEIGHT					
DEAD & BROKEN BRANCHES / HANGER				X	X
THIN FOLIAGE					X
BRANCH TIP DECLINE					
LEAF COLOR					
PRUNING DAMAGE					
INSECT DAMAGE IN CROWN					
BORERS / TERMITES					
MUSHROOMS / CONKS					
CANKERS / TRUNK BLEEDING / OOZING					
OBSERVATIONS					
REMOVE					
CONSTRUCTION ENCROACHED	YES	NO	NO	NO	NO
RELOCATE ON SITE					
UNSUITABLE FOR RELOCATION					
PEST / DISEASE TREATMENT					
RESTORE ORIGINAL GRADE		X	X	X	
ADJUST IRRIGATIONUNDERSTORY					
AERATE / APPLY MULCH					
MAINTENANCE PRUNING					
RISK LEVEL					
LOW RISK	X	X	X	X	X
MODERATE RISK					
HIGH RISK					
RATING A-F					
HEALTH	B	C	C	A	C
STRUCTURE	B	C	C	A	B
AESTHETICS	B	B	B	A	B
OVERALL RATING	B	C/B	C/B	A	B/C

SPECIES COMMENTS
TREE NO. 1 Quercus agrifolia Loc @ ex residence, one sided crown, encroached by demo and future const. Fence.
TREE NO. 2 Quercus agrifolia Loc @ south property boundary fence. No likely encroachment.
TREE NO. 3 Quercus agrifolia Loc adj to #2 @ south property boundary fence. No likely encroachment.
TREE NO. 4 Quercus agrifolia Loc top of slope. Not encroached.
TREE NO. 5 Quercus agrifolia Loc top of slope, north from #4. Not encroached.

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FIELD DATA SHEET-VISUAL INSPECTION FROM GRADE

TREE NUMBER	6	7	8	9	10
TRUNK DIAMETER (INCHES)	23	4-3	20	16	17
CROWN SPREAD (Est. N-S-E-W in FEET)	16-36-30-24	5-10-0-10	21-22-22-21	10-15-18-16	13-14-18-18
HEIGHT (ESTIMATE in FEET)	38	7	30	22	24
PHYSICAL CONDITION					
TRUNK LEAN		X			
TRUNK CAVITY					
TRUNK WOUND					
DAMAGED / DEAD STRUCTURAL ROOT					
FILL SOIL AT ROOT CROWN					
WEAK TRUNK / BRANCH ATTACH					
PREVIOUS FAILURES					
BRANCH CAVITY			X		
BRANCH WOUND	X		X	X	X
EXCESSIVE END WEIGHT					
DEAD & BROKEN BRANCHES / HANGER			X	X	X
THIN FOLIAGE		X		X	
BRANCH TIP DECLINE				X	
LEAF COLOR				X	
PRUNING DAMAGE					
INSECT DAMAGE IN CROWN				X	
BORERS / TERMITES					
MUSHROOMS / CONKS					
CANKERS / TRUNK BLEEDING / OOZING				X	
OBSERVATIONS					
REMOVE			YES	YES	
CONSTRUCTION ENCROACHED	NO	NO	YES	YES	YES
RELOCATE ON SITE					
UNSUITABLE FOR RELOCATION					
PEST / DISEASE TREATMENT					
RESTORE ORIGINAL GRADE					
ADJUST IRRIGATIONUNDERSTORY					
AERATE / APPLY MULCH					
MAINTENANCE PRUNING					
RISK LEVEL					
LOW RISK	X	X	X	X	X
MODERATE RISK					
HIGH RISK					
RATING A-F					
HEALTH	B	C	C	F	C
STRUCTURE	B	C	B	F	B
AESTHETICS	B	D	B	F	C
OVERALL RATING	B	C/D	B/C	F	C/B

SPECIES COMMENTS
TREE NO. 6 Quercus agrifolia Largest of group at top of slope. Northernmost.
TREE NO. 7 Quercus agrifolia Very small tree at top of slope above Oak #8. Crowded, low, thin crown.
TREE NO. 8 Quercus agrifolia Const removes, loc in proposed cul de sac.
TREE NO. 9 Quercus agrifolia Half of crown is dead. Oozing trunk suspected disease, suspected PSHB. Const removes
TREE NO. 10 Quercus agrifolia Probable encroachment by grading at the cul de sac.

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FIELD DATA SHEET-VISUAL INSPECTION FROM GRADE

TREE NUMBER	11	12	13	14	15
TRUNK DIAMETER Est. in. due to access	6	10-10	7-6-6	15	24-26
CROWN SPREAD Est. N-S-E-W in feet	0-15-6-0	3-21-15-14	12-11-14-10	12-21-12-24	24-28-26-26
HEIGHT Estimated in feet	9	22	14	25	34
PHYSICAL CONDITION					
TRUNK LEAN	X				
TRUNK CAVITY					
TRUNK WOUND	X	X	X		
DAMAGED / DEAD STRUCTURAL ROOT					
FILL SOIL AT ROOT CROWN					
WEAK TRUNK / BRANCH ATTACH					
PREVIOUS FAILURES					
BRANCH CAVITY					
BRANCH WOUND	X	X	X	X	X
EXCESSIVE END WEIGHT					
DEAD & BROKEN BRANCHES / HANGER				X	
THIN FOLIAGE					
BRANCH TIP DECLINE					
LEAF COLOR					
PRUNING DAMAGE					
INSECT DAMAGE IN CROWN	X				
BORERS / TERMITES					
MUSHROOMS / CONKS					
CANKERS / TRUNK BLEEDING / OOZING	X				
OBSERVATIONS					
REMOVE					
CONSTRUCTION ENCROACHED	Possible	NO	NO	NO	NO
RELOCATE ON SITE					
UNSUITABLE FOR RELOCATION					
PEST / DISEASE TREATMENT					
RESTORE ORIGINAL GRADE					
ADJUST IRRIGATIONUNDERSTORY					
AERATE / APPLY MULCH					
MAINTENANCE PRUNING					
RISK LEVEL					
LOW RISK	X	X	X		
MODERATE RISK				X	X
HIGH RISK					
RATING A-F					
HEALTH	D	C	B	B	B
STRUCTURE	D	D	B	B	C
AESTHETICS	D	C	B	B	C
OVERALL RATING	D	C/D	B	B	C/B

SPECIES COMMENTS
TREE NO. 11 Quercus agrifolia Very poor condition, small, leaning, oozing trunk, frass. Possibly encroached by grading.
TREE NO. 12 Quercus agrifolia Loc above existing drive, beyond encroachment. North residence is to remain/no work.
TREE NO. 13 Quercus berberidifolia Loc @ north residence drive. Beyond encroachment.
TREE NO. 14 Quercus agrifolia Loc @ north side of north residence to remain. No encroachment.
TREE NO. 15 Quercus agrifolia Loc @ north side of north residence to remain. No encroachment.

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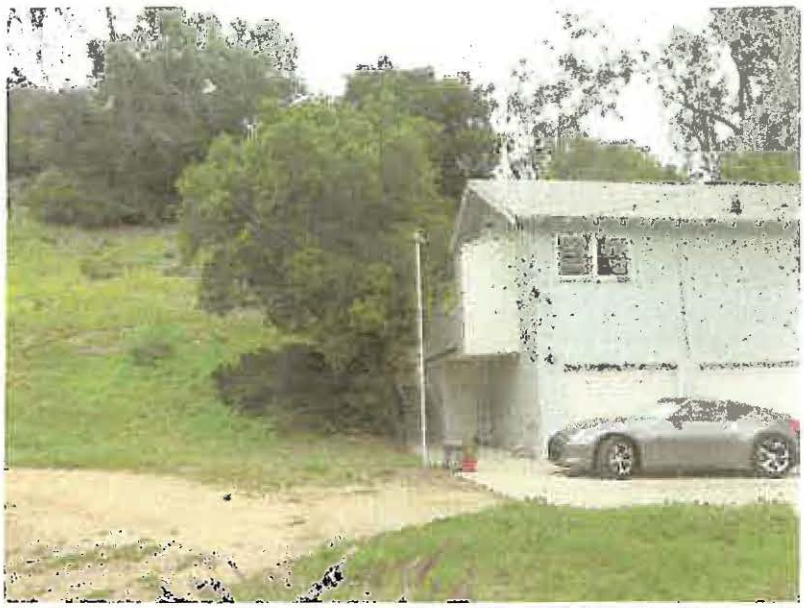
FIELD DATA SHEET-VISUAL INSPECTION FROM GRADE

TREE NUMBER	16	17			
TRUNK DIAMETER Est. in. due to access	26-15	16			
CROWN SPREAD Est. N-S-E-W in feet	18-21-20-24	16-24-21-18			
HEIGHT Estimated in feet	32	24			
PHYSICAL CONDITION					
TRUNK LEAN		X			
TRUNK CAVITY					
TRUNK WOUND					
DAMAGED / DEAD STRUCTURAL ROOT					
FILL SOIL AT ROOT CROWN					
WEAK TRUNK / BRANCH ATTACH					
PREVIOUS FAILURES					
BRANCH CAVITY					
BRANCH WOUND	X				
EXCESSIVE END WEIGHT					
DEAD & BROKEN BRANCHES / HANGER					
THIN FOLIAGE		X			
BRANCH TIP DECLINE		X			
LEAF COLOR		X			
PRUNING DAMAGE					
INSECT DAMAGE IN CROWN					
BORERS / TERMITES					
MUSHROOMS / CONKS					
CANKERS / TRUNK BLEEDING / OOZING					
OBSERVATIONS					
REMOVE					
CONSTRUCTION ENCROACHED	NO	NO			
RELOCATE ON SITE					
UNSUITABLE FOR RELOCATION					
PEST / DISEASE TREATMENT					
RESTORE ORIGINAL GRADE					
ADJUST IRRIGATIONUNDERSTORY					
AERATE / APPLY MULCH					
MAINTENANCE PRUNING					
RISK LEVEL					
LOW RISK	X	X			
MODERATE RISK					
HIGH RISK					
RATING A-F					
HEALTH	B	D			
STRUCTURE	B	D			
AESTHETICS	B	D			
OVERALL RATING	B	D			

SPECIES COMMENTS
TREE NO. 16 Quercus agrifolia Located beyond proposed work, on slope above #14-#15. No encroachment.
TREE NO. 17 Quercus agrifolia Located above Scrub #13. Very thin crown, drought, insect suspected.
TREE NO.
TREE NO.
TREE NO.



Oak #1 is located adjacent to the south residence. The residence is proposed for removal to construct a new home. Demolition of the existing will encroach this tree. The tree should be fenced with chain link protection fencing before any site work begins. Work within tree protection zones monitored.

Oaks #2 #3 are located within three feet of each other on the south property line. They are not likely to be impacted by site construction.

#2 #3 Oaks are located on the south property boundary adjacent to a block wall and fence. They are above the south residence proposed for removal but beyond potential construction impact.

#4 #5 #6 Oaks are shown from right to left. They are located at the top of slope beyond potential impacts from construction.

Oak #7 is a small, low, tree crowded by native chapparal located at the top of slope beyond encroachment.

Oaks #8 #9 #10 are shown from right to left. Lot splits are at right, the residence at left is to remain in place. Trees will require temporary chain link protection fencing when lots are developed.

Oaks #8 #10 appear to be in good condition. The middle Oak #9 is nearly dead; the top of the crown is dead with some live foliage persisting in the lower branches. Drought and insect infestation is suspected as the cause.

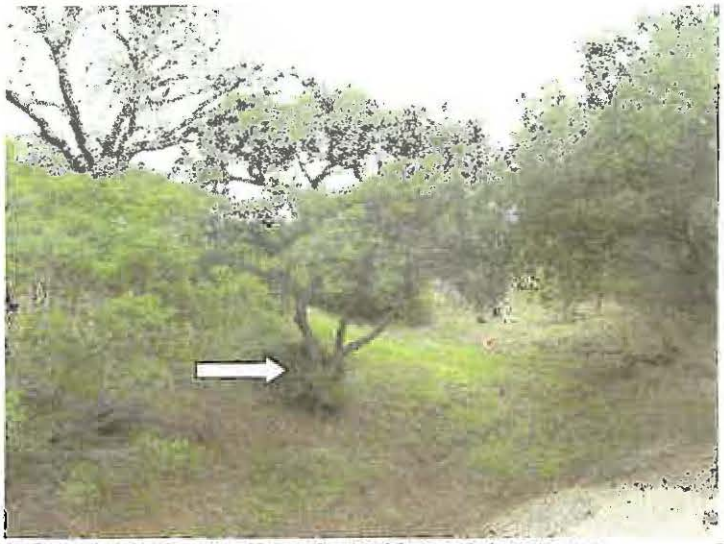
#8 Oak is a good specimen worth protecting.

Oak #9 (center) is mostly dead.
Oak #10 is a good specimen to protect.

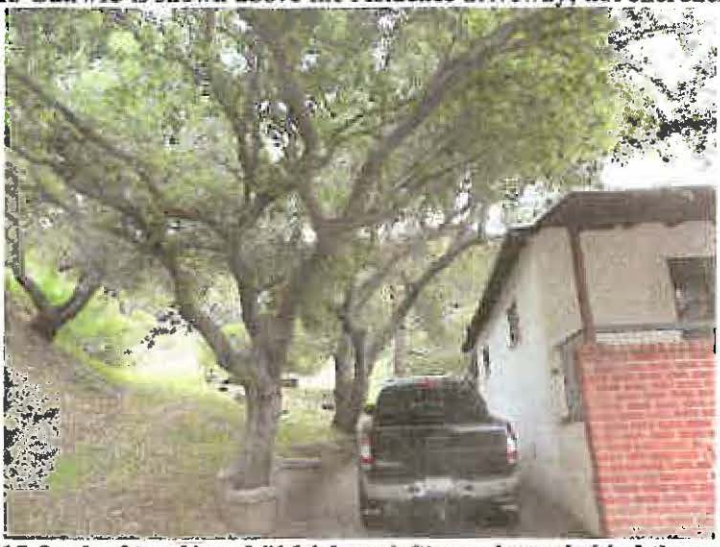
Oak #11 is a small tree in very poor condition (not encroached).
Oak #12 is at left in back; a dead tree is center back in the photo.

Oak #12 is rated fair and likely beyond encroachment at the entrance drive to the residence to remain..

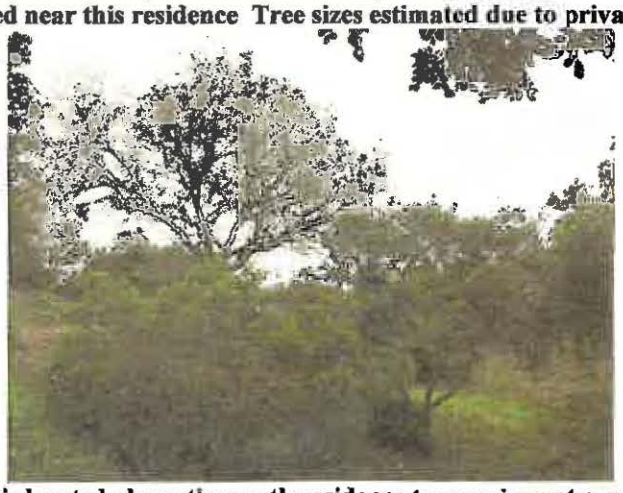
A larger Oak at right is entirely dead and excluded from this report.



Scrub Oak #13 is shown above the residence driveway; not encroached.



Oaks #14 (front) #15 (back of truck) and #16 (above left) are shown behind the residence to remain. No work is proposed near this residence Tree sizes estimated due to private access concerns.



Oak #17 is located above the north residence to remain; not encroached.

Assumptions and Limiting Conditions

This arborist report is made in compliance with City of Glendale requirements for construction where regulated trees are present. This report addresses approximated encroachments to the trees by the proposed construction.

No warranty is made, expressed or implied, that problems or deficiencies of the tree or the property will not occur in the future, from any cause. The Consultant shall not be responsible for damages or injury caused by any tree defects, and assumes no responsibility for the correction of defects or tree related problems.

The Consulting Arborist has no past, present or future interest in this property or the subject trees. Opinions contained herein are the independent and objective judgments of the Consultant relating to circumstances and observations made on the subject site.

It is assumed that statements of fact regarding property ownership, property boundaries, exact tree and structure locations are "as represented" by the client, in all verbal, written or drawn communications. The Consultant assumes no responsibility for verification of ownership or locations of property lines, or for results of any actions or recommendations based on inaccurate information.

Delivery of this report shall constitute completion of the original agreement. The Consulting Arborist shall not be required to give testimony, perform site monitoring, provide further documentation, be deposed, or to attend any meeting, court or hearing, without subsequent contractual arrangements for this additional employment, including payment of additional fees for such services as described by the Consultant.

The recommendations contained in this report are the opinions of the Consulting Arborist at the time of inspection. These opinions are based on the knowledge, experience, and education of the Consultant. The field inspection was a visual, grade level tree assessment.

It is assumed that any property referred to in this report is not in violation of any applicable codes, ordinances, statutes, or other governmental regulations. Further, the consultant assumes no responsibility for any violations caused by others in regard to any such codes, ordinances, statutes, or regulations.

Any change or alteration to this report invalidates the entire report.

Client_____ Date_____

Craig Crotty, Consulting Arborist March 14, 2016

BYER GEOTECHNICAL, INC.

GEOLOGIC AND SOILS ENGINEERING EXPLORATION

PROPOSED PRELIMINARY PARCEL MAP - 4-LOT SUBDIVISION

PROPOSED THREE RESIDENCES

ASSESSOR'S PARCEL NO. 5654-005-003

2942 OAK GLEN ROAD

GLENDALE, CALIFORNIA

FOR RIBEYE MANAGEMENT, LLC

BYER GEOTECHNICAL, INC., PROJECT NUMBER BG 22288

NOVEMBER 23, 2015

1461 East Chevy Chase Drive, Suite 200 • Glendale, California 91206 • tel 818.549.9959 • fax 818.543.3747 • www.byergeo.com

GEOLOGIC AND SOILS ENGINEERING EXPLORATION
PROPOSED PRELIMINARY PARCEL MAP - 4-LOT SUBDIVISION
PROPOSED THREE RESIDENCES
ASSESSOR'S PARCEL NO. 5654-005-003
2942 OAK GLEN ROAD
GLENDALE, CALIFORNIA
FOR RIBEYE MANAGEMENT, LLC
BYER GEOTECHNICAL, INC., PROJECT NUMBER BG 22288
NOVEMBER 23, 2015

INTRODUCTION

This report has been prepared per our signed Agreement and summarizes findings of Byer Geotechnical, Inc., 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 construction and grading for the three proposed residences and extension of Oak Glen Road. This report is intended to assist in the design and completion of the proposed project and to reduce geotechnical risks that may affect the project. The professional opinions and advice presented in this report are based upon commonly accepted exploration standards and are subject to the AGREEMENT with TERMS AND CONDITIONS, and the GENERAL CONDITIONS AND NOTICE section of this report. No warranty is expressed or implied by the issuing of this report.

PROPOSED PROJECT

The scope of the proposed project was determined from the preliminary plans provided by Malekian and Associates. The project consists of grading and development associated with the subdivision of the property into four lots with new residences being constructed on three of the (southern) lots and an existing residence to remain on the fourth (north) lot. In addition, Oak Glen Road will be extended to a new cul-de-sac. The existing residence on the southernmost proposed lot will be removed. Retaining walls up to 32 feet high are planned to support excavations for the proposed residences. Grading will consist of cut-and-fill operations during grading for the proposed residences and extension of Oak Glen Road. Access will be provided by driveways from Oak Glen Road.

EXPLORATION

The scope of the field exploration was determined from our initial site visit and consultation with Malekian and Associates. The undatedpreliminary plans provided by Malekian and Associates were a guide to our 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. The scope of this exploration did not include an assessment of general site environmental conditions for the presence of contaminants in the earth materials and groundwater. Conditions affecting portions of the property outside the area explored are beyond the scope of this report.

Exploration was conducted on September 30, 2015, with the aid of a truck-mounted hollow-stem-auger drill rig and backhoe. It included excavating four test pits and drilling three borings to depths of 6 to 25 feet. Samples of the earth materials were obtained and delivered to our soils engineering laboratory for testing and analysis. The test pits and boring tailings were visually logged by the project consultant. The borings and test pits were backfilled and tamped.

Office tasks included laboratory testing of selected soil samples, review of published maps and photos for the area, review of our files, preparation of cross sections, preparation of the Geologic Map, slope stability calculations, engineering analysis, and preparation of this report. Earth materials exposed in the test pits and borings are described on the enclosed Log of Test Pits and Log of Borings. Appendix I contains a discussion of the laboratory testing procedures and results.

The proposed project, surface geologic conditions, and the locations of the test pits and borings are shown on the enclosed Geologic Map. Subsurface distribution of the earth materials, projected geologic structure, and the proposed project are shown on Sections A through E. Section A forms the basis for the slope stability calculations.

SITE DESCRIPTION

The subject property consists of a six-acre irregularly-shaped and partially-graded hillside parcel on the west flank of the San Rafael Hills, in the city of Glendale, California (34.1906° N Latitude, 118.2250° W Longitude). It is located on the east side of Oak Glen Road, north of the intersection with Lockwood Road. The site is developed with two single-family residences in the northwest and southwest portions of the site. The surrounding area has been developed with scattered single-family residences. The north residence is accessed via a paved driveway that ascends approximately 20 feet from the north end of Oak Glen Road to a level area occupied by the two-story residence and attached garage. The south residence is accessed via a paved driveway along the south property line. The area to the east of Oak Glen Road is relatively level, with natural slopes ascending to the east of the level area. Natural slopes to the east of the level area ascend approximately 70 to 200 feet at gradients ranging from 1.3:1 to 4:1.

Past grading on the site has consisted of minor cut-and-fill operations during grading for Oak Glen Road and the level pad areas occupied by the existing two residences.

Vegetation on the site consists of scattered grasses and trees on the level area and a moderately-thick assemblage of native chaparral on slopes to the east. Surface drainage is by sheetflow runoff down the contours of the land to the west to Oak Glen Road. Roof drainage from the existing residences is collected and transferred to the pads via rain gutters and downspouts.

GROUNDWATER

Groundwater was not encountered in the borings and test pits explored to a depth of 25 feet. Seasonal fluctuations in groundwater levels occur due to variations in climate, irrigation, development, and other factors not evident at the time of the exploration. Groundwater levels may also differ across the site. Groundwater can saturate earth materials causing subsidence or instability of slopes.

EARTH MATERIALS

Fill

Fill, associated with previous site grading, underlies the west portion of the site to a maximum observed depth of two feet in the borings. Greater depths of fill may occur locally. The fill consists of silty sand that is grayish-brown, slightly moist, and medium dense, with some gravel.

Soil

Natural residual soil blankets the slopes in the east portion of the site. The soil consists of silty sand that is brown, slightly moist, medium dense, porous with roots up to one-half of an inch in diameter. The soil layer observed is on the order of one to two feet thick.

Alluvium

Natural alluvium underlies the west portion of the site. The alluvium is 17 to 20 feet thick in the vicinity of the borings and is anticipated to thicken toward the west. The alluvium consists of silty sand that is grayish-brown, brown, and tan, moist to slightly moist, and medium dense to very dense.

Bedrock

Bedrock underlying the site and encountered in the borings and test pits consists of gneiss as mapped on the Geologic Map of the Pasadena Quadrangle (Dibblee, Jr., 1989). The bedrock is light gray to dark gray, tan, light brown, moderately hard to hard.

GEOLOGIC STRUCTURE

The bedrock described above is common to this area of the San Rafael Hills and the geologic structure is consistent with regional trends. Foliation mapped near the site strikes generally north-south and dips moderately to the east. The bedrock is generally massive and lacks significant structural planes. The massive nature of the bedrock is favorable for the gross stability of the site and proposed project.

GENERAL SEISMIC CONSIDERATIONS

The subject property is located in an active seismic region. Moderate to strong earthquakes can occur on numerous local faults. The United States Geological Survey, California Geological Survey (CGS), private consultants, and universities have been studying earthquakes in southern California for several decades. Early studies were directed toward earthquake prediction and estimation of the effects of strong ground shaking. Studies indicate that earthquake prediction is not practical and not sufficiently accurate to benefit the general public. Governmental agencies now require earthquake-

resistant structures. The purpose of the code seismic-design parameters is to prevent collapse during strong ground shaking. Cosmetic damage should be expected.

Southern California faults are classified as "active" or "potentially active." Faults from past geologic periods of mountain building that do not display evidence of recent offset are considered "potentially active." Faults that have historically produced earthquakes or show evidence of movement within the past 11,000 years are known as "active faults." No known active faults cross the subject property, and the property is not located within a currently-designated Alquist-Priolo Earthquake Fault Zone (CGS, 2000)

The following table lists the applicable seismic coefficients for the project based on the California Building Code:

SEISMIC COEFFICIENTS (2013 California Building Code - Based on ASCE Standard 7-10)		
Latitude = 34.1906° N Longitude = 118.2250° W	Short Period (0.2s)	One-Second Period
Earth Materials and Site Class from Table 20.3-1, ASCE Standard 7-10	Alluvium - D	
Mapped Spectral Accelerations from Figures 1613.3.1 (1) and 1613.3.1 (2) and USGS	S_s = 2.753 (g)	S_1 = 0.964 (g)
Site Coefficients from Tables 1613.3.3 (1) and 1613.3.3 (2) and USGS	F_A = 1.00	F_V = 1.50
Maximum Considered Spectral Response Accelerations from Equations 16-37 and 16-38, 2013 CBC	S_{MS} = 2.753 (g)	S_{M1} = 1.446 (g)
Design Spectral Response Accelerations from Equations 16-39 and 16-40, 2013 CBC	S_{DS} = 1.835 (g)	S_{D1} = 0.964 (g)
Maximum Considered Earthquake Geometric Mean (MCE_G) Peak Ground Acceleration, adjusted for Site Class effects	PGA_M = 1.011 (g)	

Reference: U.S. Geological Survey, **Geologic Hazards Science Center, U. S. Seismic Design Maps,** http://earthquake.usgs.gov/designmaps/us/application.php

The Risk Category for a residence is II. The mapped spectral response acceleration parameter for the site for a 1-second period (S_1) is greater than to 0.75g. Therefore, the project is considered to be in Seismic Design Category E.

The principal seismic hazard to the proposed project is strong ground shaking from earthquakes produced by local faults. Modern buildings are designed to resist ground shaking through the use of shear panels, moment frames, and reinforcement. Additional precautions may be taken, including strapping water heaters and securing furniture to walls and floors. It is likely that the subject property will be shaken by future earthquakes produced in southern California.

Ground Motion

To determine the ground motion for the project site, a probabilistic seismic deaggregation analysis was performed, using the USGS 2008 Interactive Deaggregation application available online (http://geohazards.usgs.gov/deaggint/2008/) for a 10 percent probability of exceedance in 50 years (475-year return period), and using a shear-wave velocity estimate of 330 meters per second (Site Class D). The results are shown on the enclosed PSH Deaggregation Chart. The analysis indicates a peak ground acceleration (PGA) of 0.591g, a modal earthquake magnitude (M_w) of 6.6, and a modal fault distance of 5.4 kilometers.

Pseudo-static seismic coefficients (k_h) were derived according to the screening procedure described in Blake and others (2002) and referenced in SP117A, pages 28 - 31, using the seismically-induced ground motion parameters derived above. For a tolerable slope displacement of 5 centimeters (2 inches), the seismicity factor (f_{eq}) is equal to 0.47g and the horizontal pseudo-static seismic coefficient (K_h) is equal to 0.28g.

SLOPE STABILITY

Gross Stability

The CGS has not designated the property within a state zone requiring seismic landslide investigation per Public Resources Code, Section 2693 (c).

Slopes analyzed for stability include include a 200-foot-high, 2:1 to 1.3:1 natural slope. The gross stability of the slope was analyzed using a computerized version of Simplified Bishop method (*Slide 6.0*, Rocscience).

The analysis shows that the existing slopes are grossly stable with a factor of safety in excess of 1.5. The calculations use the shear tests of samples believed to be representative of the strength of the bedrock encountered during exploration. The slope angles, cross section, and geologic structure used are the most critical for the slopes analyzed.

Surficial Stability

Based upon the enclosed calculations, it is reasonable to assume that the natural residual soil is surficially stable. The method of analysis used is the "parallel seepage model" recommended by the American Society of Civil Engineers and the Building and Safety Advisory Committee (August 16, 1978). The assumptions of this method are: a uniform planar slope; uniform soil density and shear strength; and uniform seepage parallel to the slope. The validity of the analysis depends, in part, on how closely the assumptions model the field conditions.

CONCLUSIONS AND RECOMMENDATIONS

General Findings

The conclusions and recommendations of this exploration are based upon review of the preliminary plans, review of published maps, three borings, four test pits, field geologic mapping, research of available records, laboratory testing, engineering analysis, and years of experience performing similar studies on similar sites. It is the finding of Byer Geotechnical, Inc., that development 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 is bedrock and future compacted fill. A combination of conventional and deepened foundations may be used to support the proposed residences. Soils to be exposed at finished grade are expected to exhibit a very low expansion potential. The upper 10 to 12 feet of alluvium is soft and prone to consolidation upon saturation and loading. This upper portion of the alluvium can be removed and replaced as certified compacted fill for support of future structures. As an alternative to removal and recompaction of the alluvium under the west portion of the southern two proposed residences, the residences may be supported on cast-in-place concrete friction piles supported in the bedrock.

SITE PREPARATION - REMOVALS

Remedial grading may be used to improve site conditions. The upper 10 to 12 feet of alluvium may be removed and replaced as certified compacted fill. The following general grading specifications may be used in preparation of the grading plan and job specifications. Byer 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 area to receive compacted fill should be prepared by removing all vegetation, debris, existing fill and 10 to 12 feet of alluvium. The exposed excavated area should be observed by the soils engineer/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 dry density.

B. Fill, consisting of soil approved by the soils engineer, shall be placed in horizontal lifts, moistened as required, 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 moisture content of the fill should be near the optimum moisture content. When the moisture content of the fill is too wet or dry, the fill shall be moisture conditioned and mixed until the proper moisture is attained.

D. The fill shall be compacted to at least 90 percent of the maximum laboratory dry density for the material used. The maximum dry density shall be determined by ASTM D 1557-12 or equivalent.

E. 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 relative compaction is obtained. A minimum of one compaction test is required for each 500 cubic yards or two vertical feet of fill placed.

F. Shrinkage of the alluvium upon recompaction should be on the order of 10 to 15 percent.

Cut Slopes

Cut slopes in the bedrock may be excavated at a 1½1:1 gradient up to 20 feet high.

Excavation Characteristics

The bedrock was penetrated by the borings to five feet. The bedrock generally becomes harder and more difficult to excavate with increasing depth. Hard layers are also known to occur at random

locations and depths and may be encountered during foundation excavation or grading. Should a hard layer be encountered, coring or the use of jackhammers may be necessary.

FOUNDATION DESIGN

Spread Footings

Continuous and/or pad footings may be used to support the proposed residences, provided they are founded in bedrock or future compacted fill. 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 design parameters.

Bearing Material	Minimum Embedment Depth of Footing (Inches)	Vertical Bearing (psf)	Coefficient of Friction	Passive Earth Pressure (pcf)	Maximum Earth Pressure (psf)
Future Compacted Fill	18	2,000	0.40	250	4,000
Bedrock	12	4,000	0.50	500	6,000

Increases in the bearing value are allowable for the future compacted fill at a rate of 400 pounds-per-square-foot for each additional foot of footing width or depth to a maximum of 4,000 pounds-per-square-foot. Increases in the bearing value are allowable for the bedrock 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 values shown above are 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. When combining passive and friction for lateral resistance, the passive component should be reduced by one-third.

All continuous footings should 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 or geotechnical engineer prior to placing forms, steel, or concrete.

Deepened Foundations - Friction Piles

As an alternative to removing and recompacteing the alluvium, cast-in-place concrete friction piles may be used to support the proposed west portion of the proposed residences on the two southern lots (see Sections D and E). Piles should be a minimum of 24 inches in diameter and a minimum of eight feet into bedrock. Piles may be assumed fixed at three feet into bedrock. The piles may be designed for a skin friction of 700 pounds-per-square-foot for that portion of pile in contact with the bedrock. The structural engineer may design piles that are deeper or larger in diameter depending on final loads. All piles should be tied in two horizontal directions with grade beams.

Foundation Settlement

Settlement of the foundation system is expected to occur on initial application of loading. A total settlement of one-fourth to one-half of an inch may be anticipated. Differential settlement should not exceed one-fourth of an inch.

Toe of Slope Clearance

The building code requires a level rear-yard setback, between the toe of an ascending slope steeper than 3:1 and the proposed structure, of one-half the slope height to a maximum 15-foot clearance.

For retained slopes, the face of the retaining wall is considered the toe of the slope. For a swimming pool, the setback is one-fourth the slope height to a maximum 7.5.

RETAINING WALLS

General Design

Retaining walls up to 32 feet high with a level backslope may be designed for an active equivalent fluid pressure of 43 pounds-per-cubic-foot (see Section B, Wall Calculations). Retaining walls should be provided with a subdrain or weepholes covered with a minimum of 12 inches of ¾-inch crushed gravel.

For design of walls in hillside areas, the temporary backcut should be considered in the wall height. Backfilling a 1:1 temporary cut at 2:1, when the original slope is steeper than 2:1, results in a higher wall. The topographic survey data should be checked to avoid the need for a costly redesign during construction.

Backfill

Retaining wall backfill should be compacted to a minimum of 90 percent of the maximum dry density as determined by ASTM D 1557-12, or equivalent. 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 two 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 two feet of backfill above the gravel should consist of a compacted-fill blanket to the surface. Restrained walls should not be backfilled until the restraining system is in place.

Foundation Design

Retaining wall footings may be sized per the"Spread Footings" section of this report.

Freeboard

Retaining walls surcharged by a sloping condition should be provided with a minimum of 18 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.

TEMPORARY EXCAVATIONS

Temporary excavations will be required during grading to construct the proposed retaining walls. The excavations will be up to 32 feet in height and will expose soil over bedrock. The soil should be trimmed to 1:1 for wall excavations. The bedrock is capable of maintaining vertical excavations up to 10 feet per the enclosed calculations. Where vertical excavations in the bedrock exceed 10 feet in height, the upper portion should be trimmed to 1:1 (45 degrees).

Vertical excavations higher than 10 feet that cannot be trimmed will require the use of temporary shoring using soldier piles. Design values can be found in the "Soldier Piles" design section below.

The geologist should be present during grading to see temporary slopes. All excavations should be stabilized within 30 days of initial excavation. Water should not be allowed to pond on top of the excavations nor to flow toward them. No vehicular surcharge should be allowed within three feet of the top of the cut.

Soldier Piles

Drilled, cast-in-place concrete soldier piles may be utilized to support excavations for the proposed residences (see Sections B - E). The piles should be a minimum of 24 inches in diameter and a minimum of eight feet into bedrock below the lowest future grade. Piles may be assumed fixed at three feet into bedrock below the lowest future grade. The piles may be designed for a skin friction of 700 pounds-per-square-foot for that portion of pile in contact with the bedrock. Piles should be spaced a maximum of eight feet on center. Based upon the enclosed calculations, the piles may be designed for an active equivalent fluid pressure of 30 pounds per cubic foot. The equivalent fluid pressure should be multiplied by the pile spacing. The piles may be included in the permanent retaining wall.

Lagging

Continuous lagging is anticipated between the soldier piles. The soldier piles and anchors should be designed for the full anticipated lateral pressure. However, the pressure on the lagging will be less due to arching in the soils. Lagging should be designed for the recommended earth pressure, but may be limited to a maximum value of 400 pounds-per-square-foot. The space behind lagging should be backfilled with cement slurry.

Lateral Design

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.

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.

FLOOR SLABS

Floor slabs should be cast over approved compacted fill and reinforced with a minimum of #4 bars on 16-inch centers, each way. For deepened foundations, the slabs should be designed to bridge between the piles and grade beams.

Slabs that will be provided with a floor covering should be protected by a polyethylene plastic vapor barrier. The barrier should be sandwiched between the layers of sand, about two inches each, to prevent punctures and aid in the concrete cure. A low-slump concrete may be used to minimize possible curling of the slab. The concrete should be allowed to cure properly before placing vinyl or other moisture-sensitive floor covering.

It should be noted that cracking of concrete slabs is common. The cracking occurs because concrete shrinks as it cures. 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 performance of the slab. 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.

EXTERIOR CONCRETE DECKS

Decking should be cast over approved compacted fill and reinforced with a minimum of #3 bars placed 18 inches on center, each way. 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. The subgrade should be moistened prior to placing concrete.

PAVING

Prior to placing paving, the existing fill and upper five feet of alluvium should be removed, 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.

For rigid concrete pavement, four inches of concrete with four inches of aggregate base can be used. Concrete should be reinforced for heavy load application.

The Class II aggregate base and top one foot of subgrade should be compacted to a minimum of 95 percent of maximum dry density. Crushed aggregate base should meet the requirements of "Greenbook" (Standard Specification for Public Works Construction) Section 200-2.2.

The following table shows the recommended pavement sections:

Service	Pavement Thickness (Inches)	Base Course (Inches)
Light Passenger Cars and Moderate Trucks	3	4

DRAINAGE

Control of site drainage is important for the performance of the proposed project. Roof gutters are recommended. Pad and roof drainage should be collected and transferred to the street 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.

Irrigation

Control of irrigation water is a necessary part of site maintenance. Soggy ground and perched water may result if irrigation water is excessively applied. Irrigation systems should be adjusted to provide the minimum water needed. Adjustments should be made for changes in climate and rainfall.

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. Landscape 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 Byer Geotechnical. Any change in scope of the project may require additional work.

SITE OBSERVATIONS DURING CONSTRUCTION

The building department requires that the geotechnical engineer provide site observations during grading and construction. Foundation excavations should be observed and approved by the geotechnical engineer or geologist prior to placing steel, forms, or concrete. The engineer/geologist should observe bottoms for fill, compaction of fill, temporary excavations, shoring, permanent cut slopes, and subdrains. All fill that is placed should be approved by the geotechnical engineer and the building department prior to use for support of structural footings and floor slabs.

Please advise Byer Geotechnical, Inc., at least 24 hours prior to any required site visit. The building department stamped plans, the permits, and the geotechnical reports should be at the job site and available to our representative. The project consultant will perform the observation and post a notice at the job site with the findings. This notice should be given to the agency inspector.

FINAL REPORTS

The geotechnical engineer will prepare interim and final compaction reports upon request. The geologist will prepare reports summarizing pile excavations.

CONSTRUCTION SITE MAINTENANCE

It is the responsibility of the contractor to maintain a safe construction site. The area should be fenced and warning signs posted. All excavations must be covered and secured. Soil generated by foundation excavations should be either removed from the site or placed as compacted fill. Soil should not be spilled over any descending slope. Workers should not be allowed to enter any unshored trench excavations over five feet deep. Water shall not be allowed to saturate open footing trenches.

GENERAL CONDITIONS AND NOTICE

This report and the exploration are subject to the following conditions. Please read this section carefully; it limits our liability.

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 Byer Geotechnical, Inc., and the conclusions and recommendations are modified or reaffirmed after such review.

The subsurface conditions, excavation characteristics, and geologic structure described herein have been projected from test excavations on the site and may not reflect any variations that occur between these test 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, and recommendations 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, issued and made for the sole use and benefit of the client, is not transferable. Any liability in connection herewith shall not exceed the Phase I fee for the exploration and report or a negotiated fee per the Agreement. No warranty is expressed, implied, or intended in connection with the exploration performed or by the furnishing of this report.

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

Byer 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,
BYER GEOTECHNICAL, INC.

James E. Tucker
Project Geologist

Raffi S. Babayan
P. E. 72168

John W. Byer
E. G. 883

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Enc: List of References
Appendix I - Laboratory Testing, Log of Test Pits, and Log of Borings
Laboratory Testing
Shear Diagrams (3 Pages)
Consolidation Diagrams (3 Pages)
Log of Test Pits
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Appendix II - Calculations and Figures
PSH Deaggregation Chart
Slope Stability Calculation Sheets (6 Pages)
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Soldier Pile Calculation Sheet
Temporary Excavation Calculation Sheet
Surficial Stability Calculation Sheet
Aerial Vicinity Map
Regional Topographic Map
Regional Geologic Map
Regional Fault Map
Seismic Hazard Zones Map
Sections A - E (5 Sheets)

In Pocket: Geologic Map

xc: (4) Addressee (E-mail and Mail)

REFERENCES

California Building Standards Commission (2013), **2013 California Building Code,** Based on the 2012 International Building Code (IBC), Title 24, Part 2, Vol. 1 and 2.

California Department of Conservation (1999), **State of California, Seismic Hazard Zones, Pasadena Quadrangle**, Official Map, Division of Mines and Geology.

California Department of Conservation (1998), **Seismic Hazard Zone Report 014, Seismic Hazard Zone Report for the Pasadena 7.5-Minute Quadrangle, Los Angeles County, California**.

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California Geological Survey (Formerly California Division of Mines and Geology), 2000, **Digital Images of Official Maps of Alquist-Priolo Earthquake Fault Zones, Southern Region,** DMG CD 2000-003.

Dibblee, T. W. (1989), **Geologic Map of the Pasadena Quadrangle, Los Angeles County, California**, 1:24,000 scale, Dibblee Foundation, Santa Barbara, California, Map DF-23.

Jennings, C. W., and Bryant, W. A. (2010), **Fault Activity Map of California**, California Geological Survey, 150th Anniversary, Map No. 6.

U.S. Geological Survey, **Geologic Hazards Science Center, U. S. Seismic Design Maps,** http://earthquake.usgs.gov/designmaps/us/application.php.

Software

Slide 6.0, Rocscience, Inc., 2010.

November 23, 2015
BG 22288

APPENDIX I

Laboratory Testing, Log of Test Pits, and Log of Borings

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LABORATORY TESTING

Undisturbed and bulk samples of the soil, alluvium, and bedrock were obtained from the test pits and borings and transported to the laboratory for testing and analysis. The samples were obtained by driving a ring-lined, barrel sampler conforming to ASTM D 3550-01 with successive drops of the sampler. Experience has shown that sampling causes some disturbance of the sample. However, the test results remain within a reasonable range. The samples were retained in brass rings of 2.50 inches outside diameter and 1.00 inches in height. The samples were stored in close fitting, waterproof containers for transportation to the laboratory.

Moisture-Density

The dry density of the samples was determined using the procedures outlined in ASTM D 2937-10. The moisture content of the samples was determined using the procedures outlined in ASTM D 2216-10. The results are shown on the enclosed Log of Test Pits and Log of Borings.

Maximum Density

The maximum dry density and optimum moisture content of the future compacted fill were determined using the procedures outlined in ASTM D 1557-12, a five-layer standard. Remolded samples were prepared at 90 percent of the maximum density. The remolded samples were tested for shear strength.

Boring	Depth (Feet)	Color and Soil Type	Maximum Density (pcf)	Optimum Moisture %	Expansion Index
1	2	Brown Silty Sand	130.0	10.0	Nil

Shear Tests

Shear tests were performed on samples of future compacted fill, soil, and bedrock using the procedures outlined in ASTM D 3080-11 and a strain controlled, direct-shear machine manufactured by Soil Test, Inc. The rate of deformation was 0.025 inches per minute. The samples were tested in an artificially saturated condition. Following the shear test, the moisture content of the samples was determined to verify saturation. The results are plotted on the enclosed Shear Diagrams.

Consolidation

Consolidation tests were performed on *in situ* samples of the alluvium using the procedures outlined in ASTM D 2435-11. Results are graphed on the enclosed Consolidation Diagrams.

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SHEAR DIAGRAM #1

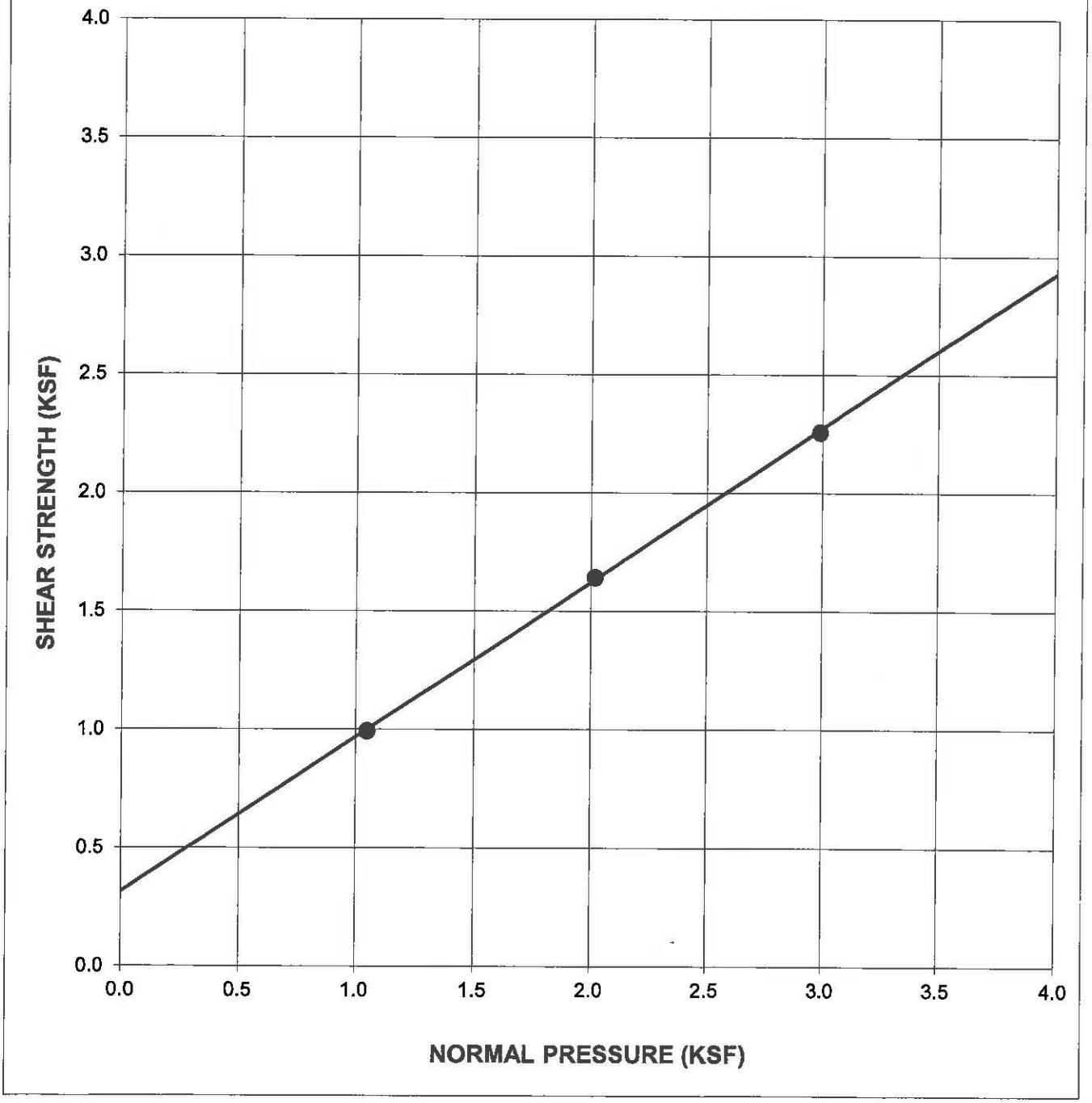
BG: 22288 CONSULTANT: JET
CLIENT: RIBEYE MANAGEMENT

EARTH MATERIAL: FUTURE FILL

SAMPLES REMOLDED TO 90% OF THE MAXIMUM DENSITY

			B1-5'
Phi Angle =	33 degrees	Moisture Content	14.9%
Cohesion =	310 psf	Dry Density (pcf)	117.0
		Percent Saturation	95.5%

DIRECT SHEAR TEST - ASTM D-3080 (ULTIMATE VALUES)



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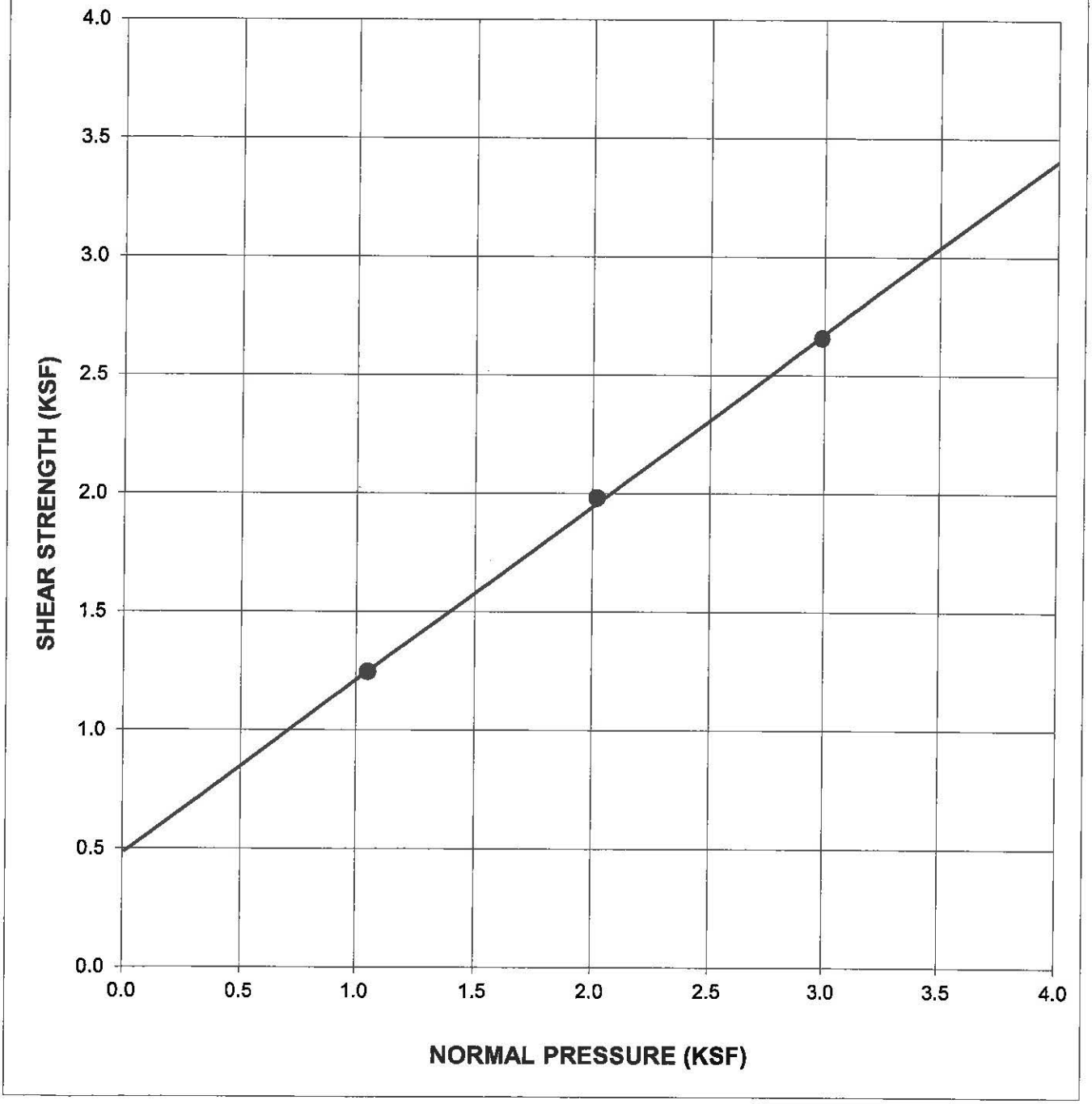
SHEAR DIAGRAM #2

BG: 22288 CONSULTANT: JET
CLIENT: RIBEYE MANAGEMENT

EARTH MATERIAL: BEDROCK

			B3-25'
Phi Angle =	36 degrees	Moisture Content	15.8%
Cohesion =	485 psf	Dry Density (pcf)	115.0
		Percent Saturation	95.6%

DIRECT SHEAR TEST - ASTM D-3080 (ULTIMATE VALUES)



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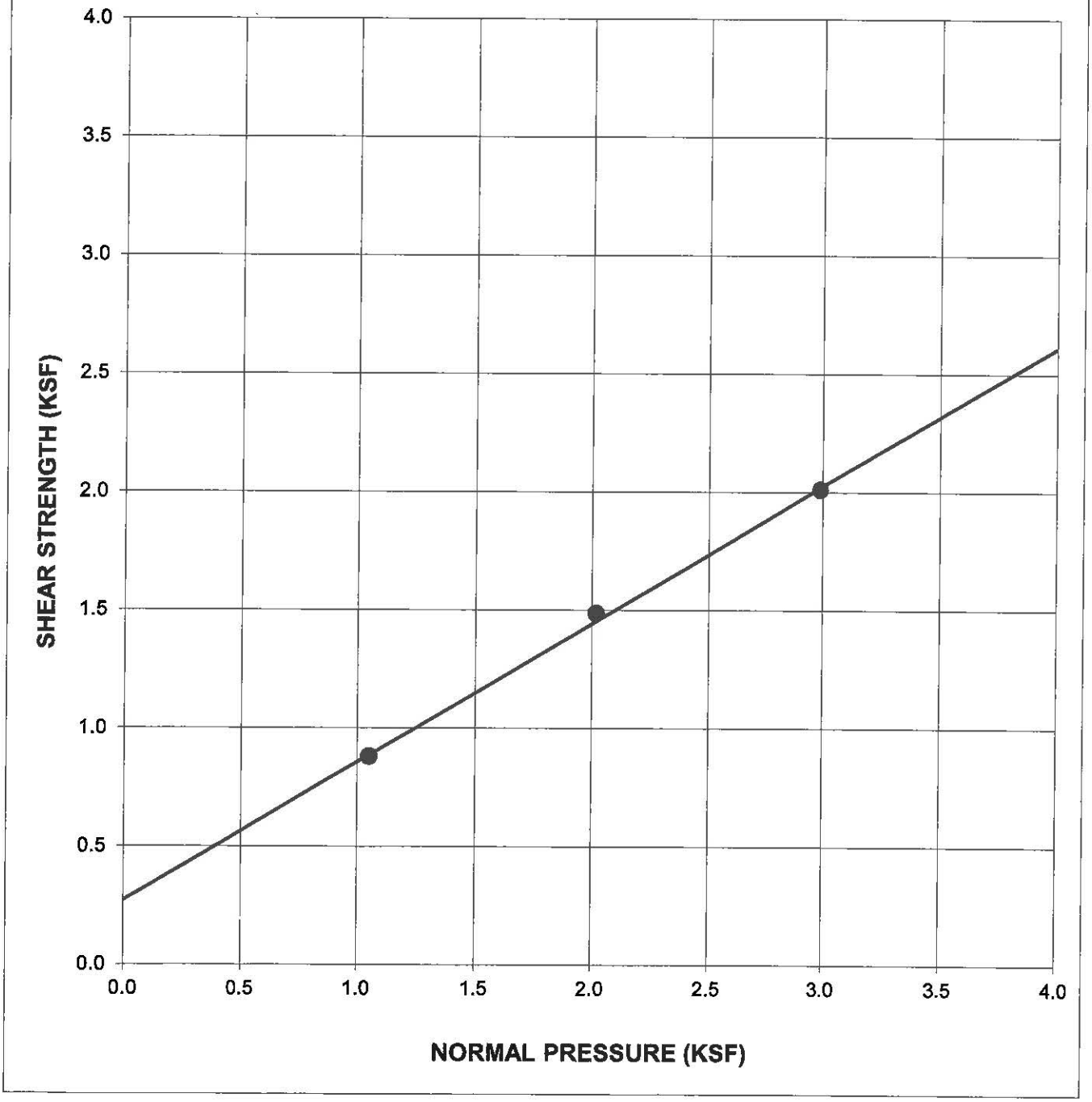
SHEAR DIAGRAM #3

BG: 22288 CONSULTANT: JET
CLIENT: RIBEYE MANAGEMENT

EARTH MATERIAL: SOIL

			TP2-1'
Phi Angle =	30 degrees	Moisture Content	24.5%
Cohesion =	270 psf	Dry Density (pcf)	98.5
		Percent Saturation	95.6%

DIRECT SHEAR TEST - ASTM D-3080 (RESIDUAL VALUES)



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GLENDALE, CA 91206
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818.543.3747 FAX

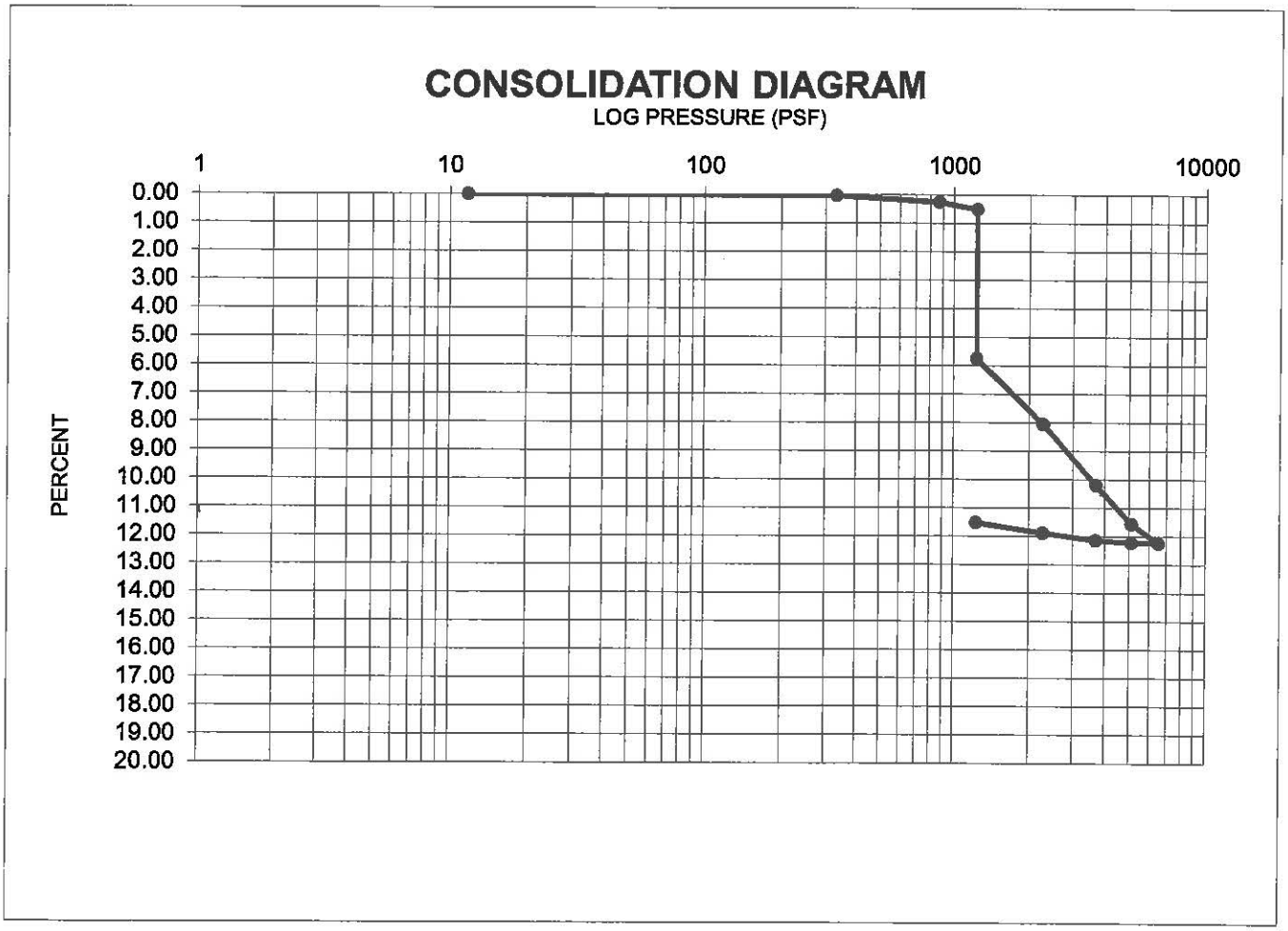
CONSOLIDATION DIAGRAM #1

BG: 22288 CONSULTANT: JET

CLIENT: RIBEYE MANAGEMENT

Earth Material:	ALLUVIUM
Sample Location:	B1-7'
Dry Weight (pcf):	102.0
Initial Moisture:	4.6%
Initial Saturation:	19.6%
Water Added at (psf)	1237

Specific Gravity:	2.65
Initial Void Ratio:	0.62
Compression Index (Cc):	0.165
Recompression Index (Cr):	0.023



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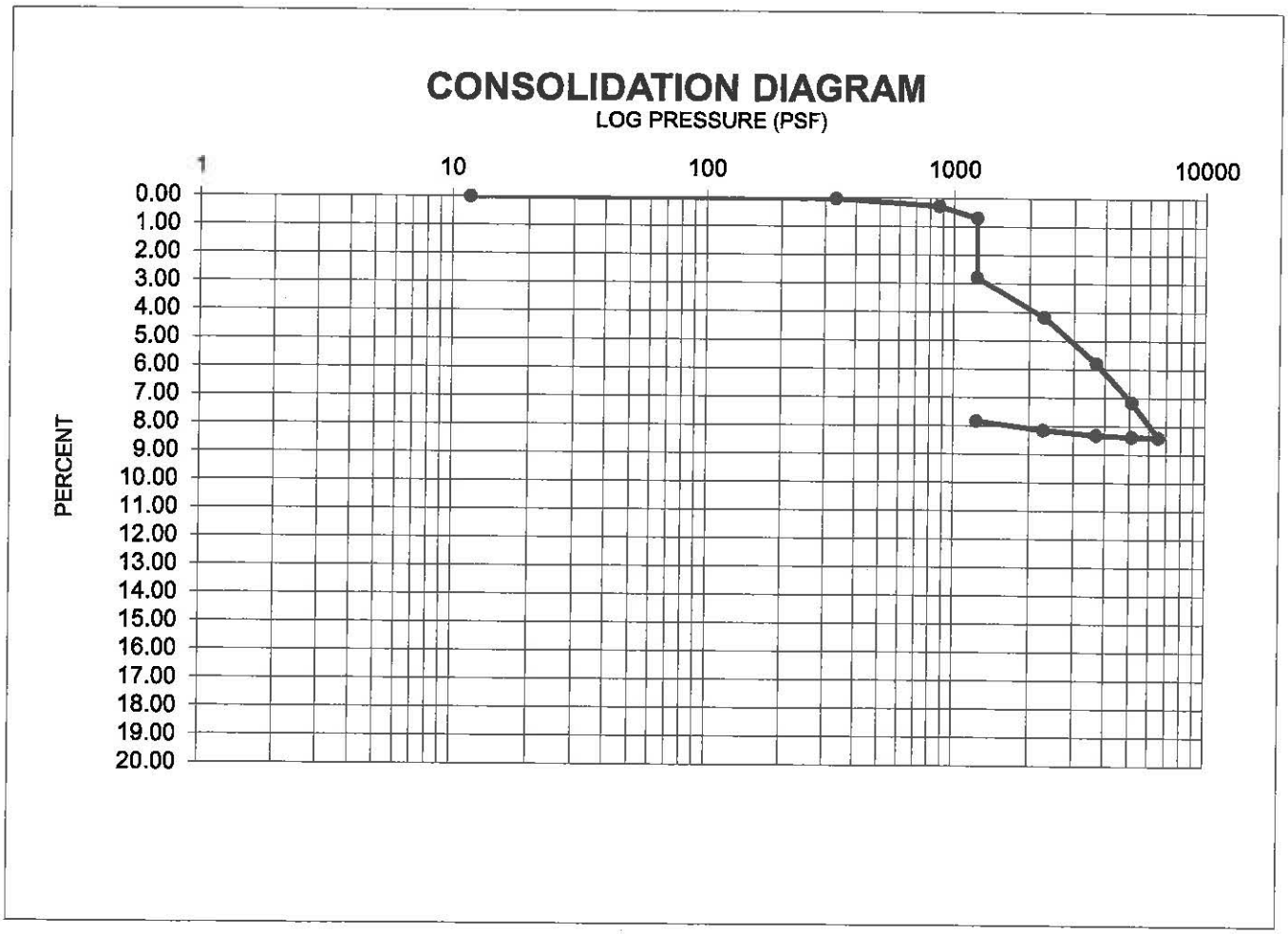
CONSOLIDATION DIAGRAM #2

BG: 22288 CONSULTANT: JET

CLIENT: RIBEYE MANAGEMENT

Earth Material:	ALLUVIUM
Sample Location:	B3-7'
Dry Weight (pcf):	108.9
Initial Moisture:	7.7%
Initial Saturation:	39.4%
Water Added at (psf)	1237

Specific Gravity:	2.65
Initial Void Ratio:	0.52
Compression Index (Cc):	0.175
Recompression Index (Cr):	0.018



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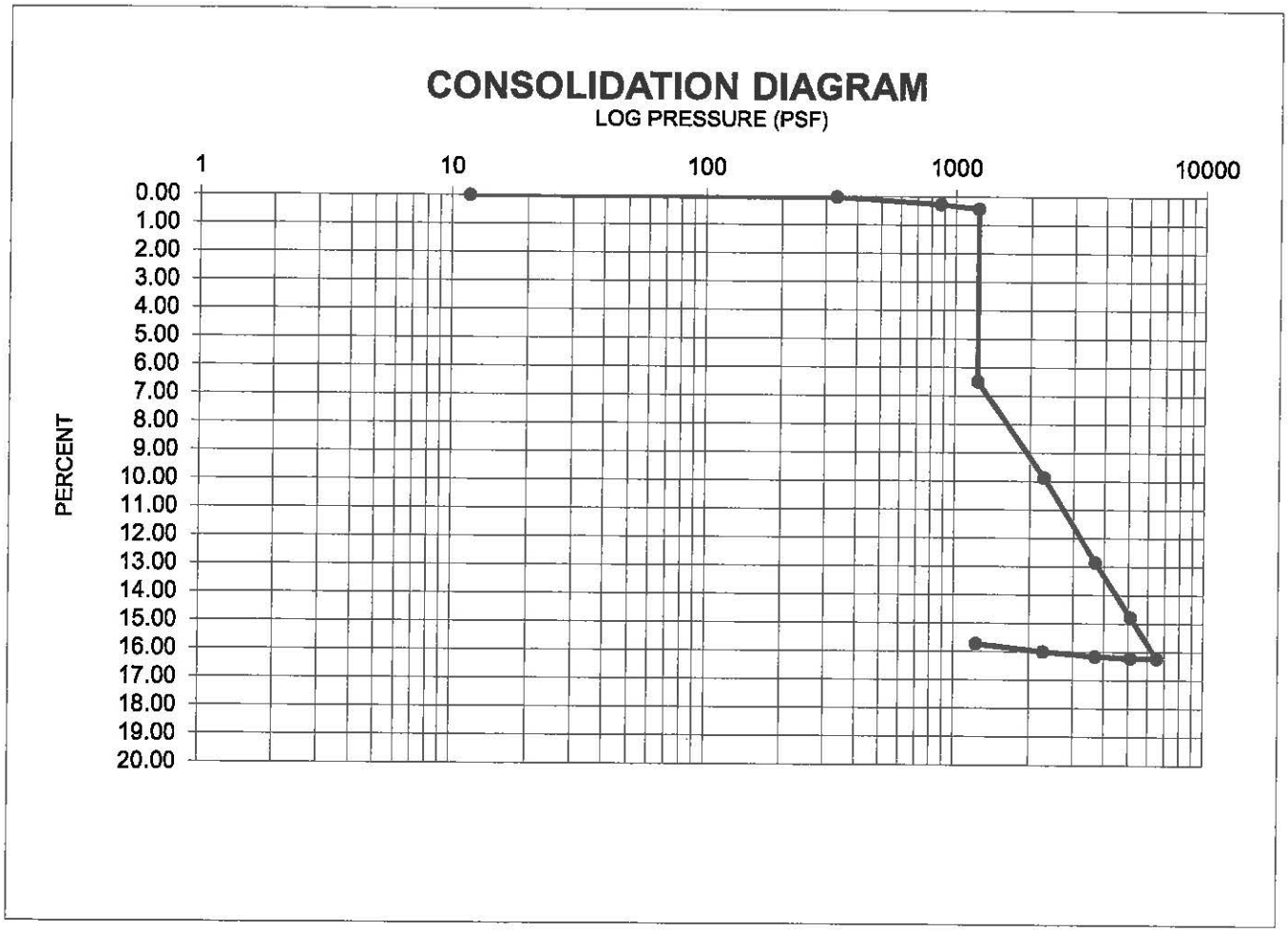
CONSOLIDATION DIAGRAM #3

BG: 22288 CONSULTANT: JET

CLIENT: RIBEYE MANAGEMENT

Earth Material:	ALLUVIUM
Sample Location:	B1-10'
Dry Weight (pcf):	101.2
Initial Moisture:	4.1%
Initial Saturation:	17.2%
Water Added at (psf)	1237

Specific Gravity:	2.65
Initial Void Ratio:	0.63
Compression Index (Cc):	0.232
Recompression Index (Cr):	0.017



BYER GEOTECHNICAL INC.
1461 E. CHEVY CHASE DRIVE, SUITE 200, GLENDALE, CA 91206
tel 818.549.9959 fax 818.543.3747

LOG OF TEST PITS

CLIENT: RIBEYE MANAGEMENT, LLC

GEOLOGIST: JET BG: 22288

REPORT DATE: 11/23/15 DATE LOGGED: 9/30/15

SAMPLE DEPTH (feet)	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	DEPTH INTERVAL (feet)	EARTH MATERIAL	LITHOLOGIC DESCRIPTION
TEST PIT #1			Surface Conditions: Slope		
			0 - 2	**FILL:**	Silty SAND (SM), brown, slightly moist, medium dense, porous, roots to ¼"
5	2.2	115.0	2 - 6	**BEDROCK:**	Gneiss, tan, light brown, gray, moderately hard, upper 1' weathered
					at 4 feet: white, tan, light gray, moderately hard to hard
End at 6 Feet; No Water; No Caving; No Fill.					
TEST PIT #2			Surface Conditions: Slope		
1	4.7	98.5	0 - 2	**FILL:**	Silty SAND (SM), brown, slightly moist, medium dense, porous, roots to ⅛"
			2 - 6	**BEDROCK:**	Gneiss, tan, light brown, gray, moderately hard, weathered
					at 4 feet: tan, light gray, gray, white, moderately hard to hard
End at 6 Feet; No Water; No Caving; No Fill.					
TEST PIT #3			Surface Conditions: Slope		
				SOIL:	Silty SAND (SM), brown, slightly moist, medium dense, roots to ½"
				BEDROCK:	Gneiss, tan, light gray, moderately hard, moderately weathered
End at 5½ Feet; No Water; No Caving; No Fill.					
TEST PIT #4			Surface Conditions: Slope		
			0 - 1	**SOIL:**	Silty SAND (SM), brown, slightly moist, medium dense, rootlets to ⅛"
			1 - 6	**BEDROCK:**	Gneiss, tan, light brown, soft to moderately hard, weathered
					at 2½ feet: tan, gray, brown, moderately hard
					at 5 feet: moderately hard to hard
End at 6 Feet; No Water; No Caving; No Fill.					

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.

BYER GEOTECHNICAL, INC.

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LOG OF BORING B1

BG No. 22288

PAGE 1 OF 1

CLIENT Ribeye Management, LLC **REPORT DATE** 11/23/15 **DRILL DATE** 9/30/15

PROJECT LOCATION 2942 Oak Glen Road **LOGGED BY** JET

CONTRACTOR Martini Drilling **DRILLING METHOD** Hollow-Stem Auger **HOLE SIZE** 8-inch diameter

DRIVE WEIGHT 140-Pound Automatic Hammer **HAMMER DROP** 30 Inches **ELEV. TOP OF HOLE**

ELEVATION (ft)	DEPTH (ft)	EARTH MATERIAL DESCRIPTION	GRAPHIC SYMBOL	USCS UNIT	SAMPLE TYPE & NUMBER	BLOW COUNT (Per 6 Inches)	MOISTURE CONTENT (%)	DRY UNIT WT. (pcf)	SATURATION (%)	TYPE OF TEST
	0	Surface: Level ground								
		(SM) **FILL:** Silty SAND, grayish-brown, slightly moist, medium dense		SM						
		(SM) **ALLUVIUM:** 2': Silty SAND, grayish-brown, slightly moist, medium dense		SM		16	3.7	104.1		
	5	(SM) 5.5': light brown, medium dense to dense		SM		14	4.2	97.4		Max, Remolded Shear
						16	4.6	102.1		Consolidation
	10					19	4.1	101.3		Consolidation
		(SM) 14': dense to very dense		SM						
	15					44	7.8	115.9		
		BEDROCK: 17': Gneiss, gray, light gray, tan, moderately hard								
	20					50	6.1	109		

End at 20 Feet; No Water; No Caving; Fill to 2 Feet.

Ring Sample

BORING LOG BYER BY RSB - GINT STD US BYER.GDT - 11/23/15 11:41 - P:\22000 - 22999\22288 RIBEYE MANAGEMENT\GINT BORING LOG.GPJ

BYER GEOTECHNICAL, INC.

1461 E. CHEVY CHASE DR., SUITE 200
GLENDALE, CA 91206
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LOG OF BORING B2

BG No. 22288
PAGE 1 OF 1

CLIENT Ribeye Management, LLC **REPORT DATE** 11/23/15 **DRILL DATE** 9/30/15
PROJECT LOCATION 2942 Oak Glen Road **LOGGED BY** JET
CONTRACTOR Martini Drilling **DRILLING METHOD** Hollow-Stem Auger **HOLE SIZE** 8-inch diameter
DRIVE WEIGHT 140-Pound Automatic Hammer **HAMMER DROP** 30 Inches **ELEV. TOP OF HOLE**

ELEVATION (ft)	DEPTH (ft)	EARTH MATERIAL DESCRIPTION	GRAPHIC SYMBOL	USCS UNIT	SAMPLE TYPE & NUMBER	BLOW COUNT (Per 6 Inches)	MOISTURE CONTENT (%)	DRY UNIT WT. (pcf)	SATURATION (%)	TYPE OF TEST
	0	Surface: Level ground								
		(SM) **FILL:** Silty SAND, grayish-brown, slightly moist, medium dense		SM						
		(SM) **ALLUVIUM:** 2': Silty SAND, light gray, brown, slightly moist, medium dense		SM		14	4.5	99.4		
	5	(SM) 5.5': light brown, medium dense to dense		SM		12	5.4	95.6		
						17	5.1	97.7		
	10	(SM) 10': brown		SM		17	6.1	99.2		
		(SM) 14': dense, light brown		SM		33	3.3	103.4		
	15	**BEDROCK:** 18': Gneiss, gray, light gray, moderately hard								
	20					50				No Recovery

End at 20 Feet; No Water; No Caving; Fill to 2 Feet.

Ring Sample

BYER GEOTECHNICAL, INC.

1461 E. CHEVY CHASE DR., SUITE 200
GLENDALE, CA 91206
818.549.9959 TEL
818.543.3747 FAX

LOG OF BORING B3

BG No. 22288

CLIENT Ribeye Management, LLC **REPORT DATE** 11/23/15 **DRILL DATE** 9/30/15
PROJECT LOCATION 2942 Oak Glen Road **LOGGED BY** JET
CONTRACTOR Martini Drilling **DRILLING METHOD** Hollow-Stem Auger **HOLE SIZE** 8-inch diameter
DRIVE WEIGHT 140-Pound Automatic Hammer **HAMMER DROP** 30 Inches **ELEV. TOP OF HOLE**

ELEVATION (ft)	DEPTH (ft)	EARTH MATERIAL DESCRIPTION	GRAPHIC SYMBOL	USCS UNIT	SAMPLE TYPE & NUMBER	BLOW COUNT (Per 6 Inches)	MOISTURE CONTENT (%)	DRY UNIT WT. (pcf)	SATURATION (%)	TYPE OF TEST
	0	Surface: Level ground								
		(SM) **FILL:** Silty SAND, grayish-brown to brown, moist, slightly loose to medium dense, some gravel		SM						
		(SM) **ALLUVIUM:** 2': Silty SAND, brown, slightly moist to moist, medium dense		SM		11	4.5	99.4		
	5					23	5.4	95.6		
						20	5.1	97.7		Consolidation
	10	(SM) 10': dense, some gravel		SM		31	6.1	99.2		
	15	(SM) 15': very dense, some cobbles		SM		42	3.3	103.4		
	20	**BEDROCK:** 20': Gneiss, dark gray, light gray, moderately hard				51				No Recovery
	25									

Ring Sample

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GLENDALE, CA 91206
818.549.9959 TEL
818.543.3747 FAX

LOG OF BORING B3

BG No. 22288

CLIENT Ribeye Management, LLC **REPORT DATE** 11/23/15 **DRILL DATE** 9/30/15

PROJECT LOCATION 2942 Oak Glen Road **LOGGED BY** JET

CONTRACTOR Martini Drilling **DRILLING METHOD** Hollow-Stem Auger **HOLE SIZE** 8-inch diameter

DRIVE WEIGHT 140-Pound Automatic Hammer **HAMMER DROP** 30 Inches **ELEV. TOP OF HOLE**

ELEVATION (ft)	DEPTH (ft)	EARTH MATERIAL DESCRIPTION	GRAPHIC SYMBOL	USCS UNIT	SAMPLE TYPE & NUMBER	BLOW COUNT (Per 6 Inches)	MOISTURE CONTENT (%)	DRY UNIT WT. (pcf)	SATURATION (%)	TYPE OF TEST
	25					50	2.2	115		Shear

End at 25 Feet; No Water; No Caving; Fill to 2 Feet.

Ring Sample

November 23, 2015
BG 22288

APPENDIX II

Calculations and Figures

PSH Deaggregation on NEHRP D soil

RIBEYE 118.225° W, 34.191 N.

Peak Horiz. Ground Accel.>=0.5891 g

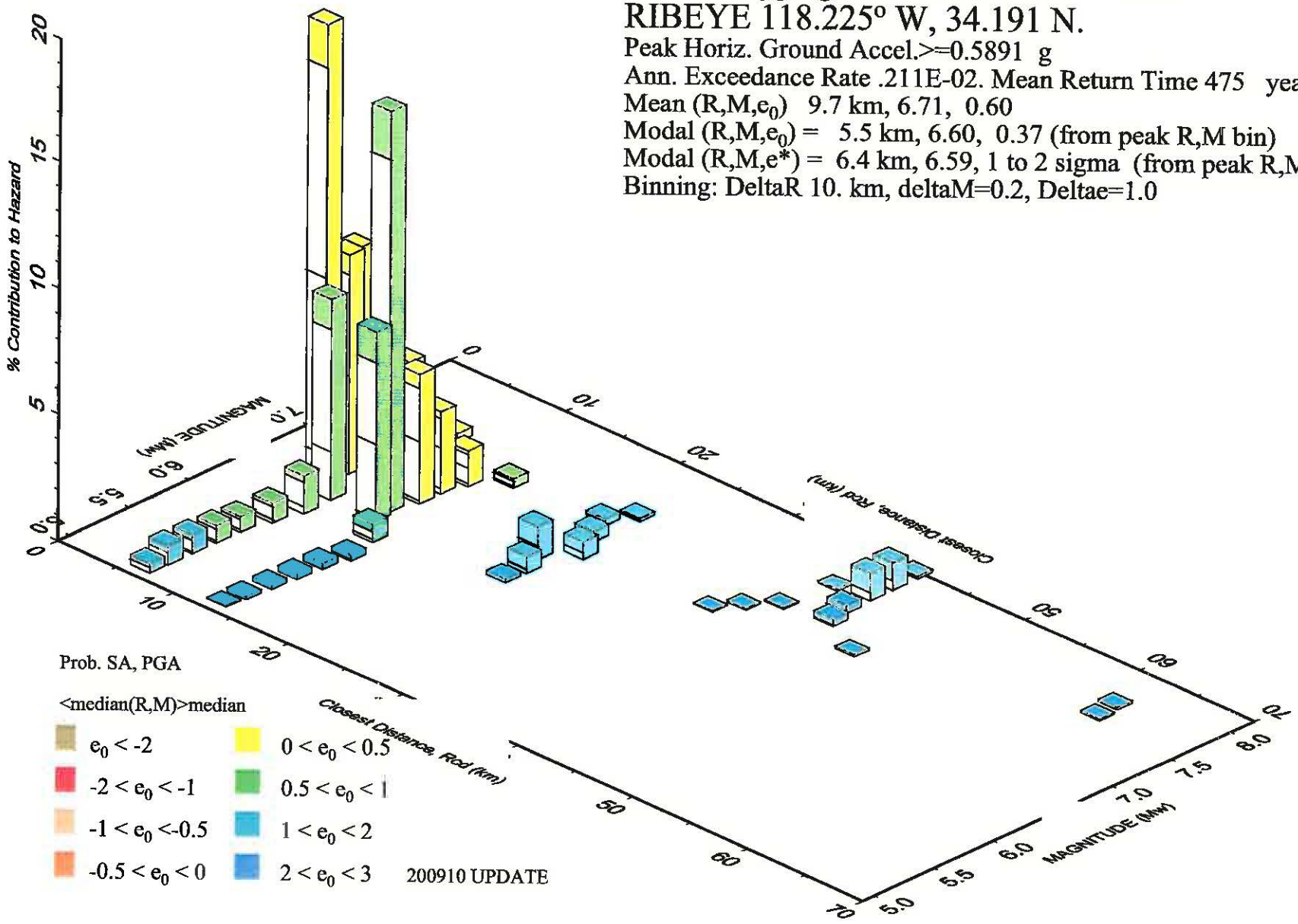
Ann. Exceedance Rate .211E-02. Mean Return Time 475 years

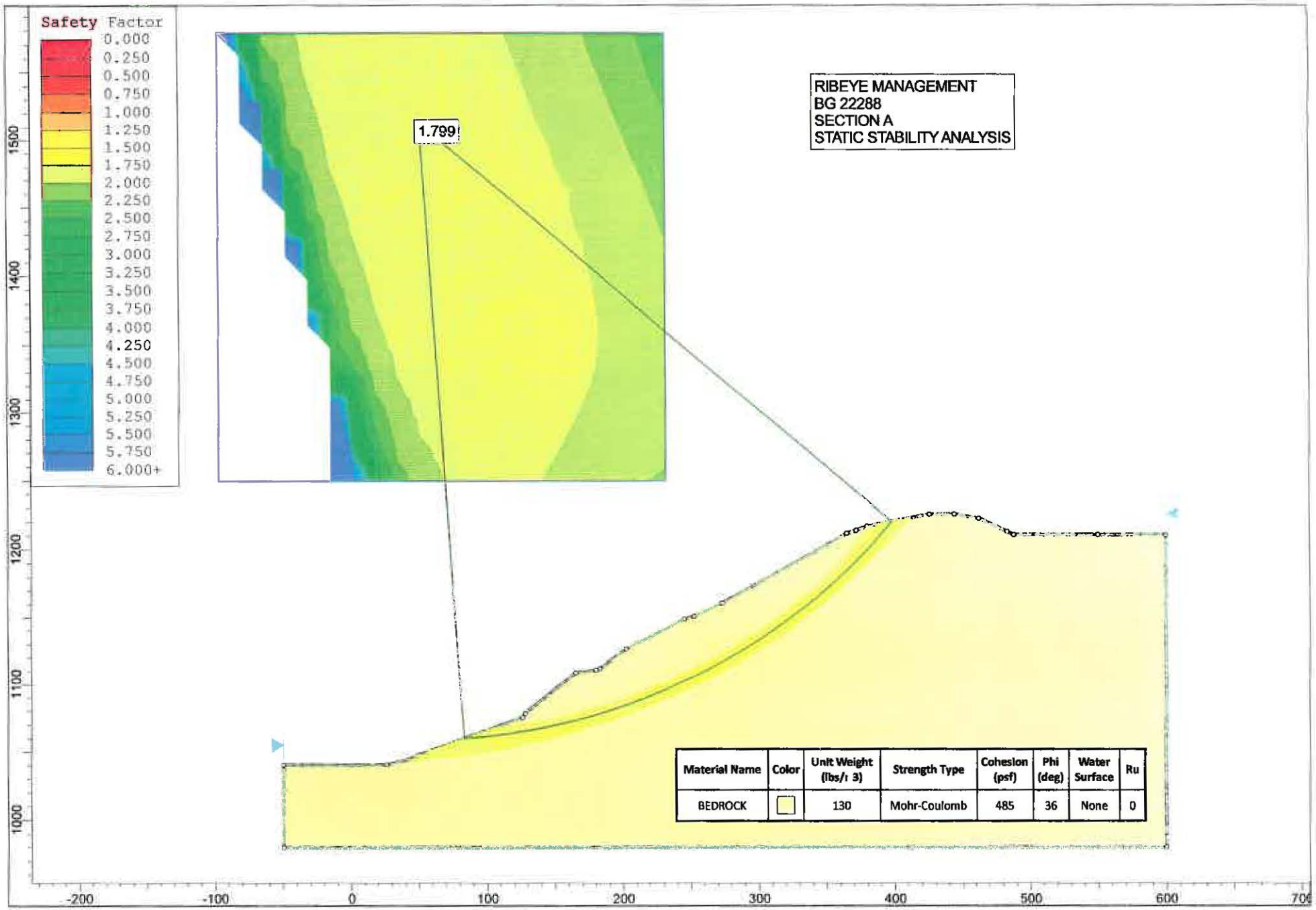
Mean (R,M,e_0) 9.7 km, 6.71, 0.60

Modal (R,M,e_0) = 5.5 km, 6.60, 0.37 (from peak R,M bin)

Modal (R,M,e^*) = 6.4 km, 6.59, 1 to 2 sigma (from peak R,M,e bin)

Binning: DeltaR 10. km, deltaM=0.2, Deltae=1.0




Safety Factor
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0.250
0.500
0.750
1.000
1.250
1.500
1.750
2.000
2.250
2.500
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3.000
3.250
3.500
3.750
4.000
4.250
4.500
4.750
5.000
5.250
5.500
5.750
6.000+
1.799
RIBEYE MANAGEMENT
BG 22288
SECTION A
STATIC STABILITY ANALYSIS
Material Name | Color | Unit Weight (lbs/ı 3) | Strength Type | Cohesion (psf) | Phi (deg) | Water Surface | Ru
BEDROCK | | 130 | Mohr-Coulomb | 485 | 36 | None | 0
1500
1400
1300
1200
1100
1000
-200
-100
0
100
200
300
400
500
600

Slide Analysis Information

SLIDE - An Interactive Slope Stability Program

Project Summary

File Name: RIBEYE STATIC
Slide Modeler Version: 6.025
Project Title: SLIDE - An Interactive Slope Stability Program
Date Created: 11/4/2015, 2:34:11 PM

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

Material Properties

Property	BEDROCK
Color	
Strength Type	Mohr-Coulomb
Unit Weight [lbs/ft3]	130
Cohesion [psf]	485
Friction Angle [deg]	36
Water Surface	None
Ru Value	0

Global Minimums

Method: bishop simplified

FS: 1.798920
Center: 51.023, 1512.453
Radius: 454.298
Left Slip Surface Endpoint: 82.719, 1059.261
Right Slip Surface Endpoint: 398.320, 1219.584
Resisting Moment=4.59596e+008 lb-ft
Driving Moment=2.55484e+008 lb-ft
Total Slice Area=9686.22 ft2

Valid / Invalid Surfaces

Method: bishop simplified

Number of Valid Surfaces: 4001
Number of Invalid Surfaces: 850

Error Codes:

Error Code -103 reported for 89 surfaces
Error Code -106 reported for 26 surfaces
Error Code -108 reported for 196 surfaces
Error Code -1000 reported for 539 surfaces

Error Codes

The following errors were encountered during the computation:

-103 = Two surface / slope intersections, but one or more surface / nonslope external polygon intersections lie between them. This usually occurs when the slip surface extends past the bottom of the soil region, but may also occur on a benched slope model with two sets of Slope Limits.
-106 = Average slice width is less than 0.0001 * (maximum horizontal extent of soil region). This limitation is imposed to avoid numerical errors which may result from too many slices, or too small a slip region.
-108 = Total driving moment or total driving force < 0.1. This is to limit the calculation of extremely high safety factors if the driving force is very small (0.1 is an arbitrary number).
-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: 1.79892

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	12.6241	2897.08	BEDROCK	485	36	350.437	630.408	200.138	0	200.138
2	12.6241	8399.18	BEDROCK	485	36	515.045	926.525	607.707	0	607.707
3	12.6241	13314.4	BEDROCK	485	36	658.274	1184.18	962.342	0	962.342
4	12.6241	20263	BEDROCK	485	36	859.227	1545.68	1459.9	0	1459.9
5	12.6241	33546.4	BEDROCK	485	36	1243.35	2236.68	2410.98	0	2410.98
6	12.6241	45921.4	BEDROCK	485	36	1592.27	2864.36	3274.91	0	3274.91
7	12.6241	56043	BEDROCK	485	36	1867.92	3360.24	3957.43	0	3957.43
8	12.6241	55201.5	BEDROCK	485	36	1822.93	3279.3	3846.03	0	3846.03
9	12.6241	59987.2	BEDROCK	485	36	1937.82	3485.99	4130.5	0	4130.5
10	12.6241	68471	BEDROCK	485	36	2153.03	3873.12	4663.36	0	4663.36
11	12.6241	71964.9	BEDROCK	485	36	2224.4	4001.52	4840.08	0	4840.08
12	12.6241	74168.2	BEDROCK	485	36	2257.9	4061.78	4923.01	0	4923.01
13	12.6241	75584.7	BEDROCK	485	36	2268.29	4080.48	4948.75	0	4948.75
14	12.6241	74001	BEDROCK	485	36	2197.26	3952.7	4772.88	0	4772.88
15	12.6241	72831.5	BEDROCK	485	36	2137.65	3845.46	4625.27	0	4625.27
16	12.6241	71846.1	BEDROCK	485	36	2082.95	3747.06	4489.84	0	4489.84
17	12.6241	70891	BEDROCK	485	36	2028.93	3649.89	4356.1	0	4356.1
18	12.6241	68997.9	BEDROCK	485	36	1951.05	3509.78	4163.25	0	4163.25
19	12.6241	66099.8	BEDROCK	485	36	1848.6	3325.49	3909.6	0	3909.6
20	12.6241	62123	BEDROCK	485	36	1720.94	3095.83	3593.5	0	3593.5
21	12.6241	56980	BEDROCK	485	36	1567.28	2819.41	3213.03	0	3213.03
22	12.6241	50565.7	BEDROCK	485	36	1386.74	2494.63	2766.02	0	2766.02
23	12.6241	41621.1	BEDROCK	485	36	1152.29	2072.87	2185.52	0	2185.52
24	12.6241	27743.9	BEDROCK	485	36	814.05	1464.41	1348.04	0	1348.04
25	12.6241	9745.68	BEDROCK	485	36	398.803	717.415	319.891	0	319.891

Interslice Data

Global Minimum Query (bishop simplified) - Safety Factor: 1.79892

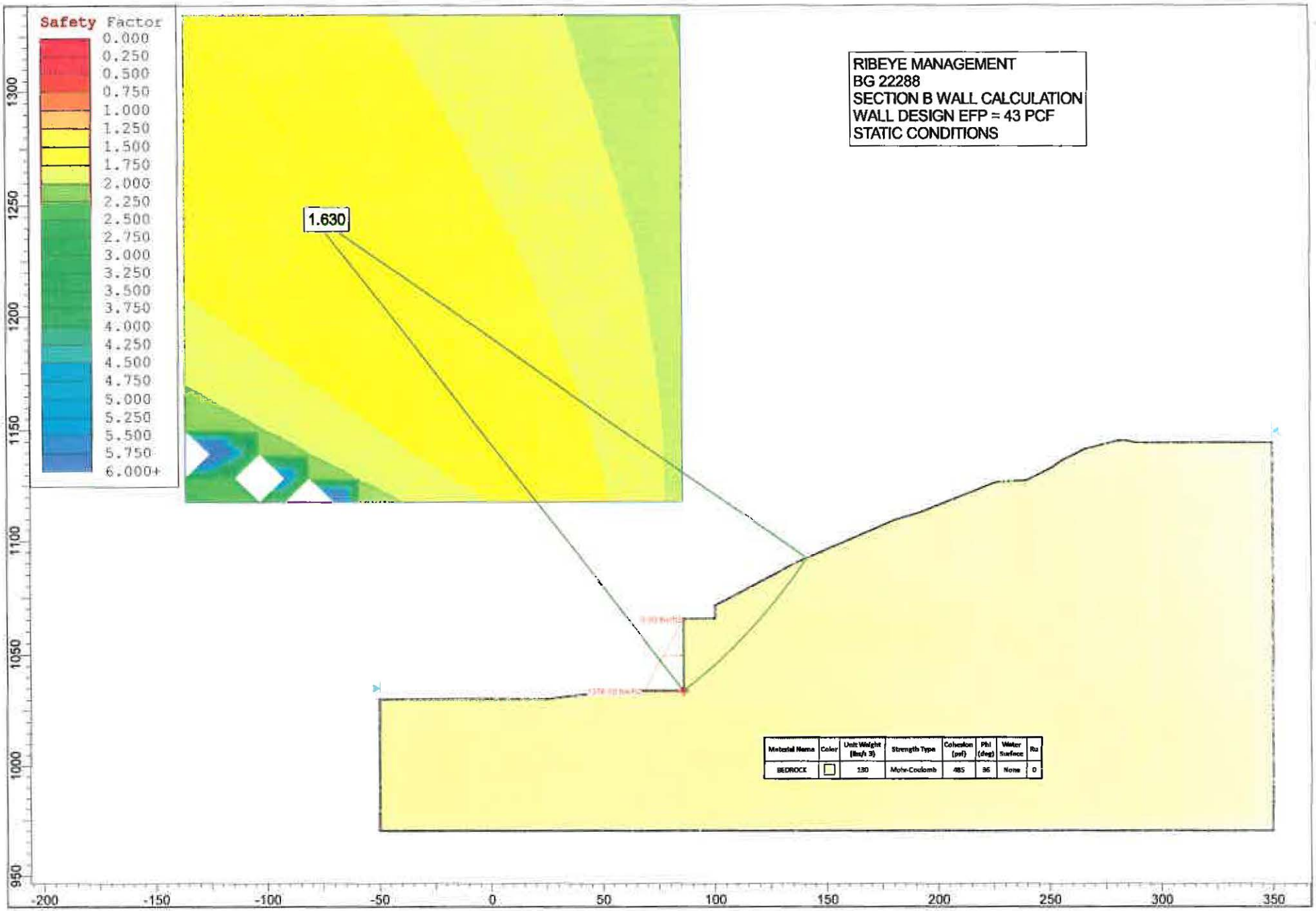
Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [degrees]
1	82.7186	1059.26	0	0	0
2	95.3426	1060.32	4200.85	0	0
3	107.967	1061.74	9826.26	0	0
4	120.591	1063.51	16407.4	0	0
5	133.215	1065.65	24105	0	0
6	145.839	1068.16	33716.4	0	0
7	158.463	1071.04	44326.7	0	0
8	171.087	1074.31	54926.8	0	0
9	183.711	1077.96	63819.8	0	0
10	196.335	1082.02	71462.6	0	0
11	208.959	1086.49	77729.3	0	0
12	221.583	1091.39	82044.2	0	0
13	234.207	1096.72	84205.1	0	0
14	246.831	1102.52	84093	0	0
15	259.455	1108.79	81825.6	0	0
16	272.08	1115.56	77419	0	0
17	284.704	1122.86	70877.2	0	0
18	297.328	1130.72	62206.6	0	0
19	309.952	1139.17	51606.5	0	0
20	322.576	1148.25	39384.4	0	0
21	335.2	1158.01	25975.6	0	0
22	347.824	1168.51	11969.5	0	0
23	360.448	1179.82	-1855.35	0	0
24	373.072	1192.03	-14023.2	0	0
25	385.696	1205.24	-21578.3	0	0
26	398.32	1219.58	0	0	0

List Of Coordinates

External Boundary

X	Y
-50	980
600	980
600	1210
550	1210
488	1210
483	1212
462	1222
444	1225
426	1225
380	1216

372	1213
365	1211
273	1160
252	1150
245	1148
202	1126
183	1111
180	1110
165	1108
128	1078
126	1075
49	1047
42	1044
26	1040
-50	1040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2.000
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3.500
3.750
4.000
4.250
4.500
4.750
5.000
5.250
5.500
5.750
6.000+
1.630
RIBEYE MANAGEMENT
BG 22288
SECTION B WALL CALCULATION
WALL DESIGN EFP = 43 PCF
STATIC CONDITIONS
Material Name
Color
Unit Weight (lbs/ft 3)
Strength Type
Cohesion (psf)
Phi (deg)
Water Surface
Ru
BEDROCK
130
Mohr-Coulomb
485
36
None
0
1300
1250
1200
1150
1100
1050
1000
950
-200
-150
-100
-50
0
50
100
150
200
250
300
350

Slide Analysis Information

SLIDE - An Interactive Slope Stability Program

Project Summary

File Name: ribeye section B wall static
Slide Modeler Version: 6.025
Project Title: SLIDE - An Interactive Slope Stability Program
Date Created: 11/17/2015, 11:12:17 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

1 Distributed Load present

Distributed Load 1

Distribution: Triangular
Magnitude 1 [psf]: 0
Magnitude 2 [psf]: 1376
Orientation: Horizontal

Material Properties

Property	BEDROCK
Color	
Strength Type	Mohr-Coulomb
Unit Weight [lbs/ft3]	130
Cohesion [psf]	485
Friction Angle [deg]	36
Water Surface	None
Ru Value	0

Global Minimums

Method: bishop simplified

FS: 1.630130
Center: -81.017, 1247.652
Radius: 271.580
Left Slip Surface Endpoint: 86.000, 1033.500
Right Slip Surface Endpoint: 141.489, 1091.938
Left Slope Intercept: 86.000 1065.500
Right Slope Intercept: 141.489 1091.938
Resisting Moment=3.18443e+007 lb-ft
Driving Moment=1.95349e+007 lb-ft
Total Slice Area=985.026 ft2

Valid / Invalid Surfaces

Method: bishop simplified

Number of Valid Surfaces: 438
Number of Invalid Surfaces: 3

Error Codes:

Error Code -106 reported for 3 surfaces

Error Codes

The following errors were encountered during the computation:

-106 = Average slice width is less than 0.0001 * (maximum horizontal extent of soil region). This limitation is imposed to avoid numerical errors which may result from too many slices, or too small a slip region.

Slice Data

Global Minimum Query (bishop simplified) - Safety Factor: 1.63013

Slice Number	Width [ft]	Weight [lbs]	Base Material	Base Cohesion [psf]	Base Friction Angle [degrees]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]
1	2.21957	8980.96	BEDROCK	485	36	1554.73	2534.41	2820.77	0	2820.77
2	2.21957	8470.63	BEDROCK	485	36	1470.61	2397.28	2632.03	0	2632.03
3	2.21957	7949.21	BEDROCK	485	36	1385.6	2258.7	2441.29	0	2441.29
4	2.21957	7416.42	BEDROCK	485	36	1299.69	2118.67	2248.55	0	2248.55
5	2.21957	6871.95	BEDROCK	485	36	1212.9	1977.19	2053.82	0	2053.82
6	2.21957	6315.48	BEDROCK	485	36	1125.22	1834.25	1857.08	0	1857.08
7	2.21957	6924.44	BEDROCK	485	36	1205.54	1965.19	2037.31	0	2037.31
8	2.21957	7144.3	BEDROCK	485	36	1229.2	2003.75	2090.38	0	2090.38
9	2.21957	6878.55	BEDROCK	485	36	1183.56	1929.35	1987.97	0	1987.97
10	2.21957	6599.29	BEDROCK	485	36	1136.36	1852.42	1882.1	0	1882.1
11	2.21957	6306.07	BEDROCK	485	36	1087.61	1772.95	1772.72	0	1772.72
12	2.21957	5998.42	BEDROCK	485	36	1037.29	1690.91	1659.8	0	1659.8
13	2.21957	5675.85	BEDROCK	485	36	985.363	1606.27	1543.29	0	1543.29
14	2.21957	5337.81	BEDROCK	485	36	931.821	1518.99	1423.17	0	1423.17
15	2.21957	4983.71	BEDROCK	485	36	876.648	1429.05	1299.37	0	1299.37
16	2.21957	4612.93	BEDROCK	485	36	819.824	1336.42	1171.88	0	1171.88
17	2.21957	4224.8	BEDROCK	485	36	761.331	1241.07	1040.64	0	1040.64
18	2.21957	3818.59	BEDROCK	485	36	701.149	1142.96	905.611	0	905.611
19	2.21957	3393.49	BEDROCK	485	36	639.263	1042.08	766.754	0	766.754
20	2.21957	2948.66	BEDROCK	485	36	575.652	938.388	624.035	0	624.035
21	2.21957	2483.15	BEDROCK	485	36	510.302	831.858	477.409	0	477.409
22	2.21957	1995.93	BEDROCK	485	36	443.196	722.467	326.845	0	326.845
23	2.21957	1485.86	BEDROCK	485	36	374.319	610.188	172.306	0	172.306
24	2.21957	924.405	BEDROCK	485	36	300.251	489.448	6.12261	0	6.12261

25	2.21957	312.498	BEDROCK	485	36	221.385	360.887	-170.826	0	-170.826

Interslice Data

Global Minimum Query (bishop simplified) - Safety Factor: 1.63013

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [degrees]
1	86	1033.5	22016	0	0
2	88.2196	1035.25	20531	0	0
3	90.4391	1037.04	19089.8	0	0
4	92.6587	1038.86	17705.9	0	0
5	94.8783	1040.73	16393.6	0	0
6	97.0978	1042.64	15168	0	0
7	99.3174	1044.59	14044.6	0	0
8	101.537	1046.58	12659.7	0	0
9	103.757	1048.62	11128.1	0	0
10	105.976	1050.7	9612.31	0	0
11	108.196	1052.83	8122.83	0	0
12	110.415	1055.01	6671.16	0	0
13	112.635	1057.25	5269.64	0	0
14	114.854	1059.53	3931.6	0	0
15	117.074	1061.87	2671.41	0	0
16	119.293	1064.26	1504.63	0	0
17	121.513	1066.72	448.069	0	0
18	123.733	1069.23	-480.071	0	0
19	125.952	1071.81	-1260.06	0	0
20	128.172	1074.46	-1870.46	0	0
21	130.391	1077.18	-2288	0	0
22	132.611	1079.97	-2487.32	0	0
23	134.83	1082.83	-2440.72	0	0
24	137.05	1085.78	-2117.93	0	0
25	139.27	1088.81	-1470.13	0	0
26	141.489	1091.94	0	0	0

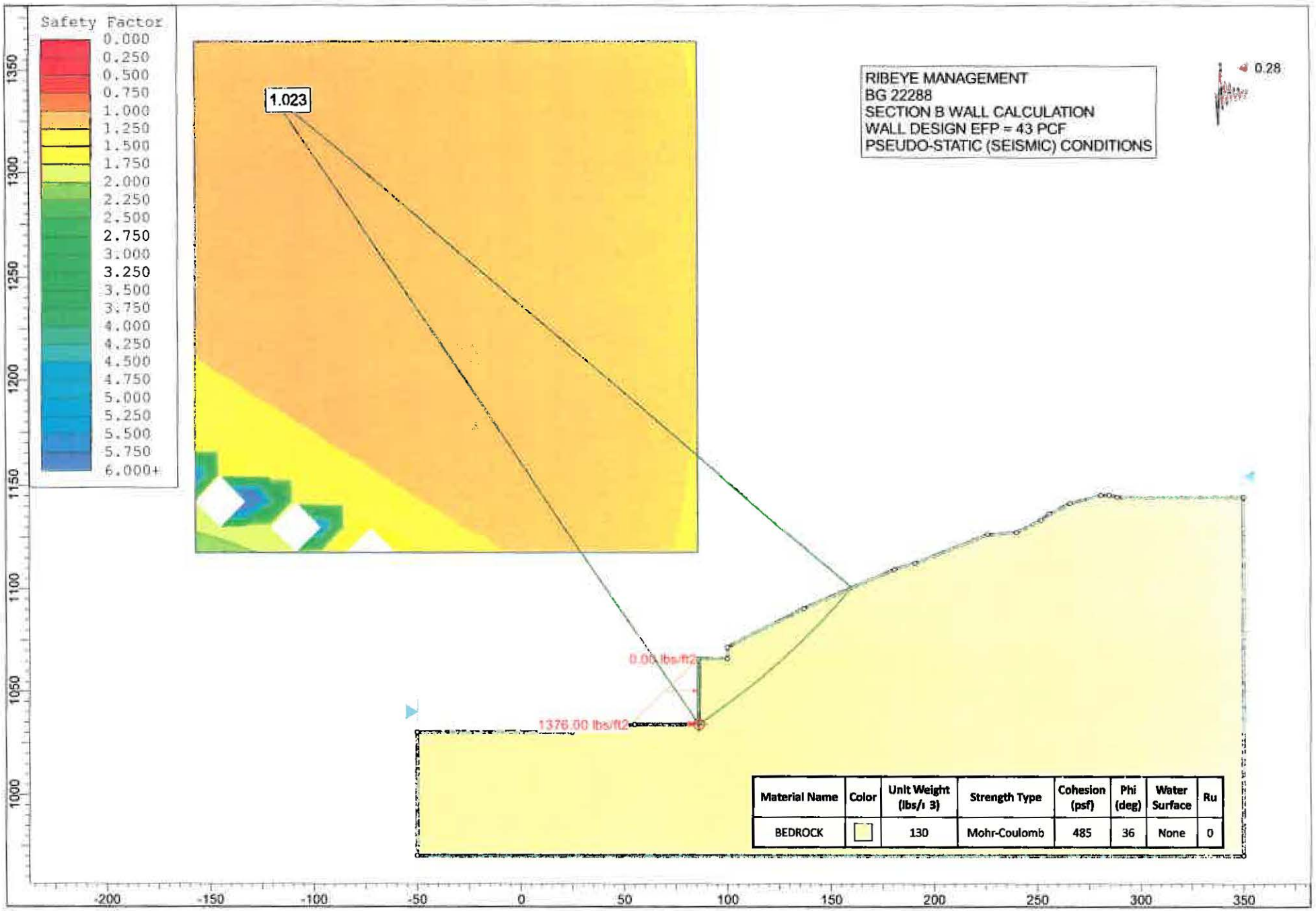
List Of Coordinates

Line Load

X	Y
86	1065.5
86	1033.5

External Boundary

X	Y
-50	970
350	970
350	1144
289	1144
285	1145
281	1145
266	1141
256	1136
252	1133
240	1127
226	1126
191	1112
181	1109
137	1090
100	1071
100	1065.5
86	1065.5
86	1033.5
55	1033.5
25	1030
-50	1030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0.000
0.250
0.500
0.750
1.000
1.250
1.500
1.750
2.000
2.250
2.500
2.750
3.000
3.250
3.500
3.750
4.000
4.250
4.500
4.750
5.000
5.250
5.500
5.750
6.000+
1.023
RIBEYE MANAGEMENT
BG 22288
SECTION B WALL CALCULATION
WALL DESIGN EFP = 43 PCF
PSEUDO-STATIC (SEISMIC) CONDITIONS
0.28
1376.00 lbs/ft2
Material Name | Color | Unit Weight (lbs/ı 3) | Strength Type | Cohesion (psf) | Phi (deg) | Water Surface | Ru
BEDROCK | | 130 | Mohr-Coulomb | 485 | 36 | None | 0
1350
1300
1250
1200
1150
1100
1050
1000
-200
-150
-100
-50
0
50
100
150
200
250
300
350

Slide Analysis Information

SLIDE - An Interactive Slope Stability Program

Project Summary

File Name: ribeye section B wall seismic
Slide Modeler Version: 6.025
Project Title: SLIDE - An Interactive Slope Stability Program
Date Created: 11/17/2015, 11:12:17 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): 0.28
1 Distributed Load present

Distributed Load 1

Distribution: Triangular
Magnitude 1 [psf]: 0
Magnitude 2 [psf]: 1376
Orientation: Horizontal

Material Properties

Property	BEDROCK
Color	
Strength Type	Mohr-Coulomb
Unit Weight [lbs/ft3]	130
Cohesion [psf]	485
Friction Angle [deg]	36
Water Surface	None
Ru Value	0

Global Minimums

Method: bishop simplified

FS: 1.023070
Center: -120.752, 1339.369
Radius: 369.192
Left Slip Surface Endpoint: 86.000, 1033.500
Right Slip Surface Endpoint: 160.423, 1100.115
Left Slope Intercept: 86.000 1065.500
Right Slope Intercept: 160.423 1100.115
Resisting Moment=5.0267e+007 lb-ft
Driving Moment=4.91335e+007 lb-ft
Total Slice Area=1375.84 ft2

Valid / Invalid Surfaces

Method: bishop simplified

Number of Valid Surfaces: 438
Number of Invalid Surfaces: 3

Error Codes:

Error Code -106 reported for 3 surfaces

Error Codes

The following errors were encountered during the computation:

-106 = Average slice width is less than 0.0001 * (maximum horizontal extent of soil region). This limitation is imposed to avoid numerical errors which may result from too many slices, or too small a slip region.

Slice Data

Global Minimum Query (bishop simplified) - Safety Factor: 1.02307

Slice Number	Width [ft]	Weight [lbs]	Base Material	Base Cohesion [psf]	Base Friction Angle [degrees]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]
1	2.97694	11990.6	BEDROCK	485	36	2245.31	2297.11	2494.15	0	2494.15
2	2.97694	11195.3	BEDROCK	485	36	2103	2151.52	2293.77	0	2293.77
3	2.97694	10383.1	BEDROCK	485	36	1959.7	2004.91	2091.98	0	2091.98
4	2.97694	9553.79	BEDROCK	485	36	1815.41	1857.29	1888.79	0	1888.79
5	2.97694	9365.55	BEDROCK	485	36	1773	1813.9	1829.07	0	1829.07
6	2.97694	10442.1	BEDROCK	485	36	1927	1971.46	2045.94	0	2045.94
7	2.97694	10150.5	BEDROCK	485	36	1867.89	1910.98	1962.69	0	1962.69
8	2.97694	9840.05	BEDROCK	485	36	1806.44	1848.11	1876.17	0	1876.17
9	2.97694	9510.34	BEDROCK	485	36	1742.67	1782.87	1786.37	0	1786.37
10	2.97694	9160.88	BEDROCK	485	36	1676.57	1715.25	1693.29	0	1693.29
11	2.97694	8791.15	BEDROCK	485	36	1608.14	1645.24	1596.94	0	1596.94
12	2.97694	8400.63	BEDROCK	485	36	1537.38	1572.85	1497.3	0	1497.3
13	2.97694	7988.73	BEDROCK	485	36	1464.29	1498.07	1394.37	0	1394.37
14	2.97694	7554.85	BEDROCK	485	36	1388.86	1420.91	1288.16	0	1288.16
15	2.97694	7098.35	BEDROCK	485	36	1311.1	1341.35	1178.66	0	1178.66
16	2.97694	6618.55	BEDROCK	485	36	1231	1259.4	1065.87	0	1065.87
17	2.97694	6114.71	BEDROCK	485	36	1148.57	1175.07	949.799	0	949.799
18	2.97694	5550.59	BEDROCK	485	36	1058.82	1083.25	823.42	0	823.42
19	2.97694	4903	BEDROCK	485	36	958.787	980.906	682.557	0	682.557
20	2.97694	4228.08	BEDROCK	485	36	856.561	876.322	538.608	0	538.608
21	2.97694	3525.68	BEDROCK	485	36	752.271	769.626	391.752	0	391.752
22	2.97694	2794.8	BEDROCK	485	36	645.928	660.83	242.01	0	242.01
23	2.97694	2034.33	BEDROCK	485	36	537.552	549.953	89.4006	0	89.4006

24	2.97694	1243.09	BEDROCK	485	36	427.16	437.015	-66.0456	0	-66.0456
25	2.97694	419.815	BEDROCK	485	36	314.777	322.039	-224.296	0	-224.296

Interslice Data

Global Minimum Query (bishop simplified) - Safety Factor: 1.02307

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [degrees]
1	86	1033.5	22016	0	0
2	88.9769	1035.53	20270.6	0	0
3	91.9539	1037.61	18633	0	0
4	94.9308	1039.73	17123.2	0	0
5	97.9078	1041.9	15762.2	0	0
6	100.885	1044.11	14373	0	0
7	103.862	1046.37	12565.3	0	0
8	106.839	1048.67	10756.9	0	0
9	109.816	1051.03	8959.9	0	0
10	112.792	1053.43	7186.84	0	0
11	115.769	1055.89	5451.29	0	0
12	118.746	1058.4	3767.68	0	0
13	121.723	1060.97	2151.37	0	0
14	124.7	1063.59	618.749	0	0
15	127.677	1066.27	-812.73	0	0
16	130.654	1069	-2124.47	0	0
17	133.631	1071.8	-3296.66	0	0
18	136.608	1074.67	-4308.15	0	0
19	139.585	1077.59	-5120.78	0	0
20	142.562	1080.59	-5683.49	0	0
21	145.539	1083.65	-5968.01	0	0
22	148.516	1086.79	-5944.61	0	0
23	151.493	1090	-5581.58	0	0
24	154.47	1093.29	-4845.09	0	0
25	157.447	1096.66	-3698.97	0	0
26	160.423	1100.11	0	0	0

List Of Coordinates

Line Load

X	Y
86	1065.5
86	1033.5

External Boundary

X	Y
-50	970
350	970
350	1144
289	1144
285	1145
281	1145
266	1141
256	1136
252	1133
240	1127
226	1126
191	1112
181	1109
137	1090
100	1071
100	1065.5
86	1065.5
86	1033.5
55	1033.5
25	1030
-50	1030

BYER GEOTECHNICAL, INC.
1461 E. CHEVY CHASE DR., SUITE 200
GLENDALE, CA 91206
818.549.9959 TEL
818.543.3747 FAX

SOLDIER PILE

BG: 22288 ENGINEER: JET
CLIENT: RIBEYE
CALCULATION SHEET #

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

CALCULATION PARAMETERS

EARTH MATERIAL:	BEDROCK	RETAINED LENGTH	32 feet
SHEAR DIAGRAM:	2	BACKSLOPE ANGLE:	0 degrees
COHESION:	485 psf	SURCHARGE:	0 pounds
PHI ANGLE:	36 degrees	SURCHARGE TYPE:	P Point
DENSITY	130 pcf	INITIAL FAILURE ANGLE:	30 degrees
SAFETY FACTOR:	1.5	FINAL FAILURE ANGLE:	70 degrees
PILE FRICTION	0 degrees	INITIAL TENSION CRACK:	1 feet
CD (C/FS):	323.3 psf	FINAL TENSION CRACK:	20 feet

PHID = ATAN(TAN(PHI)/FS) = 25.8 degrees

HORIZONTAL PSEUDO STATIC SEISMIC COEFFICIENT (k_h) 0 g

VERTICAL PSEUDO STATIC SEISMIC COEFFICIENT (k_v) 0 g

CALCULATED RESULTS

CRITICAL FAILURE ANGLE	58 degrees
AREA OF TRIAL FAILURE WEDGE	300.0 square feet
TOTAL EXTERNAL SURCHARGE	0.0 pounds
WEIGHT OF TRIAL FAILURE WEDGE	38995.1 pounds
NUMBER OF TRIAL WEDGES ANALYZED	820 trials
LENGTH OF FAILURE PLANE	28.3 feet
DEPTH OF TENSION CRACK	8.0 feet
HORIZONTAL DISTANCE TO UPSLOPE TENSION CRACK	15.0 feet
CALCULATED THRUST ON PILE	**14785.5 pounds**
CALCULATED EQUIVALENT FLUID PRESSURE	**28.9 pcf**
DESIGN EQUIVALENT FLUID PRESSURE	**30.0 pcf**

CONCLUSION:

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

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TEMPORARY EXCAVATION HEIGHT

BG: 22288 ENGINEER: JET
CLIENT: RIBEYE
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:	10 feet
SHEAR DIAGRAM:	2	BACKSLOPE ANGLE:	45 degrees
COHESION:	485 psf	SURCHARGE:	0 pounds
PHI ANGLE:	36 degrees	SURCHARGE TYPE:	p Point
DENSITY:	130 pcf	INITIAL FAILURE ANGLE:	20 degrees
SAFETY FACTOR:	1.25	FINAL FAILURE ANGLE:	70 degrees
WALL FRICTION:	0 degrees	INITIAL TENSION CRACK:	1 feet
CD (C/FS):	388.0 psf	FINAL TENSION CRACK:	20 feet
PHID = ATAN(TAN(PHI)/FS) =	30.2 degrees		

CALCULATED RESULTS

CRITICAL FAILURE ANGLE	58 degrees
AREA OF TRIAL FAILURE WEDGE	9.7 square feet
TOTAL EXTERNAL SURCHARGE	0.0 pounds
WEIGHT OF TRIAL FAILURE WEDGE	1261.0 pounds
NUMBER OF TRIAL WEDGES ANALYZED	1020 trials
LENGTH OF FAILURE PLANE	1.9 feet
DEPTH OF TENSION CRACK	9.4 feet
HORIZONTAL DISTANCE TO UPSLOPE TENSION CRACK	1.0 feet
CALCULATED HORIZONTAL THRUST	**-50.1 pounds**
CALCULATED EQUIVALENT FLUID PRESSURE	**-1.0 pcf**
MAXIMUM HEIGHT OF TEMPORARY EXCAVATION	**10.0 feet**

CONCLUSIONS:

THE CALCULATION INDICATES THAT THE TEMPORARY VERTICAL EXCAVATIONS UP TO 10 FEET HIGH IN BEDROCK HAVE A NEGATIVE THRUST AND ARE TEMPORARILY STABLE.

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SURFICIAL STABILITY

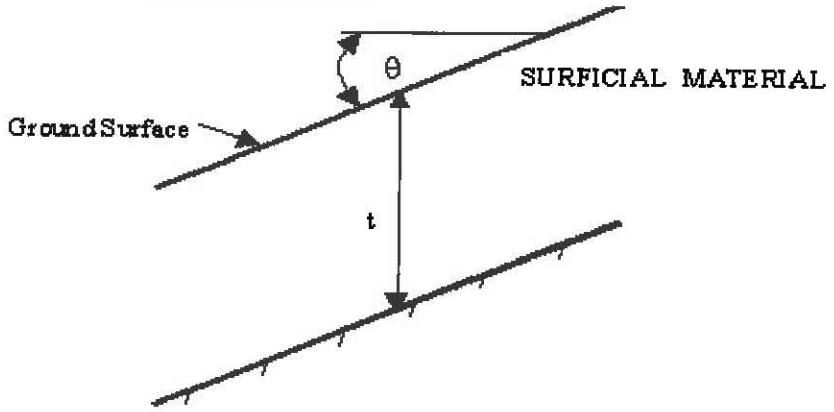
BG: 22288 CONSULT: JET
CLIENT: RIBEYE

CALCULATION SHEET #

CALCULATE THE SURFICIAL STABILITY OF THE EARTH MATERIAL USING THE INFINITE SLOPE ANALYSIS WITH PARALLEL SEEPAGE. THIS METHOD WAS RECOMMENDED BY THE ASCE AND THE BUILDING AND SAFETY ADVISORY COMMITTEE (8/16/78). MODIFIED FROM SKEMPTON & DeLORY, 1957.

CALCULATION PARAMETERS

EARTH MATERIAL:	SOIL		
COHESION:	270 psf	SHEAR DIAGRAM:	3
PHI ANGLE:	30 degrees	SLOPE ANGLE:	35 degrees
DENSITY:	125 pcf	SATURATION DEPTH (t):	4.0 feet



$$FS = \frac{C + (\gamma_{soil} - \gamma_{water}) \bullet t \bullet \cos^2\theta \tan\Phi}{\gamma_{soil} \bullet t \bullet \cos\Phi \sin\Phi}$$

SAFETY FACTOR = 1.56

CONCLUSIONS:

THE CALCULATION INDICATES THAT THE EXISTING SLOPE IS SURFICIALLY STABLE.

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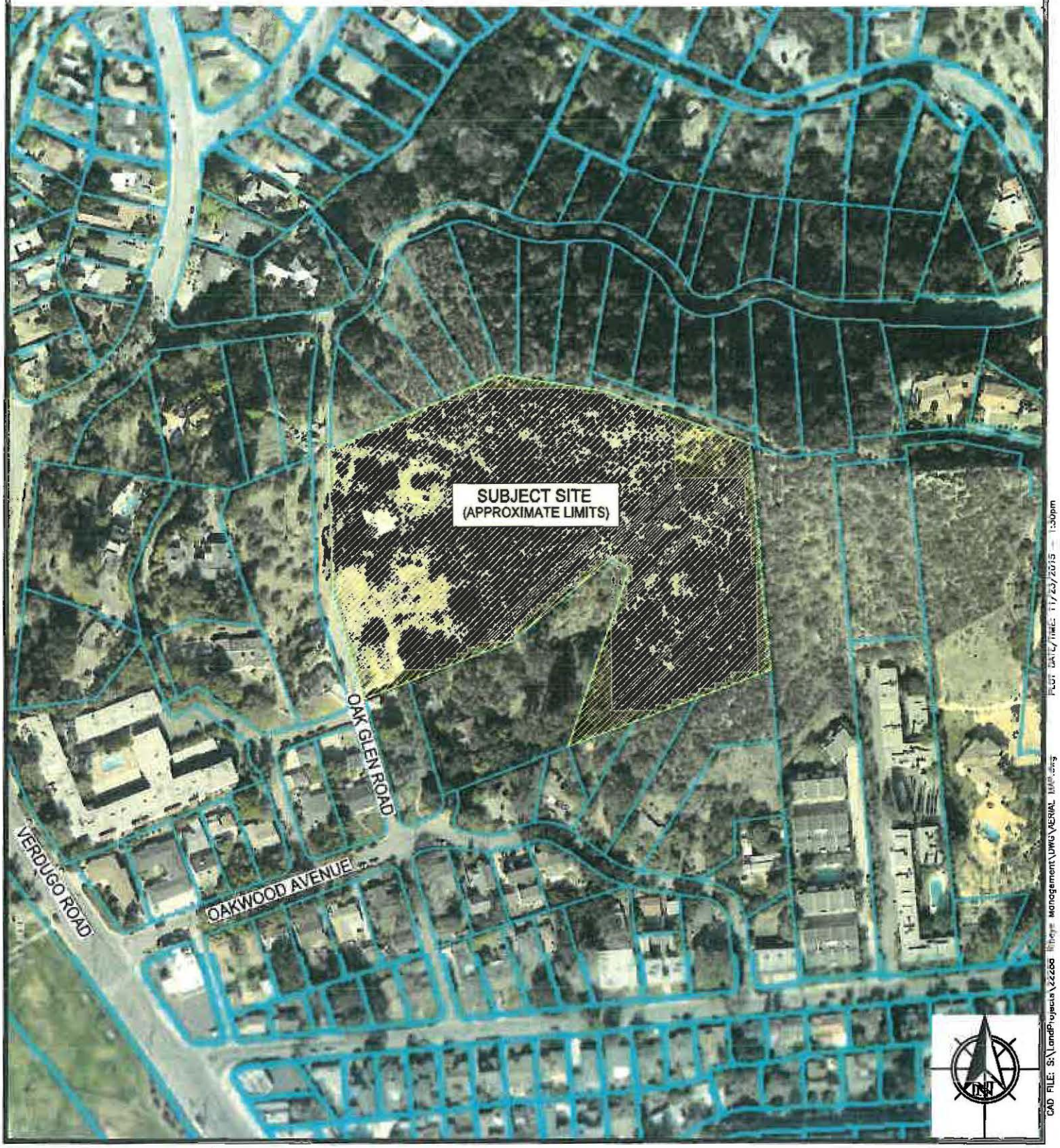
AERIAL VICINITY MAP

BG: 22288 RIBEYE MANAGEMENT

CONSULTANT: JET

SCALE: 1" = 200'

REFERENCE: LOS ANGELES COUNTY DEPARTMENT OF REGIONAL PLANNING, GIS-NET, 2013, http://gis.planning.lacounty.gov/GIS-NET_Public/Viewer.html



PLOT DATE/TIME: 11/23/2015 - 1:30pm
CAD FILE: S:\LandProjects\22288 Ribeye Management\DWG\AERIAL MAP.dwg

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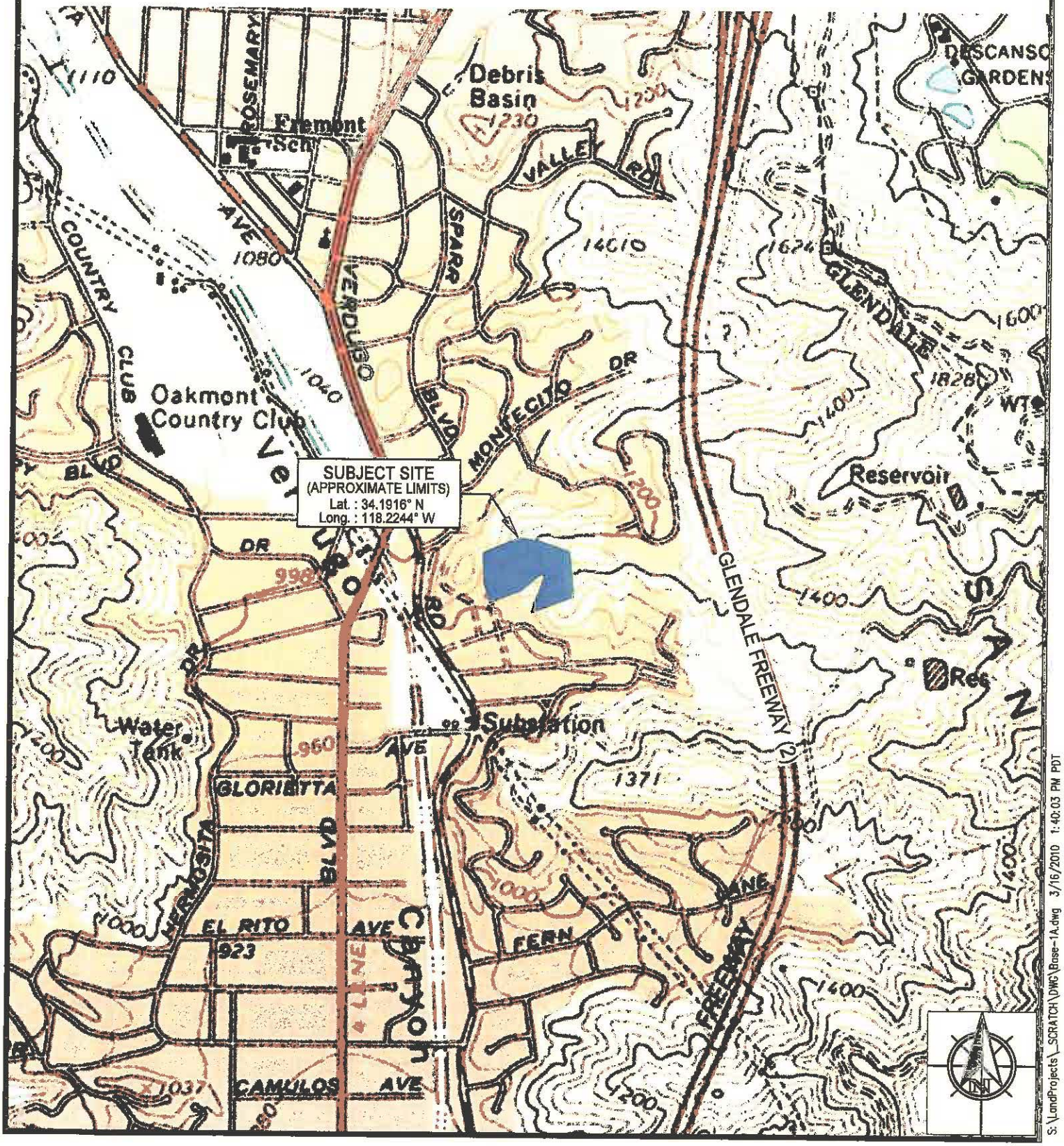
REGIONAL TOPOGRAPHIC MAP

BG: 22288 RIBEYE MANAGEMENT

CONSULTANT: JET

SCALE: 1" = 1000'

REFERENCE: USGS TOPOGRAPHIC MAP, PASADENA 7.5-MINUTE SERIES QUADRANGLE, LOS ANGELES COUNTY, CALIFORNIA CREATED 1964.



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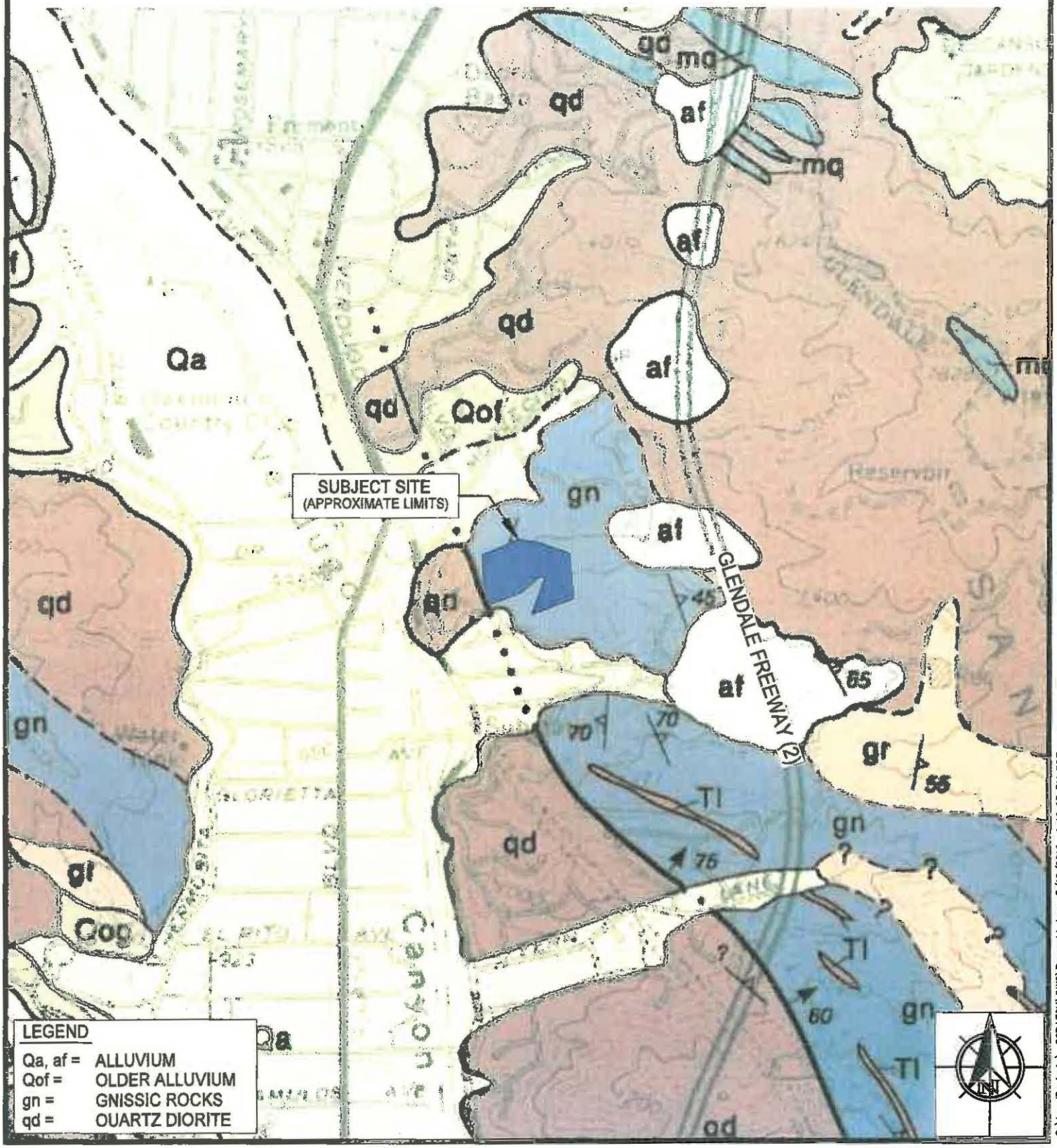
REGIONAL GEOLOGIC MAP

BG: 22288 RIBEYE MANAGEMENT

CONSULTANT: JET

SCALE: 1" = 1000'

REFERENCE: DIBBLEE, T.W. (1989), GEOLOGIC MAP OF THE PASADENA QUADRANGLES, LOS ANGELES, CALIFORNIA, DIBBLEE GEOLOGICAL FOUNDATION, MAP DF-23.



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BYER
GEOTECHNICAL
INC.
1461 E. CHEVY CHASE DR., SUITE 200
GLENDALE, CA 91206
818.549.9959 TEL
818.543.3747 FAX

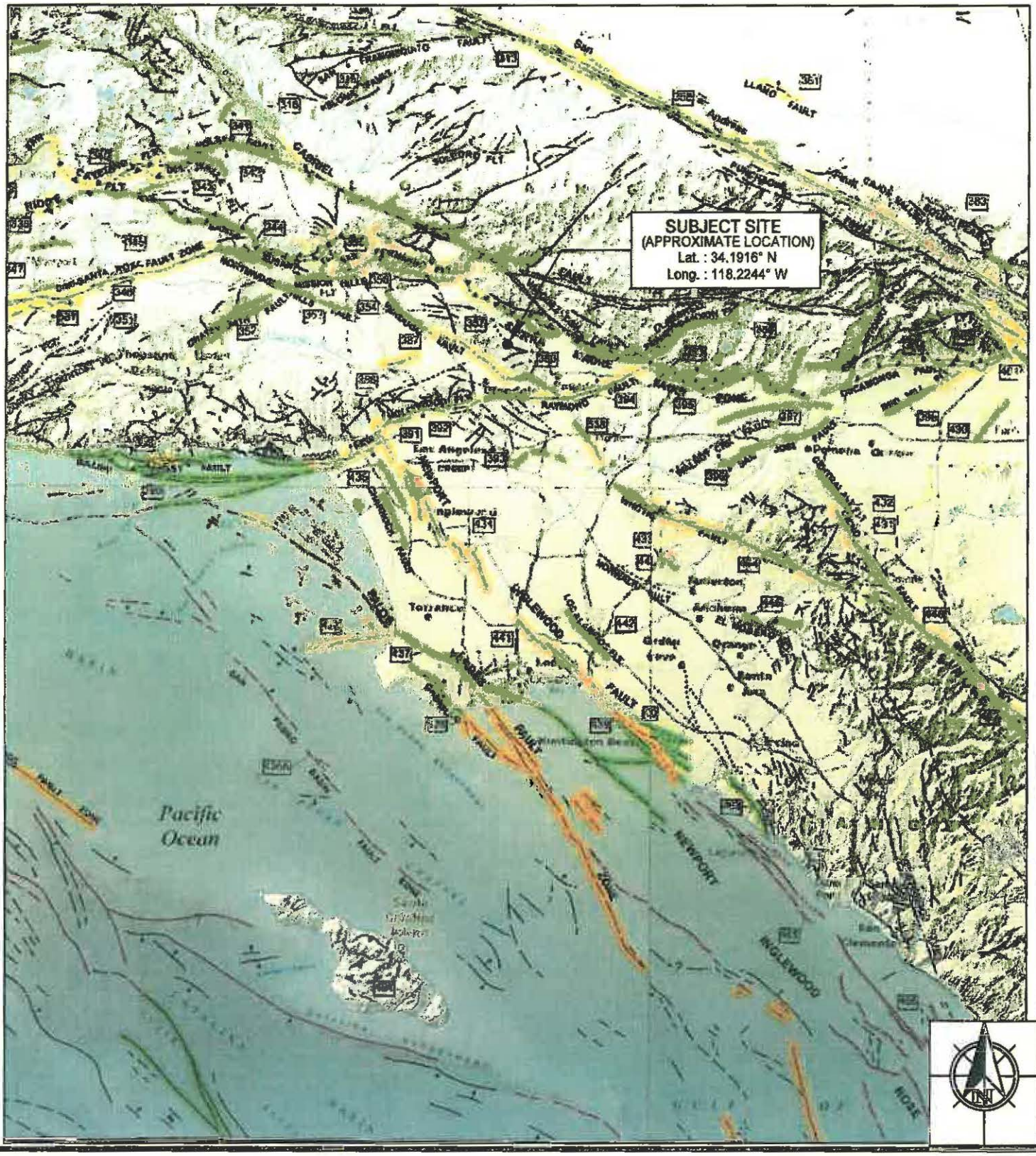
REGIONAL FAULT MAP

BG: 22288 RIBEYE MANAGEMENT

CONSULTANT: JET

SCALE: 1" = 12 MILES

REFERENCE: JENNINGS, C.W., AND BRYANT, W.A.,2010, FAULT ACTIVITY MAP OF CALIFORNIA GEOLOGICAL SURVEY, 150th ANNIVERSARY, MAP No 6.



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INC.
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GLENDALE, CA 91206
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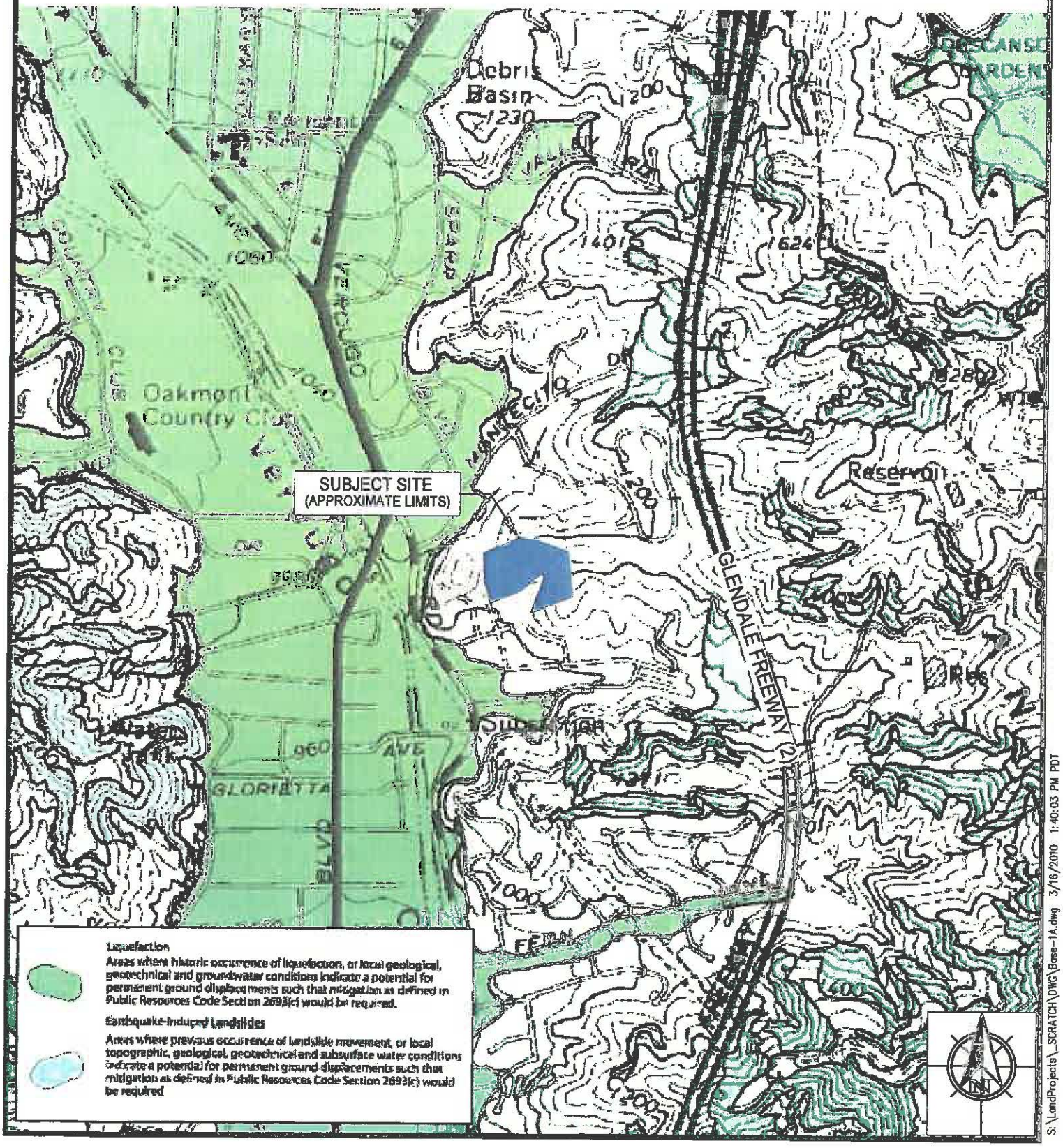
SEISMIC HAZARD ZONES MAP

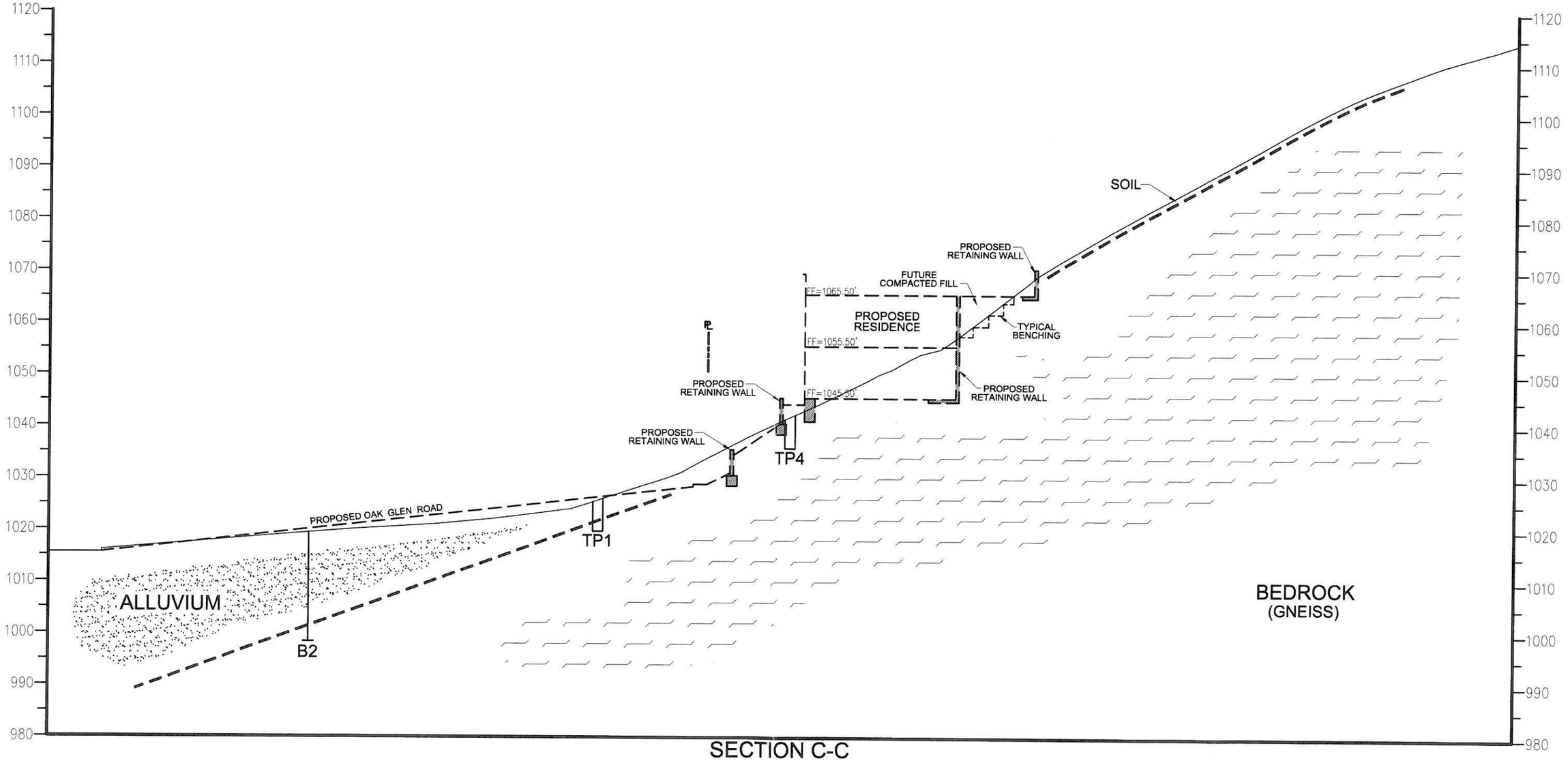
BG: 22288 RIBEYE MANAGEMENT

CONSULTANT: JET

SCALE: 1" = 1000'

REFERENCE: STATE OF CALIFORNIA SEISMIC HAZARD ZONES, PASADENA QUADRANGLE OFFICIAL MAP, CALIFORNIA GEOLOGICAL SURVEY, DATED MARCH 25, 1999.





SECTION C-C

NOV 2 3 2015

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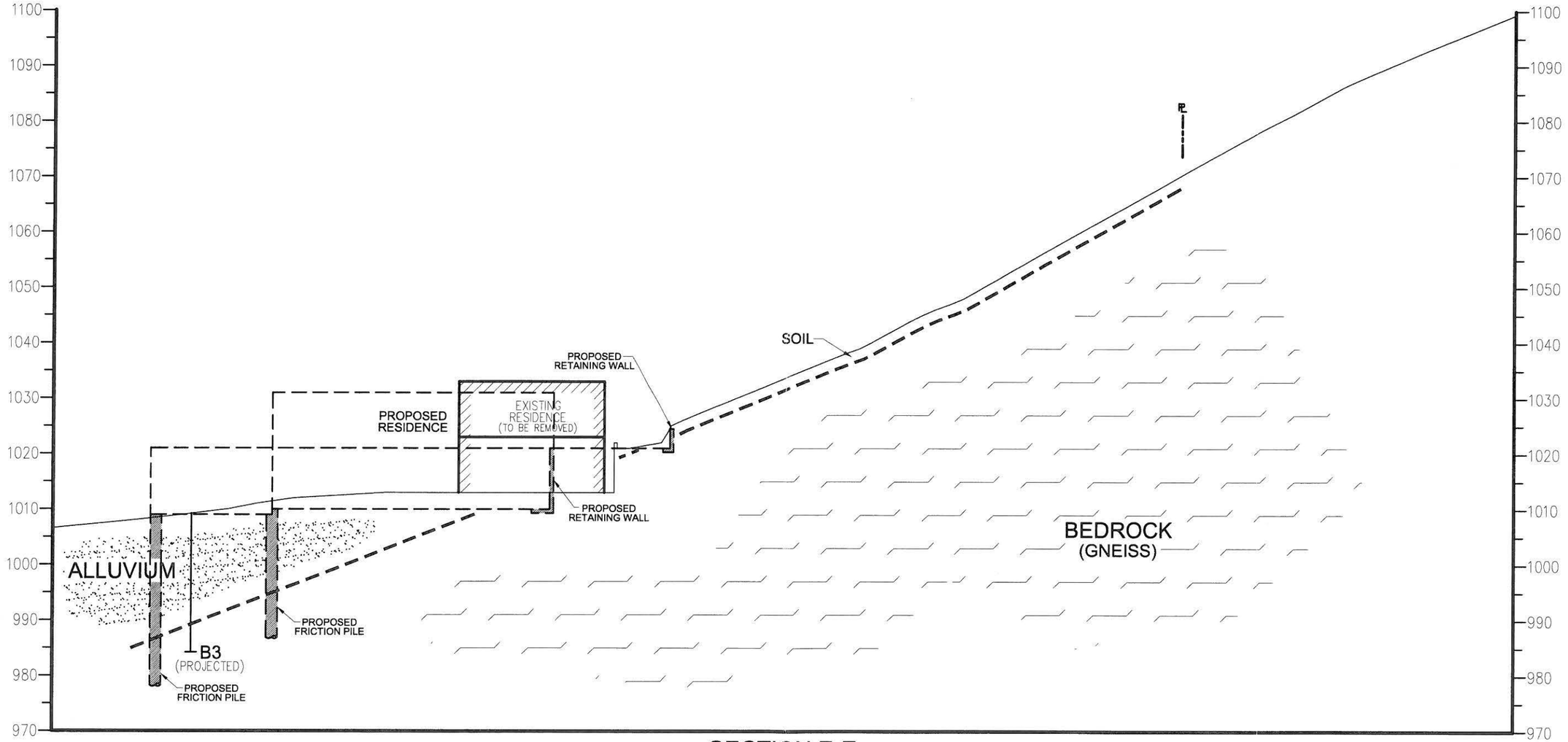
1461 E. CHEVY CHASE DR., SUITE 200
GLENDALE, CA 91206
818.549.9959 TEL
818.543.3747 FAX

SECTION C	
BG:	22288 RIBEYE MANAGEMENT
CONSULTANT: JET	SCALE: 1" = 20'



SECTION E-E

NOV 2 3 2015

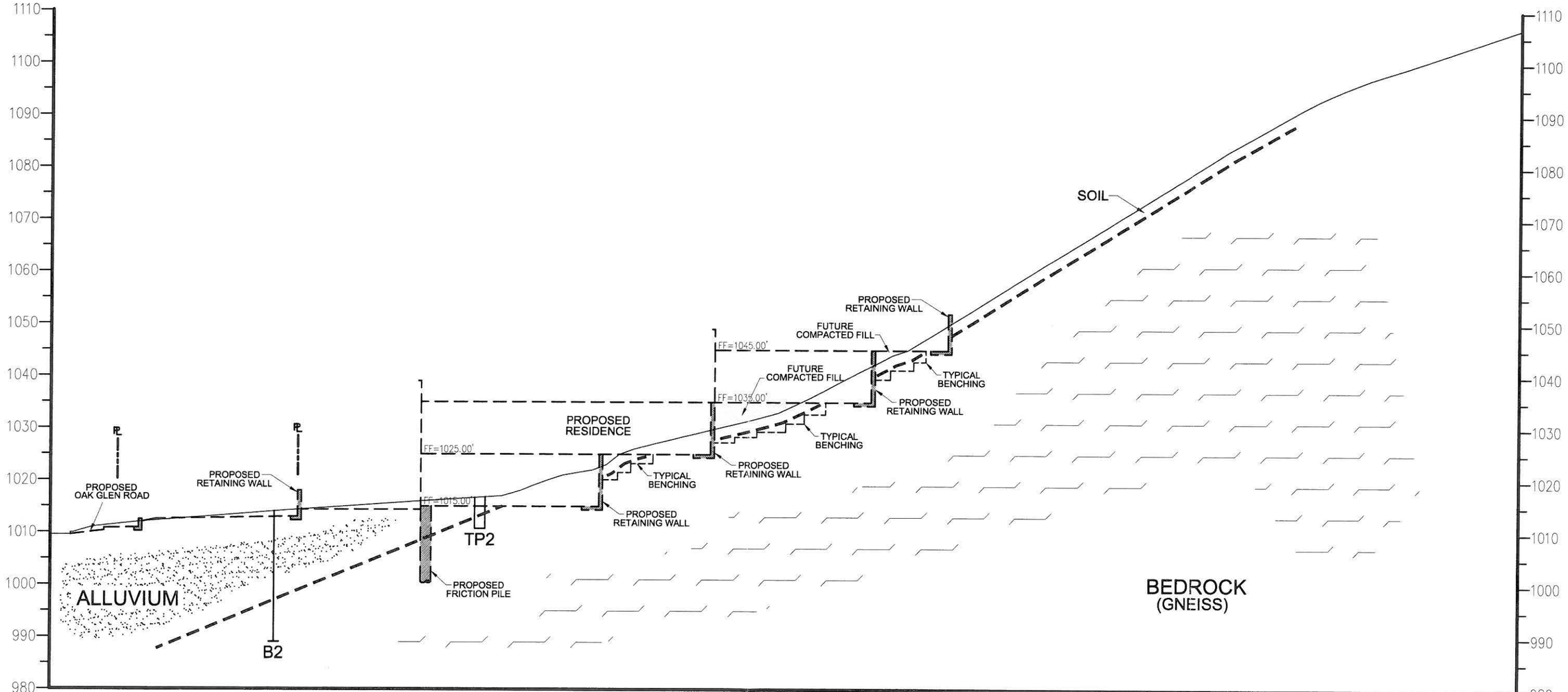
BYER GEOTECHNICAL INC.
1461 E. CHEVY CHASE DR., SUITE 200
GLENDALE, CA 91206
818.549.9959 TEL
818.543.3747 FAX

SECTION E

BG: 22288 RIBEYE MANAGEMENT

CONSULTANT: JET

SCALE: 1" = 20'



SECTION D-D

NOV 2 3 2015

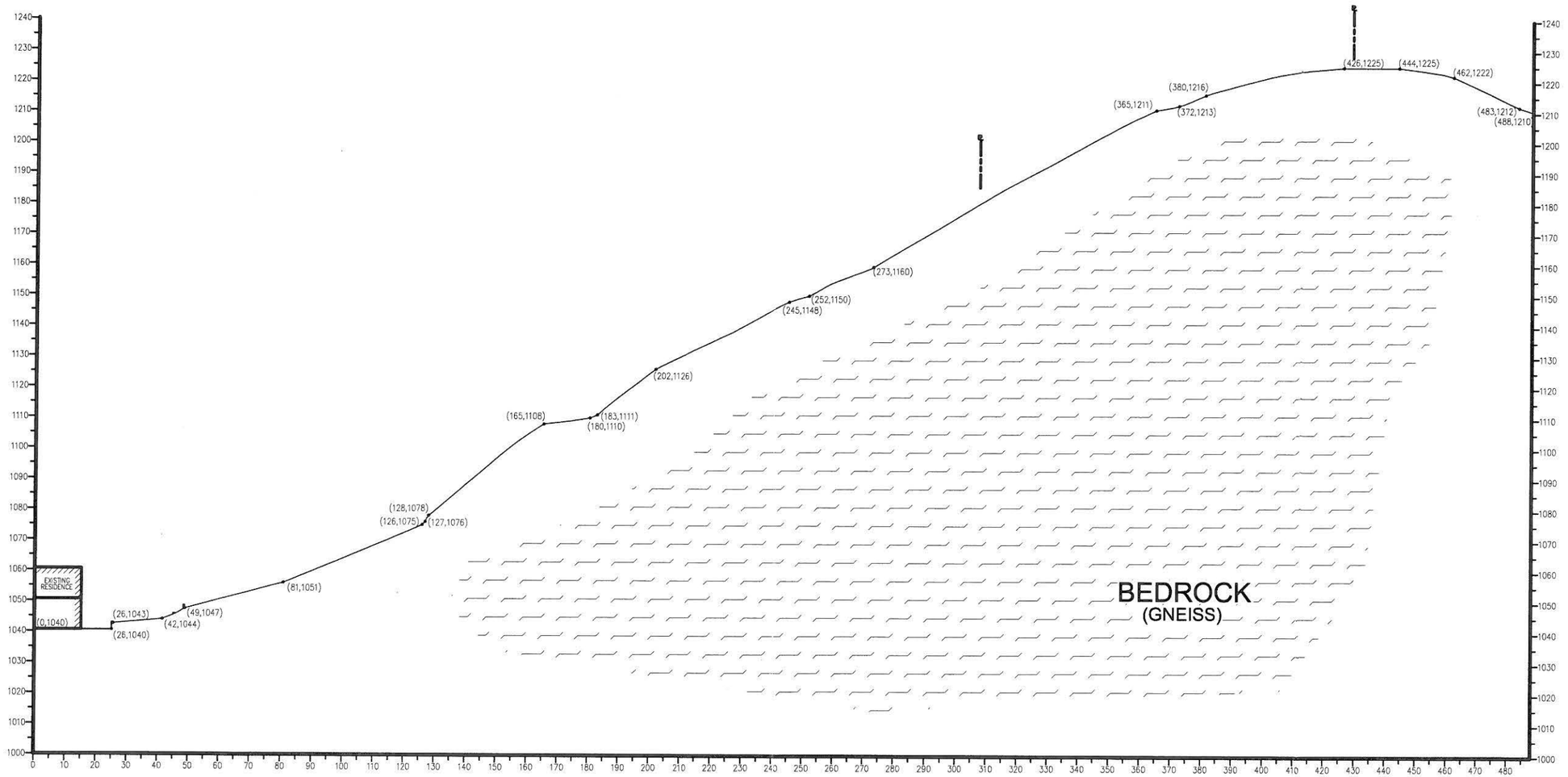
BYER GEOTECHNICAL INC.
1461 E. CHEVY CHASE DR., SUITE 200
GLENDALE, CA 91206
818.549.9959 TEL
818.543.3747 FAX

SECTION D

BG: 22288 RIBEYE MANAGEMENT

CONSULTANT: JET

SCALE: 1" = 20'



SECTION A-A

NOV 2 3 2015

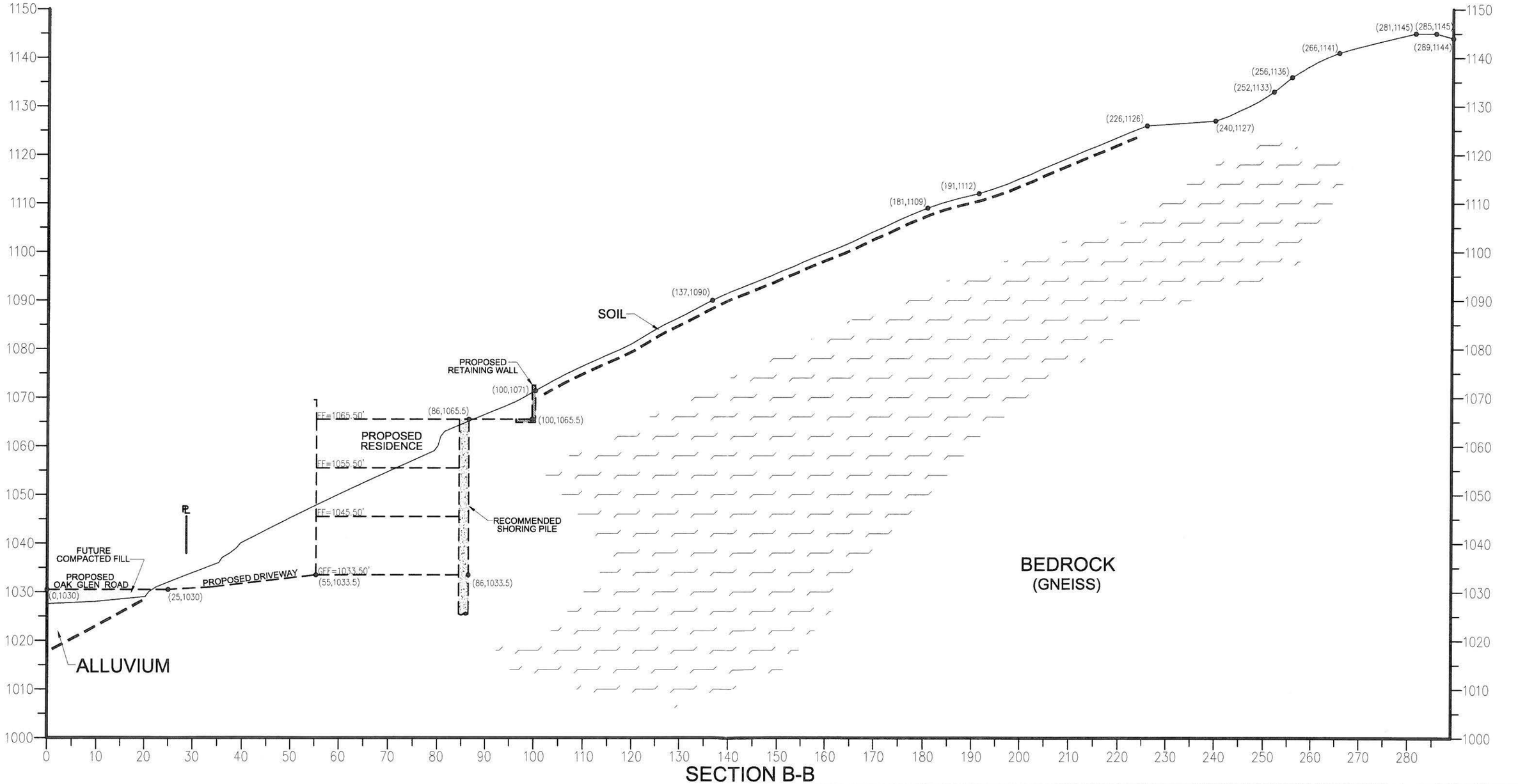
BYER GEOTECHNICAL INC.
1461 E. CHEVY CHASE DR., SUITE 200
GLENDALE, CA 91206
818.549.9959 TEL
818.543.3747 FAX

SECTION A

BG: 22288 RIBEYE MANAGEMENT

CONSULTANT: JET

SCALE: 1" = 40'



SECTION B-B

NOV 2 3 2015

BYER GEOTECHNICAL INC.
1461 E. CHEVY CHASE DR., SUITE 200
GLENDALE, CA 91206
818.549.9959 TEL
818.543.3747 FAX

SECTION B

BG: 22288 RIBEYE MANAGEMENT

CONSULTANT: JET

SCALE: 1" = 20'

BYER GEOTECHNICAL, INC.

July 29, 2016
BG 22288

Ribeye Management, LLC
201 West Palmer Avenue, Unit C
Glendale, California 91204

Attention: Ms. Diane Scioli

Subject

Addendum Geologic and Soils Engineering Exploration
Response to City of Glendale Secondary Ridgeline Review
Proposed Preliminary Parcel Map - 4-Lot Subdivision
Proposed Three Residences
Assessor's Parcel No. 5654-005-003
2942 Oak Glen Road
Glendale, California

References: **Report by Byer Geotechnical, Inc.:**

Geologic and Soils Engineering Exploration, Proposed Preliminary Parcel Map-4-Lot Subdivision, Assessor's Parcel No. 5654-005-003, 2942 Oak Glen Road, Glendale, California, dated November 23, 2015.

City of Glendale, Community Development, Planning & Neighborhood Services, letter dated May 3, 2016.

Gentlepersons:

This addendum to the geologic and soils engineering exploration report dated November 23, 2015, has been prepared to provide the additional information requested by the City of Glendale in the above-referenced letter dated May 3, 2016. Most of the corrections and requests are addressed to other professionals. The only geologic-related item requested in the review letter (enclosed with this report) is listed below, followed by Byer Geotechnical's response:

Item 4. *Seismic Study to address the earthquake fault that appears to go through the property (see map http://www.glendaleca.gov/home/showdocument?id=680);*

Response: The fault shown on the above-referenced map was originally mapped by John W. Byer in 1968 as part of an unpublished Geologic Map of Glendale. This fault is shown extending along the approximate west side of Oak Glen Road and bringing into contact the Placerita Formation gneiss underlying the subject property, with granodiorite to the west (see Local Geologic Map by Byer). This fault was also shown on the Regional Geologic Map included in the referenced report and prepared by the Dibblee Foundation. This portion of the Dibblee map is based on the original mapping by Byer and an unpublished mapping by P. L. Ehlig. This fault has also been reproduced and shown in various editions of the City of Glendale, Safety Element.

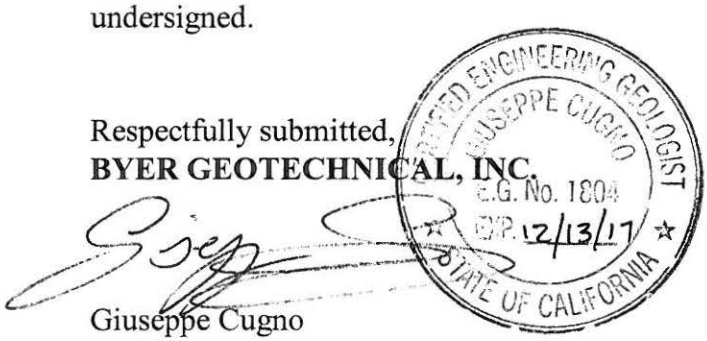
Personal communications with Byer indicate that this fault only offsets bedrock units that are Pre-Cretaceous and has not shown evidence of offsetting Quaternary deposits. Furthermore the above referenced "Environmental Hazards" map, dated June 28, 2010, does not include this portion of the fault within the city of Glendale fault hazard management zone and the property is not located within a currently-designated Alquist-Priolo Earthquake Fault Zone (CGS, 2000).

The *Fault Activity Map of California* (Jennings and Bryant, 2010) by the USGS classifies fault activity based on the most recent age of fault movement, and distinguishes between "historic faults" (displacement within the last 200 years); "Holocene faults" (displacement within the last 11,700 years); "Late Quaternary faults" (surface rupture within the last 700,000 years); "Quaternary faults" (displacement within the last 1.6 million years); and "pre-Quaternary faults" (no displacement within the last 1.6 million years). The USGS map and database show an unnamed Quaternary fault (displacement within the last 1.6 million years)

extending northwesterly across the northeastern portion of the site. The location shown on the USGS is not very accurate and is only an approximation of the mapping by Byer, Dibblee, and Ehlig. It is the opinion of Byer Geotechnical, Inc., that this fault does not represent a fault rupture hazard to the proposed development.

Byer Geotechnical appreciates the opportunity to continue 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,
BYER GEOTECHNICAL, INC.



Giuseppe Cugno
E. G. 1804

GC:JWB:mh
S:\FINAL\BG\22288_Ribeye Management\22288_Ribeye_Management_Addendum_and_Response_7.29.16.wpd

Enc: City of Glendale, letter dated May 3, 2016 (3 Pages)
Local Geologic Map

xc: (1) Addressee
(3) Alen Malekian (E-mail and Mail)

BYER GEOTECHNICAL INC.
1461 E. CHEVY CHASE DRIVE, #200, GLENDALE, CA 91206
tel 818.549.9959 fax 818.543.3747

LOCAL GEOLOGIC MAP

BG: 22288 CLIENT: RIBEYE MANAGEMENT

GEOLOGIST: GC SCALE: 1"=400'

REF: GEOLOGIC MAP OF A PORTION OF THE SAN RAFAEL HILLS, GLENDALE, CALIFORNIA (BYER 1968)