Appendix E-1
Geotechnical Review

RTF&A
GEOTECHNICAL ENGINEERING & ENGINEERING GEOLOGY

February 22, 2024

NUWI – Lyons Canyon, LLC
2001 Wilshire Blvd., Suite 401
Santa Monica, California 90403

Job No. 2020-200-001

Attention: Mr. Benny Sam

Subject: Response to County of Los Angeles Comments
Dated November 8, 2023
Proposed Lyons Canyon Development
Tentative Tract Map 83301
Los Angeles County, California

Reference: See References

Ladies and Gentlemen:

R.T. Frankian and Associates, Inc., (RTF&A) presents this response to address review comments provided by the County of Los Angeles Department of Public Works (County), Geotechnical and Materials Engineering Division (GMED), Geologic and Soils Engineering Sections, in their November 8, 2023 review comments concerning the subject site. The review comments are in response to the R.T. Frankian & Associates (RTF&A) Geotechnical 100-Scale Plan Review, dated September 15, 2023. The GMED review sheet comments are shown below in bold type. Our response follows each comment in regular type. A copy of the GMED Review sheet is included with this response.

REPORT REVIEW COMMENTS

G1. Several landslides are mapped on the slopes below the proposed water tank. Verify that landslides illustrated on Figure 1 will be removed and/or mitigated. Show limits of removals on geotechnical map and/or other mitigation measures.

This comment was discussed with the GMED Geology reviewers during a virtual meeting where new Geologic Sections were presented and in addition to addressing the original comment, slope stability calculations were also requested.

Slopes associated with the proposed water tank pad are generally steep, often with slope ratios steeper than 1 horizontal : 1 vertical (H:V), and in many locations steeper than .5H:1V. Hard conglomeratic sandstone beds between 8 feet and 40 feet thick have facilitated the steep slopes, ledges, cliffs, and hogbacks, are not prone to be involved in landslides, but rather hold the slopes up, limiting the extent of and orientation of slope instabilities in the area. Field mapping and interpretation of aerial imagery from 1930 to the present 2017 with select images presented as Figures HA-1 through HA-4 undoubtedly indicate that there is no geomorphic expression of any deep seated slope failures or landslides on the slopes of the proposed tank pad or in the vicinity. Furthermore, it is absolutely apparent that site slopes are intact as the stratigraphy favorably crosses the area of the proposed cut.

Therefore, the features previously labeled as landslides Qls11, Qls12, Qls13, and Qls14 have been relabeled and are classified as surficial slumps labeled as SS1, SS2, SS3, and SS4 (respectively) on Figure 1(R). Geologic Cross Sections 19-19', 20-20', 21-21', and 22-22' have been constructed and are presented as Figure 2.1, along with Geologic Cross Sections 13-13' through 18-18' which have previously been submitted.

Grading of the water tank pad, as proposed, will remove roughly 40 to 60 feet of rock from the ridgeline. This proposed grading will remove the steepest parts of the slopes that include the heads of the four mapped surficial slumps. This alone will mitigate further advancement or encroachment of surficial degradation into the proposed water tank pad. Each surficial slump, SS1, SS2, SS3, SS4 is discussed individually below, and identified on Figure 1(R). Each of these slumps are not deep seated features, but rather are surficial in nature, with SS3 and SS4 being considered creep features. The proposed grading does not adversely impact the stability of the existing slopes, it improves it.

Surficial Slump SS1 is surficial sloughing involving colluvium and weathered sandy mudstone on a dip slope that is structurally controlled by hard well cemented hog back forming conglomeratic sandstone. Proposed grading will remove the top of SS1 and leave debris on the slope below the cut to function as armor. Proposed grading will reduce water on the slope. Grading of the water tank pad will improve the conditions of the slope. Surficial Slump SS1 does not pose a negative impact to the water tank pad. No slope specific mitigations are necessary or recommended.

Surficial Slump SS2 is a collection of coalescing shoots generated on the antidip slope within sandy mudstone situated below a ledge forming well cemented cobbly sandstone, not the same hard sandstone bed associated with SS1. The shoots are shallow accumulations of materials with a maximum estimated thickness of 8 feet. Proposed grading will remove the heads of the shoots and the majority of the sloughed materials. Grading as proposed will reduce the natural accumulation and focusing of water into the shoots thereby improving the slope's overall condition. Grading as proposed will mitigate SS2's potential for encroachment or impacts to the proposed water tank pad. No slope specific mitigations are necessary or recommended.

Surficial Slump SS3 is an accumulation of colluvium and weathered rock that is creeping down slope. The top of SS3 is generally at the elevation of the water tank pad. Estimated maximum thickness of the slide debris is 8 feet. Proposed grading will improve the condition of the slope and reduce the volume of water on the slope. No specific mitigations are necessary or recommended for SS3.

Surficial Slump SS4 is a coalescing of small surficial slope failures and creep of colluvium and weathered rock. This complex is in a stratigraphically similar position as SS2. The top of SS4 is generated from very steep (.25:1 H:V) slopes at elevations generally above the proposed water tank elevation. Below an elevation of about 1520 the thickness of accumulated material on the slope is estimated to be about 8 feet while at the base of the slope the debris thickness is estimated to be up to 15 feet thick. Proposed grading for the water tank will remove the upper portions of the slope that are sloughing and creeping downward. Grading will reduce water on the slope improving the overall slope condition. No specific mitigation measures are necessary or proposed for SS4.

This comment was discussed with the GMED Geology reviewers during a virtual meeting where new Geologic Sections were presented and in addition to addressing the original comment, gross slope stability calculations were also requested on Geologic Cross Sections 19-19' and 21-21'. Slope stability calculations were performed using the program Slope/W Version 2022.1 prepared by GeoStudio. A static factor of safety of 1.5 and a seismic factor of safety of 1.1 are required for gross stability per GMED Guidelines. Presented below are the recommended shear strengths for use at the subject site that were previously approved by GMED with their previous approval of the referenced reports.

MATERIAL	COHESION (psf)	ANGLE OF SHEARING RESISTANCE (degrees)
Landslide Failure Plane (MSR)	200	16
TQss Bedding Static (MSR)	250	20
TQss Bedding Seismic (SSR)	200	30
TQss Cross Bed Static (SSR)	500	34
TQss Cross Bed Seismic (SSR)	800	36
Compacted Fill 90% (SSR)	350	30
Compacted Fill 95% (SSR)	400	30
Alluvium (Qal)	250	30

The slope stability calculations are presented in the Appendix and meet Los Angeles County factor of safety requirements and are considered grossly stable. No additional mitigations are considered necessary beyond those previously presented in the reviewed report.

G2. Please show the location of the abandoned oil will on Figure 1.

Acknowledged, see Figure 1(R).

S1. Show the following on the geotechnical map:
a. Existing proposed grades.

Acknowledged, see Figure 1(R).

b. Approximate limits and depth of removal and recompaction of unsuitable soils, if applicable.

Estimated removal depths are delineated with a designation such as R=20'which designates that a 20' removal below existing grade is recommended prior to placing compacted fill. The "Removal Depth Boundary Line" as labeled, extends northeast from Qls4, with the transition from a 15' foot to a 20' recommended removal below existing grade within Qac. Where the arrows end and or intersect a contact or the "Removal Depth Boundary Line" those are areas of transitioning to another estimated removal depth.

c. Location of "Restricted Use Areas", if applicable.

Restricted Use Areas are not proposed or anticipated for the project.

S2. The geotechnical consultant(s) must sign, stamp and indicate the date of signature on all reports and addenda.

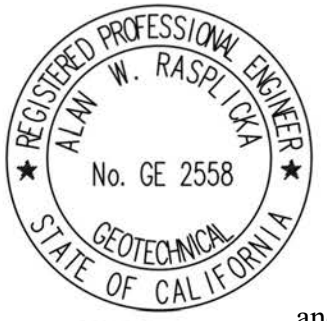
Acknowledged.

S3. Please submit documents in response to this review using the EPIC-LA system at the following URL: https://epicla.lacounty.gov/Self/Service/#/home. The documents must be submitted to the EPIC-LA geotechnical study plan case number ESTU2021000162. Please contact GMED staff at (626)458-4925 if documents cannot be uploaded to the plan case.

Submittal of this response to EPIC-LA is referred to United Civil Inc. so that they can coordinate submittal of this response with their plan and/or other related project submittals.

The following are attached and complete this report:

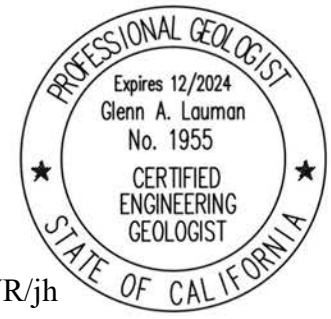
- County of Los Angeles Department of Public Works, Geotechnical and Materials Engineering Division, Geologic and Soils Engineering Review Sheet, dated November 8, 2023, 1 sheet,
- Geotechnical Map - Figure 1(R).
- Geologic Sections – Figure 2.1
- Historical Aerial Images – Figures HA-1 through HA-4
- Appendix – Slope Stability Calculations



Respectfully submitted,
R. T. Frankian & Associates

Alan W. Rasplicka

and: Alan W. Rasplicka
Principal Geotechnical Engineer



and: Glenn A. Lauman
Principal Engineering Geologist

GAL/AWR/jh

PDF Distribution via email:
New Urban West, Inc. Attn: Mr. Jason Jan, Mr. Jonathan Frankel
Madison Real Estate Consulting, LLC Attn: Mr. Benny Sam
United Civil Inc., Mr. Anthony Ng, Attn: Mr. Matt Sawyer

RTF&A
GEOTECHNICAL ENGINEERING & ENGINEERING GEOLOGY

PCA LX001129/A863
EPIC LA RPPL2021003061
ESTU2021000162

County of Los Angeles Department of Public Works
Geotechnical and Materials Engineering Division
GEOLOGIC AND SOILS ENGINEERING REVIEW SHEET
900 S. Fremont Avenue, Alhambra, CA 91803

Telephone: (626) 458-4925

Tentative Tract / Parcel Map	83301	**Tentative Map Dated**	**09/06/2023 (Tentative/Exhibit A)**
Grading By Subdivider? [Y] (Y or N)	2,600,000 yd³	**Location**	Lyons Canyon
Geologist	R.T. Frankian	**Subdivider**	NUWI-LYONS CANYON, LLC
Soils Engineer	R.T. Frankian	**Engineer/Arch.**	Alliance Land Planning & Engineering

Review of:
Geologic Report(s) Dated:
Soils Engineering Report(s) Dated:
Geotechnical Report(s) Dated: **09/15/2023**, 7/27/21, 03/19/21
References:

TENTATIVE MAP FEASIBILITY IS NOT RECOMMENDED FOR APPROVAL. PRIOR TO RECOMMENDING APPROVAL OF THE TENTATIVE TRACT OR PARCEL MAP:

G1. Several landslides are mapped on the slopes below the proposed water tank. Verify that landslides illustrated on Figure 1 will be removed and/or mitigated. Show limits of removals on geotechnical map and/or other mitigation measures.

G2. Please show the location of the abandoned oil well on Figure 1.

S1. Show the following on the geotechnical map:
- a. Existing and proposed grades.
- b. Approximate limits and depth of removal and recompaction of unsuitable soils, if applicable.
- c. Location of "Restricted Use Areas", if applicable.

S2. The geotechnical consultant(s) must sign, stamp, and indicate the date of signature on all reports and addenda.

S3. Please submit documents in response to this review using the EPIC-LA system at the following URL: https://epicla.lacounty.gov/SelfService/#/home. The documents must be submitted to the EPIC-LA geotechnical study plan case number ESTU2021000162. Please contact GMED staff at (626) 458-4925 if documents cannot be uploaded to the plan case.

NOTE: Provide a copy of this review sheet with your resubmittal.

NOTE(S) TO THE PLAN CHECKER/BUILDING AND SAFETY DISTRICT ENGINEER:
PER THE SOILS ENGINEER:
- A. ON-SITE SOILS ARE CORROSIVE TO FERROUS METALS.
- B. EXPANSION INDEX OF NEAR-SURFACE CERTIFIED ENGINEERED FILL ON BUILDING LOTS SHOULD BE EVALUATED AT THE COMPLETION OF GRADING.
- C. THE SOILS REPORT DATED 3/19/21 INDICATES THERE MAY BE ENVIRONMENTAL CONCERNS REGARDING THE PRESENCE OF OILS WELLS.
- D. FOR SECTION G-G' OF THE REPORT DATED 7/27/21, THE BEDDING PLANE THAT MEETS COUNTY FACTOR OF SAFETY REQUIREMENTS IS AT A DEPTH OF 15 FEET BELOW THE PROPOSED RETAINING WALL.
- E. FOR SECTION G-G' OF THE REPORT DATED 7/27/21, A PROPOSED PILE RETAINING WALL IS RECOMMENDED. PILES MUST BE SUFFICIENTLY STIFF TO PROVIDE RESISTANCE OF 10 KIPS PER FOOT OF WALL AT THE MID-HEIGHT OF THE PROPOSED RETAINING WALL.

Prepared by

George Molina
Soils Section

PROFESSIONAL ENGINEER GEORGE MOLINA C 91931 CIVIL STATE OF CALIFORNIA

CERTIFIED ENGINEERING GEOLOGIST MATTHEW A. CRUZ No. 2780 STATE OF CALIFORNIA

Matthew Cruz
Geology Section

Date 11/8/2023

Please complete a Customer Service Survey at http://dpw.lacounty.gov/go/gmedsurvey
NOTICE: Public safety, relative to geotechnical subsurface exploration, shall be provided in accordance with current codes for excavations, inclusive of the Los Angeles County Code, Chapter 11.48, and the State of California, Title 8, Construction Safety Orders.

EXPLANATION

- af — Artificial Fill
- Qdf — Debris Flow Deposits
- Qac — Undifferentiated Alluvium & Colluvium
- TQss — Saugus Formation, Sunshine Ranch Member
- Tp — Pico Formation
- Geologic Contact; Dashed Where Approximate, Queried Where Inferred, Dotted Where Covered
- 29 — Strike and Dip of Bedding
- 18 — 18' — Geologic Section Line
- Proposed Subdrain
- CS-12 — Cut Slope Designation
- PS-B, PS-CPT, PS-RW — Pacific Soils Bucket and CPT Locations (2006)
- PS-EP — Pacific Soils Exploratory Pit Locations (2006)
- GSC-B — Gold Coast Boring Location
- CPT — RTF&A CPT location (2021)
- HS — RTF&A Hollow Stem Locations (2021)
- TP — RTF&A Test Pit Locations (2022)
- AYERS OIL — Oil Well Location
- R=20' — Recommended Removal Prior to Placing Fill (ft)
- Recommended Stability Fill Keyway
- Qls10 — Landslide Debris (Remove All Landslide Debris Prior to Placing Fill)
- SS4 — Surficial Slough and Areas of Colluvial Creep

LEGEND:

- BOUNDARY LINE
- 1430 — EXISTING CONTOURS
- S — S — EXISTING SEWER
- W — W — EXISTING WATER
- DRAINAGE FLOW DIRECTION
- PROPOSED LOT LINES
- ZONE BOUNDARY LINE
- 90 — PROPOSED GRADING CONTOUR
- 50 — PROPOSED STREET GRADES
- PROPOSED RETAINING WALL
- PROPOSED MANUFACTURED SLOPE
- (S) — EXISTING EASEMENTS
- (A) — PROPOSED EASEMENTS
- LIMIT OF GRADING LINE
- SD — SD — PROPOSED STORM DRAIN
- S — S — PROPOSED SANITARY SEWER
- W — W — PROPOSED WATER
- LOT X — LOT NUMBER
- XXX Tax — EXISTING OAK TREE (SEE PROTECTED TREE REPORT AND SHEET 2 & 3)
- EXISTING NON-OAK PROTECTED TREE (SEE PROTECTED TREE REPORT AND SHEET 2 & 3)
- MWS — MODULAR WETLAND STORM WATER TREATMENT DEVICE

EASEMENTS BASED ON FIRST AMERICAN TITLE INSURANCE COMPANY PRELIMINARY TITLE REPORT, ORDER NO. NHSC-6837868(RA), DATED MAY 4, 2022

EXISTING EASEMENTS					
TITLE REPORT ITEM NO.	OWNER	PURPOSE	REFERENCE	FUTURE DISPOSITION	TENTATIVE MAP SHEET NO.
(4)	SO. CAL. EDISON	ELECTRICAL LINES & INCIDENTAL PURPOSES	JULY 25, 1945 BOOK 30616, PAGE 283	TO BE REALIGNED WITH FINAL SCE DESIGN	N/A CANNOT BE PLOTTED
(5)	AYERS EASEMENT	INGRESS/EGRESS	JULY 12, 1977 INSTR. NO. 77-746808 JULY 13, 1977 INSTR. NO. 77-754792 APRIL 4, 1978 INSTR. NO. 78-352178 FEBRUARY 27, 1979 INSTR. NO. 79-227247	TO BE REALIGNED WITH "A" STREET AND "B" STREET	2
PROPOSED EASEMENTS					
(X)	TWENTY FOOT WIDE MULTI-USE(HIKING, MOUNTAIN BIKING, EQUESTRIAN) TRAIL EASEMENT TO BE DEDICATED TO THE COUNTY OF LOS ANGELES APPROPRIATELY ALONG THE EXISTING VARIABLE WIDTH TRAIL ALIGNMENTS			TO LA COUNTY PARKS AND REC. DEPARTMENT	2
(Y)	MINIMUM TWENTY EIGHT FOOT WIDE ACCESS EASEMENT FOR INGRESS AND EGRESS PURPOSES TO BE GRANTED TO ADJACENT PRIVATE PROPERTY OWNERS			PRIVATE ACCESS EASEMENT (TO BE MAINTAINED BY HOA)	2
(Z)	STORM DRAIN EASEMENT FOR ACCESS AND MAINTENANCE OF LOS ANGELES COUNTY OWNED BASIN, PIPS, AND STRUCTURES			TO LA COUNTY FLOOD CONTROL	2
	TEN FOOT WIDE SANITARY SEWER EASEMENT, CENTERLINE BEING PROPOSED SEWER MAIN WHERE SEWER MAIN IS OUTSIDE OF PUBLIC RIGHT OF WAY.			TO LA COUNTY PUBLIC WORKS	

Geotechnical Map

Prepared For: NUWI-Lyons Canyon, LLC

Proposed Lyons Canyon Development
Tentative Tract Map 83301
Los Angeles County, California

Scale: AS-SHOWN	Drawn By: JH	Checked By: GAL
Date: 2/22/24	Figure 1(R)	2020-200-001

R. T. FRANKIAN & ASSOCIATES
26027 Huntington Lane, Unit A
Santa Clarita, California 91355
(818) 513-1703
www.RTFrankian.com

RTFA — GEOTECHNICAL, ENGINEERING & ENVIRONMENTAL SERVICES

GRAPHIC SCALE
0 50 100 200
(IN FEET)
1 inch = 100 ft.

EXTENDED AREA TOPOGRAPHY PROVIDED BY UNITED CIVIL, INC. FILE: 2038_TOPO_COMPOSITE.DWG

UNITED CIVIL INC
30141 Agoura Road, Suite 215
Agoura Hills, CA 91301
PH: (818) 707-8648

SIEW HUAT NG — R.C.E. 46026 — 09/05/2023 — DATE

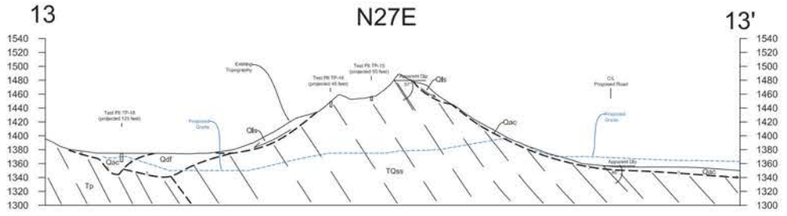
OWNER/APPLICANT:
NUWI LYONS CANYON, LLC
2001 WILSHIRE BOULEVARD, SUITE 401
SANTA MONICA, CA 90403
TEL: (310) 864-2427

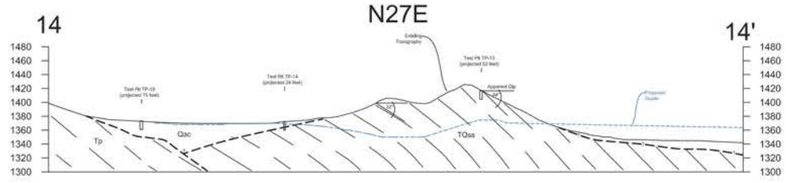
NO.	DATE	REVISIONS	BY	APPR

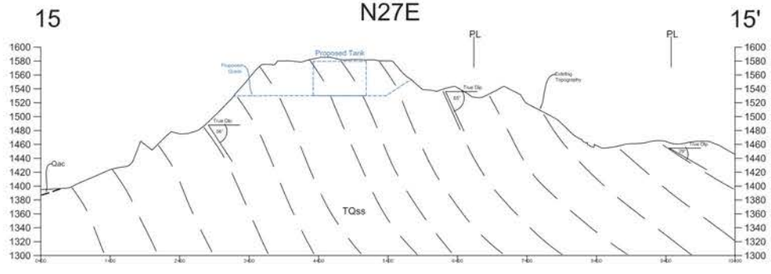
THE TRAILS AT LYONS CANYON
MAJOR LAND DIVISION
VESTING TENTATIVE TRACT NO. 83301
(FOR CONDOMINIUM PURPOSES)
LOCATED IN THE UNINCORPORATED TERRITORY OF
THE COUNTY OF LOS ANGELES, STATE OF CALIFORNIA

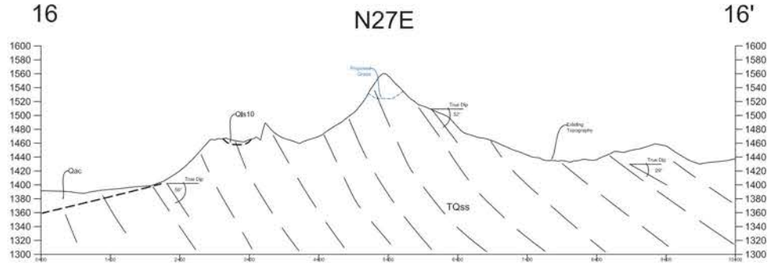
DATE: JANUARY 05, 2024
SHEET 2 OF 5

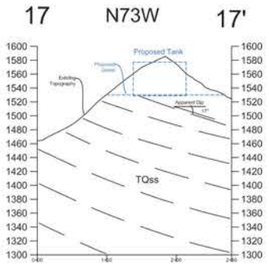
Q:\Santa Clarita\Lyons Canyon Ranch\UCI\VTM\2038_TENTATIVE-MAP_Sheets.dwg

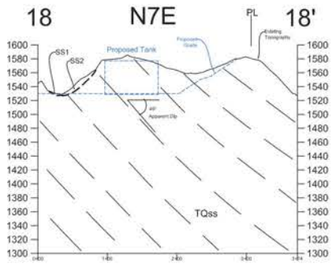


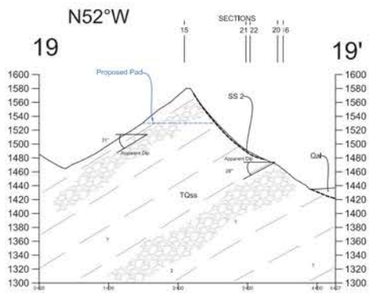


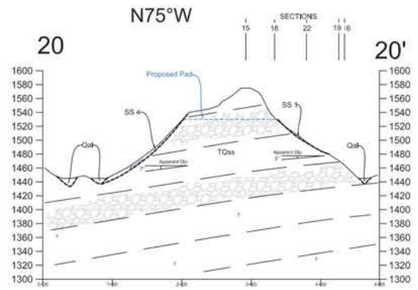


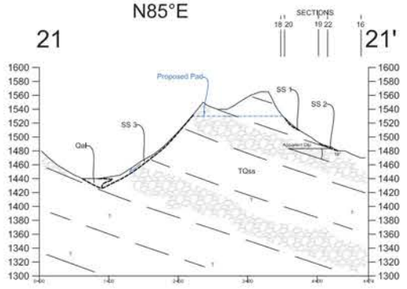






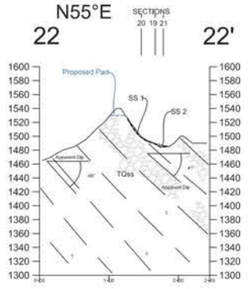






Explanation

Qac	Alluvium, Colluvium - Undifferentiated
TQss	Saugus Formation, Sunshine Ranch Member
Qls	Landslide Debris
SS4	Surficial Slough
	Sandstone Conglomerate - Hard, Well Cemented, Ridge/Hogback Forming



Geologic Sections

Prepared For:
NUWI-Lyons Canyon, LLC

Proposed Lyons Canyon Development
Tentative Tract Map 83301
Los Angeles County, California

Scale: AS-SHOWN	Drawn By: JH	Checked By: GAL
Date: 2/22/24	Figure 2.1	2020-200-001

R. T. FRANKIAN & ASSOCIATES
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Santa Clarita, California 91355
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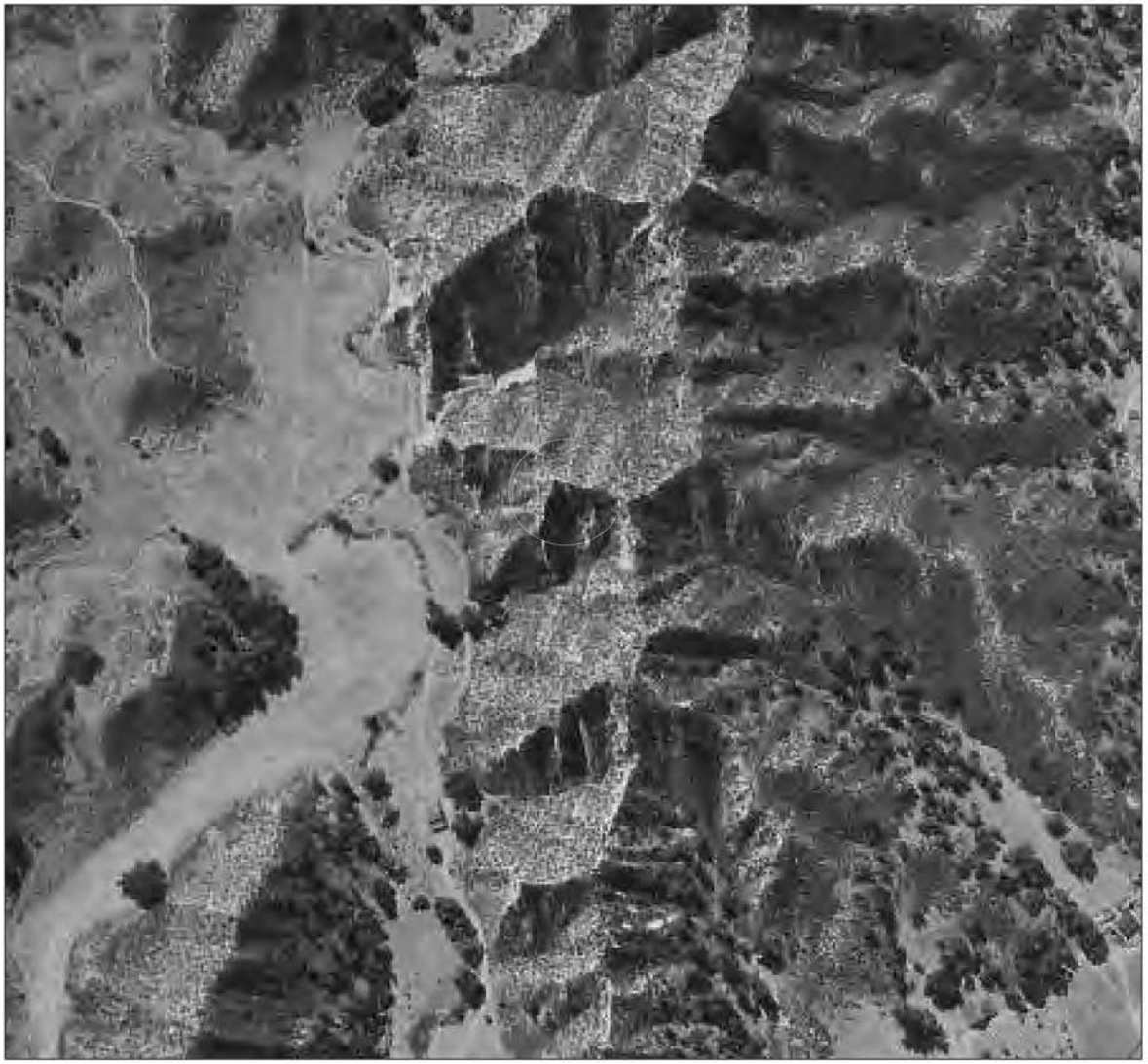
RTFA
GEOTECHNICAL ENGINEERING & ENGINEERING GEOLOGY

1930 Historical Aerial Image



Imagery Report: Flight C-1001B

View Index

Country:	United States
State(s):	California
Counties:	California, Los Angeles
Filed by (catalog):	C-1001B
Filed by (collection):	C-1001B
Imagery Location:	Map Room- Utility Shelves DB-site storage- UCLA
Index type:	mosaic, Smallindex
Index scale:	1:100,000
Size:	frames 9 X 7 inches
Height:	7
Width:	9

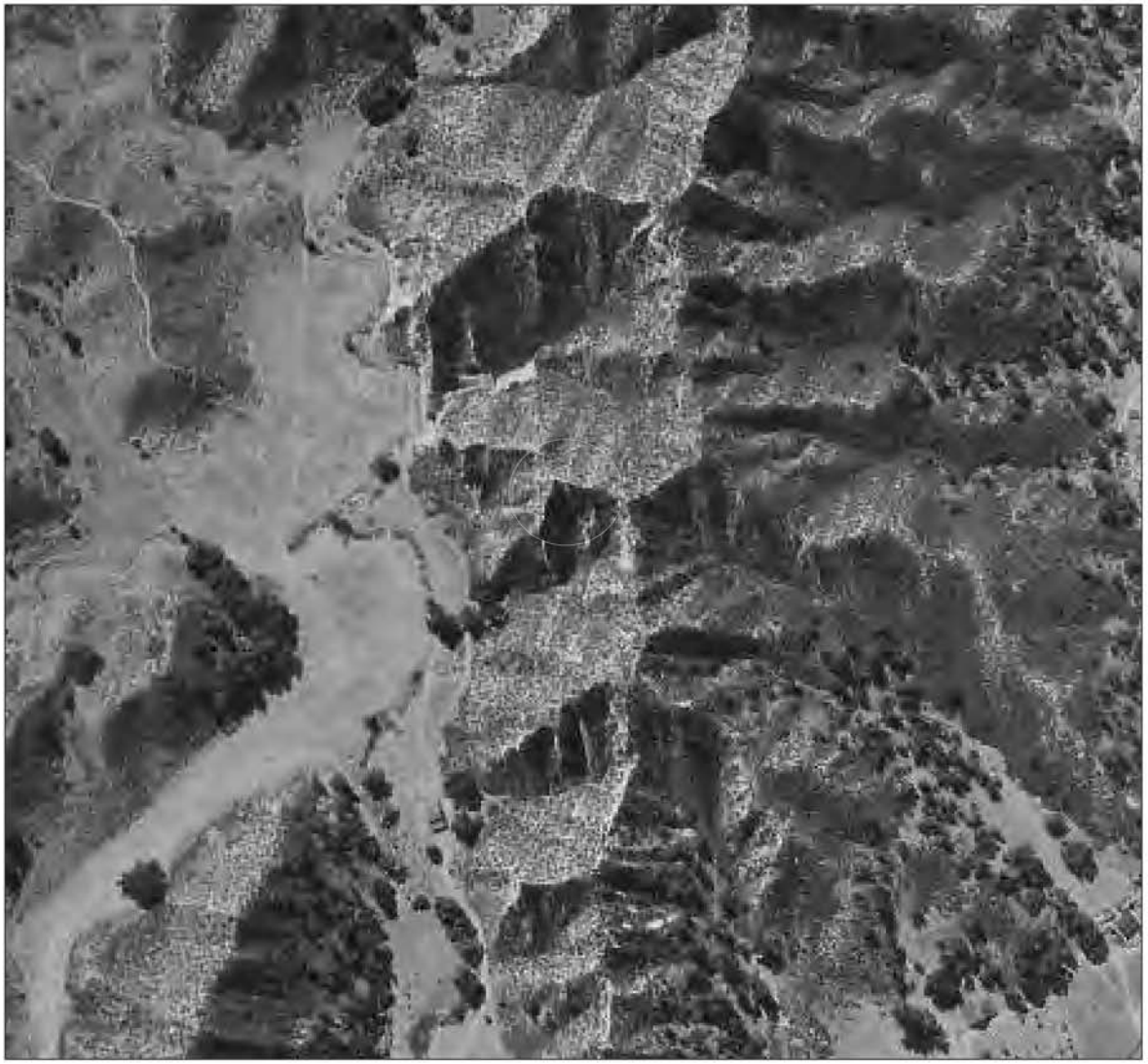
Begin date:	1930-07-16
End date:	1930-08-25
Scale:	1:15,800
Overlap:	60
Directional orientation:	Northwest-Southeast
Lens focal length:	12 inches
Film type:	Nitrate
Generation held:	1st and 2nd generation

Note	Santa Clarita to Sylmar (from Santa Clara River to intersection of Interstate 5 and Interstate 210/Foothill Freeway.) Acquired from Whittier College, January 2013. Nitrate negatives scanned, 2015.
Physical Details:	black and white paper prints, negative transparencies, cut frame, vertical view
Copyright:	Copyright © UC Regents. All Rights Reserved.
Flown by:	Fairchild Aerial Surveys
Contractor/requestor:	Standard Oil Company
Acquired from:	Whittier College
Est. frame count:	163

R. T. FRANKIAN AND ASSOCIATES
26027 Huntington Lane Unit A
Santa Clarita, California 91355
(818) 531-1501
www.RTFrankian.com

Prepared For: NUWI – LYONS CANYON, LLC		Scale: As Shown	Drawn By: JH	Project Number: 2020-200-001
Site: Proposed Lyons Canyon Development – Tentative Tract Map 83301		Date: February 2024	Checked By: GL	Figure Number: HA-1

1945 Historical Aerial Image



Imagery Report: Flight C-9800

View Index

Country:	United States
State(s):	California
Counties:	California: Los Angeles, Ventura
Filed by (catalog):	C-9800
Filed by (collection):	C-9800
Imagery Location:	Map Room--Utility Shelves Room 2552
Index type:	mosaic, Smurfindex
Index scale:	1:75,000
Size:	frames 8 x 9 inches
Height:	9
Width:	8

Begin date:	1945-10-24
End date:	1945-11-28
Scale:	1:14,400
Overlap:	60%
Sidelap:	20%
Directional orientation:	East-West
Altitude:	14,400
Lens focal length:	12 inches (304.8mm)
Camera:	Fairchild
Film type:	Copy
Spectral range:	400-ff0nm
Generation held:	1st and 2nd generation

Note:
Ventura County: area south of Township 5N from Sulfur Mountains and Santa Susana Mountains to Santa Monica Mountains. Los Angeles County: area from Malibu to Chatsworth. Some photographs held in collection do not appear on the indexes. Paper prints stored at Annex2. Frames 3-177, 3-179, 3-180, 3-182, 3-183, 3-189, and 3-201 on roll 3 have holes in them. Imagery acquired from Whittier College, January 2013.

Physical Details:	black and white; paper prints; negative/ transparencies; film roll; cut frame; vertical view;
Copyright:	Copyright © UC Regents. All Rights Reserved.
Flown by:	Fairchild Aerial Surveys
Contractor/requestor:	Ventura County
Acquired from:	Teledyne inc.; Whittier College
Est. frame count:	1702

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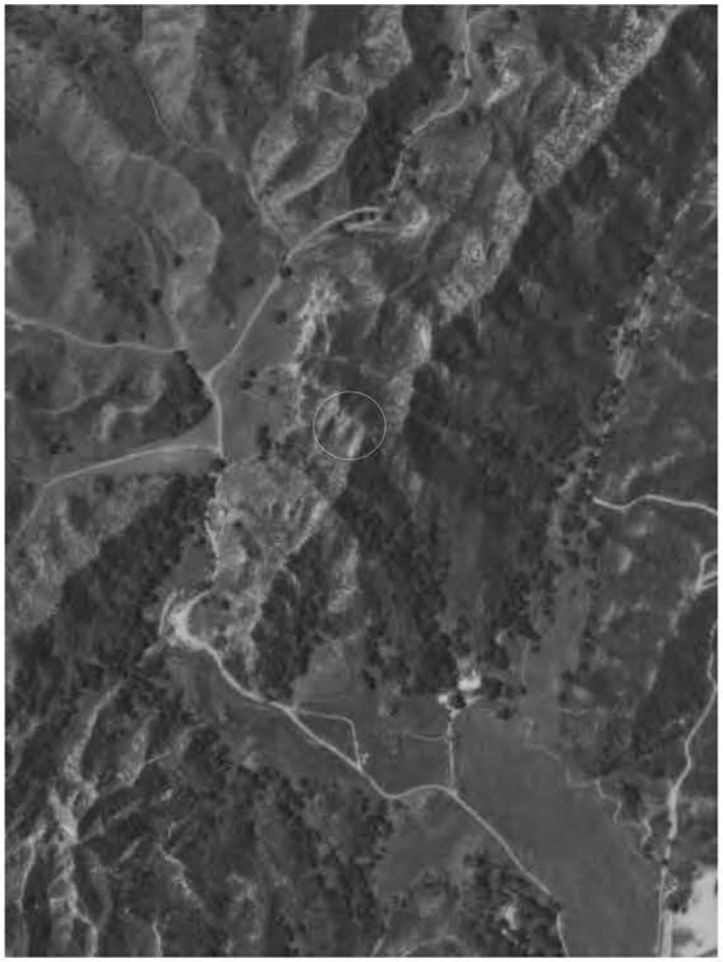
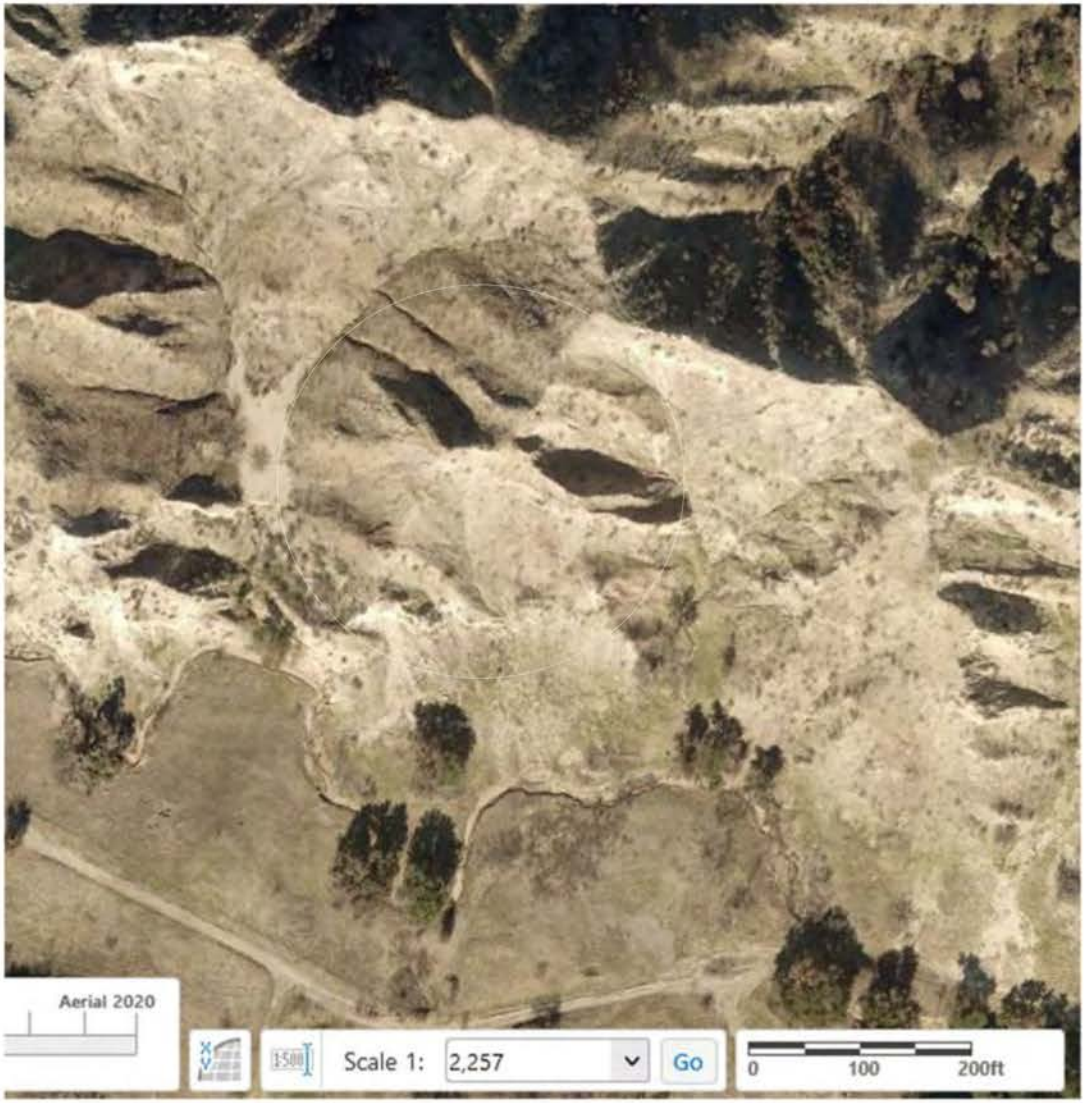
Prepared For: NUWI – LYONS CANYON, LLC		Scale: As Shown	Drawn By: JH	Project Number: 2020-200-001
Site: Proposed Lyons Canyon Development – Tentative Tract Map 83301		Date: February 2024	Checked By: GL	Figure Number: HA-2

1968 Historical Aerial Image



R. T. FRANKIAN AND ASSOCIATES 26027 Huntington Lane Unit A Santa Clarita, California 91355 (818) 531-1501 www.RTFrankian.com	Prepared For: NUWI – LYONS CANYON, LLC	Scale: As Shown	Drawn By: JH	Project Number: 2020-200-001
	Site: Proposed Lyons Canyon Development – Tentative Tract Map 83301	Date: February 2024	Checked By: GL	Figure Number: HA-3

2017 Historical Aerial Image



Courtesy of Los Angeles County Department of Regional Planning, GIS-Net Public
Acquired February 2024

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Prepared For: NUWI – LYONS CANYON, LLC		Scale: As Shown	Drawn By: JH	Project Number: 2020-200-001
Site: Proposed Lyons Canyon Development – Tentative Tract Map 83301		Date: February 2024	Checked By: GL	Figure Number: HA-4

2011 Historical Aerial Image

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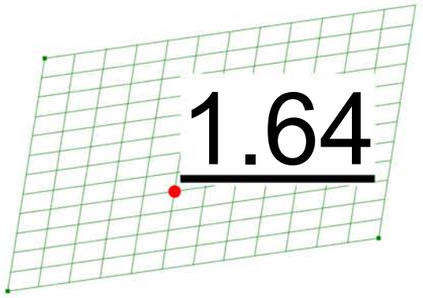
Prepared For: NUWI – LYONS CANYON, LLC		Scale: As Shown	Drawn By: JH	Project Number: 2020-200-001
Site: Proposed Lyons Canyon Development – Tentative Tract Map 83301		Date: February 2024	Checked By: GL	Figure Number:

APPENDIX A

SLOPE STABILITY CALCULATIONS

Section 19

TQss Cross Bedding Wt: 125 pcf C: 500 psf Phi: 34 °

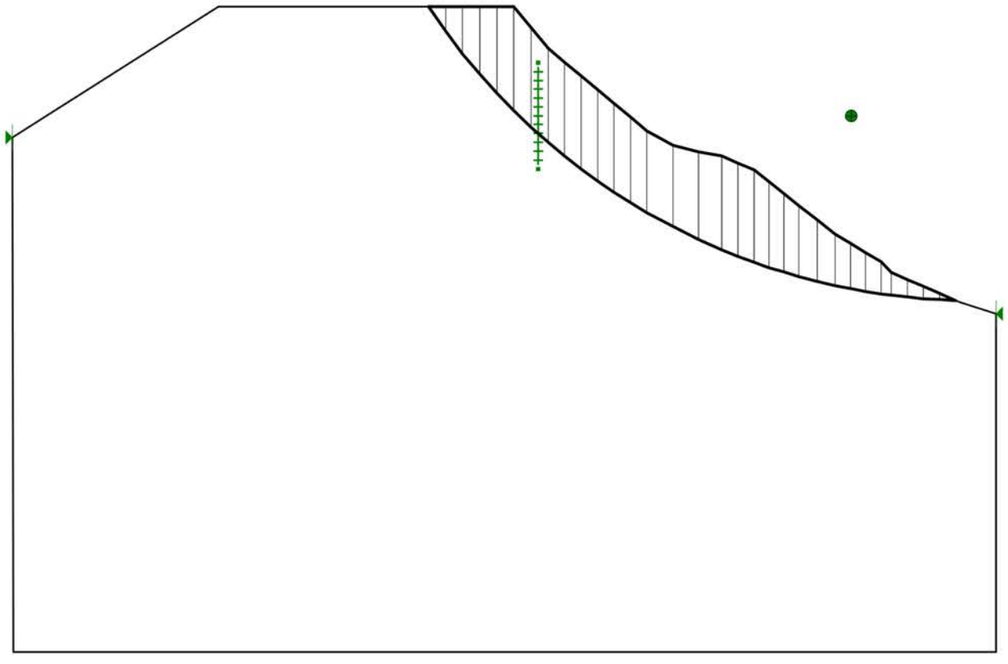


Analysis Type: Spencer
PWP Conditions from: Ru
Slip Surface Option: Grid and Radius
Critical slip surfaces saved: 25
Optimize Critical Slip Surface Location: No
Tension Crack Option: (none)

Factor of Safety: 1.64

Volume: 4,506.5313 ft³ Weight: 563,316.41 lbf
Entry: (149.10496, 230.44929) ft Exit: (337.5218, 125.61122) ft
Radius: 234.14477 ft Center: (300.19058, 191.38719) ft

Date: 02/21/2024 Time: 03:41:04 PM
Kind: SLOPE/W Tool Version: 11.4.2.250



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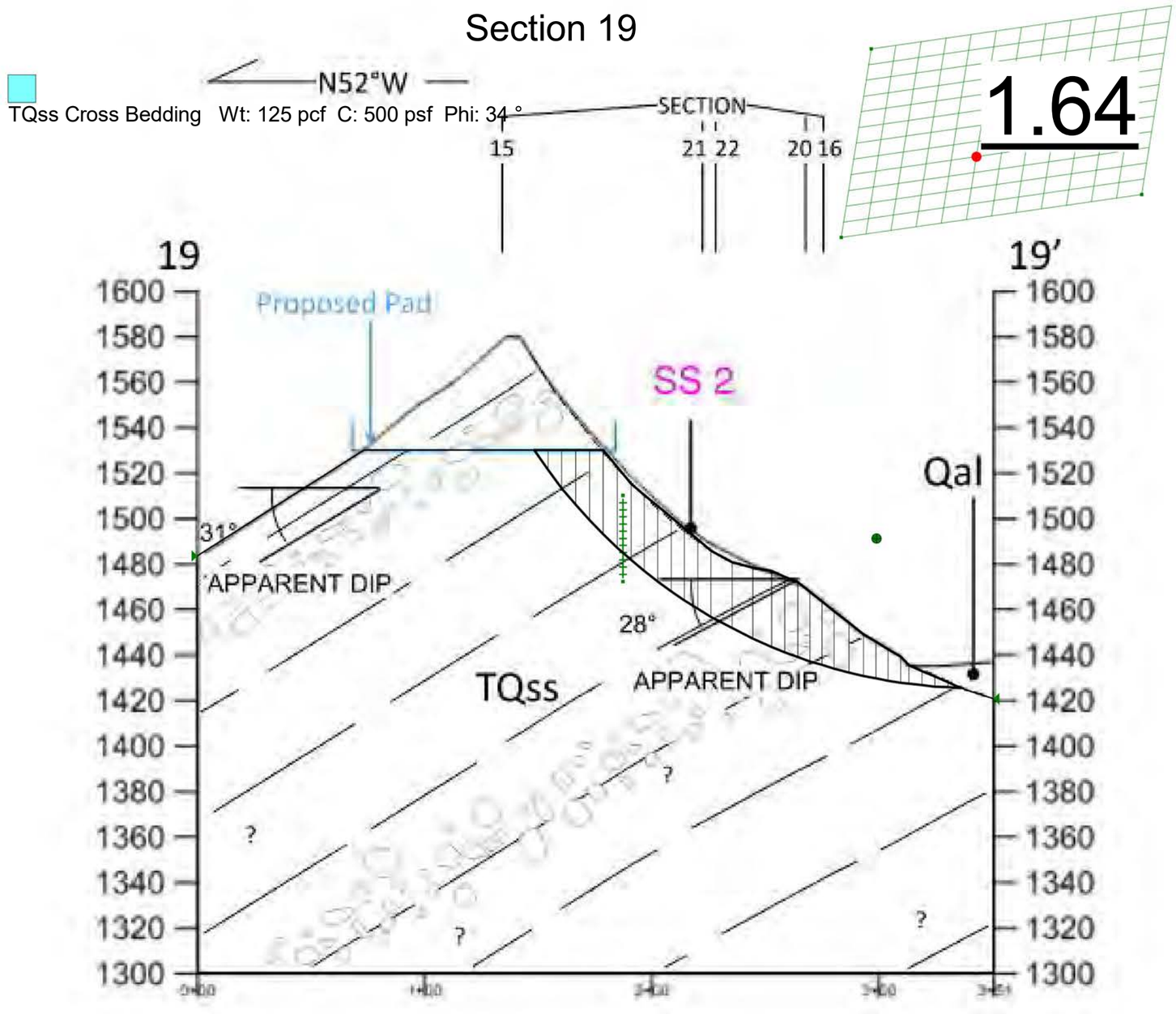
Lyons Canyon		
RTFA Job No.: 2022-200	02/21/2024	1:650

Section 19



Analysis Type: Spencer
PWP Conditions from: Ru
Slip Surface Option: Grid and Radius
Critical slip surfaces saved: 25
Optimize Critical Slip Surface Location: No
Tension Crack Option: (none)

Factor of Safety: 1.64

Volume: 4,506.5313 ft³ Weight: 563,316.41 lbf
Entry: (149.10496, 230.44929) ft Exit: (337.5218, 125.61122) ft
Radius: 234.14477 ft Center: (300.19058, 191.38719) ft

Date: 02/21/2024 Time: 03:41:04 PM
Kind: SLOPE/W Tool Version: 11.4.2.250

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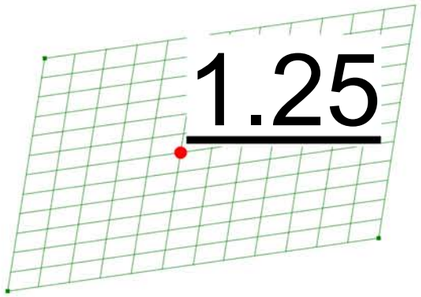
Section 19 Seismic



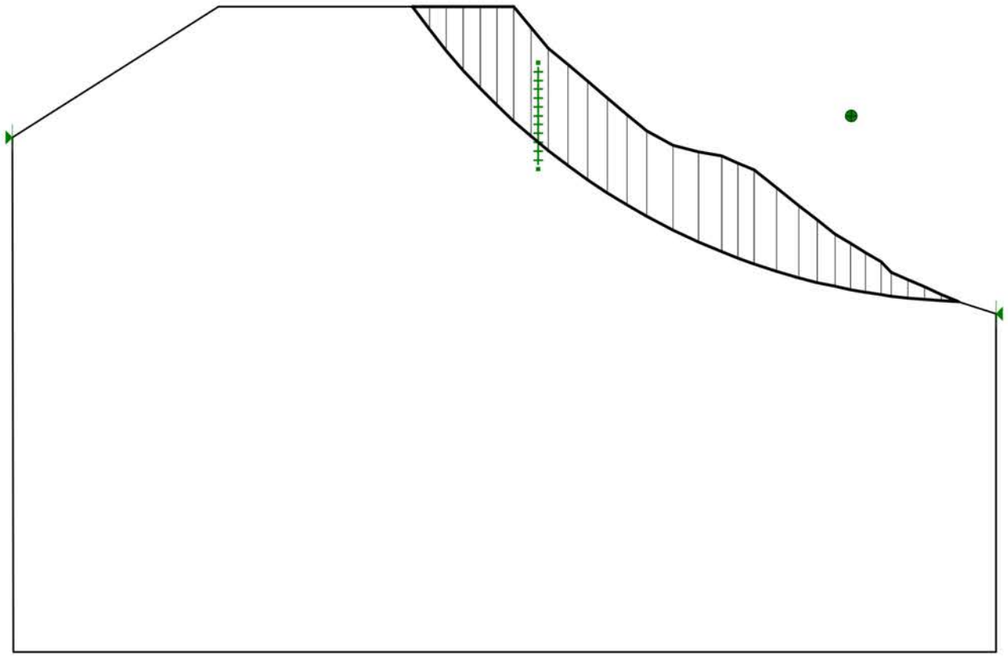
TQss Cross Bedding Wt: 125 pcf C: 500 psf Phi: 34 °

Analysis Type: Spencer
PWP Conditions from: Ru
Slip Surface Option: Grid and Radius
Critical slip surfaces saved: 25
Optimize Critical Slip Surface Location: No
Tension Crack Option: (none)

Factor of Safety: 1.25

Volume: 4,870.8927 ft³ Weight: 608,861.59 lbf
Entry: (143.41233, 230.44929) ft Exit: (338.57065, 125.16057) ft
Radius: 248.48248 ft Center: (300.19058, 191.38719) ft

Date: 02/21/2024 Time: 03:49:46 PM
Kind: SLOPE/W Tool Version: 11.4.2.250



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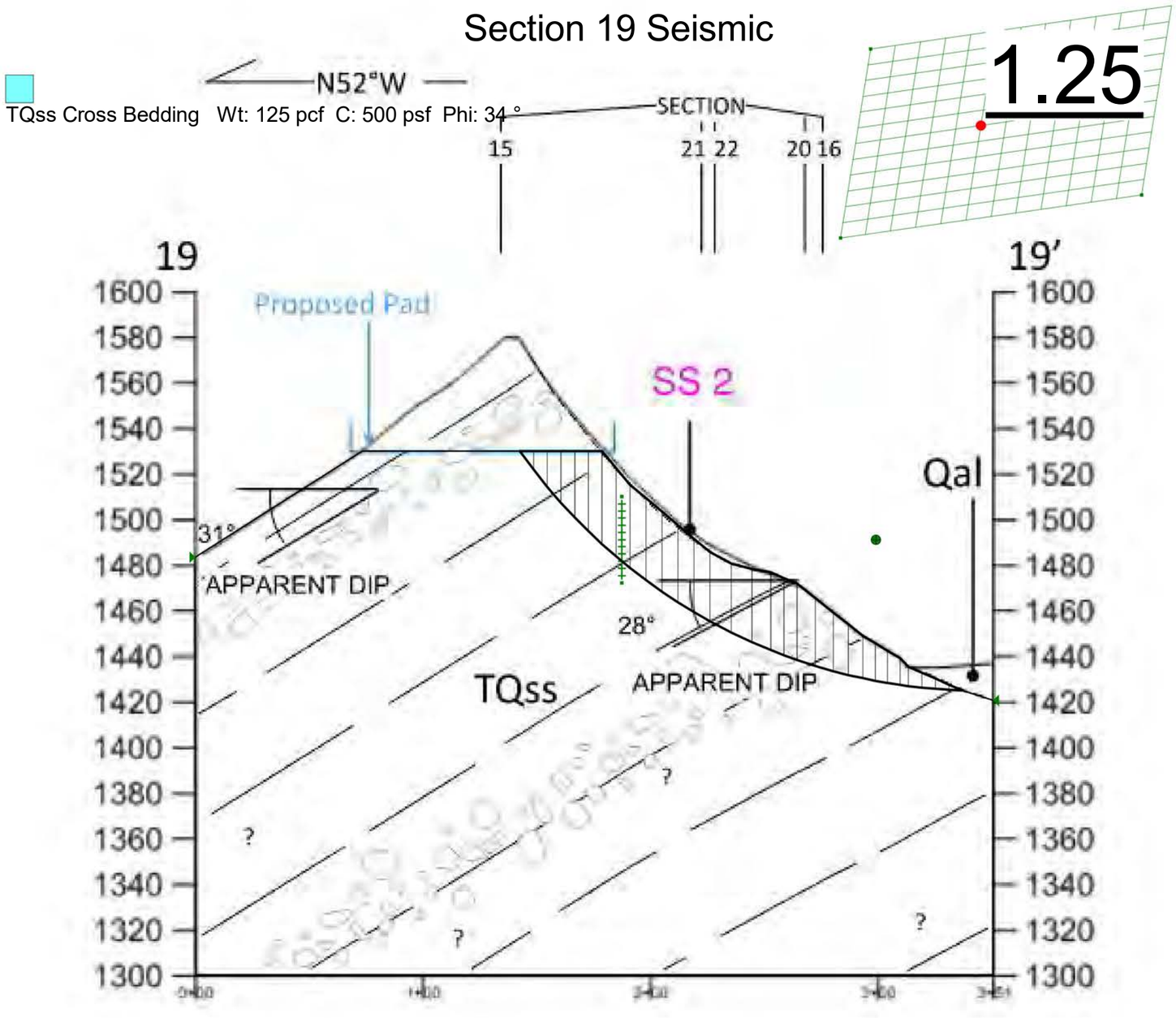
Lyons Canyon		
RTFA Job No.: 2022-200	02/21/2024	1:650

Section 19 Seismic



TQss Cross Bedding Wt: 125 pcf C: 500 psf Phi: 34 °

Analysis Type: Spencer
PWP Conditions from: Ru
Slip Surface Option: Grid and Radius
Critical slip surfaces saved: 25
Optimize Critical Slip Surface Location: No
Tension Crack Option: (none)

Factor of Safety: 1.25

Volume: 4,870.8927 ft³ Weight: 608,861.59 lbf
Entry: (143.41233, 230.44929) ft Exit: (338.57065, 125.16057) ft
Radius: 248.48248 ft Center: (300.19058, 191.38719) ft

Date: 02/21/2024 Time: 03:49:46 PM
Kind: SLOPE/W Tool Version: 11.4.2.250

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Lyons Canyon		
RTFA Job No.: 2022-200	02/21/2024	1:650

Section 19

File Information

File Version: 11.04
Title: Lyons Canyon
Comments: Lyons Canyon RTFA Job No.: 2022-200
Created By: AWR
Revision Number: 351
Date: 02/21/2024
Time: 03:49:46 PM
Tool Version: 11.4.2.250
File Name: Lyons Canyon Water Tank Site.gsz
Directory: C:\Users\Alan\Documents\2020-200 Lyons Canyon\9-18-2023\

Project Settings

Unit System: U.S. Customary Units
Start Date: Sunday, February 01, 2024

Analysis Settings

Section 19

Kind: SLOPE/W
Analysis Type: Spencer
Settings
- PWP Conditions from: Ru
- Unit Weight of Water: 62.430189 pcf

Slip Surface
- Direction of movement: Left to Right
- Use Passive Mode: No
- Slip Surface Option: Grid and Radius
- Critical slip surfaces saved: 25
- Optimize Critical Slip Surface Location: No
- Tension Crack Option: (none)

Distribution
- F of S Calculation Option: Constant

Convergence
- Geometry Settings
  - Minimum Slip Surface Depth: 0.1 ft
  - Number of Slices: 30
- Factor of Safety Convergence Settings
  - Maximum Number of Iterations: 100
  - Tolerable difference in F of S: 0.001
- Under-Relaxation Criteria
  - Initial Rate: 1
  - Minimum Rate: 0.1
  - Rate Reduction Factor: 0.65
  - Reduction Frequency (iterations): 50

Solution Settings
Search Method: Root Finder
Tolerable difference between starting and converged F of S: 3
Maximum iterations to calculate converged lambda: 20
Max Absolute Lambda: 2

Materials

TQss Cross Bedding

Slope Stability Material Model: Mohr-Coulomb
Unit Weight: 125 pcf
Effective Cohesion: 500 psf
Effective Friction Angle: 34 °
Phi-B: 0 °
Pore Water Pressure
Ru: 0.02

Slip Surface Grid

Upper Left: (297.91594, 407.2148) ft
Lower Left: (284.68759, 324.06519) ft
Lower Right: (417.34901, 342.96283) ft
Grid Horizontal Increment: 12
Grid Vertical Increment: 12

Slip Surface Radius

Upper Left Coordinate: (188.30964, 210.30141) ft
Upper Right Coordinate: (188.30964, 210.30141) ft
Lower Left Coordinate: (188.30964, 172.50614) ft
Lower Right Coordinate: (188.30964, 172.50614) ft
Number of Increments: 12
Use Left Projection: No
Left Projection Angle: 135 °
Use Right Projection: No
Right Projection Angle: 45 °

Slip Surface Limits

Left Coordinate: (0.19941, 183.80617) ft
Right Coordinate: (352.20619, 120.89809) ft

Geometry

Name: 2D Geometry

Settings

View: 2D
Element Thickness: 1 ft

Points

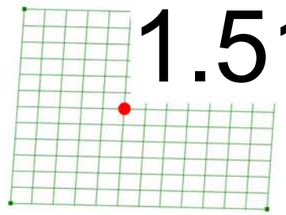
	X	Y
Point 1	0.19941 ft	183.80617 ft
Point 2	74.11957 ft	230.44929 ft
Point 3	179.62034 ft	230.44929 ft
Point 4	191.89818 ft	215.57665 ft
Point 5	227.21277 ft	186.02125 ft
Point 6	236.45279 ft	180.89493 ft
Point 7	245.7561 ft	178.67986 ft
Point 8	253.92023 ft	177.16095 ft
Point 9	265.56518 ft	172.16122 ft
Point 10	281.577 ft	159.37708 ft
Point 11	294.61429 ft	149.12445 ft
Point 12	310.87925 ft	139.37813 ft
Point 13	314.61323 ft	135.45429 ft
Point 14	339.35876 ft	124.82194 ft
Point 15	352.20619 ft	120.89809 ft
Point 16	352.20619 ft	0.14496 ft
Point 17	0.70571 ft	0.14496 ft

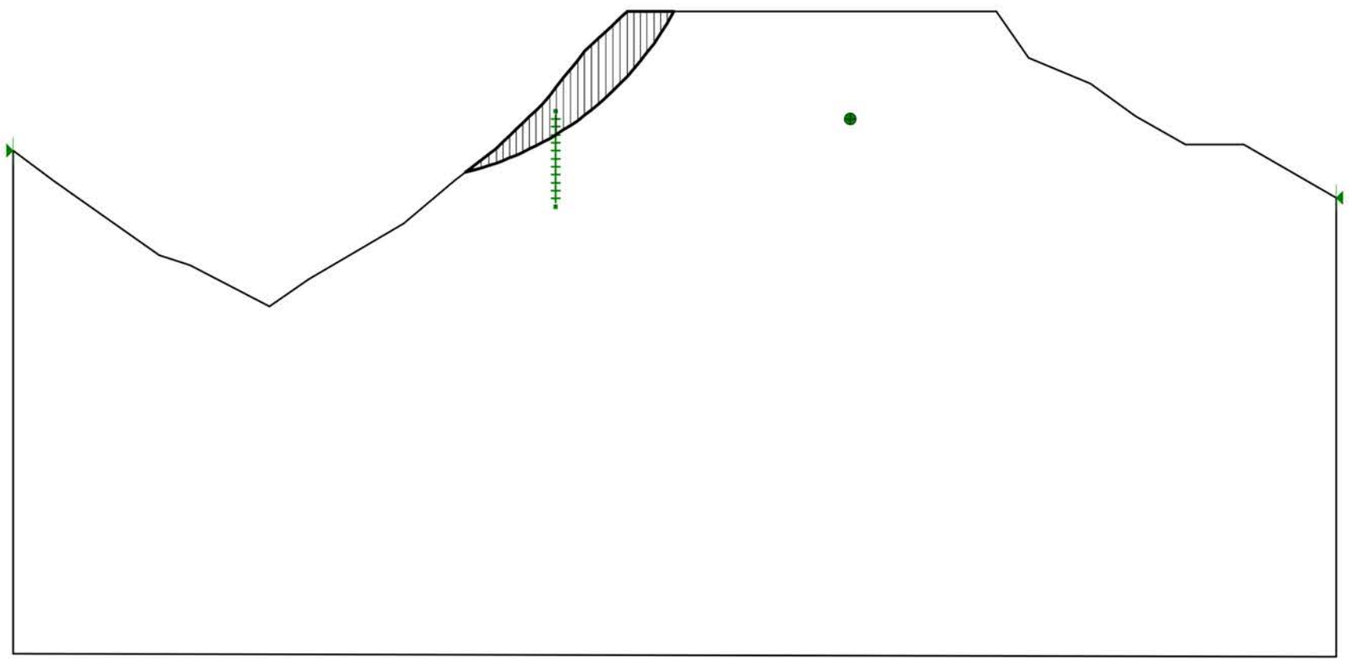
Regions

	Material	Points	Area
Region 1	TQss Cross Bedding	1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17	68,533 ft²

Section 21 Static

TQss Cross Bedding Wt: 125 pcf C: 500 psf Phi: 34 °





Analysis Type: Spencer
PWP Conditions from: Ru
Slip Surface Option: Grid and Radius
Critical slip surfaces saved: 25
Optimize Critical Slip Surface Location: No
Tension Crack Option: (none)

Factor of Safety: 1.51

Volume: 1,032.2147 ft³ Weight: 129,026.84 lbf
Entry: (162.75123, 172.42338) ft Exit: (237.15427, 229.76598) ft
Radius: 116.69975 ft Center: (300.19058, 191.38719) ft

Date: 02/21/2024 Time: 04:07:12 PM
Kind: SLOPE/W Tool Version: 11.4.2.250

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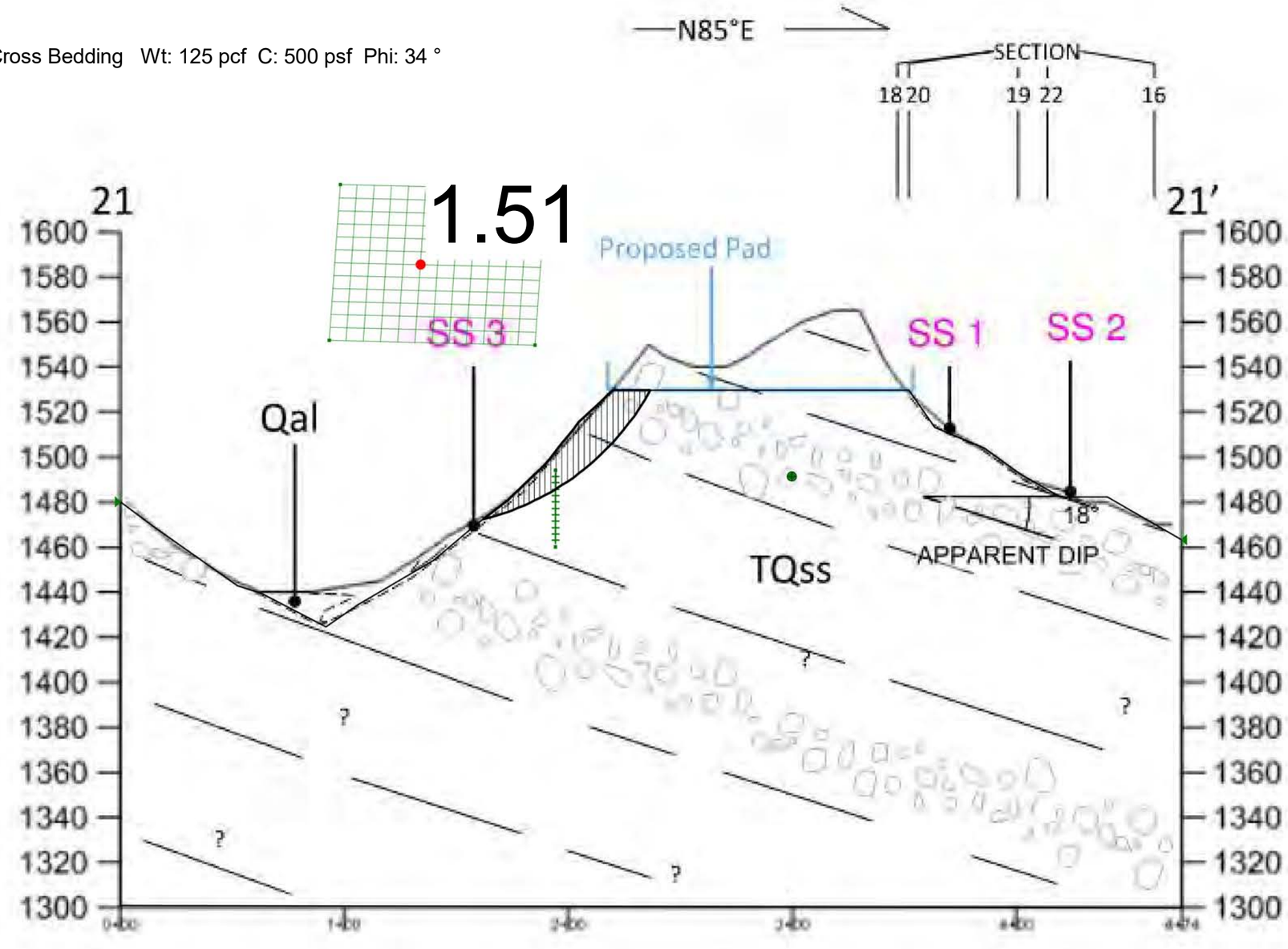
Lyons Canyon		
RTFA Job No.: 2022-200	02/21/2024	1:650

Section 21 Static

TQss Cross Bedding Wt: 125 pcf C: 500 psf Phi: 34 °



Analysis Type: Spencer
PWP Conditions from: Ru
Slip Surface Option: Grid and Radius
Critical slip surfaces saved: 25
Optimize Critical Slip Surface Location: No
Tension Crack Option: (none)

Factor of Safety: 1.51

Volume: 1,032.2147 ft³ Weight: 129,026.84 lbf
Entry: (162.75123, 172.42338) ft Exit: (237.15427, 229.76598) ft
Radius: 116.69975 ft Center: (300.19058, 191.38719) ft

Date: 02/21/2024 Time: 04:07:12 PM
Kind: SLOPE/W Tool Version: 11.4.2.250

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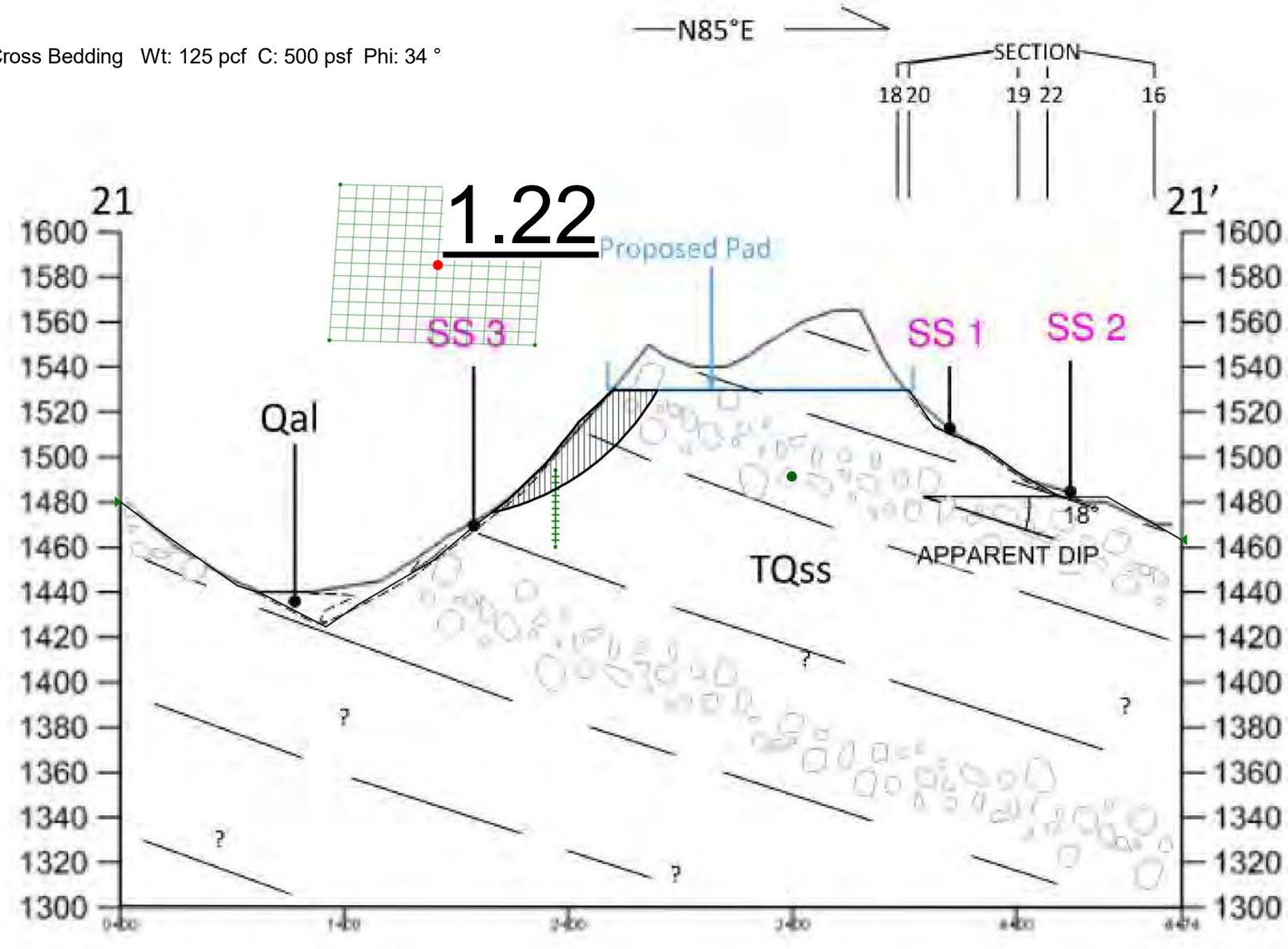
RTFA Job No.: 2022-200	02/21/2024	1:650

Section 21 Seismic

TQss Cross Bedding Wt: 125 pcf C: 500 psf Phi: 34 °



Analysis Type: Spencer
PWP Conditions from: Ru
Slip Surface Option: Grid and Radius
Critical slip surfaces saved: 25
Optimize Critical Slip Surface Location: No
Tension Crack Option: (none)

Factor of Safety: 1.22

Volume: 1,099.3591 ft³ Weight: 137,419.89 lbf
Entry: (166.51771, 175.34841) ft Exit: (240.42632, 229.76598) ft
Radius: 112.79415 ft Center: (300.19058, 191.38719) ft

Date: 02/21/2024 Time: 04:11:30 PM
Kind: SLOPE/W Tool Version: 11.4.2.250

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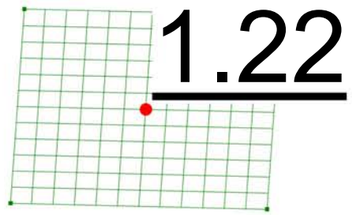
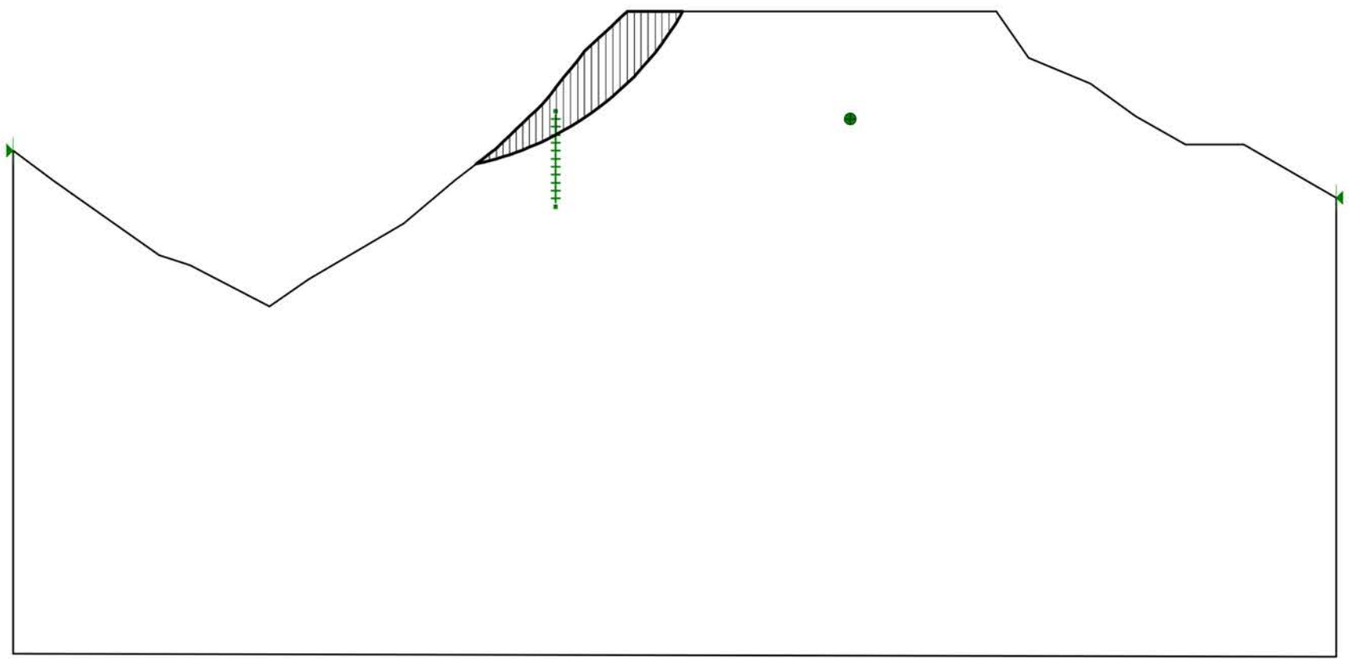
Lyons Canyon		
RTFA Job No.: 2022-200	02/21/2024	1:650

Section 21 Seismic

TQss Cross Bedding Wt: 125 pcf C: 500 psf Phi: 34 °





Analysis Type: Spencer
PWP Conditions from: Ru
Slip Surface Option: Grid and Radius
Critical slip surfaces saved: 25
Optimize Critical Slip Surface Location: No
Tension Crack Option: (none)

Factor of Safety: 1.22

Volume: 1,099.3591 ft³ Weight: 137,419.89 lbf
Entry: (166.51771, 175.34841) ft Exit: (240.42632, 229.76598) ft
Radius: 112.79415 ft Center: (300.19058, 191.38719) ft

Date: 02/21/2024 Time: 04:11:30 PM
Kind: SLOPE/W Tool Version: 11.4.2.250

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Lyons Canyon		
RTFA Job No.: 2022-200	02/21/2024	1:650

Section 21 Static

File Information

File Version: 11.04
Title: Lyons Canyon
Comments: Lyons Canyon RTFA Job No.: 2022-200
Created By: AWR
Revision Number: 355
Date: 02/21/2024
Time: 04:07:12 PM
Tool Version: 11.4.2.250
File Name: Lyons Canyon Water Tank Site.gsz
Directory: C:\Users\Alan\Documents\2020-200 Lyons Canyon\9-18-2023\
Last Solved Date: 02/21/2024
Last Solved Time: 04:07:16 PM

Project Settings

Unit System: U.S. Customary Units
Start Date: Sunday, February 01, 2024

Analysis Settings

Section 21 Static

Kind: SLOPE/W
Analysis Type: Spencer
Settings
- PWP Conditions from: Ru
- Unit Weight of Water: 62.430189 pcf

Slip Surface
- Direction of movement: Right to Left
- Use Passive Mode: No
- Slip Surface Option: Grid and Radius
- Critical slip surfaces saved: 25
- Optimize Critical Slip Surface Location: No
- Tension Crack Option: (none)

Distribution
- F of S Calculation Option: Constant

Convergence
- Geometry Settings
  - Minimum Slip Surface Depth: 0.1 ft
  - Number of Slices: 30
- Factor of Safety Convergence Settings
  - Maximum Number of Iterations: 100
  - Tolerable difference in F of S: 0.001
- Under-Relaxation Criteria
  - Initial Rate: 1
  - Minimum Rate: 0.1

Rate Reduction Factor: 0.65
Reduction Frequency (iterations): 50
Solution Settings
Search Method: Root Finder
Tolerable difference between starting and converged F of S: 3
Maximum iterations to calculate converged lambda: 20
Max Absolute Lambda: 2

Materials

TQss Cross Bedding

Slope Stability Material Model: Mohr-Coulomb
Unit Weight: 125 pcf
Effective Cohesion: 500 psf
Effective Friction Angle: 34 °
Phi-B: 0 °
Pore Water Pressure
Ru: 0.002

Slip Surface Grid

Upper Left: (98.97672, 321.26204) ft
Lower Left: (94.07846, 251.97448) ft
Lower Right: (185.78491, 249.79748) ft
Grid Horizontal Increment: 12
Grid Vertical Increment: 12

Slip Surface Radius

Upper Left Coordinate: (194.82932, 194.17543) ft
Upper Right Coordinate: (194.82932, 194.17543) ft
Lower Left Coordinate: (194.82932, 160.15968) ft
Lower Right Coordinate: (194.82932, 160.15968) ft
Number of Increments: 12
Use Left Projection: No
Left Projection Angle: 135 °
Use Right Projection: No
Right Projection Angle: 45 °

Slip Surface Limits

Left Coordinate: (0.81357, 180.15968) ft
Right Coordinate: (474.04192, 163.15181) ft

Geometry

Name: 2D Geometry

Settings

View: 2D
Element Thickness: 1 ft

Points

	X	Y
Point 1	0.81357 ft	0.63212 ft
Point 2	0.81357 ft	180.15968 ft
Point 3	15.7742 ft	168.97858 ft
Point 4	53.09704 ft	142.67937 ft
Point 5	64.12066 ft	139.2148 ft
Point 6	92.6246 ft	124.41165 ft
Point 7	106.64035 ft	134.17543 ft
Point 8	140.65609 ft	154.17543 ft
Point 9	158.92381 ft	169.45102 ft
Point 10	173.72696 ft	180.94708 ft
Point 11	190.26239 ft	196.69511 ft
Point 12	205.22302 ft	215.43527 ft
Point 13	220.49861 ft	229.76598 ft
Point 14	352.6246 ft	229.76598 ft
Point 15	363.96318 ft	213.23055 ft
Point 16	386.16791 ft	203.93921 ft
Point 17	402.2309 ft	192.44315 ft
Point 18	420.02617 ft	182.20693 ft
Point 19	432.78208 ft	182.20693 ft
Point 20	440.97105 ft	182.20693 ft
Point 21	474.04192 ft	163.15181 ft
Point 22	474.04192 ft	-0.62772 ft

Regions

	Material	Points	Area
Region 1	TQss Cross Bedding	1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18,19,20,21,22	89,154 ft²

Slip Results

Slip Surfaces Analysed: 523 of 2197 converged

Current Slip Surface

Slip Surface: 1,083
Factor of Safety: 1.51
Volume: 1,032.2147 ft³
Weight: 129,026.84 lbf
Resisting Moment: -6,489,464 lbf·ft
Activating Moment: -4,305,730.2 lbf·ft
Resisting Force: 92,717.708 lbf
Activating Force: 61,496.802 lbf
Slip Rank: 3 of 2,197 slip surfaces
Exit: (237.15427, 229.76598) ft
Entry: (162.75123, 172.42338) ft
Radius: 116.69975 ft
Center: (300.19058, 191.38719) ft

Slip Slices

	X	Y	PWP	Base Normal Stress	Frictional Strength	Cohesive Strength	Suction Strength	Base Material
Slice 1	235.96458 ft	227.69039 ft	0.51889807 psf	-40.468127 psf	-27.646097 psf	500 psf	0 psf	TQss Cross Bedding
Slice 2	233.5852 ft	223.71787 ft	1.5120279 psf	179.08436 psf	119.77405 psf	500 psf	0 psf	TQss Cross Bedding
Slice 3	231.20582 ft	220.07249 ft	2.4233725 psf	405.40275 psf	271.81302 psf	500 psf	0 psf	TQss Cross Bedding
Slice 4	228.82644 ft	216.702 ft	3.2659942 psf	636.10234 psf	426.8535 psf	500 psf	0 psf	TQss Cross Bedding
Slice 5	226.44706 ft	213.56764 ft	4.0495848 psf	869.70563 psf	583.89238 psf	500 psf	0 psf	TQss Cross Bedding
Slice 6	224.06768 ft	210.63968 ft	4.7815754 psf	1,105.2659 psf	742.28608 psf	500 psf	0 psf	TQss Cross Bedding
Slice 7	221.6883 ft	207.89472 ft	5.4678149 psf	1,342.1613 psf	901.61117 psf	500 psf	0 psf	TQss Cross Bedding
Slice 8	219.22564 ft	205.22909 ft	5.8356668 psf	1,507.0202 psf	1,012.5618 psf	500 psf	0 psf	TQss Cross Bedding
Slice 9	216.67971 ft	202.63717 ft	5.8865332 psf	1,590.768 psf	1,069.0161 psf	500 psf	0 psf	TQss Cross Bedding
Slice 10	214.13378 ft	200.19965 ft	5.8988004 psf	1,662.9233 psf	1,117.6771 psf	500 psf	0 psf	TQss Cross Bedding
Slice 11	211.58785 ft	197.90363 ft	5.8756914 psf	1,723.6097 psf	1,158.6262 psf	500 psf	0 psf	TQss Cross Bedding
Slice 12	209.04192 ft	195.73827 ft	5.8199205 psf	1,772.9047 psf	1,191.9137 psf	500 psf	0 psf	TQss Cross Bedding
Slice 13	206.49599 ft	193.6943 ft	5.7337981 psf	1,810.8426 psf	1,217.5613 psf	500 psf	0 psf	TQss Cross Bedding
Slice 14	203.9763 ft	191.78261 ft	5.5227444 psf	1,804.7543 psf	1,213.597 psf	500 psf	0 psf	TQss Cross Bedding
Slice 15	201.48286 ft	189.99427 ft	5.1889904 psf	1,752.0245 psf	1,178.2554 psf	500 psf	0 psf	TQss Cross Bedding
Slice 16	198.98942 ft	188.30258 ft	4.8310718 psf	1,684.5146 psf	1,132.9609 psf	500 psf	0 psf	TQss Cross Bedding
Slice 17	196.49599 ft	186.70259 ft	4.4502288 psf	1,602.0887 psf	1,077.6207 psf	500 psf	0 psf	TQss Cross

								Bedding
Slice 18	194.00255 ft	185.18992 ft	4.0475574 psf	1,504.5588 psf	1,012.1076 psf	500 psf	0 psf	TQss Cross Bedding
Slice 19	191.50911 ft	183.76067 ft	3.6240302 psf	1,391.6857 psf	936.2594 psf	500 psf	0 psf	TQss Cross Bedding
Slice 20	189.08129 ft	182.4449 ft	3.2813377 psf	1,301.3905 psf	875.58568 psf	500 psf	0 psf	TQss Cross Bedding
Slice 21	186.71908 ft	181.23572 ft	3.021204 psf	1,236.8837 psf	832.25073 psf	500 psf	0 psf	TQss Cross Bedding
Slice 22	184.35688 ft	180.0932 ft	2.7444026 psf	1,161.1247 psf	781.33735 psf	500 psf	0 psf	TQss Cross Bedding
Slice 23	181.99468 ft	179.01522 ft	2.4514691 psf	1,073.81 psf	722.64048 psf	500 psf	0 psf	TQss Cross Bedding
Slice 24	179.63247 ft	177.99982 ft	2.1428884 psf	974.59977 psf	655.93045 psf	500 psf	0 psf	TQss Cross Bedding
Slice 25	177.27027 ft	177.04526 ft	1.8190993 psf	863.1143 psf	580.95095 psf	500 psf	0 psf	TQss Cross Bedding
Slice 26	174.90806 ft	176.14994 ft	1.4804996 psf	738.93106 psf	497.41669 psf	500 psf	0 psf	TQss Cross Bedding
Slice 27	172.35499 ft	175.2497 ft	1.1579806 psf	617.34819 psf	415.62555 psf	500 psf	0 psf	TQss Cross Bedding
Slice 28	169.61106 ft	174.35285 ft	0.84946074 psf	497.04485 psf	334.68802 psf	500 psf	0 psf	TQss Cross Bedding
Slice 29	166.86713 ft	173.53028 ft	0.52237161 psf	360.46353 psf	242.78338 psf	500 psf	0 psf	TQss Cross Bedding
Slice 30	164.1232 ft	172.78037 ft	0.17711925 psf	206.72978 psf	139.32153 psf	500 psf	0 psf	TQss Cross Bedding

REVISED GEOTECHNICAL 100-SCALE PLAN REVIEW

LYONS CANYON DEVELOPMENT

VESTING TENTATIVE TRACT NO. 83301

LOS ANGELES COUNTY, CALIFORNIA

FOR

NUWI – LYONS CANYON, LLC

September 15, 2023

Job No. 2020-200-001

RTF&A

GEOTECHNICAL ENGINEERING & ENGINEERING GEOLOGY

NUWI – Lyons Canyon, LLC
September 15, 2023
2020-200-001

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RTF&A
GEOTECHNICAL ENGINEERING & ENGINEERING GEOLOGY

The following are attached and complete this report.

- References
- GMED Tentative Approval
- Geotechnical Map – Figure 1
- Geologic Sections – Figure 2
- Geotechnical Sections – Figure 3
- Stability Fill Detail for Grossly Stable Slopes – Figure 4
- Appendix A – RTF&A Field Explorations
- Appendix B – Field Explorations by Others
- Appendix C - Laboratory Testing
- Appendix D – Slope Stability Analyses
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- Appendix F – Seismic Parameters
- Appendix G – Liquefaction Calculations
- Appendix H – Ayers Oil Well Documentation
- Appendix I – United Civil Plan Set – Sheets 1-5 of 5, dated September 5, 2023
- Appendix J – Geotechnical 100-Scale Plan Review (dated March 19, 2021)
- Appendix K– Response to County Comments (dated July 27, 2021)
- Appendix L – Aerial Imagery and LIDAR

GEOTECHNICAL ENGINEERING & ENGINEERING GEOLOGY

September 15, 2023

NUWI – Lyons Canyon, LLC
2001 Wilshire Blvd., Suite 401
Santa Monica, California 90403

Job No. 2020-200-001

Attention: Mr. Jason Han

Subject: Revised 100-Scale Geotechnical Plan Review
Proposed Lyons Canyon Development
The Trails at Lyons Canyon
Vesting Tentative Tract No. 83301
Los Angeles County, California

References: See attached References

R. T. Frankian & Associates, Inc., (RTF&A) is pleased to present this updated and revised geotechnical grading plan review for Lyons Canyon, Tract 83301, Los Angeles County, California (Site). We recently prepared a revised geotechnical plan review (RTF&A, 2022) and it was requested by the project team that our previous approved Tentative Plan Review Report (RTF&A, 2021a) and approved response (RTF&A, 2021b) be presented in Appendix J and Appendix K of this report. Grading Plan revisions evaluated herein were made to the previous Los Angeles County approved RTF&A Geotechnical 100-Scale Plan. This report updates and supersedes our June 9, 2022 report (RTF&A, 2022).

This revised plan review is based on the attached September 5, 2023, The Trails at Lyons Canyon, Vesting Tentative Tract No. 83301 Plan prepared by United Civil, Inc. (United), included in Appendix I. Sheet 2 of 5 was used as a base for our Geotechnical Map, attached as Figure 1. The purpose of the report is to provide an updated geotechnical report to verify the applicability of the recommendations presented in our referenced reports relative to the current

grading plan by United. The grading and foundation recommendations of the referenced reports remain applicable, unless specifically superseded by this report.

The findings, conclusions, and recommendations presented in this report are based on data developed by RTF&A, Pacific Soils, and Gold Coast, as well as appropriate engineering and geologic analyses. The assessment of general Site environmental conditions for the presence of contaminants in the soils and groundwater was beyond the scope of this investigation.

Our professional services have been performed using that degree of care and skill ordinarily exercised, under similar circumstances, by reputable geotechnical engineers and geologists practicing in this or similar localities at this time. No other warranty either express or implied is made as to the professional advice included in this report. This report has been prepared for NUWI-Lyons Canyon, LLC, and their design consultants, to be used solely for planning and design of the Vesting Tentative Tract Map No. 83301.

SCOPE OF WORK

The scope of work for the previous review is presented in the referenced reports and the updated geotechnical review of the Site plan is included as Figure 1:

- reviewed State of California Alquist-Priolo Earthquake Fault Zone Maps and Seismic Hazard Maps to evaluate potential geologic hazards;
- reviewed geologic maps published by the California Geological Survey (formerly known as the California Division of Mines and Geology) and the Dibblee Foundation to assess regional geologic conditions;
- reviewed groundwater data from the Los Angeles County Department of Public Works Water Resources Division, California Division of Mines and Geology Seismic Hazard Zones Maps Oat Mountain (1997) and Newhall Quadrangles (1997), GeoTracker and GAMA to establish high groundwater levels and trends in the area;
- review of select aerial imagery and Lidar imagery, Figures L1-L4 (Appendix L);
- reviewed the referenced reports;

- performed Site reconnaissance and geologic mapping of the Site;
- excavated and logged exploratory borings, test pits, and Site reconnaissance to observe subsurface geologic units and structure;
- conducted Cone Penetrometer Tests (CPT) to evaluate liquefaction potential of alluvial materials on-site;
- performed geologic and engineering analyses to determine slope stability, liquefaction assessment, grading recommendations including anticipated removals, and preliminary foundation recommendations;
- prepared Geologic Cross Sections depicting the grading conditions, relative to the proposed cut slopes and/or our interpretation of subsurface conditions (Figure 2);
- prepared conclusions and recommendations based on existing Site conditions and future intended use; and
- prepared a Geotechnical Map, presented as Figures 1.

SITE DESCRIPTION

The Site is situated along the northeast foothills of the Santa Susana Mountains within the Santa Clarita area of Los Angeles County, California. The location of the Site is shown on Sheet 1 of the Vesting Tentative Tract Map No. 83301 dated September 5, 2023, with Sheet 2 being used as the base map for our Geotechnical Map, Figure 1. Sheet 2 of the Vesting Tentative Tract Map No. 83301 (Plan) were prepared by United at a scale of 1 inch = 100 feet provide topography of the existing and proposed grades.

The Site is bounded by The Old Road on the east, immediately south of a residential development (Tract 3794) and undeveloped hillside terrain to the west and south. Topography at the Site is dominated by the alluviated valley floor of Lyons Canyon which drains southeast then swinging to the northeast. The surrounding hills that border the canyon are characterized by a series of steep to moderately steep bedrock ridges. Elevations across the Site range from approximately 1,600 feet above mean sea level (msl), along ridge tops to roughly 1,300 feet

along The Old Road. The natural slopes on-site exhibit gradients ranging from approximately .25:1 to 10:1 horizontal to vertical (h:v).

TRACT MAP REVISIONS

The majority of the revisions to the map presented in this report are related to the addition of a proposed water tank pad and associated graded slopes for the proposed access road in the southwest portion of the Site. In addition, perimeter roads and building pads were modified and slopes along the western portion of the Site were revised. Several of these modifications were related to a revised Oak Tree mitigation planning that modified the grading for these trees to remain in their current locations. These modifications that affected the graded pad areas were mostly along the north side of "B" Street and the eastern portion of the south side of "A" Street.

SUBSURFACE EXPLORATIONS

Subsurface data was available for the Site and adjacent areas from prior investigations conducted by Pacific Soils in 2006 and Gold Coast in 2015. This data was supplemented by the excavation of an additional 5 hollow-stem auger borings excavated on November 10, 2020 and 5 Cone Penetrometer Tests (CPT) by Gregg Drilling for RTF&A in January, 2021 as presented in our referenced report (RTF&A, 2021a). Two days of field mapping were completed in April of 2022, and April of 2023, and a total of 18 additional test pits were excavated in April of 2022 as part of the tank site investigation, for modification of proposed slopes and basins along the western property boundary, and to confirm the geotechnical conditions along the southern portion of the Site. Boring and test pit logs developed by RTF&A are presented in Appendix A and the 2021 Gregg CPT soundings are presented in Appendix E. Exploratory test pits and borings from Pacific Soils and Gold Coast are presented in Appendix B. Geologic structural data obtained from the various test pits and borings, as well as from reconnaissance geologic mapping of the Site by RTF&A, are presented on the Geotechnical Map, Figure 1 with our interpretation of subsurface conditions presented in Figure 2 "Geologic Cross-Section".

LABORATORY ANALYSES

We performed laboratory tests on selected samples obtained from the test pits to aid in the classification of the soils, and to determine the pertinent engineering properties of the foundation soils.

GEOLOGY

REGIONAL GEOLOGY

The Site is located in the eastern Ventura Basin, within the Transverse Ranges geomorphic province of California, along the northeastern flank of the Santa Susana Mountains. The Ventura Basin consists of a narrow, elongate sedimentary trough extending from the Santa Barbara Channel on the west, to the San Gabriel fault on the east. The axis of the trough trends east-west, reflecting the overall east-west trend of the Transverse Ranges, and generally coincides with the Santa Clara River Valley and the Santa Barbara Channel. The Ventura Basin has been an area of subsidence and sediment accumulation since the beginning of the Tertiary period, with the present trough-like form developing near the beginning of the Miocene epoch (Winterer and Durham, 1962).

The structure of the Basin is defined as a highly folded "synclinorium" formed by north-south compressional forces (Kew, 1924) and containing a maximum 50,000± feet of marine and nonmarine Tertiary through Quaternary age sediments (Bailey and Jahns, 1954). Two main periods of general deformation of the Ventura Basin are indicated by the regional geologic structure: one in middle to late Miocene (represented by deposition of the Modelo Formation), and the other during the Pleistocene epoch, after deposition of the Plio-Pleistocene Saugus Formation (Kew, 1924; Winterer and Durham, 1962; Yeats et al., 1994). The flanks of the Ventura Basin synclinorium are broken by a series of large reverse/thrust faults including the Santa Susana and Oak Ridge faults on the southern flank, and the Red Mountain and San Cayetano faults on the northern flank (Bailey and Jahns, 1954; Yeats et al., 1994). The San Gabriel fault, the dominant geologic feature in the Santa Clarita Valley, forms the eastern

Ventura Basin boundary, and separates the Ventura Basin from the structurally similar Soledad Basin.

Sedimentary rock units comprising the eastern Ventura basin include approximately 2,000 feet of undifferentiated middle to late Eocene age rocks, 1,000± feet of the middle Miocene age Topanga Formation, 5,000± feet of the late Miocene age Modelo Formation, 4,000± feet of the late Miocene to early Pliocene age Towsley Formation, 5,000± feet of the Pliocene age Pico Formation, and 7,000± feet of the Plio-Pleistocene Saugus Formation (Winterer and Durham, 1962). The undifferentiated Eocene units and the Topanga, Modelo, Towsley, and Pico Formations are composed of marine sediments; the Saugus Formation is composed of interfingering shallow-water marine, brackish water, and nonmarine units (Kew, 1924; Winterer and Durham, 1962). These Tertiary period rock units rest unconformably on pre-Cretaceous age metamorphic and igneous basement rocks of the San Gabriel Mountains.

SITE GEOLOGY

General: Geologic conditions within the boundaries of Site have been previously evaluated by Pacific Soils (2006) and Gold Coast (2015). Additional geologic data was collected by RTF&A in January, 2021, April, 2022, and April 2023.

Geologic Units: The geologic units within the Site consist of bedrock of the Pico and Saugus formations, alluvium and colluvial (slope wash) deposits, landslide and debris flow deposits, and man-made fill. The geologic units identified within the Site are shown on the Geotechnical Map (Figures 1). A description of each unit is presented as follows:

Pico Formation (Tp): Marine sedimentary rock units of the Pliocene age Pico Formation (map unit "Tp") are exposed in the southwest corner of the Site. The formation is composed primarily of fine- to medium-grained sandstones, coarse-grained pebbly sandstones, siltstones, and some silty claystone interbeds. Fine-grained sandstone is the dominant lithology of the formation and is typically very thinly or thinly bedded, soft, and moderately weathered, with alternating bands of iron oxide staining. Siltstone and silty claystone beds are moderately to well indurated and massive. Sandstone beds are typically dark yellowish orange to yellowish gray;

siltstone beds are typically yellowish gray to olive brown. The Pico Formation was not encountered during the current field investigation.

Saugus Formation, Sunshine Ranch Member (TQss): The Sunshine Ranch Member of the Saugus Formation (designated map unit "TQss") underlies the majority of the Site and within the literature it is described as interfingering shallow-water marine, brackish water, and nonmarine sedimentary units of Plio-Pleistocene age (Winterer and Durham, 1962). Within the Site, the Sunshine Ranch Member is composed of fine- to coarse-grained sandstone and conglomeratic/pebbly sandstone, with some siltstone interbeds. Medium to coarse grained, ridge forming, sandstone and conglomeratic sandstone are the dominant lithologies of the formation in the south and are typically hard to very hard, locally difficult to excavate with a backhoe, slightly moist to dry, and moderately to thickly bedded to massive. Some of the fine grained sandstone and silty sandstone beds are very thinly bedded, locally laminated, medium hard to soft, regularly moderately weathered, and have some iron oxide staining. Siltstone and sandy siltstone beds are typically found in the Site's northern areas, generally .5 to about 10 feet thick, soft to medium hard, moderately to well indurated, and thickly bedded to massive. Sandstone beds are dark yellowish brown to grayish orange, while siltstones are yellowish gray.

Undifferentiated Alluvium and Colluvium (Qac): Undifferentiated Holocene age alluvium and colluvium (map unit "Qac") overlie the bedrock units on-site, with the alluvium mantling the floor of Lyons Canyons and the colluvium generally occurring in drainage swales and side canyons, and on slopes. These materials consist of loose to moderately dense mixtures of sand, silt, gravel, cobbles, and to a lesser extent, boulders.

Man-made Deposits (af): Man-made deposits (map unit "af"), associated with past grading activities for development of The Old Road, are located along the east boundary of the Site. The man-made deposits are composed of sand and silt mixtures derived primarily from the local bedrock materials.

Landslide and Debris Flow Deposits: Landslide and Debris Flow deposits were identified on-site and are described in the Conclusions section that follows.

Geologic Structure: The Site is located along the northerly limb of the asymmetrical Pico anticline. Within the Site boundaries, the beds forming the northerly limb strike generally northwest and dip 30 to 65 degrees to the northeast creating a steep, asymmetric hogback ridgeline along the southern boundary of the project. The very steep topography and prominent ridge is the result of hard sandstone and conglomerate beds armoring slopes. Many of the north facing slopes are dip slopes.

GROUNDWATER

Groundwater within the Site occurs in the alluvial deposits within Lyons Canyon and major tributary canyons. Data from the Water Resources Division of Los Angeles County Department of Public Works (LACDPW) indicates that one water well was located adjacent to the Site boundaries. This well, designated as Well No. 5832, was located immediately north of the Site near the intersection of Sagecrest Circle and The Old Road. The water level data from this well, which was destroyed in 1965, covers the period of December, 1956 through November, 1964, with the last water level measured on November 24, 1964. The water level at that time was measured at a depth of 118.4 feet below existing ground surface.

Exploration completed within the Site by Pacific Soils (2006) indicated groundwater within the alluviated valley floor at depths ranging from 53 to 69 feet below existing ground surface. Groundwater was not encountered within our borings within the valley floor within the main easterly canyon. However, seepage was encountered in the northerly draining canyon within Hollow Stem 3 and 4 at depths of 25 and 20 feet, respectively. Pore water dissipation, performed within some of the CPT soundings as presented in Appendix E, did not provide a consistent groundwater depth. Based on review of the California Division of Mines and Geology seismic hazard report for Oat Mountain , the historic water depth just north of the Site along The Old Road is 30 feet. A historic high water of 30 feet was conservatively utilized for the liquefaction calculations presented in Appendix G.

CONCLUSIONS AND RECOMMENDATIONS

GENERAL

Based on our review of previous geotechnical reports prepared for the project and adjacent areas, the additional subsurface exploration performed by RTF&A, and analyses completed as part of this work, it is our opinion that Vesting Tentative Tract No. 83301 may be developed as planned, provided our recommendations are incorporated in the design of the project.

GEOLOGIC CONSIDERATIONS

Faulting: No active or potentially active faults are known to exist within the subject Site and the Site is not located within an Alquist-Priolo Earthquake Fault Zone. The closest Alquist-Priolo Zone is located approximately 1.5 miles northwest of the Site and was established for surface features identified following the 1994 Northridge earthquake. In our opinion, there is little probability of surface fault rupture occurring on-site.

Landslides: Landslides were identified during this field investigation. Typically, landslides were near surface features impacting weathered and creep impacted rock on steep slopes. Failures appeared to bedding plane controlled. Large deep seated landslides were not identified on Site. Review of the California Geological Surveys "Landslide Inventory and Deep Landslide Susceptibility Map" indicated the Site is not included within a known or inferred landslide.

Debris Flows (Qdf): Remnant debris flow deposits were identified and mapped during this field investigation as depicted on Figure 1. Where observed, subtle geomorphic expression of the deposits was evident. Estimated maximum thickness of the identified deposits was on the order of 16 feet. Test pit excavations revealed that much of the surficial materials on Site slopes to a depth of about 8 feet have been or may be creep impacted, and subject to sloughing and or sliding.

The potential for debris flows exists anywhere that a moderate to thick accumulation of residual soil, slope wash, or weathered bedrock materials occur on moderate to steep slopes. The potential debris flow hazard should be addressed as part of a review of 1" = 40' rough grading plans, when building lots and drainage features have been more clearly defined.

At the rough grading plan stage, possible mitigative measures could include, but not be limited to, one or more of the following:

- removal of potential debris material;
- building setbacks from ascending slopes;
- reduction and control of drainage onto the debris material;
- construction of debris basins; and
- construction of an impact wall designed for an equivalent fluid density of at least 125 pounds per cubic foot.

In general, building lots most susceptible to potential debris flow are those lots located directly below and adjacent to natural slopes. Based on our review of the United plan, all future lots appear to have acceptable separation, either vertical or horizontal, from natural slopes and potential debris flow source areas. Therefore, potential debris flow impacts are judged to be minimal. However, these opinions should be verified at the rough grading plan review stage.

Oil Wells: Data from the California Department of Conservation's Geologic Energy Management Division (CalGEM) indicate that one oil well, designated "Ayers" 1 is located within the subject Site. Only limited data on this well exists in the CalGEM records. Based on the data, the well was drilled in February, 1961 to a depth of 9,785 feet. The well was subsequently abandoned in April, 1961. However, geophysical survey techniques did identify anomalies within the vicinity of the reported historical well location and GPS information from that search is included with the documentation related to "Ayers" 1 that was provided by Atlas in their December 28, 2020 report that is presented in Appendix H.

Figure 1 presents the surveyed location of the Ayers 1 well. It is location on the plan is based on surveyed data by others. It is anticipated and recommended that CalGEM will be contacted regarding the well's current abandonment. Furthermore, and as anticipated, CalGEM will require that the well be modified relative to proposed grade and re-abandoned to current standards, by others.

Rockfalls: Future building pads within the Site will not be located directly downslope of any potential rockfall areas.

Rippability: The bedrock exposed within the Site is weakly to moderately cemented and can likely be excavated with conventional grading equipment. Heavy single shank ripping may be needed for massive ridge forming well-cemented conglomerate or well-cemented sandstone units within the Saugus Formation, primarily in the southern areas of the Site. Should a hard well-cemented layer be encountered, the use of breakers or jackhammers may be necessary.

Restricted Use Areas (RUAs): There are no proposed RUAs within the Site.

STABILITY ANALYSES

Slope stability analyses were performed using the program Slope/W by GEO-SLOPE International Ltd., which utilized Bishop's Simplified Method or Spencer's Method was used.

GEOLOGIC SECTIONS AND ASSUMED CRITICAL FAILURE SURFACE

The updated analyses were based on subsurface conditions as depicted on the Geologic Sections, Figure 2. The existing ground surface, proposed grading scheme, and subsurface geologic structure are shown on the geologic sections. For analyses, where the location of weak bedding planes is unknown or uncertain, one is assumed to be located exactly at the critical location, typically near the toe of the slope. Although groundwater was not indicated on the Geologic Sections, the analyses assumed a phreatic surface above the critical failure surface for bedding plane failures. The critical failure surfaces, phreatic surfaces, factors of safety, and recommended mitigation measures (i.e., stabilization or buttress fills, if necessary) are added to the Geologic Sections for presentation as Geotechnical Sections in this report. The Geotechnical

Sections and Slope Stability Analysis are presented in Figure 3 and the computer printouts are presented in Appendix D.

SHEAR STRENGTH PARAMETERS

As part of the evaluation of shear strength parameters to be used in slope stability calculations, the referenced reports concerning the Site and adjacent sites were reviewed. The shear strength parameters used for slope stability analyses are based on review of the referenced reports (RTF&A, 2000 and 2016) from relatively nearby sites, review of recommended shear strength parameters from the Gold Coast (2015) report, with additional tests supplemented by our office for to establish the recommended shear strength parameters.

Presented below are the recommended shear strengths for use at the Site. The shear test results are considered to be effective values; that is, they require hydrostatic pressures be considered in a stability analysis. A description of the testing procedures and the direct shear test results are presented in Appendix C.

MATERIAL	COHESION (psf)	ANGLE OF SHEARING RESISTANCE (degrees)
Landslide Failure Plane (MSR)	200	16
TQss Bedding Static (MSR)	250	20
TQss Bedding Seismic (SSR)	200	30
TQss Cross Bed Static (SSR)	500	34
TQss Cross Bed Seismic (SSR)	800	36
Compacted Fill 90% (SSR)	350	30
Compacted Fill 95% (SSR)	400	30
Alluvium (Qal)	250	30

SLOPE STABILITY

The revised tract map for the Site will include grading of 12 cut slopes. Details specific to all proposed cut slopes, including anticipated geologic conditions and recommended mitigation of potential slope instability, were previously discussed in our March 19, 2021 report (RTF&A, 2021a). Cut Slopes 2, 5, 7, 10, 11, and 12 have been reconfigured as part of the

proposed revised grading. Cut Slope 10 was modified to accommodate the proposed water tank and tank access road, and as a result slopes 10A through 10D have been identified as part of the proposed tank Site grading and slope modifications. As the proposed grading for all remaining cut slopes is essentially unchanged, only cut slopes CS-2, CS-5, CS-7, CS-10, CS-10A, CS-10B, CS-10C, CS-10D, CS-11, and CS-12 are discussed in the following sections.

Cut Slope CS-2: Cut slope CS-2 is proposed as a 2:1 h:v curved cut, sweeping from southwest facing to east facing with a maximum height of 40 feet. An eight feet high retaining wall is planned along a portion of the base of the cut along the road. Saugus Formation will be exposed within the majority of the cut with the exception of alluvium/colluvium being exposed at the base of the cut at its' western extent. Saugus Formation bedding strikes at roughly north 55 west, dipping to the north at 31 degrees, which is generally favorable to the cut. It is recommended that the alluvium and colluvium within the cut slope be entirely removed and reconstructed as a stability fill with backdrains.

Cut Slope CS-5: Cut Slope CS-5 will consist of a north-facing 2:1 h:v slope that will attain a maximum height of about 60 feet. A 15-foot-high retaining wall will be constructed across the toe of the cut slope. Test Pit 2, a 35 feet long trench was excavated within the proposed slope footprint to obtain additional geologic subsurface information. Cut Slope CS-5 will expose Saugus Formation units in which the underlying bedding strikes northwest and dips greater than 37 to 65 degrees towards the northeast. This bedding orientation exhibits an apparent bedding component dipping approximately 16 degrees to the north (see Geologic Section 9-9', Figure 2). Bedding will impose a surcharge on the proposed retaining wall of 3 kips per foot of retaining wall. Analyses of the daylighted bedding condition presented in Appendix D meets County static and seismic factor of safety requirements after construction of a retaining wall able to resist the daylighted surcharge load of 3 kips for seismic conditions. It is assumed that the proposed retaining wall will be constructed as a either soil nail or Cast-In-Drilled-Hole (CIDH) pile supported retaining wall using top-down construction sequencing. The

pile or soil nail supported retaining wall will be more expensive than a conventional retaining wall, but is considered feasible.

Cut Slope CS-7: Cut Slope CS-7 will consist of a north-northwest-facing 2:1 slope that will attain a maximum height of about 75 feet. A 10-foot-high retaining wall will be constructed across the toe of the cut slope. Test Pit 1, a roughly 30 feet long trench was excavated within the proposed slope footprint to obtain additional geologic subsurface information. Cut Slope CS-7 will expose Saugus Formation units in which the underlying bedding strikes northwest and dips greater than 30 to 40 degrees towards the northeast. This bedding orientation exhibits an apparent bedding component dipping approximately 25 degrees to the north (see Geologic Section 8-8', Figure 2) and is daylighted with respect to the north-northwest-facing cut slope.

Bedding will impose a surcharge on the proposed retaining wall of 3 kips per foot of retaining wall to meet factor of safety requirements. Analyses of the daylighted bedding condition presented in Appendix D meets County static and seismic factor of safety requirements after construction of a retaining wall able to resist the daylighted surcharge load of 3 kips. It is assumed that the proposed retaining wall will be constructed as a either soil nail or Cast-In-Drilled-Hole (CIDH) pile supported retaining wall using top-down construction sequencing. The pile or soil nail supported retaining wall will be more expensive than a conventional retaining wall, but is considered feasible.

Cut Slope CS-10: Cut Slope CS-10 was significantly revised to provide an access road to the new proposed water tank pad. Cut Slope CS-10 will consist of cutting about 235 feet of elevation to yield a southeast-facing 2:1 slope that will attain a maximum height of about 210 feet. CS-10 ascends up slope and paralleling the strike of the hogback ridge line as presented in Figure 1. Based on apparent dips shown along the ridge line, what appears to be significant variations in bedrock orientations shown in Geologic Cross-Section 1-1' (Figure 2) are not, but are a result of small variation within the strike of the ridge forming beds. Figure 1 depicts Geologic Cross-Section line 1-1' and the strike of bedding nearly parallel, with the rock dipping away from the viewer. Cut Slope CS-10 will expose Saugus Formation units in which the

underlying bedding strikes northwest and dips roughly 41 to 71 degrees towards the northeast. As depicted on Geologic Cross-Section 1-1' (Figure 2), this bedding orientation is favorably oriented with respect to the southeast-facing cut slope and the slope is considered grossly stable from a geologic standpoint.

Alluvial and Colluvial deposits will also be exposed in the proposed debris basin slopes below Cut Slope CS-10. The alluvium and colluvial soils exposed in the proposed basin cut slopes should be removed and replaced as a fill slope. Backdrains would only be required where the back of the fill slope will be within bedrock materials.

Where the water tank access road makes a 180 degree turn at about a proposed elevation 1,445 feet there is only a narrow strip of bedrock with a gradient that dips steeply to the north. There is a thin skinned surficial slide (2 to 5 feet thick) and a potential for creep and surficial slope erosion that could eventually progress to the south where it could impact the proposed access road. Accordingly, it is recommended that up to five CIDH soldier piles be installed to depths of about 30 feet as shown on the attached Geotechnical Map, Figure 1. The diameter of the CIDH piles is expected to be about 30 inches, but should be a minimum diameter of 24 inches.

Cut Slope CS-10A: Located at the top of Cut Slope CS-10A is proposed as a south facing 42 feet high 1.5:1 h:v cut bedrock rock cut made to accommodate the access water tank pad. Geologic Cross Sections 10-10' and 16-16' present the subsurface geometry of the rock with respect to the proposed cut. Bedding is favorably steeply dipping (51 degrees) to the northeast and therefore CS-10A is grossly stable from a geologic perspective. It is anticipated that weathered rock and colluvium within 10 feet of the slope's face may be susceptible to surficial sloughing. Grading of the cut slope will improve the overall condition, nuisance water will be directed away from the slope surfaces, and no structures or improvements are planned at the base of the slopes.

Cut Slope CS-10B: A 65 feet high south facing 1.5:1 h:v bedrock cut slope is proposed to accommodate the tank access road. Bedrock is oriented striking to the northwest and dipping

to the northeast at about 65 degrees. As presented, CS-10B bedding is favorable for the cut slope and CS-10B is grossly stable from geologic perspective. It is anticipated that weathered rock and colluvium within 10 feet of the slope's face may be susceptible to surficial sloughing. Grading of the cut slope will improve the overall condition, nuisance water will be directed away from the slope surfaces, and no structures or improvements are planned at the base of the slopes.

Cut Slope CS-10C: Proposed as a less than 75 feet high, 1.5:1 h:v, north facing bedrock cut slope, CS-10C will cut through northwest trending, northeast dipping (about 55 degrees) Saugus Formation bedrock, see Figure 1. Bedrock is dipping significantly steeper than the proposed 1.5:1 h:v cut slope as shown in Cross-Section 10-10'. The slope is considered grossly stable from a geologic perspective. It is anticipated that weathered rock and colluvium within 10 feet of the south facing slope's face may be susceptible to surficial sloughing. Grading of the cut slope will improve the overall condition, nuisance water will be directed away from the slope surfaces, and no structures or improvements are planned at the base of the slopes.

Cut Slope CS-10D: Cut Slope CS-10 wraps to the north at its base, and changes the orientation of the 2:1 horizontal: vertical slope. Apparent bedding was evaluated with geometry being presented in Geologic Cross-Sections 6-6' and 13-13'. Bedding is striking to the northwest while dipping to the northeast at roughly 45 degrees to 60 degrees. Apparent bedding within the CS-10D is inclined at about 12 degrees, daylighting within the cut. It is recommended that the portion of the cut slope daylighting bedding be reconstructed as a stability fill slope with backdrains. The keyway for the stability fill should measure 30 feet wide and 3 feet deep, and should extend upslope to the top of the cut at an elevation of about 1,440 feet.

Cut Slope CS-10E: Cut slope 10E is proposed as 1.5:1 h:v, 60 feet high and south facing1.5:1. It is a bedrock cut exposing rock dipping to the north east at about 52 degrees, and is oriented favorable to the cut. CS-10E is considered grossly stable from a geologic perspective. It is anticipated that weathered rock and colluvium within 10 feet of the south facing slope's face may be susceptible to surficial sloughing. Grading of the cut slope will improve the overall

condition, nuisance water will be directed away from the slope surfaces, and no structures or improvements are planned at the base of the slopes.

Cut Slope CS-11: Cut Slope CS-11 will consist of a northeast-facing 2:1 slope with terrace drains that will attain a height of approximately 80 feet. Additional subsurface exploration consisting of TP-8 through TP-11 were excavated within the proposed slope footprint to obtain additional geologic structure. The cut slope will expose sedimentary rock units of the Saugus Formation at the edges of the proposed cut slope and, in the central portion of the slope, alluvial/colluvial deposits, and landslide debris. Bedding in the Saugus Formation strikes northwest and dips 32 to 65 degrees to the northeast. Portions of two landslides were identified within the proposed limits of Cut Slope CS-11 as depicted on Figure 1. There is also expected to be colluvium and alluvium exposed in Cut Slope CS-11 in addition to a fill over cut in the upper portion of the slope. Accordingly, it is recommended that Cut Slope CS-11 be constructed as a 35-foot-wide by 3-foot-deep stability fill. The stability fill should terminate at a terrace drain near the top of the proposed cut slope, and extend across the area of alluvium/colluvium in the central portion of the cut slope. The stability fill should be constructed with backdrains in accordance with the recommendations presented in the "Conclusions and Recommendations" section of this report, and as shown on Figure 4.

Cut Slope CS-12: Cut Slope CS-12 will consist of an east-northeast-facing 2:1 slope that will attain a maximum height of 85 feet. Test Pit TP-5 and Test Pit TP-7 were excavated within the proposed slope footprint to obtain additional geologic structure as depicted in Geologic Cross Section 2-2'. At the northeastern toe of Cut Slope CS-12, two small landslides were identified, with the western slide crossing beyond the toe of the proposed slope. These landslides should be removed in their entirety and replaced with compacted fill or as a stability fill. Rock observed within the test pits indicated that the upper 6 feet to 8 feet was or had the potential to be creep effected. The southern and central portion of Cut Slope CS-12 will expose Saugus Formation units in which the underlying bedding strikes northwest and dips greater than 42 to 46 degrees towards the northeast. As depicted on Geologic Section B-B' (Figure 2), this bedding orientation

exhibits an apparent bedding component dipping approximately 31 degrees to the northeast. The apparent bedding is steeper than the 2:1 (26 degrees) slope gradient and the central and southern portion of cut slope is considered grossly stable from a geologic standpoint.

Debris flow deposits were identified in the northern portion of Cut Slope 12 that is located above a proposed basin. The debris flow was investigated by TP-5. It is recommended that the debris flow be removed in its entirety and reconstructed as a stability fill slope with backdrains. The keyway for the stability fill should measure 35 feet wide and 3 feet deep. This proposed debris flow removal and replacement with a Stability Fill with backdrains, should extend to the top of the proposed slope.

LIQUEFACTION

Liquefaction may occur when saturated, loose to medium dense soils with little to no cohesion are densified by ground vibrations. The densification results in increased pore water pressures if the soils are not sufficiently permeable to dissipate these pressures during, and immediately following, an earthquake. When the pore water pressure is equal to or exceeds the overburden pressure, liquefaction of the affected soil layers occurs. For liquefaction to occur, three conditions are required:

- ground shaking of sufficient magnitude and duration;
- a groundwater level at or above the level of the susceptible soils during the ground shaking; and
- soils that are susceptible to liquefaction.

For a Site to be considered susceptible to liquefaction using the criteria and methodology initially developed by Seed and Idriss (1982), liquefaction of underlying soil layers must result in an observed surface effect such as sand boils, mud-spouts, surface water seepage, ground cracking, or quicksand-like conditions.

Lateral spreading can result in ground cracking and may occur when a Site is sloped or is near a free-face and there is a sufficiently continuous liquefiable layer on which the overlying

soils can move laterally. Due to the recommended removal depths and the lack of a free-face located below the recommended removals, the potential for lateral spread occurring at the Site is low.

Ground settlement may occur during seismic shaking of an area. The settlement can be caused by liquefaction of loose granular soils and by compaction of loose, but not necessarily liquefiable, soils.

The State of California Seismic Hazard Map for the Oat Mountain Quadrangle indicates the alluvial areas of the Site are located within a potential liquefaction area. The locations of the CPT soundings that were advanced for the subject investigation are indicated on the attached Geotechnical Map, Figure 1. As previously mentioned, the logs for the borings are presented in Appendix A, CPT soundings are presented in Appendix G, and the results of our laboratory tests are presented in Appendix C of this report. The results of our liquefaction calculations are presented in Appendix G.

Ground Shaking: Ground shaking of sufficient magnitude and duration to cause liquefaction can occur virtually anywhere within Southern California. The seismic parameters determined for the Site resulted in a PGAm of 1.17g. The deaggregation obtained from the USGS website indicates the mean contribution to acceleration is a 6.85 magnitude earthquake located 7.27 kilometers from the Site. The seismic data is presented in Appendix F and the liquefaction calculations are presented in Appendix G. There will not be any liquefaction related settlements with the existing bedrock areas mapped as TQss areas as indicated on the Geotechnical Map, Figure 1.

Liquefaction Analysis: The liquefaction evaluation was performed in accordance with the 2014 Los Angeles County Building Code and the Los Angeles County Department of Public Works Geotechnical Materials Engineering Division (GMED) document GS 045.0, dated October 1, 2014. Liquefaction calculations are presented in Appendix G.

Liquefaction evaluation and calculations were previously performed for the Site (Gold Coast, 2015) which determined that the alluvial portions of the Site were subject to up to 1.39 inches of

liquefaction settlement and 0.49 inches of dry sand settlement for a total seismic settlement of about 1.89 inches. The liquefaction evaluation performed by RTF&A on the 5 CPT soundings performed by Gregg Drilling in January, 2021 are discussed below and the liquefaction calculations are presented in Appendix G.

The existing alluvial areas (Qac) mapped at the Site are subject to liquefaction. After the recommended removals are performed, the remaining alluvium soils will be mantled by certified engineered fill. The alluvial soils are underlain by bedrock materials. Accordingly, the existing canyon areas at the Site will be underlain by a combination of bedrock materials, denser alluvial deposits, and certified engineered fill. Based on liquefaction calculations presented in Appendix G that were performed on the recent Gregg Drilling CPT soundings, it was determined that liquefaction settlement would be about 1.25 inches (Boring HS-5). The maximum dry sand settlement expected at the Site is about 0.5 inches. The total dynamic settlement after performing either the 15 or the 20 feet of removal and elevating the Site grade within the existing Qac areas is expected to be about 1.75 inches with up to about 1 inch of seismic differential settlement within a horizontal distance of about 30 feet.

Based on the results of our analyses, some alluvial soils beneath the Site and below the groundwater level may liquefy in the event of a large earthquake on a nearby fault that produces the design-level ground motions. In addition, soils above the groundwater level may also experience “dry” settlement. This will result in seismically induced ground settlement. The potential for liquefaction induced lateral spread occurring at the Site is considered Low. The recommended liquefaction mitigation at this Site consists of a combination of ground modification below the proposed building areas and structural mitigation. Each of the liquefaction mitigation methods is discussed below.

Ground Improvement: The recommended grading will involve the removal of the upper soils in the proposed building areas and their replacement with properly compacted fill. The upper soils, which are subject to dry sand settlement, would be removed to depths of either

15 or 20 feet and replaced with compacted fill soils as indicated on the attached Geotechnical Map, Figure 1. Properly compacted fill soils would not be subject to liquefaction.

Structural Mitigation: According to GMED GS 045.0, dated October 1, 2014, structural mitigation alone is acceptable for up to 4 inches of total seismically induced settlement, with up to 1 inch of seismically induced differential vertical displacement over a horizontal distance of 30 feet. Anything in excess of these settlements requires a combination of ground modification and structural mitigation. Accordingly, the recommended liquefaction mitigation at this Site consists of a combination of ground modification below the proposed building areas and structural mitigation.

Structural mitigation to reduce the potential for liquefaction and/or seismically induced settlement of the proposed buildings would include minimum requirements for foundation and floor slab construction as presented in the following "Recommendations" section of this report. The project Structural Engineer should also be consulted regarding the design of structural components of the buildings to reduce adverse impacts associated with liquefaction-induced settlement of the proposed structures at the Site.

INFILTRATION

The Los Angeles County Department of Public Works (LACDPW) prepared "Guidelines for Design, Investigation, and Reporting Low Impact Development Stormwater Infiltration" (Document GS200.2, dated June 30, 2017). These guidelines provide stringent requirements for minimum infiltration rates, hillside developments with steep slopes, and sites subject to liquefaction.

At the completion of the proposed grading operations, the surface of the Site is expected to consist of either relatively shallow certified compacted fill cap overlying bedrock in the existing cut areas or deeper fill soils ranging from about 20 to greater than 30 feet overlying alluvial soils. All the alluvial soils at the Site are underlain by bedrock. Compacted fill soils at the Site are not expected to meet the minimum county infiltration requirements of 0.3 inches per hour. In addition, the alluvial soils at the Site are designated by the State of California as having

the potential of being subject to liquefaction when saturated and are subject to seismic settlement as evaluated in this report. The guidelines state that infiltration shall not increase the potential for seismic settlement of structures on or adjacent to the Site. Accordingly, in compliance with the LACDPW Guidelines, it is recommended that infiltration into the subsurface compacted fill soils not occur at the Site and that stormwater mitigation requirements be achieved by methods other than on-site infiltration.

GRADING

General: The following sections present recommendations for treatment of cut and fill slopes, and grading. The applicability of the preliminary recommendations given in the following sections for foundation and retaining wall design should be confirmed at the completion of grading. Paving studies and soil corrosivity tests should be performed at the completion of rough grading to develop detailed recommendations for protection of utilities, structures, and for construction of the proposed roads.

Site Preparation: Prior to performing earthwork, the existing vegetation and any deleterious debris should be removed from the Site. All unsuitable soils in the areas of grading that are receiving fill should be removed to competent bedrock materials and replaced with engineered fill. The depth of removal and recompaction of unsuitable soils is noted on the Geotechnical Map. Any fill required to raise the Site grades should be properly compacted.

Removal of the exposed natural soils should extend to at least the depths indicated on the Geotechnical Map.

Removal Depths: The required depth of removal and recompaction of the natural soils is indicated on the Geotechnical Map. Deeper removals will be required if disturbed or unsuitable soils are encountered. After excavation of the upper natural soils on hillsides and in canyons, further excavation should be performed, if necessary, to remove slope wash or other unsuitable soils.

The Geotechnical Consultant of Record may require that additional shallow excavations be made periodically in the exposed bottom to determine that sufficient removals have been

made prior to recompacting the soil in-place. Deeper removals may be recommended by RTF&A based on observed field conditions during grading. During grading operations, the removal depths should be observed by a representative of RTF&A and surveyed by the Project Civil Engineer for conformance with the recommended removal depths shown on the grading plan.

Expansive Bedrock Requirements: It is anticipated that bedrock materials exposed at pad grade may contain expansive claystone beds that could cause differential expansion. Therefore, within building areas at locations where expansive bedrock units are exposed at pad grade, it is recommended that the bedrock be removed and recompacted to a depth at least 8 feet below the proposed final pad elevations or 5 feet below the bottom of proposed footings, whichever is greater. It is also recommended that in exposed bedrock areas receiving pavement or hardscape improvements, the bedrock be removed and recompacted to a depth at least 3 feet below proposed soil subgrade. The soils generated by these over-excavations should be mixed with non-expansive soils to yield a relatively non-expansive mixture. Should the resulting fill soil still be expansive, special construction techniques, such as pad subgrade saturation or post-tensioned slabs, may be required to reduce the potential for expansive soil–related distress.

Transition Lot Requirements: Proposed building pads located in a cut and fill transition zone may experience cracking and movement of the footings and slab due to differing compressibility of the fill, as compared to the bedrock material. To reduce the potential for cracking and differential settlement, the portion of the lot in cut bedrock or terrace deposits should be over-excavated to a depth at least 5 feet below the proposed finished pad elevation or 3 feet below the bottom of proposed footings, whichever is greater. The over-excavation should extend at least 5 feet laterally beyond the building limits, or 1 foot laterally for each 1 foot over-excavated below proposed finished pad elevation, whichever is greater. Where removal and recompaction for potentially expansive soils or bedrock is also required, it is recommended that the 8 foot removals be performed as described in the “Expansive Bedrock” section of this report.

Material for Fill: The on-site soils, less any debris or organic matter, may be used in the required fills. Any expansive clays should be mixed with non-expansive soils to result in a mixture having an expansion index less than 30 if they are to be placed within the upper eight feet of the proposed rough grades.

Rocks or hard fragments larger than eight inches may not be placed in the fill without special treatment. Rocks or hard fragments larger than four inches shall not be clustered or compose more than 25% by weight of any portion of the fill or a lift. Soils containing more than 25% rock or hard fragments larger than four inches must be removed or crushed with successive passes (e.g., with a sheepsfoot roller) until rock or hard fragments larger than four inches constitute less than 25% of the fill or lift.

Oversized Material: Rocks or material greater than eight inches in diameter, but not exceeding four feet in largest dimension, shall be considered oversized rock. The oversized rocks can be incorporated into deep fills where designated by the Geotechnical Consultant of Record. Rocks should be placed in the lower portions of the fill and should not be placed within the upper 10 feet of compacted fill, or nearer than 15 feet to the surface of any fill slope. Windrows should be excluded from areas of proposed utilities, pools, and other types of future underground improvements. Additional costs and construction difficulties should be anticipated if future improvements are located in areas where there will be conflicts with existing windrows. Rocks between eight inches and four feet in diameter shall be placed in windrows or shallow trenches located so that equipment can build up and compact fill on both sides. The width of the windrows shall not exceed four feet. The windrows should be staggered vertically so that one windrow is not placed directly above the windrow immediately below. Rock greater than one foot in diameter shall not exceed 30% of the volume of the windrows. Granular fill shall be placed on the windrow, and enough water should be applied so that soil can be flooded into the voids. Fill should be placed along the sides of the windrows and compacted as thoroughly as possible. After the fill has been brought to the top of the rock windrow, additional granular fill

should be placed and flooded into the voids. Flooding is not permitted in fill soils placed more than one foot above the top of the windrowed rocks.

Where utility lines or pipelines are to be located at depths greater than 15 feet, rock shall be excluded in that area. Excess rock that cannot be included in the fill, or that exceeds four feet in diameter, should be stockpiled for export or used for landscaping purposes.

The oversized material recommendations presented in this report provide for the geotechnical consultant to coordinate with the grading contractor to develop a procedure for construction of compacted fills that have a satisfactory fill performance for the intended use of the fill. It should be understood that it is not feasible and/or cost effective to eliminate all oversize material from constructed fills as part of a conventional grading operation. The exclusion of all oversize material is not necessary for satisfactory fill performance on the majority of projects.

Import Material: Import material should consist of relatively non-expansive soils with an expansion index less than 30. The imported materials should contain sufficient fines (binder material) so as to be relatively impermeable, and result in a stable subgrade when compacted. The import material should be free of organic materials, debris, and rocks larger than 12 inches. A bulk sample of potential import material, weighing at least 25 pounds, should be submitted to the Geotechnical Consultant of Record at least 48 hours in advance of fill operations. All proposed import materials should be approved by the Geotechnical Consultant of Record prior to being placed at the Site.

Compaction: After the Site is cleared and excavated as recommended, the exposed soils should be carefully observed for the removal of all unsuitable material. Next, the exposed subgrade soils should be scarified to a depth of at least six inches, brought to above optimum moisture content, and rolled with heavy compaction equipment. The upper six inches of exposed soils should be compacted to at least 90% of the maximum dry density obtainable by the ASTM D 1557-02 Method of Compaction.

After compacting the exposed subgrade soils, all required fills should be placed in loose lifts, not more than eight inches in thickness, and compacted to at least 90% of their maximum density. For fills placed at depths greater than 40 feet below proposed finish grade, a minimum compaction of 93% of the maximum dry density is required. The moisture content of the fill soils at the time of compaction should be above the optimum moisture content. Compacted fill should not be allowed to dry out before subsequent lifts are placed.

Rough grades should be sloped so as not to direct water flow over slope faces. Finished exterior grades should be sloped to drain away from building areas to prevent ponding of water adjacent to foundations.

Shrinkage And Bulking: Shrinkage of about 12 to 16 percent is estimated for the on-site natural alluvial soils when removed and placed as compacted fill. A bulking value of about 2 to 6 percent is estimated for materials generated from Saugus Formation bedrock cut areas for use as compacted fill. The actual shrinkage and bulking will depend upon the relative compaction obtained by the contractor during grading operations and would be expected to change on a daily basis.

Permanent Slopes: Permanent cut and fill slopes may be inclined at 2:1 or flatter. The current Site plan indicates that the steepest slope to be constructed at the Site during grading will be 2:1.

Proposed Cut Slopes: Cut slopes proposed for the rough grading of the pSite have been designated, as shown on the Geotechnical Map. Each cut slope is discussed with specific recommendations presented in the "Slope Stability Analysis" section of this report. All grading should conform to the minimum recommendations presented in this report. If these slopes are modified from those that are discussed in this report, the modifications should be reviewed by RTF&A to ascertain the applicability of our recommendations.

Fill Slopes: Where the toe of a fill slope terminates on natural, fill, or cut materials, a keyway is required at the toe of the fill slope. The fill slope keyway should be a minimum width of 12 feet, be founded within competent material, and should extend a horizontal distance

beyond the toe of the fill to the depth of the keyway. The keyway should be sloped back at a minimum gradient of two percent into the slope. The width of fill slopes shall be no less than eight feet, and under no circumstances should the fill widths be less than what the compaction equipment being used can fully compact. Benches should be cut into the existing slope to bind the fill to the slope. Benches should be step-like in profile, with each bench not less than four feet in height and established in competent material. Compressible or other unsuitable soils should be removed from the slope prior to benching. Competent material is defined as being essentially free of loose soil, heavy fracturing, or erosion-prone material and is established by the Geotechnical Consultant of Record during grading.

Where the top or toe of a fill slope terminates on a natural or cut slope and the natural or cut slope is steeper than a gradient of 3:1**,** a drainage terrace with a width of at least six feet is recommended along the contact. As an alternative, the natural or cut portion of the slope can be excavated and reconstructed as a stability fill slope to provide an all-fill slope condition. Where the contact between the face of the fill slope and the face of a lower natural or cut slope is inclined at 45 degrees or steeper, a drainage terrace would not be required.

When constructing fill slopes, the grading contractor shall avoid spillage of loose material down the face of the slope during the dumping and rolling operations. Preferably, the incoming load shall be dumped behind the face of the slope and bladed into place. After a maximum of four feet of compacted fill has been placed, the contractor shall backroll the outer face of the slope by backing the tamping roller over the top of the slope, thoroughly covering all of the slope surface with overlapping passes of the roller. The foregoing should be repeated after the placement of each four-foot thickness of fill. As an alternative, the fill slope can be overbuilt, and the slope cut back to expose a compacted core. If the required compaction is not obtained on the fill slope, additional rolling will be required prior to placement of additional fill, or the slope shall be overbuilt and cut back to expose the compacted core.

Stability Fills: Stability fill can be recommended to minimize the potential for erosion and to eliminate adverse fill-over-cut conditions. Stability fill slope should be constructed in

accordance with Stability Fill Details for Grossly Stable Slopes (Figure 4). Backdrains should be installed at the backcut of the stability fill as recommended below.

DRAINAGE

Subdrains: Canyon subdrains are recommended to intercept and remove groundwater within canyon fill areas. All subdrains should extend up-canyon, with the drain inlet carried to within 15 feet of final pad grade. The approximate location for recommended subdrains are shown on the Geotechnical Map, Figure 1. Specific subdrain locations should be determined in the field during grading operations.

The subdrains should be surveyed by the Project Surveyor to establish line and grade during construction, and for future location reference. Subdrain and backdrain excavations should be observed by the Geotechnical Consultant.

The subdrains should be installed in accordance with the manufacturer's specifications. A minimum 2% gradient is to be maintained in the subdrain pipes and the pipe shall have at least 8 uniformly spaced narrow slots per foot. The width of the slots should not exceed 1/16 of an inch. If PVC pipe with drilled perforations is utilized, the diameter of the holes should not exceed 3/8 of an inch, if gravel and filter fabric is used or 1/8 inch diameter if Los Angeles County Flood Control District (LACFCD) Designation F-1 Filter Material is used. There should be at least 8 uniformly spaced sets of 2 perforations per lineal foot of pipe. When constructing the subdrain, the pipe should be placed so that the drilled perforations are positioned on the bottom half of the pipe. The upstream end of subdrains should be capped. The final 20 feet of pipe at the downstream end of canyon, stabilization, buttress, and side hill fills shall not be slotted or perforated. Provisions should be made at all times during construction to prevent damage to the subdrain from construction equipment, and to prevent soils from being washed into an exposed subdrain by surface waters.

For runs up to 500 feet, subdrains for the bottom of canyon fills should consist of at least 6-inch diameter pipe. For runs of 500 to 1,500 feet, 8-inch diameter pipe shall be used. For runs over 1,500 feet, 10-inch diameter pipe shall be used.

Canyon subdrains may be installed in a rectangular trench excavated to expose competent material and shall be approved by the Geotechnical Consultant. The subdrains should be surrounded by at least 3 cubic feet per lineal foot of granular filter material and there should be at least 6 inches of compacted granular filter material or gravel on all sides of the pipe. The granular filter material for subdrains should meet the F1 material criteria, or have a gradation approved by the Geotechnical Consultant prior to placement.

As an alternative to the granular filter material, 3/4-inch diameter gravel may be placed around the pipe. The gravel should be separated from the surrounding soils by a filter fabric such as Mirafi 140N, or equivalent, wrapped around the gravel ("burrito wrapped").

Backdrains: Backdrains are required for all stability fills or buttress fills, and should consist of 4-inch diameter perforated or slotted pipe. The vertical spacing of the backdrains should be a maximum of about 15 feet, with a horizontal spacing of about 100 feet. Backdrain outlets should consist of non-perforated pipe. The gradient should be at least 2% to the discharge end. The exact location of the backdrains should be determined in the field by the Geotechnical Consultant after the backcut has been made, so that it can be best positioned to intercept potential seepage.

Surface Drainage: All surface drainage should be directed away from proposed structures through non-erosive devices. The ponding of water must not be allowed, especially adjacent to foundations. The pad gradients should not slope toward any descending slopes in order to reduce the potential for surficial erosion. Water that flows towards slopes should be conducted to appropriate discharge locations via non-erodible drainage devices. Drainage devices, including drainage terraces on graded slopes should be inspected periodically and should be kept clear of debris. Drainage and erosion control should be designed in accordance with the standards set forth in the CBC.

Any modification of the grades of building pads, parking areas, etc., could adversely affect drainage at the Site. Future landscaping, construction of walkways, planters and walls, etc. must never modify Site drainage unless additional measures to enhance drainage (e.g., area

drains, additional grading, etc.) are designed and constructed in accordance with the applicable Los Angeles County regulations.

Erosion Protection: In order to reduce the potential for erosion, all permanent cut-and-fill slopes on-site should be seeded or planted with lightweight, deep-rooting, drought-resistant vegetation. A landscaping expert should be consulted for ground cover recommendations. Excessive landscape irrigation or leakage from irrigation lines can cause localized slope failures. Therefore, irrigation systems for slope vegetation should be designed and maintained to minimize leakage onto graded slopes. If automatic sprinkler systems are used, they should be adjusted for seasonal variations in rainfall. Vegetation on natural slopes should remain natural and not be landscaped or irrigated in the same manner as graded slopes.

Rodent burrows are known to provide direct conduits for water flow that can decrease slope stability. Therefore, in order to maintain the integrity of graded slopes, a rodent abatement program should be instituted.

Even with the implementation of these recommendations, it is not possible to eliminate erosion within hillside developments. Removal of debris from drainage devices, slope maintenance, and landscaping will be required, especially after periods of heavy rainfall.

GENERAL GRADING REQUIREMENTS

1. All fills, unless otherwise specifically designed, shall be compacted to at least 90 percent of the maximum dry unit weight as determined by ASTM D 1557-02 Method of Soil Compaction.

2. No fill shall be placed until the area to receive the fill has been adequately prepared, and subsequently approved by the Geotechnical Consultant of Record or his representative.

3. Fill soils should be kept free of debris and organic material.

4. Rocks or hard fragments larger than eight inches may not be placed in the fill without approval of the Geotechnical Consultant of Record or his representative, and in a manner specified for each occurrence.

5. Bedrock fragments larger than eight inches, or fill soils containing greater than 25 percent of bedrock fragments larger than four inches in diameter, must be removed or processed using successive passes of a sheepsfoot compactor until rock fragments constitute less than 25 percent of the fill material.

6. The fill material shall be placed in layers which, when compacted, shall not exceed eight inches per layer. Each layer shall be spread evenly and shall be mixed thoroughly during the spreading to ensure uniformity of material and moisture.

7. When moisture content of the fill material is too low to obtain adequate compaction, water shall be added and thoroughly dispersed until the soil is approximately two to four percent above optimum moisture content.

8. When the moisture content of the fill material is too high to obtain adequate compaction, the fill material shall be aerated by blading, or other satisfactory methods, until the soil is approximately two to four percent above optimum moisture content.

9. Fill and cut slopes should not be constructed at gradients steeper than 2:1 (horizontal: vertical).

GRADING OBSERVATION

Construction observation should be made by a Geotechnical Consultant of Record during any grading activities within the Site, to verify the findings within this report. Additional recommendations may be required for landfill design based on conditions uncovered during grading.

TEMPORARY EXCAVATIONS

Based on our review of the subject plans, it does not appear that significant temporary excavations will be required during the construction of the proposed development. However, the following recommendations are applicable in areas where excavations are to be made.

Temporary excavations are not expected to stand vertically in cuts that exceed four feet in height. Temporary excavations in excess of four feet may be sloped at a gradient of ¾:1, to a maximum height of 12 feet. Slopes higher than 12 feet should be slopes back at a 1:1 gradient. By temporary, we mean a period not exceeding 60 days. All regulations of State or Federal OSHA should be followed.

If excavations are made during the rainy season (normally from November through April), particular care should be taken to protect slopes against erosion. Measures to help mitigate erosion, such as the installation of berms, plastic sheeting, or other devices, may be warranted. Surface water should be prevented from flowing over or ponding at the top of excavations.

CORROSION TESTS

Corrosion testing was previously performed by Golden Coast (2015) and indicated that the on-site soluble sulfate concentrations are negligible. The on-site soils are also corrosive to buried metals. A soil corrosion study was not performed as part of this scope of this investigation. Samples of the near-surface soil should be obtained at the conclusion of grading and be submitted to a corrosion consultant for testing. The purpose of performing the tests would be to determine if the Site soils are corrosive to concrete or underground utilities in contact with the soil.

EXPANSIVE SOILS

Samples of the on-site soils were obtained in 2015 during the investigation of the Site for laboratory expansion index testing (Golden Coast, 2015) and indicated a “very low” expansion potential . It is anticipated that when finer grained layers of the TQss are excavated and placed as compacted fill that the future compacted fill generated from the on-site soils may have a very low to medium potential for expansion depending upon the characteristics of the excavated bedrock and the degree of mixing that is obtained when placed as compacted fill. The Site soils can be classified as having a very low to medium potential for expansion.

The expansion index of near-surface certified engineered fill on building lots should be evaluated at the completion of grading to provide appropriate foundation recommendations commensurate with the post-grading expansion index test results.

FOUNDATIONS

General: Buildings may be supported on continuous or individual spread footings established in properly compacted fill soils. Foundations and floor slabs should be designed by a structural engineer, in accordance with the minimum requirements of the CBC.

Design Criteria: The recommendations presented in this section are based on the assumption that the proposed structures will have column loads not exceeding approximately 100 kips and continuous foundation loads not exceeding 3 kips per lineal foot. A bearing value of 2,000 pounds per square foot (psf) may be used in the design of spread foundations. This value can be increased by one-third when considering seismic and wind forces. The bearing material should consist of compacted fill soil. Individual column pads and continuous wall footings should be designed to meet the minimum width and depth requirements, as set forth in the CBC. Foundation depths should be measured from the lowest adjacent final grade.

Building setbacks for structures located adjacent to either ascending or descending slopes should be in accordance with the standards set forth in the CBC. All foundation excavations should be observed and approved by a representative from our firm prior to placement of reinforcing steel. Foundations should be deepened, where necessary, to prevent surcharge loads from being imposed on adjacent foundations or utilities. Observation of foundation excavations may also be required by the appropriate reviewing governmental agencies. The contractor should be familiar with the requirements of the governing reviewing agencies.

Foundations should be deepened, where necessary, to prevent surcharge loads from being imposed upon adjacent foundations or utilities. Surcharge loads should be assumed to be distributed out from the bottom edges of foundations at 45-degree angles. Foundation excavations should be cleaned of all loose material and be observed and approved by a representative of the Geotechnical Engineer of Record prior to casting concrete.

The Foundation Plans should be reviewed by the Geotechnical Engineer of Record. The Geotechnical Engineer of Record should sign and stamp the plan, provided the plans have been found to conform to the geotechnical recommendations presented in this report.

Mat Foundations: A mat foundation system can be used as an alternative to a post-tensioned slab within liquefaction areas and also for expansive soils conditions. If a mat foundation is utilized, the following geotechnical recommendations may be utilized for mat foundation construction. A base modulus of subgrade reaction of 300 pounds per cubic inch (pci) is recommended for use in the design of mat foundations for the proposed buildings at the Site. The mat could be founded directly on a 4-inch-thick layer of Crushed Aggregate Base (CAB) compacted to 95 percent relative compaction to provide a firm working surface, but it is not required from a geotechnical perspective. If utilized, the base would be placed directly on compacted fill soil that would be placed as part of the grading recommended in this report.

The base modulus should be reduced in accordance with the following equation:

$$k = k_b \left[\frac{(1 + B)}{2\,xB} \right]^2$$

where:

k = modulus of subgrade reaction for design
k_b = 300 pci = base modulus of subgrade reaction in pci
B = least dimension of foundation in feet

It is expected that mat foundations for the proposed buildings will range from about 8 to 30 inches in thickness. The thickness of each mat foundation will be a function of the loading conditions and is referred to the Project Structural Engineer for design. It is anticipated that each mat foundation, including the weight of the supported building, will impose pressure on the underlying soil of about 1,500 psf. This value could be considered as the design bearing value for mat foundation design.

Lateral Design: Lateral restraint at the bases of footings or slabs may be assumed to be the product of the dead load and a coefficient of friction of 0.4. Passive pressure on the faces of footings may also be used to resist lateral forces. A passive pressure of zero at the surface of finished grade, increasing at the rate of 250 psf per foot of depth, to a maximum value of 2,500

psf, may be used at this Site. The passive pressure and friction may be combined without reduction when evaluating lateral resistance.

Settlement: Provided that the proposed buildings are supported on shallow foundations established in compacted fill soils, as recommended, column loads do not exceed 100 kips, and continuous footings do not exceed 3 kips per lineal foot, we estimate that the maximum static settlement will be about 0.75 inches with seismic settlements of about 1.75 inches for a total settlement of about 2.5 inches within the alluvial areas (Qac) at the Site. Differential static and seismic settlements with the alluvial areas at the Site are expected to be about 1.4 inches within a horizontal distance of 30 feet. Within the compacted fill areas directly underlain by bedrock (TQss mapped areas), total seismic and static settlements of about 1 inch with differential settlement of about 0.75 inches within a horizontal distance of about 30 feet are expected. Our firm should review the foundation loads after plans are developed, to verify the applicability of our recommendations to the proposed structures.

FLOOR SLAB SUPPORT

General: The floor slab design recommendations presented in this section are based upon the assumption that the soil subgrade in proposed floor slab areas will consist of compacted fill soil and that floor slabs will be subjected to normal loads with no special requirements. Any surficial soils that become dried or disturbed during the course of construction should be moisture-conditioned and compacted prior to casting the floor slab.

Conventional floor slabs may be utilized at the subject development outside of liquefaction areas, provided the subgrade soils consist of compacted fill soils with a very low (Expansion Index of 0 to 20) potential for expansion. If the subgrade soils are determined to have an expansion potential in the low or higher range (Expansion Index greater than 21), post-tensioned floor slabs, as indicated below, are recommended. Post-tensioned slabs are also recommended for all building pads located within existing alluvial areas that are subject to liquefaction.

Conventional Floor Slabs: Conventional slabs-on-grade should be designed per the recommendations of the CBC. However, as a minimum, the building floor slabs should have a nominal thickness of at least 4 inches and should be reinforced with a No. 4 rebar spaced at 18 inches on center, in each direction, or equivalent. Thicker slabs may be required depending on the floor loads and the structural requirements; we defer to the Project Structural Engineer for design of the floor slabs.

Post-Tensioned Floor Slabs: Post-tensioned floor slabs should be designed per the recommendations of the CBC and be designed to resist the calculated static and seismic settlements in addition to the following geotechnical parameters. The design values, presented following this paragraph, assume that the proposed floor slabs will be poured monolithic with continuous perimeter edge footings. Perimeter edge footings should have a minimum depth of 18 inches. Footing depths should be measured from the lowest adjacent grade for perimeter footings or the top of slab for interior footings.

Net Bearing Value:	An allowable net bearing value of 2,000 psf for footings with a minimum width of 12 inches and a minimum depth of 18 inches below the top of slab or 18 inches below the lowest adjacent grade may be used.
Coefficient of Friction:	0.75
Passive Pressure:	250 pcf for level ground condition
Modulus of Subgrade Reaction (K):	150 pounds per cubic inch (pci) for a footing width of one foot. For larger footings or floor slabs, this value should be reduced using the following equation:

$$Kr = K\left[\frac{(B+1)}{2B}\right]^2$$

where:

Kr = Reduced Modulus Value

K = Modulus of Subgrade Reaction for a One-Foot-Wide Plate
B = Width of Large Footing or Slab

Modulus of Elasticity:	1,000 pounds per square inch (psi)	
Edge Moisture Variation Distance		
Me (Center Lift):	5.25 feet	
Me (Edge Lift):	2.5 feet	
Estimated Differential Movement	Low	Medium
My (swelling):	0.4	0.9
My (shrink):	0.3	0.7

Water Vapor Mitigation: Water vapor transmitted through floor slabs is a common cause of floor covering problems. An impermeable membrane "vapor barrier" should be installed to reduce excess vapor drive through the floor slab. The function of the impermeable membrane is to reduce the amount of water vapor transmitted through the floor slab. Vapor-related impacts should be expected in areas where a vapor barrier is not installed.

Construction activities and exposure to the environment may cause deterioration of the prepared subgrade. Therefore, the Geotechnical Consultant of Record should observe the condition of the final subgrade soils immediately prior to slab-on-grade construction and, if necessary, perform further density and moisture content tests to determine the suitability of the final prepared subgrade. The soil subgrade should be thoroughly moistened prior to casting.

Water vapor migration through slabs and associated adverse impacts should be anticipated if a vapor barrier is not constructed. The vapor barrier system recommended in this report has a record of satisfactory performance when properly installed. There are numerous methods of reducing vapor migration through slabs that also have satisfactory performance records. Each of the potential moisture reducing mitigation methods has advantages relative to cost, performance, protection of the vapor barrier during construction, and concrete curing. If requested and authorized, we would be pleased to provide the design team with additional geotechnical input on the selection of a suitable vapor barrier system.

Floor slabs should be constructed in a manner to decrease the potential of water vapor migration through the slabs. The floor slabs should be underlain by a vapor barrier consisting of a fifteen-mil-thick impermeable membrane. Care should be taken to avoid damage to the membrane and to seal the membrane around utilities and other penetrations.

Floor slabs should be underlain by a vapor barrier surrounded by 2 inches of sand above and below the barrier. The vapor barrier should be at least 10 millimeters thick; care should be taken to preserve the continuity and integrity of the barrier beneath the floor slab. The sand should be sufficiently moist to remain in place and be stable during construction; however, if the sand above the barrier becomes saturated before placing concrete, the moisture in the sand can become a source of water vapor.

Another factor affecting vapor transmission through floor slabs is a high water-to-cement ratio in the concrete used for the floor slab. A high water-to-cement ratio increases the porosity of the concrete, thereby facilitating the transmission of water and water vapor through the slab. The Project Structural Engineer or a concrete mix specialist should provide recommendations for the design of concrete for footings and floor slabs in accordance with the CBC, with consideration of the above comments.

Alternative methods of providing floor slab water vapor mitigation have also been successfully utilized. If requested, we would be pleased to provide geotechnical comments if it is desired to utilize alternative mitigation methods. The recommendations presented herewith may be superseded by the design team based on their successful experience with alternative mitigation methods. However, RTF&A assumes no responsibility related to adverse impacts associated with superseding the recommendations of this report.

SEISMIC DESIGN PARAMETERS

As with virtually all property in southern California, the Site may be subjected to strong ground shaking during earthquakes on nearby or distant faults and the improvements should be designed to resist such shaking in accordance with current codes. The seismic data is presented in Appendix C and the liquefaction calculations are presented in Appendix D. If requested and

authorized, we would be pleased to provide additional parameters utilizing other standards. The use of an appropriate seismic design parameter is referred to the Structural Engineer.

The following coefficients and factors apply to seismic force design of structures at the Site. The parameters were determined using the Applied Technology Council (ATC) Seismic Design Maps website, based upon American Society Civil Engineers (ASCE) document ASCE 7-16. Since S1 is greater than 0.2, null was reported for Sm1 and Sd1 and it will be necessary for the Project Structural Engineer to determine Cs (Seismic Response Coefficient) with the exception for Site Class D presented in Section 11.4.8 of ASCE 7-16.

Site Class	D
S_S	2.49
S_1	0.85
S_{MS}	2.49
S_{M1}	Null*
S_{DS}	1.66
S_{D1}	Null*
PGA_M	1.17

** See Section 11.4.8 of ASCE 7-16

PAVEMENT DESIGN

Samples of the on-site soil should be obtained from near final grade elevation in proposed pavement areas, following the grading operations, to perform R-value tests. The R-value test results would be used to prepare pavement section recommendations. The preliminary pavement section recommendations presented below are based on the assumption that the on-site soils have an R-value of at least 20. The final pavement section recommendations could vary depending on the results of the actual R-value tests. We would be pleased to provide pavement section recommendations for alternative Traffic Index values upon request.

	Asphalt Thickness	**(CAB) Base Course Thickness**

Traffic Index	(Inches)	(Inches)
4	3	5
6	4	9
8	5	14

Base course material should consist of crushed aggregate base (CAB), as defined by Section 200-2.2 of the Standard Specifications for Public Works Construction ("Greenbook"), or crushed miscellaneous base (CMB), as defined by Section 200-2.4 of the Greenbook. Base course material should be compacted to at least 95% of the maximum dry density of that material.

Base course material should be purchased from a supplier who will certify that it will meet or exceed the specifications in the Greenbook, as indicated. We could, upon request, perform sieve analysis and sand equivalency tests on material delivered to the Site that appears suspect. Additional tests could be performed, upon request, to determine if the material is in compliance with the remainder of the specifications indicated in the Greenbook.

The pavement section recommendations presented above are based upon assumed Traffic Index values. RTF&A does not take responsibility for the numerical determination of the Traffic Index values nor the areas where they apply within the Site.

RETAINING WALLS

General: Conventional retaining walls, CIDH pile supported retaining walls, and/or soil nail walls may be utilized at the Site. Conventional retaining walls can be designed in accordance with the "Retaining Walls" section presented later in this report. The Geotechnical Engineer of Record should review and approve the final retaining wall plans and specifications prior to construction.

Groundwater is not anticipated to be encountered during the drilling of the soldier piles or anchors. Likewise, caving of materials during the drilling of the soldier piles or anchors is not anticipated to occur.

Conventional Retaining Walls: For design of cantilevered retaining walls where the retained height of soils is less than 15 feet, and the walls are structurally independent from the proposed building, it may be assumed that drained soils will exert a lateral pressure equal to that developed by a fluid with a density of 30 pounds per cubic foot (pcf) where the backfill is level, and 45 pcf where the backfill is inclined at 2:1. The proposed retaining wall at the toe of Cut Slope CS-5 should be designed to resist an additional surcharge at a height of 10 feet of 10 kips as a result of daylighted apparent bedding.

In addition to the recommended earth pressures, the retaining walls should be designed to resist any applicable surcharges due to storage or traffic loads. A drainage system should be provided behind the walls to prevent the development of hydrostatic pressure behind the walls. If a drainage system is not installed, the walls should be designed to resist an additional hydrostatic pressure equal to that developed by a fluid with a density of 55 pcf against the full height of the wall.

In addition to the recommended earth and hydrostatic pressures, the upper ten feet of walls adjacent to vehicular traffic areas should be designed to resist a uniform lateral pressure of 100 psf, acting as a result of an assumed 300 psf surcharge behind the walls due to normal traffic. If the traffic is kept back at least ten feet from the walls, the traffic surcharge may be neglected.

The back of retaining walls should be water-proofed where aesthetics are concerned. Backfill placed behind retaining walls should be compacted to a minimum of 90% of the maximum dry density as determined by ASTM D 1557-02. When backfilling behind walls, it is recommended that the walls be braced, and heavy compaction equipment not be used closer to the back of the wall than the height of the wall. Soils which have a potential for expansion in excess of five percent should not be utilized for backfill behind walls which are greater than three feet in height.

Tieback and Pile Retaining Structures: Wherever the height of proposed retaining structures shoring exceeds 12 feet, it is expected that the retaining wall shoring will be designed

and constructed using tieback anchors or raker braces. The maximum height of the south wall indicated on the attached Geotechnical Map (Figure 1) is 27 feet.

For the design of tied-back or braced lateral support, we recommend the use of a uniform distribution of earth pressure. The recommended pressure distribution for the case where the grade is inclined at a gradient of 2:1 behind the shoring is a uniform lateral rectangular-earth pressure equal to 28H in psf (exclusive of hydrostatic pressure), throughout the depth of excavation, where H is the height of the shoring in feet. The recommended lateral pressures to be used in the design of the shoring do not incorporate adjacent surcharge loads from items such as bedding surcharge, existing streets, traffic, and buildings. An additional horizontal load of 3 kips per linear foot should be applied at the mid-height of the proposed retaining walls for Cut Slope 7 and 8 as previously discussed in the slope stability section of this report. This bedding surcharge is in addition to any loads from adjacent sources such as cranes, adjacent buildings, and traffic that should be added to the recommended lateral pressure, where applicable.

Traffic loads are not expected to surcharge the proposed retaining walls at the Site. However, if applicable, the upper 10 feet of walls below grade should include a uniform conventional shoring rectangular lateral pressure of 75 psf due to adjacent traffic unless traffic is kept at least 10 feet away from the perimeter of the shoring. This additional lateral pressure would be the result of an assumed 250 psf surcharge behind the wall due to normal street loads.

Design of Piles: For the design of Cast-in-drilled-hole piles spaced at least 2½ diameters on centers, the allowable lateral bearing value (passive value) of the soils below the bottom of the excavation may be assumed to be zero at the excavated surface, increasing at the rate of 600 psf of depth, to a maximum of 4,500 psf. To develop the full lateral value, provisions should be taken to assure firm contact between the piles and the undisturbed soils. The concrete placed in the pile excavations above the excavation bottom may be a lean-mix concrete. The concrete used in that portion of the shoring pile which is below the planned excavated level should be of sufficient strength to adequately transfer the imposed loads to the surrounding soils. It should be noted that in the unlikely event that groundwater is encountered, it will be required to increase

the design strength of concrete by 1,000 pounds per square inch (psi) where it is required to utilize a rigid tremie pipe and cast concrete in standing water more than 12 inches in depth.

The piles below the excavated level may be used to resist downward loads, provided that the portion of the piles below the excavated level is backfilled with structural concrete. The frictional resistance between the concrete soldier piles and the soils below the excavated level may be taken as equal to 500 psf (this value is based on the assumption that uniform full bearing will be developed between the steel shoring beam and the lean-mix concrete and between the lean-mix concrete and the retained earth.)

Lagging: Lagging should be installed between the CIDH piles prior to wall construction. Lagging may not be required, from a geotechnical perspective, in areas that expose materials that are not prone to caving and/or sloughing. Areas where it is desired to omit lagging should be observed and approved by a representative of the Geotechnical Engineer of Record. The governing agency should be contacted regarding any restrictions related to the elimination of lagging. Lagging may not be eliminated in areas where the excavation will be subject to surcharge loads from existing structures or items such as cranes or other construction equipment.

The shoring piles and anchors should be designed for the full anticipated lateral pressure. The pressure on the lagging, however, will be less due to arching in the soils and/or bedrock. The lagging should be designed for the recommended earth pressure but limited to a maximum value of 400 psf.

Anchor Design: Tieback friction anchors and/or soil nails (anchors) may be used to resist lateral loads. For design purposes, it may be assumed that the active wedge adjacent to the shoring or retaining wall is defined by an imaginary plane projected at 15 degrees from the horizontal to the bottom of the excavation. The anchors should extend at least 15 feet beyond the potential active wedge formed by this plane, and to a greater length, as necessary, to develop the desired capacities.

The capacities of anchors should be determined by testing of the initial anchors as outlined in the following "Anchor Installation" subheading of this report. Only the frictional resistance

developed beyond the active wedge should be considered as effective in resisting lateral loads. If the anchors are spaced at least 6 feet on centers, no reduction in the capacity of the anchors need be considered due to group action.

Anchor Capacities: The bedrock or terrace deposits/concrete strength at the interface along the length of an anchor will determine the capacity of that anchor. The anchor strengths presented in the following paragraph are suggested as the maximum values likely to be obtained. It is expected that the Shoring Engineer would use these (or lesser) values to determine the anchor test loads as opposed to the anchor design loads.

It is anticipated that the majority of the tie-back anchors will be founded in bedrock and/or terrace deposits. It is suggested that an ultimate friction of 800 psf for initial anchors be assumed for the bond length when designing anchors in open shafts with concrete placed through a standard tremie pipe. For pressure-grouted or post-grouted anchors, a value of 2,400 psf is suggested as a friction design value for the initial testing of anchors.

The shear strength, which may be mobilized between the materials encountered and the bond length of the earth anchor, will vary as a function of construction technique; the shear strength suggested above is considered to represent the upper limit. It is possible that some reduction of the available friction strength may result in areas where difficulties occur during the drilling and/or casting procedures. It is for this reason that we strongly recommend that initial anchor tests be conducted as early as possible to determine if the stated values are, in fact, available for use in production anchors.

Anchor Installation: Selected tie-back anchors should initially be installed and tested prior to installing production anchors. Based on the results of the initial anchor tests, the lengths, design friction values, or diameter of production anchors may be adjusted. Tieback anchors may be installed at angles of 15 to 40 degrees below the horizontal. For open shafts, the anchors should be filled with concrete placed by utilizing a tremie pipe and pumping concrete to the tip of the anchor. The anchors may also be of the pressure-grouted or post-grouted type. Testing of anchors should be performed prior to backfilling the active wedge.

Anchor Testing: In general, anchors are considered adequate if 150 percent of the design load is applied for a period of at least 15 minutes and the anchor deflection is less than 0.1 inch during that time period. The Geotechnical Engineer of Record should select at least one initial anchor on each tie-back level for a 24-hour 200 percent performance test. A quick 30-minute 200 percent test should be performed on 10 percent of the anchors. It is the responsibility of the Shoring Contractor to install an anchor rod or strand of sufficient strength to withstand the 200 percent test load. The purpose of the longer 200 percent tests is to verify the friction value assumed in design. The anchors should be tested to develop 2.0 times the assumed friction value. Where satisfactory tests are not achieved on the initial anchors, the anchor diameter and/or length should be increased until satisfactory test results are obtained.

The total deflection during the 24-hour 200 percent test should not exceed 12 inches during loading; the anchor deflection should not exceed 0.75 inch during the 24-hour period, measured after the 200 percent test load is applied. If the anchor movement is less than 0.5 inch after the 200 percent load has been applied for 12 hours, and the movement over the previous 4 hours has been less than 0.1 inch, the test may be terminated.

For the quick 200 percent test, the 200 percent test load should be maintained for 30 minutes. The total deflection of the anchor during the 200 percent quick test should not exceed 12 inches; the deflection after the 200 percent test load has been applied should not exceed 0.25 inch during the 30-minute period.

A test load of at least 150 percent of the design load should be applied to all of the production anchors. The total deflection during testing should not exceed 12 inches for each anchor. The deflection under the 150 percent test load should not exceed 0.l inch over a 15-minute period in order for the anchor to be approved for the design load.

After a satisfactory test, each production anchor should be “locked off” at the design load. The actual “lock off” load should be verified by checking the “lift-off” load of the anchor. The “lock off” load must be between 95 percent and 110 percent of the design load of the anchor.

The installation of the soldier piles, tie-back anchors, and load testing of the anchors should be observed by a representative of the Geotechnical Engineer of Record.

Wall "Free-Board": It is recommended that the wall design include wall "free-board" of at least 18 inches in areas where the top of the wall is downgradient of natural slopes.

Drainage: A drainage system should be provided behind retaining walls, or the walls should be designed to resist hydrostatic pressures. The drainage system could consist of a four-inch diameter perforated pipe placed six inches from the base of the wall, with the perforations down, and connected to an outlet device. The pipe should be sloped at least 1 inch per 50 feet and surrounded on all sides by at least six inches of clean gravel. The gravel should be "burrito-wrapped" with filter fabric, such as Mirafi 140N, or equivalent. As an alternative to the gravel and filter fabric, filter material meeting the requirements of LACFCD Designated F-1 Filter Material, and slotted pipe, may be used. The backside of the wall should be water-proofed.

A vertical six-inch-wide gravel chimney drain, or a drainage geocomposite such as Miradrain, should be placed against and behind retaining walls that are higher than three feet. The top of the back drain should be capped with 18 inches of on-site soils.

The installed drainage system should be observed by the Geotechnical Consultant of Record prior to backfilling the system. Inspection of the drainage system may also be required by the reviewing governmental agencies.

OBSERVATION AND TESTING

This report has been prepared assuming that RTF&A will perform all geotechnically-related field observations and testing. If the recommendations presented in this report are utilized, and observation and testing of the geotechnical work is performed by others, the party performing the observation and testing must review this report and assume responsibility for the recommendations contained herein. That party would then assume the title "Geotechnical Consultant of Record."

A representative of the Geotechnical Consultant of Record of Record should be present to observe all grading operations, as well as all footing excavations. A report presenting the results of the observations and related testing should be issued upon completion of those operations.

LOS ANGELES COUNTY SECTION 111 STATEMENT

Based on the findings summarized in this submittal, it is our professional opinion that the proposed grading, and any proposed structures at the Site, will be safe from hazards of settlement, slippage, or landslide, provided that the recommendations of this submittal, and those of the Los Angeles County Code, are incorporated into the proposed construction. Additionally, the proposed Site grading will not adversely affect the geotechnical conditions on adjacent properties.

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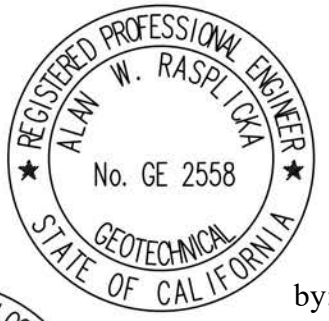
The following are attached and complete this report.

- References
- GMED Tentative Approval
- Geotechnical Map – Figure 1
- Geologic Sections – Figure 2
- Geotechnical Sections – Figure 3
- Stability Fill Detail for Grossly Stable Slopes – Figure 4
- Appendix A – RTF&A Field Explorations
- Appendix B – Field Explorations by Others
- Appendix C - Laboratory Testing
- Appendix D – Slope Stability Analyses
- Appendix E – Gregg CPT Soundings
- Appendix F – Seismic Parameters
- Appendix G – Liquefaction Calculations
- Appendix H – Ayers Oil Well Documentation
- Appendix I – United Civil Plan Set – Sheets 1-5 of 5, dated September 5, 2023
- Appendix J – Geotechnical 100-Scale Plan Review (dated March 19, 2021)
- Appendix K – Response to County Comments (dated July 27, 2021)
- Appendix L – Aerial Imagery and LIDAR



Respectfully submitted,

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GEOTECHNICAL ENGINEERING & ENGINEERING GEOLOGY

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PCA GMTR/A864
EPIC LA ESTU2021000162
Telephone: (626) 458-4925

County of Los Angeles Department of Public Works
Geotechnical and Materials Engineering Division
GEOLOGIC AND SOILS ENGINEERING REVIEW SHEET
900 S. Fremont Avenue, Alhambra, CA 91803

Tentative Tract / Parcel Map	83301	**Tentative Map Dated**	**07/28/2021 (Tent)** **Parent Tract** ---
Grading By Subdivider? [Y] (Y or N)	2,600,000 yd³	**Location**	Lyons Canyon
Geologist	R.T. Frankian	**Subdivider**	NUWI-LYONS CANYON, LLC
Soils Engineer	R.T. Frankian	**Engineer/Arch.**	Alliance Land Planning & Engineering

Review of:
Geologic Report(s) Dated:
Soils Engineering Report(s) Dated:
Geotechnical Report(s) Dated: **7/27/21**, 03/19/21
References:

TENTATIVE MAP FEASIBILITY IS RECOMMENDED FOR APPROVAL FROM A GEOTECHNICAL STANDPOINT

PRIOR TO FILING THE FINAL LAND DIVISION MAP THE FOLLOWING CONDITIONS MUST BE FULFILLED:

G1. The final map must be approved by the Geotechnical and Materials Engineering Division (GMED) to assure that all geotechnical requirements have been properly depicted. For Final Map clearance guidelines refer to policy memo GS051.0 in the County of Los Angeles Department of Public Works *Manual for Preparation of Geotechnical Reports*. The Manual is available at: ***http://dpw.lacounty.gov/gmed/permits/docs/manual.pdf***.

G2. A grading plan must be geotechnically approved by the GMED prior to Final Map approval. The grading depicted on the plan must agree with the grading depicted on the tentative tract or parcel map and the conditions approved by the Planning Commission. If the subdivision is to be recorded prior to the completion and acceptance of grading, corrective geologic bonds may be required.

G3. Prior to grading plan approval, a detailed geotechnical report must be submitted that addresses the proposed grading. All recommendations of the geotechnical consultant(s) must be incorporated into the plan. The report must comply with the provisions of the County of Los Angeles Department of Public Works *Manual for Preparation of Geotechnical Reports*. The Manual is available at: ***http://dpw.lacounty.gov/gmed/permits/docs/manual.pdf***.

G4. All geologic hazards associated with this proposed development must be eliminated. Alternatively, the geologic hazards may be designated as restricted use areas (RUA), and their boundaries delineated on the Final Map. These RUAs must be approved by the GMED, and the subdivider must dedicate to the County the right to prohibit the erection of buildings or other structures within the restricted use areas. For information on the RUA policy refer to policy memo GS063.0 in the County of Los Angeles Department of Public Works *Manual for Preparation of Geotechnical Reports*. The Manual is available at: ***http://dpw.lacounty.gov/gmed/permits/docs/manual.pdf***..

S1. At the grading plan stage, submit grading plans to the GMED for verification of compliance with County Codes and policies.

S2. At the rough grading stage, provide data from the recommended settlement monitoring program to verify that settlements will comply with County codes and policies.

NOTE(S) TO THE PLAN CHECKER/BUILDING AND SAFETY DISTRICT ENGINEER:
PER THE SOILS ENGINEER:

A. ON-SITE SOILS ARE CORROSIVE TO FERROUS METALS.
B. EXPANSION INDEX OF NEAR-SURFACE CERTIFIED ENGINEERED FILL ON BUILDING LOTS SHOULD BE EVALUATED AT THE COMPLETION OF GRADING.
C. THE SOILS REPORT DATED 3/19/21 INDICATES THERE MAY BE ENVIRONMENTAL CONCERNS REGARDING THE PRESENCE OF OILS WELLS.
D. FOR SECTION G-G' OF THE REPORT DATED 7/27/21, THE BEDDING PLANE THAT MEETS COUNTY FACTOR OF SAFETY REQUIREMENTS IS AT A DEPTH OF 15 FEET BELOW THE PROPOSED RETAINING WALL.
E. FOR SECTION G-G' OF THE REPORT DATED 7/27/21, A PROPOSED PILE RETAINING WALL IS RECOMMENDED. PILES MUST BE SUFFICIENTLY STIFF TO PROVIDE RESISTANCE OF 10 KIPS PER FOOT OF WALL AT THE MID-HEIGHT OF THE PROPOSED RETAINING WALL.

Prepared by

George Molina
Soils Section

PROFESSIONAL ENGINEER · GEORGE MOLINA · C 91931 · CIVIL · STATE OF CALIFORNIA

Matthew Cruz
Geology Section

PROFESSIONAL GEOLOGIST · Geir R. Mathisen · No. 2376 · CERTIFIED ENGINEERING GEOLOGIST · STATE OF CALIFORNIA

Date 09/20/2021

Please complete a Customer Service Survey at http://dpw.lacounty.gov/go/gmedsurvey
NOTICE: Public safety, relative to geotechnical subsurface exploration, shall be provided in accordance with current codes for excavations, inclusive of the Los Angeles County Code, Chapter 11.48, and the State of California, Title 8, Construction Safety Orders.

EXPLANATION

- af — Artificial Fill
- Qdf — Debris Flow Deposits
- Qac — Undifferentiated Alluvium & Colluvium
- TQss — Saugus Formation, Sunshine Ranch Member
- Tp — Pico Formation
- Geologic Contact; Dashed Where Approximate, Queried Where Inferred, Dotted Where Covered
- 29 — Strike and Dip of Bedding
- 18 — 18' — Geologic Section Line
- Proposed Subdrain
- CS-12 — Cut Slope Designation
- PS-B, CPT — Pacific Soils Bucket and CPT Locations (2006)
- PS-EP — Pacific Soils Exploratory Pit Locations (2006)
- GSC-B — Gold Coast Boring Location
- CPT — RTF&A CPT location (2021)
- HS — RTF&A Hollow Stem Locations (2021)
- TP — RTF&A Test Pit Locations (2022)
- AYERS OIL — Oil Well Location
- R=20' — Recommended Removal Prior to Placing Fill (ft)
- Recommended Stability Fill Keyway
- Qls14 — Landslide Debris (Remove All Landslide Debris Prior to Placing Fill)

Area Not Mapped

EXTENDED AREA TOPOGRAPHY PROVIDED BY UNITED CIVIL, INC. FILE 2038_TOPO_COMPOSITE.DWG

LEGEND:

- BOUNDARY LINE
- EXISTING CONTOURS
- EXISTING SEWER
- EXISTING WATER
- DRAINAGE FLOW DIRECTION
- PROPOSED LOT LINES
- ZONE BOUNDARY LINE
- PROPOSED GRADING CONTOUR
- PROPOSED STREET GRADES
- PROPOSED RETAINING WALL
- PROPOSED MANUFACTURED SLOPE
- EXISTING EASEMENTS
- PROPOSED EASEMENTS
- LIMIT OF GRADING LINE
- PROPOSED STORM DRAIN
- PROPOSED SANITARY SEWER
- PROPOSED WATER
- LOT X — LOT NUMBER
- EXISTING OAK TREE (SEE PROTECTED TREE REPORT AND SHEET 2 & 3)
- EXISTING NON-OAK PROTECTED TREE (SEE PROTECTED TREE REPORT AND SHEET 2 & 3)
- MWS — MODULAR WETLAND STORM WATER TREATMENT DEVICE

EASEMENTS BASED ON FIRST AMERICAN TITLE INSURANCE COMPANY PRELIMINARY TITLE REPORT, ORDER NO. NHSC-6837668(RA), DATED MAY 4, 2022

EXISTING EASEMENTS

TITLE REPORT ITEM NO.	GRANTEE	PURPOSE	REFERENCE	FUTURE DISPOSITION	TENTATIVE MAP SHEET NO.
4	SO. CAL. EDISON	ELECTRICAL LINES & INCIDENTAL PURPOSES	JULY 25, 1945 BOOK 30818, PAGE 283	TO BE REALIGNED WITH FINAL SCE DESIGN	N/A CANNOT BE PLOTTED
5	AYERS EASEMENT	INGRESS/EGRESS	JULY 12, 1977 INSTR. NO. 77-746808 JULY 13, 1977 INSTR. NO. 77-754792 APRIL 6, 1978 INSTR. NO. 78-352178 FEBRUARY 27, 1979 INSTR. NO. 79-227247	TO BE REALIGNED WITH "A" STREET AND "B" STREET	2

PROPOSED EASEMENTS

X	TWENTY FOOT WIDE MULTI-USE(HIKING, MOUNTAIN BIKING, EQUESTRIAN) TRAIL EASEMENT TO BE DEDICATED TO THE COUNTY OF LOS ANGELES APPROPRIATELY ALONG THE EXISTING VARIABLE WIDTH TRAIL ALIGNMENTS	TO LA COUNTY PARKS AND REC. DEPARTMENT	2
Y	MINIMUM TWENTY EIGHT FOOT WIDE ACCESS EASEMENT FOR INGRESS AND EGRESS PURPOSES TO BE GRANTED TO ADJACENT PRIVATE PROPERTY OWNERS	PRIVATE ACCESS EASEMENT (TO BE MAINTAINED BY HOA)	2
Z	STORM DRAIN EASEMENT FOR ACCESS AND MAINTENANCE OF LOS ANGELES COUNTY OWNED BASIN, PIPS, AND STRUCTURES	TO LA COUNTY FLOOD CONTROL	2
	TEN FOOT WIDE SANITARY SEWER EASEMENT, CENTERLINE BEING PROPOSED SEWER MAIN WHERE SEWER MAIN IS OUTSIDE OF PUBLIC RIGHT OF WAY.	TO LA COUNTY PUBLIC WORKS	

GEOTECHNICAL MAP

Prepared For:
NUWI, Lyons Canyon, LLC

Proposed Lyons Canyon Development
Vesting Tentative Tract Map No. 83301
Los Angeles County, California

Scale:	1"=100'	Drawn By:	JH	Checked By:	GAL
Date:	9/15/2023		Figure 1		2020-200-001

R. T. FRANKIAN & ASSOCIATES
24627 Huntington Lane, Unit A
Santa Clarita, California 91355
(818) 531-1501
www.RTFrankian.com

RTFA — ESTABLISHED IN: ENGINEERING & ENVIRONMENTAL GEOLOGY

GRAPHIC SCALE
0 50 100 200
(IN FEET)
1 inch = 100 ft.

UNITED CIVIL INC
30141 Agoura Road, Suite 215
Agoura Hills, CA 91301
PH: (818) 707-8648

SIEW HUAT NG — R.C.E. 46026 — 09/05/2023 DATE

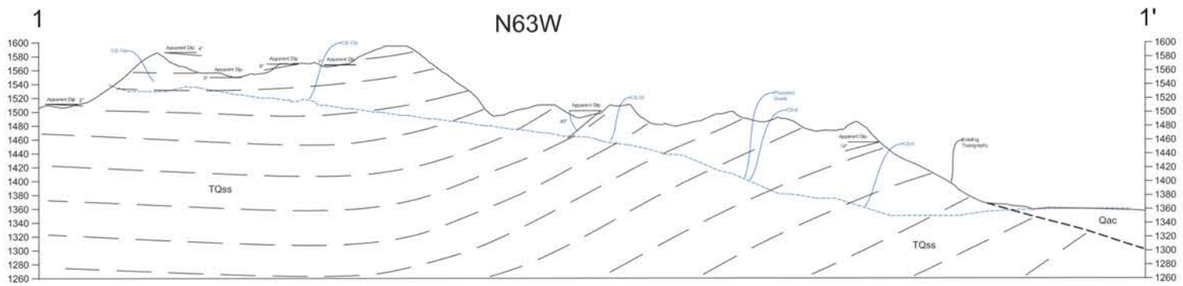
OWNER/APPLICANT:
NUWI LYONS CANYON, LLC
2001 WILSHIRE BOULEVARD, SUITE 401
SANTA MONICA, CA 90403
TEL: (310) 864-2427

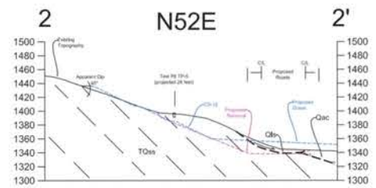
NO.	DATE	REVISIONS	BY	APPR

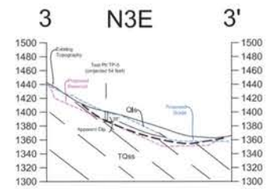
THE TRAILS AT LYONS CANYON
MAJOR LAND DIVISION
VESTING TENTATIVE TRACT NO. 83301
(FOR CONDOMINIUM PURPOSES)
LOCATED IN THE UNINCORPORATED TERRITORY OF
THE COUNTY OF LOS ANGELES, STATE OF CALIFORNIA

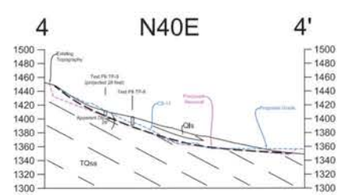
DATE: SEPTEMBER 05, 2023
SHEET 2 OF 5

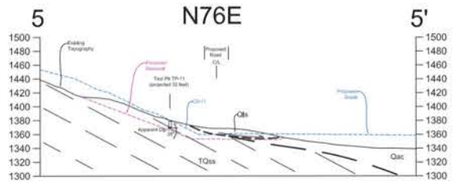
G:\Users Clarke\Lyons Canyon Ranch\GIS\VTM\2038_TENTATIVE-MAP_Sheets.dwg

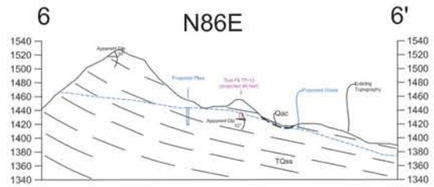


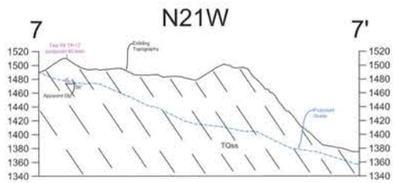


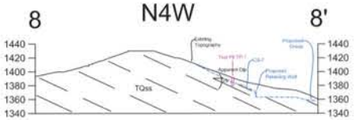


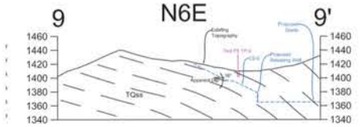


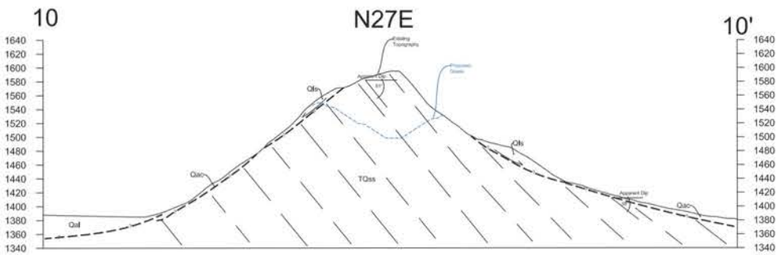


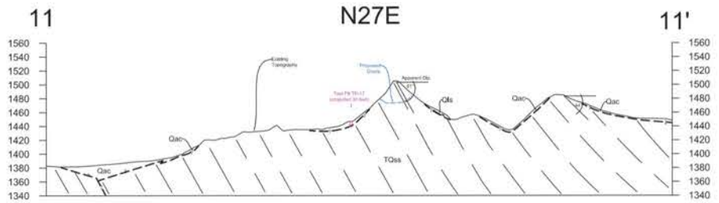


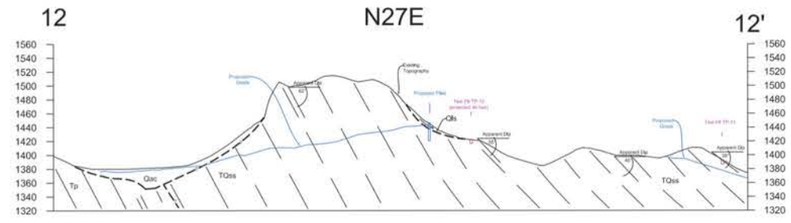


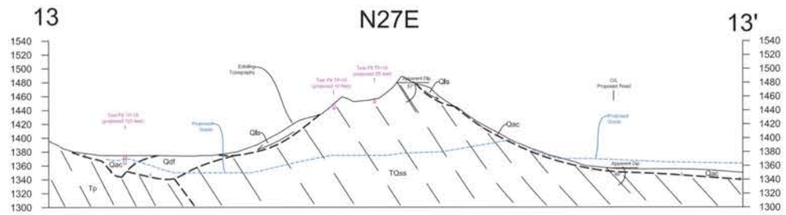


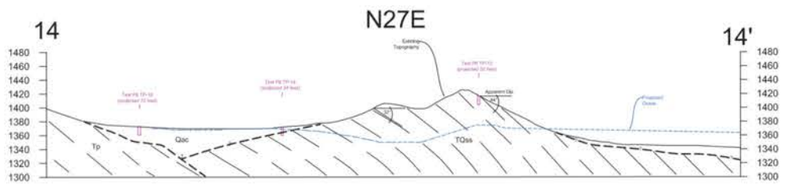


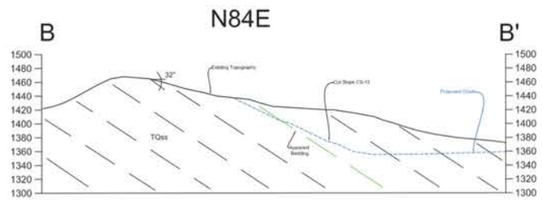




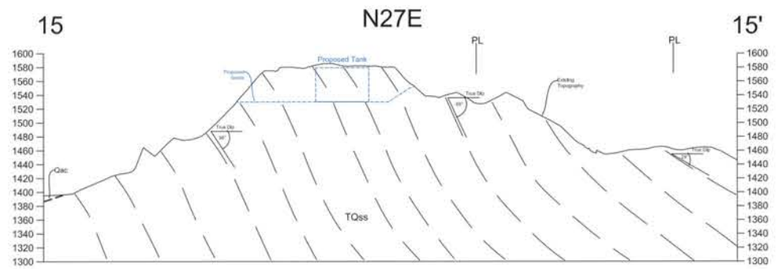


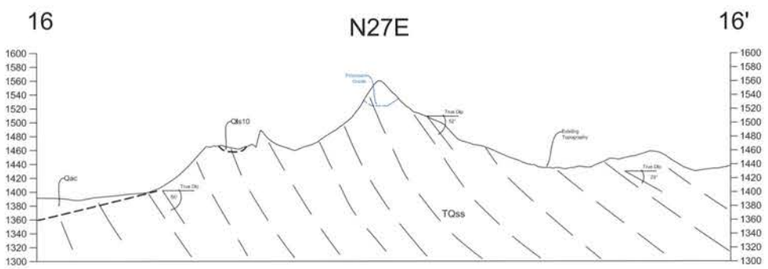


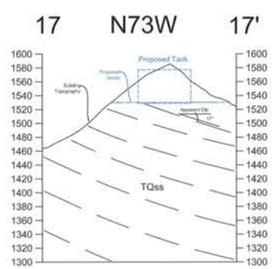


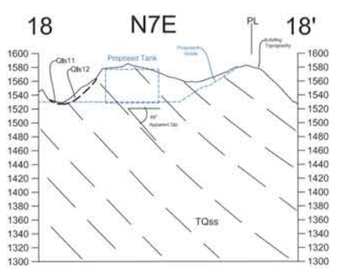


True Dip = 42°-46°









GEOLOGIC SECTIONS

Prepared For:
NUWI, Lyons Canyon, LLC

Proposed Lyons Canyon Development
Vesting Tentative Tract Map No. 83301
Los Angeles County, California

Scale: 1"=100' | Drawn By: JH | Checked By: GAL

Date: 9/15/2023 | Figure 2 | 2020-200-001

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RTFA

GEOTECHNICAL SECTIONS

Prepared For:

NUWI, Lyons Canyon, LLC

Proposed Lyons Canyon Development
Vesting Tentative Tract Map No. 83301
Los Angeles County, California

Scale:	Drawn By:	Checked By:
1"=100'	JH	GAL
Date: 9/15/2023	Figure 3	2020-200-001

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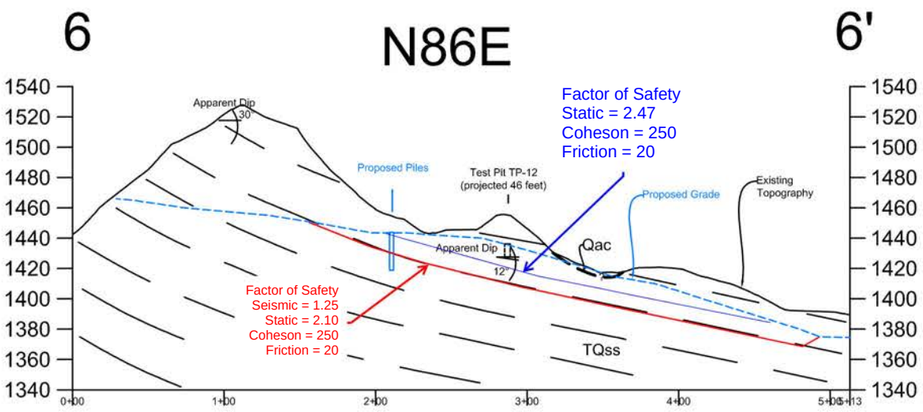
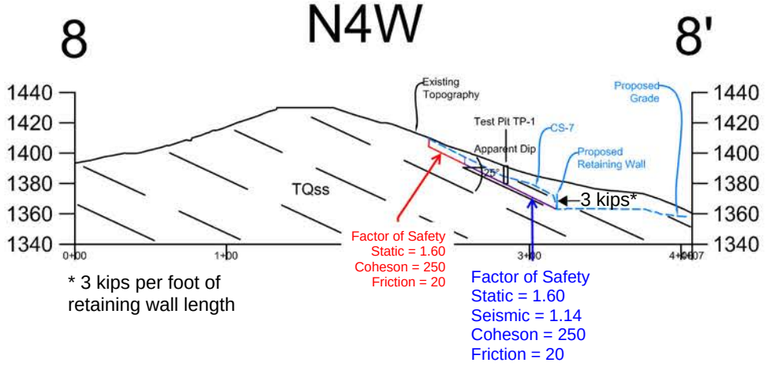
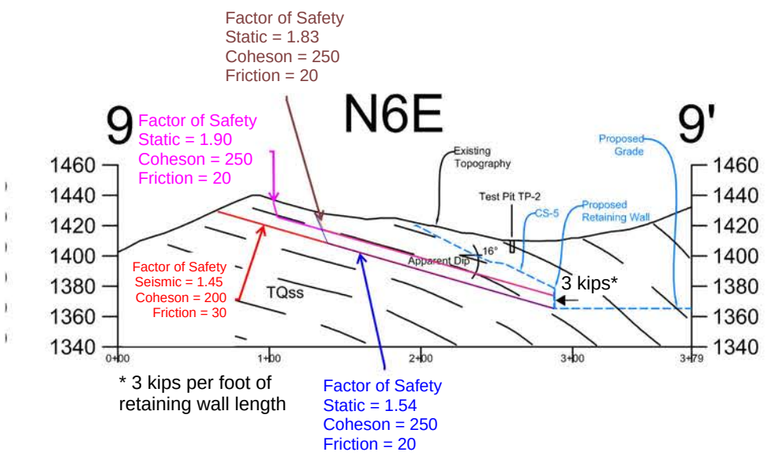
GEOTECHNICAL ENGINEERING & ENGINEERING GEOLOGY





* 3 kips per foot of retaining wall length

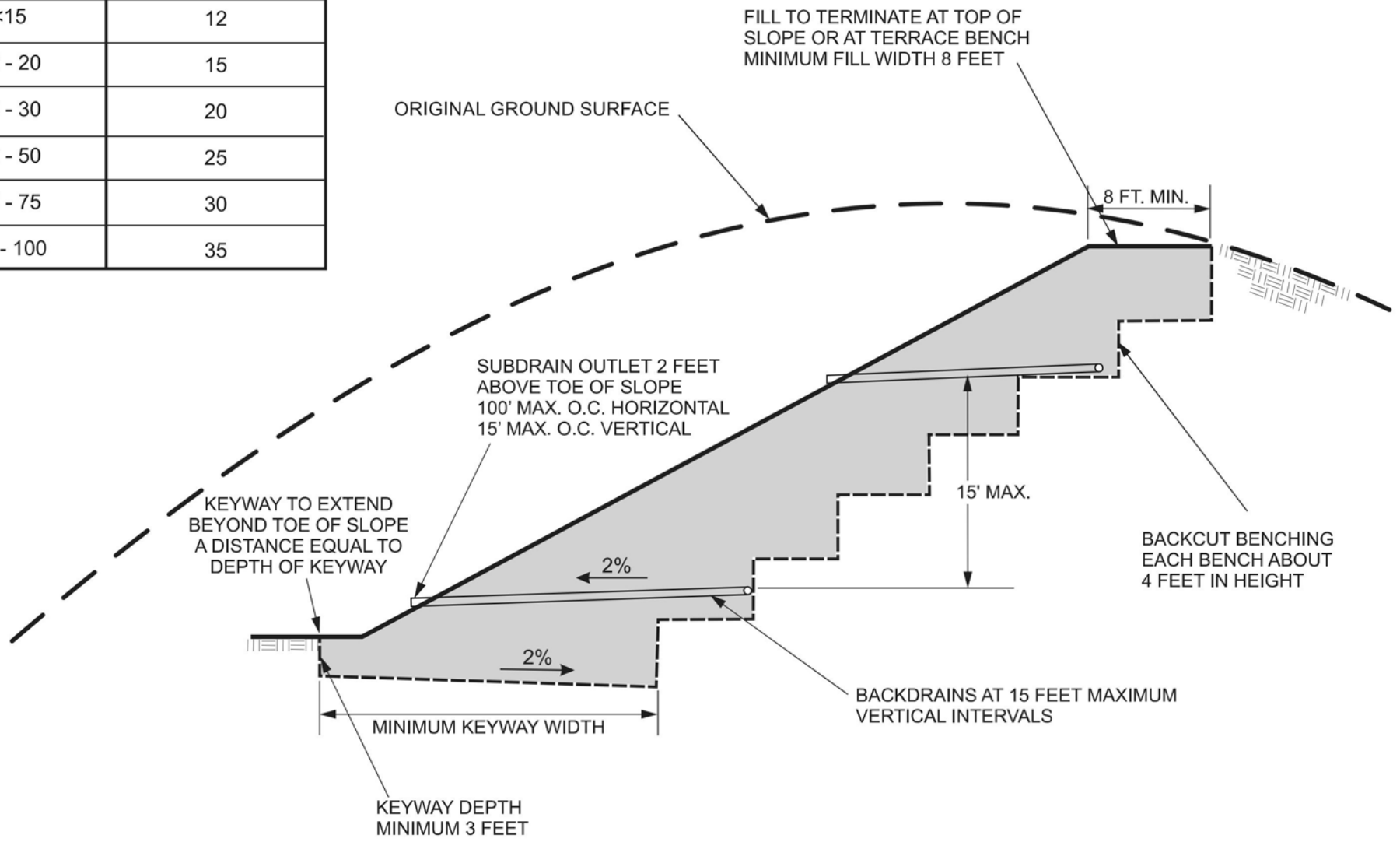
Factor of Safety
Static = 1.60
Seismic = 1.14
Cohesion = 250
Friction = 20



* 3 kips per foot of retaining wall length

Factor of Safety
Static = 1.54
Cohesion = 250
Friction = 20

STABILITY FILL HEIGHT (FEET)	MINIMUM WIDTH OF KEYWAY (FEET)
<15	12
15 - 20	15
20 - 30	20
30 - 50	25
50 - 75	30
75 - 100	35



STABILITY FILL DETAILS FOR GROSSLY STABLE SLOPES

NOT TO SCALE

NOTE:
SUBDRAIN PIPES ALONG BACKCUT SHOULD CONSIST OF AT LEAST 4'' DIAMETER SLOTTED PIPE WITH AT LEAST 6" OF F-1 FILTER MATERIAL ON ALL SIDES OF THE PIPE.
3/4" gravel may be used as an alternative to F-1 provided it is completely wrapped in Mirafi 140 N, or equivalent

NUWI – Lyons Canyon, LLC
September 15, 2023
2020-200-001

APPENDIX A

FIELD EXPLORATIONS

RTF&A
GEOTECHNICAL ENGINEERING & ENGINEERING GEOLOGY

APPENDIX A

FIELD EXPLORATION

RECONNAISSANCE GEOLOGIC MAPPING

During geologic mapping, local surficial deposits (both natural and man-made) and bedrock units were mapped on a 1 inch = 100 feet topographic base map prepared Alliance. Geologic structural features, including bedding, were observed, measured, and plotted on the base map.

LOGGING OF EXPLORATIONS

As part of this plan review work on the Site, additional backhoe test pits were performed at selected locations at the Site to supplement previous RTF&A hollow stem Borings (HS-1 through HS-5), and five CPT soundings (CPT-1 through CPT-5) were performed. The recent tests pits (TP-1 through TP-18) ranged in depth from about 5- to13 with a track mounted _Backhoe__. . The recent test pit logs are also presented in this Appendix. The approximate locations of the subsurface explorations are presented on the Geotechnical Map.

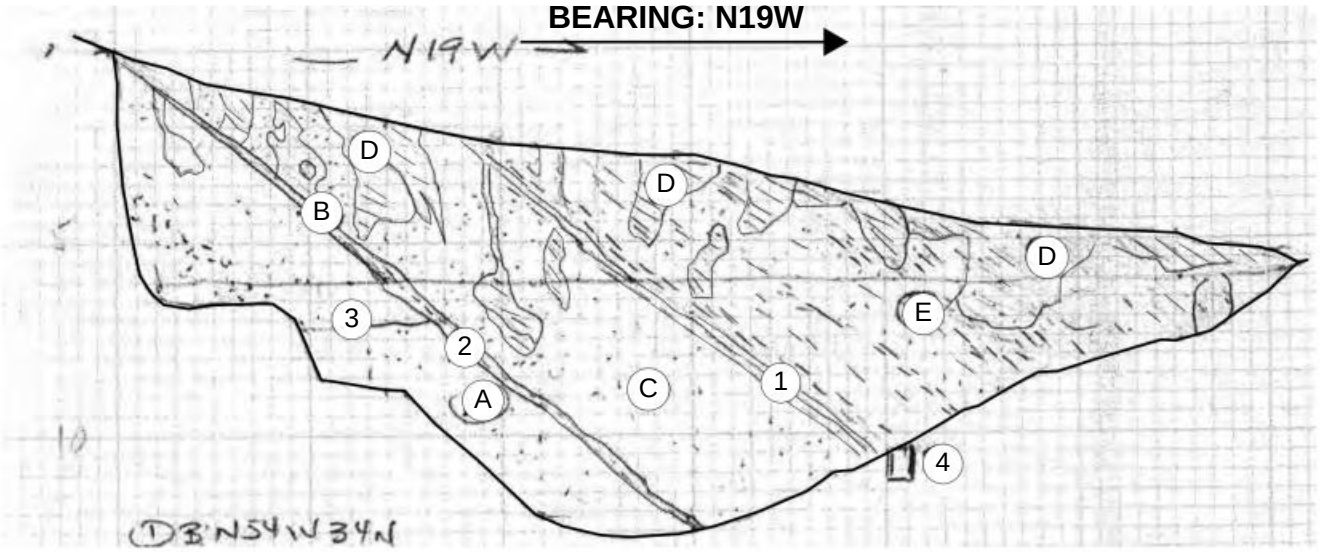
The borings were excavated with an 8-inch diameter hollow stem auger was used. Undisturbed and bulk samples of the subsurface materials were collected from the borings for laboratory inspection and testing. The lined-barrel sampler used to take undisturbed samples has an external diameter of 3.25 inches and an internal diameter of 2.625 inches. The depths at which the undisturbed samples were obtained are indicated on the logs. The number of blows required to drive the sampler 12 inches with the hammer is also shown on the boring logs.

The approximate locations of the subsurface explorations are presented on the Geotechnical Map.

LOG OF TEST PIT TP-1

JOB NUMBER: 2020-200-001 **CLIENT:** NEW URBAN WEST, Inc. **LOGGED BY:** GAL

LOCATION: LYONS CANYON **ELEVATION:** **DATE LOGGED:** 4/30/22



SCALE: 1"=5'

1 B: N54W 34N

2 B: N49W 41N

3 J: N19W 61W
Joint is filled with soil up to 1/2" wide planar and consistent for 8'. Well defined incipient slope failure (?) or ridge lurch dilation crack. Two stained crack (incipient) features sub parallel and below spaced about 6".

4 Drive Sample 1

A SANDSTONE - fine, hard to medium hard, slightly moist, medium bluish gray (5B 5/1)

B CLAYSTONE TO SILTY SANDSTONE - soft, locally sheared (flexural slip?), slightly moist, brownish black (5YR 2/1)

C SANDSTONE - fine grained with localized medium grained layers, hard, slightly moist, pale yellowish brown (10Y 8/2)

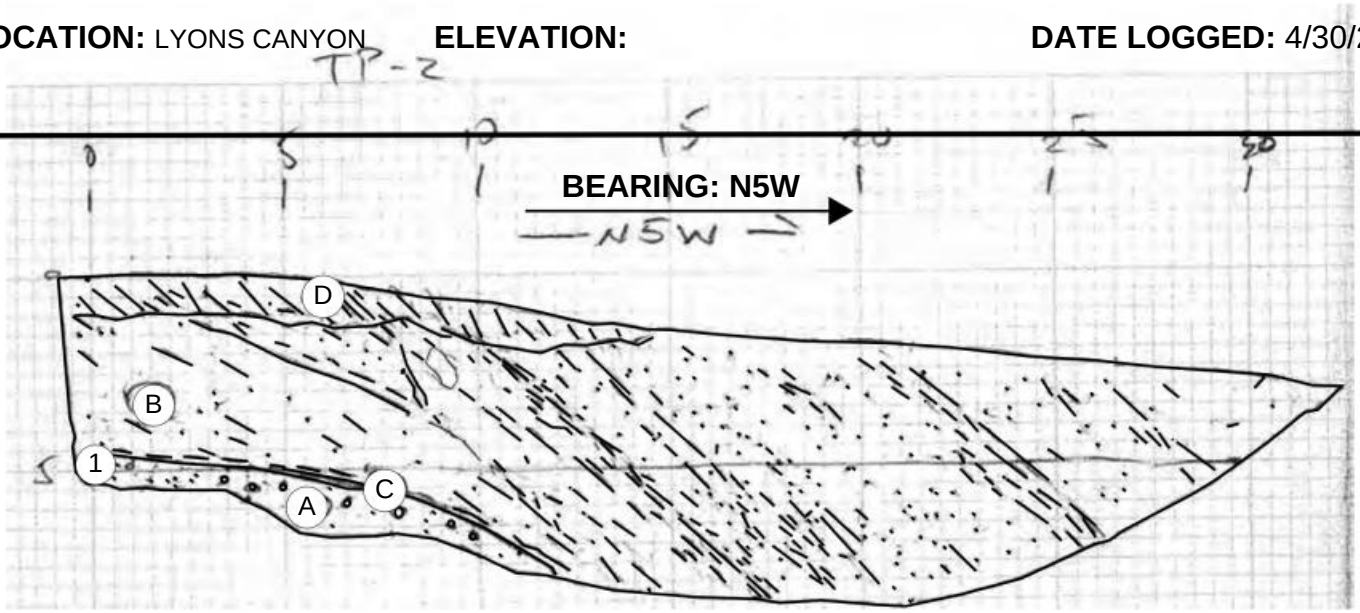
D Soil Infillings - SILTY CLAY/CLAYEY SAND, soft, slightly moist, moderate yellowish brown (10YR 5/4)

E SILTY CLAYSTONE - with interbedded sand, soft, slightly moist, light olive gray (5Y 5/2)

LOG OF TEST PIT TP-2

JOB NUMBER: 2020-200-001 **CLIENT:** NEW URBAN WEST, Inc. **LOGGED BY:** GAL

LOCATION: LYONS CANYON **ELEVATION:** **DATE LOGGED:** 4/30/22



SCALE: 1"=5'

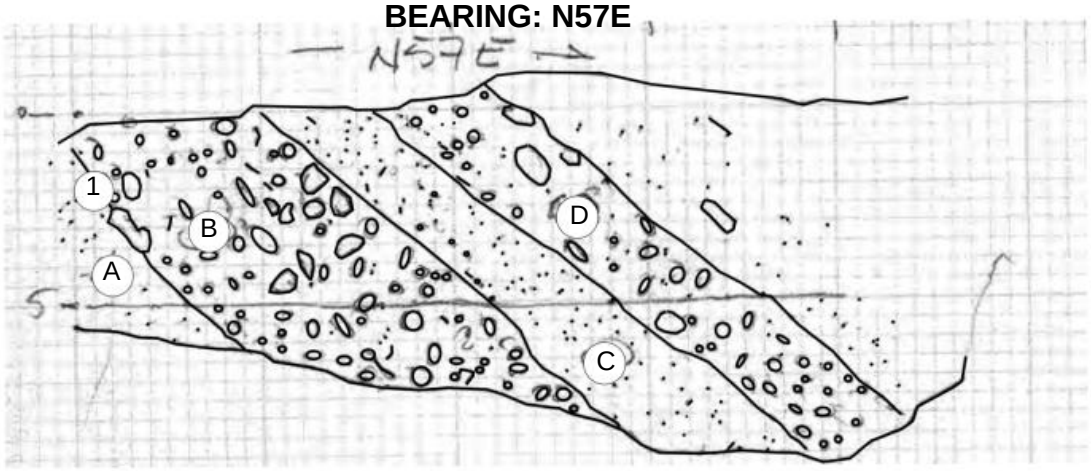
1	B: N5W 56E
A	SANDSTONE - with pebbles (well rounded), fine, hard, slightly moist, yellowish gray (5Y 5/1)
B	SANDSTONE TO SILTY SANDSTONE - hard, slightly moist, greenish gray (5G 6/1)
C	CLAYEY SILTSTONE - hard to medium hard, slightly moist, moderate brown (5YR 4/1), polish and slickenside at bottom contact, flexural slip
D	Residual Soil
E	SILTY CLAYSTONE - soft to medium hard, slightly moist, moderate brown (5YR 3/4), with lens of fine SANDSTONE, clays are distorted

LOG OF TEST PIT TP-3

JOB NUMBER: 2020-200-001 **CLIENT:** NEW URBAN WEST, Inc. **LOGGED BY:** GAL

LOCATION: LYONS CANYON **ELEVATION:** **DATE LOGGED:** 4/30/22

BEARING: N57E



SCALE: 1"=5'

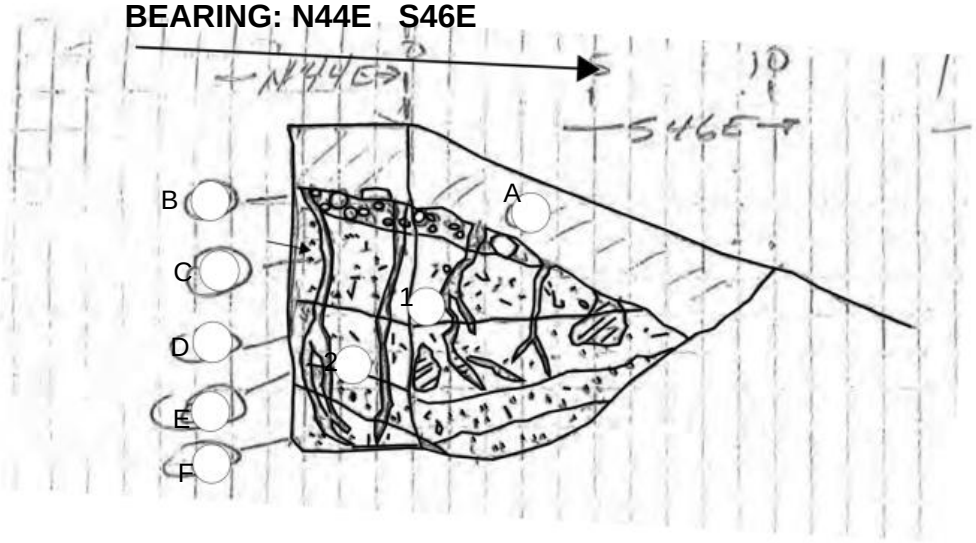
1	B: N64W 32N
A	SANDSTONE - fine to medium grained, very hard, hammer rings when hitting rock, slightly moist, locally friable, pinkish gray (5YR 8/1), holds vertical cliffs
B	CONGLOMERATE - pebbles to cobbles, rounded to subrounded, hard, slightly moist, GRAYISH ORANGE PINK (5YR 7/2)
C	SANDSTONE - fine to medium, hard, slightly moist, pinkish gray (5YR 8/1), with trace silt
D	CONGLOMERATE - pebbles to cobbles, hard, slightly moist, light brownish gray (5YR 6/1)

LOG OF TEST PIT TP-4

JOB NUMBER: 2020-200-001 **CLIENT:** NEW URBAN WEST, Inc. **LOGGED BY:** GAL

LOCATION: LYONS CANYON **ELEVATION:** **DATE LOGGED:** 4/30/22

BEARING: N44E S46E



SCALE: 1"=5'

1 B: N84W 30N

2 B: N78W 34N

A COLLUVIUM - SANDY SILT, with CLAY to SANDY CLAY, - soft, slightly moist, moderate yellowish brown (10YR 5/4)

B COBBLE CONGLOMERATE, - cobbles to 10", rounded, hard, slightly moist, very pale orange (10YR 8/2)

C SANDSTONE - medium to coarse grained, medium hard, slightly moist, yellowish gray (5Y 7/2)

D SANDSTONE - fine, slightly moist, yellowish gray (5Y 8/1)

E CONGLOMERATE PEBBLE AND COBBLE - medium hard, slightly moist, moderate yellowish brown (10YR 5/4)

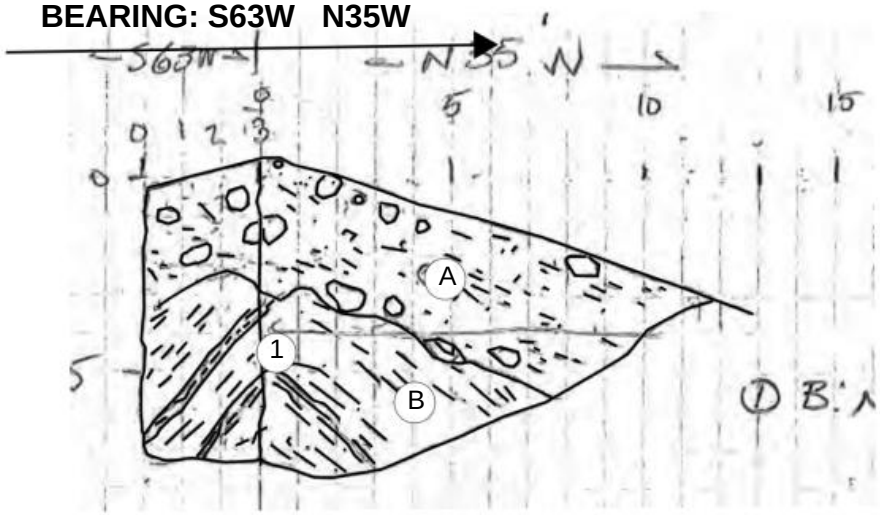
F SANDSTONE - fine grained, medium hard, slightly moist, yellowish gray (5Y 8/1)

LOG OF TEST PIT TP-5

JOB NUMBER: 2020-200-001 **CLIENT:** NEW URBAN WEST, Inc. **LOGGED BY:** GAL

LOCATION: LYONS CANYON **ELEVATION:** **DATE LOGGED:** 4/30/22

BEARING: S63W N35W



SCALE: 1"=5'

1 B: N52W 46N

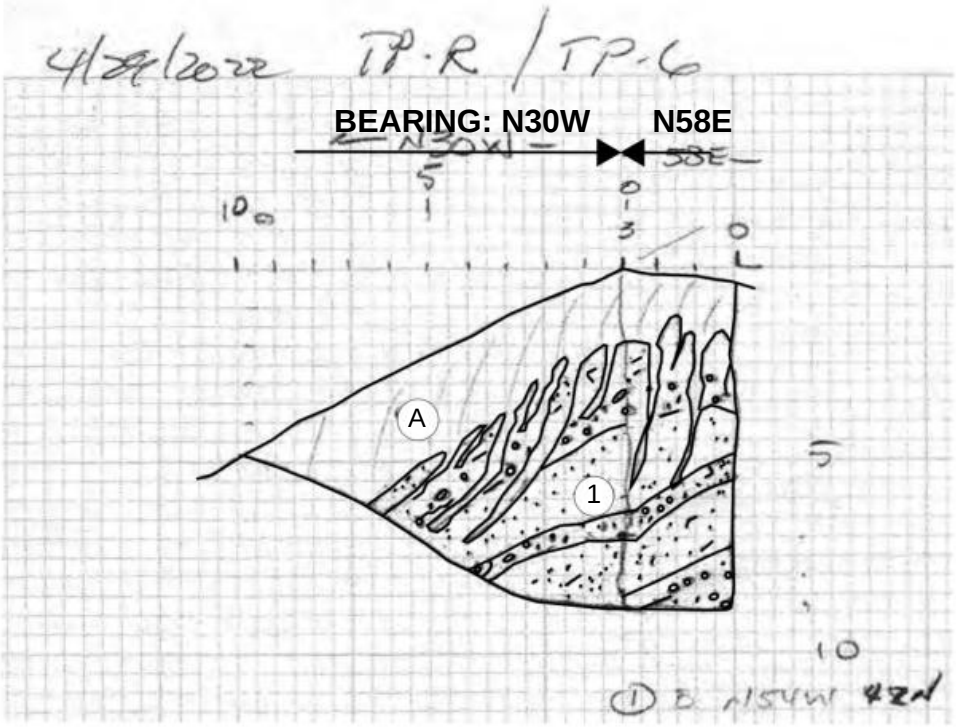
A DEBRIS FLOW - CLAYEY SAND TO SANDY CLAY - with pebbles and cobbles, dense, firm, slightly moist to moist, moderate yellowish brown (10YR 5/4)

B CLAYSTONE TO SILTY CLAYSTONE TO CLAYEY SILTSTONE - soft, slightly moist to moist, dark yellowish orange (10YR 6/6), with CLAYSTONE layers approximately 1"-3" thick, dark yellowish brown (10YR 4/2), and SILTSTONE layers 1/2"-2" thick

LOG OF TEST PIT TP-6

JOB NUMBER: 2020-200-001 **CLIENT:** NEW URBAN WEST, Inc. **LOGGED BY:** GAL

LOCATION: LYONS CANYON **ELEVATION:** **DATE LOGGED:** 4/30/22



SCALE: 1"=5'

1 B: N54W 42N

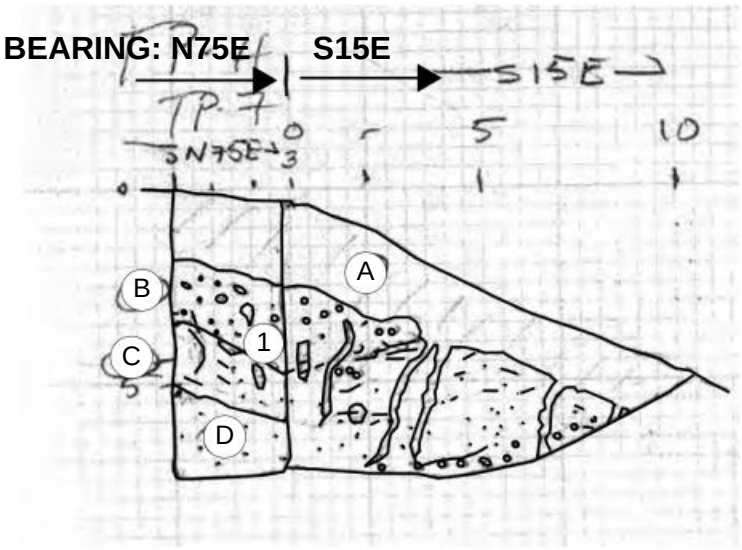
A COLLUVIUM - SANDY SILT, with clay to SILTY CLAY with fine sand, soft, loose, infilling into rock, slightly moist to powdery dry, moderate yellowish brown (10YR 5/4)

B SANDSTONE WITH INTERBEDDED PEBBLE CONGLOMERATE - medium hard, slightly moist to moist, grayish pink (5R 8/2)

LOG OF TEST PIT TP-7

JOB NUMBER: 2020-200-001 **CLIENT:** NEW URBAN WEST, Inc. **LOGGED BY:** GAL

LOCATION: LYONS CANYON **ELEVATION:** **DATE LOGGED:** 4/30/22



SCALE: 1"=5'

1 B: N48W 43N

A COLLUVIUM - SANDY CLAY to SANDY SILT - soft, loose, creeping, parting surfaces at base, slightly moist to powdery dry, pale yellowish brown (10YR 6/2)

B SANDSTONE - medium to coarse grained, with silt and trace clay, soft, can readily be excavated with hand tools, slightly moist, dark yellowish brown (10YR 4/2)

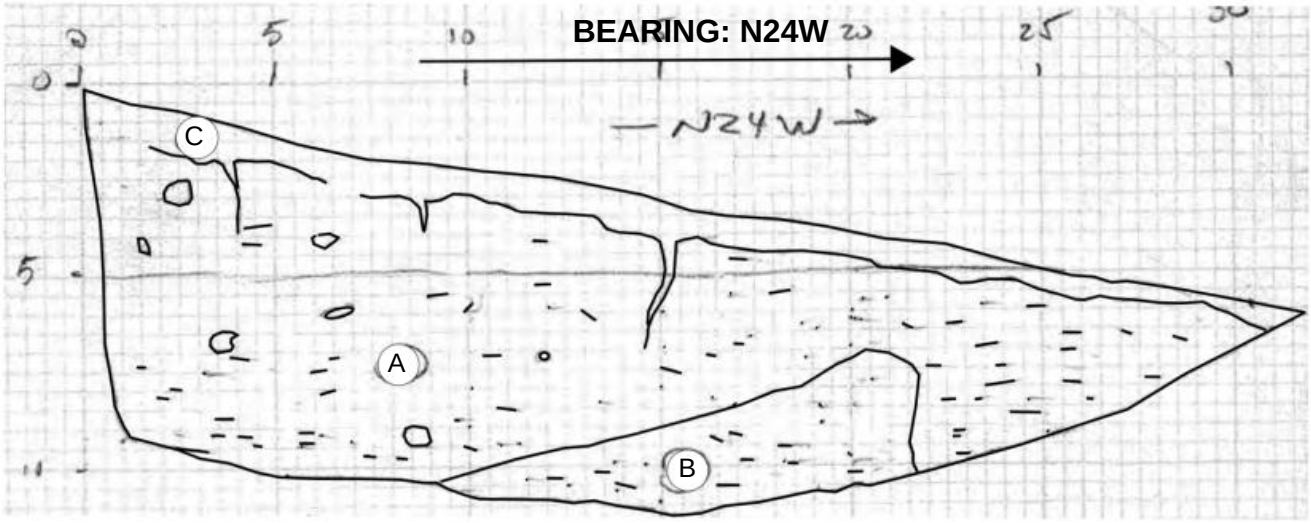
C SANDY SILTSTONE - soft to medium hard, slightly moist, pale yellowish brown (10YR 6/2)

D SANDSTONE - fine, hard, backhoe bucket bounced, slightly moist, yellowish gray (5Y 7/2)

LOG OF TEST PIT TP-8

JOB NUMBER: 2020-200-001 **CLIENT:** NEW URBAN WEST, Inc. **LOGGED BY:** GAL

LOCATION: LYONS CANYON **ELEVATION:** **DATE LOGGED:** 4/30/22



SCALE: 1"=5'

A COLLUVIUM/LANDSLIDE - CLAY TO SILTY CLAY, stiff, slightly moist to moist, dusky brown (5YR 2/r)

B CLAY TO SILTY CLAY - stiff, slightly moist to moist, pale yellowish brown (10YR 6/2), massive

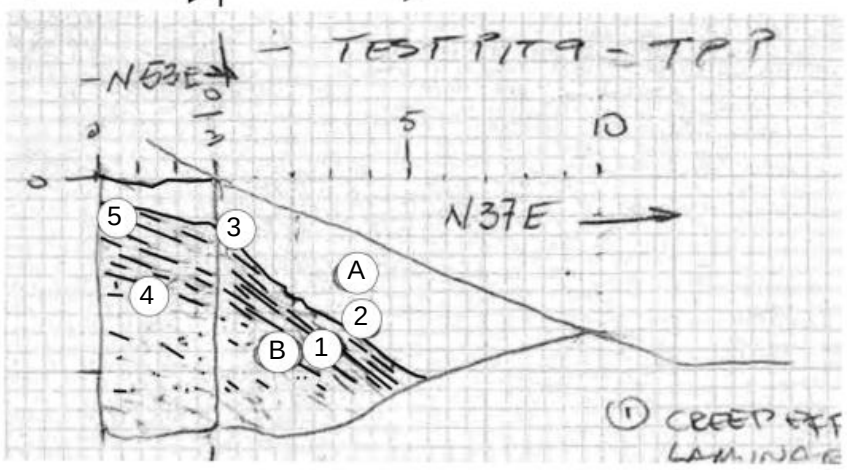
C COLLUVIUM - CLAY TO SILTY CLAY, soft to loose, blocky, slightly moist

LOG OF TEST PIT TP-9

JOB NUMBER: 2020-200-001 **CLIENT:** NEW URBAN WEST, Inc. **LOGGED BY:** GAL

LOCATION: LYONS CANYON **ELEVATION:** **DATE LOGGED:** 4/30/22

BEARING: N53E N37E



SCALE: 1"=5'

1 CREEP EFFECTED LAMINATED SHEARING

2 S: N48W 42N

3 B: N72W 32N

4 B: N65W 41N

5 B: N55W 51N

A CLAYEY SILTSTONE - weathered to a soil like consistency, soft, loose to powdery dry, grayish brown (5YR 3/2)

B SILTY SANDSTONE - fine, locally with clay lenses, hard, backhoe teeth chattering, slightly moist, yellowish gray (5Y 7/2)

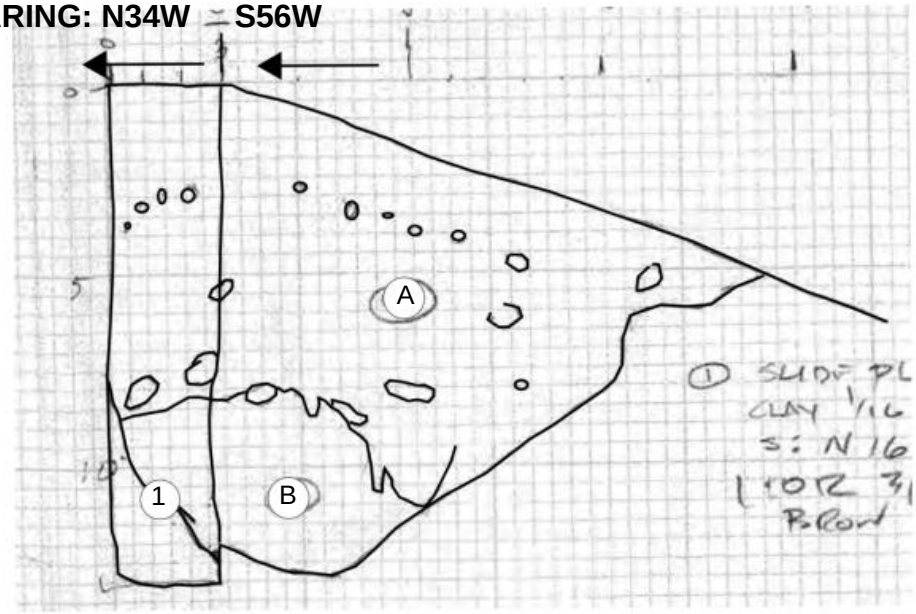
contact is sharp with broken and creeping rock parallel to the contact

LOG OF TEST PIT TP-10

JOB NUMBER: 2020-200-001 **CLIENT:** NEW URBAN WEST, Inc. **LOGGED BY:** GAL

LOCATION: LYONS CANYON **ELEVATION:** **DATE LOGGED:** 4/30/22

BEARING: N34W – S56W



SCALE: 1"=5'

1 Slide Plane: N16E 78S, CLAY, 1/16, slicked, dark reddish brown (10R 3/4)

A COLLUVIUM - CLAYEY SILT to SANDY SILT, soft, easy to excavate with hand tools, slightly moist, moderate brown (5YR 3/4)

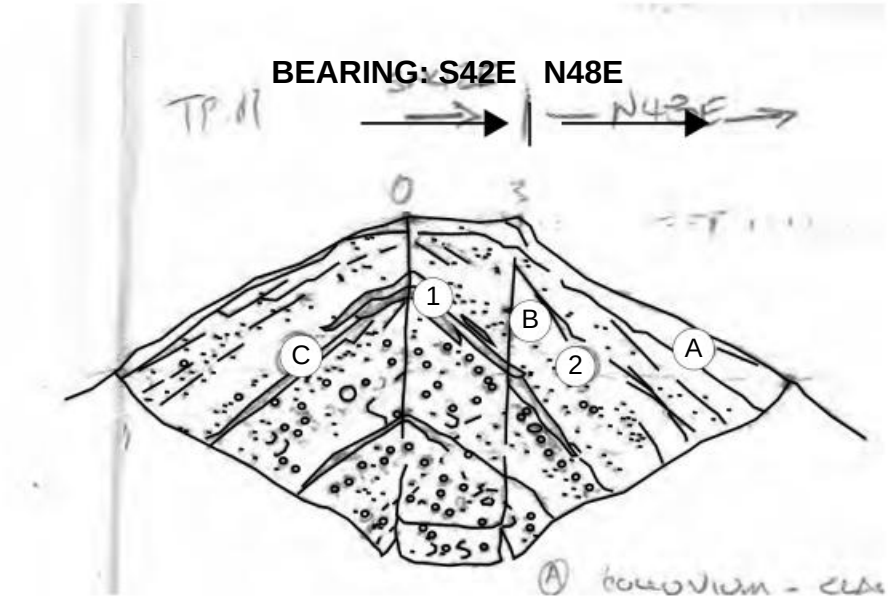
B LANDSLIDE - CLAYEY SAND, fine, soft, slightly moist, light brown (5YR 5/6)

C SILTY SANDSTONE - soft, friable, can be excavated with hand tools, slightly moist, light bluish gray (5B 7/1), with staining, dark yellowish orange (10YR 6/6), in round pebbles, massive

LOG OF TEST PIT TP-11

JOB NUMBER: 2020-200-001 **CLIENT:** NEW URBAN WEST, Inc. **LOGGED BY:** GAL

LOCATION: LYONS CANYON **ELEVATION:** **DATE LOGGED:** 4/30/22



SCALE: 1"=5'

1 B: N79W 41N to N82W 50N, infilled fractures parallel to bedding

2 B: N79W 40N

A COLLUVIUM - CLAYEY SILT - soft, loose, slightly moist, dark yellowish brown (10YR 4/2)

(B) SANDSTONE - Interbedded PEBBLE AND COBBLE CONGLOMERATE, hard, slightly moist, yellowish gray (5y 7/2)

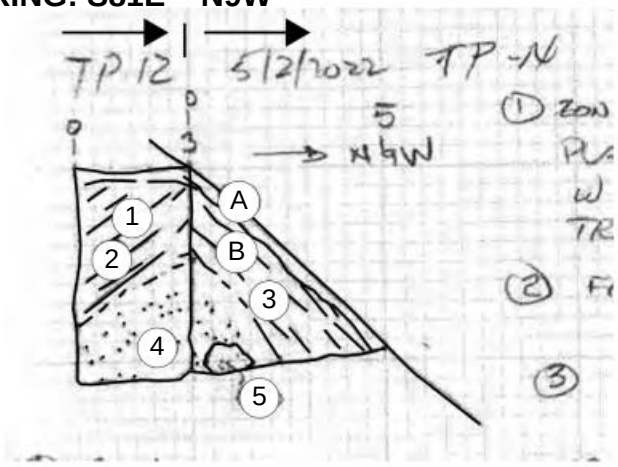
(C) Soil infilling SILTY CLAY to CLAY - soft, slightly moist, moderate yellowish brown (10YR 5/4), cracks develop primarily along bedding planes parallel to sub parallel

LOG OF TEST PIT TP-12

JOB NUMBER: 2020-200-001 **CLIENT:** NEW URBAN WEST, Inc. **LOGGED BY:** GAL

LOCATION: LYONS CANYON **ELEVATION:** **DATE LOGGED:** 4/30/22

BEARING: S81E N9W



SCALE: 1"=5'

1 Zone of creep, well developed, planar fractures surfaces with minor amounts of downslope translation parallel to bedding

2 FRACTURE: N42W 48N, creep surface, well developed

3 FRACTURE: N80W 31N, creep surfaces

4 B: N84W 57N

5 Soil Infilling

A COLLUVIUM - CLAYEY SILT - soft, loose, slightly moist, grayish brown (5YR 3/2)

B INTERBEDDED SANDSTONE AND MUDSTONE - soft, loose, fractured, slightly moist, blackish red (5R 2/2)

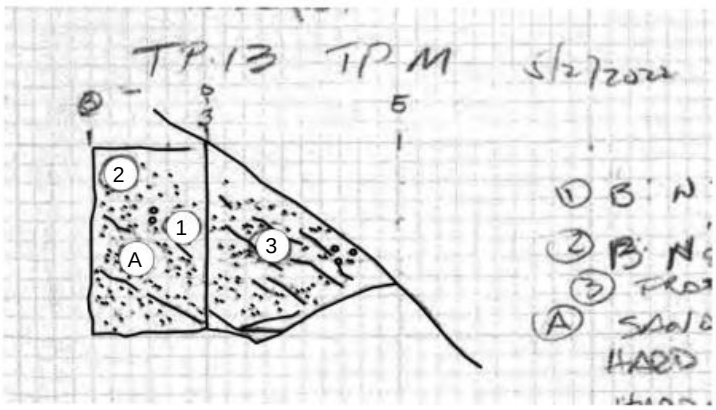
C SANDSTONE - fine, soft, locally loose, friable, slightly moist, grayish orange rust colored (10YR 7/4), staining pervasive

LOG OF TEST PIT TP-13

JOB NUMBER: 2020-200-001 **CLIENT:** NEW URBAN WEST, Inc. **LOGGED BY:** GAL

LOCATION: LYONS CANYON **ELEVATION:** **DATE LOGGED:** 4/30/22

BEARING: S62W N28E



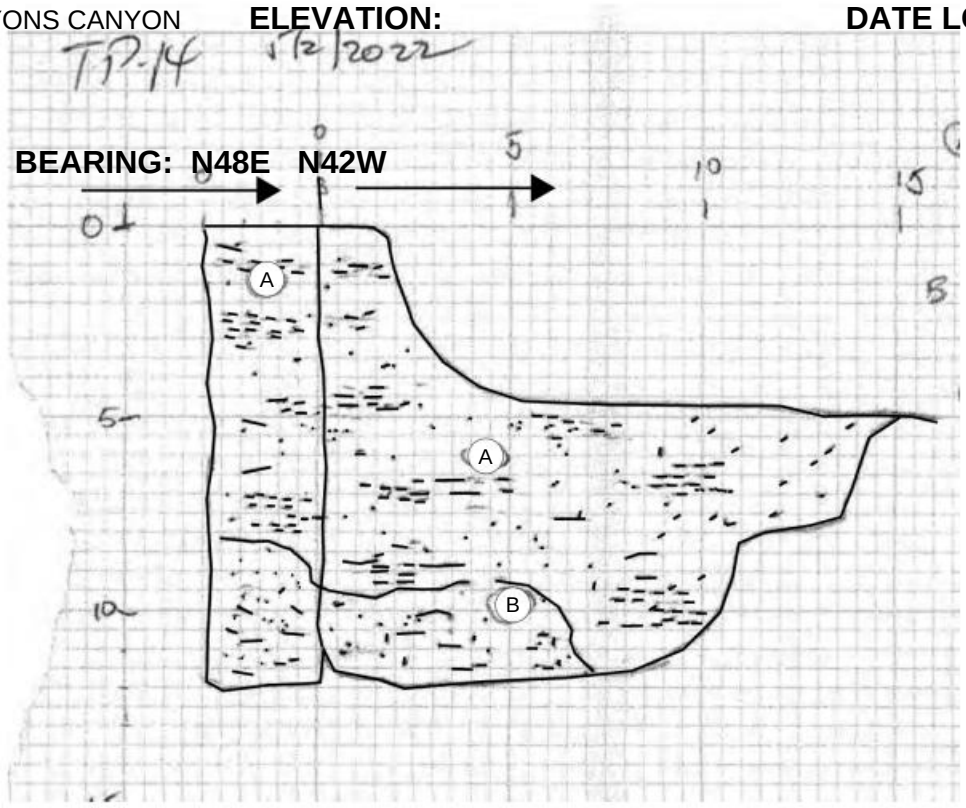
SCALE: 1"=5'

1. B: N75W 31N - SILTSTONE - 1/4" thick interbed
2. B: N85W 36N
3. FRACTURE: Surfaces creep
- A. SANDSTONE - fine to medium grained, hard, slightly moist, grayish brown (5y 8/4), hard to excavate fresh rock with backhoe

LOG OF TEST PIT TP-14

JOB NUMBER: 2020-200-001 **CLIENT:** NEW URBAN WEST, Inc. **LOGGED BY:** GAL

LOCATION: LYONS CANYON **ELEVATION:** **DATE LOGGED:** 4/30/22



SCALE: 1"=5'

(A) CLAYEY SAND - fine grained, with silt, soft, moist, grayish brown (5YR 3/2)

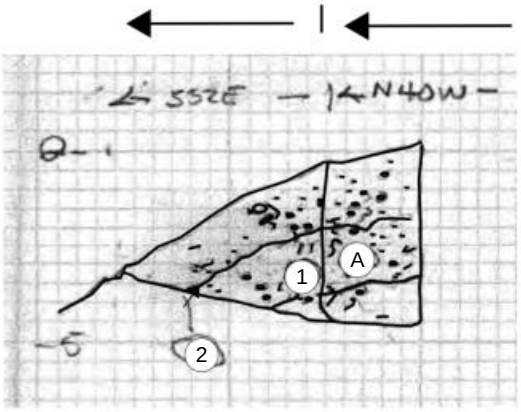
(B) SILTY SAND - fine grained, with clay, soft, wet, moderate yellowish brown (10YR 5/4)

LOG OF TEST PIT TP-15

JOB NUMBER: 2020-200-001 **CLIENT:** NEW URBAN WEST, Inc. **LOGGED BY:** GAL

LOCATION: LYONS CANYON **ELEVATION:** **DATE LOGGED:** 4/30/22

BEARING: S52E N40W



SCALE: 1"=5'

1 B: N83W 53N

2 Infilled cracks - creep

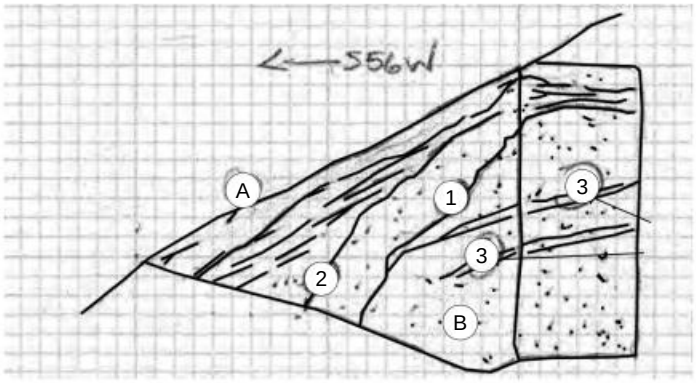
A SANDSTONE with INTERBEDDED PEBBLE CONGLOMERATE - hard when not weathered, dry, pale yellowish brown (10YR 6/2)

LOG OF TEST PIT TP-16

JOB NUMBER: 2020-200-001 **CLIENT:** NEW URBAN WEST, Inc. **LOGGED BY:** GAL

LOCATION: LYONS CANYON **ELEVATION:** **DATE LOGGED:** 4/30/22

BEARING: S56W



SCALE: 1"=5'

1 J: N52E 82NW - Planar, continuous for length of test pit, tight, water staining

2 J: N55E 86N - Planar, similar to 1

3 Soil filled cracks with root mats

A SANDY SILT TO CLAYEY SAND- soft, loose, creeping, slightly moist, moderate yellowish brown (10YR 5/4)

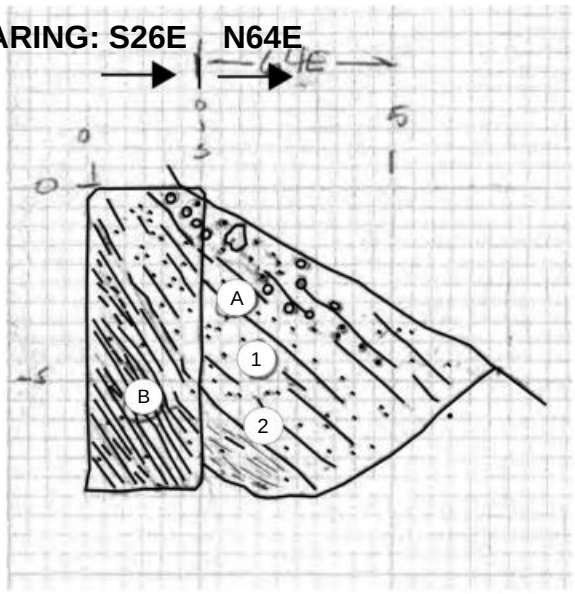
B SANDSTONE TO SILTY SANDSTONE - fine, with clay, loose and friable where slightly weathered, hard where fresh, backhoe teeth chatter, slightly moist, light olive gray (5Y 5/2), massive

LOG OF TEST PIT TP-17

JOB NUMBER: 2020-200-001 **CLIENT:** NEW URBAN WEST, Inc. **LOGGED BY:** GAL

LOCATION: LYONS CANYON **ELEVATION:** **DATE LOGGED:** 4/30/22

BEARING: S26E N64E



SCALE: 1"=5'

1 J: N52E 82NW - Planar, continuous for length of test pit, tight, water staining

2 J: N55E 86N - Planar similar to 1

3 Soil filled cracks with root mats

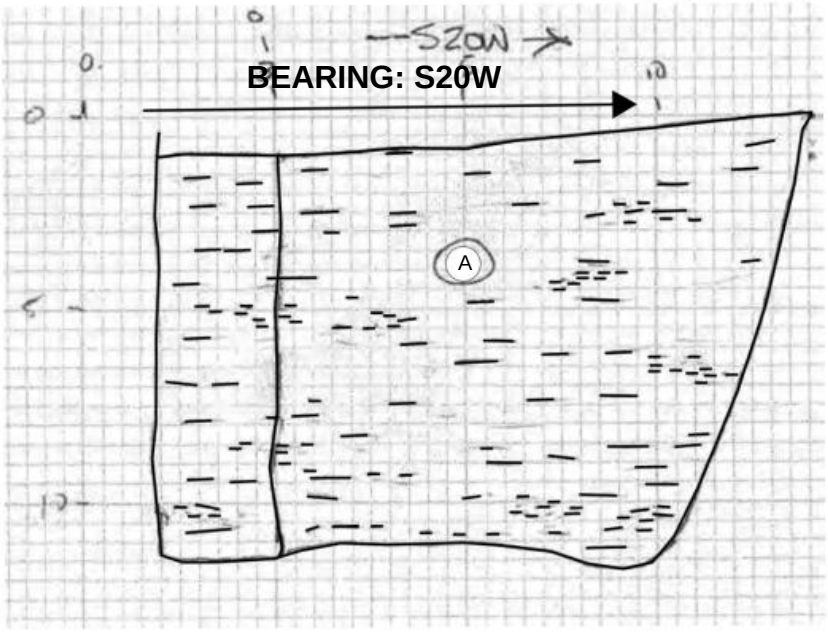
A SANDY SILT TO CLAYEY SAND - soft, loose, creeping, slightly moist, moderate yellowish brown (10YR 5/4)

B SANDSTONE TO SILTY SANDSTONE - fine, with clay, loose and friable where slightly weathered, hard where fresh, hoe teeth chatter, slightly moist, light olive gray (5Y 5/2), massive

LOG OF TEST PIT TP-18

JOB NUMBER: 2020-200-001 **CLIENT:** NEW URBAN WEST, Inc. **LOGGED BY:** GAL

LOCATION: LYONS CANYON **ELEVATION:** **DATE LOGGED:** 4/30/22



SCALE: 1"=5'

A ALLUVIUM - SILT - with clay, firm, slightly moist to very moist at 10' below ground surface, moderate brown (5YR 3/4), massive

BORING HS-1

JOB NUMBER: 2020-200
DATE DRILLED: 11/10/20
EQUIPMENT USED: 8" Diameter Hollow Stem with Heavy Duty Sampler
LOGGED BY: MKM
BORING DEPTH: 0-35.5'
SURFACE CONDITIONS: Open Lot

BLOWS PER FOOT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SOIL TYPE	
			-		ML	**ALLUVIUM (Qal)** SILT: trace clay, moderately dense, slightly moist, brown
10	6.3	95	-	5		
7	9	92	-			moderately dense
9	12.2	95	-	10		trace fine to coarse sand
10	11.1	97	-		SM	SILTY SAND: fine with occasional coarse, moderately dense, moist, brown
15	13.4	91	-	15	CL	SILTY CLAY: fine sand, stiff, moist, brown
8	14.4	98	-	20	ML	SILT: with clay, moderately stiff, moist, brown
						trace gravel
14	13.4	101	-	25		increasing in stiffness past 25'
22	12.6	109	-	30	SW	SAND: fine to coarse, with silt and gravel, dense, moist, light brown
18	5.3	101	-	35	SM	SILTY SAND: fine, dense, moist, brown
				40		Bottom of Boring at 35.5 feet. No water. No caving.

Note: The log of subsurface conditions shown hereon is approximate and applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

BOREHOLE LOG 2020-200.GPJ FRANKIAN.GDT 2/8/21

LOG OF BORING

R.T. FRANKIAN & ASSOCIATES

BORING HS-2

JOB NUMBER: 2020-200
DATE DRILLED: 11/10/20
EQUIPMENT USED: 8" Diameter Hollow Stem with Heavy Duty Sampler
LOGGED BY: MKM
BORING DEPTH: 0-31'
SURFACE CONDITIONS: Clearing in Field

BLOWS PER FOOT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SOIL TYPE	
			-		ML	**ALLUVIUM (Qal)** SILT: trace fine sand, moderately dense, dry, light brown
	6	94		5		fine with some medium to coarse, dense, slightly moist
22			-			fine
	4.8	97			SW	SAND: fine to coarse with gravel, dense, slightly moist, light brown
20			-			
14	9	92	-	10	ML	SILT: with fine sand, stiff, slightly moist, brown
18	3.7	101	-		SM	SILTY SAND: fine to medium with trace coarse, dense, slightly moist, brown
8	7.2	94	-	15	ML	SILT: with some fine sand, trace clay, moderately stiff, moist, brown
26	6	113	-	20	SM	SILTY SAND: fine to meduim with trace coarse, gravel, dense, moist, brown
						No Recovery
49			-	25		
						light brown
20	2.8	101	-	30		
						Bottom of Boring at 31 feet. No water. No caving.
				35		
				40		

Note: The log of subsurface conditions shown hereon is approximate and applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

BOREHOLE LOG 2020-200.GPJ FRANKIAN.GDT 2/8/21

LOG OF BORING

R.T. FRANKIAN & ASSOCIATES

BORING HS-3

JOB NUMBER: 2020-200
DATE DRILLED: 11/10/20
EQUIPMENT USED: 8" Diameter Hollow Stem with Heavy Duty Sampler
LOGGED BY: MKM
BORING DEPTH: 0-31'
SURFACE CONDITIONS: Dirt Road

BLOWS PER FOOT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SOIL TYPE	
			-		SC	**ALLUVIUM (Qal)** CLAYEY SAND: fine, medium dense, dry, dark brown
				5		dense, slightly moist
21	7.3	97	-			
						trace fine to very coarse sand, dense, moist, brown to dark brown
15	9.8	108	-			
15	11.4	109	-	10	CL	CLAY: with fine to coarse sand, trace gravel, stiff, moist, dark brown
25	11.4	115	-		SW	SAND: fine to coarse, trace clay, dense, moist, brown
11	15.8	115	-	15	SC	CLAYEY SAND: with fine to coarse sand, gravel, plastic, medium dense, very moist, dark brown
						reduced sand
55	14.3	111	-	20		
50/5"			-	25		seepage @ 25', No Recovery
67/10"			-	30		No Recovery, @ 31': SAUGUS FORMATION (TQs) - Sunshine Ranch Member (TQss) - Moderately hard
						Bottom of Boring at 31 feet. Water @ 25'. No caving.
				35		
				40		

Note: The log of subsurface conditions shown hereon is approximate and applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

BOREHOLE LOG 2020-200.GPJ FRANKIAN.GDT 2/9/21

LOG OF BORING

R.T. FRANKIAN & ASSOCIATES

BORING HS-4

JOB NUMBER: 2020-200
DATE DRILLED: 11/10/20
EQUIPMENT USED: 8" Diameter Hollow Stem with Heavy Duty Sampler
LOGGED BY: MKM
BORING DEPTH: 0-30.5'
SURFACE CONDITIONS: Dirt Road

BLOWS PER FOOT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	SOIL TYPE	
				ML	**ALLUVIUM (Qal)** SILT: trace fine to coarse sand, gravel, moderately dense, dry, light brown
17	5.6	108	-		with fine sand, occasional gravel, moist, brown
23	4.1	106	-	SM	SILTY SAND: fine to coarse, fine gravel, medium dense, moist, light brown
25	7	110	-	SP	GRAVELLY SAND: fine to coarse, trace silt, dense, moist, brown
18	19.7	103	-	ML	SILT: with clay and fine sand, moderately stiff, very moist, dark brown
6	29.8	95	-	SC	CLAYEY SAND: fine, with silt, medium dense, very moist, dark brown
					seepage @ 20'
50/5"	28.8		-		**SAUGUS FORMATION (TQss)** GRAVELLY SANDSTONE: fine to coarse, with clay and silt, moderately hard, very moist, yellowish brown
50/2"	12.2	107	-		
50/6"	9.4	96	-		Bottom of Boring at 30.5 feet. Water @ 20'. No caving.

DEPTH (FEET): 5, 10, 15, 20, 25, 30, 35, 40

SAMPLE LOCATION / GRAPHIC LOG

Note: The log of subsurface conditions shown hereon is approximate and applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

BOREHOLE LOG 2020-200.GPJ FRANKIAN.GDT 2/9/21

LOG OF BORING

R.T. FRANKIAN & ASSOCIATES

BORING HS-5

JOB NUMBER: 2020-200
DATE DRILLED: 11/10/20
EQUIPMENT USED: 8" Diameter Hollow Stem with Heavy Duty Sampler
LOGGED BY: MKM
BORING DEPTH: 0-28'

BLOWS PER FOOT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	SOIL TYPE	
				ML	**ALLUVIUM (Qal)** SILT: with fine sand, moderately dense, moist, dark brown
11	10.1	101	-		
					some fine gravel
25	6.9	108	-		
					with coarse sand
22	6.7	102	-		
					with clay and fine to coarse sand, fine gravel, dense, brown
16	6.3	110	-		
13	8.7	109	-	SM	SILTY SAND: fine to medium, dense, moist, gray
83/11"	8.7	121	-		**SAUGUS FORMATION (TQss)** SANDY SILTSTONE: moderately hard, moist, gray, caliche mottling
					with clay
50/5"	9.4	104	-		
					Bottom of Boring at 28 feet. No water. No caving.

DEPTH (FEET): 5, 10, 15, 20, 25, 30, 35, 40

SAMPLE LOCATION / GRAPHIC LOG

Note: The log of subsurface conditions shown hereon is approximate and applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

BOREHOLE LOG 2020-200.GPJ FRANKIAN.GDT 2/8/21

LOG OF BORING

R.T. FRANKIAN & ASSOCIATES

NUWI – Lyons Canyon, LLC
September 15, 2023
2020-200-001

APPENDIX B

EXPLORATIONS BY OTHERS

RTF&A
GEOTECHNICAL ENGINEERING & ENGINEERING GEOLOGY

GOLD COAST GEOSERVICES, INC.

SUB-SURFACE DATA — BORING LOG NO. B-1

PROJECT: D.R. HORTON - LYONS CANYON RANCH, SANTA CLARITA — FILE NO.: GC14-122536

ELEVATION: SEE PLATE 1 — DATE: 02/09/15

METHOD: 6-inch Hollow Stem Auger — DRILLING CO.: HD DRILLING

DEPTH (FT)	SAMPLE: BULK	SAMPLE: RING	BLOWCOUNT: FIELD (N)	BLOWCOUNT: N(60)	MOISTURE %	DENSITY	SIEVE: % PASSING # 200 SCREEN	GRAPHIC LOG	DESCRIPTION AND REMARKS
0									**ALLUVIUM - Qal - (0' - 60')**
-	SPT		2	2.8					
-									2.5' - Dark brown very fine- to fine-grained silty sand with
-	SPT		5	6.9					pebbles, moist, loose.
-		X	13	10.0	9.4	98.9			5' - Medium brown very fine-grained silty sand, slightly moist, loose.
-	SPT		6	8.3					7.5' - Light to medium brown very fine-grained silty sand, damp, slightly firm.
-									
10	SPT		12	16.6					10' - Medium brown fine- to medium-grained sand, slightly damp, slightly firm.
-									
-	SPT		4	5.5					12.5' - 15' - Medium to dark brown very fine-grained silty sand, slightly
-	SPT		4	5.5					damp, slightly firm.
-		X	13	10.0	9.7	100.6			
-	SPT		5	6.9					17.5' - 20' - Dark brown very fine-grained silty sand, slightly damp, firm.
-									
20	SPT		15	20.7					
-									
-	SPT		32	44.2					22.5' - 25' - Medium brown fine- to coarse grained sand containing
-									pebbles, slightly damp, firm.
-	SPT		35	48.3					27.5' - 30' - Medium brown fine- to coarse-grained sand, slightly damp,
-		x	57	43.7	8.3	104.3			firm.
-	SPT		34	46.9					
30	SPT		32	44.2					
-									
-	SPT		32	44.2					32.5' - Cobble/boulder
-									
-	SPT		39	53.8					35' - 40' - Medium brown fine- to medium-grained silty sand, dry, firm.
-		X	59	45.2	9.2	106.7			
-	SPT		43	59.3					
40	SPT		40	55.2					40' - Medium to dark brown fine-grained silty sand containing gravel, slightly
-									moist, dense
-	SPT		35	48.3					42.5' - 45' - Medium brown very fine- to medium-grained clayey to silty sand
-									slightly moist, firm.
-	SPT		35	48.3					
-		X	62	47.5	7.8	110.4			47.5' - Medium brown very fine- to medium-grained silty sand, humid, firm.
-	SPT		32	44.2					
50	SPT		37	51.1					50' - 55' - Medium brown fine- to coarse-grained gravelly silty sand,
-									humid, firm.
-	SPT		46	63.5					
-									
-	SPT		40	55.2					55' - 60' - Medium brown fine- to coarse-grained silty gravelly sand, humid,
-		X	64	49.1	7.6	113.3			firm.
-	SPT		46	63.5					
60	SPT		44	60.7					End at 60'

Comments: The following correction factors were utilized to determine N(60) (Per SP117)
Cb = 1.15 (8" Diameter Borehole); Cs = 1.2 (SPT Sampler without liner); Cs = 2/3 (California Sampler)

Notes: TOTAL DEPTH: 60' GROUNDWATER: NO REFUSAL/CAVING: NO BACKFILLED: YES

PLATE 2.1

GOLD COAST GEOSERVICES, INC.

SUB-SURFACE DATA — BORING LOG NO. B-2

PROJECT: D.R. HORTON - LYONS CANYON RANCH, SANTA CLARITA — FILE NO.: GC14-122536

ELEVATION: SEE PLATE 1 — DATE: 02/09/15

METHOD: 6-inch Hollow Stem Auger — DRILLING CO.: HD DRILLING

DEPTH (FT)	SAMPLE: BULK	SAMPLE: RING	BLOWCOUNT: FIELD (N)	BLOWCOUNT: N(60)	MOISTURE %	DENSITY	SIEVE: % PASSING # 200 SCREEN	GRAPHIC LOG	DESCRIPTION AND REMARKS
0									**ALLUVIUM - Qal - (0' - 60')**
-	SPT		7	9.7					2.5' - Dark brown very fine- to fine-grained silty sand, moist, loose.
-	SPT		9	12.4					5' - Medium brown very fine-grained silty sand, humid, slightly firm.
-		X	18	13.8	11.4	98.2			
-	SPT		6	8.3					7.5' - Medium brown very fine-to fine-grained silty sand, humid, slightly firm.
10	SPT		6	8.3					10' - Dark brown very fine- to fine-grained silty sand, humid, slightly firm.
-	SPT		7	9.7					12.5' - 15' - Medium brown very fine- to fine-grained silty sand, humid,
-	SPT		5	6.9					loose to slightly firm.
-		X	18	13.8	10.7	104.7			
-	SPT		11	15.2					17.5' - 27.5' - Dark brown very fine-grained silty sand, humid, slightly firm.
20	SPT		18	24.8					
-	SPT		22	30.4					
-	SPT		28	38.6					
-		x	48	36.8	10.3	107.3			27.5' Medium to dark brown fine- to very coarse-grained silty sand
-	SPT		28	38.6					
30	SPT		29	40.0					30' - 32.5' - Dark brown to medium reddish brown fine- to coarse-grained silty sand containing pebbles to gravel, humid, firm.
-	SPT		27	37.3					
-									35' - Medium brown fine- to medium-grained silty sand, slightly moist, firm.
-	SPT		29	40.0					
-		X	55	42.2	8.2	112.8			37.5' - 40' - Medium reddish brown fine- to very coarse-grained pebbly
-	SPT		42	58.0					silty sand, humid, dense.
40	SPT		36	49.7					
-	SPT		38	52.4					42.5' - Medium brown very fine- to fine-grained clayey to silty sand,
-									humid, firm.
-	SPT		40	55.2					45' - Medium reddish brown fine- to very coarse-grained pebbly to gravelly
-		X	68	52.1	8.4	118.0			sand, slightly moist, dense.
-	SPT		37	51.1					
50	SPT		39	53.8					47.5' - 50' - Dark brown very fine- to fine-grained clayey to silty sand,
-									slightly moist, firm.
-	SPT		56	77.3					52.5' - 60' - Medium brown fine- to coarse-grained pebbly to gravelly sand,
-									humid, dense.
-	SPT		50 for 6"						
-									
-	SPT		50 for 6"						
60	SPT								End at 60'

Comments: The following correction factors were utilized to determine $N_{(60)}$ (Per SP117)
Cb = 1.15 (8" Diameter Borehole); Cs = 1.2 (SPT Sampler without liner); Cs = 2/3 (California Sampler)

Notes: TOTAL DEPTH: 57.5' GROUNDWATER: NO REFUSAL/CAVING: NO BACKFILLED: YES

PLATE 2.2

GOLD COAST GEOSERVICES, INC.

SUB-SURFACE DATA — BORING LOG NO. B-3

PROJECT: D.R. HORTON - LYONS CANYON RANCH, SANTA CLARITA — FILE NO.: GC14-122536

ELEVATION: SEE PLATE 1 — DATE: 02/09/15

METHOD: 6-inch Hollow Stem Auger — DRILLING CO.: HD DRILLING

DEPTH (FT)	SAMPLE: BULK	SAMPLE: RING	BLOWCOUNT: FIELD (N)	BLOWCOUNT: N(60)	MOISTURE %	DENSITY	SIEVE: % PASSING # 200 SCREEN	GRAPHIC LOG	DESCRIPTION AND REMARKS
0									**ALLUVIUM - Qal - (0' - 60')**
-	SPT		4	5.5					2.5' - 5' - Medium to dark brown very fine- to fine-grained silty sandy clay
-									containing pebbles, moist, slightly firm.
-	SPT		3	4.1					5' - 15' - *Dark brown very fine-grained silty sand, humid, loose.*
-		X	11	8.4	15.9	102.0			
-	SPT		4	5.5					
-									
10	SPT		4	5.5					
-									
-	SPT		3	4.1					
-	SPT		11	15.2					15' - Medium brown fine- to medium-grained silty sand, humid, slightly firm.
-		X	34	26.1	5.5	105.8			17.5' - 30' - Medium brown fine- to coarse-grained silty sand, humid, dense.
-	SPT		18	24.8					
-									
20	SPT		17	23.5					
-									
-	SPT		28	38.6					
-									
-	SPT		27	37.3					
-		x	48	36.8	6.0	115.4			
-	SPT		27	37.3					
30	SPT		25	34.5					30' - *Medium brown very fine- to fine-grained silty sand, humid, firm.*
-									
-	SPT		27	37.3					32.5' - Medium to dark brown fine- to coarse-grained silty sand containing
-									gravel, humid, dense.
-	SPT		55 FOR 6"						35' - Cobble/boulder
-		X	51	39.1	8.3	114.3			37.5' - 42.5' - Medium brown very fine- to fine-grained silty sand, humid, firm.
-	SPT		32	44.2					
40	SPT		35	48.3					
-									
-	SPT		43	59.3					42.5' - 47.5' - Medium brown fine- to medium-grained silty sand containing
-									gravel, humid, dense.
-	SPT		32	44.2					
-		X	57	43.7	5.6	116.2			
-	SPT		34	46.9					
50	SPT		37	51.1					50' - Medium brown fine-grained silty sand, humid, dense.
-									
-	SPT		33	45.5					52.5' - Medium brown very fine- to fine-grained clayey to silty sand, slightly
-									moist, firm.
-	SPT		60	82.8					55' - 60' - *Medium reddish brown fine- to very coarse-grained silty sand,*
-	X		82	62.9	4.3	126.2			*humid, dense.*
-	SPT		67 FOR 6"						
60	SPT		64 FOR 5"						End at 60'

Comments: The following correction factors were utilized to determine N(60) (Per SP117)
Cb = 1.15 (8" Diameter Borehole); Cs = 1.2 (SPT Sampler without liner); Cs = 2/3 (California Sampler)

Notes: TOTAL DEPTH: 60' GROUNDWATER: NO REFUSAL/CAVING: NO BACKFILLED: YES

PLATE 2.3

GOLD COAST GEOSERVICES, INC.

SUB-SURFACE DATA — BORING LOG NO. B-4

PROJECT: D.R. HORTON - LYONS CANYON RANCH, SANTA CLARITA — FILE NO.: GC14-122536

ELEVATION: SEE PLATE 1 — DATE: 02/10/15

METHOD: 6-inch Hollow Stem Auger — DRILLING CO.: HD DRILLING

DEPTH (FT)	SAMPLE: BULK	SAMPLE: RING	BLOWCOUNT: FIELD (N)	BLOWCOUNT: N(60)	MOISTURE %	DENSITY	SIEVE: % PASSING # 200 SCREEN	GRAPHIC LOG	DESCRIPTION AND REMARKS
0									**ALLUVIUM - Qal - (0' - 50')**
-	SPT		8	11.0					2.5' - Dark brown fine- to coarse-grained silty sand, slightly moist, firm.
-									
-	SPT		7	9.7					5' - 17.5' - Light to medium brown very fine- to fine-grained sand, dry, firm.
-		X	26	19.9	9.4	83.9			
-	SPT		13	17.9					
-									
10	SPT		12	16.6					
-									
-	SPT		8	11.0					
-	SPT		13	17.9					
-		X	20	15.3	8.6	93.0			
-	SPT		8	11.0					17.5' - Dark brown very fine- to fine-grained clayey to silty sand, slightly moist, slightly firm.
-									
20	SPT		16	22.1					20' - Dark brown very fine- to fine-grained silty sand, humid, loose to slightly firm.
-									
-	SPT		22	30.4					22.5' - 25' - Medium brown very fine- to fine-grained clayey to silty sand, humid, slightly firm.
-									
-	SPT		27	37.3					
-		x	48	36.8	12.0	104.4			
-	SPT		25	34.5					27.5' - 30' - Medium brown fine- to coarse-grained clayey to silty sand, humid to slightly moist, firm.
30	SPT		24	33.1					
-									
-	SPT		27	37.3					32.5' - 35' - Medium brown fine- to very coarse-grained clayey to silty sand, humid to slightly moist, firm.
-									
-	SPT		24	33.1					37.5 ' - 50' - Medium brown to medium reddish brown fine- to very coarse-grained silty sand, humid, dense.
-		X	46	35.3	8.3	111.0			
-	SPT		34	46.9					
40	SPT		29	40.0					
-									
-	SPT		36	49.7					
-									
-	SPT		50	69.0					
-		X	50 for 6"		6.7	114.6			
-	SPT		50 for 6"						
50	SPT		70	96.6					End at 50'
-									
-									
-									
-									
-									
-									
60									

Comments: The following correction factors were utilized to determine $N_{(60)}$ (Per SP117)
Cb = 1.15 (8" Diameter Borehole); Cs = 1.2 (SPT Sampler without liner); Cs = 2/3 (California Sampler)

Notes: TOTAL DEPTH: 50' GROUNDWATER: NO REFUSAL/CAVING: NO BACKFILLED: YES

PLATE 2.4

GOLD COAST GEOSERVICES, INC.

SUB-SURFACE DATA — BORING LOG NO. B-5

PROJECT: D.R. HORTON - LYONS CANYON RANCH, SANTA CLARITA — FILE NO.: GC14-122536

ELEVATION: SEE PLATE 1 — DATE: 02/11/15

METHOD: 6-inch Hollow Stem Auger — DRILLING CO.: HD DRILLING

DEPTH (FT)	SAMPLE: BULK	SAMPLE: RING	BLOWCOUNT: FIELD (N)	BLOWCOUNT: N(60)	MOISTURE %	DENSITY	SIEVE: % PASSING # 200 SCREEN	GRAPHIC LOG	DESCRIPTION AND REMARKS
0									**ALLUVIUM - Qal - (0' - 40')**
-	SPT		2	2.8					2.5' - Dark brown very fine- to fine-grained silty sand, moist, loose.
-									
-	SPT		4	5.5					5' - Medium to dark brown very fine- to fine-grained silty sand, humid to
-		X	17	13.0	9.7	105.8			slightly moist, slightly firm.
-	SPT		6	8.3					7.5' - 17.5' - Medium brown to dark brown fine- to medium-grained silty sand,
-									humid, loose to slightly firm.
10	SPT		7	9.7					
-									
-	SPT		8	11.0					
-	SPT		8	11.0					
-		X	24	18.4	7.5	99.4			
-	SPT		12	16.6					17.5' - Medium brown very fine- to fine-grained silty sand, humid, firm
-									
20	SPT		15	20.7					20' - 25' - Light to medium brown very fine- to fine-grained silty sand,
-									humid, firm.
-	SPT		16	22.1					
-									
-	SPT		17	23.5					25' - Medium brown fine- to medium-grained silty sand, humid, firm.
-		x	32	24.5	2.8	108.9			
-	SPT		23	31.7					25' - 30' - Medium brown fine- to very coarse-grained silty sand,
30	SPT		20	27.6					humid, firm.
-									
-	SPT		24	33.1					30' - 40' - Light to medium brown fine- to very coarse-grained silty
-									sand containing gravel, humid, dense very dense.
-	SPT		36	49.7					
-		X	50 for 6"		5.1	117.6			
-	SPT		56	77.3					
40	SPT		67	92.5					40' - Refusal (Saugus Formation ?)
-									End at 40'
-									
-									
-									
-									
-									
-									
50									
-									
-									
-									
-									
-									
-									
60									

Comments: The following correction factors were utilized to determine N(60) (Per SP117)
Cb = 1.15 (8" Diameter Borehole); Cs = 1.2 (SPT Sampler without liner); Cs = 2/3 (California Sampler)

Notes: TOTAL DEPTH: 40' GROUNDWATER: NO REFUSAL/CAVING: NO BACKFILLED: YES

PLATE 2.5

GOLD COAST GEOSERVICES, INC.

SUB-SURFACE DATA — BORING LOG NO. B-6

PROJECT: D.R. HORTON - LYONS CANYON RANCH, SANTA CLARITA — FILE NO.: GC14-122536

ELEVATION: SEE PLATE 1 — DATE: 02/10/15

METHOD: 6-inch Hollow Stem Auger — DRILLING CO.: HD DRILLING

DEPTH (FT)	SAMPLE: BULK	SAMPLE: RING	BLOWCOUNT: FIELD (N)	BLOWCOUNT: N(60)	MOISTURE %	DENSITY	SIEVE: % PASSING #200 SCREEN	GRAPHIC LOG	DESCRIPTION AND REMARKS
0									**ALLUVIUM - Qal - (0' - 60')**
-	SPT		2	2.8					2.5' - Dark brown very fine- to medium-grained silty sand, slightly moist, loose.
-	SPT		10	13.8					5' - 10' - Light brown very fine- to fine-grained silty sand, humid, firm.
-		X	22	16.9	4.9	96.9			
-	SPT		10	13.8					
10	SPT		9	12.4					10' - Dark brown very fine- to fine-grained silty sand, humid, firm.
-	SPT		13	17.9					12.5' - Dark brown very fine- to fine-grained clayey to silty sand, humid, firm.
-	SPT		6	8.3					15' - Medium to dark brown fine- to medium-grained silty sand,
-		X	18	13.8	7.5	99.8			humid, slightly firm.
-	SPT		9	12.4					17.5' - 35' - Medium brown very fine- to medium-grained silty sand, humid, firm.
20	SPT		12	16.6					
-	SPT		27	37.3					
-	SPT		25	34.5					
-		X	46	35.3	6.1	103.8			
-	SPT		38	52.4					
30	SPT		31	42.8					
-	SPT		33	45.5					
-	SPT		47	64.9					35'- 50' - Medium brown fine- to very coarse-grained silty sand, humid,
-		X	62	47.5	6.0	104.2			dense.
-	SPT		36	49.7					
40	SPT		35	48.3					
-	SPT		39	53.8					
-	SPT		37	51.1					
-		X	66	50.6	6.4	104.8			
-	SPT		39	53.8					
50	SPT		35	48.3					50' - 55' - Dark brown medium- to very coarse-grained clayey to silty sand,
-	SPT		34	46.9					slightly moist, dense.
-	SPT		33	45.5					
-	X		62	47.5	23.9	106.1			57.5' - Dark brown fine- to coarse-grained clayey to silty sand, moist, dense.
-	SPT		37	51.1					60' - Dark brown fine- to coarse-grained clayey to silty sand,saturated, dense.
60	SPT		36	49.7					End at 60'

Comments: The following correction factors were utilized to determine N(60) (Per SP117)
Cb = 1.15 (8" Diameter Borehole); Cs = 1.2 (SPT Sampler without liner); Cs = 2/3 (California Sampler)

Notes: TOTAL DEPTH: 60' GROUNDWATER: NO REFUSAL/CAVING: NO BACKFILLED: YES

PLATE 2.6

GOLD COAST GEOSERVICES, INC.

SUB-SURFACE DATA — BORING LOG NO. B-7

PROJECT: D.R. HORTON - LYONS CANYON RANCH, SANTA CLARITA — FILE NO.: GC14-122536

ELEVATION: SEE PLATE 1 — DATE: 02/11/15

METHOD: 6-inch Hollow Stem Auger — DRILLING CO.: HD DRILLING

DEPTH (FT)	SAMPLE: BULK	SAMPLE: RING	BLOWCOUNT: FIELD (N)	BLOWCOUNT: N(60)	MOISTURE %	DENSITY	SIEVE: % PASSING #200 SCREEN	GRAPHIC LOG	DESCRIPTION AND REMARKS
0									**ALLUVIUM -Qal - (0' - 60')**
-	SPT		4	5.5					2.5' - Dark brown very fine- to fine-grained silty sand, slightly moist, loose.
-	SPT		1	1.4					5' - 20' - Medium brown very fine- to fine-grained silty sand, humid, slightly firm.
-		X	15	11.5	9.4	86.9			
-	SPT		7	9.7					
10	SPT		10	13.8					
-	SPT		9	12.4					
-	SPT		6	8.3					
-		X	16	12.3	8.2	90.6			
-	SPT		6	8.3					
20	SPT		6	8.3					20' - Medium brown fine- to coarse-grained silty sand, humid, firm.
-	SPT		23	31.7					
-	SPT		22	30.4					25' - Medium brown fine-grained silty sand, humid, slightly firm.
-		x	52	39.9	8.1	104.4			
-	SPT		49	67.6					27.5' - 35' - Medium reddish brown fine- to very coarse-grained sand containing gravel, dry, dense.
30	SPT		54	74.5					
-	SPT		32	44.2					
-	SPT		26	35.9					35' - Medium to dark brown very fine- to fine-grained clayey to silty sand, slightly moist, slightly firm.
-		X	30	23.0	11.3	103.4			
-	SPT		30	41.4					
40	SPT		35	48.3					37.5' - 45' - Medium brown fine- to very coarse-grained pebbly to gravelly sand, dry, dense.
-	SPT		39	53.8					
-	SPT		30	41.4					45' - 50' - Dark brown fine- to coarse-grained clayey to silty sand containing pebbles, slightly moist, firm to dense.
-		X	29	22.2	9.9	116.7			
-	SPT		31	42.8					
50	SPT		44	60.7					50' - 60' - Medium reddish brown fine- to coarse-grained pebbly to gravelly silty sand, slightly moist, dense.
-	SPT		50 for 6"						
-	SPT		63	86.9					
-	X		50 for 6"		3.5	110.0			
-	SPT		50 for 6"						
60	SPT		50 for 6"						60' - Rock/boulder End at 60'

Comments: The following correction factors were utilized to determine N(60) (Per SP117)
Cb = 1.15 (8" Diameter Borehole); Cs = 1.2 (SPT Sampler without liner); Cs = 2/3 (California Sampler)

Notes: TOTAL DEPTH: 60' GROUNDWATER: NO REFUSAL/CAVING: NO BACKFILLED: YES

PLATE 2.7

GOLD COAST GEOSERVICES, INC.

SUB-SURFACE DATA — BORING LOG NO. B-8

PROJECT: D.R. HORTON - LYONS CANYON RANCH, SANTA CLARITA — FILE NO.: GC14-122536

ELEVATION: SEE PLATE 1 — DATE: 02/12/15

METHOD: 6-inch Hollow Stem Auger — DRILLING CO.: HD DRILLING

DEPTH (FT)	SAMPLE: BULK	SAMPLE: RING	BLOWCOUNT: FIELD (N)	BLOWCOUNT: N(60)	MOISTURE %	DENSITY	SIEVE: % PASSING # 200 SCREEN	GRAPHIC LOG	DESCRIPTION AND REMARKS
0									**ALLUVIUM - Qal - (0' - 60')**
-	SPT		5	6.9					2.5' - Dark brown fine- to medium-grained silty sand, slightly moist, loose.
-									
-	SPT		12	16.6					5' - 20' - Medium brown very fine- to fine-grained silty sand, humid, slightly
-		X	21	16.1	7.1	89.3			firm.
-	SPT		15	20.7					
-									
10	SPT		10	13.8					
-									
-	SPT		13	17.9					
-	SPT		11	15.2					
-		X	28	21.5	4.8	101.2			
-	SPT		16	22.1					
-									
20	SPT		21	29.0					20' - Medium reddish brown fine- to medium-grained silty sand, humid,
-									dense.
-	SPT		30	41.4					
-									
-	SPT		22	30.4					25' - Medium reddish brown fine- to very coarse-grained pebbly sand,
-		x	42	32.2	5.1	107.8			humid, dense.
-	SPT		24	33.1					27.5' - Medium brown fine- to medium-grained silty sand, humid, dense.
30	SPT		28	38.6					30' - 47.5' - Medium reddish brown fine- to very coarse-grained pebbly to
-									gravelly silty sand, humid, dense.
-	SPT		37	51.1					
-									
-	SPT		28	38.6					
-		X	50	38.3	5.9	109.5			
-	SPT		27	37.3					
40	SPT		35	48.3					
-									
-	SPT		36	49.7					
-									
-	SPT		31	42.8					
-		X	50 for 6"		7.1	110.0			
-	SPT		50	69.0					47.5' - 55' - Medium reddish brown fine- to very coarse-grained silty sandy
50	SPT		46	63.5					clay containing gravel, moist, dense.
-									
-	SPT		63	86.9					
-									
-	SPT		91	125.6					55' -60' - Medium gray fine- to medium-grained sandy clay, slightly moist, dense.
-	X		50 for 6"						
-									
60									End at 60'

Comments: The following correction factors were utilized to determine N(60) (Per SP117)
Cb = 1.15 (8" Diameter Borehole); Cs = 1.2 (SPT Sampler without liner); Cs = 2/3 (California Sampler)

Notes: TOTAL DEPTH: 60' GROUNDWATER: NO REFUSAL/CAVING: NO BACKFILLED: YES

PLATE 2.8

GOLD COAST GEOSERVICES, INC.

SUB-SURFACE DATA — BORING LOG NO. B-9

PROJECT: D.R. HORTON - LYONS CANYON RANCH, SANTA CLARITA — FILE NO.: GC14-122536

ELEVATION: SEE PLATE 1 — DATE: 02/11/15

METHOD: 6-inch Hollow Stem Auger — DRILLING CO.: HD DRILLING

DEPTH (FT)	SAMPLE: BULK	SAMPLE: RING	BLOWCOUNT: FIELD (N)	BLOWCOUNT: N(60)	MOISTURE %	DENSITY	SIEVE: % PASSING # 200 SCREEN	GRAPHIC LOG	DESCRIPTION AND REMARKS
0									**ALLUVIUM - Qal - (0' - 47.5')**
-	SPT		1	1.4					2.5' - Dark brown very fine- to fine-grained silty sand, slightly moist, loose.
-	SPT		11	15.2					5' - 12.5' - Light to medium brown very fine- to fine-grained silty sand, dry, firm.
-		X	34	26.1	6.3	101.3			
-	SPT		8	11.0					
10	SPT		9	12.4					
-	SPT		11	15.2					12.5' - Medium to dark brown fine- to coarse-grained silty sand, dry, firm.
-	SPT		9	12.4					15' - 20' - Medium to dark brown fine-grained silty sand, humid, firm.
-		X	26	19.9	7.7	104.4			
-	SPT		10	13.8					
20	SPT		14	19.3					
-	SPT		22	30.4					22.5' - 35' - Medium reddish brown very fine- to medium-grained silty sand, humid, firm.
-	SPT		24	33.1					
-		x	50 for 5"		6.4	105.6			
-	SPT		21	29.0					
30	SPT		22	30.4					
-	SPT		25	34.5					
-	SPT		30	41.4					35' - 45' - Dark brown very fine- to coarse-grained clayey to silty sand, slightly moist, firm.
-		X	54	41.4	5.7	111.3			
-	SPT		39	53.8					
40	SPT		38	52.4					
-	SPT		44	60.7					
-	SPT		47	64.9					45' - Medium gray very fine- to medium-grained sandy clay to clayey sand, moist, very dense.
-		X	50 for 6"		5.8	112.2			
-	SPT		50 for 5"						**SAUGUS FORMATION - Ts - (47.5' - 57.5')** - Medium gray medium- to very coarse-grained clayey sand, moist, very dense.
50	SPT		72	99.4					
-	SPT		50 for 4"						
-	SPT		50 for 5"						End at 57.5'
60									

Comments: The following correction factors were utilized to determine N(60) (Per SP117)
Cb = 1.15 (8" Diameter Borehole); Cs = 1.2 (SPT Sampler without liner); Cs = 2/3 (California Sampler)

Notes: TOTAL DEPTH: 55' GROUNDWATER: NO REFUSAL/CAVING: NO BACKFILLED: YES

PLATE 2.9

GOLD COAST GEOSERVICES, INC.

SUB-SURFACE DATA — BORING LOG NO. B-10

PROJECT: D.R. HORTON - LYONS CANYON RANCH, SANTA CLARITA — FILE NO.: GC14-122536

ELEVATION: SEE PLATE 1 — DATE: 02/12/15

METHOD: 6-inch Hollow Stem Auger — DRILLING CO.: HD DRILLING

DEPTH (FT)	SAMPLE: BULK	SAMPLE: RING	BLOWCOUNT: FIELD (N)	BLOWCOUNT: N(60)	MOISTURE %	DENSITY	SIEVE: % PASSING #200 SCREEN	GRAPHIC LOG	DESCRIPTION AND REMARKS
0									**ALLUVIUM - Qal - (0' - 27.5')**
-	SPT		14	19.3					2.5' - Dark brown very fine- to fine-grained silty sand, slightly moist, firm.
-	SPT		31	42.8					5' - 17.5' - Medium brown fine- to coarse-grained silty sand, dry, firm.
-		X	37	28.4					
-	SPT		12	16.6					
10	SPT		12	16.6					
-	SPT		14	19.3					
-	SPT		14	19.3					
-		X	35	26.8	4.8	97.2			
-	SPT		16	22.1					
20	SPT		13	17.9					20' - 22.5' - Medium brown fine- to coarse-grained pebbly silty sand, dry, dense.
-	SPT		43	59.3					
-	SPT		44	60.7					22.5' - 27.5' - Light to medium brown very fine- to fine-grained silty sand, dry, slightly firm.
-		x	75	57.5	4.3	115.3			
-	SPT		50 for 4"						**SAUGUS FORMATION - Ts - (27.5' - 30')** - Medium brown fine- to very coarse-grained silty sand, dry, very dense.
30	SPT		50 for 2"						End at 30'
40									
50									
60									

Comments: The following correction factors were utilized to determine N(60) (Per SP117)
Cb = 1.15 (8" Diameter Borehole); Cs = 1.2 (SPT Sampler without liner); Cs = 2/3 (California Sampler)

Notes: TOTAL DEPTH: 30' GROUNDWATER: NO REFUSAL/CAVING: NO BACKFILLED: YES

PLATE 2.10

GOLD COAST GEOSERVICES, INC.

SUB-SURFACE DATA — BORING LOG NO. B-11

PROJECT: D.R. HORTON - LYONS CANYON RANCH, SANTA CLARITA — FILE NO.: GC14-122536

ELEVATION: SEE PLATE 1 — DATE: 02/17/15

METHOD: 6-inch Hollow Stem Auger — DRILLING CO.: HD DRILLING

DEPTH (FT)	SAMPLE: BULK	SAMPLE: RING	BLOWCOUNT: FIELD (N)	BLOWCOUNT: N(60)	MOISTURE %	DENSITY	SIEVE: % PASSING # 200 SCREEN	GRAPHIC LOG	DESCRIPTION AND REMARKS
0									**ALLUVIUM - Qal - (0' - 10')**
-	SPT		5	6.9					2.5' - Dark brown very fine- to fine-grained silty sand, sightly moist, loose.
-	SPT		12	16.6					5' - Medium gray very fine- to medium-grained clayey to silty sand, slightly moist, firm.
-		X	43	33.0	6.8	109.7			
-	SPT		22	30.4					7.5' - Medium reddish brown fine- to medium-grained silty sand, dry, dense.
10	SPT		50 for 4"						**SAUGUS FORMATION - Ts - (10' - 17.5')**
-	SPT		50 for 6"						10' - Medium brown fine- to very coarse-grained silty sand, dry, dense.
-									12.5' - Dark brown very fine- to medium-grained clayey to silty sand, slightly moist, dense.
-	SPT		50 for 4"						15' - 17.5' - Light to medum gray very fine-grained silty clay, moist, very stiff.
20									
30									
40									
50									
60									

Comments: The following correction factors were utilized to determine N(60) (Per SP117)
Cb = 1.15 (8" Diameter Borehole); Cs = 1.2 (SPT Sampler without liner); Cs = 2/3 (California Sampler)

Notes: TOTAL DEPTH: 17.5' GROUNDWATER: NO REFUSAL/CAVING: NO BACKFILLED: YES

PLATE 2.11

GOLD COAST GEOSERVICES, INC.

SUB-SURFACE DATA — BORING LOG NO. B-12

PROJECT: D.R. HORTON - LYONS CANYON RANCH, SANTA CLARITA — FILE NO.: GC14-122536

ELEVATION: SEE PLATE 1 — DATE: 02/18/15

METHOD: 6-inch Hollow Stem Auger — DRILLING CO.: HD DRILLING

DEPTH (FT)	SAMPLE: BULK	SAMPLE: RING	BLOWCOUNT: FIELD (N)	BLOWCOUNT: N(60)	MOISTURE %	DENSITY	SIEVE: % PASSING # 200 SCREEN	GRAPHIC LOG	DESCRIPTION AND REMARKS
0	SPT		6	8.3					**ALLUVIUM - Qal - (0' - 7.5')** - Medium reddish brown very fine- to fine-grained silty sand, slightly moist slightly firm.
	SPT		19	26.2					
		X	72	55.2	6.2	117.9			
	SPT		50 for 5"						**SAUGUS FORMATION - Ts - (7.5' - 10')** - Medium brown fine-grained silty sand, humid, very dense.
10	SPT		50 for 3"						End at 10'
20									
30									
40									
50									
60									

Comments: The following correction factors were utilized to determine N(60) (Per SP117)
Cb = 1.15 (8" Diameter Borehole); Cs = 1.2 (SPT Sampler without liner); Cs = 2/3 (California Sampler)

Notes: TOTAL DEPTH: 10' GROUNDWATER: NO REFUSAL/CAVING: NO BACKFILLED: YES

PLATE 2.12

GOLD COAST GEOSERVICES, INC.

SUB-SURFACE DATA — BORING LOG NO. B-13

PROJECT: D.R. HORTON - LYONS CANYON RANCH, SANTA CLARITA — FILE NO.: GC14-122536

ELEVATION: SEE PLATE 1 — DATE: 02/18/15

METHOD: 6-inch Hollow Stem Auger — DRILLING CO.: HD DRILLING

DEPTH (FT)	SAMPLE: BULK	SAMPLE: RING	BLOWCOUNT: FIELD (N)	BLOWCOUNT: N(60)	MOISTURE %	DENSITY	SIEVE: % PASSING # 200 SCREEN	GRAPHIC LOG	DESCRIPTION AND REMARKS
0									**ALLUVIUM - Qal - (0' - 15')**
-	SPT		6	8.3					2.5' - 5' - Medium reddish brown very fine- to fine-grained silty sand, humid, firm.
-	SPT		9	12.4					
-		X	33	25.3	10.9	93.8			
-	SPT		17	23.5					7.5' - 10' - Medium brown fine- to medium-grained silty sand to sandy silt, humid, firm.
10	SPT		11	15.2					
-	SPT		11	15.2					12.5' - 15' - Medium brown fine- to coarse-grained silty sand, dry, firm.
-	SPT		40	55.2					**SAUGUS FORMATION - Ts - (15' - 17.5')** - Medium brown fine- to medium-grained
-		X	50 for 6"		8.1				silty sand to sandy clay, slightly moist, very dense.
-	SPT		50 for 3"						End at 17.5'
20									
30									
40									
50									
60									

Comments: The following correction factors were utilized to determine N(60) (Per SP117)
Cb = 1.15 (8" Diameter Borehole); Cs = 1.2 (SPT Sampler without liner); Cs = 2/3 (California Sampler)

Notes: TOTAL DEPTH: 17.5' GROUNDWATER: NO REFUSAL/CAVING: NO BACKFILLED: YES

PLATE 2.13

GOLD COAST GEOSERVICES, INC.

SUB-SURFACE DATA — BORING LOG NO. B-14

PROJECT: D.R. HORTON - LYONS CANYON RANCH, SANTA CLARITA — FILE NO.: GC14-122536

ELEVATION: SEE PLATE 1 — DATE: 02/17/15

METHOD: 6-inch Hollow Stem Auger — DRILLING CO.: HD DRILLING

DEPTH (FT)	SAMPLE: BULK	SAMPLE: RING	BLOWCOUNT: FIELD (N)	BLOWCOUNT: N(60)	MOISTURE %	DENSITY	SIEVE: % PASSING #200 SCREEN	GRAPHIC LOG	DESCRIPTION AND REMARKS
0	SPT		6	8.3					**ALLUVIUM - Qal - (0' - 12.5')** 2.5' - Dark brown very fine- to fine-grained silty sand, moist, loose.
	SPT		9	12.4					5' - Light to medium brown very fine-grained silty sand, humid, slightly firm.
		X	33	25.3	8.0	97.9			
	SPT		17	23.5					7.5' - 12.5' - Medium brown very fine- to fine-grained silty sand to sandy silt, humid, dense.
10	SPT		11	15.2					
	SPT		50 for 6"						**SAUGUS FORMATION - Ts - (12.5' - 20')** - Medium brown fine- to medium-grained clayey to silty sand, humid to slightly moist, dense.
	SPT		50 for 5"						
		X	50 for 6"		13.8	97.7			
	SPT		50 for 3"						
20	SPT		50 for 4"						End at 20'
30									
40									
50									
60									

Comments: The following correction factors were utilized to determine N(60) (Per SP117)
Cb = 1.15 (8" Diameter Borehole); Cs = 1.2 (SPT Sampler without liner); Cs = 2/3 (California Sampler)

Notes: TOTAL DEPTH: 20' GROUNDWATER: NO REFUSAL/CAVING: NO BACKFILLED: YES

PLATE 2.14

GOLD COAST GEOSERVICES, INC.

SUB-SURFACE DATA — BORING LOG NO. B-15

PROJECT: D.R. HORTON - LYONS CANYON RANCH, SANTA CLARITA — FILE NO.: GC14-122536

ELEVATION: SEE PLATE 1 — DATE: 02/17/15

METHOD: 6-inch Hollow Stem Auger — DRILLING CO.: HD DRILLING

DEPTH (FT)	SAMPLE: BULK	SAMPLE: RING	BLOWCOUNT: FIELD (N)	BLOWCOUNT: N(60)	MOISTURE %	DENSITY	SIEVE: % PASSING #200 SCREEN	GRAPHIC LOG	DESCRIPTION AND REMARKS
0	SPT		7	9.7					**ALLUVIUM - Qal - (0' - 7.5')**
									2.5' - Dark brown very fine- to fine-grained silty sand, moist, loose.
	SPT		7	9.7					
		X	50 for 5"		7.5	98.2			5' - Light to medium brown very fine-grained silty sand, humid, slightly firm.
	SPT		69	95.2					**SAUGUS FORMATION - Ts - (7.5' - 20')**
									7.5' - 17.5' - Medium brown very fine- to fine-grained silty sand to sandy silt,
10	SPT		50 for 4"						humid, very dense.
	SPT		50 for 5"						
	SPT		50 for 5"						
		X	50 for 4"		13.2	100.0			
	SPT		50 for 5"						
20	SPT		50 for 4"						20' - Medium brown fine- to medium-grained clayey to silty sand, humid to slightly moist, very dense.
									End at 20'
30									
40									
50									
60									

Comments: The following correction factors were utilized to determine $N_{(60)}$ (Per SP117)
Cb = 1.15 (8" Diameter Borehole); Cs = 1.2 (SPT Sampler without liner); Cs = 2/3 (California Sampler)

Notes: TOTAL DEPTH: 20' GROUNDWATER: NO REFUSAL/CAVING: NO BACKFILLED: YES

PLATE 2.15

GOLD COAST GEOSERVICES, INC.

SUB-SURFACE DATA — BORING LOG NO. B-16

PROJECT: D.R. HORTON - LYONS CANYON RANCH, SANTA CLARITA — FILE NO.: GC14-122536

ELEVATION: SEE PLATE 1 — DATE: 02/17/15

METHOD: 6-inch Hollow Stem Auger — DRILLING CO.: HD DRILLING

DEPTH (FT)	SAMPLE: BULK	SAMPLE: RING	BLOWCOUNT: FIELD (N)	BLOWCOUNT: N(60)	MOISTURE %	DENSITY	SIEVE: % PASSING #200 SCREEN	GRAPHIC LOG	DESCRIPTION AND REMARKS
0									**ALLUVIUM - Qal - (0' - 15')**
	SPT		8	11.0					2.5' - Medium to dark brown very fine- to fine-grained silty sand, slightly moist, loose.
	SPT		9	12.4					5' - 10' - Medium brown very fine- to fine-grained silty sand, dry, firm.
		X	52	39.9	7.1	104.9			
	SPT		26	35.9					
10	SPT		20	27.6					
	SPT		20	27.6					12.5'- 15' - Light to medium brown very fine- to fine-grained silty sand to sandy silt, slightly moist, dense.
	SPT		50 for 5"						
		X	50 for 5"		12.6	107.4			**SAUGUS FORMATION - Ts - (15' - 22.5')** - gray siltstone.
	SPT		50 for 3"						
20	SPT		50 for 4"						
	SPT		50 for 2"						End at 22.5'
30									
40									
50									
60									

Comments: The following correction factors were utilized to determine N(60) (Per SP117)
Cb = 1.15 (8" Diameter Borehole); Cs = 1.2 (SPT Sampler without liner); Cs = 2/3 (California Sampler)

Notes: TOTAL DEPTH: 22.5' GROUNDWATER: NO REFUSAL/CAVING: NO BACKFILLED: YES

PLATE 2.16

GOLD COAST GEOSERVICES, INC.

SUB-SURFACE DATA — BORING LOG NO. B-17

PROJECT: D.R. HORTON - LYONS CANYON RANCH, SANTA CLARITA — FILE NO.: GC14-122536

ELEVATION: SEE PLATE 1 — DATE: 02/18/15

METHOD: 6-inch Hollow Stem Auger — DRILLING CO.: HD DRILLING

DEPTH (FT)	SAMPLE: BULK	SAMPLE: RING	BLOWCOUNT: FIELD (N)	BLOWCOUNT: N(60)	MOISTURE %	DENSITY	SIEVE: % PASSING # 200 SCREEN	GRAPHIC LOG	DESCRIPTION AND REMARKS
0									**ALLUVIUM - Qal - (0' - 5')**
-	SPT		5	6.9					2.5' - Dark brown fine- to medium-grained silty sand, slightly moist, loose.
-	SPT		11	15.2					SAUGUS FORMATION - Ts - (5' - 15')
-		X	68	52.1	10.0	98.1			5' - 7.5' - Medium to dark brown fine- to medium-grained silty sand, humid, slightly firm.
10	SPT		28	38.6					7.5' - 15' - Medium brown fine- to medium-grained silty to sandy clay, humid, very dense.
-	SPT		56	77.3					
-	SPT		50 for 5"						End at 15'
20									
30									
40									
50									
60									

Comments: The following correction factors were utilized to determine N(60) (Per SP117)
Cb = 1.15 (8" Diameter Borehole); Cs = 1.2 (SPT Sampler without liner); Cs = 2/3 (California Sampler)

Notes: TOTAL DEPTH: 15' GROUNDWATER: NO REFUSAL/CAVING: NO BACKFILLED: YES

PLATE 2.17

GOLD COAST GEOSERVICES, INC.

SUB-SURFACE DATA — BORING LOG NO. B-18

PROJECT: D.R. HORTON - LYONS CANYON RANCH, SANTA CLARITA — FILE NO.: GC14-122536

ELEVATION: SEE PLATE 1 — DATE: 02/18/15

METHOD: 6-inch Hollow Stem Auger — DRILLING CO.: HD DRILLING

DEPTH (FT)	SAMPLE: BULK	SAMPLE: RING	BLOWCOUNT: FIELD (N)	BLOWCOUNT: N(60)	MOISTURE %	DENSITY	SIEVE: % PASSING # 200 SCREEN	GRAPHIC LOG	DESCRIPTION AND REMARKS
0	SPT		10	13.8					**ALLUVIUM - Qal - (0' - 7.5')**
									2.5' - Dark brown very fine- to fine-grained silty sand, moist, slightly firm.
	SPT		15	20.7					
		X	50 for 6"		8.2	105.0			5' - Medium brown very fine- to fine-grained silty sand to sandy silt, humid, dense.
	SPT		50 for 3"						**SAUGUS FORMATION - Ts - (7.5' - 10')** - Dark brown fine- to coarse-grained silty sand, slightly moist, very dense.
10	SPT		50 for 3"						End at 10'
20									
30									
40									
50									
60									

Comments: The following correction factors were utilized to determine N(60) (Per SP117)
Cb = 1.15 (8" Diameter Borehole); Cs = 1.2 (SPT Sampler without liner); Cs = 2/3 (California Sampler)

Notes: TOTAL DEPTH: 10' GROUNDWATER: NO REFUSAL/CAVING: NO BACKFILLED: YES

PLATE 2.18

GOLD COAST GEOSERVICES, INC.

SUB-SURFACE DATA — BORING LOG NO. B-19

PROJECT: D.R. HORTON - LYONS CANYON RANCH, SANTA CLARITA — FILE NO.: GC14-122536

ELEVATION: SEE PLATE 1 — DATE: 02/19/15

METHOD: 6-inch Hollow Stem Auger — DRILLING CO.: HD DRILLING

DEPTH (FT)	SAMPLE: BULK	SAMPLE: RING	BLOWCOUNT: FIELD (N)	BLOWCOUNT: N(60)	MOISTURE %	DENSITY	SIEVE: % PASSING # 200 SCREEN	GRAPHIC LOG	DESCRIPTION AND REMARKS
0	SPT		20	27.6					**ALLUVIUM - Qal - (0' - 7.5')** - Medium brown fine-grained silty sand, dry, slightly firm.
	SPT		16	22.1					
		X	80	61.3	9.8	91.5			
	SPT		58	80.0					**PICO FORMATION - Tp - (7.5' - 15')**
10	SPT		32	44.2					7.5' - 12.5' - Medium brown claystone to siltstone.
	SPT		50 for 5"						12.5' - 15' - Dark brown claystone to siltstone.
	SPT		80	110.4					End at 15'
20									
30									
40									
50									
60									

Comments: The following correction factors were utilized to determine $N_{(60)}$ (Per SP117)
Cb = 1.15 (8" Diameter Borehole); Cs = 1.2 (SPT Sampler without liner); Cs = 2/3 (California Sampler)

Notes: TOTAL DEPTH: 15' GROUNDWATER: NO REFUSAL/CAVING: NO BACKFILLED: YES

PLATE 2.19

GOLD COAST GEOSERVICES, INC.

SUB-SURFACE DATA — BORING LOG NO. B-20

PROJECT: D.R. HORTON - LYONS CANYON RANCH, SANTA CLARITA — FILE NO.: GC14-122536

ELEVATION: SEE PLATE 1 — DATE: 02/19/15

METHOD: 6-inch Hollow Stem Auger — DRILLING CO.: HD DRILLING

DEPTH (FT)	SAMPLE: BULK	SAMPLE: RING	BLOWCOUNT: FIELD (N)	BLOWCOUNT: N(60)	MOISTURE %	DENSITY	SIEVE: % PASSING # 200 SCREEN	GRAPHIC LOG	DESCRIPTION AND REMARKS
0	SPT		9	12.4					**ALLUVIUM - Qal - (0' - 7.5')**
	SPT		20	27.6					2.5' - Dark brown very fine- to fine-grained silty sand, slightly moist, sightly firm.
		X	50 for 3"		8.1	103.9			5' - Medium brown fine- to medium-grained silty sand, humid, firm.
	SPT		50 for 5"						**PICO FORMATION - Tp - (7.5' - 12.5')** - Medium brown siltstone
10	SPT		79	109.0					
	SPT		50 for 2"						End at 12.5
20									
30									
40									
50									
60									

Comments: The following correction factors were utilized to determine N(60) (Per SP117)
Cb = 1.15 (8" Diameter Borehole); Cs = 1.2 (SPT Sampler without liner); Cs = 2/3 (California Sampler)

Notes: TOTAL DEPTH: 12.5' GROUNDWATER: NO REFUSAL/CAVING: NO BACKFILLED: YES

PLATE 2.20

GOLD COAST GEOSERVICES, INC.

SUB-SURFACE DATA — BORING LOG NO. B-21

PROJECT: D.R. HORTON - LYONS CANYON RANCH, SANTA CLARITA — FILE NO.: GC14-122536

ELEVATION: SEE PLATE 1 — DATE: 02/13/15

METHOD: 6-inch Hollow Stem Auger — DRILLING CO.: HD DRILLING

DEPTH (FT)	SAMPLE: BULK	SAMPLE: RING	BLOWCOUNT: FIELD (N)	BLOWCOUNT: N(60)	MOISTURE %	DENSITY	SIEVE: % PASSING # 200 SCREEN	GRAPHIC LOG	DESCRIPTION AND REMARKS
0									**ALLUVIUM - Qal - (0' - 47.5')**
-	SPT		3	4.1					2.5' - 5' - Medium to dark brown very fine- to medium-grained silty sand, humid, loose.
-	SPT		3	4.1					
-		X	26	19.9	5.7	99.0			
-	SPT		13	17.9					7.5' - 10' - Medium brown very fine- to fine-grained silty sand, humid, slightly firm.
10	SPT		8	11.0					
-	SPT		9	12.4					12.5' - 22.5' - Medium to dark brown very fine- to fine-grained silty sand, humid, slightly firm.
-	SPT		6	8.3					
-		X	15	11.5	9.2	104.6			
-	SPT		8	11.0					
20	SPT		14	19.3					
-	SPT		19	26.2					
-	SPT		20	27.6					
-		x	33	25.3	9.8	108.7			
-	SPT		31	42.8					27.5' - 30' - Medium brown fine- to coarse-grained pebbly silty sand, humid, dense.
30	SPT		29	40.0					
-	SPT		33	45.5					35' - Medium reddish brown fine- to coarse-grained pebbly sand, humid, dense.
-	SPT		28	38.6					
-		X	58	44.5	18.8	107.9			37.5' - 47.5' - Medium brown fine- to medium-grained silty sand to sandy silt, moist, firm.
-	SPT		32	44.2					
40	SPT		33	45.5					
-	SPT		30	41.4					
-	SPT		34	46.9					
-		X	50 for 4"		6.7	114.3			
-	SPT		40	55.2					**SAUGUS FORMATION - TS - (47.5' - 50')** - Medium reddish brown fine- to very coarse-grained clayey to silty sand, moist to saturated, dense.
50	SPT		57 for 5"						End at 50'
-									
-									
-									
-									
-									
60									

Comments: The following correction factors were utilized to determine N(60) (Per SP117)
Cb = 1.15 (8" Diameter Borehole); Cs = 1.2 (SPT Sampler without liner); Cs = 2/3 (California Sampler)

Notes: TOTAL DEPTH: 50' GROUNDWATER: NO REFUSAL/CAVING: NO BACKFILLED: YES

PLATE 2.21

GOLD COAST GEOSERVICES, INC.

SUB-SURFACE DATA — BORING LOG NO. B-22

PROJECT: D.R. HORTON - LYONS CANYON RANCH, SANTA CLARITA — FILE NO.: GC14-122536

ELEVATION: SEE PLATE 1 — DATE: 02/13/15

METHOD: 6-inch Hollow Stem Auger — DRILLING CO.: HD DRILLING

DEPTH (FT)	SAMPLE: BULK	SAMPLE: RING	BLOWCOUNT: FIELD (N)	BLOWCOUNT: $N_{(60)}$	MOISTURE %	DENSITY	SIEVE: % PASSING # 200 SCREEN	GRAPHIC LOG	DESCRIPTION AND REMARKS
0									**ALLUVIUM - Qal - (0' - 17.5')**
-	SPT		2	2.8					2.5' - 5' - Dark brown fine- to medium-grained silty sand, humid, loose.
-	SPT		3	4.1					
-		X	24	18.4	3.8	103.7			7.5' - 15' - Dark brown fine- to very coarse-grained silty sand, humid,
-	SPT		15	20.7					slightly firm.
10	SPT		15	20.7					
-	SPT		19	26.2					
-	SPT		11	15.2					
-		X	60	46.0	8.7	119.1			
-	SPT		70	96.6					**SAUGUS FORMATION - Ts - (17.5' - 32.5')**
20	SPT		53	73.1					17.5' - 27.5' - Medium yellowish brown medium- to very coarse-grained sand, humid, very dense.
-	SPT		68	93.8					
-	SPT		65	89.7					
-		x	50 for 3"		12.6	110.4			27.5' - 32.5' - Medium yellowish brown medium- to very coarse-grained silty
-	SPT		50 for 6"						sand, slightly moist, very dense.
30	SPT		50 for 6"						
-	SPT		50 for 5"						End at 32.5'
40									
50									
60									

Comments: The following correction factors were utilized to determine $N_{(60)}$ (Per SP117)
Cb = 1.15 (8" Diameter Borehole); Cs = 1.2 (SPT Sampler without liner); Cs = 2/3 (California Sampler)

Notes: TOTAL DEPTH: 32.5' GROUNDWATER: NO REFUSAL/CAVING: NO BACKFILLED: YES

PLATE 2.22

GOLD COAST GEOSERVICES, INC.

SUB-SURFACE DATA — BORING LOG NO. B-23

PROJECT: D.R. HORTON - LYONS CANYON RANCH, SANTA CLARITA — FILE NO.: GC14-122536

ELEVATION: SEE PLATE 1 — DATE: 02/16/15

METHOD: 6-inch Hollow Stem Auger — DRILLING CO.: HD DRILLING

DEPTH (FT)	SAMPLE: BULK	SAMPLE: RING	BLOWCOUNT: FIELD (N)	BLOWCOUNT: N(60)	MOISTURE %	DENSITY	SIEVE: % PASSING # 200 SCREEN	GRAPHIC LOG	DESCRIPTION AND REMARKS
0									**ALLUVIUM - Qal - (0' - 27.5')**
-	SPT		3	4.1					2.5' - Dark brown very fine- to medium-grained clayey to silty sand, slightly moist, loose.
-	SPT		15	20.7					5' - Dark brown very fine- to medium-grained clayey to silty sand,
-		X	57	43.7	8.0	97.0			humid, firm.
-	SPT		30	41.4					7.5' - 10' - Medium to dark brown fine- to coarse-grained clayey to silty sand, humid, firm.
10	SPT		14	19.3					
-	SPT		12	16.6					12.5' - 17.5'- Medium to dark brown fine- to coarse-grained clayey to
-	SPT		5	6.9					silty sand, slightly moist, slightly firm.
-		X	27	20.7	11.5	107.4			
-	SPT		12	16.6					
20	SPT		13	17.9					20' - 27.5' - Medium to dark brown fine- to very coarse-grained gravelly to pebbly clayey to silty sand, humid to slightly moist, slightly firm.
-	SPT		18	24.8					
-	SPT		13	17.9					**SAUGUS FORMATION - Ts - (27.5' - 30')**
-		x	43	33.0	4.3	111.7			25' - 27.5' - Medium yellowish brown fine- to coarse-grained silty sand
-	SPT		46	63.5					containing pebbles, humid, firm to dense.
30	SPT		50 for 5"						30' - Rock/boulder
40									
50									
60									

Comments: The following correction factors were utilized to determine N(60) (Per SP117)
Cb = 1.15 (8" Diameter Borehole); Cs = 1.2 (SPT Sampler without liner); Cs = 2/3 (California Sampler)

Notes: TOTAL DEPTH: 30' GROUNDWATER: NO REFUSAL/CAVING: NO BACKFILLED: YES

PLATE 2.23

GOLD COAST GEOSERVICES, INC.

SUB-SURFACE DATA — BORING LOG NO. B-24

PROJECT: D.R. HORTON - LYONS CANYON RANCH, SANTA CLARITA — FILE NO.: GC14-122536

ELEVATION: SEE PLATE 1 — DATE: 02/16/15

METHOD: 6-inch Hollow Stem Auger — DRILLING CO.: HD DRILLING

DEPTH (FT)	SAMPLE: BULK	SAMPLE: RING	BLOWCOUNT: FIELD (N)	BLOWCOUNT: N(60)	MOISTURE %	DENSITY	SIEVE: % PASSING # 200 SCREEN	GRAPHIC LOG	DESCRIPTION AND REMARKS
0	SPT		6	8.3					**ALLUVIUM - Qal - (0' - 27.5')**
-									2.5' - Dark brown fine- to medium-grained clayey to silty sand, slightly moist, slightly firm.
-	SPT		24	33.1					5' - 10' - Dark brown fine- to medium-grained clayey to silty sand, humid, firm to dense.
-		X	55	42.2	8.6	83.1			
-	SPT		20	27.6					
10	SPT		13	17.9					
-	SPT		17	23.5					12.5' - 27.5' - Medium brown fine- to medium-grained clayey silt to silty clay, humid to slightly moist, firm to dense.
-	SPT		8	11.0					
-		X	39	29.9	15.9	95.6			
-	SPT		21	29.0					
20	SPT		13	17.9					
-	SPT		57	78.7					
-	SPT		24	33.1					**PICO FORMATION - Tp - (27.5' - 37.5')**
-		x	50 for 4"		18.5	101.1			27.5' - 35' - Medium to dark grayish brown fine-grained clayey silt to silty clay, moist, dense.
-	SPT		50 for 5"						
30	SPT		64	88.3					
-	SPT		60	82.8					
-	SPT		42	58.0					35' - 37.5' - Dark brown claystone to siltstone, very dense.
-		X	50 for 5"		27.5	94.9			
-	SPT		50 for 4"						End at 37.5'
40									
50									
60									

Comments: The following correction factors were utilized to determine N(60) (Per SP117)
Cb = 1.15 (8" Diameter Borehole); Cs = 1.2 (SPT Sampler without liner); Cs = 2/3 (California Sampler)

Notes: TOTAL DEPTH: 37.5' GROUNDWATER: NO REFUSAL/CAVING: NO BACKFILLED: YES

PLATE 2.24

GOLD COAST GEOSERVICES, INC.

SUB-SURFACE DATA — BORING LOG NO. B-25

PROJECT: D.R. HORTON - LYONS CANYON RANCH, SANTA CLARITA — FILE NO.: GC14-122536

ELEVATION: SEE PLATE 1 — DATE: 02/16/15

METHOD: 6-inch Hollow Stem Auger — DRILLING CO.: HD DRILLING

DEPTH (FT)	SAMPLE: BULK	SAMPLE: RING	BLOWCOUNT: FIELD (N)	BLOWCOUNT: N(60)	MOISTURE %	DENSITY	SIEVE: % PASSING # 200 SCREEN	GRAPHIC LOG	DESCRIPTION AND REMARKS
0									**ALLUVIUM - Qal - (0' - 17.5')**
-	SPT		14	19.3					2.5' - Medium to dark brown fine- to medium-grained silty sand, humid, firm.
-	SPT		41	56.6					5' - 12.5' - Medium brown fine- to coarse-grained clayey to silty sand, humid,
-		X	82	62.9	7.5	99.1			firm to dense.
-	SPT		28	38.6					
10	SPT		20	27.6					
-	SPT		29	40.0					
-	SPT		8	11.0					15' - 17.5' - Light yellowish brown very fine- to fine-grained silty sand to sandy silt,
-		X	50 for 3"						humid, slightly firm.
-	SPT		70	96.6					**SAUGUS FORMSTION - Ts - (17.5' - 27.5')**
20	SPT		31	42.8					17.5' - Medium reddish brown fine- to medium-grained clayey to silty sand, dry, very dense.
-	SPT		50 for 6"						20' - Medium reddish brown siltstone, very dense.
-									22.5' - Light grayish brown siltstone, very dense.
-	SPT		40	55.2					25' - Medium gray siltstone, very dense.
-		x	50 for 3"						End at 27.5'
30									
40									
50									
60									

Comments: The following correction factors were utilized to determine N(60) (Per SP117)
Cb = 1.15 (8" Diameter Borehole); Cs = 1.2 (SPT Sampler without liner); Cs = 2/3 (California Sampler)

Notes: TOTAL DEPTH: 27.5' GROUNDWATER: NO REFUSAL/CAVING: NO BACKFILLED: YES

PLATE 2.25

GEOTECHNICAL BORING LOG

PROJECT NO.	102453-T	PROJECT NAME	Lyons Canyon Ranch		
DATE STARTED	6/20/01	GROUND ELEV.	1317	BORING DESIG.	B-1
DATE FINISHED	6/20/01	GW DEPTH (FT)	67	LOGGED BY	CRN
DRILLER	Ledezma Drilling	DRIVE WT.	See Note	NOTE	0-24' 3548#; 24-47'
TYPE OF DRILL RIG	30" Bucket Auger	DROP	12 inches		2577#; 47-73' 1648#

DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	ATTITUDES	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
0	1315					**ALLUVIUM (Qal):** Sandy Silt to Silty Sand; very fine- to fine-grained, moderate yellowish brown, slightly moist, firm/moderately dense.				
5		R/B	1				7.3	102.0	31	
	1310									
10		R	1				7.0	95.4	25	
	1305									
15		R	1			Sandy Silt to Silty Sand; very fine- to fine-grained, moderate yellowish brown, slightly moist, firm/moderately dense, some interbedded pebble lenses.	10.2	102.4	44	
	1300									
20		R/B	1			Silty Sand; fine- to coarse-grained with some pebbles and few cobbles, moderate to dark yellowish brown, moist, moderately dense.	4.9	112.2	26	
	1295									
25										
	1290									
30		B				Silty Sand; fine- to coarse-grained with pebbles and cobbles, moderate yellowish brown, slightly moist to moist, moderately dense to dense.				
	1285									
35										
	1280									

SAMPLE TYPES:
R RING (DRIVE) SAMPLE
S SPT (SPLIT SPOON) SAMPLE
B BULK SAMPLE T TUBE SAMPLE

GROUNDWATER LEVEL
WATER SEEP C CONTACT
B BEDDING F FAULT
J JOINTING S SHEAR

PACIFIC SOILS ENGINEERING, INC.

PLATE A-1

GEOTECHNICAL BORING LOG

PROJECT NO.	102453-T	PROJECT NAME	Lyons Canyon Ranch		
DATE STARTED	6/20/01	GROUND ELEV.	1317	BORING DESIG.	B-1
DATE FINISHED	6/20/01	GW DEPTH (FT)	67	LOGGED BY	CRN
DRILLER	Ledezma Drilling	DRIVE WT.	See Note	NOTE	0-24' 3548#; 24-47' 2577#; 47-73' 1648#
TYPE OF DRILL RIG	30" Bucket Auger	DROP	12 inches		

DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	ATTITUDES	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
45	1275									
	1270									
50		R/B	15			Pebbly Sand; fine- to very coarse-grained with abundant cobbles, moderate to dark yellowish brown, moist, dense.	4.6	126.4	37	
	1265									
55		R	5			Silty Sand; very fine- to fine-grained, moderate yellowish brown, moist, dense.	11.6	118.7	78	
	1260					Pebbly Sand; fine- to very coarse-grained with abundant cobbles, moderate to dark yellowish brown, moist, dense.				
60										
	1255									
65						Some interlayered lenses of Silty Sand (described at 55 feet).				
	1250					▼ Water at 67± feet, caving from 65 to 68± feet.				
						Total Depth 68 feet. Water at 67 feet. Caving from 65 to 68 feet. *Hole backfilled with native materials and tamped.*				

SAMPLE TYPES:
- R RING (DRIVE) SAMPLE
- S SPT (SPLIT SPOON) SAMPLE
- B BULK SAMPLE
- T TUBE SAMPLE

▼ GROUNDWATER LEVEL
► WATER SEEP
- B BEDDING
- J JOINTING
- C CONTACT
- F FAULT
- S SHEAR

PACIFIC SOILS ENGINEERING, INC.

PLATE A-2

GEOTECHNICAL BORING LOG

PROJECT NO.	102453-T	PROJECT NAME	Lyons Canyon Ranch		
DATE STARTED	6/20/01	GROUND ELEV.	1325	BORING DESIG.	B-2
DATE FINISHED	6/20/01	GW DEPTH (FT)	53	LOGGED BY	CRN
DRILLER	Ledezma Drilling	DRIVE WT.	See Note	NOTE	0-24' 3548#; 24-47' 2577#; 47-73' 1648#
TYPE OF DRILL RIG	30" Bucket Auger	DROP	12 inches		

DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	ATTITUDES	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
	1325					**ALLUVIUM (Qal):** Silt; moderate yellowish brown, dry to slightly moist, soft to firm at depth.				
5	1320									
10	1315	R/B	1			Silty Sand; very fine- to fine-grained, moderate yellowish brown, slightly moist, moderately dense, some interlayered lenses of coarse-grained Sand and Pebbles, some small organic pods.	7.7	102.0	32	
15	1310									
20	1305	R	1				8.7	105.0	40	
25	1300					Increasing pebbles and some cobbles.				
30	1295	R/B	9			Pebbly Sand; fine- to very coarse-grained, pale yellowish brown, slightly moist, moderately dense.	3.7	121.6	27	
35	1290									
	1285									

SAMPLE TYPES:
- [R] RING (DRIVE) SAMPLE
- [S] SPT (SPLIT SPOON) SAMPLE
- [B] BULK SAMPLE
- [T] TUBE SAMPLE

- ▼ GROUNDWATER LEVEL
- ► WATER SEEP
- [B] BEDDING
- [J] JOINTING
- [C] CONTACT
- [F] FAULT
- [S] SHEAR

PACIFIC SOILS ENGINEERING, INC.

PLATE A-3

GEOTECHNICAL BORING LOG

PROJECT NO.	102453-T	PROJECT NAME	Lyons Canyon Ranch		
DATE STARTED	6/20/01	GROUND ELEV.	1325	BORING DESIG.	B-2
DATE FINISHED	6/20/01	GW DEPTH (FT)	53	LOGGED BY	CRN
DRILLER	Ledezma Drilling	DRIVE WT.	See Note	NOTE	0-24' 3548#; 24-47' 2577#; 47-73' 1648#
TYPE OF DRILL RIG	30" Bucket Auger	DROP	12 inches		

DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	ATTITUDES	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
	1285	R	8			Silty Sand; fine- to very coarse-grained with pebbles, moderate yellowish brown, slightly moist to moist, dense.	6.8	122.2	51	
45	1280	B								
50	1275	R	6			Sand; fine- to coarse-grained with pebbles, pale to moderate yellowish brown, moist, moderately dense to dense.	5.5	135.5	61	
						▼ Water at 53+ feet. Caving from 52 to 54+ feet. Total Depth 54 feet. Water at 53 feet. Caving from 52 to 54 feet. Hole backfilled with native materials and tamped.				

SAMPLE TYPES:
- R RING (DRIVE) SAMPLE
- S SPT (SPLIT SPOON) SAMPLE
- B BULK SAMPLE
- T TUBE SAMPLE

▼ GROUNDWATER LEVEL
- WATER SEEP
- B BEDDING
- J JOINTING
- C CONTACT
- F FAULT
- S SHEAR

GEOTECHNICAL BORING LOG

PROJECT NO.	102453-T	PROJECT NAME	Lyons Canyon Ranch		
DATE STARTED	6/20/01	GROUND ELEV.	1331	BORING DESIG.	B-3
DATE FINISHED	6/20/01	GW DEPTH (FT)		LOGGED BY	CRN
DRILLER	Ledezma Drilling	DRIVE WT.	See Note	NOTE	0-24' 3548#; 24-47'
TYPE OF DRILL RIG	30" Bucket Auger	DROP	12 inches		2577#; 47-73' 1548#

DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	ATTITUDES	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
0	1330					ALLUVIUM (Qal): Silty Sand; very fine- to fine-grained, pale yellowish brown, dry, loose.				
5	1325					Silty Sand; fine- to coarse-grained with pebbles and cobbles, pale to moderate yellowish brown, dry to slightly moist, loose to moderately dense.				
10	1320	B				1 to 2± feet thick boulder lense with 6 to 12± inch boulders.				
						Silty Sand; fine to coarse-grained with pebbles and cobbles, pale to moderate yellowish brown, slightly moist, moderately dense.				
15	1315	R	1				2.3	106.7	11	
20	1310	R/B	2			Silty Sand; very fine- to fine-grained with pebbles, moderate yellowish brown, slightly moist to moist, moderately dense.	5.7	115.3	35	
25	1305					Silty Sand; fine- to coarse-grained with pebbles and cobbles, moderate yellowish brown, slightly moist, moderately dense.				
30	1300	R	3			Silty Sand; very fine- to fine-grained with pebbles, moderate yellowish brown, slightly moist to moist, moderately dense.	4.9	114.1	28	
35	1295									

SAMPLE TYPES:
[R] RING (DRIVE) SAMPLE
[S] SPT (SPLIT SPOON) SAMPLE
[B] BULK SAMPLE [T] TUBE SAMPLE

GROUNDWATER LEVEL
WATER SEEP [C] CONTACT
[B] BEDDING [F] FAULT
[J] JOINTING [S] SHEAR

PACIFIC SOILS ENGINEERING, INC.

PLATE A-5

GEOTECHNICAL BORING LOG

PROJECT NO.	102453-T	PROJECT NAME	Lyons Canyon Ranch		
DATE STARTED	6/20/01	GROUND ELEV.	1331	BORING DESIG.	B-3
DATE FINISHED	6/20/01	GW DEPTH (FT)		LOGGED BY	CRN
DRILLER	Ledezma Drilling	DRIVE WT.	See Note	NOTE	0-24' 3548#; 24-47' 2577#; 47-73' 1648#
TYPE OF DRILL RIG	30" Bucket Auger	DROP	12 inches		

DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	ATTITUDES	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
	1290	R/B	6				10.4	115.0	63	
45	1285					**SAUGUS FORMATION-SUNSHINE RANCH MEMBER** (Tsr): Sandstone; very fine- to fine-grained, medium light gray, slightly moist, moderately hard to hard.				
50	1280	R/B	18			Siltstone; mottled olive gray and light gray, slightly moist, hard.	15.7	115.7	97	
						Total Depth 51 feet. No water and no caving. Hole backfilled with native materials and tamped.				

SAMPLE TYPES:
- R RING (DRIVE) SAMPLE
- S SPT (SPLIT SPOON) SAMPLE
- B BULK SAMPLE
- T TUBE SAMPLE

▼ GROUNDWATER LEVEL
- WATER SEEP
- B BEDDING
- J JOINTING
- C CONTACT
- F FAULT
- S SHEAR

PACIFIC SOILS ENGINEERING, INC.

PLATE A-6

GEOTECHNICAL BORING LOG

PROJECT NO.	102453-T	PROJECT NAME	Lyons Canyon Ranch		
DATE STARTED	6/20/01	GROUND ELEV.	1342	BORING DESIG.	B-4
DATE FINISHED	6/20/01	GW DEPTH (FT)	14	LOGGED BY	CRN
DRILLER	Ledezma Drilling	DRIVE WT.	See Note	NOTE	0-24' 3548#; 24-47'
TYPE OF DRILL RIG	30" Bucket Auger	DROP	12 inches		2577#; 47-73' 1648#

DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	ATTITUDES	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
0	1340					ALLUVIUM (Qal): Silty Sand; fine- to coarse-grained with pebbles, dark yellowish brown, slightly moist to moist, moderately dense.				
5	1335				►	Silty Sand to Sandy Silt; very fine-grained with few pebbles, dark yellowish brown, slightly moist to moist, moderately dense. Water seep and caving from 7 to 9± feet.				
10		R/B	1				19.8	108.3	96	
	1330				▼	Pebbly Sand; coarse-grained with abundant cobbles, dark yellowish brown, wet, moderately dense. Water at 14+ feet, caving from 14 to 16± feet.				
15						Total Depth 16 feet. Water and caving at 7 to 9 feet and 14 to 16 feet. Hole backfilled with native materials and tamped.				

SAMPLE TYPES:
- [R] RING (DRIVE) SAMPLE
- [S] SPT (SPLIT SPOON) SAMPLE
- [B] BULK SAMPLE [T] TUBE SAMPLE

▼ GROUNDWATER LEVEL
► WATER SEEP
[B] BEDDING [C] CONTACT
[J] JOINTING [F] FAULT
[S] SHEAR

PACIFIC SOILS ENGINEERING, INC.

PLATE A-7

GEOTECHNICAL BORING LOG

PROJECT NO.	102453-T	PROJECT NAME	Lyons Canyon Ranch		
DATE STARTED	6/20/01	GROUND ELEV.	1388	BORING DESIG.	B-5
DATE FINISHED	6/20/01	GW DEPTH (FT)	15	LOGGED BY	CRN
DRILLER	Ledezma Drilling	DRIVE WT.	See Note	NOTE	0-24' 3548#; 24-47' 2577#; 47-73' 1648#
TYPE OF DRILL RIG	30" Bucket Auger	DROP	12 inches		

DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	ATTITUDES	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
	1385					ALLUVIUM (Qal): Silty Sand to Sandy Silt; very fine- to fine-grained, moderate yellowish brown, dry and loose/soft within top 3±, feet becoming slightly moist and moderately dense/firm at depth.				
5										
	1380									
10		R/B	Push		►	Water seep at 10± feet.				
	1375									
15					▼	Water at 15± feet. Caving from 14 to 16± feet. Total Depth 16 feet. Water at 10 and 15 feet. Caving from 14 to 16 feet. Hole backfilled with native materials tamped.				

SAMPLE TYPES:
- [R] RING (DRIVE) SAMPLE
- [S] SPT (SPLIT SPOON) SAMPLE
- [B] BULK SAMPLE [T] TUBE SAMPLE

▼ GROUNDWATER LEVEL
► WATER SEEP
[B] BEDDING [C] CONTACT
[J] JOINTING [F] FAULT
[S] SHEAR

PACIFIC SOILS ENGINEERING, INC.

PLATE A-8

GEOTECHNICAL BORING LOG

PROJECT NO.	102453-T	PROJECT NAME	Lyons Canyon Ranch	BORING DESIG.	B-6
DATE STARTED	6/20/01	GROUND ELEV.	1384	LOGGED BY	CRN
DATE FINISHED	6/20/01	GW DEPTH (FT)		NOTE	0-24' 3548#; 24-47'
DRILLER	Ledezma Drilling	DRIVE WT.	See Note		2577#; 47-73' 1648#
TYPE OF DRILL RIG	30" Bucket Auger	DROP	12 inches		

DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	ATTITUDES	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
	1380					**ALLUVIUM (Qal):** Silty Sand to Sandy Silt; very fine- to fine-grained with some pebbles and some cobbles, dark yellowish brown, dry and loose/soft within top 1 to 3± feet, becoming slightly moist to moist and moderately dense/firm at depth. Top 3± feet is porous.				
5		R/B	Bounce			Boulders; 1± foot in diameter. No sample due to rocks.				
						Refusal Total Depth 7 feet. No water and no caving. Refusal due to rocks. Hole backfilled with native materials and tamped.				

SAMPLE TYPES:
- [R] RING (DRIVE) SAMPLE
- [S] SPT (SPLIT SPOON) SAMPLE
- [B] BULK SAMPLE [T] TUBE SAMPLE

▼ GROUNDWATER LEVEL
- WATER SEEP [C] CONTACT
- [B] BEDDING [F] FAULT
- [J] JOINTING [S] SHEAR

PACIFIC SOILS ENGINEERING, INC.

PLATE A-9

GEOTECHNICAL BORING LOG

PROJECT NO.	102453-T	PROJECT NAME	Lyons Canyon Ranch		
DATE STARTED	6/25/01	GROUND ELEV.	1385	BORING DESIG.	B-6B
DATE FINISHED	6/25/01	GW DEPTH (FT)		LOGGED BY	CRN
DRILLER	Ledezma Drilling	DRIVE WT.	See Note	NOTE	0-24' 3548#; 24-47'
TYPE OF DRILL RIG	30" Bucket Auger	DROP	12 inches		2577#; 47-73' 1648#

DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	ATTITUDES	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
	1385					**ALLUVIUM (Qal):** Silty Sand to Sandy Silt; fine- to coarse-grained with pebbles, moderate to dark yellowish brown, top 1± foot dry and loose/soft, becoming moist and moderately dense/firm at depth.				
5	1380	R	2			2 to 3± foot thick,boulder lenses; 2-1/2 foot diameter boulder at 6± feet in depth.	9.1	116.9	58	
10	1375	R/B	6 for 6"			**SAUGUS FORMATION-SUNSHINE RANCH MEMBER (Tsr):** Weathered Silty Sandstone; very fine- to fine-grained, mottled moderate brown and medium light gray, moist, moderately hard, poorly indurated.	13.4	123.0	98	
		B								
15	1370	R	11 for 6"			Silty Sandstone; very fine- to fine-grained, medium light gray, moist, moderately hard, moderately indurated.	13.4	120.6	91	
						Total Depth 16 feet. No water, no caving. Hole backfilled with native materials and tamped.				

SAMPLE TYPES:
R RING (DRIVE) SAMPLE
S SPT (SPLIT SPOON) SAMPLE
B BULK SAMPLE T TUBE SAMPLE

GROUNDWATER LEVEL
WATER SEEP
B BEDDING C CONTACT
J JOINTING F FAULT
S SHEAR

PACIFIC SOILS ENGINEERING, INC.

PLATE A-10

GEOTECHNICAL BORING LOG

PROJECT NO.	102453-T	PROJECT NAME	Lyons Canyon Ranch		
DATE STARTED	6/25/01	GROUND ELEV.	1388	BORING DESIG.	B-7
DATE FINISHED	6/25/01	GW DEPTH (FT)		LOGGED BY	CRN
DRILLER	Ledezma Drilling	DRIVE WT.	See Note	NOTE	0-24' 3548#; 24-47'
TYPE OF DRILL RIG	30" Bucket Auger	DROP	12 inches		2577#; 47-73' 1648#

DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	ATTITUDES	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
	1385					COLLUVIUM/ALLUVIUM (Qal): Silty Sand; fine- to coarse-grained with pebbles and some cobbles, moderate yellowish brown, dry and loose top 3± feet, slightly moist and moderately dense at depth, abundant roots and rootlets throughout.				
						1± inch thick yellowish red lense at contact.				
5		R/B	4		C: N75W 44NE	SAUGUS FORMATION- SUNSHINE RANCH MEMBER (Tsr): Silty Sandstone; fine- to coarse-grained with pebbles and some cobbles, grayish orange, slightly moist, hard, moderately to well indurated, slight to moderate bedding.	4.6	114.8	27	
	1380									
					B: N80W 41NE	1± foot thick, scour/infill structure - infill with fine-grained Sand (attitude from top of Sand infill).				
10		R/B	4 for 3" Bounce				3.4	121.9	25	
	1375									
					B: N70W 54NE	2± foot thick,scour/infill structure - infill with fine-grained Sand (attitude from top of infill).				
15					B: N80W 50NE	Silty Sandstone; fine-grained, light gray, slightly moist, hard, well indurated.				
	1370					Used ripper and core bucket from 18 to 19± feet. Refusal at 19+ feet. Total Depth 19 feet. No water, no caving. Hole backfilled with native materials and tamped.				

SAMPLE TYPES:
- R RING (DRIVE) SAMPLE
- S SPT (SPLIT SPOON) SAMPLE
- B BULK SAMPLE
- T TUBE SAMPLE

GROUNDWATER LEVEL
- WATER SEEP
- B BEDDING
- J JOINTING
- C CONTACT
- F FAULT
- S SHEAR

PACIFIC SOILS ENGINEERING, INC.

PLATE A-11

GEOTECHNICAL BORING LOG

PROJECT NO.	102453-T	PROJECT NAME	Lyons Canyon Ranch	BORING DESIG.	B-8
DATE STARTED	6/25/01	GROUND ELEV.	1353	LOGGED BY	CRN
DATE FINISHED	6/25/01	GW DEPTH (FT)	19	NOTE	0-24' 3548#; 24-47' 2577#; 47-73' 1648#
DRILLER	Ledezma Drilling	DRIVE WT.	See Note		
TYPE OF DRILL RIG	30" Bucket Auger	DROP	12 inches		

DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	ATTITUDES	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
0	1350					COLLUVIUM/ALLUVIUM (Qal): Silty Sand to Sandy Silt; fine- to coarse-grained with pebbles, cobbles, some clay pods, slightly moist to moist, loose/soft to moderately dense/firm at depth.				
5										
	1345									
10						Increasing pebbles and cobbles.				
	1340									
15		R/B	6				10.7	122.3	81	
	1335									
						▼ Water at 19 feet.				
20		R	10			SAUGUS FORMATION-SUNSHINE RANCH MEMBER (Tsr): Silty Sandstone to Sandy Siltstone; very fine- to fine-grained, light olive, moist, moderately hard, moderately to well indurated, thinly bedded to laminated, weathered.	14.1	121.5	98	
		B								
	1330									
25						Silty Sandstone; fine to coarse-grained, medium light gray, slightly moist, hard, moderately to well indurated.	9.6	122.0	73	
						Total Depth 26 feet. Water at 19 feet. No caving. Hole backfilled.				

SAMPLE TYPES:
- R RING (DRIVE) SAMPLE
- S SPT (SPLIT SPOON) SAMPLE
- B BULK SAMPLE
- T TUBE SAMPLE

▼ GROUNDWATER LEVEL
► WATER SEEP
B BEDDING
J JOINTING
C CONTACT
F FAULT
S SHEAR

PACIFIC SOILS ENGINEERING, INC.

PLATE A-12

GEOTECHNICAL BORING LOG

PROJECT NO.	102453-T	PROJECT NAME	Lyons Canyon Ranch		
DATE STARTED	6/25/01	GROUND ELEV.	1327	BORING DESIG.	B-9
DATE FINISHED	6/25/01	GW DEPTH (FT)		LOGGED BY	CRN
DRILLER	Ledezma Drilling	DRIVE WT.	See Note	NOTE	0-24' 3548#; 24-47'
TYPE OF DRILL RIG	30" Bucket Auger	DROP	12 inches		2577#; 47-73' 1648#

DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	ATTITUDES	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
0	1325					ALLUVIUM (Qal): Silty Sand; fine- to coarse-grained with pebbles and cobbles, moderate yellowish brown, top 6± feet dry to moist at depth, loose top 3± feet to moderately dense at depth.				
5	1320									
10		R/B	Push			Sandy Silt to Silty Sand; fine-grained, moderate to dark yellowish brown, moist, firm/moderately dense, porous, abundant rootlets.	13.9	115.1	84	
15	1315									
20	1310	R	1			Silty Sand; fine- to medium-grained, moderate to dark yellowish brown, moist, moderately dense, micaceous.	12.1	111.7	64	
25	1305									
30	1300	R/B	Push			Silty Sand to Sandy Silt; fine- to coarse-grained with some pebbles, moderate yellowish brown, moist to very moist, moderately dense, micaceous.	18.0	112.0	100	
35	1295									
	1290	B				SAUGUS FORMATION-SUNSHINE RANCH MEMBER (Tsr): Silty Sandstone; fine to medium-grained, light olive gray, moist, moderately hard, moderately indurated, slightly				

SAMPLE TYPES:
- R RING (DRIVE) SAMPLE
- S SPT (SPLIT SPOON) SAMPLE
- B BULK SAMPLE
- T TUBE SAMPLE

- ▼ GROUNDWATER LEVEL
- WATER SEEP
- B BEDDING
- J JOINTING
- C CONTACT
- F FAULT
- S SHEAR

PACIFIC SOILS ENGINEERING, INC.

PLATE A-13

GEOTECHNICAL BORING LOG

PROJECT NO. 102453-T
DATE STARTED 6/25/01
DATE FINISHED 6/25/01
DRILLER Ledezma Drilling
TYPE OF DRILL RIG 30" Bucket Auger

PROJECT NAME Lyons Canyon Ranch
GROUND ELEV. 1327
GW DEPTH (FT)
DRIVE WT. See Note
DROP 12 inches

BORING DESIG. B-9
LOGGED BY CRN
NOTE 0-24' 3548#; 24-47' 2577#; 47-73' 1648#

DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	ATTITUDES	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
		R	5			to moderately weathered.	10.0	117.9	63	
	1285					Total Depth 41 feet. No water, no caving. Hole backfilled with native materials and tamped.				

SAMPLE TYPES:
- R RING (DRIVE) SAMPLE
- S SPT (SPLIT SPOON) SAMPLE
- B BULK SAMPLE
- T TUBE SAMPLE

GROUNDWATER LEVEL
- WATER SEEP
- C CONTACT
- B BEDDING
- F FAULT
- J JOINTING
- S SHEAR

PACIFIC SOILS ENGINEERING, INC.

PLATE A-14

GEOTECHNICAL BORING LOG

PROJECT NO. 102453-T
DATE STARTED 4/25/02
DATE FINISHED 4/26/02
DRILLER Dave's Drilling
TYPE OF DRILL RIG 30" Bucket Auger

PROJECT NAME Lyons Canyon Ranch
GROUND ELEV. 1635
GW DEPTH (FT)
DRIVE WT. See Note
DROP 12 inches

BORING DESIG. B-10
LOGGED BY CRN
NOTE 0-27' 4500#; 27-52' 3500#; 52-80' 2500#; 80-104' 1000#

DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	ATTITUDES	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
	1635	B				**PICO FORMATION (Tp):** Sandy Siltstone; very fine-grained Sand, pale yellowish brown, slightly moist, hard, fossiliferous (abundant bi-valves); interbedded with Silty Sandstone; very fine- to fine-grained, pale yellowish brown, slightly moist, hard, scour-fill into Siltstone; both units jointed with caliche infill, both units laminated to 8± inch thick bedding.				
5	1630				B: N75W 46NE					
10	1625	R/B	4 for 5"		B: B80W 54NE	Interbedded Silty Sandstone; fine-grained, pale yellowish to grayish orange, slightly moist to moist, hard; with Sandy Siltstone; mottled grayish orange and pale olive gray, slightly moist to moist, hard; both units laminated to 2± inch thick bedding.	8.8	115.4	54	
15	1620				B: N85W 53NE	Some interlayered Silty Claystone; olive gray, moist, moderately firm to firm, laminated, 1 to 2±mm thick layers, some caliche along bedding.				
20	1615	R/B	5 for 4"		B: B80W 45NE	Silty Sandstone; fine- to medium-grained, light gray with light brown staining, slightly moist, hard, laminated to 1/4± inch thick bedding./	5.8	106.0	29	
25	1610				B: N70W 51NE	Some isolated cobble lenses, quartzite and gneissic composition.				
30	1605	R/B	8 for 8"		B: N70W 50NE	Sandy to Clayey Siltstone; very fine-grained Sand; light olive gray, moist, moderately hard to hard, laminated to 1/4± inch thick bedding, some gypsum strands along bedding up to 1/4± inch thick. Some isolated Clay lenses and pods; dark brownish black, moist, moderately firm to firm, concentrated along bedding planes.	11.0	116.4	69	
35	1600				B: N65W 49NE	Claystone layer; 1/4± inch thick, olive gray, moist, soft, abundant well formed, gypsum crystals.				
	1595									

SAMPLE TYPES:
R RING (DRIVE) SAMPLE
S SPT (SPLIT SPOON) SAMPLE
B BULK SAMPLE T TUBE SAMPLE

GROUNDWATER LEVEL
WATER SEEP
B BEDDING J JOINTING C CONTACT F FAULT S SHEAR

PACIFIC SOILS ENGINEERING, INC.

PLATE A-15

GEOTECHNICAL BORING LOG

PROJECT NO.	102453-T	PROJECT NAME	Lyons Canyon Ranch		
DATE STARTED	4/25/02	GROUND ELEV.	1635	BORING DESIG.	B-10
DATE FINISHED	4/26/02	GW DEPTH (FT)		LOGGED BY	CRN
DRILLER	Dave's Drilling	DRIVE WT.	See Note	NOTE	0-27' 4500#; 27-52' 3500#; 52-80' 2500#; 80-104' 1000#
TYPE OF DRILL RIG	30" Bucket Auger	DROP	12 inches		

DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	ATTITUDES	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
	1595	R	8 for 6"		B: N80W 47NE	Sandy Siltstone; fine-grained Sand; olive gray, moist, hard, some laminated to 1/4± inch bedding, generally massive, with abundant cross-cutting gypsum seams. Cobble layers; 1± foot thick, set in pebbly sand matrix, medium- to very coarse-grained, moist, moderately hard to hard, quartzite cobbles and pebbles.	10.0	121.2	73	
45	1590				B: N85W 57NE	Silty Sandstone; fine-grained, reddish brown, slightly moist to moist, hard; interlayered with Sandy Siltstone; very fine- to fine-grained Sand, moist, moderately firm to firm, some very firm layers, laminated; both units 6 to 12 inch beds.				
50	1585	R/B	8 for 5"			Silty Sandstone; fine-grained, pale olive gray, moist, hard.	7.2	113.1	41	
					B: N70W 49NE	Pebble lense; medium- to very coarse-grained Sand matrix, quartzite pebbles, mottled reddish to light brown and pale olive gray, slightly moist, very hard, slightly concretionary.				
55	1580				B: N75W 50NE	Some isolated Clay lenses and pods along bedding, 1± inch thick to 6± inches long, medium- to very coarse-grained Sand matrix, quartzite pebbles, mottled reddish to light brown and pale olive gray, slightly moist, very hard, slightly concretionary.				
60	1575	R	10 for 5"		B: N60E 47NW	Silty Sandstone; layered fine- to medium-grained, pale olive gray, moist, hard, friable; interbedded with Sandy to Clayey Siltstone, olive gray, moist, hard, laminated to 1/2± inch thick bedding. Siltstone concretion; 1± inch thick, light to olive gray, slightly moist, very hard, massive, slightly jointed with light brown staining along joints.	7.3	113.0	42	
65	1570				B: E-W 51N	Some gypsum along bedding; up to 1/4± inch thick.				
70	1565	R/B	10 for 5"			Clayey Sandstone; very fine- to fine-grained, layered, pale yellowish brown to olive gray, moist, hard, friable, generally massive, some gypsum strands.	12.1	109.5	63	
					B: B60W 46NE					
75	1560					Clayey Siltstone to Clayey Sandstone layers; 1± foot thick, very fine-grained, medium light to medium gray, moist, hard, micaceous, massive.				
					B: N75W 46NE	Silty Sandstone; very fine- to fine-grained, medium light to medium gray, moist, hard, micaceous, laminated to 1± inch thick bedding.				
	1555									

SAMPLE TYPES:
- R RING (DRIVE) SAMPLE
- S SPT (SPLIT SPOON) SAMPLE
- B BULK SAMPLE
- T TUBE SAMPLE

GROUNDWATER LEVEL
- WATER SEEP
- B BEDDING
- J JOINTING
- C CONTACT
- F FAULT
- S SHEAR

PACIFIC SOILS ENGINEERING, INC.

PLATE A-16

GEOTECHNICAL BORING LOG

PROJECT NO.	102453-T	PROJECT NAME	Lyons Canyon Ranch		
DATE STARTED	4/25/02	GROUND ELEV.	1635	BORING DESIG.	B-10
DATE FINISHED	4/26/02	GW DEPTH (FT)		LOGGED BY	CRN
DRILLER	Dave's Drilling	DRIVE WT.	See Note	NOTE	0-27' 4500#; 27-52' 3500#; 52-80' 2500#; 80-104' 1000#
TYPE OF DRILL RIG	30" Bucket Auger	DROP	12 inches		

DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	ATTITUDES	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
	1555	R/B	20 for 4"			No sample recovery at 80 feet.				
85	1550				B: E-W 52N	Gradational color change to light olive gray.				
90	1545	R	25 for 4"			Silty Sandstone; very fine- to fine-grained, light olive gray, slightly moist, hard, massive to very slightly bedded with some cross-bedding. No sample recovery at 92 feet.				
						Some isolated bi-valve shells to depth.				
95	1540				B: E-W 50N (Approx.)					
100	1535	R	25 for 4"							
						Total Depth 101 feet. No water, no caving. Hole backfilled with native				

SAMPLE TYPES:
- R RING (DRIVE) SAMPLE
- S SPT (SPLIT SPOON) SAMPLE
- B BULK SAMPLE
- T TUBE SAMPLE

▼ GROUNDWATER LEVEL
- WATER SEEP
- B BEDDING
- J JOINTING
- C CONTACT
- F FAULT
- S SHEAR

PACIFIC SOILS ENGINEERING, INC.

PLATE A-17

GEOTECHNICAL BORING LOG

PROJECT NO.	102453-T	PROJECT NAME	Lyons Canyon Ranch		
DATE STARTED	4/26/02	GROUND ELEV.	1582	BORING DESIG.	B-11
DATE FINISHED	4/26/02	GW DEPTH (FT)		LOGGED BY	CRN
DRILLER	Dave's Drilling	DRIVE WT.	See Note	NOTE	0-27' 4500#; 27-52' 3500#; 52-80' 2500#; 80-104' 1000#
TYPE OF DRILL RIG	30" Bucket Auger	DROP	12 inches		

DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	ATTITUDES	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
						PICO FORMATION (Tp):				
	1580				B: N50W 45SN J: N50E Vertical J: N10W 62NE	Sandy Siltstone; very fine-grained Sand, layered light to olive gray and light brown, slightly moist, moderately hard to hard, laminated to 1/2± inch thick bedding, jointed/weathered, abundant roots.				
5					F: N80W 62NE F: N50W 63SW	Fault Gouge: 1/4 to 1/2± inch thick, plastic Clay layer; olive gray, moist, soft to firm, flaky, abundant roots and rootlets.				
	1575									
10		R/B	5				13.0	119.4	89	
					J: N45W 78SW F: N55E 65NW	Fault Gouge: plastic Clay layer; olive gray, moist, soft, flaky, abundant roots.				
	1570									
					B: N50E 48NW					
15										
	1565									
						Some medium sized bi-valves.				
					B: N40E 49NW					
20		R/B	5 for 6"			Sandy Siltstone; very fine-grained Sand, medium dark gray, slightly moist, hard, massive, some isolated small to medium bi-valves.	13.2	122.3	99	
	1560									
25					J: N50W 86SW J: N40E 66NW	Clay lined joint 1-2 mm thick. Gypsum lined joint 2-3 mm thick.				
	1555									
30		R/B	8 for 6"			Sandy Siltstone; very fine-grained Sand, greenish gray, slightly moist, firm, massive, fossiliferous (small bi-valves); interlayered plastic with Silty Sandstone, medium gray, slightly moist, hard, slightly layered to massive; some interlayered Claystone, medium dark to dark gray, moist, soft to moderately firm, laminated, flaky.	12.2	123.5	95	
	1550				B: N60W 75SW					
35										
	1545					Some isolated concretionary pods, 2 to 6± inches in diameter, very hard.				

SAMPLE TYPES:
R RING (DRIVE) SAMPLE
S SPT (SPLIT SPOON) SAMPLE
B BULK SAMPLE T TUBE SAMPLE

GROUNDWATER LEVEL
WATER SEEP C CONTACT
B BEDDING F FAULT
J JOINTING S SHEAR

PACIFIC SOILS ENGINEERING, INC.

GEOTECHNICAL BORING LOG

PROJECT NO.	102453-T	PROJECT NAME	Lyons Canyon Ranch		
DATE STARTED	4/26/02	GROUND ELEV.	1582	BORING DESIG.	B-11
DATE FINISHED	4/26/02	GW DEPTH (FT)		LOGGED BY	CRN
DRILLER	Dave's Drilling	DRIVE WT.	See Note	NOTE	0-27' 4500#; 27-52' 3500#; 52-80' 2500#; 80-104' 1000#
TYPE OF DRILL RIG	30" Bucket Auger	DROP	12 inches		

DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	ATTITUDES	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
		R	8 for 6"		B: N20E 55NW	Clayey to Sandy Siltstone; very fine-grained Sand, greenish to dark greenish gray, slightly moist, firm, laminated to massive.	12.3	119.7	85	
	1540									
45					B: N60W 55SW (Approx.)					
	1535					Hard drilling.				
50		R/B	10 for 6"			Clayey Siltstone; medium dark gray, slightly moist, firm, slightly laminated, generally massive.	11.9	122.1	89	
	1530				B: N55W 75SW					
55										
	1525				B: N20W 67NE (Approx.)	Siltstone concretion lense; 8 to 10± inches thick, very hard, massive.				
60		R	15 for 6"			Clayey Siltstone; olive gray, slightly moist, firm, slightly laminated, generally massive, few small bi-valve shells.	10.5	121.0	76	
	1520				B: N60W Vertical	Ripple marks, small amplitude.				
65					B: N50W 52SW					
	1515				B: N50W 43SW					
70		R	15 for 5"		B: N60E 59SE	Sandy Siltstone; very fine-grained Sand, medium dark gray, slightly moist, hard, slightly laminated to 1/2± inch thick bedding, generally massive.	10.3	105.0	47	
	1510					Clay lense; 2 to 3± inches thick, medium dark gray, moist, soft, pliable.				
75					B: N60W 75SW					
	1505									

SAMPLE TYPES:
- R RING (DRIVE) SAMPLE
- S SPT (SPLIT SPOON) SAMPLE
- B BULK SAMPLE
- T TUBE SAMPLE

GROUNDWATER LEVEL
- WATER SEEP
- B BEDDING
- J JOINTING
- C CONTACT
- F FAULT
- S SHEAR

PACIFIC SOILS ENGINEERING, INC.

PLATE A-19

GEOTECHNICAL BORING LOG

PROJECT NO. 102453-T
DATE STARTED 4/26/02
DATE FINISHED 4/26/02
DRILLER Dave's Drilling
TYPE OF DRILL RIG 30" Bucket Auger

PROJECT NAME Lyons Canyon Ranch
GROUND ELEV. 1582
GW DEPTH (FT)
DRIVE WT. See Note
DROP 12 inches

BORING DESIG. B-11
LOGGED BY CRN
NOTE 0-27' 4500#; 27-52' 3500#; 52-80' 2500#; 80-104' 1000#

DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	ATTITUDES	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
		R	25 for 3.5"				10.8	120.8	78	
	1500					Total Depth 81 feet. No water, no caving. Hole backfilled with native materials and tamped.				

SAMPLE TYPES:
- R RING (DRIVE) SAMPLE
- S SPT (SPLIT SPOON) SAMPLE
- B BULK SAMPLE
- T TUBE SAMPLE

▼ GROUNDWATER LEVEL
► WATER SEEP
- C CONTACT
- B BEDDING
- F FAULT
- J JOINTING
- S SHEAR

PACIFIC SOILS ENGINEERING, INC.

PLATE A-20

GEOTECHNICAL BORING LOG

PROJECT NO.	102453-T	PROJECT NAME	Lyons Canyon Ranch		
DATE STARTED	4/29/02	GROUND ELEV.	1557	BORING DESIG.	B-12
DATE FINISHED	4/29/02	GW DEPTH (FT)		LOGGED BY	CRN
DRILLER	Dave's Drilling	DRIVE WT.	See Note	NOTE	0-27' 4500#; 27-52' 3500#; 52-80' 2500#; 80-104' 1000#
TYPE OF DRILL RIG	30" Bucket Auger	DROP	12 inches		

DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	ATTITUDES	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
						PICO FORMATION (Tp):				
	1555				B: N60W 57NE	Sandy Siltstone; very fine- to fine-grained Sand; yellowish brown, slightly moist to moist, moderately hard, laminated to 1/2± inch thick bedding; interlayered with Silty Sandstone; fine-grained, mottled moderate yellowish brown and pale olive, slightly moist, moderately hard, laminated to 1/2± inch thick bedding; abundant caliche, both units highly to moderately weathered.				
5										
	1550				B: N80E 72NW	Abundant penecontemporaneous deformation.				
10		R/B	5 for 10"				12.9	117.6	84	
	1545					Sandy Siltstone; very fine-grained Sand; light olive gray, slightly moist to moist, moderately hard to hard, slightly laminated generally massive; some interlayered Silty Sandstone, fine-grained, layered yellowish gray and light brown, slightly moist, moderately hard to hard, laminated to 1/4± inch thick bedding; some fine-grained gypsum along bedding bottom of "high to moderate" weathering zone.				
15					B: N50W 65NE					
	1540									
20		R/B			B: N70W 73NE	Clayey Siltstone; mottled light to olive gray and moderate brown, slightly moist to moist, moderately hard to hard, massive, micaceous, some fine-rained gypsum strands.	14.6	115.8	90	
	1535					Silty Sandstone to Clayey Siltstone; very fine-grained Sand, medium dark gray, slightly moist, hard, massive, some small isolated bi-valves and gastropods.				
25										
	1530									
30		R/B	10 for 10"		B: E-W 64N (Approx.)	Sandy Siltstone; very fine-grained, medium dark gray, slightly moist to moist, hard, slightly laminated, generally massive, slightly fossiliferous, micaceous.	12.6	123.0	97	
	1525									
35										
	1520									

SAMPLE TYPES:
- R RING (DRIVE) SAMPLE
- S SPT (SPLIT SPOON) SAMPLE
- B BULK SAMPLE
- T TUBE SAMPLE

GROUNDWATER LEVEL
- WATER SEEP
- B BEDDING
- J JOINTING
- C CONTACT
- F FAULT
- S SHEAR

PACIFIC SOILS ENGINEERING, INC.

PLATE A-21

GEOTECHNICAL BORING LOG

PROJECT NO.	102453-T	PROJECT NAME	Lyons Canyon Ranch		
DATE STARTED	4/29/02	GROUND ELEV.	1557	BORING DESIG.	B-12
DATE FINISHED	4/29/02	GW DEPTH (FT)		LOGGED BY	CRN
DRILLER	Dave's Drilling	DRIVE WT.	See Note	NOTE	0-27' 4500#; 27-52' 3500#; 52-80' 2500#; 80-104' 1000#
TYPE OF DRILL RIG	30" Bucket Auger	DROP	12 inches		

DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	ATTITUDES	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
					B: N70W 69NE	Sandy Siltstone to Silty Sandstone; very fine-grained Sand, medium dark gray, slightly moist to moist, hard, slightly laminated generally massive, slightly fossiliferous, micaceous; some interlayered Silty Sandstone, very fine-grained, light gray, slightly moist, hard, and Claystone, brownish to olive black, moist, moderately firm, laminated.	14.2	118.6	95	
	1515									
45					B: N50W 57NE (Approx.)					
	1510									
50		R/B	8 for 8"			Silty sandstone; very fine- to fine-grained, medium dark to olive gray, slightly moist, hard, slightly laminated, generally massive, micaceous, slightly fossiliferous.	13.4	120.6	96	
	1505									
55										
	1500									
60		R/B	15 for 8"		B: N60W 53NE	Silty Sandstone; very fine- to fine-grained, medium dark gray, slightly moist, hard, slightly laminated, generally massive, micaceous, slightly fossiliferous; some interbedded Claystone lenses, 1 to 2± thick, brownish to olive black, moist, moderately firm to firm, laminated.	13.2	120.6	94	
	1495				B: N60W 53NE	Silty Sandstone lense; 8± inches thick, light to medium light gray, fine-grained, moist, moderately hard, fossiliferous; underlain by 1 to 2± inch thick soft Claystone lense.				
65										
	1490				B: N50W 52NE					
70		R	15 for 8"			Silty Sandstone; very fine- to fine-grained, medium dark gray, slightly moist, hard, slightly laminated, generally massive, micaceous, slightly fossiliferous.	13.0	122.1	97	
	1485									
75					B: N25W 77NE					
	1480									

SAMPLE TYPES:
- [R] RING (DRIVE) SAMPLE
- [S] SPT (SPLIT SPOON) SAMPLE
- [B] BULK SAMPLE
- [T] TUBE SAMPLE

- ▼ GROUNDWATER LEVEL
- WATER SEEP
- [B] BEDDING
- [J] JOINTING
- [C] CONTACT
- [F] FAULT
- [S] SHEAR

PACIFIC SOILS ENGINEERING, INC.

PLATE A-22

GEOTECHNICAL BORING LOG

PROJECT NO.	102453-T	PROJECT NAME	Lyons Canyon Ranch	BORING DESIG.	B-12
DATE STARTED	4/29/02	GROUND ELEV.	1557	LOGGED BY	CRN
DATE FINISHED	4/29/02	GW DEPTH (FT)		NOTE	0-27' 4500#; 27-52' 3500#; 52-80' 2500#; 80-104' 1000#
DRILLER	Dave's Drilling	DRIVE WT.	See Note		
TYPE OF DRILL RIG	30" Bucket Auger	DROP	12 inches		

DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	ATTITUDES	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT. URATION (%)	OTHER TESTS
		R/B	20 for 6"				13.3	108.9	68	
	1475				B: N65W 46NE	Silty Sandstone lense; interbedded with Sandy Siltstone, dark gray, slightly moist, hard, slightly lamainted, generally massive, 1/2 to 1± inch thick beds.				
85					B: N50W 63NE					
	1470									
90		R	25 for 5"				12.3	104.8	56	
						Total Depth 91 feet. No water, no caving. Hole backfilled with native materials and tamped.				

SAMPLE TYPES:
- [R] RING (DRIVE) SAMPLE
- [S] SPT (SPLIT SPOON) SAMPLE
- [B] BULK SAMPLE [T] TUBE SAMPLE

▼ GROUNDWATER LEVEL
► WATER SEEP [C] CONTACT
[B] BEDDING [F] FAULT
[J] JOINTING [S] SHEAR

PACIFIC SOILS ENGINEERING, INC.

PLATE A-23

GEOTECHNICAL BORING LOG

PROJECT NO.	102453-T	PROJECT NAME	Lyons Canyon Ranch		
DATE STARTED	5/1/02	GROUND ELEV.	1445	BORING DESIG.	B-13
DATE FINISHED	5/1/02	GW DEPTH (FT)		LOGGED BY	CRN
DRILLER	Dave's Drilling	DRIVE WT.	See Note	NOTE	0-27' 4500#; 27-52' 3500#; 52-80' 2500#; 80-104' 1000#
TYPE OF DRILL RIG	30" Bucket Auger	DROP	12 inches		

DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	ATTITUDES	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
	1445					**SAUGUS FORMATION - SUNSHINE RANCH MEMBER** (Tsr): Silty Sandstone; fine- to coarse-grained with pebbles, very pale orange to pale yellowish brown, dry, moderately hard to hard, abundant scour-infill, normal grading.				
					B: N30E 55NW					
5	1440									
10	1435	R/B	5 for 5"		B: N80E 39NW	Silty Sandstone; fine- to coarse-grained, pale yellowish brown, dry to slightly moist, moderately hard to hard.	4.5	116.1	28	
					B: N70E 60NW	Some interlayered Clayey Siltstone layers; 6± inches thick, pale olive gray, moist, moderately hard, laminated.				
15	1430									
						1 foot thick lense of 6 to 8± inch diameter cobbles, scour/infill with lower contact into underlying Siltstone.				
20	1425	R/S	5 for 6"			Sandy Siltstone; very fine- to fine-grained, pale olive gray, moist, moderately hard to hard, slightly laminated generally massive.	11.1	120.1	78	
25	1420									
					S: E-W 40N	Silty Sandstone; fine- to coarse-grained with some pebble lenses, grayish orange to light olive gray, slightly moist to moist, moderately hard to hard, abundant scour-fill, graded bedding, cross-bedding.				
30	1415	R	8 for 6"				5.1	105.6	24	
35	1410				B: N80W 43NE					
	1405									

SAMPLE TYPES:
- R RING (DRIVE) SAMPLE
- S SPT (SPLIT SPOON) SAMPLE
- B BULK SAMPLE
- T TUBE SAMPLE

GROUNDWATER LEVEL
- WATER SEEP
- B BEDDING
- J JOINTING
- C CONTACT
- F FAULT
- S SHEAR

PACIFIC SOILS ENGINEERING, INC.

PLATE A-24

GEOTECHNICAL BORING LOG

PROJECT NO.	102453-T	PROJECT NAME	Lyons Canyon Ranch		
DATE STARTED	5/1/02	GROUND ELEV.	1445	BORING DESIG.	B-13
DATE FINISHED	5/1/02	GW DEPTH (FT)		LOGGED BY	CRN
DRILLER	Dave's Drilling	DRIVE WT.	See Note	NOTE	0-27' 4500#; 27-52' 3500#; 52-80' 2500#; 80-104' 1000#
TYPE OF DRILL RIG	30" Bucket Auger	DROP	12 inches		

DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	GROUP SYMBOL	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
		R/B	8 for 6"			Silty Sandstone; very fine- to fine-grained, pale olive gray, slightly moist to moist, moderately hard to hard; some interlayered Silty Sandstone, fine- to coarse-grained with pebbles, grayish orange, slightly moist, moderately hard to hard.	3.8	112.5	21	
45	1400									
						Silty Sandstone; fine- to coarse-grained with pebbles and cobbles, moderate yellowish to moderate brown, moist, moderately hard to hard.				
50	1395	B	N/R			Discontinuous Paleosol; Silty Sand to Sandy Silt, fine- to coarse-grained dark yellowish brown, moist, soft, 6± inches thick. Silty Sandstone; fine- to coarse-grained with pebbles and cobbles, some boulders up to 10± inches, moderate yellowish to moderate brown, moist, moderately hard to hard, massive 50/50± clast-matrix supported. @ 50 feet; no sample recovery due to cobbles.				
55	1390									
60	1385	R/B	10 for 5"			Silty Sandstone; fine- to coarse-grained with pebbles and some cobbles, moderate yellowish to moderate brown, moist, hard. FAULT ZONE: Clayey Siltstone; dusky blue green, moist, moderately hard to hard, massive, some polished surfaces, some scour-infill with overlying Sandstone.	7.5	112.7	43	
65	1380									
						FAULT: Claystone; olive gray, moist, moderately firm, slightly pliable, abundant polished surfaces and striations, laminated to 1± inch thick bedding. @ 66'; Trend and plunge of striations on fault plane: N60E 42W. Silty Sandstone; very fine- to fine-grained, light olive gray, moist, moderately hard, laminated to 2± inch, massive bedding.				
70	1375	R/B	10 for 10"			Silty Sandstone; fine- to coarse-grained with pebbles and cobbles, moderate yellowish brown, moist, moderately hard, scour-infill, generally massive, matrix supported.	14.6	119.0	99	
75	1370									
		B								
						Total Depth 78 feet. No water, no caving. Hole backfilled with native materials and tamped.				

SAMPLE TYPES:
R RING (DRIVE) SAMPLE
S SPT (SPLIT SPOON) SAMPLE
B BULK SAMPLE T TUBE SAMPLE

Ground Water Seepage
MAX - Max. Density/Opt. Moist.
DS - Direct Shear
HYDR - Hydrometer Analysis
ASCE - Expansion Index
CONS - Consolidation

PACIFIC SOILS ENGINEERING, INC.

PLATE A-25

GEOTECHNICAL BORING LOG

PROJECT NO.	102463-T	PROJECT NAME	Lyons Canyon Ranch		
DATE STARTED	5/2/02	GROUND ELEV.	1338	BORING DESIG.	B-14
DATE FINISHED	5/2/02	GW DEPTH (FT)		LOGGED BY	CRN
DRILLER	Dave's Drilling	DRIVE WT.	See Note	NOTE	0-27' 4500#; 27-52' 3500#; 52-80' 2500#; 80-104' 1000#
TYPE OF DRILL RIG	30" Bucket Auger	DROP	12 Inches		

DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	GROUP SYMBOL	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
5	1333	B				SOIL: Sandy Silt; very fine- to fine-grained, pale to moderate yellowish brown, dry, very loose, abundant rootlets. ALLUVIUM (Qal): Sandy Silt to Silty Sand; very fine- to medium-grained with pebbles and cobbles, pale yellowish brown, dry, loose. Silty Sand; fine- to coarse-grained with pebbles and cobbles, some boulders up to 10± inches, moderate to dark yellowish brown, slightly moist, loose to moderately dense, stratified cobbles consist of gneiss, granite and sandstone, some quartzite. Increase moisture content to slightly moist. Boulder lense: 2-1/2 to 3± feet in diameter, moderate to major caving. Total Depth 8 feet. No water. Moderate to major caving 5 to 8± feet. Hole backfilled.				

SAMPLE TYPES:
- R RING (DRIVE) SAMPLE
- S SPT (SPLIT SPOON) SAMPLE
- B BULK SAMPLE
- T TUBE SAMPLE

Ground Water Seepage
MAX - Max. Density/Opt. Moist.
DS - Direct Shear
HYDR - Hydrometer Analysis
ASCE - Expansion Index
CONS - Consolidation

PACIFIC SOILS ENGINEERING, INC.

PLATE A-26

GEOTECHNICAL BORING LOG

PROJECT NO.	102453-T	PROJECT NAME	Lyons Canyon Ranch	BORING DESIG.	B-14B
DATE STARTED	5/2/02	GROUND ELEV.	1338	LOGGED BY	CRN
DATE FINISHED	5/2/02	GW DEPTH (FT)		NOTE	0-27' 4500#; 27-52' 3500#; 52-80' 2500#; 80-104' 1000#
DRILLER	Dave's Drilling	DRIVE WT.	See Note		
TYPE OF DRILL RIG	30" Bucket Auger	DROP	12 inches		

DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	GROUP SYMBOL	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
0						SOIL: Silty Sand to Sandy Silt; very fine- to fine-grained, pale yellowish brown, dry, very loose, abundant rootlets and gopher holes.				
						ALLUVIUM (Qal): Pebbly to cobbly Sand; fine- to coarse-grained, pale to moderate yellowish brown, dry, loose to moderately dense, stratified, some boulders to 10± inches.				
5	1333	B				Increase moisture to: slightly moist. Boulder layer; up to 3± feet in diameter, moderate caving.				
						Increase moisture to: slightly moist to moist.				
10	1328	B				Boulder layer; up to 2± feet in diameter, predominantly Sandstone and Pebbly Sandstone, some granite.				
15	1323					Clayey Siltstone layer; 1 to 2± inch thick, mottled moderate yellowish brown and pale olive, moist to wet (perched/saturated), soft. Boulder layer, need rippers/core to continue. Refusal. Total Depth 14 feet. No water. Moderate caving throughout. Refusal - Boulders. Hole backfilled.				
20	1318									
25	1313									
30	1308									
35	1303									

SAMPLE TYPES:
- [R] RING (DRIVE) SAMPLE
- [S] SPT (SPLIT SPOON) SAMPLE
- [B] BULK SAMPLE
- [T] TUBE SAMPLE

Ground Water Seepage
MAX - Max. Density/Opt. Moist.
DS - Direct Shear
HYDR - Hydrometer Analysis
ASCE - Expansion Index
CONS - Consolidation

PACIFIC SOILS ENGINEERING, INC.

PLATE A-27

GEOTECHNICAL BORING LOG

PROJECT NO. 102453-T
DATE STARTED 4/4/02
DATE FINISHED 4/4/02
DRILLER A & W Drilling
TYPE OF DRILL RIG Rotary Wash

PROJECT NAME Lyons Canyon Ranch
GROUND ELEV. 1323
GW DEPTH (FT)
DRIVE WT. See Note
DROP 30 inches

BORING DESIG. RW-1
LOGGED BY TMD
NOTE 140# for SPT; 400# for ring sample

DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	GROUP SYMBOL	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
						ALLUVIUM (Qal):				
5	1318	SPT	11			Silty Sand; brown with pebbles, slightly moist, medium dense.				
10	1313	SPT	11			Silty Sand; brown with pebbles, slightly moist, medium dense.				
15	1308	SPT	16			Silty Sand; brown with pebbles, slightly moist, medium dense.				
20	1303	SPT	26			Silty Sand; light brown with pebbles, slightly moist, medium dense.				
25	1298	SPT	60			Gravelly Sand; brown, slightly moist, very dense.				
30	1293	R	25			Silty Sand; fine- to medium-grained, light brown, moist, medium dense, 2± feet thick layer.	12.0	108.4	61	
35	1288	SPT	40			Sand; fine- to medium-grained, brown with gravel, moist, dense.				
						Very firm drilling.				

SAMPLE TYPES:
- R RING (DRIVE) SAMPLE
- S SPT (SPLIT SPOON) SAMPLE
- B BULK SAMPLE
- T TUBE SAMPLE

Ground Water Seepage
MAX - Max. Density/Opt. Moist.
DS - Direct Shear
HYDR - Hydrometer Analysis
ASCE - Expansion Index
CONS - Consolidation

PACIFIC SOILS ENGINEERING, INC.

PLATE A-28

GEOTECHNICAL BORING LOG

PROJECT NO.	102453-T	PROJECT NAME	Lyons Canyon Ranch		
DATE STARTED	4/4/02	GROUND ELEV.	1323	BORING DESIG.	RW-1
DATE FINISHED	4/4/02	GW DEPTH (FT)		LOGGED BY	TMD
DRILLER	A & W Drilling	DRIVE WT.	See Note	NOTE	140# for SPT; 400# for ring sample
TYPE OF DRILL RIG	Rotary Wash	DROP	30 inches		

DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	GROUP SYMBOL	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
		SPT	34			Gravelly Sand; fine- to medium-grained, brown, slightly moist, dense, some silt.				
45	1278	SPT	17 for 12"			Gravelly Sand; fine- to medium-grained, brown, moist, dense.				
						SAUGUS FORMATION - SUNSHINE RANCH MEMBER (Tsr):				
50	1273	SPT	75 for 6"			Harder drilling. Sandstone; medium- to coarse-grained with gravel, grayish brown.				
55	1268	SPT	75 for 5"			Silty Sandstone; fine- to coarse-grained with gravel, grayish brown. 6 to 8 inch cobble layer.				
60	1263	SPT	50 for 1"			No recovery.				
65	1258	R	50 for 4"			Sandstone; medium- to coarse-grained, brown, hard. Total Depth 65 feet. No apparent water or caving. Hole backfilled.				

SAMPLE TYPES:
- R RING (DRIVE) SAMPLE
- S SPT (SPLIT SPOON) SAMPLE
- B BULK SAMPLE
- T TUBE SAMPLE

▼ Ground Water Seepage
MAX - Max. Density/Opt. Moist.
DS - Direct Shear
HYDR - Hydrometer Analysis
ASCE - Expansion Index
CONS - Consolidation

PACIFIC SOILS ENGINEERING, INC.

GEOTECHNICAL BORING LOG

PROJECT NO. 102453-T
DATE STARTED 4/4/02
DATE FINISHED 4/4/02
DRILLER A & W Drilling
TYPE OF DRILL RIG Rotary Wash

PROJECT NAME Lyons Canyon Ranch
GROUND ELEV. 1318
GW DEPTH (FT) 69
DRIVE WT. See Note
DROP 30 inches

BORING DESIG. RW-2
LOGGED BY TMD
NOTE 140# for SPT; 400# for ring sample

DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	GROUP SYMBOL	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
						ALLUVIUM (Qal):				
5	1313	SPT	4			Sandy Silt; fine-grained, brown, slightly moist, soft.				
10	1308	SPT	16			Silty Sand; brown, slightly moist, medium dense, fine- to medium-grained with small pebbles, sample from spoils screen.				
15	1303	SPT	36			Slightly Silty Sand; brown, moist, dense, fine- to medium-grained with pebbles, sample obtained by driving ring sampler 6".				
20	1298					Cobbles.				
		SPT	22			Gravelly Silty Sand; fine- to coarse-grained, red/brown, slightly most, medium dense, with pebbles.				
25	1293	SPT	18			Sandy Silt; brown, slightly moist, very stiff.				
30	1288	SPT	19			Silty Sand to Sandy Silt; fine-grained Sand, light brown, moist, very stiff.				
35	1283	SPT	35			Silty Sand; fine- to coarse-grained, with gravel, light brown, slightly moist, dense.				

SAMPLE TYPES:
R RING (DRIVE) SAMPLE
S SPT (SPLIT SPOON) SAMPLE
B BULK SAMPLE T TUBE SAMPLE

Ground Water Seepage
MAX - Max. Density/Opt. Moist.
DS - Direct Shear
HYDR - Hydrometer Analysis
ASCE - Expansion Index
CONS - Consolidation

PACIFIC SOILS ENGINEERING, INC.

GEOTECHNICAL BORING LOG

PROJECT NO.	102453-T	PROJECT NAME	Lyons Canyon Ranch		
DATE STARTED	4/4/02	GROUND ELEV.	1318	BORING DESIG.	RW-2
DATE FINISHED	4/4/02	GW DEPTH (FT)	69	LOGGED BY	TMD
DRILLER	A & W Drilling	DRIVE WT.	See Note	NOTE	140# for SPT; 400# for ring sample
TYPE OF DRILL RIG	Rotary Wash	DROP	30 inches		

DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	GROUP SYMBOL	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
		R	32			Sand; fine to coarse-grained brown, slightly moist, dense, soil retrieved from sampler tip with large rock fragment.				
45	1273	R	28			Sand; with gravel, medium to coarse-grained, red brown, slightly moist, slightly dense, Siltstone fragments in sampler tip.	11.0	121.7	81	
50	1268	SPT	57 for 6"			Silty Sand; fine to coarse-grained with gravel, light brown, slightly moist, very dense, sample may be from side of boring.				
55	1263	SPT	22			Sandy to Silty Clay; dark brown, moist, very stiff, soil obtained by driving ring sampler 6".				
60	1258	SPT	18			Sandy to Silty Clay; dark brown, moist, very stiff, soil obtained by driving ring sampler 6".				
65	1253	SPT	15			Sandy Silty Clay; fine-grained Sand, light brown, slightly moist, stiff, soil obtained by driving ring sampler 6".				
70	1248	SPT	32			SAUGUS FORMATION-SUNSHINE RANCH MEMBER (Tsr): slightly Sandy Silty Clay; fine-grained Sand, grayish brown, soil obtained by driving ring sampler 6".				
75	1243	SPT	22 for 12"			Silty Sandstone; gray. Total Depth 75 feet. Water at 69 feet. No apparent caving. Hole backfilled.				

SAMPLE TYPES:
- R RING (DRIVE) SAMPLE
- S SPT (SPLIT SPOON) SAMPLE
- B BULK SAMPLE
- T TUBE SAMPLE

▼ Ground Water Seepage
MAX - Max. Density/Opt. Moist.
DS - Direct Shear
HYDR - Hydrometer Analysis
ASCE - Expansion Index
CONS - Consolidation

PACIFIC SOILS ENGINEERING, INC.

PLATE A-31

GEOTECHNICAL BORING LOG

PROJECT NO.	102453-T	PROJECT NAME	Lyons Canyon Ranch	BORING DESIG.	RW-3
DATE STARTED	4/4/02	GROUND ELEV.	1330	LOGGED BY	TMD
DATE FINISHED	4/5/02	GW DEPTH (FT)	54	NOTE	140# for SPT; 400# for ring sample
DRILLER	A & W Drilling	DRIVE WT.	See Note		
TYPE OF DRILL RIG	Rotary Wash	DROP	30 inches		

DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	GROUP SYMBOL	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
						ALLUVIUM (Qal):				
5	1325	SPT	19			Sandy Silt; fine-grained, light brown, slightly moist, very stiff.				
10	1320	SPT	20			Sandy Silt; fine-grained, light brown, slightly moist, very stiff.				
15	1315	SPT	14			Silty Sand; fine- to coarse-grained, light brown, slightly moist, medium dense.				
20	1310	SPT	30			Gravelly Sand; medium- to coarse-grained, light brown, slightly moist, dense.				
25	1305	R	17			Gravelly Sand; medium- to coarse-grained, light brown, slightly moist, medium dense.	8.1	111.0	44	
30	1300	SPT	50 for 11"			Silty Sand; medium- to coarse-grained, with gravel, light brown, slightly moist, very dense.				
35	1295	SPT	48			Gravelly Sand; medium- to coarse-grained, with silt, light brown, slightly moist, dense.				

SAMPLE TYPES:
- R RING (DRIVE) SAMPLE
- S SPT (SPLIT SPOON) SAMPLE
- B BULK SAMPLE
- T TUBE SAMPLE

Ground Water Seepage
MAX - Max. Density/Opt. Moist.
DS - Direct Shear
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PACIFIC SOILS ENGINEERING, INC.

PLATE A-32

GEOTECHNICAL BORING LOG

PROJECT NO.	102453-T	PROJECT NAME	Lyons Canyon Ranch		
DATE STARTED	4/4/02	GROUND ELEV.	1330	BORING DESIG.	RW-3
DATE FINISHED	4/5/02	GW DEPTH (FT)	54	LOGGED BY	TMD
DRILLER	A & W Drilling	DRIVE WT.	See Note	NOTE	140# for SPT; 400# for ring sample
TYPE OF DRILL RIG	Rotary Wash	DROP	30 inches		

DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	GROUP SYMBOL	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
		SPT	30 for 11"			Silty Sand; medium- to coarse-grained, with gravel, light brown, slightly moist, very dense.				
45	1285	SPT	19			Sandy Silt; fine-grained, light brown, slightly moist, very stiff.				
50	1280	SPT	50 for 10.5"			Slightly Silty Sand; fine-grained, reddish brown, moist, very dense.				
						▼				
55	1275	SPT	31			Sandy Silty Clay; fine-grained, light brown, moist, hard, soil obtained from ring sampler, driven 6".				
60	1270	SPT	75 for 5"			SAUGUS FORMATION - SUNSHINE RANCH MEMBER (Tsr): Slightly Clayey Sand; medium- to coarse-grained, gray.				
65	1265	R	60 for 6"			Sandstone; medium to coarse-grained; gray. No sample retrieved. Total Depth 65 feet. Groundwater at 54 feet. No apparent caving. Hole backfilled.				

SAMPLE TYPES:
- R RING (DRIVE) SAMPLE
- S SPT (SPLIT SPOON) SAMPLE
- B BULK SAMPLE
- T TUBE SAMPLE

▼ Ground Water Seepage
MAX - Max. Density/Opt. Moist.
DS - Direct Shear
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PACIFIC SOILS ENGINEERING, INC.

GEOTECHNICAL BORING LOG

PROJECT NO.	102453-T	PROJECT NAME	Lyons Canyon Ranch	BORING DESIG.	RW-4
DATE STARTED	4/5/02	GROUND ELEV.	1408	LOGGED BY	TMD
DATE FINISHED	4/5/02	GW DEPTH (FT)		NOTE	140# for SPT; 400# for ring sample
DRILLER	A & W Drilling	DRIVE WT.	See Note		
TYPE OF DRILL RIG	Rotary Wash	DROP	30 inches		

DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	GROUP SYMBOL	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
						ALLUVIUM (Qal):				
5	1403	SPT	7			Sandy Silty Clay; fine-grained Sand, light brown, slightly moist, firm.				
10	1398	SPT	11			Silty Sand; light brown, slightly moist, medium dense.				
15	1393	SPT	35 for 11"			SAUGUS FORMATION - SUNSHINE RANCH MEMBER (Tsr): Slightly Clayey Siltstone; grayish brown, weathered.				
20	1388	R	75 for 11"			Very fine Sandy Siltstone; gray, hard. Total Depth 20 feet. No apparent groundwater or caving. Hole backfilled.	14.5	119.3	100	

SAMPLE TYPES:
- R RING (DRIVE) SAMPLE
- S SPT (SPLIT SPOON) SAMPLE
- B BULK SAMPLE
- T TUBE SAMPLE

Ground Water Seepage
MAX - Max. Density/Opt. Moist.
DS - Direct Shear
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CONS - Consolidation

GEOTECHNICAL BORING LOG

PROJECT NO.	102453-T	PROJECT NAME	Lyons Canyon Ranch	BORING DESIG.	RW-5
DATE STARTED	4/5/02	GROUND ELEV.	1348	LOGGED BY	TMD
DATE FINISHED	4/5/02	GW DEPTH (FT)	17	NOTE	140# for SPT; 400# for ring sample
DRILLER	A & W Drilling	DRIVE WT.	See Note		
TYPE OF DRILL RIG	Rotary Wash	DROP	30 inches		

DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	GROUP SYMBOL	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
						ALLUVIUM (Qal):				
5	1343	SPT	17			Silty Sand; fine-grained, light brown, slightly moist, medium dense.				
10	1338	SPT	8			Silty Sand to Sandy Silt; dark brown, moist, loose.				
15	1333	R	5			Silty Sand; fine- to medium-grained, dark brown, slightly moist, slightly dense.	17.3	112.9	99	
20	1328	SPT	6			Clayey to Silty Sand; brown, moist, loose.				
25	1323	SPT	10			Clayey to Sandy Silt; gray, very moist, stiff.				
						Some gravel.				
30	1318	SPT	50 for 8"			Silty fine- to medium-grained Sand; gray, moist, very dense.				
35	1313	SPT	57			SAUGUS FORMATION - SUNSHINE RANCH MEMBER (Tsr): Silty Sandstone/Sandy Siltstone; brown/gray.				

SAMPLE TYPES:
- R RING (DRIVE) SAMPLE
- S SPT (SPLIT SPOON) SAMPLE
- B BULK SAMPLE
- T TUBE SAMPLE

▼ Ground Water Seepage
MAX - Max. Density/Opt. Moist.
DS - Direct Shear
HYDR - Hydrometer Analysis
ASCE - Expansion Index
CONS - Consolidation

PACIFIC SOILS ENGINEERING, INC.

GEOTECHNICAL BORING LOG

PROJECT NO. 102453-T
DATE STARTED 4/5/02
DATE FINISHED 4/5/02
DRILLER A & W Drilling
TYPE OF DRILL RIG Rotary Wash

PROJECT NAME Lyons Canyon Ranch
GROUND ELEV. 1348
GW DEPTH (FT) 17
DRIVE WT. See Note
DROP 30 inches

BORING DESIG. RW-5
LOGGED BY TMD
NOTE 140# for SPT; 400# for ring sample

DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	GROUP SYMBOL	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
		R	50 for 10"			Silty Sandstone; medium- to coarse-grained, gray, hard. Total Depth 40 feet. No apparent caving. Groundwater at 17 feet. Hole backfilled.				

SAMPLE TYPES:
- R RING (DRIVE) SAMPLE
- S SPT (SPLIT SPOON) SAMPLE
- B BULK SAMPLE
- T TUBE SAMPLE

Ground Water Seepage
MAX - Max. Density/Opt. Moist.
DS - Direct Shear
HYDR - Hydrometer Analysis
ASCE - Expansion Index
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PACIFIC SOILS ENGINEERING, INC.

PLATE A-36

GEOTECHNICAL BORING LOG

PROJECT NO.	102453-T	PROJECT NAME	Lyons Canyon Ranch	BORING DESIG.	RW-6
DATE STARTED	4/5/02	GROUND ELEV.	1379	LOGGED BY	TMD
DATE FINISHED	4/5/02	GW DEPTH (FT)	18	NOTE	140# for SPT, 400# for ring sample
DRILLER	A & W Drilling	DRIVE WT.	See Note		
TYPE OF DRILL RIG	Rotary Wash	DROP	30 Inches		

DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	GROUP SYMBOL	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
						ALLUVIUM (Qal):				
5	1374	SPT	8			Silty Sand; brown, slightly moist, loose.				
10	1369	SPT	14			Gravelly Sand; fine- to medium-grained, brown, some silt, slightly moist, medium dense.				
15	1364	SPT	23			Gravelly Sand; fine- to medium-grained, with some silt, reddish brown, very moist, medium dense. ▼				
20	1359	R	11			SAUGUS FORMATION - SUNSHINE RANCH MEMBER (Tsr): Silty medium- to coarse-grained Sand; red brown, with gravel, ring sample disturbed.				
25	1354	R	50 for 6"			Sandy Siltstone; very fine-grained Sand, bluish gray, hard. Total Depth 25 feet. No apparent caving. Water at 17.5 feet. Hole backfilled.	15.6	116.6	99	

SAMPLE TYPES:
- R RING (DRIVE) SAMPLE
- S SPT (SPLIT SPOON) SAMPLE
- B BULK SAMPLE
- T TUBE SAMPLE

▼ Ground Water Seepage
MAX - Max. Density/Opt. Moist.
DS - Direct Shear
HYDR - Hydrometer Analysis
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CONS - Consolidation

PACIFIC SOILS ENGINEERING, INC.

GEOTECHNICAL BORING LOG

PROJECT NO.	102453-T	PROJECT NAME	Lyons Canyon Ranch	BORING DESIG.	CPT/SPT-1
DATE STARTED	7/31/01	GROUND ELEV.	1317	LOGGED BY	CRN
DATE FINISHED	7/31/01	GW DEPTH (FT)		NOTE	Combo Rig - Truck Mounted, 4-1/2" Rotary Wash, SPT & CPT
DRILLER	Gregg In-Situ	DRIVE WT.	140 lbs.		
TYPE OF DRILL RIG	See Note	DROP	30 inches		

DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	GROUP SYMBOL	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
						ALLUVIUM (Qal): (Note: See adjacent exploratory boring B-1 for descriptive log of Alluvium from 0 to 70± feet).				
5	1312					Begin CPT.				
10	1307									
15	1302									
20	1297					Stop CPT - Drill through gravelly layers.				
25	1292					Begin CPT - Stop CPT - (Unable to advance) Drill through gravelly layers.				
30	1287	SPT	50 for 5"			Begin CPT - Stop CPT (6± inches of advancement). Drill through gravelly layers.				
35	1282									

SAMPLE TYPES:
- R RING (DRIVE) SAMPLE
- S SPT (SPLIT SPOON) SAMPLE
- B BULK SAMPLE
- T TUBE SAMPLE

▼ Ground Water Seepage
MAX - Max. Density/Opt. Moist.
DS - Direct Shear
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ASCE - Expansion Index
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PACIFIC SOILS ENGINEERING, INC.

PLATE A-38

GEOTECHNICAL BORING LOG

PROJECT NO.	102453-T	PROJECT NAME	Lyons Canyon Ranch	BORING DESIG.	CPT/SPT-1
DATE STARTED	7/31/01	GROUND ELEV.	1317	LOGGED BY	CRN
DATE FINISHED	7/31/01	GW DEPTH (FT)		NOTE	Combo Rig - Truck Mounted, 4-1/2" Rotary Wash, SPT & CPT
DRILLER	Gregg In-Situ	DRIVE WT.	140 lbs.		
TYPE OF DRILL RIG	See Note	DROP	30 inches		

DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	GROUP SYMBOL	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
						Begin CPT.				
						Stop CPT. Drill through gravelly layers.				
45	1272					Pebbles in auger tip.				
50	1267					Gravel lense.				
						Begin CPT.				
						Stop CPT. Drill through gravelly layers.				
55	1262									
60	1257					Begin CPT.				
						Stop CPT. Drill through gravelly layers.				
65	1252									
70	1247	SPT	102 for 4"			Gravelly Sand; medium to coarse-grained with pebbles, moderate yellowish brown, moist to wet, dense, interlayered pebble lenses.				
75	1242									

SAMPLE TYPES:
- R RING (DRIVE) SAMPLE
- S SPT (SPLIT SPOON) SAMPLE
- B BULK SAMPLE
- T TUBE SAMPLE

Ground Water Seepage
MAX - Max. Density/Opt. Moist.
DS - Direct Shear
HYDR - Hydrometer Analysis
ASCE - Expansion Index
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PACIFIC SOILS ENGINEERING, INC.

PLATE A-39

GEOTECHNICAL BORING LOG

PROJECT NO.	102453-T	PROJECT NAME	Lyons Canyon Ranch	BORING DESIG.	CPT/SPT-1
DATE STARTED	7/31/01	GROUND ELEV.	1317	LOGGED BY	CRN
DATE FINISHED	7/31/01	GW DEPTH (FT)		NOTE	Combo Rig - Truck Mounted, 4-1/2" Rotary Wash, SPT & CPT
DRILLER	Gregg In-Situ	DRIVE WT.	140 lbs.		
TYPE OF DRILL RIG	See Note	DROP	30 inches		

DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	GROUP SYMBOL	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
		SPT	70			SAUGUS FORMATION - SUNSHINE RANCH MEMBER (Tsr): Silty Sandstone; fine to coarse-grained with some pebbles, yellowish gray, moist to wet, moderately hard.				
85	1232									
90	1227	SPT	50 for 2"			Gravelly Sandstone to Pebbly Conglomerate; medium to very coarse-grained, light to medium gray, moist, moderately hard.				
95	1222									
						Claystone; 1 to 2± foo thick layer/lense, olive gray, moist to wet, soft to firm.				
100	1217	SPT	50 for 3"			@ 100 feet; No recovery of SPT sample.				
						Total Depth 101± feet. Hole backfilled with on-site cuttings.				

SAMPLE TYPES:
- R RING (DRIVE) SAMPLE
- S SPT (SPLIT SPOON) SAMPLE
- B BULK SAMPLE
- T TUBE SAMPLE

▼ Ground Water Seepage
MAX - Max. Density/Opt. Moist.
DS - Direct Shear
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CONS - Consolidation

GEOTECHNICAL BORING LOG

PROJECT NO.	102453-T	PROJECT NAME	Lyons Canyon Ranch		
DATE STARTED	7/31/01	GROUND ELEV.	1363	BORING DESIG.	CPT/SPT-2
DATE FINISHED	7/31/01	GW DEPTH (FT)	15	LOGGED BY	CRN
DRILLER	Gregg In-Situ	DRIVE WT.	140 lbs.	NOTE	Combo Rig - Truck Mounted, 4-1/2" Rotary Wash, SPT & CPT
TYPE OF DRILL RIG	See Note	DROP	30 inches		

DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	GROUP SYMBOL	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
						ALLUVIUM (Qal):				
		SPT	10			Silt; dark yellowish brown, moist, soft to moderately firm.				
5	1358									
10	1353	SPT	3			Sandy Clay; fine-grained, moderate yellowish brown, moist, soft to moderately firm.				
15	1348	SPT	13			Clayey Sand; fine- to medium- with some coarse-grained, olive gray, moist to wet, moderately dense.				
20	1343	SPT	3			**SAUGUS FORMATION - SUNSHINE RANCH MEMBER** (Tsr): Clayey Sandstone; fine- to very coarse-grained with pebbles, medium dark gray, moist, moderately hard to hard.				
25	1338					Begin CPT.				
30	1333	SPT	50 for 3"			Stop CPT. Silty Sandstone; fine- to coarse-grained, medium gray, slightly moist, hard to very hard.				
35	1328									

SAMPLE TYPES:
- R RING (DRIVE) SAMPLE
- S SPT (SPLIT SPOON) SAMPLE
- B BULK SAMPLE
- T TUBE SAMPLE

Ground Water Seepage
MAX - Max. Density/Opt. Moist.
DS - Direct Shear
HYDR - Hydrometer Analysis
ASCE - Expansion Index
CONS - Consolidation

PACIFIC SOILS ENGINEERING, INC.

PLATE A-41

GEOTECHNICAL BORING LOG

PROJECT NO.	102453-T	PROJECT NAME	Lyons Canyon Ranch		
DATE STARTED	7/31/01	GROUND ELEV.	1363	BORING DESIG.	CPT/SPT-2
DATE FINISHED	7/31/01	GW DEPTH (FT)	15	LOGGED BY	CRN
DRILLER	Gregg In-Situ	DRIVE WT.	140 lbs.	NOTE	Combo Rig - Truck Mounted, 4-1/2" Rotary Wash, SPT & CPT
TYPE OF DRILL RIG	See Note	DROP	30 inches		

DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	GROUP SYMBOL	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
		SPT	50 for 3"			Silty Sandstone; fine- to coarse-grained, medium gray, slightly moist, hard to very hard. Total Depth 41 feet. Groundwater at 15 feet. No apparent caving. Hole backfilled.				

SAMPLE TYPES:
- R RING (DRIVE) SAMPLE
- S SPT (SPLIT SPOON) SAMPLE
- B BULK SAMPLE
- T TUBE SAMPLE

Ground Water Seepage
MAX - Max. Density/Opt. Moist.
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PACIFIC SOILS ENGINEERING, INC.

PLATE A-42

GEOTECHNICAL BORING LOG

PROJECT NO.	102453-T	PROJECT NAME	Lyons Ranch		
DATE STARTED	1/13/04	GROUND ELEV.	1315	BORING DESIG.	B-101
DATE FINISHED	1/13/04	GW DEPTH (FT)		LOGGED BY	CRN
DRILLER	JN Drilling	DRIVE WT.	See Note	NOTE	0-24', 3548#; 24-47', 2577#; 47-75', 1548#
TYPE OF DRILL RIG	30" Bucket Auger	DROP	12 inches		

DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	GROUP SYMBOL	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
						ALLUVIUM (Qal): Silty to Clayey Sand; fine-grained, few pebbles, dark yellowish brown, moist, loose to medium dense, abundant roots and rootlets.				
5	1310	R/B	Push			Sandy Silt; very fine- to fine-grained Sand, moderate yellowish brown, slightly moist, very loose, slightly porous, some white carbonate.	10.0	82.4	26	
10	1305	R	Push for 6" 1 for 6"			Sand Silt; very fine- to fine-grained Sand, moderate yellowish brown, slightly moist, very loose, slightly porous, some white carbonate, some rootlets.	5.1	103.0	22	
15	1300	R	1			Silty Sand; fine- with some medium-grained, few pebbles, moderate to dark yellowish brown, slightly moist, loose.	6.2	107.3	29	
20	1295	R/B	1			Silty Sand; fine- to coarse-grained with some pebbles, moderate yellowish brown, slightly moist, loose.	6.2	105.1	28	
25	1290					Gravelly Sand; fine- to coarse-grained with pebbles and cobbles, few boulders to 1± foot, light to moderate yellowish brown, slightly moist, loose to medium dense; interlayered with Sand lenses, medium- to coarse-grained, light yellowish brown, slightly moist, loose to medium dense.				
30	1285	B				Increase abundance of cobbles and boulders (8 to 12± inches).				
35	1280	B				34 to 36± feet, some raveling in coarse-grained material, change to cork screw auger.				
						SAUGUS FORMATION-SUNSHINE RANCH FORMATION MEMBER (Tsr): Pebble and Cobble Conglomerate; medium- to very coarse-grained Sand matrix; pale yellowish gray, dry to slightly moist, hard to very hard.				

SAMPLE TYPES:
- R RING (DRIVE) SAMPLE
- S SPT (SPLIT SPOON) SAMPLE
- B BULK SAMPLE
- T TUBE SAMPLE

Ground Water Seepage
MAX - Max. Density/Opt. Moist.
DS - Direct Shear
HYDR - Hydrometer Analysis
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PACIFIC SOILS ENGINEERING, INC.

GEOTECHNICAL BORING LOG

PROJECT NO.	102453-T	PROJECT NAME	Lyons Ranch		
DATE STARTED	1/13/04	GROUND ELEV.	1315	BORING DESIG.	B-101
DATE FINISHED	1/13/04	GW DEPTH (FT)		LOGGED BY	CRN
DRILLER	JN Drilling	DRIVE WT.	See Note	NOTE	0-24', 3548::#; 24-47',
TYPE OF DRILL RIG	30" Bucket Auger	DROP	12 inches		2577#, 47-75', 1648#

DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	GROUP SYMBOL	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
						Total Depth 40± feet. No water. Some raveling 34 to 36± feet. Hole backfilled.				

SAMPLE TYPES:
- R RING (DRIVE) SAMPLE
- S SPT (SPLIT SPOON) SAMPLE
- B BULK SAMPLE
- T TUBE SAMPLE

Ground Water Seepage
MAX - Max. Density/Opt. Moist.
DS - Direct Shear
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PACIFIC SOILS ENGINEERING, INC.

PLATE A-44

GEOTECHNICAL BORING LOG

PROJECT NO.	102453-T	PROJECT NAME	Lyons Ranch		
DATE STARTED	1/13/04	GROUND ELEV.	1323	BORING DESIG.	B-102
DATE FINISHED	1/13/04	GW DEPTH (FT)		LOGGED BY	CRN
DRILLER	JN Drilling	DRIVE WT.	See Note	NOTE	0-24', 3548#; 24-47', 2577#; 47-75', 1648#
TYPE OF DRILL RIG	30" Bucket Auger	DROP	12 inches		

DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	GROUP SYMBOL	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
						SOIL: Sandy Silt; very fine- to fine- with some medium-grained Sand, dark yellowish brown, moist, very loose, abundant roots and rootlets.				
						ALLUVIUM (Qal): Sand Silt; very fine- to fine-grained Sand, moderate yellowish brown, slightly moist to moist, loose.				
5	1318	R/B	1			Sandy Silt to Silty Sand; fine- to medium- with some coarse-grained Sand and pebbles, dry to slightly moist, loose, porous, some rootlets.	4.8	100.7	19	
10	1313	R	Push			Sandy Silt to Silty Sand; fine- to medium- with some coarse-grained Sand and pebbles, dry to slightly moist, very loose, porous, some rootlets.	9.4	105.1	42	
15	1308	R	Push			Sandy Silt to Silty Sand; fine- to medium- with some coarse-grained Sand and pebbles, moderate yellowish brown, slightly moist to moist, very loose.	9.8	106.8	46	
20	1303	R/B	1			Sandy Silt to Silty Sand; fine- to medium- with some coarse-grained Sand and pebbles, colour change to moderate yellowish brown, moisture increase to slightly moist to moist, dry to slightly moist, loose.	8.1	107.0	38	
25	1298	R/B	2			Silty Sand; fine- to coarse-grained with pebbles, pale to moderate yellowish brown, slightly moist, loose to medium dense.	3.0	115.6	16	
30	1293					Increase abundance of pebbles and cobbles.				
		R	3			Pebbly to Cobbly Sand; fine- to coarse-grained, pale to moderate yellowish brown, slightly moist to moist, medium dense; interlayered with Silty Sand; fine- to coarse-grained with pebbles, pale to moderate yellowish brown, slightly moist, medium dense.	3.8	118.3	24	
		B								
35	1288					Change to cork-screw auger due to abundant cobbles and boulders (up to 12± inches). 34 to 38± feet, moderate to severe raveling of coarse-grained materials.				
						SAUGUS FORMATION-SUNSHINE RANCH FORMATION MEMBER (Tsr)(?): Clayey to Sandy Silt; fine-grained Sand; moderate yellowish brown, moist, soft.				

SAMPLE TYPES:
R RING (DRIVE) SAMPLE
S SPT (SPLIT SPOON) SAMPLE
B BULK SAMPLE T TUBE SAMPLE

Ground Water Seepage
MAX - Max. Density/Opt. Moist.
DS - Direct Shear
HYDR - Hydrometer Analysis
ASCE - Expansion Index
CONS - Consolidation

PACIFIC SOILS ENGINEERING, INC.

PLATE A-45

GEOTECHNICAL BORING LOG

PROJECT NO. 102453-T
DATE STARTED 1/13/04
DATE FINISHED 1/13/04
DRILLER JN Drilling
TYPE OF DRILL RIG 30" Bucket Auger

PROJECT NAME Lyons Ranch
GROUND ELEV. 1323
GW DEPTH (FT)
DRIVE WT. See Note
DROP 12 Inches

BORING DESIG. B-102
LOGGED BY CRN
NOTE 0-24', 3548#; 24-47', 2577#; 47-75', 1648#

DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	GROUP SYMBOL	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
						(weathered Tsr?). "Hard Drilling" at auger tip/refusal. Total Depth 38 feet. No water. Moderate to severe raveling 34 to 38± feet. Hole backfilled.				

SAMPLE TYPES:
R RING (DRIVE) SAMPLE
S SPT (SPLIT SPOON) SAMPLE
B BULK SAMPLE T TUBE SAMPLE

Ground Water Seepage
MAX - Max. Density/Opt. Moist.
DS - Direct Shear
HYDR - Hydrometer Analysis
ASCE - Expansion Index
CONS - Consolidation

PACIFIC SOILS ENGINEERING, INC.

PLATE A-46

GEOTECHNICAL BORING LOG

PROJECT NO.	102453-T	PROJECT NAME	Lyons Ranch		
DATE STARTED	1/13/04	GROUND ELEV.	1324	BORING DESIG.	B-103
DATE FINISHED	1/13/04	GW DEPTH (FT)		LOGGED BY	CRN
DRILLER	JN Drilling	DRIVE WT.	See Note	NOTE	0-24', 3548#; 24-47', 2577#; 47-75', 1648#
TYPE OF DRILL RIG	30" Bucket Auger	DROP	12 inches		

DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	GROUP SYMBOL	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
						ALLUVIUM (Qal): Sandy Silt; very fine- to fine-grained Sand, dark to moderate yellowish brown, moist, very loose, abundant roots and rootlets.				
5	1319	R	Push			Silty Sand; fine- to medium-grained, moderate yellowish brown, slighty moist, very loose.	4.0	103.1	17	
						Increase abundance of pebbles.				
10	1314	R	Push			Silty Sand; fine- to coarse-grained with pebbles, moderate yellowish brown, slighty moist, loose to medium dense.	8.6	104.8	38	
						Some cobbles and boulders (up to 12± inches).				
15	1309	R	Push			Silty Sand; fine- to medium-grained with some pebbles, moderate yellowish brown, slightly moist, loose to medium dense.	8.9	107.4	42	
20	1304	R	1			Silty Sand; fine- to medium-grained with some pebbles, moderate yellowish brown, slightly moist, loose.	11.1	104.8	49	
25	1299	R	1			Silty Sand; fine- to coarse-grained with pebbles, pale to moderate yellowish brown, slightly moist, loose.	4.8	114.9	28	
30	1294	R	3			Silty Sand; fine- to coarse-grained with pebbles and cobbles, pale to moderate yellowish brown, slightly moist, medium dense.	6.3	111.6	33	
35	1289					Pebbly to cobbly Sand; fine- to coarse-grained, moderate yellowish brown, slightly moist, medium dense to dense.				

SAMPLE TYPES:
- R RING (DRIVE) SAMPLE
- S SPT (SPLIT SPOON) SAMPLE
- B BULK SAMPLE
- T TUBE SAMPLE

Ground Water Seepage
MAX - Max. Density/Opt. Moist.
DS - Direct Shear
HYDR - Hydrometer Analysis
ASCE - Expansion Index
CONS - Consolidation

PACIFIC SOILS ENGINEERING, INC.

PLATE A-47

GEOTECHNICAL BORING LOG

PROJECT NO.	102453-T	PROJECT NAME	Lyons Ranch		
DATE STARTED	1/13/04	GROUND ELEV.	1324	BORING DESIG.	B-103
DATE FINISHED	1/13/04	GW DEPTH (FT)		LOGGED BY	CRN
DRILLER	JN Drilling	DRIVE WT.	See Note	NOTE	0-24', 3548#; 24-47', 2577#; 47-75', 1648#
TYPE OF DRILL RIG	30" Bucket Auger	DROP	12 inches		

DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	GROUP SYMBOL	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
		B				Pebbly to cobbly Sand; fine- to coarse-grained with some boulders up to 12± inches, moderate yellowish brown, slightly moist, dense.				
45	1279					Increase abundant of cobbles and boulders.				
						SAUGUS FORMATION-SUNSHINE RANCH FORMATION MEMBER (Tsr): Pebble and Cobble Conglomerate; fine to very coarse-grained Sand matrix, pale yellowish gray, dry to slighty moist, hard.				
						Total Depth 49 feet. No water. No caving. Hole backfilled.				

SAMPLE TYPES:
- R RING (DRIVE) SAMPLE
- S SPT (SPLIT SPOON) SAMPLE
- B BULK SAMPLE
- T TUBE SAMPLE

Ground Water Seepage
MAX - Max. Density/Opt. Moist.
DS - Direct Shear
HYDR - Hydrometer Analysis
ASCE - Expansion Index
CONS - Consolidation

PACIFIC SOILS ENGINEERING, INC.

GEOTECHNICAL BORING LOG

PROJECT NO.	102453-T	PROJECT NAME	Lyons Ranch		
DATE STARTED	1/13/04	GROUND ELEV.	1315	BORING DESIG.	B-104
DATE FINISHED	1/13/04	GW DEPTH (FT)		LOGGED BY	CRN
DRILLER	JN Drilling	DRIVE WT.	See Note	NOTE	0-24', 3548#; 24-47', 2577#; 47-75', 1648#
TYPE OF DRILL RIG	30" Bucket Auger	DROP	12 inches		

DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	GROUP SYMBOL	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
						ALLUVIUM (Qal): Silty Sand; fine- to coarse-grained with pebbles and cobbles, pale yellowish brown, slightly moist, loose to medium dense. Sandy Silt; very fine- to fine-grained Sand, moderate yellowish brown, moist, loose.				
5	1310	R	1			Silty Sand; very fine- to fine-grained Sand, moderate yellowish brown, moist, loose.	6.8	103.8	29	
10	1305	R/B	2			Silty Sand; fine- to coarse-grained with pebbles and cobbles, pale yellowish brown, slightly moist, medium dense.	6.4	100.4	25	
15	1300	R	3			Silty Sand; fine- to coarse-grained with pebbles and some cobbles, moderate yellowish brown, slightly moist, medium dense.	2.4	120.7	16	
20	1295	R	1			Silty Sand; fine- to medium-grained and pebbles, moderate yellowish brown, slightly moist, medium dense.	6.3	103.4	27	
25	1290	B				Pebbly to Cobbly Sand; fine- to coarse-grained, moderate yellowish brown, slightly moist to moist, medium dense. Some boulders up to 12± inches.				
		R	2			Silty Sand; fine- to medium-grained and pebbles, moderate yellowish brown, slightly moist, medium dense.	6.9	108.2	33	
30	1285	B								
		R	3			Interlayered 1± foot: Pebbly to cobbly Sand; medium- to very coarse-grained, moderate yellowish gray, slightly moist, medium dense. Silty Sand; fine- to coarse-grained with pebbles, moderate yellowish brown, slightly moist, medium dense.	3.5	107.7	17	
35	1280	R	2			Interlayered 1± foot: Pebbly to cobbly Sand; medium- to very coarse-grained, moderate yellowish gray, slightly moist, medium dense.	4.0	111.1	21	

SAMPLE TYPES:
- R RING (DRIVE) SAMPLE
- S SPT (SPLIT SPOON) SAMPLE
- B BULK SAMPLE
- T TUBE SAMPLE

- ▼ Ground Water Seepage
- MAX - Max. Density/Opt. Moist.
- DS - Direct Shear
- HYDR - Hydrometer Analysis
- ASCE - Expansion Index
- CONS - Consolidation

GEOTECHNICAL BORING LOG

PROJECT NO.	102453-T	PROJECT NAME	Lyons Ranch		
DATE STARTED	1/13/04	GROUND ELEV.	1315	BORING DESIG.	B-104
DATE FINISHED	1/13/04	GW DEPTH (FT)		LOGGED BY	CRN
DRILLER	JN Drilling	DRIVE WT.	See Note	NOTE	0-24', 3548#; 24-47', 2577#; 47-75', 1648#
TYPE OF DRILL RIG	30" Bucket Auger	DROP	12 inches		

DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	GROUP SYMBOL	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
45	1270	R/B	3			Silty Sand; fine- to coarse-grained with pebbles, moderate yellowish brown, slightly moist, medium dense. Interlayered 1± foot: Pebbly to Cobbly Sand; medium- to very coarse-grained, moderate yellowish gray, slightly moist, medium dense.	4.3	108.3	21	
50	1265	R	4			Silty Sand; very fine- to medium-grained with some pebbles, moderate yellowish brown, slightly moist, medium dense.	8.4	104.0	37	
						Pebbly to cobbly Sand; fine- to coarse-grained, pale to moderate yellowish brown, slightly moist, medium dense.				
55	1260					Silty Sand; fine- to very coarse-grained with pebbles and cobbles, moderate yellowish brown, slightly moist to moist, medium dense.				
60	1255									
65	1250	B				Silty Sand; fine- to very coarse-grained with pebbles and cobbles, moderate yellowish brown, slightly moist to moist, medium dense. Pebbly to cobbly Sand; fine- to coarse-grained, pale to moderate yellowish brown, slightly moist, medium dense.				
70	1245					SAUGUS FORMATION-SUNSHINE RANCH FORMATION MEMBER (Tsr): Pebble and cobble Conglomerate; medium to coarse-grained Sand matrix, pale yellowish gray, dry to slighty moist, hard. Total Depth 70 feet. No water. No caving. Hole backfilled.				

SAMPLE TYPES:
- R RING (DRIVE) SAMPLE
- S SPT (SPLIT SPOON) SAMPLE
- B BULK SAMPLE
- T TUBE SAMPLE

Ground Water Seepage
MAX - Max. Density/Opt. Moist.
DS - Direct Shear
HYDR - Hydrometer Analysis
ASCE - Expansion Index
CONS - Consolidation

TABLE II

LOG OF EXPLORATORY PITS

Exploratory Pits	Depth (feet)	Description — Logged by: CRN, Date Logged: 07/05/01
EP-1	0 to 6	COLLUVIUM (Qcol): Silty Sand to Sandy Silt; fine- to medium-grained, moderate yellowish brown, dry to slightly moist at depth, loose to moderately dense/soft to firm, abundant roots and rootlets.
	6 to 8	SAUGUS FORMATION – SUNSHINE RANCH MEMBER (Tsr): Sandstone; fine- to medium-grained, olive gray, slightly moist, moderately hard to hard, abundant white carbonate stringers, moderately weathered top 1± foot.
		Total Depth 8 feet. No water, no caving.
EP-2	0 to 15	ALLUVIUM (Qal): Silty Sand; fine- to coarse-grained with pebbles and cobbles, moderate yellowish brown, dry to slightly moist at depth, loose to moderately dense at depth, abundant roots and rootlets.
		Total Depth 15 feet No water, no caving.
EP-3	0 to 2½	SOIL: Silty Sand to Sandy Silt; fine- to medium-grained, moderate yellowish brown, dry, loose/soft, abundant roots and rootlets.
	2½ to 8	SAUGUS FORMATION – SUNSHINE RANCH MEMBER (Tsr): Sandstone; fine- to medium-grained, light olive, slightly moist, top 2± feet highly weathered and loose with abundant roots and rootlets, moderately hard at depth, massive.
		Total Depth 8 feet. No water, no caving.

TABLE II

LOG OF EXPLORATORY PITS

Exploratory Pits	Depth (feet)	Description	Logged by: CRN Date Logged: 07/05/01
EP-4	0 to 5	COLLUVIUM (Qcol): Silty Sand; fine- to medium-grained with pebbles and some cobbles, moderate yellowish brown, dry to slightly moist at depth, loose to moderately dense, abundant roots and rootlets.	
	5 to 9	SAUGUS FORMATION – SUNSHINE RANCH MEMBER (Tsr): Sandstone; fine- to coarse-grained with pebbles and cobbles, light yellowish gray, slightly moist, moderately hard, some interbedded pebbles lenses, generally massive. Bedding Attitude: @ 7 feet, N40W, 42NE Total Depth 9 feet. No water, no caving.	
EP-5	0 to 8	ALLUVIUM (Qal): Silty Sand; fine- to coarse-grained with pebbles and cobbles, moderate yellowish brown, dry to slightly moist at depth, loose to moderately dense at depth, abundant root, and rootlets.	
	8 to 10	Cobbly Sand; medium- to coarse-grained with pebbles, slightly moist, loose to moderately dense, roots to depth.	
	10 to 13	SAUGUS FORMATION – SUNSHINE RANCH MEMBER (Tsr): Sandstone; fine- to medium-grained, light olive gray, slightly moist, moderately hard, slight to moderate weathering, massive. Total Depth 13 feet. No water, no caving.	

TABLE II

LOG OF EXPLORATORY PITS

Exploratory Pits	Depth (feet)	Description	Logged by: CRN Date Logged: 07/05/01
EP-6	0 to 2	SOIL: Silty Sand; fine- to coarse-grained with pebbles and cobbles, moderate yellowish brown, dry, loose, abundant roots and rootlets.	
	2 to 4	SAUGUS FORMATION – SUNSHINE RANCH MEMBER (Tsr): Cobble Conglomerate; coarse-grained Sand matrix, slightly moist, moderately hard.	
	4 to 7	Siltstone; light bluish gray, slightly moist, moderately hard, laminated.	
		Bedding Attitude: @ 5 feet, N50W, 37 NE	
		Total Depth 7 feet.	
EP-7	0 to ½	SOIL: Silty Sand; fine- to coarse-grained with pebbles and cobbles, moderate yellowish brown, dry, loose, abundant roots and rootlets.	
	½ to 2	SAUGUS FORMATION – SUNSHINE RANCH MEMBER (Tsr): Pebble Conglomerate; medium- to coarse-grained Sand matrix, slightly moist, loose, abundant roots.	
	2 to 5	Silty Sandstone; fine- to medium-grained, light yellowish gray, slightly moist, moderately hard, abundant roots.	
		Bedding Attitude: @ 3 feet, N60W, 35 NE	
		Total Depth 5 feet.	

TABLE II

LOG OF EXPLORATORY PITS

Exploratory Pits	Depth (feet)	Description	Logged by: CRN Date Logged: 07/05/01
EP-8	0 to 1	SOIL: Sandy Silt; light to moderate yellowish brown, dry, soft, abundant roots and rootlets.	
	1 to 3	SAUGUS FORMATION – SUNSHINE RANCH MEMBER (Tsr): Sandy Siltstone; light olive gray, slightly moist, moderately hard, abundant white carbonate, highly jointed, slightly laminated, generally massive.	
	3 to 5	Claystone; reddish brown, moist, moderately hard, highly jointed, abundant white carbonate along joints.	
		Bedding Attitude: @ 4 feet, N70W, 45NE	
		Total Depth 5 feet. No water, no caving.	
EP-9	0 to 6	COLLUVIUM (Qcol): Silty Sand; fine- to coarse-grained with pebbles and cobbles, dark yellowish brown, dry to slightly moist at depth, loose to moderately dense at depth, abundant root and rootlets.	
	6 to 9	SAUGUS FORMATION – SUNSHINE RANCH MEMBER (Tsr): Pebble and Cobble Conglomerate; medium to coarse-grained Sand matrix, slightly moist, moderately hard, poorly indurated.	
	9 to 12	Silty Sandstone; fine-grained, light olive gray, slightly moist, moderately hard, moderately indurated, moderately bedded.	
		Bedding Attitude: @ 10 feet, N60W, 45NE	
		Total Depth 12 feet. No water, no caving.	

TABLE II

LOG OF EXPLORATORY PITS

Exploratory Pits	Depth (feet)	Description	Logged by: CRN Date Logged: 07/05/01
EP-10	0 to 2	SOIL: Sandy Silt; yellowish brown, moist, firm, abundant roots and rootlets.	
	2 to 5	SAUGUS FORMATION -- SUNSHINE RANCH MEMBER (Tsr): Clayey Siltstone; light olive gray, moist, moderately hard, massive, slightly fractured; overlies Silty Sandstone; fine-grained, light yellowish gray, slightly moist, moderately hard, slightly bedded, generally massive.	
		Bedding Attitude: @ 3 feet, N45W, 47NE	
		Total Depth 5 feet. No water, no caving.	
EP-11	0 to 3	ALLUVIUM (Qal): Silty Sand; fine- to medium-grained, moderate yellowish brown, top 2± feet dry and loose, slightly moist to moderately dense at depth, abundant root and rootlets, porous.	
	3 to 20	Pebbly Sand; fine- to coarse-grained with cobbles, light to moderate yellowish brown, slightly moist to moist, moderately dense.	
		Total Depth 20 feet. No water, no caving.	

TABLE II

LOG OF EXPLORATORY PITS

Exploratory Pits	Depth (feet)	Description	Logged by: CRN Date Logged: 07/05/01
EP-12	0 to 3	SOIL: Sandy Silt to Silty Sand; fine to coarse-grained with pebbles and cobbles, moderate yellowish brown, dry to slightly moist, soft/loose, abundant roots and rootlets.	
	3 to 10	SAUGUS FORMATION – SUNSHINE RANCH MEMBER (Tsr): Pebble and Cobble Conglomerate; fine- to coarse-grained Sand matrix, slightly moist, moderately hard, poorly to moderately indurated, moderately bedded. Bedding Attitudes: @ 5 feet, N50W, 44NE @ 8 feet, N45W, 42NE Total Depth 10 feet. No water, no caving.	
EP-13	0 to 6	COLLUVIUM (Qcol): Silty Sand; fine- to coarse-grained with pebbles and some cobbles, moderate to dark yellowish brown, dry to slightly moist, loose to moderately dense, porous, abundant roots and rootlets.	
	6 to 9	SAUGUS FORMATION – SUNSHINE RANCH MEMBER (Tsr): Pebble and Cobble Conglomerate; medium- to coarse-grained Sand matrix, slightly moist, moderately hard, moderately indurated, moderately bedded. Bedding Attitude: @ 8 feet, N50W, 46NE Total Depth 9 feet. No water, no caving.	

TABLE II

LOG OF EXPLORATORY PITS

Exploratory Pits	Depth (feet)	Description	Logged by: CRN Date Logged: 07/05/01
EP-14	0 to 6	COLLUVIUM (Qcol): Silty Sand; fine- to medium-grained, dark yellowish brown, dry to slightly moist, loose to moderately dense, porous, abundant roots and rootlets.	
	6 to 8	SAUGUS FORMATION – SUNSHINE RANCH MEMBER (Tsr): Clayey Siltstone; olive to light olive gray, moist, soft to moderately hard, massive, abundant white carbonate.	
		Total Depth 8 feet. No water, no caving.	
EP-15	0 to 2½	SOIL: Silty Sand; fine- to medium-grained, dark yellowish brown, dry to slightly moist, loose, porous, abundant roots and rootlets, gopher holes.	
	2½ to 7	SAUGUS FORMATION – SUNSHINE RANCH MEMBER (Tsr): Sandstone; fine- to medium-grained with pebbles, yellowish orange, slightly moist, moderately hard, slightly bedded; some interbedded lenses of pebbles and cobbles with scour-fill basal contacts.	
		Approximate Bedding Attitude: @ 5 feet, N50W, 38NE	
		Total Depth 7 feet. No water, no caving.	

TABLE II

LOG OF EXPLORATORY PITS

Exploratory Pits	Depth (feet)	Description — Logged by: CRN, Date Logged: 07/05/01
EP-16	0 to 3	SOIL: Silty Sand to Sandy Silt; fine to medium-grained, moderate yellowish brown, dry to slightly moist, loose/soft, abundant roots and rootlets.
	3 to 5	SAUGUS FORMATION – SUNSHINE RANCH MEMBER (Tsr): Pebble Conglomerate; medium- to coarse-grained Sand matrix, slightly moist, loose, highly weathered, abundant roots. @ 5 feet, Claystone; 1 to 4± inch thick layer, mottled moderate yellowish brown and olive gray, moist, soft, flaky, some polished surfaces, discontinuous layer.
	5 to 9	Sandstone; fine-grained, light olive gray, slightly moist, moderately hard, highly weathered, abundant joints, abundant roots along joints. Bedding Attitude: @ 5 feet, N60W, 32NE Total Depth 9 feet. No water, no caving.
EP-17	0 to ½	SOIL: Sandy Silt; dark yellowish brown, dry, soft, abundant roots and rootlets.
	½ to 8	SAUGUS FORMATION – SUNSHINE RANCH MEMBER (Tsr): Sandstone; fine- to medium-grained, light yellowish gray, slightly moist, moderately hard to hard, top 1± foot moderately weathered, slight to moderate bedding with some rootlets along bedding planes. Bedding Attitudes: @ 3 feet, N65W, 43NE @ 6 feet, E-W, 49N Total Depth 8 feet. No water, no caving.

TABLE II

LOG OF EXPLORATORY PITS

Exploratory Pits	Depth (feet)	Description — Logged by: CRN, Date Logged: 07/05/01
EP-18	0 to 2	SOIL: Silty Sand; fine- to coarse-grained with pebbles and some cobbles, light to moderate yellowish brown, dry, loose, abundant roots and rootlets.
	2 to 7	SAUGUS FORMATION – SUNSHINE RANCH MEMBER (Tsr): Silty Sandstone; fine-grained, mottled reddish orange and olive gray, moist, hard, top 2± feet slightly jointed, moderately bedded. Bedding Attitude: @ 5 feet, N60W, 40SW Total Depth 7 feet. No water, no caving.
EP-19	0 to ½	SOIL: Silty Sand; fine-grained, light to moderate yellowish brown, dry, loose, abundant roots and rootlets.
	½ to 6	SAUGUS FORMATION – SUNSHINE RANCH MEMBER (Tsr): Sandstone; fine-grained, light olive gray, slightly moist, moderately hard to hard, moderately bedded. Bedding Attitude: @ 4½ feet, N65W, 40NE Total Depth 6 feet. No water, no caving.
EP-20	0 to 9	ALLUVIUM (Qal): Cobbly Sand; fine- to coarse-grained with abundant pebbles, light yellowish brown, top 2± feet dry and loose, slightly moist to moist and moderately dense to depth, some cobbles up to 12± inches diameter, abundant roots and rootlets to depth. Severe caving throughout. Total Depth 9 feet No water, caving from 0 to 9 feet.

TABLE II

LOG OF EXPLORATORY PITS

Exploratory Pits	Depth (feet)	Description	Logged by: CRN Date Logged: 07/05/01
EP-21	0 to 13	ALLUVIUM (Qal): Silty Sand to Sandy Silt; fine- to medium-grained with some pebbles and cobbles; moderate yellowish brown, top 2± feet dry and loose, slightly moist to moist and moderately dense to depth, poorly consolidated, some roots to depth.	
	13 to 14	SAUGUS FORMATION – SUNSHINE RANCH MEMBER (Tsr): Pebble and Cobble Conglomerate; medium to coarse-grained Sand matrix, moist, moderately hard to hard, weathered.	
		Total Depth 14 feet No water, no caving.	
EP-22	0 to 7	ALLUVIUM (Qal): Silty Sand; fine- to medium-grained with some pebbles, dark yellowish brown, top 2± feet loose and dry, slightly moist to moist and moderately dense to depth, basal cobbles, abundant roots and rootlets.	
	7 to 10	SAUGUS FORMATION – SUNSHINE RANCH MEMBER (Tsr): Siltstone; moderate yellowish brown, moist, moderately hard, laminated, moderately fractured, some tectonic shears along bedding, some roots and rootlets.	
	10 to 12	Silty Sandstone; very fine- to fine-grained, olive gray, slightly moist to moist, moderately hard, slightly fractured.	
		Bedding Attitude: @ 10 feet, N60W, 40NE	
		Total Depth 12 feet. No water, no caving.	

TABLE II

LOG OF EXPLORATORY PITS

Exploratory Pits	Depth (feet)	Description — Logged by: CRN, Date Logged: 07/05/01
EP-23	0 to 1	SOIL: Silty Sand; fine- to coarse-grained with pebbles, dark yellowish brown, dry, loose, abundant roots and rootlets.
	1 to 5	SAUGUS FORMATION – SUNSHINE RANCH MEMBER (Tsr): Sandstone; fine- to medium-grained, pale yellowish gray, slightly moist, moderately hard to hard, some rootlets from 1 to 3± feet in depth. Bedding Attitude: @ 4 feet, N60W, 45NE Total Depth 5 feet. No water, no caving.
EP-24	0 to 1	SOIL: Silty Sand; fine- to coarse-grained with pebbles and cobbles, dark yellowish brown, dry, loose, abundant roots and rootlets.
	1 to 4	SAUGUS FORMATION – SUNSHINE RANCH MEMBER (Tsr): Pebble and Cobble Conglomerate; medium- to coarse-grained Sand matrix, slightly moist, moderately hard to hard, few roots to depth.
	4 to 5	Sandstone; fine- to medium-grained, light yellowish gray, slightly moist, moderately hard, moderately bedded. Bedding Attitude: @ 4½ feet, N60W, 40NE Total Depth 5 feet. No water, no caving.

TABLE II

LOG OF EXPLORATORY PITS

Exploratory Pits	Depth (feet)	Description	Logged by: CRN Date Logged: 07/05/01
EP-25	0 to 2½	COLLUVIUM (Qcol): Silty Sand to Sandy Silt; very fine- to fine-grained with some isolated pebbles, moderate to dark yellowish brown, dry to slightly moist, loose/soft, abundant roots and rootlets, porous.	
	2½ to 5	Clayey Silt; moderate to dark yellowish brown, slightly moist, soft to firm, porous, abundant caliche.	
	5 to 9	PICO FORMATION (Tp): Clayey Siltstone; mottled pale olive gray and light brown, slightly moist, moderately firm, laminated to ½±-inch thick bedding, weathered to a depth of 7± feet. Bedding Attitudes: @ 6 feet, N50E, 32SE @ 8 feet, N80E, 35SE Total Depth 9 feet. No water, no caving.	
EP-26	0 to 1½	SOIL: Silty Sand to Sandy Silt; very fine- to fine-grained, moderate yellowish brown, dry to slightly moist, loose, abundant roots and rootlets, porous.	
	1½ to 6	PICO FORMATION (Tp): Clayey Siltstone; pale olive, slightly moist, moderately firm, laminated to massive 2±-inch thick bedding, weathered with roots and caliche to a depth of 3½ feet. Bedding Attitudes: @ 4 feet, N30W, 40NE @ 4½ feet, N10W, 30NE @ 5 feet, N30E, 29SE Total Depth 6 feet. No water, no caving.	

TABLE II

LOG OF EXPLORATORY PITS

Exploratory Pits	Depth (feet)	Description	Logged by: CRN Date Logged: 07/05/01
EP-27	0 to 1	SOIL: Silty Sand to Sandy Silt; very fine- to fine-grained moderate yellowish brown, dry to slightly moist, loose/soft, abundant roots and rootlets.	
	1 to 5	PICO FORMATION (Tp): Sandy Siltstone; fine-grained, pale olive gray, slightly moist, moderately hard, 1 to 6± inch thick laminated beds; jointed/fractured, interbedded with Clayey Siltstone; pale olive to olive gray, moderately firm, laminated to 3±-inch thick massive beds; top 1½± feet highly weathered. Bedding Attitudes: @ 4 feet, N50W, 39NE Total Depth 5 feet. No water, no caving.	
EP-28	0 to 1	SOIL: Sandy Silt; very fine- to fine-grained, pale to moderate yellowish brown, dry, loose, abundant roots and rootlets.	
	1 to 7	PICO FORMATION (Tp): Interbedded Silty Sandstone; very fine- to fine-grained, pale olive, slightly moist, moderately hard, 2 to 6±-inch laminated bedding; with Clayey Siltstone, pale to dark olive, slightly moist to moist, moderately firm, laminated to 2±-inch thick bedding; top 3± feet highly weathered and abundant roots. Bedding Attitudes: @ 5 feet, EW, 49N @ 6 feet, N70E, 73NW Total Depth 7 feet. No water, no caving.	

TABLE II

LOG OF EXPLORATORY PITS

Exploratory Pits	Depth (feet)	Description — Logged by: CRN, Date Logged: 07/05/01
EP-29	0 to 11	ALLUVIUM (Qal): Silty Sand to Sandy Silt; very fine- to fine-grained, moderate yellowish brown, dry to slightly moist at 6± feet to depth, loose/soft to moderately dense/firm with depth.
	11 to 12	PICO FORMATION (Tp): Silty Claystone; dark olive green, moist, moderately firm to firm, laminated to ½±-inch thick bedding.
		Total Depth 12 feet. No water; no caving.
EP-30	0 to 14	COLLUVIUM (Qcol): Clayey to Sandy Silt; very fine-grained Sand, pale to moderate yellowish brown, dry to slightly moist, soft, porous, abundant rootlets and roots.
		Total Depth 14 feet. No water, no caving.
EP-31	0 to 1	SOIL: Clayey To Sandy Silt; very fine- to fine-grained, dark yellowish brown, slightly moist to moist, soft, porous, abundant roots and rootlets.
	1 to 2	PICO FORMATION (Tp): Claystone; mottled olive gray and light brown, slightly moist to moist, moderately firm, highly weathered, abundant roots.
	2 to 3	Silty Sandstone; light gray lenses 3 to 4± inches thick at top and bottom with light brown core, slightly moist, moderately hard, massive, scour-fill bottom, flat top.
	3 to 4	Silty Sandstone to Sandy Siltstone; pale olive gray, slightly moist, firm, highly weathered, blocky, abundant caliche.
	4 to 5	Sandy to Clay Siltstone; pale to dark olive gray, slightly moist to moist, moderately hard, laminated to ½±-inch bedding.
		Bedding Attitudes: @ 3 feet, N80W, 59SW (overturned) @ 4 feet, N65W, 35SW (overturned)
		Total Depth 5 feet. No water, no caving.

TABLE II

LOG OF EXPLORATORY PITS

Exploratory Pits	Depth (feet)	Description — Logged by: CRN, Date Logged: 07/05/01
EP-32	0 to 5	COLLUVIUM (Qcol): Sandy Silt; very fine-grained Sand, pale to moderate yellowish brown, dry to slightly moist, soft, abundant rootlets.
	5 to 8	PICO FORMATION (Tp): Silty Sandstone; very fine- to fine-grained, pale to olive gray, slightly moist to moist, moderately hard, laminated to 3±-inch beds. Bedding Attitude: @ 6 feet, N70E, 54NW Total Depth 8 feet. No water, no caving.
EP-33	0 to 12	COLLUVIUM (Qcol): Sandy Silt; very fine- to fine-grained Sand, pale yellowish brown, dry to slightly moist, loose/soft, abundant rootlets, 2± foot diameter boulder at 2± feet. No water, no caving.
EP-34	0 to ½	SOIL: Clayey Silt; moderate yellowish brown, dry, loose, abundant roots and rootlets.
	½ to 4	PICO FORMATION (Tp): Silty Sandstone; very fine- to fine-grained, pale to olive gray, slightly moist, moderately firm, highly weathered, abundant roots and rootlets.
	4 to 6	Silty Sandstone; fine-grained, pale olive gray, slightly moist, moderately hard, massive. Bedding Attitudes: @ 3 feet, N45E, 65SE (overturned) @ 5 feet, N70E, 59SE (overturned) Total Depth 6 feet. No water, no caving.

TABLE II

LOG OF EXPLORATORY PITS

Exploratory Pits	Depth (feet)	Description	Logged by: CRN Date Logged: 07/05/01
EP-35	0 to 14	ALLUVIUM (Qal): Silty Sand to Sandy Silt; very fine- to fine- with some medium-grained, moderate yellowish orange, top 2± feet dry and loose/soft, slightly moist to moist and moderately dense/firm at depth, slightly porous, pocket of pebbles and cobbles @ 12± feet. Total Depth 14 feet. No water, no caving.	
EP-36	0 to ½	SOIL: Sandy Silt; very fine-grained Sand, moderate yellowish brown, dry, soft, abundant roots and rootlets.	
	½ to 6	PICO FORMATION (Tp): Silty Sandstone; very fine- to fine-grained, pale olive gray, slightly moist, moderately hard, laminated to 3±-inch bedding, upper 3± feet slightly creep affected.	
	6 to 8	Silty Sandstone, fine-grained, pale olive gray, slightly moist, moderately hard, massive. Bedding Attitudes: @ 2 feet, N10E, 50NW @ 4 feet, N30W, 30SW Total Depth 8 feet. No water, no caving.	

TABLE II

LOG OF EXPLORATORY PITS

Exploratory Pits	Depth (feet)	Description	Logged by: CRN Date Logged: 07/05/01
EP-37	0 to ½	SOIL: Sandy Silt; very fine-grained, moderate yellowish brown, dry, loose, abundant roots and rootlets.	
	½ to 5	PICO FORMATION (Tp): Silty Sandstone; very fine- to fine-grained, pale olive gray, slightly moist, moderately hard, laminated to 1± inch bedding, possibly creep affected.	
	5 to 7	Silty Sandstone; fine-grained, pale olive, slightly moist, moderately hard to hard, massive.	
		Bedding Attitudes: @ 2 feet, N10E, 36NW @ 5 feet, N50E, 42 NW	
		Total Depth 7 feet. No water, no caving.	
EP-38	0 to ½	SOIL: Silty Sand; fine- to medium-grained, moderate to dark yellowish brown, dry, loose, porous, abundant roots and rootlets..	
	½ to 2	SAUGUS FORMATION – SUNSHINE RANCH MEMBER (Tsr): Silty Sandstone; medium- to very coarse-grained with pebbles and cobbles of quartzite and granitics (Mt. Lowe), pale yellowish orange, slightly moist, moderately hard, poorly cemented, slightly layered generally massive.	
	2 to 6	PICO FORMATION (Tp): Sandy Siltstone; very fine-grained, moderate yellowish brown, slightly moist, moderately hard/firm, slightly laminated, generally massive.	
		Contact Attitude: @ 2 feet, N65W, 67NE Bedding Attitude: @ 4 feet, N55W, 54NE	
		Total Depth 6 feet. No water, no caving.	

TABLE II

LOG OF EXPLORATORY PITS

Exploratory Pits	Depth (feet)	Description — Logged by: CRN, Date Logged: 07/05/01
EP-39	0 to 17	COLLUVIUM (Qcol): Sandy Silt; very fine-grained Sand, moderate yellowish brown, dry to slightly moist at depth, soft to firm at depth, wet at bottom. Total Depth 17 feet. No water, no caving.
EP-40	0 to 9	ALLUVIUM (Qal): Silty Sand to Sandy Silt; fine-grained, moderate yellowish brown, dry to slightly moist at depth, loose/soft to moderately dense/firm at depth, roots to 5± feet in depth.
	9 to 10	SAUGUS FORMATION – SUNSHINE RANCH MEMBER (Tsr): Silty Sandstone; fine- to medium-grained, yellowish gray, moist, hard, massive. Total Depth 10 feet. No water, no caving.
EP-41	0 to 1	SOIL: Silty Sand; fine- to coarse-grained, dark yellowish brown, dry, loose, abundant roots and rootlets.
	1 to 3	SAUGUS FORMATION – SUNSHINE RANCH MEMBER (Tsr): Pebbly Sandstone; medium- to very coarse-grained, yellowish gray, slightly moist, moderately hard, abundant roots, normal grading.
	3 to 5	Silty Sandstone; fine- to medium-grained, yellowish gray, slightly moist, moderately hard, massive. Bedding Attitude: @ 3 feet, N70W, 32NE Total Depth at 5 feet. No water, no caving.

TABLE II

LOG OF EXPLORATORY PITS

Exploratory Pits	Depth (feet)	Description	Logged by: CRN Date Logged: 07/05/01
EP-42	0 to 1½	SOIL: Silty Sand; fine- to coarse-grained with pebbles and cobbles, dark yellowish brown, dry, loose, abundant roots and rootlets.	
	1½ to 6	SAUGUS FORMATION – SUNSHINE RANCH MEMBER (Tsr): Silty Sandstone; fine- to medium-grained, mottled yellowish gray and light brown, slightly moist, hard, ¼ to 3±-inch beds. @ 4 feet; 6± inch thick carbonaceous layer, brownish black, abundant sulfur deposits. Bedding Attitude: @ 4 feet, N65W, 28NE Total Depth 6 feet. No water, no caving.	
EP-43	0 to 1½	SOIL: Sandy Silt; very fine-grained, dark yellowish brown, dry to slightly moist, soft, abundant rootlets.	
	1½ to 6	SAUGUS FORMATION – SUNSHINE RANCH MEMBER (Tsr): Silty Sandstone; very fine- to fine-grained, pale olive gray, slightly moist, moderately hard to hard, slightly bedded generally massive. Bedding Attitude: @ 4 feet, N70W, 45NE Total Depth 6 feet. No water, no caving.	

TABLE II

LOG OF EXPLORATORY PITS

Exploratory Pits	Depth (feet)	Description	Logged by: CRN Date Logged: 07/05/01
EP-44	0 to 1	SOIL: Sandy Silt to Silty Sand; very fine- to fine-grained, moderate to dark yellowish brown, slightly moist, soft/loose, abundant roots and rootlets.	
	1 to 5	SAUGUS FORMATION – SUNSHINE RANCH MEMBER (Tsr): Silty Sandstone; fine- to medium-grained with some coarse-grained layers with pebbles, pale yellowish gray, slightly moist, moderately hard, bedded. Bedding Attitude: @ 4 feet, N60W, 43NE Total Depth 5 feet. No water, no caving.	
EP-45	0 to 7	ALLUVIUM (Qal): Silty Sand; very fine- to medium-grained, pale to moderate yellowish brown, dry to slightly moist at depth, loose to moderately dense at depth.	
	7 to 14	Pebbly Sand; medium- to coarse-grained with cobbles, moderate yellowish brown, moist, moderately dense. Total Depth 14 feet. No water, no caving.	

TABLE II

LOG OF EXPLORATORY PITS

Exploratory Pits	Depth (feet)	Description	Logged by: CRN Date Logged: 07/05/01
EP-46	0 to 2½	SOIL: Silty Sand; fine- to coarse-grained, dark yellowish brown, dry, loose, abundant roots and rootlets.	
	2½ to 9	SAUGUS FORMATION – SUNSHINE RANCH MEMBER (Tsr): Pebbly Sandstone, medium- to coarse-grained with cobbles, yellowish orange, slightly moist, moderately hard to hard, bedded.	
		Bedding Attitudes: @ 5 feet, N55W, 36NE @ 8 feet, N40W, 32NE	
		Total Depth 9 feet. No water, no caving.	
EP-47	0 to 5	COLLUVIUM (Qcol): Silty Sand; fine- to coarse-grained with pebbles, dark yellowish brown, dry, loose to moderately dense, abundant roots and rootlets.	
	5 to 9	SAUGUS FORMATION – SUNSHINE RANCH MEMBER (Tsr): Pebbly Sandstone; medium- to coarse-grained with pebbles and cobbles, yellowish gray, slightly moist, moderately hard to hard, slightly layered, generally massive, some scour in fill structures.	
		Bedding Attitude – Approximate: @ 8 feet, N50W, 30NE	
		Total Depth 9 feet. No water, no caving.	

TABLE II

EXPLORATORY PITS

Log No.	Depth (ft.)	Description	Logged: 1-26-04 By: CRN
EP-101	0 to 2	SOIL: Sandy Silt; fine-, dark yellowish brown, slightly moist, loose, soft, abundant roots, and rootlets.	
	2 to 7	PICO FORMATION (Tp): Clayey Siltstone; pale yellowish green, slightly moist, moderately hard, massive to slightly bedded.	
		Attitude: Bedding @ 4 feet, N30E 50 SE	
		Total Depth 7 feet.	
EP-102	0 to 7	COLLUVIUM (Qcol): Sandy Silt to Silty Sand; fine-grained, moderate to light yellowish brown to yellowish green at depth, slightly moist, loose, abundant roots and rootlets.	
	7 to 9	PICO FORMATION (Tp): Clayey Siltstone; pale yellowish green, slightly moist, moderately hard, massive to slightly bedded, moderately weathered.	
		Attitude: Bedding @ 8 feet, N70E 41 SE	
		Total Depth 9 feet.	
EP-103	0 to 2	SOIL: Sandy Silt; fine-grained, moderate yellowish brown, slightly moist, loose, abundant roots and rootlets.	
	2 to 6	PICO FORMATION (Tp): Sandy Siltstone; fine-grained, pale yellowish green, dry to slightly moist, moderate hard, massive, upper 3 to 4± feet highly weathered with abundant roots and rootlets.	
		Total Depth 6 feet.	

TABLE II

EXPLORATORY PITS

Log No.	Depth (ft.)	Description	Logged: 1-26-04 By: CRN
EP-104	0 to 2	SOIL/COLLUVIUM (Qcol): Clayey Silt; moderate yellowish brown, slightly moist, soft, abundant roots and rootlets.	
	2 to 7	PICO FORMATION (Tp): Sandy Siltstone; fine-grained, pale yellowish green, dry to slightly moist, moderate hard, massive, weathered 2± feet, some shell fragments, some roots to depth.	
		Total Depth 7 feet.	
EP-105	0 to 5	COLLUVIUM (Qcol): Sandy to Clayey Silt; moderate yellowish brown to pale yellowish green, slightly moist, loose, abundant roots and rootlets.	
	5 to 8	PICO FORMATION (Tp): Sandy Siltstone; fine-grained, pale yellowish green, dry to slightly moist, moderate hard, massive, weathered 2± feet, some shell fragments, some roots to depth.	
		Total Depth 8 feet.	
EP-106	0 to 10	COLLUVIUM (Qcol): Sandy to Clayey Silt; moderate yellowish brown to pale yellowish green, slightly moist, loose, abundant roots and rootlets.	
	10 to 12	PICO FORMATION (Tp): Clayey Siltstone; pale yellowish green, slightly moist, moderately hard, massive, moderately weathered, some white carbonate.	
		Total Depth 12 feet.	

TABLE II

EXPLORATORY PITS

Log No.	Depth (ft.)	Description	Logged: 1-26-04 By: CRN
EP-107	0 to 1	SOIL: Sandy to Clayey Silt; fine-grained, moderate yellowish brown, slightly moist, loose, abundant roots and rootlets.	
	1 to 7	PICO FORMATION (Tp): Silty Sandstone; fine-grained, pale yellowish green, slightly moist, moderately hard, laminated to ½± inch bedding, top 2± feet highly weathered with abundant roots and rootlets, some white carbonate. Attitude: Bedding @ 6 feet, N50E 53NW Total Depth 7 feet.	
EP-108	0 to 1	SOIL: Sandy to Clayey Silt; fine-grained, moderate yellowish brown, slightly moist, loose, abundant roots and rootlets.	
	1 to 6	PICO FORMATION (Tp): Silty Sandstone; fine-grained, pale yellowish green, slightly moist, moderately hard to hard at depth, slightly bedded, generally massive, upper 2± feet highly weathered with abundant roots. Attitude: Bedding @ 5 feet, N10E 56NW Total Depth 6 feet.	
EP-109	0 to 2	SOIL: Sandy to Clayey Silt; fine-grained, moderate yellowish brown, slightly moist, loose, abundant roots and rootlets.	
	2 to 7	PICO FORMATION (Tp): Silty Sandstone; fine-grained, pale yellowish green, slightly moist, moderately hard, laminated to ½± inch bedding, top 2± feet highly weathered. Attitude: Bedding @ 6 feet, N80E 36NW Total Depth 7 feet.	

TABLE II

EXPLORATORY PITS

Log No.	Depth (ft.)	Description	Logged: 1-26-04 By: CRN
EP-110	0 to 2	SOIL: Silty Sand to Sandy Silt; fine-grained, moderate yellowish brown, slightly moist, loose, abundant roots and rootlets.	
	2 to 8	PICO FORMATION (Tp): Silty to Clayey Sandstone; fine-grained, pale yellowish green, slightly moist, moderately hard, laminated to ½± inch bedding, top 2± feet highly weathered.	
		Attitude: Bedding @ 6 feet, E-W 57N	
		Total Depth 8 feet.	
EP-111	0 to 7	COLLUVIUM (Qcol): Silty to Clayey Sand; fine-grained, dark to moderate yellowish brown, slightly moist, loose, abundant roots and rootlets.	
	7 to 9	PICO FORMATION (Tp): Silty Sandstone; fine- with some medium-grained, pale yellowish green, slightly moist, moderately hard, slightly bedded, generally massive.	
		Attitude: Bedding @ 8 feet, N50W 47NE	
		Total Depth 9 feet.	
EP-112	0 to 1	SOIL: Silty Sand to Sandy Silt; fine-grained, moderate yellowish brown, slightly moist, loose, abundant roots and rootlets.	
	1 to 6	PICO FORMATION (Tp): Silty Sandstone; fine-grained, pale yellowish green, slightly moist, moderately hard, top 2 to 3± feet highly weathered.	
		Attitude: Bedding @ 5 feet, N60E 52NE	
		Total Depth 6 feet.	

TABLE II

EXPLORATORY PITS

Log No.	Depth (ft.)	Description	Logged: 1-26-04 By: CRN
EP-113	0 to 2	SOIL: Silty Sand to Sandy Silt; fine-grained, moderate yellowish brown, slightly moist, loose, abundant roots and rootlets.	
	2 to 7	PICO FORMATION (Tp): Silty Sandstone; fine-grained, pale yellowish green, slightly moist, moderately hard, slightly bedded, generally massive.	
		Total Depth 7 feet.	
EP-114	0 to 6	COLLUVIUM (Qcol): Silty to Clayey Sand; fine-grained, dark yellowish brown to moderate yellowish brown at depth, slightly moist, loose, abundant roots and rootlets.	
	6 to 8	PICO FORMATION (Tp): Silty Claystone; mottled olive and moderate reddish brown, moist, firm, generally massive, abundant white carbonate.	
		Attitude: Bedding @ 7 feet, N70W 46NE	
		Total Depth 8 feet.	
EP-115	0 to 3	SOIL: Sandy to Clayey Silt; fine-grained, moderate yellowish brown, moist, loose, abundant roots and rootlets.	
	3 to 7	PICO FORMATION (Tp): Clayey Sandstone; fine-grained, pale olive, slightly moist to moist, moderately hard, laminated to massive, top 2± feet highly weathered with abundant white carbonate.	
		Attitude: Bedding @ 5 feet, EW33N	
		Total Depth 7 feet.	
EP-116	0 to 2	SOIL: Silty Sand; very fine- to fine-grained, moderate yellowish brown, moist, loose, abundant roots and rootlets.	
	2 to 9	PICO FORMATION (Tp): Silty Sandstone; very fine- to fine-grained, some interbeded, medium- to coarse-grained Sand with pebbles, pale yellowish gray, dry to slightly moist, medium hard, generally massive.	
		Attitude: Bedding @ 7 feet, E-W 37N	
		Total Depth 9 feet.	

TABLE II

EXPLORATORY PITS

Log No.	Depth (ft.)	Description	Logged: 1-26-04 By: CRN
EP-117	0 to ½	SOIL: Silty Sand to Sandy Silt; fine-grained, moderate yellowish brown, slightly moist, loose, abundant roots and rootlets.	
	½ to 6	PICO FORMATION (Tp): Silty Sandstone; very fine- to fine-grained, pale yellowish green, slightly moist, moderately hard, slightly bedded, massive, some shell fragments.	
		Total Depth 6 feet.	
EP-118	0 to 4	SOIL/COLLUVIUM (Qcol): Silty Sand to Sandy Silt; fine-grained, moderate yellowish brown, slightly moist, loose, abundant roots and rootlets.	
	4 to 6	PICO FORMATION (Tp): Clayey Sandstone; fine-grained, moderate yellowish green, slightly moist, moderate hard, slightly bedded, generally massive.	
		Attitude: Approximate Bedding @ 5 feet; E-W 27N	
		Total Depth 6 feet.	
EP-119	0 to 2	SOIL: Silty Sand to Sandy Silt; fine-grained, moderate yellowish brown, slightly moist, loose, abundant roots and rootlets.	
	2 to 8	PICO FORMATION (Tp): Clayey Sandstone; fine-grained, moderate yellowish brown, slightly moist, loose, laminated to ½± inch bedding.	
		Attitude: Bedding @ 6 feet, N70W 55NE	
		Total Depth 8 feet.	
EP-120	0 to 5	COLLUVIUM (Qcol): Silty to Clayey Sand; fine-grained, moderate yellowish brown, slightly moist to moist, loose, abundant roots and rootlets.	
	5 to 7	PICO FORMATION (Tp): Clayey Siltstone; pale olive, slightly moist, moderately hard, massive, top 1± foot highly weathered with abundant white carbonate.	
		Total Depth 7 feet.	

TABLE II

EXPLORATORY PITS

Log No.	Depth (ft.)	Description	Logged: 1-26-04 By: CRN
EP-121	0 to 1	SOIL: Silty Sand; fine-grained, moderate yellowish brown, slightly moist, loose, abundant roots and rootlets.	
	1 to 6	PICO FORMATION (Tp): Clayey Siltstone; fine-grained, pale yellowish, slightly moist, moderately hard to hard at depth, ½± inch bedding.	
		Attitude: Bedding @ 4 feet, E-W 40N	
		Total Depth 6 feet.	
EP-122	0 to 1	SOIL: Silty Sand; fine-grained, moderate yellowish brown, slightly moist, loose, abundant roots and rootlets.	
	1 to 6	PICO FORMATION (Tp): Clayey Siltstone; fine-, pale yellowish, slightly moist, moderately hard to hard at depth, laminated to ½± inch bedding.	
		Attitude: Bedding @ 5 feet, N80E 46NW	
		Total Depth 6 feet.	
EP-123	0 to 1	SOIL: Sandy Silt to Silty Sand; fine-grained, moderate yellowish brown, slightly moist, loose, abundant roots and rootlets.	
	1 to 7	PICO FORMATION (Tp): Sandy Siltstone; fine-grained, pale olive, slightly moist, moderately hard, laminated to ½± inch bedding, top 2± feet highly weathered.	
		Attitude: Bedding @ 5 feet, N70E 48NW	
		Total Depth 7 feet.	

TABLE II

EXPLORATORY PITS

Log No.	Depth (ft.)	Description	Logged: 1-26-04 By: CRN
EP-124	0 to ½	SOIL: Sandy Silt to Silty Sand; fine-grained, moderate yellowish brown, slightly moist, loose, abundant roots and rootlets.	
	½ to 6	PICO FORMATION (Tp): Silty Sandstone; very fine- to fine-grained, pale yellowish green, slightly moist, moderately hard, laminated to ½± inch bedding, top 2± feet highly weathered. Attitude: Bedding @ 4 feet, N70E 52NE Joint @ 4 feet, N25E Vertical Total Depth 6 feet.	
EP-125	0 to 1	SOIL: Sandy Silt to Silty Sand; fine- to coarse-grained with some pebbles and cobbles, moderate yellowish brown, slightly moist, loose, abundant roots and rootlets.	
	1 to 5	PICO FORMATION (Tp): Silty Sandstone; fine-grained, pale yellowish grey, dry to slightly moist, moderately hard to hard at depth, some thinly interlayered medium- to coarse-grained Sand lenses, generally massive. Attitude: Bedding @ 4 feet, N80W 52NE Total Depth at 5 feet.	
EP-126	1 to 3	SOIL/COLLUVIUM (Qcol): Silty Sand to Sand, Silt; fine-grained, moderate yellow brown, slightly moist, loose, abundant roots and rootlets.	
	3 to 7	PICO FORMATION (Tp): Sandy Siltstone; fine-grained Sand, pale yellowish green, dry to slightly moist, moderately hard, ½± inch bedding, top 2± feet highly weathered with abundant white carbonate. Attitude: Bedding @ 6 feet, N80E 36NW Total Depth 7 feet.	

TABLE II

EXPLORATORY PITS

Log No.	Depth (ft.)	Description	Logged: 1-26-04 By: CRN
EP-127	0 to 9	COLLUVIUM (Qcol): Silty Sand to Sand, Silt; fine-grained, moderate yellow brown, slightly moist, loose, abundant roots and rootlets.	
	9 to 10	PICO FORMATION (Tp): Silty Claystone; olive, moist, moderately firm to firm, some white carbonate.	
		Total Depth 10 feet.	
EP-128	0 to 4	COLLUVIUM/ALLUVIUM (Qcol/Qal): Silty Sand to Sandy Silt; fine-grained, moderate yellow brown, moist, loose to medium dense with depth, some roots and rootlets.	
	4 to 6	PICO FORMATION (Tp): Claystone; olive, moist, moderately firm, laminated to 1± inch bedding, slightly plastic, some white carbonate.	
		Attitude: Bedding @ 5 feet, N60W 52NE	
		Total Depth 6 feet.	
EP-129	0 to 5	COLLUVIUM/ALLUVIUM (Qcol/Qal): Silty Sand to Sandy Silt; fine-grained with some basal cobbles, moderate yellow brown, moist, loose to medium dense with depth, some roots and rootlets.	
	5 to 7	PICO FORMATION (Tp): Claystone; olive, moist, moderately firm, laminated to 1± inch bedding, slightly plastic, some white carbonate.	
		Attitude: Bedding @ 6 feet, N60W 42NE	
		Total Depth 7 feet.	

TABLE II

EXPLORATORY PITS

Log No.	Depth (ft.)	Description	Logged: 1-27-04 By: CRN
EP-130	0 to 1	SOIL: Silty Sand to Sandy, Silt; fine-grained, moderate yellow brown, slightly moist, loose, abundant roots and rootlets.	
	1 to 7	PICO FORMATION (Tp): Sandy Siltstone to Silty Sandstone; very fine- to fine-grained, pale yellowish green, slightly moist, moderately hard, laminated to ½± inch bedding, top 2 to 3± feet highly weathered with some roots and rootlets. Attitude: Bedding @ 6 feet, N30E 33NW Total Depth 7 Feet.	
EP-131	0 to 1½	SOIL: Silty Sand to Sandy, Silt; fine-grained, moderate yellow brown, slightly moist, loose, abundant roots and rootlets.	
	1½ to 6	PICO FORMATION (Tp) (south side of pit): Silty Claystone; mottled olive and moderate yellowish brown, slightly moist, moderately hard, laminated to 1± inch bedding, highly jointed/fractured, some roots and rootlets to depths. Attitude: Bedding @ 5 feet, N40E 48NW FAULT (2 to 3+ inches thick zone): Silty Sand; fine-grained, pale grey, dry, loose, some roots. Attitude: Fault @ 5 feet, N60W Vertical	
	1½ to 6	PICO FORMATION (Tp) (north side of pit): Silty Sandstone; fine-grained, layered pale grey and pale olive, slightly moist, moderately hard, 1 to 6± inch bedding, top 2± feet moderately weathered. Attitude: Bedding @ 5 feet, N60W Vertical Total Depth 6 feet.	

TABLE II

EXPLORATORY PITS

Log No.	Depth (ft.)	Description	Logged: 1-27-04 By: CRN
EP-132	0 to 1	SOIL: Clayey Silt; moderate yellow brown, slightly moist, loose, abundant roots, rootlets and white carbonate.	
	1 to 7	PICO FORMATION (Tp): Interbedded Silty Claystone; mottled olive and moderate yellowish brown, slightly moist, moderately hard, laminated to 1± inch bedding; with Silty Sandstone, fine-grained, pale olive, slightly moist, moderately hard, 2 to 3± inch bedding, top 3± inch bedding, top 3± feet highly weathered. Attitudes: Bedding @ 5 feet, N60W Vertical Bedding @ 6 feet, N30W Vertical Total Depth 7 feet.	
EP-133	0 to ½	SOIL: Clayey Silt; moderate yellow brown, slightly moist, loose, abundant roots, rootlets and white carbonate.	
	½ to 6	PICO FORMATION (Tp): Sandy Siltstone; very fine- to fine-grained, pale yellowish green, slightly moist, moderately hard, laminated to 1± inch bedding, top 2± feet highly weathered with abundant rootlets and some white carbonate. Attitude: Bedding @ 5 feet, N60E 69NW Total Depth 6 feet.	
EP-134	0 to 3	SOIL: Clayey Silt with Sand; fine-grained, moderate yellow brown, slightly moist, loose, abundant roots, rootlets and white carbonate.	
	3 to 5	PICO FORMATION (Tp): Silty Sandstone; fine- to coarse-grained, pale grey, dry, moderately hard, massive, abundant shells.	
	5 to 8	Silty Claystone; mottled olive and moderate yellow brown, slightly moist, moderately hard, slightly bedded generally massive. Attitude: Bedding @ 7 feet, N50W 58NE Total Depth 8 feet.	

TABLE II

EXPLORATORY PITS

Log No.	Depth (ft.)	Description	Logged: 1-27-04 By: CRN
EP-135	0 to 2½	SOIL: Sandy Silt; fine-grained, moderate yellow brown, dry to slightly moist, loose, abundant roots and rootlets.	
	2½ to 7	PICO FORMATION (Tp): Silty Sandstone; moderate yellow brown, slightly moist, loose, top 2± feet highly weathered with roots and rootlets.	
		Attitude: Bedding @ 6 feet, N60W 49NE	
		Total Depth 7 feet.	
EP-136	0 to 1	SOIL: Sandy Silt; fine-grained, moderate yellow brown, dry to slightly moist, loose, abundant roots and rootlets.	
	1 to 8	PICO FORMATION (Tp): Silty Claystone; moderate yellow brown, slightly moist, loose, top 3± feet highly weathered, with roots and rootlets; some interbedded Silty Sandstone, fine-grained, pale to moderate yellowish grey, dry, moderately hard, 1 to 2± inch bedding.	
		Attitude: Bedding @ 7 feet, N40W 72SW	
		Total Depth 8 feet.	
EP-137	0 to 5	SOIL/COLLUVIUM (Qcol): Sandy Silt to Silty Sand; fine-grained, moderate yellow brown, dry to slightly moist, loose, abundant roots and rootlets.	
	5 to 12	PICO FORMATION (Tp): Silty Claystone; moderate yellow brown, slightly moist, loose, top 3± feet highly weathered, with roots and rootlets; some interbedded Silty Sandstone, fine-grained, pale to moderate yellowish grey, dry, moderately hard, 1 to 2± inch bedding.	
		Attitude: Bedding @ 11 feet, N50W 52NE	
		Total Depth 12 feet.	

TABLE II

EXPLORATORY PITS

Log No.	Depth (ft.)	Description	Logged: 1-27-04 By: CRN
EP-138	0 to 7	SAUGUS FORMATION-SUNSHINE RANCH MEMBER (Tsr): Silty Sandstone; fine- to coarse-grained with pebbles and cobbles, pale yellowish brown to pale grey, slightly moist, moderately hard, slightly bedded generally massive with some scour fill structure. Attitude: Bedding @ 6 feet, N40W 37NE Note: Soil removed by dozer during recent fire fighting operations. Total Depth 7 feet.	
EP-139	0 to ½	SOIL: Silty Sand; fine- to coarse-grained with pebbles and cobbles, moderate yellowish brown, slightly moist, loose, some roots and rootlets.	
	½ to 5	SAUGUS FORMATION-SUNSHINE RANCH MEMBER (Tsr): Silty Sandstone; fine- to coarse-grained with pebbles and cobbles, pale yellowish brown to pale grey, slightly moist, moderately hard, slightly bedded generally massive with some scour fill structure. Attitude: Approximate Bedding @ 4 feet E-W 30N Total Depth 5 feet.	
EP-140	0 to ½	SOIL: Silty Sand; fine- to coarse-grained with pebbles and cobbles, moderate yellowish brown, slightly moist, loose, some roots and rootlets.	
	½ to 6	SAUGUS FORMATION-SUNSHINE RANCH MEMBER (Tsr): Silty Sandstone; fine- to coarse-grained with pebbles and cobbles, pale yellowish brown to pale grey, slightly moist, moderately hard, slightly bedded generally massive with some scour fill structure. Attitude: Bedding @ 5 feet, N80E 28NW Total Depth 6 feet.	

TABLE II

EXPLORATORY PITS

Log No.	Depth (ft.)	Description	Logged: 1-27-04 By: CRN
EP-141	0 to 3	SOIL: Silty to Clayey Sand; very fine- to medium-grained with some pebbles, dark yellowish brown, moist, soft, some roots and rootlets.	
	3 to 8	SAUGUS FORMATION-SUNSHINE RANCH MEMBER (Tsr): Gravelly Sandstone; fine- to coarse-grained with pebbles and cobbles, some boulders up to 18± inches, pale yellowish brown, slightly moist, moderately hard, massive, matrix supported, top 2± feet highly weathered.	
		Total Depth 8 feet.	
EP-142	0 to 3	SOIL/COLLUVIUM (Qcol): Silty Sand; fine- to coarse-grained with pebbles and cobbles, moderate to dark yellow brown, moist, loose some roots and rootlets.	
	3 to 9	SAUGUS FORMATION-SUNSHINE RANCH MEMBER (Tsr): Gravelly Sandstone; fine- to coarse-grained with pebbles and cobbles, pale yellowish grey to pale grey, slightly moist, moderately hard, massive with interlayered pebbles and cobbles lenses.	
		Attitude: Bedding @ 8 feet, E-W 33N	
		Total Depth 9 feet.	
EP-143	0 to ½	SOIL: Silty Sand; fine- to medium-grained, moderate yellowish brown, slightly moist, loose, some roots and rootlets. Note: Some soil removed during recent fire fighting operations.	
	½ to 6	SAUGUS FORMATION-SUNSHINE RANCH MEMBER (Tsr): Silty Sandstone; fine- to medium-grained, pale grey, slightly moist, moderately hard, slightly bedded generally massive.	
		Attitude: Bedding @ 4 feet, N60W 32NE	
		Total Depth 6 feet.	

TABLE II

EXPLORATORY PITS

Log No.	Depth (ft.)	Description	Logged: 1-27-04 By: CRN
EP-144	0 to 5	SOIL/COLLUVIUM (Qcol): Silty Sand; fine- to medium-grained, moderate yellow brown, slightly moist to moist, loose, abundant roots and rootlets.	
	5 to 9	SAUGUS FORMATION-SUNSHINE RANCH MEMBER (Tsr): Pebbly Sandstone; fine- to coarse-grained, pale grey, slightly moist, moderately hard, massive with some interlayered pebble and cobbles lenses. Attitude: Bedding @ 7 feet, N70W 32NE Total Depth 9 feet.	

TABLE I

EXPLORATORY TRENCH LOGS

Log No.	Depth (ft.)	Description	Logged: 1-31-06 By: RHS
EP-201	0 to 2	SOIL: Sandy Clay; dark yellowish brown, slightly moist, firm, rootlets common, clusters of small bi-valve shells.	
	2 to 9	SAUGUS FORMATION - SUNSHINE RANCH MEMBER (Tsr): Sandy Siltstone; light olive gray with reddish brown stain, dry, soft, highly fractured, weathered.	
	@ 9	Fine- to medium-grained Sandstone, pinkish gray, soft, poorly cemented, some pebbles, probable cross-bed.	
		Bedding Attitude: N65E, 28NW	
		Total Depth 9 feet.	
EP-202	0 to 2	SAUGUS FORMATION - SUNSHINE RANCH MEMBER (Tsr): Fine- to medium-grained Sandstone, pinkish gray, dry, soft, many pebbles and small cobbles.	
	2 to 5	Sandy Siltstone, pale yellowish brown, slightly moist, soft, moderately fractured, rootlet to depth.	
	5 to 6	Sandstone, pinkish gray, dry, soft.	
		Bedding Attitude: N55W, 35NE	
		Total Depth 6 feet.	
EP-203	0 to 2	SOIL: Sandy Silt; dark yellowish brown, slightly moist, stiff, many pebbles.	
	2 to 4½	SAUGUS FORMATION - SUNSHINE RANCH MEMBER (Tsr): Fine- to medium-grained Sandstone, pinkish gray, slightly moist, soft, poorly cemented.	
	4½ to 7	Siltstone, light olive gray, slightly moist, soft to moderately hard.	
		Bedding Attitude: N80E, 45NW	
		Total Depth 7 feet.	

TABLE I

EXPLORATORY TRENCH LOGS

Log No.	Depth (ft.)	Description	Logged: 1-31-06 By: RHS
EP-204	0 to 6½	SAUGUS FORMATION - SUNSHINE RANCH MEMBER (Tsr): Fine- to coarse-grained Sandstone, soft to moderately hard, dry, poorly cemented, pebble and small cobble beds and lenses.	
		Bedding Attitude: EW, 40N	
		Total Depth 6½ feet.	
EP-205	0 to 2	SOIL: Silty Clay; dark yellowish brown, moist, stiff, porous.	
	2 to 10	SAUGUS FORMATION - SUNSHINE RANCH MEMBER (Tsr): Sandy Siltstone, light olive gray, slightly moist, soft to moderately hard at depth, white carbonate pods common.	
	@ 6 & 8	Silty Sandstone; very light olive gray, slightly moist, moderately hard, 6 to 12 inch thick interbeds.	
		Bedding Attitude: N85W, 30NE	
		Ring and Bulk samples at 6 and 10 feet.	
		Total Depth 8 feet.	
EP-206	0 to ¼	SOIL: Sandy Silt; moderate yellowish brown, dry, firm, porous.	
	¼ to 5	SAUGUS FORMATION - SUNSHINE RANCH MEMBER (Tsr): Fine- to medium-grained Sandstone, pinkish gray, dry, soft to moderately hard, poorly cemented, roots to depth.	
	@ 3	8 to 10-inch thick Silty Sandstone-pebble conglomerate, grayish orange, dry, soft, one small cobble.	
		Bedding Attitude: N70W, 45NE	
		Total Depth 5 feet.	

TABLE I

EXPLORATORY TRENCH LOGS

Log No.	Depth (ft.)	Description	Logged: 1-31-06 By: RHS
EP-207	0 to ½	SOIL: Sandy Silt; dark yellowish brown, moist, firm, abundant rootlets.	
	½ to 3½	PICO FORMATION (Tp): Silty Sandstone; very pale orange to yellowish gray, slightly moist, soft, red brown stain common.	
		Bedding Attitude: N55W, 40NE	
		Total Depth 3½ feet.	

GOLD COAST GEOSERVICES, INC.

SUB-SURFACE DATA — BORING LOG NO. B-1

PROJECT: D.R. HORTON - LYONS CANYON RANCH, SANTA CLARITA — FILE NO.: GC14-122536

ELEVATION: SEE PLATE 1 — DATE: 02/09/15

METHOD: 6-inch Hollow Stem Auger — DRILLING CO.: HD DRILLING

DEPTH (FT)	SAMPLE: BULK	SAMPLE: RING	BLOWCOUNT: FIELD (N)	BLOWCOUNT: N(60)	MOISTURE %	DENSITY	SIEVE: % PASSING # 200 SCREEN	GRAPHIC LOG	DESCRIPTION AND REMARKS
0									**ALLUVIUM - Qal - (0' - 60')**
-	SPT		2	2.8					
-									2.5' - Dark brown very fine- to fine-grained silty sand with
-	SPT		5	6.9					pebbles, moist, loose.
-		X	13	10.0	9.4	98.9			5' - Medium brown very fine-grained silty sand, slightly moist, loose.
-	SPT		6	8.3					7.5' - Light to medium brown very fine-grained silty sand, damp, slightly firm.
-									
10	SPT		12	16.6					10' - Medium brown fine- to medium-grained sand, slightly damp, slightly firm.
-									
-	SPT		4	5.5					12.5' - 15' - Medium to dark brown very fine-grained silty sand, slightly
-	SPT		4	5.5					damp, slightly firm.
-		X	13	10.0	9.7	100.6			
-	SPT		5	6.9					17.5' - 20' - Dark brown very fine-grained silty sand, slightly damp, firm.
-									
20	SPT		15	20.7					
-									
-	SPT		32	44.2					22.5' - 25' - Medium brown fine- to coarse grained sand containing
-									pebbles, slightly damp, firm.
-	SPT		35	48.3					27.5' - 30' - Medium brown fine- to coarse-grained sand, slightly damp,
-		x	57	43.7	8.3	104.3			firm.
-	SPT		34	46.9					
30	SPT		32	44.2					
-									
-	SPT		32	44.2					32.5' - Cobble/boulder
-									
-	SPT		39	53.8					35' - 40' - Medium brown fine- to medium-grained silty sand, dry, firm.
-		X	59	45.2	9.2	106.7			
-	SPT		43	59.3					
40	SPT		40	55.2					40' - Medium to dark brown fine-grained silty sand containing gravel, slightly
-									moist, dense
-	SPT		35	48.3					42.5' - 45' - Medium brown very fine- to medium-grained clayey to silty sand
-									slightly moist, firm.
-	SPT		35	48.3					
-		X	62	47.5	7.8	110.4			47.5' - Medium brown very fine- to medium-grained silty sand, humid, firm.
-	SPT		32	44.2					
50	SPT		37	51.1					50' - 55' - Medium brown fine- to coarse-grained gravelly silty sand,
-									humid, firm.
-	SPT		46	63.5					
-									
-	SPT		40	55.2					55' - 60' - Medium brown fine- to coarse-grained silty gravelly sand, humid,
-		X	64	49.1	7.6	113.3			firm.
-	SPT		46	63.5					
60	SPT		44	60.7					End at 60'

Comments: The following correction factors were utilized to determine $N_{(60)}$ (Per SP117)
Cb = 1.15 (8" Diameter Borehole); Cs = 1.2 (SPT Sampler without liner); Cs = 2/3 (California Sampler)

Notes: TOTAL DEPTH: 60' GROUNDWATER: NO REFUSAL/CAVING: NO BACKFILLED: YES

PLATE 2.1

GOLD COAST GEOSERVICES, INC.

SUB-SURFACE DATA — BORING LOG NO. B-2

PROJECT: D.R. HORTON - LYONS CANYON RANCH, SANTA CLARITA — FILE NO.: GC14-122536

ELEVATION: SEE PLATE 1 — DATE: 02/09/15

METHOD: 6-inch Hollow Stem Auger — DRILLING CO.: HD DRILLING

DEPTH (FT)	SAMPLE: BULK	SAMPLE: RING	BLOWCOUNT: FIELD (N)	BLOWCOUNT: N(60)	MOISTURE %	DENSITY	SIEVE: % PASSING # 200 SCREEN	GRAPHIC LOG	DESCRIPTION AND REMARKS
0									**ALLUVIUM - Qal - (0' - 60')**
-	SPT		7	9.7					2.5' - Dark brown very fine- to fine-grained silty sand, moist, loose.
-									
-	SPT		9	12.4					5' - Medium brown very fine-grained silty sand, humid, slightly firm.
-		X	18	13.8	11.4	98.2			
-	SPT		6	8.3					7.5' - Medium brown very fine-to fine-grained silty sand, humid, slightly firm.
-									
10	SPT		6	8.3					10' - Dark brown very fine- to fine-grained silty sand, humid, slightly firm.
-									
-	SPT		7	9.7					12.5' - 15' - Medium brown very fine- to fine-grained silty sand, humid,
-	SPT		5	6.9					loose to slightly firm.
-		X	18	13.8	10.7	104.7			
-	SPT		11	15.2					17.5' - 27.5' - Dark brown very fine-grained silty sand, humid, slightly firm.
-									
20	SPT		18	24.8					
-									
-	SPT		22	30.4					
-									
-	SPT		28	38.6					
-		x	48	36.8	10.3	107.3			27.5' Medium to dark brown fine- to very coarse-grained silty sand
-	SPT		28	38.6					
30	SPT		29	40.0					30' - 32.5' - Dark brown to medium reddish brown fine- to coarse-grained
-									silty sand containing pebbles to gravel, humid, firm.
-	SPT		27	37.3					
-									35' - Medium brown fine- to medium-grained silty sand, slightly moist, firm.
-	SPT		29	40.0					
-		X	55	42.2	8.2	112.8			37.5' - 40' - Medium reddish brown fine- to very coarse-grained pebbly
-	SPT		42	58.0					silty sand, humid, dense.
40	SPT		36	49.7					
-									
-	SPT		38	52.4					42.5' - Medium brown very fine- to fine-grained clayey to silty sand,
-									humid, firm.
-	SPT		40	55.2					45' - Medium reddish brown fine- to very coarse-grained pebbly to gravelly
-		X	68	52.1	8.4	118.0			sand, slightly moist, dense.
-	SPT		37	51.1					
50	SPT		39	53.8					47.5' - 50' - Dark brown very fine- to fine-grained clayey to silty sand,
-									slightly moist, firm.
-	SPT		56	77.3					52.5' - 60' - Medium brown fine- to coarse-grained pebbly to gravelly sand,
-									humid, dense.
-	SPT		50 for 6"						
-									
-	SPT		50 for 6"						
60	SPT								End at 60'

Comments: The following correction factors were utilized to determine N(60) (Per SP117)
Cb = 1.15 (8" Diameter Borehole); Cs = 1.2 (SPT Sampler without liner); Cs = 2/3 (California Sampler)

Notes: TOTAL DEPTH: 57.5' GROUNDWATER: NO REFUSAL/CAVING: NO BACKFILLED: YES

PLATE 2.2

GOLD COAST GEOSERVICES, INC.

SUB-SURFACE DATA — BORING LOG NO. B-3

PROJECT: D.R. HORTON - LYONS CANYON RANCH, SANTA CLARITA — FILE NO.: GC14-122536

ELEVATION: SEE PLATE 1 — DATE: 02/09/15

METHOD: 6-inch Hollow Stem Auger — DRILLING CO.: HD DRILLING

DEPTH (FT)	SAMPLE: BULK	SAMPLE: RING	BLOWCOUNT: FIELD (N)	BLOWCOUNT: N(60)	MOISTURE %	DENSITY	SIEVE: % PASSING # 200 SCREEN	GRAPHIC LOG	DESCRIPTION AND REMARKS
0									**ALLUVIUM - Qal - (0' - 60')**
-	SPT		4	5.5					2.5' - 5' - Medium to dark brown very fine- to fine-grained silty sandy clay
-									containing pebbles, moist, slightly firm.
-	SPT		3	4.1					5' - 15' - Dark brown very fine-grained silty sand, humid, loose.
-		X	11	8.4	15.9	102.0			
-	SPT		4	5.5					
-									
10	SPT		4	5.5					
-									
-	SPT		3	4.1					
-	SPT		11	15.2					15' - Medium brown fine- to medium-grained silty sand, humid, slightly firm.
-		X	34	26.1	5.5	105.8			17.5' - 30' - Medium brown fine- to coarse-grained silty sand, humid, dense.
-	SPT		18	24.8					
-									
20	SPT		17	23.5					
-									
-	SPT		28	38.6					
-									
-	SPT		27	37.3					
-		x	48	36.8	6.0	115.4			
-	SPT		27	37.3					
30	SPT		25	34.5					30' - Medium brown very fine- to fine-grained silty sand, humid, firm.
-									
-	SPT		27	37.3					32.5' - Medium to dark brown fine- to coarse-grained silty sand containing
-									gravel, humid, dense.
-	SPT		55 FOR 6"						35' - Cobble/boulder
-		X	51	39.1	8.3	114.3			37.5' - 42.5' - Medium brown very fine- to fine-grained silty sand, humid, firm.
-	SPT		32	44.2					
40	SPT		35	48.3					
-									
-	SPT		43	59.3					42.5' - 47.5' - Medium brown fine- to medium-grained silty sand containing
-									gravel, humid, dense.
-	SPT		32	44.2					
-		X	57	43.7	5.6	116.2			
-	SPT		34	46.9					
50	SPT		37	51.1					50' - Medium brown fine-grained silty sand, humid, dense.
-									
-	SPT		33	45.5					52.5' - Medium brown very fine- to fine-grained clayey to silty sand, slightly
-									moist, firm.
-	SPT		60	82.8					55' - 60' - Medium reddish brown fine- to very coarse-grained silty sand,
-	X		82	62.9	4.3	126.2			humid, dense.
-	SPT		67 FOR 6"						
60	SPT		64 FOR 5"						End at 60'

Comments: The following correction factors were utilized to determine N(60) (Per SP117)
Cb = 1.15 (8" Diameter Borehole); Cs = 1.2 (SPT Sampler without liner); Cs = 2/3 (California Sampler)

Notes: TOTAL DEPTH: 60' GROUNDWATER: NO REFUSAL/CAVING: NO BACKFILLED: YES

PLATE 2.3

GOLD COAST GEOSERVICES, INC.

SUB-SURFACE DATA — BORING LOG NO. B-4

PROJECT: D.R. HORTON - LYONS CANYON RANCH, SANTA CLARITA — FILE NO.: GC14-122536

ELEVATION: SEE PLATE 1 — DATE: 02/10/15

METHOD: 6-inch Hollow Stem Auger — DRILLING CO.: HD DRILLING

DEPTH (FT)	SAMPLE: BULK	SAMPLE: RING	BLOWCOUNT: FIELD (N)	BLOWCOUNT: N(60)	MOISTURE %	DENSITY	SIEVE: % PASSING # 200 SCREEN	GRAPHIC LOG	DESCRIPTION AND REMARKS
0									**ALLUVIUM - Qal - (0' - 50')**
-	SPT		8	11.0					2.5' - Dark brown fine- to coarse-grained silty sand, slightly moist, firm.
-									
-	SPT		7	9.7					5' - 17.5' - Light to medium brown very fine- to fine-grained sand, dry, firm.
-		X	26	19.9	9.4	83.9			
-	SPT		13	17.9					
-									
10	SPT		12	16.6					
-									
-	SPT		8	11.0					
-	SPT		13	17.9					
-		X	20	15.3	8.6	93.0			
-	SPT		8	11.0					17.5' - Dark brown very fine- to fine-grained clayey to silty sand, slightly
-									moist, slightly firm.
20	SPT		16	22.1					20' - Dark brown very fine- to fine-grained silty sand, humid, loose to
-									slightly firm.
-	SPT		22	30.4					22.5' - 25' - Medium brown very fine- to fine-grained clayey to silty sand,
-									humid, slightly firm.
-	SPT		27	37.3					
-		x	48	36.8	12.0	104.4			
-	SPT		25	34.5					27.5' - 30' - Medium brown fine- to coarse-grained clayey to silty sand,
30	SPT		24	33.1					humid to slightly moist, firm.
-									
-	SPT		27	37.3					32.5' - 35' - Medium brown fine- to very coarse-grained clayey to silty sand,
-									humid to slightly moist, firm.
-	SPT		24	33.1					37.5 ' - 50' - Medium brown to medium reddish brown fine- to very coarse-
-		X	46	35.3	8.3	111.0			grained silty sand, humid, dense.
-	SPT		34	46.9					
40	SPT		29	40.0					
-									
-	SPT		36	49.7					
-									
-	SPT		50	69.0					
-		X	50 for 6"		6.7	114.6			
-	SPT		50 for 6"						
50	SPT		70	96.6					End at 50'
-									
-									
-									
-									
-									
-									
60									

Comments: The following correction factors were utilized to determine N(60) (Per SP117)
Cb = 1.15 (8" Diameter Borehole); Cs = 1.2 (SPT Sampler without liner); Cs = 2/3 (California Sampler)

Notes: TOTAL DEPTH: 50' GROUNDWATER: NO REFUSAL/CAVING: NO BACKFILLED: YES

PLATE 2.4

GOLD COAST GEOSERVICES, INC.

SUB-SURFACE DATA — BORING LOG NO. B-5

PROJECT: D.R. HORTON - LYONS CANYON RANCH, SANTA CLARITA — FILE NO.: GC14-122536

ELEVATION: SEE PLATE 1 — DATE: 02/11/15

METHOD: 6-inch Hollow Stem Auger — DRILLING CO.: HD DRILLING

DEPTH (FT)	SAMPLE: BULK	SAMPLE: RING	BLOWCOUNT: FIELD (N)	BLOWCOUNT: N(60)	MOISTURE %	DENSITY	SIEVE: % PASSING # 200 SCREEN	GRAPHIC LOG	DESCRIPTION AND REMARKS
0									**ALLUVIUM - Qal - (0' - 40')**
-	SPT		2	2.8					2.5' - Dark brown very fine- to fine-grained silty sand, moist, loose.
-									
-	SPT		4	5.5					5' - Medium to dark brown very fine- to fine-grained silty sand, humid to
-		X	17	13.0	9.7	105.8			slightly moist, slightly firm.
-	SPT		6	8.3					7.5' - 17.5' - Medium brown to dark brown fine- to medium-grained silty sand,
-									humid, loose to slightly firm.
10	SPT		7	9.7					
-									
-	SPT		8	11.0					
-	SPT		8	11.0					
-		X	24	18.4	7.5	99.4			
-	SPT		12	16.6					17.5' - Medium brown very fine- to fine-grained silty sand, humid, firm
-									
20	SPT		15	20.7					20' - 25' - Light to medium brown very fine- to fine-grained silty sand,
-									humid, firm.
-	SPT		16	22.1					
-									
-	SPT		17	23.5					25' - Medium brown fine- to medium-grained silty sand, humid, firm.
-		x	32	24.5	2.8	108.9			
-	SPT		23	31.7					25' - 30' - Medium brown fine- to very coarse-grained silty sand,
30	SPT		20	27.6					humid, firm.
-									
-	SPT		24	33.1					30' - 40' - Light to medium brown fine- to very coarse-grained silty
-									sand containing gravel, humid, dense very dense.
-	SPT		36	49.7					
-		X	50 for 6"		5.1	117.6			
-	SPT		56	77.3					
40	SPT		67	92.5					40' - Refusal (Saugus Formation ?)
-									End at 40'
-									
-									
-									
-									
-									
-									
50									
-									
-									
-									
-									
-									
-									
60									

Comments: The following correction factors were utilized to determine N(60) (Per SP117)
Cb = 1.15 (8" Diameter Borehole); Cs = 1.2 (SPT Sampler without liner); Cs = 2/3 (California Sampler)

Notes: TOTAL DEPTH: 40' GROUNDWATER: NO REFUSAL/CAVING: NO BACKFILLED: YES

PLATE 2.5

GOLD COAST GEOSERVICES, INC.

SUB-SURFACE DATA — BORING LOG NO. B-6

PROJECT: D.R. HORTON - LYONS CANYON RANCH, SANTA CLARITA — FILE NO.: GC14-122536

ELEVATION: SEE PLATE 1 — DATE: 02/10/15

METHOD: 6-inch Hollow Stem Auger — DRILLING CO.: HD DRILLING

DEPTH (FT)	SAMPLE: BULK	SAMPLE: RING	BLOWCOUNT: FIELD (N)	BLOWCOUNT: N(60)	MOISTURE %	DENSITY	SIEVE: % PASSING # 200 SCREEN	GRAPHIC LOG	DESCRIPTION AND REMARKS
0									**ALLUVIUM - Qal - (0' - 60')**
-	SPT		2	2.8					2.5' - Dark brown very fine- to medium-grained silty sand, slightly moist, loose.
-	SPT		10	13.8					5' - 10' - Light brown very fine- to fine-grained silty sand, humid, firm.
-		X	22	16.9	4.9	96.9			
-	SPT		10	13.8					
10	SPT		9	12.4					10' - Dark brown very fine- to fine-grained silty sand, humid, firm.
-	SPT		13	17.9					12.5' - Dark brown very fine- to fine-grained clayey to silty sand, humid, firm.
-	SPT		6	8.3					15' - Medium to dark brown fine- to medium-grained silty sand,
-		X	18	13.8	7.5	99.8			humid, slightly firm.
-	SPT		9	12.4					17.5' - 35' - Medium brown very fine- to medium-grained silty sand, humid, firm.
20	SPT		12	16.6					
-	SPT		27	37.3					
-	SPT		25	34.5					
-		X	46	35.3	6.1	103.8			
-	SPT		38	52.4					
30	SPT		31	42.8					
-	SPT		33	45.5					
-	SPT		47	64.9					35'- 50' - Medium brown fine- to very coarse-grained silty sand, humid,
-		X	62	47.5	6.0	104.2			dense.
-	SPT		36	49.7					
40	SPT		35	48.3					
-	SPT		39	53.8					
-	SPT		37	51.1					
-		X	66	50.6	6.4	104.8			
-	SPT		39	53.8					
50	SPT		35	48.3					50' - 55' - Dark brown medium- to very coarse-grained clayey to silty sand, slightly moist, dense.
-	SPT		34	46.9					
-	SPT		33	45.5					
-	X		62	47.5	23.9	106.1			57.5' - Dark brown fine- to coarse-grained clayey to silty sand, moist, dense.
-	SPT		37	51.1					60' - Dark brown fine- to coarse-grained clayey to silty sand,saturated, dense.
60	SPT		36	49.7					End at 60'

Comments: The following correction factors were utilized to determine N(60) (Per SP117)
Cb = 1.15 (8" Diameter Borehole); Cs = 1.2 (SPT Sampler without liner); Cs = 2/3 (California Sampler)

Notes: TOTAL DEPTH: 60' GROUNDWATER: NO REFUSAL/CAVING: NO BACKFILLED: YES

PLATE 2.6

GOLD COAST GEOSERVICES, INC.

SUB-SURFACE DATA — BORING LOG NO. B-7

PROJECT: D.R. HORTON - LYONS CANYON RANCH, SANTA CLARITA — FILE NO.: GC14-122536

ELEVATION: SEE PLATE 1 — DATE: 02/11/15

METHOD: 6-inch Hollow Stem Auger — DRILLING CO.: HD DRILLING

DEPTH (FT)	SAMPLE: BULK	SAMPLE: RING	BLOWCOUNT: FIELD (N)	BLOWCOUNT: N(60)	MOISTURE %	DENSITY	SIEVE: % PASSING # 200 SCREEN	GRAPHIC LOG	DESCRIPTION AND REMARKS
0									**ALLUVIUM -Qal - (0' - 60')**
-	SPT		4	5.5					2.5' - Dark brown very fine- to fine-grained silty sand, slightly moist, loose.
-									
-	SPT		1	1.4					5' - 20' - Medium brown very fine- to fine-grained silty sand, humid, slightly
-		X	15	11.5	9.4	88.9			firm.
-	SPT		7	9.7					
-									
10	SPT		10	13.8					
-									
-	SPT		9	12.4					
-	SPT		6	8.3					
-		X	16	12.3	8.2	90.6			
-	SPT		6	8.3					
-									
20	SPT		6	8.3					20' - Medium brown fine- to coarse-grained silty sand, humid, firm.
-									
-	SPT		23	31.7					
-									
-	SPT		22	30.4					25' - Medium brown fine-grained silty sand, humid, slightly firm.
-		x	52	39.9	8.1	104.4			
-	SPT		49	67.6					27.5' - 35' - Medium reddish brown fine- to very coarse-grained sand
30	SPT		54	74.5					containing gravel, dry, dense.
-									
-	SPT		32	44.2					
-									
-	SPT		26	35.9					35' - Medium to dark brown very fine- to fine-grained clayey to silty sand,
-		X	30	23.0	11.3	103.4			slightly moist, slightly firm.
-	SPT		30	41.4					
40	SPT		35	48.3					37.5' - 45' - Medium brown fine- to very coarse-grained pebbly to gravelly
-									sand, dry, dense.
-	SPT		39	53.8					
-									
-	SPT		30	41.4					45' - 50' - Dark brown fine- to coarse-grained clayey to silty sand containing
-		X	29	22.2	9.9	116.7			pebbles, slightly moist, firm to dense.
-	SPT		31	42.8					
50	SPT		44	60.7					50' - 60' - Medium reddish brown fine- to coarse-grained pebbly to gravelly
-									silty sand, slightly moist, dense.
-	SPT		50 for 6"						
-									
-	SPT		63	86.9					
-	X		50 for 6"		3.5	110.0			
-	SPT		50 for 6"						60' - Rock/boulder
60	SPT		50 for 6"						End at 60'

Comments: The following correction factors were utilized to determine N(60) (Per SP117)
Cb = 1.15 (8" Diameter Borehole); Cs = 1.2 (SPT Sampler without liner); Cs = 2/3 (California Sampler)

Notes: TOTAL DEPTH: 60' GROUNDWATER: NO REFUSAL/CAVING: NO BACKFILLED: YES

PLATE 2.7

GOLD COAST GEOSERVICES, INC.

SUB-SURFACE DATA — BORING LOG NO. B-8

PROJECT: D.R. HORTON - LYONS CANYON RANCH, SANTA CLARITA — FILE NO.: GC14-122536

ELEVATION: SEE PLATE 1 — DATE: 02/12/15

METHOD: 6-inch Hollow Stem Auger — DRILLING CO.: HD DRILLING

DEPTH (FT)	SAMPLE: BULK	SAMPLE: RING	BLOWCOUNT: FIELD (N)	BLOWCOUNT: N(60)	MOISTURE %	DENSITY	SIEVE: % PASSING # 200 SCREEN	GRAPHIC LOG	DESCRIPTION AND REMARKS
0									**ALLUVIUM - Qal - (0' - 60')**
-	SPT		5	6.9					2.5' - Dark brown fine- to medium-grained silty sand, slightly moist, loose.
-									
-	SPT		12	16.6					5' - 20' - Medium brown very fine- to fine-grained silty sand, humid, slightly
-		X	21	16.1	7.1	89.3			firm.
-	SPT		15	20.7					
-									
10	SPT		10	13.8					
-									
-	SPT		13	17.9					
-	SPT		11	15.2					
-		X	28	21.5	4.8	101.2			
-	SPT		16	22.1					
-									
20	SPT		21	29.0					20' - Medium reddish brown fine- to medium-grained silty sand, humid,
-									dense.
-	SPT		30	41.4					
-									
-	SPT		22	30.4					25' - Medium reddish brown fine- to very coarse-grained pebbly sand,
-		x	42	32.2	5.1	107.8			humid, dense.
-	SPT		24	33.1					27.5' - Medium brown fine- to medium-grained silty sand, humid, dense.
30	SPT		28	38.6					30' - 47.5' - Medium reddish brown fine- to very coarse-grained pebbly to
-									gravelly silty sand, humid, dense.
-	SPT		37	51.1					
-									
-	SPT		28	38.6					
-		X	50	38.3	5.9	109.5			
-	SPT		27	37.3					
40	SPT		35	48.3					
-									
-	SPT		36	49.7					
-									
-	SPT		31	42.8					
-		X	50 for 6"		7.1	110.0			
-	SPT		50	69.0					47.5' - 55' - Medium reddish brown fine- to very coarse-grained silty sandy
50	SPT		46	63.5					clay containing gravel, moist, dense.
-									
-	SPT		63	86.9					
-									
-	SPT		91	125.6					55' -60' - Medium gray fine- to medium-grained sandy clay, slightly moist, dense.
-	X		50 for 6"						
-									
60									End at 60'

Comments: The following correction factors were utilized to determine N(60) (Per SP117)
Cb = 1.15 (8" Diameter Borehole); Cs = 1.2 (SPT Sampler without liner); Cs = 2/3 (California Sampler)

Notes: TOTAL DEPTH: 60' GROUNDWATER: NO REFUSAL/CAVING: NO BACKFILLED: YES

PLATE 2.8

GOLD COAST GEOSERVICES, INC.

SUB-SURFACE DATA — BORING LOG NO. B-9

PROJECT: D.R. HORTON - LYONS CANYON RANCH, SANTA CLARITA — FILE NO.: GC14-122536

ELEVATION: SEE PLATE 1 — DATE: 02/11/15

METHOD: 6-inch Hollow Stem Auger — DRILLING CO.: HD DRILLING

DEPTH (FT)	SAMPLE: BULK	SAMPLE: RING	BLOWCOUNT: FIELD (N)	BLOWCOUNT: N(60)	MOISTURE %	DENSITY	SIEVE: % PASSING # 200 SCREEN	GRAPHIC LOG	DESCRIPTION AND REMARKS
0									**ALLUVIUM - Qal - (0' - 47.5')**
-	SPT		1	1.4					2.5' - Dark brown very fine- to fine-grained silty sand, slightly moist, loose.
-	SPT		11	15.2					5' - 12.5' - Light to medium brown very fine- to fine-grained silty sand, dry, firm.
-		X	34	26.1	6.3	101.3			
-	SPT		8	11.0					
10	SPT		9	12.4					
-	SPT		11	15.2					12.5' - Medium to dark brown fine- to coarse-grained silty sand, dry, firm.
-	SPT		9	12.4					15' - 20' - Medium to dark brown fine-grained silty sand, humid, firm.
-		X	26	19.9	7.7	104.4			
-	SPT		10	13.8					
20	SPT		14	19.3					
-	SPT		22	30.4					22.5' - 35' - Medium reddish brown very fine- to medium-grained silty sand, humid, firm.
-	SPT		24	33.1					
-		x	50 for 5"		6.4	105.6			
-	SPT		21	29.0					
30	SPT		22	30.4					
-	SPT		25	34.5					
-	SPT		30	41.4					35' - 45' - Dark brown very fine- to coarse-grained clayey to silty sand, slightly moist, firm.
-		X	54	41.4	5.7	111.3			
-	SPT		39	53.8					
40	SPT		38	52.4					
-	SPT		44	60.7					
-	SPT		47	64.9					45' - Medium gray very fine- to medium-grained sandy clay to clayey sand, moist, very dense.
-		X	50 for 6"		5.8	112.2			
-	SPT		50 for 5"						**SAUGUS FORMATION - Ts - (47.5' - 57.5')** - Medium gray medium- to very coarse-grained clayey sand, moist, very dense.
50	SPT		72	99.4					
-	SPT		50 for 4"						
-	SPT		50 for 5"						End at 57.5'
60									

Comments: The following correction factors were utilized to determine N(60) (Per SP117)
Cb = 1.15 (8" Diameter Borehole); Cs = 1.2 (SPT Sampler without liner); Cs = 2/3 (California Sampler)

Notes: TOTAL DEPTH: 55' GROUNDWATER: NO REFUSAL/CAVING: NO BACKFILLED: YES

PLATE 2.9

GOLD COAST GEOSERVICES, INC.

SUB-SURFACE DATA — BORING LOG NO. B-10

PROJECT: D.R. HORTON - LYONS CANYON RANCH, SANTA CLARITA — FILE NO.: GC14-122536

ELEVATION: SEE PLATE 1 — DATE: 02/12/15

METHOD: 6-inch Hollow Stem Auger — DRILLING CO.: HD DRILLING

DEPTH (FT)	SAMPLE: BULK	SAMPLE: RING	BLOWCOUNT: FIELD (N)	BLOWCOUNT: N(60)	MOISTURE %	DENSITY	SIEVE: % PASSING # 200 SCREEN	GRAPHIC LOG	DESCRIPTION AND REMARKS
0									**ALLUVIUM - Qal - (0' - 27.5')**
-	SPT		14	19.3					2.5' - Dark brown very fine- to fine-grained silty sand, slightly moist, firm.
-									
-	SPT		31	42.8					5' - 17.5' - Medium brown fine- to coarse-grained silty sand, dry, firm.
-		X	37	28.4					
-	SPT		12	16.6					
-									
10	SPT		12	16.6					
-									
-	SPT		14	19.3					
-	SPT		14	19.3					
-		X	35	26.8	4.8	97.2			
-	SPT		16	22.1					
-									
20	SPT		13	17.9					20' - 22.5' - Medium brown fine- to coarse-grained pebbly silty sand, dry, dense.
-									
-	SPT		43	59.3					
-									
-	SPT		44	60.7					22.5' - 27.5' - Light to medium brown very fine- to fine-grained silty sand, dry,
-		x	75	57.5	4.3	115.3			slightly firm.
-	SPT		50 for 4"						**SAUGUS FORMATION - Ts - (27.5' - 30')** - Medium brown fine- to very coarse-
30	SPT		50 for 2"						grained silty sand, dry, very dense.
-									End at 30'
-									
-									
-									
-									
-									
40									
-									
-									
-									
-									
-									
-									
-									
50									
-									
-									
-									
-									
-									
-									
60									

Comments: The following correction factors were utilized to determine N(60) (Per SP117)
Cb = 1.15 (8" Diameter Borehole); Cs = 1.2 (SPT Sampler without liner); Cs = 2/3 (California Sampler)

Notes: TOTAL DEPTH: 30' GROUNDWATER: NO REFUSAL/CAVING: NO BACKFILLED: YES

PLATE 2.10

GOLD COAST GEOSERVICES, INC.

SUB-SURFACE DATA — BORING LOG NO. B-11

PROJECT: D.R. HORTON - LYONS CANYON RANCH, SANTA CLARITA — FILE NO.: GC14-122536

ELEVATION: SEE PLATE 1 — DATE: 02/17/15

METHOD: 6-inch Hollow Stem Auger — DRILLING CO.: HD DRILLING

DEPTH (FT)	SAMPLE: BULK	SAMPLE: RING	BLOWCOUNT: FIELD (N)	BLOWCOUNT: N(60)	MOISTURE %	DENSITY	SIEVE: % PASSING # 200 SCREEN	GRAPHIC LOG	DESCRIPTION AND REMARKS
0									**ALLUVIUM - Qal - (0' - 10')**
-	SPT		5	6.9					2.5' - Dark brown very fine- to fine-grained silty sand, sightly moist, loose.
-	SPT		12	16.6					5' - Medium gray very fine- to medium-grained clayey to silty sand, slightly
-		X	43	33.0	6.8	109.7			moist, firm.
-	SPT		22	30.4					7.5' - Medium reddish brown fine- to medium-grained silty sand, dry, dense.
10	SPT		50 for 4"						**SAUGUS FORMATION - Ts - (10' - 17.5')**
-									10' - Medium brown fine- to very coarse-grained silty sand, dry, dense.
-	SPT		50 for 6"						12.5' - Dark brown very fine- to medium-grained clayey to silty sand, slightly
-									moist, dense.
-	SPT		50 for 4"						15' - 17.5' - Light to medum gray very fine-grained silty clay, moist, very stiff.
20									
30									
40									
50									
60									

Comments: The following correction factors were utilized to determine N(60) (Per SP117)
Cb = 1.15 (8" Diameter Borehole); Cs = 1.2 (SPT Sampler without liner); Cs = 2/3 (California Sampler)

Notes: TOTAL DEPTH: 17.5' GROUNDWATER: NO REFUSAL/CAVING: NO BACKFILLED: YES

PLATE 2.11

GOLD COAST GEOSERVICES, INC.

SUB-SURFACE DATA — BORING LOG NO. B-12

PROJECT: D.R. HORTON - LYONS CANYON RANCH, SANTA CLARITA — FILE NO.: GC14-122536

ELEVATION: SEE PLATE 1 — DATE: 02/18/15

METHOD: 6-inch Hollow Stem Auger — DRILLING CO.: HD DRILLING

DEPTH (FT)	SAMPLE: BULK	SAMPLE: RING	BLOWCOUNT: FIELD (N)	BLOWCOUNT: N(60)	MOISTURE %	DENSITY	SIEVE: % PASSING # 200 SCREEN	GRAPHIC LOG	DESCRIPTION AND REMARKS
0									
-	SPT		6	8.3					**ALLUVIUM - Qal - (0' - 7.5')** - Medium reddish brown very fine- to fine-grained silty sand, slightly moist slightly firm.
-	SPT		19	26.2					
-		X	72	55.2	6.2	117.9			
-	SPT		50 for 5"						**SAUGUS FORMATION - Ts - (7.5' - 10')** - Medium brown fine-grained silty sand, humid, very dense.
10	SPT		50 for 3"						End at 10'
20									
30									
40									
50									
60									

Comments: The following correction factors were utilized to determine N(60) (Per SP117)
Cb = 1.15 (8" Diameter Borehole); Cs = 1.2 (SPT Sampler without liner); Cs = 2/3 (California Sampler)

Notes: TOTAL DEPTH: 10' GROUNDWATER: NO REFUSAL/CAVING: NO BACKFILLED: YES

PLATE 2.12

GOLD COAST GEOSERVICES, INC.

SUB-SURFACE DATA — BORING LOG NO. B-13

PROJECT: D.R. HORTON - LYONS CANYON RANCH, SANTA CLARITA — FILE NO.: GC14-122536

ELEVATION: SEE PLATE 1 — DATE: 02/18/15

METHOD: 6-inch Hollow Stem Auger — DRILLING CO.: HD DRILLING

DEPTH (FT)	SAMPLE: BULK	SAMPLE: RING	BLOWCOUNT: FIELD (N)	BLOWCOUNT: N(60)	MOISTURE %	DENSITY	SIEVE: % PASSING # 200 SCREEN	GRAPHIC LOG	DESCRIPTION AND REMARKS
0									**ALLUVIUM - Qal - (0' - 15')**
-	SPT		6	8.3					2.5' - 5' - Medium reddish brown very fine- to fine-grained silty sand, humid, firm.
-	SPT		9	12.4					
-		X	33	25.3	10.9	93.8			
-	SPT		17	23.5					7.5' - 10' - Medium brown fine- to medium-grained silty sand to sandy silt, humid, firm.
10	SPT		11	15.2					
-	SPT		11	15.2					12.5' - 15' - Medium brown fine- to coarse-grained silty sand, dry, firm.
-	SPT		40	55.2					**SAUGUS FORMATION - Ts - (15' - 17.5')** - Medium brown fine- to medium-grained
-		X	50 for 6"		8.1				silty sand to sandy clay, slightly moist, very dense.
-	SPT		50 for 3"						End at 17.5'
20									
30									
40									
50									
60									

Comments: The following correction factors were utilized to determine N(60) (Per SP117)
Cb = 1.15 (8" Diameter Borehole); Cs = 1.2 (SPT Sampler without liner); Cs = 2/3 (California Sampler)

Notes: TOTAL DEPTH: 17.5' GROUNDWATER: NO REFUSAL/CAVING: NO BACKFILLED: YES

PLATE 2.13

GOLD COAST GEOSERVICES, INC.

SUB-SURFACE DATA — BORING LOG NO. B-14

PROJECT: D.R. HORTON - LYONS CANYON RANCH, SANTA CLARITA — FILE NO.: GC14-122536

ELEVATION: SEE PLATE 1 — DATE: 02/17/15

METHOD: 6-inch Hollow Stem Auger — DRILLING CO.: HD DRILLING

DEPTH (FT)	SAMPLE: BULK	SAMPLE: RING	BLOWCOUNT: FIELD (N)	BLOWCOUNT: N(60)	MOISTURE %	DENSITY	SIEVE: % PASSING #200 SCREEN	GRAPHIC LOG	DESCRIPTION AND REMARKS
0	SPT		6	8.3					**ALLUVIUM - Qal - (0' - 12.5')** 2.5' - Dark brown very fine- to fine-grained silty sand, moist, loose.
	SPT		9	12.4					5' - Light to medium brown very fine-grained silty sand, humid, slightly firm.
		X	33	25.3	8.0	97.9			
	SPT		17	23.5					7.5' - 12.5' - Medium brown very fine- to fine-grained silty sand to sandy silt, humid, dense.
10	SPT		11	15.2					
	SPT		50 for 6"						**SAUGUS FORMATION - Ts - (12.5' - 20')** - Medium brown fine- to medium-grained clayey to silty sand, humid to slightly moist, dense.
	SPT		50 for 5"						
		X	50 for 6"		13.8	97.7			
	SPT		50 for 3"						
20	SPT		50 for 4"						End at 20'
30									
40									
50									
60									

Comments: The following correction factors were utilized to determine N(60) (Per SP117)
Cb = 1.15 (8" Diameter Borehole); Cs = 1.2 (SPT Sampler without liner); Cs = 2/3 (California Sampler)

Notes: TOTAL DEPTH: 20' GROUNDWATER: NO REFUSAL/CAVING: NO BACKFILLED: YES

PLATE 2.14

GOLD COAST GEOSERVICES, INC.

SUB-SURFACE DATA — BORING LOG NO. B-15

PROJECT: D.R. HORTON - LYONS CANYON RANCH, SANTA CLARITA — FILE NO.: GC14-122536

ELEVATION: SEE PLATE 1 — DATE: 02/17/15

METHOD: 6-inch Hollow Stem Auger — DRILLING CO.: HD DRILLING

DEPTH (FT)	SAMPLE: BULK	SAMPLE: RING	BLOWCOUNT: FIELD (N)	BLOWCOUNT: N(60)	MOISTURE %	DENSITY	SIEVE: % PASSING # 200 SCREEN	GRAPHIC LOG	DESCRIPTION AND REMARKS
0									**ALLUVIUM - Qal - (0' - 7.5')**
-	SPT		7	9.7					2.5' - Dark brown very fine- to fine-grained silty sand, moist, loose.
-	SPT		7	9.7					5' - Light to medium brown very fine-grained silty sand, humid, slightly firm.
-		X	50 for 5"		7.5	98.2			
-	SPT		69	95.2					**SAUGUS FORMATION - Ts - (7.5' - 20')**
-									7.5' - 17.5' - Medium brown very fine- to fine-grained silty sand to sandy silt,
10	SPT		50 for 4"						humid, very dense.
-	SPT		50 for 5"						
-	SPT		50 for 5"						
-		X	50 for 4"		13.2	100.0			
-	SPT		50 for 5"						
-									
20	SPT		50 for 4"						20' - Medium brown fine- to medium-grained clayey to silty sand, humid to slightly moist, very dense.
-									End at 20'
-									
-									
-									
-									
-									
30									
-									
-									
-									
-									
-									
40									
-									
-									
-									
-									
-									
50									
-									
-									
-									
-									
-									
60									

Comments: The following correction factors were utilized to determine N(60) (Per SP117)
Cb = 1.15 (8" Diameter Borehole); Cs = 1.2 (SPT Sampler without liner); Cs = 2/3 (California Sampler)

Notes: TOTAL DEPTH: 20' GROUNDWATER: NO REFUSAL/CAVING: NO BACKFILLED: YES

PLATE 2.15

GOLD COAST GEOSERVICES, INC.

SUB-SURFACE DATA — BORING LOG NO. B-16

PROJECT: D.R. HORTON - LYONS CANYON RANCH, SANTA CLARITA — FILE NO.: GC14-122536

ELEVATION: SEE PLATE 1 — DATE: 02/17/15

METHOD: 6-inch Hollow Stem Auger — DRILLING CO.: HD DRILLING

DEPTH (FT)	SAMPLE: BULK	SAMPLE: RING	BLOWCOUNT: FIELD (N)	BLOWCOUNT: N(60)	MOISTURE %	DENSITY	SIEVE: % PASSING # 200 SCREEN	GRAPHIC LOG	DESCRIPTION AND REMARKS
0									**ALLUVIUM - Qal - (0' - 15')**
-	SPT		8	11.0					2.5' - Medium to dark brown very fine- to fine-grained silty sand, slightly moist, loose.
-	SPT		9	12.4					5' - 10' - Medium brown very fine- to fine-grained silty sand, dry, firm.
-		X	52	39.9	7.1	104.9			
-	SPT		26	35.9					
10	SPT		20	27.6					
-	SPT		20	27.6					12.5'- 15' - Light to medium brown very fine- to fine-grained silty sand to sandy silt, slightly moist, dense.
-	SPT		50 for 5"						
-		X	50 for 5"		12.6	107.4			**SAUGUS FORMATION - Ts - (15' - 22.5')** - gray siltstone.
-	SPT		50 for 3"						
20	SPT		50 for 4"						
-	SPT		50 for 2"						End at 22.5'
30									
40									
50									
60									

Comments: The following correction factors were utilized to determine N(60) (Per SP117)
Cb = 1.15 (8" Diameter Borehole); Cs = 1.2 (SPT Sampler without liner); Cs = 2/3 (California Sampler)

Notes: TOTAL DEPTH: 22.5' GROUNDWATER: NO REFUSAL/CAVING: NO BACKFILLED: YES

PLATE 2.16

GOLD COAST GEOSERVICES, INC.

SUB-SURFACE DATA — BORING LOG NO. B-17

PROJECT: D.R. HORTON - LYONS CANYON RANCH, SANTA CLARITA — FILE NO.: GC14-122536

ELEVATION: SEE PLATE 1 — DATE: 02/18/15

METHOD: 6-inch Hollow Stem Auger — DRILLING CO.: HD DRILLING

DEPTH (FT)	SAMPLE: BULK	SAMPLE: RING	BLOWCOUNT: FIELD (N)	BLOWCOUNT: N(60)	MOISTURE %	DENSITY	SIEVE: % PASSING # 200 SCREEN	GRAPHIC LOG	DESCRIPTION AND REMARKS
0									**ALLUVIUM - Qal - (0' - 5')**
-	SPT		5	6.9					2.5' - Dark brown fine- to medium-grained silty sand, slightly moist, loose.
-									
-	SPT		11	15.2					SAUGUS FORMATION - Ts - (5' - 15')
-		X	68	52.1	10.0	98.1			5' - 7.5' - Medium to dark brown fine- to medium-grained silty sand, humid, slightly firm.
-									7.5' - 15' - Medium brown fine- to medium-grained silty to sandy clay, humid,
10	SPT		28	38.6					very dense.
-									
-	SPT		56	77.3					
-	SPT		50 for 5"						End at 15'
-									
-									
-									
20									
-									
-									
-									
-									
-									
-									
30									
-									
-									
-									
-									
-									
-									
40									
-									
-									
-									
-									
-									
-									
50									
-									
-									
-									
-									
-									
-									
60									

Comments: The following correction factors were utilized to determine N(60) (Per SP117)
Cb = 1.15 (8" Diameter Borehole); Cs = 1.2 (SPT Sampler without liner); Cs = 2/3 (California Sampler)

Notes: TOTAL DEPTH: 15' GROUNDWATER: NO REFUSAL/CAVING: NO BACKFILLED: YES

PLATE 2.17

GOLD COAST GEOSERVICES, INC.

SUB-SURFACE DATA — BORING LOG NO. B-18

PROJECT: D.R. HORTON - LYONS CANYON RANCH, SANTA CLARITA — FILE NO.: GC14-122536

ELEVATION: SEE PLATE 1 — DATE: 02/18/15

METHOD: 6-inch Hollow Stem Auger — DRILLING CO.: HD DRILLING

DEPTH (FT)	SAMPLE: BULK	SAMPLE: RING	BLOWCOUNT: FIELD (N)	BLOWCOUNT: N(60)	MOISTURE %	DENSITY	SIEVE: % PASSING # 200 SCREEN	GRAPHIC LOG	DESCRIPTION AND REMARKS
0	SPT		10	13.8					**ALLUVIUM - Qal - (0' - 7.5')**
									2.5' - Dark brown very fine- to fine-grained silty sand, moist, slightly firm.
	SPT		15	20.7					
		X	50 for 6"		8.2	105.0			5' - Medium brown very fine- to fine-grained silty sand to sandy silt, humid, dense.
	SPT		50 for 3"						**SAUGUS FORMATION - Ts - (7.5' - 10')** - Dark brown fine- to coarse-grained silty sand, slightly moist, very dense.
10	SPT		50 for 3"						End at 10'
20									
30									
40									
50									
60									

Comments: The following correction factors were utilized to determine N(60) (Per SP117)
Cb = 1.15 (8" Diameter Borehole); Cs = 1.2 (SPT Sampler without liner); Cs = 2/3 (California Sampler)

Notes: TOTAL DEPTH: 10' GROUNDWATER: NO REFUSAL/CAVING: NO BACKFILLED: YES

PLATE 2.18

GOLD COAST GEOSERVICES, INC.

SUB-SURFACE DATA — BORING LOG NO. B-19

PROJECT: D.R. HORTON - LYONS CANYON RANCH, SANTA CLARITA — FILE NO.: GC14-122536

ELEVATION: SEE PLATE 1 — DATE: 02/19/15

METHOD: 6-inch Hollow Stem Auger — DRILLING CO.: HD DRILLING

DEPTH (FT)	SAMPLE: BULK	SAMPLE: RING	BLOWCOUNT: FIELD (N)	BLOWCOUNT: N(60)	MOISTURE %	DENSITY	SIEVE: % PASSING # 200 SCREEN	GRAPHIC LOG	DESCRIPTION AND REMARKS
0	SPT		20	27.6					**ALLUVIUM - Qal - (0' - 7.5')** - Medium brown fine-grained silty sand, dry, slightly firm.
	SPT		16	22.1					
		X	80	61.3	9.8	91.5			
	SPT		58	80.0					**PICO FORMATION - Tp - (7.5' - 15')**
									7.5' - 12.5' - Medium brown claystone to siltstone.
10	SPT		32	44.2					
	SPT		50 for 5"						12.5' - 15' - Dark brown claystone to siltstone.
	SPT		80	110.4					End at 15'
20									
30									
40									
50									
60									

Comments: The following correction factors were utilized to determine N(60) (Per SP117)
Cb = 1.15 (8" Diameter Borehole); Cs = 1.2 (SPT Sampler without liner); Cs = 2/3 (California Sampler)

Notes: TOTAL DEPTH: 15' GROUNDWATER: NO REFUSAL/CAVING: NO BACKFILLED: YES

PLATE 2.19

GOLD COAST GEOSERVICES, INC.

SUB-SURFACE DATA — BORING LOG NO. B-20

PROJECT: D.R. HORTON - LYONS CANYON RANCH, SANTA CLARITA — FILE NO.: GC14-122536

ELEVATION: SEE PLATE 1 — DATE: 02/19/15

METHOD: 6-inch Hollow Stem Auger — DRILLING CO.: HD DRILLING

DEPTH (FT)	SAMPLE: BULK	SAMPLE: RING	BLOWCOUNT: FIELD (N)	BLOWCOUNT: N(60)	MOISTURE %	DENSITY	SIEVE: % PASSING # 200 SCREEN	GRAPHIC LOG	DESCRIPTION AND REMARKS
0									**ALLUVIUM - Qal - (0' - 7.5')**
-	SPT		9	12.4					2.5' - Dark brown very fine- to fine-grained silty sand, slightly moist, sightly firm.
-	SPT		20	27.6					5' - Medium brown fine- to medium-grained silty sand, humid, firm.
-		X	50 for 3"		8.1	103.9			
-	SPT		50 for 5"						**PICO FORMATION - Tp - (7.5' - 12.5')** - Medium brown siltstone
10	SPT		79	109.0					
-	SPT		50 for 2"						End at 12.5
20									
30									
40									
50									
60									

Comments: The following correction factors were utilized to determine $N_{(60)}$ (Per SP117)
Cb = 1.15 (8" Diameter Borehole); Cs = 1.2 (SPT Sampler without liner); Cs = 2/3 (California Sampler)

Notes: TOTAL DEPTH: 12.5' GROUNDWATER: NO REFUSAL/CAVING: NO BACKFILLED: YES

PLATE 2.20

GOLD COAST GEOSERVICES, INC.

SUB-SURFACE DATA — BORING LOG NO. B-21

PROJECT: D.R. HORTON - LYONS CANYON RANCH, SANTA CLARITA — FILE NO.: GC14-122536

ELEVATION: SEE PLATE 1 — DATE: 02/13/15

METHOD: 6-inch Hollow Stem Auger — DRILLING CO.: HD DRILLING

DEPTH (FT)	SAMPLE: BULK	SAMPLE: RING	BLOWCOUNT: FIELD (N)	BLOWCOUNT: N(60)	MOISTURE %	DENSITY	SIEVE: % PASSING # 200 SCREEN	GRAPHIC LOG	DESCRIPTION AND REMARKS
0									**ALLUVIUM - Qal - (0' - 47.5')**
-	SPT		3	4.1					2.5' - 5' - Medium to dark brown very fine- to medium-grained silty sand, humid, loose.
-	SPT		3	4.1					
-		X	26	19.9	5.7	99.0			
-	SPT		13	17.9					7.5' - 10' - Medium brown very fine- to fine-grained silty sand, humid, slightly firm.
10	SPT		8	11.0					
-	SPT		9	12.4					12.5' - 22.5' - Medium to dark brown very fine- to fine-grained silty sand, humid, slightly firm.
-	SPT		6	8.3					
-		X	15	11.5	9.2	104.6			
-	SPT		8	11.0					
20	SPT		14	19.3					
-	SPT		19	26.2					
-	SPT		20	27.6					
-		x	33	25.3	9.8	108.7			
-	SPT		31	42.8					27.5' - 30' - Medium brown fine- to coarse-grained pebbly silty sand, humid, dense.
30	SPT		29	40.0					
-	SPT		33	45.5					
-	SPT		28	38.6					35' - Medium reddish brown fine- to coarse-grained pebbly sand, humid, dense.
-		X	58	44.5	18.8	107.9			37.5' - 47.5' - Medium brown fine- to medium-grained silty sand to sandy silt, moist, firm.
-	SPT		32	44.2					
40	SPT		33	45.5					
-	SPT		30	41.4					
-	SPT		34	46.9					
-		X	50 for 4"		6.7	114.3			
-	SPT		40	55.2					**SAUGUS FORMATION - TS - (47.5' - 50')** - Medium reddish brown fine- to very coarse-grained clayey to silty sand, moist to saturated, dense.
50	SPT		57 for 5"						End at 50'
-									
-									
-									
-									
-									
60									

Comments: The following correction factors were utilized to determine N(60) (Per SP117)
Cb = 1.15 (8" Diameter Borehole); Cs = 1.2 (SPT Sampler without liner); Cs = 2/3 (California Sampler)

Notes: TOTAL DEPTH: 50' GROUNDWATER: NO REFUSAL/CAVING: NO BACKFILLED: YES

PLATE 2.21

GOLD COAST GEOSERVICES, INC.

SUB-SURFACE DATA — BORING LOG NO. B-22

PROJECT: D.R. HORTON - LYONS CANYON RANCH, SANTA CLARITA — FILE NO.: GC14-122536

ELEVATION: SEE PLATE 1 — DATE: 02/13/15

METHOD: 6-inch Hollow Stem Auger — DRILLING CO.: HD DRILLING

DEPTH (FT)	SAMPLE: BULK	SAMPLE: RING	BLOWCOUNT: FIELD (N)	BLOWCOUNT: N(60)	MOISTURE %	DENSITY	SIEVE: % PASSING # 200 SCREEN	GRAPHIC LOG	DESCRIPTION AND REMARKS
0									**ALLUVIUM - Qal - (0' - 17.5')**
-	SPT		2	2.8					2.5' - 5' - Dark brown fine- to medium-grained silty sand, humid, loose.
-	SPT		3	4.1					
-		X	24	18.4	3.8	103.7			7.5' - 15' - Dark brown fine- to very coarse-grained silty sand, humid,
-	SPT		15	20.7					slightly firm.
10	SPT		15	20.7					
-	SPT		19	26.2					
-	SPT		11	15.2					
-		X	60	46.0	8.7	119.1			
-	SPT		70	96.6					**SAUGUS FORMATION - Ts - (17.5' - 32.5')**
20	SPT		53	73.1					17.5' - 27.5' - Medium yellowish brown medium- to very coarse-grained sand, humid, very dense.
-	SPT		68	93.8					
-	SPT		65	89.7					
-		x	50 for 3"		12.6	110.4			27.5' - 32.5' - Medium yellowish brown medium- to very coarse-grained silty
-	SPT		50 for 6"						sand, slightly moist, very dense.
30	SPT		50 for 6"						
-	SPT		50 for 5"						End at 32.5'
40									
50									
60									

Comments: The following correction factors were utilized to determine N(60) (Per SP117)
Cb = 1.15 (8" Diameter Borehole); Cs = 1.2 (SPT Sampler without liner); Cs = 2/3 (California Sampler)

Notes: TOTAL DEPTH: 32.5' GROUNDWATER: NO REFUSAL/CAVING: NO BACKFILLED: YES

PLATE 2.22

GOLD COAST GEOSERVICES, INC.

SUB-SURFACE DATA — BORING LOG NO. B-23

PROJECT: D.R. HORTON - LYONS CANYON RANCH, SANTA CLARITA — FILE NO.: GC14-122536

ELEVATION: SEE PLATE 1 — DATE: 02/16/15

METHOD: 6-inch Hollow Stem Auger — DRILLING CO.: HD DRILLING

DEPTH (FT)	SAMPLE: BULK	SAMPLE: RING	BLOWCOUNT: FIELD (N)	BLOWCOUNT: N(60)	MOISTURE %	DENSITY	SIEVE: % PASSING # 200 SCREEN	GRAPHIC LOG	DESCRIPTION AND REMARKS
0									**ALLUVIUM - Qal - (0' - 27.5')**
-	SPT		3	4.1					2.5' - Dark brown very fine- to medium-grained clayey to silty sand, slightly moist, loose.
-	SPT		15	20.7					5' - Dark brown very fine- to medium-grained clayey to silty sand, humid, firm.
-		X	57	43.7	8.0	97.0			7.5' - 10' - Medium to dark brown fine- to coarse-grained clayey to silty sand, humid, firm.
-	SPT		30	41.4					
10	SPT		14	19.3					
-	SPT		12	16.6					12.5' - 17.5'- Medium to dark brown fine- to coarse-grained clayey to silty sand, slightly moist, slightly firm.
-	SPT		5	6.9					
-		X	27	20.7	11.5	107.4			
-	SPT		12	16.6					
20	SPT		13	17.9					20' - 27.5' - Medium to dark brown fine- to very coarse-grained gravelly to pebbly clayey to silty sand, humid to slightly moist, slightly firm.
-	SPT		18	24.8					
-	SPT		13	17.9					**SAUGUS FORMATION - Ts - (27.5' - 30')**
-		x	43	33.0	4.3	111.7			25' - 27.5' - Medium yellowish brown fine- to coarse-grained silty sand containing pebbles, humid, firm to dense.
-	SPT		46	63.5					
30	SPT		50 for 5"						30' - Rock/boulder
40									
50									
60									

Comments: The following correction factors were utilized to determine N(60) (Per SP117)
Cb = 1.15 (8" Diameter Borehole); Cs = 1.2 (SPT Sampler without liner); Cs = 2/3 (California Sampler)

Notes: TOTAL DEPTH: 30' GROUNDWATER: NO REFUSAL/CAVING: NO BACKFILLED: YES

PLATE 2.23

GOLD COAST GEOSERVICES, INC.

SUB-SURFACE DATA — BORING LOG NO. B-24

PROJECT: D.R. HORTON - LYONS CANYON RANCH, SANTA CLARITA — FILE NO.: GC14-122536

ELEVATION: SEE PLATE 1 — DATE: 02/16/15

METHOD: 6-inch Hollow Stem Auger — DRILLING CO.: HD DRILLING

DEPTH (FT)	SAMPLE: BULK	SAMPLE: RING	BLOWCOUNT: FIELD (N)	BLOWCOUNT: N(60)	MOISTURE %	DENSITY	SIEVE: % PASSING # 200 SCREEN	GRAPHIC LOG	DESCRIPTION AND REMARKS
0									**ALLUVIUM - Qal - (0' - 27.5')**
-	SPT		6	8.3					2.5' - Dark brown fine- to medium-grained clayey to silty sand, slightly moist, slightly firm.
-	SPT		24	33.1					5' - 10' - Dark brown fine- to medium-grained clayey to silty sand, humid, firm to dense.
-		X	55	42.2	8.6	83.1			
-	SPT		20	27.6					
10	SPT		13	17.9					
-	SPT		17	23.5					12.5' - 27.5' - Medium brown fine- to medium-grained clayey silt to silty clay, humid to slightly moist, firm to dense.
-	SPT		8	11.0					
-		X	39	29.9	15.9	95.6			
-	SPT		21	29.0					
20	SPT		13	17.9					
-	SPT		57	78.7					
-	SPT		24	33.1					**PICO FORMATION - Tp - (27.5' - 37.5')**
-		x	50 for 4"		18.5	101.1			27.5' - 35' - Medium to dark grayish brown fine-grained clayey silt to silty clay, moist, dense.
-	SPT		50 for 5"						
30	SPT		64	88.3					
-	SPT		60	82.8					
-	SPT		42	58.0					35' - 37.5' - Dark brown claystone to siltstone, very dense.
-		X	50 for 5"		27.5	94.9			
-	SPT		50 for 4"						End at 37.5'
40									
-									
-									
-									
-									
-									
-									
50									
-									
-									
-									
-									
-									
-									
60									

Comments: The following correction factors were utilized to determine N(60) (Per SP117)
Cb = 1.15 (8" Diameter Borehole); Cs = 1.2 (SPT Sampler without liner); Cs = 2/3 (California Sampler)

Notes: TOTAL DEPTH: 37.5' GROUNDWATER: NO REFUSAL/CAVING: NO BACKFILLED: YES

PLATE 2.24

GOLD COAST GEOSERVICES, INC.

SUB-SURFACE DATA — BORING LOG NO. B-25

PROJECT: D.R. HORTON - LYONS CANYON RANCH, SANTA CLARITA — FILE NO.: GC14-122536

ELEVATION: SEE PLATE 1 — DATE: 02/16/15

METHOD: 6-inch Hollow Stem Auger — DRILLING CO.: HD DRILLING

DEPTH (FT)	SAMPLE: BULK	SAMPLE: RING	BLOWCOUNT: FIELD (N)	BLOWCOUNT: N(60)	MOISTURE %	DENSITY	SIEVE: % PASSING # 200 SCREEN	GRAPHIC LOG	DESCRIPTION AND REMARKS
0									**ALLUVIUM - Qal - (0' - 17.5')**
-	SPT		14	19.3					2.5' - Medium to dark brown fine- to medium-grained silty sand, humid, firm.
-	SPT		41	56.6					5' - 12.5' - Medium brown fine- to coarse-grained clayey to silty sand, humid,
-		X	82	62.9	7.5	99.1			firm to dense.
-	SPT		28	38.6					
10	SPT		20	27.6					
-	SPT		29	40.0					
-	SPT		8	11.0					15' - 17.5' - Light yellowish brown very fine- to fine-grained silty sand to sandy silt,
-		X	50 for 3"						humid, slightly firm.
-	SPT		70	96.6					**SAUGUS FORMSTION - Ts - (17.5' - 27.5')**
20	SPT		31	42.8					17.5' - Medium reddish brown fine- to medium-grained clayey to silty sand, dry, very dense.
-	SPT		50 for 6"						20' - Medium reddish brown siltstone, very dense.
-									22.5' - Light grayish brown siltstone, very dense.
-	SPT		40	55.2					25' - Medium gray siltstone, very dense.
-		x	50 for 3"						End at 27.5'
30									
40									
50									
60									

Comments: The following correction factors were utilized to determine N(60) (Per SP117)
Cb = 1.15 (8" Diameter Borehole); Cs = 1.2 (SPT Sampler without liner); Cs = 2/3 (California Sampler)

Notes: TOTAL DEPTH: 27.5' GROUNDWATER: NO REFUSAL/CAVING: NO BACKFILLED: YES

PLATE 2.25

GEOTECHNICAL BORING LOG

PROJECT NO.	102453-T	PROJECT NAME	Lyons Canyon Ranch		
DATE STARTED	6/20/01	GROUND ELEV.	1317	BORING DESIG.	B-1
DATE FINISHED	6/20/01	GW DEPTH (FT)	67	LOGGED BY	CRN
DRILLER	Ledezma Drilling	DRIVE WT.	See Note	NOTE	0-24' 3548#; 24-47'
TYPE OF DRILL RIG	30" Bucket Auger	DROP	12 inches		2577#; 47-73' 1648#

DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	ATTITUDES	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
0	1315					**ALLUVIUM (Qal):** Sandy Silt to Silty Sand; very fine- to fine-grained, moderate yellowish brown, slightly moist, firm/moderately dense.				
5		R/B	1				7.3	102.0	31	
	1310									
10		R	1				7.0	96.4	25	
	1305									
15		R	1			Sandy Silt to Silty Sand; very fine- to fine-grained, moderate yellowish brown, slightly moist, firm/moderately dense, some interbedded pebble lenses.	10.2	102.4	44	
	1300									
20		R/B	1			Silty Sand; fine- to coarse-grained with some pebbles and few cobbles, moderate to dark yellowish brown, moist, moderately dense.	4.9	112.2	26	
	1295									
25										
	1290									
30		B				Silty Sand; fine- to coarse-grained with pebbles and cobbles, moderate yellowish brown, slightly moist to moist, moderately dense to dense.				
	1285									
35										
	1280									

SAMPLE TYPES:
R RING (DRIVE) SAMPLE
S SPT (SPLIT SPOON) SAMPLE
B BULK SAMPLE T TUBE SAMPLE

GROUNDWATER LEVEL
WATER SEEP
B BEDDING
J JOINTING
C CONTACT
F FAULT
S SHEAR

PACIFIC SOILS ENGINEERING, INC.

PLATE A-1

GEOTECHNICAL BORING LOG

PROJECT NO.	102453-T	PROJECT NAME	Lyons Canyon Ranch		
DATE STARTED	6/20/01	GROUND ELEV.	1317	BORING DESIG.	B-1
DATE FINISHED	6/20/01	GW DEPTH (FT)	67	LOGGED BY	CRN
DRILLER	Ledezma Drilling	DRIVE WT.	See Note	NOTE	0-24' 3548#; 24-47'
TYPE OF DRILL RIG	30" Bucket Auger	DROP	12 inches		2577#; 47-73' 1648#

DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	ATTITUDES	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
	1275									
45										
	1270									
50		R/B	15			Pebbly Sand; fine- to very coarse-grained with abundant cobbles, moderate to dark yellowish brown, moist, dense.	4.6	126.4	37	
	1265									
55		R	5			Silty Sand; very fine- to fine-grained, moderate yellowish brown, moist, dense.	11.6	118.7	78	
	1260					Pebbly Sand; fine- to very coarse-grained with abundant cobbles, moderate to dark yellowish brown, moist, dense.				
60										
	1255									
65						Some interlayered lenses of Silty Sand (described at 55 feet).				
	1250					▼ Water at 67± feet, caving from 65 to 68± feet.				
						Total Depth 68 feet. Water at 67 feet. Caving from 65 to 68 feet. Hole backfilled with native materials and tamped.				

SAMPLE TYPES:
- R RING (DRIVE) SAMPLE
- S SPT (SPLIT SPOON) SAMPLE
- B BULK SAMPLE
- T TUBE SAMPLE

▼ GROUNDWATER LEVEL
➤ WATER SEEP
- B BEDDING
- J JOINTING
- C CONTACT
- F FAULT
- S SHEAR

PACIFIC SOILS ENGINEERING, INC.

PLATE A-2

GEOTECHNICAL BORING LOG

PROJECT NO.	102453-T	PROJECT NAME	Lyons Canyon Ranch		
DATE STARTED	6/20/01	GROUND ELEV.	1325	BORING DESIG.	B-2
DATE FINISHED	6/20/01	GW DEPTH (FT)	53	LOGGED BY	CRN
DRILLER	Ledezma Drilling	DRIVE WT.	See Note	NOTE	0-24' 3548#; 24-47' 2577#; 47-73' 1648#
TYPE OF DRILL RIG	30" Bucket Auger	DROP	12 inches		

DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	ATTITUDES	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
	1325					**ALLUVIUM (Qal):** Silt; moderate yellowish brown, dry to slightly moist, soft to firm at depth.				
5	1320									
10	1315	R/B	1			Silty Sand; very fine- to fine-grained, moderate yellowish brown, slightly moist, moderately dense, some interlayered lenses of coarse-grained Sand and Pebbles, some small organic pods.	7.7	102.0	32	
15	1310									
20	1305	R	1				8.7	105.0	40	
25	1300					Increasing pebbles and some cobbles.				
30	1295	R/B	9			Pebbly Sand; fine- to very coarse-grained, pale yellowish brown, slightly moist, moderately dense.	3.7	121.6	27	
35	1290									
	1285									

SAMPLE TYPES:
- R RING (DRIVE) SAMPLE
- S SPT (SPLIT SPOON) SAMPLE
- B BULK SAMPLE
- T TUBE SAMPLE

- ▼ GROUNDWATER LEVEL
- WATER SEEP
- B BEDDING
- J JOINTING
- C CONTACT
- F FAULT
- S SHEAR

PACIFIC SOILS ENGINEERING, INC.

PLATE A-3

GEOTECHNICAL BORING LOG

PROJECT NO.	102453-T	PROJECT NAME	Lyons Canyon Ranch		
DATE STARTED	6/20/01	GROUND ELEV.	1325	BORING DESIG.	B-2
DATE FINISHED	6/20/01	GW DEPTH (FT)	53	LOGGED BY	CRN
DRILLER	Ledezma Drilling	DRIVE WT.	See Note	NOTE	0-24' 3548#; 24-47' 2577#; 47-73' 1648#
TYPE OF DRILL RIG	30" Bucket Auger	DROP	12 inches		

DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	ATTITUDES	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
	1285	R	8			Silty Sand; fine- to very coarse-grained with pebbles, moderate yellowish brown, slightly moist to moist, dense.	6.8	122.2	51	
45	1280	B								
50	1275	R	6			Sand; fine- to coarse-grained with pebbles, pale to moderate yellowish brown, moist, moderately dense to dense.	5.5	135.5	61	
						▼ Water at 53+ feet. Caving from 52 to 54+ feet. Total Depth 54 feet. Water at 53 feet. Caving from 52 to 54 feet. Hole backfilled with native materials and tamped.				

SAMPLE TYPES:
- R RING (DRIVE) SAMPLE
- S SPT (SPLIT SPOON) SAMPLE
- B BULK SAMPLE
- T TUBE SAMPLE

▼ GROUNDWATER LEVEL
- WATER SEEP
- B BEDDING
- J JOINTING
- C CONTACT
- F FAULT
- S SHEAR

PACIFIC SOILS ENGINEERING, INC.

PLATE A-4

GEOTECHNICAL BORING LOG

PROJECT NO.	102453-T	PROJECT NAME	Lyons Canyon Ranch		
DATE STARTED	6/20/01	GROUND ELEV.	1331	BORING DESIG.	B-3
DATE FINISHED	6/20/01	GW DEPTH (FT)		LOGGED BY	CRN
DRILLER	Ledezma Drilling	DRIVE WT.	See Note.	NOTE	0-24' 3548#; 24-47'
TYPE OF DRILL RIG	30" Bucket Auger	DROP	12 inches		2577#; 47-73' 1648#

DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	ATTITUDES	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
0	1330					**ALLUVIUM (Qal):** Silty Sand; very fine- to fine-grained, pale yellowish brown, dry, loose.				
						Silty Sand; fine- to coarse-grained with pebbles and cobbles, pale to moderate yellowish brown, dry to slightly moist, loose to moderately dense.				
5	1325									
10	1320	B				1 to 2± feet thick boulder lense with 6 to 12± inch boulders.				
						Silty Sand; fine to coarse-grained with pebbles and cobbles, pale to moderate yellowish brown, slightly moist, moderately dense.				
15	1315	R	1				2.3	106.7	11	
20	1310	R/B	2			Silty Sand; very fine- to fine-grained with pebbles, moderate yellowish brown, slightly moist to moist, moderately dense.	5.7	115.3	35	
25	1305					Silty Sand; fine- to coarse-grained with pebbles and cobbles, moderate yellowish brown, slightly moist, moderately dense.				
30	1300	R	3			Silty Sand; very fine- to fine-grained with pebbles, moderate yellowish brown, slightly moist to moist, moderately dense.	4.9	114.1	28	
35	1295									

SAMPLE TYPES:
- [R] RING (DRIVE) SAMPLE
- [S] SPT (SPLIT SPOON) SAMPLE
- [B] BULK SAMPLE [T] TUBE SAMPLE

▼ GROUNDWATER LEVEL
► WATER SEEP [C] CONTACT
[B] BEDDING [F] FAULT
[J] JOINTING [S] SHEAR

PACIFIC SOILS ENGINEERING, INC.

GEOTECHNICAL BORING LOG

PROJECT NO.	102453-T	PROJECT NAME	Lyons Canyon Ranch		
DATE STARTED	6/20/01	GROUND ELEV.	1331	BORING DESIG.	B-3
DATE FINISHED	6/20/01	GW DEPTH (FT)		LOGGED BY	CRN
DRILLER	Ledezma Drilling	DRIVE WT.	See Note	NOTE	0-24' 3548#; 24-47'
TYPE OF DRILL RIG	30" Bucket Auger	DROP	12 inches		2577#; 47-73' 1648#

DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	ATTITUDES	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
	1290	R/B	6				10.4	115.0	63	
45	1285					**SAUGUS FORMATION-SUNSHINE RANCH MEMBER** (Tsr): Sandstone; very fine- to fine-grained, medium light gray, slightly moist, moderately hard to hard.				
50	1280	R/B	18			Siltstone; mottled olive gray and light gray, slightly moist, hard.	15.7	115.7	97	
						Total Depth 51 feet. No water and no caving. Hole backfilled with native materials and tamped.				

SAMPLE TYPES:
- R RING (DRIVE) SAMPLE
- S SPT (SPLIT SPOON) SAMPLE
- B BULK SAMPLE
- T TUBE SAMPLE

▼ GROUNDWATER LEVEL
- WATER SEEP
- B BEDDING
- J JOINTING
- C CONTACT
- F FAULT
- S SHEAR

PACIFIC SOILS ENGINEERING, INC.

PLATE A-6

GEOTECHNICAL BORING LOG

PROJECT NO.	102453-T	PROJECT NAME	Lyons Canyon Ranch		
DATE STARTED	6/20/01	GROUND ELEV.	1342	BORING DESIG.	B-4
DATE FINISHED	6/20/01	GW DEPTH (FT)	14	LOGGED BY	CRN
DRILLER	Ledezma Drilling	DRIVE WT.	See Note	NOTE	0-24' 3548#; 24-47'
TYPE OF DRILL RIG	30" Bucket Auger	DROP	12 inches		2577#; 47-73' 1648#

DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	ATTITUDES	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
0	1340					**ALLUVIUM (Qal):** Silty Sand; fine- to coarse-grained with pebbles, dark yellowish brown, slightly moist to moist, moderately dense.				
5										
	1335				►	Silty Sand to Sandy Silt; very fine-grained with few pebbles, dark yellowish brown, slightly moist to moist, moderately dense. Water seep and caving from 7 to 9± feet.				
10		R/B	1				19.8	108.3	96	
	1330									
					▼	Pebbly Sand; coarse-grained with abundant cobbles, dark yellowish brown, wet, moderately dense. Water at 14± feet, caving from 14 to 16± feet.				
15						Total Depth 16 feet. Water and caving at 7 to 9 feet and 14 to 16 feet. Hole backfilled with native materials and tamped.				

SAMPLE TYPES:
- [R] RING (DRIVE) SAMPLE
- [S] SPT (SPLIT SPOON) SAMPLE
- [B] BULK SAMPLE
- [T] TUBE SAMPLE

▼ GROUNDWATER LEVEL
► WATER SEEP
[B] BEDDING
[J] JOINTING
[C] CONTACT
[F] FAULT
[S] SHEAR

PACIFIC SOILS ENGINEERING, INC.

PLATE A-7

GEOTECHNICAL BORING LOG

PROJECT NO.	102453-T	PROJECT NAME	Lyons Canyon Ranch	BORING DESIG.	B-5
DATE STARTED	6/20/01	GROUND ELEV.	1388	LOGGED BY	CRN
DATE FINISHED	6/20/01	GW DEPTH (FT)	15	NOTE	0-24' 3548#; 24-47; 2577#; 47-73' 1648#
DRILLER	Ledezma Drilling	DRIVE WT.	See Note		
TYPE OF DRILL RIG	30" Bucket Auger	DROP	12 inches		

DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	ATTITUDES	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
						ALLUVIUM (Qal): Silty Sand to Sandy Silt; very fine- to fine-grained, moderate yellowish brown, dry and loose/soft within top 3±, feet becoming slightly moist and moderately dense/firm at depth.				
	1385									
5										
	1380									
10		R/B	Push		►	Water seep at 10± feet.				
	1375									
15					▼	Water at 15± feet. Caving from 14 to 16+ feet. Total Depth 16 feet. Water at 10 and 15 feet. Caving from 14 to 16 feet. Hole backfilled with native materials tamped.				

SAMPLE TYPES:
- [R] RING (DRIVE) SAMPLE
- [S] SPT (SPLIT SPOON) SAMPLE
- [B] BULK SAMPLE
- [T] TUBE SAMPLE

▼ GROUNDWATER LEVEL
► WATER SEEP
[B] BEDDING
[J] JOINTING
[C] CONTACT
[F] FAULT
[S] SHEAR

PACIFIC SOILS ENGINEERING, INC.

PLATE A-8

GEOTECHNICAL BORING LOG

PROJECT NO.	102453-T	PROJECT NAME	Lyons Canyon Ranch		
DATE STARTED	6/20/01	GROUND ELEV.	1384	BORING DESIG.	B-6
DATE FINISHED	6/20/01	GW DEPTH (FT)		LOGGED BY	CRN
DRILLER	Ledezma Drilling	DRIVE WT.	See Note	NOTE	0-24' 3548#; 24-47' 2577#; 47-73' 1648#
TYPE OF DRILL RIG	30" Bucket Auger	DROP	12 inches		

DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	ATTITUDES	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
	1380					**ALLUVIUM (Qal):** Silty Sand to Sandy Silt; very fine- to fine-grained with some pebbles and some cobbles, dark yellowish brown, dry and loose/soft within top 1 to 3± feet, becoming slightly moist to moist and moderately dense/firm at depth. Top 3± feet is porous.				
5		R/B	Bounce			Boulders; 1± foot in diameter. No sample due to rocks.				
						Refusal Total Depth 7 feet. No water and no caving. Refusal due to rocks. Hole backfilled with native materials and tamped.				

SAMPLE TYPES:
- [R] RING (DRIVE) SAMPLE
- [S] SPT (SPLIT SPOON) SAMPLE
- [B] BULK SAMPLE [T] TUBE SAMPLE

▼ GROUNDWATER LEVEL
► WATER SEEP [C] CONTACT
[B] BEDDING [F] FAULT
[J] JOINTING [S] SHEAR

PACIFIC SOILS ENGINEERING, INC.

PLATE A-9

GEOTECHNICAL BORING LOG

PROJECT NO.	102453-T	PROJECT NAME	Lyons Canyon Ranch		
DATE STARTED	6/25/01	GROUND ELEV.	1385	BORING DESIG.	B-6B
DATE FINISHED	6/25/01	GW DEPTH (FT)		LOGGED BY	CRN
DRILLER	Ledezma Drilling	DRIVE WT.	See Note	NOTE	0-24' 3548#; 24-47'
TYPE OF DRILL RIG	30" Bucket Auger	DROP	12 inches		2577#; 47-73' 1648#

DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	ATTITUDES	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
	1385					**ALLUVIUM (Qal):** Silty Sand to Sandy Silt; fine- to coarse-grained with pebbles, moderate to dark yellowish brown, top 1± foot dry and loose/soft, becoming moist and moderately dense/firm at depth.				
5	1380	R	2			2 to 3± foot thick,boulder lenses; 2-1/2 foot diameter boulder at 6± feet in depth.	9.1	116.9	58	
10	1375	R/B	6 for 6"			**SAUGUS FORMATION-SUNSHINE RANCH MEMBER (Tsr):** Weathered Silty Sandstone; very fine- to fine-grained, mottled moderate brown and medium light gray, moist, moderately hard, poorly indurated.	13.4	123.0	98	
		B				Silty Sandstone; very fine- to fine-grained, medium light gray, moist, moderately hard, moderately indurated.				
15	1370	R	11 for 6"				13.4	120.6	91	
						Total Depth 16 feet. No water, no caving. Hole backfilled with native materials and tamped.				

SAMPLE TYPES:
R RING (DRIVE) SAMPLE
S SPT (SPLIT SPOON) SAMPLE
B BULK SAMPLE T TUBE SAMPLE

GROUNDWATER LEVEL
WATER SEEP
B BEDDING C CONTACT
J JOINTING F FAULT S SHEAR

PACIFIC SOILS ENGINEERING, INC.

PLATE A-10

GEOTECHNICAL BORING LOG

PROJECT NO.	102453-T	PROJECT NAME	Lyons Canyon Ranch		
DATE STARTED	6/25/01	GROUND ELEV.	1388	BORING DESIG.	B-7
DATE FINISHED	6/25/01	GW DEPTH (FT)		LOGGED BY	CRN
DRILLER	Ledezma Drilling	DRIVE WT.	See Note	NOTE	0-24' 3548#; 24-47'
TYPE OF DRILL RIG	30" Bucket Auger	DROP	12 inches		2577#; 47-73' 1648#

DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	ATTITUDES	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
	1385					**COLLUVIUM/ALLUVIUM (Qal):** Silty Sand; fine- to coarse-grained with pebbles and some cobbles, moderate yellowish brown, dry and loose top 3± feet, slightly moist and moderately dense at depth, abundant roots and rootlets throughout.				
						1± inch thick yellowish red lense at contact.				
5		R/B	4		C: N75W 44NE	**SAUGUS FORMATION- SUNSHINE RANCH MEMBER (Tsr):** Silty Sandstone; fine- to coarse-grained with pebbles and some cobbles, grayish orange, slightly moist, hard, moderately to well indurated, slight to moderate bedding.	4.6	114.8	27	
	1380									
					B: N80W 41NE	1± foot thick, scour/infill structure - infill with fine-grained Sand (attitude from top of Sand infill).				
10		R/B	4 for 3" Bounce				3.4	121.9	25	
	1375									
					B: N70W 54NE	2± foot thick,scour/infill structure - infill with fine-grained Sand (attitude from top of infill).				
15										
					B: N80W 50NE	Silty Sandstone; fine-grained, light gray, slightly moist, hard, well indurated.				
	1370					Used ripper and core bucket from 18 to 19± feet. Refusal at 19+ feet. Total Depth 19 feet. No water, no caving. Hole backfilled with native materials and tamped.				

SAMPLE TYPES:
- R RING (DRIVE) SAMPLE
- S SPT (SPLIT SPOON) SAMPLE
- B BULK SAMPLE
- T TUBE SAMPLE

▼ GROUNDWATER LEVEL
► WATER SEEP
B BEDDING
J JOINTING
C CONTACT
F FAULT
S SHEAR

PACIFIC SOILS ENGINEERING, INC.

PLATE A-11

GEOTECHNICAL BORING LOG

PROJECT NO.	102453-T	PROJECT NAME	Lyons Canyon Ranch	BORING DESIG.	B-8
DATE STARTED	6/25/01	GROUND ELEV.	1353	LOGGED BY	CRN
DATE FINISHED	6/25/01	GW DEPTH (FT)	19	NOTE	0-24' 3548#; 24-47'
DRILLER	Ledezma Drilling	DRIVE WT.	See Note		2577#; 47-73' 1648#
TYPE OF DRILL RIG	30" Bucket Auger	DROP	12 inches		

DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	ATTITUDES	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
0	1350					**COLLUVIUM/ALLUVIUM (Qal):** Silty Sand to Sandy Silt; fine- to coarse-grained with pebbles, cobbles, some clay pods, slightly moist to moist, loose/soft to moderately dense/firm at depth.				
5										
	1345									
10						Increasing pebbles and cobbles.				
	1340									
15		R/B	6				10.7	122.3	81	
	1335					▼ Water at 19 feet.				
20		R B	10			**SAUGUS FORMATION-SUNSHINE RANCH MEMBER (Tsr):** Silty Sandstone to Sandy Siltstone; very fine- to fine-grained, light olive, moist, moderately hard, moderately to well indurated, thinly bedded to laminated, weathered.	14.1	121.5	98	
	1330									
25						Silty Sandstone; fine to coarse-grained, medium light gray, slightly moist, hard, moderately to well indurated.	9.8	122.0	73	
						Total Depth 26 feet. Water at 19 feet. No caving. Hole backfilled.				

SAMPLE TYPES:
- R RING (DRIVE) SAMPLE
- S SPT (SPLIT SPOON) SAMPLE
- B BULK SAMPLE
- T TUBE SAMPLE

▼ GROUNDWATER LEVEL
► WATER SEEP
B BEDDING
J JOINTING
C CONTACT
F FAULT
S SHEAR

PACIFIC SOILS ENGINEERING, INC.

PLATE A-12

GEOTECHNICAL BORING LOG

PROJECT NO.	102453-T	PROJECT NAME	Lyons Canyon Ranch		
DATE STARTED	6/25/01	GROUND ELEV.	1327	BORING DESIG.	B-9
DATE FINISHED	6/25/01	GW DEPTH (FT)		LOGGED BY	CRN
DRILLER	Ledezma Drilling	DRIVE WT.	See Note	NOTE	0-24' 3548#; 24-47'
TYPE OF DRILL RIG	30" Bucket Auger	DROP	12 inches		2577#; 47-73' 1648#

DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	ATTITUDES	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
0	1325					**ALLUVIUM (Qal):** Silty Sand; fine- to coarse-grained with pebbles and cobbles, moderate yellowish brown, top 6± feet dry to moist at depth, loose top 3± feet to moderately dense at depth.				
5										
	1320									
10		R/B	Push			Sandy Silt to Silty Sand; fine-grained, moderate to dark yellowish brown, moist, firm/moderately dense, porous, abundant rootlets.	13.9	115.1	84	
	1315									
15										
	1310									
20		R	1			Silty Sand; fine- to medium-grained, moderate to dark yellowish brown, moist, moderately dense, micaceous.	12.1	111.7	64	
	1305									
25										
	1300									
30		R/B	Push			Silty Sand to Sandy Silt; fine- to coarse-grained with some pebbles, moderate yellowish brown, moist to very moist, moderately dense, micaceous.	18.0	112.0	100	
	1295									
35										
	1290									
		B				**SAUGUS FORMATION-SUNSHINE RANCH MEMBER (Tsr):** Silty Sandstone; fine to medium-grained, light olive gray, moist, moderately hard, moderately indurated, slightly				

SAMPLE TYPES:
R RING (DRIVE) SAMPLE
S SPT (SPLIT SPOON) SAMPLE
B BULK SAMPLE T TUBE SAMPLE

GROUNDWATER LEVEL
WATER SEEP
B BEDDING J JOINTING C CONTACT F FAULT S SHEAR

PACIFIC SOILS ENGINEERING, INC.

PLATE A-13

GEOTECHNICAL BORING LOG

PROJECT NO.	102453-T	PROJECT NAME	Lyons Canyon Ranch		
DATE STARTED	6/25/01	GROUND ELEV.	1327	BORING DESIG.	B-9
DATE FINISHED	6/25/01	GW DEPTH (FT)		LOGGED BY	CRN
DRILLER	Ledezma Drilling	DRIVE WT.	See Note	NOTE	0-24' 3548#; 24-47'
TYPE OF DRILL RIG	30" Bucket Auger	DROP	12 inches		2577#; 47-73' 1648#

DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	ATTITUDES	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
		R	5			to moderately weathered.	10.0	117.9	63	
	1285					Total Depth 41 feet. No water, no caving. Hole backfilled with native materials and tamped.				

SAMPLE TYPES:
- [R] RING (DRIVE) SAMPLE
- [S] SPT (SPLIT SPOON) SAMPLE
- [B] BULK SAMPLE
- [T] TUBE SAMPLE

▼ GROUNDWATER LEVEL
- ► WATER SEEP
- [B] BEDDING
- [J] JOINTING
- [C] CONTACT
- [F] FAULT
- [S] SHEAR

PACIFIC SOILS ENGINEERING, INC.

PLATE A-14

GEOTECHNICAL BORING LOG

PROJECT NO. 102453-T
DATE STARTED 4/25/02
DATE FINISHED 4/26/02
DRILLER Dave's Drilling
TYPE OF DRILL RIG 30" Bucket Auger

PROJECT NAME Lyons Canyon Ranch
GROUND ELEV. 1635
GW DEPTH (FT)
DRIVE WT. See Note
DROP 12 inches

BORING DESIG. B-10
LOGGED BY CRN
NOTE 0-27' 4500#; 27-52' 3500#; 52-80' 2500#; 80-104' 1000#

DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	ATTITUDES	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
	1635	B				**PICO FORMATION (Tp):** Sandy Siltstone; very fine-grained Sand, pale yellowish brown, slightly moist, hard, fossiliferous (abundant bi-valves); interbedded with Silty Sandstone; very fine- to fine-grained, pale yellowish brown, slightly moist, hard, scour-fill into Siltstone; both units jointed with caliche infill, both units laminated to 8± inch thick bedding.				
					B: N75W 46NE					
5	1630									
10	1625	R/B	4 for 5"			Interbedded Silty Sandstone; fine-grained, pale yellowish to grayish orange, slightly moist to moist, hard; with Sandy Siltstone; mottled grayish orange and pale olive gray, slightly moist to moist, hard; both units laminated to 2± inch thick bedding.	8.8	115.4	54	
					B: B80W 54NE					
					B: N85W 53NE	Some interlayered Silty Claystone; olive gray, moist, moderately firm to firm, laminated, 1 to 2±mm thick layers, some caliche along bedding.				
15	1620									
20	1615	R/B	5 for 4"		B: B80W 45NE	Silty Sandstone; fine- to medium-grained, light gray with light brown staining, slightly moist, hard, laminated to 1/4± inch thick bedding./	5.8	108.0	29	
25	1610				B: N70W 51NE	Some isolated cobble lenses, quartzite and gneissic composition.				
30	1605	R/B	8 for 8"		B: N70W 50NE	Sandy to Clayey Siltstone; very fine-grained Sand; light olive gray, moist, moderately hard to hard, laminated to 1/4± inch thick bedding, some gypsum strands along bedding up to 1/4± inch thick. Some isolated Clay lenses and pods; dark brownish black, moist, moderately firm to firm, concentrated along bedding planes.	11.0	116.4	69	
35	1600									
					B: N65W 49NE	Claystone layer; 1/4± inch thick, olive gray, moist, soft, abundant well formed, gypsum crystals.				
	1595									

SAMPLE TYPES:
R RING (DRIVE) SAMPLE
S SPT (SPLIT SPOON) SAMPLE
B BULK SAMPLE T TUBE SAMPLE

GROUNDWATER LEVEL
WATER SEEP C CONTACT
B BEDDING F FAULT
J JOINTING S SHEAR

PACIFIC SOILS ENGINEERING, INC.

PLATE A-15

GEOTECHNICAL BORING LOG

PROJECT NO.	102453-T	PROJECT NAME	Lyons Canyon Ranch		
DATE STARTED	4/25/02	GROUND ELEV.	1635	BORING DESIG.	B-10
DATE FINISHED	4/26/02	GW DEPTH (FT)		LOGGED BY	CRN
DRILLER	Dave's Drilling	DRIVE WT.	See Note	NOTE	0-27' 4500#; 27-52' 3500#; 52-80' 2500#; 80-104' 1000#
TYPE OF DRILL RIG	30" Bucket Auger	DROP	12 inches		

DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	ATTITUDES	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
	1595	R	8 for 6"		B: N80W 47NE	Sandy Siltstone; fine-grained Sand; olive gray, moist, hard, some laminated to 1/4± inch bedding, generally massive, with abundant cross-cutting gypsum seams. Cobble layers; 1± foot thick, set in pebbly sand matrix, medium- to very coarse-grained, moist, moderately hard to hard, quartzite cobbles and pebbles.	10.0	121.2	73	
45	1590				B: N85W 57NE	Silty Sandstone; fine-grained, reddish brown, slightly moist to moist, hard; interlayered with Sandy Siltstone; very fine- to fine-grained Sand, moist, moderately firm to firm, some very firm layers, laminated; both units 6 to 12 inch beds.				
50	1585	R/B	8 for 5"			Silty Sandstone; fine-grained, pale olive gray, moist, hard.	7.2	113.1	41	
					B: N70W 49NE	Pebble lense; medium- to very coarse-grained Sand matrix, quartzite pebbles, mottled reddish to light brown and pale olive gray, slightly moist, very hard, slightly concretionary.				
55	1580				B: N75W 50NE	Some isolated Clay lenses and pods along bedding, 1± inch thick to 6± inches long, medium- to very coarse-grained Sand matrix, quartzite pebbles, mottled reddish to light brown and pale olive gray, slightly moist, very hard, slightly concretionary.				
60	1575	R	10 for 5"		B: N60E 47NW	Silty Sandstone; layered fine- to medium-grained, pale olive gray, moist, hard, friable; interbedded with Sandy to Clayey Siltstone, olive gray, moist, hard, laminated to 1/2± inch thick bedding. Siltstone concretion; 1± inch thick, light to olive gray, slightly moist, very hard, massive, slightly jointed with light brown staining along joints.	7.3	113.0	42	
65	1570				B: E-W 51N	Some gypsum along bedding; up to 1/4± inch thick.				
70	1565	R/B	10 for 5"		B: B80W 48NE	Clayey Sandstone; very fine- to fine-grained, layered, pale yellowish brown to olive gray, moist, hard, friable, generally massive, some gypsum strands.	12.1	109.6	63	
75	1560				B: N75W 48NE	Clayey Siltstone to Clayey Sandstone layers; 1± foot thick, very fine-grained, medium light to medium gray, moist, hard, micaceous, massive. Silty Sandstone; very fine- to fine-grained, medium light to medium gray, moist, hard, micaceous, laminated to 1± inch thick bedding.				
	1555									

SAMPLE TYPES:
- R RING (DRIVE) SAMPLE
- S SPT (SPLIT SPOON) SAMPLE
- B BULK SAMPLE
- T TUBE SAMPLE

- GROUNDWATER LEVEL
- WATER SEEP
- B BEDDING
- J JOINTING
- C CONTACT
- F FAULT
- S SHEAR

PACIFIC SOILS ENGINEERING, INC.

PLATE A-16

GEOTECHNICAL BORING LOG

PROJECT NO.	102453-T	PROJECT NAME	Lyons Canyon Ranch	BORING DESIG.	B-10
DATE STARTED	4/25/02	GROUND ELEV.	1635	LOGGED BY	CRN
DATE FINISHED	4/26/02	GW DEPTH (FT)		NOTE	0-27' 4500#; 27-52' 3500#; 52-80' 2500#; 80-104' 1000#
DRILLER	Dave's Drilling	DRIVE WT.	See Note		
TYPE OF DRILL RIG	30" Bucket Auger	DROP	12 inches		

DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	ATTITUDES	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
	1555	R/B	20 for 4"			No sample recovery at 80 feet.				
85	1550				B: E-W 52N	Gradational color change to light olive gray.				
90	1545	R	25 for 4"			Silty Sandstone; very fine- to fine-grained, light olive gray, slightly moist, hard, massive to very slightly bedded with some cross-bedding. No sample recovery at 92 feet.				
						Some isolated bi-valve shells to depth.				
95	1540				B: E-W 50N (Approx.)					
100	1535	R	25 for 4"							
						Total Depth 101 feet. No water, no caving. Hole backfilled with native				

SAMPLE TYPES:
- R RING (DRIVE) SAMPLE
- S SPT (SPLIT SPOON) SAMPLE
- B BULK SAMPLE
- T TUBE SAMPLE

▼ GROUNDWATER LEVEL
- WATER SEEP
- B BEDDING
- J JOINTING
- C CONTACT
- F FAULT
- S SHEAR

PACIFIC SOILS ENGINEERING, INC.

PLATE A-17

GEOTECHNICAL BORING LOG

PROJECT NO.	102453-T	PROJECT NAME	Lyons Canyon Ranch	BORING DESIG.	B-11
DATE STARTED	4/26/02	GROUND ELEV.	1582	LOGGED BY	CRN
DATE FINISHED	4/26/02	GW DEPTH (FT)		NOTE	0-27' 4500#; 27-52' 3500#; 52-80' 2500#; 80-104' 1000#
DRILLER	Dave's Drilling	DRIVE WT.	See Note		
TYPE OF DRILL RIG	30" Bucket Auger	DROP	12 inches		

DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	ATTITUDES	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
						PICO FORMATION (Tp):				
	1580				B: N50W 45SN J: N60E Vertical J: N10W 62NE	Sandy Siltstone; very fine-grained Sand, layered light to olive gray and light brown, slightly moist, moderately hard to hard, laminated to 1/2± inch thick bedding, jointed/weathered, abundant roots.				
5					F: N80W 62NE F: N50W 63SW	Fault Gouge: 1/4 to 1/2± inch thick, plastic Clay layer; olive gray, moist, soft to firm, flaky, abundant roots and rootlets.				
	1575									
10		R/B	5				13.0	119.4	89	
					J: N45W 78SW F: N55E 65NW	Fault Gouge: plastic Clay layer; olive gray, moist, soft, flaky, abundant roots.				
	1570									
15					B: N50E 48NW					
	1565					Some medium sized bi-valves.				
					B: N40E 49NW					
20		R/B	5 for 6"			Sandy Siltstone; very fine-grained Sand, medium dark gray, slightly moist, hard, massive, some isolated small to medium bi-valves.	13.2	122.3	99	
	1560									
25					J: N50W 86SW J: N40E 66NW	Clay lined joint 1-2 mm thick. Gypsum lined joint 2-3 mm thick.				
	1555									
30		R/B	8 for 6"			Sandy Siltstone; very fine-grained Sand, greenish gray, slightly moist, firm, massive, fossiliferous (small bi-valves); interlayered plastic with Silty Sandstone, medium gray, slightly moist, hard, slightly layered to massive; some Interlayered Claystone, medium dark to dark gray, moist, soft to moderately firm, laminated, flaky.	12.2	123.5	95	
	1550				B: N60W 75SW					
35										
	1545					Some isolated concretionary pods, 2 to 6± inches in diameter, very hard.				

SAMPLE TYPES:
- R RING (DRIVE) SAMPLE
- S SPT (SPLIT SPOON) SAMPLE
- B BULK SAMPLE
- T TUBE SAMPLE

GROUNDWATER LEVEL
- WATER SEEP
- B BEDDING
- J JOINTING
- C CONTACT
- F FAULT
- S SHEAR

PACIFIC SOILS ENGINEERING, INC.

PLATE A-18

GEOTECHNICAL BORING LOG

PROJECT NO. 102453-T
DATE STARTED 4/26/02
DATE FINISHED 4/26/02
DRILLER Dave's Drilling
TYPE OF DRILL RIG 30" Bucket Auger

PROJECT NAME Lyons Canyon Ranch
GROUND ELEV. 1582
GW DEPTH (FT)
DRIVE WT. See Note
DROP 12 inches

BORING DESIG. B-11
LOGGED BY CRN
NOTE 0-27' 4500#; 27-52' 3500#; 52-80' 2500#; 80-104' 1000#

DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	ATTITUDES	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
		R	8 for 6"		B: N20E 55NW	Clayey to Sandy Siltstone; very fine-grained Sand, greenish to dark greenish gray, slightly moist, firm, laminated to massive.	12.3	119.7	85	
	1540									
45					B: N60W 55SW (Approx.)					
	1535					Hard drilling.				
50		R/B	10 for 6"			Clayey Siltstone; medium dark gray, slightly moist, firm, slightly laminated, generally massive.	11.9	122.1	89	
	1530									
					B: N55W 75SW					
55										
	1525				B: N20W 67NE (Approx.)	Siltstone concretion lense; 8 to 10± inches thick, very hard, massive.				
60		R	15 for 6"			Clayey Siltstone; olive gray, slightly moist, firm, slightly laminated, generally massive, few small bi-valve shells.	10.5	121.0	76	
	1520				B: N60W Vertical	Ripple marks, small amplitude.				
65					B: N50W 52SW					
	1515				B: N50W 43SW					
70		R	15 for 5"			Sandy Siltstone; very fine-grained Sand, medium dark gray, slightly moist, hard, slightly laminated to 1/2± inch thick bedding, generally massive.	10.3	105.0	47	
	1510				B: N60E 59SE	Clay lense; 2 to 3± inches thick, medium dark gray, moist, soft, pliable.				
75					B: N60W 75SW					
	1505									

SAMPLE TYPES:
R RING (DRIVE) SAMPLE
S SPT (SPLIT SPOON) SAMPLE
B BULK SAMPLE T TUBE SAMPLE

GROUNDWATER LEVEL
WATER SEEP
B BEDDING
J JOINTING
C CONTACT
F FAULT
S SHEAR

PACIFIC SOILS ENGINEERING, INC.

PLATE A-19

GEOTECHNICAL BORING LOG

PROJECT NO. 102453-T
DATE STARTED 4/26/02
DATE FINISHED 4/26/02
DRILLER Dave's Drilling
TYPE OF DRILL RIG 30" Bucket Auger

PROJECT NAME Lyons Canyon Ranch
GROUND ELEV. 1582
GW DEPTH (FT)
DRIVE WT. See Note
DROP 12 inches

BORING DESIG. B-11
LOGGED BY CRN
NOTE 0-27' 4500#; 27-52' 3500#; 52-80' 2500#; 80-104' 1000#

DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	ATTITUDES	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
		R	25 for 3.5"				10.8	120.8	78	
	1500					Total Depth 81 feet. No water, no caving. Hole backfilled with native materials and tamped.				

SAMPLE TYPES:
R RING (DRIVE) SAMPLE
S SPT (SPLIT SPOON) SAMPLE
B BULK SAMPLE T TUBE SAMPLE

GROUNDWATER LEVEL
WATER SEEP
B BEDDING
J JOINTING
C CONTACT
F FAULT
S SHEAR

PACIFIC SOILS ENGINEERING, INC.

PLATE A-20

GEOTECHNICAL BORING LOG

PROJECT NO.	102453-T	PROJECT NAME	Lyons Canyon Ranch	BORING DESIG.	B-12
DATE STARTED	4/29/02	GROUND ELEV.	1557	LOGGED BY	CRN
DATE FINISHED	4/29/02	GW DEPTH (FT)		NOTE	0-27' 4500#; 27-52' 3500#; 52-80' 2500#; 80-104' 1000#
DRILLER	Dave's Drilling	DRIVE WT.	See Note		
TYPE OF DRILL RIG	30" Bucket Auger	DROP	12 inches		

DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	ATTITUDES	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
						PICO FORMATION (Tp):				
	1555				B: N60W 57NE	Sandy Siltstone; very fine- to fine-grained Sand; yellowish brown, slightly moist to moist, moderately hard, laminated to 1/2± inch thick bedding; interlayered with Silty Sandstone; fine-grained, mottled moderate yellowish brown and pale olive, slightly moist, moderately hard, laminated to 1/2± inch thick bedding; abundant caliche, both units highly to moderately weathered.				
5										
	1550				B: N80E 72NW	Abundant penecontemporaneous deformation.				
10		R/B	5 for 10"				12.9	117.6	84	
	1545					Sandy Siltstone; very fine-grained Sand; light olive gray, slightly moist to moist, moderately hard to hard, slightly laminated generally massive; some interlayered Silty Sandstone, fine-grained, layered yellowish gray and light brown, slightly moist, moderately hard to hard, laminated to 1/4± inch thick bedding; some fine-grained gypsum along bedding bottom of "high to moderate" weathering zone.				
15					B: N50W 65NE					
	1540									
20		R/B			B: N70W 73NE	Clayey Siltstone; mottled light to olive gray and moderate brown, slightly moist to moist, moderately hard to hard, massive, micaceous, some fine-rained gypsum strands.	14.6	115.8	90	
	1535					Silty Sandstone to Clayey Siltstone; very fine-grained Sand, medium dark gray, slightly moist, hard, massive, some small isolated bi-valves and gastropods.				
25										
	1530									
30		R/B	10 for 10"		B: E-W 64N (Approx.)	Sandy Siltstone; very fine-grained, medium dark gray, slightly moist to moist, hard, slightly laminated, generally massive, slightly fossiliferous, micaceous.	12.6	123.0	97	
	1525									
35										
	1520									

SAMPLE TYPES:
- R RING (DRIVE) SAMPLE
- S SPT (SPLIT SPOON) SAMPLE
- B BULK SAMPLE
- T TUBE SAMPLE

GROUNDWATER LEVEL
- WATER SEEP
- B BEDDING
- J JOINTING
- C CONTACT
- F FAULT
- S SHEAR

PACIFIC SOILS ENGINEERING, INC.

PLATE A-21

GEOTECHNICAL BORING LOG

PROJECT NO.	102453-T	PROJECT NAME	Lyons Canyon Ranch		
DATE STARTED	4/29/02	GROUND ELEV.	1557	BORING DESIG.	B-12
DATE FINISHED	4/29/02	GW DEPTH (FT)		LOGGED BY	CRN
DRILLER	Dave's Drilling	DRIVE WT.	See Note	NOTE	0-27' 4500#; 27-52' 3500#; 52-80' 2500#; 80-104' 1000#
TYPE OF DRILL RIG	30" Bucket Auger	DROP	12 inches		

DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	ATTITUDES	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
					B: N70W 69NE	Sandy Siltstone to Silty Sandstone; very fine-grained Sand, medium dark gray, slightly moist to moist, hard, slightly laminated generally massive, slightly fossiliferous, micaceous; some interlayered Silty Sandstone, very fine-grained, light gray, slightly moist, hard, and Claystone, brownish to olive black, moist, moderately firm, laminated.	14.2	118.6	95	
	1515									
45					B: N50W 57NE (Approx.)					
	1510									
50		R/B	8 for 8"			Silty sandstone; very fine- to fine-grained, medium dark to olive gray, slightly moist, hard, slightly laminated, generally massive, micaceous, slightly fossiliferous.	13.4	120.8	96	
	1505									
55										
	1500									
60		R/B	15 for 8"		B: N60W 63NE	Silty Sandstone; very fine- to fine-grained, medium dark gray, slightly moist, hard, slightly laminated, generally massive, micaceous, slightly fossiliferous; some interbedded Claystone lenses, 1 to 2± thick, brownish to olive black, moist, moderately firm to firm, laminated.	13.2	120.6	94	
	1495				B: N60W 53NE	Silty Sandstone lense; 8± inches thick, light to medium light gray, fine-grained, moist, moderately hard, fossiliferous; underlain by 1 to 2± inch thick soft Claystone lense.				
65										
	1490				B: N50W 52NE					
70		R	15 for 8"			Silty Sandstone; very fine- to fine-grained, medium dark gray, slightly moist, hard, slightly laminated, generally massive, micaceous, slightly fossiliferous.	13.0	122.1	97	
	1485									
75					B: N25W 77NE					
	1480									

SAMPLE TYPES:
[R] RING (DRIVE) SAMPLE
[S] SPT (SPLIT SPOON) SAMPLE
[B] BULK SAMPLE [T] TUBE SAMPLE

▼ GROUNDWATER LEVEL
WATER SEEP
[B] BEDDING [C] CONTACT
[J] JOINTING [F] FAULT
[S] SHEAR

PACIFIC SOILS ENGINEERING, INC.

PLATE A-22

GEOTECHNICAL BORING LOG

PROJECT NO.	102453-T	PROJECT NAME	Lyons Canyon Ranch		
DATE STARTED	4/29/02	GROUND ELEV.	1557	BORING DESIG.	B-12
DATE FINISHED	4/29/02	GW DEPTH (FT)		LOGGED BY	CRN
DRILLER	Dave's Drilling	DRIVE WT.	See Note	NOTE	0-27' 4500#; 27-52' 3500#; 52-80' 2500#; 80-104' 1000#
TYPE OF DRILL RIG	30" Bucket Auger	DROP	12 inches		

DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	ATTITUDES	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
		R/B	20 for 6"				13.3	108.9	68	
	1475				B: N65W 46NE	Silty Sandstone lense; interbedded with Sandy Siltstone, dark gray, slightly moist, hard, slightly lamainted, generally massive, 1/2 to 1± inch thick beds.				
85					B: N50W 63NE					
	1470									
90		R	25 for 5"				12.3	104.8	56	
						Total Depth 91 feet. No water, no caving. Hole backfilled with native materials and tamped.				

SAMPLE TYPES:
- [R] RING (DRIVE) SAMPLE
- [S] SPT (SPLIT SPOON) SAMPLE
- [B] BULK SAMPLE [T] TUBE SAMPLE

- ▼ GROUNDWATER LEVEL
- ► WATER SEEP
- [B] BEDDING [C] CONTACT
- [J] JOINTING [F] FAULT
- [S] SHEAR

PACIFIC SOILS ENGINEERING, INC.

PLATE A-23

GEOTECHNICAL BORING LOG

PROJECT NO.	102453-T	PROJECT NAME	Lyons Canyon Ranch	BORING DESIG.	B-13
DATE STARTED	5/1/02	GROUND ELEV.	1445	LOGGED BY	CRN
DATE FINISHED	5/1/02	GW DEPTH (FT)		NOTE	0-27' 4500#; 27-52' 3500#; 52-80' 2500#; 80-104' 1000#
DRILLER	Dave's Drilling	DRIVE WT.	See Note		
TYPE OF DRILL RIG	30" Bucket Auger	DROP	12 inches		

DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	ATTITUDES	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
	1445					**SAUGUS FORMATION - SUNSHINE RANCH MEMBER** (Tsr): Silty Sandstone; fine- to coarse-grained with pebbles, very pale orange to pale yellowish brown, dry, moderately hard to hard, abundant scour-infill, normal grading.				
					B: N80E 55NW					
5	1440									
10	1435	R/B	5 for 5"		B: N80E 39NW	Silty Sandstone; fine- to coarse-grained, pale yellowish brown, dry to slightly moist, moderately hard to hard.	4.5	116.1	28	
					B: N70E 50NW	Some interlayered Clayey Siltstone layers; 6± inches thick, pale olive gray, moist, moderately hard, laminated.				
15	1430									
						1 foot thick lense of 6 to 8± inch diameter cobbles, scour/infill with lower contact into underlying Siltstone.				
20	1425	R/B	5 for 6"			Sandy Siltstone; very fine- to fine-grained, pale olive gray, moist, moderately hard to hard, slightly laminated generally massive.	11.1	120.1	78	
25	1420									
					B: E-W 40N	Silty Sandstone; fine- to coarse-grained with some pebble lenses, grayish orange to light olive gray, slightly moist to moist, moderately hard to hard, abundant scour-fill, graded bedding, cross-bedding.				
30	1415	R	8 for 6"				5.1	105.6	24	
35	1410				B: N80W 43NE					
	1405									

SAMPLE TYPES:
- R RING (DRIVE) SAMPLE
- S SPT (SPLIT SPOON) SAMPLE
- B BULK SAMPLE
- T TUBE SAMPLE

- ▼ GROUNDWATER LEVEL
- ► WATER SEEP
- C CONTACT
- B BEDDING
- F FAULT
- J JOINTING
- S SHEAR

PACIFIC SOILS ENGINEERING, INC.

PLATE A-24

GEOTECHNICAL BORING LOG

PROJECT NO.	102453-T	PROJECT NAME	Lyons Canyon Ranch		
DATE STARTED	5/1/02	GROUND ELEV.	1445	BORING DESIG.	B-13
DATE FINISHED	5/1/02	GW DEPTH (FT)		LOGGED BY	CRN
DRILLER	Dave's Drilling	DRIVE WT.	See Note	NOTE	0-27' 4500#; 27-52' 3500#; 52-80' 2500#; 80-104' 1000#
TYPE OF DRILL RIG	30" Bucket Auger	DROP	12 inches		

DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	GROUP SYMBOL	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
		R/B	8 for 6"			Silty Sandstone; very fine- to fine-grained, pale olive gray, slightly moist to moist, moderately hard to hard; some interlayered Silty Sandstone, fine- to coarse-grained with pebbles, grayish orange, slightly moist, moderately hard to hard.	3.8	112.5	21	
45	1400									
						Silty Sandstone; fine- to coarse-grained with pebbles and cobbles, moderate yellowish to moderate brown, moist, moderately hard to hard.				
50	1395	B	N/R			Discontinuous Paleosol; Silty Sand to Sandy Silt, fine- to coarse-grained dark yellowish brown, moist, soft, 6± inches thick. Silty Sandstone; fine- to coarse-grained with pebbles and cobbles, some boulders up to 10± inches, moderate yellowish to moderate brown, moist, moderately hard to hard, massive 50/50± clast-matrix supported. @ 50 feet; no sample recovery due to cobbles.				
55	1390									
60	1385	R/B	10 for 5"			Silty Sandstone; fine- to coarse-grained with pebbles and some cobbles, moderate yellowish to moderate brown, moist, hard. FAULT ZONE: Clayey Siltstone; dusky blue green, moist, moderately hard to hard, massive, some polished surfaces, some scour-infill with overlying Sandstone.	7.5	112.7	43	
65	1380									
						FAULT: Claystone; olive gray, moist, moderately firm, slightly pliable, abundant polished surfaces and striations, laminated to 1± inch thick bedding. @ 66'; Trend and plunge of striations on fault plane: N60E 42W. Silty Sandstone; very fine- to fine-grained, light olive gray, moist, moderately hard, laminated to 2± inch, massive bedding.				
70	1375	R/B	10 for 10"			Silty Sandstone; fine- to coarse-grained with pebbles and cobbles, moderate yellowish brown, moist, moderately hard, scour-infill, generally massive, matrix supported.	14.6	119.0	99	
75	1370									
		B				Total Depth 78 feet. No water, no caving. Hole backfilled with native materials and tamped.				

SAMPLE TYPES:
- R RING (DRIVE) SAMPLE
- S SPT (SPLIT SPOON) SAMPLE
- B BULK SAMPLE
- T TUBE SAMPLE

Ground Water Seepage
MAX - Max. Density/Opt. Moist.
DS - Direct Shear
HYDR - Hydrometer Analysis
ASCE - Expansion Index
CONS - Consolidation

PACIFIC SOILS ENGINEERING, INC.

PLATE A-25

GEOTECHNICAL BORING LOG

PROJECT NO.	102453-T	PROJECT NAME	Lyons Canyon Ranch	BORING DESIG.	B-14
DATE STARTED	5/2/02	GROUND ELEV.	1338	LOGGED BY	CRN
DATE FINISHED	5/2/02	GW DEPTH (FT)		NOTE	0-27' 4500#; 27-52' 3500#; 52-80' 2500#; 80-104' 1000#
DRILLER	Dave's Drilling	DRIVE WT.	See Note		
TYPE OF DRILL RIG	30" Bucket Auger	DROP	12 inches		

DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	GROUP SYMBOL	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
5	1333	B				**SOIL:** Sandy Silt; very fine- to fine-grained, pale to moderate yellowish brown, dry, very loose, abundant rootlets. **ALLUVIUM (Qal):** Sandy Silt to Silty Sand; very fine- to medium-grained with pebbles and cobbles, pale yellowish brown, dry, loose. Silty Sand; fine- to coarse-grained with pebbles and cobbles, some boulders up to 10± inches, moderate to dark yellowish brown, slightly moist, loose to moderately dense, stratified cobbles consist of gneiss, granite and sandstone, some quartzite. Increase moisture content to slightly moist. Boulder lense: 2-1/2 to 3± feet in diameter, moderate to major caving. Total Depth 8 feet. No water. Moderate to major caving 5 to 8± feet. Hole backfilled.				

SAMPLE TYPES:
- R RING (DRIVE) SAMPLE
- S SPT (SPLIT SPOON) SAMPLE
- B BULK SAMPLE
- T TUBE SAMPLE

Ground Water Seepage
MAX - Max. Density/Opt. Moist.
DS - Direct Shear
HYDR - Hydrometer Analysis
ASCE - Expansion Index
CONS - Consolidation

PACIFIC SOILS ENGINEERING, INC.

PLATE A-26

GEOTECHNICAL BORING LOG

PROJECT NO.	102453-T	PROJECT NAME	Lyons Canyon Ranch	BORING DESIG.	B-14B
DATE STARTED	5/2/02	GROUND ELEV.	1338	LOGGED BY	CRN
DATE FINISHED	5/2/02	GW DEPTH (FT)		NOTE	0-27' 4500#; 27-52' 3500#; 52-80' 2500#; 80-104' 1000#
DRILLER	Dave's Drilling	DRIVE WT.	See Note		
TYPE OF DRILL RIG	30" Bucket Auger	DROP	12 inches		

DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	GROUP SYMBOL	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
						SOIL: Silty Sand to Sandy Silt; very fine- to fine-grained, pale yellowish brown, dry, very loose, abundant rootlets and gopher holes.				
						ALLUVIUM (Qal): Pebbly to cobbly Sand; fine- to coarse-grained, pale to moderate yellowish brown, dry, loose to moderately dense, stratified, some boulders to 10± inches.				
5	1333					Increase moisture to: slightly moist.				
		B				Boulder layer; up to 3± feet in diameter, moderate caving.				
						Increase moisture to: slightly moist to moist.				
10	1328					Boulder layer; up to 2± feet in diameter, predominantly Sandstone and Pebbly Sandstone, some granite.				
		B				Clayey Siltstone layer; 1 to 2± inch thick, mottled moderate yellowish brown and pale olive, moist to wet (perched/saturated), soft.				
15	1323					Boulder layer, need rippers/core to continue. Refusal.				
						Total Depth 14 feet.				
						No water. Moderate caving throughout.				
						Refusal - Boulders.				
						Hole backfilled.				
20	1318									
25	1313									
30	1308									
35	1303									

SAMPLE TYPES:
- R RING (DRIVE) SAMPLE
- S SPT (SPLIT SPOON) SAMPLE
- B BULK SAMPLE
- T TUBE SAMPLE

Ground Water Seepage
MAX - Max. Density/Opt. Moist.
DS - Direct Shear
HYDR - Hydrometer Analysis
ASCE - Expansion Index
CONS - Consolidation

PACIFIC SOILS ENGINEERING, INC.

PLATE A-27

GEOTECHNICAL BORING LOG

PROJECT NO.	102453-T	PROJECT NAME	Lyons Canyon Ranch				
DATE STARTED	4/4/02	GROUND ELEV.	1323	BORING DESIG.	RW-1		
DATE FINISHED	4/4/02	GW DEPTH (FT)		LOGGED BY	TMD		
DRILLER	A & W Drilling	DRIVE WT.	See Note	NOTE	140# for SPT; 400# for ring sample		
TYPE OF DRILL RIG	Rotary Wash	DROP	30 inches				

DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	GROUP SYMBOL	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
						ALLUVIUM (Qal):				
5	1318	SPT	11			Silty Sand; brown with pebbles, slightly moist, medium dense.				
10	1313	SPT	11			Silty Sand; brown with pebbles, slightly moist, medium dense.				
15	1308	SPT	16			Silty Sand; brown with pebbles, slightly moist, medium dense.				
20	1303	SPT	26			Silty Sand; light brown with pebbles, slightly moist, medium dense.				
25	1298	SPT	60			Gravelly Sand; brown, slightly moist, very dense.				
30	1293	R	25			Silty Sand; fine- to medium-grained, light brown, moist, medium dense, 2± feet thick layer.	12.0	108.4	61	
35	1288	SPT	40			Sand; fine- to medium-grained, brown with gravel, moist, dense.				
						Very firm drilling.				

SAMPLE TYPES:
- R RING (DRIVE) SAMPLE
- S SPT (SPLIT SPOON) SAMPLE
- B BULK SAMPLE
- T TUBE SAMPLE

Ground Water Seepage
MAX - Max. Density/Opt. Moist.
DS - Direct Shear
HYDR - Hydrometer Analysis
ASCE - Expansion Index
CONS - Consolidation

PACIFIC SOILS ENGINEERING, INC.

PLATE A-28

GEOTECHNICAL BORING LOG

PROJECT NO.	102453-T	PROJECT NAME	Lyons Canyon Ranch		
DATE STARTED	4/4/02	GROUND ELEV.	1323	BORING DESIG.	RW-1
DATE FINISHED	4/4/02	GW DEPTH (FT)		LOGGED BY	TMD
DRILLER	A & W Drilling	DRIVE WT.	See Note	NOTE	140# for SPT; 400# for ring sample
TYPE OF DRILL RIG	Rotary Wash	DROP	30 inches		

DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	GROUP SYMBOL	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
		SPT	34			Gravelly Sand; fine- to medium-grained, brown, slightly moist, dense, some silt.				
45	1278	SPT	17 for 12"			Gravelly Sand; fine- to medium-grained, brown, moist, dense.				
						SAUGUS FORMATION - SUNSHINE RANCH MEMBER (Tsr):				
50	1273	SPT	75 for 6"			Harder drilling. Sandstone; medium- to coarse-grained with gravel, grayish brown.				
55	1268	SPT	75 for 5"			Silty Sandstone; fine- to coarse-grained with gravel, grayish brown. 6 to 8 inch cobble layer.				
60	1263	SPT	50 for 1"			No recovery.				
65	1258	R	50 for 4"			Sandstone; medium- to coarse-grained, brown, hard. Total Depth 65 feet. No apparent water or caving. Hole backfilled.				

SAMPLE TYPES:
- R RING (DRIVE) SAMPLE
- S SPT (SPLIT SPOON) SAMPLE
- B BULK SAMPLE
- T TUBE SAMPLE

Ground Water Seepage
MAX - Max. Density/Opt. Moist.
DS - Direct Shear
HYDR - Hydrometer Analysis
ASCE - Expansion Index
CONS - Consolidation

PACIFIC SOILS ENGINEERING, INC.

PLATE A-29

GEOTECHNICAL BORING LOG

PROJECT NO.	102453-T	PROJECT NAME	Lyons Canyon Ranch		
DATE STARTED	4/4/02	GROUND ELEV.	1318	BORING DESIG.	RW-2
DATE FINISHED	4/4/02	GW DEPTH (FT)	69	LOGGED BY	TMD
DRILLER	A & W Drilling	DRIVE WT.	See Note	NOTE	140# for SPT; 400# for ring sample
TYPE OF DRILL RIG	Rotary Wash	DROP	30 inches		

DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	GROUP SYMBOL	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
						ALLUVIUM (Qal):				
5	1313	SPT	4			Sandy Silt; fine-grained, brown, slightly moist, soft.				
10	1308	SPT	16			Silty Sand; brown, slightly moist, medium dense, fine- to medium-grained with small pebbles, sample from spoils screen.				
15	1303	SPT	36			Slightly Silty Sand; brown, moist, dense, fine- to medium-grained with pebbles, sample obtained by driving ring sampler 6".				
20	1298					Cobbles.				
		SPT	22			Gravelly Silty Sand; fine- to coarse-grained, red/brown, slightly most, medium dense, with pebbles.				
25	1293	SPT	18			Sandy Silt; brown, slightly moist, very stiff.				
30	1288	SPT	19			Silty Sand to Sandy Silt; fine-grained Sand, light brown, moist, very stiff.				
35	1283	SPT	35			Silty Sand; fine- to coarse-grained, with gravel, light brown, slightly moist, dense.				

SAMPLE TYPES:
- R RING (DRIVE) SAMPLE
- S SPT (SPLIT SPOON) SAMPLE
- B BULK SAMPLE
- T TUBE SAMPLE

▼ Ground Water Seepage
MAX - Max. Density/Opt. Moist.
DS - Direct Shear
HYDR - Hydrometer Analysis
ASCE - Expansion Index
CONS - Consolidation

PACIFIC SOILS ENGINEERING, INC.

PLATE A-30

GEOTECHNICAL BORING LOG

PROJECT NO.	102453-T	PROJECT NAME	Lyons Canyon Ranch				
DATE STARTED	4/4/02	GROUND ELEV.	1318			BORING DESIG.	RW-2
DATE FINISHED	4/4/02	GW DEPTH (FT)	69			LOGGED BY	TMD
DRILLER	A & W Drilling	DRIVE WT.	See Note			NOTE	140# for SPT; 400# for ring sample
TYPE OF DRILL RIG	Rotary Wash	DROP	30 inches				

DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	GROUP SYMBOL	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
		R	32			Sand; fine to coarse-grained brown, slightly moist, dense, soil retrieved from sampler tip with large rock fragment.				
45	1273	R	28			Sand; with gravel, medium to coarse-grained, red brown, slightly moist, slightly dense, Siltstone fragments in sampler tip.	11.0	121.7	81	
50	1268	SPT	57 for 6"			Silty Sand; fine to coarse-grained with gravel, light brown, slightly moist, very dense, sample may be from side of boring.				
55	1263	SPT	22			Sandy to Silty Clay; dark brown, moist, very stiff, soil obtained by driving ring sampler 6".				
60	1258	SPT	18			Sandy to Silty Clay; dark brown, moist, very stiff, soil obtained by driving ring sampler 6".				
65	1253	SPT	15			Sandy Silty Clay; fine-grained Sand, light brown, slightly moist, stiff, soil obtained by driving ring sampler 6".				
70	1248	SPT	32			**SAUGUS FORMATION-SUNSHINE RANCH MEMBER (Tsr):** slightly Sandy Silty Clay; fine-grained Sand, grayish brown, soil obtained by driving ring sampler 6".				
75	1243	SPT	22 for 12"			Silty Sandstone; gray. Total Depth 75 feet. Water at 69 feet. No apparent caving. Hole backfilled.				

SAMPLE TYPES:
- R RING (DRIVE) SAMPLE
- S SPT (SPLIT SPOON) SAMPLE
- B BULK SAMPLE
- T TUBE SAMPLE

▼ Ground Water Seepage
MAX - Max. Density/Opt. Moist.
DS - Direct Shear
HYDR - Hydrometer Analysis
ASCE - Expansion Index
CONS - Consolidation

PACIFIC SOILS ENGINEERING, INC.

PLATE A-31

GEOTECHNICAL BORING LOG

PROJECT NO.	102453-T	PROJECT NAME	Lyons Canyon Ranch	BORING DESIG.	RW-3
DATE STARTED	4/4/02	GROUND ELEV.	1330	LOGGED BY	TMD
DATE FINISHED	4/5/02	GW DEPTH (FT)	54	NOTE	140# for SPT; 400# for ring sample
DRILLER	A & W Drilling	DRIVE WT.	See Note		
TYPE OF DRILL RIG	Rotary Wash	DROP	30 inches		

DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	GROUP SYMBOL	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
						ALLUVIUM (Qal):				
5	1325	SPT	19			Sandy Silt; fine-grained, light brown, slightly moist, very stiff.				
10	1320	SPT	20			Sandy Silt; fine-grained, light brown, slightly moist, very stiff.				
15	1315	SPT	14			Silty Sand; fine- to coarse-grained, light brown, slightly moist, medium dense.				
20	1310	SPT	30			Gravelly Sand; medium- to coarse-grained, light brown, slightly moist, dense.				
25	1305	R	17			Gravelly Sand; medium- to coarse-grained, light brown, slightly moist, medium dense.	8.1	111.0	44	
30	1300	SPT	50 for 11"			Silty Sand; medium- to coarse-grained, with gravel, light brown, slightly moist, very dense.				
35	1295	SPT	48			Gravelly Sand; medium- to coarse-grained, with silt, light brown, slightly moist, dense.				

SAMPLE TYPES:
- R RING (DRIVE) SAMPLE
- S SPT (SPLIT SPOON) SAMPLE
- B BULK SAMPLE
- T TUBE SAMPLE

Ground Water Seepage
MAX - Max. Density/Opt. Moist.
DS - Direct Shear
HYDR - Hydrometer Analysis
ASCE - Expansion Index
CONS - Consolidation

PACIFIC SOILS ENGINEERING, INC.

PLATE A-32

GEOTECHNICAL BORING LOG

PROJECT NO.	102453-T	PROJECT NAME	Lyons Canyon Ranch		
DATE STARTED	4/4/02	GROUND ELEV.	1330	BORING DESIG.	RW-3
DATE FINISHED	4/5/02	GW DEPTH (FT)	54	LOGGED BY	TMD
DRILLER	A & W Drilling	DRIVE WT.	See Note	NOTE	140# for SPT; 400# for ring sample
TYPE OF DRILL RIG	Rotary Wash	DROP	30 inches		

DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	GROUP SYMBOL	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
		SPT	30 for 11"			Silty Sand; medium- to coarse-grained, with gravel, light brown, slightly moist, very dense.				
45	1285	SPT	19			Sandy Silt; fine-grained, light brown, slightly moist, very stiff.				
50	1280	SPT	50 for 10.5"			Slightly Silty Sand; fine-grained, reddish brown, moist, very dense.				
55	1275	SPT	31			Sandy Silty Clay; fine-grained, light brown, moist, hard, soil obtained from ring sampler, driven 6".				
60	1270	SPT	75 for 5"			SAUGUS FORMATION - SUNSHINE RANCH MEMBER (Tsr): Slightly Clayey Sand; medium- to coarse-grained, gray.				
65	1265	R	60 for 6"			Sandstone; medium to coarse-grained; gray. No sample retrieved. Total Depth 65 feet. Groundwater at 54 feet. No apparent caving. Hole backfilled.				

SAMPLE TYPES:
- R RING (DRIVE) SAMPLE
- S SPT (SPLIT SPOON) SAMPLE
- B BULK SAMPLE
- T TUBE SAMPLE

▼ Ground Water Seepage
MAX - Max. Density/Opt. Moist.
DS - Direct Shear
HYDR - Hydrometer Analysis
ASCE - Expansion Index
CONS - Consolidation

GEOTECHNICAL BORING LOG

PROJECT NO.	102453-T	PROJECT NAME	Lyons Canyon Ranch		
DATE STARTED	4/5/02	GROUND ELEV.	1408	BORING DESIG.	RW-4
DATE FINISHED	4/5/02	GW DEPTH (FT)		LOGGED BY	TMD
DRILLER	A & W Drilling	DRIVE WT.	See Note	NOTE	140# for SPT; 400# for ring sample
TYPE OF DRILL RIG	Rotary Wash	DROP	30 Inches		

DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	GROUP SYMBOL	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
						ALLUVIUM (Qal):				
5	1403	SPT	7			Sandy Silty Clay; fine-grained Sand, light brown, slightly moist, firm.				
10	1398	SPT	11			Silty Sand; light brown, slightly moist, medium dense.				
15	1393	SPT	35 for 11"			SAUGUS FORMATION - SUNSHINE RANCH MEMBER (Tsr): Slightly Clayey Siltstone; grayish brown, weathered.				
20	1388	R	75 for 11"			Very fine Sandy Siltstone; gray, hard. Total Depth 20 feet. No apparent groundwater or caving. Hole backfilled.	14.5	119.3	100	

SAMPLE TYPES:
- R RING (DRIVE) SAMPLE
- S SPT (SPLIT SPOON) SAMPLE
- B BULK SAMPLE
- T TUBE SAMPLE

▼ Ground Water Seepage
MAX - Max. Density/Opt. Moist.
DS - Direct Shear
HYDR - Hydrometer Analysis
ASCE - Expansion Index
CONS - Consolidation

PACIFIC SOILS ENGINEERING, INC.

PLATE A-34

GEOTECHNICAL BORING LOG

PROJECT NO.	102453-T	PROJECT NAME	Lyons Canyon Ranch		
DATE STARTED	4/5/02	GROUND ELEV.	1348	BORING DESIG.	RW-5
DATE FINISHED	4/5/02	GW DEPTH (FT)	17	LOGGED BY	TMD
DRILLER	A & W Drilling	DRIVE WT.	See Note	NOTE	140# for SPT; 400# for ring sample
TYPE OF DRILL RIG	Rotary Wash	DROP	30 inches		

DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	GROUP SYMBOL	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
						ALLUVIUM (Qal):				
5	1343	SPT	17			Silty Sand; fine-grained, light brown, slightly moist, medium dense.				
10	1338	SPT	8			Silty Sand to Sandy Silt; dark brown, moist, loose.				
15	1333	R	5			Silty Sand; fine- to medium-grained, dark brown, slightly moist, slightly dense. ▼	17.3	112.9	99	
20	1328	SPT	6			Clayey to Silty Sand; brown, moist, loose.				
25	1323	SPT	10			Clayey to Sandy Silt; gray, very moist, stiff.				
						Some gravel.				
30	1318	SPT	50 for 8"			Silty fine- to medium-grained Sand; gray, moist, very dense.				
35	1313	SPT	57			**SAUGUS FORMATION - SUNSHINE RANCH MEMBER (Tsr):** Silty Sandstone/Sandy Siltstone; brown/gray.				

SAMPLE TYPES:
- R RING (DRIVE) SAMPLE
- S SPT (SPLIT SPOON) SAMPLE
- B BULK SAMPLE
- T TUBE SAMPLE

▼ Ground Water Seepage
MAX - Max. Density/Opt. Moist.
DS - Direct Shear
HYDR - Hydrometer Analysis
ASCE - Expansion Index
CONS - Consolidation

PACIFIC SOILS ENGINEERING, INC.

GEOTECHNICAL BORING LOG

PROJECT NO.	102453-T	PROJECT NAME	Lyons Canyon Ranch		
DATE STARTED	4/5/02	GROUND ELEV.	1348	BORING DESIG.	RW-5
DATE FINISHED	4/5/02	GW DEPTH (FT)	17	LOGGED BY	TMD
DRILLER	A & W Drilling	DRIVE WT.	See Note	NOTE	140# for SPT; 400# for ring sample
TYPE OF DRILL RIG	Rotary Wash	DROP	30 inches		

DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	GROUP SYMBOL	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
		R	50 for 10"			Silty Sandstone; medium- to coarse-grained, gray, hard. Total Depth 40 feet. No apparent caving. Groundwater at 17 feet. Hole backfilled.				

SAMPLE TYPES:
- R RING (DRIVE) SAMPLE
- S SPT (SPLIT SPOON) SAMPLE
- B BULK SAMPLE
- T TUBE SAMPLE

Ground Water Seepage
MAX - Max. Density/Opt. Moist.
DS - Direct Shear
HYDR - Hydrometer Analysis
ASCE - Expansion Index
CONS - Consolidation

PACIFIC SOILS ENGINEERING, INC.

PLATE A-36

GEOTECHNICAL BORING LOG

PROJECT NO.	102453-T	PROJECT NAME	Lyons Canyon Ranch		
DATE STARTED	4/5/02	GROUND ELEV.	1379	BORING DESIG.	RW-6
DATE FINISHED	4/5/02	GW DEPTH (FT)	18	LOGGED BY	TMD
DRILLER	A & W Drilling	DRIVE WT.	See Note	NOTE	140# for SPT; 400# for ring sample
TYPE OF DRILL RIG	Rotary Wash	DROP	30 inches		

DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	GROUP SYMBOL	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
						ALLUVIUM (Qal):				
5	1374	SPT	6			Silty Sand; brown, slightly moist, loose.				
10	1369	SPT	14			Gravelly Sand; fine- to medium-grained, brown, some silt, slightly moist, medium dense.				
15	1364	SPT	23			Gravelly Sand; fine- to medium-grained, with some silt, reddish brown, very moist, medium dense. ▼				
20	1359	R	11			SAUGUS FORMATION - SUNSHINE RANCH MEMBER (Tsr): Silty medium- to coarse-grained Sand; red brown, with gravel, ring sample disturbed.				
25	1354	R	50 for 6"			Sandy Siltstone; very fine-grained Sand, bluish gray, hard. Total Depth 25 feet. No apparent caving. Water at 17.5 feet. Hole backfilled.	15.6	116.6	99	

SAMPLE TYPES:
- R RING (DRIVE) SAMPLE
- S SPT (SPLIT SPOON) SAMPLE
- B BULK SAMPLE
- T TUBE SAMPLE

▼ Ground Water Seepage
MAX - Max. Density/Opt. Moist.
DS - Direct Shear
HYDR - Hydrometer Analysis
ASCE - Expansion Index
CONS - Consolidation

PACIFIC SOILS ENGINEERING, INC.

PLATE A-37

GEOTECHNICAL BORING LOG

PROJECT NO.	102453-T	PROJECT NAME	Lyons Canyon Ranch	BORING DESIG.	CPT/SPT-1
DATE STARTED	7/31/01	GROUND ELEV.	1317	LOGGED BY	CRN
DATE FINISHED	7/31/01	GW DEPTH (FT)		NOTE	Combo Rig - Truck Mounted, 4-1/2" Rotary Wash, SPT & CPT
DRILLER	Gregg In-Situ	DRIVE WT.	140 lbs.		
TYPE OF DRILL RIG	See Note	DROP	30 inches		

DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	GROUP SYMBOL	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
						ALLUVIUM (Qal): (Note: See adjacent exploratory boring B-1 for descriptive log of Alluvium from 0 to 70± feet).				
5	1312					Begin CPT.				
10	1307									
15	1302									
20	1297					Stop CPT - Drill through gravelly layers.				
25	1292					Begin CPT - Stop CPT - (Unable to advance) Drill through gravelly layers.				
30	1287	SPT	50 for 5"			Begin CPT - Stop CPT (6± inches of advancement). Drill through gravelly layers.				
35	1282									

SAMPLE TYPES:
- R RING (DRIVE) SAMPLE
- S SPT (SPLIT SPOON) SAMPLE
- B BULK SAMPLE
- T TUBE SAMPLE

▼ Ground Water Seepage
MAX - Max. Density/Opt. Moist.
DS - Direct Shear
HYDR - Hydrometer Analysis
ASCE - Expansion Index
CONS - Consolidation

PACIFIC SOILS ENGINEERING, INC.

PLATE A-38

GEOTECHNICAL BORING LOG

PROJECT NO. 102453-T
DATE STARTED 7/31/01
DATE FINISHED 7/31/01
DRILLER Gregg In-Situ
TYPE OF DRILL RIG See Note

PROJECT NAME Lyons Canyon Ranch
GROUND ELEV. 1317
GW DEPTH (FT)
DRIVE WT. 140 lbs.
DROP 30 inches

BORING DESIG. CPT/SPT-1
LOGGED BY CRN
NOTE Combo Rig - Truck Mounted, 4-1/2" Rotary Wash, SPT & CPT

DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	GROUP SYMBOL	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
						Begin CPT.				
						Stop CPT. Drill through gravelly layers.				
45	1272					Pebbles in auger tip.				
50	1267					Gravel lense. Begin CPT.				
						Stop CPT. Drill through gravelly layers.				
55	1262									
60	1257					Begin CPT.				
						Stop CPT. Drill through gravelly layers.				
65	1252									
70	1247	SPT	102 for 4"			Gravelly Sand; medium to coarse-grained with pebbles, moderate yellowish brown, moist to wet, dense, interlayered pebble lenses.				
75	1242									

SAMPLE TYPES:
R RING (DRIVE) SAMPLE
S SPT (SPLIT SPOON) SAMPLE
B BULK SAMPLE T TUBE SAMPLE

Ground Water Seepage
MAX - Max. Density/Opt. Moist.
DS - Direct Shear
HYDR - Hydrometer Analysis
ASCE - Expansion Index
CONS - Consolidation

PACIFIC SOILS ENGINEERING, INC.

PLATE A-39

GEOTECHNICAL BORING LOG

PROJECT NO.	102453-T	PROJECT NAME	Lyons Canyon Ranch	BORING DESIG.	CPT/SPT-1
DATE STARTED	7/31/01	GROUND ELEV.	1317	LOGGED BY	CRN
DATE FINISHED	7/31/01	GW DEPTH (FT)		NOTE	Combo Rig - Truck Mounted, 4-1/2" Rotary Wash, SPT & CPT
DRILLER	Gregg In-Situ	DRIVE WT.	140 lbs.		
TYPE OF DRILL RIG	See Note	DROP	30 inches		

DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	GROUP SYMBOL	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
		SPT	70			SAUGUS FORMATION - SUNSHINE RANCH MEMBER (Tsr): Silty Sandstone; fine to coarse-grained with some pebbles, yellowish gray, moist to wet, moderately hard.				
85	1232									
90	1227	SPT	50 for 2"			Gravelly Sandstone to Pebbly Conglomerate; medium to very coarse-grained, light to medium gray, moist, moderately hard.				
95	1222									
						Claystone; 1 to 2± foo thick layer/lense, olive gray, moist to wet, soft to firm.				
100	1217	SPT	50 for 3"			@ 100 feet; No recovery of SPT sample.				
						Total Depth 101± feet. Hole backfilled with on-site cuttings.				

SAMPLE TYPES:
- R RING (DRIVE) SAMPLE
- S SPT (SPLIT SPOON) SAMPLE
- B BULK SAMPLE
- T TUBE SAMPLE

Ground Water Seepage
MAX - Max. Density/Opt. Moist.
DS - Direct Shear
HYDR - Hydrometer Analysis
ASCE - Expansion Index
CONS - Consolidation

GEOTECHNICAL BORING LOG

PROJECT NO.	102453-T	PROJECT NAME	Lyons Canyon Ranch	BORING DESIG.	CPT/SPT-2
DATE STARTED	7/31/01	GROUND ELEV.	1363	LOGGED BY	CRN
DATE FINISHED	7/31/01	GW DEPTH (FT)	15	NOTE	Combo Rig - Truck Mounted, 4-1/2" Rotary Wash, SPT & CPT
DRILLER	Gregg In-Situ	DRIVE WT.	140 lbs.		
TYPE OF DRILL RIG	See Note	DROP	30 inches		

DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	GROUP SYMBOL	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
						ALLUVIUM (Qal):				
		SPT	10			Silt; dark yellowish brown, moist, soft to moderately firm.				
5	1358									
10	1353	SPT	3			Sandy Clay; fine-grained, moderate yellowish brown, moist, soft to moderately firm.				
15	1348	SPT	13			▼ Clayey Sand; fine- to medium- with some coarse-grained, olive gray, moist to wet, moderately dense.				
20	1343	SPT	3			**SAUGUS FORMATION - SUNSHINE RANCH MEMBER** (Tsr): Clayey Sandstone; fine- to very coarse-grained with pebbles, medium dark gray, moist, moderately hard to hard.				
25	1338					Begin CPT.				
30	1333	SPT	50 for 3"			Stop CPT. Silty Sandstone; fine- to coarse-grained, medium gray, slightly moist, hard to very hard.				
35	1328									

SAMPLE TYPES:
- [R] RING (DRIVE) SAMPLE
- [S] SPT (SPLIT SPOON) SAMPLE
- [B] BULK SAMPLE
- [T] TUBE SAMPLE

▼ Ground Water Seepage
MAX - Max. Density/Opt. Moist.
DS - Direct Shear
HYDR - Hydrometer Analysis
ASCE - Expansion Index
CONS - Consolidation

PACIFIC SOILS ENGINEERING, INC.

PLATE A-41

GEOTECHNICAL BORING LOG

PROJECT NO. 102453-T
DATE STARTED 7/31/01
DATE FINISHED 7/31/01
DRILLER Gregg In-Situ
TYPE OF DRILL RIG See Note

PROJECT NAME Lyons Canyon Ranch
GROUND ELEV. 1363
GW DEPTH (FT) 15
DRIVE WT. 140 lbs.
DROP 30 inches

BORING DESIG. CPT/SPT-2
LOGGED BY CRN
NOTE Combo Rig - Truck Mounted, 4-1/2" Rotary Wash, SPT & CPT

DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	GROUP SYMBOL	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
		SPT	50 for 3"			Silty Sandstone; fine- to coarse-grained, medium gray, slightly moist, hard to very hard. Total Depth 41 feet. Groundwater at 15 feet. No apparent caving. Hole backfilled.				

SAMPLE TYPES:
R RING (DRIVE) SAMPLE
S SPT (SPLIT SPOON) SAMPLE
B BULK SAMPLE T TUBE SAMPLE

Ground Water Seepage
MAX - Max. Density/Opt. Moist.
DS - Direct Shear
HYDR - Hydrometer Analysis
ASCE - Expansion Index
CONS - Consolidation

PACIFIC SOILS ENGINEERING, INC.

PLATE A-42

GEOTECHNICAL BORING LOG

PROJECT NO. 102453-T
DATE STARTED 1/13/04
DATE FINISHED 1/13/04
DRILLER JN Drilling
TYPE OF DRILL RIG 30" Bucket Auger

PROJECT NAME Lyons Ranch
GROUND ELEV. 1315
GW DEPTH (FT)
DRIVE WT. See Note
DROP 12 inches

BORING DESIG. B-101
LOGGED BY CRN
NOTE 0-24', 3548#; 24-47', 2577#; 47-75', 1648#

DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	GROUP SYMBOL	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
						ALLUVIUM (Qal): Silty to Clayey Sand; fine-grained, few pebbles, dark yellowish brown, moist, loose to medium dense, abundant roots and rootlets.				
5	1310	R/B	Push			Sandy Silt; very fine- to fine-grained Sand, moderate yellowish brown, slightly moist, very loose, slightly porous, some white carbonate.	10.0	82.4	26	
10	1305	R	Push for 6" 1 for 6"			Sand Silt; very fine- to fine-grained Sand, moderate yellowish brown, slightly moist, very loose, slightly porous, some white carbonate, some rootlets.	5.1	103.0	22	
15	1300	R	1			Silty Sand; fine- with some medium-grained, few pebbles, moderate to dark yellowish brown, slightly moist, loose.	6.2	107.3	29	
20	1295	R/B	1			Silty Sand; fine- to coarse-grained with some pebbles, moderate yellowish brown, slightly moist, loose.	6.2	105.1	28	
25	1290					Gravelly Sand; fine- to coarse-grained with pebbles and cobbles, few boulders to 1± foot, light to moderate yellowish brown, slightly moist, loose to medium dense; interlayered with Sand lenses, medium- to coarse-grained, light yellowish brown, slightly moist, loose to medium dense.				
30	1285	B				Increase abundance of cobbles and boulders (8 to 12± inches).				
35	1280	B				34 to 36± feet, some raveling in coarse-grained material, change to cork screw auger.				
						SAUGUS FORMATION-SUNSHINE RANCH FORMATION MEMBER (Tsr): Pebble and Cobble Conglomerate; medium- to very coarse-grained Sand matrix; pale yellowish gray, dry to slightly moist, hard to very hard.				

SAMPLE TYPES:
R RING (DRIVE) SAMPLE
S SPT (SPLIT SPOON) SAMPLE
B BULK SAMPLE T TUBE SAMPLE

▼ Ground Water Seepage
MAX - Max. Density/Opt. Moist.
DS - Direct Shear
HYDR - Hydrometer Analysis
ASCE - Expansion Index
CONS - Consolidation

PACIFIC SOILS ENGINEERING, INC.

PLATE A-43

GEOTECHNICAL BORING LOG

PROJECT NO.	102453-T	PROJECT NAME	Lyons Ranch	BORING DESIG.	B-101
DATE STARTED	1/13/04	GROUND ELEV.	1315	LOGGED BY	CRN
DATE FINISHED	1/13/04	GW DEPTH (FT)		NOTE	0-24', 3548#; 24-47', 2577#; 47-75', 1648#
DRILLER	JN Drilling	DRIVE WT.	See Note		
TYPE OF DRILL RIG	30" Bucket Auger	DROP	12 inches		

DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	GROUP SYMBOL	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
						Total Depth 40± feet. No water. Some raveling 34 to 36± feet. Hole backfilled.				

SAMPLE TYPES:
- R RING (DRIVE) SAMPLE
- S SPT (SPLIT SPOON) SAMPLE
- B BULK SAMPLE
- T TUBE SAMPLE

▼ Ground Water Seepage
MAX - Max. Density/Opt. Moist.
DS - Direct Shear
HYDR - Hydrometer Analysis
ASCE - Expansion Index
CONS - Consolidation

PACIFIC SOILS ENGINEERING, INC.

PLATE A-44

GEOTECHNICAL BORING LOG

PROJECT NO.	102453-T	PROJECT NAME	Lyons Ranch		
DATE STARTED	1/13/04	GROUND ELEV.	1323	BORING DESIG.	B-102
DATE FINISHED	1/13/04	GW DEPTH (FT)		LOGGED BY	CRN
DRILLER	JN Drilling	DRIVE WT.	See Note	NOTE	0-24', 3548:;#; 24-47', 2577#; 47-75', 1648#
TYPE OF DRILL RIG	30" Bucket Auger	DROP	12 inches		

DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	GROUP SYMBOL	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
						SOIL: Sandy Silt; very fine- to fine- with some medium-grained Sand, dark yellowish brown, moist, very loose, abundant roots and rootlets.				
						ALLUVIUM (Qal): Sand Silt; very fine- to fine-grained Sand, moderate yellowish brown, slightly moist to moist, loose.				
5	1318	R/B	1			Sandy Silt to Silty Sand; fine- to medium- with some coarse-grained Sand and pebbles, dry to slightly moist, loose, porous, some rootlets.	4.8	100.7	19	
10	1313	R	Push			Sandy Silt to Silty Sand; fine- to medium- with some coarse-grained Sand and pebbles, dry to slightly moist, very loose, porous, some rootlets.	9.4	105.1	42	
15	1308	R	Push			Sandy Silt to Silty Sand; fine- to medium- with some coarse-grained Sand and pebbles, moderate yellowish brown, slightly moist to moist, very loose.	9.8	106.8	46	
20	1303	R/B	1			Sandy Silt to Silty Sand; fine- to medium- with some coarse-grained Sand and pebbles, colour change to moderate yellowish brown, moisture increase to slightly moist to moist, dry to slightly moist, loose.	8.1	107.0	38	
25	1298	R/B	2			Silty Sand; fine- to coarse-grained with pebbles, pale to moderate yellowish brown, slightly moist, loose to medium dense.	3.0	115.6	18	
30	1293					Increase abundance of pebbles and cobbles.				
		R	3			Pebbly to Cobbly Sand; fine- to coarse-grained, pale to moderate yellowish brown, slightly moist to moist, medium dense; interlayered with Silty Sand; fine- to coarse-grained with pebbles, pale to moderate yellowish brown, slightly moist, medium dense.	3.8	118.3	24	
		B								
35	1288					Change to cork-screw auger due to abundant cobbles and boulders (up to 12± inches). 34 to 38± feet, moderate to severe raveling of coarse-grained materials.				
						SAUGUS FORMATION-SUNSHINE RANCH FORMATION MEMBER (Tsr)(?): Clayey to Sandy Silt; fine-grained Sand; moderate yellowish brown, moist, soft.				

SAMPLE TYPES:
R RING (DRIVE) SAMPLE
S SPT (SPLIT SPOON) SAMPLE
B BULK SAMPLE T TUBE SAMPLE

Ground Water Seepage
MAX - Max. Density/Opt. Moist.
DS - Direct Shear
HYDR - Hydrometer Analysis
ASCE - Expansion Index
CONS - Consolidation

PACIFIC SOILS ENGINEERING, INC.

GEOTECHNICAL BORING LOG

PROJECT NO. 102453-T
DATE STARTED 1/13/04
DATE FINISHED 1/13/04
DRILLER JN Drilling
TYPE OF DRILL RIG 30" Bucket Auger

PROJECT NAME Lyons Ranch
GROUND ELEV. 1323
GW DEPTH (FT)
DRIVE WT. See Note
DROP 12 Inches

BORING DESIG. B-102
LOGGED BY CRN
NOTE 0-24', 3548#; #; 24-47', 2577#; 47-75', 1648#

DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	GROUP SYMBOL	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
						(weathered Tsr?). "Hard Drilling" at auger tip/refusal.				
						Total Depth 38 feet.				
						No water.				
						Moderate to severe raveling 34 to 38± feet.				
						Hole backfilled.				

SAMPLE TYPES:
R RING (DRIVE) SAMPLE
S SPT (SPLIT SPOON) SAMPLE
B BULK SAMPLE T TUBE SAMPLE

Ground Water Seepage
MAX - Max. Density/Opt. Moist.
DS - Direct Shear
HYDR - Hydrometer Analysis
ASCE - Expansion Index
CONS - Consolidation

PACIFIC SOILS ENGINEERING, INC.

PLATE A-46

GEOTECHNICAL BORING LOG

PROJECT NO.	102453-T	PROJECT NAME	Lyons Ranch		
DATE STARTED	1/13/04	GROUND ELEV.	1324	BORING DESIG.	B-103
DATE FINISHED	1/13/04	GW DEPTH (FT)		LOGGED BY	CRN
DRILLER	JN Drilling	DRIVE WT.	See Note	NOTE	0-24', 3548;:#; 24-47', 2577#; 47-75', 1648#
TYPE OF DRILL RIG	30" Bucket Auger	DROP	12 inches		

DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	GROUP SYMBOL	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
						ALLUVIUM (Qal): Sandy Silt; very fine- to fine-grained Sand, dark to moderate yellowish brown, moist, very loose, abundant roots and rootlets.				
5	1319	R	Push			Silty Sand; fine- to medium-grained, moderate yellowish brown, slighty moist, very loose.	4.0	103.1	17	
						Increase abundance of pebbles.				
10	1314	R	Push			Silty Sand; fine- to coarse-grained with pebbles, moderate yellowish brown, slighty moist, loose to medium dense.	8.6	104.8	38	
						Some cobbles and boulders (up to 12± inches).				
15	1309	R	Push			Silty Sand; fine- to medium-grained with some pebbles, moderate yellowish brown, slightly moist, loose to medium dense.	8.9	107.4	42	
20	1304	R	1			Silty Sand; fine- to medium-grained with some pebbles, moderate yellowish brown, slightly moist, loose.	11.1	104.8	49	
25	1299	R	1			Silty Sand; fine- to coarse-grained with pebbles, pale to moderate yellowish brown, slightly moist, loose.	4.8	114.9	28	
30	1294	R	3			Silty Sand; fine- to coarse-grained with pebbles and cobbles, pale to moderate yellowish brown, slightly moist, medium dense.	6.3	111.6	33	
35	1289					Pebbly to cobbly Sand; fine- to coarse-grained, moderate yellowish brown, slightly moist, medium dense to dense.				

SAMPLE TYPES:
- R RING (DRIVE) SAMPLE
- S SPT (SPLIT SPOON) SAMPLE
- B BULK SAMPLE
- T TUBE SAMPLE

Ground Water Seepage
MAX - Max. Density/Opt. Moist.
DS - Direct Shear
HYDR - Hydrometer Analysis
ASCE - Expansion Index
CONS - Consolidation

PACIFIC SOILS ENGINEERING, INC.

PLATE A-47

GEOTECHNICAL BORING LOG

PROJECT NO. 102453-T
DATE STARTED 1/13/04
DATE FINISHED 1/13/04
DRILLER JN Drilling
TYPE OF DRILL RIG 30" Bucket Auger

PROJECT NAME Lyons Ranch
GROUND ELEV. 1324
GW DEPTH (FT)
DRIVE WT. See Note
DROP 12 inches

BORING DESIG. B-103
LOGGED BY CRN
NOTE 0-24', 3548;:#; 24-47', 2577#; 47-75', 1648#

DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	GROUP SYMBOL	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
		B				Pebbly to cobbly Sand; fine- to coarse-grained with some boulders up to 12± inches, moderate yellowish brown, slightly moist, dense.				
45	1279					Increase abundant of cobbles and boulders.				
						SAUGUS FORMATION-SUNSHINE RANCH FORMATION MEMBER (Tsr): Pebble and Cobble Conglomerate; fine to very coarse-grained Sand matrix, pale yellowish gray, dry to slighty moist, hard.				
						Total Depth 49 feet. No water. No caving. Hole backfilled.				

SAMPLE TYPES:
[R] RING (DRIVE) SAMPLE
[S] SPT (SPLIT SPOON) SAMPLE
[B] BULK SAMPLE [T] TUBE SAMPLE

Ground Water Seepage
MAX - Max. Density/Opt. Moist.
DS - Direct Shear
HYDR - Hydrometer Analysis
ASCE - Expansion Index
CONS - Consolidation

PACIFIC SOILS ENGINEERING, INC.

PLATE A-48

GEOTECHNICAL BORING LOG

PROJECT NO. 102453-T
DATE STARTED 1/13/04
DATE FINISHED 1/13/04
DRILLER JN Drilling
TYPE OF DRILL RIG 30" Bucket Auger

PROJECT NAME Lyons Ranch
GROUND ELEV. 1315
GW DEPTH (FT)
DRIVE WT. See Note
DROP 12 inches

BORING DESIG. B-104
LOGGED BY CRN
NOTE 0-24', 3548#; 24-47', 2577#; 47-75', 1648#

DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	GROUP SYMBOL	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
						ALLUVIUM (Qal): Silty Sand; fine- to coarse-grained with pebbles and cobbles, pale yellowish brown, slightly moist, loose to medium dense. Sandy Silt; very fine- to fine-grained Sand, moderate yellowish brown, moist, loose.				
5	1310	R	1			Silty Sand; very fine- to fine-grained Sand, moderate yellowish brown, moist, loose.	6.8	103.8	29	
10	1305	R/B	2			Silty Sand; fine- to coarse-grained with pebbles and cobbles, pale yellowish brown, slightly moist, medium dense.	6.4	100.4	25	
15	1300	R	3			Silty Sand; fine- to coarse-grained with pebbles and some cobbles, moderate yellowish brown, slightly moist, medium dense.	2.4	120.7	16	
20	1295	R	1			Silty Sand; fine- to medium-grained and pebbles, moderate yellowish brown, slightly moist, medium dense. Pebbly to Cobbly Sand; fine- to coarse-grained, moderate yellowish brown, slightly moist to moist, medium dense.	6.3	103.4	27	
25	1290	B				Some boulders up to 12± inches.				
		R	2			Silty Sand; fine- to medium-grained and pebbles, moderate yellowish brown, slightly moist, medium dense.	6.9	108.2	33	
30	1285	B								
		R	3			Interlayered 1± foot: Pebbly to cobbly Sand; medium- to very coarse-grained, moderate yellowish gray, slightly moist, medium dense. Silty Sand; fine- to coarse-grained with pebbles, moderate yellowish brown, slightly moist, medium dense.	3.5	107.7	17	
35	1280	R	2			Interlayered 1± foot: Pebbly to cobbly Sand; medium- to very coarse-grained, moderate yellowish gray, slightly moist, medium dense.	4.0	111.1	21	

SAMPLE TYPES:
R RING (DRIVE) SAMPLE
S SPT (SPLIT SPOON) SAMPLE
B BULK SAMPLE T TUBE SAMPLE

Ground Water Seepage
MAX - Max. Density/Opt. Moist.
DS - Direct Shear
HYDR - Hydrometer Analysis
ASCE - Expansion Index
CONS - Consolidation

PACIFIC SOILS ENGINEERING, INC.

PLATE A-49

GEOTECHNICAL BORING LOG

PROJECT NO.	102453-T	PROJECT NAME	Lyons Ranch		
DATE STARTED	1/13/04	GROUND ELEV.	1315	BORING DESIG.	B-104
DATE FINISHED	1/13/04	GW DEPTH (FT)		LOGGED BY	CRN
DRILLER	JN Drilling	DRIVE WT.	See Note	NOTE	0-24', 3548;:#; 24-47',
TYPE OF DRILL RIG	30" Bucket Auger	DROP	12 inches		2577#; 47-75', 1648#

DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	GROUP SYMBOL	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
45	1270	R/B	3			Silty Sand; fine- to coarse-grained with pebbles, moderate yellowish brown, slightly moist, medium dense. Interlayered 1± foot: Pebbly to Cobbly Sand; medium- to very coarse-grained, moderate yellowish gray, slightly moist, medium dense.	4.3	108.3	21	
50	1265	R	4			Silty Sand; very fine- to medium-grained with some pebbles, moderate yellowish brown, slightly moist, medium dense.	8.4	104.0	37	
						Pebbly to cobbly Sand; fine- to coarse-grained, pale to moderate yellowish brown, slightly moist, medium dense.				
55	1260					Silty Sand; fine- to very coarse-grained with pebbles and cobbles, moderate yellowish brown, slightly moist to moist, medium dense.				
60	1255									
65	1250	B				Silty Sand; fine- to very coarse-grained with pebbles and cobbles, moderate yellowish brown, slightly moist to moist, medium dense. Pebbly to cobbly Sand; fine- to coarse-grained, pale to moderate yellowish brown, slightly moist, medium dense.				
70	1245					SAUGUS FORMATION-SUNSHINE RANCH FORMATION MEMBER (Tsr): Pebble and cobble Conglomerate; medium to coarse-grained Sand matrix, pale yellowish gray, dry to slighty moist, hard. Total Depth 70 feet. No water. No caving. Hole backfilled.				

SAMPLE TYPES:
R RING (DRIVE) SAMPLE
S SPT (SPLIT SPOON) SAMPLE
B BULK SAMPLE T TUBE SAMPLE

Ground Water Seepage
MAX - Max. Density/Opt. Moist.
DS - Direct Shear
HYDR - Hydrometer Analysis
ASCE - Expansion Index
CONS - Consolidation

PACIFIC SOILS ENGINEERING, INC.

PLATE A-50

TABLE II

LOG OF EXPLORATORY PITS

Exploratory Pits	Depth (feet)	Description	Logged by: CRN Date Logged: 07/05/01
EP-1	0 to 6	COLLUVIUM (Qcol): Silty Sand to Sandy Silt; fine- to medium-grained, moderate yellowish brown, dry to slightly moist at depth, loose to moderately dense/soft to firm, abundant roots and rootlets.	
	6 to 8	SAUGUS FORMATION – SUNSHINE RANCH MEMBER (Tsr): Sandstone; fine- to medium-grained, olive gray, slightly moist, moderately hard to hard, abundant white carbonate stringers, moderately weathered top 1± foot.	
		Total Depth 8 feet. No water, no caving.	
EP-2	0 to 15	ALLUVIUM (Qal): Silty Sand; fine- to coarse-grained with pebbles and cobbles, moderate yellowish brown, dry to slightly moist at depth, loose to moderately dense at depth, abundant roots and rootlets.	
		Total Depth 15 feet No water, no caving.	
EP-3	0 to 2½	SOIL: Silty Sand to Sandy Silt; fine- to medium-grained, moderate yellowish brown, dry, loose/soft, abundant roots and rootlets.	
	2½ to 8	SAUGUS FORMATION – SUNSHINE RANCH MEMBER (Tsr): Sandstone; fine- to medium-grained, light olive, slightly moist, top 2± feet highly weathered and loose with abundant roots and rootlets, moderately hard at depth, massive.	
		Total Depth 8 feet. No water, no caving.	

TABLE II

LOG OF EXPLORATORY PITS

Exploratory Pits	Depth (feet)	Description	Logged by: CRN Date Logged: 07/05/01
EP-4	0 to 5	COLLUVIUM (Qcol): Silty Sand; fine- to medium-grained with pebbles and some cobbles, moderate yellowish brown, dry to slightly moist at depth, loose to moderately dense, abundant roots and rootlets.	
	5 to 9	SAUGUS FORMATION – SUNSHINE RANCH MEMBER (Tsr): Sandstone; fine- to coarse-grained with pebbles and cobbles, light yellowish gray, slightly moist, moderately hard, some interbedded pebbles lenses, generally massive. Bedding Attitude: @ 7 feet, N40W, 42NE Total Depth 9 feet. No water, no caving.	
EP-5	0 to 8	ALLUVIUM (Qal): Silty Sand; fine- to coarse-grained with pebbles and cobbles, moderate yellowish brown, dry to slightly moist at depth, loose to moderately dense at depth, abundant root, and rootlets.	
	8 to 10	Cobbly Sand; medium- to coarse-grained with pebbles, slightly moist, loose to moderately dense, roots to depth.	
	10 to 13	SAUGUS FORMATION – SUNSHINE RANCH MEMBER (Tsr): Sandstone; fine- to medium-grained, light olive gray, slightly moist, moderately hard, slight to moderate weathering, massive. Total Depth 13 feet. No water, no caving.	

TABLE II

LOG OF EXPLORATORY PITS

Exploratory Pits	Depth (feet)	Description	Logged by: CRN Date Logged: 07/05/01
EP-6	0 to 2	SOIL: Silty Sand; fine- to coarse-grained with pebbles and cobbles, moderate yellowish brown, dry, loose, abundant roots and rootlets.	
	2 to 4	SAUGUS FORMATION – SUNSHINE RANCH MEMBER (Tsr): Cobble Conglomerate; coarse-grained Sand matrix, slightly moist, moderately hard.	
	4 to 7	Siltstone; light bluish gray, slightly moist, moderately hard, laminated.	
		Bedding Attitude: @ 5 feet, N50W, 37 NE	
		Total Depth 7 feet.	
EP-7	0 to ½	SOIL: Silty Sand; fine- to coarse-grained with pebbles and cobbles, moderate yellowish brown, dry, loose, abundant roots and rootlets.	
	½ to 2	SAUGUS FORMATION – SUNSHINE RANCH MEMBER (Tsr): Pebble Conglomerate; medium- to coarse-grained Sand matrix, slightly moist, loose, abundant roots.	
	2 to 5	Silty Sandstone; fine- to medium-grained, light yellowish gray, slightly moist, moderately hard, abundant roots.	
		Bedding Attitude: @ 3 feet, N60W, 35 NE	
		Total Depth 5 feet.	

TABLE II

LOG OF EXPLORATORY PITS

Exploratory Pits	Depth (feet)	Description	Logged by: CRN Date Logged: 07/05/01
EP-8	0 to 1	SOIL: Sandy Silt; light to moderate yellowish brown, dry, soft, abundant roots and rootlets.	
	1 to 3	SAUGUS FORMATION – SUNSHINE RANCH MEMBER (Tsr): Sandy Siltstone; light olive gray, slightly moist, moderately hard, abundant white carbonate, highly jointed, slightly laminated, generally massive.	
	3 to 5	Claystone; reddish brown, moist, moderately hard, highly jointed, abundant white carbonate along joints.	
		Bedding Attitude: @ 4 feet, N70W, 45NE	
		Total Depth 5 feet. No water, no caving.	
EP-9	0 to 6	COLLUVIUM (Qcol): Silty Sand; fine- to coarse-grained with pebbles and cobbles, dark yellowish brown, dry to slightly moist at depth, loose to moderately dense at depth, abundant root and rootlets.	
	6 to 9	SAUGUS FORMATION – SUNSHINE RANCH MEMBER (Tsr): Pebble and Cobble Conglomerate; medium to coarse-grained Sand matrix, slightly moist, moderately hard, poorly indurated.	
	9 to 12	Silty Sandstone; fine-grained, light olive gray, slightly moist, moderately hard, moderately indurated, moderately bedded.	
		Bedding Attitude: @ 10 feet, N60W, 45NE	
		Total Depth 12 feet. No water, no caving.	

TABLE II

LOG OF EXPLORATORY PITS

Exploratory Pits	Depth (feet)	Description	Logged by: CRN Date Logged: 07/05/01
EP-10	0 to 2	SOIL: Sandy Silt; yellowish brown, moist, firm, abundant roots and rootlets.	
	2 to 5	SAUGUS FORMATION – SUNSHINE RANCH MEMBER (Tsr): Clayey Siltstone; light olive gray, moist, moderately hard, massive, slightly fractured; overlies Silty Sandstone; fine-grained, light yellowish gray, slightly moist, moderately hard, slightly bedded, generally massive. Bedding Attitude: @ 3 feet, N45W, 47NE Total Depth 5 feet. No water, no caving.	
EP-11	0 to 3	ALLUVIUM (Qal): Silty Sand; fine- to medium-grained, moderate yellowish brown, top 2+ feet dry and loose, slightly moist to moderately dense at depth, abundant root and rootlets, porous.	
	3 to 20	Pebbly Sand; fine- to coarse-grained with cobbles, light to moderate yellowish brown, slightly moist to moist, moderately dense. Total Depth 20 feet. No water, no caving.	

TABLE II

LOG OF EXPLORATORY PITS

Exploratory Pits	Depth (feet)	Description	Logged by: CRN Date Logged: 07/05/01
EP-12	0 to 3	SOIL: Sandy Silt to Silty Sand; fine to coarse-grained with pebbles and cobbles, moderate yellowish brown, dry to slightly moist, soft/loose, abundant roots and rootlets.	
	3 to 10	SAUGUS FORMATION – SUNSHINE RANCH MEMBER (Tsr): Pebble and Cobble Conglomerate; fine- to coarse-grained Sand matrix, slightly moist, moderately hard, poorly to moderately indurated, moderately bedded. Bedding Attitudes: @ 5 feet, N50W, 44NE @ 8 feet, N45W, 42NE Total Depth 10 feet. No water, no caving.	
EP-13	0 to 6	COLLUVIUM (Qcol): Silty Sand; fine- to coarse-grained with pebbles and some cobbles, moderate to dark yellowish brown, dry to slightly moist, loose to moderately dense, porous, abundant roots and rootlets.	
	6 to 9	SAUGUS FORMATION – SUNSHINE RANCH MEMBER (Tsr): Pebble and Cobble Conglomerate; medium- to coarse-grained Sand matrix, slightly moist, moderately hard, moderately indurated, moderately bedded. Bedding Attitude: @ 8 feet, N50W, 46NE Total Depth 9 feet. No water, no caving.	

TABLE II

LOG OF EXPLORATORY PITS

Exploratory Pits	Depth (feet)	Description	Logged by: CRN Date Logged: 07/05/01
EP-14	0 to 6	COLLUVIUM (Qcol): Silty Sand; fine- to medium-grained, dark yellowish brown, dry to slightly moist, loose to moderately dense, porous, abundant roots and rootlets.	
	6 to 8	SAUGUS FORMATION – SUNSHINE RANCH MEMBER (Tsr): Clayey Siltstone; olive to light olive gray, moist, soft to moderately hard, massive, abundant white carbonate.	
		Total Depth 8 feet. No water, no caving.	
EP-15	0 to 2½	SOIL: Silty Sand; fine- to medium-grained, dark yellowish brown, dry to slightly moist, loose, porous, abundant roots and rootlets, gopher holes.	
	2½ to 7	SAUGUS FORMATION – SUNSHINE RANCH MEMBER (Tsr): Sandstone; fine- to medium-grained with pebbles, yellowish orange, slightly moist, moderately hard, slightly bedded; some interbedded lenses of pebbles and cobbles with scour-fill basal contacts.	
		Approximate Bedding Attitude: @ 5 feet, N50W, 38NE	
		Total Depth 7 feet. No water, no caving.	

TABLE II

LOG OF EXPLORATORY PITS

Exploratory Pits	Depth (feet)	Description	Logged by: CRN Date Logged: 07/05/01
EP-16	0 to 3	SOIL: Silty Sand to Sandy Silt; fine to medium-grained, moderate yellowish brown, dry to slightly moist, loose/soft, abundant roots and rootlets.	
	3 to 5	SAUGUS FORMATION – SUNSHINE RANCH MEMBER (Tsr): Pebble Conglomerate; medium- to coarse-grained Sand matrix, slightly moist, loose, highly weathered, abundant roots. @ 5 feet, Claystone; 1 to 4± inch thick layer, mottled moderate yellowish brown and olive gray, moist, soft, flaky, some polished surfaces, discontinuous layer.	
	5 to 9	Sandstone; fine-grained, light olive gray, slightly moist, moderately hard, highly weathered, abundant joints, abundant roots along joints. Bedding Attitude: @ 5 feet, N60W, 32NE Total Depth 9 feet. No water, no caving.	
EP-17	0 to ½	SOIL: Sandy Silt; dark yellowish brown, dry, soft, abundant roots and rootlets.	
	½ to 8	SAUGUS FORMATION – SUNSHINE RANCH MEMBER (Tsr): Sandstone; fine- to medium-grained, light yellowish gray, slightly moist, moderately hard to hard, top 1± foot moderately weathered, slight to moderate bedding with some rootlets along bedding planes. Bedding Attitudes: @ 3 feet, N65W, 43NE @ 6 feet, E-W, 49N Total Depth 8 feet. No water, no caving.	

TABLE II

LOG OF EXPLORATORY PITS

Exploratory Pits	Depth (feet)	Description	Logged by: CRN Date Logged: 07/05/01
EP-18	0 to 2	SOIL: Silty Sand; fine- to coarse-grained with pebbles and some cobbles, light to moderate yellowish brown, dry, loose, abundant roots and rootlets.	
	2 to 7	SAUGUS FORMATION – SUNSHINE RANCH MEMBER (Tsr): Silty Sandstone; fine-grained, mottled reddish orange and olive gray, moist, hard, top 2± feet slightly jointed, moderately bedded. Bedding Attitude: @ 5 feet, N60W, 40SW Total Depth 7 feet. No water, no caving.	
EP-19	0 to ½	SOIL: Silty Sand; fine-grained, light to moderate yellowish brown, dry, loose, abundant roots and rootlets.	
	½ to 6	SAUGUS FORMATION – SUNSHINE RANCH MEMBER (Tsr): Sandstone; fine-grained, light olive gray, slightly moist, moderately hard to hard, moderately bedded. Bedding Attitude: @ 4½ feet, N65W, 40NE Total Depth 6 feet. No water, no caving.	
EP-20	0 to 9	ALLUVIUM (Qal): Cobbly Sand; fine- to coarse-grained with abundant pebbles, light yellowish brown, top 2± feet dry and loose, slightly moist to moist and moderately dense to depth, some cobbles up to 12± inches diameter, abundant roots and rootlets to depth. Severe caving throughout. Total Depth 9 feet No water, caving from 0 to 9 feet.	

TABLE II

LOG OF EXPLORATORY PITS

Exploratory Pits	Depth (feet)	Description	Logged by: CRN Date Logged: 07/05/01
EP-21	0 to 13	ALLUVIUM (Qal): Silty Sand to Sandy Silt; fine- to medium-grained with some pebbles and cobbles; moderate yellowish brown, top 2+ feet dry and loose, slightly moist to moist and moderately dense to depth, poorly consolidated, some roots to depth.	
	13 to 14	SAUGUS FORMATION – SUNSHINE RANCH MEMBER (Tsr): Pebble and Cobble Conglomerate; medium to coarse-grained Sand matrix, moist, moderately hard to hard, weathered.	
		Total Depth 14 feet No water, no caving.	
EP-22	0 to 7	ALLUVIUM (Qal): Silty Sand; fine- to medium-grained with some pebbles, dark yellowish brown, top 2+ feet loose and dry, slightly moist to moist and moderately dense to depth, basal cobbles, abundant roots and rootlets.	
	7 to 10	SAUGUS FORMATION – SUNSHINE RANCH MEMBER (Tsr): Siltstone; moderate yellowish brown, moist, moderately hard, laminated, moderately fractured, some tectonic shears along bedding, some roots and rootlets.	
	10 to 12	Silty Sandstone; very fine- to fine-grained, olive gray, slightly moist to moist, moderately hard, slightly fractured.	
		Bedding Attitude: @ 10 feet, N60W, 40NE	
		Total Depth 12 feet. No water, no caving.	

TABLE II

LOG OF EXPLORATORY PITS

Exploratory Pits	Depth (feet)	Description	Logged by: CRN Date Logged: 07/05/01
EP-23	0 to 1	SOIL: Silty Sand; fine- to coarse-grained with pebbles, dark yellowish brown, dry, loose, abundant roots and rootlets.	
	1 to 5	SAUGUS FORMATION – SUNSHINE RANCH MEMBER (Tsr): Sandstone; fine- to medium-grained, pale yellowish gray, slightly moist, moderately hard to hard, some rootlets from 1 to 3± feet in depth. Bedding Attitude: @ 4 feet, N60W, 45NE Total Depth 5 feet. No water, no caving.	
EP-24	0 to 1	SOIL: Silty Sand; fine- to coarse-grained with pebbles and cobbles, dark yellowish brown, dry, loose, abundant roots and rootlets.	
	1 to 4	SAUGUS FORMATION – SUNSHINE RANCH MEMBER (Tsr): Pebble and Cobble Conglomerate; medium- to coarse-grained Sand matrix, slightly moist, moderately hard to hard, few roots to depth.	
	4 to 5	Sandstone; fine- to medium-grained, light yellowish gray, slightly moist, moderately hard, moderately bedded. Bedding Attitude: @ 4½ feet, N60W, 40NE Total Depth 5 feet. No water, no caving.	

TABLE II

LOG OF EXPLORATORY PITS

Exploratory Pits	Depth (feet)	Description	Logged by: CRN Date Logged: 07/05/01
EP-25	0 to 2½	COLLUVIUM (Qcol): Silty Sand to Sandy Silt; very fine- to fine-grained with some isolated pebbles, moderate to dark yellowish brown, dry to slightly moist, loose/soft, abundant roots and rootlets, porous.	
	2½ to 5	Clayey Silt; moderate to dark yellowish brown, slightly moist, soft to firm, porous, abundant caliche.	
	5 to 9	PICO FORMATION (Tp): Clayey Siltstone; mottled pale olive gray and light brown, slightly moist, moderately firm, laminated to ½±-inch thick bedding, weathered to a depth of 7± feet. Bedding Attitudes: @ 6 feet, N50E, 32SE @ 8 feet, N80E, 35SE Total Depth 9 feet. No water, no caving.	
EP-26	0 to 1½	SOIL: Silty Sand to Sandy Silt; very fine- to fine-grained, moderate yellowish brown, dry to slightly moist, loose, abundant roots and rootlets, porous.	
	1½ to 6	PICO FORMATION (Tp): Clayey Siltstone; pale olive, slightly moist, moderately firm, laminated to massive 2±-inch thick bedding, weathered with roots and caliche to a depth of 3½ feet. Bedding Attitudes: @ 4 feet, N30W, 40NE @ 4½ feet, N10W, 30NE @ 5 feet, N30E, 29SE Total Depth 6 feet. No water, no caving.	

TABLE II

LOG OF EXPLORATORY PITS

Exploratory Pits	Depth (feet)	Description	Logged by: CRN Date Logged: 07/05/01
EP-27	0 to 1	SOIL: Silty Sand to Sandy Silt; very fine- to fine-grained moderate yellowish brown, dry to slightly moist, loose/soft, abundant roots and rootlets.	
	1 to 5	PICO FORMATION (Tp): Sandy Siltstone; fine-grained, pale olive gray, slightly moist, moderately hard, 1 to 6± inch thick laminated beds; jointed/fractured, interbedded with Clayey Siltstone; pale olive to olive gray, moderately firm, laminated to 3±-inch thick massive beds; top 1½± feet highly weathered. Bedding Attitudes: @ 4 feet, N50W, 39NE Total Depth 5 feet. No water, no caving.	
EP-28	0 to 1	SOIL: Sandy Silt; very fine- to fine-grained, pale to moderate yellowish brown, dry, loose, abundant roots and rootlets.	
	1 to 7	PICO FORMATION (Tp): Interbedded Silty Sandstone; very fine- to fine-grained, pale olive, slightly moist, moderately hard, 2 to 6±-inch laminated bedding; with Clayey Siltstone, pale to dark olive, slightly moist to moist, moderately firm, laminated to 2±-inch thick bedding; top 3± feet highly weathered and abundant roots. Bedding Attitudes: @ 5 feet, EW, 49N @ 6 feet, N70E, 73NW Total Depth 7 feet. No water, no caving.	

TABLE II

LOG OF EXPLORATORY PITS

Exploratory Pits	Depth (feet)	Description	Logged by: CRN Date Logged: 07/05/01
EP-29	0 to 11	ALLUVIUM (Qal): Silty Sand to Sandy Silt; very fine- to fine-grained, moderate yellowish brown, dry to slightly moist at 6± feet to depth, loose/soft to moderately dense/firm with depth.	
	11 to 12	PICO FORMATION (Tp): Silty Claystone; dark olive green, moist, moderately firm to firm, laminated to ½±-inch thick bedding.	
		Total Depth 12 feet. No water; no caving.	
EP-30	0 to 14	COLLUVIUM (Qcol): Clayey to Sandy Silt; very fine-grained Sand, pale to moderate yellowish brown, dry to slightly moist, soft, porous, abundant rootlets and roots.	
		Total Depth 14 feet. No water, no caving.	
EP-31	0 to 1	SOIL: Clayey To Sandy Silt; very fine- to fine-grained, dark yellowish brown, slightly moist to moist, soft, porous, abundant roots and rootlets.	
	1 to 2	PICO FORMATION (Tp): Claystone; mottled olive gray and light brown, slightly moist to moist, moderately firm, highly weathered, abundant roots.	
	2 to 3	Silty Sandstone; light gray lenses 3 to 4± inches thick at top and bottom with light brown core, slightly moist, moderately hard, massive, scour-fill bottom, flat top.	
	3 to 4	Silty Sandstone to Sandy Siltstone; pale olive gray, slightly moist, firm, highly weathered, blocky, abundant caliche.	
	4 to 5	Sandy to Clay Siltstone; pale to dark olive gray, slightly moist to moist, moderately hard, laminated to ½±-inch bedding.	
		Bedding Attitudes: @ 3 feet, N80W, 59SW (overturned) @ 4 feet, N65W, 35SW (overturned)	
		Total Depth 5 feet. No water, no caving.	

TABLE II

LOG OF EXPLORATORY PITS

Exploratory Pits	Depth (feet)	Description	Logged by: CRN Date Logged: 07/05/01
EP-32	0 to 5	COLLUVIUM (Qcol): Sandy Silt; very fine-grained Sand, pale to moderate yellowish brown, dry to slightly moist, soft, abundant rootlets.	
	5 to 8	PICO FORMATION (Tp): Silty Sandstone; very fine- to fine-grained, pale to olive gray, slightly moist to moist, moderately hard, laminated to 3±-inch beds.	
		Bedding Attitude: @ 6 feet, N70E, 54NW	
		Total Depth 8 feet. No water, no caving.	
EP-33	0 to 12	COLLUVIUM (Qcol): Sandy Silt; very fine- to fine-grained Sand, pale yellowish brown, dry to slightly moist, loose/soft, abundant rootlets, 2± foot diameter boulder at 2± feet.	
		No water, no caving.	
EP-34	0 to ½	SOIL: Clayey Silt; moderate yellowish brown, dry, loose, abundant roots and rootlets.	
	½ to 4	PICO FORMATION (Tp): Silty Sandstone; very fine- to fine-grained, pale to olive gray, slightly moist, moderately firm, highly weathered, abundant roots and rootlets.	
	4 to 6	Silty Sandstone; fine-grained, pale olive gray, slightly moist, moderately hard, massive.	
		Bedding Attitudes: @ 3 feet, N45E, 65SE (overturned) @ 5 feet, N70E, 59SE (overturned)	
		Total Depth 6 feet. No water, no caving.	

TABLE II

LOG OF EXPLORATORY PITS

Exploratory Pits	Depth (feet)	Description	Logged by: CRN Date Logged: 07/05/01
EP-35	0 to 14	ALLUVIUM (Qal): Silty Sand to Sandy Silt; very fine- to fine- with some medium-grained, moderate yellowish orange, top 2± feet dry and loose/soft, slightly moist to moist and moderately dense/firm at depth, slightly porous, pocket of pebbles and cobbles @ 12± feet. Total Depth 14 feet. No water, no caving.	
EP-36	0 to ½	SOIL: Sandy Silt; very fine-grained Sand, moderate yellowish brown, dry, soft, abundant roots and rootlets.	
	½ to 6	PICO FORMATION (Tp): Silty Sandstone; very fine- to fine-grained, pale olive gray, slightly moist, moderately hard, laminated to 3±-inch bedding, upper 3± feet slightly creep affected.	
	6 to 8	Silty Sandstone, fine-grained, pale olive gray, slightly moist, moderately hard, massive. Bedding Attitudes: @ 2 feet, N10E, 50NW @ 4 feet, N30W, 30SW Total Depth 8 feet. No water, no caving.	

TABLE II

LOG OF EXPLORATORY PITS

Exploratory Pits	Depth (feet)	Description	Logged by: CRN Date Logged: 07/05/01
EP-37	0 to ½	SOIL: Sandy Silt; very fine-grained, moderate yellowish brown, dry, loose, abundant roots and rootlets.	
	½ to 5	PICO FORMATION (Tp): Silty Sandstone; very fine- to fine-grained, pale olive gray, slightly moist, moderately hard, laminated to 1± inch bedding, possibly creep affected.	
	5 to 7	Silty Sandstone; fine-grained, pale olive, slightly moist, moderately hard to hard, massive. Bedding Attitudes: @ 2 feet, N10E, 36NW @ 5 feet, N50E, 42 NW Total Depth 7 feet. No water, no caving.	
EP-38	0 to ½	SOIL: Silty Sand; fine- to medium-grained, moderate to dark yellowish brown, dry, loose, porous, abundant roots and rootlets..	
	½ to 2	SAUGUS FORMATION – SUNSHINE RANCH MEMBER (Tsr): Silty Sandstone; medium- to very coarse-grained with pebbles and cobbles of quartzite and granitics (Mt. Lowe), pale yellowish orange, slightly moist, moderately hard, poorly cemented, slightly layered generally massive.	
	2 to 6	PICO FORMATION (Tp): Sandy Siltstone; very fine-grained, moderate yellowish brown, slightly moist, moderately hard/firm, slightly laminated, generally massive. Contact Attitude: @ 2 feet, N65W, 67NE Bedding Attitude: @ 4 feet, N55W, 54NE Total Depth 6 feet. No water, no caving.	

TABLE II

LOG OF EXPLORATORY PITS

Exploratory Pits	Depth (feet)	Description — Logged by: CRN, Date Logged: 07/05/01
EP-39	0 to 17	COLLUVIUM (Qcol): Sandy Silt; very fine-grained Sand, moderate yellowish brown, dry to slightly moist at depth, soft to firm at depth, wet at bottom. Total Depth 17 feet. No water, no caving.
EP-40	0 to 9	ALLUVIUM (Qal): Silty Sand to Sandy Silt; fine-grained, moderate yellowish brown, dry to slightly moist at depth, loose/soft to moderately dense/firm at depth, roots to 5± feet in depth.
	9 to 10	SAUGUS FORMATION – SUNSHINE RANCH MEMBER (Tsr): Silty Sandstone; fine- to medium-grained, yellowish gray, moist, hard, massive. Total Depth 10 feet. No water, no caving.
EP-41	0 to 1	SOIL: Silty Sand; fine- to coarse-grained, dark yellowish brown, dry, loose, abundant roots and rootlets.
	1 to 3	SAUGUS FORMATION – SUNSHINE RANCH MEMBER (Tsr): Pebbly Sandstone; medium- to very coarse-grained, yellowish gray, slightly moist, moderately hard, abundant roots, normal grading.
	3 to 5	Silty Sandstone; fine- to medium-grained, yellowish gray, slightly moist, moderately hard, massive. Bedding Attitude: @ 3 feet, N70W, 32NE Total Depth at 5 feet. No water, no caving.

TABLE II

LOG OF EXPLORATORY PITS

Exploratory Pits	Depth (feet)	Description	Logged by: CRN Date Logged: 07/05/01
EP-42	0 to 1½	SOIL: Silty Sand; fine- to coarse-grained with pebbles and cobbles, dark yellowish brown, dry, loose, abundant roots and rootlets.	
	1½ to 6	SAUGUS FORMATION – SUNSHINE RANCH MEMBER (Tsr): Silty Sandstone; fine- to medium-grained, mottled yellowish gray and light brown, slightly moist, hard, ¼ to 3±-inch beds.	
		@ 4 feet; 6± inch thick carbonaceous layer, brownish black, abundant sulfur deposits.	
		Bedding Attitude: @ 4 feet, N65W, 28NE	
		Total Depth 6 feet. No water, no caving.	
EP-43	0 to 1½	SOIL: Sandy Silt; very fine-grained, dark yellowish brown, dry to slightly moist, soft, abundant rootlets.	
	1½ to 6	SAUGUS FORMATION – SUNSHINE RANCH MEMBER (Tsr): Silty Sandstone; very fine- to fine-grained, pale olive gray, slightly moist, moderately hard to hard, slightly bedded generally massive.	
		Bedding Attitude: @ 4 feet, N70W, 45NE	
		Total Depth 6 feet. No water, no caving.	

TABLE II

LOG OF EXPLORATORY PITS

Exploratory Pits	Depth (feet)	Description	Logged by: CRN Date Logged: 07/05/01
EP-44	0 to 1	SOIL: Sandy Silt to Silty Sand; very fine- to fine-grained, moderate to dark yellowish brown, slightly moist, soft/loose, abundant roots and rootlets.	
	1 to 5	SAUGUS FORMATION – SUNSHINE RANCH MEMBER (Tsr): Silty Sandstone; fine- to medium-grained with some coarse-grained layers with pebbles, pale yellowish gray, slightly moist, moderately hard, bedded. Bedding Attitude: @ 4 feet, N60W, 43NE Total Depth 5 feet. No water, no caving.	
EP-45	0 to 7	ALLUVIUM (Qal): Silty Sand; very fine- to medium-grained, pale to moderate yellowish brown, dry to slightly moist at depth, loose to moderately dense at depth.	
	7 to 14	Pebbly Sand; medium- to coarse-grained with cobbles, moderate yellowish brown, moist, moderately dense. Total Depth 14 feet. No water, no caving.	

TABLE II

LOG OF EXPLORATORY PITS

Exploratory Pits	Depth (feet)	Description	Logged by: CRN Date Logged: 07/05/01
EP-46	0 to 2½	SOIL: Silty Sand; fine- to coarse-grained, dark yellowish brown, dry, loose, abundant roots and rootlets.	
	2½ to 9	SAUGUS FORMATION – SUNSHINE RANCH MEMBER (Tsr): Pebbly Sandstone, medium- to coarse-grained with cobbles, yellowish orange, slightly moist, moderately hard to hard, bedded. Bedding Attitudes: @ 5 feet, N55W, 36NE @ 8 feet, N40W, 32NE Total Depth 9 feet. No water, no caving.	
EP-47	0 to 5	COLLUVIUM (Qcol): Silty Sand; fine- to coarse-grained with pebbles, dark yellowish brown, dry, loose to moderately dense, abundant roots and rootlets.	
	5 to 9	SAUGUS FORMATION – SUNSHINE RANCH MEMBER (Tsr): Pebbly Sandstone; medium- to coarse-grained with pebbles and cobbles, yellowish gray, slightly moist, moderately hard to hard, slightly layered, generally massive, some scour in fill structures. Bedding Attitude – Approximate: @ 8 feet, N50W, 30NE Total Depth 9 feet. No water, no caving.	

TABLE II

EXPLORATORY PITS

Log No.	Depth (ft.)	Description	Logged: 1-26-04 By: CRN
EP-101	0 to 2	SOIL: Sandy Silt; fine-, dark yellowish brown, slightly moist, loose, soft, abundant roots, and rootlets.	
	2 to 7	PICO FORMATION (Tp): Clayey Siltstone; pale yellowish green, slightly moist, moderately hard, massive to slightly bedded.	
		Attitude: Bedding @ 4 feet, N30E 50 SE	
		Total Depth 7 feet.	
EP-102	0 to 7	COLLUVIUM (Qcol): Sandy Silt to Silty Sand; fine-grained, moderate to light yellowish brown to yellowish green at depth, slightly moist, loose, abundant roots and rootlets.	
	7 to 9	PICO FORMATION (Tp): Clayey Siltstone; pale yellowish green, slightly moist, moderately hard, massive to slightly bedded, moderately weathered.	
		Attitude: Bedding @ 8 feet, N70E 41 SE	
		Total Depth 9 feet.	
EP-103	0 to 2	SOIL: Sandy Silt; fine-grained, moderate yellowish brown, slightly moist, loose, abundant roots and rootlets.	
	2 to 6	PICO FORMATION (Tp): Sandy Siltstone; fine-grained, pale yellowish green, dry to slightly moist, moderate hard, massive, upper 3 to 4± feet highly weathered with abundant roots and rootlets.	
		Total Depth 6 feet.	

TABLE II

EXPLORATORY PITS

Log No.	Depth (ft.)	Description	Logged: 1-26-04 By: CRN
EP-104	0 to 2	SOIL/COLLUVIUM (Qcol): Clayey Silt; moderate yellowish brown, slightly moist, soft, abundant roots and rootlets.	
	2 to 7	PICO FORMATION (Tp): Sandy Siltstone; fine-grained, pale yellowish green, dry to slightly moist, moderate hard, massive, weathered 2± feet, some shell fragments, some roots to depth.	
		Total Depth 7 feet.	
EP-105	0 to 5	COLLUVIUM (Qcol): Sandy to Clayey Silt; moderate yellowish brown to pale yellowish green, slightly moist, loose, abundant roots and rootlets.	
	5 to 8	PICO FORMATION (Tp): Sandy Siltstone; fine-grained, pale yellowish green, dry to slightly moist, moderate hard, massive, weathered 2± feet, some shell fragments, some roots to depth.	
		Total Depth 8 feet.	
EP-106	0 to 10	COLLUVIUM (Qcol): Sandy to Clayey Silt; moderate yellowish brown to pale yellowish green, slightly moist, loose, abundant roots and rootlets.	
	10 to 12	PICO FORMATION (Tp): Clayey Siltstone; pale yellowish green, slightly moist, moderately hard, massive, moderately weathered, some white carbonate.	
		Total Depth 12 feet.	

TABLE II

EXPLORATORY PITS

Log No.	Depth (ft.)	Description	Logged: 1-26-04 By: CRN
EP-107	0 to 1	SOIL: Sandy to Clayey Silt; fine-grained, moderate yellowish brown, slightly moist, loose, abundant roots and rootlets.	
	1 to 7	PICO FORMATION (Tp): Silty Sandstone; fine-grained, pale yellowish green, slightly moist, moderately hard, laminated to ½± inch bedding, top 2± feet highly weathered with abundant roots and rootlets, some white carbonate. Attitude: Bedding @ 6 feet, N50E 53NW Total Depth 7 feet.	
EP-108	0 to 1	SOIL: Sandy to Clayey Silt; fine-grained, moderate yellowish brown, slightly moist, loose, abundant roots and rootlets.	
	1 to 6	PICO FORMATION (Tp): Silty Sandstone; fine-grained, pale yellowish green, slightly moist, moderately hard to hard at depth, slightly bedded, generally massive, upper 2± feet highly weathered with abundant roots. Attitude: Bedding @ 5 feet, N10E 56NW Total Depth 6 feet.	
EP-109	0 to 2	SOIL: Sandy to Clayey Silt; fine-grained, moderate yellowish brown, slightly moist, loose, abundant roots and rootlets.	
	2 to 7	PICO FORMATION (Tp): Silty Sandstone; fine-grained, pale yellowish green, slightly moist, moderately hard, laminated to ½± inch bedding, top 2± feet highly weathered. Attitude: Bedding @ 6 feet, N80E 36NW Total Depth 7 feet.	

TABLE II

EXPLORATORY PITS

Log No.	Depth (ft.)	Description	Logged: 1-26-04 By: CRN
EP-110	0 to 2	SOIL: Silty Sand to Sandy Silt; fine-grained, moderate yellowish brown, slightly moist, loose, abundant roots and rootlets.	
	2 to 8	PICO FORMATION (Tp): Silty to Clayey Sandstone; fine-grained, pale yellowish green, slightly moist, moderately hard, laminated to ½± inch bedding, top 2± feet highly weathered.	
		Attitude: Bedding @ 6 feet, E-W 57N	
		Total Depth 8 feet.	
EP-111	0 to 7	COLLUVIUM (Qcol): Silty to Clayey Sand; fine-grained, dark to moderate yellowish brown, slightly moist, loose, abundant roots and rootlets.	
	7 to 9	PICO FORMATION (Tp): Silty Sandstone; fine- with some medium-grained, pale yellowish green, slightly moist, moderately hard, slightly bedded, generally massive.	
		Attitude: Bedding @ 8 feet, N50W 47NE	
		Total Depth 9 feet.	
EP-112	0 to 1	SOIL: Silty Sand to Sandy Silt; fine-grained, moderate yellowish brown, slightly moist, loose, abundant roots and rootlets.	
	1 to 6	PICO FORMATION (Tp): Silty Sandstone; fine-grained, pale yellowish green, slightly moist, moderately hard, top 2 to 3± feet highly weathered.	
		Attitude: Bedding @ 5 feet, N60E 52NE	
		Total Depth 6 feet.	

TABLE II

EXPLORATORY PITS

Log No.	Depth (ft.)	Description	Logged: 1-26-04 By: CRN
EP-113	0 to 2	SOIL: Silty Sand to Sandy Silt; fine-grained, moderate yellowish brown, slightly moist, loose, abundant roots and rootlets.	
	2 to 7	PICO FORMATION (Tp): Silty Sandstone; fine-grained, pale yellowish green, slightly moist, moderately hard, slightly bedded, generally massive.	
		Total Depth 7 feet.	
EP-114	0 to 6	COLLUVIUM (Qcol): Silty to Clayey Sand; fine-grained, dark yellowish brown to moderate yellowish brown at depth, slightly moist, loose, abundant roots and rootlets.	
	6 to 8	PICO FORMATION (Tp): Silty Claystone; mottled olive and moderate reddish brown, moist, firm, generally massive, abundant white carbonate.	
		Attitude: Bedding @ 7 feet, N70W 46NE	
		Total Depth 8 feet.	
EP-115	0 to 3	SOIL: Sandy to Clayey Silt; fine-grained, moderate yellowish brown, moist, loose, abundant roots and rootlets.	
	3 to 7	PICO FORMATION (Tp): Clayey Sandstone; fine-grained, pale olive, slightly moist to moist, moderately hard, laminated to massive, top 2± feet highly weathered with abundant white carbonate.	
		Attitude: Bedding @ 5 feet, EW33N	
		Total Depth 7 feet.	
EP-116	0 to 2	SOIL: Silty Sand; very fine- to fine-grained, moderate yellowish brown, moist, loose, abundant roots and rootlets.	
	2 to 9	PICO FORMATION (Tp): Silty Sandstone; very fine- to fine-grained, some interbeded, medium- to coarse-grained Sand with pebbles, pale yellowish gray, dry to slightly moist, medium hard, generally massive.	
		Attitude: Bedding @ 7 feet, E-W 37N	
		Total Depth 9 feet.	

TABLE II

EXPLORATORY PITS

Log No.	Depth (ft.)	Description	Logged: 1-26-04 By: CRN
EP-117	0 to ½	SOIL: Silty Sand to Sandy Silt; fine-grained, moderate yellowish brown, slightly moist, loose, abundant roots and rootlets.	
	½ to 6	PICO FORMATION (Tp): Silty Sandstone; very fine- to fine-grained, pale yellowish green, slightly moist, moderately hard, slightly bedded, massive, some shell fragments.	
		Total Depth 6 feet.	
EP-118	0 to 4	SOIL/COLLUVIUM (Qcol): Silty Sand to Sandy Silt; fine-grained, moderate yellowish brown, slightly moist, loose, abundant roots and rootlets.	
	4 to 6	PICO FORMATION (Tp): Clayey Sandstone; fine-grained, moderate yellowish green, slightly moist, moderate hard, slightly bedded, generally massive.	
		Attitude: Approximate Bedding @ 5 feet; E-W 27N	
		Total Depth 6 feet.	
EP-119	0 to 2	SOIL: Silty Sand to Sandy Silt; fine-grained, moderate yellowish brown, slightly moist, loose, abundant roots and rootlets.	
	2 to 8	PICO FORMATION (Tp): Clayey Sandstone; fine-grained, moderate yellowish brown, slightly moist, loose, laminated to ½± inch bedding.	
		Attitude: Bedding @ 6 feet, N70W 55NE	
		Total Depth 8 feet.	
EP-120	0 to 5	COLLUVIUM (Qcol): Silty to Clayey Sand; fine-grained, moderate yellowish brown, slightly moist to moist, loose, abundant roots and rootlets.	
	5 to 7	PICO FORMATION (Tp): Clayey Siltstone; pale olive, slightly moist, moderately hard, massive, top 1± foot highly weathered with abundant white carbonate.	
		Total Depth 7 feet.	

TABLE II

EXPLORATORY PITS

Log No.	Depth (ft.)	Description	Logged: 1-26-04 By: CRN
EP-121	0 to 1	SOIL: Silty Sand; fine-grained, moderate yellowish brown, slightly moist, loose, abundant roots and rootlets.	
	1 to 6	PICO FORMATION (Tp): Clayey Siltstone; fine-grained, pale yellowish, slightly moist, moderately hard to hard at depth, ½± inch bedding.	
		Attitude: Bedding @ 4 feet, E-W 40N	
		Total Depth 6 feet.	
EP-122	0 to 1	SOIL: Silty Sand; fine-grained, moderate yellowish brown, slightly moist, loose, abundant roots and rootlets.	
	1 to 6	PICO FORMATION (Tp): Clayey Siltstone; fine-, pale yellowish, slightly moist, moderately hard to hard at depth, laminated to ½± inch bedding.	
		Attitude: Bedding @ 5 feet, N80E 46NW	
		Total Depth 6 feet.	
EP-123	0 to 1	SOIL: Sandy Silt to Silty Sand; fine-grained, moderate yellowish brown, slightly moist, loose, abundant roots and rootlets.	
	1 to 7	PICO FORMATION (Tp): Sandy Siltstone; fine-grained, pale olive, slightly moist, moderately hard, laminated to ½± inch bedding, top 2± feet highly weathered.	
		Attitude: Bedding @ 5 feet, N70E 48NW	
		Total Depth 7 feet.	

TABLE II

EXPLORATORY PITS

Log No.	Depth (ft.)	Description	Logged: 1-26-04 By: CRN
EP-124	0 to ½	SOIL: Sandy Silt to Silty Sand; fine-grained, moderate yellowish brown, slightly moist, loose, abundant roots and rootlets.	
	½ to 6	PICO FORMATION (Tp): Silty Sandstone; very fine- to fine-grained, pale yellowish green, slightly moist, moderately hard, laminated to ½± inch bedding, top 2± feet highly weathered. Attitude: Bedding @ 4 feet, N70E 52NE Joint @ 4 feet, N25E Vertical Total Depth 6 feet.	
EP-125	0 to 1	SOIL: Sandy Silt to Silty Sand; fine- to coarse-grained with some pebbles and cobbles, moderate yellowish brown, slightly moist, loose, abundant roots and rootlets.	
	1 to 5	PICO FORMATION (Tp): Silty Sandstone; fine-grained, pale yellowish grey, dry to slightly moist, moderately hard to hard at depth, some thinly interlayered medium- to coarse-grained Sand lenses, generally massive. Attitude: Bedding @ 4 feet, N80W 52NE Total Depth at 5 feet.	
EP-126	1 to 3	SOIL/COLLUVIUM (Qcol): Silty Sand to Sand, Silt; fine-grained, moderate yellow brown, slightly moist, loose, abundant roots and rootlets.	
	3 to 7	PICO FORMATION (Tp): Sandy Siltstone; fine-grained Sand, pale yellowish green, dry to slightly moist, moderately hard, ½± inch bedding, top 2± feet highly weathered with abundant white carbonate. Attitude: Bedding @ 6 feet, N80E 36NW Total Depth 7 feet.	

TABLE II

EXPLORATORY PITS

Log No.	Depth (ft.)	Description	Logged: 1-26-04 By: CRN
EP-127	0 to 9	COLLUVIUM (Qcol): Silty Sand to Sand, Silt; fine-grained, moderate yellow brown, slightly moist, loose, abundant roots and rootlets.	
	9 to 10	PICO FORMATION (Tp): Silty Claystone; olive, moist, moderately firm to firm, some white carbonate.	
		Total Depth 10 feet.	
EP-128	0 to 4	COLLUVIUM/ALLUVIUM (Qcol/Qal): Silty Sand to Sandy Silt; fine-grained, moderate yellow brown, moist, loose to medium dense with depth, some roots and rootlets.	
	4 to 6	PICO FORMATION (Tp): Claystone; olive, moist, moderately firm, laminated to 1± inch bedding, slightly plastic, some white carbonate.	
		Attitude: Bedding @ 5 feet, N60W 52NE	
		Total Depth 6 feet.	
EP-129	0 to 5	COLLUVIUM/ALLUVIUM (Qcol/Qal): Silty Sand to Sandy Silt; fine-grained with some basal cobbles, moderate yellow brown, moist, loose to medium dense with depth, some roots and rootlets.	
	5 to 7	PICO FORMATION (Tp): Claystone; olive, moist, moderately firm, laminated to 1± inch bedding, slightly plastic, some white carbonate.	
		Attitude: Bedding @ 6 feet, N60W 42NE	
		Total Depth 7 feet.	

TABLE II

EXPLORATORY PITS

Log No.	Depth (ft.)	Description	Logged: 1-27-04 By: CRN
EP-130	0 to 1	SOIL: Silty Sand to Sandy, Silt; fine-grained, moderate yellow brown, slightly moist, loose, abundant roots and rootlets.	
	1 to 7	PICO FORMATION (Tp): Sandy Siltstone to Silty Sandstone; very fine- to fine-grained, pale yellowish green, slightly moist, moderately hard, laminated to ½± inch bedding, top 2 to 3± feet highly weathered with some roots and rootlets. Attitude: Bedding @ 6 feet, N30E 33NW Total Depth 7 Feet.	
EP-131	0 to 1½	SOIL: Silty Sand to Sandy, Silt; fine-grained, moderate yellow brown, slightly moist, loose, abundant roots and rootlets.	
	1½ to 6	PICO FORMATION (Tp) (south side of pit): Silty Claystone; mottled olive and moderate yellowish brown, slightly moist, moderately hard, laminated to 1± inch bedding, highly jointed/fractured, some roots and rootlets to depths. Attitude: Bedding @ 5 feet, N40E 48NW FAULT (2 to 3+ inches thick zone): Silty Sand; fine-grained, pale grey, dry, loose, some roots. Attitude: Fault @ 5 feet, N60W Vertical	
	1½ to 6	PICO FORMATION (Tp) (north side of pit): Silty Sandstone; fine-grained, layered pale grey and pale olive, slightly moist, moderately hard, 1 to 6± inch bedding, top 2± feet moderately weathered. Attitude: Bedding @ 5 feet, N60W Vertical Total Depth 6 feet.	

TABLE II

EXPLORATORY PITS

Log No.	Depth (ft.)	Description	Logged: 1-27-04 By: CRN
EP-132	0 to 1	SOIL: Clayey Silt; moderate yellow brown, slightly moist, loose, abundant roots, rootlets and white carbonate.	
	1 to 7	PICO FORMATION (Tp): Interbedded Silty Claystone; mottled olive and moderate yellowish brown, slightly moist, moderately hard, laminated to 1± inch bedding; with Silty Sandstone, fine-grained, pale olive, slightly moist, moderately hard, 2 to 3± inch bedding, top 3± inch bedding, top 3± feet highly weathered. Attitudes: Bedding @ 5 feet, N60W Vertical Bedding @ 6 feet, N30W Vertical Total Depth 7 feet.	
EP-133	0 to ½	SOIL: Clayey Silt; moderate yellow brown, slightly moist, loose, abundant roots, rootlets and white carbonate.	
	½ to 6	PICO FORMATION (Tp): Sandy Siltstone; very fine- to fine-grained, pale yellowish green, slightly moist, moderately hard, laminated to 1± inch bedding, top 2± feet highly weathered with abundant rootlets and some white carbonate. Attitude: Bedding @ 5 feet, N60E 69NW Total Depth 6 feet.	
EP-134	0 to 3	SOIL: Clayey Silt with Sand; fine-grained, moderate yellow brown, slightly moist, loose, abundant roots, rootlets and white carbonate.	
	3 to 5	PICO FORMATION (Tp): Silty Sandstone; fine- to coarse-grained, pale grey, dry, moderately hard, massive, abundant shells.	
	5 to 8	Silty Claystone; mottled olive and moderate yellow brown, slightly moist, moderately hard, slightly bedded generally massive. Attitude: Bedding @ 7 feet, N50W 58NE Total Depth 8 feet.	

TABLE II

EXPLORATORY PITS

Log No.	Depth (ft.)	Description	Logged: 1-27-04 By: CRN
EP-135	0 to 2½	SOIL: Sandy Silt; fine-grained, moderate yellow brown, dry to slightly moist, loose, abundant roots and rootlets.	
	2½ to 7	PICO FORMATION (Tp): Silty Sandstone; moderate yellow brown, slightly moist, loose, top 2± feet highly weathered with roots and rootlets. Attitude: Bedding @ 6 feet, N60W 49NE Total Depth 7 feet.	
EP-136	0 to 1	SOIL: Sandy Silt; fine-grained, moderate yellow brown, dry to slightly moist, loose, abundant roots and rootlets.	
	1 to 8	PICO FORMATION (Tp): Silty Claystone; moderate yellow brown, slightly moist, loose, top 3± feet highly weathered, with roots and rootlets; some interbedded Silty Sandstone, fine-grained, pale to moderate yellowish grey, dry, moderately hard, 1 to 2± inch bedding. Attitude: Bedding @ 7 feet, N40W 72SW Total Depth 8 feet.	
EP-137	0 to 5	SOIL/COLLUVIUM (Qcol): Sandy Silt to Silty Sand; fine-grained, moderate yellow brown, dry to slightly moist, loose, abundant roots and rootlets.	
	5 to 12	PICO FORMATION (Tp): Silty Claystone; moderate yellow brown, slightly moist, loose, top 3± feet highly weathered, with roots and rootlets; some interbedded Silty Sandstone, fine-grained, pale to moderate yellowish grey, dry, moderately hard, 1 to 2± inch bedding. Attitude: Bedding @ 11 feet, N50W 52NE Total Depth 12 feet.	

TABLE II

EXPLORATORY PITS

Log No.	Depth (ft.)	Description	Logged: 1-27-04 By: CRN
EP-138	0 to 7	SAUGUS FORMATION-SUNSHINE RANCH MEMBER (Tsr): Silty Sandstone; fine- to coarse-grained with pebbles and cobbles, pale yellowish brown to pale grey, slightly moist, moderately hard, slightly bedded generally massive with some scour fill structure. Attitude: Bedding @ 6 feet, N40W 37NE Note: Soil removed by dozer during recent fire fighting operations. Total Depth 7 feet.	
EP-139	0 to ½	SOIL: Silty Sand; fine- to coarse-grained with pebbles and cobbles, moderate yellowish brown, slightly moist, loose, some roots and rootlets.	
	½ to 5	SAUGUS FORMATION-SUNSHINE RANCH MEMBER (Tsr): Silty Sandstone; fine- to coarse-grained with pebbles and cobbles, pale yellowish brown to pale grey, slightly moist, moderately hard, slightly bedded generally massive with some scour fill structure. Attitude: Approximate Bedding @ 4 feet E-W 30N Total Depth 5 feet.	
EP-140	0 to ½	SOIL: Silty Sand; fine- to coarse-grained with pebbles and cobbles, moderate yellowish brown, slightly moist, loose, some roots and rootlets.	
	½ to 6	SAUGUS FORMATION-SUNSHINE RANCH MEMBER (Tsr): Silty Sandstone; fine- to coarse-grained with pebbles and cobbles, pale yellowish brown to pale grey, slightly moist, moderately hard, slightly bedded generally massive with some scour fill structure. Attitude: Bedding @ 5 feet, N80E 28NW Total Depth 6 feet.	

TABLE II

EXPLORATORY PITS

Log No.	Depth (ft.)	Description	Logged: 1-27-04 By: CRN
EP-141	0 to 3	SOIL: Silty to Clayey Sand; very fine- to medium-grained with some pebbles, dark yellowish brown, moist, soft, some roots and rootlets.	
	3 to 8	SAUGUS FORMATION-SUNSHINE RANCH MEMBER (Tsr): Gravelly Sandstone; fine- to coarse-grained with pebbles and cobbles, some boulders up to 18± inches, pale yellowish brown, slightly moist, moderately hard, massive, matrix supported, top 2± feet highly weathered.	
		Total Depth 8 feet.	
EP-142	0 to 3	SOIL/COLLUVIUM (Qcol): Silty Sand; fine- to coarse-grained with pebbles and cobbles, moderate to dark yellow brown, moist, loose some roots and rootlets.	
	3 to 9	SAUGUS FORMATION-SUNSHINE RANCH MEMBER (Tsr): Gravelly Sandstone; fine- to coarse-grained with pebbles and cobbles, pale yellowish grey to pale grey, slightly moist, moderately hard, massive with interlayered pebbles and cobbles lenses.	
		Attitude: Bedding @ 8 feet, E-W 33N	
		Total Depth 9 feet.	
EP-143	0 to ½	SOIL: Silty Sand; fine- to medium-grained, moderate yellowish brown, slightly moist, loose, some roots and rootlets. Note: Some soil removed during recent fire fighting operations.	
	½ to 6	SAUGUS FORMATION-SUNSHINE RANCH MEMBER (Tsr): Silty Sandstone; fine- to medium-grained, pale grey, slightly moist, moderately hard, slightly bedded generally massive.	
		Attitude: Bedding @ 4 feet, N60W 32NE	
		Total Depth 6 feet.	

TABLE II

EXPLORATORY PITS

Log No.	Depth (ft.)	Description	Logged: 1-27-04 By: CRN
EP-144	0 to 5	SOIL/COLLUVIUM (Qcol): Silty Sand; fine- to medium-grained, moderate yellow brown, slightly moist to moist, loose, abundant roots and rootlets.	
	5 to 9	SAUGUS FORMATION-SUNSHINE RANCH MEMBER (Tsr): Pebbly Sandstone; fine- to coarse-grained, pale grey, slightly moist, moderately hard, massive with some interlayered pebble and cobbles lenses. Attitude: Bedding @ 7 feet, N70W 32NE Total Depth 9 feet.	

TABLE I

EXPLORATORY TRENCH LOGS

Log No.	Depth (ft.)	Description	Logged: 1-31-06 By: RHS
EP-201	0 to 2	SOIL: Sandy Clay; dark yellowish brown, slightly moist, firm, rootlets common, clusters of small bi-valve shells.	
	2 to 9	SAUGUS FORMATION - SUNSHINE RANCH MEMBER (Tsr): Sandy Siltstone; light olive gray with reddish brown stain, dry, soft, highly fractured, weathered.	
	@ 9	Fine- to medium-grained Sandstone, pinkish gray, soft, poorly cemented, some pebbles, probable cross-bed.	
		Bedding Attitude: N65E, 28NW	
		Total Depth 9 feet.	
EP-202	0 to 2	SAUGUS FORMATION - SUNSHINE RANCH MEMBER (Tsr): Fine- to medium-grained Sandstone, pinkish gray, dry, soft, many pebbles and small cobbles.	
	2 to 5	Sandy Siltstone, pale yellowish brown, slightly moist, soft, moderately fractured, rootlet to depth.	
	5 to 6	Sandstone, pinkish gray, dry, soft.	
		Bedding Attitude: N55W, 35NE	
		Total Depth 6 feet.	
EP-203	0 to 2	SOIL: Sandy Silt; dark yellowish brown, slightly moist, stiff, many pebbles.	
	2 to 4½	SAUGUS FORMATION - SUNSHINE RANCH MEMBER (Tsr): Fine- to medium-grained Sandstone, pinkish gray, slightly moist, soft, poorly cemented.	
	4½ to 7	Siltstone, light olive gray, slightly moist, soft to moderately hard.	
		Bedding Attitude: N80E, 45NW	
		Total Depth 7 feet.	

RHS:cp-2453RT04logs

TABLE I

EXPLORATORY TRENCH LOGS

Log No.	Depth (ft.)	Description	Logged: 1-31-06 By: RHS
EP-204	0 to 6½	SAUGUS FORMATION - SUNSHINE RANCH MEMBER (Tsr): Fine- to coarse-grained Sandstone, soft to moderately hard, dry, poorly cemented, pebble and small cobble beds and lenses.	
		Bedding Attitude: EW, 40N	
		Total Depth 6½ feet.	
EP-205	0 to 2	SOIL: Silty Clay; dark yellowish brown, moist, stiff, porous.	
	2 to 10	SAUGUS FORMATION - SUNSHINE RANCH MEMBER (Tsr): Sandy Siltstone, light olive gray, slightly moist, soft to moderately hard at depth, white carbonate pods common.	
	@ 6 & 8	Silty Sandstone; very light olive gray, slightly moist, moderately hard, 6 to 12 inch thick interbeds.	
		Bedding Attitude: N85W, 30NE	
		Ring and Bulk samples at 6 and 10 feet.	
		Total Depth 8 feet.	
EP-206	0 to ¼	SOIL: Sandy Silt; moderate yellowish brown, dry, firm, porous.	
	¼ to 5	SAUGUS FORMATION - SUNSHINE RANCH MEMBER (Tsr): Fine- to medium-grained Sandstone, pinkish gray, dry, soft to moderately hard, poorly cemented, roots to depth.	
	@ 3	8 to 10-inch thick Silty Sandstone-pebble conglomerate, grayish orange, dry, soft, one small cobble.	
		Bedding Attitude: N70W, 45NE	
		Total Depth 5 feet.	

TABLE I

EXPLORATORY TRENCH LOGS

Log No.	Depth (ft.)	Description	Logged: 1-31-06 By: RHS
EP-207	0 to ½	SOIL: Sandy Silt; dark yellowish brown, moist, firm, abundant rootlets.	
	½ to 3½	PICO FORMATION (Tp): Silty Sandstone; very pale orange to yellowish gray, slightly moist, soft, red brown stain common.	
		Bedding Attitude: N55W, 40NE	
		Total Depth 3½ feet.	

RHS:cp-2453RT04logs

NUWI – Lyons Canyon, LLC
September 15, 2023
2020-200-001

APPENDIX C

LABORATORY TESTING

RTF&A
GEOTECHNICAL ENGINEERING & ENGINEERING GEOLOGY

APPENDIX C

LABORATORY TESTING

Laboratory tests were performed on selected samples obtained from the referenced field explorations (TRF&A, 2021a) and recent test pits to aid in the classification of the soils and to determine their engineering properties.

Direct shear tests were performed on selected undisturbed samples to determine the strength of the soils. The tests were performed after soaking the samples to near-saturated moisture content and at various surcharge pressures. The strength values determined from the direct shear tests are presented on the Shear Test Data page.

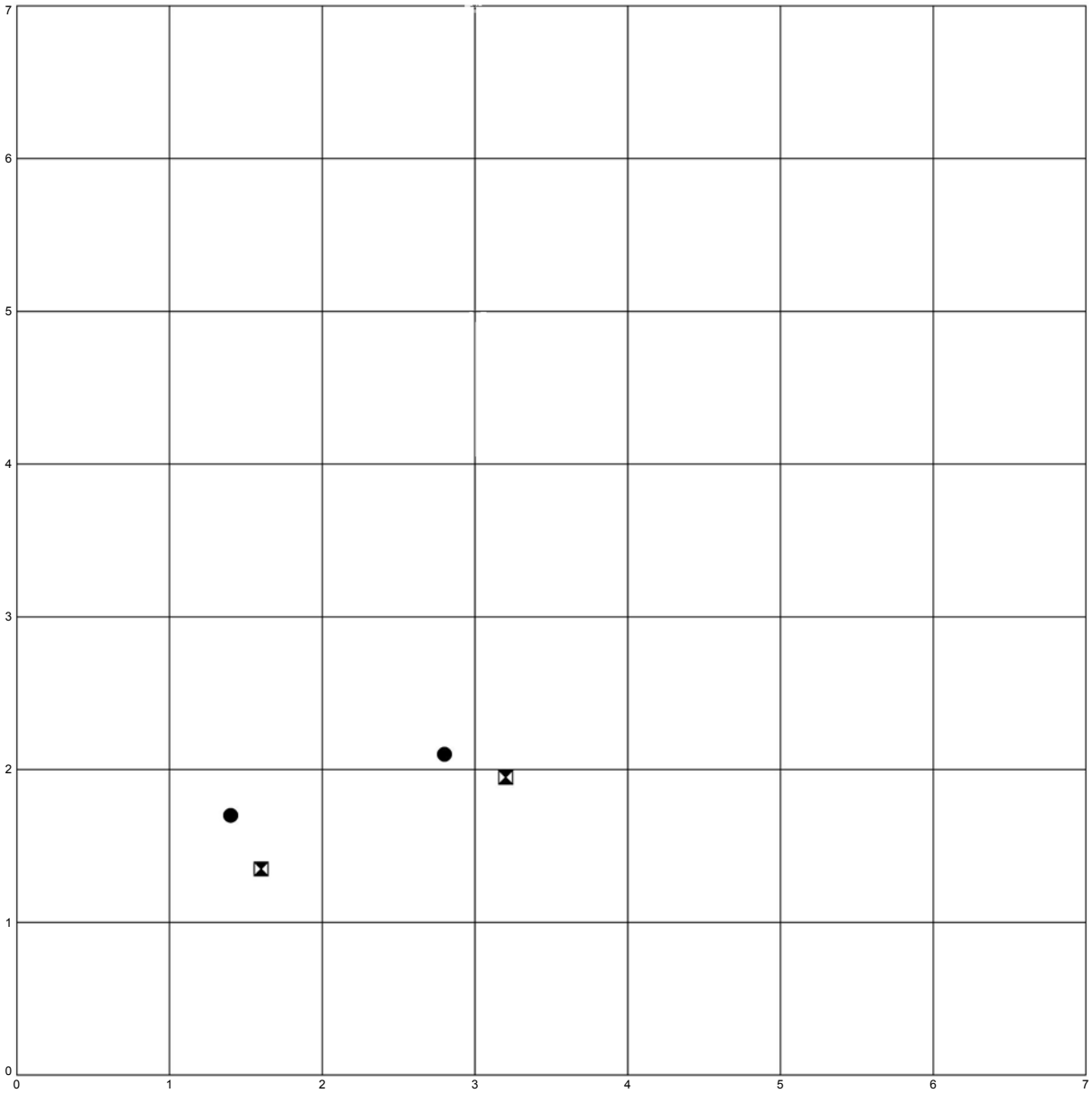
Confined consolidation tests were performed on remolded samples. Water was added during the tests to each of the samples to illustrate the effect of moisture on the compressibility. The results of the tests are presented on the Consolidation Test Data pages.

Atterberg limits (liquid and plastic limit) tests were conducted on selected samples to aid in classifying the soils and determining index properties. Test results are presented on the attached graphic, "Atterberg Limit's Test Data."

A sieve analysis was used to determine the distribution of grain sizes in selected soil samples. The results of the sieve analysis tests are presented as an attachment to this report.

Maximum Density Tests: The maximum dry densities and optimum moisture contents of bulk soil samples obtained from the test borings were determined in our laboratory in accordance with the current ASTM Soil Compaction Method D1557. The optimum moisture contents are in percent of dry weight and the maximum dry densities are in pounds per cubic foot (pcf). The double-letter soil classification that follows each soil description is in accordance with the Uniform Soil Classification System (ASTM D2487). The results of the maximum dry density tests are as follows:

Sample	Soil Description and Classification	Maximum Dry Density (pcf)	Optimum Moisture Content (%)
TP-1 @ 10'	SANDY CLAY (CL) very fine to medium with occasional coarse, medium brown	123.0	12.0
TP-8 @ 10'	SANDY CLAY (CL) fine to medium, dark brown	121.0	13.5
TP-17 @ 6'	SILTY SAND (SM) very fine to fine, light brown	115.0	13.0



Specimen Identification		Classification
●	**HS-1 (S-1)**	**SILT: Trace Clay, Brown (ML) Remolded to 102 pcf @ 11.9%**
⊠	**HS-2 (S-1)**	**SILT: Trace Fine Sand, Light Brown (ML) Remolded to 103 pcf @ 12.0%**

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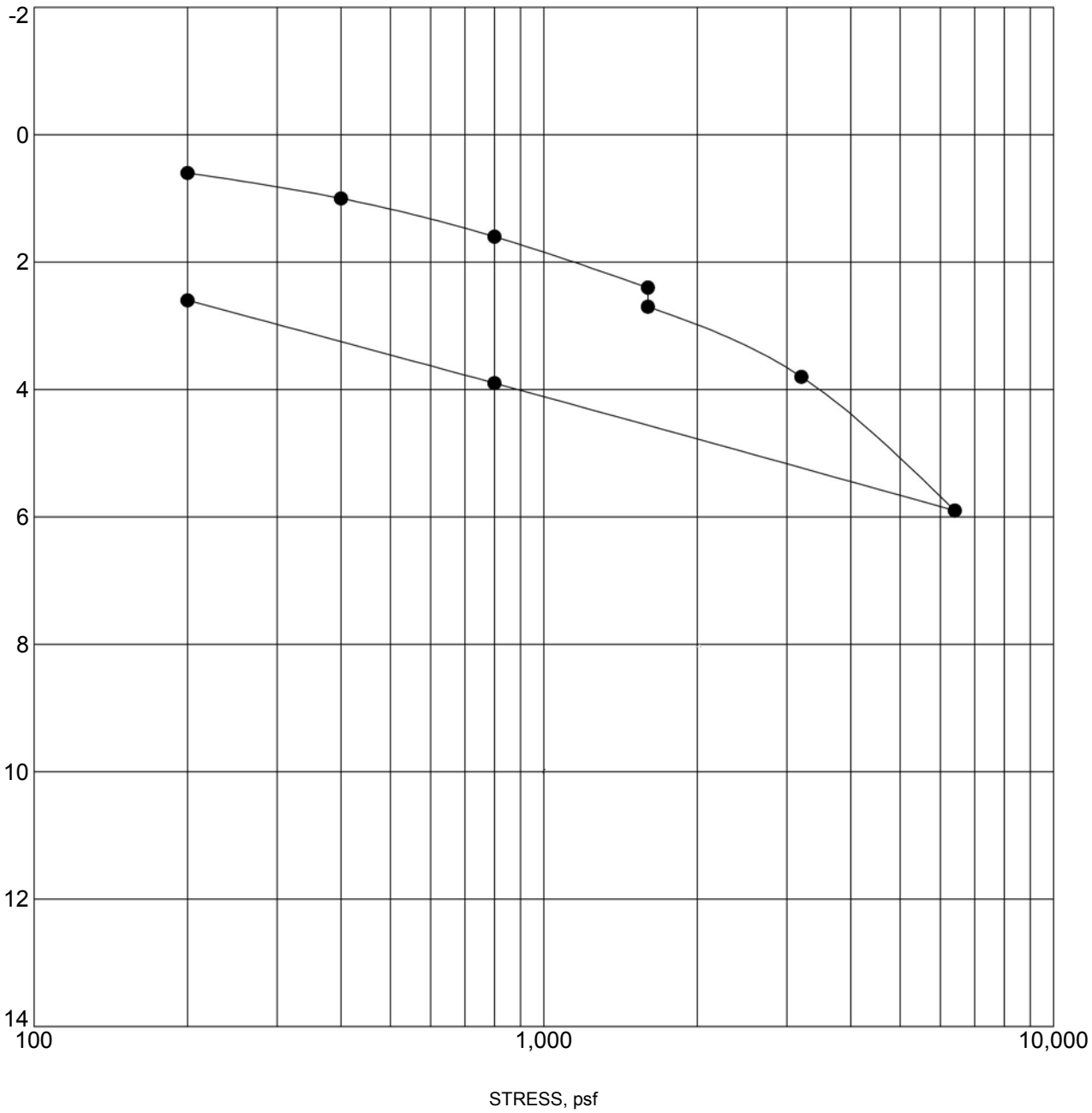
DIRECT SHEAR TEST

JOB NUMBER: 2020-200

REPORT DATED:



Water added at 1600 psf

Specimen Identification		Classification		
●	**HS-1 10.0'**			
⊠				
▲				
★				
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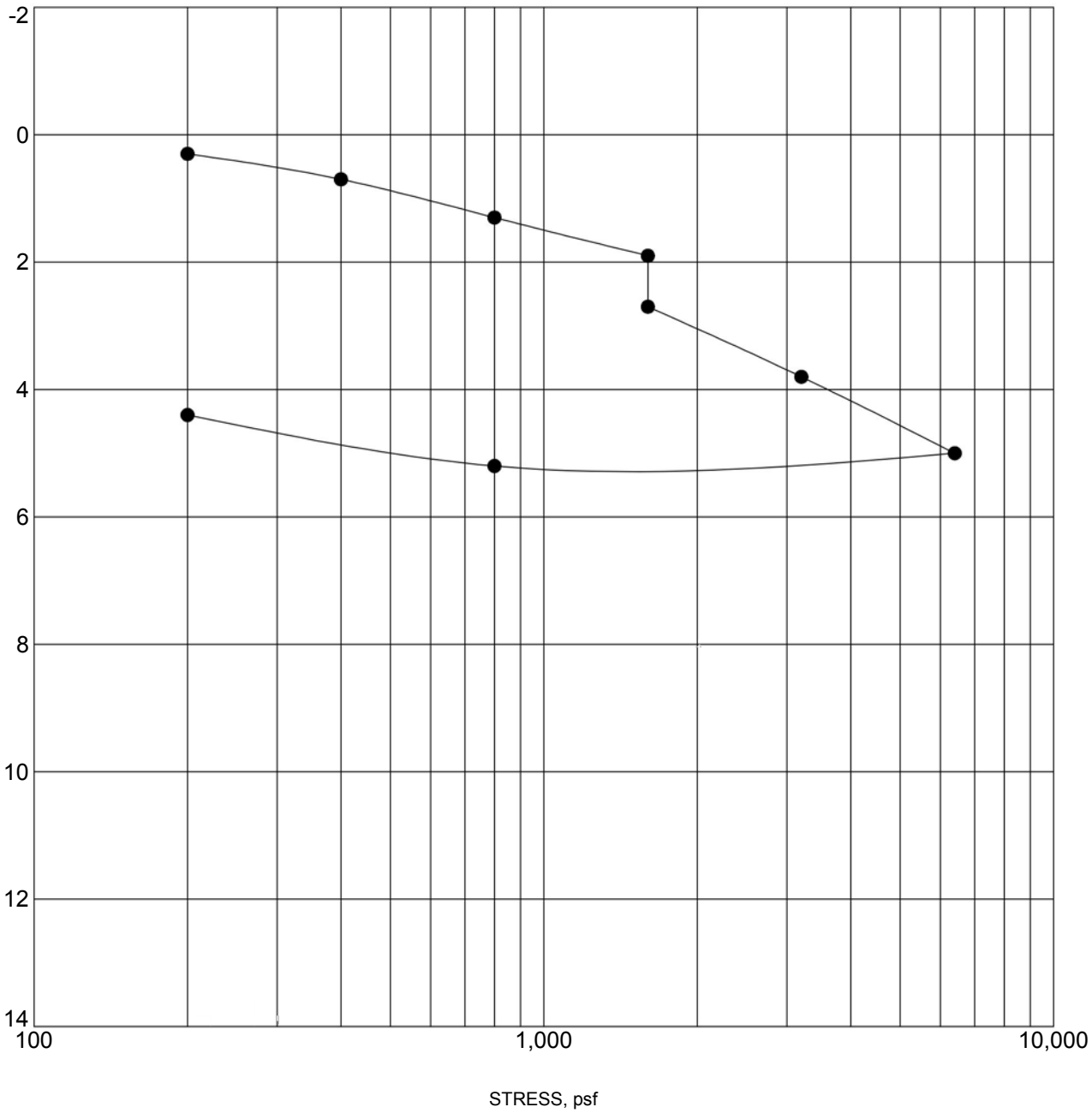
CONSOLIDATION TEST

JOB NUMBER: 2020-200

REPORT DATED:



Water added at 1600 psf

Specimen Identification		Classification		
●	**HS-1 12.0'**			
⊠				
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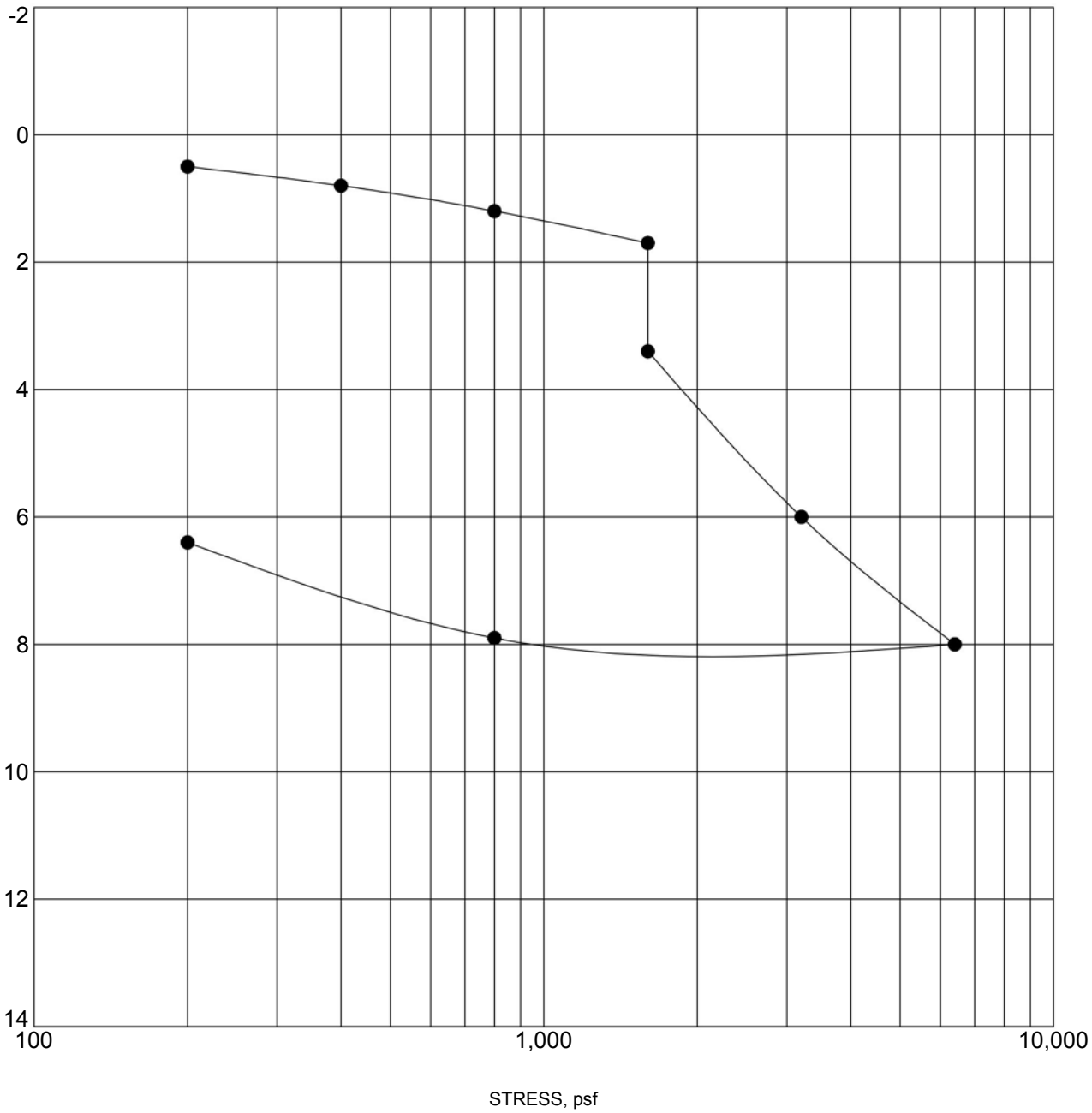

Water added at 1600 psf

Specimen Identification		Classification		
●	**HS-2 8.0'**			
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★				
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CONSOLIDATION TEST

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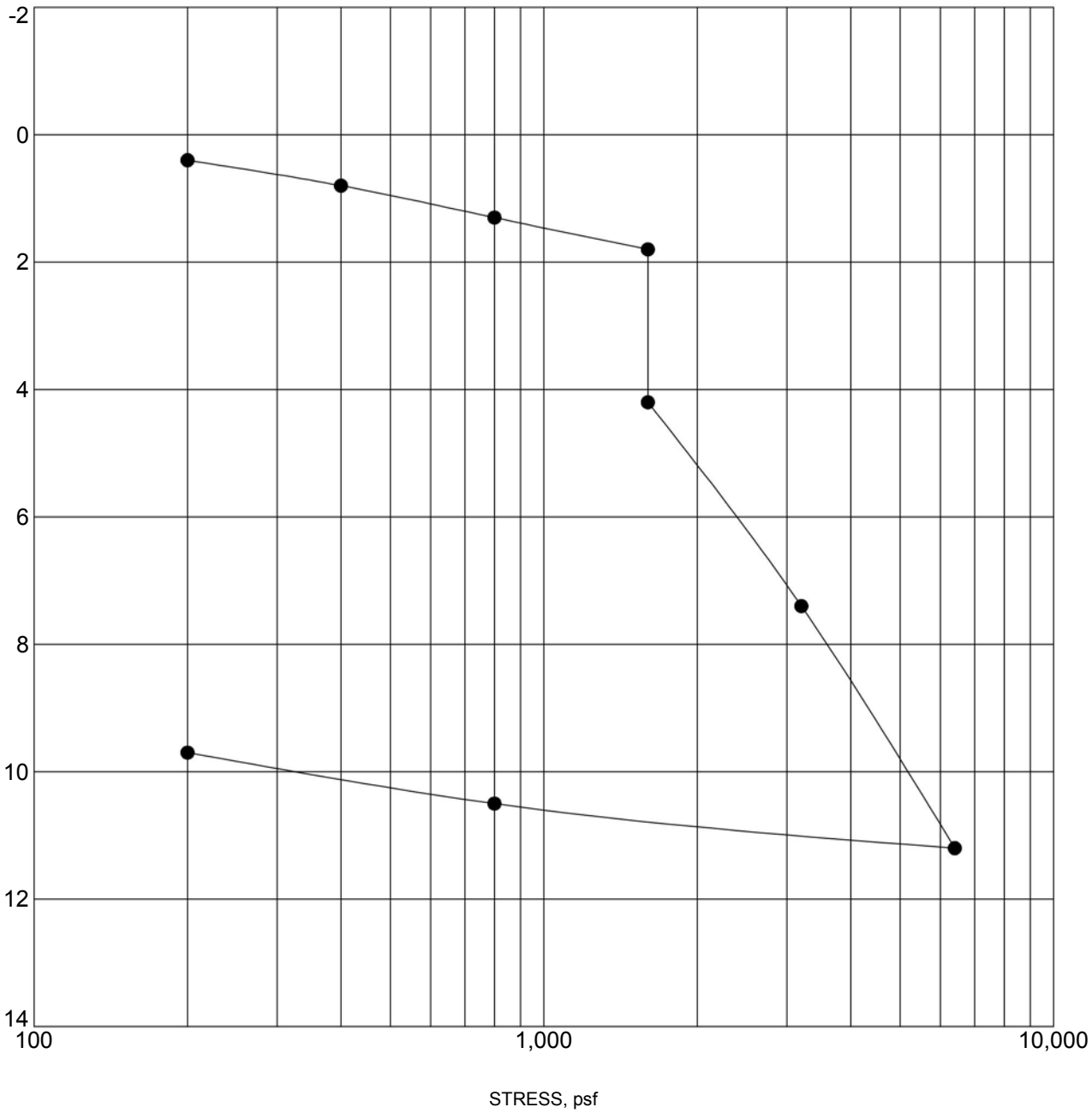
REPORT DATED:

US CONSOL STRAIN 2020-200.GPJ FRANKIAN.GDT 2/2/21



Water added at 1600 psf

Specimen Identification		Classification		
●	**HS-2 10.0'**			
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★				
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CONSOLIDATION TEST

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REPORT DATED:

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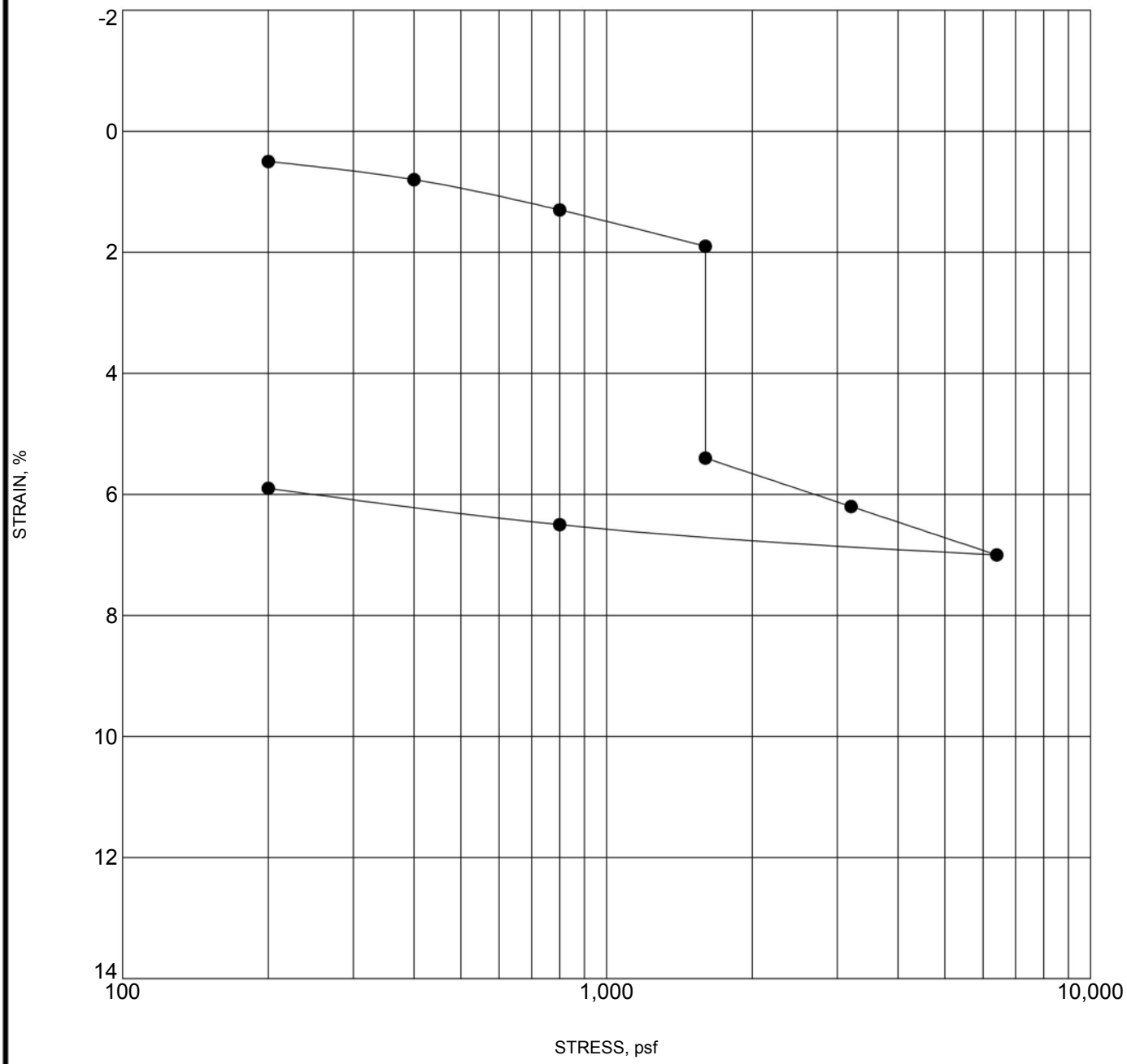

Water added at 1600 psf

Specimen Identification		Classification		
●	**HS-3 5.0'**			
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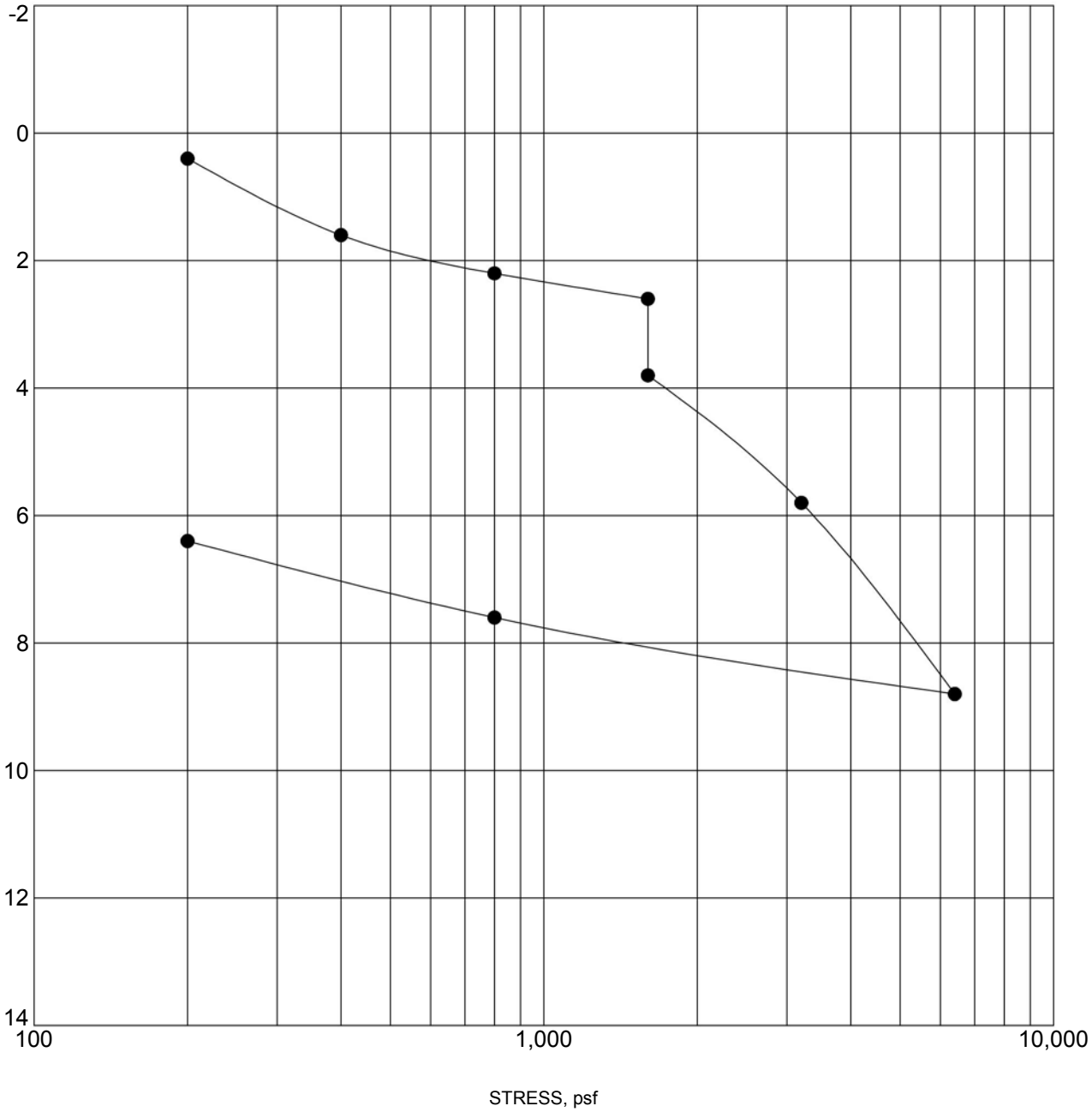
CONSOLIDATION TEST

JOB NUMBER: 2020-200

REPORT DATED:

DRAFT



Water added at 1600 psf

Specimen Identification		Classification		
●	**HS-3 8.0'**			
⊠				
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★				
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CONSOLIDATION TEST

JOB NUMBER: 2020-200

REPORT DATED:

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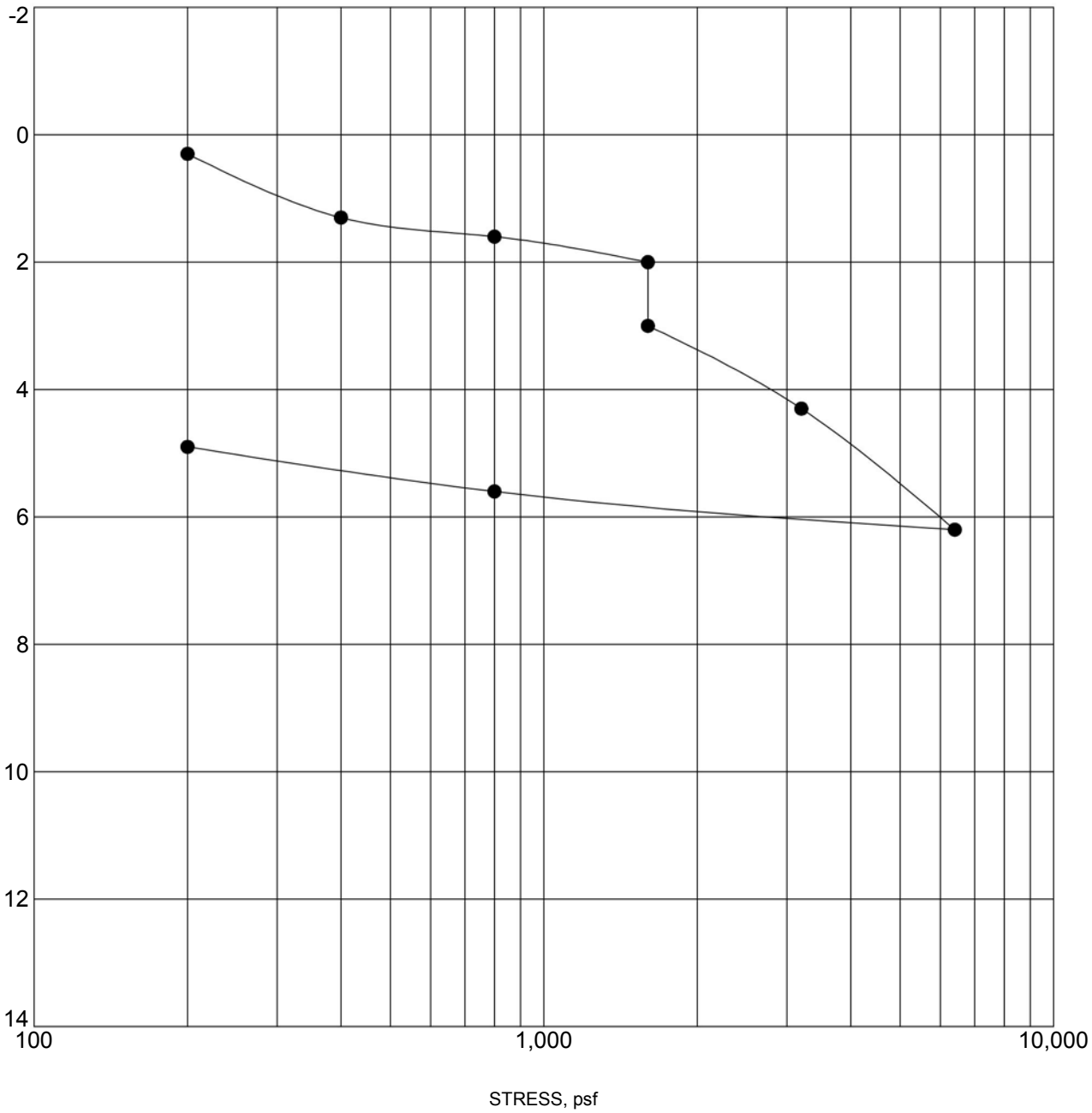

Water added at 1600 psf

Specimen Identification		Classification		
●	**HS-3 12.0'**			
⊠				
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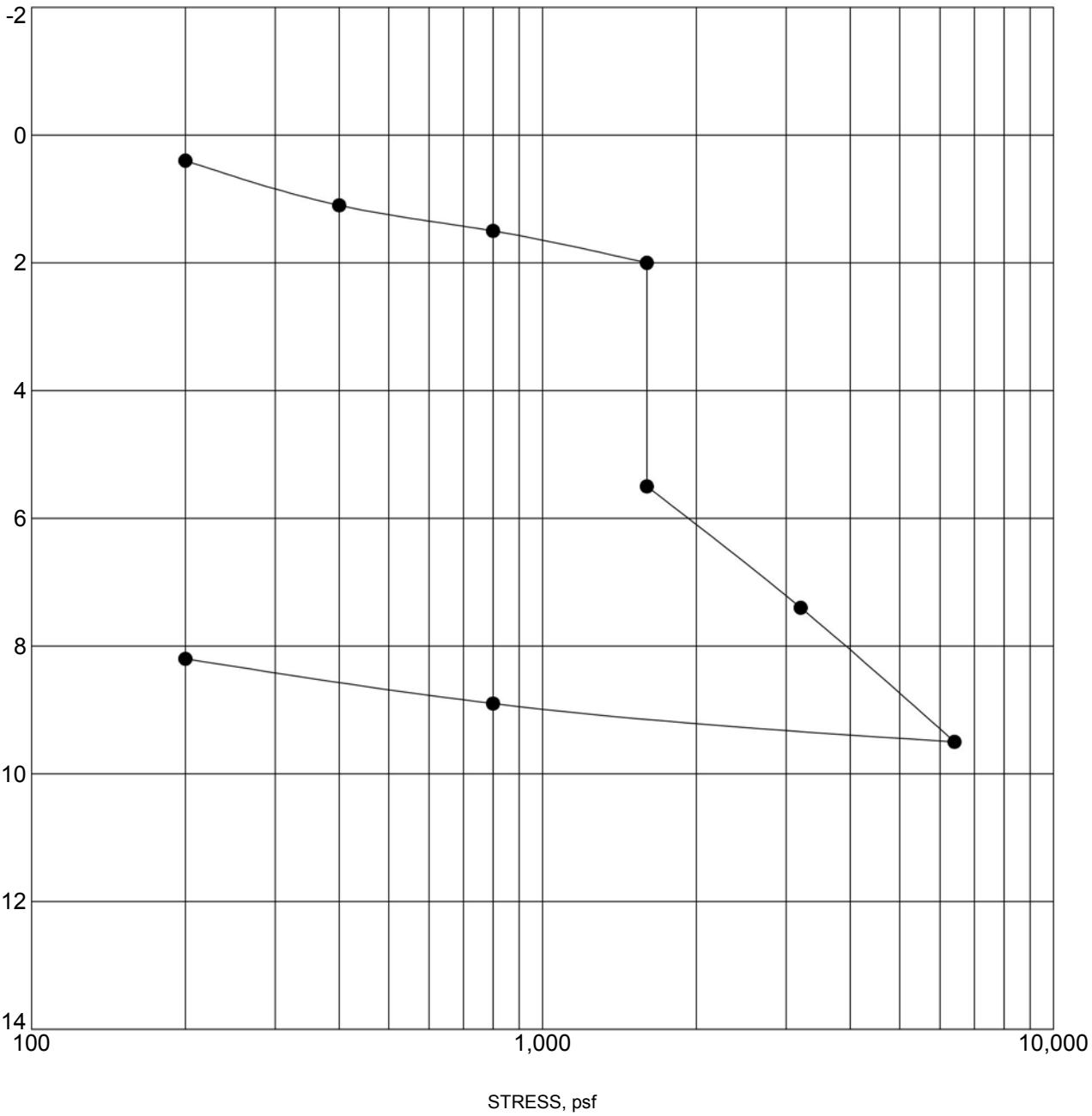

Water added at 1600 psf

Specimen Identification		Classification		
●	**HS-4 8.0'**			
⊠				
▲				
★				
⊙				
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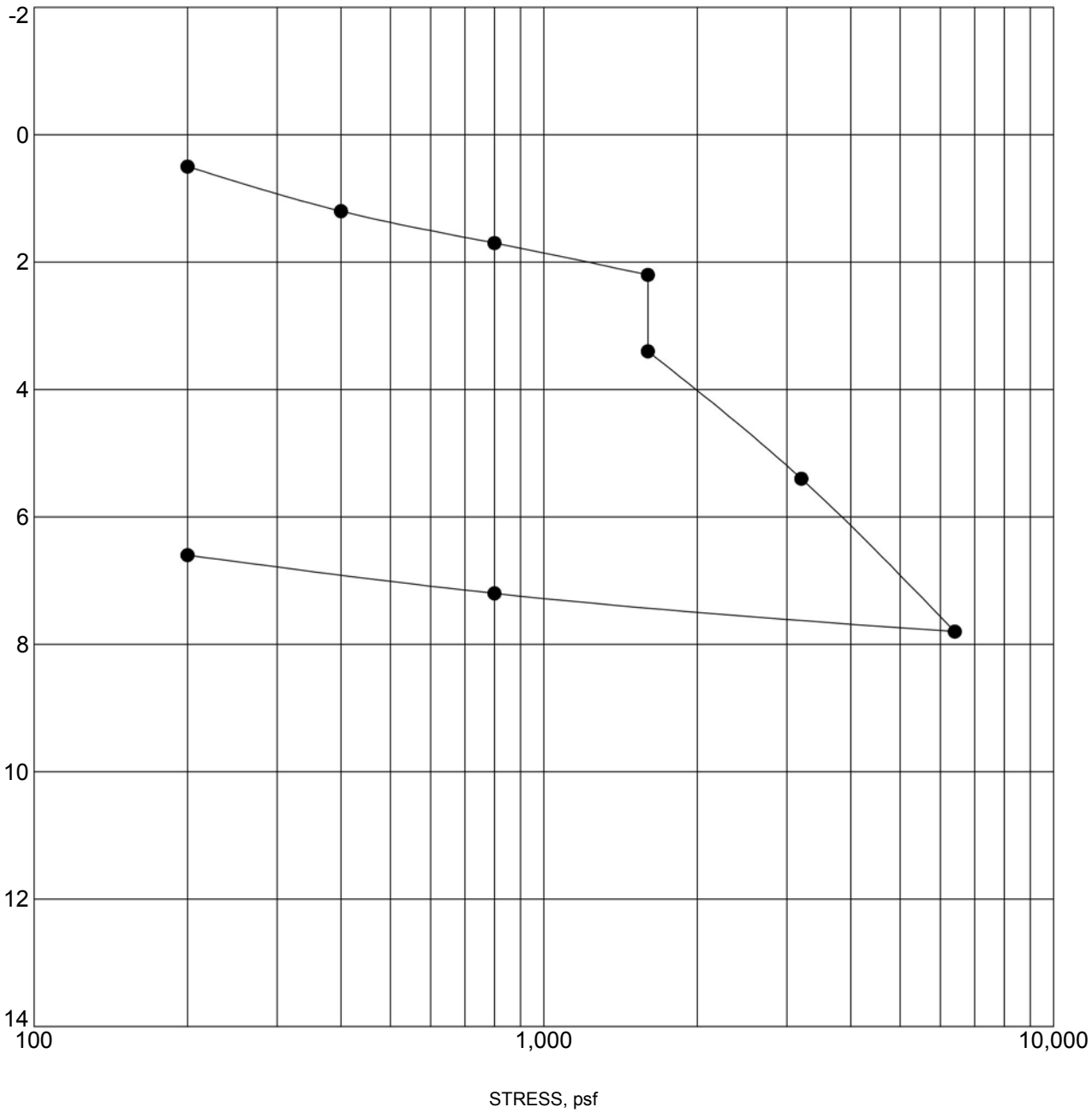
CONSOLIDATION TEST

JOB NUMBER: 2020-200

REPORT DATED:

US CONSOL STRAIN 2020-200.GPJ FRANKIAN.GDT 2/2/21



Water added at 1600 psf

Specimen Identification		Classification		
●	**HS-4 10.0'**			
⊠				
▲				
★				
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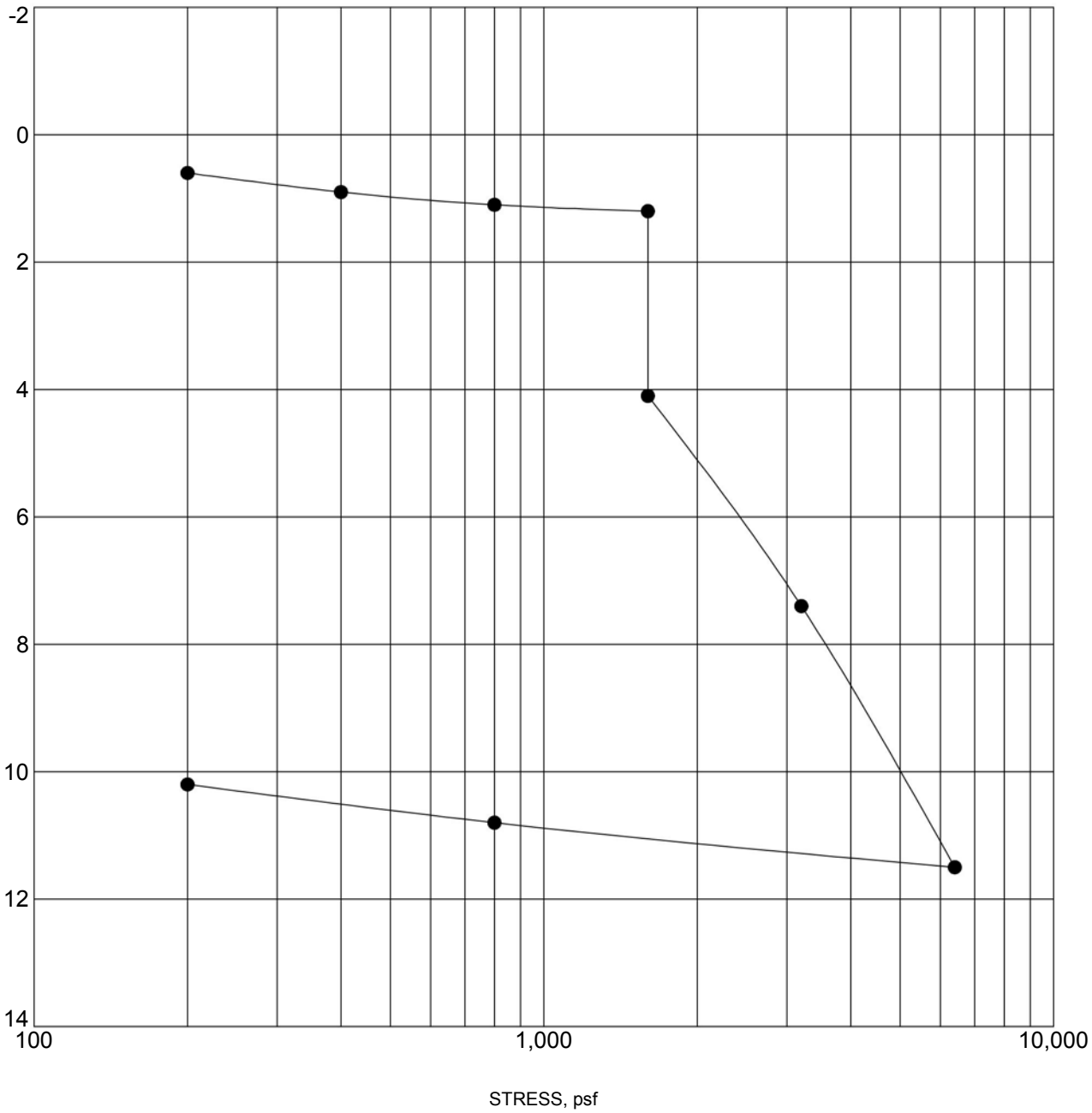
Santa Clarita CA 91355
Telephone: 818 531 1501
Fax: 818 531 1510

CONSOLIDATION TEST

JOB NUMBER: 2020-200

REPORT DATED:

US CONSOL STRAIN 2020-200.GPJ FRANKIAN.GDT 2/2/21



Water added at 1600 psf

Specimen Identification		Classification		
●	**HS-5 8.0'**			
⊠				
▲				
★				
⊙				
✪				

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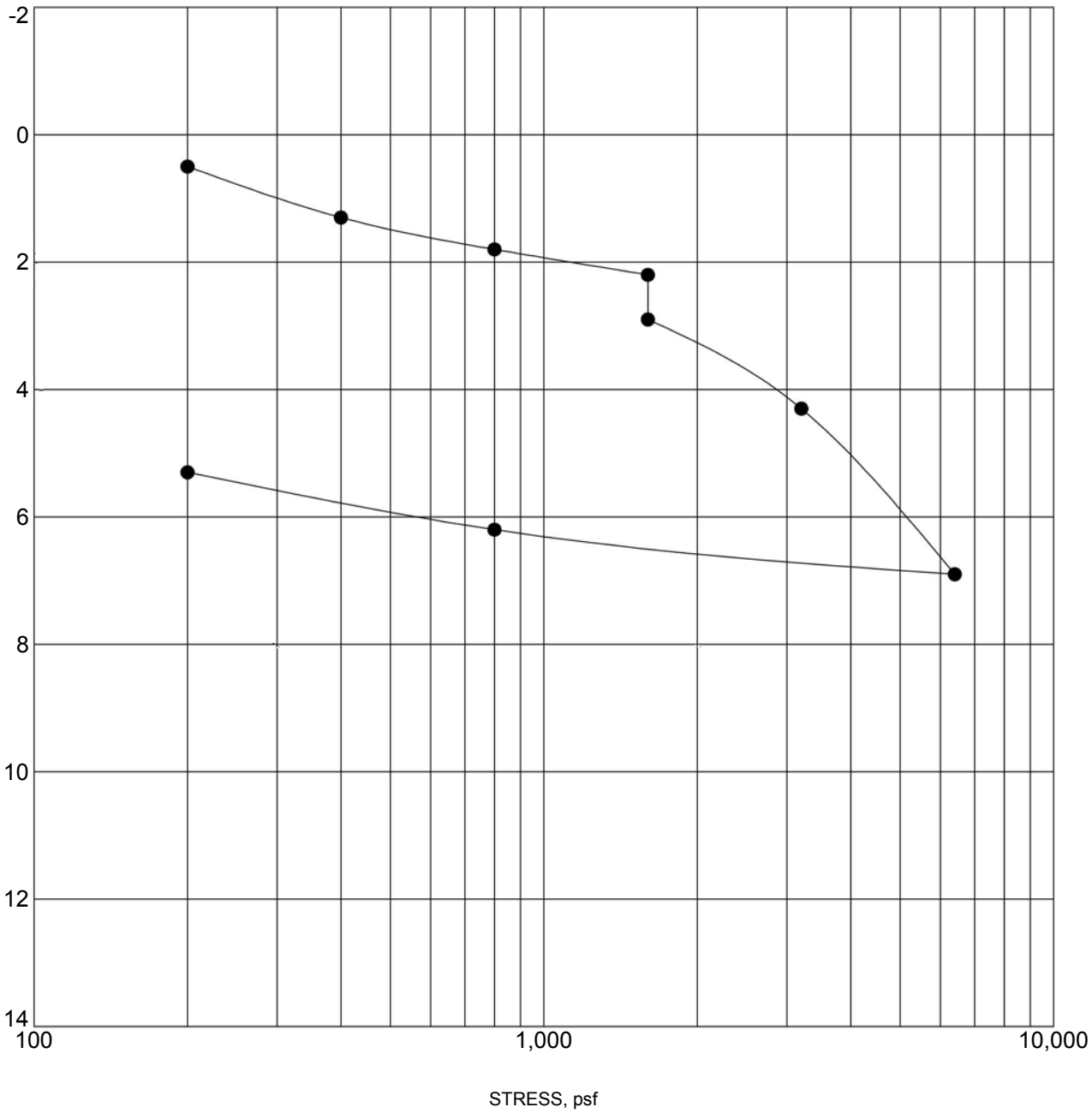
CONSOLIDATION TEST

JOB NUMBER: 2020-200

REPORT DATED:

US CONSOL STRAIN 2020-200.GPJ FRANKIAN.GDT 2/2/21



Water added at 1600 psf

Specimen Identification		Classification		
●	**HS-5 12.0'**			
⊠				
▲				
★				
⊙				
✪				

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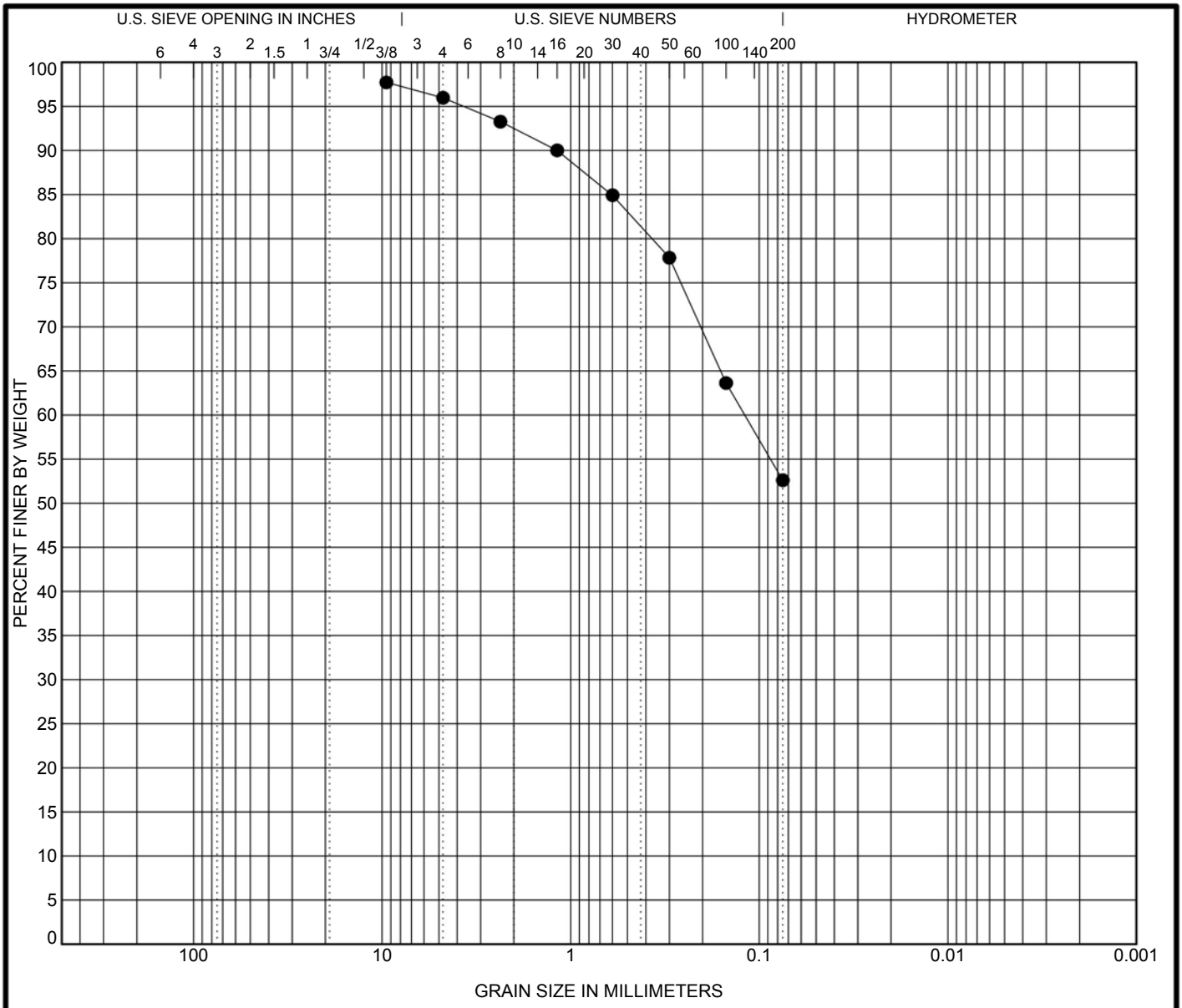
CONSOLIDATION TEST

JOB NUMBER: 2020-200

REPORT DATED:



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification		Classification	LL	PL	PI	Cc	Cu
●	**HS-1**	**1.0**						
⊠								
▲								
★								
⊙								

	Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	**HS-1**	**1.0**	**9.5**	**0.119**			**1.7**	**43.4**	**52.6**	
⊠										
▲										
★										
⊙										

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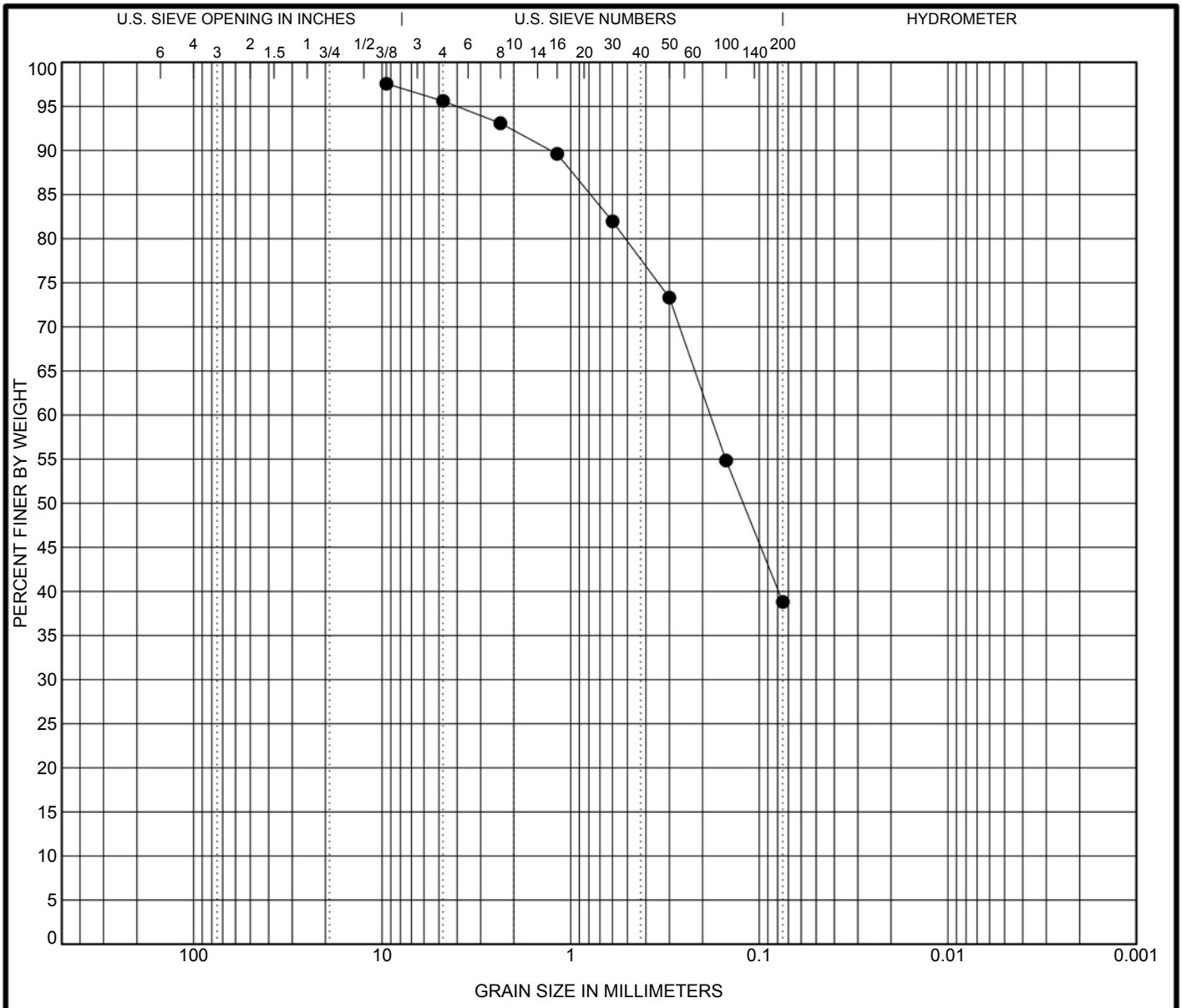
GRAIN SIZE DISTRIBUTION

JOB NUMBER: 2020-200

REPORT DATED:

US GRAIN SIZE 2020-200.GPJ FRANKIAN.GDT 1/29/21



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification		Classification	LL	PL	PI	Cc	Cu
●	**HS-2**	**2.0**						
⊠								
▲								
★								
⊙								

	Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	**HS-2**	**2.0**	**9.5**	**0.182**			**2.0**	**56.8**	**38.8**	
⊠										
▲										
★										
⊙										

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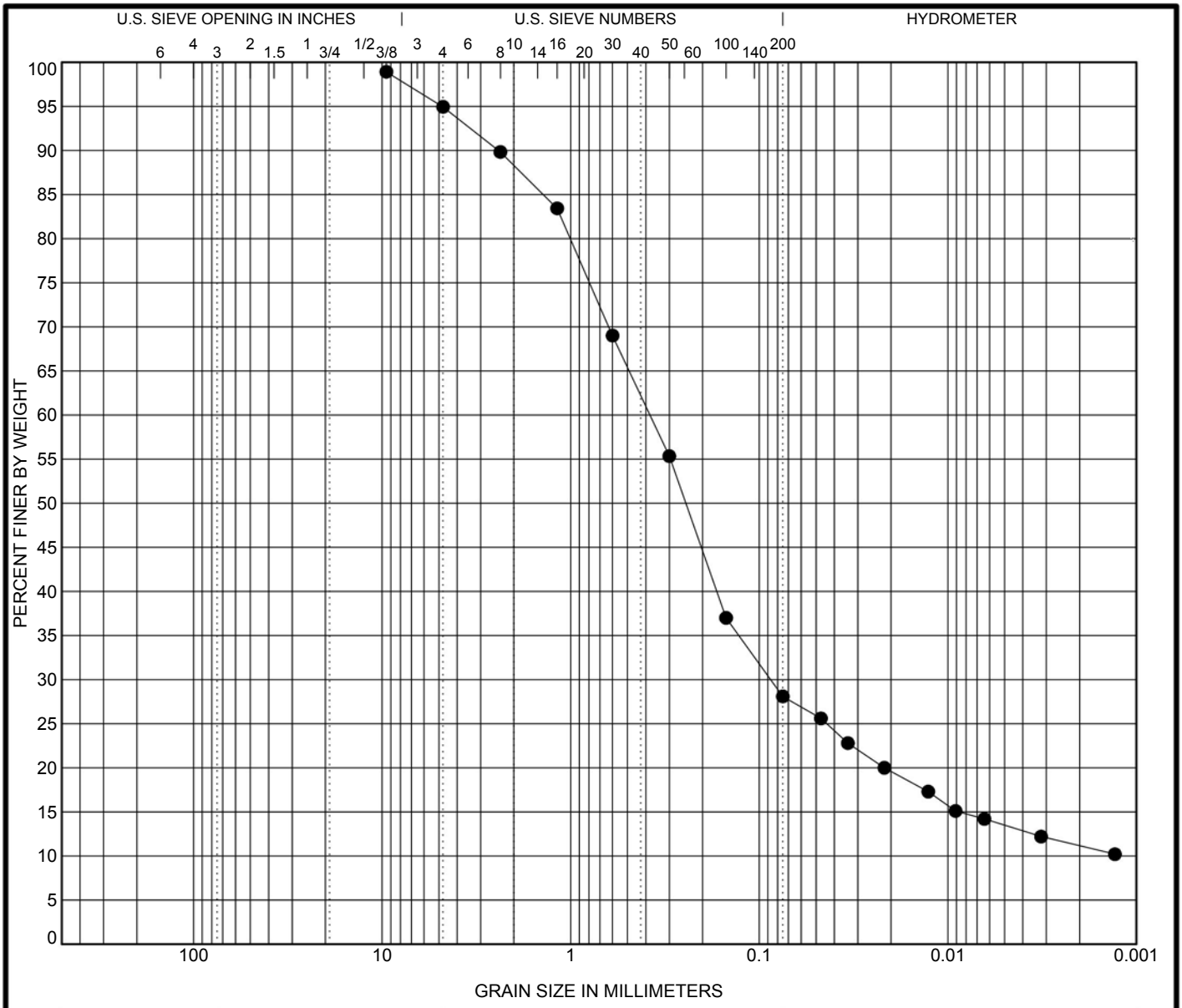
GRAIN SIZE DISTRIBUTION

JOB NUMBER: 2020-200

REPORT DATED:

US GRAIN SIZE 2020-200.GPJ FRANKIAN.GDT 1/29/21



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification		Classification	LL	PL	PI	Cc	Cu
●	**HS-3**	**1.0**	**CLAYEY SAND(SC)**	**30**	**18**	**12**		
⊠								
▲								
★								
⊙								

	Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	**HS-3**	**1.0**	**9.5**	**0.38**	**0.087**		**4.0**	**66.8**	**14.6**	**13.5**
⊠										
▲										
★										
⊙										

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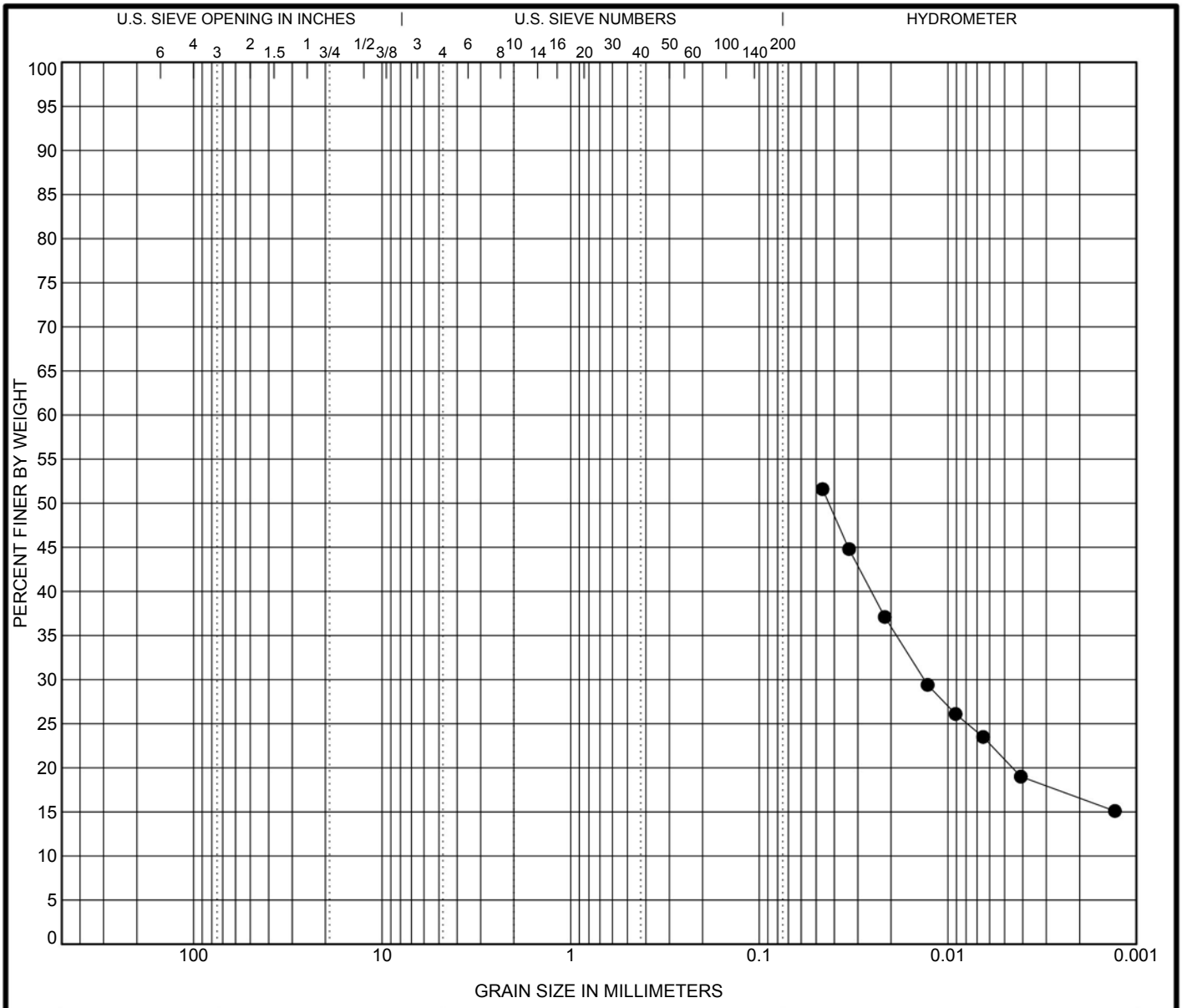
GRAIN SIZE DISTRIBUTION

JOB NUMBER: 2020-200

REPORT DATED:

US GRAIN SIZE 2020-200.GPJ FRANKIAN.GDT 2/2/21



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification		Classification	LL	PL	PI	Cc	Cu
●	**HS-4**	**1.0**						
⊠								
▲								
★								
⊙								

	Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	**HS-4**	**1.0**			**0.013**					**20.9**
⊠										
▲										
★										
⊙										

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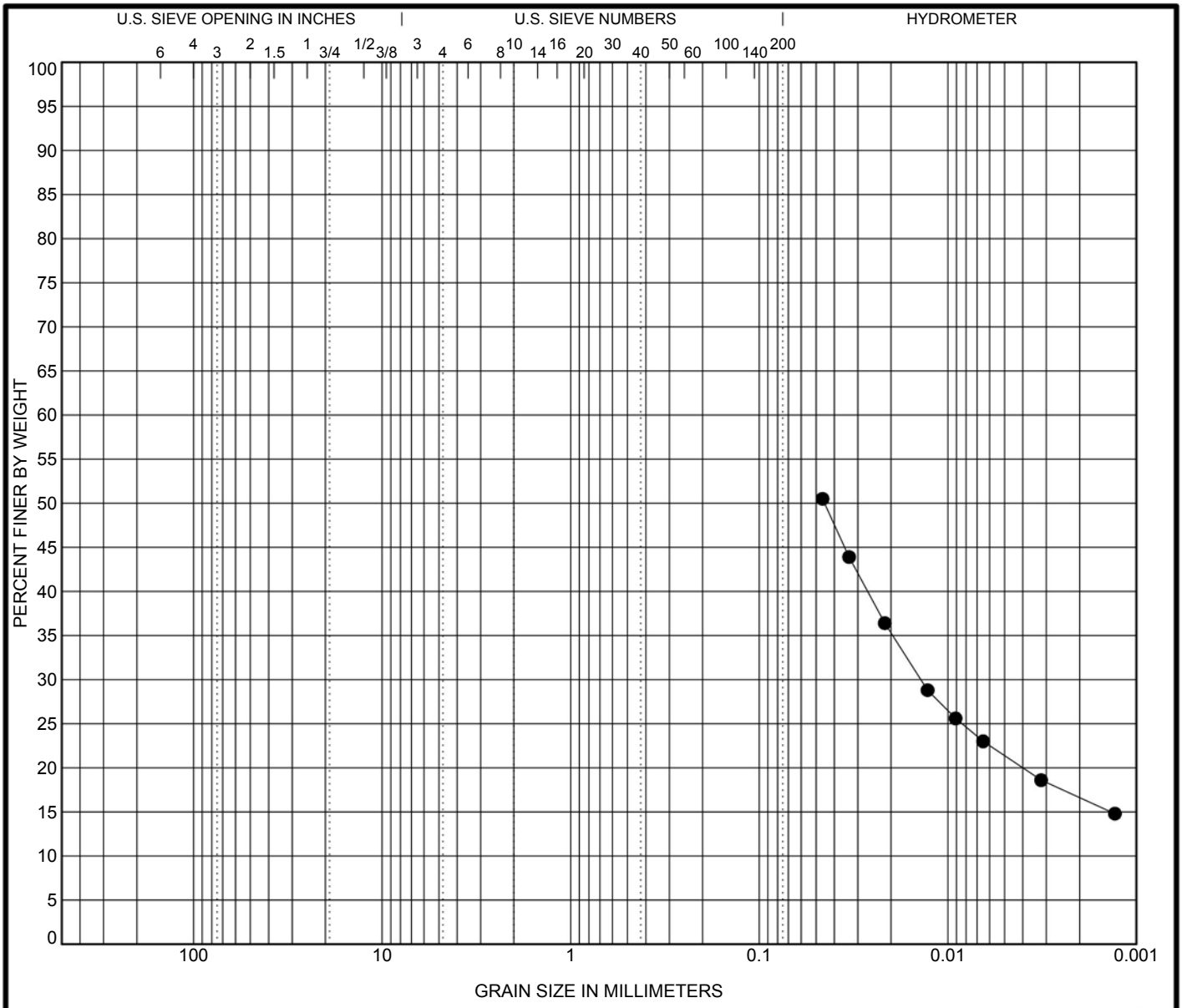
GRAIN SIZE DISTRIBUTION

JOB NUMBER: 2020-200

REPORT DATED:

US GRAIN SIZE 2020-200.GPJ FRANKIAN.GDT 1/29/21



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification		Classification	LL	PL	PI	Cc	Cu
●	Hole-4	20.0						
⊠								
▲								
★								
⊙								

	Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	Hole-4	20.0			0.014					21.4
⊠										
▲										
★										
⊙										

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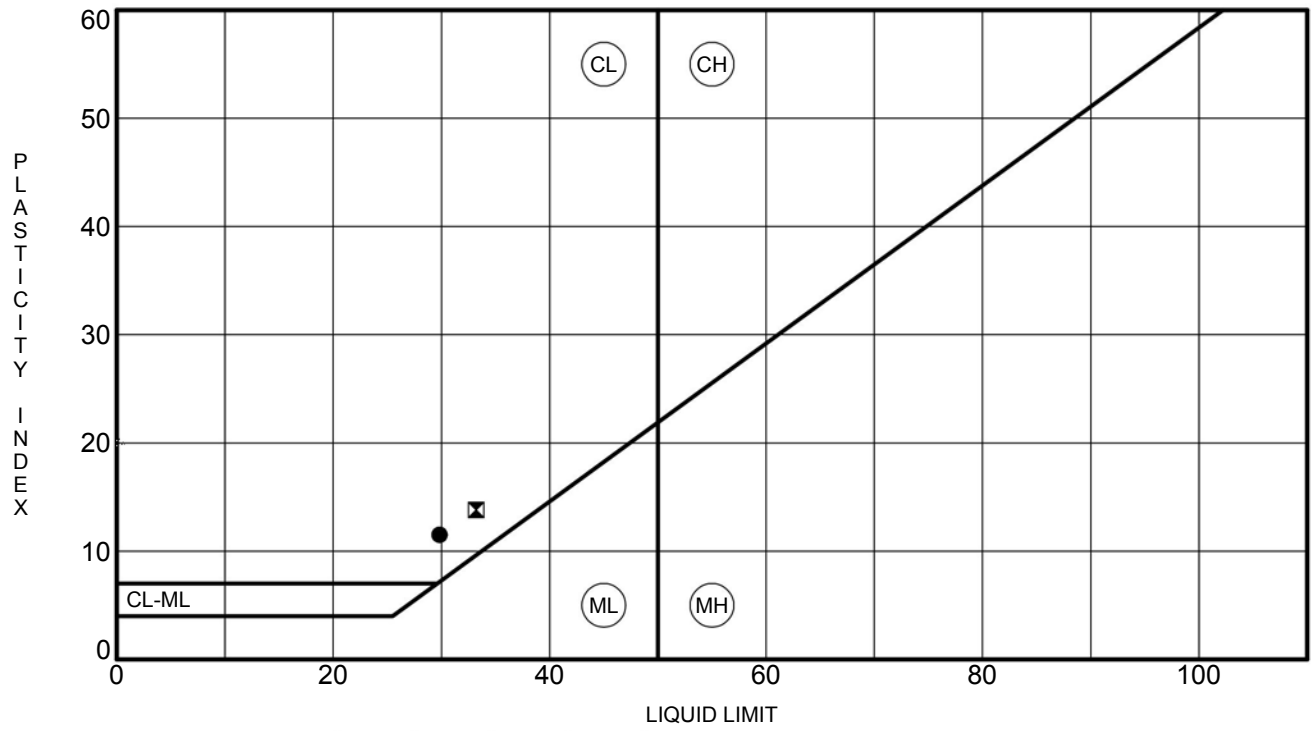
GRAIN SIZE DISTRIBUTION

JOB NUMBER: 2020-200

REPORT DATED:

US GRAIN SIZE 2020-200.GPJ FRANKIAN.GDT 1/29/21



	Specimen Identification		LL	PL	PI	Fines	Classification
●	**HS-3**	**1.0**	**30**	**18**	**12**	**33**	**CLAYEY SAND(SC)**
⊠	**HS-4**	**20.0**	**33**	**19**	**14**	**50**	**CLAYEY SAND(SC)**

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ATTERBERG LIMITS' RESULTS

JOB NUMBER: 2020-200

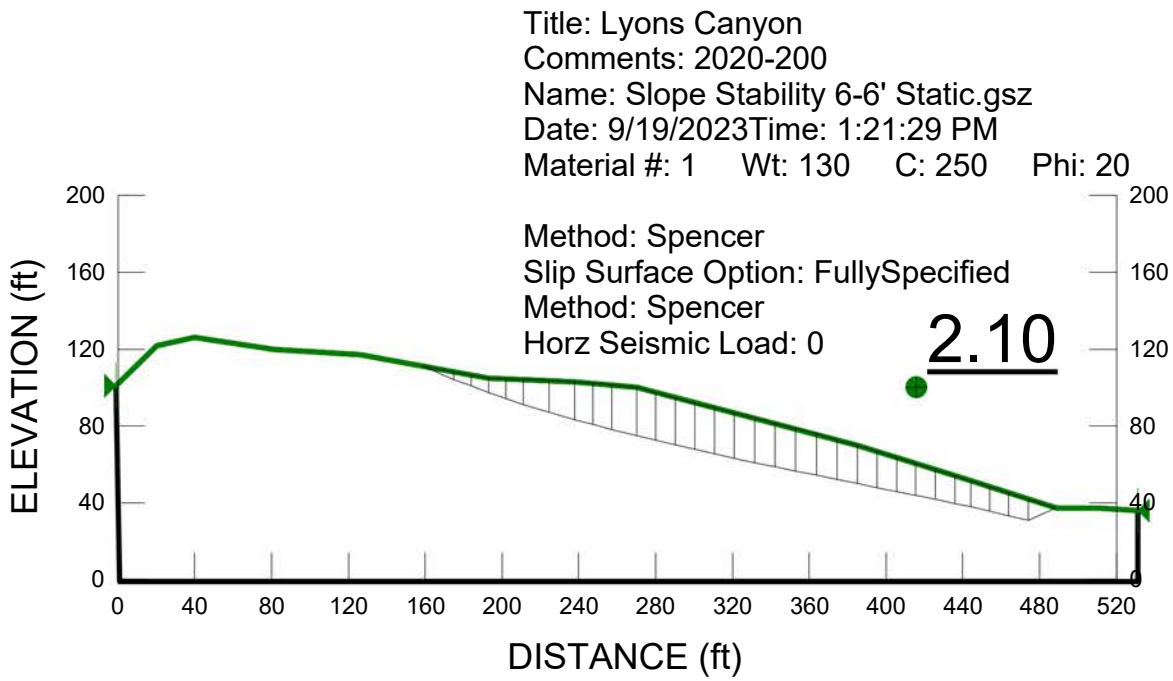
REPORT DATED:

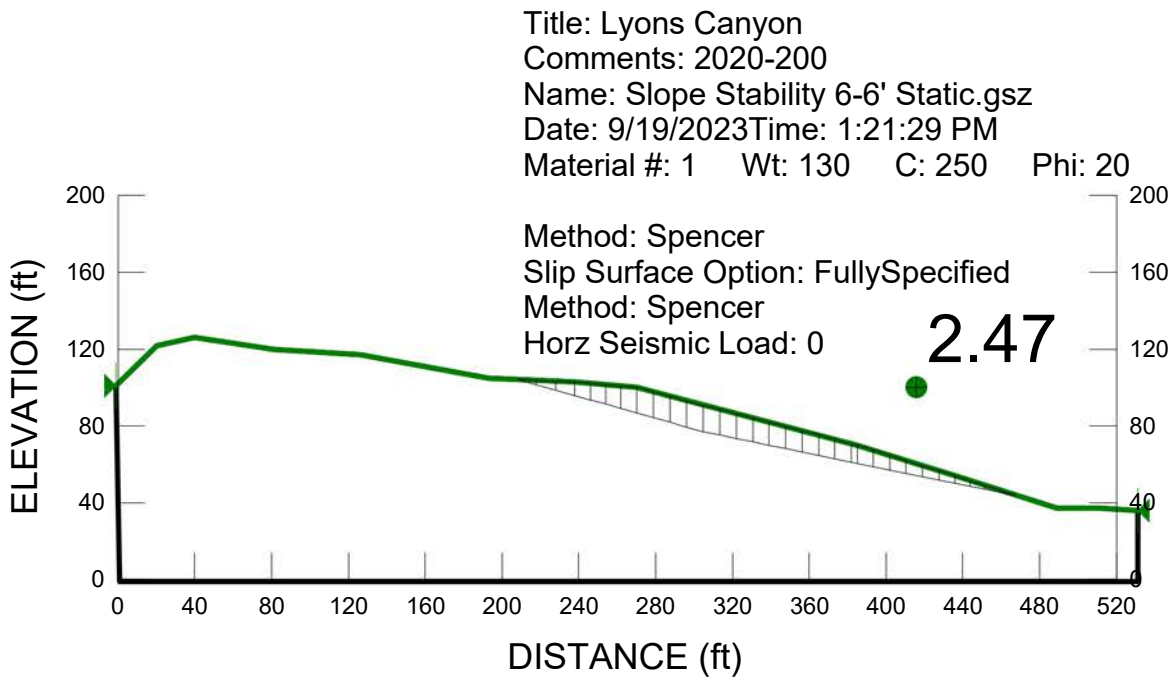
NUWI – Lyons Canyon, LLC
September 15, 2023
2020-200-001

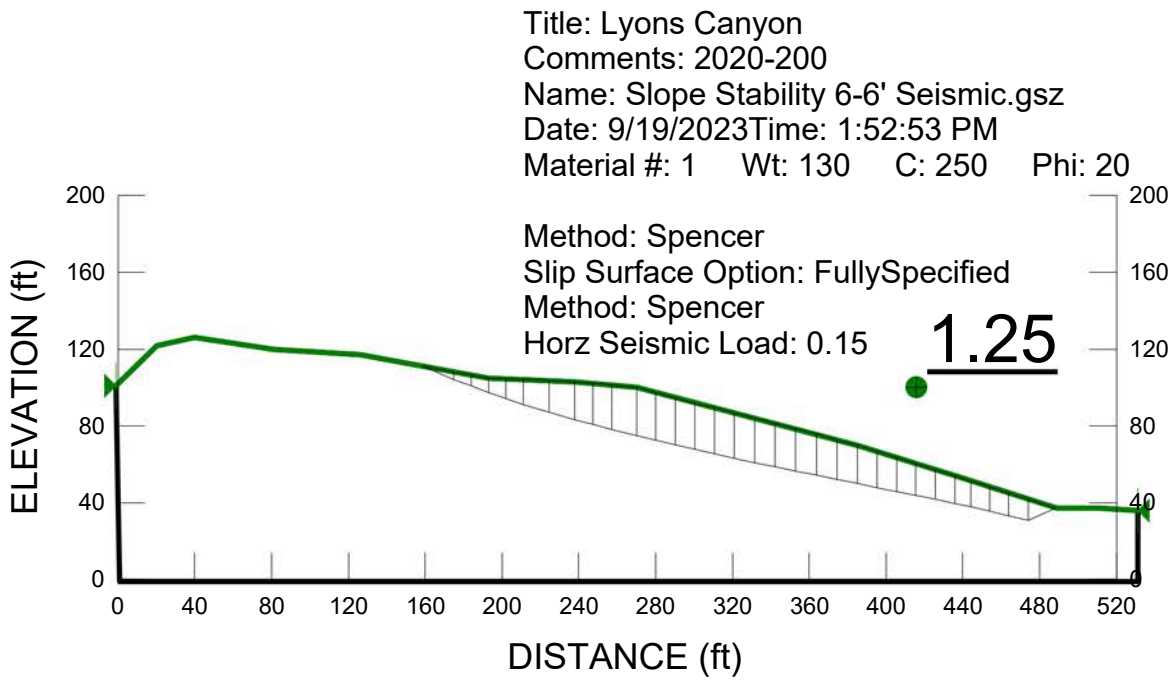
APPENDIX D

SLOPE STABILITY ANALYSES

RTF&A
GEOTECHNICAL ENGINEERING & ENGINEERING GEOLOGY

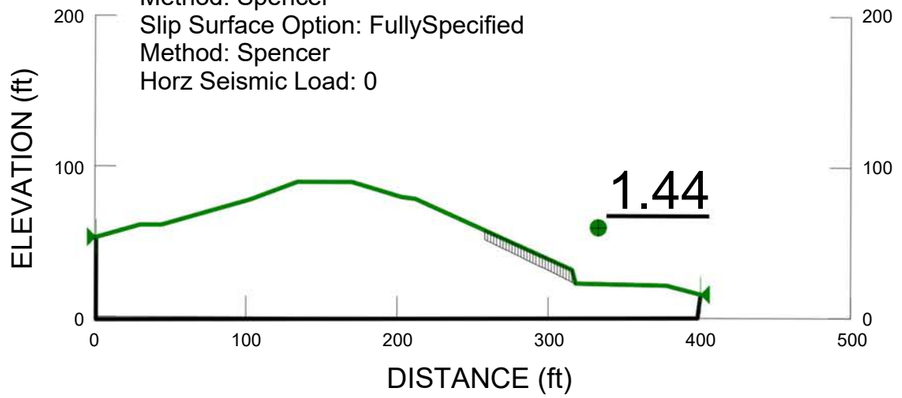

Title: Lyons Canyon
Comments: 2020-200
Name: Slope Stability 6-6' Static.gsz
Date: 9/19/2023Time: 1:21:29 PM
Material #: 1 Wt: 130 C: 250 Phi: 20
Method: Spencer
Slip Surface Option: FullySpecified
Method: Spencer
Horz Seismic Load: 0
2.10
ELEVATION (ft)
DISTANCE (ft)
0
40
80
120
160
200
240
280
320
360
400
440
480
520


Title: Lyons Canyon
Comments: 2020-200
Name: Slope Stability 6-6' Static.gsz
Date: 9/19/2023Time: 1:21:29 PM
Material #: 1 Wt: 130 C: 250 Phi: 20
Method: Spencer
Slip Surface Option: FullySpecified
Method: Spencer
Horz Seismic Load: 0
2.47
ELEVATION (ft)
DISTANCE (ft)
0
40
80
120
160
200
240
280
320
360
400
440
480
520


Title: Lyons Canyon
Comments: 2020-200
Name: Slope Stability 6-6' Seismic.gsz
Date: 9/19/2023Time: 1:52:53 PM
Material #: 1 Wt: 130 C: 250 Phi: 20
Method: Spencer
Slip Surface Option: FullySpecified
Method: Spencer
Horz Seismic Load: 0.15
1.25
ELEVATION (ft)
DISTANCE (ft)
0
40
80
120
160
200
240
280
320
360
400
440
480
520

Title: Lyons Canyon
Comments: 2020-200
Name: Slope Stability 8-8' Static CIDH Wall 0 kips Horizontal LIne Load.gsz
Date: 6/10/2022Time: 11:52:51 AM
Material #: 1 Wt: 130 C: 250 Phi: 20

Method: Spencer
Slip Surface Option: FullySpecified
Method: Spencer
Horz Seismic Load: 0



Title: Lyons Canyon
Comments: 2020-200
Name: Slope Stability 8-8' Static CIDH Wall 3 kips Horizontal LIne Load.gsz
Date: 6/10/2022Time: 12:08:32 PM
Material #: 1 Wt: 130 C: 250 Phi: 20

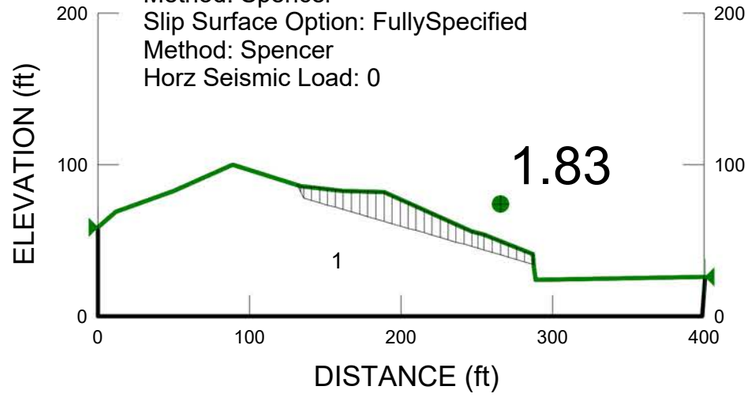
Method: Spencer
Slip Surface Option: FullySpecified
Method: Spencer
Horz Seismic Load: 0

Title: Lyons Canyon
Comments: 2020-200
Name: Slope Stability 8-8' Seismic CIDH Wall 3 kips Horizontal LIne Load.gsz
Date: 6/10/2022Time: 12:12:49 PM
Material #: 1 Wt: 130 C: 250 Phi: 20

Method: Spencer
Slip Surface Option: FullySpecified
Method: Spencer
Horz Seismic Load: 0.15

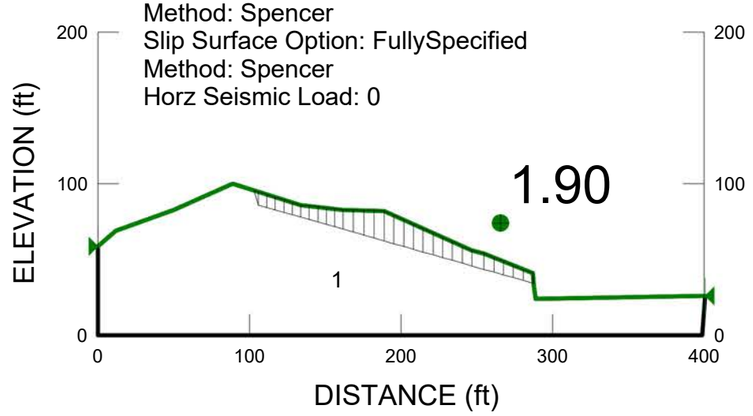
Title: Lyons Canyon
Comments: 2020-200
Name: Slope Stability 9-9' Static CIDH Wall 0 kips Horizontal LIne Load.gsz
Date: 6/10/2022Time: 12:24:51 PM
Material #: 1 Wt: 130 C: 250 Phi: 20

Method: Spencer
Slip Surface Option: FullySpecified
Method: Spencer
Horz Seismic Load: 0



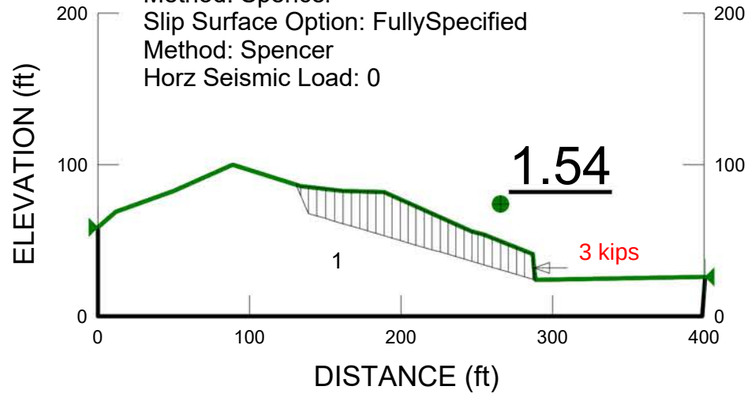
Title: Lyons Canyon
Comments: 2020-200
Name: Slope Stability 9-9' Static CIDH Wall 0 kips Horizontal LIne Load.gsz
Date: 6/10/2022Time: 12:24:51 PM
Material #: 1 Wt: 130 C: 250 Phi: 20

Method: Spencer
Slip Surface Option: FullySpecified
Method: Spencer
Horz Seismic Load: 0



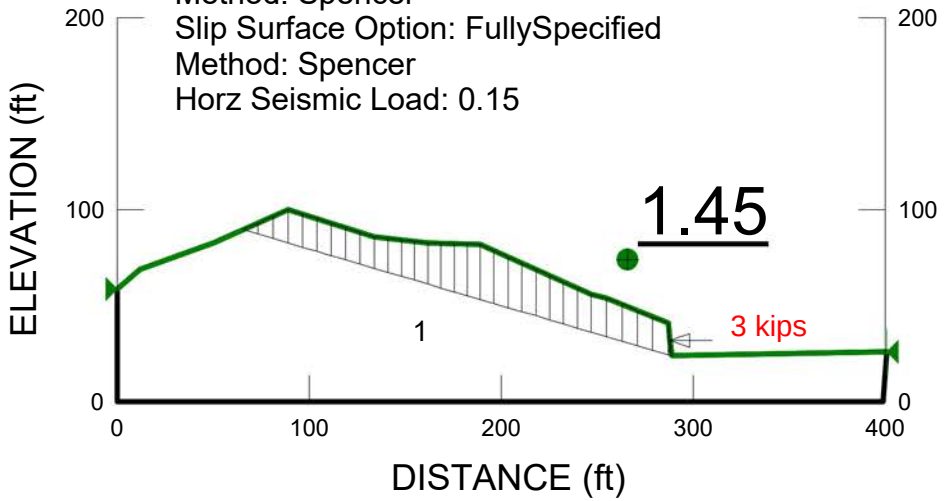
Title: Lyons Canyon
Comments: 2020-200
Name: Slope Stability 9-9' Static CIDH Wall 3 kips Horizontal LIne Load.gsz
Date: 6/10/2022Time: 12:29:45 PM
Material #: 1 Wt: 130 C: 250 Phi: 20

Method: Spencer
Slip Surface Option: FullySpecified
Method: Spencer
Horz Seismic Load: 0



Title: Lyons Canyon
Comments: 2020-200
Name: Slope Stability 9-9' Seismic CIDH Wall 3 kips Horizontal LIne Load c = 200 friction = 30
Date: 8/3/2022Time: 2:52:25 PM
Material #: 1 Wt: 130 C: 200 Phi: 30

Method: Spencer
Slip Surface Option: FullySpecified
Method: Spencer
Horz Seismic Load: 0.15



NUWI – Lyons Canyon, LLC
September 15, 2023
2020-200-001

APPENDIX E

GREGG CPT SOUNDINGS

RTF&A
GEOTECHNICAL ENGINEERING & ENGINEERING GEOLOGY

January 14, 2021

RT Frankian
Attn: Matt Marin

Subject: CPT Site Investigation
Lyons Canyon
Stevenson Ranch, California
GREGG Project Number: D1215005

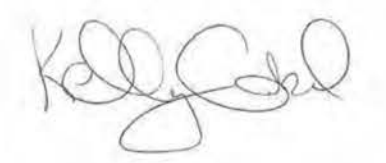
Dear Mr. Marin:

The following report presents the results of GREGG Drilling Cone Penetration Test investigation for the above referenced site. The following testing services were performed:

1	Cone Penetration Tests	(CPTU)	☒
2	Pore Pressure Dissipation Tests	(PPD)	☒
3	Seismic Cone Penetration Tests	(SCPTU)	☒
4	UVOST Laser Induced Fluorescence	(UVOST)	☐
5	Groundwater Sampling	(GWS)	☐
6	Soil Sampling	(SS)	☐
7	Vapor Sampling	(VS)	☐
8	Pressuremeter Testing	(PMT)	☐
9	Vane Shear Testing	(VST)	☐
10	Dilatometer Testing	(DMT)	☐

A list of reference papers providing additional background on the specific tests conducted is provided in the bibliography following the text of the report. If you would like a copy of any of these publications or should you have any questions or comments regarding the contents of this report, please do not hesitate to contact me at 949-903-6873.

Sincerely,
Gregg Drilling, LLC.



CPT Reports Team
Gregg Drilling, LLC.

Cone Penetration Test Sounding Summary

-Table 1-

CPT Sounding Identification	Date	Termination Depth (feet)	Depth of Groundwater Samples (feet)	Depth of Soil Samples (feet)	Depth of Pore Pressure Dissipation Tests (feet)
CPT-03	1/13/2021	34.45	-	-	34.4
CPT-04	1/13/2021	39.7	-	-	39.7
CPT-05	1/13/2021	50.36	-	-	-
SCPT-01	1/13/2021	36.42	-	-	-
SCPT-02	1/13/2021	30.02	-	-	30.0

Bibliography

Lunne, T., Robertson, P.K. and Powell, J.J.M., "Cone Penetration Testing in Geotechnical Practice" E & FN Spon. ISBN 0 419 23750, 1997

Roberston, P.K., "Soil Classification using the Cone Penetration Test", Canadian Geotechnical Journal, Vol. 27, 1990 pp. 151-158.

Mayne, P.W., "NHI (2002) Manual on Subsurface Investigations: Geotechnical Site Characterization", available through www.ce.gatech.edu/~geosys/Faculty/Mayne/papers/index.html, Section 5.3, pp. 107-112.

Robertson, P.K., R.G. Campanella, D. Gillespie and A. Rice, "Seismic CPT to Measure In-Situ Shear Wave Velocity", Journal of Geotechnical Engineering ASCE, Vol. 112, No. 8, 1986 pp. 791-803.

Robertson, P.K., Sully, J., Woeller, D.J., Lunne, T., Powell, J.J.M., and Gillespie, D.J., "Guidelines for Estimating Consolidation Parameters in Soils from Piezocone Tests", Canadian Geotechnical Journal, Vol. 29, No. 4, August 1992, pp. 539-550.

Robertson, P.K., T. Lunne and J.J.M. Powell, "Geo-Environmental Application of Penetration Testing", Geotechnical Site Characterization, Robertson & Mayne (editors), 1998 Balkema, Rotterdam, ISBN 90 5410 939 4 pp 35-47.

Campanella, R.G. and I. Weemees, "Development and Use of An Electrical Resistivity Cone for Groundwater Contamination Studies", Canadian Geotechnical Journal, Vol. 27 No. 5, 1990 pp. 557-567.

DeGroot, D.J. and A.J. Lutenegger, "Reliability of Soil Gas Sampling and Characterization Techniques", International Site Characterization Conference - Atlanta, 1998.

Woeller, D.J., P.K. Robertson, T.J. Boyd and Dave Thomas, "Detection of Polyaromatic Hydrocarbon Contaminants Using the UVIF-CPT", 53rd Canadian Geotechnical Conference Montreal, QC October pp. 733-739, 2000.

Zemo, D.A., T.A. Delfino, J.D. Gallinatti, V.A. Baker and L.R. Hilpert, "Field Comparison of Analytical Results from Discrete-Depth Groundwater Samplers" BAT EnviroProbe and QED HydroPunch, Sixth national Outdoor Action Conference, Las Vegas, Nevada Proceedings, 1992, pp 299-312.

Copies of ASTM Standards are available through www.astm.org

Cone Penetration Testing Procedure (CPT)

Gregg Drilling carries out all Cone Penetration Tests (CPT) using an integrated electronic cone system, *Figure CPT*.

The cone takes measurements of tip resistance (q_c), sleeve resistance (f_s), and penetration pore water pressure (u_2). Measurements are taken at either 2.5 or 5 cm intervals during penetration to provide a nearly continuous profile. CPT data reduction and basic interpretation is performed in real time facilitating on-site decision making. The above mentioned parameters are stored electronically for further analysis and reference. All CPT soundings are performed in accordance with revised ASTM standards (D 5778-12).

The 5mm thick porous plastic filter element is located directly behind the cone tip in the u_2 location. A new saturated filter element is used on each sounding to measure both penetration pore pressures as well as measurements during a dissipation test (*PPDT*). Prior to each test, the filter element is fully saturated with oil under vacuum pressure to improve accuracy.

When the sounding is completed, the test hole is backfilled according to client specifications. If grouting is used, the procedure generally consists of pushing a hollow tremie pipe with a "knock out" plug to the termination depth of the CPT hole. Grout is then pumped under pressure as the tremie pipe is pulled from the hole. Disruption or further contamination to the site is therefore minimized.

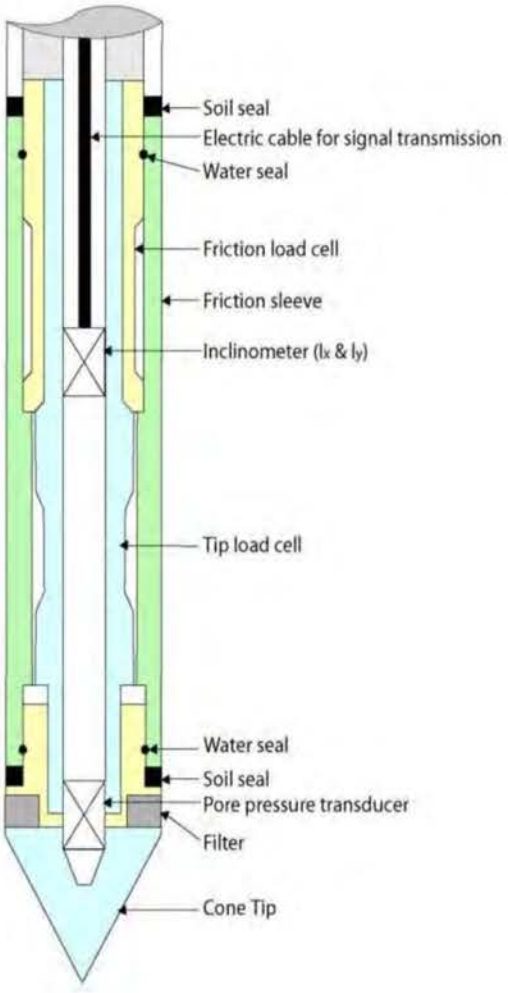


Figure CPT

Gregg 15cm^2 Standard Cone Specifications

Dimensions	
Cone base area	15 cm^2
Sleeve surface area	225 cm^2
Cone net area ratio	0.80
Specifications	
Cone load cell	
Full scale range	180 kN (20 tons)
Overload capacity	150%
Full scale tip stress	120 MPa (1,200 tsf)
Repeatability	120 kPa (1.2 tsf)
Sleeve load cell	
Full scale range	31 kN (3.5 tons)
Overload capacity	150%
Full scale sleeve stress	1,400 kPa (15 tsf)
Repeatability	1.4 kPa (0.015 tsf)
Pore pressure transducer	
Full scale range	7,000 kPa (1,000 psi)
Overload capacity	150%
Repeatability	7 kPa (1 psi)

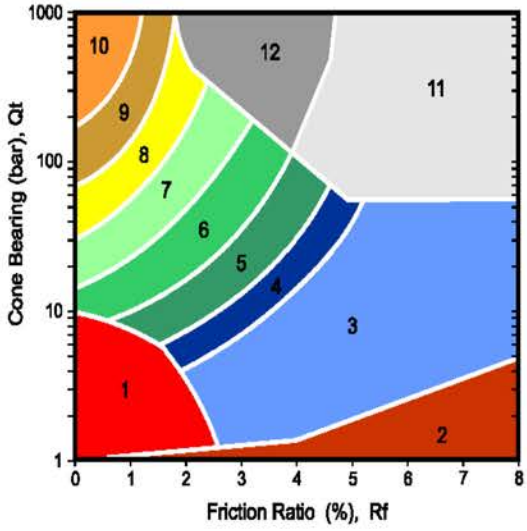
Note: The repeatability during field use will depend somewhat on ground conditions, abrasion, maintenance and zero load stability.

Cone Penetration Test Data & Interpretation

The Cone Penetration Test (CPT) data collected are presented in graphical and electronic form in the report. The plots include interpreted Soil Behavior Type (SBT) based on the charts described by Robertson (1990). Typical plots display SBT based on the non-normalized charts of Robertson et al (1986). For CPT soundings deeper than 30m, we recommend the use of the normalized charts of Robertson (1990) which can be displayed as SBTn, upon request. The report also includes spreadsheet output of computer calculations of basic interpretation in terms of SBT and SBTn and various geotechnical parameters using current published correlations based on the comprehensive review by Lunne, Robertson and Powell (1997), as well as recent updates by Professor Robertson (Guide to Cone Penetration Testing, 2015). The interpretations are presented only as a guide for geotechnical use and should be carefully reviewed. Gregg Drilling & Testing Inc. does not warranty the correctness or the applicability of any of the geotechnical parameters interpreted by the software and does not assume any liability for use of the results in any design or review. The user should be fully aware of the techniques and limitations of any method used in the software. Some interpretation methods require input of the groundwater level to calculate vertical effective stress. An estimate of the in-situ groundwater level has been made based on field observations and/or CPT results, but should be verified by the user.

A summary of locations and depths is available in Table 1. Note that all penetration depths referenced in the data are with respect to the existing ground surface.

Note that it is not always possible to clearly identify a soil type based solely on q_t, f_s, and u_2. In these situations, experience, judgment, and an assessment of the pore pressure dissipation data should be used to infer the correct soil behavior type.



ZONE	SBT
1	Sensitive, fine grained
2	Organic materials
3	Clay
4	Silty clay to clay
5	Clayey silt to silty clay
6	Sandy silt to clayey silt
7	Silty sand to sandy silt
8	Sand to silty sand
9	Sand
10	Gravely sand to sand
11	Very stiff fine grained*
12	Sand to clayey sand*

*over consolidated or cemented

Figure SBT (After Robertson et al., 1986) – Note: Colors may vary slightly compared to plots

Cone Penetration Test (CPT) Interpretation

Gregg uses a proprietary CPT interpretation and plotting software. The software takes the CPT data and performs basic interpretation in terms of soil behavior type (SBT) and various geotechnical parameters using current published empirical correlations based on the comprehensive review by Lunne, Robertson and Powell (1997). The interpretation is presented in tabular format using MS Excel. The interpretations are presented only as a guide for geotechnical use and should be carefully reviewed. Gregg does not warranty the correctness or the applicability of any of the geotechnical parameters interpreted by the software and does not assume any liability for any use of the results in any design or review. The user should be fully aware of the techniques and limitations of any method used in the software.

The following provides a summary of the methods used for the interpretation. Many of the empirical correlations to estimate geotechnical parameters have constants that have a range of values depending on soil type, geologic origin and other factors. The software uses 'default' values that have been selected to provide, in general, conservatively low estimates of the various geotechnical parameters.

Input:

1 Units for display (Imperial or metric) (atm. pressure, p_a = 0.96 tsf or 0.1 MPa)
2 Depth interval to average results (ft or m). Data are collected at either 0.02 or 0.05m and can be averaged every 1, 3 or 5 intervals.
3 Elevation of ground surface (ft or m)
4 Depth to water table, z_w (ft or m) – input required
5 Net area ratio for cone, a (default to 0.80)
6 Relative Density constant, C_{Dr} (default to 350)
7 Young's modulus number for sands, α (default to 5)
8 Small strain shear modulus number
  a. for sands, S_G (default to 180 for SBT_n 5, 6, 7)
  b. for clays, C_G (default to 50 for SBT_n 1, 2, 3 & 4)
9 Undrained shear strength cone factor for clays, N_{kt} (default to 15)
10 Over Consolidation ratio number, k_{ocr} (default to 0.3)
11 Unit weight of water, (default to γ_w = 62.4 lb/ft^3 or 9.81 kN/m^3)

Column

1 Depth, z, (m) – CPT data is collected in meters
2 Depth (ft)
3 Cone resistance, q_c (tsf or MPa)
4 Sleeve resistance, f_s (tsf or MPa)
5 Penetration pore pressure, u (psi or MPa), measured behind the cone (i.e. u_2)
6 Other – any additional data
7 Total cone resistance, q_t (tsf or MPa) $q_t = q_c + u\,(1\text{-}a)$

8	Friction Ratio, R_f (%)	$R_f = (f_s/q_t) \times 100\%$
9	Soil Behavior Type (non-normalized), SBT	see note
10	Unit weight, γ (pcf or kN/m^3)	based on SBT, see note
11	Total overburden stress, σ_v (tsf)	$\sigma_{vo} = \sigma\, z$
12	In-situ pore pressure, u_o (tsf)	$u_o = \gamma_w (z - z_w)$
13	Effective overburden stress, σ'_{vo} (tsf)	$\sigma'_{vo} = \sigma_{vo} - u_o$
14	Normalized cone resistance, Q_{t1}	$Q_{t1} = (q_t - \sigma_{vo}) / \sigma'_{vo}$
15	Normalized friction ratio, F_r (%)	$F_r = f_s / (q_t - \sigma_{vo}) \times 100\%$
16	Normalized Pore Pressure ratio, B_q	$B_q = u - u_o / (q_t - \sigma_{vo})$
17	Soil Behavior Type (normalized), SBT_n	see note
18	SBT_n Index, I_c	see note
19	Normalized Cone resistance, Q_{tn} (n varies with I_c)	see note
20	Estimated permeability, k_{SBT} (cm/sec or ft/sec)	see note
21	Equivalent SPT N_{60}, blows/ft	see note
22	Equivalent SPT $(N_1)_{60}$ blows/ft	see note
23	Estimated Relative Density, D_r, (%)	see note
24	Estimated Friction Angle, ϕ', (degrees)	see note
25	Estimated Young's modulus, E_s (tsf)	see note
26	Estimated small strain Shear modulus, Go (tsf)	see note
27	Estimated Undrained shear strength, s_u (tsf)	see note
28	Estimated Undrained strength ratio	s_u/σ_v'
29	Estimated Over Consolidation ratio, OCR	see note

Notes:

1 Soil Behavior Type (non-normalized), SBT (Lunne et al., 1997 and table below)

2 Unit weight, γ either constant at 119 pcf or based on Non-normalized SBT (Lunne et al., 1997 and table below)

3 Soil Behavior Type (Normalized), SBT_n Lunne et al. (1997)

4 SBT_n Index, I_c $I_c = ((3.47 - \log Q_{t1})^2 + (\log F_r + 1.22)^2)^{0.5}$

5 Normalized Cone resistance, Q_{tn} (n varies with Ic)

$Q_{tn} = ((q_t - \sigma_{vo})/pa)\ (pa/(\sigma'_{vo})^n$ and recalculate I_c, then iterate:

When $I_c < 1.64$, n = 0.5 (clean sand)
When $I_c > 3.30$, n = 1.0 (clays)
When $1.64 < I_c < 3.30$, $n = (I_c - 1.64)0.3 + 0.5$
Iterate until the change in n, $\Delta n < 0.01$

6 Estimated permeability, k_{SBT} based on Normalized SBT_n (Lunne et al., 1997 and table below)

7 Equivalent SPT N_{60}, blows/ft Lunne et al. (1997)

$$\frac{(q_t/p_a)}{N_{60}} = 8.5\left(1 - \frac{I_c}{4.6}\right)$$

8 Equivalent SPT $(N_1)_{60}$ blows/ft $(N_1)_{60} = N_{60}\, C_N$,
where $C_N = (pa/\sigma'_{vo})^{0.5}$

9 Relative Density, D_r, (%) $D_r^2 = Q_{tn} / C_{Dr}$
Only SBT_n 5, 6, 7 & 8 *Show 'N/A' in zones 1, 2, 3, 4 & 9*

10 Friction Angle, ϕ', (degrees) $\tan\phi' = \frac{1}{2.68}\left[\log\left(\frac{q_c}{\sigma'_{vo}}\right) + 0.29\right]$
Only SBT_n 5, 6, 7 & 8 *Show'N/A' in zones 1, 2, 3, 4 & 9*

11 Young's modulus, E_s $E_s = \alpha\, q_t$
Only SBT_n 5, 6, 7 & 8 *Show 'N/A' in zones 1, 2, 3, 4 & 9*

12 Small strain shear modulus, Go

a. $G_o = S_G\,(q_t\ \sigma'_{vo}\ pa)^{1/3}$ *For SBT_n 5, 6, 7*

b. $G_o = C_G\, q_t$ *For SBT_n 1, 2, 3& 4*

Show 'N/A' in zones 8 & 9

13 Undrained shear strength, s_u $s_u = (q_t - \sigma_{vo}) / N_{kt}$
Only SBT_n 1, 2, 3, 4 & 9 *Show 'N/A' in zones 5, 6, 7 & 8*

14 Over Consolidation ratio, OCR $OCR = k_{ocr}\, Q_{t1}$
Only SBT_n 1, 2, 3, 4 & 9 *Show 'N/A' in zones 5, 6, 7 & 8*

The following updated and simplified SBT descriptions have been used in the software:

SBT Zones		**SBT_n Zones**	
1	sensitive fine grained	1	sensitive fine grained
2	organic soil	2	organic soil
3	clay	3	clay
4	clay & silty clay	4	clay & silty clay
5	clay & silty clay		
6	sandy silt & clayey silt		

7	silty sand & sandy silt	5	silty sand & sandy silt
8	sand & silty sand	6	sand & silty sand
9	sand		
10	sand	7	sand
11	very dense/stiff soil*	8	very dense/stiff soil*
12	very dense/stiff soil*	9	very dense/stiff soil*

*heavily overconsolidated and/or cemented

Track when soils fall with zones of same description and print that description (i.e. if soils fall only within SBT zones 4 & 5, print 'clays & silty clays')

Estimated Permeability (see Lunne et al., 1997)

SBT_n	Permeability (ft/sec)	(m/sec)
1	$3x\ 10^{-8}$	$1x\ 10^{-8}$
2	$3x\ 10^{-7}$	$1x\ 10^{-7}$
3	$1x\ 10^{-9}$	$3x\ 10^{-10}$
4	$3x\ 10^{-8}$	$1x\ 10^{-8}$
5	$3x\ 10^{-6}$	$1x\ 10^{-6}$
6	$3x\ 10^{-4}$	$1x\ 10^{-4}$
7	$3x\ 10^{-2}$	$1x\ 10^{-2}$
8	$3x\ 10^{-6}$	$1x\ 10^{-6}$
9	$1x\ 10^{-8}$	$3x\ 10^{-9}$

Estimated Unit Weight (see Lunne et al., 1997)

SBT	Approximate Unit Weight (lb/ft^3)	(kN/m^3)
1	111.4	17.5
2	79.6	12.5
3	111.4	17.5
4	114.6	18.0
5	114.6	18.0
6	114.6	18.0
7	117.8	18.5
8	120.9	19.0
9	124.1	19.5
10	127.3	20.0
11	130.5	20.5
12	120.9	19.0

Pore Pressure Dissipation Tests (PPDT)

Pore Pressure Dissipation Tests (PPDT's) conducted at various intervals can be used to measure equilibrium water pressure (at the time of the CPT). If conditions are hydrostatic, the equilibrium water pressure can be used to determine the approximate depth of the ground water table. A PPDT is conducted when penetration is halted at specific intervals determined by the field representative. The variation of the penetration pore pressure (*u)* with time is measured behind the tip of the cone and recorded.

Pore pressure dissipation data can be interpreted to provide estimates of:

- Equilibrium piezometric pressure
- Phreatic Surface
- In situ horizontal coefficient of consolidation (c_h)
- In situ horizontal coefficient of permeability (k_h)

In order to correctly interpret the equilibrium piezometric pressure and/or the phreatic surface, the pore pressure must be monitored until it reaches equilibrium, *Figure PPDT*. This time is commonly referred to as t_{100}, the point at which 100% of the excess pore pressure has dissipated.

A complete reference on pore pressure dissipation tests is presented by Robertson et al. 1992 and Lunne et al. 1997.

A summary of the pore pressure dissipation tests are summarized in Table 1.

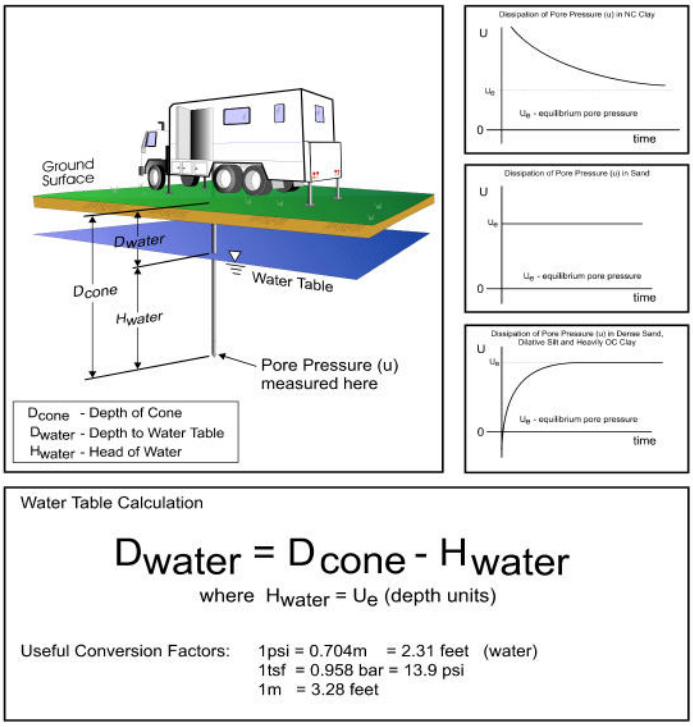


Figure PPDT

Seismic Cone Penetration Testing (SCPT)

Seismic Cone Penetration Testing (SCPT) can be conducted at various intervals during the Cone Penetration Test. Shear wave velocity (Vs) can then be calculated over a specified interval with depth. A small interval for seismic testing, such as 1-1.5m (3-5ft) allows for a detailed look at the shear wave profile with depth. Conversely, a larger interval such as 3-6m (10-20ft) allows for a more average shear wave velocity to be calculated. Gregg's cones have a horizontally active geophone located 0.2m (0.66ft) behind the tip.

To conduct the seismic shear wave test, the penetration of the cone is stopped and the rods are decoupled from the rig. An automatic hammer is triggered to send a shear wave into the soil. The distance from the source to the cone is calculated knowing the total depth of the cone and the horizontal offset distance between the source and the cone. To calculate an interval velocity, a minimum of two tests must be performed at two different depths. The arrival times between the two wave traces are compared to obtain the difference in time (Δt). The difference in depth is calculated (Δd) and velocity can be determined using the simple equation: $v = \Delta d/\Delta t$

Multiple wave traces can be recorded at the same depth to improve quality of the data.

A complete reference on seismic cone penetration tests is presented by Robertson et al. 1986 and Lunne et al. 1997.

A summary the shear wave velocities, arrival times and wave traces are provided with the report.

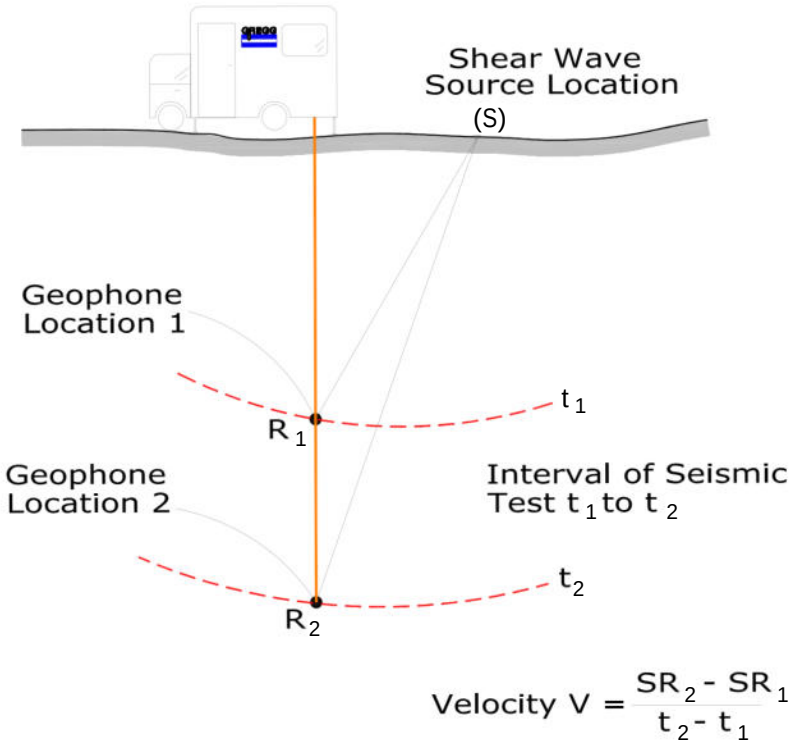


Figure SCPT

Groundwater Sampling

Gregg Drilling & Testing, Inc. conducts groundwater sampling using a sampler as shown in *Figure GWS*. The groundwater sampler has a retrievable stainless steel or disposable PVC screen with steel drop off tip. This allows for samples to be taken at multiple depth intervals within the same sounding location. In areas of slower water recharge, provisions may be made to set temporary PVC well screens during sampling to allow the pushing equipment to advance to the next sample location while the groundwater is allowed to infiltrate.

The groundwater sampler operates by advancing 44.5mm (1¾ inch) hollow push rods with the filter tip in a closed configuration to the base of the desired sampling interval. Once at the desired sample depth, the push rods are retracted; exposing the encased filter screen and allowing groundwater to infiltrate hydrostatically from the formation into the inlet screen. A small diameter bailer (approximately ½ or ¾ inch) is lowered through the push rods into the screen section for sample collection. The number of downhole trips with the bailer and time necessary to complete the sample collection at each depth interval is a function of sampling protocols, volume requirements, and the yield characteristics and storage capacity of the formation. Upon completion of sample collection, the push rods and sampler, with the exception of the PVC screen and steel drop off tip are retrieved to the ground surface, decontaminated and prepared for the next sampling event.

For a detailed reference on direct push groundwater sampling, refer to Zemo et. al., 1992.

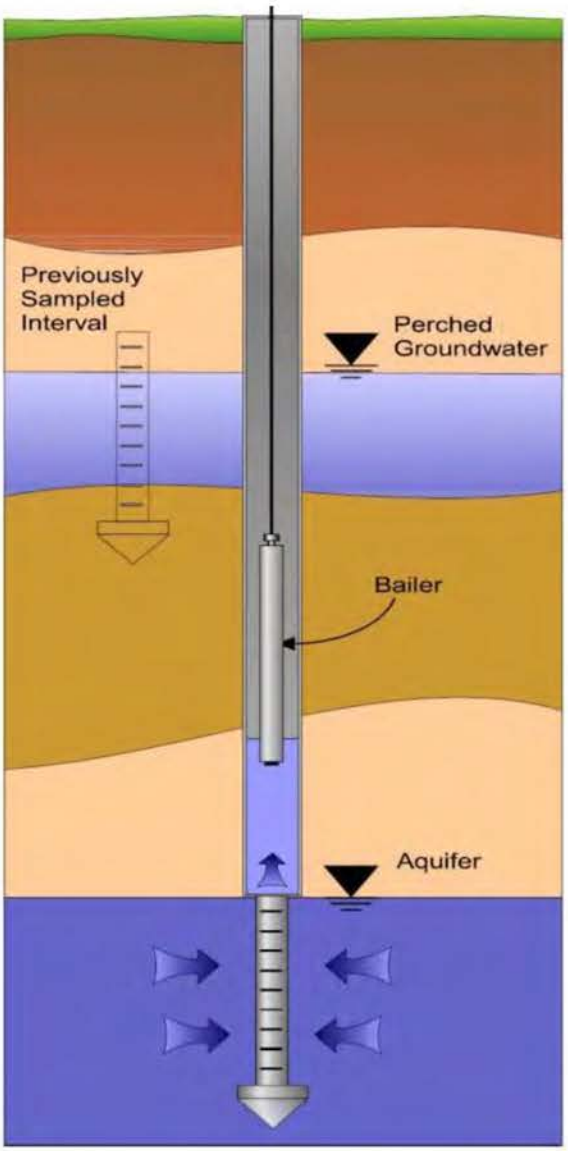


Figure GWS

Soil Sampling

Gregg Drilling & Testing, Inc. uses a piston-type push-in sampler to obtain small soil samples without generating any soil cuttings, *Figure SS*. Two different types of samplers (12 and 18 inch) are used depending on the soil type and density. The soil sampler is initially pushed in a "closed" position to the desired sampling interval using the CPT pushing equipment. Keeping the sampler closed minimizes the potential of cross contamination. The inner tip of the sampler is then retracted leaving a hollow soil sampler with inner 1¼" diameter sample tubes. The hollow sampler is then pushed in a locked "open" position to collect a soil sample. The filled sampler and push rods are then retrieved to the ground surface. Because the soil enters the sampler at a constant rate, the opportunity for 100% recovery is increased. For environmental analysis, the soil sample tube ends are sealed with Teflon and plastic caps. Often, a longer "split tube" can be used for geotechnical sampling.

For a detailed reference on direct push soil sampling, refer to Robertson et al, 1998.

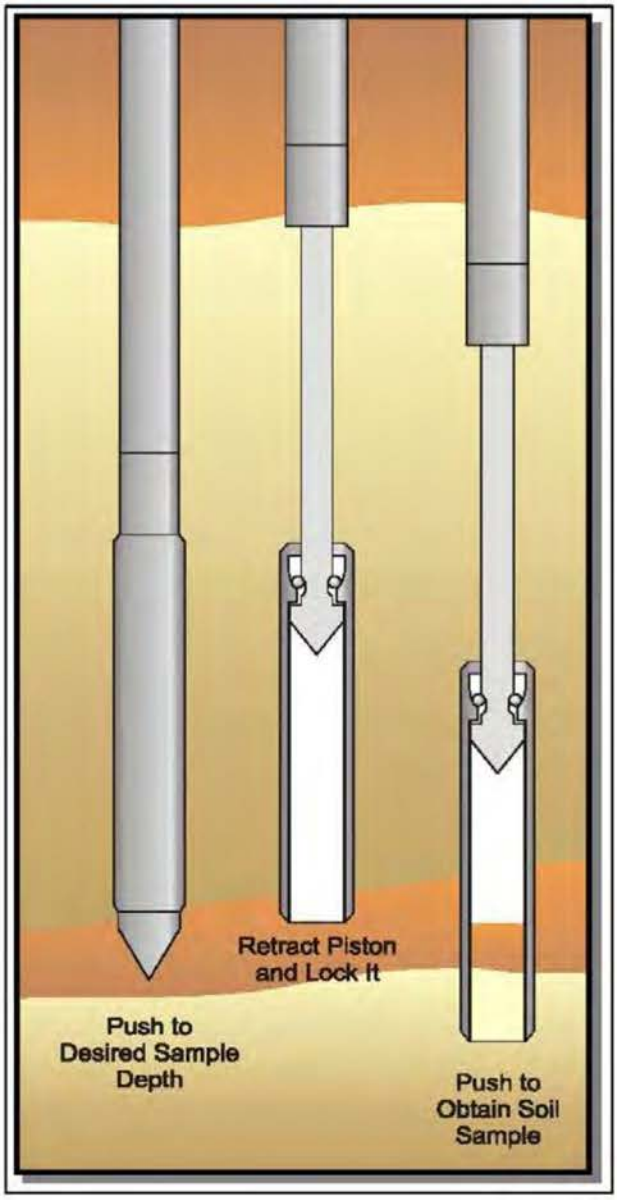


Figure SS

GREGG DRILLING, LLC
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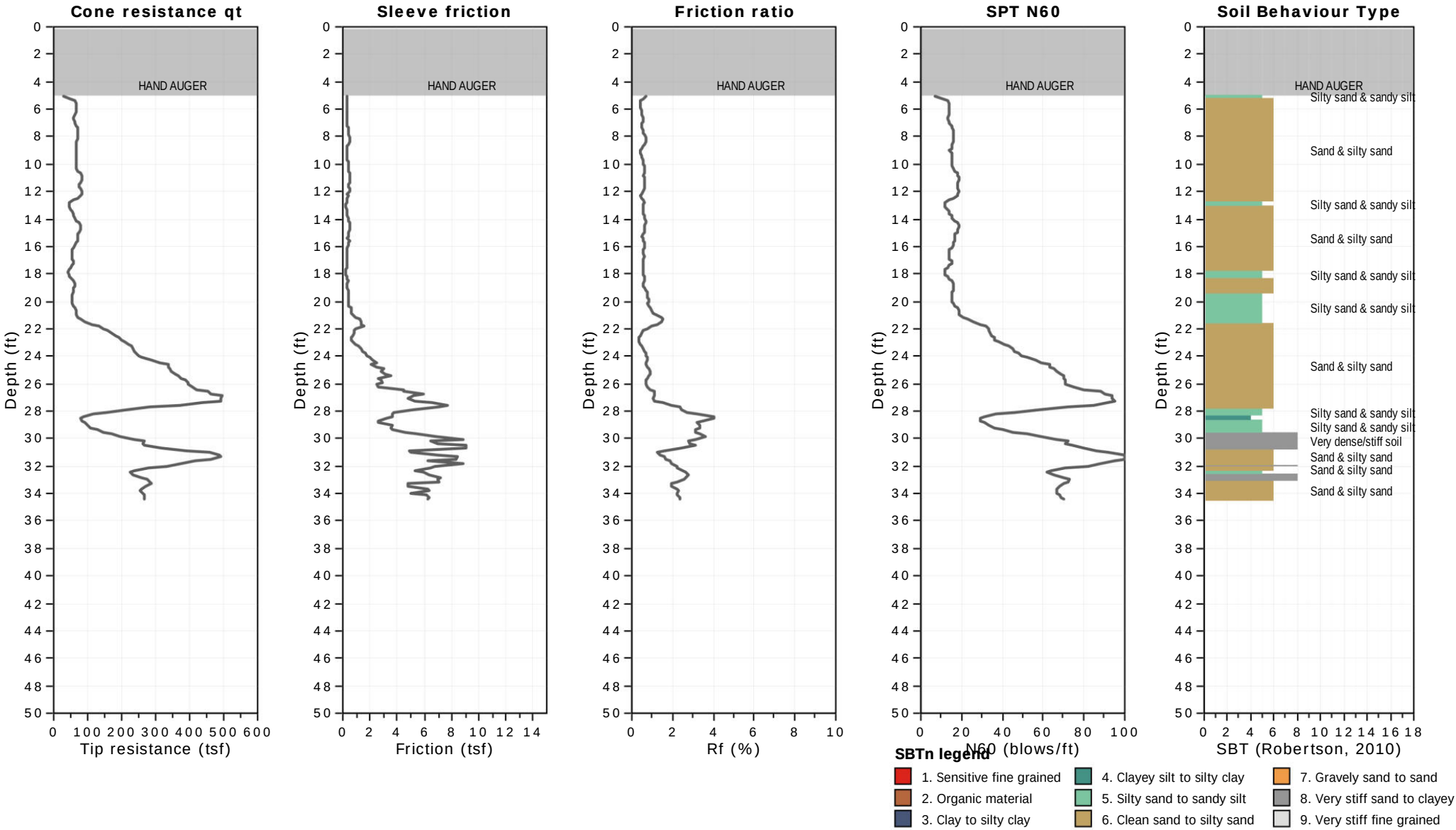
CPT: CPT-03

CLIENT: RT FRANKIAN

FIELD REP: MATT M

SITE: LYONS CANYON, STEVENSON RANCH, CA

Total depth: 34.45 ft, Date: 1/13/2021



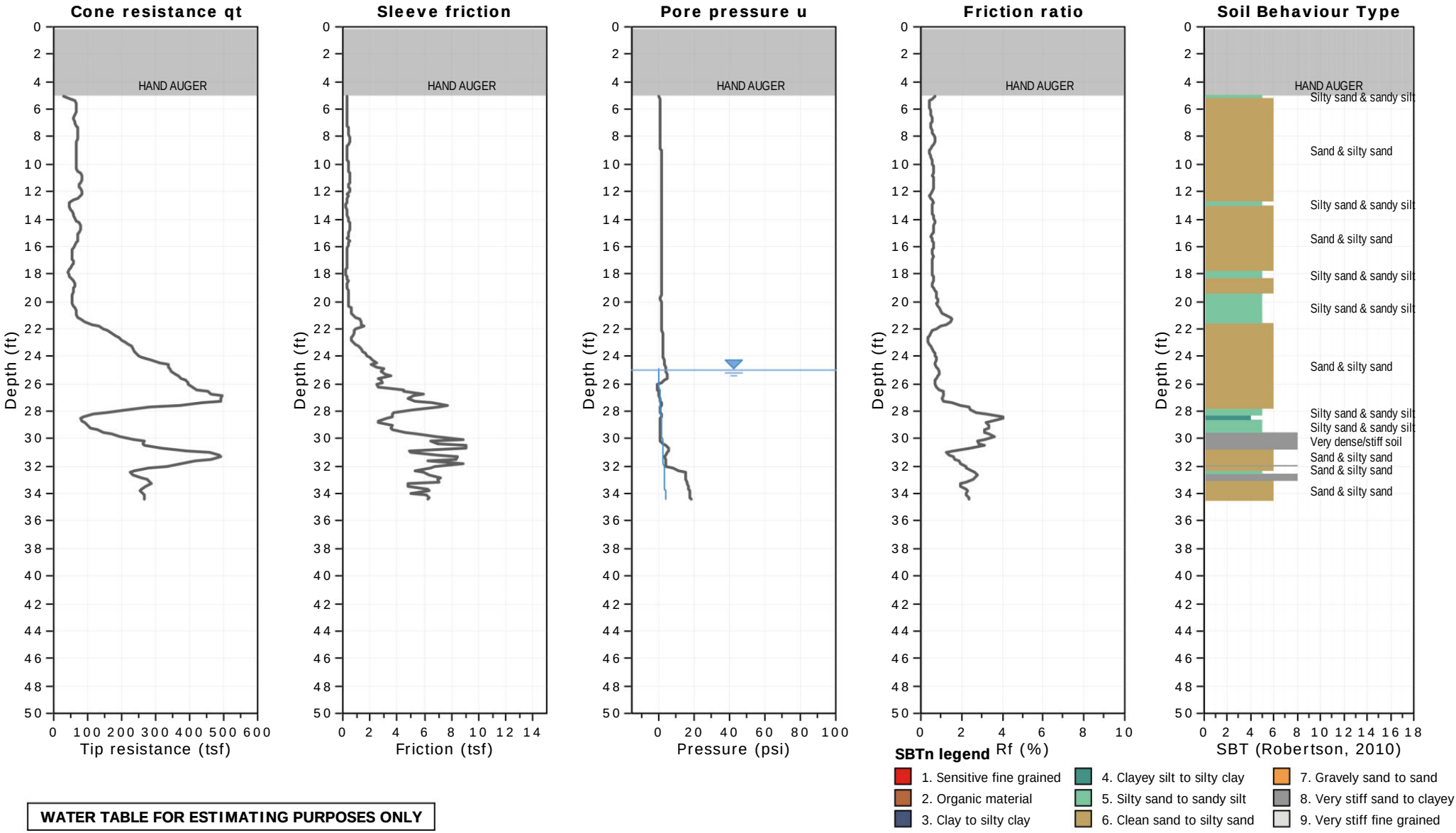
CPT: CPT-03

CLIENT: RT FRANKIAN

SITE: LYONS CANYON, STEVENSON RANCH, CA

FIELD REP: MATT M

Total depth: 34.45 ft, Date: 1/13/2021



WATER TABLE FOR ESTIMATING PURPOSES ONLY

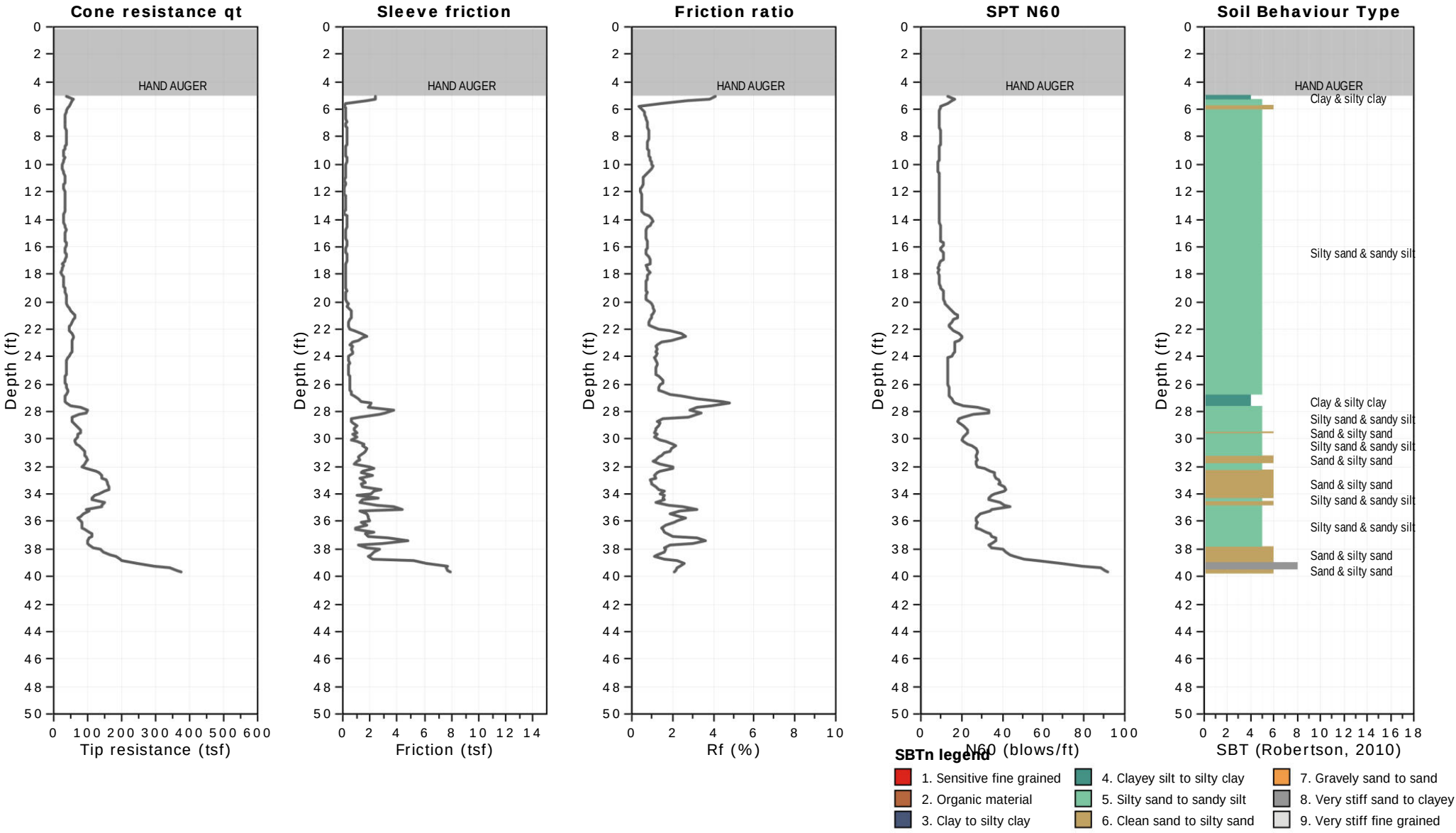
CPT: CPT-04

CLIENT: RT FRANKIAN

SITE: LYONS CANYON, STEVENSON RANCH, CA

FIELD REP: MATT M

Total depth: 39.70 ft, Date: 1/13/2021



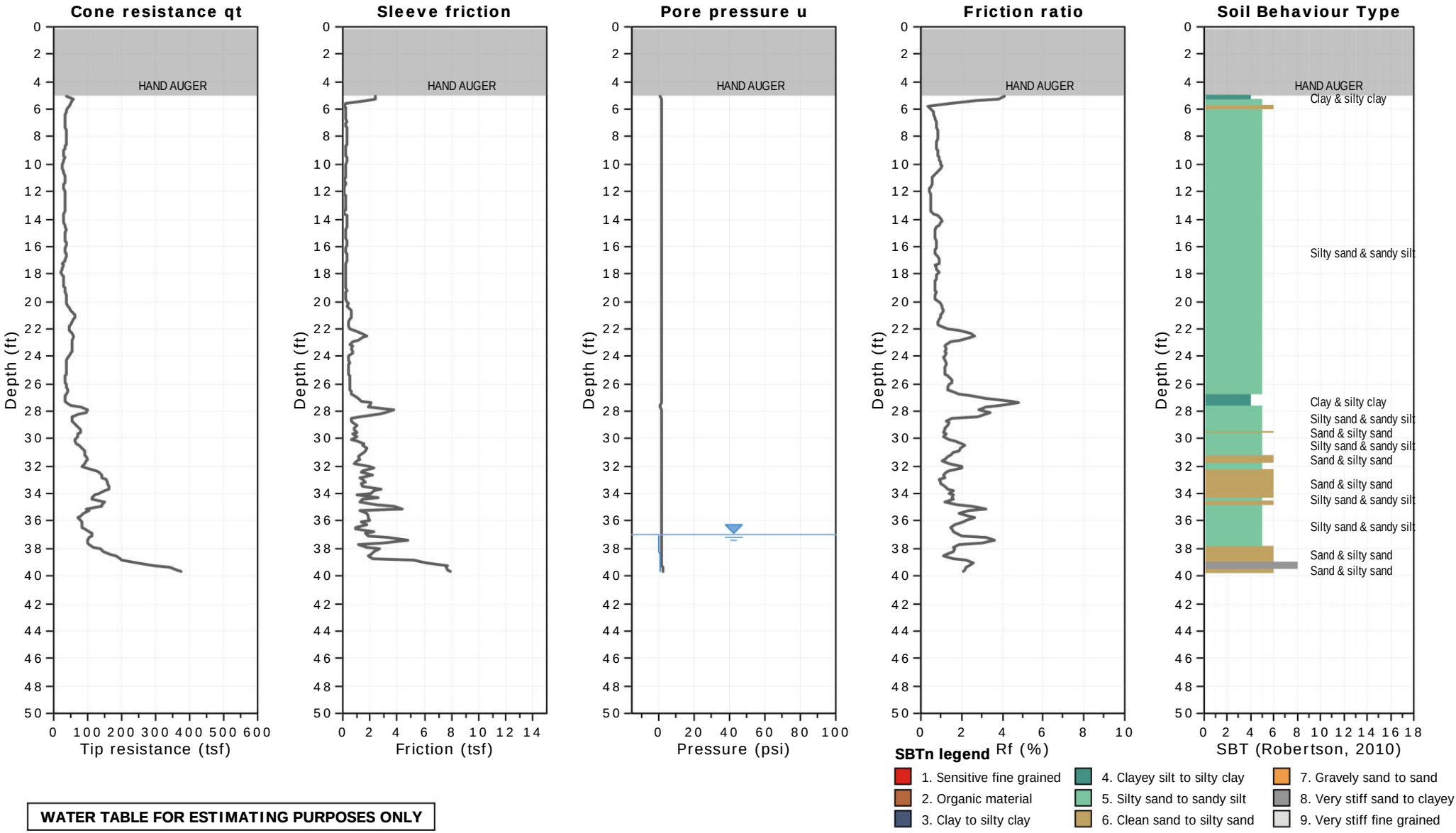
CPT: CPT-04

CLIENT: RT FRANKIAN

SITE: LYONS CANYON, STEVENSON RANCH, CA

FIELD REP: MATT M

Total depth: 39.70 ft, Date: 1/13/2021



WATER TABLE FOR ESTIMATING PURPOSES ONLY

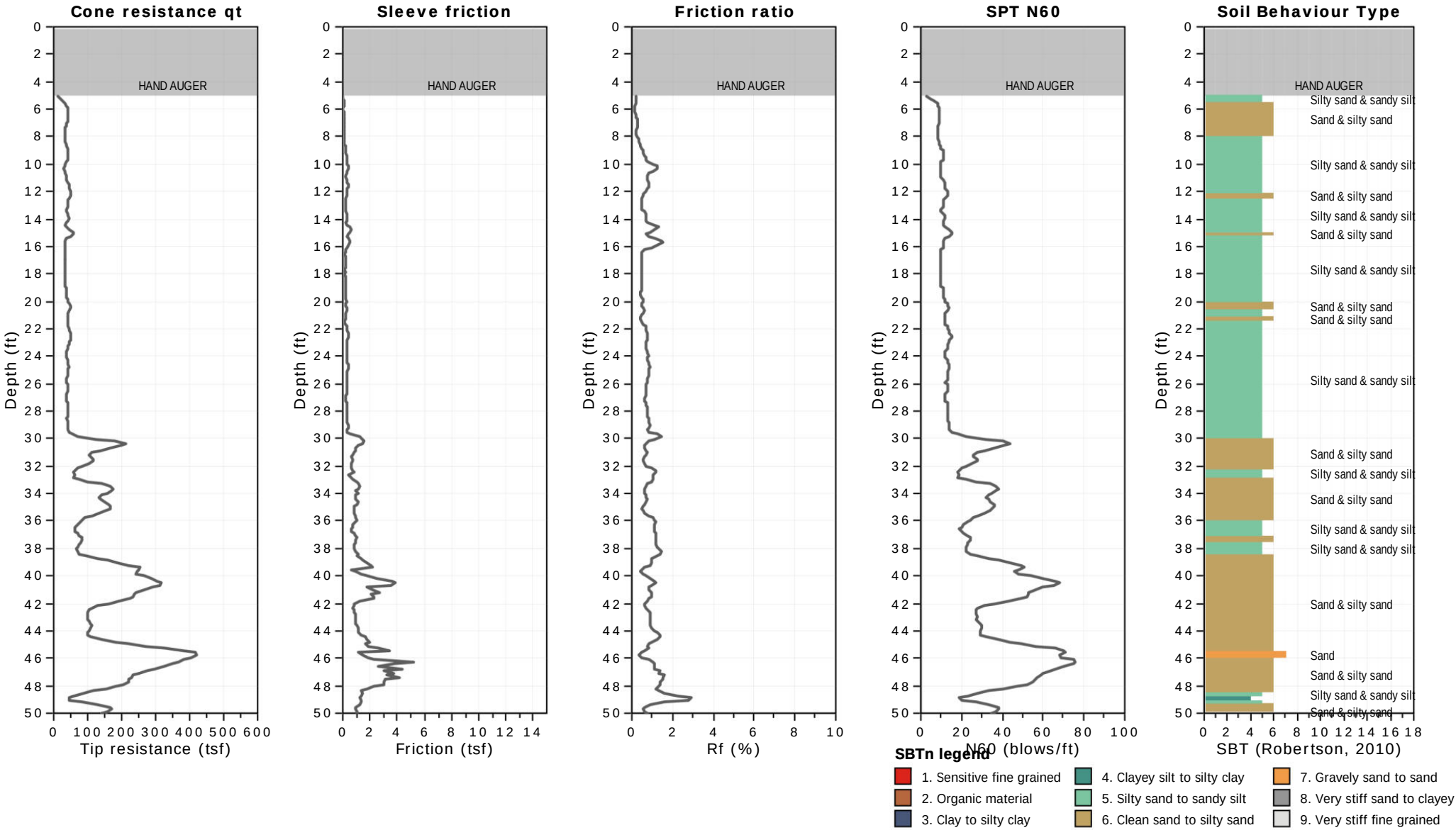
CPT: CPT-05

CLIENT: RT FRANKIAN

SITE: LYONS CANYON, STEVENSON RANCH, CA

FIELD REP: MATT M

Total depth: 50.36 ft, Date: 1/13/2021



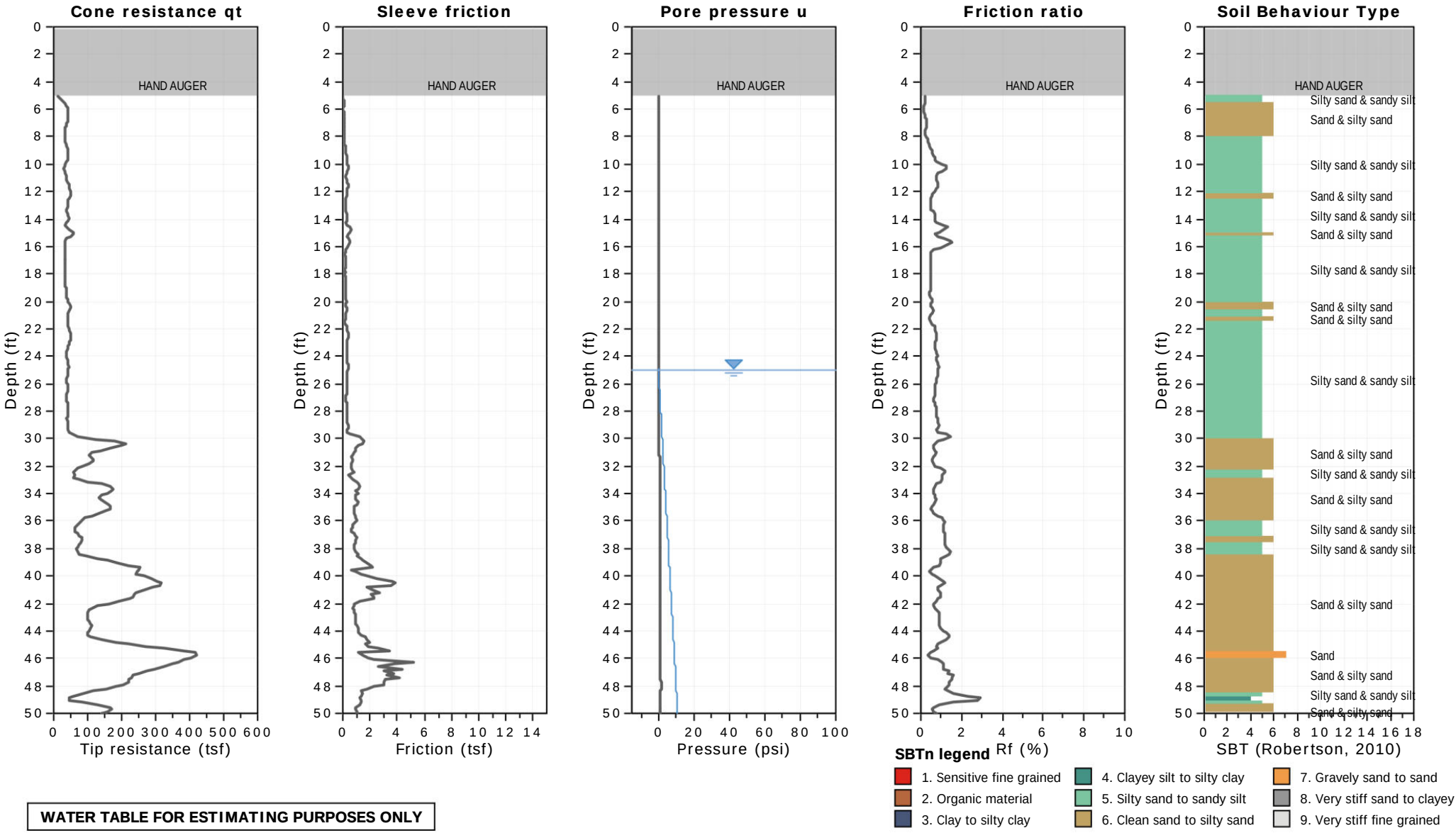
CPT: CPT-05

CLIENT: RT FRANKIAN

SITE: LYONS CANYON, STEVENSON RANCH, CA

FIELD REP: MATT M

Total depth: 50.36 ft, Date: 1/13/2021



WATER TABLE FOR ESTIMATING PURPOSES ONLY

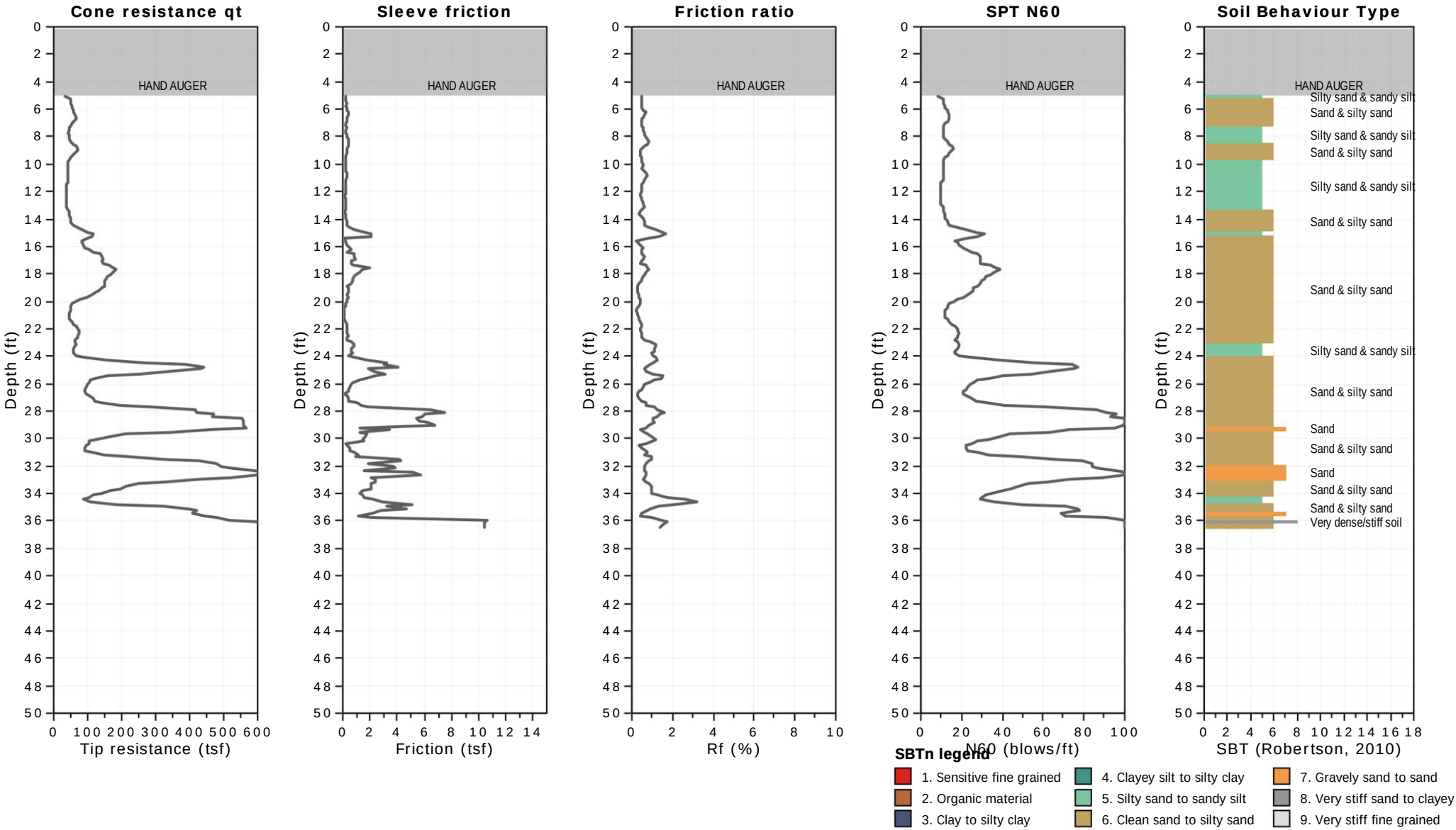
CPT: SCPT-01

CLIENT: RT FRANKIAN

SITE: LYONS CANYON, STEVENSON RANCH, CA

FIELD REP: MATT M

Total depth: 36.42 ft, Date: 1/13/2021



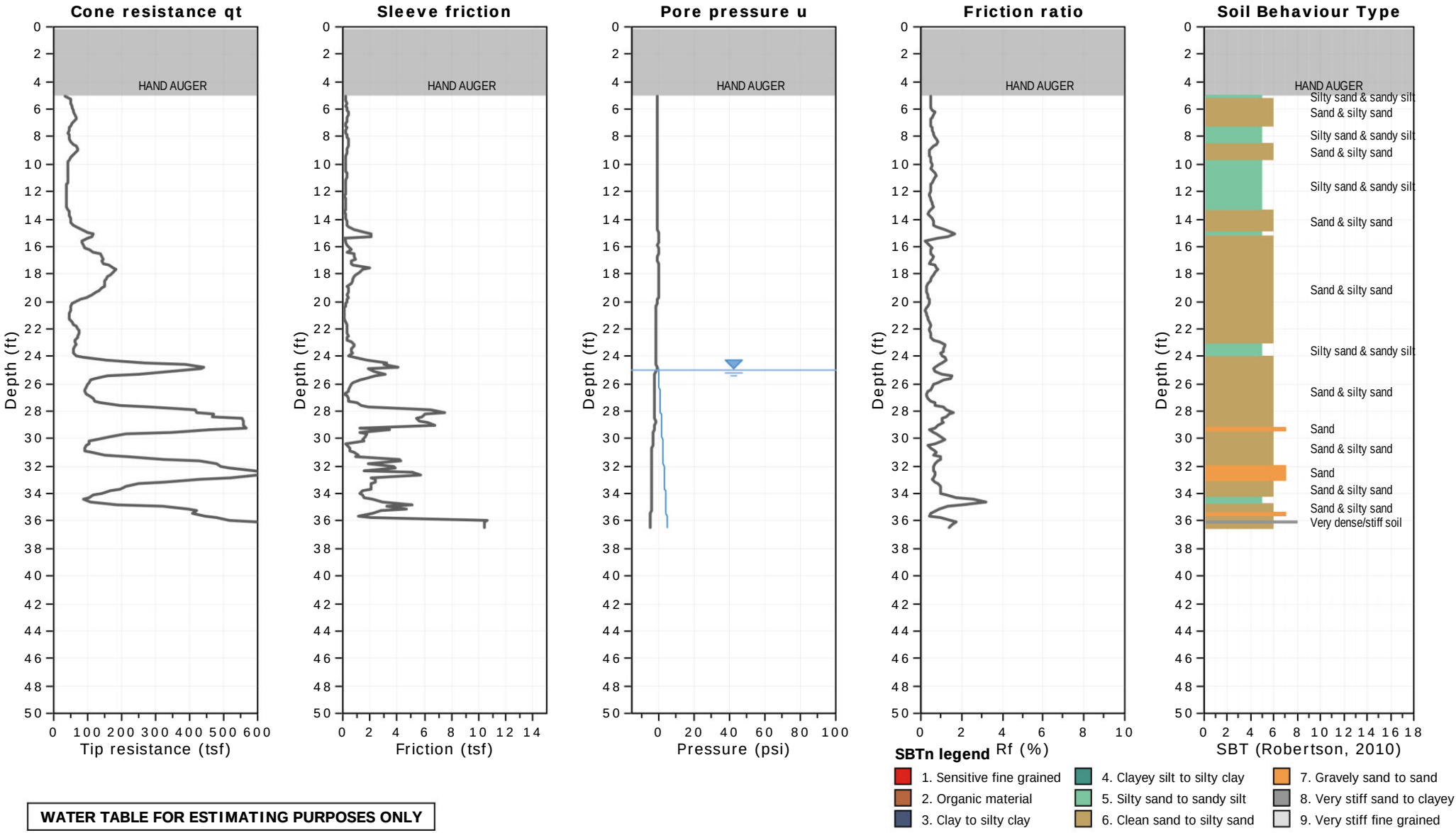
CPT: SCPT-01

CLIENT: RT FRANKIAN

SITE: LYONS CANYON, STEVENSON RANCH, CA

FIELD REP: MATT M

Total depth: 36.42 ft, Date: 1/13/2021



WATER TABLE FOR ESTIMATING PURPOSES ONLY

GREGG DRILLING, LLC
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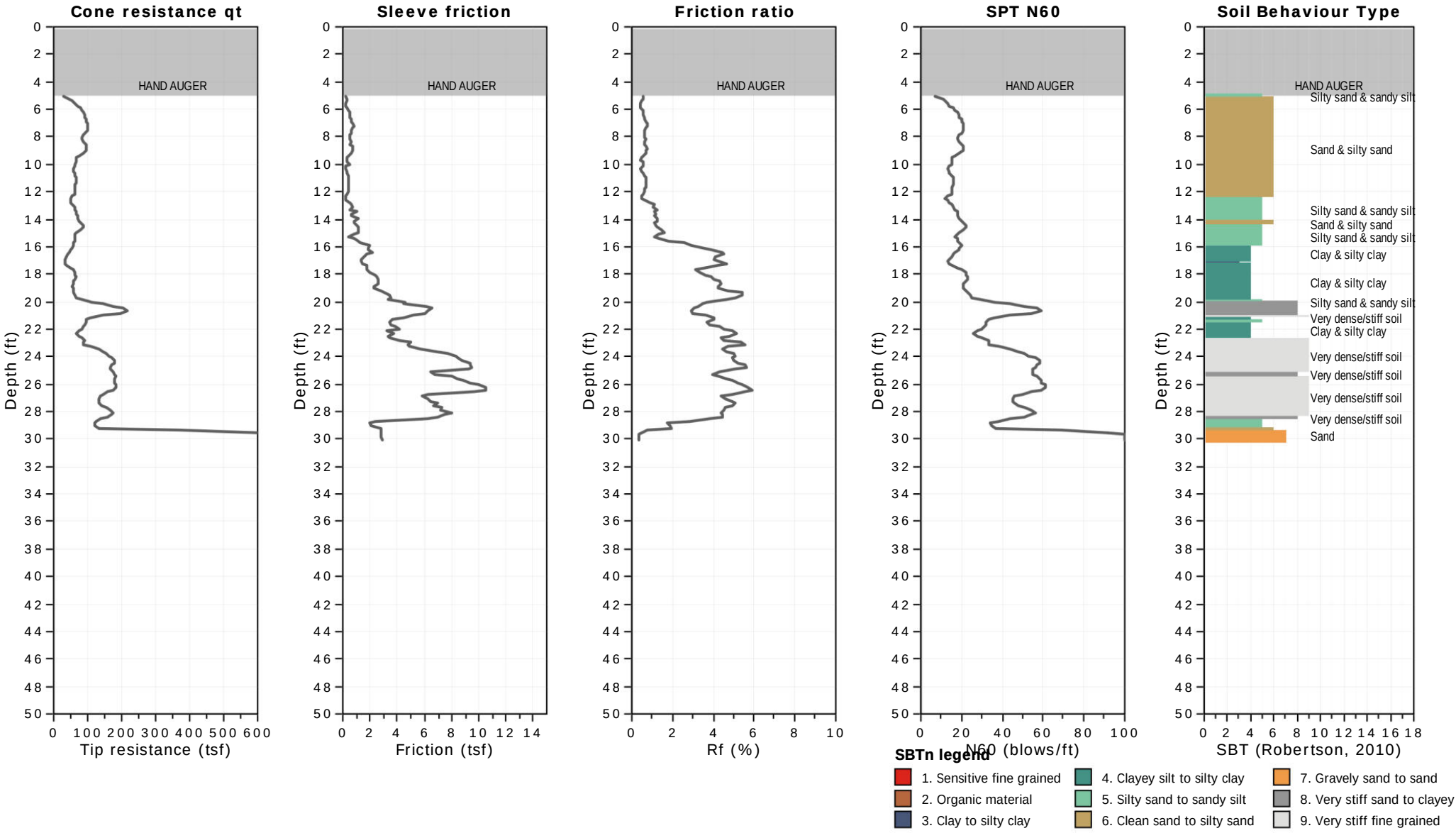
CPT: SCPT-02

CLIENT: RT FRANKIAN

SITE: LYONS CANYON, STEVENSON RANCH, CA

FIELD REP: MATT M

Total depth: 30.02 ft, Date: 1/13/2021



GREGG DRILLING, LLC
WWW.GREGGDRILLING.COM

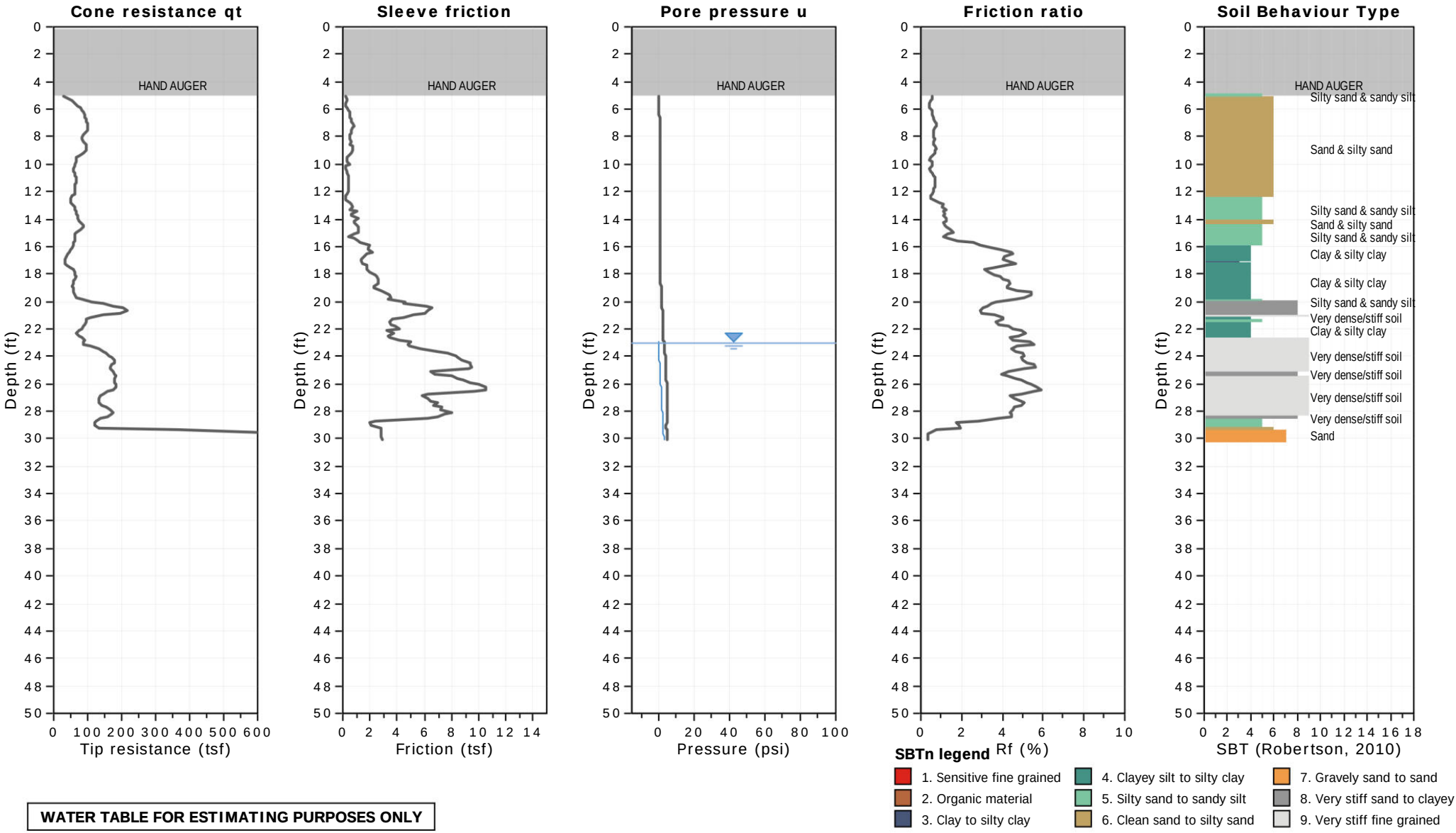
CPT: SCPT-02

CLIENT: RT FRANKIAN

SITE: LYONS CANYON, STEVENSON RANCH, CA

FIELD REP: MATT M

Total depth: 30.02 ft, Date: 1/13/2021



WATER TABLE FOR ESTIMATING PURPOSES ONLY

GREGG DRILLING, LLC
WWW.GREGGDRILLING.COM

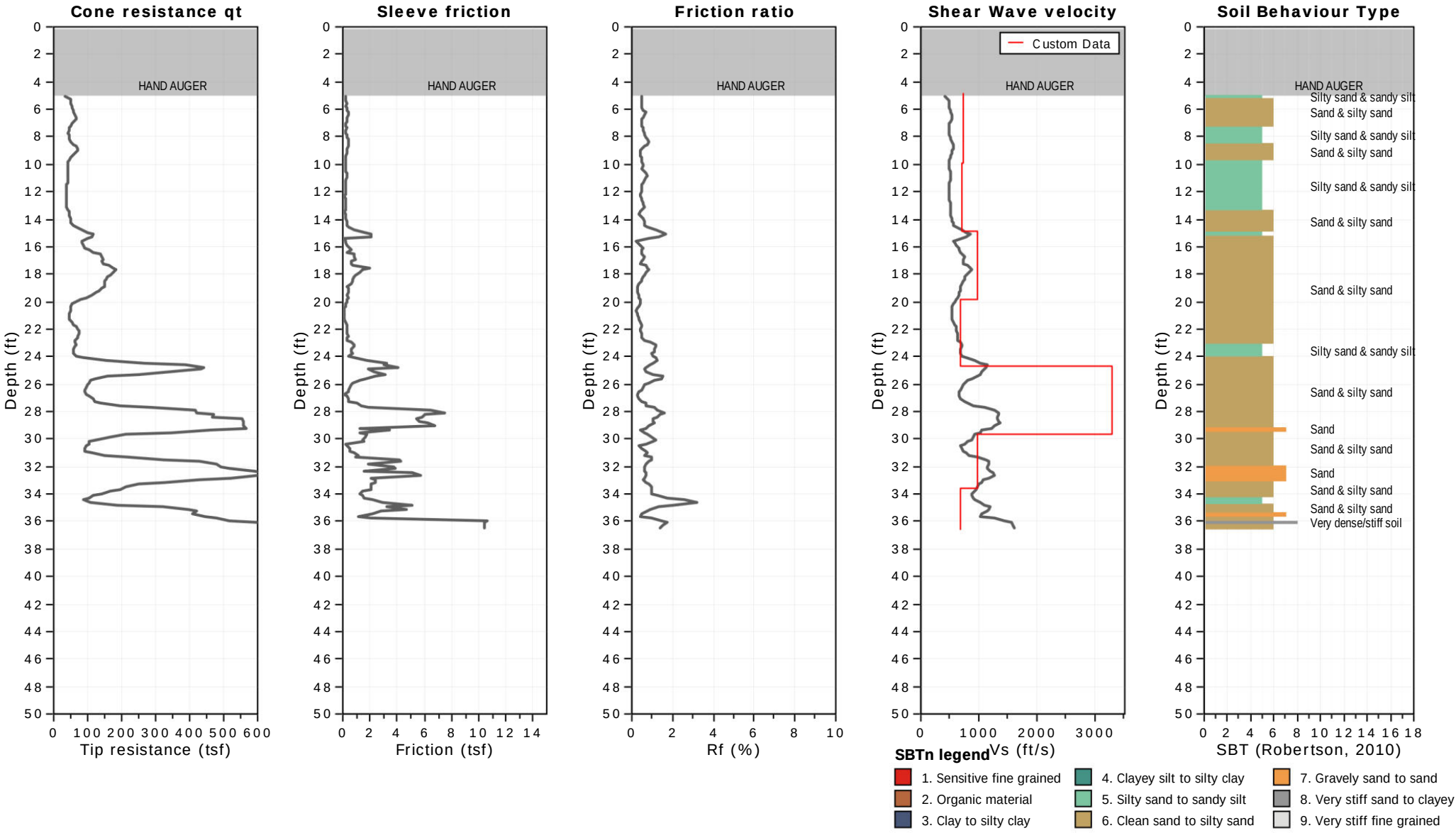
CPT: SCPT-01

CLIENT: RT FRANKIAN

SITE: LYONS CANYON, STEVENSON RANCH, CA

FIELD REP: MATT M

Total depth: 36.42 ft, Date: 1/13/2021



GREGG DRILLING, LLC
WWW.GREGGDRILLING.COM

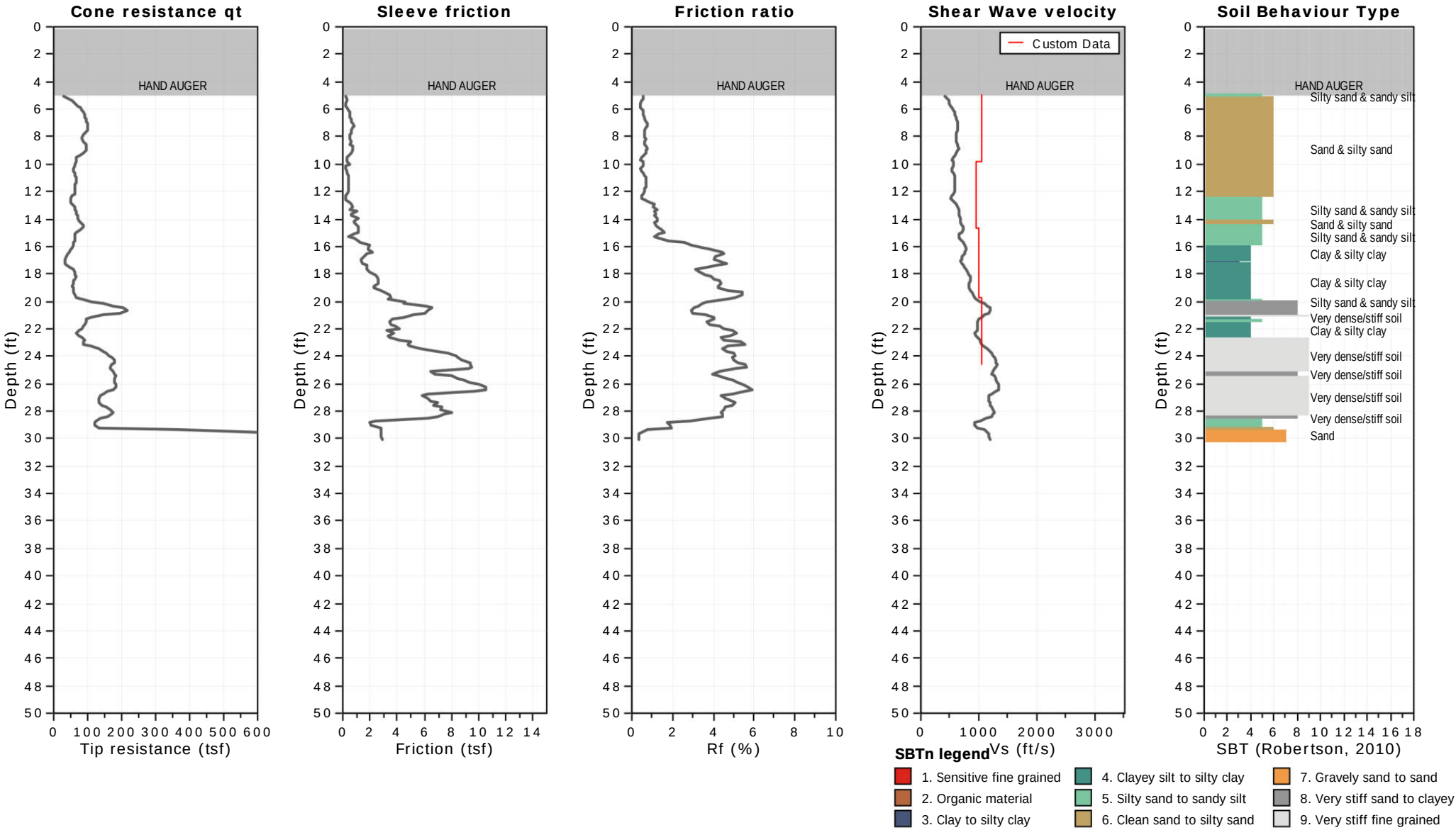
CPT: SCPT-02

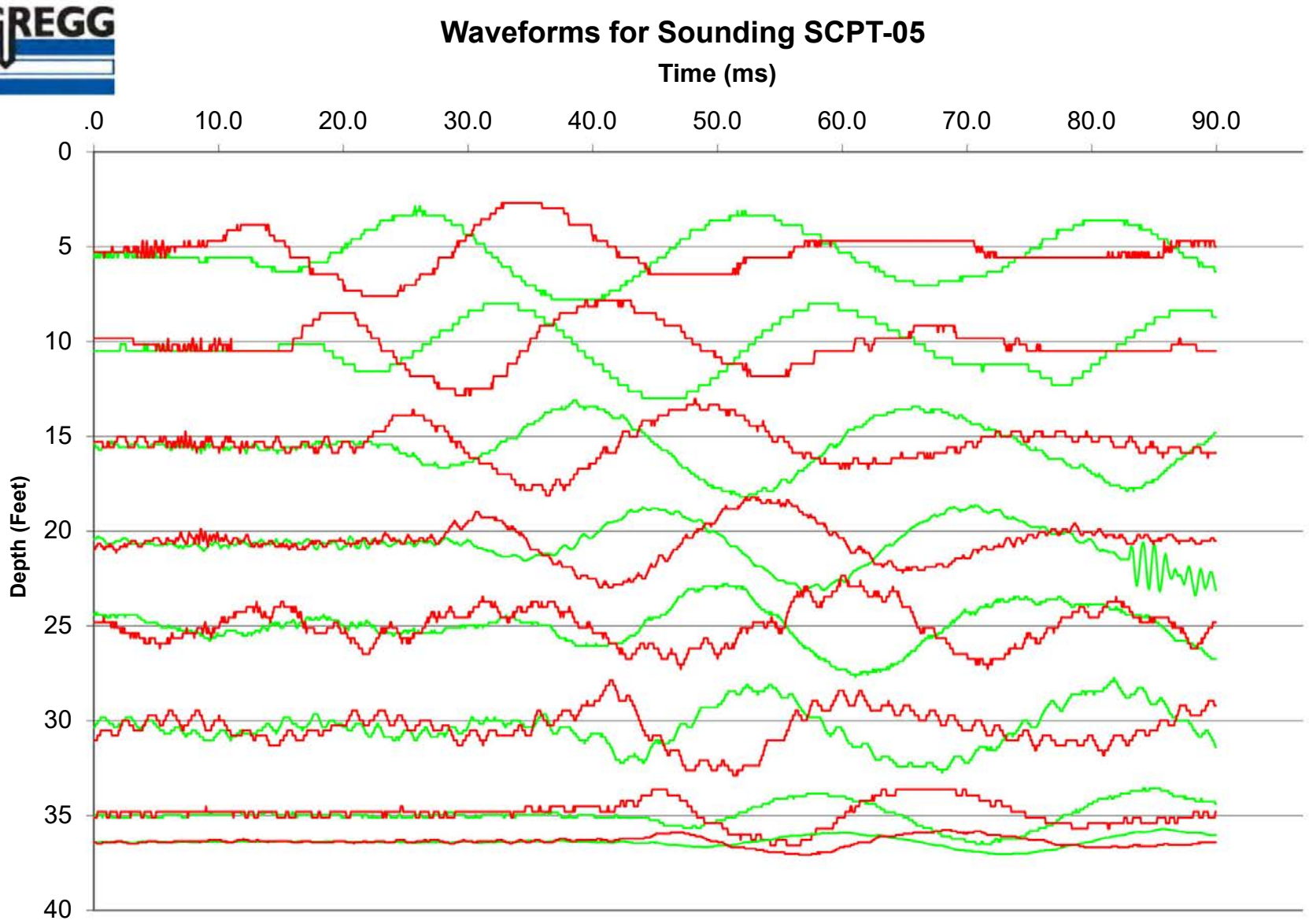
CLIENT: RT FRANKIAN

SITE: LYONS CANYON, STEVENSON RANCH, CA

FIELD REP: MATT M

Total depth: 30.02 ft, Date: 1/13/2021




Waveforms for Sounding SCPT-05
Time (ms)
.0
10.0
20.0
30.0
40.0
50.0
60.0
70.0
80.0
90.0
Depth (Feet)
0
5
10
15
20
25
30
35
40

Shear Wave Velocity Calculations

LYONS CANYON

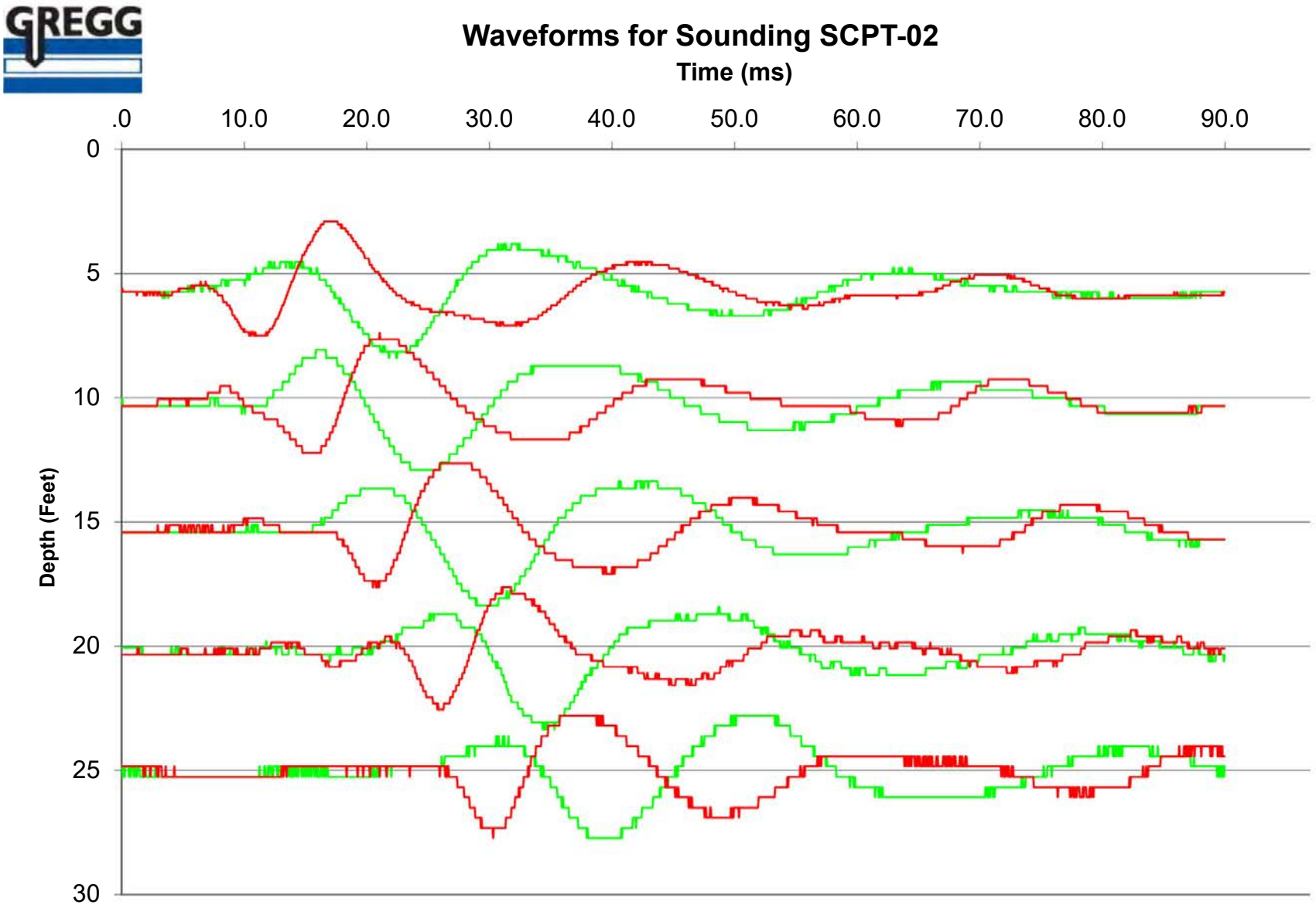
SCPT-05 ← SCPT-01

Geophone Offset: 0.66 Feet

Source Offset: 1.67 Feet

01/13/21

Test Depth (Feet)	Geophone Depth (Feet)	Waveform Ray Path (Feet)	Incremental Distance (Feet)	Characteristic Arrival Time (ms)	Incremental Time Interval (ms)	Interval Velocity (Ft/Sec)	Interval Depth (Feet)
5.58	4.92	5.19	5.19	30.0000			
10.50	9.84	9.98	4.79	36.6500	6.6500	719.7	7.38
15.58	14.92	15.02	5.04	43.8500	7.2000	699.7	12.38
20.67	20.01	20.08	5.06	49.1000	5.2500	964.1	17.47
25.10	24.44	24.50	4.42	55.5000	6.4000	690.1	22.22
30.51	29.85	29.90	5.40	57.1500	1.6500	3274.6	27.15
35.10	34.44	34.49	4.59	61.9000	4.7500	965.7	32.15
36.42	35.76	35.80	1.31	63.8000	1.9000	689.9	35.10


GREGG
Waveforms for Sounding SCPT-02
Time (ms)
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10.0
20.0
30.0
40.0
50.0
60.0
70.0
80.0
90.0
Depth (Feet)
0
5
10
15
20
25
30

Shear Wave Velocity Calculations

LYONS CANYON

SCPT-02

Geophone Offset: 0.66 Feet
Source Offset: 1.67 Feet

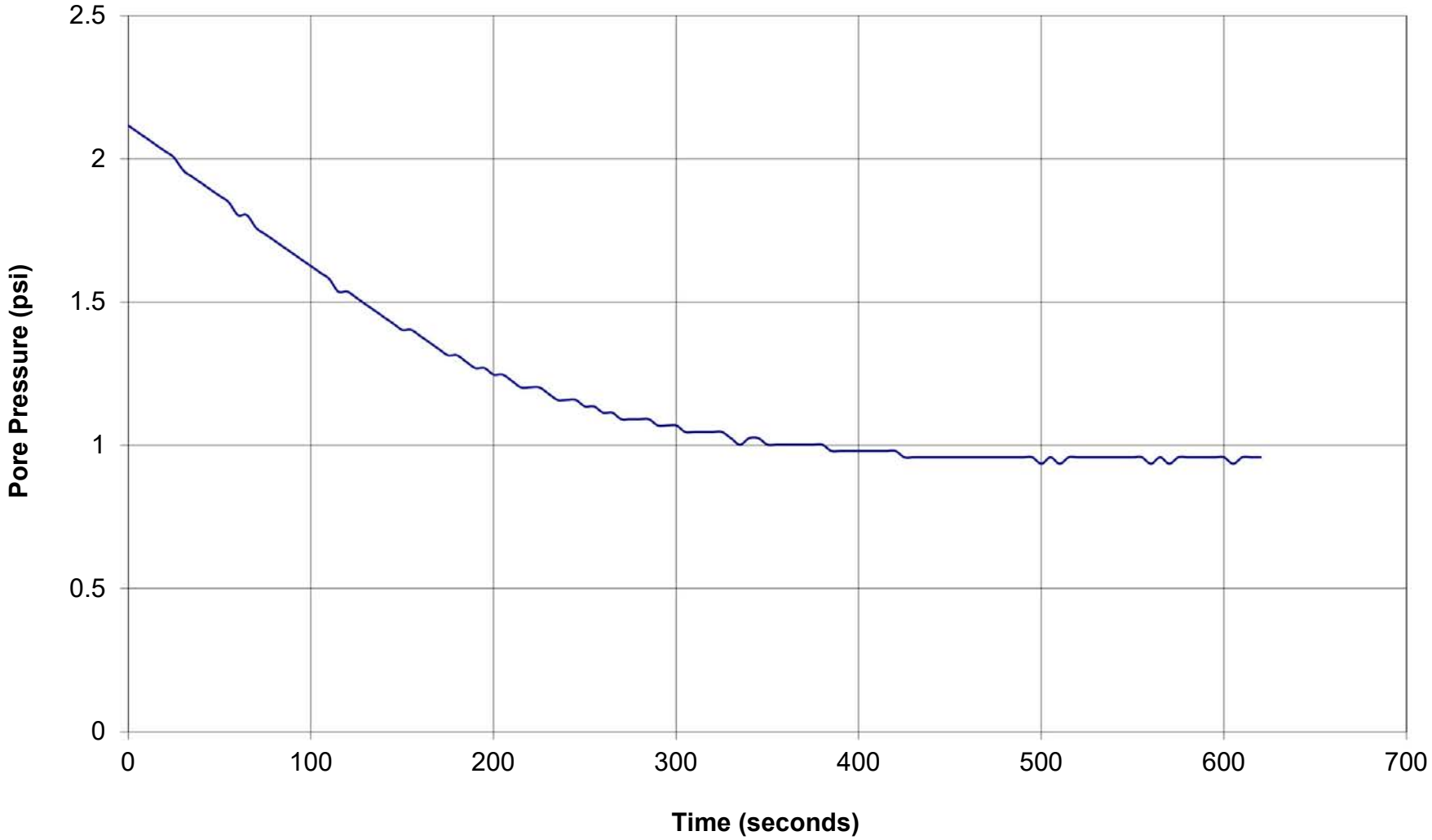
01/13/21

Test Depth (Feet)	Geophone Depth (Feet)	Waveform Ray Path (Feet)	Incremental Distance (Feet)	Characteristic Arrival Time (ms)	Incremental Time Interval (ms)	Interval Velocity (Ft/Sec)	Interval Depth (Feet)
5.74	5.08	5.35	5.35	14.4500			
10.33	9.67	9.82	4.47	18.7000	4.2500	1051.5	7.38
15.42	14.76	14.85	5.04	23.9500	5.2500	959.3	12.22
20.34	19.68	19.75	4.90	28.9000	4.9500	989.5	17.22
25.26	24.60	24.66	4.91	33.5500	4.6500	1055.3	22.14

GREGG DRILLING & TESTING

Pore Pressure Dissipation Test

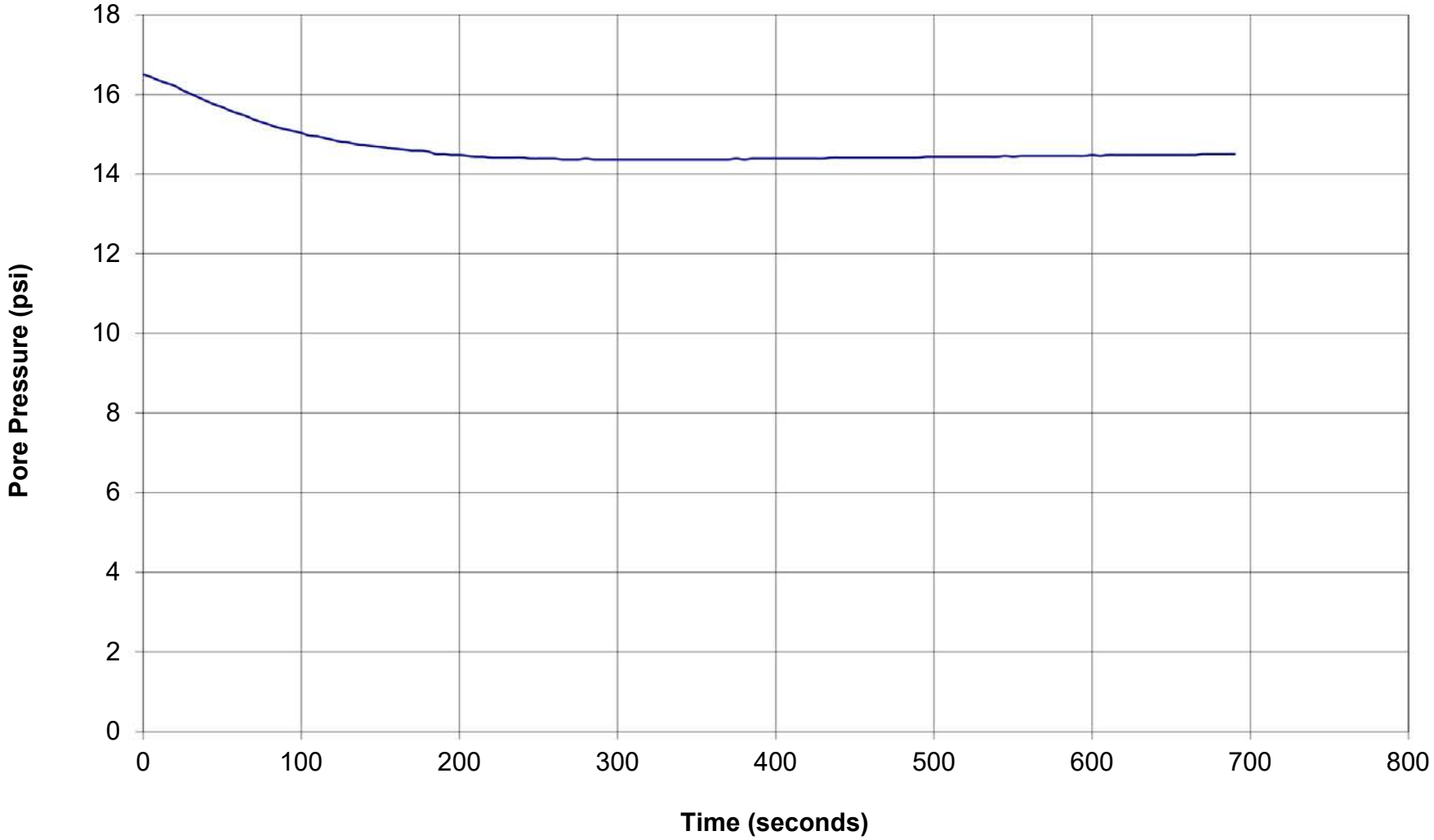
Sounding: CPT-04
Depth (ft): 39.70
Site: LYONS CANYON
Engineer: MATT M



GREGG DRILLING & TESTING

Pore Pressure Dissipation Test

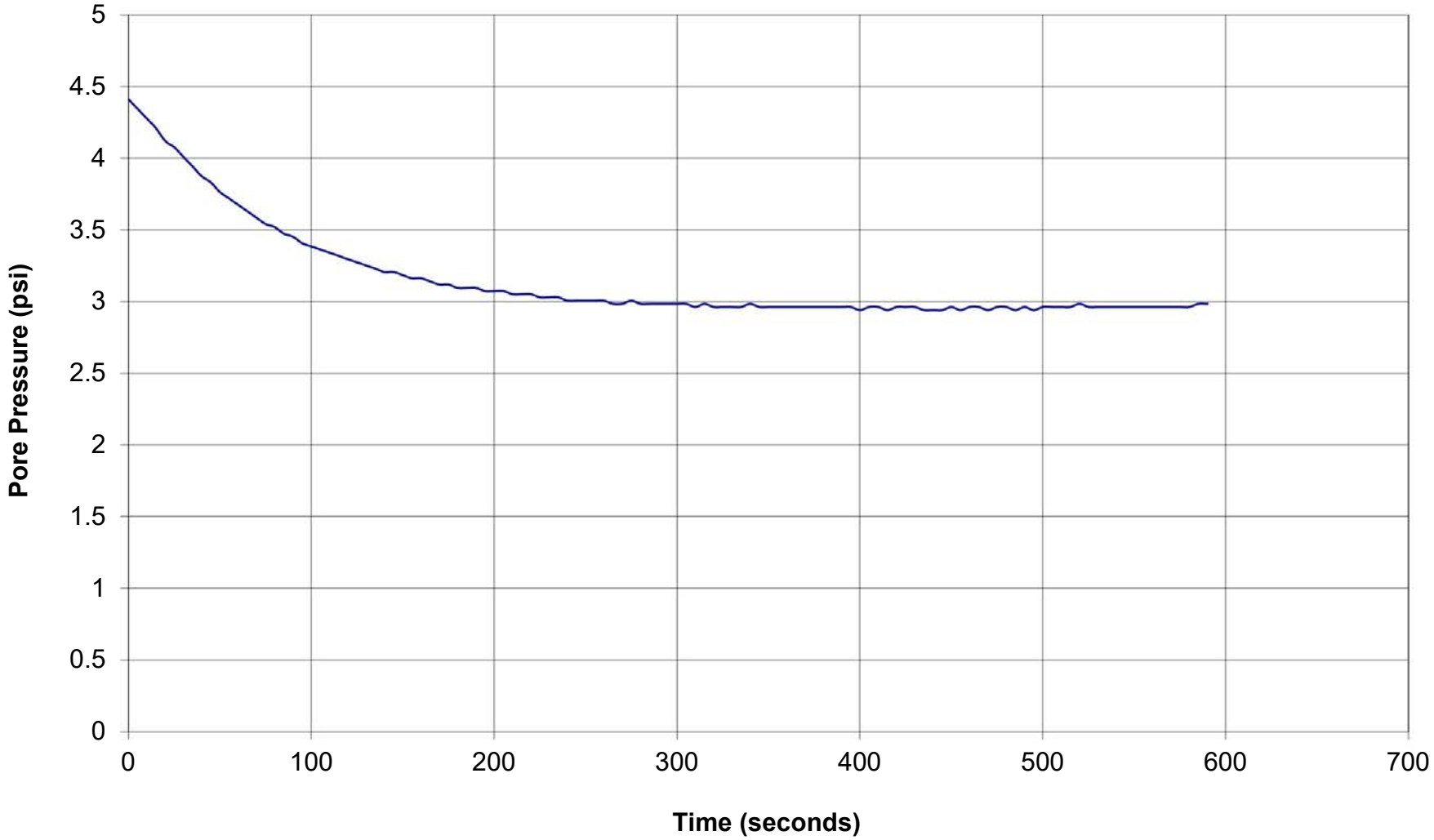
Sounding: CPT-03
Depth (ft): 34.45
Site: LYONS CANYON
Engineer: MATT M



GREGG DRILLING & TESTING

Pore Pressure Dissipation Test

Sounding: SCPT-02
Depth (ft): 30.02
Site: LYONS CANYON
Engineer: MATT M



NUWI – Lyons Canyon, LLC
September 15, 2023
2020-200-001

APPENDIX F

SEISMIC PARAMETERS

RTF&A
GEOTECHNICAL ENGINEERING & ENGINEERING GEOLOGY

Hazards by Location

Search Information

Coordinates: 34.369896, -118.562368

Elevation: 1321 ft

Timestamp: 2021-02-03T00:42:28.306Z

Hazard Type: Seismic

Reference Document: ASCE7-16

Risk Category: II

Site Class: D

Basic Parameters

Name	Value	Description
S_S	2.494	MCE_R ground motion (period=0.2s)
S_1	0.849	MCE_R ground motion (period=1.0s)
S_{MS}	2.494	Site-modified spectral acceleration value
S_{M1}	* null	Site-modified spectral acceleration value
S_{DS}	1.663	Numeric seismic design value at 0.2s SA
S_{D1}	* null	Numeric seismic design value at 1.0s SA

* See Section 11.4.8

Additional Information

Name	Value	Description
SDC	* null	Seismic design category
F_a	1	Site amplification factor at 0.2s
F_v	* null	Site amplification factor at 1.0s
CR_S	0.908	Coefficient of risk (0.2s)
CR_1	0.893	Coefficient of risk (1.0s)
PGA	1.062	MCE_G peak ground acceleration
F_{PGA}	1.1	Site amplification factor at PGA
PGA_M	1.168	Site modified peak ground acceleration
T_L	8	Long-period transition period (s)

SsRT	2.494	Probabilistic risk-targeted ground motion (0.2s)
SsUH	2.747	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
SsD	2.713	Factored deterministic acceleration value (0.2s)
S1RT	0.892	Probabilistic risk-targeted ground motion (1.0s)
S1UH	1	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
S1D	0.849	Factored deterministic acceleration value (1.0s)
PGAd	1.092	Factored deterministic acceleration value (PGA)

* See Section 11.4.8

The results indicated here DO NOT reflect any state or local amendments to the values or any delineation lines made during the building code adoption process. Users should confirm any output obtained from this tool with the local Authority Having Jurisdiction before proceeding with design.

Disclaimer

Hazard loads are provided by the U.S. Geological Survey Seismic Design Web Services.

While the information presented on this website is believed to be correct, ATC and its sponsors and contributors assume no responsibility or liability for its accuracy. The material presented in the report should not be used or relied upon for any specific application without competent examination and verification of its accuracy, suitability and applicability by engineers or other licensed professionals. ATC does not intend that the use of this information replace the sound judgment of such competent professionals, having experience and knowledge in the field of practice, nor to substitute for the standard of care required of such professionals in interpreting and applying the results of the report provided by this website. Users of the information from this website assume all liability arising from such use. Use of the output of this website does not imply approval by the governing building code bodies responsible for building code approval and interpretation for the building site described by latitude/longitude location in the report.

U.S. Geological Survey - Earthquake Hazards Program

Uni. ed Hazard Tool

Please do not use this tool to obtain ground motion parameter values for the design code reference documents covered by the U.S. Seismic Design Maps web tools (e.g., the International Building Code and the ASCE 7 or 41 Standard). The values returned by the two applications are not identical.

Input

Edition

Dynamic: Conterminous U.S. 2014 (u…

Spectral Period

Peak Ground Acceleration

Latitude

Decimal degrees

34.369896

Time Horizon

Return period in years

2475

Longitude

Decimal degrees, negative values for western longitudes

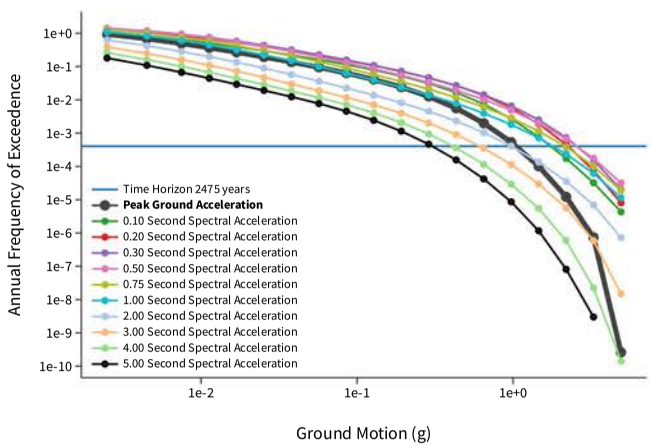
-118.562368

Site Class

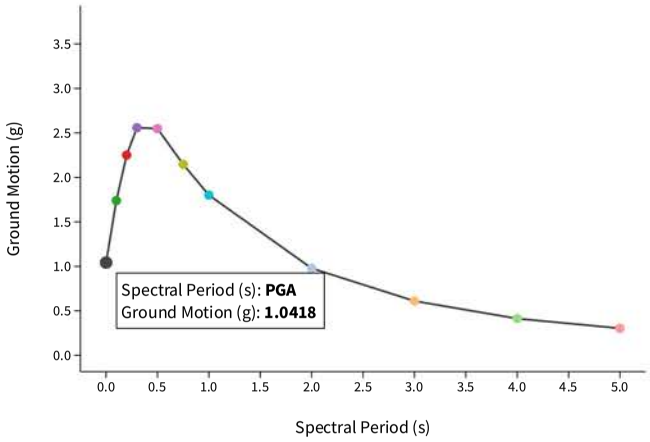
259 m/s (Site class D)

Hazard Curve

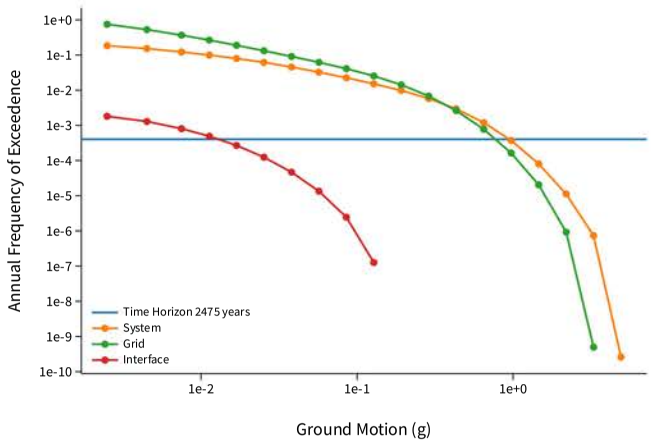
Hazard Curves



Uniform Hazard Response Spectrum



Component Curves for Peak Ground Acceleration

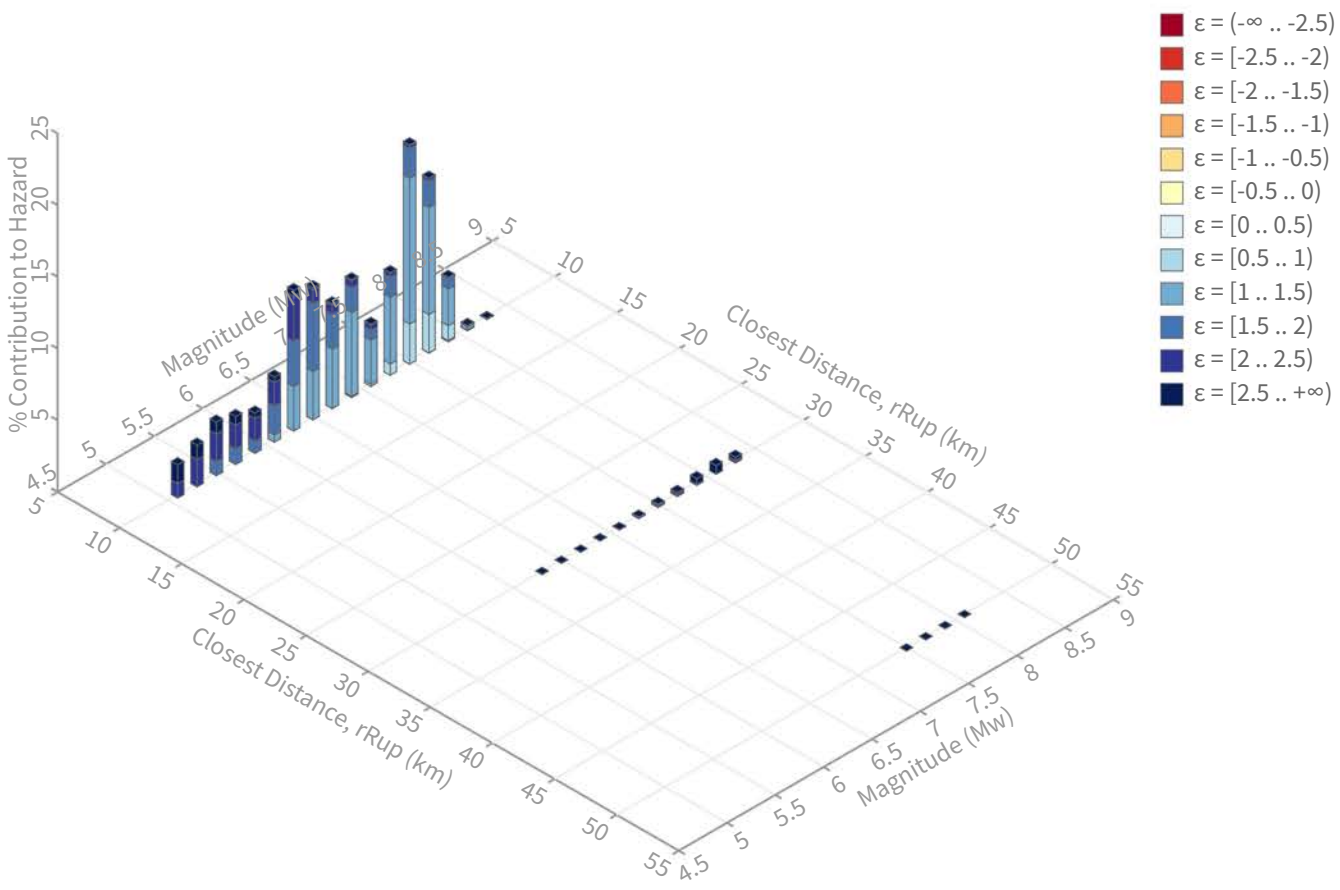


View Raw Data

Deaggregation

Component

Total



Summary statistics for, Deaggregation: Total

Deaggregation targets

Return period: 2475 yrs
Exceedance rate: 0.0004040404 yr^{-1}
PGA ground motion: 1.0417615 g

Recovered targets

Return period: 3149.6892 yrs
Exceedance rate: 0.00031749164 yr^{-1}

Totals

Binned: 100 %
Residual: 0 %
Trace: 0.04 %

Mean (over all sources)

m: 6.85
r: 7.27 km
ε_0: 1.6 σ

Mode (largest m-r bin)

m: 7.52
r: 5.72 km
ε_0: 1.21 σ
Contribution: 15.27 %

Mode (largest m-r-ε_0 bin)

m: 7.51
r: 5.72 km
ε_0: 1.18 σ
Contribution: 10.16 %

Discretization

r: min = 0.0, max = 1000.0, Δ = 20.0 km
m: min = 4.4, max = 9.4, Δ = 0.2
ε: min = -3.0, max = 3.0, Δ = 0.5 σ

Epsilon keys

ε0: [-∞ .. -2.5)
ε1: [-2.5 .. -2.0)
ε2: [-2.0 .. -1.5)
ε3: [-1.5 .. -1.0)
ε4: [-1.0 .. -0.5)
ε5: [-0.5 .. 0.0)
ε6: [0.0 .. 0.5)
ε7: [0.5 .. 1.0)
ε8: [1.0 .. 1.5)
ε9: [1.5 .. 2.0)
ε10: [2.0 .. 2.5)
ε11: [2.5 .. +∞]

Deaggregation Contributors

Source Set ↳ Source	Type	r	m	ε_0	lon	lat	az	%
UC33brAvg_FM32	System							38.97
Santa Susana alt 2 [3]		5.78	7.15	1.32	118.574°W	34.313°N	189.35	22.61
Northridge Hills [1]		5.64	7.65	1.06	118.608°W	34.305°N	210.41	4.59
Santa Susana alt 2 [2]		6.28	6.47	1.68	118.528°W	34.317°N	152.08	2.52
Northridge [2]		8.54	7.50	1.41	118.576°W	34.358°N	222.71	2.19
Holser alt 2 [1]		6.07	7.49	1.25	118.570°W	34.423°N	353.48	1.09
Santa Susana East (connector) [0]		8.60	6.39	2.27	118.499°W	34.314°N	136.86	1.03
UC33brAvg_FM31	System							35.56
Santa Susana alt 1 [0]		4.83	7.31	1.27	118.576°W	34.329°N	195.65	13.60
Mission Hills 2011 [1]		8.81	6.50	1.61	118.556°W	34.283°N	176.54	5.39
Northridge Hills [1]		5.64	7.65	1.04	118.608°W	34.305°N	210.41	4.73
Northridge [2]		8.54	7.30	1.45	118.576°W	34.358°N	222.71	4.20
Holser alt 1 [2]		4.63	7.06	1.32	118.544°W	34.405°N	22.92	2.94
Santa Susana alt 1 [1]		4.83	7.36	1.20	118.576°W	34.329°N	195.65	1.13
UC33brAvg_FM31 (opt)	Grid							13.35
PointSourceFinite: -118.562, 34.410		6.70	5.73	2.02	118.562°W	34.410°N	0.00	3.32
PointSourceFinite: -118.562, 34.410		6.70	5.73	2.02	118.562°W	34.410°N	0.00	3.32
PointSourceFinite: -118.562, 34.428		7.78	5.84	2.15	118.562°W	34.428°N	0.00	1.41
PointSourceFinite: -118.562, 34.428		7.78	5.84	2.15	118.562°W	34.428°N	0.00	1.41
UC33brAvg_FM32 (opt)	Grid							12.12
PointSourceFinite: -118.562, 34.410		6.69	5.72	2.03	118.562°W	34.410°N	0.00	3.01
PointSourceFinite: -118.562, 34.410		6.69	5.72	2.03	118.562°W	34.410°N	0.00	3.01
PointSourceFinite: -118.562, 34.428		7.80	5.82	2.17	118.562°W	34.428°N	0.00	1.20
PointSourceFinite: -118.562, 34.428		7.80	5.82	2.17	118.562°W	34.428°N	0.00	1.20

NUWI – Lyons Canyon, LLC
September 15, 2023
2020-200-001

APPENDIX G

LIQUEFACTION CALCULATIONS

RTF&A
GEOTECHNICAL ENGINEERING & ENGINEERING GEOLOGY

WORKBOOK TO CALCULATE LIQUEFACTION POTENTIAL AND SEISMIC SETTLEMENT

SUMMARY SHEET

REFERENCE:
Youd, T. L., Idriss, I. M., plus 19 others, 2001, "Liquefaction Resistance of Soils: Summary Report from the 1996 NCEER and 1998 NCEER/NSF Workshops on Evaluation of Liquefaction Resistance of Soils," Journal of Geotechnical and Geoenvironmental Engineering, ASCE, Vol. 127, No. 10 (October 2001), pp. 817-833.

CLIENT: **NUWI - Lyons Canyon, LLC**
RTF JOB: **2020-200**
PROJ. : **Lyons Canyon**
BY: **AWR**
DATE: **02/08/2021**

Z	Ic	Soil	rd#	Reference
3	>2.95	Clay to Silty Clay	1	Tokimatsu & Yoshimi (1983)
4	<2.95	Clayey Silt to Silty Clay	2	Seed & Idriss mean (1971) and Youd (1997)
5	<2.6	Silty Sand to Sandy Silt	3	Seed & Idriss lower limit (1971)
6	<2.05	Clean Sand to Silty Sand	4	Idriss & Golesorkhi (1997)
7	<1.31	Gravelly Sand to Sand	5	Site-Specific

FS = Threshold Factor of Safety = **1.30**
NL = Not liquefiable
Liquefiable Ic (between 1.5 and 2.6) = **2.60** (usu. 2.05 to 2.6)
Seismic Settlement Soil (Type) = **3**

amax = **1.17** g
Mag = **6.8** MSF **1.28**
Pa = 1.04427 tsf MSP calc 1.2846274
Fill Density = **125** pcf

Depth	CPT-1 1-13-21	CPT-2 1-13-21	CPT-3 1-13-21	CPT-4 1-13-21	CPT-5 1-13-21	CPT-*** 0-0-00	CPT-*** 0-0-00	CPT-*** 0-0-00
Elevation -->	1333 Sht. 1	1340 Sht. 2	1329 Sht. 3	1317 Sht. 4	1315 Sht. 5	1351 Sht. 6	1342 Sht. 7	*** Sht. 8
Meas. Water -->	A Water **55.0** 55.0	A Water **55.0** 55.0	A Water **55.0** 55.0	A Water **55.0** 55.0	A Water **55.0** 55.0	A Water **0.0** 0.0	A Water **0.0** 0.0	A Water *** ***
Design Water -->	D Water **30.0** 30.0 feet	D Water **30.0** 30.0 feet	D Water **30.0** 30.0 feet	D Water **30.0** 30.0 feet	D Water **30.0** 30.0 feet	D Water **0.0** 0.0 feet	D Water **0.0** 0.0 feet	D Water *** *** feet
Soil Density -->	Gamma **120** 120.0 pcf	Gamma **120** 120.0 pcf	Gamma **120** 120.0 pcf	Gamma **120** 120.0 pcf	Gamma **120** 120.0 pcf	Gamma **120** 120.0 pcf	Gamma **120** 120.0 pcf	Gamma **120** 120.0 pcf
Site rd -->	rd **2** 2.0	rd **2** 2.0	rd **2** 2.0	rd **2** 2.0	rd **2** 2.0	rd **2** 2.0	rd **2** 2.0	rd **2** 2.0
R & R -->	R and R **20.0** feet	R and R **20.0** feet	R and R **20.0** feet	R and R **20.0** feet	R and R **20.0** feet	R and R **0.0** feet	R and R **0.0** feet	R and R *** feet
Added Fill -->	Fill **21.0** feet	Fill **20.0** feet	Fill **35.0** feet	Fill **3.0** feet	Fill **15.0** feet	Fill **0.0** feet	Fill **0.0** feet	Fill *** feet
Ratio -->	**18.88**	**9999**	**9999**	**4.01**	**2.69**	**#NUM!**	**#NUM!**	**#VALUE!**
Liq Settlement	Liq. 0.16 0.16 inches	Liq. 0.00 0.00 inches	Liq. 0.00 0.00 inches	Liq. 0.37 0.37 inches	Liq. 1.22 1.22 inches	Liq. #NUM! #NUM! inches	Liq. #NUM! #NUM! inches	Liq. ####### ####### inches
Total After R&R	Total 0.16 inches	Total 0.00 inches	Total 0.00 inches	Total 0.37 inches	Total 1.22 inches	Total #NUM! inches	Total #NUM! inches	Total ####### inches

	meters	feet	Soil	CPT-1	Ishihara	F.S.	Soil	CPT-2	Ishihara	F.S.	Soil	CPT-3	Ishihara	F.S.	Soil	CPT-4	Ishihara	F.S.	Soil	CPT-5	Ishihara	F.S.	Soil	CPT-***	Ishihara	F.S.	Soil	CPT-***	Ishihara	F.S.	Soil	CPT-***	Ishihara	F.S.
	0	**0**	'1!'AF19	1			'2!'AF19	1			'3!'AF19	1			'4!'AF19	1			'5!'AF19	1			'6!'AF19	1			'7!'AF19	1			'8!'AF19	1		
1	0.05	**0.16**	**7 S**		---	**NL**	**7 S**		---	**NL**	**7 S**		---	**NL**	**6 S**		---	**NL**	**7 S**		---	**NL**	**#NUM!**	**#NUM!**	#NUM!	**#NUM!**	**#NUM!**	**#NUM!**	#NUM!	**#NUM!**	**#VALUE!**	**#VALUE!**	#VALUE!	**#VALUE!**
2	0.10	**0.33**	**7 S**		---	**NL**	**7 S**		---	**NL**	**7 S**		---	**NL**	**6 S**		---	**NL**	**7 S**		---	**NL**	**#NUM!**	**#NUM!**	#NUM!	**#NUM!**	**#NUM!**	**#NUM!**	#NUM!	**#NUM!**	**#NUM!**	**#NUM!**	#VALUE!	**#NUM!**
3	0.15	**0.49**	**7 S**		---	**NL**	**7 S**		---	**NL**	**7 S**		---	**NL**	**6 S**		---	**NL**	**7 S**		---	**NL**	**#NUM!**	**#NUM!**	#NUM!	**#NUM!**	**#NUM!**	**#NUM!**	#NUM!	**#NUM!**	**#NUM!**	**#NUM!**	#VALUE!	**#NUM!**
4	0.20	**0.66**	**7 S**		---	**NL**	**7 S**		---	**NL**	**7 S**		---	**NL**	**6 S**		---	**NL**	**7 S**		---	**NL**	**#NUM!**	**#NUM!**	#NUM!	**#NUM!**	**#NUM!**	**#NUM!**	#NUM!	**#NUM!**	**#NUM!**	**#NUM!**	#VALUE!	**#NUM!**
5	0.25	**0.82**	**7 S**		---	**NL**	**7 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**7 S**		---	**NL**	**#NUM!**	**#NUM!**	#NUM!	**#NUM!**	**#NUM!**	**#NUM!**	#NUM!	**#NUM!**	**0 C**		#VALUE!	
6	0.30	**0.98**	**7 S**		---	**NL**	**7 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**7 S**		---	**NL**	**0 C**		#NUM!		**#NUM!**	**#NUM!**	#NUM!	**#NUM!**	**0 C**		#VALUE!	
7	0.35	**1.15**	**7 S**		---	**NL**	**7 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**7 S**		---	**NL**	**0 C**		#NUM!		**#NUM!**	**#NUM!**	#NUM!	**#NUM!**	**0 C**		#VALUE!	
8	0.40	**1.31**	**7 S**		---	**NL**	**7 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**7 S**		---	**NL**	**0 C**		#NUM!		**#NUM!**	**#NUM!**	#NUM!	**#NUM!**	**0 C**		#VALUE!	
9	0.45	**1.48**	**7 S**		---	**NL**	**7 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**0 C**		#NUM!		**#NUM!**	**#NUM!**	#NUM!	**#NUM!**	**0 C**		#VALUE!	
10	0.50	**1.64**	**7 S**		---	**NL**	**7 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**0 C**		#NUM!		**0 C**		#NUM!		**0 C**		#VALUE!	
11	0.55	**1.80**	**7 S**		---	**NL**	**7 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**0 C**		#NUM!		**0 C**		#NUM!		**0 C**		#VALUE!	
12	0.60	**1.97**	**7 S**		---	**NL**	**7 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**0 C**		#NUM!		**0 C**		#NUM!		**0 C**		#VALUE!	
13	0.65	**2.13**	**7 S**		---	**NL**	**7 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**0 C**		#NUM!		**0 C**		#NUM!		**0 C**		#VALUE!	
14	0.70	**2.30**	**7 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**0 C**		#NUM!		**0 C**		#NUM!		**0 C**		#VALUE!	
15	0.75	**2.46**	**7 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**0 C**		#NUM!		**0 C**		#NUM!		**0 C**		#VALUE!	
16	0.80	**2.62**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**0 C**		#NUM!		**0 C**		#NUM!		**0 C**		#VALUE!	
17	0.85	**2.79**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**0 C**		#NUM!		**0 C**		#NUM!		**0 C**		#VALUE!	
18	0.90	**2.95**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**0 C**		#NUM!		**0 C**		#NUM!		**0 C**		#VALUE!	
19	0.95	**3.12**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**5 M**		---	**NL**	**6 S**		---	**NL**	**0 C**		#NUM!		**0 C**		#NUM!		**0 C**		#VALUE!	
20	1.00	**3.28**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**5 M**		---	**NL**	**6 S**		---	**NL**	**0 C**		#NUM!		**0 C**		#NUM!		**0 C**		#VALUE!	
21	1.05	**3.44**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**5 M**		---	**NL**	**6 S**		---	**NL**	**0 C**		#NUM!		**0 C**		#NUM!		**0 C**		#VALUE!	
22	1.10	**3.61**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**5 M**		---	**NL**	**6 S**		---	**NL**	**0 C**		#NUM!		**0 C**		#NUM!		**0 C**		#VALUE!	
23	1.15	**3.77**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**5 M**		---	**NL**	**6 S**		---	**NL**	**0 C**		#NUM!		**0 C**		#NUM!		**0 C**		#VALUE!	
24	1.20	**3.94**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**5 M**		---	**NL**	**6 S**		---	**NL**	**0 C**		#NUM!		**0 C**		#NUM!		**0 C**		#VALUE!	
25	1.25	**4.10**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**5 M**		---	**NL**	**6 S**		---	**NL**	**0 C**		#NUM!		**0 C**		#NUM!		**0 C**		#VALUE!	
26	1.30	**4.27**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**5 M**		---	**NL**	**6 S**		---	**NL**	**0 C**		#NUM!		**0 C**		#NUM!		**0 C**		#VALUE!	
27	1.35	**4.43**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**5 M**		---	**NL**	**6 S**		---	**NL**	**0 C**		#NUM!		**0 C**		#NUM!		**0 C**		#VALUE!	
28	1.40	**4.59**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**5 M**		---	**NL**	**6 S**		---	**NL**	**0 C**		#NUM!		**0 C**		#NUM!		**0 C**		#VALUE!	
29	1.45	**4.76**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**5 M**		---	**NL**	**6 S**		---	**NL**	**0 C**		#NUM!		**0 C**		#NUM!		**0 C**		#VALUE!	
30	1.50	**4.92**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**5 M**		---	**NL**	**6 S**		---	**NL**	**0 C**		#NUM!		**0 C**		#NUM!		**0 C**		#VALUE!	
31	1.55	**5.09**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**5 M**		---	**NL**	**6 S**		---	**NL**	**0 C**		#NUM!		**0 C**		#NUM!		**0 C**		#VALUE!	
32	1.60	**5.25**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**5 M**		---	**NL**	**6 S**		---	**NL**	**0 C**		#NUM!		**0 C**		#NUM!		**0 C**		#VALUE!	
33	1.65	**5.41**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**5 M**		---	**NL**	**6 S**		---	**NL**	**0 C**		#NUM!		**0 C**		#NUM!		**0 C**		#VALUE!	
34	1.70	**5.58**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**0 C**		#NUM!		**0 C**		#NUM!		**0 C**		#VALUE!	
35	1.75	**5.74**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**0 C**		#NUM!		**0 C**		#NUM!		**0 C**		#VALUE!	
36	1.80	**5.91**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**0 C**		#NUM!		**0 C**		#NUM!		**0 C**		#VALUE!	
37	1.85	**6.07**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**0 C**		#NUM!		**0 C**		#NUM!		**0 C**		#VALUE!	
38	1.90	**6.23**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**0 C**		#NUM!		**0 C**		#NUM!		**0 C**		#VALUE!	
39	1.95	**6.40**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**0 C**		#NUM!		**0 C**		#NUM!		**0 C**		#VALUE!	
40	2.00	**6.56**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**0 C**		#NUM!		**0 C**		#NUM!		**0 C**		#VALUE!	
41	2.05	**6.73**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**0 C**		#NUM!		**0 C**		#NUM!		**0 C**		#VALUE!	
42	2.10	**6.89**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**0 C**		#NUM!		**0 C**		#NUM!		**0 C**		#VALUE!	
43	2.15	**7.05**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**0 C**		#NUM!		**0 C**		#NUM!		**0 C**		#VALUE!	
44	2.20	**7.22**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**0 C**		#NUM!		**0 C**		#NUM!		**0 C**		#VALUE!	
45	2.25	**7.38**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**0 C**		#NUM!		**0 C**		#NUM!		**0 C**		#VALUE!	
46	2.30	**7.55**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**0 C**		#NUM!		**0 C**		#NUM!		**0 C**		#VALUE!	
47	2.35	**7.71**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**0 C**		#NUM!		**0 C**		#NUM!		**0 C**		#VALUE!	
48	2.40	**7.87**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**0 C**		#NUM!		**0 C**		#NUM!		**0 C**		#VALUE!	
49	2.45	**8.04**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**0 C**		#NUM!		**0 C**		#NUM!		**0 C**		#VALUE!	
50	2.50	**8.20**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**0 C**		#NUM!		**0 C**		#NUM!		**0 C**		#VALUE!	
51	2.55	**8.37**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**0 C**		#NUM!		**0 C**		#NUM!		**0 C**		#VALUE!	
52	2.60	**8.53**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**0 C**		#NUM!		**0 C**		#NUM!		**0 C**		#VALUE!	
53	2.65	**8.69**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**0 C**		#NUM!		**0 C**		#NUM!		**0 C**		#VALUE!	
54	2.70	**8.86**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**0 C**		#NUM!		**0 C**		#NUM!		**0 C**		#VALUE!	
55	2.75	**9.02**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**5 M**		---	**NL**	**6 S**		---	**NL**	**0 C**		#NUM!		**0 C**		#NUM!		**0 C**		#VALUE!	
56	2.80	**9.19**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**5 M**		---	**NL**	**6 S**		---	**NL**	**0 C**		#NUM!		**0 C**		#NUM!		**0 C**		#VALUE!	
57	2.85	**9.35**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**5 M**		---	**NL**	**6 S**		---	**NL**	**0 C**		#NUM!		**0 C**		#NUM!		**0 C**		#VALUE!	
58	2.90	**9.51**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**5 M**		---	**NL**	**6 S**		---	**NL**	**0 C**		#NUM!		**0 C**		#NUM!		**0 C**		#VALUE!	
59	2.95	**9.68**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**5 M**		---	**NL**	**6 S**		---	**NL**	**0 C**		#NUM!		**0 C**		#NUM!		**0 C**		#VALUE!	
60	3.00	**9.84**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**5 M**		---	**NL**	**6 S**		---	**NL**	**0 C**		#NUM!		**0 C**		#NUM!		**0 C**		#VALUE!	
61	3.05	**10.01**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**5 M**		---	**NL**	**5 M**		---	**NL**	**0 C**		#NUM!		**0 C**		#NUM!		**0 C**		#VALUE!	
62	3.10	**10.17**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**5 M**		---	**NL**	**5 M**		---	**NL**	**0 C**		#NUM!		**0 C**		#NUM!		**0 C**		#VALUE!	
63	3.15	**10.33**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**5 M**		---	**NL**	**5 M**		---	**NL**	**0 C**		#NUM!		**0 C**		#NUM!		**0 C**		#VALUE!	
64	3.20	**10.50**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**5 M**		---	**NL**	**5 M**		---	**NL**	**0 C**		#NUM!		**0 C**		#NUM!		**0 C**		#VALUE!	
65	3.25	**10.66**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**5 M**		---	**NL**	**5 M**		---	**NL**	**0 C**		#NUM!		**0 C**		#NUM!		**0 C**		#VALUE!	
66	3.30	**10.83**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**5 M**		---	**NL**	**6 S**		---	**NL**	**0 C**		#NUM!		**0 C**		#NUM!		**0 C**		#VALUE!	
67	3.35	**10.99**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**0 C**		#NUM!		**0 C**		#NUM!		**0 C**		#VALUE!	
68	3.40	**11.15**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**5 M**		---	**NL**	**6 S**		---	**NL**	**0 C**		#NUM!		**0 C**		#NUM!		**0 C**		#VALUE!	

SUMMARY SHEET

of Geotechnical and Geoenvironmental Engineering, ASCE, Vol. 127, No. 10 (October 2001), pp. 817-833.

CLIENT: **NUWI - Lyons Canyon, LLC**
RTF JOB: **2020-200**
PROJ. : **Lyons Canyon**
BY: **AWR**
DATE: **02/08/2021**

Z	Ic	Soil	rd#	Reference
3	>2.95	Clay to Silty Clay	1	Tokimatsu & Yoshimi (1983)
4	<2.95	Clayey Silt to Silty Clay	2	Seed & Idriss mean (1971) and Youd (1997)
5	<2.6	Silty Sand to Sandy Silt	3	Seed & Idriss lower limit (1971)
6	<2.05	Clean Sand to Silty Sand	4	Idriss & Golesorkhi (1997)
7	<1.31	Gravelly Sand to Sand	5	Site-Specific

FS = Threshold Factor of Safety = **1.30**
NL = Not liquefiable
Liquefiable Ic (between 1.5 and 2.6) = **2.60** (usu. 2.05 to 2.6)
Seismic Settlement Soil (Type) = **3**

amax = **1.17** g
Mag = **6.8** MSF **1.28**
Pa = 1.04427 tsf MSP calc 1.2846274
Fill Density = **125** pcf

Depth			CPT-1 1-13-21			CPT-2 1-13-21			CPT-3 1-13-21			CPT-4 1-13-21			CPT-5 1-13-21			CPT-*** 0-0-00		CPT-*** 0-0-00		CPT-*** 0-0-00	
69	3.45	11.32	6 S	---	NL	6 S	---	NL	6 S	---	NL	5 M	---	NL	6 S	---	NL	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
70	3.50	11.48	6 S	---	NL	6 S	---	NL	6 S	---	NL	5 M	---	NL	6 S	---	NL	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
71	3.55	11.65	6 S	---	NL	6 S	---	NL	6 S	---	NL	6 S	---	NL	6 S	---	NL	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
72	3.60	11.81	6 S	---	NL	6 S	---	NL	6 S	---	NL	6 S	---	NL	6 S	---	NL	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
73	3.65	11.98	6 S	---	NL	6 S	---	NL	6 S	---	NL	6 S	---	NL	6 S	---	NL	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
74	3.70	12.14	6 S	---	NL	6 S	---	NL	6 S	---	NL	6 S	---	NL	6 S	---	NL	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
75	3.75	12.30	6 S	---	NL	6 S	---	NL	6 S	---	NL	6 S	---	NL	6 S	---	NL	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
76	3.80	12.47	6 S	---	NL	6 S	---	NL	6 S	---	NL	5 M	---	NL	6 S	---	NL	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
77	3.85	12.63	6 S	---	NL	6 S	---	NL	6 S	---	NL	5 M	---	NL	6 S	---	NL	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
78	3.90	12.80	6 S	---	NL	5 M	---	NL	6 S	---	NL	5 M	---	NL	6 S	---	NL	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
79	3.95	12.96	5 M	---	NL	5 M	---	NL	6 S	---	NL	6 S	---	NL	6 S	---	NL	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
80	4.00	13.12	5 M	---	NL	5 M	---	NL	6 S	---	NL	5 M	---	NL	6 S	---	NL	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
81	4.05	13.29	5 M	---	NL	6 S	---	NL	6 S	---	NL	5 M	---	NL	6 S	---	NL	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
82	4.10	13.45	6 S	---	NL	5 M	---	NL	6 S	---	NL	5 M	---	NL	5 M	---	NL	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
83	4.15	13.62	6 S	---	NL	6 S	---	NL	6 S	---	NL	5 M	---	NL	5 M	---	NL	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
84	4.20	13.78	6 S	---	NL	6 S	---	NL	6 S	---	NL	5 M	---	NL	5 M	---	NL	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
85	4.25	13.94	6 S	---	NL	5 M	---	NL	6 S	---	NL	5 M	---	NL	5 M	---	NL	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
86	4.30	14.11	6 S	---	NL	6 S	---	NL	6 S	---	NL	5 M	---	NL	5 M	---	NL	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
87	4.35	14.27	6 S	---	NL	6 S	---	NL	6 S	---	NL	5 M	---	NL	5 M	---	NL	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
88	4.40	14.44	6 S	---	NL	6 S	---	NL	6 S	---	NL	5 M	---	NL	5 M	---	NL	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
89	4.45	14.60	6 S	---	NL	6 S	---	NL	6 S	---	NL	5 M	---	NL	5 M	---	NL	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
90	4.50	14.76	6 S	---	NL	5 M	---	NL	6 S	---	NL	5 M	---	NL	5 M	---	NL	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
91	4.55	14.93	6 S	---	NL	5 M	---	NL	6 S	---	NL	5 M	---	NL	6 S	---	NL	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
92	4.60	15.09	6 S	---	NL	5 M	---	NL	6 S	---	NL	5 M	---	NL	6 S	---	NL	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
93	4.65	15.26	6 S	---	NL	6 S	---	NL	6 S	---	NL	5 M	---	NL	5 M	---	NL	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
94	4.70	15.42	6 S	---	NL	5 M	---	NL	6 S	---	NL	5 M	---	NL	5 M	---	NL	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
95	4.75	15.58	6 S	---	NL	5 M	---	NL	6 S	---	NL	5 M	---	NL	5 M	---	NL	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
96	4.80	15.75	6 S	---	NL	5 M	---	NL	6 S	---	NL	5 M	---	NL	5 M	---	NL	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
97	4.85	15.91	6 S	---	NL	5 M	---	NL	6 S	---	NL	5 M	---	NL	5 M	---	NL	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
98	4.90	16.08	6 S	---	NL	5 M	---	NL	6 S	---	NL	5 M	---	NL	5 M	---	NL	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
99	4.95	16.24	6 S	---	NL	5 M	---	NL	6 S	---	NL	5 M	---	NL	5 M	---	NL	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
100	5.00	16.40	6 S	---	NL	4 C	---	NL	6 S	---	NL	5 M	---	NL	5 M	---	NL	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
101	5.05	16.57	6 S	---	NL	4 C	---	NL	6 S	---	NL	5 M	---	NL	5 M	---	NL	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
102	5.10	16.73	6 S	---	NL	4 C	---	NL	6 S	---	NL	5 M	---	NL	5 M	---	NL	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
103	5.15	16.90	6 S	---	NL	4 C	---	NL	6 S	---	NL	5 M	---	NL	5 M	---	NL	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
104	5.20	17.06	6 S	---	NL	4 C	---	NL	6 S	---	NL	5 M	---	NL	5 M	---	NL	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
105	5.25	17.22	6 S	---	NL	4 C	---	NL	6 S	---	NL	5 M	---	NL	5 M	---	NL	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
106	5.30	17.39	6 S	---	NL	4 C	---	NL	6 S	---	NL	4 C	---	NL	5 M	---	NL	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
107	5.35	17.55	6 S	---	NL	5 M	---	NL	5 M	---	NL	5 M	---	NL	5 M	---	NL	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
108	5.40	17.72	6 S	---	NL	5 M	---	NL	5 M	---	NL	5 M	---	NL	5 M	---	NL	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
109	5.45	17.88	6 S	---	NL	5 M	---	NL	5 M	---	NL	5 M	---	NL	5 M	---	NL	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
110	5.50	18.04	6 S	---	NL	5 M	---	NL	5 M	---	NL	5 M	---	NL	5 M	---	NL	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
111	5.55	18.21	6 S	---	NL	5 M	---	NL	5 M	---	NL	5 M	---	NL	5 M	---	NL	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
112	5.60	18.37	6 S	---	NL	5 M	---	NL	5 M	---	NL	5 M	---	NL	5 M	---	NL	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
113	5.65	18.54	6 S	---	NL	5 M	---	NL	6 S	---	NL	5 M	---	NL	5 M	---	NL	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
114	5.70	18.70	6 S	---	NL	4 C	---	NL	6 S	---	NL	5 M	---	NL	5 M	---	NL	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
115	5.75	18.86	6 S	---	NL	5 M	---	NL	6 S	---	NL	5 M	---	NL	5 M	---	NL	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
116	5.80	19.03	6 S	---	NL	5 M	---	NL	6 S	---	NL	5 M	---	NL	5 M	---	NL	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
117	5.85	19.19	6 S	---	NL	4 C	---	NL	5 M	---	NL	5 M	---	NL	5 M	---	NL	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
118	5.90	19.36	6 S	---	NL	4 C	---	NL	5 M	---	NL	5 M	---	NL	5 M	---	NL	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
119	5.95	19.52	6 S	---	NL	4 C	---	NL	5 M	---	NL	5 M	---	NL	5 M	---	NL	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
120	6.00	19.69	6 S	---	NL	5 M	---	NL	5 M	---	NL	5 M	---	NL	5 M	---	NL	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
121	6.05	19.85	6 S	---	NL	5 M	---	NL	5 M	---	NL	5 M	---	NL	5 M	---	NL	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
122	6.10	20.01	6 S	---	NL	5 M	---	NL	5 M	---	NL	5 M	---	NL	5 M	---	NL	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
123	6.15	20.18	6 S	---	NL	5 M	---	NL	5 M	---	NL	5 M	---	NL	5 M	---	NL	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
124	6.20	20.34	6 S	---	NL	5 M	---	NL	5 M	---	NL	5 M	---	NL	6 S	---	NL	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
125	6.25	20.51	6 S	---	NL	5 M	---	NL	5 M	---	NL	5 M	---	NL	5 M	---	NL	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
126	6.30	20.67	6 S	---	NL	6 S	---	NL	5 M	---	NL	5 M	---	NL	5 M	---	NL	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
127	6.35	20.83	6 S	---	NL	5 M	---	NL	5 M	---	NL	5 M	---	NL	5 M	---	NL	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
128	6.40	21.00	5 M	---	NL	5 M	---	NL	5 M	---	NL	5 M	---	NL	5 M	---	NL	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
129	6.45	21.16	5 M	---	NL	5 M	---	NL	5 M	---	NL	5 M	---	NL	5 M	---	NL	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
130	6.50	21.33	5 M	---	NL	5 M	---	NL	5 M	---	NL	5 M	---	NL	5 M	---	NL	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
131	6.55	21.49	6 S	---	NL	5 M	---	NL	5 M	---	NL	5 M	---	NL	5 M	---	NL	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
132	6.60	21.65	5 M	---	NL	5 M	---	NL	6 S	---	NL	5 M	---	NL	5 M	---	NL	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
133	6.65	21.82	6 S	---	NL	5 M	---	NL	6 S	---	NL	5 M	---	NL	5 M	---	NL	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
134	6.70	21.98	6 S	---	NL	5 M	---	NL	6 S	---	NL	5 M	---	NL	5 M	---	NL	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
135	6.75	22.15	6 S	---	NL	5 M	---	NL	6 S	---	NL	5 M	---	NL	5 M	---	NL	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
136	6.80	22.31	6 S	---	NL	4 C	---	NL	6 S	---	NL	5 M	---	NL	5 M	---	NL	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
137	6.85	22.47	6 S	---	NL	4 C	---	NL	6 S	---	NL	5 M	---	NL	5 M	---	NL	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
138	6.90	22.64	6 S	---	NL	5 M	---	NL	6 S	---	NL	5 M	---	NL	5 M	---	NL	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
139	6.95	22.80	6 S	---	NL	5 M	---	NL	6 S	---	NL	5 M	---	NL	5 M	---	NL	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
140	7.00	22.97	5 M	---	NL	4 C	---	NL	6 S	---	NL	5 M	---	NL	5 M	---	NL	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
141	7.05	23.13	5 M	---	NL	4 C	---	NL	6 S	---	NL	5 M	---	NL	5 M	---	NL	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
142	7.10	23.29	5 M	---	NL	5 M	---	NL	6 S	---	NL	5 M	---	NL	5 M	---	NL	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
143	7.15	23.46	5 M	---	NL	5 M	---	NL	6 S	---	NL	5 M	---	NL	5 M	---	NL	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
144	7.20	23.62	5 M	---	NL	5 M	---	NL	6 S	---	NL	5 M	---	NL	5 M	---	NL	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
145	7.25	23.79	5 M	---	NL	5 M	---	NL	6 S	---	NL	5 M	---	NL	5 M	---	NL	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
146	7.30	23.95	5 M	---	NL	5 M	---	NL	6 S	---	NL	5 M	---	NL	5 M	---	NL	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
147	7.35	24.11	5 M	---	NL	5 M	---	NL	6 S	---	NL	5 M	---	NL	5 M	---	NL	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
148	7.40	24.28	5 M	---	NL	5 M	---	NL	6 S	---	NL	5 M	---	NL	5 M	---	NL	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
149	7.45	24.44	6 S	---	NL	5 M	---	NL	6 S	---	NL	5 M	---	NL	5 M	---	NL	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
150	7.50	24.61	6 S	---	NL	5 M	---	NL	6 S	---	NL	5 M	---	NL	5 M	---	NL	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
151	7.55	24.77	6 S	---	NL	5 M	---	NL	6 S	---	NL	5 M	---	NL	5 M	---	NL	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
152	7.60	24.93	6 S	---	NL	5 M	---	NL	6 S	---	NL	5 M	---	NL	5 M	---	NL	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
153	7.65	25.10	6 S	---	NL	5 M	---	NL	6 S	---	NL	5 M	---	NL	5 M	---	NL	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
154	7.70	25.26	6 S	---	NL	5 M	---	NL	6 S	---	NL	5 M	---	NL	5 M	---	NL	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!

SUMMARY SHEET

of Geotechnical and Geoenvironmental Engineering, ASCE, Vol. 127, No. 10 (October 2001), pp. 817-833.

CLIENT: **NUWI - Lyons Canyon, LLC**
RTF JOB: **2020-200**
PROJ. : **Lyons Canyon**
BY: **AWR**
DATE: **02/08/2021**

Z	Ic	Soil	rd#	Reference
3	>2.95	Clay to Silty Clay	1	Tokimatsu & Yoshimi (1983)
4	<2.95	Clayey Silt to Silty Clay	2	Seed & Idriss mean (1971) and Youd (1997)
5	<2.6	Silty Sand to Sandy Silt	3	Seed & Idriss lower limit (1971)
6	<2.05	Clean Sand to Silty Sand	4	Idriss & Golesorkhi (1997)
7	<1.31	Gravelly Sand to Sand	5	Site-Specific

FS = Threshold Factor of Safety = **1.30**
NL = Not liquefiable
Liquefiable Ic (between 1.5 and 2.6) = **2.60** (usu. 2.05 to 2.6)
Seismic Settlement Soil (Type) = **3**

amax = **1.17** g
Mag = **6.8** MSF **1.28**
Pa = 1.04427 tsf MSP calc 1.2846274
Fill Density = **125** pcf

Depth			CPT-1	1-13-21			CPT-2	1-13-21			CPT-3	1-13-21			CPT-4	1-13-21			CPT-5	1-13-21			CPT-***	0-0-00		CPT-***	0-0-00		CPT-***	0-0-00	
155	7.75	**25.43**	5 M		---	NL	5 M		---	NL	6 S		---	NL	5 M		---	NL	5 M		---	NL	0 C		#NUM!	0 C		#NUM!	0 C		#VALUE!
156	7.80	**25.59**	5 M		---	NL	5 M		---	NL	6 S		---	NL	5 M		---	NL	5 M		---	NL	0 C		#NUM!	0 C		#NUM!	0 C		#VALUE!
157	7.85	**25.75**	5 M		---	NL	5 M		---	NL	6 S		---	NL	5 M		---	NL	5 M		---	NL	0 C		#NUM!	0 C		#NUM!	0 C		#VALUE!
158	7.90	**25.92**	6 S		---	NL	5 M		---	NL	6 S		---	NL	5 M		---	NL	5 M		---	NL	0 C		#NUM!	0 C		#NUM!	0 C		#VALUE!
159	7.95	**26.08**	6 S		---	NL	5 M		---	NL	6 S		---	NL	5 M		---	NL	5 M		---	NL	0 C		#NUM!	0 C		#NUM!	0 C		#VALUE!
160	8.00	**26.25**	6 S		---	NL	5 M		---	NL	6 S		---	NL	5 M		---	NL	5 M		---	NL	0 C		#NUM!	0 C		#NUM!	0 C		#VALUE!
161	8.05	**26.41**	6 S		---	NL	5 M		---	NL	6 S		---	NL	5 M		---	NL	5 M		---	NL	0 C		#NUM!	0 C		#NUM!	0 C		#VALUE!
162	8.10	**26.57**	6 S		---	NL	5 M		---	NL	6 S		---	NL	5 M		---	NL	5 M		---	NL	0 C		#NUM!	0 C		#NUM!	0 C		#VALUE!
163	8.15	**26.74**	6 S		---	NL	5 M		---	NL	6 S		---	NL	5 M		---	NL	5 M		---	NL	0 C		#NUM!	0 C		#NUM!	0 C		#VALUE!
164	8.20	**26.90**	6 S		---	NL	5 M		---	NL	6 S		---	NL	4 C		---	NL	5 M		---	NL	0 C		#NUM!	0 C		#NUM!	0 C		#VALUE!
165	8.25	**27.07**	6 S		---	NL	5 M		---	NL	6 S		---	NL	4 C		---	NL	5 M		---	NL	0 C		#NUM!	0 C		#NUM!	0 C		#VALUE!
166	8.30	**27.23**	6 S		---	NL	5 M		---	NL	6 S		---	NL	4 C		---	NL	5 M		---	NL	0 C		#NUM!	0 C		#NUM!	0 C		#VALUE!
167	8.35	**27.40**	6 S		---	NL	5 M		---	NL	6 S		---	NL	4 C		---	NL	5 M		---	NL	0 C		#NUM!	0 C		#NUM!	0 C		#VALUE!
168	8.40	**27.56**	6 S		---	NL	5 M		---	NL	6 S		---	NL	4 C		---	NL	5 M		---	NL	0 C		#NUM!	0 C		#NUM!	0 C		#VALUE!
169	8.45	**27.72**	6 S		---	NL	5 M		---	NL	6 S		---	NL	5 M		---	NL	5 M		---	NL	0 C		#NUM!	0 C		#NUM!	0 C		#VALUE!
170	8.50	**27.89**	6 S		---	NL	5 M		---	NL	5 M		---	NL	5 M		---	NL	5 M		---	NL	0 C		#NUM!	0 C		#NUM!	0 C		#VALUE!
171	8.55	**28.05**	6 S		---	NL	5 M		---	NL	5 M		---	NL	5 M		---	NL	5 M		---	NL	0 C		#NUM!	0 C		#NUM!	0 C		#VALUE!
172	8.60	**28.22**	6 S		---	NL	5 M		---	NL	5 M		---	NL	4 C		---	NL	5 M		---	NL	0 C		#NUM!	0 C		#NUM!	0 C		#VALUE!
173	8.65	**28.38**	6 S		---	NL	5 M		---	NL	5 M		---	NL	5 M		---	NL	5 M		---	NL	0 C		#NUM!	0 C		#NUM!	0 C		#VALUE!
174	8.70	**28.54**	6 S		---	NL	5 M		---	NL	4 C		---	NL	5 M		---	NL	5 M		---	NL	0 C		#NUM!	0 C		#NUM!	0 C		#VALUE!
175	8.75	**28.71**	6 S		---	NL	5 M		---	NL	5 M		---	NL	5 M		---	NL	5 M		---	NL	0 C		#NUM!	0 C		#NUM!	0 C		#VALUE!
176	8.80	**28.87**	6 S		---	NL	5 M		---	NL	5 M		---	NL	5 M		---	NL	5 M		---	NL	0 C		#NUM!	0 C		#NUM!	0 C		#VALUE!
177	8.85	**29.04**	6 S		---	NL	5 M		---	NL	5 M		---	NL	5 M		---	NL	5 M		---	NL	0 C		#NUM!	0 C		#NUM!	0 C		#VALUE!
178	8.90	**29.20**	7 S		---	NL	5 M		---	NL	5 M		---	NL	5 M		---	NL	5 M		---	NL	0 C		#NUM!	0 C		#NUM!	0 C		#VALUE!
179	8.95	**29.36**	6 S		---	NL	5 M		---	NL	5 M		---	NL	5 M		---	NL	5 M		---	NL	0 C		#NUM!	0 C		#NUM!	0 C		#VALUE!
180	9.00	**29.53**	6 S		---	NL	7 S		---	NL	5 M		---	NL	5 M		---	NL	5 M		---	NL	0 C		#NUM!	0 C		#NUM!	0 C		#VALUE!
181	9.05	**29.69**	6 S		---	NL	7 S		---	NL	5 M		---	NL	5 M		---	NL	5 M		---	NL	0 C		#NUM!	0 C		#NUM!	0 C		#VALUE!
182	9.10	**29.86**	6 S		---	NL	7 S		---	NL	5 M		---	NL	5 M		---	NL	5 M		---	NL	0 C		#NUM!	0 C		#NUM!	0 C		#VALUE!
183	9.15	**30.02**	5 M	<1>	310.02	**0.38**	7 S		---	**38.74**	5 M		---	**3.83**	5 M	<1>	200.29	**0.22**	5 M	<1>	273.44	**0.36**	0 C		#NUM!	0 C		#NUM!	0 C		#VALUE!
184	9.20	**30.18**	5 M	<1>	155.01	**0.40**	0 C		---		6 S		---	**2.99**	5 M	<1>	100.14	**0.29**	6 S	<1>	136.72	**0.81**	0 C		#NUM!	0 C		#NUM!	0 C		#VALUE!
185	9.25	**30.35**	6 S	<1>	103.34	**0.22**	0 C		---		5 M		---	**3.26**	5 M	<1>	66.76	**0.39**	6 S	<1>	91.15	**0.89**	0 C		#NUM!	0 C		#NUM!	0 C		#VALUE!
186	9.30	**30.51**	6 S	<1>	77.50	**0.23**	0 C		---		5 M		---	**3.87**	5 M	<1>	50.07	**0.36**	6 S	<1>	68.36	**0.66**	0 C		#NUM!	0 C		#NUM!	0 C		#VALUE!
187	9.35	**30.68**	5 M	<1>	62.00	**0.22**	0 C		---		5 M		---	**4.51**	5 M	<1>	40.06	**0.43**	6 S	<1>	54.69	**0.48**	0 C		#NUM!	0 C		#NUM!	0 C		#VALUE!
188	9.40	**30.84**	5 M	<1>	51.67	**0.23**	0 C		---		6 S		---	**5.25**	5 M	<1>	33.38	**0.40**	6 S	<1>	45.57	**0.36**	0 C		#NUM!	0 C		#NUM!	0 C		#VALUE!
189	9.45	**31.00**	5 M	<1>	44.29	**0.28**	0 C		---		6 S		---	**5.42**	5 M	<1>	28.61	**0.38**	6 S	<1>	39.06	**0.29**	0 C		#NUM!	0 C		#NUM!	0 C		#VALUE!
190	9.50	**31.17**	6 S	<1>	38.75	**0.41**	0 C		---		6 S		---	**8.11**	5 M	<1>	25.04	**0.32**	5 M	<1>	34.18	**0.26**	0 C		#NUM!	0 C		#NUM!	0 C		#VALUE!
191	9.55	**31.33**	6 S	<1>	34.45	**0.65**	0 C		---		6 S		---	**9.52**	5 M	<1>	22.25	**0.31**	6 S	<1>	30.38	**0.26**	0 C		#NUM!	0 C		#NUM!	0 C		#VALUE!
192	9.60	**31.50**	6 S		34.56	**2.40**	0 C		---		6 S		---	**7.33**	5 M	<1>	20.03	**0.32**	6 S	<1>	27.34	**0.30**	0 C		#NUM!	0 C		#NUM!	0 C		#VALUE!
193	9.65	**31.66**	6 S		34.67	**6.37**	0 C		---		6 S		---	**5.29**	5 M	<1>	18.21	**0.30**	6 S	<1>	24.86	**0.31**	0 C		#NUM!	0 C		#NUM!	0 C		#VALUE!
194	9.70	**31.82**	6 S		34.78	**7.96**	0 C		---		6 S		---	**5.85**	5 M	<1>	16.69	**0.25**	6 S	<1>	22.79	**0.25**	0 C		#NUM!	0 C		#NUM!	0 C		#VALUE!
195	9.75	**31.99**	6 S		34.89	**6.16**	0 C		---		6 S		---	**3.56**	5 M	<1>	15.41	**0.46**	5 M	<1>	21.03	**0.22**	0 C		#NUM!	0 C		#NUM!	0 C		#VALUE!
196	9.80	**32.15**	6 S		35.00	**7.76**	0 C		---		6 S		---	**2.91**	5 M	<1>	14.31	**0.55**	5 M	<1>	19.53	**0.22**	0 C		#NUM!	0 C		#NUM!	0 C		#VALUE!
197	9.85	**32.32**	7 S		35.11	**11.11**	0 C		---		5 M		---	**1.87**	5 M	<1>	13.35	**0.39**	5 M	<1>	18.23	**0.23**	0 C		#NUM!	0 C		#NUM!	0 C		#VALUE!
198	9.90	**32.48**	6 S		35.22	**19.33**	0 C		---		5 M		---	**1.93**	6 S	<1>	12.52	**0.49**	5 M	<1>	17.09	**0.25**	0 C		#NUM!	0 C		#NUM!	0 C		#VALUE!
199	9.95	**32.64**	6 S		35.34	**11.26**	0 C		---		5 M		---	**2.35**	5 M	<1>	11.78	**0.51**	5 M	<1>	16.08	**0.19**	0 C		#NUM!	0 C		#NUM!	0 C		#VALUE!
200	10.00	**32.81**	6 S		35.45	**8.92**	0 C		---		5 M		---	**2.88**	6 S	<1>	11.13	**0.39**	5 M	<1>	15.19	**0.21**	0 C		#NUM!	0 C		#NUM!	0 C		#VALUE!
201	10.05	**32.97**	6 S		35.56	**5.06**	0 C		---		5 M		---	**2.86**	6 S	<1>	10.54	**0.51**	5 M	<1>	14.39	**0.24**	0 C		#NUM!	0 C		#NUM!	0 C		#VALUE!
202	10.10	**33.14**	6 S		35.67	**1.81**	0 C		---		5 M		---	**3.15**	6 S	<1>	10.01	**0.52**	5 M	<1>	13.67	**0.30**	0 C		#NUM!	0 C		#NUM!	0 C		#VALUE!
203	10.15	**33.30**	6 S	<1>	32.10	**0.92**	0 C		---		6 S		---	**2.15**	6 S	<1>	9.54	**0.43**	6 S	<1>	13.02	**0.40**	0 C		#NUM!	0 C		#NUM!	0 C		#VALUE!
204	10.20	**33.46**	6 S	<1>	29.18	**0.83**	0 C		---		6 S		---	**2.12**	6 S	<1>	9.10	**0.49**	6 S	<1>	12.43	**0.50**	0 C		#NUM!	0 C		#NUM!	0 C		#VALUE!
205	10.25	**33.63**	6 S	<1>	26.75	**0.76**	0 C		---		5 M		---	**2.34**	5 M	<1>	8.71	**0.76**	6 S	<1>	11.89	**0.53**	0 C		#NUM!	0 C		#NUM!	0 C		#VALUE!
206	10.30	**33.79**	6 S	<1>	24.69	**0.53**	0 C		---		5 M		---	**2.26**	5 M	<1>	8.35	**0.58**	6 S	<1>	11.39	**0.45**	0 C		#NUM!	0 C		#NUM!	0 C		#VALUE!
207	10.35	**33.96**	5 M	<1>	22.93	**0.38**	0 C		---		6 S		---	**2.08**	5 M	<1>	8.01	**0.48**	6 S	<1>	10.94	**0.43**	0 C		#NUM!	0 C		#NUM!	0 C		#VALUE!
208	10.40	**34.12**	5 M	<1>	21.40	**0.39**	0 C		---		5 M		---	**2.38**	5 M	<1>	7.70	**0.32**	6 S	<1>	10.52	**0.37**	0 C		#NUM!	0 C		#NUM!	0 C		#VALUE!
209	10.45	**34.28**	5 M	<1>	20.06	**0.36**	0 C		---		5 M		---	**2.37**	5 M	<1>	7.42	**0.57**	6 S	<1>	10.13	**0.31**	0 C		#NUM!	0 C		#NUM!	0 C		#VALUE!
210	10.50	**34.45**	5 M	<1>	18.88	**0.51**	0 C		---		5 M		---	**2.48**	5 M	<1>	7.15	**0.35**	6 S	<1>	9.77	**0.34**	0 C		#NUM!	0 C		#NUM!	0 C		#VALUE!
211	10.55	**34.61**	4 C		18.94	NL	0 C		---		0 C		---		5 M	<1>	6.91	**0.34**	6 S	<1>	9.43	**0.42**	0 C		#NUM!	0 C		#NUM!	0 C		#VALUE!
212	10.60	**34.78**	5 M		19.00	**1.40**	0 C		---		0 C		---		6 S	<1>	6.68	**0.96**	6 S	<1>	9.11	**0.42**	0 C		#NUM!	0 C		#NUM!	0 C		#VALUE!
213	10.65	**34.94**	6 S		19.06	**1.96**	0 C		---		0 C		---		4 C		6.71	NL	6 S	<1>	8.82	**0.42**	0 C		#NUM!	0 C		#NUM!	0 C		#VALUE!
214	10.70	**35.10**	6 S		19.12	**5.79**	0 C		---		0 C		---		5 M	<1>	6.49	**1.13**	6 S	<1>	8.55	**0.42**	0 C		#NUM!	0 C		#NUM!	0 C		#VALUE!
215	10.75	**35.27**	6 S		19.18	**3.14**	0 C		---		0 C		---		5 M	<1>	6.29	**0.30**	6 S	<1>	8.29	**0.38**	0 C		#NUM!	0 C		#NUM!	0 C		#VALUE!
216	10.80	**35.43**	6 S		19.24	**3.32**	0 C		---		0 C		---		5 M	<1>	6.10	**0.39**	6 S	<1>	8.04	**0.33**	0 C		#NUM!	0 C		#NUM!	0 C		#VALUE!
217	10.85	**35.60**	6 S		19.30	**4.52**	0 C		---		0 C		---		4 C		6.13	NL	5 M	<1>	7.81	**0.28**	0 C		#NUM!	0 C		#NUM!	0 C		#VALUE!
218	10.90	**35.76**	6 S		19.35	**6.23**	0 C		---		0 C		---		4 C		6.16	NL	5 M	<1>	7.60	**0.26**	0 C		#NUM!	0 C		#NUM!	0 C		#VALUE!
219	10.95	**35.93**	6 S		19.41	**8.73**	0 C		---		0 C		---		5 M	<1>	5.98	**0.42**	5 M	<1>	7.39	**0.26**	0 C		#NUM!	0 C		#NUM!	0 C		#VALUE!
220	11.00	**36.09**	6 S		19.47	**10.55**	0 C		---		0 C		---		5 M	<1>	5.81	**0.31**	5 M	<1>	7.20	**0.25**	0 C		#NUM!	0 C		#NUM!	0 C		#VALUE!
221	11.05	**36.25**	6 S		19.53	**20.25**	0 C		---		0 C		---		5 M	<1>	5.65	**0.40**	5 M	<1>	7.01	**0.23**	0 C		#NUM!	0 C		#NUM!	0 C		#VALUE!
222	11.10	**36.42**	6 S		19.59	**19.02**	0 C		---		0 C		---		5 M	<1>	5.49	**0.26**	5 M	<1>	6.84	**0.22**	0 C		#NUM!	0 C		#NUM!	0 C		#VALUE!
223	11.15	**36.58**	0 C		19.65		0 C		---		0 C		---		5 M	<1>	5.35	**0.25**	5 M	<1>	6.67	**0.21**	0 C		#NUM!	0 C		#NUM!	0 C		#VALUE!
224	11.20	**36.75**	0 C		19.71		0 C		---		0 C		---		5 M	<1>	5.21	**0.49**	5 M	<1>	6.51	**0.21**	0 C		#NUM!	0 C		#NUM!	0 C		#VALUE!
225	11.25	**36.91**	0 C		19.77		0 C		---		0 C		---		5 M	<1>	5.08	**0.39**	5 M	<1>	6.36	**0.23**	0 C		#NUM!	0 C		#NUM!	0 C		#VALUE!
226	11.30	**37.07**	0 C		19.82		0 C		---		0 C		---		5 M	<1>	4.96	**0.41**	5 M	<1>	6.21	**0.25**	0 C		#NUM!	0 C		#NUM!	0 C		#VALUE!
227	11.35	**37.24**	0 C		19.88		0 C		---		0 C		---		5 M	<1>	4.84	**0.76**	5 M	<1>	6.08	**0.26**	0 C		#NUM!	0 C		#NUM!	0 C		#VALUE!
228	11.40	**37.40**	0 C		19.94		0 C		---		0 C		---		4 C		4.86	NL	5 M	<1>	5.94	**0.25**	0 C		#NUM!	0 C		#NUM!	0 C		#VALUE!
229	11.45	**37.57**	0 C		20.00		0 C		---		0 C		---		5 M	<1>	4.75	**0.62**	5 M	<1>	5.82	**0.24**	0 C		#NUM!	0 C		#NUM!	0 C		#VALUE!
230	11.50	**37.73**	0 C		20.06		0 C		---		0 C		---		5 M	<1>	4.64	**0.27**	5 M	<1>	5.70	**0.24**	0 C		#NUM!	0 C		#NUM!	0 C		#VALUE!
231	11.55	**37.89**	0 C		20.12		0 C		---		0 C		---		5 M	<1>	4.54	**0.40**	5 M	<1>	5.58	**0.24**	0 C		#NUM!	0 C		#NUM!	0 C		#VALUE!
232	11.60	**38.06**	0 C		20.18		0 C		---		0 C		---		5 M	<1>	4.44	**0.59**	5 M	<1>	5.47	**0.24**	0 C		#NUM!	0 C		#NUM!	0 C		#VALUE!
233	11.65	**38.22**	0 C		20.24		0 C		---		0 C		---		5 M	<1>	4.35	**0.52**	5 M	<1>	5.36	**0.24**	0 C		#NUM!	0 C		#NUM!	0 C		#VALUE!
234	11.70	**38.39**	0 C		20.30		0 C		---		0 C		---		5 M	<1>	4.26	**0.50**	5 M	<1>	5.26	**0.28**	0 C		#NUM!	0 C		#NUM!	0 C		#VALUE!
235	11.75	**38.55**	0 C		20.35		0 C		---		0 C		---		6 S	<1>	4.17	**0.66**	5 M	<1>	5.16	**0.27**	0 C		#NUM!	0 C		#NUM!	0 C		#VALUE!
236	11.80	**38.71**	0 C		20.41		0 C		---		0 C		---		6 S	<1>	4.09	**0.64**	5 M	<1>	5.06	**0.35**	0 C		#NUM!	0 C		#NUM!	0 C		#VALUE!
237	11.85	**38.88**	0 C		20.47		0 C		---		0 C		---		5 M	<1>	4.01	**1.29**	6 S	<1>	4.97	**0.46**	0 C		#NUM!	0 C		#NUM!	0 C		#VALUE!
238	11.90	**39.04**	0 C		20.53		0 C		---		0 C		---		5 M		4.03	**1.73**	6 S	<1>	4.88	**0.52**	0 C		#NUM!	0 C		#NUM!	0 C		#VALUE!
239	11.95	**39.21**	0 C		20.59		0 C		---		0 C		---		5 M		4.04	**3.13**	6 S	<1>	4.80	**0.75**	0 C		#NUM!	0 C		#NUM!	0 C		#VALUE!
240	12.00	**39.37**	0 C		20.65		0 C		---		0 C		---		6 S		4.06	**3.21**	6 S	<1>	4.71	**1.04**	0 C		#NUM!	0 C		#NUM!	0 C		#VALUE!

SUMMARY SHEET

of Geotechnical and Geoenvironmental Engineering, ASCE, Vol. 127, No. 10 (October 2001), pp. 817-833.

CLIENT: **NUWI - Lyons Canyon, LLC**
RTF JOB: **2020-200**
PROJ. : **Lyons Canyon**
BY: **AWR**
DATE: **02/08/2021**

Z	Ic	Soil	rd#	Reference
3	>2.95	Clay to Silty Clay	1	Tokimatsu & Yoshimi (1983)
4	<2.95	Clayey Silt to Silty Clay	2	Seed & Idriss mean (1971) and Youd (1997)
5	<2.6	Silty Sand to Sandy Silt	3	Seed & Idriss lower limit (1971)
6	<2.05	Clean Sand to Silty Sand	4	Idriss & Golesorkhi (1997)
7	<1.31	Gravelly Sand to Sand	5	Site-Specific

FS = Threshold Factor of Safety = **1.30**
NL = Not liquefiable
Liquefiable Ic (between 1.5 and 2.6) = **2.60** (usu. 2.05 to 2.6)
Seismic Settlement Soil (Type) = **3**

amax = **1.17** g
Mag = **6.8** MSF 1.28
Pa = 1.04427 tsf MSP calc 1.2846274
Fill Density = **125** pcf

Depth			CPT-1	1-13-21	CPT-2	1-13-21	CPT-3	1-13-21	CPT-4	1-13-21		CPT-5	1-13-21		CPT-***	0-0-00	CPT-***	0-0-00	CPT-***	0-0-00
241	12.05	**39.53**	**0 C**	20.71	**0 C**	---	**0 C**	---	**6 S**	4.08	**3.52**	**6 S**	<1>	4.63	**1.06**	**0 C**	#NUM!	**0 C**	#NUM!	**0 C**	#VALUE!
242	12.10	**39.70**	**0 C**	20.77	**0 C**	---	**0 C**	---	**6 S**	4.10	**3.85**	**6 S**	<1>	4.56	**0.52**	**0 C**	#NUM!	**0 C**	#NUM!	**0 C**	#VALUE!
243	12.15	**39.86**	**0 C**	20.82	**0 C**	---	**0 C**	---	**0 C**	4.12		**6 S**	<1>	4.48	**0.79**	**0 C**	#NUM!	**0 C**	#NUM!	**0 C**	#VALUE!
244	12.20	**40.03**	**0 C**	20.88	**0 C**	---	**0 C**	---	**0 C**	4.14		**6 S**	<1>	4.41	**1.01**	**0 C**	#NUM!	**0 C**	#NUM!	**0 C**	#VALUE!
245	12.25	**40.19**	**0 C**	20.94	**0 C**	---	**0 C**	---	**0 C**	4.16		**6 S**	<1>	4.34	**1.17**	**0 C**	#NUM!	**0 C**	#NUM!	**0 C**	#VALUE!
246	12.30	**40.35**	**0 C**	21.00	**0 C**	---	**0 C**	---	**0 C**	4.18		**6 S**		4.36	**1.65**	**0 C**	#NUM!	**0 C**	#NUM!	**0 C**	#VALUE!
247	12.35	**40.52**	**0 C**	21.06	**0 C**	---	**0 C**	---	**0 C**	4.20		**6 S**		4.37	**1.87**	**0 C**	#NUM!	**0 C**	#NUM!	**0 C**	#VALUE!
248	12.40	**40.68**	**0 C**	21.12	**0 C**	---	**0 C**	---	**0 C**	4.22		**6 S**		4.39	**1.64**	**0 C**	#NUM!	**0 C**	#NUM!	**0 C**	#VALUE!
249	12.45	**40.85**	**0 C**	21.18	**0 C**	---	**0 C**	---	**0 C**	4.24		**6 S**	<1>	4.32	**1.22**	**0 C**	#NUM!	**0 C**	#NUM!	**0 C**	#VALUE!
250	12.50	**41.01**	**0 C**	21.24	**0 C**	---	**0 C**	---	**0 C**	4.26		**6 S**	<1>	4.25	**0.98**	**0 C**	#NUM!	**0 C**	#NUM!	**0 C**	#VALUE!
251	12.55	**41.17**	**0 C**	21.30	**0 C**	---	**0 C**	---	**0 C**	4.28		**6 S**	<1>	4.19	**0.92**	**0 C**	#NUM!	**0 C**	#NUM!	**0 C**	#VALUE!
252	12.60	**41.34**	**0 C**	21.35	**0 C**	---	**0 C**	---	**0 C**	4.30		**6 S**	<1>	4.13	**0.73**	**0 C**	#NUM!	**0 C**	#NUM!	**0 C**	#VALUE!
253	12.65	**41.50**	**0 C**	21.41	**0 C**	---	**0 C**	---	**0 C**	4.32		**6 S**	<1>	4.07	**0.90**	**0 C**	#NUM!	**0 C**	#NUM!	**0 C**	#VALUE!
254	12.70	**41.67**	**0 C**	21.47	**0 C**	---	**0 C**	---	**0 C**	4.34		**6 S**	<1>	4.01	**0.77**	**0 C**	#NUM!	**0 C**	#NUM!	**0 C**	#VALUE!
255	12.75	**41.83**	**0 C**	21.53	**0 C**	---	**0 C**	---	**0 C**	4.36		**6 S**	<1>	3.95	**0.50**	**0 C**	#NUM!	**0 C**	#NUM!	**0 C**	#VALUE!
256	12.80	**41.99**	**0 C**	21.59	**0 C**	---	**0 C**	---	**0 C**	4.38		**6 S**	<1>	3.89	**0.34**	**0 C**	#NUM!	**0 C**	#NUM!	**0 C**	#VALUE!
257	12.85	**42.16**	**0 C**	21.65	**0 C**	---	**0 C**	---	**0 C**	4.40		**5 M**	<1>	3.84	**0.28**	**0 C**	#NUM!	**0 C**	#NUM!	**0 C**	#VALUE!
258	12.90	**42.32**	**0 C**	21.71	**0 C**	---	**0 C**	---	**0 C**	4.42		**5 M**	<1>	3.79	**0.24**	**0 C**	#NUM!	**0 C**	#NUM!	**0 C**	#VALUE!
259	12.95	**42.49**	**0 C**	21.77	**0 C**	---	**0 C**	---	**0 C**	4.44		**5 M**	<1>	3.74	**0.24**	**0 C**	#NUM!	**0 C**	#NUM!	**0 C**	#VALUE!
260	13.00	**42.65**	**0 C**	21.82	**0 C**	---	**0 C**	---	**0 C**	4.46		**5 M**	<1>	3.69	**0.24**	**0 C**	#NUM!	**0 C**	#NUM!	**0 C**	#VALUE!
261	13.05	**42.81**	**0 C**	21.88	**0 C**	---	**0 C**	---	**0 C**	4.48		**5 M**	<1>	3.64	**0.25**	**0 C**	#NUM!	**0 C**	#NUM!	**0 C**	#VALUE!
262	13.10	**42.98**	**0 C**	21.94	**0 C**	---	**0 C**	---	**0 C**	4.50		**5 M**	<1>	3.59	**0.25**	**0 C**	#NUM!	**0 C**	#NUM!	**0 C**	#VALUE!
263	13.15	**43.14**	**0 C**	22.00	**0 C**	---	**0 C**	---	**0 C**	4.52		**5 M**	<1>	3.54	**0.25**	**0 C**	#NUM!	**0 C**	#NUM!	**0 C**	#VALUE!
264	13.20	**43.31**	**0 C**	22.06	**0 C**	---	**0 C**	---	**0 C**	4.54		**5 M**	<1>	3.50	**0.25**	**0 C**	#NUM!	**0 C**	#NUM!	**0 C**	#VALUE!
265	13.25	**43.47**	**0 C**	22.12	**0 C**	---	**0 C**	---	**0 C**	4.55		**5 M**	<1>	3.46	**0.26**	**0 C**	#NUM!	**0 C**	#NUM!	**0 C**	#VALUE!
266	13.30	**43.64**	**0 C**	22.18	**0 C**	---	**0 C**	---	**0 C**	4.57		**5 M**	<1>	3.41	**0.28**	**0 C**	#NUM!	**0 C**	#NUM!	**0 C**	#VALUE!
267	13.35	**43.80**	**0 C**	22.24	**0 C**	---	**0 C**	---	**0 C**	4.59		**5 M**	<1>	3.37	**0.28**	**0 C**	#NUM!	**0 C**	#NUM!	**0 C**	#VALUE!
268	13.40	**43.96**	**0 C**	22.30	**0 C**	---	**0 C**	---	**0 C**	4.61		**5 M**	<1>	3.33	**0.28**	**0 C**	#NUM!	**0 C**	#NUM!	**0 C**	#VALUE!
269	13.45	**44.13**	**0 C**	22.35	**0 C**	---	**0 C**	---	**0 C**	4.63		**5 M**	<1>	3.29	**0.27**	**0 C**	#NUM!	**0 C**	#NUM!	**0 C**	#VALUE!
270	13.50	**44.29**	**0 C**	22.41	**0 C**	---	**0 C**	---	**0 C**	4.65		**5 M**	<1>	3.25	**0.29**	**0 C**	#NUM!	**0 C**	#NUM!	**0 C**	#VALUE!
271	13.55	**44.46**	**0 C**	22.47	**0 C**	---	**0 C**	---	**0 C**	4.67		**5 M**	<1>	3.21	**0.34**	**0 C**	#NUM!	**0 C**	#NUM!	**0 C**	#VALUE!
272	13.60	**44.62**	**0 C**	22.53	**0 C**	---	**0 C**	---	**0 C**	4.69		**5 M**	<1>	3.18	**0.38**	**0 C**	#NUM!	**0 C**	#NUM!	**0 C**	#VALUE!
273	13.65	**44.78**	**0 C**	22.59	**0 C**	---	**0 C**	---	**0 C**	4.71		**5 M**	<1>	3.14	**0.54**	**0 C**	#NUM!	**0 C**	#NUM!	**0 C**	#VALUE!
274	13.70	**44.95**	**0 C**	22.65	**0 C**	---	**0 C**	---	**0 C**	4.73		**6 S**	<1>	3.11	**0.64**	**0 C**	#NUM!	**0 C**	#NUM!	**0 C**	#VALUE!
275	13.75	**45.11**	**0 C**	22.71	**0 C**	---	**0 C**	---	**0 C**	4.75		**6 S**	<1>	3.07	**0.77**	**0 C**	#NUM!	**0 C**	#NUM!	**0 C**	#VALUE!
276	13.80	**45.28**	**0 C**	22.77	**0 C**	---	**0 C**	---	**0 C**	4.77		**6 S**		3.08	**1.52**	**0 C**	#NUM!	**0 C**	#NUM!	**0 C**	#VALUE!
277	13.85	**45.44**	**0 C**	22.82	**0 C**	---	**0 C**	---	**0 C**	4.79		**6 S**		3.09	**2.24**	**0 C**	#NUM!	**0 C**	#NUM!	**0 C**	#VALUE!
278	13.90	**45.60**	**0 C**	22.88	**0 C**	---	**0 C**	---	**0 C**	4.81		**6 S**		3.10	**2.78**	**0 C**	#NUM!	**0 C**	#NUM!	**0 C**	#VALUE!
279	13.95	**45.77**	**0 C**	22.94	**0 C**	---	**0 C**	---	**0 C**	4.83		**6 S**		3.12	**3.09**	**0 C**	#NUM!	**0 C**	#NUM!	**0 C**	#VALUE!
280	14.00	**45.93**	**0 C**	23.00	**0 C**	---	**0 C**	---	**0 C**	4.85		**6 S**		3.13	**2.39**	**0 C**	#NUM!	**0 C**	#NUM!	**0 C**	#VALUE!
281	14.05	**46.10**	**0 C**	23.06	**0 C**	---	**0 C**	---	**0 C**	4.87		**6 S**		3.14	**1.97**	**0 C**	#NUM!	**0 C**	#NUM!	**0 C**	#VALUE!
282	14.10	**46.26**	**0 C**	23.12	**0 C**	---	**0 C**	---	**0 C**	4.89		**6 S**		3.15	**2.48**	**0 C**	#NUM!	**0 C**	#NUM!	**0 C**	#VALUE!
283	14.15	**46.42**	**0 C**	23.18	**0 C**	---	**0 C**	---	**0 C**	4.91		**6 S**		3.16	**1.88**	**0 C**	#NUM!	**0 C**	#NUM!	**0 C**	#VALUE!
284	14.20	**46.59**	**0 C**	23.24	**0 C**	---	**0 C**	---	**0 C**	4.93		**6 S**		3.17	**1.33**	**0 C**	#NUM!	**0 C**	#NUM!	**0 C**	#VALUE!
285	14.25	**46.75**	**0 C**	23.30	**0 C**	---	**0 C**	---	**0 C**	4.95		**6 S**		3.18	**1.47**	**0 C**	#NUM!	**0 C**	#NUM!	**0 C**	#VALUE!
286	14.30	**46.92**	**0 C**	23.35	**0 C**	---	**0 C**	---	**0 C**	4.97		**6 S**	<1>	3.15	**1.08**	**0 C**	#NUM!	**0 C**	#NUM!	**0 C**	#VALUE!
287	14.35	**47.08**	**0 C**	23.41	**0 C**	---	**0 C**	---	**0 C**	4.99		**5 M**	<1>	3.11	**1.10**	**0 C**	#NUM!	**0 C**	#NUM!	**0 C**	#VALUE!
288	14.40	**47.24**	**0 C**	23.47	**0 C**	---	**0 C**	---	**0 C**	5.01		**5 M**	<1>	3.08	**0.84**	**0 C**	#NUM!	**0 C**	#NUM!	**0 C**	#VALUE!
289	14.45	**47.41**	**0 C**	23.53	**0 C**	---	**0 C**	---	**0 C**	5.03		**5 M**	<1>	3.05	**1.00**	**0 C**	#NUM!	**0 C**	#NUM!	**0 C**	#VALUE!
290	14.50	**47.57**	**0 C**	23.59	**0 C**	---	**0 C**	---	**0 C**	5.04		**5 M**	<1>	3.02	**0.88**	**0 C**	#NUM!	**0 C**	#NUM!	**0 C**	#VALUE!
291	14.55	**47.74**	**0 C**	23.65	**0 C**	---	**0 C**	---	**0 C**	5.06		**5 M**	<1>	2.98	**0.76**	**0 C**	#NUM!	**0 C**	#NUM!	**0 C**	#VALUE!
292	14.60	**47.90**	**0 C**	23.71	**0 C**	---	**0 C**	---	**0 C**	5.08		**5 M**	<1>	2.95	**0.74**	**0 C**	#NUM!	**0 C**	#NUM!	**0 C**	#VALUE!
293	14.65	**48.06**	**0 C**	23.77	**0 C**	---	**0 C**	---	**0 C**	5.10		**5 M**	<1>	2.92	**0.59**	**0 C**	#NUM!	**0 C**	#NUM!	**0 C**	#VALUE!
294	14.70	**48.23**	**0 C**	23.82	**0 C**	---	**0 C**	---	**0 C**	5.12		**5 M**	<1>	2.89	**0.38**	**0 C**	#NUM!	**0 C**	#NUM!	**0 C**	#VALUE!
295	14.75	**48.39**	**0 C**	23.88	**0 C**	---	**0 C**	---	**0 C**	5.14		**5 M**	<1>	2.86	**0.31**	**0 C**	#NUM!	**0 C**	#NUM!	**0 C**	#VALUE!
296	14.80	**48.56**	**0 C**	23.94	**0 C**	---	**0 C**	---	**0 C**	5.16		**5 M**	<1>	2.84	**0.31**	**0 C**	#NUM!	**0 C**	#NUM!	**0 C**	#VALUE!
297	14.85	**48.72**	**0 C**	24.00	**0 C**	---	**0 C**	---	**0 C**	5.18		**4 C**		2.85	**NL**	**0 C**	#NUM!	**0 C**	#NUM!	**0 C**	#VALUE!
298	14.90	**48.88**	**0 C**	24.06	**0 C**	---	**0 C**	---	**0 C**	5.20		**3 C**		2.86	**NL**	**0 C**	#NUM!	**0 C**	#NUM!	**0 C**	#VALUE!
299	14.95	**49.05**	**0 C**	24.12	**0 C**	---	**0 C**	---	**0 C**	5.22		**4 C**		2.87	**NL**	**0 C**	#NUM!	**0 C**	#NUM!	**0 C**	#VALUE!
300	15.00	**49.21**	**0 C**	24.18	**0 C**	---	**0 C**	---	**0 C**	5.24		**4 C**		2.88	**NL**	**0 C**	#NUM!	**0 C**	#NUM!	**0 C**	#VALUE!
301	15.05	**49.38**	**0 C**	24.24	**0 C**	---	**0 C**	---	**0 C**	5.26		**5 M**	1	2.85	**0.32**	**0 C**	#NUM!	**0 C**	#NUM!	**0 C**	#VALUE!
302	15.10	**49.54**	**0 C**	24.30	**0 C**	---	**0 C**	---	**0 C**	5.28		**6 S**	1	2.82	**0.38**	**0 C**	#NUM!	**0 C**	#NUM!	**0 C**	#VALUE!
303	15.15	**49.70**	**0 C**	24.35	**0 C**	---	**0 C**	---	**0 C**	5.30		**6 S**	1	2.79	**0.37**	**0 C**	#NUM!	**0 C**	#NUM!	**0 C**	#VALUE!
304	15.20	**49.87**	**0 C**	24.41	**0 C**	---	**0 C**	---	**0 C**	5.32		**5 M**	1	2.77	**0.32**	**0 C**	#NUM!	**0 C**	#NUM!	**0 C**	#VALUE!
305	15.25	**50.03**	**0 C**	24.47	**0 C**	---	**0 C**	---	**0 C**	5.34		**5 M**	1	2.74	**0.30**	**0 C**	#NUM!	**0 C**	#NUM!	**0 C**	#VALUE!
306	15.30	**50.20**	**0 C**	24.53	**0 C**	---	**0 C**	---	**0 C**	5.36		**5 M**	1	2.71	**0.29**	**0 C**	#NUM!	**0 C**	#NUM!	**0 C**	#VALUE!
307	15.35	**50.36**	**0 C**	24.59	**0 C**	---	**0 C**	---	**0 C**	5.38		**5 M**	1	2.69	**0.29**	**0 C**	#NUM!	**0 C**	#NUM!	**0 C**	#VALUE!
308	15.40	**50.52**	**0 C**	24.65	**0 C**	---	**0 C**	---	**0 C**	5.40		**0 C**		2.70		**0 C**	#NUM!	**0 C**	#NUM!	**0 C**	#VALUE!
309	15.45	**50.69**	**0 C**	24.71	**0 C**	---	**0 C**	---	**0 C**	5.42		**0 C**		2.71		**0 C**	#NUM!	**0 C**	#NUM!	**0 C**	#VALUE!
310	15.50	**50.85**	**0 C**	24.77	**0 C**	---	**0 C**	---	**0 C**	5.44		**0 C**		2.72		**0 C**	#NUM!	**0 C**	#NUM!	**0 C**	#VALUE!

GREGG DRILLING & TESTING, INC.

SCPT-1

Average Unit Weight (psf)	120.00
Depth to Water (ft)	51.00

Interval Depth (ft)	Interval Velocity (ft/sec)	Vs (m/s)	Total Stress (psf)	Effective Stress (psf)	Effective Stress (kpa)	(Pa/∂')	(Pa/∂')0.25	Vsi (m/s)
4.9	9.8	719.7	588.0	588.0	28.1	3.6	1.4	988.1
9.8	14.9	699.7	1176.0	1176.0	56.3	1.8	1.2	807.8
14.9	20	964.1	1788.0	1788.0	85.6	1.2	1.0	1002.3
20	24.4	690.1	2400.0	2400.0	114.9	0.9	1.0	666.6
24.4	29.9	3274.6	2928.0	2928.0	140.2	0.7	0.9	3009.5
29.9	34.4	965.7	3588.0	3588.0	171.8	0.6	0.9	843.6
34.4	35.8	689.9	4128.0	4128.0	197.6	0.5	0.8	581.9

GREGG DRILLING & TESTING, INC.

SCPT-2

Average Unit Weight (psf)	120.00
Depth to Water (ft)	55.00

Interval Depth (ft)	Interval Velocity (ft/sec)	Vs (m/s)	Total Stress (psf)	Effective Stress (psf)	Effective Stress (kpa)	(Pa/∂')	(Pa/∂')0.25	Vsi (m/s)
5.1	9.7	1051.5	612.0	612.0	29.3	3.4	1.4	1429.2
9.7	14.8	959.3	1164.0	1164.0	55.7	1.8	1.2	1110.3
14.8	19.7	989.5	1776.0	1776.0	85.0	1.2	1.0	1030.5
19.7	24.6	1055.3	2364.0	2364.0	113.2	0.9	1.0	1023.2

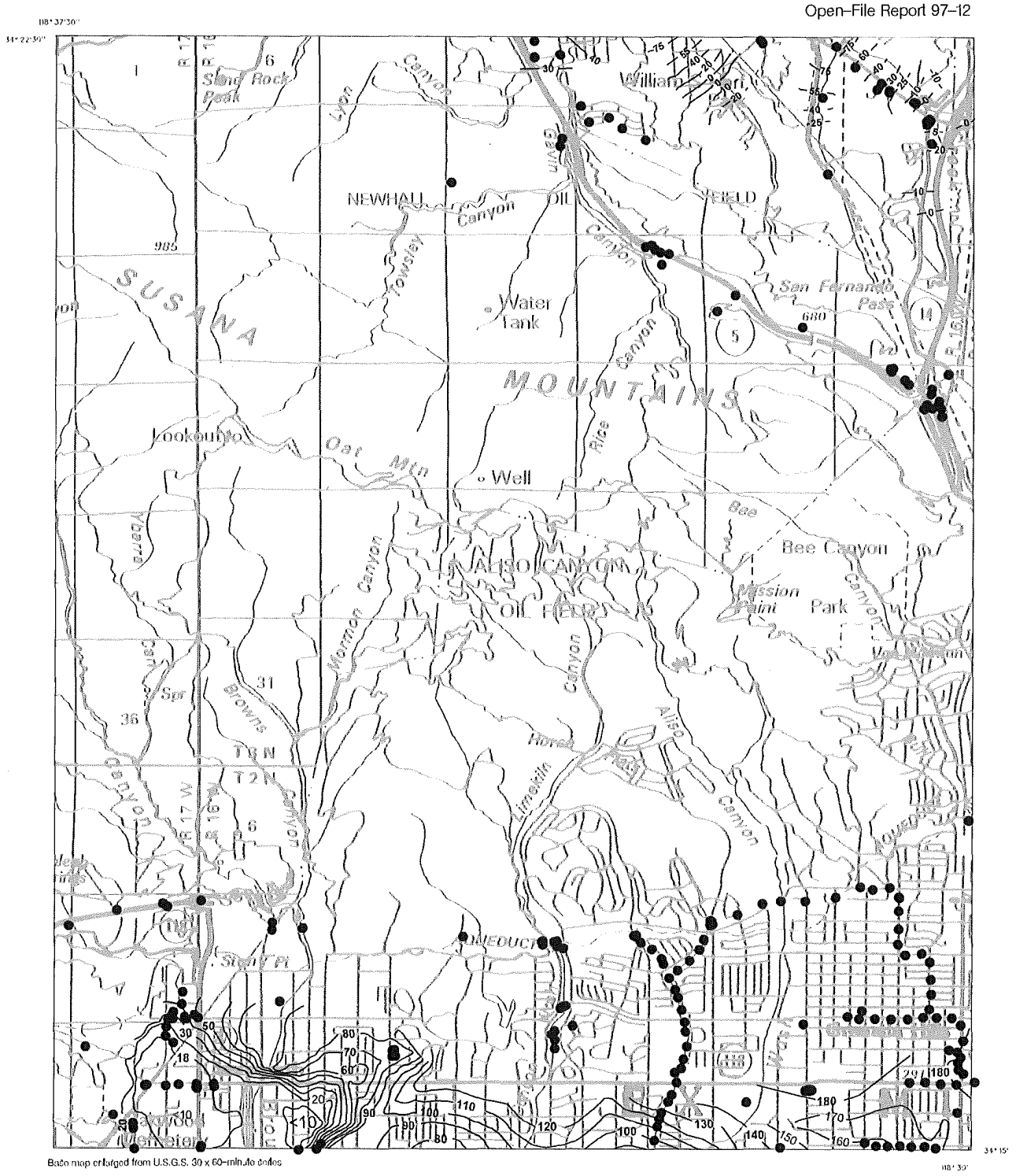
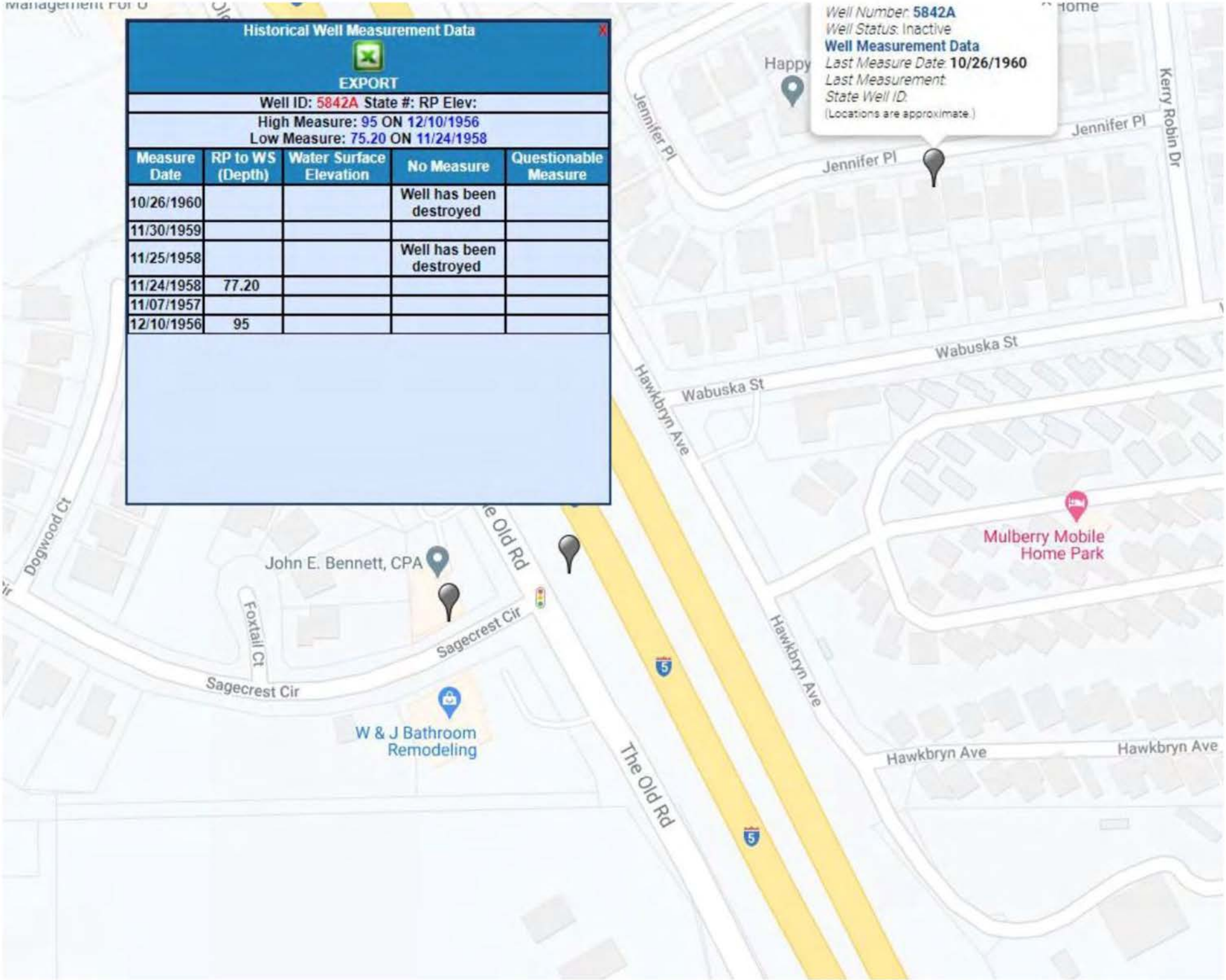


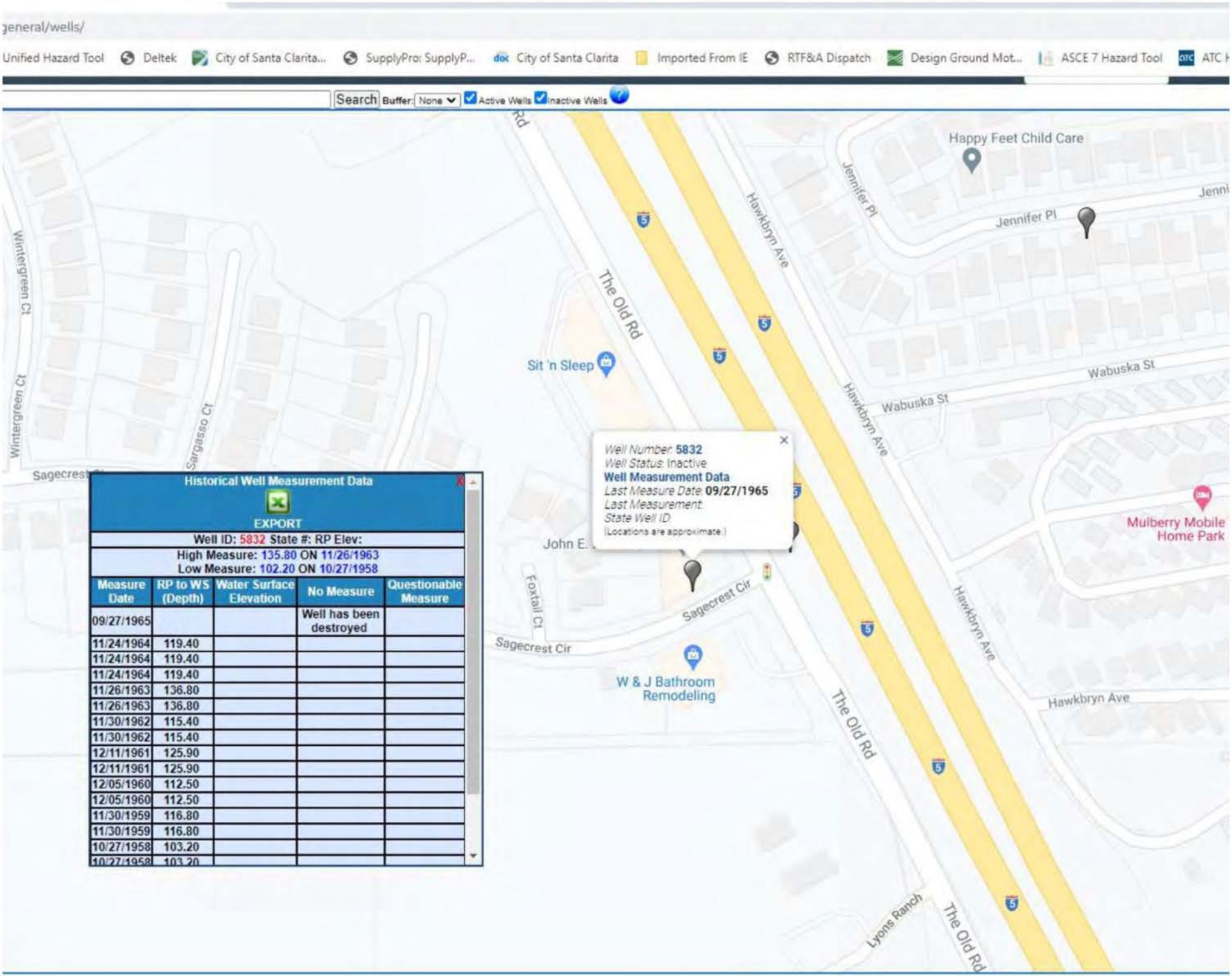
Plate 1.2 Historically Highest Ground Water Contours and Borehole Log Data Locations, Oat Mountain 7.5-minute Quadrangle, California.

● Borehole Site

30 Depth to ground water in feet

ONE MILE
SCALE


Historical Well Measurement Data
EXPORT
Well ID: 5842A State #: RP Elev:
High Measure: 95 ON 12/10/1956
Low Measure: 75.20 ON 11/24/1958
Measure Date | RP to WS (Depth) | Water Surface Elevation | No Measure | Questionable Measure
10/26/1960 | | | Well has been destroyed |
11/30/1959 | | | |
11/25/1958 | | | Well has been destroyed |
11/24/1958 | 77.20 | | |
11/07/1957 | | | |
12/10/1956 | 95 | | |
Well Number: 5842A
Well Status: Inactive
Well Measurement Data
Last Measure Date: 10/26/1960
Last Measurement:
State Well ID:
(Locations are approximate.)
Happy
Jennifer Pl
Jennifer Pl
Kerry Robin Dr
Wabuska St
Wabuska St
Hawkbryn Ave
Mulberry Mobile Home Park
Dogwood Ct
John E. Bennett, CPA
Foxtail Ct
Sagecrest Cir
Sagecrest Cir
W & J Bathroom Remodeling
The Old Rd
Hawkbryn Ave
Hawkbryn Ave
Hawkbryn Ave
5
5



Measure Date	RP to WS (Depth)	Water Surface Elevation	No Measure	Questionable Measure
09/27/1965			Well has been destroyed	
11/24/1964	119.40			
11/24/1964	119.40			
11/24/1964	119.40			
11/26/1963	136.80			
11/26/1963	136.80			
11/30/1962	115.40			
11/30/1962	115.40			
12/11/1961	125.90			
12/11/1961	125.90			
12/05/1960	112.50			
12/05/1960	112.50			
11/30/1959	116.80			
11/30/1959	116.80			
10/27/1958	103.20			
10/27/1958	103.20			

NUWI – Lyons Canyon, LLC
September 15, 2023
2020-200-001

APPENDIX H

AYERS OIL WELL DOCUMENTATION

RTF&A
GEOTECHNICAL ENGINEERING & ENGINEERING GEOLOGY

GEOPHYSICAL EVALUATION

LYONS CANYON RANCH WELL

Santa Clarita, California

PREPARED FOR:
Qtative Development Solutions
100 Spectrum Center Drive, Suite 1400
Irvine, CA 92618

PREPARED BY:
Atlas Technical Consultants, LLC
6280 Riverdale Street
San Diego, CA 92120

December 28, 2020

6280 Riverdale Street
San Diego, CA 92120
877.215.4321 | oneatlas.com

December 28, 2020

Atlas No. 120513SWG
Report No. 1

MR. DEREK BARBOUR
QTATIVE DEVELOPMENT SOLUTIONS
100 SPECTRUM DRIVE, SUITE 1400
IRVINE, CALIFORNIA 92618

Subject: Geophysical Evaluation
Lyons Canyon Ranch Well
Santa Clarita, California

Dear Mr. Barbour:

In accordance with your authorization, Atlas has performed a geophysical evaluation pertaining to the Lyons Canyon Ranch Well project located in Santa Clarita, California. Specifically, our services included the performance of a magnetic (MAG) evaluation for portions of the property. The primary purpose of the study was to assess the presence and location of a former oil well within a study area designated by you and your office. Our services were conducted on December 9, 2020. This report presents the methodology, equipment used, analysis, and findings.

If you have any questions, please call us at 619.280.4321.

Respectfully submitted,
Atlas Technical Consultants LLC

REGISTERED PROFESSIONAL GEOPHYSICIST
PATRICK F. LEHRMANN
No. 1043
Exp. 1/31/2022
STATE OF CALIFORNIA

Evan C. Anderson
Senior Staff Geophysicist

Patrick F. Lehrmann, P.G., P.Gp.
Principal Geologist/Geophysicist

ECA:PFL:pfl:ds

Distribution: dbarbour@qtative.com

TABLE OF CONTENTS

FIGURES

1. INTRODUCTION

In accordance with your authorization, Atlas has performed a geophysical evaluation pertaining to the Lyons Canyon Ranch Well project located in Santa Clarita, California (Figure 1). Specifically, our services included the performance of a magnetic (MAG) evaluation for portions of the property. The primary purpose of the study was to assess the presence and location of former oil wells within three study areas designated by you and your office. Our services were conducted on December 9, 2020. This report presents the methodology, equipment used, analysis, and findings.

2. SCOPE OF SERVICES

Our scope of services included:

- Performance of magnetic evaluations across the study areas using a Geometrics G858 cesium vapor magnetometer, Schonstedt GA-52 magnetic gradiometer and a Trimble Pro XRS global positioning system (GPS) for spatial control.
- Compilation and analysis of the data collected.
- Site reconnaissance and mapping.
- Preparation of this report presenting our findings, conclusions, and recommendations.

3. SITE AND PROJECT DESCRIPTION

The project site is located at Lyons Canyon Ranch in Santa Clarita, California (Figure 1). The study site is currently a vacant and undeveloped lot. Based on historical images, former buildings and/or structures occupied areas adjacent to the study area. However, no structures are currently in the area. The site contains active trails, dirt roads, tall trees, grass and brush. Figure 3 depicts the general site conditions in the study areas.

Based on our discussions with you, it is our understanding that an oil well formerly occupied a portion of the property with GPS coordinates provided by DOGGR.

4. GEOPHYSICAL INSTRUMENTATION AND APPLICATIONS

Our evaluation included the use of a Geometrics G858 cesium vapor magnetometer and Schonstedt GA-52 magnetic gradiometer. These instruments provide real-time results and facilitates the delineation of subsurface ferrous metallic features.

4.1 GEOMETRICS G-858 MAGNETOMETER

The Geometrics G-858 cesium vapor magnetometer measures the strength of the earth's magnetic field and the superposed magnetic field of ferromagnetic materials in its vicinity. The precision of the instrument is approximately 1/10th gamma. The earth's field strength is roughly 46,676 gammas at this latitude. The earth's magnetic field is inclined in the direction of the north

magnetic pole. Because of this inclination, a buried ferromagnetic object generally is expressed as a paired anomaly with a positive (above background) slightly to the south and a negative slightly in the direction of magnetic north, whereas a long vertical ferromagnetic object (i.e., well) would generally be expressed as a positive (monopole). However, it should be noted that surface and subsurface metal objects (i.e., fence poles, fences, and metal debris) can influence the location and size of the magnetic response. In addition, the depth of burial can substantially change the amplitude and areal extent of the magnetic response. Typically, the pipe produces an alignment of high and low responses along the length of the feature. Detection depths of more than 20 feet are possible over large ferrous pipes.

4.2 SCHONSTEDT GA-52C MAGNETIC GRADIOMETER

The magnetic gradiometer has two fluxgate magnetic fixed sensors that are passed closely to and over the ground. When not near a magnetic object, that is, only in the earth's field, the instrument emits an audible sound signal at a low frequency. When the instrument passes over buried iron or steel objects, so that the field is significantly different at the two sensors, the frequency of the emitted sound increases. Frequency is a function of the gradient between the two sensors. The gradiometer is less sensitive to surface features than the single sensor magnetometers. Limitations may include obstructions from surface objects and interference from nearby ferrous magnetic objects.

5. SURVEY METHODOLOGY

Our evaluation of the site primarily included the collection of magnetic (MAG) data using a cesium vapor magnetometer. The MAG data were collected in conjunction with a Trimble Pro XRS Global Positioning System (GPS) with sub-meter accuracy for spatial control. Measurements were collected at 0.2-second intervals along generally north-south and/or east-west traverses spaced approximately 10 feet apart across the study areas. Collected MAG data were downloaded to a portable computer in the field for preliminary analysis. The gradiometer was used to delineate the surface expression of anomalies detected during the MAG study. Detected anomalies were delineated on the surface with pin feathers and/or flags.

6. FINDINGS AND CONCLUSIONS

The primary purpose of our study was to evaluate the presence and location of an abandoned oil well within the designated study area through the collection of magnetic data. The results of the MAG study are presented in Figure 2 with areas of high and low magnetic responses illustrated in the figures by hot (pink/red) and cool (blue/purple) colors, respectively. Our evaluation revealed a significant candidate oil well anomaly in the study area.

The candidate oil well anomaly is located towards the western portion of the study area. The anomaly was found roughly 30 feet northwest of a former excavation and survey stake, and approximately 30 feet southwest of the DOGGR coordinates for the abandoned well. The anomaly produced a relatively high amplitude monopole magnetic response in the shape of a bull's eye

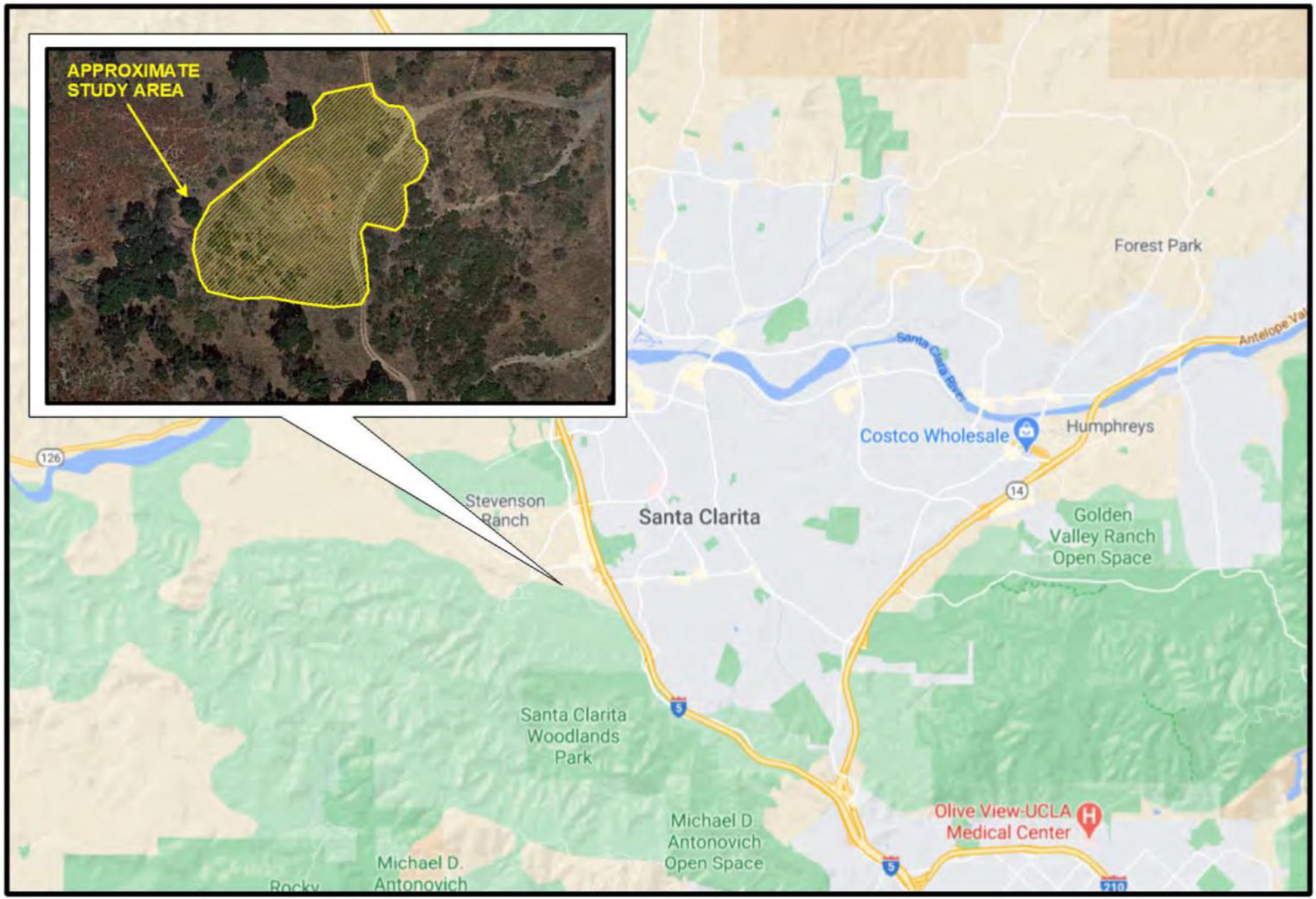
(Figure 2). This feature is similar in magnetic response and shape to former magnetic studies which revealed buried oil wells. Using the Peter's half-slope method and straight slope method, the top and/or cap of the oil well was estimated between 7 ½ feet to 11 feet below the ground surface. Figure 4 details the approach to this estimate.

Our survey utilized industry standard equipment (i.e. magnetic instruments) and was conducted in general accordance with current practice. It should be noted, however, that the presence of existing structures and surface objects (i.e., buildings, metal fences, manholes, etc.) potentially limited the survey. Where obstructions were present subsurface data could not be collected. Moreover, magnetic responses produced by metal surface objects and underground lines can potentially obscure subsurface features.

7. LIMITATIONS

The field evaluation and geophysical analyses presented in this report have been conducted in general accordance with current practice and the standard of care exercised by consultants performing similar tasks in the project area. No warranty, express or implied, is made regarding the conclusions and opinions presented in this report. There is no evaluation detailed enough to reveal every subsurface condition. Variations may exist, and conditions not observed or described in this report may be present. Uncertainties relative to subsurface conditions can be reduced through additional subsurface exploration. Additional subsurface surveying will be performed upon request.

This document is intended to be used only in its entirety. No portion of the document, by itself, is designed to completely represent any aspect of the project described herein. Atlas should be contacted if the reader requires additional information or has questions regarding the content, interpretations presented, or completeness of this document. This report is intended exclusively for use by the client. Any use or reuse of the findings, conclusions, and/or recommendations of this report by parties other than the client is undertaken at said parties' sole responsibility.



SITE LOCATION MAP

N

Lyons Canyon Ranch Well
Santa Clarita, California

Project No.: 120513SWG | Date: 12/20

ATLAS

Figure 1

DOGGR GPS location

Candidate Oil Well Anomaly

Survey Stake/Former Excavation

12480250
12480230
12480210
12480190
12480170
12480150
12480130
12480110
12480090
12480070
12480050
12480030
12480010
12479990
12479970
12479950

1168120 1168140 1168160 1168180 1168200 1168220 1168240 1168260 1168280 1168300 1168320 1168340 1168360 1168380 1168400 1168420

57000
54000
51000
48000
45000
42000

MAG Data
(in gammas)

GIS Coordinate System:

System = UTM
Zone = 11 north
Datum = NAD 1983 (Conus)
Coordinate Units = Feet

SITE DATA MAP
MAG Data CI= 1000 gammas

N

Lyons Canyon Ranch Well
Santa Clarita, California

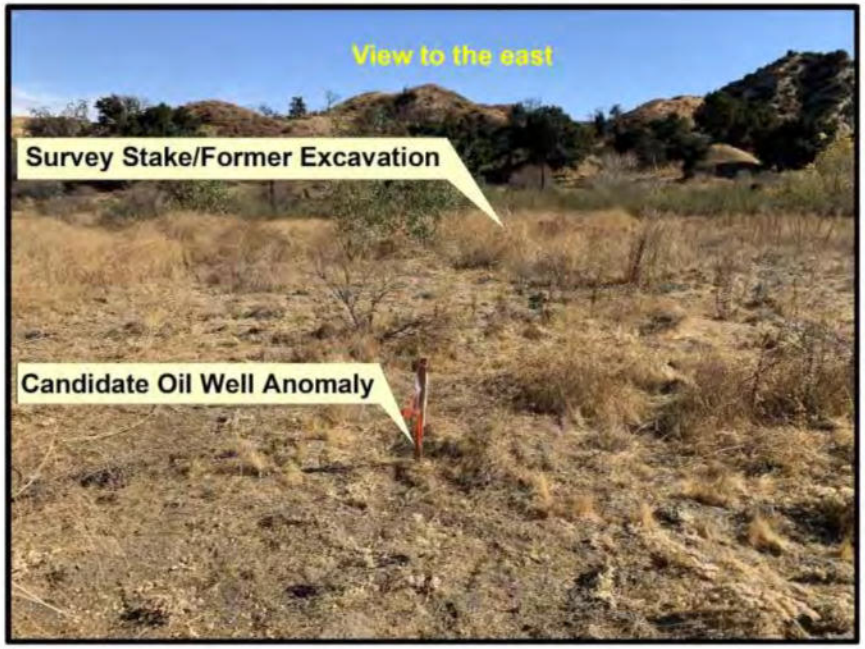
Project No.: 120513SWG | Date: 12/20

ATLAS

Figure 2

0 40 80 120 160

approximate scale in feet



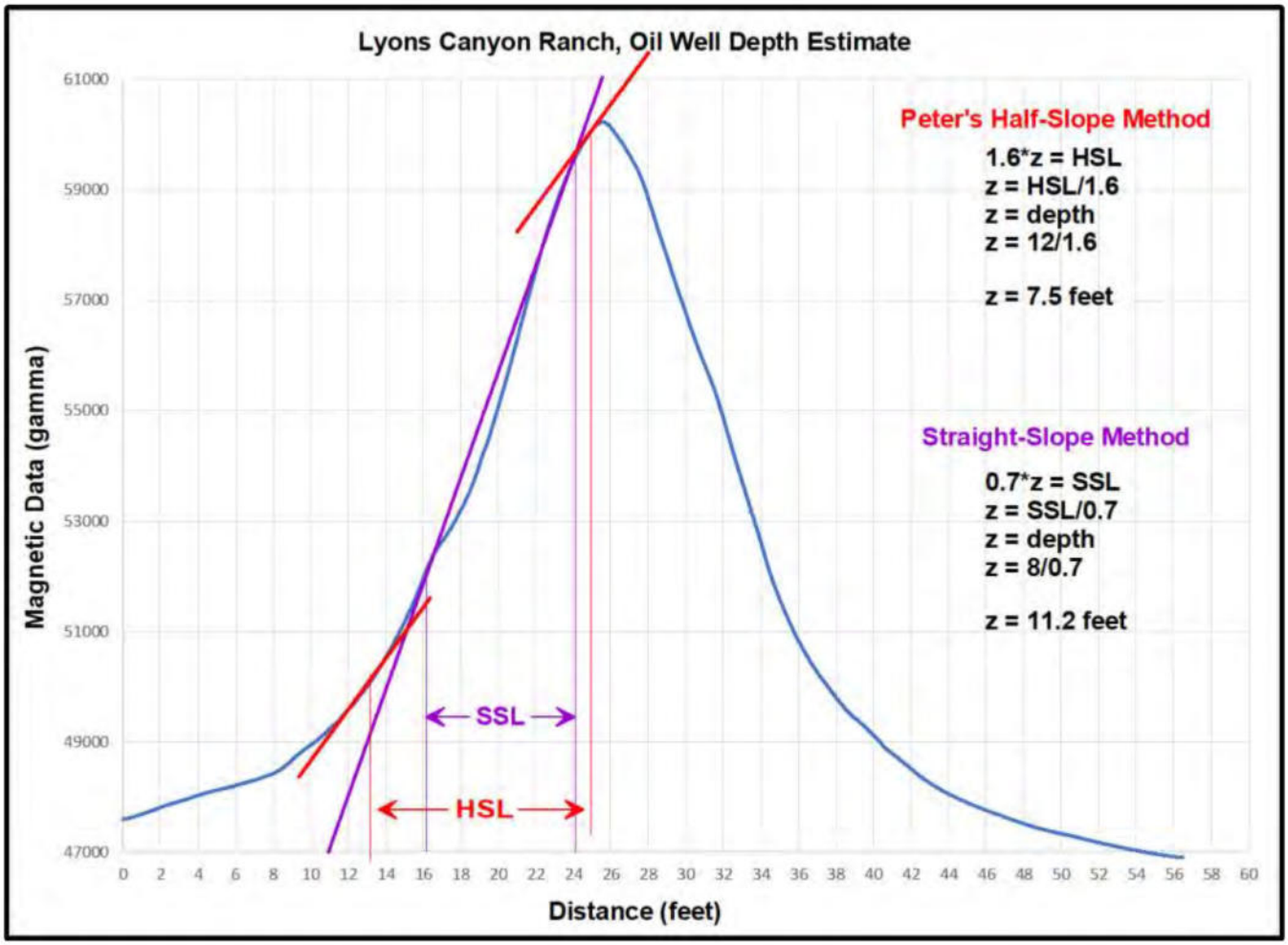
SITE PHOTOGRAPHS

Lyons Canyon Ranch Well
Santa Clarita, California

Project No.: 120513SWG | Date: 12/20

ATLAS

Figure 3



OIL WELL DEPTH ESTIMATE	Lyons Canyon Ranch Well Santa Clarita, California	ATLAS Figure 4
	Project No.: 120513SWG / Date: 12/20	

NUWI – Lyons Canyon, LLC
September 15, 2023
2020-200-001

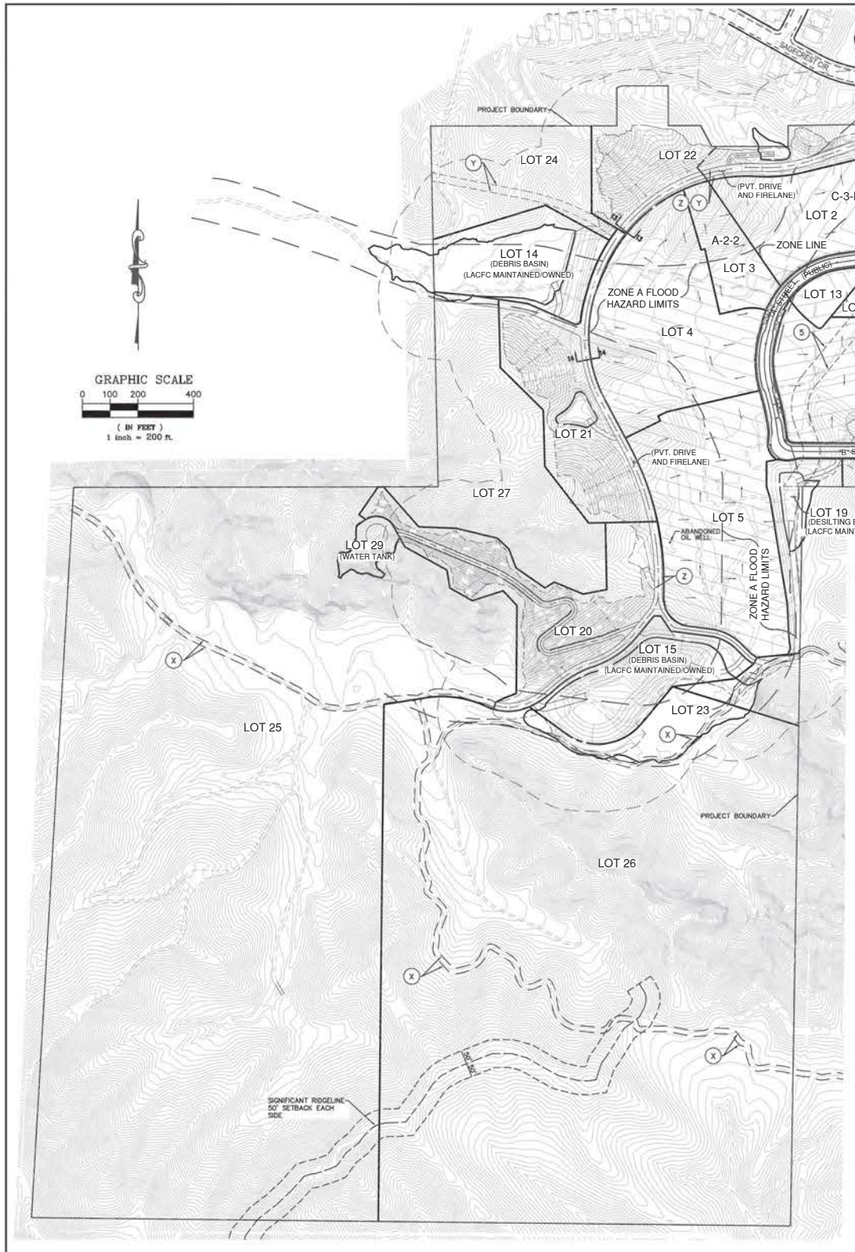
APPENDIX I

UNITED CIVIL PLAN SET
TRACT 83301

SHEETS 1-5 OF 5

DATED SEPTEMBER 5, 2023

RTF&A
GEOTECHNICAL ENGINEERING & ENGINEERING GEOLOGY



ABBREVIATIONS:

AC	ACRES
EX	EXISTING
FF	FINISH FLOOR
GB	GRADE BREAK
H.L.	HOUSE LATERAL
HP	HIGH POINT
L	LENGTH
MIN	MINIMUM
P/L	PROPERTY LINE
PROP	PROPOSED
R	RADIUS
R/W	RIGHT OF WAY
SF	SQUARE FEET
SD	STORM DRAIN
SS	SANITARY SEWER
TBI	TO BE IMPACTED
TBR	TO BE REMOVED
VC	VERTICAL CURVE
W	WATER

EARTHWORK SUMMARY:

CUT: 1,500,000 CY
FILL: 1,300,000 CY
OVEREXCAVATION 1,345,000 CY
SHRINKAGE ON OVEREX (15%)=200,000 CY
IMPORT/EXPORT: (1,500,000 CY – 1,300,000 – 200,000 CY) = 0 CY

TOTAL EARTHWORK (1,500,000 CY+1,345,000 CY) = 2,845,000 CY

UTILITY PROVIDERS

SEWER:	LOS ANGELES SANITATION DISTRICT
WATER:	SANTA CLARITA VALLEY WATER AGENCY
ELECTRICAL:	SOUTHERN CALIFORNIA EDISON COMPANY
GAS:	SOUTHERN CALIFORNIA GAS COMPANY
TELEPHONE:	AT&T
CABLE TV:	CHARTER
SCHOOLS:	NEWHALL SCHOOL DISTRICT & WILLIAM S. HART UNION HIGH SCHOOL DISTRICT

ASSESSOR'S PARCEL NUMBERS:

2826–022–026, –027, –035; 2826–023–014; 2826–041–039;

LEGAL DESCRIPTION

PARCEL 1:

A PORTION OF LOT 31, TRACT NO. 43793, IN THE COUNTY OF LOS ANGELES, STATE OF CALIFORNIA, AS PER MAP RECORDED IN BOOK 1072, PAGES 1 THROUGH 7, INCLUSIVE, OF MAPS, AND PORTIONS OF LOT 7 AND PORTIONS OF SECTIONS 4 AND 9, TOWNSHIP 3 NORTH, RANGE 16 WEST, S.B.M., IN THE COUNTY OF LOS ANGELES, STATE OF CALIFORNIA.

APN: 2826–022–027 AND 2826–022–035 AND 2826–023–014 AND 2826–041–039

PARCEL 2:

THE SOUTHEAST ONE–FOURTH OF THE SOUTHEAST ONE–FOURTH OF THE SOUTHWEST ONE–FOURTH OF SECTION 4, TOWNSHIP 3 NORTH, RANGE 16 WEST, ACCORDING TO OFFICIAL PLAT OF THE SURVEY OF SAID LAND ON FILE IN THE BUREAU OF LAND MANAGEMENT.

APN: 2826–022–026

BENCHMARK

NEWHALL (2018) L 5370

DESCRIPTION: LACO BM TAG IN SE CB RET 10' N/O BCR 40' S/O C/L ONRAMP SFRWY SO & 39' E/O C/L CALGROVE BL

ELEVATION 1,339.015'

LOT SUMMARY

ZONE	LOT NO.	PRODUCT	GROSS ACREAGE	NET ACREAGE	NO. OF BUILDINGS	UNITS	DENSITY
* A–2–2	LOT 1	LANDSCAPE/ OPEN SPACE	0.06	0.04	0	0	0.0 DU/AC
C–3–DP	LOT 2	3–STORY ATTACHED CONDOS	4.64	3.88	14	87	18.8 DU/AC
A–2–2	LOT 3	3–STORY ATTACHED CONDOS	1.84	1.38	5	20	10.9 DU/AC
A–2–2	LOT 4	3–STORY DETACHED CONDOS	7.79	6.66	105	105	13.5 DU/AC
A–2–2	LOT 5	2–STORY DETACHED CONDOS	8.50	7.47	70	70	8.2 DU/AC
A–2–2	LOT 6	2–STORY DETACHED CONDOS	9.07	8.40	78	78	8.6 DU/AC
A–2–1	LOT 7	2–STORY ATTACHED CONDOS	6.95	5.73	15	90	12.9 DU/AC
C–3	LOT 8	2–STORY ATTACHED CONDOS	0.78	0.70	1	6	7.7 DU/AC
A–2–1	LOT 9	2–STORY ATTACHED CONDOS	0.65	0.57	1	6	9.2 DU/AC
C–3–DP	LOT 10	AFFORDABLE SENIOR APARTMENTS	0.75	0.70	1	48	64.0 DU/AC
A–2–1	LOT 11	AFFORDABLE SENIOR APARTMENTS	0.51	0.30	0	0	
A–2–2	LOT 12	REC.CENTER	0.40	0.40	1	0	
C–3–DP	LOT 13	REC.CENTER	0.73	0.73	0	0	
A–2–2	LOT 14	DEBRIS BASIN (LACFC OWNED/MAINT.)	3.97	3.97	0	0	
A–2–2	LOT 15	DEBRIS BASIN (LACFC OWNED/MAINT.)	3.76	3.76	0	0	
A–2–1	LOT 16	HOA OPEN SPACE	0.86	0.86	0	0	
A–2–1	LOT 17	HOA OPEN SPACE	1.20	1.20	0	0	
A–2–2	LOT 18	HOA OPEN SPACE	1.63	1.63	0	0	
A–2–2	LOT 19	DEBRIS BASIN (LACFC OWNED/MAINT.)	1.62	1.62	0	0	
A–2–2	LOT 20	HOA OPEN SPACE	6.90	6.90	0	0	
A–2–2	LOT 21	HOA OPEN SPACE	5.53	5.53	0	0	
A–2–1 A–2–2 C–3 C–3–DP	LOT 22	HOA OPEN SPACE	6.14	6.14	0	0	
A–2–2	LOT 23	HOA OPEN SPACE	1.32	1.32	0	0	
A–2–2	LOT 24	NATURAL OPEN SPACE	4.63	4.63	0	0	
A–2–2	LOT 25	NATURAL OPEN SPACE	75.95	75.95	0	0	
A–2–2	LOT 26	NATURAL OPEN SPACE	62.94	62.94	0	0	
A–2–2	LOT 27	NATURAL OPEN SPACE	8.84	8.84	0	0	
A–2–1	LOT 28	WATER PRV	0.75	0.75	0	0	
A–2–2	LOT 29	WATER TANK	0.68	0.68	0	0	
		"A" & "B" STREET (PUBLIC)	4.10	4.10	0	0	
TOTAL	29		233.49	227.78	291	510	2.18 DU/AC

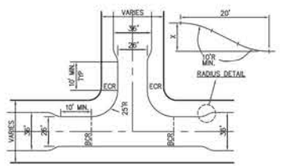
* UNDERSIZED LOT 1: TOTAL AREA = 2,490 SQ. FT

GENERAL NOTES

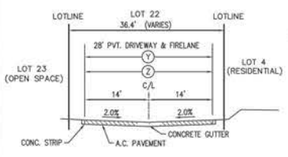
1. GROSS AREA: 233.49 ACRES NET AREA: 227.78 ACRES
2. EXISTING ZONING: A–2–1/A–2–2/C–3/C–3–DP
3. EXISTING SITE USE: VACANT
4. DEVELOPMENT TYPE: SINGLE AND MULTI–FAMILY RESIDENTIAL
5. TOTAL NUMBER OF RESIDENTIAL LOTS: 10
6. SMALLEST RESIDENTIAL LOT SIZE: 0.5 ACRES.
7. DEVELOPMENT IS LOCATED IN FIRE ZONE 4.
8. PRIVATE DRIVEWAY AND FIRE LANE GRADES: MIN. 0.5% MAX. 12.5%
9. TOPOGRAPHY IS BASED ON CONTROLLED TOPO W/ CONTOUR INTERVALS 5 FEET.
10. THE OLD ROAD HAS A VARIABLE WIDTH RIGHT–OF–WAY OFFERED FOR DEDICATION.
11. ALL SLOPES OVER 5 FEET IN HEIGHT ARE TO BE LANDSCAPED AND IRRIGATED WITH THE COUNTY APPROVED PLANTS AND GROUND COVER.
12. EXISTING LOS ANGELES COUNTY GENERAL PLAN: H2/SEA
13. EXISTING LA COUNTY SANTA CLARITA VALLEY AREA WIDE LOCAL PLAN: H2
14. THERE ARE OAK TREES EXISTING WITHIN PROJECT BOUNDARY
15. BOUNDARY LINE DIMENSIONS ARE TAKEN FROM RECORD DATA, LOT AREAS SHOWN IN TABLE HEREON ARE GROSS ACREAGE.
16. TOP & TOE OF SLOPES ARE SUBJECT TO CHANGE IN FINAL ENGINEERING.
17. AN H.O.A. WILL BE ESTABLISHED FOR MAINTENANCE OF OPEN SPACE, SLOPES, AND ALL COMMON LANDSCAPE AREAS.
18. GRADE ELEVATIONS SHOWN ON THE VTTM AND THE EXHIBIT MAP ARE APPROXIMATE. THE ELEVATIONS MAY CHANGE BY 10 FEET. ELEVATION CHANGES MAY BE GREATER THAN 10 FEET BUT ONLY IF DETERMINED BY DPW AND DRP THAT THE REVISIONS ARE CONSISTENT WITH THE INTENT OF THE SUBDIVISION MAP APPROVAL.
19. LOT LINES CAN BE ADJUSTED TO THE SATISFACTION OF DRP.
20. ALIGNMENT AND GEOMETRICS OF THE PRIVATE DRIVEWAYS AND TRAILS ARE APPROXIMATE. ADJUSTMENTS TO TRAILS CAN BE MADE WITH APPROVAL BY DRP AND THE PARKS AND RECREATION DEPARTMENT.
21. BUILDING FOOTPRINTS THAT ARE SHOWN ON THE EXHIBIT MAP ARE ONLY FOR ILLUSTRATIVE PURPOSES. ACTUAL BUILDING LOCATIONS AND FOOTPRINTS MAY VARY. APPROVAL IS REQUESTED DURING PLOT PLAN REVIEW PROVIDED THE PROPOSED BUILDINGS SATISFY ALL EXISTING CODES AND ORDINANCES. THIS MINOR CHANGE DOES NOT, HOWEVER, INCLUDE:
    A. A CHANGE IN PROPOSED LAND USE.
    B. A CHANGE OF MORE THAN 10 FEET IN BUILDING HEIGHT.
22. PERMISSION IS REQUESTED FOR UNIT PHASING. SEE UNIT PHASING EXHIBIT HEREON.
23. PERMISSION IS REQUESTED TO COMBINE LOTS.
24. PERMISSION IS REQUESTED TO RECORD ADDITIONAL OPEN SPACE LOTS.
25. PERMISSION IS REQUESTED TO RECORD ADDITIONAL UTILITY LOTS AND PROVIDE MAINTENANCE EASEMENTS TO THE SATISFACTION OF THE DPW AND DRP.
26. THE LOCATIONS OF APPURTENANT STRUCTURES (E.G., PASEOS, TRAILS, TRANSIT SHELTERS, WATER QUALITY DEVICES OR BASINS, ETC.) MAY BE RELOCATED TO THE SATISFACTION OF DPW AND DRP.
27. PRIVATE DRIVEWAY AND FIRELANE WILL HAVE A RECIPROCAL ACCESS EASEMENT TO PROVIDE ACCESS TO ALL RESIDENTIAL LOTS, OPEN SPACES, LA COUNTY FLOOD CONTROL DISTRICT AND ADJACENT PROPERTIES
28. PERMISSION IS REQUESTED TO MASS GRADE.
29. PERMISSION IS REQUESTED TO WAIVE STREET FRONTAGE REQUIREMENTS FOR LOT NOS. 7, 10, 12, 14, 15, 20–27, AND 29.
30. PROPOSED PRIVATE DRIVEWAY GRADING IS APPROXIMATE ONLY AND SUBJECT TO ADJUSTMENTS PENDING DETERMINATION OF FINAL DEVELOPMENT LAYOUT AND PLANS.
31. LOCATION OF TRAILS TO BE FINALIZED PRIOR TO FINAL MAP APPROVAL.
32. ALL DIMENSIONS SHOWN ARE APPROXIMATE.
36. RELATED ENTITLEMENTS:
    –TENTATIVE MAP NO. 083301 (RPPL2021003061)
    –CONDITIONAL USE PERMIT NO. RPPL2021003113
    –OAK TREE PERMIT NO. RPPL2021003070
    –ADMINISTRATIVE HOUSING PERMIT NO. RPPL2021003105
    –ENVIRONMENTAL ASSESSMENT NO. RPPL2021003071
    –SEA CONDITIONAL USE PERMIT NO. RPPL2021003113
    –ZONING CONFORMANCE NO. RPPL2021003126
37. ALL SANITARY SEWER MAINLINES SHALL BE LOCATED WITHIN PUBLIC RIGHT OF WAY OR A MINIMUM 10' WIDE SANITARY SEWER EASEMENT WHEN LOCATED WITHIN PRIVATE DRIVE AND PROPERTIES. EACH RESIDENTIAL UNIT WILL BE SERVED BY A SEPARATE 4" SEWER LATERAL THAT IS CONNECTED TO THE SEWER MAIN WITHIN THE PRIVATE DRIVE AND FIRELANES.
38. THE DEVELOPER/ENGINEER ACKNOWLEDGE THAT THE SIZE OF THE WATER QUALITY AND/OR FLOOD CONTROL BASIN WILL BE REVIEWED AT THE IMPROVEMENT PLAN STAGE. SIGNIFICANT CHANGE OF THE SIZE OF THE BASIN FROM WHAT IS SHOWN ON THE TENTATIVE MAP MAY RESULT IN REVISING PLANNING DOCUMENTS BY THE DEPARTMENT OF REGIONAL PLANNING.
39. FEMA APPROVED CLOMER WILL BE REQUIRED BEFORE STORM DRAIN PLAN APPROVAL.

LEGEND:

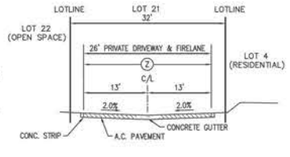
- BOUNDARY LINE
- 1480 EXISTING CONTOURS
- S EXISTING SEWER
- W EXISTING WATER
- DRAINAGE FLOW DIRECTION
- PROPOSED LOT LINES
- ZONE BOUNDARY LINE
- 90 PROPOSED GRADING CONTOUR
- 50 PROPOSED STREET GRADES
- PROPOSED RETAINING WALL
- PROPOSED MANUFACTURED SLOPE
- EXISTING EASEMENTS
- PROPOSED EASEMENTS
- LIMIT OF GRADING LINE
- PROPOSED STORM DRAIN
- PROPOSED SANITARY SEWER
- PROPOSED WATER
- LOT X LOT NUMBER
- MWS MODULAR WETLAND STORM WATER TREATMENT DEVICE



TYPICAL PUBLIC STREET LOCAL INTERSECTION
3-WAY TRAFFIC CALMING DETAIL
N.T.S.



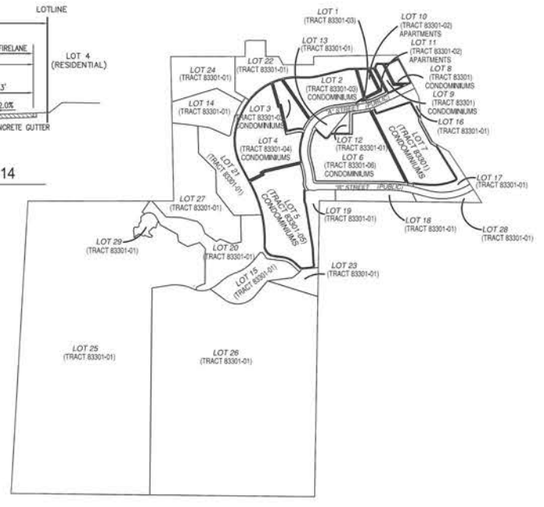
SECTION 13-13
N.T.S



SECTION 14-14
N.T.S

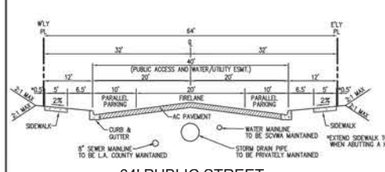
EASEMENTS BASED ON FIRST AMERICAN TITLE INSURANCE COMPANY PRELIMINARY TITLE REPORT, ORDER NO. NHSC-6837868(RA), DATED MAY 4, 2022

TITLE REPORT ITEM NO.	OWNER	PURPOSE	REFERENCE	FUTURE DISPOSITION	TENTATIVE MAP SHEET NO.
EXISTING EASEMENTS					
(4)	SO. CAL. EDISON	ELECTRICAL LINES & INCIDENTAL PURPOSES	JULY 25, 1945 BOOK 30616, PAGE 283	TO BE REALIGNED WITH FINAL SCE DESIGN	N/A CANNOT BE PLOTTED
(5)	AYERS EASEMENT	INGRESS/EGRESS	JULY 12, 1977 INSTR. NO. 77–746808 JULY 13, 1977 INSTR. NO. 77–754792 APRIL 4, 1978 INSTR. NO. 78–352178 FEBRUARY 27, 1979 INSTR. NO. 79–227247	TO BE REALIGNED WITH "A" STREET AND "B" STREET	2
PROPOSED EASEMENTS					
(X)	TWENTY FOOT WIDE MULTI–USE(HIKING, MOUNTAIN BIKING, EQUESTRIAN) TRAIL EASEMENT TO BE DEDICATED TO THE COUNTY OF LOS ANGELES APPROPRIATELY ALONG THE EXISTING VARIABLE WIDTH TRAIL ALIGNMENTS		TO LA COUNTY PARKS AND REC. DEPARTMENT	2
(Y)	MINIMUM TWENTY EIGHT FOOT WIDE ACCESS EASEMENT FOR INGRESS AND EGRESS PURPOSES TO BE GRANTED TO ADJACENT PRIVATE PROPERTY OWNERS		PRIVATE ACCESS EASEMENT (TO BE MAINTAINED BY HOA)	2
(Z)	STORM DRAIN EASEMENT FOR ACCESS AND MAINTENANCE OF LOS ANGELES COUNTY OWNED BASIN, PIPS, AND STRUCTURES		TO LA COUNTY FLOOD CONTROL	2
	TEN FOOT WIDE SANITARY SEWER EASEMENT, CENTERLINE BEING PROPOSED SEWER MAIN WHERE SEWER MAIN IS OUTSIDE OF PUBLIC RIGHT OF WAY		TO LA COUNTY PUBLIC WORKS		

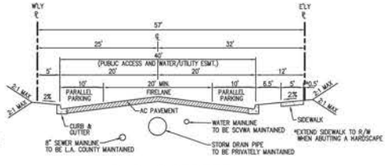


TRACT NO.	RES. UNITS		OPEN SPACE
TR 83301–01	–		177.14 Ac.
TR 83301–02	48	AFFORDABLE	–
TR 83301–03	107	CONDOMINIUMS	–
TR 83301–04	105	CONDOMINIUMS	–
TR 83301–05	70	CONDOMINIUMS	–
TR 83301–06	78	CONDOMINIUMS	–
TR 83301	102	CONDOMINIUMS	–
TOTAL	510	UNITS	177.14 Ac.

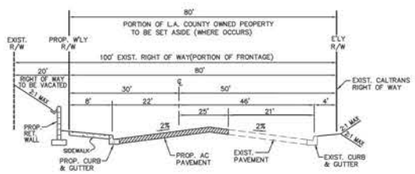
UNIT MAP PHASING EXHIBIT
N.T.S.



64' PUBLIC STREET
"A" STREET AND "B" STREET
N.T.S



57' PUBLIC STREET
"A" STREET AND "B" STREET
N.T.S



PUBLIC STREET - (R/W = 80')
THE OLD ROAD

UNITED CIVIL INC
30141 Agoura Road, Suite 215
Agoura Hills, CA 91301
PH: (818) 707-8648

09/05/2023
SIEW HUAT NG R.C.E. 46026 DATE

OWNER/APPLICANT:

NUWI LYONS CANYON, LLC
2001 WILSHIRE BOULEVARD, SUITE 401
SANTA MONICA, CA 90403
TEL: (310) 864-2427

NO.	DATE	REVISIONS	BY	APPR

THE TRAILS AT LYONS CANYON
MAJOR LAND DIVISION
VESTING TENTATIVE TRACT NO. 83301
(FOR CONDOMINIUM PURPOSES)
LOCATED IN THE UNINCORPORATED TERRITORY OF
THE COUNTY OF LOS ANGELES, STATE OF CALIFORNIA

DATE: SEPTEMBER 05, 2023
SHEET 1
OF 5

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LEGEND:

- BOUNDARY LINE
- EXISTING CONTOURS
- EXISTING SEWER
- EXISTING WATER
- DRAINAGE FLOW DIRECTION
- PROPOSED LOT LINES
- ZONE BOUNDARY LINE
- PROPOSED GRADING CONTOUR
- PROPOSED STREET GRADES
- PROPOSED RETAINING WALL
- PROPOSED MANUFACTURED SLOPE
- EXISTING EASEMENTS
- PROPOSED EASEMENTS
- LIMIT OF GRADING LINE
- PROPOSED STORM DRAIN
- PROPOSED SANITARY SEWER
- PROPOSED WATER
- LOT X — LOT NUMBER
- EXISTING OAK TREE (SEE PROTECTED TREE REPORT AND SHEET 2 & 3)
- EXISTING NON-OAK PROTECTED TREE (SEE PROTECTED TREE REPORT AND SHEET 2 & 3)
- MWS — MODULAR WETLAND STORM WATER TREATMENT DEVICE

EASEMENTS BASED ON FIRST AMERICAN TITLE INSURANCE COMPANY PRELIMINARY TITLE REPORT, ORDER NO. NHSC-6837868(RA), DATED MAY 4, 2022

EXISTING EASEMENTS

TITLE REPORT ITEM NO.	OWNER	PURPOSE	REFERENCE	FUTURE DISPOSITION	TENTATIVE MAP SHEET NO.
(4)	SO. CAL. EDISON	ELECTRICAL LINES & INCIDENTAL PURPOSES	JULY 25, 1945 BOOK 30616, PAGE 283	TO BE REALIGNED WITH FINAL SCE DESIGN	N/A CANNOT BE PLOTTED
(5)	AYERS EASEMENT	INGRESS/EGRESS	JULY 12, 1977 INSTR. NO. 77-746808 JULY 13, 1977 INSTR. NO. 77-754792 APRIL 4, 1978 INSTR. NO. 78-352178 FEBRUARY 27, 1979 INSTR. NO. 79-227247	TO BE REALIGNED WITH "A" STREET AND "B" STREET	2

PROPOSED EASEMENTS

(X)	TWENTY FOOT WIDE MULTI-USE(HIKING, MOUNTAIN BIKING, EQUESTRIAN) TRAIL EASEMENT TO BE DEDICATED TO THE COUNTY OF LOS ANGELES APPROPRIATELY ALONG THE EXISTING VARIABLE WIDTH TRAIL ALIGNMENTS	TO LA COUNTY PARKS AND REC. DEPARTMENT	2
(Y)	MINIMUM TWENTY EIGHT FOOT WIDE ACCESS EASEMENT FOR INGRESS AND EGRESS PURPOSES TO BE GRANTED TO ADJACENT PRIVATE PROPERTY OWNERS	PRIVATE ACCESS EASEMENT (TO BE MAINTAINED BY HOA)	2
(Z)	STORM DRAIN EASEMENT FOR ACCESS AND MAINTENANCE OF LOS ANGELES COUNTY OWNED BASIN, PIPS, AND STRUCTURES	TO LA COUNTY FLOOD CONTROL	2
	TEN FOOT WIDE SANITARY SEWER EASEMENT, CENTERLINE BEING PROPOSED SEWER MAIN WHERE SEWER MAIN IS OUTSIDE OF PUBLIC RIGHT OF WAY	TO LA COUNTY PUBLIC WORKS	

SCALE 1"=100'

GRAPHIC SCALE
0 50 100 200
(IN FEET)
1 inch = 100 ft.

UNITED CIVIL INC
30141 Agoura Road, Suite 215
Agoura Hills, CA 91301
PH: (818) 707-8648

SIEW HUAT NG R.C.E. 46026 09/05/2023 DATE

REGISTERED PROFESSIONAL ENGINEER SIEW HUAT NG NO.46026 DEC 31, 24 CIVIL STATE OF CALIFORNIA

OWNER/APPLICANT:

NUWI LYONS CANYON, LLC
2001 WILSHIRE BOULEVARD, SUITE 401
SANTA MONICA, CA 90403
TEL: (310) 864-2427

NO.	DATE	REVISIONS	BY	APPR

THE TRAILS AT LYONS CANYON
MAJOR LAND DIVISION
VESTING TENTATIVE TRACT NO. 83301
(FOR CONDOMINIUM PURPOSES)

LOCATED IN THE UNINCORPORATED TERRITORY OF THE COUNTY OF LOS ANGELES, STATE OF CALIFORNIA

DATE: SEPTEMBER 05, 2023

SHEET 2 OF 5

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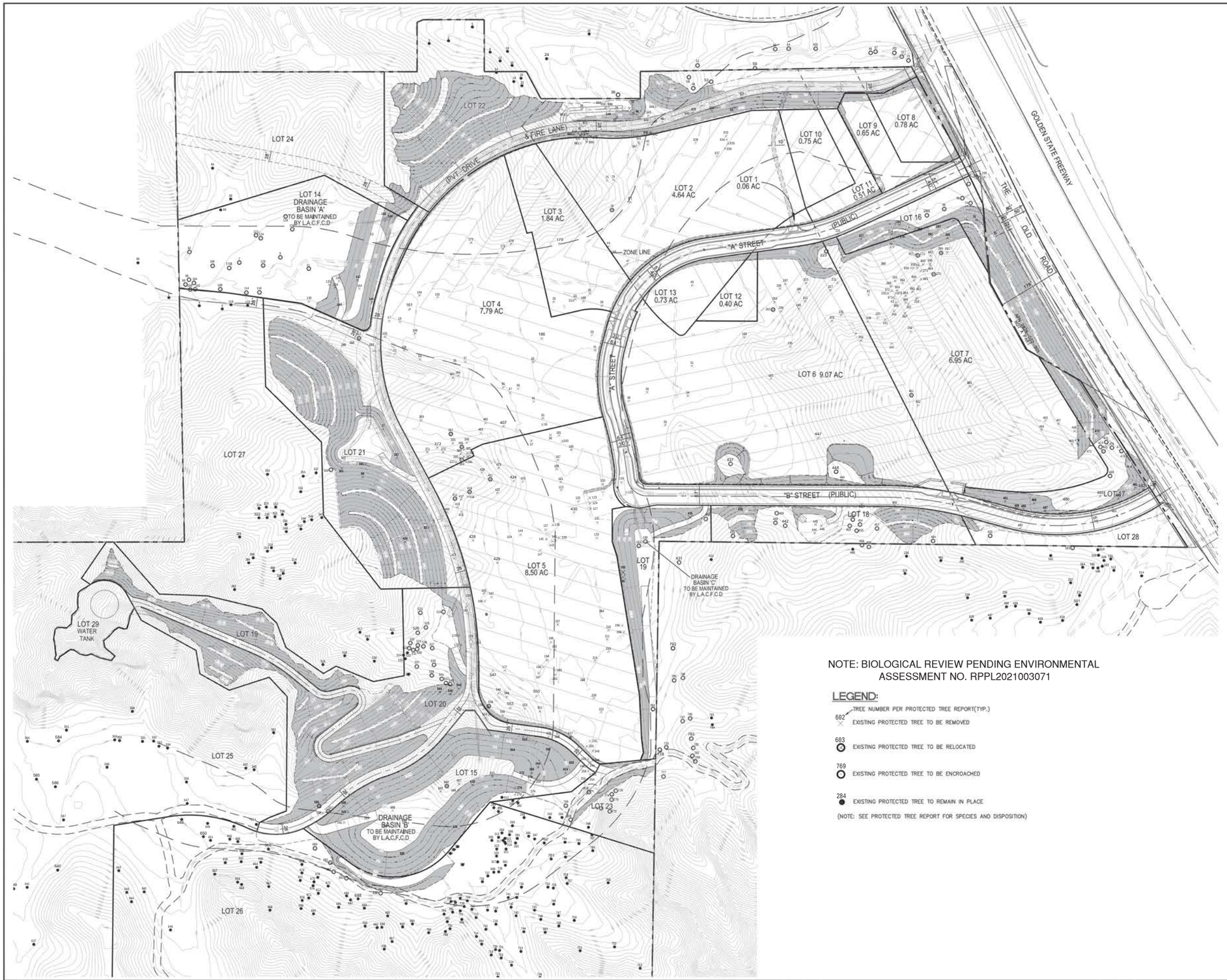

NOTE: BIOLOGICAL REVIEW PENDING ENVIRONMENTAL ASSESSMENT NO. RPPL2021003071

LEGEND:

602 — TREE NUMBER PER PROTECTED TREE REPORT(TYP.)
× EXISTING PROTECTED TREE TO BE REMOVED

603 — EXISTING PROTECTED TREE TO BE RELOCATED

769 — EXISTING PROTECTED TREE TO BE ENCROACHED

284 — EXISTING PROTECTED TREE TO REMAIN IN PLACE

(NOTE: SEE PROTECTED TREE REPORT FOR SPECIES AND DISPOSITION)

SCALE: 1"=100'

GRAPHIC SCALE
0 50 100 200
(IN FEET)
1 inch = 100 ft.

PROTECTED TREE SITE PLAN

UNITED CIVIL INC
30141 Agoura Road, Suite 215
Agoura Hills, CA. 91301
PH: (818) 707-8648

09/05/2023
SIEW HUAT NG R.C.E. 46026 DATE

REGISTERED PROFESSIONAL ENGINEER SIEW HUAT NG NO. 46026 09-30-24 CIVIL STATE OF CALIFORNIA

OWNER/APPLICANT:

NUWI LYONS CANYON, LLC
2001 WILSHIRE BOULEVARD, SUITE 401
SANTA MONICA, CA 90403
TEL: (310) 864-2427

NO.	DATE	REVISIONS	BY	APPR

THE TRAILS AT LYONS CANYON
MAJOR LAND DIVISION
VESTING TENTATIVE TRACT NO. 83301
(FOR CONDOMINIUM PURPOSES)
LOCATED IN THE UNINCORPORATED TERRITORY OF
THE COUNTY OF LOS ANGELES, STATE OF CALIFORNIA

DATE: SEPTEMBER 05, 2023
SHEET 3
OF 5

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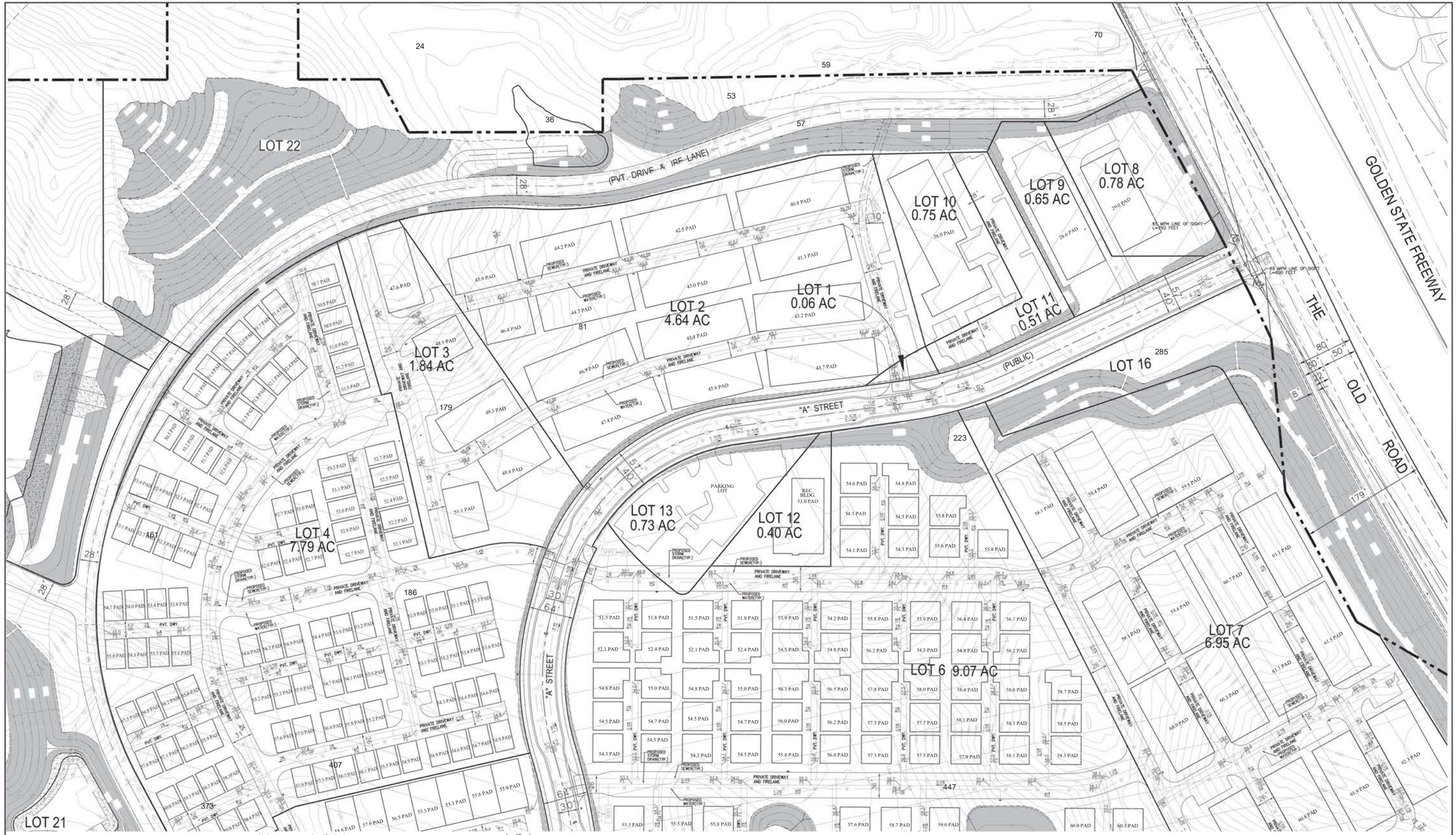

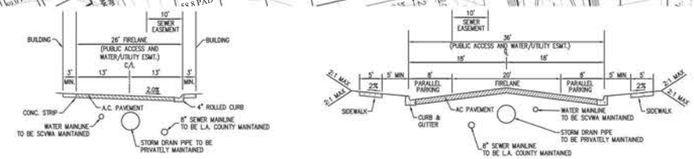

TYPICAL 26' PRIVATE DRIVEWAY AND FIRELANE

N.T.S

TYPICAL 36' PRIVATE DRIVEWAY AND FIRELANE

N.T.S

GRAPHIC SCALE

0 25 50 100

(IN FEET)

1 inch = 50 ft.

UNITED CIVIL INC
30141 Agoura Road, Suite 215
Agoura Hills, CA 91301
PH: (818) 707-3648

SIEW HUAT NG R.C.E. 46026 — 09/05/2023 DATE

REGISTERED PROFESSIONAL ENGINEER SIEW HUAT NG NO.46026 CIVIL STATE OF CALIFORNIA

OWNER/APPLICANT:

NUWI LYONS CANYON, LLC
2001 WILSHIRE BOULEVARD, SUITE 401
SANTA MONICA, CA 90403
TEL: (310) 864-2427

NO.	DATE	REVISIONS	BY	APPR.

THE TRAILS AT LYONS CANYON
MAJOR LAND DIVISION
VESTING TENTATIVE TRACT NO. 83301
(FOR CONDOMINIUM PURPOSES)
LOCATED IN THE UNINCORPORATED TERRITORY OF
THE COUNTY OF LOS ANGELES, STATE OF CALIFORNIA

DATE: SEPTEMBER 05, 2023

SHEET 4 OF 5

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"B" STREET (PUBLIC)

LOT 18

LOT 19

LOT 20

LOT 15

LOT 23

LOT 5
8.50 AC

DRAINAGE BASIN 'C'
TO BE MAINTAINED
BY L.A.C.F.C.D

DRAINAGE BASIN 'B'
TO BE MAINTAINED
BY L.A.C.F.C.D

PRIVATE DRIVEWAY AND FIRELANE

PROPOSED WATER(TYP.)

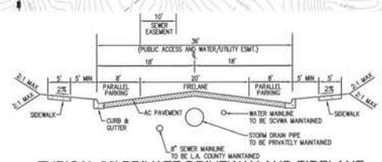
PROPOSED SEWER(TYP.)

PROPOSED STORM DRAIN(TYP.)

PVT. DWY.

EXIST. OIL WELL

TYPICAL 26' PRIVATE DRIVEWAY AND FIRELANE
N.T.S



TYPICAL 36' PRIVATE DRIVEWAY AND FIRELANE
N.T.S

GRAPHIC SCALE
0 25 50 100
(IN FEET)
1 inch = 50 ft.

SCALE 1"=60'

UNITED CIVIL INC
30141 Agoura Road, Suite 215
Agoura Hills, CA 91301
PH: (818) 707-3648

SIEW HUAT NG R.C.E. 46026 09/05/2023 DATE

REGISTERED PROFESSIONAL ENGINEER SIEW HUAT NG NO.46026 09-30-24 CIVIL STATE OF CALIFORNIA

OWNER/APPLICANT:

NUWI LYONS CANYON, LLC
2001 WILSHIRE BOULEVARD, SUITE 401
SANTA MONICA, CA 90403
TEL: (310) 864-2427

NO.	DATE	REVISIONS	BY	APPR

THE TRAILS AT LYONS CANYON
MAJOR LAND DIVISION
VESTING TENTATIVE TRACT NO. 83301
(FOR CONDOMINIUM PURPOSES)
LOCATED IN THE UNINCORPORATED TERRITORY OF
THE COUNTY OF LOS ANGELES, STATE OF CALIFORNIA

DATE: SEPTEMBER 05, 2023

SHEET 5 OF 5

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NUWI – Lyons Canyon, LLC
September 15, 2023
2020-200-001

APPENDIX J

GEOTECHNICAL 100-SCALE PLAN REVIEW

(RTF&A, 2021a)

RTF&A
GEOTECHNICAL ENGINEERING & ENGINEERING GEOLOGY

GEOTECHNICAL 100-SCALE PLAN REVIEW

LYONS CANYON DEVELOPMENT

VESTING TENTATIVE TRACT MAP NO. 83301

LOS ANGELES COUNTY, CALIFORNIA

FOR

NUWI – LYONS CANYON, LLC

March 19, 2021

Job No. 2020-200-001

RTF&A

GEOTECHNICAL ENGINEERING & ENGINEERING GEOLOGY

NUWI – Lyons Canyon, LLC
March 19, 2021
2020-200-001

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March 19, 2021

NUWI – Lyons Canyon, LLC
2001 Wilshire Blvd., Suite 401
Santa Monica, California 90403

Job No. 2020-200-001(R2)

Attention: Jason Han

Subject: 100-Scale Geotechnical Plan Review
Proposed Lyons Canyon Development
Vesting Tentative Tract Map No. 083301
Los Angeles County, California

References: See attached References

R.T. Frankian and Associates (RTF&A) are pleased to present this 100-scale geotechnical plan review of the proposed Lyons Canyon Development, Vesting Tentative Tract Map No. 083301 (herein referred to as "the site"), Los Angeles County, California. The plan is based on the *Vesting Tentative Tract Map No. 083301* prepared by Alliance Land Planning & Engineering, Inc. (Alliance) and dated March 11, 2021. Sheet 2 of 2 was used as a base for our Geotechnical Map, attached as Figure 1. The purpose of this report is to evaluate the proposed development of the site and provide geotechnical recommendations as required. Previous geotechnical studies conducted on the site were performed by Pacific Soils Engineering, Inc. (Pacific Soils) in 2006 and Gold Coast Geoservices, Inc. (Gold Coast) in 2015. Data from the Gold Coast report was reviewed and evaluated in preparation of this report.

The findings, conclusions, and recommendations presented in this report are based on data developed by RTF&A, Pacific Soils, and Gold Coast, as well as appropriate engineering and

geologic analyses. The assessment of general site environmental conditions for the presence of contaminants in the soils and groundwater was beyond the scope of this investigation.

Our professional services have been performed using that degree of care and skill ordinarily exercised, under similar circumstances, by reputable geotechnical engineers and geologists practicing in this or similar localities. No other warranty, expressed or implied, is made as to the professional advice included in this report. This report has been prepared for NUWI-Lyons Canyon, LLC and their design consultants, to be used solely for planning and design of the Vesting Tentative Tract Map No. 83301.

SCOPE OF WORK

The scope of work for the geotechnical review of the site plan included:

- reviewed State of California Alquist-Priolo Earthquake Fault Zone Maps and Seismic Hazard Maps to evaluate potential geologic hazards;
- reviewed geologic maps published by the California Geological Survey (formerly known as the California Division of Mines and Geology) and the Dibblee Foundation to assess regional geologic conditions;
- reviewed groundwater data from the Los Angeles County Department of Public Works Water Resources Division to establish high groundwater levels and trends in the area;
- reviewed the referenced reports;
- performed site reconnaissance and geologic mapping of the site;
- excavated and logged exploratory borings and site reconasiance to observe subsurface geologic units and structure;
- conducted Cone Penetrometer Tests (CPT) to evaluate liquefaction potential of alluvial materials onsite;

- performed geologic and engineering analyses to determine slope stability, liquefaction assessment, grading recommendations including anticipated removals, and preliminary foundation recommendations;

- prepared Geologic Sections depicting the grading conditions, relative to the proposed cut slopes and/or landslides (Figure 2);

- prepared conclusions and recommendations based on existing site conditions and future intended use; and

- prepared a Geotechnical Map, presented as Figures 1.

SITE DESCRIPTION

The site is situated along the northeast foothills of the Santa Susan Mountains within the Santa Clarita area of Los Angeles County, California. The location of the site is shown on Sheet 2 of the Vesting Tentative Tract Map No. 083301 dated March 11, 2021 that is used as the base map for our Geotechnical Map, Figure 1. This Grading/Drainage Plan was prepared by Alliance Land Planning and Engineering, Inc (Alliance) and was prepared at a scale of 1 inch = 100 feet that provides topography of existing and proposed grades.

The site is bounded by The Old Road on the east, immediately south of a residential development (Tract 3794) and undeveloped hillside terrain to the west and south. Topography at the site is dominated by the alluviated valley floor of Lyons Canyon which drains north to easterly through the site. The surrounding hills that border the canyon are characterized by a series of steep to moderately steep bedrock ridges. Elevations across the site range from approximately 1,600 feet above mean sea level, in the southwestern portion of the site, to 1,300 feet along The Old Road. The natural slopes on-site exhibit gradients ranging from approximately ¾:1 to 3:1 (horizontal: vertical).

SUBSURFACE EXPLORATIONS

Subsurface data was available for the site and adjacent areas from prior investigations conducted by Pacific Soils in 2006 and Gold Coast (2015). We do not have the Pacific Soils investigation report. However, the Pacific Soils explorations were presented in the Gold Coast Investigation Report (Gold Coast, 2015). This data was supplemented by the excavation of an additional 5 hollow-stem auger borings excavated on November 10, 2020 and 5 Cone Penetrometer Tests (CPT) by Gregg Drilling for RTF&A in January, 2021. The logs of the RTF&A borings are presented in Appendix A and the recent Gregg CPT soundings are presented in Appendix E. Pertinent exploratory test pits and borings from Pacific Soils and Gold Coast are presented in Appendix B. Geologic structural data obtained from the various test pits and borings, as well as from reconnaissance geologic mapping of the site by RTF&A, are presented on the Geotechnical Map, Figure 1.

LABORATORY ANALYSES

We performed laboratory tests on selected samples obtained from the test pits to aid in the classification of the soils, and to determine the pertinent engineering properties of the foundation soils. The results of the tests as described and presented in Appendix C.

GEOLOGY

REGIONAL GEOLOGY

The site is located in the eastern Ventura basin, within the Transverse Ranges geomorphic province of California, along the northerly flank of the Santa Susana Mountains. The Ventura basin consists of a narrow, elongate sedimentary trough extending from the Santa Barbara Channel on the west, to the San Gabriel fault on the east. The axis of the trough trends east-west, reflecting the overall east-west trend of the Transverse Ranges, and generally

coincides with the Santa Clara River Valley and the Santa Barbara Channel. The Ventura basin has been an area of subsidence and sediment accumulation since the beginning of the Tertiary period, with the present trough-like form developing near the beginning of the Miocene epoch (Winterer and Durham, 1962).

The structure of the basin is defined as a highly folded "synclinorium" formed by north-south compressional forces (Kew, 1924) and containing a maximum 50,000± feet of marine and nonmarine Tertiary through Quaternary age sediments (Bailey and Jahns, 1954). Two main periods of general deformation of the Ventura basin are indicated by the regional geologic structure: one in middle to late Miocene (represented by deposition of the Modelo Formation), and the other during the Pleistocene epoch, after deposition of the Plio-Pleistocene Saugus Formation (Kew, 1924; Winterer and Durham, 1962; Yeats et al., 1994). The flanks of the Ventura basin synclinorium are broken by a series of large reverse/thrust faults including the Santa Susana and Oak Ridge faults on the southern flank, and the Red Mountain and San Cayetano faults on the northern flank (Bailey and Jahns, 1954; Yeats et al., 1994). The San Gabriel fault, the dominant geologic feature in the Santa Clarita Valley, forms the eastern Ventura basin boundary, and separates the Ventura basin from the structurally similar Soledad basin.

Sedimentary rock units comprising the eastern Ventura basin include approximately 2,000 feet of undifferentiated middle to late Eocene age rocks, 1,000± feet of the middle Miocene age Topanga Formation, 5,000± feet of the late Miocene age Modelo Formation, 4,000± feet of the late Miocene to early Pliocene age Towsley Formation, 5,000± feet of the Pliocene age Pico Formation, and 7,000± feet of the Plio-Pleistocene Saugus Formation (Winterer and Durham, 1962). The undifferentiated Eocene units and the Topanga, Modelo, Towsley, and Pico Formations are composed of marine sediments; the Saugus Formation is composed of interfingering shallow-water marine, brackish water, and nonmarine units (Kew,

1924; Winterer and Durham, 1962). These Tertiary period rock units rest unconformably on pre-Cretaceous age metamorphic and igneous basement rocks of the San Gabriel Mountains.

SITE GEOLOGY

General: Geologic conditions within the boundaries of site have been previously evaluated by Pacific Soils (2006) and Gold Coast (2015). Additional geologic data was collected by RTF&A in January, 2021.

Geologic Units: The geologic units within the site consist of bedrock of the Pico and Saugus formations, alluvium and colluvial (slope wash) deposits, and man-made fill. The geologic units identified within the site are shown on the Geotechnical Map (Figure 1). A description of each unit is presented as follows:

Pico Formation (Tp): Marine sedimentary rock units of the Pliocene age Pico Formation (map unit "Tp") are exposed in the southwest corner of the site. The formation is composed primarily of fine- to medium-grained sandstones, coarse-grained pebbly sandstones, siltstones, and some silty claystone interbeds. Fine-grained sandstone is the dominant lithology of the formation and is typically very thinly or thinly bedded, soft, and moderately weathered, with alternating bands of iron oxide staining. Siltstone and silty claystone beds are moderately to well indurated and massive. Sandstone beds are typically dark yellowish orange to yellowish gray; siltstone beds are typically yellowish gray to olive brown.

Saugus Formation, Sunshine Ranch Member (TQss): The Sunshine Ranch Member of the Saugus Formation (designated map unit "TQss") underlies the majority of the site and consists of interfingering shallow-water marine, brackish water, and nonmarine sedimentary units of Plio-Pleistocene age (Winterer and Durham, 1962). Within the site, the Sunshine Ranch Member is composed of fine- to coarse-grained sandstone and conglomeratic/pebbly sandstone, with some siltstone interbeds. Medium to coarse sandstone and conglomeratic sandstone are the

dominant lithologies of the formation and are typically soft, dry, and thickly bedded to massive. Some of the finer grained sandstone beds are very thinly bedded, moderately weathered, and have some iron oxide staining. Siltstone beds within the formation are typically 2 feet thick or less, moderately to well indurated, and thickly bedded to massive. Sandstone beds are dark yellowish orange to grayish orange, while siltstones are yellowish gray.

Undifferentiated Alluvium and Colluvium (Qac): Undifferentiated Holocene age alluvium and colluvium (map unit "Qac") overlie the bedrock units onsite, with the alluvium mantling the floor of Lyons Canyons and the colluvium generally occurring in drainage swales and side canyons, and along the lower elevations of the natural slopes. These materials consist of loose to moderately dense mixtures of sand, silt, gravel, cobbles, and to a lesser extent, boulders.

Man-made Deposits (af): Man-made deposits (map unit "af"), associated with past grading activities for development of The Old Road, are located along the east boundary of the site. The man-made deposits are composed of sand and silt mixtures derived primarily from the local bedrock materials.

Geologic Structure: The site is located along the northerly limb of the asymmetrical Pico anticline. Within the site boundaries, the beds forming the northerly limb strike generally northwest and dip 30 to 65 degrees to the northeast.

GROUNDWATER

Groundwater within site occurs in the alluvial deposits within Lyons Canyon and major tributary canyons. Data from the Water Resources Division of Los Angeles County Department of Public Works (LACDPW) indicates that one water well was located adjacent to the site boundaries. This well, designated as Well No. 5832, was located immediately north of the site near the intersection of Sagecrest Circle and The Old Road. The water level data from this well,

which was destroyed in 1965, covers the period of December, 1956 through November, 1964, with the last water level measured on November 24, 1964. The water level at that time was measured at a depth of 118.4 feet below existing ground surface.

Exploration completed within the site by Pacific Soils (2006) indicated groundwater within the alluviated valley floor at depths ranging from 53 to 69 feet below existing ground surface. Groundwater was not encountered within our borings within the valley floor within the main easterly canyon. However, seepage was encountered in the northerly draining canyon within Hollow Stem 3 and 4 at depths of 25 and 20 feet, respectively. Pore water dissipation was performed within some of the CPT soundings as presented in Appendix E did not provide a consistent groundwater depth. Based on review of the California Division of Mines and Geology seismic hazard report for Oat Mountain (1998), the historic water depth just north of the site along The Old Road is 30 feet. A historic high water of 30 feet was conservatively utilized for the liquefaction calculations presented in Appendix G.

SLOPE STABILITY

General: The grading plan for Vesting Tentative Tract Map No. 83301 will include grading of 12 cut slopes. For the purposes of this report, a cut slope is defined as a slope 10 feet or more in height. The cut slopes are designated CS-1 through CS-12 with locations shown on Figure 1. Proposed cut slope gradients will be 2:1 (horizontal: vertical). The maximum cut slope height is approximately 155 feet (Cut Slope CS-10). Data specific to all of the cut slopes, including slope height, gradient, and underlying geologic conditions, are summarized on Table 1 and discussed below.

Natural slopes within the grading limits are underlain by bedrock of the Plio-Pleistocene Saugus Formation, composed of bedded sedimentary rock units. Bedding planes within the Saugus Formation are poorly to moderately well developed. The bedding can constitute planes of weakness. Where bedding is adversely oriented, or "daylighted," with respect to natural or cut

slopes, potential for “block-glide” failure exists.

STABILITY ANALYSES

Slope stability analyses were performed using the program Slope/W by GEO-SLOPE International Ltd., which utilized Bishop’s Simplified Method or Spencer’s Method was used.

GEOLOGIC SECTIONS AND ASSUMED CRITICAL FAILURE SURFACE

The analyses were based on subsurface conditions as depicted on the Geologic Sections, Figure 2. The existing ground surface, proposed grading scheme, and subsurface geologic structure are shown on the geologic sections. For analyses, where the location of weak bedding planes is unknown or uncertain, one is assumed to be located exactly at the critical location, typically near the toe of the slope. Although groundwater was not indicated on the Geologic Sections, the analyses assumed a phreatic surface above the critical failure surface for bedding plane failures. The critical failure surfaces, phreatic surfaces, factors of safety, and recommended mitigation measures (i.e. stabilization or buttress fills, if necessary) are added to the Geologic Sections for presentation as Geotechnical Sections in this report. The Geotechnical Sections and Slope Stability Analysis are presented in Figures 3 and the computer printouts are presented in Appendix D.

SHEAR STRENGTH PARAMETERS

As part of the evaluation of shear strength parameters to be used in slope stability calculations, the referenced reports concerning the subject site and adjacent sites were reviewed. The shear strength parameters used for slope stability analyses are based on review of the referenced reports (RTF&A, 2000 and 2016) from relatively nearby sites, review of

recommended shear strength parameters from the Gold Coast (2015) report, with additional tests supplemented by our office for to establish the recommended shear strength parameters.

Presented below are the recommended shear strengths for use at the subject site. The shear test results are considered to be effective values; that is, they require hydrostatic pressures be considered in a stability analysis. A description of the testing procedures is included in Appendix B and the direct shear test results are presented in Appendix C.

MATERIAL	COHESION (psf)	ANGLE OF SHEARING RESISTANCE (degrees)
Landslide Failure Plane (MSR)	200	16
TQss Bedding Static (MSR)	250	20
TQss Bedding Seismic (SSR)	200	30
TQss Cross Bed Static (SSR)	500	34
TQss Cross Bed Seismic (SSR)	800	36
Compacted Fill 90% (SSR)	350	30
Compacted Fill 95% (SSR)	400	30
Alluvium (Qal)	250	30

Cut Slope CS-1: Cut Slope CS-1 will consist of a southeast-facing 2:1 slope that will attain a height of approximately 115 feet. The cut slope will expose sedimentary rock units of the Saugus Formation and alluvial/colluvial deposits. Bedding in the Saugus Formation strikes northwest and dips 45 to 65 degrees to the northeast. As indicated on Geologic Section A-A' (Figure 2), the northeast-dipping bedding structure is favorably oriented with respect to the southeast-facing cut slope. Therefore, the portion of the cut slope exposing bedrock materials is considered grossly stable from a geologic standpoint.

Alluvial and colluvial materials will likely be exposed in the western portion of Cut Slope CS-1. These materials are weakly cemented and subject to erosion and surficial failures. Accordingly, it is recommended that the eastern portion of the cut slope exposing the alluvium/colluvium be reconstructed as a stability fill slope with backdrains. The keyway for the

stability fill should measure 30 feet wide and 3 feet deep and should extend to the proposed third terrace drain at an elevation of about 1,405 msl. The stability fill should be constructed with backdrains in accordance with the recommendations presented in the "Conclusions and Recommendations" section of this report, and as shown on the "Stability Fill Details for Grossly Stable Slopes" (Figure 4).

Cut Slope CS-2: Cut Slope CS-2 will be graded as A 30 feet high, 2:1 south-southeast-facing cut slope. The cut slope will expose of Saugus Formation units in which the underlying bedding strikes northwest and dips 31 to 35 degrees to the northeast. This bedding is favorably oriented with respect to the southeast-facing cut slope, and the slope is considered grossly stable from a geologic standpoint.

Cut Slope CS-3: Development of Cut Slope CS-3 will consist of trimming an existing 2:1 cut slope and lowering the overall slope height from the current 115 feet to a height of approximately 45 feet. The resultant 2:1 cut slope will face northeast. Cut Slope CS-3 will expose Saugus Formation units in which the underlying bedding strikes northwest and dips 33 to 45 degrees towards the northeast. As depicted on Geologic Section H-H' (Figure 2), an apparent bedding component dipping 29 degrees to the northeast will be encountered in the cut slope. The apparent bedding is steeper than the 2:1 (26 degrees) slope gradient and the cut slope is considered grossly stable from a geologic standpoint.

Cut Slope CS-4: Cut Slope CS-4 will consist of a 40-foot high, south-southeast-facing 2:1 slope underlain by Saugus Formation units and alluvial/colluvial deposits. Bedding beneath the proposed cut slope strikes northwest and dips 30 to 45 degrees to the northeast. This bedding orientation is favorable relative to the proposed cut slope and the cut slope is considered grossly stable, from a geologic standpoint.

Alluvial and colluvial materials will likely be exposed in the lower portions of Cut Slope CS-4. These materials are weakly cemented and subject to erosion and surficial failures.

Accordingly, it is recommended that the entire cut slope be reconstructed as a stability fill slope with backdrains. The keyway for the stability fill should measure 25 feet wide and 3 feet deep.

Cut Slope CS-5: Cut Slope CS-5 will consist of a north-facing 2:1 slope that will attain a maximum height of 30 feet. A 10-foot-high retaining wall will be constructed across the toe of the cut slope. Cut Slope CS-5 will expose Saugus Formation units in which the underlying bedding strikes northwest and dips greater than 37 to 65 degrees towards the northeast. This bedding orientation exhibits an apparent bedding component dipping approximately 29 degrees to the north (see Geologic Section G-G', Figure 2). Although the bedding dips steeper than the 2:1 (26 degree) cut slope and is grossly stable, the northerly-dipping bedding will impose a surcharge on the proposed retaining wall of 10 kips per foot of retaining wall. Analyses of the daylighted bedding condition presented in Appendix D meets County static and seismic factor of safety requirements after construction of a retaining wall able to resist the daylighted surcharge load of 10 kips. It is assumed that the proposed retaining wall will be constructed as a pile supported retaining wall using top-down construction sequencing. The pile supported retaining wall will be more expensive that a conventional retaining wall, but is considered feasible.

Cut Slope CS-6: Cut Slope CS-6 will consist of a 15-foot high, north-facing 2:1 cut slope that will expose alluvial and colluvial deposits. It is recommended that the alluvium and colluvium in the area of the cut slope be entirely removed as part of the adjacent canyon cleanout and the entire slope reconstructed as a 2:1 fill slope.

Cut Slope CS-7: Cut Slope CS-7 will consist of a north-northwest-facing 2:1 slope that will attain a maximum height of 40 feet. A 10-foot-high retaining wall will be constructed across the toe of the cut slope. Cut Slope CS-7 will expose Saugus Formation units in which the underlying bedding strikes northwest and dips greater than 30 to 40 degrees towards the northeast. This bedding orientation exhibits an apparent bedding component dipping approximately 23 degrees to the north (see Geologic Section F-F', Figure 2) and is daylighted with respect to the north-northwest-facing cut slope. Analyses of the daylighted bedding

condition presented in Appendix D meets County static and seismic factor of safety requirements.

As currently proposed, the retaining wall does not need to be designed to support an additional load on the wall due to daylighted conditions. However, the need to include a load due to daylighted conditions on the proposed retaining wall below Cut Slope CS-7 should be further evaluated once the specific design details are determined. It is assumed that the proposed retaining wall will be constructed as a pile supported retaining wall using top-down construction sequencing similar to the retaining wall construction below Cut Slope CS-5.

Cut Slope CS-8: Cut Slope CS-8 will consist of a north-northeast-facing 2:1 slope that will attain a maximum height of 20 feet. Cut Slope CS-8 will expose Saugus Formation units in which the underlying bedding strikes northwest and dips greater than 36 to 42 degrees towards the northeast. As depicted on Geologic Section E-E', this bedding orientation exhibits an apparent bedding component dipping approximately 33 degrees to the northeast (see Geologic Section G-G', Figure 2). The apparent bedding is steeper than the 2:1 (26 degrees) slope gradient and the cut slope is considered grossly stable from a geologic standpoint.

Cut Slope CS-9: Cut Slope CS-9 will consist of a 25± feet high, south-southwest-facing 2:1 slope. The cut slope is underlain by Saugus Formation units. Bedding beneath the proposed cut slope strikes northwest and dips 36 to 42 degrees to the northeast. This bedding orientation is favorable with respect to Cut Slope CS-9 (see Geologic Section E-E'), and the cut slope is considered grossly stable from a geologic standpoint.

Cut Slope CS-10: Cut Slope CS-10 will consist of a southeast-facing 2:1 slope that will attain a maximum height of 155 feet. Cut Slope CS-10 will expose Saugus Formation units in which the underlying bedding strikes northwest and dips greater than 55 to 65 degrees towards the northeast. As depicted on Geologic Section D-D' (Figure 2), this bedding orientation is favorably oriented with respect to the southeast-facing cut slope and the slope is considered grossly stable from a geologic standpoint.

Alluvial and colluvial deposits will be exposed in the central portion of the cut slope. These materials are weakly cemented and subject to erosion and surficial failures. Accordingly, it is recommended that the portion of the cut slope exposing the alluvium/colluvium be reconstructed as a stability fill slope with backdrains. The keyway for the stability fill should measure 30 feet wide and 3 feet deep, and should extend upslope to the mid-slope drainage terrace (approximate elevation 1,440 feet).

Alluvial and Colluvial deposits will also be exposed in the proposed debris basin slopes below Cut Slope CS-10. The alluvium and colluvial soils exposed in the proposed basin cut slopes should be removed and replaced as a fill slope. Backdrains would only be required where the back of the fill slope will be within bedrock materials.

Cut Slope CS-11: Cut Slope CS-1 will consist of a northeast-facing 2:1 slope that will attain a height of approximately 70 feet. The cut slope will expose sedimentary rock units of the Saugus Formation and, in the central portion of the slope, alluvial/colluvial deposits. Bedding in the Saugus Formation strikes northwest and dips 38 to 65 degrees to the northeast. As indicated on Geologic Section C-C' (Figure 2), an apparent bedding component of 24 degrees is daylighted with respect to the cut slope. Stability analyses performed for potential failure along the daylighted bedding depicted on Geologic Section C-C' indicate that proposed Cut Slope CS-11 meets the requirements for grossly stable slopes.

There is a potential for seepage of water along daylighted bedding planes. Therefore, it is recommended that Cut Slope CS-11 be constructed as a 20-foot-wide by 3-foot-deep stability fill. The stability fill should extend upslope to the first drainage terrace, and extend across the area of alluvium/colluvium in the central portion of the cut slope. The stability fill should be constructed with backdrains in accordance with the recommendations presented in the "Conclusions and Recommendations" section of this report, and as shown on Figure 4.

Cut Slope CS-12: Cut Slope CS-12 will consist of an east-northeast-facing 2:1 slope that will attain a maximum height of 75 feet. Cut Slope CS-12 will expose Saugus Formation units in

which the underlying bedding strikes northwest and dips greater than 42 to 46 degrees towards the northeast. As depicted on Geologic Section B-B' (Figure 2), this bedding orientation exhibits an apparent bedding component dipping approximately 32 degrees to the northeast. The apparent bedding is steeper than the 2:1 (26 degrees) slope gradient and the cut slope is considered grossly stable from a geologic standpoint.

CONCLUSIONS AND RECOMMENDATIONS

GENERAL

Based on our review of previous geotechnical reports prepared for the project and adjacent areas, the additional subsurface exploration performed by RTF&A, and analyses completed as part of this work, it is our opinion that Vesting Tentative Tract Map No. 83301 may be developed as planned, provided our recommendations are incorporated in the design of the project.

GEOLOGIC CONSIDERATIONS

Faulting: No active or potentially active faults are known to exist within the subject site and the site is not located within an Alquist-Priolo Earthquake Fault Zone. The closest Alguist-Priolo Zone is located approximately 1.5 miles northwest of the site and was established for surface features identified following the 1994 Northridge earthquake. In our opinion, there is little probability of surface fault rupture occurring onsite.

Landslides: There are no known landslide with the subject site.

Debris Flows: The potential for debris flows exist anywhere that a moderate to thick accumulation of residual soil, slope wash, or weathered bedrock materials occur on moderate to steep slopes. The potential debris flow hazard should be addressed as part of a review of 1" = 40' rough grading plans, when building lots and drainage features have been more clearly defined.

At the rough grading plan stage, possible mitigative measures could include, but not be limited to, one or more of the following:

- removal of potential debris material;
- building setbacks from ascending slopes;
- reduction and control of drainage onto the debris material;
- construction of debris basins; and
- construction of an impact wall designed for an equivalent fluid density of at least 125 pounds per cubic foot.

In general, building lots most susceptible to potential debris flow are those lots located directly below and adjacent to natural slopes. Based on our review of the Alliance plan, all future lots appear to have acceptable separation, either vertical or horizontal, from natural slopes and potential debris flow source areas. Therefore, potential debris flow impacts are judged to be minimal. However, these opinions should be verified at the rough grading plan review stage.

Oil Wells: Data from the California Division of Oil, Gas and Geothermal Resources (DOGGR) indicate that one oil well, designated "Ayers" 1 is located within the subject site. Only limited data on this well exists in the DOGGR records. Based on the data, the well was drilled in February, 1961 to a depth of 9,785 feet. The well was subsequently abandoned in April, 1961. Recent attempts to locate this well by others were unsuccessful. However, physical survey techniques did identify anomalies within the vicinity of the reported historical well location and GPS information from that search is included with the documentation related to "Ayers" 1 that was provided by Atlas in their December 28, 2020 report that is presented in Appendix H.

It is recommended that prior to development the DOGGR mapped oil well location be surveyed and staked in the field. The surveyed location should be plotted on the current grading

plan to determine the location relative to the grading footprint. Furthermore, DOGGR should be afforded the opportunity to review the site development plans to provide the necessary recommendations with respect to well abandonment. It is likely that reabandonment of the oil well to current DOGGR standards will be required if the well is found to lie within the grading footprint.

Rockfalls: Future building pads within the subject site will not be located directly downslope of any potential rockfall areas.

Rippability: The bedrock exposed within the subject site is weakly to moderately cemented and can likely be excavated with conventional grading equipment. Heavy single shank ripping may be needed for massive conglomerate or well-cemented sandstone units within the Saugus Formation. Should a hard well-cemented layer be encountered, the use of breakers or jackhammers may be necessary.

Restricted Use Areas (RUAs): There are no proposed RUAs within the subject site.

LIQUEFACTION

GENERAL

Liquefaction may occur when saturated, loose to medium dense soils with little to no cohesion are densified by ground vibrations. The densification results in increased pore water pressures if the soils are not sufficiently permeable to dissipate these pressures during, and immediately following, an earthquake. When the pore water pressure is equal to or exceeds the overburden pressure, liquefaction of the affected soil layers occurs. For liquefaction to occur, three conditions are required:

- ground shaking of sufficient magnitude and duration;
- a groundwater level at or above the level of the susceptible soils during the ground shaking; and

- soils that are susceptible to liquefaction.

For a site to be considered susceptible to liquefaction using the criteria and methodology initially developed by Seed and Idriss (1982), liquefaction of underlying soil layers must result in an observed surface effect such as sand boils, mud-spouts, surface water seepage, ground cracking, or quicksand-like conditions.

Lateral spreading can result in ground cracking and may occur when a site is sloped or is near a free-face and there is a sufficiently continuous liquefiable layer on which the overlying soils can move laterally.

Ground settlement may occur during seismic shaking of an area. The settlement can be caused by liquefaction of loose granular soils and by compaction of loose, but not necessarily liquefiable, soils.

The State of California Seismic Hazard Map for the Oat Mountain Quadrangle indicates the alluvial areas of the subject site are located within a potential liquefaction area. The locations of the CPT soundings that were advanced for the subject investigation are indicated on the attached Geotechnical Map, Figure 1. As previously mentioned, the logs for the borings are presented in Appendix A, CPT soundings are presented in Appendix G, and the results of our laboratory tests are presented in Appendix C of this report. The results of our liquefaction calculations are presented in Appendix G.

Ground Shaking: Ground shaking of sufficient magnitude and duration to cause liquefaction can occur virtually anywhere within Southern California. The seismic parameters determined for the subject site resulted in a PGAm of 1.17g. The deaggregation obtained from the USGS website indicates the mean contribution to acceleration is a 6.85 magnitude earthquake located 7.27 kilometers from the site. The seismic data is presented in Appendix F and the liquefaction calculations are presented in Appendix G. There will not be any liquefaction related settlements with the existing bedrock areas mapped as TQss areas as indicated on the Geotechnical Map, Figure 1.

Liquefaction Analysis: The liquefaction evaluation was performed in accordance with the 2014 Los Angeles County Building Code and the Los Angeles County Department of Public Works Geotechnical Materials Engineering Division (GMED) document GS 045.0, dated October 1, 2014. Liquefaction calculations are presented in Appendix G.

Liquefaction evaluation and calculations were previously performed for the site (Gold Coast, 2015) which determined that the alluvial portions of the site were subject to up to 1.39 inches of liquefaction settlement and 0.49 inches none of dry sand settlement for a total seismic settlement of about 1.89 inches. The liquefaction evaluation performed by RTF&A on the 5 CPT soundings performed by Gregg Drilling in January, 2021 are discussed below and the liquefaction calculations are presented in Appendix G.

The existing alluvial areas (Qac) mapped at the site are subject to liquefaction. After the recommended removals are performed, the remaining alluvium soils will be mantled by certified engineered fill. The alluvial soils are underlain by bedrock materials. Accordingly, the existing canyon areas at the stie will be underlain by a combination of bedrock materials, denser alluvial deposits, and certified engineered fill. Bases on liquefaction calculations presented in Appendix G that were performed on the recent Gregg Drilling CPT soundings, it was determined that liquefaction settlement would be about 1.25 inches (Boring HS-5). The maximum dry sand settlement expected at the site is about 0.5 inches. The total dynamic settlement after performing either the 15 or the 20 feet of removal and elevating the site grade within the existing Qac areas is expected to be about 1.75 inches with up to about 1 inch of seismic differential settlement within a horizontal distance of about 30 feet.

Based on the results of our analyses, some alluvial soils beneath the site and below the groundwater level may liquefy in the event of a large earthquake on a nearby fault that produces the design-level ground motions. In addition, soils above the groundwater level may also experience “dry” settlement. This will result in seismically induced ground settlement. The recommended liquefaction mitigation at this site consists of a combination of ground

modification below the proposed building areas and structural mitigation. Each of the liquefaction mitigation methods is discussed below.

Ground Improvement: The recommended grading will involve the removal of the upper soils in the proposed building areas and their replacement with properly compacted fill. The upper soils, which are subject to dry sand settlement, would be removed to depths of either 15 or 20 feet and replaced with compacted fill soils as indicated on the attached Geotechnical Map, Figure 1. Properly compacted fill soils would not be subject to liquefaction.

Structural Mitigation: According to GMED GS 045.0, dated October 1, 2014, structural mitigation alone is acceptable for up to 4 inches of total seismically induced settlement, with up to 1 inch of seismically induced differential vertical displacement over a horizontal distance of 30 feet. Anything in excess of these settlements requires a combination of ground modification and structural mitigation. Accordingly, the recommended liquefaction mitigation at this site consists of a combination of ground modification below the proposed building areas and structural mitigation.

Structural mitigation to reduce the potential for liquefaction and/or seismically induced settlement of the proposed buildings would include minimum requirements for foundation and floor slab construction as presented in the following "Recommendations" section of this report. The project Structural Engineer should also be consulted regarding the design of structural components of the buildings to reduce adverse impacts associated with liquefaction-induced settlement of the proposed structures at the site.

INFILTRATION

The Los Angeles County Department of Public Works (LACDPW) prepared "Guidelines for Design, Investigation, and Reporting Low Impact Development Stormwater Infiltration" (Document GS200.2, dated June 30, 2017). These guidelines provide stringent requirements for minimum infiltration rates, hillside developments with steep slopes, and sites subject to

liquefaction.

At the completion of the proposed grading operations, the surface of the subject site is expected to consist of either relatively shallow certified compacted fill cap overlying bedrock in the existing cut areas or deeper fill soils ranging from about 20 to greater than 30 feet overlying alluvial soils. All the alluvial soils at the site are underlain by bedrock. Compacted fill soils at the subject site are not expected to meet the minimum county infiltration requirements of 0.3 inches per hour. In addition, the alluvial soils at the site are designated by the State of California as having the potential of being subject to liquefaction when saturated and are subject to seismic settlement as evaluated in this report. The guidelines state that infiltration shall not increase the potential for seismic settlement of structures on or adjacent to the site. Accordingly, in compliance with the LACDPW Guidelines, it is recommended that infiltration into the subsurface compacted fill soils not occur at the subject site and that stormwater mitigation requirements be achieved by methods other than on-site infiltration.

GRADING

General: The following sections present recommendations for treatment of cut and fill slopes, and grading. The applicability of the preliminary recommendations given in the following sections for foundation and retaining wall design should be confirmed at the completion of grading. Paving studies and soil corrosivity tests should be performed at the completion of rough grading to develop detailed recommendations for protection of utilities, structures, and for construction of the proposed roads.

Site Preparation: Prior to performing earthwork, the existing vegetation and any deleterious debris should be removed from the site. All unsuitable soils in the areas of grading that are receiving fill should be removed to competent bedrock materials and replaced with engineered fill. The depth of removal and recompaction of unsuitable soils is noted on the Geotechnical Map. Any fill required to raise the site grades should be properly compacted.

Removal of the exposed natural soils should extend to at least the depths indicated on the Geotechnical Map.

Removal Depths: The required depth of removal and recompaction of the natural soils is indicated on the Geotechnical Map. Deeper removals will be required if disturbed or unsuitable soils are encountered. After excavation of the upper natural soils on hillsides and in canyons, further excavation should be performed, if necessary, to remove slope wash or other unsuitable soils.

The Geotechnical Consultant of Record may require that additional shallow excavations be made periodically in the exposed bottom to determine that sufficient removals have been made prior to recompacting the soil in-place. Deeper removals may be recommended by RTF&A based on observed field conditions during grading. During grading operations, the removal depths should be observed by a representative of RTF&A and surveyed by the Project Civil Engineer for conformance with the recommended removal depths shown on the grading plan.

Expansive Bedrock Requirements: It is anticipated that bedrock materials exposed at pad grade may contain expansive claystone beds that could cause differential expansion. Therefore, within building areas at locations where expansive bedrock units are exposed at pad grade, it is recommended that the bedrock be removed and recompacted to a depth at least 8 feet below the proposed final pad elevations or 5 feet below the bottom of proposed footings, whichever is greater. It is also recommended that in exposed bedrock areas receiving pavement or hardscape improvements, the bedrock be removed and recompacted to a depth at least 3 feet below proposed soil subgrade. The soils generated by these over-excavations should be mixed with non-expansive soils to yield a relatively non-expansive mixture. Should the resulting fill soil still be expansive, special construction techniques, such as pad subgrade saturation or post-tensioned slabs, may be required to reduce the potential for expansive soil–related distress.

Transition Lot Requirements: Proposed building pads located in a cut and fill transition zone may experience cracking and movement of the footings and slab due to differing compressibility of the fill, as compared to the bedrock material. To reduce the potential for cracking and differential settlement, the portion of the lot in cut bedrock or terrace deposits should be over-excavated to a depth at least 5 feet below the proposed finished pad elevation or 3 feet below the bottom of proposed footings, whichever is greater. The over-excavation should extend at least 5 feet laterally beyond the building limits, or 1 foot laterally for each 1 foot over-excavated below proposed finished pad elevation, whichever is greater. Where removal and recompaction for potentially expansive soils or bedrock is also required, it is recommended that the 8 foot removals be performed as described in the "Expansive Bedrock" section of this report.

Material for Fill: The on-site soils, less any debris or organic matter, may be used in the required fills. Any expansive clays should be mixed with non-expansive soils to result in a mixture having an expansion index less than 30 if they are to be placed within the upper eight feet of the proposed rough grades.

Rocks or hard fragments larger than eight inches may not be placed in the fill without special treatment. Rocks or hard fragments larger than four inches shall not be clustered or compose more than 25% by weight of any portion of the fill or a lift. Soils containing more than 25% rock or hard fragments larger than four inches must be removed or crushed with successive passes (e.g., with a sheepsfoot roller) until rock or hard fragments larger than four inches constitute less than 25% of the fill or lift.

Oversized Material: Rocks or material greater than eight inches in diameter, but not exceeding four feet in largest dimension, shall be considered oversized rock. The oversized rocks can be incorporated into deep fills where designated by the Geotechnical Consultant of Record. Rocks should be placed in the lower portions of the fill and should not be placed within the upper 10 feet of compacted fill, or nearer than 15 feet to the surface of any fill slope. Windrows should be excluded from areas of proposed utilities, pools, and other types of future

underground improvements. Additional costs and construction difficulties should be anticipated if future improvements are located in areas where there will be conflicts with existing windrows. Rocks between eight inches and four feet in diameter shall be placed in windrows or shallow trenches located so that equipment can build up and compact fill on both sides. The width of the windrows shall not exceed four feet. The windrows should be staggered vertically so that one windrow is not placed directly above the windrow immediately below. Rock greater than one foot in diameter shall not exceed 30% of the volume of the windrows. Granular fill shall be placed on the windrow, and enough water should be applied so that soil can be flooded into the voids. Fill should be placed along the sides of the windrows and compacted as thoroughly as possible. After the fill has been brought to the top of the rock windrow, additional granular fill should be placed and flooded into the voids. Flooding is not permitted in fill soils placed more than one foot above the top of the windrowed rocks.

Where utility lines or pipelines are to be located at depths greater than 15 feet, rock shall be excluded in that area. Excess rock that cannot be included in the fill, or that exceeds four feet in diameter, should be stockpiled for export or used for landscaping purposes.

The oversized material recommendations presented in this report provide for the geotechnical consultant to coordinate with the grading contractor to develop a procedure for construction of compacted fills that have a satisfactory fill performance for the intended use of the fill. It should be understood that it is not feasible and/or cost effective to eliminate all oversize material from constructed fills as part of a conventional grading operation. The exclusion of all oversize material is not necessary for satisfactory fill performance on the majority of projects.

Import Material: Import material should consist of relatively non-expansive soils with an expansion index less than 30. The imported materials should contain sufficient fines (binder material) so as to be relatively impermeable, and result in a stable subgrade when compacted. The import material should be free of organic materials, debris, and rocks larger than 12 inches.

A bulk sample of potential import material, weighing at least 25 pounds, should be submitted to the Geotechnical Consultant of Record at least 48 hours in advance of fill operations. All proposed import materials should be approved by the Geotechnical Consultant of Record prior to being placed at the site.

Compaction: After the site is cleared and excavated as recommended, the exposed soils should be carefully observed for the removal of all unsuitable material. Next, the exposed subgrade soils should be scarified to a depth of at least six inches, brought to above optimum moisture content, and rolled with heavy compaction equipment. The upper six inches of exposed soils should be compacted to at least 90% of the maximum dry density obtainable by the ASTM D 1557-02 Method of Compaction.

After compacting the exposed subgrade soils, all required fills should be placed in loose lifts, not more than eight inches in thickness, and compacted to at least 90% of their maximum density. For fills placed at depths greater than 40 feet below proposed finish grade, a minimum compaction of 93% of the maximum dry density is required. The moisture content of the fill soils at the time of compaction should be above the optimum moisture content. Compacted fill should not be allowed to dry out before subsequent lifts are placed.

Rough grades should be sloped so as not to direct water flow over slope faces. Finished exterior grades should be sloped to drain away from building areas to prevent ponding of water adjacent to foundations.

Shrinkage And Bulking: Shrinkage of about 12 to 16 percent is estimated for the on-site natural alluvial soils when removed and placed as compacted fill. A bulking value of about 2 to 6 percent is estimated for materials generated from Saugus Formation bedrock cut areas for use as compacted fill. The actual shrinkage and bulking will depend upon the relative compaction obtained by the contractor during grading operations and would be expected to change on a daily basis.

Permanent Slopes: Permanent cut and fill slopes may be inclined at 2:1 or flatter. The current site plan indicates that the steepest slope to be constructed at the site during grading will be 2:1.

Proposed Cut Slopes: Cut slopes proposed for the rough grading of the project site have been designated, as shown on the Geotechnical Map. Each cut slope is discussed with specific recommendations presented in the "Slope Stability Analysis" section of this report. All grading should conform to the minimum recommendations presented in this report. If these slopes are modified from those that are discussed in this report, the modifications should be reviewed by RTF&A to ascertain the applicability of our recommendations.

Fill Slopes: Where the toe of a fill slope terminates on natural, fill, or cut materials, a keyway is required at the toe of the fill slope. The fill slope keyway should be a minimum width of 12 feet, be founded within competent material, and should extend a horizontal distance beyond the toe of the fill to the depth of the keyway. The keyway should be sloped back at a minimum gradient of two percent into the slope. The width of fill slopes shall be no less than eight feet, and under no circumstances should the fill widths be less than what the compaction equipment being used can fully compact. Benches should be cut into the existing slope to bind the fill to the slope. Benches should be step-like in profile, with each bench not less than four feet in height and established in competent material. Compressible or other unsuitable soils should be removed from the slope prior to benching. Competent material is defined as being essentially free of loose soil, heavy fracturing, or erosion-prone material and is established by the Geotechnical Consultant of Record during grading.

Where the top or toe of a fill slope terminates on a natural or cut slope and the natural or cut slope is steeper than a gradient of 3:1, a drainage terrace with a width of at least six feet is recommended along the contact. As an alternative, the natural or cut portion of the slope can be excavated and reconstructed as a stability fill slope to provide an all-fill slope condition. Where

the contact between the face of the fill slope and the face of a lower natural or cut slope is inclined at 45 degrees or steeper, a drainage terrace would not be required.

When constructing fill slopes, the grading contractor shall avoid spillage of loose material down the face of the slope during the dumping and rolling operations. Preferably, the incoming load shall be dumped behind the face of the slope and bladed into place. After a maximum of four feet of compacted fill has been placed, the contractor shall backroll the outer face of the slope by backing the tamping roller over the top of the slope, thoroughly covering all of the slope surface with overlapping passes of the roller. The foregoing should be repeated after the placement of each four-foot thickness of fill. As an alternative, the fill slope can be overbuilt and the slope cut back to expose a compacted core. If the required compaction is not obtained on the fill slope, additional rolling will be required prior to placement of additional fill, or the slope shall be overbuilt and cut back to expose the compacted core.

Stability Fills: Stability fill can be recommended to minimize the potential for erosion and to eliminate adverse fill-over-cut conditions. Stability fill slope should be constructed in accordance with Stability Fill Details for Grossly Stable Slopes (Figure 4). Backdrains should be installed at the backcut of the stability fill as recommended below.

DRAINAGE

Subdrains: Canyon subdrains are recommended to intercept and remove groundwater within canyon fill areas. All subdrains should extend up-canyon, with the drain inlet carried to within 15 feet of final pad grade. The approximate location for recommended subdrains are shown on the Geotechnical Map, Figure 1. Specific subdrain locations should be determined in the field during grading operations.

The subdrains should be surveyed by the Project Surveyor to establish line and grade during construction, and for future location reference. Subdrain and backdrain excavations should be observed by the Geotechnical Consultant.

The subdrains should be installed in accordance with the manufacturer's specifications. A minimum 2% gradient is to be maintained in the subdrain pipes and the pipe shall have at least 8 uniformly spaced narrow slots per foot. The width of the slots should not exceed 1/16 of an inch. If PVC pipe with drilled perforations is utilized, the diameter of the holes should not exceed 3/8 of an inch, if gravel and filter fabric is used or 1/8 inch diameter if Los Angeles County Flood Control District (LACFCD) Designation F-1 Filter Material is used. There should be at least 8 uniformly spaced sets of 2 perforations per lineal foot of pipe. When constructing the subdrain, the pipe should be placed so that the drilled perforations are positioned on the bottom half of the pipe. The upstream end of subdrains should be capped. The final 20 feet of pipe at the downstream end of canyon, stabilization, buttress, and side hill fills shall not be slotted or perforated. Provisions should be made at all times during construction to prevent damage to the subdrain from construction equipment, and to prevent soils from being washed into an exposed subdrain by surface waters.

For runs up to 500 feet, subdrains for the bottom of canyon fills should consist of at least 6-inch diameter pipe. For runs of 500 to 1,500 feet, 8-inch diameter pipe shall be used. For runs over 1,500 feet, 10-inch diameter pipe shall be used.

Canyon subdrains may be installed in a rectangular trench excavated to expose competent material and shall be approved by the Geotechnical Consultant. The subdrains should be surrounded by at least 3 cubic feet per lineal foot of granular filter material and there should be at least 6 inches of compacted granular filter material or gravel on all sides of the pipe. The granular filter material for subdrains should meet the F1 material criteria, or have a gradation approved by the Geotechnical Consultant prior to placement.

As an alternative to the granular filter material, 3/4-inch diameter gravel may be placed around the pipe. The gravel should be separated from the surrounding soils by a filter fabric such as Mirafi 140N, or equivalent, wrapped around the gravel (“burrito wrapped”).

Backdrains: Backdrains are required for all stability fills or buttress fills, and should consist of 4-inch diameter perforated or slotted pipe. The vertical spacing of the backdrains should be a maximum of about 15 feet, with a horizontal spacing of about 100 feet. Backdrain outlets should consist of non-perforated pipe. The gradient should be at least 2% to the discharge end. The exact location of the backdrains should be determined in the field by the Geotechnical Consultant after the backcut has been made, so that it can be best positioned to intercept potential seepage.

Surface Drainage: All surface drainage should be directed away from proposed structures through non-erosive devices. The ponding of water must not be allowed, especially adjacent to foundations. The pad gradients should not slope toward any descending slopes in order to reduce the potential for surficial erosion. Water that flows towards slopes should be conducted to appropriate discharge locations via non-erodible drainage devices. Drainage devices, including drainage terraces on graded slopes should be inspected periodically and should be kept clear of debris. Drainage and erosion control should be designed in accordance with the standards set forth in the CBC.

Any modification of the grades of building pads, parking areas, etc., could adversely affect drainage at the site. Future landscaping, construction of walkways, planters and walls, etc. must never modify site drainage unless additional measures to enhance drainage (e.g. area drains, additional grading, etc.) are designed and constructed in accordance with the applicable Los Angeles County regulations.

Erosion Protection: In order to reduce the potential for erosion, all permanent cut-and-fill slopes on-site should be seeded or planted with lightweight, deep-rooting, drought-resistant vegetation. A landscaping expert should be consulted for ground cover recommendations. Excessive landscape irrigation or leakage from irrigation lines can cause localized slope failures. Therefore, irrigation systems for slope vegetation should be designed and maintained to minimize leakage onto graded slopes. If automatic sprinkler systems are used, they should be

adjusted for seasonal variations in rainfall. Vegetation on natural slopes should remain natural and not be landscaped or irrigated in the same manner as graded slopes.

Rodent burrows are known to provide direct conduits for water flow that can decrease slope stability. Therefore, in order to maintain the integrity of graded slopes, a rodent abatement program should be instituted.

Even with the implementation of these recommendations, it is not possible to eliminate erosion within hillside developments. Removal of debris from drainage devices, slope maintenance, and landscaping will be required, especially after periods of heavy rainfall.

GENERAL GRADING REQUIREMENTS

1. All fills, unless otherwise specifically designed, shall be compacted to at least 90 percent of the maximum dry unit weight as determined by ASTM D 1557-02 Method of Soil Compaction.

2. No fill shall be placed until the area to receive the fill has been adequately prepared, and subsequently approved by the Geotechnical Consultant of Record or his representative.

3. Fill soils should be kept free of debris and organic material.

4. Rocks or hard fragments larger than eight inches may not be placed in the fill without approval of the Geotechnical Consultant of Record or his representative, and in a manner specified for each occurrence.

   Bedrock fragments larger than eight inches, or fill soils containing greater than 25 percent of bedrock fragments larger than four inches in diameter, must be removed or processed using successive passes of a sheepsfoot compactor until rock fragments constitute less than 25 percent of the fill material.

5. The fill material shall be placed in layers which, when compacted, shall not exceed eight inches per layer. Each layer shall be spread evenly and shall be mixed thoroughly during the spreading to ensure uniformity of material and moisture.

6. When moisture content of the fill material is too low to obtain adequate compaction, water shall be added and thoroughly dispersed until the soil is approximately two to four percent above optimum moisture content.

7. When the moisture content of the fill material is too high to obtain adequate compaction, the fill material shall be aerated by blading, or other satisfactory methods, until the soil is approximately two to four percent above optimum moisture content.

8. Fill and cut slopes should not be constructed at gradients steeper than 2:1 (horizontal:vertical).

GRADING OBSERVATION

Construction observation should be made by a Geotechnical Consultant of Record during any grading activities within the project site, to verify the findings within this report. Additional recommendations may be required for landfill design based on conditions uncovered during grading.

TEMPORARY EXCAVATIONS

Based on our review of the subject plans, it does not appear that significant temporary excavations will be required during the construction of the proposed development. However, the following recommendations are applicable in areas where excavations are to be made.

Temporary excavations are not expected to stand vertically in cuts that exceed four feet in height. Temporary excavations in excess of four feet may be sloped at a gradient of ¾:1, to a maximum height of 12 feet. Slopes higher than 12 feet should be slopes back at a 1:1 gradient. By temporary, we mean a period not exceeding 60 days. All regulations of State or Federal OSHA should be followed.

If excavations are made during the rainy season (normally from November through April), particular care should be taken to protect slopes against erosion. Measures to help mitigate erosion, such as the installation of berms, plastic sheeting, or other devices, may be warranted. Surface water should be prevented from flowing over or ponding at the top of excavations.

CORROSION TESTS

Corrosion testing was previously performed by Golden Coast (2015) and indicated that the on-site soluble sulfate concentrations are negligible. The on-site soils are also corrosive to buried metals. A soil corrosion study was not performed as part of this scope of this investigation. Samples of the near-surface soil should be obtained at the conclusion of grading and be submitted to a corrosion consultant for testing. The purpose of performing the tests would be to determine if the site soils are corrosive to concrete or underground utilities in contact with the soil.

EXPANSIVE SOILS

Samples of the on-site soils were obtained in 2015 during the investigation of the site for laboratory expansion index testing (Golden Coast, 2015) and indicated a “very low” expansion potential . It is anticipated that when finer grained layers of the TQss are excavated and placed as compacted fill that the future compacted fill generated from the on-site soils may have a very low to medium potential for expansion depending upon the characteristics of the excavated bedrock and the degree of mixing that is obtained when placed as compacted fill. The site soils can be classified as having a very low to medium potential for expansion.

The expansion index of near-surface certified engineered fill on building lots should be evaluated at the completion of grading to provide appropriate foundation recommendations commensurate with the post-grading expansion index test results.

FOUNDATIONS

General: Buildings may be supported on continuous or individual spread footings established in properly compacted fill soils. Foundations and floor slabs should be designed by a structural engineer, in accordance with the minimum requirements of the CBC.

Design Criteria: The recommendations presented in this section are based on the assumption that the proposed structures will have column loads not exceeding approximately 100 kips and continuous foundation loads not exceeding 3 kips per lineal foot. A bearing value of 2,000 pounds per square foot (psf) may be used in the design of spread foundations. This value can be increased by one-third when considering seismic and wind forces. The bearing material should consist of compacted fill soil. Individual column pads and continuous wall footings should be designed to meet the minimum width and depth requirements, as set forth in the CBC. Foundation depths should be measured from the lowest adjacent final grade.

Building setbacks for structures located adjacent to either ascending or descending slopes should be in accordance with the standards set forth in the CBC. All foundation excavations should be observed and approved by a representative from our firm prior to placement of reinforcing steel. Foundations should be deepened, where necessary, to prevent surcharge loads from being imposed on adjacent foundations or utilities. Observation of foundation excavations may also be required by the appropriate reviewing governmental agencies. The contractor should be familiar with the requirements of the governing reviewing agencies.

Foundations should be deepened, where necessary, to prevent surcharge loads from being imposed upon adjacent foundations or utilities. Surcharge loads should be assumed to be distributed out from the bottom edges of foundations at 45-degree angles. Foundation excavations should be cleaned of all loose material and be observed and approved by a representative of the Geotechnical Engineer of Record prior to casting concrete.

The Foundation Plans should be reviewed by the Geotechnical Engineer of Record. The Geotechnical Engineer of Record should sign and stamp the plan, provided the plans have been found to conform to the geotechnical recommendations presented in this report.

Mat Foundations: A mat foundation system can be used as an alternative to a post-tensioned slab within liquefaction areas and also for expansive soils conditions. If a mat foundation is utilized, the following geotechnical recommendations may be utilized for mat foundation construction. A base modulus of subgrade reaction of 300 pounds per cubic inch (pci) is recommended for use in the design of mat foundations for the proposed buildings at the subject site. The mat could be founded directly on a 4-inch-thick layer of Crushed Aggregate Base (CAB) compacted to 95 percent relative compaction to provide a firm working surface, but it is not required from a geotechnical perspective. If utilized, the base would be placed directly on compacted fill soil that would be placed as part of the grading recommended in this report.

The base modulus should be reduced in accordance with the following equation:

$$k = k_b \left[\frac{(1 + B)}{2 x B} \right]^2$$

where:

k = modulus of subgrade reaction for design
k_b = 300 pci = base modulus of subgrade reaction in pci
B = least dimension of foundation in feet

It is expected that mat foundations for the proposed buildings will range from about 8 to 30 inches in thickness. The thickness of each mat foundation will be a function of the loading conditions and is referred to the Project Structural Engineer for design. It is anticipated that each mat foundation, including the weight of the supported building, will impose pressure on the underlying soil of about 1,500 psf. This value could be considered as the design bearing value for mat foundation design.

Pile Footings: Foundations for structures can be designed as either conventional spread footings or as pile foundations. If it is determined that pile foundations will be utilized, it is recommended that those pile foundations be designed as skin friction piles as opposed to end bearing piles. The following recommendations apply to skin friction piles.

Skin friction piles may be founded in compacted fill soils, native soils, or a combination of fill and native soil may be used to provide frictional support for the foundation piles. Friction piles should be at least 18 inches in diameter and be designed using a skin friction value of 300 psf for the supporting soils. A passive pressure of a depth of three feet, increasing at the rate of 350 psf per foot of depth, to a maximum of 3,000 psf, may be used for pile foundations. Lateral resistance and skin friction should be assumed to apply at a depth of 3 feet below the lowest adjacent grade. The foundation excavations should be cleaned of loose materials and be observed and approved by the Geotechnical Consultant of Record and the City of Santa Clarita prior to casting piles.

Lateral Design: Lateral restraint at the bases of footings or slabs may be assumed to be the product of the dead load and a coefficient of friction of 0.4. Passive pressure on the faces of footings may also be used to resist lateral forces. A passive pressure of zero at the surface of finished grade, increasing at the rate of 250 psf per foot of depth, to a maximum value of 2,500 psf, may be used at this site. The passive pressure and friction may be combined without reduction when evaluating lateral resistance.

Settlement: Provided that the proposed buildings are supported on shallow foundations established in compacted fill soils, as recommended, column loads do not exceed 100 kips, and continuous footings do not exceed 3 kips per lineal foot, we estimate that the maximum static settlement will be about 0.75 inches with seismic settlements of about 1.75 inches for a total settlement of about 2.5 inches within the alluvial areas (Qac) at the site. Differential static and seismic settlements with the alluvial areas at the site are expected to be about 1.4 inches within a horizontal distance of 30 feet. Within the compacted fill areas directly underlain by bedrock

(TQss mapped areas), total seismic and static settlements of about 1 inch with differential settlement of about 0.75 inches within a horizontal distance of about 30 feet are expected. Our firm should review the foundation loads after plans are developed, to verify the applicability of our recommendations to the proposed structures.

FLOOR SLAB SUPPORT

General: The floor slab design recommendations presented in this section are based upon the assumption that the soil subgrade in proposed floor slab areas will consist of compacted fill soil and that floor slabs will be subjected to normal loads with no special requirements. Any surficial soils that become dried or disturbed during the course of construction should be moisture-conditioned and compacted prior to casting the floor slab.

Conventional floor slabs may be utilized at the subject development outside of liquefaction areas, provided the subgrade soils consist of compacted fill soils with a very low (Expansion Index of 0 to 20) potential for expansion. If the subgrade soils are determined to have an expansion potential in the low or higher range (Expansion Index greater than 21), post-tensioned floor slabs, as indicated below, are recommended. Post-tensioned slabs are also recommended for all building pads located within existing alluvial areas that are subject to liquefaction.

Conventional Floor Slabs: Conventional slabs-on-grade should be designed per the recommendations of the CBC. However, as a minimum, the building floor slabs should have a nominal thickness of at least 4 inches and should be reinforced with a No. 4 rebar spaced at 18 inches on center, in each direction, or equivalent. Thicker slabs may be required depending on the floor loads and the structural requirements; we defer to the Project Structural Engineer for design of the floor slabs.

Post-Tensioned Floor Slabs: Post-tensioned floor slabs should be designed per the recommendations of the CBC and be designed to resist the calculated static and seismic

settlements in addition to the following geotechnical parameters. The design values, presented following this paragraph, assume that the proposed floor slabs will be poured monolithic with continuous perimeter edge footings. Perimeter edge footings should have a minimum depth of 18 inches. Footing depths should be measured from the lowest adjacent grade for perimeter footings or the top of slab for interior footings.

Net Bearing Value:	An allowable net bearing value of 2,000 psf for footings with a minimum width of 12 inches and a minimum depth of 18 inches below the top of slab or 18 inches below the lowest adjacent grade may be used.
Coefficient of Friction:	0.75
Passive Pressure:	250 pcf for level ground condition
Modulus of Subgrade Reaction (K):	150 pounds per cubic inch (pci) for a footing width of one foot. For larger footings or floor slabs, this value should be reduced using the following equation:

$$Kr = K\left[\frac{(B+1)}{2B}\right]^2$$

where:

Kr = Reduced Modulus Value
K = Modulus of Subgrade Reaction for a One-Foot-Wide Plate
B = Width of Large Footing or Slab

Modulus of Elasticity:	1,000 pounds per square inch (psi)
Edge Moisture Variation Distance Me (Center Lift):	5.25 feet

Me (Edge Lift):	2.5 feet	
Estimated Differential Movement	Low	Medium
My (swelling):	0.4	0.9
My (shrink):	0.3	0.7

Water Vapor Mitigation: Water vapor transmitted through floor slabs is a common cause of floor covering problems. An impermeable membrane "vapor barrier" should be installed to reduce excess vapor drive through the floor slab. The function of the impermeable membrane is to reduce the amount of water vapor transmitted through the floor slab. Vapor-related impacts should be expected in areas where a vapor barrier is not installed.

Construction activities and exposure to the environment may cause deterioration of the prepared subgrade. Therefore, the Geotechnical Consultant of Record should observe the condition of the final subgrade soils immediately prior to slab-on-grade construction and, if necessary, perform further density and moisture content tests to determine the suitability of the final prepared subgrade. The soil subgrade should be thoroughly moistened prior to casting.

Water vapor migration through slabs and associated adverse impacts should be anticipated if a vapor barrier is not constructed. The vapor barrier system recommended in this report has a record of satisfactory performance when properly installed. There are numerous methods of reducing vapor migration through slabs that also have satisfactory performance records. Each of the potential moisture reducing mitigation methods has advantages relative to cost, performance, protection of the vapor barrier during construction, and concrete curing. If requested and authorized, we would be pleased to provide the design team with additional geotechnical input on the selection of a suitable vapor barrier system.

Floor slabs should be constructed in a manner to decrease the potential of water vapor migration through the slabs. The floor slabs should be underlain by a vapor barrier consisting of a fifteen-mil-thick impermeable membrane. Care should be taken to avoid damage to the membrane and to seal the membrane around utilities and other penetrations.

Floor slabs should be underlain by a vapor barrier surrounded by 2 inches of sand above and below the barrier. The vapor barrier should be at least 10 millimeters thick; care should be taken to preserve the continuity and integrity of the barrier beneath the floor slab. The sand should be sufficiently moist to remain in place and be stable during construction; however, if the sand above the barrier becomes saturated before placing concrete, the moisture in the sand can become a source of water vapor.

Another factor affecting vapor transmission through floor slabs is a high water-to-cement ratio in the concrete used for the floor slab. A high water-to-cement ratio increases the porosity of the concrete, thereby facilitating the transmission of water and water vapor through the slab. The Project Structural Engineer or a concrete mix specialist should provide recommendations for the design of concrete for footings and floor slabs in accordance with the CBC, with consideration of the above comments.

Alternative methods of providing floor slab water vapor mitigation have also been successfully utilized. If requested, we would be pleased to provide geotechnical comments if it is desired to utilize alternative mitigation methods. The recommendations presented herewith may be superseded by the design team based on their successful experience with alternative mitigation methods. However, RTF&A assumes no responsibility related to adverse impacts associated with superseding the recommendations of this report.

SEISMIC DESIGN PARAMETERS

As with virtually all property in southern California, the site may be subjected to strong ground shaking during earthquakes on nearby or distant faults and the improvements should be designed to resist such shaking in accordance with current codes. The seismic data is presented in Appendix C and the liquefaction calculations are presented in Appendix D. If requested and

authorized, we would be pleased to provide additional parameters utilizing other standards. The use of an appropriate seismic design parameter is referred to the Structural Engineer.

The following coefficients and factors apply to seismic force design of structures at the site. The parameters were determined using the Applied Technology Council (ATC) Seismic Design Maps website, based upon American Society Civil Engineers (ASCE) document ASCE 7-16. Since S1 is greater than 0.2, null was reported for Sm1 and Sd1 and it will be necessary for the Project Structural Engineer to determine Cs (Seismic Response Coefficient) with the exception for Site Class D presented in Section 11.4.8 of ASCE 7-16.

Site Class	D
S_S	2.49
S_1	0.85
S_{MS}	2.49
S_{M1}	Null*
S_{DS}	1.66
S_{D1}	Null*
PGA_M	1.17

** See Section 11.4.8 of ASCE 7-16

PAVEMENT DESIGN

Samples of the on-site soil should be obtained from near final grade elevation in proposed pavement areas, following the grading operations, to perform R-value tests. The R-value test results would be used to prepare pavement section recommendations. The preliminary pavement section recommendations presented below are based on the assumption that the on-site soils have an R-value of at least 20. The final pavement section recommendations could vary depending on the results of the actual R-value tests. We would be pleased to provide pavement section recommendations for alternative Traffic Index values upon request.

Traffic Index	Asphalt Thickness (Inches)	(CAB) Base Course Thickness (Inches)
4	3	5
6	4	9
8	5	14

Base course material should consist of crushed aggregate base (CAB), as defined by Section 200-2.2 of the Standard Specifications for Public Works Construction ("Greenbook"), or crushed miscellaneous base (CMB), as defined by Section 200-2.4 of the Greenbook. Base course material should be compacted to at least 95% of the maximum dry density of that material.

Base course material should be purchased from a supplier who will certify that it will meet or exceed the specifications in the Greenbook, as indicated. We could, upon request, perform sieve analysis and sand equivalency tests on material delivered to the site that appears suspect. Additional tests could be performed, upon request, to determine if the material is in compliance with the remainder of the specifications indicated in the Greenbook.

The pavement section recommendations presented above are based upon assumed Traffic Index values. RTF&A does not take responsibility for the numerical determination of the Traffic Index values nor the areas where they apply within the site.

RETAINING WALLS

For design of cantilevered retaining walls where the retained height of soils is less than 15 feet, and the walls are structurally independent from the proposed building, it may be assumed that drained soils will exert a lateral pressure equal to that developed by a fluid with a density of 30 pounds per cubic foot (pcf) where the backfill is level, and 45 pcf where the

backfill is inclined at 2:1. The proposed retaining wall at the toe of Cut Slope CS-5 should be designed to resist an additional surcharge at a height of 10 feet of 10 kips as a result of daylighted apparent bedding.

In addition to the recommended earth pressures, the retaining walls should be designed to resist any applicable surcharges due to storage or traffic loads. A drainage system should be provided behind the walls to prevent the development of hydrostatic pressure behind the walls. If a drainage system is not installed, the walls should be designed to resist an additional hydrostatic pressure equal to that developed by a fluid with a density of 55 pcf against the full height of the wall.

In addition to the recommended earth and hydrostatic pressures, the upper ten feet of walls adjacent to vehicular traffic areas should be designed to resist a uniform lateral pressure of 100 psf, acting as a result of an assumed 300 psf surcharge behind the walls due to normal traffic. If the traffic is kept back at least ten feet from the walls, the traffic surcharge may be neglected.

The back of retaining walls should be water-proofed where aesthetics are concerned. Backfill placed behind retaining walls should be compacted to a minimum of 90% of the maximum dry density as determined by ASTM D 1557-02. When backfilling behind walls, it is recommended that the walls be braced, and heavy compaction equipment not be used closer to the back of the wall than the height of the wall. Soils which have a potential for expansion in excess of five percent should not be utilized for backfill behind walls which are greater than three feet in height.

Drainage: A drainage system should be provided behind retaining walls, or the walls should be designed to resist hydrostatic pressures. The drainage system could consist of a four-inch diameter perforated pipe placed six inches from the base of the wall, with the perforations down, and connected to an outlet device. The pipe should be sloped at least 1 inch per 50 feet and surrounded on all sides by at least six inches of clean gravel. The gravel should be "burrito-

wrapped" with filter fabric, such as Mirafi 140N, or equivalent. As an alternative to the gravel and filter fabric, filter material meeting the requirements of LACFCD Designated F-1 Filter Material, and slotted pipe, may be used. The backside of the wall should be water-proofed.

A vertical six-inch-wide gravel chimney drain, or a drainage geocomposite such as Miradrain, should be placed against and behind retaining walls that are higher than three feet. The top of the back drain should be capped with 18 inches of on-site soils.

The installed drainage system should be observed by the Geotechnical Consultant of Record prior to backfilling the system. Inspection of the drainage system may also be required by the reviewing governmental agencies.

OBSERVATION AND TESTING

This report has been prepared assuming that RTF&A will perform all geotechnically-related field observations and testing. If the recommendations presented in this report are utilized, and observation and testing of the geotechnical work is performed by others, the party performing the observation and testing must review this report and assume responsibility for the recommendations contained herein. That party would then assume the title "Geotechnical Consultant of Record."

A representative of the Geotechnical Consultant of Record of Record should be present to observe all grading operations, as well as all footing excavations. A report presenting the results of the observations and related testing should be issued upon completion of those operations.

LOS ANGELES COUNTY SECTION 111 STATEMENT

Based on the findings summarized in this submittal, it is our professional opinion that the proposed grading, and any proposed structures at the site, will be safe from hazards of settlement, slippage, or landslide, provided that the recommendations of this submittal, and those of the Los Angeles County Code, are incorporated into the proposed construction. Additionally,

the proposed site grading will not adversely affect the geotechnical conditions on adjacent properties.

-oOo-

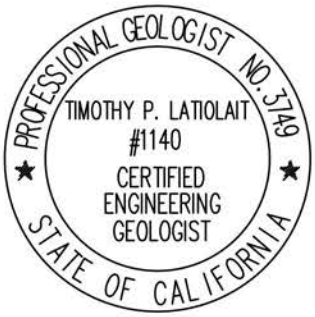
The following are attached and complete this report.

- References
- Summary of Cut Slopes – Table 1
- Geotechnical Map – Figure 1
- Geologic Sections – Figure 2
- Geotechnical Sections – Figure 3
- Stability Fill Detail for Grossly Stable Slopes – Figure 4
- Appendix A – RTF&A Field Explorations
- Appendix B – Field Explorations by Others
- Appendix C - Laboratory Testing
- Appendix D – Slope Stability Analyses
- Appendix E – Gregg CPT Soundings
- Appendix F – Seismic Parameters
- Appendix G – Liquefaction Calculations
- Appendix H – Ayers Oil Well Documentation

Respectfully submitted,

R. T. FRANKIAN & ASSOCIATES

by: Alan W. Rasplicka
Principal Geotechnical Engineer



and: Timothy P. Latiolait
Principal Engineering Geologist

Distribution: New Urban West, Inc. Attn: Mr. Jason Han, Mr. Jonathan Frankel
Alliance Land Planning and Engineering Attn: Mr. Craig Whiteker, Mr. Michael La Bounty
Madison Real Estate Consulting, LLC Attn: Mr. Benny Sam

RTF&A
GEOTECHNICAL ENGINEERING & ENGINEERING GEOLOGY

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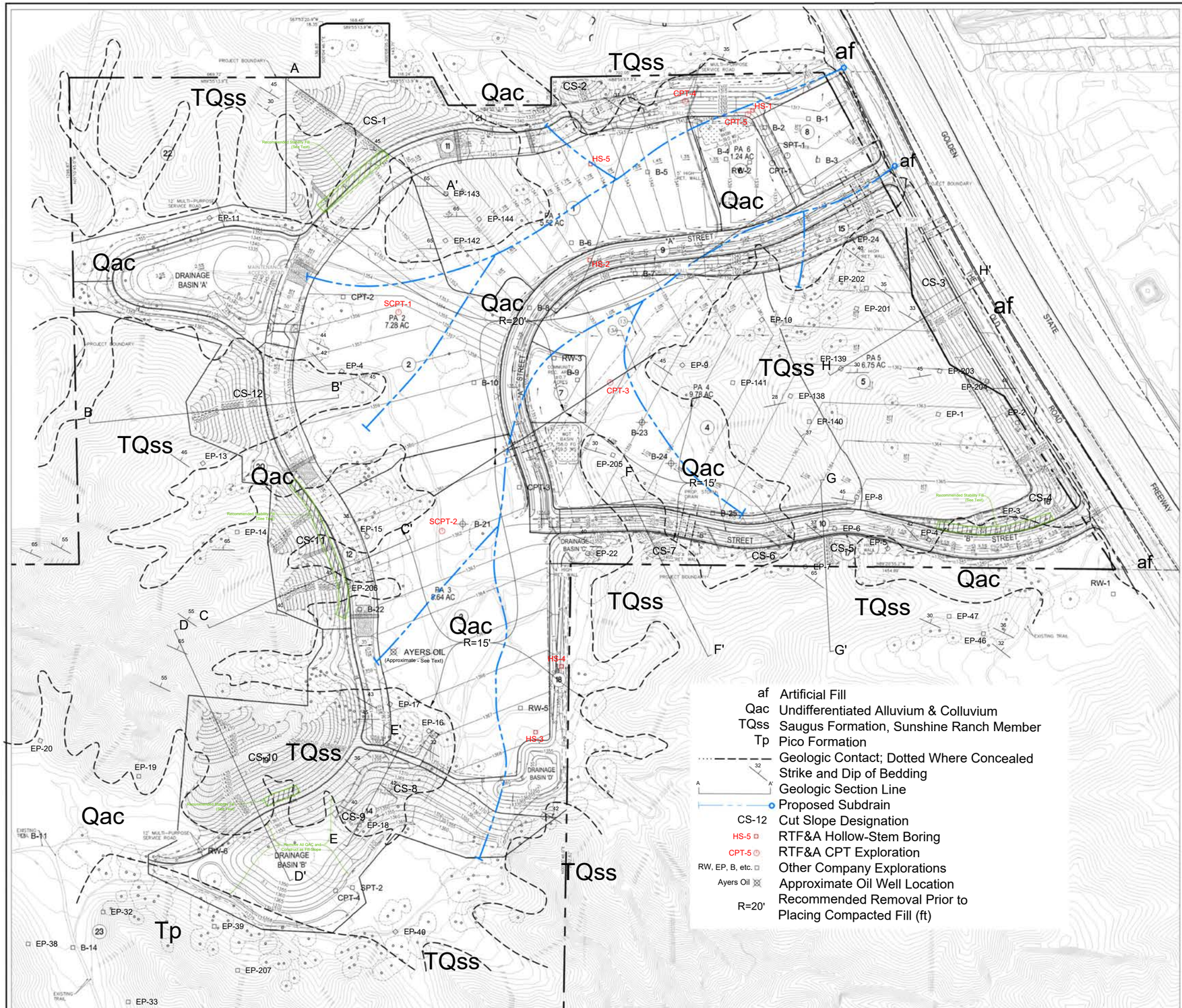
TABLE 1
CUT SLOPE SUMMARY
Lyons Canyon Development
Vesting Tentative Tract Map No. 53653
Tentative Tract Map No. 53301

CUT SLOPE	SLOPE GRADIENT	SLOPE HEIGHT (feet)	SLOPE FACE DIRECTION	GEOLOGIC MATERIALS	CROSS SECTION	GEOLOGIC STABILITY	MITIGATION
CS-1	2:1	115	SE	TQss & Qac	A-A'	Favorable bedding; grossly stable	Stabilize erosion-susceptible alluvial & colluvial deposits with a 30 feet wide, 3 deep stability fill slope backdrains
CS-2	2:1	30	SSE	TQss	---	Favorable bedding; grossly stable	None
CS-3	2:1	40	NE	TQss	H-H'	Favorable bedding; grossly stable	None
CS-4	2:1	36	SSE	TQss & Qac	---	Favorable bedding; grossly stable	Stabilize erosion-susceptible alluvial & colluvial deposits with a 25 feet wide, 3 deep stability fill slope with backdrains
CS-5	2:1	35	N	TQss & Qac	G-G'	Favorable bedding; grossly stable	Retaining Wall Designed to Support 10 Kip Daylighted Bedding Surcharge
CS-6	2:1	15	N	Qac	---	Grossly Stable	The alluvium and colluvium exposed in the cut slope should be entirely removed and the slope reconstructed as a fill slope
CS-7	2:1	40	NNW	TQss	F-F'	Daylighted bedding; stable by analyses	None
CS-8	2:1	20	NNE	TQss & Qac	E-E'	Favorable bedding; grossly stable	None
CS-9	2:1	25	SSW	TQss	E-E'	Favorable bedding; grossly stable	None
CS-10	2:1	155	SE	TQss & Qac	D-D'	Favorable bedding; grossly stable	Stabilize erosion-susceptible alluvial & colluvial deposits with a 30 feet wide, 3 deep stability fill slope with backdrains. Stability fill should extend up to mid-slope drainage terrace
CS-11	2:1	70	NE	TQss & Qac	C-C'	Favorable bedding; grossly stable	Construct 20-foot wide 3-foot deep stability fill to first drainage terrace and across area of alluvium/colluvium
CS-12	2:1	75	ENE	TQss	B-B'	Favorable bedding; grossly stable	None



GEOTECHNICAL MAP

Prepared For:
NUWI - Lyons Canyon, LLC
Proposed Lyons Canyon Development
Vesting Tentative Tract Map No. 83301
Los Angeles County, California

Scale:	Drawn By:	Checked By:
As Shown	JH	TPL
Date: 2/8/2021	Figure 1	2020-200-001

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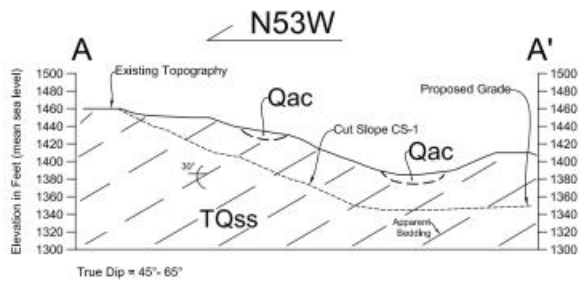
CRAIG M. WHITTEKER R.C.E. NO. 51929 DATE 3/11/21
REGISTERED PROFESSIONAL ENGINEER CRAIG M. WHITTEKER NO. 51929 EXP 6-30-22 CIVIL STATE OF CALIFORNIA

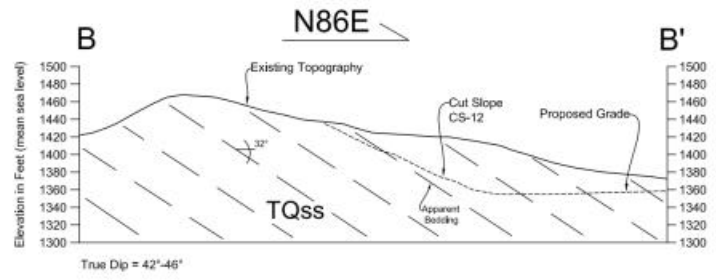
OWNER/APPLICANT:
NUWI LYONS CANYON, LLC
2001 WILSHIRE BOULEVARD, SUITE 401
SANTA MONICA, CA 90403
TEL: (310) 864-2427

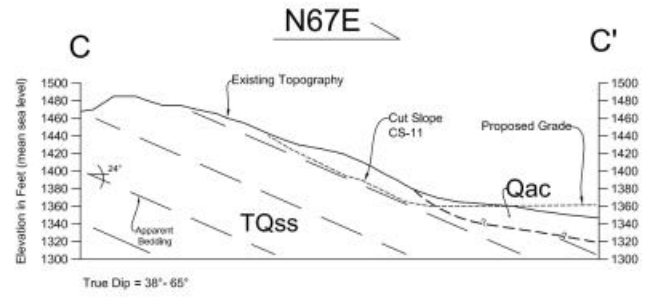
NO.	DATE	REVISIONS	BY	APPR

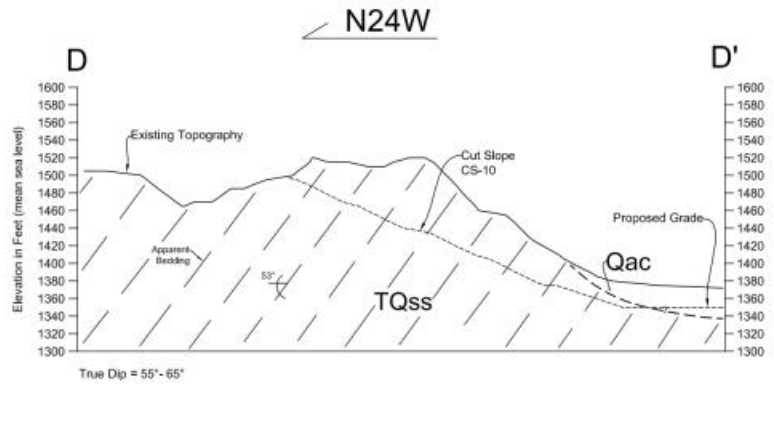
MAJOR LAND DIVISION
VESTING TENTATIVE TRACT MAP NO. 083301
THE TRAILS AT LYONS CANYON
LOCATED IN THE UNINCORPORATED TERRITORY OF THE COUNTY OF LOS ANGELES

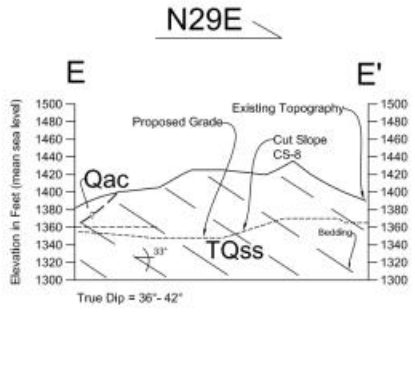
DATE: MARCH 11, 2021
SHEET 2 OF 2

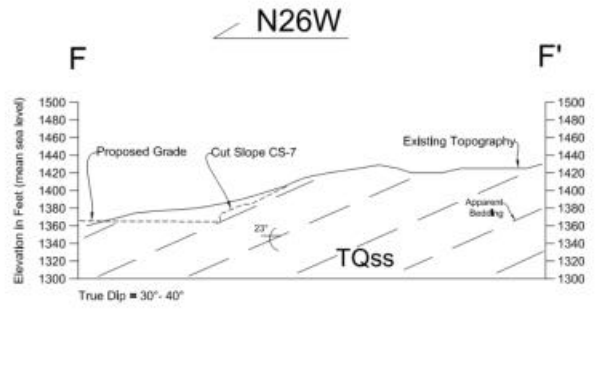


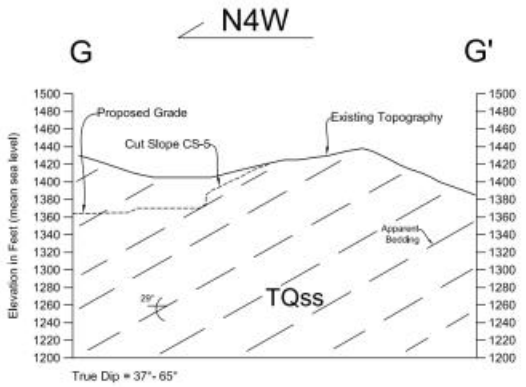


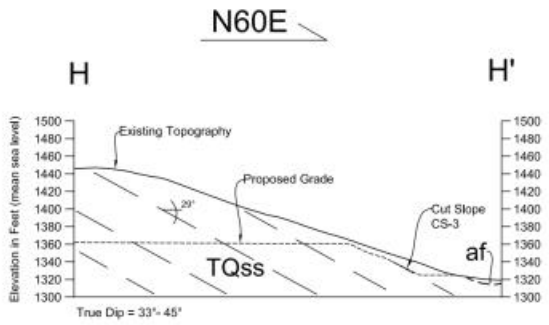












GEOTECHNICAL MAP
Geologic Sections

Prepared For:

NUWI - Lyons Canyon, LLC

Proposed Lyons Canyon Development
Vesting Tentative Tract Map 53533
Los Angeles County, California

Scale:	Drawn By:	Checked By:
As shown	JH	TPL
Date: 3/19/2021	Figure 2	2020-200-001

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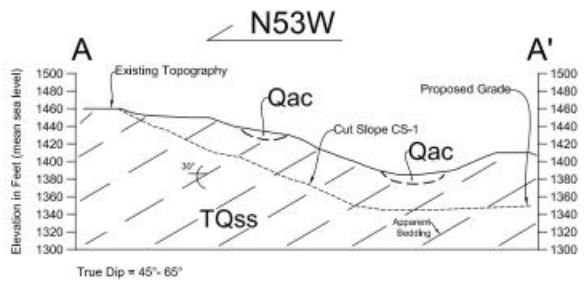

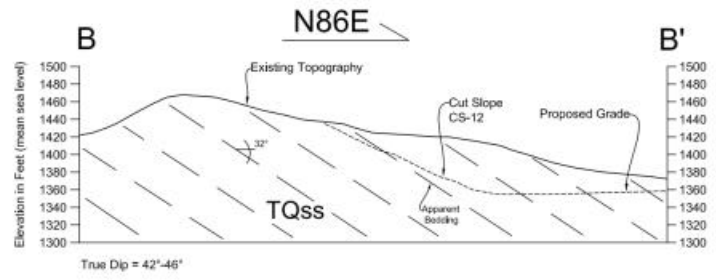

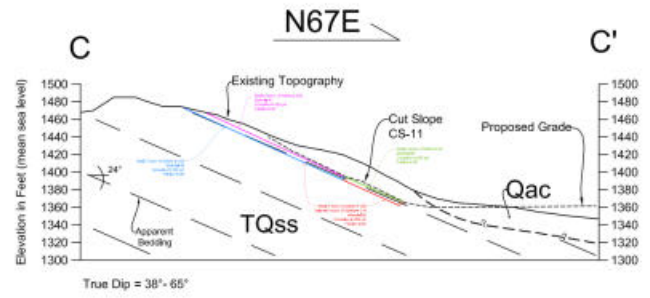

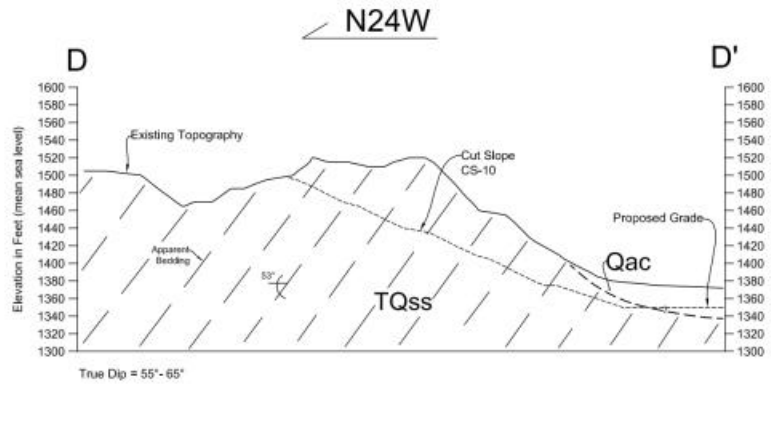

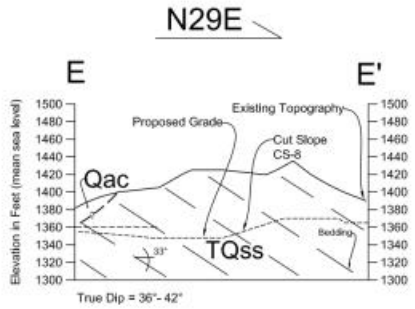

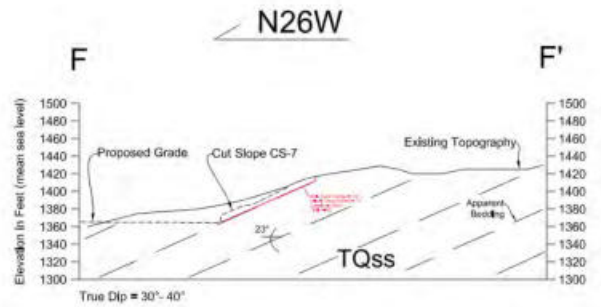

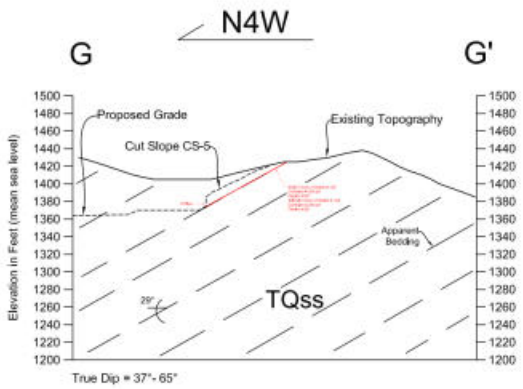

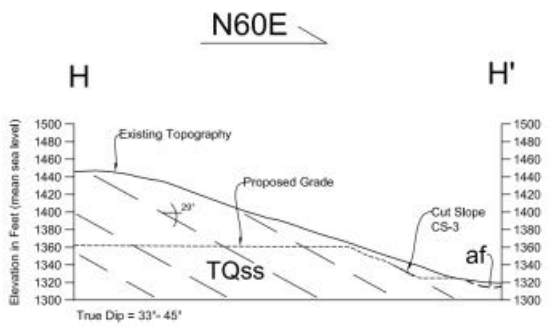

Geotechnical Sections

Prepared For:

NUWI - Lyons Canyon, LLC

Proposed Lyons Canyon Development
Vesting Tentative Tract Map 53301
Los Angeles County, California

Scale:	Drawn By:	Checked By:
As shown	JH	TPL
Date: 3/19/2021	Figure 3	2020-200-001

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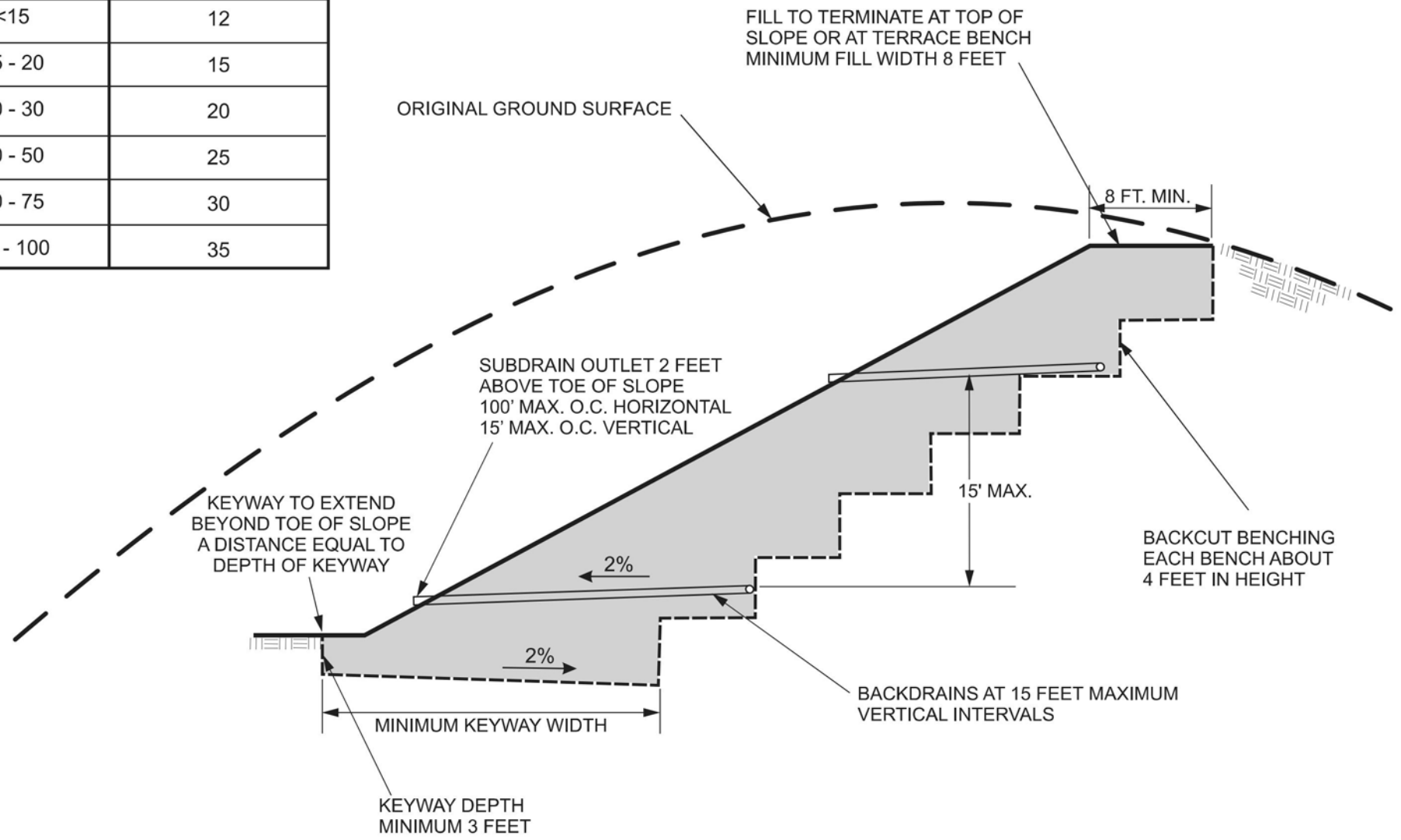
STABILITY FILL HEIGHT (FEET)	MINIMUM WIDTH OF KEYWAY (FEET)
<15	12
15 - 20	15
20 - 30	20
30 - 50	25
50 - 75	30
75 - 100	35



STABILITY FILL DETAILS FOR GROSSLY STABLE SLOPES

NOT TO SCALE

NOTE:
SUBDRAIN PIPES ALONG BACKCUT SHOULD CONSIST OF AT LEAST 4'' DIAMETER SLOTTED PIPE WITH AT LEAST 6" OF F-1 FILTER MATERIAL ON ALL SIDES OF THE PIPE.
3/4" gravel may be used as an alternative to F-1 provided it is completely wrapped in Mirafi 140 N, or equivalent

NUWI – Lyons Canyon, LLC
March 19, 2021
2020-200-001

APPENDIX A

FIELD EXPLORATIONS

RTF&A
GEOTECHNICAL ENGINEERING & ENGINEERING GEOLOGY

APPENDIX A

FIELD EXPLORATION

RECONNAISSANCE GEOLOGIC MAPPING

During geologic mapping, local surficial deposits (both natural and man-made) and bedrock units were mapped on a 1 inch = 100 feet topographic base map prepared Alliance. Geologic structural features, including bedding, were observed, measured, and plotted on the base map.

LOGGING OF EXPLORATIONS

As part of this plan review work on the site, additional explorations were performed at selected locations at the subject site. Logging was performed on these explorations, which included 5 hollow stem borings (HS-1 through HS-5), and five CPT soundings (CPT-1 through CPT-5) were performed. The approximate locations are presented on the Geotechnical Map.

The borings were excavated with an 8-inch diameter hollow stem auger was used. Undisturbed and bulk samples of the subsurface materials were collected from the borings for laboratory inspection and testing. The lined-barrel sampler used to take undisturbed samples has an external diameter of 3.25 inches and an internal diameter of 2.625 inches. The depths at which the undisturbed samples were obtained are indicated on the logs. The number of blows required to drive the sampler 12 inches with the hammer is also shown on the boring logs.

BORING HS-1

JOB NUMBER: 2020-200
DATE DRILLED: 11/10/20
EQUIPMENT USED: 8" Diameter Hollow Stem with Heavy Duty Sampler
LOGGED BY: MKM
BORING DEPTH: 0-35.5'
SURFACE CONDITIONS: Open Lot

BLOWS PER FOOT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SOIL TYPE	
			-		ML	**ALLUVIUM (Qal)** SILT: trace clay, moderately dense, slightly moist, brown
10	6.3	95	-	5		
7	9	92	-			moderately dense
9	12.2	95	-	10		trace fine to coarse sand
10	11.1	97	-		SM	SILTY SAND: fine with occasional coarse, moderately dense, moist, brown
15	13.4	91	-	15	CL	SILTY CLAY: fine sand, stiff, moist, brown
8	14.4	98	-	20	ML	SILT: with clay, moderately stiff, moist, brown
						trace gravel
14	13.4	101	-	25		increasing in stiffness past 25'
22	12.6	109	-	30	SW	SAND: fine to coarse, with silt and gravel, dense, moist, light brown
18	5.3	101	-	35	SM	SILTY SAND: fine, dense, moist, brown
				40		Bottom of Boring at 35.5 feet. No water. No caving.

Note: The log of subsurface conditions shown hereon is approximate and applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

BOREHOLE LOG 2020-200.GPJ FRANKIAN.GDT 2/8/21

LOG OF BORING

R.T. FRANKIAN & ASSOCIATES

BORING HS-2

JOB NUMBER: 2020-200
DATE DRILLED: 11/10/20
EQUIPMENT USED: 8" Diameter Hollow Stem with Heavy Duty Sampler
LOGGED BY: MKM
BORING DEPTH: 0-31'
SURFACE CONDITIONS: Clearing in Field

BLOWS PER FOOT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SOIL TYPE	
			-		ML	**ALLUVIUM (Qal)** SILT: trace fine sand, moderately dense, dry, light brown
	6	94		5		fine with some medium to coarse, dense, slightly moist
22			-			fine
	4.8	97			SW	SAND: fine to coarse with gravel, dense, slightly moist, light brown
20			-			
14	9	92	-	10	ML	SILT: with fine sand, stiff, slightly moist, brown
18	3.7	101	-		SM	SILTY SAND: fine to medium with trace coarse, dense, slightly moist, brown
8	7.2	94	-	15	ML	SILT: with some fine sand, trace clay, moderately stiff, moist, brown
26	6	113	-	20	SM	SILTY SAND: fine to meduim with trace coarse, gravel, dense, moist, brown
						No Recovery
49			-	25		
						light brown
20	2.8	101	-	30		
						Bottom of Boring at 31 feet. No water. No caving.
				35		
				40		

Note: The log of subsurface conditions shown hereon is approximate and applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

BOREHOLE LOG 2020-200.GPJ FRANKIAN.GDT 2/8/21

LOG OF BORING

R.T. FRANKIAN & ASSOCIATES

BORING HS-3

JOB NUMBER: 2020-200
DATE DRILLED: 11/10/20
EQUIPMENT USED: 8" Diameter Hollow Stem with Heavy Duty Sampler
LOGGED BY: MKM
BORING DEPTH: 0-31'
SURFACE CONDITIONS: Dirt Road

BLOWS PER FOOT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SOIL TYPE	
			-		SC	**ALLUVIUM (Qal)** CLAYEY SAND: fine, medium dense, dry, dark brown
				5		dense, slightly moist
21	7.3	97	-			
						trace fine to very coarse sand, dense, moist, brown to dark brown
15	9.8	108	-			
15	11.4	109	-	10	CL	CLAY: with fine to coarse sand, trace gravel, stiff, moist, dark brown
25	11.4	115	-		SW	SAND: fine to coarse, trace clay, dense, moist, brown
11	15.8	115	-	15	SC	CLAYEY SAND: with fine to coarse sand, gravel, plastic, medium dense, very moist, dark brown
						reduced sand
55	14.3	111	-	20		
50/5"			-	25		seepage @ 25', No Recovery
67/10"			-	30		No Recovery, @ 31': SAUGUS FORMATION (TQs) - Sunshine Ranch Member (TQss) - Moderately hard
						Bottom of Boring at 31 feet. Water @ 25'. No caving.
				35		
				40		

Note: The log of subsurface conditions shown hereon is approximate and applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

BOREHOLE LOG 2020-200.GPJ FRANKIAN.GDT 2/9/21

LOG OF BORING

R.T. FRANKIAN & ASSOCIATES

BORING HS-4

JOB NUMBER: 2020-200
DATE DRILLED: 11/10/20
EQUIPMENT USED: 8" Diameter Hollow Stem with Heavy Duty Sampler
LOGGED BY: MKM
BORING DEPTH: 0-30.5'
SURFACE CONDITIONS: Dirt Road

BLOWS PER FOOT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	SOIL TYPE	
				ML	**ALLUVIUM (Qal)** SILT: trace fine to coarse sand, gravel, moderately dense, dry, light brown
17	5.6	108	-		with fine sand, occasional gravel, moist, brown
23	4.1	106	-	SM	SILTY SAND: fine to coarse, fine gravel, medium dense, moist, light brown
25	7	110	-	SP	GRAVELLY SAND: fine to coarse, trace silt, dense, moist, brown
18	19.7	103	-	ML	SILT: with clay and fine sand, moderately stiff, very moist, dark brown
6	29.8	95	-	SC	CLAYEY SAND: fine, with silt, medium dense, very moist, dark brown
					seepage @ 20'
50/5"	28.8		-		**SAUGUS FORMATION (TQss)** GRAVELLY SANDSTONE: fine to coarse, with clay and silt, moderately hard, very moist, yellowish brown
50/2"	12.2	107	-		
50/6"	9.4	96	-		Bottom of Boring at 30.5 feet. Water @ 20'. No caving.

DEPTH (FEET): 5, 10, 15, 20, 25, 30, 35, 40

SAMPLE LOCATION / GRAPHIC LOG

Note: The log of subsurface conditions shown hereon is approximate and applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

BOREHOLE LOG 2020-200.GPJ FRANKIAN.GDT 2/9/21

LOG OF BORING

R.T. FRANKIAN & ASSOCIATES

BORING HS-5

JOB NUMBER: 2020-200
DATE DRILLED: 11/10/20
EQUIPMENT USED: 8" Diameter Hollow Stem with Heavy Duty Sampler
LOGGED BY: MKM
BORING DEPTH: 0-28'

BLOWS PER FOOT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	SOIL TYPE	
				ML	**ALLUVIUM (Qal)** SILT: with fine sand, moderately dense, moist, dark brown
11	10.1	101	-		
					some fine gravel
25	6.9	108	-		
					with coarse sand
22	6.7	102	-		
					with clay and fine to coarse sand, fine gravel, dense, brown
16	6.3	110	-		
13	8.7	109	-	SM	SILTY SAND: fine to medium, dense, moist, gray
83/11"	8.7	121	-		**SAUGUS FORMATION (TQss)** SANDY SILTSTONE: moderately hard, moist, gray, caliche mottling
					with clay
50/5"	9.4	104	-		
					Bottom of Boring at 28 feet. No water. No caving.

DEPTH (FEET): 5, 10, 15, 20, 25, 30, 35, 40

SAMPLE LOCATION / GRAPHIC LOG

Note: The log of subsurface conditions shown hereon is approximate and applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

BOREHOLE LOG 2020-200.GPJ FRANKIAN.GDT 2/8/21

LOG OF BORING

R.T. FRANKIAN & ASSOCIATES

NUWI – Lyons Canyon, LLC
March 19, 2021
2020-200-001

APPENDIX B

EXPLORATIONS BY OTHERS

GEOTECHNICAL ENGINEERING & ENGINEERING GEOLOGY

GOLD COAST GEOSERVICES, INC.

SUB-SURFACE DATA — BORING LOG NO. B-1

PROJECT: D.R. HORTON - LYONS CANYON RANCH, SANTA CLARITA — FILE NO.: GC14-122536

ELEVATION: SEE PLATE 1 — DATE: 02/09/15

METHOD: 6-inch Hollow Stem Auger — DRILLING CO.: HD DRILLING

DEPTH (FT)	SAMPLE: BULK	SAMPLE: RING	BLOWCOUNT: FIELD (N)	BLOWCOUNT: N(60)	MOISTURE %	DENSITY	SIEVE: % PASSING # 200 SCREEN	GRAPHIC LOG	DESCRIPTION AND REMARKS
0									**ALLUVIUM - Qal - (0' - 60')**
-	SPT		2	2.8					
-									2.5' - Dark brown very fine- to fine-grained silty sand with
-	SPT		5	6.9					pebbles, moist, loose.
-		X	13	10.0	9.4	98.9			5' - Medium brown very fine-grained silty sand, slightly moist, loose.
-	SPT		6	8.3					7.5' - Light to medium brown very fine-grained silty sand, damp, slightly firm.
-									
10	SPT		12	16.6					10' - Medium brown fine- to medium-grained sand, slightly damp, slightly firm.
-									
-	SPT		4	5.5					12.5' - 15' - Medium to dark brown very fine-grained silty sand, slightly
-	SPT		4	5.5					damp, slightly firm.
-		X	13	10.0	9.7	100.6			
-	SPT		5	6.9					17.5' - 20' - Dark brown very fine-grained silty sand, slightly damp, firm.
-									
20	SPT		15	20.7					
-									
-	SPT		32	44.2					22.5' - 25' - Medium brown fine- to coarse grained sand containing
-									pebbles, slightly damp, firm.
-	SPT		35	48.3					27.5' - 30' - Medium brown fine- to coarse-grained sand, slightly damp,
-		x	57	43.7	8.3	104.3			firm.
-	SPT		34	46.9					
30	SPT		32	44.2					
-									
-	SPT		32	44.2					32.5' - Cobble/boulder
-									
-	SPT		39	53.8					35' - 40' - Medium brown fine- to medium-grained silty sand, dry, firm.
-		X	59	45.2	9.2	106.7			
-	SPT		43	59.3					
40	SPT		40	55.2					40' - Medium to dark brown fine-grained silty sand containing gravel, slightly
-									moist, dense
-	SPT		35	48.3					42.5' - 45' - Medium brown very fine- to medium-grained clayey to silty sand
-									slightly moist, firm.
-	SPT		35	48.3					
-		X	62	47.5	7.8	110.4			47.5' - Medium brown very fine- to medium-grained silty sand, humid, firm.
-	SPT		32	44.2					
50	SPT		37	51.1					50' - 55' - Medium brown fine- to coarse-grained gravelly silty sand,
-									humid, firm.
-	SPT		46	63.5					
-									
-	SPT		40	55.2					55' - 60' - Medium brown fine- to coarse-grained silty gravelly sand, humid,
-		X	64	49.1	7.6	113.3			firm.
-	SPT		46	63.5					
60	SPT		44	60.7					End at 60'

Comments: The following correction factors were utilized to determine N(60) (Per SP117)
Cb = 1.15 (8" Diameter Borehole); Cs = 1.2 (SPT Sampler without liner); Cs = 2/3 (California Sampler)

Notes: TOTAL DEPTH: 60' GROUNDWATER: NO REFUSAL/CAVING: NO BACKFILLED: YES

PLATE 2.1

GOLD COAST GEOSERVICES, INC.

SUB-SURFACE DATA — BORING LOG NO. B-2

PROJECT: D.R. HORTON - LYONS CANYON RANCH, SANTA CLARITA — FILE NO.: GC14-122536

ELEVATION: SEE PLATE 1 — DATE: 02/09/15

METHOD: 6-inch Hollow Stem Auger — DRILLING CO.: HD DRILLING

DEPTH (FT)	SAMPLE: BULK	SAMPLE: RING	BLOWCOUNT: FIELD (N)	BLOWCOUNT: N(60)	MOISTURE %	DENSITY	SIEVE: % PASSING # 200 SCREEN	GRAPHIC LOG	DESCRIPTION AND REMARKS
0									**ALLUVIUM - Qal - (0' - 60')**
-	SPT		7	9.7					2.5' - Dark brown very fine- to fine-grained silty sand, moist, loose.
-	SPT		9	12.4					5' - Medium brown very fine-grained silty sand, humid, slightly firm.
-		X	18	13.8	11.4	98.2			
-	SPT		6	8.3					7.5' - Medium brown very fine-to fine-grained silty sand, humid, slightly firm.
10	SPT		6	8.3					10' - Dark brown very fine- to fine-grained silty sand, humid, slightly firm.
-	SPT		7	9.7					12.5' - 15' - Medium brown very fine- to fine-grained silty sand, humid,
-	SPT		5	6.9					loose to slightly firm.
-		X	18	13.8	10.7	104.7			
-	SPT		11	15.2					17.5' - 27.5' - Dark brown very fine-grained silty sand, humid, slightly firm.
20	SPT		18	24.8					
-	SPT		22	30.4					
-	SPT		28	38.6					
-		x	48	36.8	10.3	107.3			27.5' Medium to dark brown fine- to very coarse-grained silty sand
-	SPT		28	38.6					
30	SPT		29	40.0					30' - 32.5' - Dark brown to medium reddish brown fine- to coarse-grained silty sand containing pebbles to gravel, humid, firm.
-	SPT		27	37.3					
-									35' - Medium brown fine- to medium-grained silty sand, slightly moist, firm.
-	SPT		29	40.0					
-		X	55	42.2	8.2	112.8			37.5' - 40' - Medium reddish brown fine- to very coarse-grained pebbly
-	SPT		42	58.0					silty sand, humid, dense.
40	SPT		36	49.7					
-	SPT		38	52.4					42.5' - Medium brown very fine- to fine-grained clayey to silty sand,
-									humid, firm.
-	SPT		40	55.2					45' - Medium reddish brown fine- to very coarse-grained pebbly to gravelly
-		X	68	52.1	8.4	118.0			sand, slightly moist, dense.
-	SPT		37	51.1					
50	SPT		39	53.8					47.5' - 50' - Dark brown very fine- to fine-grained clayey to silty sand,
-									slightly moist, firm.
-	SPT		56	77.3					52.5' - 60' - Medium brown fine- to coarse-grained pebbly to gravelly sand,
-									humid, dense.
-	SPT		50 for 6"						
-									
-	SPT		50 for 6"						
60	SPT								End at 60'

Comments: The following correction factors were utilized to determine $N_{(60)}$ (Per SP117)
Cb = 1.15 (8" Diameter Borehole); Cs = 1.2 (SPT Sampler without liner); Cs = 2/3 (California Sampler)

Notes: TOTAL DEPTH: 57.5' GROUNDWATER: NO REFUSAL/CAVING: NO BACKFILLED: YES

PLATE 2.2

GOLD COAST GEOSERVICES, INC.

SUB-SURFACE DATA — BORING LOG NO. B-3

PROJECT: D.R. HORTON - LYONS CANYON RANCH, SANTA CLARITA — FILE NO.: GC14-122536

ELEVATION: SEE PLATE 1 — DATE: 02/09/15

METHOD: 6-inch Hollow Stem Auger — DRILLING CO.: HD DRILLING

DEPTH (FT)	SAMPLE: BULK	SAMPLE: RING	BLOWCOUNT: FIELD (N)	BLOWCOUNT: N(60)	MOISTURE %	DENSITY	SIEVE: % PASSING # 200 SCREEN	GRAPHIC LOG	DESCRIPTION AND REMARKS
0									**ALLUVIUM - Qal - (0' - 60')**
-	SPT		4	5.5					2.5' - 5' - Medium to dark brown very fine- to fine-grained silty sandy clay
-									containing pebbles, moist, slightly firm.
-	SPT		3	4.1					5' - 15' - *Dark brown very fine-grained silty sand, humid, loose.*
-		X	11	8.4	15.9	102.0			
-	SPT		4	5.5					
-									
10	SPT		4	5.5					
-									
-	SPT		3	4.1					
-	SPT		11	15.2					15' - Medium brown fine- to medium-grained silty sand, humid, slightly firm.
-		X	34	26.1	5.5	105.8			17.5' - 30' - Medium brown fine- to coarse-grained silty sand, humid, dense.
-	SPT		18	24.8					
-									
20	SPT		17	23.5					
-									
-	SPT		28	38.6					
-									
-	SPT		27	37.3					
-		x	48	36.8	6.0	115.4			
-	SPT		27	37.3					
30	SPT		25	34.5					30' - *Medium brown very fine- to fine-grained silty sand, humid, firm.*
-									
-	SPT		27	37.3					32.5' - Medium to dark brown fine- to coarse-grained silty sand containing
-									gravel, humid, dense.
-	SPT		55 FOR 6"						35' - Cobble/boulder
-		X	51	39.1	8.3	114.3			37.5' - 42.5' - Medium brown very fine- to fine-grained silty sand, humid, firm.
-	SPT		32	44.2					
40	SPT		35	48.3					
-									
-	SPT		43	59.3					42.5' - 47.5' - Medium brown fine- to medium-grained silty sand containing
-									gravel, humid, dense.
-	SPT		32	44.2					
-		X	57	43.7	5.6	116.2			
-	SPT		34	46.9					
50	SPT		37	51.1					50' - Medium brown fine-grained silty sand, humid, dense.
-									
-	SPT		33	45.5					52.5' - Medium brown very fine- to fine-grained clayey to silty sand, slightly
-									moist, firm.
-	SPT		60	82.8					55' - 60' - *Medium reddish brown fine- to very coarse-grained silty sand,*
-	X		82	62.9	4.3	126.2			*humid, dense.*
-	SPT		67 FOR 6"						
60	SPT		64 FOR 5"						End at 60'

Comments: The following correction factors were utilized to determine N(60) (Per SP117)
Cb = 1.15 (8" Diameter Borehole); Cs = 1.2 (SPT Sampler without liner); Cs = 2/3 (California Sampler)

Notes: TOTAL DEPTH: 60' GROUNDWATER: NO REFUSAL/CAVING: NO BACKFILLED: YES

PLATE 2.3

GOLD COAST GEOSERVICES, INC.

SUB-SURFACE DATA — BORING LOG NO. B-4

PROJECT: D.R. HORTON - LYONS CANYON RANCH, SANTA CLARITA — FILE NO.: GC14-122536

ELEVATION: SEE PLATE 1 — DATE: 02/10/15

METHOD: 6-inch Hollow Stem Auger — DRILLING CO.: HD DRILLING

DEPTH (FT)	SAMPLE: BULK	SAMPLE: RING	BLOWCOUNT: FIELD (N)	BLOWCOUNT: N(60)	MOISTURE %	DENSITY	SIEVE: % PASSING # 200 SCREEN	GRAPHIC LOG	DESCRIPTION AND REMARKS
0									**ALLUVIUM - Qal - (0' - 50')**
-	SPT		8	11.0					2.5' - Dark brown fine- to coarse-grained silty sand, slightly moist, firm.
-									
-	SPT		7	9.7					5' - 17.5' - Light to medium brown very fine- to fine-grained sand, dry, firm.
-		X	26	19.9	9.4	83.9			
-	SPT		13	17.9					
-									
10	SPT		12	16.6					
-									
-	SPT		8	11.0					
-	SPT		13	17.9					
-		X	20	15.3	8.6	93.0			
-	SPT		8	11.0					17.5' - Dark brown very fine- to fine-grained clayey to silty sand, slightly moist, slightly firm.
-									
20	SPT		16	22.1					20' - Dark brown very fine- to fine-grained silty sand, humid, loose to slightly firm.
-									
-	SPT		22	30.4					22.5' - 25' - Medium brown very fine- to fine-grained clayey to silty sand, humid, slightly firm.
-									
-	SPT		27	37.3					
-		x	48	36.8	12.0	104.4			
-	SPT		25	34.5					27.5' - 30' - Medium brown fine- to coarse-grained clayey to silty sand, humid to slightly moist, firm.
30	SPT		24	33.1					
-									
-	SPT		27	37.3					32.5' - 35' - Medium brown fine- to very coarse-grained clayey to silty sand, humid to slightly moist, firm.
-									
-	SPT		24	33.1					37.5 ' - 50' - Medium brown to medium reddish brown fine- to very coarse-grained silty sand, humid, dense.
-		X	46	35.3	8.3	111.0			
-	SPT		34	46.9					
40	SPT		29	40.0					
-									
-	SPT		36	49.7					
-									
-	SPT		50	69.0					
-		X	50 for 6"		6.7	114.6			
-	SPT		50 for 6"						
50	SPT		70	96.6					End at 50'
-									
-									
-									
-									
-									
-									
60									

Comments: The following correction factors were utilized to determine $N_{(60)}$ (Per SP117)
Cb = 1.15 (8" Diameter Borehole); Cs = 1.2 (SPT Sampler without liner); Cs = 2/3 (California Sampler)

Notes: TOTAL DEPTH: 50' GROUNDWATER: NO REFUSAL/CAVING: NO BACKFILLED: YES

PLATE 2.4

GOLD COAST GEOSERVICES, INC.

SUB-SURFACE DATA — BORING LOG NO. B-5

PROJECT: D.R. HORTON - LYONS CANYON RANCH, SANTA CLARITA — FILE NO.: GC14-122536

ELEVATION: SEE PLATE 1 — DATE: 02/11/15

METHOD: 6-inch Hollow Stem Auger — DRILLING CO.: HD DRILLING

DEPTH (FT)	SAMPLE: BULK	SAMPLE: RING	BLOWCOUNT: FIELD (N)	BLOWCOUNT: N(60)	MOISTURE %	DENSITY	SIEVE: % PASSING # 200 SCREEN	GRAPHIC LOG	DESCRIPTION AND REMARKS
0									**ALLUVIUM - Qal - (0' - 40')**
-	SPT		2	2.8					2.5' - Dark brown very fine- to fine-grained silty sand, moist, loose.
-									
-	SPT		4	5.5					5' - Medium to dark brown very fine- to fine-grained silty sand, humid to
-		X	17	13.0	9.7	105.8			slightly moist, slightly firm.
-	SPT		6	8.3					7.5' - 17.5' - Medium brown to dark brown fine- to medium-grained silty sand,
-									humid, loose to slightly firm.
10	SPT		7	9.7					
-									
-	SPT		8	11.0					
-	SPT		8	11.0					
-		X	24	18.4	7.5	99.4			
-	SPT		12	16.6					17.5' - Medium brown very fine- to fine-grained silty sand, humid, firm
-									
20	SPT		15	20.7					20' - 25' - Light to medium brown very fine- to fine-grained silty sand,
-									humid, firm.
-	SPT		16	22.1					
-									
-	SPT		17	23.5					25' - Medium brown fine- to medium-grained silty sand, humid, firm.
-		x	32	24.5	2.8	108.9			
-	SPT		23	31.7					25' - 30' - Medium brown fine- to very coarse-grained silty sand,
30	SPT		20	27.6					humid, firm.
-									
-	SPT		24	33.1					30' - 40' - Light to medium brown fine- to very coarse-grained silty
-									sand containing gravel, humid, dense very dense.
-	SPT		36	49.7					
-		X	50 for 6"		5.1	117.6			
-	SPT		56	77.3					
40	SPT		67	92.5					40' - Refusal (Saugus Formation ?)
-									End at 40'
-									
-									
-									
-									
-									
-									
50									
-									
-									
-									
-									
-									
-									
60									

Comments: The following correction factors were utilized to determine N(60) (Per SP117)
Cb = 1.15 (8" Diameter Borehole); Cs = 1.2 (SPT Sampler without liner); Cs = 2/3 (California Sampler)

Notes: TOTAL DEPTH: 40' GROUNDWATER: NO REFUSAL/CAVING: NO BACKFILLED: YES

PLATE 2.5

GOLD COAST GEOSERVICES, INC.

SUB-SURFACE DATA — BORING LOG NO. B-6

PROJECT: D.R. HORTON - LYONS CANYON RANCH, SANTA CLARITA — FILE NO.: GC14-122536

ELEVATION: SEE PLATE 1 — DATE: 02/10/15

METHOD: 6-inch Hollow Stem Auger — DRILLING CO.: HD DRILLING

DEPTH (FT)	SAMPLE: BULK	SAMPLE: RING	BLOWCOUNT: FIELD (N)	BLOWCOUNT: N(60)	MOISTURE %	DENSITY	SIEVE: % PASSING #200 SCREEN	GRAPHIC LOG	DESCRIPTION AND REMARKS
0									**ALLUVIUM - Qal - (0' - 60')**
-	SPT		2	2.8					2.5' - Dark brown very fine- to medium-grained silty sand, slightly moist, loose.
-	SPT		10	13.8					5' - 10' - Light brown very fine- to fine-grained silty sand, humid, firm.
-		X	22	16.9	4.9	96.9			
-	SPT		10	13.8					
10	SPT		9	12.4					10' - Dark brown very fine- to fine-grained silty sand, humid, firm.
-	SPT		13	17.9					12.5' - Dark brown very fine- to fine-grained clayey to silty sand, humid, firm.
-	SPT		6	8.3					15' - Medium to dark brown fine- to medium-grained silty sand,
-		X	18	13.8	7.5	99.8			humid, slightly firm.
-	SPT		9	12.4					17.5' - 35' - Medium brown very fine- to medium-grained silty sand, humid, firm.
20	SPT		12	16.6					
-	SPT		27	37.3					
-	SPT		25	34.5					
-		X	46	35.3	6.1	103.8			
-	SPT		38	52.4					
30	SPT		31	42.8					
-	SPT		33	45.5					
-	SPT		47	64.9					35'- 50' - Medium brown fine- to very coarse-grained silty sand, humid,
-		X	62	47.5	6.0	104.2			dense.
-	SPT		36	49.7					
40	SPT		35	48.3					
-	SPT		39	53.8					
-	SPT		37	51.1					
-		X	66	50.6	6.4	104.8			
-	SPT		39	53.8					
50	SPT		35	48.3					50' - 55' - Dark brown medium- to very coarse-grained clayey to silty sand,
-	SPT		34	46.9					slightly moist, dense.
-	SPT		33	45.5					
-	X		62	47.5	23.9	106.1			57.5' - Dark brown fine- to coarse-grained clayey to silty sand, moist, dense.
-	SPT		37	51.1					60' - Dark brown fine- to coarse-grained clayey to silty sand,saturated, dense.
60	SPT		36	49.7					End at 60'

Comments: The following correction factors were utilized to determine N(60) (Per SP117)
Cb = 1.15 (8" Diameter Borehole); Cs = 1.2 (SPT Sampler without liner); Cs = 2/3 (California Sampler)

Notes: TOTAL DEPTH: 60' GROUNDWATER: NO REFUSAL/CAVING: NO BACKFILLED: YES

PLATE 2.6

GOLD COAST GEOSERVICES, INC.

SUB-SURFACE DATA — BORING LOG NO. B-7

PROJECT: D.R. HORTON - LYONS CANYON RANCH, SANTA CLARITA — FILE NO.: GC14-122536

ELEVATION: SEE PLATE 1 — DATE: 02/11/15

METHOD: 6-inch Hollow Stem Auger — DRILLING CO.: HD DRILLING

DEPTH (FT)	SAMPLE: BULK	SAMPLE: RING	BLOWCOUNT: FIELD (N)	BLOWCOUNT: N(60)	MOISTURE %	DENSITY	SIEVE: % PASSING #200 SCREEN	GRAPHIC LOG	DESCRIPTION AND REMARKS
0									**ALLUVIUM -Qal - (0' - 60')**
-	SPT		4	5.5					2.5' - Dark brown very fine- to fine-grained silty sand, slightly moist, loose.
-	SPT		1	1.4					5' - 20' - Medium brown very fine- to fine-grained silty sand, humid, slightly firm.
-		X	15	11.5	9.4	86.9			
-	SPT		7	9.7					
10	SPT		10	13.8					
-	SPT		9	12.4					
-	SPT		6	8.3					
-		X	16	12.3	8.2	90.6			
-	SPT		6	8.3					
20	SPT		6	8.3					20' - Medium brown fine- to coarse-grained silty sand, humid, firm.
-	SPT		23	31.7					
-	SPT		22	30.4					25' - Medium brown fine-grained silty sand, humid, slightly firm.
-		x	52	39.9	8.1	104.4			
-	SPT		49	67.6					27.5' - 35' - Medium reddish brown fine- to very coarse-grained sand containing gravel, dry, dense.
30	SPT		54	74.5					
-	SPT		32	44.2					
-	SPT		26	35.9					35' - Medium to dark brown very fine- to fine-grained clayey to silty sand, slightly moist, slightly firm.
-		X	30	23.0	11.3	103.4			
-	SPT		30	41.4					
40	SPT		35	48.3					37.5' - 45' - Medium brown fine- to very coarse-grained pebbly to gravelly sand, dry, dense.
-	SPT		39	53.8					
-	SPT		30	41.4					45' - 50' - Dark brown fine- to coarse-grained clayey to silty sand containing pebbles, slightly moist, firm to dense.
-		X	29	22.2	9.9	116.7			
-	SPT		31	42.8					
50	SPT		44	60.7					50' - 60' - Medium reddish brown fine- to coarse-grained pebbly to gravelly silty sand, slightly moist, dense.
-	SPT		50 for 6"						
-	SPT		63	86.9					
-	X		50 for 6"		3.5	110.0			
-	SPT		50 for 6"						
60	SPT		50 for 6"						60' - Rock/boulder End at 60'

Comments: The following correction factors were utilized to determine N(60) (Per SP117)
Cb = 1.15 (8" Diameter Borehole); Cs = 1.2 (SPT Sampler without liner); Cs = 2/3 (California Sampler)

Notes: TOTAL DEPTH: 60' GROUNDWATER: NO REFUSAL/CAVING: NO BACKFILLED: YES

PLATE 2.7

GOLD COAST GEOSERVICES, INC.

SUB-SURFACE DATA — BORING LOG NO. B-8

PROJECT: D.R. HORTON - LYONS CANYON RANCH, SANTA CLARITA — FILE NO.: GC14-122536

ELEVATION: SEE PLATE 1 — DATE: 02/12/15

METHOD: 6-inch Hollow Stem Auger — DRILLING CO.: HD DRILLING

DEPTH (FT)	SAMPLE: BULK	SAMPLE: RING	BLOWCOUNT: FIELD (N)	BLOWCOUNT: N(60)	MOISTURE %	DENSITY	SIEVE: % PASSING # 200 SCREEN	GRAPHIC LOG	DESCRIPTION AND REMARKS
0									**ALLUVIUM - Qal - (0' - 60')**
-	SPT		5	6.9					2.5' - Dark brown fine- to medium-grained silty sand, slightly moist, loose.
-									
-	SPT		12	16.6					5' - 20' - Medium brown very fine- to fine-grained silty sand, humid, slightly
-		X	21	16.1	7.1	89.3			firm.
-	SPT		15	20.7					
-									
10	SPT		10	13.8					
-									
-	SPT		13	17.9					
-	SPT		11	15.2					
-		X	28	21.5	4.8	101.2			
-	SPT		16	22.1					
-									
20	SPT		21	29.0					20' - Medium reddish brown fine- to medium-grained silty sand, humid,
-									dense.
-	SPT		30	41.4					
-									
-	SPT		22	30.4					25' - Medium reddish brown fine- to very coarse-grained pebbly sand,
-		x	42	32.2	5.1	107.8			humid, dense.
-	SPT		24	33.1					27.5' - Medium brown fine- to medium-grained silty sand, humid, dense.
30	SPT		28	38.6					30' - 47.5' - Medium reddish brown fine- to very coarse-grained pebbly to
-									gravelly silty sand, humid, dense.
-	SPT		37	51.1					
-									
-	SPT		28	38.6					
-		X	50	38.3	5.9	109.5			
-	SPT		27	37.3					
40	SPT		35	48.3					
-									
-	SPT		36	49.7					
-									
-	SPT		31	42.8					
-		X	50 for 6"		7.1	110.0			
-	SPT		50	69.0					47.5' - 55' - Medium reddish brown fine- to very coarse-grained silty sandy
50	SPT		46	63.5					clay containing gravel, moist, dense.
-									
-	SPT		63	86.9					
-									
-	SPT		91	125.6					55' -60' - Medium gray fine- to medium-grained sandy clay, slightly moist, dense.
-	X		50 for 6"						
-									
60									End at 60'

Comments: The following correction factors were utilized to determine N(60) (Per SP117)
Cb = 1.15 (8" Diameter Borehole); Cs = 1.2 (SPT Sampler without liner); Cs = 2/3 (California Sampler)

Notes: TOTAL DEPTH: 60' GROUNDWATER: NO REFUSAL/CAVING: NO BACKFILLED: YES

PLATE 2.8

GOLD COAST GEOSERVICES, INC.

SUB-SURFACE DATA — BORING LOG NO. B-9

PROJECT: D.R. HORTON - LYONS CANYON RANCH, SANTA CLARITA — FILE NO.: GC14-122536

ELEVATION: SEE PLATE 1 — DATE: 02/11/15

METHOD: 6-inch Hollow Stem Auger — DRILLING CO.: HD DRILLING

DEPTH (FT)	SAMPLE: BULK	SAMPLE: RING	BLOWCOUNT: FIELD (N)	BLOWCOUNT: N(60)	MOISTURE %	DENSITY	SIEVE: % PASSING # 200 SCREEN	GRAPHIC LOG	DESCRIPTION AND REMARKS
0									**ALLUVIUM - Qal - (0' - 47.5')**
-	SPT		1	1.4					2.5' - Dark brown very fine- to fine-grained silty sand, slightly moist, loose.
-	SPT		11	15.2					5' - 12.5' - Light to medium brown very fine- to fine-grained silty sand, dry, firm.
-		X	34	26.1	6.3	101.3			
-	SPT		8	11.0					
10	SPT		9	12.4					
-	SPT		11	15.2					12.5' - Medium to dark brown fine- to coarse-grained silty sand, dry, firm.
-	SPT		9	12.4					15' - 20' - Medium to dark brown fine-grained silty sand, humid, firm.
-		X	26	19.9	7.7	104.4			
-	SPT		10	13.8					
20	SPT		14	19.3					
-	SPT		22	30.4					22.5' - 35' - Medium reddish brown very fine- to medium-grained silty sand, humid, firm.
-	SPT		24	33.1					
-		x	50 for 5"		6.4	105.6			
-	SPT		21	29.0					
30	SPT		22	30.4					
-	SPT		25	34.5					
-	SPT		30	41.4					35' - 45' - Dark brown very fine- to coarse-grained clayey to silty sand, slightly moist, firm.
-		X	54	41.4	5.7	111.3			
-	SPT		39	53.8					
40	SPT		38	52.4					
-	SPT		44	60.7					
-	SPT		47	64.9					45' - Medium gray very fine- to medium-grained sandy clay to clayey sand, moist, very dense.
-		X	50 for 6"		5.8	112.2			
-	SPT		50 for 5"						**SAUGUS FORMATION - Ts - (47.5' - 57.5')** - Medium gray medium- to very coarse-grained clayey sand, moist, very dense.
50	SPT		72	99.4					
-	SPT		50 for 4"						
-	SPT		50 for 5"						End at 57.5'
60									

Comments: The following correction factors were utilized to determine N(60) (Per SP117)
Cb = 1.15 (8" Diameter Borehole); Cs = 1.2 (SPT Sampler without liner); Cs = 2/3 (California Sampler)

Notes: TOTAL DEPTH: 55' GROUNDWATER: NO REFUSAL/CAVING: NO BACKFILLED: YES

PLATE 2.9

GOLD COAST GEOSERVICES, INC.

SUB-SURFACE DATA — BORING LOG NO. B-10

PROJECT: D.R. HORTON - LYONS CANYON RANCH, SANTA CLARITA — FILE NO.: GC14-122536

ELEVATION: SEE PLATE 1 — DATE: 02/12/15

METHOD: 6-inch Hollow Stem Auger — DRILLING CO.: HD DRILLING

DEPTH (FT)	SAMPLE: BULK	SAMPLE: RING	BLOWCOUNT: FIELD (N)	BLOWCOUNT: N(60)	MOISTURE %	DENSITY	SIEVE: % PASSING #200 SCREEN	GRAPHIC LOG	DESCRIPTION AND REMARKS
0									**ALLUVIUM - Qal - (0' - 27.5')**
-	SPT		14	19.3					2.5' - Dark brown very fine- to fine-grained silty sand, slightly moist, firm.
-	SPT		31	42.8					5' - 17.5' - Medium brown fine- to coarse-grained silty sand, dry, firm.
-		X	37	28.4					
-	SPT		12	16.6					
10	SPT		12	16.6					
-	SPT		14	19.3					
-	SPT		14	19.3					
-		X	35	26.8	4.8	97.2			
-	SPT		16	22.1					
20	SPT		13	17.9					20' - 22.5' - Medium brown fine- to coarse-grained pebbly silty sand, dry, dense.
-	SPT		43	59.3					
-	SPT		44	60.7					22.5' - 27.5' - Light to medium brown very fine- to fine-grained silty sand, dry, slightly firm.
-		x	75	57.5	4.3	115.3			
-	SPT		50 for 4"						**SAUGUS FORMATION - Ts - (27.5' - 30')** - Medium brown fine- to very coarse-grained silty sand, dry, very dense.
30	SPT		50 for 2"						End at 30'
40									
50									
60									

Comments: The following correction factors were utilized to determine N(60) (Per SP117)
Cb = 1.15 (8" Diameter Borehole); Cs = 1.2 (SPT Sampler without liner); Cs = 2/3 (California Sampler)

Notes: TOTAL DEPTH: 30' GROUNDWATER: NO REFUSAL/CAVING: NO BACKFILLED: YES

PLATE 2.10

GOLD COAST GEOSERVICES, INC.

SUB-SURFACE DATA — BORING LOG NO. B-11

PROJECT: D.R. HORTON - LYONS CANYON RANCH, SANTA CLARITA — FILE NO.: GC14-122536

ELEVATION: SEE PLATE 1 — DATE: 02/17/15

METHOD: 6-inch Hollow Stem Auger — DRILLING CO.: HD DRILLING

DEPTH (FT)	SAMPLE: BULK	SAMPLE: RING	BLOWCOUNT: FIELD (N)	BLOWCOUNT: N(60)	MOISTURE %	DENSITY	SIEVE: % PASSING # 200 SCREEN	GRAPHIC LOG	DESCRIPTION AND REMARKS
0									**ALLUVIUM - Qal - (0' - 10')**
-	SPT		5	6.9					2.5' - Dark brown very fine- to fine-grained silty sand, sightly moist, loose.
-	SPT		12	16.6					5' - Medium gray very fine- to medium-grained clayey to silty sand, slightly moist, firm.
-		X	43	33.0	6.8	109.7			
-	SPT		22	30.4					7.5' - Medium reddish brown fine- to medium-grained silty sand, dry, dense.
10	SPT		50 for 4"						**SAUGUS FORMATION - Ts - (10' - 17.5')**
-	SPT		50 for 6"						10' - Medium brown fine- to very coarse-grained silty sand, dry, dense.
-									12.5' - Dark brown very fine- to medium-grained clayey to silty sand, slightly moist, dense.
-	SPT		50 for 4"						15' - 17.5' - Light to medum gray very fine-grained silty clay, moist, very stiff.
20									
30									
40									
50									
60									

Comments: The following correction factors were utilized to determine N(60) (Per SP117)
Cb = 1.15 (8" Diameter Borehole); Cs = 1.2 (SPT Sampler without liner); Cs = 2/3 (California Sampler)

Notes: TOTAL DEPTH: 17.5' GROUNDWATER: NO REFUSAL/CAVING: NO BACKFILLED: YES

PLATE 2.11

GOLD COAST GEOSERVICES, INC.

SUB-SURFACE DATA — BORING LOG NO. B-12

PROJECT: D.R. HORTON - LYONS CANYON RANCH, SANTA CLARITA — FILE NO.: GC14-122536

ELEVATION: SEE PLATE 1 — DATE: 02/18/15

METHOD: 6-inch Hollow Stem Auger — DRILLING CO.: HD DRILLING

DEPTH (FT)	SAMPLE: BULK	SAMPLE: RING	BLOWCOUNT: FIELD (N)	BLOWCOUNT: N(60)	MOISTURE %	DENSITY	SIEVE: % PASSING # 200 SCREEN	GRAPHIC LOG	DESCRIPTION AND REMARKS
0	SPT		6	8.3					**ALLUVIUM - Qal - (0' - 7.5')** - Medium reddish brown very fine- to fine-grained silty sand, slightly moist slightly firm.
	SPT		19	26.2					
		X	72	55.2	6.2	117.9			
	SPT		50 for 5"						**SAUGUS FORMATION - Ts - (7.5' - 10')** - Medium brown fine-grained silty sand, humid, very dense.
10	SPT		50 for 3"						End at 10'
20									
30									
40									
50									
60									

Comments: The following correction factors were utilized to determine N(60) (Per SP117)
Cb = 1.15 (8" Diameter Borehole); Cs = 1.2 (SPT Sampler without liner); Cs = 2/3 (California Sampler)

Notes: TOTAL DEPTH: 10' GROUNDWATER: NO REFUSAL/CAVING: NO BACKFILLED: YES

PLATE 2.12

GOLD COAST GEOSERVICES, INC.

SUB-SURFACE DATA — BORING LOG NO. B-13

PROJECT: D.R. HORTON - LYONS CANYON RANCH, SANTA CLARITA — FILE NO.: GC14-122536

ELEVATION: SEE PLATE 1 — DATE: 02/18/15

METHOD: 6-inch Hollow Stem Auger — DRILLING CO.: HD DRILLING

DEPTH (FT)	SAMPLE: BULK	SAMPLE: RING	BLOWCOUNT: FIELD (N)	BLOWCOUNT: N(60)	MOISTURE %	DENSITY	SIEVE: % PASSING # 200 SCREEN	GRAPHIC LOG	DESCRIPTION AND REMARKS
0									**ALLUVIUM - Qal - (0' - 15')**
-	SPT		6	8.3					2.5' - 5' - Medium reddish brown very fine- to fine-grained silty sand, humid, firm.
-	SPT		9	12.4					
-		X	33	25.3	10.9	93.8			
-	SPT		17	23.5					7.5' - 10' - Medium brown fine- to medium-grained silty sand to sandy silt, humid, firm.
10	SPT		11	15.2					
-	SPT		11	15.2					12.5' - 15' - Medium brown fine- to coarse-grained silty sand, dry, firm.
-	SPT		40	55.2					**SAUGUS FORMATION - Ts - (15' - 17.5')** - Medium brown fine- to medium-grained
-		X	50 for 6"		8.1				silty sand to sandy clay, slightly moist, very dense.
-	SPT		50 for 3"						End at 17.5'
20									
30									
40									
50									
60									

Comments: The following correction factors were utilized to determine N(60) (Per SP117)
Cb = 1.15 (8" Diameter Borehole); Cs = 1.2 (SPT Sampler without liner); Cs = 2/3 (California Sampler)

Notes: TOTAL DEPTH: 17.5' GROUNDWATER: NO REFUSAL/CAVING: NO BACKFILLED: YES

PLATE 2.13

GOLD COAST GEOSERVICES, INC.

SUB-SURFACE DATA — BORING LOG NO. B-14

PROJECT: D.R. HORTON - LYONS CANYON RANCH, SANTA CLARITA — FILE NO.: GC14-122536

ELEVATION: SEE PLATE 1 — DATE: 02/17/15

METHOD: 6-inch Hollow Stem Auger — DRILLING CO.: HD DRILLING

DEPTH (FT)	SAMPLE: BULK	SAMPLE: RING	BLOWCOUNT: FIELD (N)	BLOWCOUNT: N(60)	MOISTURE %	DENSITY	SIEVE: % PASSING #200 SCREEN	GRAPHIC LOG	DESCRIPTION AND REMARKS
0	SPT		6	8.3					**ALLUVIUM - Qal - (0' - 12.5')** 2.5' - Dark brown very fine- to fine-grained silty sand, moist, loose.
	SPT		9	12.4					5' - Light to medium brown very fine-grained silty sand, humid, slightly firm.
		X	33	25.3	8.0	97.9			
	SPT		17	23.5					7.5' - 12.5' - Medium brown very fine- to fine-grained silty sand to sandy silt, humid, dense.
10	SPT		11	15.2					
	SPT		50 for 6"						**SAUGUS FORMATION - Ts - (12.5' - 20')** - Medium brown fine- to medium-grained clayey to silty sand, humid to slightly moist, dense.
	SPT		50 for 5"						
		X	50 for 6"		13.8	97.7			
	SPT		50 for 3"						
20	SPT		50 for 4"						End at 20'
30									
40									
50									
60									

Comments: The following correction factors were utilized to determine N(60) (Per SP117)
Cb = 1.15 (8" Diameter Borehole); Cs = 1.2 (SPT Sampler without liner); Cs = 2/3 (California Sampler)

Notes: TOTAL DEPTH: 20' GROUNDWATER: NO REFUSAL/CAVING: NO BACKFILLED: YES

PLATE 2.14

GOLD COAST GEOSERVICES, INC.

SUB-SURFACE DATA — BORING LOG NO. B-15

PROJECT: D.R. HORTON - LYONS CANYON RANCH, SANTA CLARITA — FILE NO.: GC14-122536

ELEVATION: SEE PLATE 1 — DATE: 02/17/15

METHOD: 6-inch Hollow Stem Auger — DRILLING CO.: HD DRILLING

DEPTH (FT)	SAMPLE: BULK	SAMPLE: RING	BLOWCOUNT: FIELD (N)	BLOWCOUNT: N(60)	MOISTURE %	DENSITY	SIEVE: % PASSING #200 SCREEN	GRAPHIC LOG	DESCRIPTION AND REMARKS
0	SPT		7	9.7					**ALLUVIUM - Qal - (0' - 7.5')**
									2.5' - Dark brown very fine- to fine-grained silty sand, moist, loose.
	SPT		7	9.7					
		X	50 for 5"		7.5	98.2			5' - Light to medium brown very fine-grained silty sand, humid, slightly firm.
	SPT		69	95.2					**SAUGUS FORMATION - Ts - (7.5' - 20')**
									7.5' - 17.5' - Medium brown very fine- to fine-grained silty sand to sandy silt,
10	SPT		50 for 4"						humid, very dense.
	SPT		50 for 5"						
	SPT		50 for 5"						
		X	50 for 4"		13.2	100.0			
	SPT		50 for 5"						
20	SPT		50 for 4"						20' - Medium brown fine- to medium-grained clayey to silty sand, humid to slightly moist, very dense.
									End at 20'
30									
40									
50									
60									

Comments: The following correction factors were utilized to determine $N_{(60)}$ (Per SP117)
Cb = 1.15 (8" Diameter Borehole); Cs = 1.2 (SPT Sampler without liner); Cs = 2/3 (California Sampler)

Notes: TOTAL DEPTH: 20' GROUNDWATER: NO REFUSAL/CAVING: NO BACKFILLED: YES

PLATE 2.15

GOLD COAST GEOSERVICES, INC.

SUB-SURFACE DATA — BORING LOG NO. B-16

PROJECT: D.R. HORTON - LYONS CANYON RANCH, SANTA CLARITA — FILE NO.: GC14-122536

ELEVATION: SEE PLATE 1 — DATE: 02/17/15

METHOD: 6-inch Hollow Stem Auger — DRILLING CO.: HD DRILLING

DEPTH (FT)	SAMPLE: BULK	SAMPLE: RING	BLOWCOUNT: FIELD (N)	BLOWCOUNT: N(60)	MOISTURE %	DENSITY	SIEVE: % PASSING #200 SCREEN	GRAPHIC LOG	DESCRIPTION AND REMARKS
0									**ALLUVIUM - Qal - (0' - 15')**
	SPT		8	11.0					2.5' - Medium to dark brown very fine- to fine-grained silty sand, slightly moist, loose.
	SPT		9	12.4					5' - 10' - Medium brown very fine- to fine-grained silty sand, dry, firm.
		X	52	39.9	7.1	104.9			
	SPT		26	35.9					
10	SPT		20	27.6					
	SPT		20	27.6					12.5'- 15' - Light to medium brown very fine- to fine-grained silty sand to sandy silt, slightly moist, dense.
	SPT		50 for 5"						
		X	50 for 5"		12.6	107.4			**SAUGUS FORMATION - Ts - (15' - 22.5')** - gray siltstone.
	SPT		50 for 3"						
20	SPT		50 for 4"						
	SPT		50 for 2"						End at 22.5'
30									
40									
50									
60									

Comments: The following correction factors were utilized to determine N(60) (Per SP117)
Cb = 1.15 (8" Diameter Borehole); Cs = 1.2 (SPT Sampler without liner); Cs = 2/3 (California Sampler)

Notes: TOTAL DEPTH: 22.5' GROUNDWATER: NO REFUSAL/CAVING: NO BACKFILLED: YES

PLATE 2.16

GOLD COAST GEOSERVICES, INC.

SUB-SURFACE DATA — BORING LOG NO. B-17

PROJECT: D.R. HORTON - LYONS CANYON RANCH, SANTA CLARITA — FILE NO.: GC14-122536

ELEVATION: SEE PLATE 1 — DATE: 02/18/15

METHOD: 6-inch Hollow Stem Auger — DRILLING CO.: HD DRILLING

DEPTH (FT)	SAMPLE: BULK	SAMPLE: RING	BLOWCOUNT: FIELD (N)	BLOWCOUNT: N(60)	MOISTURE %	DENSITY	SIEVE: % PASSING # 200 SCREEN	GRAPHIC LOG	DESCRIPTION AND REMARKS
0									**ALLUVIUM - Qal - (0' - 5')**
-	SPT		5	6.9					2.5' - Dark brown fine- to medium-grained silty sand, slightly moist, loose.
-	SPT		11	15.2					SAUGUS FORMATION - Ts - (5' - 15')
-		X	68	52.1	10.0	98.1			5' - 7.5' - Medium to dark brown fine- to medium-grained silty sand, humid, slightly firm.
10	SPT		28	38.6					7.5' - 15' - Medium brown fine- to medium-grained silty to sandy clay, humid, very dense.
-	SPT		56	77.3					
-	SPT		50 for 5"						End at 15'
20									
30									
40									
50									
60									

Comments: The following correction factors were utilized to determine N(60) (Per SP117)
Cb = 1.15 (8" Diameter Borehole); Cs = 1.2 (SPT Sampler without liner); Cs = 2/3 (California Sampler)

Notes: TOTAL DEPTH: 15' GROUNDWATER: NO REFUSAL/CAVING: NO BACKFILLED: YES

PLATE 2.17

GOLD COAST GEOSERVICES, INC.

SUB-SURFACE DATA — BORING LOG NO. B-18

PROJECT: D.R. HORTON - LYONS CANYON RANCH, SANTA CLARITA — FILE NO.: GC14-122536

ELEVATION: SEE PLATE 1 — DATE: 02/18/15

METHOD: 6-inch Hollow Stem Auger — DRILLING CO.: HD DRILLING

DEPTH (FT)	SAMPLE: BULK	SAMPLE: RING	BLOWCOUNT: FIELD (N)	BLOWCOUNT: N(60)	MOISTURE %	DENSITY	SIEVE: % PASSING # 200 SCREEN	GRAPHIC LOG	DESCRIPTION AND REMARKS
0	SPT		10	13.8					**ALLUVIUM - Qal - (0' - 7.5')**
									2.5' - Dark brown very fine- to fine-grained silty sand, moist, slightly firm.
	SPT		15	20.7					
		X	50 for 6"		8.2	105.0			5' - Medium brown very fine- to fine-grained silty sand to sandy silt, humid, dense.
	SPT		50 for 3"						**SAUGUS FORMATION - Ts - (7.5' - 10')** - Dark brown fine- to coarse-grained silty sand, slightly moist, very dense.
10	SPT		50 for 3"						End at 10'
20									
30									
40									
50									
60									

Comments: The following correction factors were utilized to determine N(60) (Per SP117)
Cb = 1.15 (8" Diameter Borehole); Cs = 1.2 (SPT Sampler without liner); Cs = 2/3 (California Sampler)

Notes: TOTAL DEPTH: 10' GROUNDWATER: NO REFUSAL/CAVING: NO BACKFILLED: YES

PLATE 2.18

GOLD COAST GEOSERVICES, INC.

SUB-SURFACE DATA — BORING LOG NO. B-19

PROJECT: D.R. HORTON - LYONS CANYON RANCH, SANTA CLARITA — FILE NO.: GC14-122536

ELEVATION: SEE PLATE 1 — DATE: 02/19/15

METHOD: 6-inch Hollow Stem Auger — DRILLING CO.: HD DRILLING

DEPTH (FT)	SAMPLE: BULK	SAMPLE: RING	BLOWCOUNT: FIELD (N)	BLOWCOUNT: N(60)	MOISTURE %	DENSITY	SIEVE: % PASSING # 200 SCREEN	GRAPHIC LOG	DESCRIPTION AND REMARKS
0	SPT		20	27.6					**ALLUVIUM - Qal - (0' - 7.5')** - Medium brown fine-grained silty sand, dry, slightly firm.
	SPT		16	22.1					
		X	80	61.3	9.8	91.5			
	SPT		58	80.0					**PICO FORMATION - Tp - (7.5' - 15')**
10	SPT		32	44.2					7.5' - 12.5' - Medium brown claystone to siltstone.
	SPT		50 for 5"						12.5' - 15' - Dark brown claystone to siltstone.
	SPT		80	110.4					End at 15'
20									
30									
40									
50									
60									

Comments: The following correction factors were utilized to determine $N_{(60)}$ (Per SP117)
Cb = 1.15 (8" Diameter Borehole); Cs = 1.2 (SPT Sampler without liner); Cs = 2/3 (California Sampler)

Notes: TOTAL DEPTH: 15' GROUNDWATER: NO REFUSAL/CAVING: NO BACKFILLED: YES

PLATE 2.19

GOLD COAST GEOSERVICES, INC.

SUB-SURFACE DATA — BORING LOG NO. B-20

PROJECT: D.R. HORTON - LYONS CANYON RANCH, SANTA CLARITA — FILE NO.: GC14-122536

ELEVATION: SEE PLATE 1 — DATE: 02/19/15

METHOD: 6-inch Hollow Stem Auger — DRILLING CO.: HD DRILLING

DEPTH (FT)	SAMPLE: BULK	SAMPLE: RING	BLOWCOUNT: FIELD (N)	BLOWCOUNT: N(60)	MOISTURE %	DENSITY	SIEVE: % PASSING # 200 SCREEN	GRAPHIC LOG	DESCRIPTION AND REMARKS
0	SPT		9	12.4					**ALLUVIUM - Qal - (0' - 7.5')**
	SPT		20	27.6					2.5' - Dark brown very fine- to fine-grained silty sand, slightly moist, sightly firm.
		X	50 for 3"		8.1	103.9			5' - Medium brown fine- to medium-grained silty sand, humid, firm.
	SPT		50 for 5"						**PICO FORMATION - Tp - (7.5' - 12.5')** - Medium brown siltstone
10	SPT		79	109.0					
	SPT		50 for 2"						End at 12.5
20									
30									
40									
50									
60									

Comments: The following correction factors were utilized to determine N(60) (Per SP117)
Cb = 1.15 (8" Diameter Borehole); Cs = 1.2 (SPT Sampler without liner); Cs = 2/3 (California Sampler)

Notes: TOTAL DEPTH: 12.5' GROUNDWATER: NO REFUSAL/CAVING: NO BACKFILLED: YES

PLATE 2.20

GOLD COAST GEOSERVICES, INC.

SUB-SURFACE DATA — BORING LOG NO. B-21

PROJECT: D.R. HORTON - LYONS CANYON RANCH, SANTA CLARITA — FILE NO.: GC14-122536

ELEVATION: SEE PLATE 1 — DATE: 02/13/15

METHOD: 6-inch Hollow Stem Auger — DRILLING CO.: HD DRILLING

DEPTH (FT)	SAMPLE: BULK	SAMPLE: RING	BLOWCOUNT: FIELD (N)	BLOWCOUNT: N(60)	MOISTURE %	DENSITY	SIEVE: % PASSING # 200 SCREEN	GRAPHIC LOG	DESCRIPTION AND REMARKS
0									**ALLUVIUM - Qal - (0' - 47.5')**
-	SPT		3	4.1					2.5' - 5' - Medium to dark brown very fine- to medium-grained silty sand, humid, loose.
-	SPT		3	4.1					
-		X	26	19.9	5.7	99.0			
-	SPT		13	17.9					7.5' - 10' - Medium brown very fine- to fine-grained silty sand, humid, slightly firm.
10	SPT		8	11.0					
-	SPT		9	12.4					12.5' - 22.5' - Medium to dark brown very fine- to fine-grained silty sand, humid, slightly firm.
-	SPT		6	8.3					
-		X	15	11.5	9.2	104.6			
-	SPT		8	11.0					
20	SPT		14	19.3					
-	SPT		19	26.2					
-	SPT		20	27.6					
-		x	33	25.3	9.8	108.7			
-	SPT		31	42.8					27.5' - 30' - Medium brown fine- to coarse-grained pebbly silty sand, humid, dense.
30	SPT		29	40.0					
-	SPT		33	45.5					35' - Medium reddish brown fine- to coarse-grained pebbly sand, humid, dense.
-	SPT		28	38.6					
-		X	58	44.5	18.8	107.9			37.5' - 47.5' - Medium brown fine- to medium-grained silty sand to sandy silt, moist, firm.
-	SPT		32	44.2					
40	SPT		33	45.5					
-	SPT		30	41.4					
-	SPT		34	46.9					
-		X	50 for 4"		6.7	114.3			
-	SPT		40	55.2					**SAUGUS FORMATION - TS - (47.5' - 50')** - Medium reddish brown fine- to very coarse-grained clayey to silty sand, moist to saturated, dense.
50	SPT		57 for 5"						End at 50'
-									
-									
-									
-									
-									
60									

Comments: The following correction factors were utilized to determine N(60) (Per SP117)
Cb = 1.15 (8" Diameter Borehole); Cs = 1.2 (SPT Sampler without liner); Cs = 2/3 (California Sampler)

Notes: TOTAL DEPTH: 50' GROUNDWATER: NO REFUSAL/CAVING: NO BACKFILLED: YES

PLATE 2.21

GOLD COAST GEOSERVICES, INC.

SUB-SURFACE DATA — BORING LOG NO. B-22

PROJECT: D.R. HORTON - LYONS CANYON RANCH, SANTA CLARITA — FILE NO.: GC14-122536

ELEVATION: SEE PLATE 1 — DATE: 02/13/15

METHOD: 6-inch Hollow Stem Auger — DRILLING CO.: HD DRILLING

DEPTH (FT)	SAMPLE: BULK	SAMPLE: RING	BLOWCOUNT: FIELD (N)	BLOWCOUNT: $N_{(60)}$	MOISTURE %	DENSITY	SIEVE: % PASSING # 200 SCREEN	GRAPHIC LOG	DESCRIPTION AND REMARKS
0									**ALLUVIUM - Qal - (0' - 17.5')**
-	SPT		2	2.8					2.5' - 5' - Dark brown fine- to medium-grained silty sand, humid, loose.
-	SPT		3	4.1					
-		X	24	18.4	3.8	103.7			7.5' - 15' - Dark brown fine- to very coarse-grained silty sand, humid,
-	SPT		15	20.7					slightly firm.
10	SPT		15	20.7					
-	SPT		19	26.2					
-	SPT		11	15.2					
-		X	60	46.0	8.7	119.1			
-	SPT		70	96.6					**SAUGUS FORMATION - Ts - (17.5' - 32.5')**
20	SPT		53	73.1					17.5' - 27.5' - Medium yellowish brown medium- to very coarse-grained sand, humid, very dense.
-	SPT		68	93.8					
-	SPT		65	89.7					
-		x	50 for 3"		12.6	110.4			27.5' - 32.5' - Medium yellowish brown medium- to very coarse-grained silty
-	SPT		50 for 6"						sand, slightly moist, very dense.
30	SPT		50 for 6"						
-	SPT		50 for 5"						End at 32.5'
40									
50									
60									

Comments: The following correction factors were utilized to determine $N_{(60)}$ (Per SP117)
Cb = 1.15 (8" Diameter Borehole); Cs = 1.2 (SPT Sampler without liner); Cs = 2/3 (California Sampler)

Notes: TOTAL DEPTH: 32.5' GROUNDWATER: NO REFUSAL/CAVING: NO BACKFILLED: YES

PLATE 2.22

GOLD COAST GEOSERVICES, INC.

SUB-SURFACE DATA — BORING LOG NO. B-23

PROJECT: D.R. HORTON - LYONS CANYON RANCH, SANTA CLARITA — FILE NO.: GC14-122536

ELEVATION: SEE PLATE 1 — DATE: 02/16/15

METHOD: 6-inch Hollow Stem Auger — DRILLING CO.: HD DRILLING

DEPTH (FT)	SAMPLE: BULK	SAMPLE: RING	BLOWCOUNT: FIELD (N)	BLOWCOUNT: N(60)	MOISTURE %	DENSITY	SIEVE: % PASSING # 200 SCREEN	GRAPHIC LOG	DESCRIPTION AND REMARKS
0									**ALLUVIUM - Qal - (0' - 27.5')**
-	SPT		3	4.1					2.5' - Dark brown very fine- to medium-grained clayey to silty sand, slightly moist, loose.
-	SPT		15	20.7					5' - Dark brown very fine- to medium-grained clayey to silty sand,
-		X	57	43.7	8.0	97.0			humid, firm.
-	SPT		30	41.4					7.5' - 10' - Medium to dark brown fine- to coarse-grained clayey to silty sand, humid, firm.
10	SPT		14	19.3					
-	SPT		12	16.6					12.5' - 17.5'- Medium to dark brown fine- to coarse-grained clayey to
-	SPT		5	6.9					silty sand, slightly moist, slightly firm.
-		X	27	20.7	11.5	107.4			
-	SPT		12	16.6					
20	SPT		13	17.9					20' - 27.5' - Medium to dark brown fine- to very coarse-grained gravelly to pebbly clayey to silty sand, humid to slightly moist, slightly firm.
-	SPT		18	24.8					
-	SPT		13	17.9					**SAUGUS FORMATION - Ts - (27.5' - 30')**
-		x	43	33.0	4.3	111.7			25' - 27.5' - Medium yellowish brown fine- to coarse-grained silty sand
-	SPT		46	63.5					containing pebbles, humid, firm to dense.
30	SPT		50 for 5"						30' - Rock/boulder
40									
50									
60									

Comments: The following correction factors were utilized to determine N(60) (Per SP117)
Cb = 1.15 (8" Diameter Borehole); Cs = 1.2 (SPT Sampler without liner); Cs = 2/3 (California Sampler)

Notes: TOTAL DEPTH: 30' GROUNDWATER: NO REFUSAL/CAVING: NO BACKFILLED: YES

PLATE 2.23

GOLD COAST GEOSERVICES, INC.

SUB-SURFACE DATA — BORING LOG NO. B-24

PROJECT: D.R. HORTON - LYONS CANYON RANCH, SANTA CLARITA — FILE NO.: GC14-122536

ELEVATION: SEE PLATE 1 — DATE: 02/16/15

METHOD: 6-inch Hollow Stem Auger — DRILLING CO.: HD DRILLING

DEPTH (FT)	SAMPLE: BULK	SAMPLE: RING	BLOWCOUNT: FIELD (N)	BLOWCOUNT: N(60)	MOISTURE %	DENSITY	SIEVE: % PASSING # 200 SCREEN	GRAPHIC LOG	DESCRIPTION AND REMARKS
0	SPT		6	8.3					**ALLUVIUM - Qal - (0' - 27.5')**
-									2.5' - Dark brown fine- to medium-grained clayey to silty sand, slightly moist, slightly firm.
-	SPT		24	33.1					5' - 10' - Dark brown fine- to medium-grained clayey to silty sand, humid, firm to dense.
-		X	55	42.2	8.6	83.1			
-	SPT		20	27.6					
10	SPT		13	17.9					
-	SPT		17	23.5					12.5' - 27.5' - Medium brown fine- to medium-grained clayey silt to silty clay, humid to slightly moist, firm to dense.
-	SPT		8	11.0					
-		X	39	29.9	15.9	95.6			
-	SPT		21	29.0					
20	SPT		13	17.9					
-	SPT		57	78.7					
-	SPT		24	33.1					**PICO FORMATION - Tp - (27.5' - 37.5')**
-		x	50 for 4"		18.5	101.1			27.5' - 35' - Medium to dark grayish brown fine-grained clayey silt to silty clay, moist, dense.
-	SPT		50 for 5"						
30	SPT		64	88.3					
-	SPT		60	82.8					
-	SPT		42	58.0					35' - 37.5' - Dark brown claystone to siltstone, very dense.
-		X	50 for 5"		27.5	94.9			
-	SPT		50 for 4"						End at 37.5'
40									
50									
60									

Comments: The following correction factors were utilized to determine N(60) (Per SP117)
Cb = 1.15 (8" Diameter Borehole); Cs = 1.2 (SPT Sampler without liner); Cs = 2/3 (California Sampler)

Notes: TOTAL DEPTH: 37.5' GROUNDWATER: NO REFUSAL/CAVING: NO BACKFILLED: YES

PLATE 2.24

GOLD COAST GEOSERVICES, INC.

SUB-SURFACE DATA — BORING LOG NO. B-25

PROJECT: D.R. HORTON - LYONS CANYON RANCH, SANTA CLARITA — FILE NO.: GC14-122536

ELEVATION: SEE PLATE 1 — DATE: 02/16/15

METHOD: 6-inch Hollow Stem Auger — DRILLING CO.: HD DRILLING

DEPTH (FT)	SAMPLE: BULK	SAMPLE: RING	BLOWCOUNT: FIELD (N)	BLOWCOUNT: N(60)	MOISTURE %	DENSITY	SIEVE: % PASSING # 200 SCREEN	GRAPHIC LOG	DESCRIPTION AND REMARKS
0									**ALLUVIUM - Qal - (0' - 17.5')**
-	SPT		14	19.3					2.5' - Medium to dark brown fine- to medium-grained silty sand, humid, firm.
-	SPT		41	56.6					5' - 12.5' - Medium brown fine- to coarse-grained clayey to silty sand, humid,
-		X	82	62.9	7.5	99.1			firm to dense.
-	SPT		28	38.6					
10	SPT		20	27.6					
-	SPT		29	40.0					
-	SPT		8	11.0					15' - 17.5' - Light yellowish brown very fine- to fine-grained silty sand to sandy silt,
-		X	50 for 3"						humid, slightly firm.
-	SPT		70	96.6					**SAUGUS FORMSTION - Ts - (17.5' - 27.5')**
20	SPT		31	42.8					17.5' - Medium reddish brown fine- to medium-grained clayey to silty sand, dry, very dense.
-	SPT		50 for 6"						20' - Medium reddish brown siltstone, very dense.
-									22.5' - Light grayish brown siltstone, very dense.
-	SPT		40	55.2					25' - Medium gray siltstone, very dense.
-		x	50 for 3"						End at 27.5'
30									
40									
50									
60									

Comments: The following correction factors were utilized to determine N(60) (Per SP117)
Cb = 1.15 (8" Diameter Borehole); Cs = 1.2 (SPT Sampler without liner); Cs = 2/3 (California Sampler)

Notes: TOTAL DEPTH: 27.5' GROUNDWATER: NO REFUSAL/CAVING: NO BACKFILLED: YES

PLATE 2.25

GEOTECHNICAL BORING LOG

PROJECT NO.	102453-T	PROJECT NAME	Lyons Canyon Ranch		
DATE STARTED	6/20/01	GROUND ELEV.	1317	BORING DESIG.	B-1
DATE FINISHED	6/20/01	GW DEPTH (FT)	67	LOGGED BY	CRN
DRILLER	Ledezma Drilling	DRIVE WT.	See Note	NOTE	0-24' 3548#; 24-47'
TYPE OF DRILL RIG	30" Bucket Auger	DROP	12 inches		2577#; 47-73' 1648#

DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	ATTITUDES	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
0	1315					**ALLUVIUM (Qal):** Sandy Silt to Silty Sand; very fine- to fine-grained, moderate yellowish brown, slightly moist, firm/moderately dense.				
5		R/B	1				7.3	102.0	31	
	1310									
10		R	1				7.0	95.4	25	
	1305									
15		R	1			Sandy Silt to Silty Sand; very fine- to fine-grained, moderate yellowish brown, slightly moist, firm/moderately dense, some interbedded pebble lenses.	10.2	102.4	44	
	1300									
20		R/B	1			Silty Sand; fine- to coarse-grained with some pebbles and few cobbles, moderate to dark yellowish brown, moist, moderately dense.	4.9	112.2	26	
	1295									
25										
	1290									
30		B				Silty Sand; fine- to coarse-grained with pebbles and cobbles, moderate yellowish brown, slightly moist to moist, moderately dense to dense.				
	1285									
35										
	1280									

SAMPLE TYPES:
R RING (DRIVE) SAMPLE
S SPT (SPLIT SPOON) SAMPLE
B BULK SAMPLE T TUBE SAMPLE

GROUNDWATER LEVEL
WATER SEEP C CONTACT
B BEDDING F FAULT
J JOINTING S SHEAR

PACIFIC SOILS ENGINEERING, INC.

PLATE A-1

GEOTECHNICAL BORING LOG

PROJECT NO.	102453-T	PROJECT NAME	Lyons Canyon Ranch		
DATE STARTED	6/20/01	GROUND ELEV.	1317	BORING DESIG.	B-1
DATE FINISHED	6/20/01	GW DEPTH (FT)	67	LOGGED BY	CRN
DRILLER	Ledezma Drilling	DRIVE WT.	See Note	NOTE	0-24' 3548#; 24-47' 2577#; 47-73' 1648#
TYPE OF DRILL RIG	30" Bucket Auger	DROP	12 inches		

DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	ATTITUDES	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
45	1275									
	1270									
50		R/B	15			Pebbly Sand; fine- to very coarse-grained with abundant cobbles, moderate to dark yellowish brown, moist, dense.	4.6	126.4	37	
	1265									
55		R	5			Silty Sand; very fine- to fine-grained, moderate yellowish brown, moist, dense.	11.6	118.7	78	
	1260					Pebbly Sand; fine- to very coarse-grained with abundant cobbles, moderate to dark yellowish brown, moist, dense.				
60										
	1255									
65						Some interlayered lenses of Silty Sand (described at 55 feet).				
	1250					▼ Water at 67± feet, caving from 65 to 68± feet.				
						Total Depth 68 feet. Water at 67 feet. Caving from 65 to 68 feet. *Hole backfilled with native materials and tamped.*				

SAMPLE TYPES:
- R RING (DRIVE) SAMPLE
- S SPT (SPLIT SPOON) SAMPLE
- B BULK SAMPLE
- T TUBE SAMPLE

▼ GROUNDWATER LEVEL
► WATER SEEP
- B BEDDING
- J JOINTING
- C CONTACT
- F FAULT
- S SHEAR

PACIFIC SOILS ENGINEERING, INC.

PLATE A-2

GEOTECHNICAL BORING LOG

PROJECT NO.	102453-T	PROJECT NAME	Lyons Canyon Ranch		
DATE STARTED	6/20/01	GROUND ELEV.	1325	BORING DESIG.	B-2
DATE FINISHED	6/20/01	GW DEPTH (FT)	53	LOGGED BY	CRN
DRILLER	Ledezma Drilling	DRIVE WT.	See Note	NOTE	0-24' 3548#; 24-47' 2577#; 47-73' 1648#
TYPE OF DRILL RIG	30" Bucket Auger	DROP	12 inches		

DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	ATTITUDES	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
	1325					**ALLUVIUM (Qal):** Silt; moderate yellowish brown, dry to slightly moist, soft to firm at depth.				
5	1320									
10	1315	R/B	1			Silty Sand; very fine- to fine-grained, moderate yellowish brown, slightly moist, moderately dense, some interlayered lenses of coarse-grained Sand and Pebbles, some small organic pods.	7.7	102.0	32	
15	1310									
20	1305	R	1				8.7	105.0	40	
25	1300					Increasing pebbles and some cobbles.				
30	1295	R/B	9			Pebbly Sand; fine- to very coarse-grained, pale yellowish brown, slightly moist, moderately dense.	3.7	121.6	27	
35	1290									
	1285									

SAMPLE TYPES:
- [R] RING (DRIVE) SAMPLE
- [S] SPT (SPLIT SPOON) SAMPLE
- [B] BULK SAMPLE
- [T] TUBE SAMPLE

- ▼ GROUNDWATER LEVEL
- ► WATER SEEP
- [B] BEDDING
- [J] JOINTING
- [C] CONTACT
- [F] FAULT
- [S] SHEAR

PACIFIC SOILS ENGINEERING, INC.

PLATE A-3

GEOTECHNICAL BORING LOG

PROJECT NO.	102453-T	PROJECT NAME	Lyons Canyon Ranch		
DATE STARTED	6/20/01	GROUND ELEV.	1325	BORING DESIG.	B-2
DATE FINISHED	6/20/01	GW DEPTH (FT)	53	LOGGED BY	CRN
DRILLER	Ledezma Drilling	DRIVE WT.	See Note	NOTE	0-24' 3548#; 24-47' 2577#; 47-73' 1648#
TYPE OF DRILL RIG	30" Bucket Auger	DROP	12 inches		

DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	ATTITUDES	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
	1285	R	8			Silty Sand; fine- to very coarse-grained with pebbles, moderate yellowish brown, slightly moist to moist, dense.	6.8	122.2	51	
45	1280	B								
50	1275	R	6			Sand; fine- to coarse-grained with pebbles, pale to moderate yellowish brown, moist, moderately dense to dense.	5.5	135.5	61	
						▼ Water at 53+ feet. Caving from 52 to 54+ feet. Total Depth 54 feet. Water at 53 feet. Caving from 52 to 54 feet. Hole backfilled with native materials and tamped.				

SAMPLE TYPES:
- R RING (DRIVE) SAMPLE
- S SPT (SPLIT SPOON) SAMPLE
- B BULK SAMPLE
- T TUBE SAMPLE

▼ GROUNDWATER LEVEL
- WATER SEEP
- B BEDDING
- J JOINTING
- C CONTACT
- F FAULT
- S SHEAR

GEOTECHNICAL BORING LOG

PROJECT NO.	102453-T	PROJECT NAME	Lyons Canyon Ranch		
DATE STARTED	6/20/01	GROUND ELEV.	1331	BORING DESIG.	B-3
DATE FINISHED	6/20/01	GW DEPTH (FT)		LOGGED BY	CRN
DRILLER	Ledezma Drilling	DRIVE WT.	See Note	NOTE	0-24' 3548#; 24-47'
TYPE OF DRILL RIG	30" Bucket Auger	DROP	12 inches		2577#; 47-73' 1548#

DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	ATTITUDES	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
0	1330					ALLUVIUM (Qal): Silty Sand; very fine- to fine-grained, pale yellowish brown, dry, loose.				
5	1325					Silty Sand; fine- to coarse-grained with pebbles and cobbles, pale to moderate yellowish brown, dry to slightly moist, loose to moderately dense.				
10	1320	B				1 to 2± feet thick boulder lense with 6 to 12± inch boulders.				
						Silty Sand; fine to coarse-grained with pebbles and cobbles, pale to moderate yellowish brown, slightly moist, moderately dense.				
15	1315	R	1				2.3	106.7	11	
20	1310	R/B	2			Silty Sand; very fine- to fine-grained with pebbles, moderate yellowish brown, slightly moist to moist, moderately dense.	5.7	115.3	35	
25	1305					Silty Sand; fine- to coarse-grained with pebbles and cobbles, moderate yellowish brown, slightly moist, moderately dense.				
30	1300	R	3			Silty Sand; very fine- to fine-grained with pebbles, moderate yellowish brown, slightly moist to moist, moderately dense.	4.9	114.1	28	
35	1295									

SAMPLE TYPES:
[R] RING (DRIVE) SAMPLE
[S] SPT (SPLIT SPOON) SAMPLE
[B] BULK SAMPLE [T] TUBE SAMPLE

GROUNDWATER LEVEL
WATER SEEP [C] CONTACT
[B] BEDDING [F] FAULT
[J] JOINTING [S] SHEAR

PACIFIC SOILS ENGINEERING, INC.

PLATE A-5

GEOTECHNICAL BORING LOG

PROJECT NO.	102453-T	PROJECT NAME	Lyons Canyon Ranch		
DATE STARTED	6/20/01	GROUND ELEV.	1331	BORING DESIG.	B-3
DATE FINISHED	6/20/01	GW DEPTH (FT)		LOGGED BY	CRN
DRILLER	Ledezma Drilling	DRIVE WT.	See Note	NOTE	0-24' 3548#; 24-47' 2577#; 47-73' 1648#
TYPE OF DRILL RIG	30" Bucket Auger	DROP	12 inches		

DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	ATTITUDES	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
	1290	R/B	6				10.4	115.0	63	
45	1285					**SAUGUS FORMATION-SUNSHINE RANCH MEMBER** (Tsr): Sandstone; very fine- to fine-grained, medium light gray, slightly moist, moderately hard to hard.				
50	1280	R/B	18			Siltstone; mottled olive gray and light gray, slightly moist, hard.	15.7	115.7	97	
						Total Depth 51 feet. No water and no caving. Hole backfilled with native materials and tamped.				

SAMPLE TYPES:
- R RING (DRIVE) SAMPLE
- S SPT (SPLIT SPOON) SAMPLE
- B BULK SAMPLE
- T TUBE SAMPLE

▼ GROUNDWATER LEVEL
- WATER SEEP
- B BEDDING
- J JOINTING
- C CONTACT
- F FAULT
- S SHEAR

PACIFIC SOILS ENGINEERING, INC.

PLATE A-6

GEOTECHNICAL BORING LOG

PROJECT NO.	102453-T	PROJECT NAME	Lyons Canyon Ranch		
DATE STARTED	6/20/01	GROUND ELEV.	1342	BORING DESIG.	B-4
DATE FINISHED	6/20/01	GW DEPTH (FT)	14	LOGGED BY	CRN
DRILLER	Ledezma Drilling	DRIVE WT.	See Note	NOTE	0-24' 3548#; 24-47'
TYPE OF DRILL RIG	30" Bucket Auger	DROP	12 inches		2577#; 47-73' 1648#

DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	ATTITUDES	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
0	1340					ALLUVIUM (Qal): Silty Sand; fine- to coarse-grained with pebbles, dark yellowish brown, slightly moist to moist, moderately dense.				
5	1335				►	Silty Sand to Sandy Silt; very fine-grained with few pebbles, dark yellowish brown, slightly moist to moist, moderately dense. Water seep and caving from 7 to 9± feet.				
10		R/B	1				19.8	108.3	96	
	1330				▼	Pebbly Sand; coarse-grained with abundant cobbles, dark yellowish brown, wet, moderately dense. Water at 14+ feet, caving from 14 to 16± feet.				
15						Total Depth 16 feet. Water and caving at 7 to 9 feet and 14 to 16 feet. Hole backfilled with native materials and tamped.				

SAMPLE TYPES:
- [R] RING (DRIVE) SAMPLE
- [S] SPT (SPLIT SPOON) SAMPLE
- [B] BULK SAMPLE [T] TUBE SAMPLE

▼ GROUNDWATER LEVEL
► WATER SEEP
[B] BEDDING [C] CONTACT
[J] JOINTING [F] FAULT
[S] SHEAR

PACIFIC SOILS ENGINEERING, INC.

PLATE A-7

GEOTECHNICAL BORING LOG

PROJECT NO.	102453-T	PROJECT NAME	Lyons Canyon Ranch		
DATE STARTED	6/20/01	GROUND ELEV.	1388	BORING DESIG.	B-5
DATE FINISHED	6/20/01	GW DEPTH (FT)	15	LOGGED BY	CRN
DRILLER	Ledezma Drilling	DRIVE WT.	See Note	NOTE	0-24' 3548#; 24-47' 2577#; 47-73' 1648#
TYPE OF DRILL RIG	30" Bucket Auger	DROP	12 inches		

DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	ATTITUDES	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
	1385					ALLUVIUM (Qal): Silty Sand to Sandy Silt; very fine- to fine-grained, moderate yellowish brown, dry and loose/soft within top 3±, feet becoming slightly moist and moderately dense/firm at depth.				
5										
	1380									
10		R/B	Push		►	Water seep at 10± feet.				
	1375									
15					▼	Water at 15± feet. Caving from 14 to 16± feet. Total Depth 16 feet. Water at 10 and 15 feet. Caving from 14 to 16 feet. Hole backfilled with native materials tamped.				

SAMPLE TYPES:
- [R] RING (DRIVE) SAMPLE
- [S] SPT (SPLIT SPOON) SAMPLE
- [B] BULK SAMPLE [T] TUBE SAMPLE

▼ GROUNDWATER LEVEL
► WATER SEEP
[B] BEDDING [C] CONTACT
[J] JOINTING [F] FAULT
[S] SHEAR

PACIFIC SOILS ENGINEERING, INC.

PLATE A-8

GEOTECHNICAL BORING LOG

PROJECT NO.	102453-T	PROJECT NAME	Lyons Canyon Ranch	BORING DESIG.	B-6
DATE STARTED	6/20/01	GROUND ELEV.	1384	LOGGED BY	CRN
DATE FINISHED	6/20/01	GW DEPTH (FT)		NOTE	0-24' 3548#; 24-47'
DRILLER	Ledezma Drilling	DRIVE WT.	See Note		2577#; 47-73' 1648#
TYPE OF DRILL RIG	30" Bucket Auger	DROP	12 inches		

DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	ATTITUDES	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
	1380					**ALLUVIUM (Qal):** Silty Sand to Sandy Silt; very fine- to fine-grained with some pebbles and some cobbles, dark yellowish brown, dry and loose/soft within top 1 to 3± feet, becoming slightly moist to moist and moderately dense/firm at depth. Top 3± feet is porous.				
5		R/B	Bounce			Boulders; 1± foot in diameter. No sample due to rocks.				
						Refusal Total Depth 7 feet. No water and no caving. Refusal due to rocks. Hole backfilled with native materials and tamped.				

SAMPLE TYPES:
- [R] RING (DRIVE) SAMPLE
- [S] SPT (SPLIT SPOON) SAMPLE
- [B] BULK SAMPLE [T] TUBE SAMPLE

▼ GROUNDWATER LEVEL
- WATER SEEP [C] CONTACT
- [B] BEDDING [F] FAULT
- [J] JOINTING [S] SHEAR

PACIFIC SOILS ENGINEERING, INC.

PLATE A-9

GEOTECHNICAL BORING LOG

PROJECT NO.	102453-T	PROJECT NAME	Lyons Canyon Ranch		
DATE STARTED	6/25/01	GROUND ELEV.	1385	BORING DESIG.	B-6B
DATE FINISHED	6/25/01	GW DEPTH (FT)		LOGGED BY	CRN
DRILLER	Ledezma Drilling	DRIVE WT.	See Note	NOTE	0-24' 3548#; 24-47'
TYPE OF DRILL RIG	30" Bucket Auger	DROP	12 inches		2577#; 47-73' 1648#

DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	ATTITUDES	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
	1385					**ALLUVIUM (Qal):** Silty Sand to Sandy Silt; fine- to coarse-grained with pebbles, moderate to dark yellowish brown, top 1± foot dry and loose/soft, becoming moist and moderately dense/firm at depth.				
5	1380	R	2			2 to 3± foot thick,boulder lenses; 2-1/2 foot diameter boulder at 6± feet in depth.	9.1	116.9	58	
10	1375	R/B	6 for 6"			**SAUGUS FORMATION-SUNSHINE RANCH MEMBER (Tsr):** Weathered Silty Sandstone; very fine- to fine-grained, mottled moderate brown and medium light gray, moist, moderately hard, poorly indurated.	13.4	123.0	98	
		B								
15	1370	R	11 for 6"			Silty Sandstone; very fine- to fine-grained, medium light gray, moist, moderately hard, moderately indurated.	13.4	120.6	91	
						Total Depth 16 feet. No water, no caving. Hole backfilled with native materials and tamped.				

SAMPLE TYPES:
R RING (DRIVE) SAMPLE
S SPT (SPLIT SPOON) SAMPLE
B BULK SAMPLE T TUBE SAMPLE

GROUNDWATER LEVEL
WATER SEEP
B BEDDING C CONTACT
J JOINTING F FAULT
S SHEAR

PACIFIC SOILS ENGINEERING, INC.

PLATE A-10

GEOTECHNICAL BORING LOG

PROJECT NO.	102453-T	PROJECT NAME	Lyons Canyon Ranch		
DATE STARTED	6/25/01	GROUND ELEV.	1388	BORING DESIG.	B-7
DATE FINISHED	6/25/01	GW DEPTH (FT)		LOGGED BY	CRN
DRILLER	Ledezma Drilling	DRIVE WT.	See Note	NOTE	0-24' 3548#; 24-47'
TYPE OF DRILL RIG	30" Bucket Auger	DROP	12 inches		2577#; 47-73' 1648#

DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	ATTITUDES	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
	1385					COLLUVIUM/ALLUVIUM (Qal): Silty Sand; fine- to coarse-grained with pebbles and some cobbles, moderate yellowish brown, dry and loose top 3± feet, slightly moist and moderately dense at depth, abundant roots and rootlets throughout.				
						1± inch thick yellowish red lense at contact.				
5		R/B	4		C: N75W 44NE	SAUGUS FORMATION- SUNSHINE RANCH MEMBER (Tsr): Silty Sandstone; fine- to coarse-grained with pebbles and some cobbles, grayish orange, slightly moist, hard, moderately to well indurated, slight to moderate bedding.	4.6	114.8	27	
	1380									
					B: N80W 41NE	1± foot thick, scour/infill structure - infill with fine-grained Sand (attitude from top of Sand infill).				
10		R/B	4 for 3" Bounce				3.4	121.9	25	
	1375									
					B: N70W 54NE	2± foot thick,scour/infill structure - infill with fine-grained Sand (attitude from top of infill).				
15					B: N80W 50NE	Silty Sandstone; fine-grained, light gray, slightly moist, hard, well indurated.				
	1370					Used ripper and core bucket from 18 to 19± feet. Refusal at 19+ feet. Total Depth 19 feet. No water, no caving. Hole backfilled with native materials and tamped.				

SAMPLE TYPES:
- R RING (DRIVE) SAMPLE
- S SPT (SPLIT SPOON) SAMPLE
- B BULK SAMPLE
- T TUBE SAMPLE

GROUNDWATER LEVEL
- WATER SEEP
- B BEDDING
- J JOINTING
- C CONTACT
- F FAULT
- S SHEAR

PACIFIC SOILS ENGINEERING, INC.

PLATE A-11

GEOTECHNICAL BORING LOG

PROJECT NO.	102453-T	PROJECT NAME	Lyons Canyon Ranch	BORING DESIG.	B-8
DATE STARTED	6/25/01	GROUND ELEV.	1353	LOGGED BY	CRN
DATE FINISHED	6/25/01	GW DEPTH (FT)	19	NOTE	0-24' 3548#; 24-47' 2577#; 47-73' 1648#
DRILLER	Ledezma Drilling	DRIVE WT.	See Note		
TYPE OF DRILL RIG	30" Bucket Auger	DROP	12 inches		

DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	ATTITUDES	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
0	1350					COLLUVIUM/ALLUVIUM (Qal): Silty Sand to Sandy Silt; fine- to coarse-grained with pebbles, cobbles, some clay pods, slightly moist to moist, loose/soft to moderately dense/firm at depth.				
5										
	1345									
10						Increasing pebbles and cobbles.				
	1340									
15		R/B	6				10.7	122.3	81	
	1335									
						▼ Water at 19 feet.				
20		R	10			SAUGUS FORMATION-SUNSHINE RANCH MEMBER (Tsr): Silty Sandstone to Sandy Siltstone; very fine- to fine-grained, light olive, moist, moderately hard, moderately to well indurated, thinly bedded to laminated, weathered.	14.1	121.5	98	
		B								
	1330									
25						Silty Sandstone; fine to coarse-grained, medium light gray, slightly moist, hard, moderately to well indurated.	9.6	122.0	73	
						Total Depth 26 feet. Water at 19 feet. No caving. Hole backfilled.				

SAMPLE TYPES:
- R RING (DRIVE) SAMPLE
- S SPT (SPLIT SPOON) SAMPLE
- B BULK SAMPLE
- T TUBE SAMPLE

▼ GROUNDWATER LEVEL
► WATER SEEP
B BEDDING
J JOINTING
C CONTACT
F FAULT
S SHEAR

PACIFIC SOILS ENGINEERING, INC.

PLATE A-12

GEOTECHNICAL BORING LOG

PROJECT NO.	102453-T	PROJECT NAME	Lyons Canyon Ranch		
DATE STARTED	6/25/01	GROUND ELEV.	1327	BORING DESIG.	B-9
DATE FINISHED	6/25/01	GW DEPTH (FT)		LOGGED BY	CRN
DRILLER	Ledezma Drilling	DRIVE WT.	See Note	NOTE	0-24' 3548#; 24-47'
TYPE OF DRILL RIG	30" Bucket Auger	DROP	12 inches		2577#; 47-73' 1648#

DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	ATTITUDES	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
0	1325					ALLUVIUM (Qal): Silty Sand; fine- to coarse-grained with pebbles and cobbles, moderate yellowish brown, top 6± feet dry to moist at depth, loose top 3± feet to moderately dense at depth.				
5	1320									
10		R/B	Push			Sandy Silt to Silty Sand; fine-grained, moderate to dark yellowish brown, moist, firm/moderately dense, porous, abundant rootlets.	13.9	115.1	84	
15	1315									
20	1310	R	1			Silty Sand; fine- to medium-grained, moderate to dark yellowish brown, moist, moderately dense, micaceous.	12.1	111.7	64	
25	1305									
30	1300	R/B	Push			Silty Sand to Sandy Silt; fine- to coarse-grained with some pebbles, moderate yellowish brown, moist to very moist, moderately dense, micaceous.	18.0	112.0	100	
35	1295									
	1290	B				SAUGUS FORMATION-SUNSHINE RANCH MEMBER (Tsr): Silty Sandstone; fine to medium-grained, light olive gray, moist, moderately hard, moderately indurated, slightly				

SAMPLE TYPES:
- R RING (DRIVE) SAMPLE
- S SPT (SPLIT SPOON) SAMPLE
- B BULK SAMPLE
- T TUBE SAMPLE

- ▼ GROUNDWATER LEVEL
- WATER SEEP
- B BEDDING
- J JOINTING
- C CONTACT
- F FAULT
- S SHEAR

PACIFIC SOILS ENGINEERING, INC.

PLATE A-13

GEOTECHNICAL BORING LOG

PROJECT NO. 102453-T
DATE STARTED 6/25/01
DATE FINISHED 6/25/01
DRILLER Ledezma Drilling
TYPE OF DRILL RIG 30" Bucket Auger

PROJECT NAME Lyons Canyon Ranch
GROUND ELEV. 1327
GW DEPTH (FT)
DRIVE WT. See Note
DROP 12 inches

BORING DESIG. B-9
LOGGED BY CRN
NOTE 0-24' 3548#; 24-47' 2577#; 47-73' 1648#

DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	ATTITUDES	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
		R	5			to moderately weathered.	10.0	117.9	63	
	1285					Total Depth 41 feet. No water, no caving. Hole backfilled with native materials and tamped.				

SAMPLE TYPES:
- R RING (DRIVE) SAMPLE
- S SPT (SPLIT SPOON) SAMPLE
- B BULK SAMPLE
- T TUBE SAMPLE

GROUNDWATER LEVEL
- WATER SEEP
- C CONTACT
- B BEDDING
- F FAULT
- J JOINTING
- S SHEAR

PACIFIC SOILS ENGINEERING, INC.

PLATE A-14

GEOTECHNICAL BORING LOG

PROJECT NO. 102453-T
DATE STARTED 4/25/02
DATE FINISHED 4/26/02
DRILLER Dave's Drilling
TYPE OF DRILL RIG 30" Bucket Auger

PROJECT NAME Lyons Canyon Ranch
GROUND ELEV. 1635
GW DEPTH (FT)
DRIVE WT. See Note
DROP 12 inches

BORING DESIG. B-10
LOGGED BY CRN
NOTE 0-27' 4500#; 27-52' 3500#; 52-80' 2500#; 80-104' 1000#

DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	ATTITUDES	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
	1635	B				**PICO FORMATION (Tp):** Sandy Siltstone; very fine-grained Sand, pale yellowish brown, slightly moist, hard, fossiliferous (abundant bi-valves); interbedded with Silty Sandstone; very fine- to fine-grained, pale yellowish brown, slightly moist, hard, scour-fill into Siltstone; both units jointed with caliche infill, both units laminated to 8± inch thick bedding.				
5	1630				B: N75W 46NE					
10	1625	R/B	4 for 5"		B: B80W 54NE	Interbedded Silty Sandstone; fine-grained, pale yellowish to grayish orange, slightly moist to moist, hard; with Sandy Siltstone; mottled grayish orange and pale olive gray, slightly moist to moist, hard; both units laminated to 2± inch thick bedding.	8.8	115.4	54	
15	1620				B: N85W 53NE	Some interlayered Silty Claystone; olive gray, moist, moderately firm to firm, laminated, 1 to 2±mm thick layers, some caliche along bedding.				
20	1615	R/B	5 for 4"		B: B80W 45NE	Silty Sandstone; fine- to medium-grained, light gray with light brown staining, slightly moist, hard, laminated to 1/4± inch thick bedding./	5.8	106.0	29	
25	1610				B: N70W 51NE	Some isolated cobble lenses, quartzite and gneissic composition.				
30	1605	R/B	8 for 8"		B: N70W 50NE	Sandy to Clayey Siltstone; very fine-grained Sand; light olive gray, moist, moderately hard to hard, laminated to 1/4± inch thick bedding, some gypsum strands along bedding up to 1/4± inch thick. Some isolated Clay lenses and pods; dark brownish black, moist, moderately firm to firm, concentrated along bedding planes.	11.0	116.4	69	
35	1600				B: N65W 49NE	Claystone layer; 1/4± inch thick, olive gray, moist, soft, abundant well formed, gypsum crystals.				
	1595									

SAMPLE TYPES:
R RING (DRIVE) SAMPLE
S SPT (SPLIT SPOON) SAMPLE
B BULK SAMPLE T TUBE SAMPLE

GROUNDWATER LEVEL
WATER SEEP
B BEDDING J JOINTING C CONTACT F FAULT S SHEAR

PACIFIC SOILS ENGINEERING, INC.

PLATE A-15

GEOTECHNICAL BORING LOG

PROJECT NO.	102453-T	PROJECT NAME	Lyons Canyon Ranch		
DATE STARTED	4/25/02	GROUND ELEV.	1635	BORING DESIG.	B-10
DATE FINISHED	4/26/02	GW DEPTH (FT)		LOGGED BY	CRN
DRILLER	Dave's Drilling	DRIVE WT.	See Note	NOTE	0-27' 4500#; 27-52' 3500#; 52-80' 2500#; 80-104' 1000#
TYPE OF DRILL RIG	30" Bucket Auger	DROP	12 inches		

DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	ATTITUDES	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
	1595	R	8 for 6"		B: N80W 47NE	Sandy Siltstone; fine-grained Sand; olive gray, moist, hard, some laminated to 1/4± inch bedding, generally massive, with abundant cross-cutting gypsum seams. Cobble layers; 1± foot thick, set in pebbly sand matrix, medium- to very coarse-grained, moist, moderately hard to hard, quartzite cobbles and pebbles.	10.0	121.2	73	
45	1590				B: N85W 57NE	Silty Sandstone; fine-grained, reddish brown, slightly moist to moist, hard; interlayered with Sandy Siltstone; very fine- to fine-grained Sand, moist, moderately firm to firm, some very firm layers, laminated; both units 6 to 12 inch beds.				
50	1585	R/B	8 for 5"			Silty Sandstone; fine-grained, pale olive gray, moist, hard.	7.2	113.1	41	
					B: N70W 49NE	Pebble lense; medium- to very coarse-grained Sand matrix, quartzite pebbles, mottled reddish to light brown and pale olive gray, slightly moist, very hard, slightly concretionary.				
55	1580				B: N75W 50NE	Some isolated Clay lenses and pods along bedding, 1± inch thick to 6± inches long, medium- to very coarse-grained Sand matrix, quartzite pebbles, mottled reddish to light brown and pale olive gray, slightly moist, very hard, slightly concretionary.				
60	1575	R	10 for 5"		B: N60E 47NW	Silty Sandstone; layered fine- to medium-grained, pale olive gray, moist, hard, friable; interbedded with Sandy to Clayey Siltstone, olive gray, moist, hard, laminated to 1/2± inch thick bedding. Siltstone concretion; 1± inch thick, light to olive gray, slightly moist, very hard, massive, slightly jointed with light brown staining along joints.	7.3	113.0	42	
65	1570				B: E-W 51N	Some gypsum along bedding; up to 1/4± inch thick.				
70	1565	R/B	10 for 5"			Clayey Sandstone; very fine- to fine-grained, layered, pale yellowish brown to olive gray, moist, hard, friable, generally massive, some gypsum strands.	12.1	109.5	63	
					B: B60W 46NE					
75	1560					Clayey Siltstone to Clayey Sandstone layers; 1± foot thick, very fine-grained, medium light to medium gray, moist, hard, micaceous, massive.				
					B: N75W 46NE	Silty Sandstone; very fine- to fine-grained, medium light to medium gray, moist, hard, micaceous, laminated to 1± inch thick bedding.				
	1555									

SAMPLE TYPES:
- R RING (DRIVE) SAMPLE
- S SPT (SPLIT SPOON) SAMPLE
- B BULK SAMPLE
- T TUBE SAMPLE

GROUNDWATER LEVEL
- WATER SEEP
- B BEDDING
- J JOINTING
- C CONTACT
- F FAULT
- S SHEAR

PACIFIC SOILS ENGINEERING, INC.

PLATE A-16

GEOTECHNICAL BORING LOG

PROJECT NO.	102453-T	PROJECT NAME	Lyons Canyon Ranch		
DATE STARTED	4/25/02	GROUND ELEV.	1635	BORING DESIG.	B-10
DATE FINISHED	4/26/02	GW DEPTH (FT)		LOGGED BY	CRN
DRILLER	Dave's Drilling	DRIVE WT.	See Note	NOTE	0-27' 4500#; 27-52' 3500#; 52-80' 2500#; 80-104' 1000#
TYPE OF DRILL RIG	30" Bucket Auger	DROP	12 inches		

DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	ATTITUDES	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
	1555	R/B	20 for 4"			No sample recovery at 80 feet.				
85	1550				B: E-W 52N	Gradational color change to light olive gray.				
90	1545	R	25 for 4"			Silty Sandstone; very fine- to fine-grained, light olive gray, slightly moist, hard, massive to very slightly bedded with some cross-bedding. No sample recovery at 92 feet.				
						Some isolated bi-valve shells to depth.				
95	1540				B: E-W 50N (Approx.)					
100	1535	R	25 for 4"							
						Total Depth 101 feet. No water, no caving. Hole backfilled with native				

SAMPLE TYPES:
- R RING (DRIVE) SAMPLE
- S SPT (SPLIT SPOON) SAMPLE
- B BULK SAMPLE
- T TUBE SAMPLE

▼ GROUNDWATER LEVEL
- WATER SEEP
- B BEDDING
- J JOINTING
- C CONTACT
- F FAULT
- S SHEAR

PACIFIC SOILS ENGINEERING, INC.

PLATE A-17

GEOTECHNICAL BORING LOG

PROJECT NO.	102453-T	PROJECT NAME	Lyons Canyon Ranch		
DATE STARTED	4/26/02	GROUND ELEV.	1582	BORING DESIG.	B-11
DATE FINISHED	4/26/02	GW DEPTH (FT)		LOGGED BY	CRN
DRILLER	Dave's Drilling	DRIVE WT.	See Note	NOTE	0-27' 4500#; 27-52' 3500#; 52-80' 2500#; 80-104' 1000#
TYPE OF DRILL RIG	30" Bucket Auger	DROP	12 inches		

DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	ATTITUDES	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
						PICO FORMATION (Tp):				
	1580				B: N50W 45SN J: N50E Vertical J: N10W 62NE	Sandy Siltstone; very fine-grained Sand, layered light to olive gray and light brown, slightly moist, moderately hard to hard, laminated to 1/2± inch thick bedding, jointed/weathered, abundant roots.				
5					F: N80W 62NE F: N50W 63SW	Fault Gouge: 1/4 to 1/2± inch thick, plastic Clay layer; olive gray, moist, soft to firm, flaky, abundant roots and rootlets.				
	1575									
10		R/B	5				13.0	119.4	89	
					J: N45W 78SW F: N55E 65NW	Fault Gouge: plastic Clay layer; olive gray, moist, soft, flaky, abundant roots.				
	1570									
					B: N50E 48NW					
15										
	1565									
						Some medium sized bi-valves.				
					B: N40E 49NW					
20		R/B	5 for 6"			Sandy Siltstone; very fine-grained Sand, medium dark gray, slightly moist, hard, massive, some isolated small to medium bi-valves.	13.2	122.3	99	
	1560									
25					J: N50W 86SW J: N40E 66NW	Clay lined joint 1-2 mm thick. Gypsum lined joint 2-3 mm thick.				
	1555									
30		R/B	8 for 6"			Sandy Siltstone; very fine-grained Sand, greenish gray, slightly moist, firm, massive, fossiliferous (small bi-valves); interlayered plastic with Silty Sandstone, medium gray, slightly moist, hard, slightly layered to massive; some interlayered Claystone, medium dark to dark gray, moist, soft to moderately firm, laminated, flaky.	12.2	123.5	95	
	1550				B: N60W 75SW					
35										
	1545					Some isolated concretionary pods, 2 to 6± inches in diameter, very hard.				

SAMPLE TYPES:
R RING (DRIVE) SAMPLE
S SPT (SPLIT SPOON) SAMPLE
B BULK SAMPLE T TUBE SAMPLE

GROUNDWATER LEVEL
WATER SEEP C CONTACT
B BEDDING F FAULT
J JOINTING S SHEAR

PACIFIC SOILS ENGINEERING, INC.

GEOTECHNICAL BORING LOG

PROJECT NO.	102453-T	PROJECT NAME	Lyons Canyon Ranch		
DATE STARTED	4/26/02	GROUND ELEV.	1582	BORING DESIG.	B-11
DATE FINISHED	4/26/02	GW DEPTH (FT)		LOGGED BY	CRN
DRILLER	Dave's Drilling	DRIVE WT.	See Note	NOTE	0-27' 4500#; 27-52' 3500#; 52-80' 2500#; 80-104' 1000#
TYPE OF DRILL RIG	30" Bucket Auger	DROP	12 inches		

DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	ATTITUDES	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
		R	8 for 6"		B: N20E 55NW	Clayey to Sandy Siltstone; very fine-grained Sand, greenish to dark greenish gray, slightly moist, firm, laminated to massive.	12.3	119.7	85	
	1540									
45					B: N60W 55SW (Approx.)					
	1535					Hard drilling.				
50		R/B	10 for 6"			Clayey Siltstone; medium dark gray, slightly moist, firm, slightly laminated, generally massive.	11.9	122.1	89	
	1530				B: N55W 75SW					
55										
	1525				B: N20W 67NE (Approx.)	Siltstone concretion lense; 8 to 10± inches thick, very hard, massive.				
60		R	15 for 6"			Clayey Siltstone; olive gray, slightly moist, firm, slightly laminated, generally massive, few small bi-valve shells.	10.5	121.0	76	
	1520				B: N60W Vertical	Ripple marks, small amplitude.				
65					B: N50W 52SW					
	1515				B: N50W 43SW					
70		R	15 for 5"		B: N60E 59SE	Sandy Siltstone; very fine-grained Sand, medium dark gray, slightly moist, hard, slightly laminated to 1/2± inch thick bedding, generally massive.	10.3	105.0	47	
	1510					Clay lense; 2 to 3± inches thick, medium dark gray, moist, soft, pliable.				
75					B: N60W 75SW					
	1505									

SAMPLE TYPES:
- R RING (DRIVE) SAMPLE
- S SPT (SPLIT SPOON) SAMPLE
- B BULK SAMPLE
- T TUBE SAMPLE

GROUNDWATER LEVEL
- WATER SEEP
- B BEDDING
- J JOINTING
- C CONTACT
- F FAULT
- S SHEAR

PACIFIC SOILS ENGINEERING, INC.

PLATE A-19

GEOTECHNICAL BORING LOG

PROJECT NO. 102453-T
DATE STARTED 4/26/02
DATE FINISHED 4/26/02
DRILLER Dave's Drilling
TYPE OF DRILL RIG 30" Bucket Auger

PROJECT NAME Lyons Canyon Ranch
GROUND ELEV. 1582
GW DEPTH (FT)
DRIVE WT. See Note
DROP 12 inches

BORING DESIG. B-11
LOGGED BY CRN
NOTE 0-27' 4500#; 27-52' 3500#; 52-80' 2500#; 80-104' 1000#

DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	ATTITUDES	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
		R	25 for 3.5"				10.8	120.8	78	
	1500					Total Depth 81 feet. No water, no caving. Hole backfilled with native materials and tamped.				

SAMPLE TYPES:
- R RING (DRIVE) SAMPLE
- S SPT (SPLIT SPOON) SAMPLE
- B BULK SAMPLE
- T TUBE SAMPLE

▼ GROUNDWATER LEVEL
► WATER SEEP
- C CONTACT
- B BEDDING
- F FAULT
- J JOINTING
- S SHEAR

PACIFIC SOILS ENGINEERING, INC.

PLATE A-20

GEOTECHNICAL BORING LOG

PROJECT NO.	102453-T	PROJECT NAME	Lyons Canyon Ranch		
DATE STARTED	4/29/02	GROUND ELEV.	1557	BORING DESIG.	B-12
DATE FINISHED	4/29/02	GW DEPTH (FT)		LOGGED BY	CRN
DRILLER	Dave's Drilling	DRIVE WT.	See Note	NOTE	0-27' 4500#; 27-52' 3500#; 52-80' 2500#; 80-104' 1000#
TYPE OF DRILL RIG	30" Bucket Auger	DROP	12 inches		

DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	ATTITUDES	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
						PICO FORMATION (Tp):				
	1555				B: N60W 57NE	Sandy Siltstone; very fine- to fine-grained Sand; yellowish brown, slightly moist to moist, moderately hard, laminated to 1/2± inch thick bedding; interlayered with Silty Sandstone; fine-grained, mottled moderate yellowish brown and pale olive, slightly moist, moderately hard, laminated to 1/2± inch thick bedding; abundant caliche, both units highly to moderately weathered.				
5										
	1550				B: N80E 72NW	Abundant penecontemporaneous deformation.				
10		R/B	5 for 10"				12.9	117.6	84	
	1545					Sandy Siltstone; very fine-grained Sand; light olive gray, slightly moist to moist, moderately hard to hard, slightly laminated generally massive; some interlayered Silty Sandstone, fine-grained, layered yellowish gray and light brown, slightly moist, moderately hard to hard, laminated to 1/4± inch thick bedding; some fine-grained gypsum along bedding bottom of "high to moderate" weathering zone.				
15					B: N50W 65NE					
	1540									
20		R/B			B: N70W 73NE	Clayey Siltstone; mottled light to olive gray and moderate brown, slightly moist to moist, moderately hard to hard, massive, micaceous, some fine-rained gypsum strands.	14.6	115.8	90	
	1535					Silty Sandstone to Clayey Siltstone; very fine-grained Sand, medium dark gray, slightly moist, hard, massive, some small isolated bi-valves and gastropods.				
25										
	1530									
30		R/B	10 for 10"		B: E-W 64N (Approx.)	Sandy Siltstone; very fine-grained, medium dark gray, slightly moist to moist, hard, slightly laminated, generally massive, slightly fossiliferous, micaceous.	12.6	123.0	97	
	1525									
35										
	1520									

SAMPLE TYPES:
- R RING (DRIVE) SAMPLE
- S SPT (SPLIT SPOON) SAMPLE
- B BULK SAMPLE
- T TUBE SAMPLE

GROUNDWATER LEVEL
- WATER SEEP
- B BEDDING
- J JOINTING
- C CONTACT
- F FAULT
- S SHEAR

PACIFIC SOILS ENGINEERING, INC.

PLATE A-21

GEOTECHNICAL BORING LOG

PROJECT NO.	102453-T	PROJECT NAME	Lyons Canyon Ranch		
DATE STARTED	4/29/02	GROUND ELEV.	1557	BORING DESIG.	B-12
DATE FINISHED	4/29/02	GW DEPTH (FT)		LOGGED BY	CRN
DRILLER	Dave's Drilling	DRIVE WT.	See Note	NOTE	0-27' 4500#; 27-52' 3500#; 52-80' 2500#; 80-104' 1000#
TYPE OF DRILL RIG	30" Bucket Auger	DROP	12 inches		

DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	ATTITUDES	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
					B: N70W 69NE	Sandy Siltstone to Silty Sandstone; very fine-grained Sand, medium dark gray, slightly moist to moist, hard, slightly laminated generally massive, slightly fossiliferous, micaceous; some interlayered Silty Sandstone, very fine-grained, light gray, slightly moist, hard, and Claystone, brownish to olive black, moist, moderately firm, laminated.	14.2	118.6	95	
	1515									
45					B: N50W 57NE (Approx.)					
	1510									
50		R/B	8 for 8"			Silty sandstone; very fine- to fine-grained, medium dark to olive gray, slightly moist, hard, slightly laminated, generally massive, micaceous, slightly fossiliferous.	13.4	120.6	96	
	1505									
55										
	1500									
60		R/B	15 for 8"		B: N60W 53NE	Silty Sandstone; very fine- to fine-grained, medium dark gray, slightly moist, hard, slightly laminated, generally massive, micaceous, slightly fossiliferous; some interbedded Claystone lenses, 1 to 2± thick, brownish to olive black, moist, moderately firm to firm, laminated.	13.2	120.6	94	
	1495				B: N60W 53NE	Silty Sandstone lense; 8± inches thick, light to medium light gray, fine-grained, moist, moderately hard, fossiliferous; underlain by 1 to 2± inch thick soft Claystone lense.				
65										
	1490				B: N50W 52NE					
70		R	15 for 8"			Silty Sandstone; very fine- to fine-grained, medium dark gray, slightly moist, hard, slightly laminated, generally massive, micaceous, slightly fossiliferous.	13.0	122.1	97	
	1485									
75					B: N25W 77NE					
	1480									

SAMPLE TYPES:
- [R] RING (DRIVE) SAMPLE
- [S] SPT (SPLIT SPOON) SAMPLE
- [B] BULK SAMPLE
- [T] TUBE SAMPLE

- ▼ GROUNDWATER LEVEL
- WATER SEEP
- [B] BEDDING
- [J] JOINTING
- [C] CONTACT
- [F] FAULT
- [S] SHEAR

PACIFIC SOILS ENGINEERING, INC.

PLATE A-22

GEOTECHNICAL BORING LOG

PROJECT NO.	102453-T	PROJECT NAME	Lyons Canyon Ranch	BORING DESIG.	B-12
DATE STARTED	4/29/02	GROUND ELEV.	1557	LOGGED BY	CRN
DATE FINISHED	4/29/02	GW DEPTH (FT)		NOTE	0-27' 4500#; 27-52' 3500#; 52-80' 2500#; 80-104' 1000#
DRILLER	Dave's Drilling	DRIVE WT.	See Note		
TYPE OF DRILL RIG	30" Bucket Auger	DROP	12 inches		

DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	ATTITUDES	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT. URATION (%)	OTHER TESTS
		R/B	20 for 6"				13.3	108.9	68	
	1475				B: N65W 46NE	Silty Sandstone lense; interbedded with Sandy Siltstone, dark gray, slightly moist, hard, slightly lamainted, generally massive, 1/2 to 1± inch thick beds.				
85					B: N50W 63NE					
	1470									
90		R	25 for 5"				12.3	104.8	56	
						Total Depth 91 feet. No water, no caving. Hole backfilled with native materials and tamped.				

SAMPLE TYPES:
- [R] RING (DRIVE) SAMPLE
- [S] SPT (SPLIT SPOON) SAMPLE
- [B] BULK SAMPLE [T] TUBE SAMPLE

▼ GROUNDWATER LEVEL
► WATER SEEP [C] CONTACT
[B] BEDDING [F] FAULT
[J] JOINTING [S] SHEAR

PACIFIC SOILS ENGINEERING, INC.

PLATE A-23

GEOTECHNICAL BORING LOG

PROJECT NO.	102453-T	PROJECT NAME	Lyons Canyon Ranch		
DATE STARTED	5/1/02	GROUND ELEV.	1445	BORING DESIG.	B-13
DATE FINISHED	5/1/02	GW DEPTH (FT)		LOGGED BY	CRN
DRILLER	Dave's Drilling	DRIVE WT.	See Note	NOTE	0-27' 4500#; 27-52' 3500#; 52-80' 2500#; 80-104' 1000#
TYPE OF DRILL RIG	30" Bucket Auger	DROP	12 inches		

DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	ATTITUDES	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
	1445					**SAUGUS FORMATION - SUNSHINE RANCH MEMBER** (Tsr): Silty Sandstone; fine- to coarse-grained with pebbles, very pale orange to pale yellowish brown, dry, moderately hard to hard, abundant scour-infill, normal grading.				
					B: N30E 55NW					
5	1440									
10	1435	R/B	5 for 5"		B: N80E 39NW	Silty Sandstone; fine- to coarse-grained, pale yellowish brown, dry to slightly moist, moderately hard to hard.	4.5	116.1	28	
					B: N70E 60NW	Some interlayered Clayey Siltstone layers; 6± inches thick, pale olive gray, moist, moderately hard, laminated.				
15	1430									
						1 foot thick lense of 6 to 8± inch diameter cobbles, scour/infill with lower contact into underlying Siltstone.				
20	1425	R/S	5 for 6"			Sandy Siltstone; very fine- to fine-grained, pale olive gray, moist, moderately hard to hard, slightly laminated generally massive.	11.1	120.1	78	
25	1420									
					S: E-W 40N	Silty Sandstone; fine- to coarse-grained with some pebble lenses, grayish orange to light olive gray, slightly moist to moist, moderately hard to hard, abundant scour-fill, graded bedding, cross-bedding.				
30	1415	R	8 for 6"				5.1	105.6	24	
35	1410				B: N80W 43NE					
	1405									

SAMPLE TYPES:
- R RING (DRIVE) SAMPLE
- S SPT (SPLIT SPOON) SAMPLE
- B BULK SAMPLE
- T TUBE SAMPLE

GROUNDWATER LEVEL
- WATER SEEP
- B BEDDING
- J JOINTING
- C CONTACT
- F FAULT
- S SHEAR

PACIFIC SOILS ENGINEERING, INC.

PLATE A-24

GEOTECHNICAL BORING LOG

PROJECT NO.	102453-T	PROJECT NAME	Lyons Canyon Ranch		
DATE STARTED	5/1/02	GROUND ELEV.	1445	BORING DESIG.	B-13
DATE FINISHED	5/1/02	GW DEPTH (FT)		LOGGED BY	CRN
DRILLER	Dave's Drilling	DRIVE WT.	See Note	NOTE	0-27' 4500#; 27-52' 3500#; 52-80' 2500#; 80-104' 1000#
TYPE OF DRILL RIG	30" Bucket Auger	DROP	12 inches		

DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	GROUP SYMBOL	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
		R/B	8 for 6"			Silty Sandstone; very fine- to fine-grained, pale olive gray, slightly moist to moist, moderately hard to hard; some interlayered Silty Sandstone, fine- to coarse-grained with pebbles, grayish orange, slightly moist, moderately hard to hard.	3.8	112.5	21	
45	1400									
						Silty Sandstone; fine- to coarse-grained with pebbles and cobbles, moderate yellowish to moderate brown, moist, moderately hard to hard.				
50	1395	B	N/R			Discontinuous Paleosol; Silty Sand to Sandy Silt, fine- to coarse-grained dark yellowish brown, moist, soft, 6± inches thick. Silty Sandstone; fine- to coarse-grained with pebbles and cobbles, some boulders up to 10± inches, moderate yellowish to moderate brown, moist, moderately hard to hard, massive 50/50± clast-matrix supported. @ 50 feet; no sample recovery due to cobbles.				
55	1390									
60	1385	R/B	10 for 5"			Silty Sandstone; fine- to coarse-grained with pebbles and some cobbles, moderate yellowish to moderate brown, moist, hard. FAULT ZONE: Clayey Siltstone; dusky blue green, moist, moderately hard to hard, massive, some polished surfaces, some scour-infill with overlying Sandstone.	7.5	112.7	43	
65	1380									
						FAULT: Claystone; olive gray, moist, moderately firm, slightly pliable, abundant polished surfaces and striations, laminated to 1± inch thick bedding. @ 66'; Trend and plunge of striations on fault plane: N60E 42W. Silty Sandstone; very fine- to fine-grained, light olive gray, moist, moderately hard, laminated to 2± inch, massive bedding.				
70	1375	R/B	10 for 10"			Silty Sandstone; fine- to coarse-grained with pebbles and cobbles, moderate yellowish brown, moist, moderately hard, scour-infill, generally massive, matrix supported.	14.6	119.0	99	
75	1370									
		B								
						Total Depth 78 feet. No water, no caving. Hole backfilled with native materials and tamped.				

SAMPLE TYPES:
R RING (DRIVE) SAMPLE
S SPT (SPLIT SPOON) SAMPLE
B BULK SAMPLE T TUBE SAMPLE

Ground Water Seepage
MAX - Max. Density/Opt. Moist.
DS - Direct Shear
HYDR - Hydrometer Analysis
ASCE - Expansion Index
CONS - Consolidation

PACIFIC SOILS ENGINEERING, INC.

PLATE A-25

GEOTECHNICAL BORING LOG

PROJECT NO.	102463-T	PROJECT NAME	Lyons Canyon Ranch		
DATE STARTED	5/2/02	GROUND ELEV.	1338	BORING DESIG.	B-14
DATE FINISHED	5/2/02	GW DEPTH (FT)		LOGGED BY	CRN
DRILLER	Dave's Drilling	DRIVE WT.	See Note	NOTE	0-27' 4500#; 27-52' 3500#; 52-80' 2500#; 80-104' 1000#
TYPE OF DRILL RIG	30" Bucket Auger	DROP	12 Inches		

DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	GROUP SYMBOL	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
5	1333	B				SOIL: Sandy Silt; very fine- to fine-grained, pale to moderate yellowish brown, dry, very loose, abundant rootlets. ALLUVIUM (Qal): Sandy Silt to Silty Sand; very fine- to medium-grained with pebbles and cobbles, pale yellowish brown, dry, loose. Silty Sand; fine- to coarse-grained with pebbles and cobbles, some boulders up to 10± inches, moderate to dark yellowish brown, slightly moist, loose to moderately dense, stratified cobbles consist of gneiss, granite and sandstone, some quartzite. Increase moisture content to slightly moist. Boulder lense: 2-1/2 to 3± feet in diameter, moderate to major caving. Total Depth 8 feet. No water. Moderate to major caving 5 to 8± feet. Hole backfilled.				

SAMPLE TYPES:
- R RING (DRIVE) SAMPLE
- S SPT (SPLIT SPOON) SAMPLE
- B BULK SAMPLE
- T TUBE SAMPLE

Ground Water Seepage
MAX - Max. Density/Opt. Moist.
DS - Direct Shear
HYDR - Hydrometer Analysis
ASCE - Expansion Index
CONS - Consolidation

PACIFIC SOILS ENGINEERING, INC.

PLATE A-26

GEOTECHNICAL BORING LOG

PROJECT NO.	102453-T	PROJECT NAME	Lyons Canyon Ranch	BORING DESIG.	B-14B
DATE STARTED	5/2/02	GROUND ELEV.	1338	LOGGED BY	CRN
DATE FINISHED	5/2/02	GW DEPTH (FT)		NOTE	0-27' 4500#; 27-52' 3500#; 52-80' 2500#; 80-104' 1000#
DRILLER	Dave's Drilling	DRIVE WT.	See Note		
TYPE OF DRILL RIG	30" Bucket Auger	DROP	12 inches		

DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	GROUP SYMBOL	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
0						SOIL: Silty Sand to Sandy Silt; very fine- to fine-grained, pale yellowish brown, dry, very loose, abundant rootlets and gopher holes.				
						ALLUVIUM (Qal): Pebbly to cobbly Sand; fine- to coarse-grained, pale to moderate yellowish brown, dry, loose to moderately dense, stratified, some boulders to 10± inches.				
5	1333	B				Increase moisture to: slightly moist. Boulder layer; up to 3± feet in diameter, moderate caving.				
						Increase moisture to: slightly moist to moist.				
10	1328	B				Boulder layer; up to 2± feet in diameter, predominantly Sandstone and Pebbly Sandstone, some granite.				
15	1323					Clayey Siltstone layer; 1 to 2± inch thick, mottled moderate yellowish brown and pale olive, moist to wet (perched/saturated), soft. Boulder layer, need rippers/core to continue. Refusal. Total Depth 14 feet. No water. Moderate caving throughout. Refusal - Boulders. Hole backfilled.				
20	1318									
25	1313									
30	1308									
35	1303									

SAMPLE TYPES:
- [R] RING (DRIVE) SAMPLE
- [S] SPT (SPLIT SPOON) SAMPLE
- [B] BULK SAMPLE
- [T] TUBE SAMPLE

Ground Water Seepage
MAX - Max. Density/Opt. Moist.
DS - Direct Shear
HYDR - Hydrometer Analysis
ASCE - Expansion Index
CONS - Consolidation

PACIFIC SOILS ENGINEERING, INC.

PLATE A-27

GEOTECHNICAL BORING LOG

PROJECT NO. 102453-T
DATE STARTED 4/4/02
DATE FINISHED 4/4/02
DRILLER A & W Drilling
TYPE OF DRILL RIG Rotary Wash

PROJECT NAME Lyons Canyon Ranch
GROUND ELEV. 1323
GW DEPTH (FT)
DRIVE WT. See Note
DROP 30 inches

BORING DESIG. RW-1
LOGGED BY TMD
NOTE 140# for SPT; 400# for ring sample

DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	GROUP SYMBOL	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
						ALLUVIUM (Qal):				
5	1318	SPT	11			Silty Sand; brown with pebbles, slightly moist, medium dense.				
10	1313	SPT	11			Silty Sand; brown with pebbles, slightly moist, medium dense.				
15	1308	SPT	16			Silty Sand; brown with pebbles, slightly moist, medium dense.				
20	1303	SPT	26			Silty Sand; light brown with pebbles, slightly moist, medium dense.				
25	1298	SPT	60			Gravelly Sand; brown, slightly moist, very dense.				
30	1293	R	25			Silty Sand; fine- to medium-grained, light brown, moist, medium dense, 2± feet thick layer.	12.0	108.4	61	
35	1288	SPT	40			Sand; fine- to medium-grained, brown with gravel, moist, dense.				
						Very firm drilling.				

SAMPLE TYPES:
- R RING (DRIVE) SAMPLE
- S SPT (SPLIT SPOON) SAMPLE
- B BULK SAMPLE
- T TUBE SAMPLE

Ground Water Seepage
MAX - Max. Density/Opt. Moist.
DS - Direct Shear
HYDR - Hydrometer Analysis
ASCE - Expansion Index
CONS - Consolidation

PACIFIC SOILS ENGINEERING, INC.

PLATE A-28

GEOTECHNICAL BORING LOG

PROJECT NO.	102453-T	PROJECT NAME	Lyons Canyon Ranch		
DATE STARTED	4/4/02	GROUND ELEV.	1323	BORING DESIG.	RW-1
DATE FINISHED	4/4/02	GW DEPTH (FT)		LOGGED BY	TMD
DRILLER	A & W Drilling	DRIVE WT.	See Note	NOTE	140# for SPT; 400# for ring sample
TYPE OF DRILL RIG	Rotary Wash	DROP	30 inches		

DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	GROUP SYMBOL	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
		SPT	34			Gravelly Sand; fine- to medium-grained, brown, slightly moist, dense, some silt.				
45	1278	SPT	17 for 12"			Gravelly Sand; fine- to medium-grained, brown, moist, dense.				
						SAUGUS FORMATION - SUNSHINE RANCH MEMBER (Tsr):				
50	1273	SPT	75 for 6"			Harder drilling. Sandstone; medium- to coarse-grained with gravel, grayish brown.				
55	1268	SPT	75 for 5"			Silty Sandstone; fine- to coarse-grained with gravel, grayish brown. 6 to 8 inch cobble layer.				
60	1263	SPT	50 for 1"			No recovery.				
65	1258	R	50 for 4"			Sandstone; medium- to coarse-grained, brown, hard. Total Depth 65 feet. No apparent water or caving. Hole backfilled.				

SAMPLE TYPES:
- R RING (DRIVE) SAMPLE
- S SPT (SPLIT SPOON) SAMPLE
- B BULK SAMPLE
- T TUBE SAMPLE

▼ Ground Water Seepage
MAX - Max. Density/Opt. Moist.
DS - Direct Shear
HYDR - Hydrometer Analysis
ASCE - Expansion Index
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PACIFIC SOILS ENGINEERING, INC.

GEOTECHNICAL BORING LOG

PROJECT NO. 102453-T
DATE STARTED 4/4/02
DATE FINISHED 4/4/02
DRILLER A & W Drilling
TYPE OF DRILL RIG Rotary Wash

PROJECT NAME Lyons Canyon Ranch
GROUND ELEV. 1318
GW DEPTH (FT) 69
DRIVE WT. See Note
DROP 30 inches

BORING DESIG. RW-2
LOGGED BY TMD
NOTE 140# for SPT; 400# for ring sample

DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	GROUP SYMBOL	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
						ALLUVIUM (Qal):				
5	1313	SPT	4			Sandy Silt; fine-grained, brown, slightly moist, soft.				
10	1308	SPT	16			Silty Sand; brown, slightly moist, medium dense, fine- to medium-grained with small pebbles, sample from spoils screen.				
15	1303	SPT	36			Slightly Silty Sand; brown, moist, dense, fine- to medium-grained with pebbles, sample obtained by driving ring sampler 6".				
20	1298					Cobbles.				
		SPT	22			Gravelly Silty Sand; fine- to coarse-grained, red/brown, slightly most, medium dense, with pebbles.				
25	1293	SPT	18			Sandy Silt; brown, slightly moist, very stiff.				
30	1288	SPT	19			Silty Sand to Sandy Silt; fine-grained Sand, light brown, moist, very stiff.				
35	1283	SPT	35			Silty Sand; fine- to coarse-grained, with gravel, light brown, slightly moist, dense.				

SAMPLE TYPES:
R RING (DRIVE) SAMPLE
S SPT (SPLIT SPOON) SAMPLE
B BULK SAMPLE T TUBE SAMPLE

Ground Water Seepage
MAX - Max. Density/Opt. Moist.
DS - Direct Shear
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CONS - Consolidation

PACIFIC SOILS ENGINEERING, INC.

GEOTECHNICAL BORING LOG

PROJECT NO.	102453-T	PROJECT NAME	Lyons Canyon Ranch		
DATE STARTED	4/4/02	GROUND ELEV.	1318	BORING DESIG.	RW-2
DATE FINISHED	4/4/02	GW DEPTH (FT)	69	LOGGED BY	TMD
DRILLER	A & W Drilling	DRIVE WT.	See Note	NOTE	140# for SPT; 400# for ring sample
TYPE OF DRILL RIG	Rotary Wash	DROP	30 inches		

DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	GROUP SYMBOL	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
		R	32			Sand; fine to coarse-grained brown, slightly moist, dense, soil retrieved from sampler tip with large rock fragment.				
45	1273	R	28			Sand; with gravel, medium to coarse-grained, red brown, slightly moist, slightly dense, Siltstone fragments in sampler tip.	11.0	121.7	81	
50	1268	SPT	57 for 6"			Silty Sand; fine to coarse-grained with gravel, light brown, slightly moist, very dense, sample may be from side of boring.				
55	1263	SPT	22			Sandy to Silty Clay; dark brown, moist, very stiff, soil obtained by driving ring sampler 6".				
60	1258	SPT	18			Sandy to Silty Clay; dark brown, moist, very stiff, soil obtained by driving ring sampler 6".				
65	1253	SPT	15			Sandy Silty Clay; fine-grained Sand, light brown, slightly moist, stiff, soil obtained by driving ring sampler 6".				
70	1248	SPT	32			SAUGUS FORMATION-SUNSHINE RANCH MEMBER (Tsr): slightly Sandy Silty Clay; fine-grained Sand, grayish brown, soil obtained by driving ring sampler 6".				
75	1243	SPT	22 for 12"			Silty Sandstone; gray. Total Depth 75 feet. Water at 69 feet. No apparent caving. Hole backfilled.				

SAMPLE TYPES:
- R RING (DRIVE) SAMPLE
- S SPT (SPLIT SPOON) SAMPLE
- B BULK SAMPLE
- T TUBE SAMPLE

▼ Ground Water Seepage
MAX - Max. Density/Opt. Moist.
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ASCE - Expansion Index
CONS - Consolidation

PACIFIC SOILS ENGINEERING, INC.

PLATE A-31

GEOTECHNICAL BORING LOG

PROJECT NO.	102453-T	PROJECT NAME	Lyons Canyon Ranch	BORING DESIG.	RW-3
DATE STARTED	4/4/02	GROUND ELEV.	1330	LOGGED BY	TMD
DATE FINISHED	4/5/02	GW DEPTH (FT)	54	NOTE	140# for SPT; 400# for ring sample
DRILLER	A & W Drilling	DRIVE WT.	See Note		
TYPE OF DRILL RIG	Rotary Wash	DROP	30 inches		

DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	GROUP SYMBOL	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
						ALLUVIUM (Qal):				
5	1325	SPT	19			Sandy Silt; fine-grained, light brown, slightly moist, very stiff.				
10	1320	SPT	20			Sandy Silt; fine-grained, light brown, slightly moist, very stiff.				
15	1315	SPT	14			Silty Sand; fine- to coarse-grained, light brown, slightly moist, medium dense.				
20	1310	SPT	30			Gravelly Sand; medium- to coarse-grained, light brown, slightly moist, dense.				
25	1305	R	17			Gravelly Sand; medium- to coarse-grained, light brown, slightly moist, medium dense.	8.1	111.0	44	
30	1300	SPT	50 for 11"			Silty Sand; medium- to coarse-grained, with gravel, light brown, slightly moist, very dense.				
35	1295	SPT	48			Gravelly Sand; medium- to coarse-grained, with silt, light brown, slightly moist, dense.				

SAMPLE TYPES:
- R RING (DRIVE) SAMPLE
- S SPT (SPLIT SPOON) SAMPLE
- B BULK SAMPLE
- T TUBE SAMPLE

Ground Water Seepage
MAX - Max. Density/Opt. Moist.
DS - Direct Shear
HYDR - Hydrometer Analysis
ASCE - Expansion Index
CONS - Consolidation

PACIFIC SOILS ENGINEERING, INC.

PLATE A-32

GEOTECHNICAL BORING LOG

PROJECT NO.	102453-T	PROJECT NAME	Lyons Canyon Ranch		
DATE STARTED	4/4/02	GROUND ELEV.	1330	BORING DESIG.	RW-3
DATE FINISHED	4/5/02	GW DEPTH (FT)	54	LOGGED BY	TMD
DRILLER	A & W Drilling	DRIVE WT.	See Note	NOTE	140# for SPT; 400# for ring sample
TYPE OF DRILL RIG	Rotary Wash	DROP	30 inches		

DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	GROUP SYMBOL	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
		SPT	30 for 11"			Silty Sand; medium- to coarse-grained, with gravel, light brown, slightly moist, very dense.				
45	1285	SPT	19			Sandy Silt; fine-grained, light brown, slightly moist, very stiff.				
50	1280	SPT	50 for 10.5"			Slightly Silty Sand; fine-grained, reddish brown, moist, very dense.				
						▼				
55	1275	SPT	31			Sandy Silty Clay; fine-grained, light brown, moist, hard, soil obtained from ring sampler, driven 6".				
60	1270	SPT	75 for 5"			SAUGUS FORMATION - SUNSHINE RANCH MEMBER (Tsr): Slightly Clayey Sand; medium- to coarse-grained, gray.				
65	1265	R	60 for 6"			Sandstone; medium to coarse-grained; gray. No sample retrieved. Total Depth 65 feet. Groundwater at 54 feet. No apparent caving. Hole backfilled.				

SAMPLE TYPES:
- R RING (DRIVE) SAMPLE
- S SPT (SPLIT SPOON) SAMPLE
- B BULK SAMPLE
- T TUBE SAMPLE

▼ Ground Water Seepage
MAX - Max. Density/Opt. Moist.
DS - Direct Shear
HYDR - Hydrometer Analysis
ASCE - Expansion Index
CONS - Consolidation

PACIFIC SOILS ENGINEERING, INC.

GEOTECHNICAL BORING LOG

PROJECT NO.	102453-T	PROJECT NAME	Lyons Canyon Ranch	BORING DESIG.	RW-4
DATE STARTED	4/5/02	GROUND ELEV.	1408	LOGGED BY	TMD
DATE FINISHED	4/5/02	GW DEPTH (FT)		NOTE	140# for SPT; 400# for ring sample
DRILLER	A & W Drilling	DRIVE WT.	See Note		
TYPE OF DRILL RIG	Rotary Wash	DROP	30 inches		

DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	GROUP SYMBOL	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
						ALLUVIUM (Qal):				
5	1403	SPT	7			Sandy Silty Clay; fine-grained Sand, light brown, slightly moist, firm.				
10	1398	SPT	11			Silty Sand; light brown, slightly moist, medium dense.				
15	1393	SPT	35 for 11"			SAUGUS FORMATION - SUNSHINE RANCH MEMBER (Tsr): Slightly Clayey Siltstone; grayish brown, weathered.				
20	1388	R	75 for 11"			Very fine Sandy Siltstone; gray, hard. Total Depth 20 feet. No apparent groundwater or caving. Hole backfilled.	14.5	119.3	100	

SAMPLE TYPES:
- R RING (DRIVE) SAMPLE
- S SPT (SPLIT SPOON) SAMPLE
- B BULK SAMPLE
- T TUBE SAMPLE

Ground Water Seepage
MAX - Max. Density/Opt. Moist.
DS - Direct Shear
HYDR - Hydrometer Analysis
ASCE - Expansion Index
CONS - Consolidation

GEOTECHNICAL BORING LOG

PROJECT NO.	102453-T	PROJECT NAME	Lyons Canyon Ranch	BORING DESIG.	RW-5
DATE STARTED	4/5/02	GROUND ELEV.	1348	LOGGED BY	TMD
DATE FINISHED	4/5/02	GW DEPTH (FT)	17	NOTE	140# for SPT; 400# for ring sample
DRILLER	A & W Drilling	DRIVE WT.	See Note		
TYPE OF DRILL RIG	Rotary Wash	DROP	30 inches		

DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	GROUP SYMBOL	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
						ALLUVIUM (Qal):				
5	1343	SPT	17			Silty Sand; fine-grained, light brown, slightly moist, medium dense.				
10	1338	SPT	8			Silty Sand to Sandy Silt; dark brown, moist, loose.				
15	1333	R	5			Silty Sand; fine- to medium-grained, dark brown, slightly moist, slightly dense.	17.3	112.9	99	
20	1328	SPT	6			Clayey to Silty Sand; brown, moist, loose.				
25	1323	SPT	10			Clayey to Sandy Silt; gray, very moist, stiff.				
						Some gravel.				
30	1318	SPT	50 for 8"			Silty fine- to medium-grained Sand; gray, moist, very dense.				
35	1313	SPT	57			SAUGUS FORMATION - SUNSHINE RANCH MEMBER (Tsr): Silty Sandstone/Sandy Siltstone; brown/gray.				

SAMPLE TYPES:
- R RING (DRIVE) SAMPLE
- S SPT (SPLIT SPOON) SAMPLE
- B BULK SAMPLE
- T TUBE SAMPLE

▼ Ground Water Seepage
MAX - Max. Density/Opt. Moist.
DS - Direct Shear
HYDR - Hydrometer Analysis
ASCE - Expansion Index
CONS - Consolidation

PACIFIC SOILS ENGINEERING, INC.

GEOTECHNICAL BORING LOG

PROJECT NO. 102453-T
DATE STARTED 4/5/02
DATE FINISHED 4/5/02
DRILLER A & W Drilling
TYPE OF DRILL RIG Rotary Wash

PROJECT NAME Lyons Canyon Ranch
GROUND ELEV. 1348
GW DEPTH (FT) 17
DRIVE WT. See Note
DROP 30 inches

BORING DESIG. RW-5
LOGGED BY TMD
NOTE 140# for SPT; 400# for ring sample

DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	GROUP SYMBOL	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
		R	50 for 10"			Silty Sandstone; medium- to coarse-grained, gray, hard. Total Depth 40 feet. No apparent caving. Groundwater at 17 feet. Hole backfilled.				

SAMPLE TYPES:
- R RING (DRIVE) SAMPLE
- S SPT (SPLIT SPOON) SAMPLE
- B BULK SAMPLE
- T TUBE SAMPLE

Ground Water Seepage
MAX - Max. Density/Opt. Moist.
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ASCE - Expansion Index
CONS - Consolidation

PACIFIC SOILS ENGINEERING, INC.

PLATE A-36

GEOTECHNICAL BORING LOG

PROJECT NO.	102453-T	PROJECT NAME	Lyons Canyon Ranch	BORING DESIG.	RW-6
DATE STARTED	4/5/02	GROUND ELEV.	1379	LOGGED BY	TMD
DATE FINISHED	4/5/02	GW DEPTH (FT)	18	NOTE	140# for SPT, 400# for ring sample
DRILLER	A & W Drilling	DRIVE WT.	See Note		
TYPE OF DRILL RIG	Rotary Wash	DROP	30 Inches		

DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	GROUP SYMBOL	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
						ALLUVIUM (Qal):				
5	1374	SPT	8			Silty Sand; brown, slightly moist, loose.				
10	1369	SPT	14			Gravelly Sand; fine- to medium-grained, brown, some silt, slightly moist, medium dense.				
15	1364	SPT	23			Gravelly Sand; fine- to medium-grained, with some silt, reddish brown, very moist, medium dense. ▼				
20	1359	R	11			SAUGUS FORMATION - SUNSHINE RANCH MEMBER (Tsr): Silty medium- to coarse-grained Sand; red brown, with gravel, ring sample disturbed.				
25	1354	R	50 for 6"			Sandy Siltstone; very fine-grained Sand, bluish gray, hard. Total Depth 25 feet. No apparent caving. Water at 17.5 feet. Hole backfilled.	15.6	116.6	99	

SAMPLE TYPES:
- R RING (DRIVE) SAMPLE
- S SPT (SPLIT SPOON) SAMPLE
- B BULK SAMPLE
- T TUBE SAMPLE

▼ Ground Water Seepage
MAX - Max. Density/Opt. Moist.
DS - Direct Shear
HYDR - Hydrometer Analysis
ASCE - Expansion Index
CONS - Consolidation

PACIFIC SOILS ENGINEERING, INC.

GEOTECHNICAL BORING LOG

PROJECT NO.	102453-T	PROJECT NAME	Lyons Canyon Ranch	BORING DESIG.	CPT/SPT-1
DATE STARTED	7/31/01	GROUND ELEV.	1317	LOGGED BY	CRN
DATE FINISHED	7/31/01	GW DEPTH (FT)		NOTE	Combo Rig - Truck Mounted, 4-1/2" Rotary Wash, SPT & CPT
DRILLER	Gregg In-Situ	DRIVE WT.	140 lbs.		
TYPE OF DRILL RIG	See Note	DROP	30 inches		

DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	GROUP SYMBOL	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
						ALLUVIUM (Qal): (Note: See adjacent exploratory boring B-1 for descriptive log of Alluvium from 0 to 70± feet).				
5	1312					Begin CPT.				
10	1307									
15	1302									
20	1297					Stop CPT - Drill through gravelly layers.				
25	1292					Begin CPT - Stop CPT - (Unable to advance) Drill through gravelly layers.				
30	1287	SPT	50 for 5"			Begin CPT - Stop CPT (6± inches of advancement). Drill through gravelly layers.				
35	1282									

SAMPLE TYPES:
- R RING (DRIVE) SAMPLE
- S SPT (SPLIT SPOON) SAMPLE
- B BULK SAMPLE
- T TUBE SAMPLE

▼ Ground Water Seepage
MAX - Max. Density/Opt. Moist.
DS - Direct Shear
HYDR - Hydrometer Analysis
ASCE - Expansion Index
CONS - Consolidation

PACIFIC SOILS ENGINEERING, INC.

PLATE A-38

GEOTECHNICAL BORING LOG

PROJECT NO.	102453-T	PROJECT NAME	Lyons Canyon Ranch	BORING DESIG.	CPT/SPT-1
DATE STARTED	7/31/01	GROUND ELEV.	1317	LOGGED BY	CRN
DATE FINISHED	7/31/01	GW DEPTH (FT)		NOTE	Combo Rig - Truck Mounted, 4-1/2" Rotary Wash, SPT & CPT
DRILLER	Gregg In-Situ	DRIVE WT.	140 lbs.		
TYPE OF DRILL RIG	See Note	DROP	30 inches		

DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	GROUP SYMBOL	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
						Begin CPT.				
						Stop CPT. Drill through gravelly layers.				
45	1272					Pebbles in auger tip.				
50	1267					Gravel lense.				
						Begin CPT.				
						Stop CPT. Drill through gravelly layers.				
55	1262									
60	1257					Begin CPT.				
						Stop CPT. Drill through gravelly layers.				
65	1252									
70	1247	SPT	102 for 4"			Gravelly Sand; medium to coarse-grained with pebbles, moderate yellowish brown, moist to wet, dense, interlayered pebble lenses.				
75	1242									

SAMPLE TYPES:
- R RING (DRIVE) SAMPLE
- S SPT (SPLIT SPOON) SAMPLE
- B BULK SAMPLE
- T TUBE SAMPLE

Ground Water Seepage
MAX - Max. Density/Opt. Moist.
DS - Direct Shear
HYDR - Hydrometer Analysis
ASCE - Expansion Index
CONS - Consolidation

PACIFIC SOILS ENGINEERING, INC.

PLATE A-39

GEOTECHNICAL BORING LOG

PROJECT NO.	102453-T	PROJECT NAME	Lyons Canyon Ranch	BORING DESIG.	CPT/SPT-1
DATE STARTED	7/31/01	GROUND ELEV.	1317	LOGGED BY	CRN
DATE FINISHED	7/31/01	GW DEPTH (FT)		NOTE	Combo Rig - Truck Mounted, 4-1/2" Rotary Wash, SPT & CPT
DRILLER	Gregg In-Situ	DRIVE WT.	140 lbs.		
TYPE OF DRILL RIG	See Note	DROP	30 inches		

DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	GROUP SYMBOL	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
		SPT	70			SAUGUS FORMATION - SUNSHINE RANCH MEMBER (Tsr): Silty Sandstone; fine to coarse-grained with some pebbles, yellowish gray, moist to wet, moderately hard.				
85	1232									
90	1227	SPT	50 for 2"			Gravelly Sandstone to Pebbly Conglomerate; medium to very coarse-grained, light to medium gray, moist, moderately hard.				
95	1222									
						Claystone; 1 to 2± foo thick layer/lense, olive gray, moist to wet, soft to firm.				
100	1217	SPT	50 for 3"			@ 100 feet; No recovery of SPT sample.				
						Total Depth 101± feet. Hole backfilled with on-site cuttings.				

SAMPLE TYPES:
- R RING (DRIVE) SAMPLE
- S SPT (SPLIT SPOON) SAMPLE
- B BULK SAMPLE
- T TUBE SAMPLE

▼ Ground Water Seepage
MAX - Max. Density/Opt. Moist.
DS - Direct Shear
HYDR - Hydrometer Analysis
ASCE - Expansion Index
CONS - Consolidation

GEOTECHNICAL BORING LOG

PROJECT NO.	102453-T	PROJECT NAME	Lyons Canyon Ranch		
DATE STARTED	7/31/01	GROUND ELEV.	1363	BORING DESIG.	CPT/SPT-2
DATE FINISHED	7/31/01	GW DEPTH (FT)	15	LOGGED BY	CRN
DRILLER	Gregg In-Situ	DRIVE WT.	140 lbs.	NOTE	Combo Rig - Truck Mounted, 4-1/2" Rotary Wash, SPT & CPT
TYPE OF DRILL RIG	See Note	DROP	30 inches		

DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	GROUP SYMBOL	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
						ALLUVIUM (Qal):				
		SPT	10			Silt; dark yellowish brown, moist, soft to moderately firm.				
5	1358									
10	1353	SPT	3			Sandy Clay; fine-grained, moderate yellowish brown, moist, soft to moderately firm.				
15	1348	SPT	13			Clayey Sand; fine- to medium- with some coarse-grained, olive gray, moist to wet, moderately dense.				
20	1343	SPT	3			**SAUGUS FORMATION - SUNSHINE RANCH MEMBER** (Tsr): Clayey Sandstone; fine- to very coarse-grained with pebbles, medium dark gray, moist, moderately hard to hard.				
25	1338					Begin CPT.				
30	1333	SPT	50 for 3"			Stop CPT. Silty Sandstone; fine- to coarse-grained, medium gray, slightly moist, hard to very hard.				
35	1328									

SAMPLE TYPES:
- R RING (DRIVE) SAMPLE
- S SPT (SPLIT SPOON) SAMPLE
- B BULK SAMPLE
- T TUBE SAMPLE

Ground Water Seepage
MAX - Max. Density/Opt. Moist.
DS - Direct Shear
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ASCE - Expansion Index
CONS - Consolidation

PACIFIC SOILS ENGINEERING, INC.

PLATE A-41

GEOTECHNICAL BORING LOG

PROJECT NO.	102453-T	PROJECT NAME	Lyons Canyon Ranch		
DATE STARTED	7/31/01	GROUND ELEV.	1363	BORING DESIG.	CPT/SPT-2
DATE FINISHED	7/31/01	GW DEPTH (FT)	15	LOGGED BY	CRN
DRILLER	Gregg In-Situ	DRIVE WT.	140 lbs.	NOTE	Combo Rig - Truck Mounted, 4-1/2" Rotary Wash, SPT & CPT
TYPE OF DRILL RIG	See Note	DROP	30 inches		

DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	GROUP SYMBOL	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
		SPT	50 for 3"			Silty Sandstone; fine- to coarse-grained, medium gray, slightly moist, hard to very hard. Total Depth 41 feet. Groundwater at 15 feet. No apparent caving. Hole backfilled.				

SAMPLE TYPES:
- R RING (DRIVE) SAMPLE
- S SPT (SPLIT SPOON) SAMPLE
- B BULK SAMPLE
- T TUBE SAMPLE

Ground Water Seepage
MAX - Max. Density/Opt. Moist.
DS - Direct Shear
HYDR - Hydrometer Analysis
ASCE - Expansion Index
CONS - Consolidation

PACIFIC SOILS ENGINEERING, INC.

PLATE A-42

GEOTECHNICAL BORING LOG

PROJECT NO.	102453-T	PROJECT NAME	Lyons Ranch		
DATE STARTED	1/13/04	GROUND ELEV.	1315	BORING DESIG.	B-101
DATE FINISHED	1/13/04	GW DEPTH (FT)		LOGGED BY	CRN
DRILLER	JN Drilling	DRIVE WT.	See Note	NOTE	0-24', 3548#; 24-47', 2577#; 47-75', 1548#
TYPE OF DRILL RIG	30" Bucket Auger	DROP	12 inches		

DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	GROUP SYMBOL	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
						ALLUVIUM (Qal): Silty to Clayey Sand; fine-grained, few pebbles, dark yellowish brown, moist, loose to medium dense, abundant roots and rootlets.				
5	1310	R/B	Push			Sandy Silt; very fine- to fine-grained Sand, moderate yellowish brown, slightly moist, very loose, slightly porous, some white carbonate.	10.0	82.4	26	
10	1305	R	Push for 6" 1 for 6"			Sand Silt; very fine- to fine-grained Sand, moderate yellowish brown, slightly moist, very loose, slightly porous, some white carbonate, some rootlets.	5.1	103.0	22	
15	1300	R	1			Silty Sand; fine- with some medium-grained, few pebbles, moderate to dark yellowish brown, slightly moist, loose.	6.2	107.3	29	
20	1295	R/B	1			Silty Sand; fine- to coarse-grained with some pebbles, moderate yellowish brown, slightly moist, loose.	6.2	105.1	28	
25	1290					Gravelly Sand; fine- to coarse-grained with pebbles and cobbles, few boulders to 1± foot, light to moderate yellowish brown, slightly moist, loose to medium dense; interlayered with Sand lenses, medium- to coarse-grained, light yellowish brown, slightly moist, loose to medium dense.				
30	1285	B				Increase abundance of cobbles and boulders (8 to 12± inches).				
35	1280	B				34 to 36± feet, some raveling in coarse-grained material, change to cork screw auger.				
						SAUGUS FORMATION-SUNSHINE RANCH FORMATION MEMBER (Tsr): Pebble and Cobble Conglomerate; medium- to very coarse-grained Sand matrix; pale yellowish gray, dry to slightly moist, hard to very hard.				

SAMPLE TYPES:
- R RING (DRIVE) SAMPLE
- S SPT (SPLIT SPOON) SAMPLE
- B BULK SAMPLE
- T TUBE SAMPLE

Ground Water Seepage
MAX - Max. Density/Opt. Moist.
DS - Direct Shear
HYDR - Hydrometer Analysis
ASCE - Expansion Index
CONS - Consolidation

PACIFIC SOILS ENGINEERING, INC.

GEOTECHNICAL BORING LOG

PROJECT NO.	102453-T	PROJECT NAME	Lyons Ranch		
DATE STARTED	1/13/04	GROUND ELEV.	1315	BORING DESIG.	B-101
DATE FINISHED	1/13/04	GW DEPTH (FT)		LOGGED BY	CRN
DRILLER	JN Drilling	DRIVE WT.	See Note	NOTE	0-24', 3548::#; 24-47',
TYPE OF DRILL RIG	30" Bucket Auger	DROP	12 inches		2577#, 47-75', 1648#

DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	GROUP SYMBOL	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
						Total Depth 40± feet. No water. Some raveling 34 to 36± feet. Hole backfilled.				

SAMPLE TYPES:
- R RING (DRIVE) SAMPLE
- S SPT (SPLIT SPOON) SAMPLE
- B BULK SAMPLE
- T TUBE SAMPLE

Ground Water Seepage
MAX - Max. Density/Opt. Moist.
DS - Direct Shear
HYDR - Hydrometer Analysis
ASCE - Expansion Index
CONS - Consolidation

PACIFIC SOILS ENGINEERING, INC.

PLATE A-44

GEOTECHNICAL BORING LOG

PROJECT NO.	102453-T	PROJECT NAME	Lyons Ranch		
DATE STARTED	1/13/04	GROUND ELEV.	1323	BORING DESIG.	B-102
DATE FINISHED	1/13/04	GW DEPTH (FT)		LOGGED BY	CRN
DRILLER	JN Drilling	DRIVE WT.	See Note	NOTE	0-24', 3548#; 24-47', 2577#; 47-75', 1648#
TYPE OF DRILL RIG	30" Bucket Auger	DROP	12 inches		

DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	GROUP SYMBOL	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
						SOIL: Sandy Silt; very fine- to fine- with some medium-grained Sand, dark yellowish brown, moist, very loose, abundant roots and rootlets.				
						ALLUVIUM (Qal): Sand Silt; very fine- to fine-grained Sand, moderate yellowish brown, slightly moist to moist, loose.				
5	1318	R/B	1			Sandy Silt to Silty Sand; fine- to medium- with some coarse-grained Sand and pebbles, dry to slightly moist, loose, porous, some rootlets.	4.8	100.7	19	
10	1313	R	Push			Sandy Silt to Silty Sand; fine- to medium- with some coarse-grained Sand and pebbles, dry to slightly moist, very loose, porous, some rootlets.	9.4	105.1	42	
15	1308	R	Push			Sandy Silt to Silty Sand; fine- to medium- with some coarse-grained Sand and pebbles, moderate yellowish brown, slightly moist to moist, very loose.	9.8	106.8	46	
20	1303	R/B	1			Sandy Silt to Silty Sand; fine- to medium- with some coarse-grained Sand and pebbles, colour change to moderate yellowish brown, moisture increase to slightly moist to moist, dry to slightly moist, loose.	8.1	107.0	38	
25	1298	R/B	2			Silty Sand; fine- to coarse-grained with pebbles, pale to moderate yellowish brown, slightly moist, loose to medium dense.	3.0	115.6	16	
30	1293					Increase abundance of pebbles and cobbles.				
		R	3			Pebbly to Cobbly Sand; fine- to coarse-grained, pale to moderate yellowish brown, slightly moist to moist, medium dense; interlayered with Silty Sand; fine- to coarse-grained with pebbles, pale to moderate yellowish brown, slightly moist, medium dense.	3.8	118.3	24	
		B								
35	1288					Change to cork-screw auger due to abundant cobbles and boulders (up to 12± inches). 34 to 38± feet, moderate to severe raveling of coarse-grained materials.				
						SAUGUS FORMATION-SUNSHINE RANCH FORMATION MEMBER (Tsr)(?): Clayey to Sandy Silt; fine-grained Sand; moderate yellowish brown, moist, soft.				

SAMPLE TYPES:
R RING (DRIVE) SAMPLE
S SPT (SPLIT SPOON) SAMPLE
B BULK SAMPLE T TUBE SAMPLE

Ground Water Seepage
MAX - Max. Density/Opt. Moist.
DS - Direct Shear
HYDR - Hydrometer Analysis
ASCE - Expansion Index
CONS - Consolidation

PACIFIC SOILS ENGINEERING, INC.

PLATE A-45

GEOTECHNICAL BORING LOG

PROJECT NO. 102453-T
DATE STARTED 1/13/04
DATE FINISHED 1/13/04
DRILLER JN Drilling
TYPE OF DRILL RIG 30" Bucket Auger

PROJECT NAME Lyons Ranch
GROUND ELEV. 1323
GW DEPTH (FT)
DRIVE WT. See Note
DROP 12 Inches

BORING DESIG. B-102
LOGGED BY CRN
NOTE 0-24', 3548#; 24-47', 2577#; 47-75', 1648#

DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	GROUP SYMBOL	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
						(weathered Tsr?). "Hard Drilling" at auger tip/refusal. Total Depth 38 feet. No water. Moderate to severe raveling 34 to 38± feet. Hole backfilled.				

SAMPLE TYPES:
R RING (DRIVE) SAMPLE
S SPT (SPLIT SPOON) SAMPLE
B BULK SAMPLE T TUBE SAMPLE

Ground Water Seepage
MAX - Max. Density/Opt. Moist.
DS - Direct Shear
HYDR - Hydrometer Analysis
ASCE - Expansion Index
CONS - Consolidation

PACIFIC SOILS ENGINEERING, INC.

PLATE A-46

GEOTECHNICAL BORING LOG

PROJECT NO.	102453-T	PROJECT NAME	Lyons Ranch		
DATE STARTED	1/13/04	GROUND ELEV.	1324	BORING DESIG.	B-103
DATE FINISHED	1/13/04	GW DEPTH (FT)		LOGGED BY	CRN
DRILLER	JN Drilling	DRIVE WT.	See Note	NOTE	0-24', 3548#; 24-47', 2577#; 47-75', 1648#
TYPE OF DRILL RIG	30" Bucket Auger	DROP	12 inches		

DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	GROUP SYMBOL	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
						ALLUVIUM (Qal): Sandy Silt; very fine- to fine-grained Sand, dark to moderate yellowish brown, moist, very loose, abundant roots and rootlets.				
5	1319	R	Push			Silty Sand; fine- to medium-grained, moderate yellowish brown, slighty moist, very loose.	4.0	103.1	17	
						Increase abundance of pebbles.				
10	1314	R	Push			Silty Sand; fine- to coarse-grained with pebbles, moderate yellowish brown, slighty moist, loose to medium dense.	8.6	104.8	38	
						Some cobbles and boulders (up to 12± inches).				
15	1309	R	Push			Silty Sand; fine- to medium-grained with some pebbles, moderate yellowish brown, slightly moist, loose to medium dense.	8.9	107.4	42	
20	1304	R	1			Silty Sand; fine- to medium-grained with some pebbles, moderate yellowish brown, slightly moist, loose.	11.1	104.8	49	
25	1299	R	1			Silty Sand; fine- to coarse-grained with pebbles, pale to moderate yellowish brown, slightly moist, loose.	4.8	114.9	28	
30	1294	R	3			Silty Sand; fine- to coarse-grained with pebbles and cobbles, pale to moderate yellowish brown, slightly moist, medium dense.	6.3	111.6	33	
35	1289					Pebbly to cobbly Sand; fine- to coarse-grained, moderate yellowish brown, slightly moist, medium dense to dense.				

SAMPLE TYPES:
- R RING (DRIVE) SAMPLE
- S SPT (SPLIT SPOON) SAMPLE
- B BULK SAMPLE
- T TUBE SAMPLE

Ground Water Seepage
MAX - Max. Density/Opt. Moist.
DS - Direct Shear
HYDR - Hydrometer Analysis
ASCE - Expansion Index
CONS - Consolidation

PACIFIC SOILS ENGINEERING, INC.

PLATE A-47

GEOTECHNICAL BORING LOG

PROJECT NO.	102453-T	PROJECT NAME	Lyons Ranch		
DATE STARTED	1/13/04	GROUND ELEV.	1324	BORING DESIG.	B-103
DATE FINISHED	1/13/04	GW DEPTH (FT)		LOGGED BY	CRN
DRILLER	JN Drilling	DRIVE WT.	See Note	NOTE	0-24', 3548#; 24-47', 2577#; 47-75', 1648#
TYPE OF DRILL RIG	30" Bucket Auger	DROP	12 inches		

DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	GROUP SYMBOL	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
		B				Pebbly to cobbly Sand; fine- to coarse-grained with some boulders up to 12± inches, moderate yellowish brown, slightly moist, dense.				
45	1279					Increase abundant of cobbles and boulders.				
						SAUGUS FORMATION-SUNSHINE RANCH FORMATION MEMBER (Tsr): Pebble and Cobble Conglomerate; fine to very coarse-grained Sand matrix, pale yellowish gray, dry to slighty moist, hard.				
						Total Depth 49 feet. No water. No caving. Hole backfilled.				

SAMPLE TYPES:
- R RING (DRIVE) SAMPLE
- S SPT (SPLIT SPOON) SAMPLE
- B BULK SAMPLE
- T TUBE SAMPLE

Ground Water Seepage
MAX - Max. Density/Opt. Moist.
DS - Direct Shear
HYDR - Hydrometer Analysis
ASCE - Expansion Index
CONS - Consolidation

PACIFIC SOILS ENGINEERING, INC.

GEOTECHNICAL BORING LOG

PROJECT NO.	102453-T	PROJECT NAME	Lyons Ranch		
DATE STARTED	1/13/04	GROUND ELEV.	1315	BORING DESIG.	B-104
DATE FINISHED	1/13/04	GW DEPTH (FT)		LOGGED BY	CRN
DRILLER	JN Drilling	DRIVE WT.	See Note	NOTE	0-24', 3548#; 24-47', 2577#; 47-75', 1648#
TYPE OF DRILL RIG	30" Bucket Auger	DROP	12 inches		

DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	GROUP SYMBOL	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
						ALLUVIUM (Qal): Silty Sand; fine- to coarse-grained with pebbles and cobbles, pale yellowish brown, slightly moist, loose to medium dense. Sandy Silt; very fine- to fine-grained Sand, moderate yellowish brown, moist, loose.				
5	1310	R	1			Silty Sand; very fine- to fine-grained Sand, moderate yellowish brown, moist, loose.	6.8	103.8	29	
10	1305	R/B	2			Silty Sand; fine- to coarse-grained with pebbles and cobbles, pale yellowish brown, slightly moist, medium dense.	6.4	100.4	25	
15	1300	R	3			Silty Sand; fine- to coarse-grained with pebbles and some cobbles, moderate yellowish brown, slightly moist, medium dense.	2.4	120.7	16	
20	1295	R	1			Silty Sand; fine- to medium-grained and pebbles, moderate yellowish brown, slightly moist, medium dense.	6.3	103.4	27	
25	1290	B				Pebbly to Cobbly Sand; fine- to coarse-grained, moderate yellowish brown, slightly moist to moist, medium dense. Some boulders up to 12± inches.				
		R	2			Silty Sand; fine- to medium-grained and pebbles, moderate yellowish brown, slightly moist, medium dense.	6.9	108.2	33	
30	1285	B								
		R	3			Interlayered 1± foot: Pebbly to cobbly Sand; medium- to very coarse-grained, moderate yellowish gray, slightly moist, medium dense. Silty Sand; fine- to coarse-grained with pebbles, moderate yellowish brown, slightly moist, medium dense.	3.5	107.7	17	
35	1280	R	2			Interlayered 1± foot: Pebbly to cobbly Sand; medium- to very coarse-grained, moderate yellowish gray, slightly moist, medium dense.	4.0	111.1	21	

SAMPLE TYPES:
- R RING (DRIVE) SAMPLE
- S SPT (SPLIT SPOON) SAMPLE
- B BULK SAMPLE
- T TUBE SAMPLE

- ▼ Ground Water Seepage
- MAX - Max. Density/Opt. Moist.
- DS - Direct Shear
- HYDR - Hydrometer Analysis
- ASCE - Expansion Index
- CONS - Consolidation

GEOTECHNICAL BORING LOG

PROJECT NO.	102453-T	PROJECT NAME	Lyons Ranch		
DATE STARTED	1/13/04	GROUND ELEV.	1315	BORING DESIG.	B-104
DATE FINISHED	1/13/04	GW DEPTH (FT)		LOGGED BY	CRN
DRILLER	JN Drilling	DRIVE WT.	See Note	NOTE	0-24', 3548#; 24-47', 2577#; 47-75', 1648#
TYPE OF DRILL RIG	30" Bucket Auger	DROP	12 inches		

DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	GROUP SYMBOL	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
45	1270	R/B	3			Silty Sand; fine- to coarse-grained with pebbles, moderate yellowish brown, slightly moist, medium dense. Interlayered 1± foot: Pebbly to Cobbly Sand; medium- to very coarse-grained, moderate yellowish gray, slightly moist, medium dense.	4.3	108.3	21	
50	1265	R	4			Silty Sand; very fine- to medium-grained with some pebbles, moderate yellowish brown, slightly moist, medium dense.	8.4	104.0	37	
						Pebbly to cobbly Sand; fine- to coarse-grained, pale to moderate yellowish brown, slightly moist, medium dense.				
55	1260					Silty Sand; fine- to very coarse-grained with pebbles and cobbles, moderate yellowish brown, slightly moist to moist, medium dense.				
60	1255									
65	1250	B				Silty Sand; fine- to very coarse-grained with pebbles and cobbles, moderate yellowish brown, slightly moist to moist, medium dense. Pebbly to cobbly Sand; fine- to coarse-grained, pale to moderate yellowish brown, slightly moist, medium dense.				
70	1245					SAUGUS FORMATION-SUNSHINE RANCH FORMATION MEMBER (Tsr): Pebble and cobble Conglomerate; medium to coarse-grained Sand matrix, pale yellowish gray, dry to slighty moist, hard. Total Depth 70 feet. No water. No caving. Hole backfilled.				

SAMPLE TYPES:
- R RING (DRIVE) SAMPLE
- S SPT (SPLIT SPOON) SAMPLE
- B BULK SAMPLE
- T TUBE SAMPLE

Ground Water Seepage
MAX - Max. Density/Opt. Moist.
DS - Direct Shear
HYDR - Hydrometer Analysis
ASCE - Expansion Index
CONS - Consolidation

TABLE II

LOG OF EXPLORATORY PITS

Exploratory Pits	Depth (feet)	Description — Logged by: CRN, Date Logged: 07/05/01
EP-1	0 to 6	COLLUVIUM (Qcol): Silty Sand to Sandy Silt; fine- to medium-grained, moderate yellowish brown, dry to slightly moist at depth, loose to moderately dense/soft to firm, abundant roots and rootlets.
	6 to 8	SAUGUS FORMATION – SUNSHINE RANCH MEMBER (Tsr): Sandstone; fine- to medium-grained, olive gray, slightly moist, moderately hard to hard, abundant white carbonate stringers, moderately weathered top 1± foot.
		Total Depth 8 feet. No water, no caving.
EP-2	0 to 15	ALLUVIUM (Qal): Silty Sand; fine- to coarse-grained with pebbles and cobbles, moderate yellowish brown, dry to slightly moist at depth, loose to moderately dense at depth, abundant roots and rootlets.
		Total Depth 15 feet No water, no caving.
EP-3	0 to 2½	SOIL: Silty Sand to Sandy Silt; fine- to medium-grained, moderate yellowish brown, dry, loose/soft, abundant roots and rootlets.
	2½ to 8	SAUGUS FORMATION – SUNSHINE RANCH MEMBER (Tsr): Sandstone; fine- to medium-grained, light olive, slightly moist, top 2± feet highly weathered and loose with abundant roots and rootlets, moderately hard at depth, massive.
		Total Depth 8 feet. No water, no caving.

TABLE II

LOG OF EXPLORATORY PITS

Exploratory Pits	Depth (feet)	Description	Logged by: CRN Date Logged: 07/05/01
EP-4	0 to 5	COLLUVIUM (Qcol): Silty Sand; fine- to medium-grained with pebbles and some cobbles, moderate yellowish brown, dry to slightly moist at depth, loose to moderately dense, abundant roots and rootlets.	
	5 to 9	SAUGUS FORMATION – SUNSHINE RANCH MEMBER (Tsr): Sandstone; fine- to coarse-grained with pebbles and cobbles, light yellowish gray, slightly moist, moderately hard, some interbedded pebbles lenses, generally massive. Bedding Attitude: @ 7 feet, N40W, 42NE Total Depth 9 feet. No water, no caving.	
EP-5	0 to 8	ALLUVIUM (Qal): Silty Sand; fine- to coarse-grained with pebbles and cobbles, moderate yellowish brown, dry to slightly moist at depth, loose to moderately dense at depth, abundant root, and rootlets.	
	8 to 10	Cobbly Sand; medium- to coarse-grained with pebbles, slightly moist, loose to moderately dense, roots to depth.	
	10 to 13	SAUGUS FORMATION – SUNSHINE RANCH MEMBER (Tsr): Sandstone; fine- to medium-grained, light olive gray, slightly moist, moderately hard, slight to moderate weathering, massive. Total Depth 13 feet. No water, no caving.	

TABLE II

LOG OF EXPLORATORY PITS

Exploratory Pits	Depth (feet)	Description	Logged by: CRN Date Logged: 07/05/01
EP-6	0 to 2	SOIL: Silty Sand; fine- to coarse-grained with pebbles and cobbles, moderate yellowish brown, dry, loose, abundant roots and rootlets.	
	2 to 4	SAUGUS FORMATION – SUNSHINE RANCH MEMBER (Tsr): Cobble Conglomerate; coarse-grained Sand matrix, slightly moist, moderately hard.	
	4 to 7	Siltstone; light bluish gray, slightly moist, moderately hard, laminated.	
		Bedding Attitude: @ 5 feet, N50W, 37 NE	
		Total Depth 7 feet.	
EP-7	0 to ½	SOIL: Silty Sand; fine- to coarse-grained with pebbles and cobbles, moderate yellowish brown, dry, loose, abundant roots and rootlets.	
	½ to 2	SAUGUS FORMATION – SUNSHINE RANCH MEMBER (Tsr): Pebble Conglomerate; medium- to coarse-grained Sand matrix, slightly moist, loose, abundant roots.	
	2 to 5	Silty Sandstone; fine- to medium-grained, light yellowish gray, slightly moist, moderately hard, abundant roots.	
		Bedding Attitude: @ 3 feet, N60W, 35 NE	
		Total Depth 5 feet.	

TABLE II

LOG OF EXPLORATORY PITS

Exploratory Pits	Depth (feet)	Description	Logged by: CRN Date Logged: 07/05/01
EP-8	0 to 1	SOIL: Sandy Silt; light to moderate yellowish brown, dry, soft, abundant roots and rootlets.	
	1 to 3	SAUGUS FORMATION – SUNSHINE RANCH MEMBER (Tsr): Sandy Siltstone; light olive gray, slightly moist, moderately hard, abundant white carbonate, highly jointed, slightly laminated, generally massive.	
	3 to 5	Claystone; reddish brown, moist, moderately hard, highly jointed, abundant white carbonate along joints.	
		Bedding Attitude: @ 4 feet, N70W, 45NE	
		Total Depth 5 feet. No water, no caving.	
EP-9	0 to 6	COLLUVIUM (Qcol): Silty Sand; fine- to coarse-grained with pebbles and cobbles, dark yellowish brown, dry to slightly moist at depth, loose to moderately dense at depth, abundant root and rootlets.	
	6 to 9	SAUGUS FORMATION – SUNSHINE RANCH MEMBER (Tsr): Pebble and Cobble Conglomerate; medium to coarse-grained Sand matrix, slightly moist, moderately hard, poorly indurated.	
	9 to 12	Silty Sandstone; fine-grained, light olive gray, slightly moist, moderately hard, moderately indurated, moderately bedded.	
		Bedding Attitude: @ 10 feet, N60W, 45NE	
		Total Depth 12 feet. No water, no caving.	

TABLE II

LOG OF EXPLORATORY PITS

Exploratory Pits	Depth (feet)	Description	Logged by: CRN Date Logged: 07/05/01
EP-10	0 to 2	SOIL: Sandy Silt; yellowish brown, moist, firm, abundant roots and rootlets.	
	2 to 5	SAUGUS FORMATION -- SUNSHINE RANCH MEMBER (Tsr): Clayey Siltstone; light olive gray, moist, moderately hard, massive, slightly fractured; overlies Silty Sandstone; fine-grained, light yellowish gray, slightly moist, moderately hard, slightly bedded, generally massive.	
		Bedding Attitude: @ 3 feet, N45W, 47NE	
		Total Depth 5 feet. No water, no caving.	
EP-11	0 to 3	ALLUVIUM (Qal): Silty Sand; fine- to medium-grained, moderate yellowish brown, top 2± feet dry and loose, slightly moist to moderately dense at depth, abundant root and rootlets, porous.	
	3 to 20	Pebbly Sand; fine- to coarse-grained with cobbles, light to moderate yellowish brown, slightly moist to moist, moderately dense.	
		Total Depth 20 feet. No water, no caving.	

TABLE II

LOG OF EXPLORATORY PITS

Exploratory Pits	Depth (feet)	Description	Logged by: CRN Date Logged: 07/05/01
EP-12	0 to 3	SOIL: Sandy Silt to Silty Sand; fine to coarse-grained with pebbles and cobbles, moderate yellowish brown, dry to slightly moist, soft/loose, abundant roots and rootlets.	
	3 to 10	SAUGUS FORMATION – SUNSHINE RANCH MEMBER (Tsr): Pebble and Cobble Conglomerate; fine- to coarse-grained Sand matrix, slightly moist, moderately hard, poorly to moderately indurated, moderately bedded. Bedding Attitudes: @ 5 feet, N50W, 44NE @ 8 feet, N45W, 42NE Total Depth 10 feet. No water, no caving.	
EP-13	0 to 6	COLLUVIUM (Qcol): Silty Sand; fine- to coarse-grained with pebbles and some cobbles, moderate to dark yellowish brown, dry to slightly moist, loose to moderately dense, porous, abundant roots and rootlets.	
	6 to 9	SAUGUS FORMATION – SUNSHINE RANCH MEMBER (Tsr): Pebble and Cobble Conglomerate; medium- to coarse-grained Sand matrix, slightly moist, moderately hard, moderately indurated, moderately bedded. Bedding Attitude: @ 8 feet, N50W, 46NE Total Depth 9 feet. No water, no caving.	

TABLE II

LOG OF EXPLORATORY PITS

Exploratory Pits	Depth (feet)	Description	Logged by: CRN Date Logged: 07/05/01
EP-14	0 to 6	COLLUVIUM (Qcol): Silty Sand; fine- to medium-grained, dark yellowish brown, dry to slightly moist, loose to moderately dense, porous, abundant roots and rootlets.	
	6 to 8	SAUGUS FORMATION – SUNSHINE RANCH MEMBER (Tsr): Clayey Siltstone; olive to light olive gray, moist, soft to moderately hard, massive, abundant white carbonate.	
		Total Depth 8 feet. No water, no caving.	
EP-15	0 to 2½	SOIL: Silty Sand; fine- to medium-grained, dark yellowish brown, dry to slightly moist, loose, porous, abundant roots and rootlets, gopher holes.	
	2½ to 7	SAUGUS FORMATION – SUNSHINE RANCH MEMBER (Tsr): Sandstone; fine- to medium-grained with pebbles, yellowish orange, slightly moist, moderately hard, slightly bedded; some interbedded lenses of pebbles and cobbles with scour-fill basal contacts.	
		Approximate Bedding Attitude: @ 5 feet, N50W, 38NE	
		Total Depth 7 feet. No water, no caving.	

TABLE II

LOG OF EXPLORATORY PITS

Exploratory Pits	Depth (feet)	Description — Logged by: CRN, Date Logged: 07/05/01
EP-16	0 to 3	SOIL: Silty Sand to Sandy Silt; fine to medium-grained, moderate yellowish brown, dry to slightly moist, loose/soft, abundant roots and rootlets.
	3 to 5	SAUGUS FORMATION – SUNSHINE RANCH MEMBER (Tsr): Pebble Conglomerate; medium- to coarse-grained Sand matrix, slightly moist, loose, highly weathered, abundant roots. @ 5 feet, Claystone; 1 to 4± inch thick layer, mottled moderate yellowish brown and olive gray, moist, soft, flaky, some polished surfaces, discontinuous layer.
	5 to 9	Sandstone; fine-grained, light olive gray, slightly moist, moderately hard, highly weathered, abundant joints, abundant roots along joints. Bedding Attitude: @ 5 feet, N60W, 32NE Total Depth 9 feet. No water, no caving.
EP-17	0 to ½	SOIL: Sandy Silt; dark yellowish brown, dry, soft, abundant roots and rootlets.
	½ to 8	SAUGUS FORMATION – SUNSHINE RANCH MEMBER (Tsr): Sandstone; fine- to medium-grained, light yellowish gray, slightly moist, moderately hard to hard, top 1± foot moderately weathered, slight to moderate bedding with some rootlets along bedding planes. Bedding Attitudes: @ 3 feet, N65W, 43NE @ 6 feet, E-W, 49N Total Depth 8 feet. No water, no caving.

TABLE II

LOG OF EXPLORATORY PITS

Exploratory Pits	Depth (feet)	Description — Logged by: CRN, Date Logged: 07/05/01
EP-18	0 to 2	SOIL: Silty Sand; fine- to coarse-grained with pebbles and some cobbles, light to moderate yellowish brown, dry, loose, abundant roots and rootlets.
	2 to 7	SAUGUS FORMATION – SUNSHINE RANCH MEMBER (Tsr): Silty Sandstone; fine-grained, mottled reddish orange and olive gray, moist, hard, top 2± feet slightly jointed, moderately bedded. Bedding Attitude: @ 5 feet, N60W, 40SW Total Depth 7 feet. No water, no caving.
EP-19	0 to ½	SOIL: Silty Sand; fine-grained, light to moderate yellowish brown, dry, loose, abundant roots and rootlets.
	½ to 6	SAUGUS FORMATION – SUNSHINE RANCH MEMBER (Tsr): Sandstone; fine-grained, light olive gray, slightly moist, moderately hard to hard, moderately bedded. Bedding Attitude: @ 4½ feet, N65W, 40NE Total Depth 6 feet. No water, no caving.
EP-20	0 to 9	ALLUVIUM (Qal): Cobbly Sand; fine- to coarse-grained with abundant pebbles, light yellowish brown, top 2± feet dry and loose, slightly moist to moist and moderately dense to depth, some cobbles up to 12± inches diameter, abundant roots and rootlets to depth. Severe caving throughout. Total Depth 9 feet No water, caving from 0 to 9 feet.

TABLE II

LOG OF EXPLORATORY PITS

Exploratory Pits	Depth (feet)	Description	Logged by: CRN Date Logged: 07/05/01
EP-21	0 to 13	ALLUVIUM (Qal): Silty Sand to Sandy Silt; fine- to medium-grained with some pebbles and cobbles; moderate yellowish brown, top 2± feet dry and loose, slightly moist to moist and moderately dense to depth, poorly consolidated, some roots to depth.	
	13 to 14	SAUGUS FORMATION – SUNSHINE RANCH MEMBER (Tsr): Pebble and Cobble Conglomerate; medium to coarse-grained Sand matrix, moist, moderately hard to hard, weathered.	
		Total Depth 14 feet No water, no caving.	
EP-22	0 to 7	ALLUVIUM (Qal): Silty Sand; fine- to medium-grained with some pebbles, dark yellowish brown, top 2± feet loose and dry, slightly moist to moist and moderately dense to depth, basal cobbles, abundant roots and rootlets.	
	7 to 10	SAUGUS FORMATION – SUNSHINE RANCH MEMBER (Tsr): Siltstone; moderate yellowish brown, moist, moderately hard, laminated, moderately fractured, some tectonic shears along bedding, some roots and rootlets.	
	10 to 12	Silty Sandstone; very fine- to fine-grained, olive gray, slightly moist to moist, moderately hard, slightly fractured.	
		Bedding Attitude: @ 10 feet, N60W, 40NE	
		Total Depth 12 feet. No water, no caving.	

TABLE II

LOG OF EXPLORATORY PITS

Exploratory Pits	Depth (feet)	Description — Logged by: CRN, Date Logged: 07/05/01
EP-23	0 to 1	SOIL: Silty Sand; fine- to coarse-grained with pebbles, dark yellowish brown, dry, loose, abundant roots and rootlets.
	1 to 5	SAUGUS FORMATION – SUNSHINE RANCH MEMBER (Tsr): Sandstone; fine- to medium-grained, pale yellowish gray, slightly moist, moderately hard to hard, some rootlets from 1 to 3± feet in depth. Bedding Attitude: @ 4 feet, N60W, 45NE Total Depth 5 feet. No water, no caving.
EP-24	0 to 1	SOIL: Silty Sand; fine- to coarse-grained with pebbles and cobbles, dark yellowish brown, dry, loose, abundant roots and rootlets.
	1 to 4	SAUGUS FORMATION – SUNSHINE RANCH MEMBER (Tsr): Pebble and Cobble Conglomerate; medium- to coarse-grained Sand matrix, slightly moist, moderately hard to hard, few roots to depth.
	4 to 5	Sandstone; fine- to medium-grained, light yellowish gray, slightly moist, moderately hard, moderately bedded. Bedding Attitude: @ 4½ feet, N60W, 40NE Total Depth 5 feet. No water, no caving.

TABLE II

LOG OF EXPLORATORY PITS

Exploratory Pits	Depth (feet)	Description	Logged by: CRN Date Logged: 07/05/01
EP-25	0 to 2½	COLLUVIUM (Qcol): Silty Sand to Sandy Silt; very fine- to fine-grained with some isolated pebbles, moderate to dark yellowish brown, dry to slightly moist, loose/soft, abundant roots and rootlets, porous.	
	2½ to 5	Clayey Silt; moderate to dark yellowish brown, slightly moist, soft to firm, porous, abundant caliche.	
	5 to 9	PICO FORMATION (Tp): Clayey Siltstone; mottled pale olive gray and light brown, slightly moist, moderately firm, laminated to ½±-inch thick bedding, weathered to a depth of 7± feet. Bedding Attitudes: @ 6 feet, N50E, 32SE @ 8 feet, N80E, 35SE Total Depth 9 feet. No water, no caving.	
EP-26	0 to 1½	SOIL: Silty Sand to Sandy Silt; very fine- to fine-grained, moderate yellowish brown, dry to slightly moist, loose, abundant roots and rootlets, porous.	
	1½ to 6	PICO FORMATION (Tp): Clayey Siltstone; pale olive, slightly moist, moderately firm, laminated to massive 2±-inch thick bedding, weathered with roots and caliche to a depth of 3½ feet. Bedding Attitudes: @ 4 feet, N30W, 40NE @ 4½ feet, N10W, 30NE @ 5 feet, N30E, 29SE Total Depth 6 feet. No water, no caving.	

TABLE II

LOG OF EXPLORATORY PITS

Exploratory Pits	Depth (feet)	Description	Logged by: CRN Date Logged: 07/05/01
EP-27	0 to 1	SOIL: Silty Sand to Sandy Silt; very fine- to fine-grained moderate yellowish brown, dry to slightly moist, loose/soft, abundant roots and rootlets.	
	1 to 5	PICO FORMATION (Tp): Sandy Siltstone; fine-grained, pale olive gray, slightly moist, moderately hard, 1 to 6± inch thick laminated beds; jointed/fractured, interbedded with Clayey Siltstone; pale olive to olive gray, moderately firm, laminated to 3±-inch thick massive beds; top 1½± feet highly weathered. Bedding Attitudes: @ 4 feet, N50W, 39NE Total Depth 5 feet. No water, no caving.	
EP-28	0 to 1	SOIL: Sandy Silt; very fine- to fine-grained, pale to moderate yellowish brown, dry, loose, abundant roots and rootlets.	
	1 to 7	PICO FORMATION (Tp): Interbedded Silty Sandstone; very fine- to fine-grained, pale olive, slightly moist, moderately hard, 2 to 6±-inch laminated bedding; with Clayey Siltstone, pale to dark olive, slightly moist to moist, moderately firm, laminated to 2±-inch thick bedding; top 3± feet highly weathered and abundant roots. Bedding Attitudes: @ 5 feet, EW, 49N @ 6 feet, N70E, 73NW Total Depth 7 feet. No water, no caving.	

TABLE II

LOG OF EXPLORATORY PITS

Exploratory Pits	Depth (feet)	Description — Logged by: CRN, Date Logged: 07/05/01
EP-29	0 to 11	ALLUVIUM (Qal): Silty Sand to Sandy Silt; very fine- to fine-grained, moderate yellowish brown, dry to slightly moist at 6± feet to depth, loose/soft to moderately dense/firm with depth.
	11 to 12	PICO FORMATION (Tp): Silty Claystone; dark olive green, moist, moderately firm to firm, laminated to ½±-inch thick bedding.
		Total Depth 12 feet. No water; no caving.
EP-30	0 to 14	COLLUVIUM (Qcol): Clayey to Sandy Silt; very fine-grained Sand, pale to moderate yellowish brown, dry to slightly moist, soft, porous, abundant rootlets and roots.
		Total Depth 14 feet. No water, no caving.
EP-31	0 to 1	SOIL: Clayey To Sandy Silt; very fine- to fine-grained, dark yellowish brown, slightly moist to moist, soft, porous, abundant roots and rootlets.
	1 to 2	PICO FORMATION (Tp): Claystone; mottled olive gray and light brown, slightly moist to moist, moderately firm, highly weathered, abundant roots.
	2 to 3	Silty Sandstone; light gray lenses 3 to 4± inches thick at top and bottom with light brown core, slightly moist, moderately hard, massive, scour-fill bottom, flat top.
	3 to 4	Silty Sandstone to Sandy Siltstone; pale olive gray, slightly moist, firm, highly weathered, blocky, abundant caliche.
	4 to 5	Sandy to Clay Siltstone; pale to dark olive gray, slightly moist to moist, moderately hard, laminated to ½±-inch bedding.
		Bedding Attitudes: @ 3 feet, N80W, 59SW (overturned) @ 4 feet, N65W, 35SW (overturned)
		Total Depth 5 feet. No water, no caving.

TABLE II

LOG OF EXPLORATORY PITS

Exploratory Pits	Depth (feet)	Description — Logged by: CRN, Date Logged: 07/05/01
EP-32	0 to 5	COLLUVIUM (Qcol): Sandy Silt; very fine-grained Sand, pale to moderate yellowish brown, dry to slightly moist, soft, abundant rootlets.
	5 to 8	PICO FORMATION (Tp): Silty Sandstone; very fine- to fine-grained, pale to olive gray, slightly moist to moist, moderately hard, laminated to 3±-inch beds. Bedding Attitude: @ 6 feet, N70E, 54NW Total Depth 8 feet. No water, no caving.
EP-33	0 to 12	COLLUVIUM (Qcol): Sandy Silt; very fine- to fine-grained Sand, pale yellowish brown, dry to slightly moist, loose/soft, abundant rootlets, 2± foot diameter boulder at 2± feet. No water, no caving.
EP-34	0 to ½	SOIL: Clayey Silt; moderate yellowish brown, dry, loose, abundant roots and rootlets.
	½ to 4	PICO FORMATION (Tp): Silty Sandstone; very fine- to fine-grained, pale to olive gray, slightly moist, moderately firm, highly weathered, abundant roots and rootlets.
	4 to 6	Silty Sandstone; fine-grained, pale olive gray, slightly moist, moderately hard, massive. Bedding Attitudes: @ 3 feet, N45E, 65SE (overturned) @ 5 feet, N70E, 59SE (overturned) Total Depth 6 feet. No water, no caving.

TABLE II

LOG OF EXPLORATORY PITS

Exploratory Pits	Depth (feet)	Description	Logged by: CRN Date Logged: 07/05/01
EP-35	0 to 14	ALLUVIUM (Qal): Silty Sand to Sandy Silt; very fine- to fine- with some medium-grained, moderate yellowish orange, top 2± feet dry and loose/soft, slightly moist to moist and moderately dense/firm at depth, slightly porous, pocket of pebbles and cobbles @ 12± feet. Total Depth 14 feet. No water, no caving.	
EP-36	0 to ½	SOIL: Sandy Silt; very fine-grained Sand, moderate yellowish brown, dry, soft, abundant roots and rootlets.	
	½ to 6	PICO FORMATION (Tp): Silty Sandstone; very fine- to fine-grained, pale olive gray, slightly moist, moderately hard, laminated to 3±-inch bedding, upper 3± feet slightly creep affected.	
	6 to 8	Silty Sandstone, fine-grained, pale olive gray, slightly moist, moderately hard, massive. Bedding Attitudes: @ 2 feet, N10E, 50NW @ 4 feet, N30W, 30SW Total Depth 8 feet. No water, no caving.	

TABLE II

LOG OF EXPLORATORY PITS

Exploratory Pits	Depth (feet)	Description	Logged by: CRN Date Logged: 07/05/01
EP-37	0 to ½	SOIL: Sandy Silt; very fine-grained, moderate yellowish brown, dry, loose, abundant roots and rootlets.	
	½ to 5	PICO FORMATION (Tp): Silty Sandstone; very fine- to fine-grained, pale olive gray, slightly moist, moderately hard, laminated to 1± inch bedding, possibly creep affected.	
	5 to 7	Silty Sandstone; fine-grained, pale olive, slightly moist, moderately hard to hard, massive.	
		Bedding Attitudes: @ 2 feet, N10E, 36NW @ 5 feet, N50E, 42 NW	
		Total Depth 7 feet. No water, no caving.	
EP-38	0 to ½	SOIL: Silty Sand; fine- to medium-grained, moderate to dark yellowish brown, dry, loose, porous, abundant roots and rootlets..	
	½ to 2	SAUGUS FORMATION – SUNSHINE RANCH MEMBER (Tsr): Silty Sandstone; medium- to very coarse-grained with pebbles and cobbles of quartzite and granitics (Mt. Lowe), pale yellowish orange, slightly moist, moderately hard, poorly cemented, slightly layered generally massive.	
	2 to 6	PICO FORMATION (Tp): Sandy Siltstone; very fine-grained, moderate yellowish brown, slightly moist, moderately hard/firm, slightly laminated, generally massive.	
		Contact Attitude: @ 2 feet, N65W, 67NE Bedding Attitude: @ 4 feet, N55W, 54NE	
		Total Depth 6 feet. No water, no caving.	

TABLE II

LOG OF EXPLORATORY PITS

Exploratory Pits	Depth (feet)	Description — Logged by: CRN, Date Logged: 07/05/01
EP-39	0 to 17	COLLUVIUM (Qcol): Sandy Silt; very fine-grained Sand, moderate yellowish brown, dry to slightly moist at depth, soft to firm at depth, wet at bottom. Total Depth 17 feet. No water, no caving.
EP-40	0 to 9	ALLUVIUM (Qal): Silty Sand to Sandy Silt; fine-grained, moderate yellowish brown, dry to slightly moist at depth, loose/soft to moderately dense/firm at depth, roots to 5± feet in depth.
	9 to 10	SAUGUS FORMATION – SUNSHINE RANCH MEMBER (Tsr): Silty Sandstone; fine- to medium-grained, yellowish gray, moist, hard, massive. Total Depth 10 feet. No water, no caving.
EP-41	0 to 1	SOIL: Silty Sand; fine- to coarse-grained, dark yellowish brown, dry, loose, abundant roots and rootlets.
	1 to 3	SAUGUS FORMATION – SUNSHINE RANCH MEMBER (Tsr): Pebbly Sandstone; medium- to very coarse-grained, yellowish gray, slightly moist, moderately hard, abundant roots, normal grading.
	3 to 5	Silty Sandstone; fine- to medium-grained, yellowish gray, slightly moist, moderately hard, massive. Bedding Attitude: @ 3 feet, N70W, 32NE Total Depth at 5 feet. No water, no caving.

TABLE II

LOG OF EXPLORATORY PITS

Exploratory Pits	Depth (feet)	Description	Logged by: CRN Date Logged: 07/05/01
EP-42	0 to 1½	SOIL: Silty Sand; fine- to coarse-grained with pebbles and cobbles, dark yellowish brown, dry, loose, abundant roots and rootlets.	
	1½ to 6	SAUGUS FORMATION – SUNSHINE RANCH MEMBER (Tsr): Silty Sandstone; fine- to medium-grained, mottled yellowish gray and light brown, slightly moist, hard, ¼ to 3±-inch beds. @ 4 feet; 6± inch thick carbonaceous layer, brownish black, abundant sulfur deposits. Bedding Attitude: @ 4 feet, N65W, 28NE Total Depth 6 feet. No water, no caving.	
EP-43	0 to 1½	SOIL: Sandy Silt; very fine-grained, dark yellowish brown, dry to slightly moist, soft, abundant rootlets.	
	1½ to 6	SAUGUS FORMATION – SUNSHINE RANCH MEMBER (Tsr): Silty Sandstone; very fine- to fine-grained, pale olive gray, slightly moist, moderately hard to hard, slightly bedded generally massive. Bedding Attitude: @ 4 feet, N70W, 45NE Total Depth 6 feet. No water, no caving.	

TABLE II

LOG OF EXPLORATORY PITS

Exploratory Pits	Depth (feet)	Description	Logged by: CRN Date Logged: 07/05/01
EP-44	0 to 1	SOIL: Sandy Silt to Silty Sand; very fine- to fine-grained, moderate to dark yellowish brown, slightly moist, soft/loose, abundant roots and rootlets.	
	1 to 5	SAUGUS FORMATION – SUNSHINE RANCH MEMBER (Tsr): Silty Sandstone; fine- to medium-grained with some coarse-grained layers with pebbles, pale yellowish gray, slightly moist, moderately hard, bedded. Bedding Attitude: @ 4 feet, N60W, 43NE Total Depth 5 feet. No water, no caving.	
EP-45	0 to 7	ALLUVIUM (Qal): Silty Sand; very fine- to medium-grained, pale to moderate yellowish brown, dry to slightly moist at depth, loose to moderately dense at depth.	
	7 to 14	Pebbly Sand; medium- to coarse-grained with cobbles, moderate yellowish brown, moist, moderately dense. Total Depth 14 feet. No water, no caving.	

TABLE II

LOG OF EXPLORATORY PITS

Exploratory Pits	Depth (feet)	Description	Logged by: CRN Date Logged: 07/05/01
EP-46	0 to 2½	SOIL: Silty Sand; fine- to coarse-grained, dark yellowish brown, dry, loose, abundant roots and rootlets.	
	2½ to 9	SAUGUS FORMATION – SUNSHINE RANCH MEMBER (Tsr): Pebbly Sandstone, medium- to coarse-grained with cobbles, yellowish orange, slightly moist, moderately hard to hard, bedded.	
		Bedding Attitudes: @ 5 feet, N55W, 36NE @ 8 feet, N40W, 32NE	
		Total Depth 9 feet. No water, no caving.	
EP-47	0 to 5	COLLUVIUM (Qcol): Silty Sand; fine- to coarse-grained with pebbles, dark yellowish brown, dry, loose to moderately dense, abundant roots and rootlets.	
	5 to 9	SAUGUS FORMATION – SUNSHINE RANCH MEMBER (Tsr): Pebbly Sandstone; medium- to coarse-grained with pebbles and cobbles, yellowish gray, slightly moist, moderately hard to hard, slightly layered, generally massive, some scour in fill structures.	
		Bedding Attitude – Approximate: @ 8 feet, N50W, 30NE	
		Total Depth 9 feet. No water, no caving.	

TABLE II

EXPLORATORY PITS

Log No.	Depth (ft.)	Description	Logged: 1-26-04 By: CRN
EP-101	0 to 2	SOIL: Sandy Silt; fine-, dark yellowish brown, slightly moist, loose, soft, abundant roots, and rootlets.	
	2 to 7	PICO FORMATION (Tp): Clayey Siltstone; pale yellowish green, slightly moist, moderately hard, massive to slightly bedded.	
		Attitude: Bedding @ 4 feet, N30E 50 SE	
		Total Depth 7 feet.	
EP-102	0 to 7	COLLUVIUM (Qcol): Sandy Silt to Silty Sand; fine-grained, moderate to light yellowish brown to yellowish green at depth, slightly moist, loose, abundant roots and rootlets.	
	7 to 9	PICO FORMATION (Tp): Clayey Siltstone; pale yellowish green, slightly moist, moderately hard, massive to slightly bedded, moderately weathered.	
		Attitude: Bedding @ 8 feet, N70E 41 SE	
		Total Depth 9 feet.	
EP-103	0 to 2	SOIL: Sandy Silt; fine-grained, moderate yellowish brown, slightly moist, loose, abundant roots and rootlets.	
	2 to 6	PICO FORMATION (Tp): Sandy Siltstone; fine-grained, pale yellowish green, dry to slightly moist, moderate hard, massive, upper 3 to 4± feet highly weathered with abundant roots and rootlets.	
		Total Depth 6 feet.	

TABLE II

EXPLORATORY PITS

Log No.	Depth (ft.)	Description	Logged: 1-26-04 By: CRN
EP-104	0 to 2	SOIL/COLLUVIUM (Qcol): Clayey Silt; moderate yellowish brown, slightly moist, soft, abundant roots and rootlets.	
	2 to 7	PICO FORMATION (Tp): Sandy Siltstone; fine-grained, pale yellowish green, dry to slightly moist, moderate hard, massive, weathered 2± feet, some shell fragments, some roots to depth.	
		Total Depth 7 feet.	
EP-105	0 to 5	COLLUVIUM (Qcol): Sandy to Clayey Silt; moderate yellowish brown to pale yellowish green, slightly moist, loose, abundant roots and rootlets.	
	5 to 8	PICO FORMATION (Tp): Sandy Siltstone; fine-grained, pale yellowish green, dry to slightly moist, moderate hard, massive, weathered 2± feet, some shell fragments, some roots to depth.	
		Total Depth 8 feet.	
EP-106	0 to 10	COLLUVIUM (Qcol): Sandy to Clayey Silt; moderate yellowish brown to pale yellowish green, slightly moist, loose, abundant roots and rootlets.	
	10 to 12	PICO FORMATION (Tp): Clayey Siltstone; pale yellowish green, slightly moist, moderately hard, massive, moderately weathered, some white carbonate.	
		Total Depth 12 feet.	

TABLE II

EXPLORATORY PITS

Log No.	Depth (ft.)	Description	Logged: 1-26-04 By: CRN
EP-107	0 to 1	SOIL: Sandy to Clayey Silt; fine-grained, moderate yellowish brown, slightly moist, loose, abundant roots and rootlets.	
	1 to 7	PICO FORMATION (Tp): Silty Sandstone; fine-grained, pale yellowish green, slightly moist, moderately hard, laminated to ½± inch bedding, top 2± feet highly weathered with abundant roots and rootlets, some white carbonate. Attitude: Bedding @ 6 feet, N50E 53NW Total Depth 7 feet.	
EP-108	0 to 1	SOIL: Sandy to Clayey Silt; fine-grained, moderate yellowish brown, slightly moist, loose, abundant roots and rootlets.	
	1 to 6	PICO FORMATION (Tp): Silty Sandstone; fine-grained, pale yellowish green, slightly moist, moderately hard to hard at depth, slightly bedded, generally massive, upper 2± feet highly weathered with abundant roots. Attitude: Bedding @ 5 feet, N10E 56NW Total Depth 6 feet.	
EP-109	0 to 2	SOIL: Sandy to Clayey Silt; fine-grained, moderate yellowish brown, slightly moist, loose, abundant roots and rootlets.	
	2 to 7	PICO FORMATION (Tp): Silty Sandstone; fine-grained, pale yellowish green, slightly moist, moderately hard, laminated to ½± inch bedding, top 2± feet highly weathered. Attitude: Bedding @ 6 feet, N80E 36NW Total Depth 7 feet.	

TABLE II

EXPLORATORY PITS

Log No.	Depth (ft.)	Description	Logged: 1-26-04 By: CRN
EP-110	0 to 2	SOIL: Silty Sand to Sandy Silt; fine-grained, moderate yellowish brown, slightly moist, loose, abundant roots and rootlets.	
	2 to 8	PICO FORMATION (Tp): Silty to Clayey Sandstone; fine-grained, pale yellowish green, slightly moist, moderately hard, laminated to ½± inch bedding, top 2± feet highly weathered.	
		Attitude: Bedding @ 6 feet, E-W 57N	
		Total Depth 8 feet.	
EP-111	0 to 7	COLLUVIUM (Qcol): Silty to Clayey Sand; fine-grained, dark to moderate yellowish brown, slightly moist, loose, abundant roots and rootlets.	
	7 to 9	PICO FORMATION (Tp): Silty Sandstone; fine- with some medium-grained, pale yellowish green, slightly moist, moderately hard, slightly bedded, generally massive.	
		Attitude: Bedding @ 8 feet, N50W 47NE	
		Total Depth 9 feet.	
EP-112	0 to 1	SOIL: Silty Sand to Sandy Silt; fine-grained, moderate yellowish brown, slightly moist, loose, abundant roots and rootlets.	
	1 to 6	PICO FORMATION (Tp): Silty Sandstone; fine-grained, pale yellowish green, slightly moist, moderately hard, top 2 to 3± feet highly weathered.	
		Attitude: Bedding @ 5 feet, N60E 52NE	
		Total Depth 6 feet.	

TABLE II

EXPLORATORY PITS

Log No.	Depth (ft.)	Description	Logged: 1-26-04 By: CRN
EP-113	0 to 2	SOIL: Silty Sand to Sandy Silt; fine-grained, moderate yellowish brown, slightly moist, loose, abundant roots and rootlets.	
	2 to 7	PICO FORMATION (Tp): Silty Sandstone; fine-grained, pale yellowish green, slightly moist, moderately hard, slightly bedded, generally massive.	
		Total Depth 7 feet.	
EP-114	0 to 6	COLLUVIUM (Qcol): Silty to Clayey Sand; fine-grained, dark yellowish brown to moderate yellowish brown at depth, slightly moist, loose, abundant roots and rootlets.	
	6 to 8	PICO FORMATION (Tp): Silty Claystone; mottled olive and moderate reddish brown, moist, firm, generally massive, abundant white carbonate.	
		Attitude: Bedding @ 7 feet, N70W 46NE	
		Total Depth 8 feet.	
EP-115	0 to 3	SOIL: Sandy to Clayey Silt; fine-grained, moderate yellowish brown, moist, loose, abundant roots and rootlets.	
	3 to 7	PICO FORMATION (Tp): Clayey Sandstone; fine-grained, pale olive, slightly moist to moist, moderately hard, laminated to massive, top 2± feet highly weathered with abundant white carbonate.	
		Attitude: Bedding @ 5 feet, EW33N	
		Total Depth 7 feet.	
EP-116	0 to 2	SOIL: Silty Sand; very fine- to fine-grained, moderate yellowish brown, moist, loose, abundant roots and rootlets.	
	2 to 9	PICO FORMATION (Tp): Silty Sandstone; very fine- to fine-grained, some interbeded, medium- to coarse-grained Sand with pebbles, pale yellowish gray, dry to slightly moist, medium hard, generally massive.	
		Attitude: Bedding @ 7 feet, E-W 37N	
		Total Depth 9 feet.	

TABLE II

EXPLORATORY PITS

Log No.	Depth (ft.)	Description	Logged: 1-26-04 By: CRN
EP-117	0 to ½	SOIL: Silty Sand to Sandy Silt; fine-grained, moderate yellowish brown, slightly moist, loose, abundant roots and rootlets.	
	½ to 6	PICO FORMATION (Tp): Silty Sandstone; very fine- to fine-grained, pale yellowish green, slightly moist, moderately hard, slightly bedded, massive, some shell fragments.	
		Total Depth 6 feet.	
EP-118	0 to 4	SOIL/COLLUVIUM (Qcol): Silty Sand to Sandy Silt; fine-grained, moderate yellowish brown, slightly moist, loose, abundant roots and rootlets.	
	4 to 6	PICO FORMATION (Tp): Clayey Sandstone; fine-grained, moderate yellowish green, slightly moist, moderate hard, slightly bedded, generally massive.	
		Attitude: Approximate Bedding @ 5 feet; E-W 27N	
		Total Depth 6 feet.	
EP-119	0 to 2	SOIL: Silty Sand to Sandy Silt; fine-grained, moderate yellowish brown, slightly moist, loose, abundant roots and rootlets.	
	2 to 8	PICO FORMATION (Tp): Clayey Sandstone; fine-grained, moderate yellowish brown, slightly moist, loose, laminated to ½± inch bedding.	
		Attitude: Bedding @ 6 feet, N70W 55NE	
		Total Depth 8 feet.	
EP-120	0 to 5	COLLUVIUM (Qcol): Silty to Clayey Sand; fine-grained, moderate yellowish brown, slightly moist to moist, loose, abundant roots and rootlets.	
	5 to 7	PICO FORMATION (Tp): Clayey Siltstone; pale olive, slightly moist, moderately hard, massive, top 1± foot highly weathered with abundant white carbonate.	
		Total Depth 7 feet.	

TABLE II

EXPLORATORY PITS

Log No.	Depth (ft.)	Description	Logged: 1-26-04 By: CRN
EP-121	0 to 1	SOIL: Silty Sand; fine-grained, moderate yellowish brown, slightly moist, loose, abundant roots and rootlets.	
	1 to 6	PICO FORMATION (Tp): Clayey Siltstone; fine-grained, pale yellowish, slightly moist, moderately hard to hard at depth, ½± inch bedding.	
		Attitude: Bedding @ 4 feet, E-W 40N	
		Total Depth 6 feet.	
EP-122	0 to 1	SOIL: Silty Sand; fine-grained, moderate yellowish brown, slightly moist, loose, abundant roots and rootlets.	
	1 to 6	PICO FORMATION (Tp): Clayey Siltstone; fine-, pale yellowish, slightly moist, moderately hard to hard at depth, laminated to ½± inch bedding.	
		Attitude: Bedding @ 5 feet, N80E 46NW	
		Total Depth 6 feet.	
EP-123	0 to 1	SOIL: Sandy Silt to Silty Sand; fine-grained, moderate yellowish brown, slightly moist, loose, abundant roots and rootlets.	
	1 to 7	PICO FORMATION (Tp): Sandy Siltstone; fine-grained, pale olive, slightly moist, moderately hard, laminated to ½± inch bedding, top 2± feet highly weathered.	
		Attitude: Bedding @ 5 feet, N70E 48NW	
		Total Depth 7 feet.	

TABLE II

EXPLORATORY PITS

Log No.	Depth (ft.)	Description	Logged: 1-26-04 By: CRN
EP-124	0 to ½	SOIL: Sandy Silt to Silty Sand; fine-grained, moderate yellowish brown, slightly moist, loose, abundant roots and rootlets.	
	½ to 6	PICO FORMATION (Tp): Silty Sandstone; very fine- to fine-grained, pale yellowish green, slightly moist, moderately hard, laminated to ½± inch bedding, top 2± feet highly weathered. Attitude: Bedding @ 4 feet, N70E 52NE Joint @ 4 feet, N25E Vertical Total Depth 6 feet.	
EP-125	0 to 1	SOIL: Sandy Silt to Silty Sand; fine- to coarse-grained with some pebbles and cobbles, moderate yellowish brown, slightly moist, loose, abundant roots and rootlets.	
	1 to 5	PICO FORMATION (Tp): Silty Sandstone; fine-grained, pale yellowish grey, dry to slightly moist, moderately hard to hard at depth, some thinly interlayered medium- to coarse-grained Sand lenses, generally massive. Attitude: Bedding @ 4 feet, N80W 52NE Total Depth at 5 feet.	
EP-126	1 to 3	SOIL/COLLUVIUM (Qcol): Silty Sand to Sand, Silt; fine-grained, moderate yellow brown, slightly moist, loose, abundant roots and rootlets.	
	3 to 7	PICO FORMATION (Tp): Sandy Siltstone; fine-grained Sand, pale yellowish green, dry to slightly moist, moderately hard, ½± inch bedding, top 2± feet highly weathered with abundant white carbonate. Attitude: Bedding @ 6 feet, N80E 36NW Total Depth 7 feet.	

TABLE II

EXPLORATORY PITS

Log No.	Depth (ft.)	Description	Logged: 1-26-04 By: CRN
EP-127	0 to 9	COLLUVIUM (Qcol): Silty Sand to Sand, Silt; fine-grained, moderate yellow brown, slightly moist, loose, abundant roots and rootlets.	
	9 to 10	PICO FORMATION (Tp): Silty Claystone; olive, moist, moderately firm to firm, some white carbonate.	
		Total Depth 10 feet.	
EP-128	0 to 4	COLLUVIUM/ALLUVIUM (Qcol/Qal): Silty Sand to Sandy Silt; fine-grained, moderate yellow brown, moist, loose to medium dense with depth, some roots and rootlets.	
	4 to 6	PICO FORMATION (Tp): Claystone; olive, moist, moderately firm, laminated to 1± inch bedding, slightly plastic, some white carbonate.	
		Attitude: Bedding @ 5 feet, N60W 52NE	
		Total Depth 6 feet.	
EP-129	0 to 5	COLLUVIUM/ALLUVIUM (Qcol/Qal): Silty Sand to Sandy Silt; fine-grained with some basal cobbles, moderate yellow brown, moist, loose to medium dense with depth, some roots and rootlets.	
	5 to 7	PICO FORMATION (Tp): Claystone; olive, moist, moderately firm, laminated to 1± inch bedding, slightly plastic, some white carbonate.	
		Attitude: Bedding @ 6 feet, N60W 42NE	
		Total Depth 7 feet.	

TABLE II

EXPLORATORY PITS

Log No.	Depth (ft.)	Description	Logged: 1-27-04 By: CRN
EP-130	0 to 1	SOIL: Silty Sand to Sandy, Silt; fine-grained, moderate yellow brown, slightly moist, loose, abundant roots and rootlets.	
	1 to 7	PICO FORMATION (Tp): Sandy Siltstone to Silty Sandstone; very fine- to fine-grained, pale yellowish green, slightly moist, moderately hard, laminated to ½± inch bedding, top 2 to 3± feet highly weathered with some roots and rootlets. Attitude: Bedding @ 6 feet, N30E 33NW Total Depth 7 Feet.	
EP-131	0 to 1½	SOIL: Silty Sand to Sandy, Silt; fine-grained, moderate yellow brown, slightly moist, loose, abundant roots and rootlets.	
	1½ to 6	PICO FORMATION (Tp) (south side of pit): Silty Claystone; mottled olive and moderate yellowish brown, slightly moist, moderately hard, laminated to 1± inch bedding, highly jointed/fractured, some roots and rootlets to depths. Attitude: Bedding @ 5 feet, N40E 48NW FAULT (2 to 3+ inches thick zone): Silty Sand; fine-grained, pale grey, dry, loose, some roots. Attitude: Fault @ 5 feet, N60W Vertical	
	1½ to 6	PICO FORMATION (Tp) (north side of pit): Silty Sandstone; fine-grained, layered pale grey and pale olive, slightly moist, moderately hard, 1 to 6± inch bedding, top 2± feet moderately weathered. Attitude: Bedding @ 5 feet, N60W Vertical Total Depth 6 feet.	

TABLE II

EXPLORATORY PITS

Log No.	Depth (ft.)	Description	Logged: 1-27-04 By: CRN
EP-132	0 to 1	SOIL: Clayey Silt; moderate yellow brown, slightly moist, loose, abundant roots, rootlets and white carbonate.	
	1 to 7	PICO FORMATION (Tp): Interbedded Silty Claystone; mottled olive and moderate yellowish brown, slightly moist, moderately hard, laminated to 1± inch bedding; with Silty Sandstone, fine-grained, pale olive, slightly moist, moderately hard, 2 to 3± inch bedding, top 3± inch bedding, top 3± feet highly weathered. Attitudes: Bedding @ 5 feet, N60W Vertical Bedding @ 6 feet, N30W Vertical Total Depth 7 feet.	
EP-133	0 to ½	SOIL: Clayey Silt; moderate yellow brown, slightly moist, loose, abundant roots, rootlets and white carbonate.	
	½ to 6	PICO FORMATION (Tp): Sandy Siltstone; very fine- to fine-grained, pale yellowish green, slightly moist, moderately hard, laminated to 1± inch bedding, top 2± feet highly weathered with abundant rootlets and some white carbonate. Attitude: Bedding @ 5 feet, N60E 69NW Total Depth 6 feet.	
EP-134	0 to 3	SOIL: Clayey Silt with Sand; fine-grained, moderate yellow brown, slightly moist, loose, abundant roots, rootlets and white carbonate.	
	3 to 5	PICO FORMATION (Tp): Silty Sandstone; fine- to coarse-grained, pale grey, dry, moderately hard, massive, abundant shells.	
	5 to 8	Silty Claystone; mottled olive and moderate yellow brown, slightly moist, moderately hard, slightly bedded generally massive. Attitude: Bedding @ 7 feet, N50W 58NE Total Depth 8 feet.	

TABLE II

EXPLORATORY PITS

Log No.	Depth (ft.)	Description	Logged: 1-27-04 By: CRN
EP-135	0 to 2½	SOIL: Sandy Silt; fine-grained, moderate yellow brown, dry to slightly moist, loose, abundant roots and rootlets.	
	2½ to 7	PICO FORMATION (Tp): Silty Sandstone; moderate yellow brown, slightly moist, loose, top 2± feet highly weathered with roots and rootlets.	
		Attitude: Bedding @ 6 feet, N60W 49NE	
		Total Depth 7 feet.	
EP-136	0 to 1	SOIL: Sandy Silt; fine-grained, moderate yellow brown, dry to slightly moist, loose, abundant roots and rootlets.	
	1 to 8	PICO FORMATION (Tp): Silty Claystone; moderate yellow brown, slightly moist, loose, top 3± feet highly weathered, with roots and rootlets; some interbedded Silty Sandstone, fine-grained, pale to moderate yellowish grey, dry, moderately hard, 1 to 2± inch bedding.	
		Attitude: Bedding @ 7 feet, N40W 72SW	
		Total Depth 8 feet.	
EP-137	0 to 5	SOIL/COLLUVIUM (Qcol): Sandy Silt to Silty Sand; fine-grained, moderate yellow brown, dry to slightly moist, loose, abundant roots and rootlets.	
	5 to 12	PICO FORMATION (Tp): Silty Claystone; moderate yellow brown, slightly moist, loose, top 3± feet highly weathered, with roots and rootlets; some interbedded Silty Sandstone, fine-grained, pale to moderate yellowish grey, dry, moderately hard, 1 to 2± inch bedding.	
		Attitude: Bedding @ 11 feet, N50W 52NE	
		Total Depth 12 feet.	

TABLE II

EXPLORATORY PITS

Log No.	Depth (ft.)	Description	Logged: 1-27-04 By: CRN
EP-138	0 to 7	SAUGUS FORMATION-SUNSHINE RANCH MEMBER (Tsr): Silty Sandstone; fine- to coarse-grained with pebbles and cobbles, pale yellowish brown to pale grey, slightly moist, moderately hard, slightly bedded generally massive with some scour fill structure. Attitude: Bedding @ 6 feet, N40W 37NE Note: Soil removed by dozer during recent fire fighting operations. Total Depth 7 feet.	
EP-139	0 to ½	SOIL: Silty Sand; fine- to coarse-grained with pebbles and cobbles, moderate yellowish brown, slightly moist, loose, some roots and rootlets.	
	½ to 5	SAUGUS FORMATION-SUNSHINE RANCH MEMBER (Tsr): Silty Sandstone; fine- to coarse-grained with pebbles and cobbles, pale yellowish brown to pale grey, slightly moist, moderately hard, slightly bedded generally massive with some scour fill structure. Attitude: Approximate Bedding @ 4 feet E-W 30N Total Depth 5 feet.	
EP-140	0 to ½	SOIL: Silty Sand; fine- to coarse-grained with pebbles and cobbles, moderate yellowish brown, slightly moist, loose, some roots and rootlets.	
	½ to 6	SAUGUS FORMATION-SUNSHINE RANCH MEMBER (Tsr): Silty Sandstone; fine- to coarse-grained with pebbles and cobbles, pale yellowish brown to pale grey, slightly moist, moderately hard, slightly bedded generally massive with some scour fill structure. Attitude: Bedding @ 5 feet, N80E 28NW Total Depth 6 feet.	

TABLE II

EXPLORATORY PITS

Log No.	Depth (ft.)	Description	Logged: 1-27-04 By: CRN
EP-141	0 to 3	SOIL: Silty to Clayey Sand; very fine- to medium-grained with some pebbles, dark yellowish brown, moist, soft, some roots and rootlets.	
	3 to 8	SAUGUS FORMATION-SUNSHINE RANCH MEMBER (Tsr): Gravelly Sandstone; fine- to coarse-grained with pebbles and cobbles, some boulders up to 18± inches, pale yellowish brown, slightly moist, moderately hard, massive, matrix supported, top 2± feet highly weathered.	
		Total Depth 8 feet.	
EP-142	0 to 3	SOIL/COLLUVIUM (Qcol): Silty Sand; fine- to coarse-grained with pebbles and cobbles, moderate to dark yellow brown, moist, loose some roots and rootlets.	
	3 to 9	SAUGUS FORMATION-SUNSHINE RANCH MEMBER (Tsr): Gravelly Sandstone; fine- to coarse-grained with pebbles and cobbles, pale yellowish grey to pale grey, slightly moist, moderately hard, massive with interlayered pebbles and cobbles lenses.	
		Attitude: Bedding @ 8 feet, E-W 33N	
		Total Depth 9 feet.	
EP-143	0 to ½	SOIL: Silty Sand; fine- to medium-grained, moderate yellowish brown, slightly moist, loose, some roots and rootlets. Note: Some soil removed during recent fire fighting operations.	
	½ to 6	SAUGUS FORMATION-SUNSHINE RANCH MEMBER (Tsr): Silty Sandstone; fine- to medium-grained, pale grey, slightly moist, moderately hard, slightly bedded generally massive.	
		Attitude: Bedding @ 4 feet, N60W 32NE	
		Total Depth 6 feet.	

TABLE II

EXPLORATORY PITS

Log No.	Depth (ft.)	Description	Logged: 1-27-04 By: CRN
EP-144	0 to 5	SOIL/COLLUVIUM (Qcol): Silty Sand; fine- to medium-grained, moderate yellow brown, slightly moist to moist, loose, abundant roots and rootlets.	
	5 to 9	SAUGUS FORMATION-SUNSHINE RANCH MEMBER (Tsr): Pebbly Sandstone; fine- to coarse-grained, pale grey, slightly moist, moderately hard, massive with some interlayered pebble and cobbles lenses. Attitude: Bedding @ 7 feet, N70W 32NE Total Depth 9 feet.	

TABLE I

EXPLORATORY TRENCH LOGS

Log No.	Depth (ft.)	Description	Logged: 1-31-06 By: RHS
EP-201	0 to 2	SOIL: Sandy Clay; dark yellowish brown, slightly moist, firm, rootlets common, clusters of small bi-valve shells.	
	2 to 9	SAUGUS FORMATION - SUNSHINE RANCH MEMBER (Tsr): Sandy Siltstone; light olive gray with reddish brown stain, dry, soft, highly fractured, weathered.	
	@ 9	Fine- to medium-grained Sandstone, pinkish gray, soft, poorly cemented, some pebbles, probable cross-bed.	
		Bedding Attitude: N65E, 28NW	
		Total Depth 9 feet.	
EP-202	0 to 2	SAUGUS FORMATION - SUNSHINE RANCH MEMBER (Tsr): Fine- to medium-grained Sandstone, pinkish gray, dry, soft, many pebbles and small cobbles.	
	2 to 5	Sandy Siltstone, pale yellowish brown, slightly moist, soft, moderately fractured, rootlet to depth.	
	5 to 6	Sandstone, pinkish gray, dry, soft.	
		Bedding Attitude: N55W, 35NE	
		Total Depth 6 feet.	
EP-203	0 to 2	SOIL: Sandy Silt; dark yellowish brown, slightly moist, stiff, many pebbles.	
	2 to 4½	SAUGUS FORMATION - SUNSHINE RANCH MEMBER (Tsr): Fine- to medium-grained Sandstone, pinkish gray, slightly moist, soft, poorly cemented.	
	4½ to 7	Siltstone, light olive gray, slightly moist, soft to moderately hard.	
		Bedding Attitude: N80E, 45NW	
		Total Depth 7 feet.	

TABLE I

EXPLORATORY TRENCH LOGS

Log No.	Depth (ft.)	Description	Logged: 1-31-06 By: RHS
EP-204	0 to 6½	SAUGUS FORMATION - SUNSHINE RANCH MEMBER (Tsr): Fine- to coarse-grained Sandstone, soft to moderately hard, dry, poorly cemented, pebble and small cobble beds and lenses.	
		Bedding Attitude: EW, 40N	
		Total Depth 6½ feet.	
EP-205	0 to 2	SOIL: Silty Clay; dark yellowish brown, moist, stiff, porous.	
	2 to 10	SAUGUS FORMATION - SUNSHINE RANCH MEMBER (Tsr): Sandy Siltstone, light olive gray, slightly moist, soft to moderately hard at depth, white carbonate pods common.	
	@ 6 & 8	Silty Sandstone; very light olive gray, slightly moist, moderately hard, 6 to 12 inch thick interbeds.	
		Bedding Attitude: N85W, 30NE	
		Ring and Bulk samples at 6 and 10 feet.	
		Total Depth 8 feet.	
EP-206	0 to ¼	SOIL: Sandy Silt; moderate yellowish brown, dry, firm, porous.	
	¼ to 5	SAUGUS FORMATION - SUNSHINE RANCH MEMBER (Tsr): Fine- to medium-grained Sandstone, pinkish gray, dry, soft to moderately hard, poorly cemented, roots to depth.	
	@ 3	8 to 10-inch thick Silty Sandstone-pebble conglomerate, grayish orange, dry, soft, one small cobble.	
		Bedding Attitude: N70W, 45NE	
		Total Depth 5 feet.	

TABLE I

EXPLORATORY TRENCH LOGS

Log No.	Depth (ft.)	Description	Logged: 1-31-06 By: RHS
EP-207	0 to ½	SOIL: Sandy Silt; dark yellowish brown, moist, firm, abundant rootlets.	
	½ to 3½	PICO FORMATION (Tp): Silty Sandstone; very pale orange to yellowish gray, slightly moist, soft, red brown stain common.	
		Bedding Attitude: N55W, 40NE	
		Total Depth 3½ feet.	

GOLD COAST GEOSERVICES, INC.

SUB-SURFACE DATA — BORING LOG NO. B-1

PROJECT: D.R. HORTON - LYONS CANYON RANCH, SANTA CLARITA — FILE NO.: GC14-122536

ELEVATION: SEE PLATE 1 — DATE: 02/09/15

METHOD: 6-inch Hollow Stem Auger — DRILLING CO.: HD DRILLING

DEPTH (FT)	SAMPLE: BULK	SAMPLE: RING	BLOWCOUNT: FIELD (N)	BLOWCOUNT: N(60)	MOISTURE %	DENSITY	SIEVE: % PASSING # 200 SCREEN	GRAPHIC LOG	DESCRIPTION AND REMARKS
0									**ALLUVIUM - Qal - (0' - 60')**
-	SPT		2	2.8					
-									2.5' - Dark brown very fine- to fine-grained silty sand with
-	SPT		5	6.9					pebbles, moist, loose.
-		X	13	10.0	9.4	98.9			5' - Medium brown very fine-grained silty sand, slightly moist, loose.
-	SPT		6	8.3					7.5' - Light to medium brown very fine-grained silty sand, damp, slightly firm.
-									
10	SPT		12	16.6					10' - Medium brown fine- to medium-grained sand, slightly damp, slightly firm.
-									
-	SPT		4	5.5					12.5' - 15' - Medium to dark brown very fine-grained silty sand, slightly
-	SPT		4	5.5					damp, slightly firm.
-		X	13	10.0	9.7	100.6			
-	SPT		5	6.9					17.5' - 20' - Dark brown very fine-grained silty sand, slightly damp, firm.
-									
20	SPT		15	20.7					
-									
-	SPT		32	44.2					22.5' - 25' - Medium brown fine- to coarse grained sand containing
-									pebbles, slightly damp, firm.
-	SPT		35	48.3					27.5' - 30' - Medium brown fine- to coarse-grained sand, slightly damp,
-		x	57	43.7	8.3	104.3			firm.
-	SPT		34	46.9					
30	SPT		32	44.2					
-									
-	SPT		32	44.2					32.5' - Cobble/boulder
-									
-	SPT		39	53.8					35' - 40' - Medium brown fine- to medium-grained silty sand, dry, firm.
-		X	59	45.2	9.2	106.7			
-	SPT		43	59.3					
40	SPT		40	55.2					40' - Medium to dark brown fine-grained silty sand containing gravel, slightly
-									moist, dense
-	SPT		35	48.3					42.5' - 45' - Medium brown very fine- to medium-grained clayey to silty sand
-									slightly moist, firm.
-	SPT		35	48.3					
-		X	62	47.5	7.8	110.4			47.5' - Medium brown very fine- to medium-grained silty sand, humid, firm.
-	SPT		32	44.2					
50	SPT		37	51.1					50' - 55' - Medium brown fine- to coarse-grained gravelly silty sand,
-									humid, firm.
-	SPT		46	63.5					
-									
-	SPT		40	55.2					55' - 60' - Medium brown fine- to coarse-grained silty gravelly sand, humid,
-		X	64	49.1	7.6	113.3			firm.
-	SPT		46	63.5					
60	SPT		44	60.7					End at 60'

Comments: The following correction factors were utilized to determine $N_{(60)}$ (Per SP117)
Cb = 1.15 (8" Diameter Borehole); Cs = 1.2 (SPT Sampler without liner); Cs = 2/3 (California Sampler)

Notes: TOTAL DEPTH: 60' GROUNDWATER: NO REFUSAL/CAVING: NO BACKFILLED: YES

PLATE 2.1

GOLD COAST GEOSERVICES, INC.

SUB-SURFACE DATA — BORING LOG NO. B-2

PROJECT: D.R. HORTON - LYONS CANYON RANCH, SANTA CLARITA — FILE NO.: GC14-122536

ELEVATION: SEE PLATE 1 — DATE: 02/09/15

METHOD: 6-inch Hollow Stem Auger — DRILLING CO.: HD DRILLING

DEPTH (FT)	SAMPLE: BULK	SAMPLE: RING	BLOWCOUNT: FIELD (N)	BLOWCOUNT: N(60)	MOISTURE %	DENSITY	SIEVE: % PASSING # 200 SCREEN	GRAPHIC LOG	DESCRIPTION AND REMARKS
0									**ALLUVIUM - Qal - (0' - 60')**
-	SPT		7	9.7					2.5' - Dark brown very fine- to fine-grained silty sand, moist, loose.
-									
-	SPT		9	12.4					5' - Medium brown very fine-grained silty sand, humid, slightly firm.
-		X	18	13.8	11.4	98.2			
-	SPT		6	8.3					7.5' - Medium brown very fine-to fine-grained silty sand, humid, slightly firm.
-									
10	SPT		6	8.3					10' - Dark brown very fine- to fine-grained silty sand, humid, slightly firm.
-									
-	SPT		7	9.7					12.5' - 15' - Medium brown very fine- to fine-grained silty sand, humid,
-	SPT		5	6.9					loose to slightly firm.
-		X	18	13.8	10.7	104.7			
-	SPT		11	15.2					17.5' - 27.5' - Dark brown very fine-grained silty sand, humid, slightly firm.
-									
20	SPT		18	24.8					
-									
-	SPT		22	30.4					
-									
-	SPT		28	38.6					
-		x	48	36.8	10.3	107.3			27.5' Medium to dark brown fine- to very coarse-grained silty sand
-	SPT		28	38.6					
30	SPT		29	40.0					30' - 32.5' - Dark brown to medium reddish brown fine- to coarse-grained
-									silty sand containing pebbles to gravel, humid, firm.
-	SPT		27	37.3					
-									35' - Medium brown fine- to medium-grained silty sand, slightly moist, firm.
-	SPT		29	40.0					
-		X	55	42.2	8.2	112.8			37.5' - 40' - Medium reddish brown fine- to very coarse-grained pebbly
-	SPT		42	58.0					silty sand, humid, dense.
40	SPT		36	49.7					
-									
-	SPT		38	52.4					42.5' - Medium brown very fine- to fine-grained clayey to silty sand,
-									humid, firm.
-	SPT		40	55.2					45' - Medium reddish brown fine- to very coarse-grained pebbly to gravelly
-		X	68	52.1	8.4	118.0			sand, slightly moist, dense.
-	SPT		37	51.1					
50	SPT		39	53.8					47.5' - 50' - Dark brown very fine- to fine-grained clayey to silty sand,
-									slightly moist, firm.
-	SPT		56	77.3					52.5' - 60' - Medium brown fine- to coarse-grained pebbly to gravelly sand,
-									humid, dense.
-	SPT		50 for 6"						
-									
-	SPT		50 for 6"						
60	SPT								End at 60'

Comments: The following correction factors were utilized to determine N(60) (Per SP117)
Cb = 1.15 (8" Diameter Borehole); Cs = 1.2 (SPT Sampler without liner); Cs = 2/3 (California Sampler)

Notes: TOTAL DEPTH: 57.5' GROUNDWATER: NO REFUSAL/CAVING: NO BACKFILLED: YES

PLATE 2.2

GOLD COAST GEOSERVICES, INC.

SUB-SURFACE DATA — BORING LOG NO. B-3

PROJECT: D.R. HORTON - LYONS CANYON RANCH, SANTA CLARITA — FILE NO.: GC14-122536

ELEVATION: SEE PLATE 1 — DATE: 02/09/15

METHOD: 6-inch Hollow Stem Auger — DRILLING CO.: HD DRILLING

DEPTH (FT)	SAMPLE: BULK	SAMPLE: RING	BLOWCOUNT: FIELD (N)	BLOWCOUNT: N(60)	MOISTURE %	DENSITY	SIEVE: % PASSING # 200 SCREEN	GRAPHIC LOG	DESCRIPTION AND REMARKS
0									**ALLUVIUM - Qal - (0' - 60')**
-	SPT		4	5.5					2.5' - 5' - Medium to dark brown very fine- to fine-grained silty sandy clay
-									containing pebbles, moist, slightly firm.
-	SPT		3	4.1					5' - 15' - Dark brown very fine-grained silty sand, humid, loose.
-		X	11	8.4	15.9	102.0			
-	SPT		4	5.5					
-									
10	SPT		4	5.5					
-									
-	SPT		3	4.1					
-	SPT		11	15.2					15' - Medium brown fine- to medium-grained silty sand, humid, slightly firm.
-		X	34	26.1	5.5	105.8			17.5' - 30' - Medium brown fine- to coarse-grained silty sand, humid, dense.
-	SPT		18	24.8					
-									
20	SPT		17	23.5					
-									
-	SPT		28	38.6					
-									
-	SPT		27	37.3					
-		x	48	36.8	6.0	115.4			
-	SPT		27	37.3					
30	SPT		25	34.5					30' - Medium brown very fine- to fine-grained silty sand, humid, firm.
-									
-	SPT		27	37.3					32.5' - Medium to dark brown fine- to coarse-grained silty sand containing
-									gravel, humid, dense.
-	SPT		55 FOR 6"						35' - Cobble/boulder
-		X	51	39.1	8.3	114.3			37.5' - 42.5' - Medium brown very fine- to fine-grained silty sand, humid, firm.
-	SPT		32	44.2					
40	SPT		35	48.3					
-									
-	SPT		43	59.3					42.5' - 47.5' - Medium brown fine- to medium-grained silty sand containing
-									gravel, humid, dense.
-	SPT		32	44.2					
-		X	57	43.7	5.6	116.2			
-	SPT		34	46.9					
50	SPT		37	51.1					50' - Medium brown fine-grained silty sand, humid, dense.
-									
-	SPT		33	45.5					52.5' - Medium brown very fine- to fine-grained clayey to silty sand, slightly
-									moist, firm.
-	SPT		60	82.8					55' - 60' - Medium reddish brown fine- to very coarse-grained silty sand,
-	X		82	62.9	4.3	126.2			humid, dense.
-	SPT		67 FOR 6"						
60	SPT		64 FOR 5"						End at 60'

Comments: The following correction factors were utilized to determine N(60) (Per SP117)
Cb = 1.15 (8" Diameter Borehole); Cs = 1.2 (SPT Sampler without liner); Cs = 2/3 (California Sampler)

Notes: TOTAL DEPTH: 60' GROUNDWATER: NO REFUSAL/CAVING: NO BACKFILLED: YES

PLATE 2.3

GOLD COAST GEOSERVICES, INC.

SUB-SURFACE DATA — BORING LOG NO. B-4

PROJECT: D.R. HORTON - LYONS CANYON RANCH, SANTA CLARITA — FILE NO.: GC14-122536

ELEVATION: SEE PLATE 1 — DATE: 02/10/15

METHOD: 6-inch Hollow Stem Auger — DRILLING CO.: HD DRILLING

DEPTH (FT)	SAMPLE: BULK	SAMPLE: RING	BLOWCOUNT: FIELD (N)	BLOWCOUNT: N(60)	MOISTURE %	DENSITY	SIEVE: % PASSING # 200 SCREEN	GRAPHIC LOG	DESCRIPTION AND REMARKS
0									**ALLUVIUM - Qal - (0' - 50')**
-	SPT		8	11.0					2.5' - Dark brown fine- to coarse-grained silty sand, slightly moist, firm.
-									
-	SPT		7	9.7					5' - 17.5' - Light to medium brown very fine- to fine-grained sand, dry, firm.
-		X	26	19.9	9.4	83.9			
-	SPT		13	17.9					
-									
10	SPT		12	16.6					
-									
-	SPT		8	11.0					
-	SPT		13	17.9					
-		X	20	15.3	8.6	93.0			
-	SPT		8	11.0					17.5' - Dark brown very fine- to fine-grained clayey to silty sand, slightly
-									moist, slightly firm.
20	SPT		16	22.1					20' - Dark brown very fine- to fine-grained silty sand, humid, loose to
-									slightly firm.
-	SPT		22	30.4					22.5' - 25' - Medium brown very fine- to fine-grained clayey to silty sand,
-									humid, slightly firm.
-	SPT		27	37.3					
-		x	48	36.8	12.0	104.4			
-	SPT		25	34.5					27.5' - 30' - Medium brown fine- to coarse-grained clayey to silty sand,
30	SPT		24	33.1					humid to slightly moist, firm.
-									
-	SPT		27	37.3					32.5' - 35' - Medium brown fine- to very coarse-grained clayey to silty sand,
-									humid to slightly moist, firm.
-	SPT		24	33.1					37.5 ' - 50' - Medium brown to medium reddish brown fine- to very coarse-
-		X	46	35.3	8.3	111.0			grained silty sand, humid, dense.
-	SPT		34	46.9					
40	SPT		29	40.0					
-									
-	SPT		36	49.7					
-									
-	SPT		50	69.0					
-		X	50 for 6"		6.7	114.6			
-	SPT		50 for 6"						
50	SPT		70	96.6					End at 50'
-									
-									
-									
-									
-									
-									
60									

Comments: The following correction factors were utilized to determine N(60) (Per SP117)
Cb = 1.15 (8" Diameter Borehole); Cs = 1.2 (SPT Sampler without liner); Cs = 2/3 (California Sampler)

Notes: TOTAL DEPTH: 50' GROUNDWATER: NO REFUSAL/CAVING: NO BACKFILLED: YES

PLATE 2.4

GOLD COAST GEOSERVICES, INC.

SUB-SURFACE DATA — BORING LOG NO. B-5

PROJECT: D.R. HORTON - LYONS CANYON RANCH, SANTA CLARITA — FILE NO.: GC14-122536

ELEVATION: SEE PLATE 1 — DATE: 02/11/15

METHOD: 6-inch Hollow Stem Auger — DRILLING CO.: HD DRILLING

DEPTH (FT)	SAMPLE: BULK	SAMPLE: RING	BLOWCOUNT: FIELD (N)	BLOWCOUNT: N(60)	MOISTURE %	DENSITY	SIEVE: % PASSING # 200 SCREEN	GRAPHIC LOG	DESCRIPTION AND REMARKS
0									**ALLUVIUM - Qal - (0' - 40')**
-	SPT		2	2.8					2.5' - Dark brown very fine- to fine-grained silty sand, moist, loose.
-									
-	SPT		4	5.5					5' - Medium to dark brown very fine- to fine-grained silty sand, humid to
-		X	17	13.0	9.7	105.8			slightly moist, slightly firm.
-	SPT		6	8.3					7.5' - 17.5' - Medium brown to dark brown fine- to medium-grained silty sand,
-									humid, loose to slightly firm.
10	SPT		7	9.7					
-									
-	SPT		8	11.0					
-	SPT		8	11.0					
-		X	24	18.4	7.5	99.4			
-	SPT		12	16.6					17.5' - Medium brown very fine- to fine-grained silty sand, humid, firm
-									
20	SPT		15	20.7					20' - 25' - Light to medium brown very fine- to fine-grained silty sand,
-									humid, firm.
-	SPT		16	22.1					
-									
-	SPT		17	23.5					25' - Medium brown fine- to medium-grained silty sand, humid, firm.
-		x	32	24.5	2.8	108.9			
-	SPT		23	31.7					25' - 30' - Medium brown fine- to very coarse-grained silty sand,
30	SPT		20	27.6					humid, firm.
-									
-	SPT		24	33.1					30' - 40' - Light to medium brown fine- to very coarse-grained silty
-									sand containing gravel, humid, dense very dense.
-	SPT		36	49.7					
-		X	50 for 6"		5.1	117.6			
-	SPT		56	77.3					
40	SPT		67	92.5					40' - Refusal (Saugus Formation ?)
-									End at 40'
-									
-									
-									
-									
-									
-									
50									
-									
-									
-									
-									
-									
-									
60									

Comments: The following correction factors were utilized to determine N(60) (Per SP117)
Cb = 1.15 (8" Diameter Borehole); Cs = 1.2 (SPT Sampler without liner); Cs = 2/3 (California Sampler)

Notes: TOTAL DEPTH: 40' GROUNDWATER: NO REFUSAL/CAVING: NO BACKFILLED: YES

PLATE 2.5

GOLD COAST GEOSERVICES, INC.

SUB-SURFACE DATA — BORING LOG NO. B-6

PROJECT: D.R. HORTON - LYONS CANYON RANCH, SANTA CLARITA — FILE NO.: GC14-122536

ELEVATION: SEE PLATE 1 — DATE: 02/10/15

METHOD: 6-inch Hollow Stem Auger — DRILLING CO.: HD DRILLING

DEPTH (FT)	SAMPLE: BULK	SAMPLE: RING	BLOWCOUNT: FIELD (N)	BLOWCOUNT: N(60)	MOISTURE %	DENSITY	SIEVE: % PASSING # 200 SCREEN	GRAPHIC LOG	DESCRIPTION AND REMARKS
0									**ALLUVIUM - Qal - (0' - 60')**
-	SPT		2	2.8					2.5' - Dark brown very fine- to medium-grained silty sand, slightly moist, loose.
-	SPT		10	13.8					5' - 10' - Light brown very fine- to fine-grained silty sand, humid, firm.
-		X	22	16.9	4.9	96.9			
-	SPT		10	13.8					
10	SPT		9	12.4					10' - Dark brown very fine- to fine-grained silty sand, humid, firm.
-	SPT		13	17.9					12.5' - Dark brown very fine- to fine-grained clayey to silty sand, humid, firm.
-	SPT		6	8.3					15' - Medium to dark brown fine- to medium-grained silty sand,
-		X	18	13.8	7.5	99.8			humid, slightly firm.
-	SPT		9	12.4					17.5' - 35' - Medium brown very fine- to medium-grained silty sand, humid, firm.
20	SPT		12	16.6					
-	SPT		27	37.3					
-	SPT		25	34.5					
-		X	46	35.3	6.1	103.8			
-	SPT		38	52.4					
30	SPT		31	42.8					
-	SPT		33	45.5					
-	SPT		47	64.9					35'- 50' - Medium brown fine- to very coarse-grained silty sand, humid,
-		X	62	47.5	6.0	104.2			dense.
-	SPT		36	49.7					
40	SPT		35	48.3					
-	SPT		39	53.8					
-	SPT		37	51.1					
-		X	66	50.6	6.4	104.8			
-	SPT		39	53.8					
50	SPT		35	48.3					50' - 55' - Dark brown medium- to very coarse-grained clayey to silty sand, slightly moist, dense.
-	SPT		34	46.9					
-	SPT		33	45.5					
-	X		62	47.5	23.9	106.1			57.5' - Dark brown fine- to coarse-grained clayey to silty sand, moist, dense.
-	SPT		37	51.1					60' - Dark brown fine- to coarse-grained clayey to silty sand,saturated, dense.
60	SPT		36	49.7					End at 60'

Comments: The following correction factors were utilized to determine N(60) (Per SP117)
Cb = 1.15 (8" Diameter Borehole); Cs = 1.2 (SPT Sampler without liner); Cs = 2/3 (California Sampler)

Notes: TOTAL DEPTH: 60' GROUNDWATER: NO REFUSAL/CAVING: NO BACKFILLED: YES

PLATE 2.6

GOLD COAST GEOSERVICES, INC.

SUB-SURFACE DATA — BORING LOG NO. B-7

PROJECT: D.R. HORTON - LYONS CANYON RANCH, SANTA CLARITA — FILE NO.: GC14-122536

ELEVATION: SEE PLATE 1 — DATE: 02/11/15

METHOD: 6-inch Hollow Stem Auger — DRILLING CO.: HD DRILLING

DEPTH (FT)	SAMPLE: BULK	SAMPLE: RING	BLOWCOUNT: FIELD (N)	BLOWCOUNT: N(60)	MOISTURE %	DENSITY	SIEVE: % PASSING # 200 SCREEN	GRAPHIC LOG	DESCRIPTION AND REMARKS
0									**ALLUVIUM -Qal - (0' - 60')**
-	SPT		4	5.5					2.5' - Dark brown very fine- to fine-grained silty sand, slightly moist, loose.
-									
-	SPT		1	1.4					5' - 20' - Medium brown very fine- to fine-grained silty sand, humid, slightly
-		X	15	11.5	9.4	88.9			firm.
-	SPT		7	9.7					
-									
10	SPT		10	13.8					
-									
-	SPT		9	12.4					
-	SPT		6	8.3					
-		X	16	12.3	8.2	90.6			
-	SPT		6	8.3					
-									
20	SPT		6	8.3					20' - Medium brown fine- to coarse-grained silty sand, humid, firm.
-									
-	SPT		23	31.7					
-									
-	SPT		22	30.4					25' - Medium brown fine-grained silty sand, humid, slightly firm.
-		x	52	39.9	8.1	104.4			
-	SPT		49	67.6					27.5' - 35' - Medium reddish brown fine- to very coarse-grained sand
30	SPT		54	74.5					containing gravel, dry, dense.
-									
-	SPT		32	44.2					
-									
-	SPT		26	35.9					35' - Medium to dark brown very fine- to fine-grained clayey to silty sand,
-		X	30	23.0	11.3	103.4			slightly moist, slightly firm.
-	SPT		30	41.4					
40	SPT		35	48.3					37.5' - 45' - Medium brown fine- to very coarse-grained pebbly to gravelly
-									sand, dry, dense.
-	SPT		39	53.8					
-									
-	SPT		30	41.4					45' - 50' - Dark brown fine- to coarse-grained clayey to silty sand containing
-		X	29	22.2	9.9	116.7			pebbles, slightly moist, firm to dense.
-	SPT		31	42.8					
50	SPT		44	60.7					50' - 60' - Medium reddish brown fine- to coarse-grained pebbly to gravelly
-									silty sand, slightly moist, dense.
-	SPT		50 for 6"						
-									
-	SPT		63	86.9					
-	X		50 for 6"		3.5	110.0			
-	SPT		50 for 6"						60' - Rock/boulder
60	SPT		50 for 6"						End at 60'

Comments: The following correction factors were utilized to determine N(60) (Per SP117)
Cb = 1.15 (8" Diameter Borehole); Cs = 1.2 (SPT Sampler without liner); Cs = 2/3 (California Sampler)

Notes: TOTAL DEPTH: 60' GROUNDWATER: NO REFUSAL/CAVING: NO BACKFILLED: YES

PLATE 2.7

GOLD COAST GEOSERVICES, INC.

SUB-SURFACE DATA — BORING LOG NO. B-8

PROJECT: D.R. HORTON - LYONS CANYON RANCH, SANTA CLARITA — FILE NO.: GC14-122536

ELEVATION: SEE PLATE 1 — DATE: 02/12/15

METHOD: 6-inch Hollow Stem Auger — DRILLING CO.: HD DRILLING

DEPTH (FT)	SAMPLE: BULK	SAMPLE: RING	BLOWCOUNT: FIELD (N)	BLOWCOUNT: N(60)	MOISTURE %	DENSITY	SIEVE: % PASSING # 200 SCREEN	GRAPHIC LOG	DESCRIPTION AND REMARKS
0									**ALLUVIUM - Qal - (0' - 60')**
-	SPT		5	6.9					2.5' - Dark brown fine- to medium-grained silty sand, slightly moist, loose.
-									
-	SPT		12	16.6					5' - 20' - Medium brown very fine- to fine-grained silty sand, humid, slightly
-		X	21	16.1	7.1	89.3			firm.
-	SPT		15	20.7					
-									
10	SPT		10	13.8					
-									
-	SPT		13	17.9					
-	SPT		11	15.2					
-		X	28	21.5	4.8	101.2			
-	SPT		16	22.1					
-									
20	SPT		21	29.0					20' - Medium reddish brown fine- to medium-grained silty sand, humid,
-									dense.
-	SPT		30	41.4					
-									
-	SPT		22	30.4					25' - Medium reddish brown fine- to very coarse-grained pebbly sand,
-		x	42	32.2	5.1	107.8			humid, dense.
-	SPT		24	33.1					27.5' - Medium brown fine- to medium-grained silty sand, humid, dense.
30	SPT		28	38.6					30' - 47.5' - Medium reddish brown fine- to very coarse-grained pebbly to
-									gravelly silty sand, humid, dense.
-	SPT		37	51.1					
-									
-	SPT		28	38.6					
-		X	50	38.3	5.9	109.5			
-	SPT		27	37.3					
40	SPT		35	48.3					
-									
-	SPT		36	49.7					
-									
-	SPT		31	42.8					
-		X	50 for 6"		7.1	110.0			
-	SPT		50	69.0					47.5' - 55' - Medium reddish brown fine- to very coarse-grained silty sandy
50	SPT		46	63.5					clay containing gravel, moist, dense.
-									
-	SPT		63	86.9					
-									
-	SPT		91	125.6					55' -60' - Medium gray fine- to medium-grained sandy clay, slightly moist, dense.
-	X		50 for 6"						
-									
60									End at 60'

Comments: The following correction factors were utilized to determine N(60) (Per SP117)
Cb = 1.15 (8" Diameter Borehole); Cs = 1.2 (SPT Sampler without liner); Cs = 2/3 (California Sampler)

Notes: TOTAL DEPTH: 60' GROUNDWATER: NO REFUSAL/CAVING: NO BACKFILLED: YES

PLATE 2.8

GOLD COAST GEOSERVICES, INC.

SUB-SURFACE DATA — BORING LOG NO. B-9

PROJECT: D.R. HORTON - LYONS CANYON RANCH, SANTA CLARITA — FILE NO.: GC14-122536

ELEVATION: SEE PLATE 1 — DATE: 02/11/15

METHOD: 6-inch Hollow Stem Auger — DRILLING CO.: HD DRILLING

DEPTH (FT)	SAMPLE: BULK	SAMPLE: RING	BLOWCOUNT: FIELD (N)	BLOWCOUNT: N(60)	MOISTURE %	DENSITY	SIEVE: % PASSING # 200 SCREEN	GRAPHIC LOG	DESCRIPTION AND REMARKS
0									**ALLUVIUM - Qal - (0' - 47.5')**
-	SPT		1	1.4					2.5' - Dark brown very fine- to fine-grained silty sand, slightly moist, loose.
-	SPT		11	15.2					5' - 12.5' - Light to medium brown very fine- to fine-grained silty sand, dry, firm.
-		X	34	26.1	6.3	101.3			
-	SPT		8	11.0					
10	SPT		9	12.4					
-	SPT		11	15.2					12.5' - Medium to dark brown fine- to coarse-grained silty sand, dry, firm.
-	SPT		9	12.4					15' - 20' - Medium to dark brown fine-grained silty sand, humid, firm.
-		X	26	19.9	7.7	104.4			
-	SPT		10	13.8					
20	SPT		14	19.3					
-	SPT		22	30.4					22.5' - 35' - Medium reddish brown very fine- to medium-grained silty sand, humid, firm.
-	SPT		24	33.1					
-		x	50 for 5"		6.4	105.6			
-	SPT		21	29.0					
30	SPT		22	30.4					
-	SPT		25	34.5					
-	SPT		30	41.4					35' - 45' - Dark brown very fine- to coarse-grained clayey to silty sand, slightly moist, firm.
-		X	54	41.4	5.7	111.3			
-	SPT		39	53.8					
40	SPT		38	52.4					
-	SPT		44	60.7					
-	SPT		47	64.9					45' - Medium gray very fine- to medium-grained sandy clay to clayey sand, moist, very dense.
-		X	50 for 6"		5.8	112.2			
-	SPT		50 for 5"						**SAUGUS FORMATION - Ts - (47.5' - 57.5')** - Medium gray medium- to very coarse-grained clayey sand, moist, very dense.
50	SPT		72	99.4					
-	SPT		50 for 4"						
-	SPT		50 for 5"						End at 57.5'
60									

Comments: The following correction factors were utilized to determine N(60) (Per SP117)
Cb = 1.15 (8" Diameter Borehole); Cs = 1.2 (SPT Sampler without liner); Cs = 2/3 (California Sampler)

Notes: TOTAL DEPTH: 55' GROUNDWATER: NO REFUSAL/CAVING: NO BACKFILLED: YES

PLATE 2.9

GOLD COAST GEOSERVICES, INC.

SUB-SURFACE DATA — BORING LOG NO. B-10

PROJECT: D.R. HORTON - LYONS CANYON RANCH, SANTA CLARITA — FILE NO.: GC14-122536

ELEVATION: SEE PLATE 1 — DATE: 02/12/15

METHOD: 6-inch Hollow Stem Auger — DRILLING CO.: HD DRILLING

DEPTH (FT)	SAMPLE: BULK	SAMPLE: RING	BLOWCOUNT: FIELD (N)	BLOWCOUNT: N(60)	MOISTURE %	DENSITY	SIEVE: % PASSING # 200 SCREEN	GRAPHIC LOG	DESCRIPTION AND REMARKS
0									**ALLUVIUM - Qal - (0' - 27.5')**
-	SPT		14	19.3					2.5' - Dark brown very fine- to fine-grained silty sand, slightly moist, firm.
-									
-	SPT		31	42.8					5' - 17.5' - Medium brown fine- to coarse-grained silty sand, dry, firm.
-		X	37	28.4					
-	SPT		12	16.6					
-									
10	SPT		12	16.6					
-									
-	SPT		14	19.3					
-	SPT		14	19.3					
-		X	35	26.8	4.8	97.2			
-	SPT		16	22.1					
-									
20	SPT		13	17.9					20' - 22.5' - Medium brown fine- to coarse-grained pebbly silty sand, dry, dense.
-									
-	SPT		43	59.3					
-									
-	SPT		44	60.7					22.5' - 27.5' - Light to medium brown very fine- to fine-grained silty sand, dry,
-		x	75	57.5	4.3	115.3			slightly firm.
-	SPT		50 for 4"						**SAUGUS FORMATION - Ts - (27.5' - 30')** - Medium brown fine- to very coarse-
30	SPT		50 for 2"						grained silty sand, dry, very dense.
-									End at 30'
-									
-									
-									
-									
-									
40									
-									
-									
-									
-									
-									
-									
-									
50									
-									
-									
-									
-									
-									
-									
60									

Comments: The following correction factors were utilized to determine N(60) (Per SP117)
Cb = 1.15 (8" Diameter Borehole); Cs = 1.2 (SPT Sampler without liner); Cs = 2/3 (California Sampler)

Notes: TOTAL DEPTH: 30' GROUNDWATER: NO REFUSAL/CAVING: NO BACKFILLED: YES

PLATE 2.10

GOLD COAST GEOSERVICES, INC.

SUB-SURFACE DATA — BORING LOG NO. B-11

PROJECT: D.R. HORTON - LYONS CANYON RANCH, SANTA CLARITA — FILE NO.: GC14-122536

ELEVATION: SEE PLATE 1 — DATE: 02/17/15

METHOD: 6-inch Hollow Stem Auger — DRILLING CO.: HD DRILLING

DEPTH (FT)	SAMPLE: BULK	SAMPLE: RING	BLOWCOUNT: FIELD (N)	BLOWCOUNT: N(60)	MOISTURE %	DENSITY	SIEVE: % PASSING # 200 SCREEN	GRAPHIC LOG	DESCRIPTION AND REMARKS
0									**ALLUVIUM - Qal - (0' - 10')**
-	SPT		5	6.9					2.5' - Dark brown very fine- to fine-grained silty sand, sightly moist, loose.
-	SPT		12	16.6					5' - Medium gray very fine- to medium-grained clayey to silty sand, slightly
-		X	43	33.0	6.8	109.7			moist, firm.
-	SPT		22	30.4					7.5' - Medium reddish brown fine- to medium-grained silty sand, dry, dense.
10	SPT		50 for 4"						**SAUGUS FORMATION - Ts - (10' - 17.5')**
-									10' - Medium brown fine- to very coarse-grained silty sand, dry, dense.
-	SPT		50 for 6"						12.5' - Dark brown very fine- to medium-grained clayey to silty sand, slightly
-									moist, dense.
-	SPT		50 for 4"						15' - 17.5' - Light to medum gray very fine-grained silty clay, moist, very stiff.
20									
30									
40									
50									
60									

Comments: The following correction factors were utilized to determine N(60) (Per SP117)
Cb = 1.15 (8" Diameter Borehole); Cs = 1.2 (SPT Sampler without liner); Cs = 2/3 (California Sampler)

Notes: TOTAL DEPTH: 17.5' GROUNDWATER: NO REFUSAL/CAVING: NO BACKFILLED: YES

PLATE 2.11

GOLD COAST GEOSERVICES, INC.

SUB-SURFACE DATA — BORING LOG NO. B-12

PROJECT: D.R. HORTON - LYONS CANYON RANCH, SANTA CLARITA — FILE NO.: GC14-122536

ELEVATION: SEE PLATE 1 — DATE: 02/18/15

METHOD: 6-inch Hollow Stem Auger — DRILLING CO.: HD DRILLING

DEPTH (FT)	SAMPLE: BULK	SAMPLE: RING	BLOWCOUNT: FIELD (N)	BLOWCOUNT: N(60)	MOISTURE %	DENSITY	SIEVE: % PASSING # 200 SCREEN	GRAPHIC LOG	DESCRIPTION AND REMARKS
0									
-	SPT		6	8.3					**ALLUVIUM - Qal - (0' - 7.5')** - Medium reddish brown very fine- to fine-grained silty sand, slightly moist slightly firm.
-	SPT		19	26.2					
-		X	72	55.2	6.2	117.9			
-	SPT		50 for 5"						**SAUGUS FORMATION - Ts - (7.5' - 10')** - Medium brown fine-grained silty sand, humid, very dense.
10	SPT		50 for 3"						End at 10'
20									
30									
40									
50									
60									

Comments: The following correction factors were utilized to determine N(60) (Per SP117)
Cb = 1.15 (8" Diameter Borehole); Cs = 1.2 (SPT Sampler without liner); Cs = 2/3 (California Sampler)

Notes: TOTAL DEPTH: 10' GROUNDWATER: NO REFUSAL/CAVING: NO BACKFILLED: YES

PLATE 2.12

GOLD COAST GEOSERVICES, INC.

SUB-SURFACE DATA — BORING LOG NO. B-13

PROJECT: D.R. HORTON - LYONS CANYON RANCH, SANTA CLARITA — FILE NO.: GC14-122536

ELEVATION: SEE PLATE 1 — DATE: 02/18/15

METHOD: 6-inch Hollow Stem Auger — DRILLING CO.: HD DRILLING

DEPTH (FT)	SAMPLE: BULK	SAMPLE: RING	BLOWCOUNT: FIELD (N)	BLOWCOUNT: N(60)	MOISTURE %	DENSITY	SIEVE: % PASSING # 200 SCREEN	GRAPHIC LOG	DESCRIPTION AND REMARKS
0									**ALLUVIUM - Qal - (0' - 15')**
-	SPT		6	8.3					2.5' - 5' - Medium reddish brown very fine- to fine-grained silty sand, humid, firm.
-	SPT		9	12.4					
-		X	33	25.3	10.9	93.8			
-	SPT		17	23.5					7.5' - 10' - Medium brown fine- to medium-grained silty sand to sandy silt, humid, firm.
10	SPT		11	15.2					
-	SPT		11	15.2					12.5' - 15' - Medium brown fine- to coarse-grained silty sand, dry, firm.
-	SPT		40	55.2					**SAUGUS FORMATION - Ts - (15' - 17.5')** - Medium brown fine- to medium-grained
-		X	50 for 6"		8.1				silty sand to sandy clay, slightly moist, very dense.
-	SPT		50 for 3"						End at 17.5'
20									
30									
40									
50									
60									

Comments: The following correction factors were utilized to determine N(60) (Per SP117)
Cb = 1.15 (8" Diameter Borehole); Cs = 1.2 (SPT Sampler without liner); Cs = 2/3 (California Sampler)

Notes: TOTAL DEPTH: 17.5' GROUNDWATER: NO REFUSAL/CAVING: NO BACKFILLED: YES

PLATE 2.13

GOLD COAST GEOSERVICES, INC.

SUB-SURFACE DATA — BORING LOG NO. B-14

PROJECT: D.R. HORTON - LYONS CANYON RANCH, SANTA CLARITA — FILE NO.: GC14-122536

ELEVATION: SEE PLATE 1 — DATE: 02/17/15

METHOD: 6-inch Hollow Stem Auger — DRILLING CO.: HD DRILLING

DEPTH (FT)	SAMPLE: BULK	SAMPLE: RING	BLOWCOUNT: FIELD (N)	BLOWCOUNT: N(60)	MOISTURE %	DENSITY	SIEVE: % PASSING #200 SCREEN	GRAPHIC LOG	DESCRIPTION AND REMARKS
0	SPT		6	8.3					**ALLUVIUM - Qal - (0' - 12.5')** 2.5' - Dark brown very fine- to fine-grained silty sand, moist, loose.
	SPT		9	12.4					5' - Light to medium brown very fine-grained silty sand, humid, slightly firm.
		X	33	25.3	8.0	97.9			
	SPT		17	23.5					7.5' - 12.5' - Medium brown very fine- to fine-grained silty sand to sandy silt, humid, dense.
10	SPT		11	15.2					
	SPT		50 for 6"						**SAUGUS FORMATION - Ts - (12.5' - 20')** - Medium brown fine- to medium-grained clayey to silty sand, humid to slightly moist, dense.
	SPT		50 for 5"						
		X	50 for 6"		13.8	97.7			
	SPT		50 for 3"						
20	SPT		50 for 4"						End at 20'
30									
40									
50									
60									

Comments: The following correction factors were utilized to determine N(60) (Per SP117)
Cb = 1.15 (8" Diameter Borehole); Cs = 1.2 (SPT Sampler without liner); Cs = 2/3 (California Sampler)

Notes: TOTAL DEPTH: 20' GROUNDWATER: NO REFUSAL/CAVING: NO BACKFILLED: YES

PLATE 2.14

GOLD COAST GEOSERVICES, INC.

SUB-SURFACE DATA — BORING LOG NO. B-15

PROJECT: D.R. HORTON - LYONS CANYON RANCH, SANTA CLARITA — FILE NO.: GC14-122536

ELEVATION: SEE PLATE 1 — DATE: 02/17/15

METHOD: 6-inch Hollow Stem Auger — DRILLING CO.: HD DRILLING

DEPTH (FT)	SAMPLE: BULK	SAMPLE: RING	BLOWCOUNT: FIELD (N)	BLOWCOUNT: N(60)	MOISTURE %	DENSITY	SIEVE: % PASSING # 200 SCREEN	GRAPHIC LOG	DESCRIPTION AND REMARKS
0									**ALLUVIUM - Qal - (0' - 7.5')**
-	SPT		7	9.7					2.5' - Dark brown very fine- to fine-grained silty sand, moist, loose.
-	SPT		7	9.7					5' - Light to medium brown very fine-grained silty sand, humid, slightly firm.
-		X	50 for 5"		7.5	98.2			
-	SPT		69	95.2					**SAUGUS FORMATION - Ts - (7.5' - 20')**
-									7.5' - 17.5' - Medium brown very fine- to fine-grained silty sand to sandy silt,
10	SPT		50 for 4"						humid, very dense.
-	SPT		50 for 5"						
-	SPT		50 for 5"						
-		X	50 for 4"		13.2	100.0			
-	SPT		50 for 5"						
-									
20	SPT		50 for 4"						20' - Medium brown fine- to medium-grained clayey to silty sand, humid to slightly moist, very dense.
-									End at 20'
-									
-									
-									
-									
-									
30									
-									
-									
-									
-									
-									
40									
-									
-									
-									
-									
-									
50									
-									
-									
-									
-									
-									
60									

Comments: The following correction factors were utilized to determine N(60) (Per SP117)
Cb = 1.15 (8" Diameter Borehole); Cs = 1.2 (SPT Sampler without liner); Cs = 2/3 (California Sampler)

Notes: TOTAL DEPTH: 20' GROUNDWATER: NO REFUSAL/CAVING: NO BACKFILLED: YES

PLATE 2.15

GOLD COAST GEOSERVICES, INC.

SUB-SURFACE DATA — BORING LOG NO. B-16

PROJECT: D.R. HORTON - LYONS CANYON RANCH, SANTA CLARITA — FILE NO.: GC14-122536

ELEVATION: SEE PLATE 1 — DATE: 02/17/15

METHOD: 6-inch Hollow Stem Auger — DRILLING CO.: HD DRILLING

DEPTH (FT)	SAMPLE: BULK	SAMPLE: RING	BLOWCOUNT: FIELD (N)	BLOWCOUNT: N(60)	MOISTURE %	DENSITY	SIEVE: % PASSING # 200 SCREEN	GRAPHIC LOG	DESCRIPTION AND REMARKS
0									**ALLUVIUM - Qal - (0' - 15')**
-	SPT		8	11.0					2.5' - Medium to dark brown very fine- to fine-grained silty sand, slightly moist, loose.
-	SPT		9	12.4					5' - 10' - Medium brown very fine- to fine-grained silty sand, dry, firm.
-		X	52	39.9	7.1	104.9			
-	SPT		26	35.9					
10	SPT		20	27.6					
-	SPT		20	27.6					12.5'- 15' - Light to medium brown very fine- to fine-grained silty sand to sandy silt, slightly moist, dense.
-	SPT		50 for 5"						
-		X	50 for 5"		12.6	107.4			**SAUGUS FORMATION - Ts - (15' - 22.5')** - gray siltstone.
-	SPT		50 for 3"						
20	SPT		50 for 4"						
-	SPT		50 for 2"						End at 22.5'
30									
40									
50									
60									

Comments: The following correction factors were utilized to determine N(60) (Per SP117)
Cb = 1.15 (8" Diameter Borehole); Cs = 1.2 (SPT Sampler without liner); Cs = 2/3 (California Sampler)

Notes: TOTAL DEPTH: 22.5' GROUNDWATER: NO REFUSAL/CAVING: NO BACKFILLED: YES

PLATE 2.16

GOLD COAST GEOSERVICES, INC.

SUB-SURFACE DATA — BORING LOG NO. B-17

PROJECT: D.R. HORTON - LYONS CANYON RANCH, SANTA CLARITA — FILE NO.: GC14-122536

ELEVATION: SEE PLATE 1 — DATE: 02/18/15

METHOD: 6-inch Hollow Stem Auger — DRILLING CO.: HD DRILLING

DEPTH (FT)	SAMPLE: BULK	SAMPLE: RING	BLOWCOUNT: FIELD (N)	BLOWCOUNT: N(60)	MOISTURE %	DENSITY	SIEVE: % PASSING # 200 SCREEN	GRAPHIC LOG	DESCRIPTION AND REMARKS
0									**ALLUVIUM - Qal - (0' - 5')**
-	SPT		5	6.9					2.5' - Dark brown fine- to medium-grained silty sand, slightly moist, loose.
-									
-	SPT		11	15.2					SAUGUS FORMATION - Ts - (5' - 15')
-		X	68	52.1	10.0	98.1			5' - 7.5' - Medium to dark brown fine- to medium-grained silty sand, humid, slightly firm.
-									7.5' - 15' - Medium brown fine- to medium-grained silty to sandy clay, humid,
10	SPT		28	38.6					very dense.
-									
-	SPT		56	77.3					
-	SPT		50 for 5"						End at 15'
-									
-									
-									
20									
-									
-									
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30									
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-									
50									
-									
-									
-									
-									
-									
-									
60									

Comments: The following correction factors were utilized to determine N(60) (Per SP117)
Cb = 1.15 (8" Diameter Borehole); Cs = 1.2 (SPT Sampler without liner); Cs = 2/3 (California Sampler)

Notes: TOTAL DEPTH: 15' GROUNDWATER: NO REFUSAL/CAVING: NO BACKFILLED: YES

PLATE 2.17

GOLD COAST GEOSERVICES, INC.

SUB-SURFACE DATA — BORING LOG NO. B-18

PROJECT: D.R. HORTON - LYONS CANYON RANCH, SANTA CLARITA — FILE NO.: GC14-122536

ELEVATION: SEE PLATE 1 — DATE: 02/18/15

METHOD: 6-inch Hollow Stem Auger — DRILLING CO.: HD DRILLING

DEPTH (FT)	SAMPLE: BULK	SAMPLE: RING	BLOWCOUNT: FIELD (N)	BLOWCOUNT: N(60)	MOISTURE %	DENSITY	SIEVE: % PASSING # 200 SCREEN	GRAPHIC LOG	DESCRIPTION AND REMARKS
0	SPT		10	13.8					**ALLUVIUM - Qal - (0' - 7.5')**
									2.5' - Dark brown very fine- to fine-grained silty sand, moist, slightly firm.
	SPT		15	20.7					
		X	50 for 6"		8.2	105.0			5' - Medium brown very fine- to fine-grained silty sand to sandy silt, humid, dense.
	SPT		50 for 3"						**SAUGUS FORMATION - Ts - (7.5' - 10')** - Dark brown fine- to coarse-grained silty sand, slightly moist, very dense.
10	SPT		50 for 3"						End at 10'
20									
30									
40									
50									
60									

Comments: The following correction factors were utilized to determine N(60) (Per SP117)
Cb = 1.15 (8" Diameter Borehole); Cs = 1.2 (SPT Sampler without liner); Cs = 2/3 (California Sampler)

Notes: TOTAL DEPTH: 10' GROUNDWATER: NO REFUSAL/CAVING: NO BACKFILLED: YES

PLATE 2.18

GOLD COAST GEOSERVICES, INC.

SUB-SURFACE DATA — BORING LOG NO. B-19

PROJECT: D.R. HORTON - LYONS CANYON RANCH, SANTA CLARITA — FILE NO.: GC14-122536

ELEVATION: SEE PLATE 1 — DATE: 02/19/15

METHOD: 6-inch Hollow Stem Auger — DRILLING CO.: HD DRILLING

DEPTH (FT)	SAMPLE: BULK	SAMPLE: RING	BLOWCOUNT: FIELD (N)	BLOWCOUNT: N(60)	MOISTURE %	DENSITY	SIEVE: % PASSING # 200 SCREEN	GRAPHIC LOG	DESCRIPTION AND REMARKS
0									
-	SPT		20	27.6					**ALLUVIUM - Qal - (0' - 7.5')** - Medium brown fine-grained silty sand, dry, slightly firm.
-									
-	SPT		16	22.1					
-		X	80	61.3	9.8	91.5			
-	SPT		58	80.0					**PICO FORMATION - Tp - (7.5' - 15')**
-									7.5' - 12.5' - Medium brown claystone to siltstone.
10	SPT		32	44.2					
-									
-	SPT		50 for 5"						12.5' - 15' - Dark brown claystone to siltstone.
-	SPT		80	110.4					End at 15'
-									
-									
-									
20									
-									
-									
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40									
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-									
-									
50									
-									
-									
-									
-									
-									
-									
60									

Comments: The following correction factors were utilized to determine N(60) (Per SP117)
Cb = 1.15 (8" Diameter Borehole); Cs = 1.2 (SPT Sampler without liner); Cs = 2/3 (California Sampler)

Notes: TOTAL DEPTH: 15' GROUNDWATER: NO REFUSAL/CAVING: NO BACKFILLED: YES

PLATE 2.19

GOLD COAST GEOSERVICES, INC.

SUB-SURFACE DATA — BORING LOG NO. B-20

PROJECT: D.R. HORTON - LYONS CANYON RANCH, SANTA CLARITA — FILE NO.: GC14-122536

ELEVATION: SEE PLATE 1 — DATE: 02/19/15

METHOD: 6-inch Hollow Stem Auger — DRILLING CO.: HD DRILLING

DEPTH (FT)	SAMPLE: BULK	SAMPLE: RING	BLOWCOUNT: FIELD (N)	BLOWCOUNT: N(60)	MOISTURE %	DENSITY	SIEVE: % PASSING # 200 SCREEN	GRAPHIC LOG	DESCRIPTION AND REMARKS
0									**ALLUVIUM - Qal - (0' - 7.5')**
-	SPT		9	12.4					2.5' - Dark brown very fine- to fine-grained silty sand, slightly moist, sightly firm.
-	SPT		20	27.6					5' - Medium brown fine- to medium-grained silty sand, humid, firm.
-		X	50 for 3"		8.1	103.9			
-	SPT		50 for 5"						**PICO FORMATION - Tp - (7.5' - 12.5')** - Medium brown siltstone
10	SPT		79	109.0					
-	SPT		50 for 2"						End at 12.5
20									
30									
40									
50									
60									

Comments: The following correction factors were utilized to determine $N_{(60)}$ (Per SP117)
Cb = 1.15 (8" Diameter Borehole); Cs = 1.2 (SPT Sampler without liner); Cs = 2/3 (California Sampler)

Notes: TOTAL DEPTH: 12.5' GROUNDWATER: NO REFUSAL/CAVING: NO BACKFILLED: YES

PLATE 2.20

GOLD COAST GEOSERVICES, INC.

SUB-SURFACE DATA — BORING LOG NO. B-21

PROJECT: D.R. HORTON - LYONS CANYON RANCH, SANTA CLARITA — FILE NO.: GC14-122536

ELEVATION: SEE PLATE 1 — DATE: 02/13/15

METHOD: 6-inch Hollow Stem Auger — DRILLING CO.: HD DRILLING

DEPTH (FT)	SAMPLE: BULK	SAMPLE: RING	BLOWCOUNT: FIELD (N)	BLOWCOUNT: N(60)	MOISTURE %	DENSITY	SIEVE: % PASSING # 200 SCREEN	GRAPHIC LOG	DESCRIPTION AND REMARKS
0									**ALLUVIUM - Qal - (0' - 47.5')**
-	SPT		3	4.1					2.5' - 5' - Medium to dark brown very fine- to medium-grained silty sand, humid, loose.
-	SPT		3	4.1					
-		X	26	19.9	5.7	99.0			
-	SPT		13	17.9					7.5' - 10' - Medium brown very fine- to fine-grained silty sand, humid, slightly firm.
10	SPT		8	11.0					
-	SPT		9	12.4					12.5' - 22.5' - Medium to dark brown very fine- to fine-grained silty sand, humid, slightly firm.
-	SPT		6	8.3					
-		X	15	11.5	9.2	104.6			
-	SPT		8	11.0					
20	SPT		14	19.3					
-	SPT		19	26.2					
-	SPT		20	27.6					
-		x	33	25.3	9.8	108.7			
-	SPT		31	42.8					27.5' - 30' - Medium brown fine- to coarse-grained pebbly silty sand, humid, dense.
30	SPT		29	40.0					
-	SPT		33	45.5					35' - Medium reddish brown fine- to coarse-grained pebbly sand, humid, dense.
-	SPT		28	38.6					
-		X	58	44.5	18.8	107.9			37.5' - 47.5' - Medium brown fine- to medium-grained silty sand to sandy silt, moist, firm.
-	SPT		32	44.2					
40	SPT		33	45.5					
-	SPT		30	41.4					
-	SPT		34	46.9					
-		X	50 for 4"		6.7	114.3			
-	SPT		40	55.2					**SAUGUS FORMATION - TS - (47.5' - 50')** - Medium reddish brown fine- to very coarse-grained clayey to silty sand, moist to saturated, dense.
50	SPT		57 for 5"						End at 50'
-									
-									
-									
-									
-									
60									

Comments: The following correction factors were utilized to determine N(60) (Per SP117)
Cb = 1.15 (8" Diameter Borehole); Cs = 1.2 (SPT Sampler without liner); Cs = 2/3 (California Sampler)

Notes: TOTAL DEPTH: 50' GROUNDWATER: NO REFUSAL/CAVING: NO BACKFILLED: YES

PLATE 2.21

GOLD COAST GEOSERVICES, INC.

SUB-SURFACE DATA — BORING LOG NO. B-22

PROJECT: D.R. HORTON - LYONS CANYON RANCH, SANTA CLARITA — FILE NO.: GC14-122536

ELEVATION: SEE PLATE 1 — DATE: 02/13/15

METHOD: 6-inch Hollow Stem Auger — DRILLING CO.: HD DRILLING

DEPTH (FT)	SAMPLE: BULK	SAMPLE: RING	BLOWCOUNT: FIELD (N)	BLOWCOUNT: N(60)	MOISTURE %	DENSITY	SIEVE: % PASSING # 200 SCREEN	GRAPHIC LOG	DESCRIPTION AND REMARKS
0									**ALLUVIUM - Qal - (0' - 17.5')**
-	SPT		2	2.8					2.5' - 5' - Dark brown fine- to medium-grained silty sand, humid, loose.
-	SPT		3	4.1					
-		X	24	18.4	3.8	103.7			7.5' - 15' - Dark brown fine- to very coarse-grained silty sand, humid,
-	SPT		15	20.7					slightly firm.
10	SPT		15	20.7					
-	SPT		19	26.2					
-	SPT		11	15.2					
-		X	60	46.0	8.7	119.1			
-	SPT		70	96.6					**SAUGUS FORMATION - Ts - (17.5' - 32.5')**
20	SPT		53	73.1					17.5' - 27.5' - Medium yellowish brown medium- to very coarse-grained sand, humid, very dense.
-	SPT		68	93.8					
-	SPT		65	89.7					
-		x	50 for 3"		12.6	110.4			27.5' - 32.5' - Medium yellowish brown medium- to very coarse-grained silty
-	SPT		50 for 6"						sand, slightly moist, very dense.
30	SPT		50 for 6"						
-	SPT		50 for 5"						End at 32.5'
40									
50									
60									

Comments: The following correction factors were utilized to determine N(60) (Per SP117)
Cb = 1.15 (8" Diameter Borehole); Cs = 1.2 (SPT Sampler without liner); Cs = 2/3 (California Sampler)

Notes: TOTAL DEPTH: 32.5' GROUNDWATER: NO REFUSAL/CAVING: NO BACKFILLED: YES

PLATE 2.22

GOLD COAST GEOSERVICES, INC.

SUB-SURFACE DATA — BORING LOG NO. B-23

PROJECT: D.R. HORTON - LYONS CANYON RANCH, SANTA CLARITA — FILE NO.: GC14-122536

ELEVATION: SEE PLATE 1 — DATE: 02/16/15

METHOD: 6-inch Hollow Stem Auger — DRILLING CO.: HD DRILLING

DEPTH (FT)	SAMPLE: BULK	SAMPLE: RING	BLOWCOUNT: FIELD (N)	BLOWCOUNT: N(60)	MOISTURE %	DENSITY	SIEVE: % PASSING # 200 SCREEN	GRAPHIC LOG	DESCRIPTION AND REMARKS
0									**ALLUVIUM - Qal - (0' - 27.5')**
-	SPT		3	4.1					2.5' - Dark brown very fine- to medium-grained clayey to silty sand, slightly moist, loose.
-	SPT		15	20.7					5' - Dark brown very fine- to medium-grained clayey to silty sand, humid, firm.
-		X	57	43.7	8.0	97.0			7.5' - 10' - Medium to dark brown fine- to coarse-grained clayey to silty sand, humid, firm.
-	SPT		30	41.4					
10	SPT		14	19.3					
-	SPT		12	16.6					12.5' - 17.5'- Medium to dark brown fine- to coarse-grained clayey to silty sand, slightly moist, slightly firm.
-	SPT		5	6.9					
-		X	27	20.7	11.5	107.4			
-	SPT		12	16.6					
20	SPT		13	17.9					20' - 27.5' - Medium to dark brown fine- to very coarse-grained gravelly to pebbly clayey to silty sand, humid to slightly moist, slightly firm.
-	SPT		18	24.8					
-	SPT		13	17.9					**SAUGUS FORMATION - Ts - (27.5' - 30')**
-		x	43	33.0	4.3	111.7			25' - 27.5' - Medium yellowish brown fine- to coarse-grained silty sand containing pebbles, humid, firm to dense.
-	SPT		46	63.5					
30	SPT		50 for 5"						30' - Rock/boulder
40									
50									
60									

Comments: The following correction factors were utilized to determine N(60) (Per SP117)
Cb = 1.15 (8" Diameter Borehole); Cs = 1.2 (SPT Sampler without liner); Cs = 2/3 (California Sampler)

Notes: TOTAL DEPTH: 30' GROUNDWATER: NO REFUSAL/CAVING: NO BACKFILLED: YES

PLATE 2.23

GOLD COAST GEOSERVICES, INC.

SUB-SURFACE DATA — BORING LOG NO. B-24

PROJECT: D.R. HORTON - LYONS CANYON RANCH, SANTA CLARITA — FILE NO.: GC14-122536

ELEVATION: SEE PLATE 1 — DATE: 02/16/15

METHOD: 6-inch Hollow Stem Auger — DRILLING CO.: HD DRILLING

DEPTH (FT)	SAMPLE: BULK	SAMPLE: RING	BLOWCOUNT: FIELD (N)	BLOWCOUNT: N(60)	MOISTURE %	DENSITY	SIEVE: % PASSING # 200 SCREEN	GRAPHIC LOG	DESCRIPTION AND REMARKS
0									**ALLUVIUM - Qal - (0' - 27.5')**
-	SPT		6	8.3					2.5' - Dark brown fine- to medium-grained clayey to silty sand, slightly moist, slightly firm.
-	SPT		24	33.1					5' - 10' - Dark brown fine- to medium-grained clayey to silty sand, humid, firm to dense.
-		X	55	42.2	8.6	83.1			
-	SPT		20	27.6					
10	SPT		13	17.9					
-	SPT		17	23.5					12.5' - 27.5' - Medium brown fine- to medium-grained clayey silt to silty clay, humid to slightly moist, firm to dense.
-	SPT		8	11.0					
-		X	39	29.9	15.9	95.6			
-	SPT		21	29.0					
20	SPT		13	17.9					
-	SPT		57	78.7					
-	SPT		24	33.1					**PICO FORMATION - Tp - (27.5' - 37.5')**
-		x	50 for 4"		18.5	101.1			27.5' - 35' - Medium to dark grayish brown fine-grained clayey silt to silty clay, moist, dense.
-	SPT		50 for 5"						
30	SPT		64	88.3					
-	SPT		60	82.8					
-	SPT		42	58.0					35' - 37.5' - Dark brown claystone to siltstone, very dense.
-		X	50 for 5"		27.5	94.9			
-	SPT		50 for 4"						End at 37.5'
40									
-									
-									
-									
-									
-									
-									
50									
-									
-									
-									
-									
-									
-									
60									

Comments: The following correction factors were utilized to determine N(60) (Per SP117)
Cb = 1.15 (8" Diameter Borehole); Cs = 1.2 (SPT Sampler without liner); Cs = 2/3 (California Sampler)

Notes: TOTAL DEPTH: 37.5' GROUNDWATER: NO REFUSAL/CAVING: NO BACKFILLED: YES

PLATE 2.24

GOLD COAST GEOSERVICES, INC.

SUB-SURFACE DATA — BORING LOG NO. B-25

PROJECT: D.R. HORTON - LYONS CANYON RANCH, SANTA CLARITA — FILE NO.: GC14-122536

ELEVATION: SEE PLATE 1 — DATE: 02/16/15

METHOD: 6-inch Hollow Stem Auger — DRILLING CO.: HD DRILLING

DEPTH (FT)	SAMPLE: BULK	SAMPLE: RING	BLOWCOUNT: FIELD (N)	BLOWCOUNT: N(60)	MOISTURE %	DENSITY	SIEVE: % PASSING # 200 SCREEN	GRAPHIC LOG	DESCRIPTION AND REMARKS
0									**ALLUVIUM - Qal - (0' - 17.5')**
-	SPT		14	19.3					2.5' - Medium to dark brown fine- to medium-grained silty sand, humid, firm.
-	SPT		41	56.6					5' - 12.5' - Medium brown fine- to coarse-grained clayey to silty sand, humid,
-		X	82	62.9	7.5	99.1			firm to dense.
-	SPT		28	38.6					
10	SPT		20	27.6					
-	SPT		29	40.0					
-	SPT		8	11.0					15' - 17.5' - Light yellowish brown very fine- to fine-grained silty sand to sandy silt,
-		X	50 for 3"						humid, slightly firm.
-	SPT		70	96.6					**SAUGUS FORMSTION - Ts - (17.5' - 27.5')**
20	SPT		31	42.8					17.5' - Medium reddish brown fine- to medium-grained clayey to silty sand, dry, very dense.
-	SPT		50 for 6"						20' - Medium reddish brown siltstone, very dense.
-									22.5' - Light grayish brown siltstone, very dense.
-	SPT		40	55.2					25' - Medium gray siltstone, very dense.
-		x	50 for 3"						End at 27.5'
30									
40									
50									
60									

Comments: The following correction factors were utilized to determine N(60) (Per SP117)
Cb = 1.15 (8" Diameter Borehole); Cs = 1.2 (SPT Sampler without liner); Cs = 2/3 (California Sampler)

Notes: TOTAL DEPTH: 27.5' GROUNDWATER: NO REFUSAL/CAVING: NO BACKFILLED: YES

PLATE 2.25

GEOTECHNICAL BORING LOG

PROJECT NO.	102453-T	PROJECT NAME	Lyons Canyon Ranch		
DATE STARTED	6/20/01	GROUND ELEV.	1317	BORING DESIG.	B-1
DATE FINISHED	6/20/01	GW DEPTH (FT)	67	LOGGED BY	CRN
DRILLER	Ledezma Drilling	DRIVE WT.	See Note	NOTE	0-24' 3548#; 24-47'
TYPE OF DRILL RIG	30" Bucket Auger	DROP	12 inches		2577#; 47-73' 1648#

DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	ATTITUDES	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
0	1315					**ALLUVIUM (Qal):** Sandy Silt to Silty Sand; very fine- to fine-grained, moderate yellowish brown, slightly moist, firm/moderately dense.				
5		R/B	1				7.3	102.0	31	
	1310									
10		R	1				7.0	96.4	25	
	1305									
15		R	1			Sandy Silt to Silty Sand; very fine- to fine-grained, moderate yellowish brown, slightly moist, firm/moderately dense, some interbedded pebble lenses.	10.2	102.4	44	
	1300									
20		R/B	1			Silty Sand; fine- to coarse-grained with some pebbles and few cobbles, moderate to dark yellowish brown, moist, moderately dense.	4.9	112.2	26	
	1295									
25										
	1290									
30		B				Silty Sand; fine- to coarse-grained with pebbles and cobbles, moderate yellowish brown, slightly moist to moist, moderately dense to dense.				
	1285									
35										
	1280									

SAMPLE TYPES:
R RING (DRIVE) SAMPLE
S SPT (SPLIT SPOON) SAMPLE
B BULK SAMPLE T TUBE SAMPLE

GROUNDWATER LEVEL
WATER SEEP C CONTACT
B BEDDING F FAULT
J JOINTING S SHEAR

PACIFIC SOILS ENGINEERING, INC.

GEOTECHNICAL BORING LOG

PROJECT NO.	102453-T	PROJECT NAME	Lyons Canyon Ranch		
DATE STARTED	6/20/01	GROUND ELEV.	1317	BORING DESIG.	B-1
DATE FINISHED	6/20/01	GW DEPTH (FT)	67	LOGGED BY	CRN
DRILLER	Ledezma Drilling	DRIVE WT.	See Note	NOTE	0-24' 3548#; 24-47'
TYPE OF DRILL RIG	30" Bucket Auger	DROP	12 inches		2577#; 47-73' 1648#

DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	ATTITUDES	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
	1275									
45										
	1270									
50		R/B	15			Pebbly Sand; fine- to very coarse-grained with abundant cobbles, moderate to dark yellowish brown, moist, dense.	4.6	126.4	37	
	1265									
55		R	5			Silty Sand; very fine- to fine-grained, moderate yellowish brown, moist, dense.	11.6	118.7	78	
	1260					Pebbly Sand; fine- to very coarse-grained with abundant cobbles, moderate to dark yellowish brown, moist, dense.				
60										
	1255									
65						Some interlayered lenses of Silty Sand (described at 55 feet).				
	1250					▼ Water at 67± feet, caving from 65 to 68± feet.				
						Total Depth 68 feet. Water at 67 feet. Caving from 65 to 68 feet. Hole backfilled with native materials and tamped.				

SAMPLE TYPES:
- R RING (DRIVE) SAMPLE
- S SPT (SPLIT SPOON) SAMPLE
- B BULK SAMPLE
- T TUBE SAMPLE

▼ GROUNDWATER LEVEL
➤ WATER SEEP
B BEDDING
J JOINTING
C CONTACT
F FAULT
S SHEAR

PACIFIC SOILS ENGINEERING, INC.

PLATE A-2

GEOTECHNICAL BORING LOG

PROJECT NO.	102453-T	PROJECT NAME	Lyons Canyon Ranch		
DATE STARTED	6/20/01	GROUND ELEV.	1325	BORING DESIG.	B-2
DATE FINISHED	6/20/01	GW DEPTH (FT)	53	LOGGED BY	CRN
DRILLER	Ledezma Drilling	DRIVE WT.	See Note	NOTE	0-24' 3548#; 24-47' 2577#; 47-73' 1648#
TYPE OF DRILL RIG	30" Bucket Auger	DROP	12 inches		

DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	ATTITUDES	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
	1325					**ALLUVIUM (Qal):** Silt; moderate yellowish brown, dry to slightly moist, soft to firm at depth.				
5	1320									
10	1315	R/B	1			Silty Sand; very fine- to fine-grained, moderate yellowish brown, slightly moist, moderately dense, some interlayered lenses of coarse-grained Sand and Pebbles, some small organic pods.	7.7	102.0	32	
15	1310									
20	1305	R	1				8.7	105.0	40	
25	1300					Increasing pebbles and some cobbles.				
30	1295	R/B	9			Pebbly Sand; fine- to very coarse-grained, pale yellowish brown, slightly moist, moderately dense.	3.7	121.6	27	
35	1290									
	1285									

SAMPLE TYPES:
- R RING (DRIVE) SAMPLE
- S SPT (SPLIT SPOON) SAMPLE
- B BULK SAMPLE
- T TUBE SAMPLE

▼ GROUNDWATER LEVEL
WATER SEEP
B BEDDING
J JOINTING
C CONTACT
F FAULT
S SHEAR

PACIFIC SOILS ENGINEERING, INC.

PLATE A-3

GEOTECHNICAL BORING LOG

PROJECT NO.	102453-T	PROJECT NAME	Lyons Canyon Ranch		
DATE STARTED	6/20/01	GROUND ELEV.	1325	BORING DESIG.	B-2
DATE FINISHED	6/20/01	GW DEPTH (FT)	53	LOGGED BY	CRN
DRILLER	Ledezma Drilling	DRIVE WT.	See Note	NOTE	0-24' 3548#; 24-47' 2577#; 47-73' 1648#
TYPE OF DRILL RIG	30" Bucket Auger	DROP	12 inches		

DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	ATTITUDES	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
	1285	R	8			Silty Sand; fine- to very coarse-grained with pebbles, moderate yellowish brown, slightly moist to moist, dense.	6.8	122.2	51	
45	1280	B								
50	1275	R	6			Sand; fine- to coarse-grained with pebbles, pale to moderate yellowish brown, moist, moderately dense to dense.	5.5	135.5	61	
						▼ Water at 53+ feet. Caving from 52 to 54+ feet. Total Depth 54 feet. Water at 53 feet. Caving from 52 to 54 feet. Hole backfilled with native materials and tamped.				

SAMPLE TYPES:
- [R] RING (DRIVE) SAMPLE
- [S] SPT (SPLIT SPOON) SAMPLE
- [B] BULK SAMPLE
- [T] TUBE SAMPLE

▼ GROUNDWATER LEVEL
- WATER SEEP
- [B] BEDDING
- [J] JOINTING
- [C] CONTACT
- [F] FAULT
- [S] SHEAR

PACIFIC SOILS ENGINEERING, INC.

PLATE A-4

GEOTECHNICAL BORING LOG

PROJECT NO.	102453-T	PROJECT NAME	Lyons Canyon Ranch		
DATE STARTED	6/20/01	GROUND ELEV.	1331	BORING DESIG.	B-3
DATE FINISHED	6/20/01	GW DEPTH (FT)		LOGGED BY	CRN
DRILLER	Ledezma Drilling	DRIVE WT.	See Note	NOTE	0-24' 3548#; 24-47'
TYPE OF DRILL RIG	30" Bucket Auger	DROP	12 inches		2577#; 47-73' 1648#

DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	ATTITUDES	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
0	1330					**ALLUVIUM (Qal):** Silty Sand; very fine- to fine-grained, pale yellowish brown, dry, loose.				
						Silty Sand; fine- to coarse-grained with pebbles and cobbles, pale to moderate yellowish brown, dry to slightly moist, loose to moderately dense.				
5	1325									
10	1320	B				1 to 2± feet thick boulder lense with 6 to 12± inch boulders.				
						Silty Sand; fine to coarse-grained with pebbles and cobbles, pale to moderate yellowish brown, slightly moist, moderately dense.				
15	1315	R	1				2.3	106.7	11	
20	1310	R/B	2			Silty Sand; very fine- to fine-grained with pebbles, moderate yellowish brown, slightly moist to moist, moderately dense.	5.7	115.3	35	
25	1305					Silty Sand; fine- to coarse-grained with pebbles and cobbles, moderate yellowish brown, slightly moist, moderately dense.				
30	1300	R	3			Silty Sand; very fine- to fine-grained with pebbles, moderate yellowish brown, slightly moist to moist, moderately dense.	4.9	114.1	28	
35	1295									

SAMPLE TYPES:
- [R] RING (DRIVE) SAMPLE
- [S] SPT (SPLIT SPOON) SAMPLE
- [B] BULK SAMPLE [T] TUBE SAMPLE

▼ GROUNDWATER LEVEL
► WATER SEEP [C] CONTACT
[B] BEDDING [F] FAULT
[J] JOINTING [S] SHEAR

PACIFIC SOILS ENGINEERING, INC.

PLATE A-5

GEOTECHNICAL BORING LOG

PROJECT NO.	102453-T	PROJECT NAME	Lyons Canyon Ranch		
DATE STARTED	6/20/01	GROUND ELEV.	1331	BORING DESIG.	B-3
DATE FINISHED	6/20/01	GW DEPTH (FT)		LOGGED BY	CRN
DRILLER	Ledezma Drilling	DRIVE WT.	See Note	NOTE	0-24' 3548#; 24-47'
TYPE OF DRILL RIG	30" Bucket Auger	DROP	12 inches		2577#; 47-73' 1648#

DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	ATTITUDES	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
	1290	R/B	6				10.4	115.0	63	
45	1285					**SAUGUS FORMATION-SUNSHINE RANCH MEMBER** (Tsr): Sandstone; very fine- to fine-grained, medium light gray, slightly moist, moderately hard to hard.				
50	1280	R/B	18			Siltstone; mottled olive gray and light gray, slightly moist, hard. Total Depth 51 feet. No water and no caving. Hole backfilled with native materials and tamped.	15.7	115.7	97	

SAMPLE TYPES:
- R RING (DRIVE) SAMPLE
- S SPT (SPLIT SPOON) SAMPLE
- B BULK SAMPLE
- T TUBE SAMPLE

- ▼ GROUNDWATER LEVEL
- WATER SEEP
- B BEDDING
- J JOINTING
- C CONTACT
- F FAULT
- S SHEAR

PACIFIC SOILS ENGINEERING, INC.

PLATE A-6

GEOTECHNICAL BORING LOG

PROJECT NO.	102453-T	PROJECT NAME	Lyons Canyon Ranch		
DATE STARTED	6/20/01	GROUND ELEV.	1342	BORING DESIG.	B-4
DATE FINISHED	6/20/01	GW DEPTH (FT)	14	LOGGED BY	CRN
DRILLER	Ledezma Drilling	DRIVE WT.	See Note	NOTE	0-24' 3548#; 24-47' 2577#; 47-73' 1648#
TYPE OF DRILL RIG	30" Bucket Auger	DROP	12 inches		

DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	ATTITUDES	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
0	1340					**ALLUVIUM (Qal):** Silty Sand; fine- to coarse-grained with pebbles, dark yellowish brown, slightly moist to moist, moderately dense.				
5	1335				►	Silty Sand to Sandy Silt; very fine-grained with few pebbles, dark yellowish brown, slightly moist to moist, moderately dense. Water seep and caving from 7 to 9± feet.				
10		R/B	1				19.8	108.3	96	
	1330									
15					▼	Pebbly Sand; coarse-grained with abundant cobbles, dark yellowish brown, wet, moderately dense. Water at 14± feet, caving from 14 to 16± feet.				
						Total Depth 16 feet. Water and caving at 7 to 9 feet and 14 to 16 feet. Hole backfilled with native materials and tamped.				

SAMPLE TYPES:
- [R] RING (DRIVE) SAMPLE
- [S] SPT (SPLIT SPOON) SAMPLE
- [B] BULK SAMPLE
- [T] TUBE SAMPLE

▼ GROUNDWATER LEVEL
► WATER SEEP
[B] BEDDING
[J] JOINTING
[C] CONTACT
[F] FAULT
[S] SHEAR

PACIFIC SOILS ENGINEERING, INC.

PLATE A-7

GEOTECHNICAL BORING LOG

PROJECT NO.	102453-T	PROJECT NAME	Lyons Canyon Ranch		
DATE STARTED	6/20/01	GROUND ELEV.	1388	BORING DESIG.	B-5
DATE FINISHED	6/20/01	GW DEPTH (FT)	15	LOGGED BY	CRN
DRILLER	Ledezma Drilling	DRIVE WT.	See Note	NOTE	0-24' 3548#; 24-47:
TYPE OF DRILL RIG	30" Bucket Auger	DROP	12 inches		2577#; 47-73' 1648#

DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	ATTITUDES	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
						ALLUVIUM (Qal): Silty Sand to Sandy Silt; very fine- to fine-grained, moderate yellowish brown, dry and loose/soft within top 3±, feet becoming slightly moist and moderately dense/firm at depth.				
	1385									
5										
	1380									
10		R/B	Push		►	Water seep at 10± feet.				
	1375									
15					▼	Water at 15± feet. Caving from 14 to 16+ feet. Total Depth 16 feet. Water at 10 and 15 feet. Caving from 14 to 16 feet. Hole backfilled with native materials tamped.				

SAMPLE TYPES:
- [R] RING (DRIVE) SAMPLE
- [S] SPT (SPLIT SPOON) SAMPLE
- [B] BULK SAMPLE
- [T] TUBE SAMPLE

▼ GROUNDWATER LEVEL
► WATER SEEP
[B] BEDDING
[J] JOINTING
[C] CONTACT
[F] FAULT
[S] SHEAR

PACIFIC SOILS ENGINEERING, INC.

PLATE A-8

GEOTECHNICAL BORING LOG

PROJECT NO.	102453-T	PROJECT NAME	Lyons Canyon Ranch		
DATE STARTED	6/20/01	GROUND ELEV.	1384	BORING DESIG.	B-6
DATE FINISHED	6/20/01	GW DEPTH (FT)		LOGGED BY	CRN
DRILLER	Ledezma Drilling	DRIVE WT.	See Note	NOTE	0-24' 3548#; 24-47'
TYPE OF DRILL RIG	30" Bucket Auger	DROP	12 inches		2577#; 47-73' 1648#

DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	ATTITUDES	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
	1380					**ALLUVIUM (Qal):** Silty Sand to Sandy Silt; very fine- to fine-grained with some pebbles and some cobbles, dark yellowish brown, dry and loose/soft within top 1 to 3± feet, becoming slightly moist to moist and moderately dense/firm at depth. Top 3± feet is porous.				
5		R/B	Bounce			Boulders; 1± foot in diameter. No sample due to rocks.				
						Refusal Total Depth 7 feet. No water and no caving. Refusal due to rocks. Hole backfilled with native materials and tamped.				

SAMPLE TYPES:
- [R] RING (DRIVE) SAMPLE
- [S] SPT (SPLIT SPOON) SAMPLE
- [B] BULK SAMPLE
- [T] TUBE SAMPLE

- ▼ GROUNDWATER LEVEL
- ► WATER SEEP
- [B] BEDDING
- [J] JOINTING
- [C] CONTACT
- [F] FAULT
- [S] SHEAR

PACIFIC SOILS ENGINEERING, INC.

PLATE A-9

GEOTECHNICAL BORING LOG

PROJECT NO.	102453-T	PROJECT NAME	Lyons Canyon Ranch		
DATE STARTED	6/25/01	GROUND ELEV.	1385	BORING DESIG.	B-6B
DATE FINISHED	6/25/01	GW DEPTH (FT)		LOGGED BY	CRN
DRILLER	Ledezma Drilling	DRIVE WT.	See Note	NOTE	0-24' 3548#; 24-47'
TYPE OF DRILL RIG	30" Bucket Auger	DROP	12 inches		2577#; 47-73' 1648#

DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	ATTITUDES	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
	1385					**ALLUVIUM (Qal):** Silty Sand to Sandy Silt; fine- to coarse-grained with pebbles, moderate to dark yellowish brown, top 1± foot dry and loose/soft, becoming moist and moderately dense/firm at depth.				
5	1380	R	2			2 to 3± foot thick,boulder lenses; 2-1/2 foot diameter boulder at 6± feet in depth.	9.1	116.9	58	
10	1375	R/B	6 for 6"			**SAUGUS FORMATION-SUNSHINE RANCH MEMBER (Tsr):** Weathered Silty Sandstone; very fine- to fine-grained, mottled moderate brown and medium light gray, moist, moderately hard, poorly indurated.	13.4	123.0	98	
		B				Silty Sandstone; very fine- to fine-grained, medium light gray, moist, moderately hard, moderately indurated.				
15	1370	R	11 for 6"				13.4	120.6	91	
						Total Depth 16 feet. No water, no caving. Hole backfilled with native materials and tamped.				

SAMPLE TYPES:
R RING (DRIVE) SAMPLE
S SPT (SPLIT SPOON) SAMPLE
B BULK SAMPLE T TUBE SAMPLE

GROUNDWATER LEVEL
WATER SEEP
B BEDDING C CONTACT
J JOINTING F FAULT S SHEAR

PACIFIC SOILS ENGINEERING, INC.

PLATE A-10

GEOTECHNICAL BORING LOG

PROJECT NO.	102453-T	PROJECT NAME	Lyons Canyon Ranch		
DATE STARTED	6/25/01	GROUND ELEV.	1388	BORING DESIG.	B-7
DATE FINISHED	6/25/01	GW DEPTH (FT)		LOGGED BY	CRN
DRILLER	Ledezma Drilling	DRIVE WT.	See Note	NOTE	0-24' 3548#; 24-47'
TYPE OF DRILL RIG	30" Bucket Auger	DROP	12 inches		2577#; 47-73' 1648#

DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	ATTITUDES	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
	1385					**COLLUVIUM/ALLUVIUM (Qal):** Silty Sand; fine- to coarse-grained with pebbles and some cobbles, moderate yellowish brown, dry and loose top 3± feet, slightly moist and moderately dense at depth, abundant roots and rootlets throughout.				
						1± inch thick yellowish red lense at contact.				
5		R/B	4		C: N75W 44NE	**SAUGUS FORMATION- SUNSHINE RANCH MEMBER (Tsr):** Silty Sandstone; fine- to coarse-grained with pebbles and some cobbles, grayish orange, slightly moist, hard, moderately to well indurated, slight to moderate bedding.	4.6	114.8	27	
	1380									
					B: N80W 41NE	1± foot thick, scour/infill structure - infill with fine-grained Sand (attitude from top of Sand infill).				
10		R/B	4 for 3" Bounce				3.4	121.9	25	
	1375									
					B: N70W 54NE	2± foot thick,scour/infill structure - infill with fine-grained Sand (attitude from top of infill).				
15										
					B: N80W 50NE	Silty Sandstone; fine-grained, light gray, slightly moist, hard, well indurated.				
	1370					Used ripper and core bucket from 18 to 19± feet. Refusal at 19+ feet. Total Depth 19 feet. No water, no caving. Hole backfilled with native materials and tamped.				

SAMPLE TYPES:
- R RING (DRIVE) SAMPLE
- S SPT (SPLIT SPOON) SAMPLE
- B BULK SAMPLE
- T TUBE SAMPLE

GROUNDWATER LEVEL
- WATER SEEP
- B BEDDING
- J JOINTING
- C CONTACT
- F FAULT
- S SHEAR

PACIFIC SOILS ENGINEERING, INC.

PLATE A-11

GEOTECHNICAL BORING LOG

PROJECT NO.	102453-T	PROJECT NAME	Lyons Canyon Ranch		
DATE STARTED	6/25/01	GROUND ELEV.	1353	BORING DESIG.	B-8
DATE FINISHED	6/25/01	GW DEPTH (FT)	19	LOGGED BY	CRN
DRILLER	Ledezma Drilling	DRIVE WT.	See Note	NOTE	0-24' 3548#; 24-47'
TYPE OF DRILL RIG	30" Bucket Auger	DROP	12 inches		2577#; 47-73' 1648#

DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	ATTITUDES	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
0	1350					**COLLUVIUM/ALLUVIUM (Qal):** Silty Sand to Sandy Silt; fine- to coarse-grained with pebbles, cobbles, some clay pods, slightly moist to moist, loose/soft to moderately dense/firm at depth.				
5										
	1345									
10						Increasing pebbles and cobbles.				
	1340									
15		R/B	6				10.7	122.3	81	
	1335					▼ Water at 19 feet.				
20		R B	10			**SAUGUS FORMATION-SUNSHINE RANCH MEMBER (Tsr):** Silty Sandstone to Sandy Siltstone; very fine- to fine-grained, light olive, moist, moderately hard, moderately to well indurated, thinly bedded to laminated, weathered.	14.1	121.5	98	
	1330									
25						Silty Sandstone; fine to coarse-grained, medium light gray, slightly moist, hard, moderately to well indurated.	9.8	122.0	73	
						Total Depth 26 feet. Water at 19 feet. No caving. Hole backfilled.				

SAMPLE TYPES:
- R RING (DRIVE) SAMPLE
- S SPT (SPLIT SPOON) SAMPLE
- B BULK SAMPLE
- T TUBE SAMPLE

▼ GROUNDWATER LEVEL
► WATER SEEP
B BEDDING
J JOINTING
C CONTACT
F FAULT
S SHEAR

PACIFIC SOILS ENGINEERING, INC.

PLATE A-12

GEOTECHNICAL BORING LOG

PROJECT NO.	102453-T	PROJECT NAME	Lyons Canyon Ranch		
DATE STARTED	6/25/01	GROUND ELEV.	1327	BORING DESIG.	B-9
DATE FINISHED	6/25/01	GW DEPTH (FT)		LOGGED BY	CRN
DRILLER	Ledezma Drilling	DRIVE WT.	See Note	NOTE	0-24' 3548#; 24-47'
TYPE OF DRILL RIG	30" Bucket Auger	DROP	12 inches		2577#; 47-73' 1648#

DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	ATTITUDES	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
0	1325					**ALLUVIUM (Qal):** Silty Sand; fine- to coarse-grained with pebbles and cobbles, moderate yellowish brown, top 6± feet dry to moist at depth, loose top 3± feet to moderately dense at depth.				
5										
	1320									
10		R/B	Push			Sandy Silt to Silty Sand; fine-grained, moderate to dark yellowish brown, moist, firm/moderately dense, porous, abundant rootlets.	13.9	115.1	84	
	1315									
15										
	1310									
20		R	1			Silty Sand; fine- to medium-grained, moderate to dark yellowish brown, moist, moderately dense, micaceous.	12.1	111.7	64	
	1305									
25										
	1300									
30		R/B	Push			Silty Sand to Sandy Silt; fine- to coarse-grained with some pebbles, moderate yellowish brown, moist to very moist, moderately dense, micaceous.	18.0	112.0	100	
	1295									
35										
	1290									
		B				**SAUGUS FORMATION-SUNSHINE RANCH MEMBER (Tsr):** Silty Sandstone; fine to medium-grained, light olive gray, moist, moderately hard, moderately indurated, slightly				

SAMPLE TYPES:
R RING (DRIVE) SAMPLE
S SPT (SPLIT SPOON) SAMPLE
B BULK SAMPLE T TUBE SAMPLE

GROUNDWATER LEVEL
WATER SEEP
B BEDDING J JOINTING C CONTACT F FAULT S SHEAR

PACIFIC SOILS ENGINEERING, INC.

PLATE A-13

GEOTECHNICAL BORING LOG

PROJECT NO.	102453-T	PROJECT NAME	Lyons Canyon Ranch	BORING DESIG.	B-9
DATE STARTED	6/25/01	GROUND ELEV.	1327	LOGGED BY	CRN
DATE FINISHED	6/25/01	GW DEPTH (FT)		NOTE	0-24' 3548#; 24-47'
DRILLER	Ledezma Drilling	DRIVE WT.	See Note		2577#; 47-73' 1648#
TYPE OF DRILL RIG	30" Bucket Auger	DROP	12 inches		

DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	ATTITUDES	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
		R	5			to moderately weathered.	10.0	117.9	63	
	1285					Total Depth 41 feet. No water, no caving. Hole backfilled with native materials and tamped.				

SAMPLE TYPES:
- R RING (DRIVE) SAMPLE
- S SPT (SPLIT SPOON) SAMPLE
- B BULK SAMPLE
- T TUBE SAMPLE

▼ GROUNDWATER LEVEL
► WATER SEEP
B BEDDING
J JOINTING
C CONTACT
F FAULT
S SHEAR

PACIFIC SOILS ENGINEERING, INC.

PLATE A-14

GEOTECHNICAL BORING LOG

PROJECT NO.	102453-T	PROJECT NAME	Lyons Canyon Ranch	BORING DESIG.	B-10
DATE STARTED	4/25/02	GROUND ELEV.	1635	LOGGED BY	CRN
DATE FINISHED	4/26/02	GW DEPTH (FT)		NOTE	0-27' 4500#; 27-52' 3500#; 52-80' 2500#; 80-104' 1000#
DRILLER	Dave's Drilling	DRIVE WT.	See Note		
TYPE OF DRILL RIG	30" Bucket Auger	DROP	12 inches		

DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	ATTITUDES	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
	1635	B				**PICO FORMATION (Tp):** Sandy Siltstone; very fine-grained Sand, pale yellowish brown, slightly moist, hard, fossiliferous (abundant bi-valves); interbedded with Silty Sandstone; very fine- to fine-grained, pale yellowish brown, slightly moist, hard, scour-fill into Siltstone; both units jointed with caliche infill, both units laminated to 8± inch thick bedding.				
					B: N75W 46NE					
5	1630									
10	1625	R/B	4 for 5"			Interbedded Silty Sandstone; fine-grained, pale yellowish to grayish orange, slightly moist to moist, hard; with Sandy Siltstone; mottled grayish orange and pale olive gray, slightly moist to moist, hard; both units laminated to 2± inch thick bedding.	8.8	115.4	54	
					B: B80W 54NE					
					B: N85W 53NE	Some interlayered Silty Claystone; olive gray, moist, moderately firm to firm, laminated, 1 to 2±mm thick layers, some caliche along bedding.				
15	1620									
20	1615	R/B	5 for 4"		B: B80W 45NE	Silty Sandstone; fine- to medium-grained, light gray with light brown staining, slightly moist, hard, laminated to 1/4± inch thick bedding./	5.8	108.0	29	
25	1610				B: N70W 51NE	Some isolated cobble lenses, quartzite and gneissic composition.				
30	1605	R/B	8 for 8"		B: N70W 50NE	Sandy to Clayey Siltstone; very fine-grained Sand; light olive gray, moist, moderately hard to hard, laminated to 1/4± inch thick bedding, some gypsum strands along bedding up to 1/4± inch thick. Some isolated Clay lenses and pods; dark brownish black, moist, moderately firm to firm, concentrated along bedding planes.	11.0	116.4	69	
35	1600									
					B: N65W 49NE	Claystone layer; 1/4± inch thick, olive gray, moist, soft, abundant well formed, gypsum crystals.				
	1595									

SAMPLE TYPES:
- R RING (DRIVE) SAMPLE
- S SPT (SPLIT SPOON) SAMPLE
- B BULK SAMPLE
- T TUBE SAMPLE

▼ GROUNDWATER LEVEL
- WATER SEEP
- B BEDDING
- J JOINTING
- C CONTACT
- F FAULT
- S SHEAR

PACIFIC SOILS ENGINEERING, INC.

PLATE A-15

GEOTECHNICAL BORING LOG

PROJECT NO.	102453-T	PROJECT NAME	Lyons Canyon Ranch		
DATE STARTED	4/25/02	GROUND ELEV.	1635	BORING DESIG.	B-10
DATE FINISHED	4/26/02	GW DEPTH (FT)		LOGGED BY	CRN
DRILLER	Dave's Drilling	DRIVE WT.	See Note	NOTE	0-27' 4500#; 27-52' 3500#; 52-80' 2500#; 80-104' 1000#
TYPE OF DRILL RIG	30" Bucket Auger	DROP	12 inches		

DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	ATTITUDES	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
	1595	R	8 for 6"		B: N80W 47NE	Sandy Siltstone; fine-grained Sand; olive gray, moist, hard, some laminated to 1/4± inch bedding, generally massive, with abundant cross-cutting gypsum seams. Cobble layers; 1± foot thick, set in pebbly sand matrix, medium- to very coarse-grained, moist, moderately hard to hard, quartzite cobbles and pebbles.	10.0	121.2	73	
45	1590				B: N85W 57NE	Silty Sandstone; fine-grained, reddish brown, slightly moist to moist, hard; interlayered with Sandy Siltstone; very fine- to fine-grained Sand, moist, moderately firm to firm, some very firm layers, laminated; both units 6 to 12 inch beds.				
50	1585	R/B	8 for 5"			Silty Sandstone; fine-grained, pale olive gray, moist, hard.	7.2	113.1	41	
					B: N70W 49NE	Pebble lense; medium- to very coarse-grained Sand matrix, quartzite pebbles, mottled reddish to light brown and pale olive gray, slightly moist, very hard, slightly concretionary.				
55	1580				B: N75W 50NE	Some isolated Clay lenses and pods along bedding, 1± inch thick to 6± inches long, medium- to very coarse-grained Sand matrix, quartzite pebbles, mottled reddish to light brown and pale olive gray, slightly moist, very hard, slightly concretionary.				
60	1575	R	10 for 5"		B: N60E 47NW	Silty Sandstone; layered fine- to medium-grained, pale olive gray, moist, hard, friable; interbedded with Sandy to Clayey Siltstone, olive gray, moist, hard, laminated to 1/2± inch thick bedding. Siltstone concretion; 1± inch thick, light to olive gray, slightly moist, very hard, massive, slightly jointed with light brown staining along joints.	7.3	113.0	42	
65	1570				B: E-W 51N	Some gypsum along bedding; up to 1/4± inch thick.				
70	1565	R/B	10 for 5"		B: B80W 48NE	Clayey Sandstone; very fine- to fine-grained, layered, pale yellowish brown to olive gray, moist, hard, friable, generally massive, some gypsum strands.	12.1	109.6	63	
75	1560					Clayey Siltstone to Clayey Sandstone layers; 1± foot thick, very fine-grained, medium light to medium gray, moist, hard, micaceous, massive.				
	1555				B: N75W 48NE	Silty Sandstone; very fine- to fine-grained, medium light to medium gray, moist, hard, micaceous, laminated to 1± inch thick bedding.				

SAMPLE TYPES:
- R RING (DRIVE) SAMPLE
- S SPT (SPLIT SPOON) SAMPLE
- B BULK SAMPLE
- T TUBE SAMPLE

- ▼ GROUNDWATER LEVEL
- ► WATER SEEP
- B BEDDING
- J JOINTING
- C CONTACT
- F FAULT
- S SHEAR

GEOTECHNICAL BORING LOG

PROJECT NO.	102453-T	PROJECT NAME	Lyons Canyon Ranch		
DATE STARTED	4/25/02	GROUND ELEV.	1635	BORING DESIG.	B-10
DATE FINISHED	4/26/02	GW DEPTH (FT)		LOGGED BY	CRN
DRILLER	Dave's Drilling	DRIVE WT.	See Note	NOTE	0-27' 4500#; 27-52' 3500#; 52-80' 2500#; 80-104' 1000#
TYPE OF DRILL RIG	30" Bucket Auger	DROP	12 inches		

DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	ATTITUDES	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
	1555	R/B	20 for 4"			No sample recovery at 80 feet.				
85	1550				B: E-W 52N	Gradational color change to light olive gray.				
90	1545	R	25 for 4"			Silty Sandstone; very fine- to fine-grained, light olive gray, slightly moist, hard, massive to very slightly bedded with some cross-bedding. No sample recovery at 92 feet.				
						Some isolated bi-valve shells to depth.				
95	1540				B: E-W 50N (Approx.)					
100	1535	R	25 for 4"							
						Total Depth 101 feet. No water, no caving. Hole backfilled with native				

SAMPLE TYPES:
- R RING (DRIVE) SAMPLE
- S SPT (SPLIT SPOON) SAMPLE
- B BULK SAMPLE
- T TUBE SAMPLE

▼ GROUNDWATER LEVEL
- WATER SEEP
- B BEDDING
- J JOINTING
- C CONTACT
- F FAULT
- S SHEAR

PACIFIC SOILS ENGINEERING, INC.

PLATE A-17

GEOTECHNICAL BORING LOG

PROJECT NO.	102453-T	PROJECT NAME	Lyons Canyon Ranch		
DATE STARTED	4/26/02	GROUND ELEV.	1582	BORING DESIG.	B-11
DATE FINISHED	4/26/02	GW DEPTH (FT)		LOGGED BY	CRN
DRILLER	Dave's Drilling	DRIVE WT.	See Note	NOTE	0-27' 4500#; 27-52' 3500#; 52-80' 2500#; 80-104' 1000#
TYPE OF DRILL RIG	30" Bucket Auger	DROP	12 inches		

DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	ATTITUDES	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
						PICO FORMATION (Tp):				
	1580				B: N50W 45SN J: N60E Vertical J: N10W 62NE	Sandy Siltstone; very fine-grained Sand, layered light to olive gray and light brown, slightly moist, moderately hard to hard, laminated to 1/2± inch thick bedding, jointed/weathered, abundant roots.				
5					F: N80W 62NE F: N50W 63SW	Fault Gouge: 1/4 to 1/2± inch thick, plastic Clay layer; olive gray, moist, soft to firm, flaky, abundant roots and rootlets.				
	1575									
10		R/B	5				13.0	119.4	89	
					J: N45W 78SW F: N55E 65NW	Fault Gouge: plastic Clay layer; olive gray, moist, soft, flaky, abundant roots.				
	1570									
					B: N50E 48NW					
15										
	1565									
						Some medium sized bi-valves.				
					B: N40E 49NW					
20		R/B	5 for 6"			Sandy Siltstone; very fine-grained Sand, medium dark gray, slightly moist, hard, massive, some isolated small to medium bi-valves.	13.2	122.3	99	
	1560									
25					J: N50W 86SW J: N40E 66NW	Clay lined joint 1-2 mm thick. Gypsum lined joint 2-3 mm thick.				
	1555									
30		R/B	8 for 6"			Sandy Siltstone; very fine-grained Sand, greenish gray, slightly moist, firm, massive, fossiliferous (small bi-valves); interlayered plastic with Silty Sandstone, medium gray, slightly moist, hard, slightly layered to massive; some Interlayered Claystone, medium dark to dark gray, moist, soft to moderately firm, laminated, flaky.	12.2	123.5	95	
	1550				B: N60W 75SW					
35										
	1545					Some isolated concretionary pods, 2 to 6± inches in diameter, very hard.				

SAMPLE TYPES:
- R RING (DRIVE) SAMPLE
- S SPT (SPLIT SPOON) SAMPLE
- B BULK SAMPLE
- T TUBE SAMPLE

- ▼ GROUNDWATER LEVEL
- ➤ WATER SEEP
- C CONTACT
- B BEDDING
- F FAULT
- J JOINTING
- S SHEAR

PACIFIC SOILS ENGINEERING, INC.

PLATE A-18

GEOTECHNICAL BORING LOG

PROJECT NO. 102453-T
DATE STARTED 4/26/02
DATE FINISHED 4/26/02
DRILLER Dave's Drilling
TYPE OF DRILL RIG 30" Bucket Auger

PROJECT NAME Lyons Canyon Ranch
GROUND ELEV. 1582
GW DEPTH (FT)
DRIVE WT. See Note
DROP 12 inches

BORING DESIG. B-11
LOGGED BY CRN
NOTE 0-27' 4500#; 27-52' 3500#; 52-80' 2500#; 80-104' 1000#

DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	ATTITUDES	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
		R	8 for 6"		B: N20E 55NW	Clayey to Sandy Siltstone; very fine-grained Sand, greenish to dark greenish gray, slightly moist, firm, laminated to massive.	12.3	119.7	85	
	1540									
45					B: N60W 55SW (Approx.)					
	1535					Hard drilling.				
50		R/B	10 for 6"			Clayey Siltstone; medium dark gray, slightly moist, firm, slightly laminated, generally massive.	11.9	122.1	89	
	1530									
					B: N55W 75SW					
55										
	1525				B: N20W 67NE (Approx.)	Siltstone concretion lense; 8 to 10± inches thick, very hard, massive.				
60		R	15 for 6"			Clayey Siltstone; olive gray, slightly moist, firm, slightly laminated, generally massive, few small bi-valve shells.	10.5	121.0	76	
	1520				B: N60W Vertical	Ripple marks, small amplitude.				
65					B: N50W 52SW					
	1515				B: N50W 43SW					
70		R	15 for 5"		B: N60E 59SE	Sandy Siltstone; very fine-grained Sand, medium dark gray, slightly moist, hard, slightly laminated to 1/2± inch thick bedding, generally massive.	10.3	105.0	47	
	1510					Clay lense; 2 to 3± inches thick, medium dark gray, moist, soft, pliable.				
75					B: N60W 75SW					
	1505									

SAMPLE TYPES:
[R] RING (DRIVE) SAMPLE
[S] SPT (SPLIT SPOON) SAMPLE
[B] BULK SAMPLE [T] TUBE SAMPLE

▼ GROUNDWATER LEVEL
WATER SEEP [C] CONTACT
[B] BEDDING [F] FAULT
[J] JOINTING [S] SHEAR

PACIFIC SOILS ENGINEERING, INC.

GEOTECHNICAL BORING LOG

PROJECT NO. 102453-T
DATE STARTED 4/26/02
DATE FINISHED 4/26/02
DRILLER Dave's Drilling
TYPE OF DRILL RIG 30" Bucket Auger

PROJECT NAME Lyons Canyon Ranch
GROUND ELEV. 1582
GW DEPTH (FT)
DRIVE WT. See Note
DROP 12 inches

BORING DESIG. B-11
LOGGED BY CRN
NOTE 0-27' 4500#; 27-52' 3500#; 52-80' 2500#; 80-104' 1000#

DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	ATTITUDES	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
		R	25 for 3.5"				10.8	120.8	78	
	1500					Total Depth 81 feet. No water, no caving. Hole backfilled with native materials and tamped.				

SAMPLE TYPES:
[R] RING (DRIVE) SAMPLE
[S] SPT (SPLIT SPOON) SAMPLE
[B] BULK SAMPLE [T] TUBE SAMPLE

▼ GROUNDWATER LEVEL
► WATER SEEP
[B] BEDDING [C] CONTACT
[J] JOINTING [F] FAULT
[S] SHEAR

PACIFIC SOILS ENGINEERING, INC.

PLATE A-20

GEOTECHNICAL BORING LOG

PROJECT NO.	102453-T	PROJECT NAME	Lyons Canyon Ranch	BORING DESIG.	B-12
DATE STARTED	4/29/02	GROUND ELEV.	1557	LOGGED BY	CRN
DATE FINISHED	4/29/02	GW DEPTH (FT)		NOTE	0-27' 4500#; 27-52' 3500#; 52-80' 2500#; 80-104' 1000#
DRILLER	Dave's Drilling	DRIVE WT.	See Note		
TYPE OF DRILL RIG	30" Bucket Auger	DROP	12 inches		

DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	ATTITUDES	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
						PICO FORMATION (Tp):				
	1555				B: N60W 57NE	Sandy Siltstone; very fine- to fine-grained Sand; yellowish brown, slightly moist to moist, moderately hard, laminated to 1/2± inch thick bedding; interlayered with Silty Sandstone; fine-grained, mottled moderate yellowish brown and pale olive, slightly moist, moderately hard, laminated to 1/2± inch thick bedding; abundant caliche, both units highly to moderately weathered.				
5										
	1550				B: N80E 72NW	Abundant penecontemporaneous deformation.				
10		R/B	5 for 10"				12.9	117.6	84	
	1545					Sandy Siltstone; very fine-grained Sand; light olive gray, slightly moist to moist, moderately hard to hard, slightly laminated generally massive; some interlayered Silty Sandstone, fine-grained, layered yellowish gray and light brown, slightly moist, moderately hard to hard, laminated to 1/4± inch thick bedding; some fine-grained gypsum along bedding bottom of "high to moderate" weathering zone.				
15					B: N50W 65NE					
	1540									
20		R/B			B: N70W 73NE	Clayey Siltstone; mottled light to olive gray and moderate brown, slightly moist to moist, moderately hard to hard, massive, micaceous, some fine-rained gypsum strands.	14.6	115.8	90	
	1535					Silty Sandstone to Clayey Siltstone; very fine-grained Sand, medium dark gray, slightly moist, hard, massive, some small isolated bi-valves and gastropods.				
25										
	1530				B: E-W 64N (Approx.)					
30		R/B	10 for 10"			Sandy Siltstone; very fine-grained, medium dark gray, slightly moist to moist, hard, slightly laminated, generally massive, slightly fossiliferous, micaceous.	12.6	123.0	97	
	1525									
35										
	1520									

SAMPLE TYPES:
- R RING (DRIVE) SAMPLE
- S SPT (SPLIT SPOON) SAMPLE
- B BULK SAMPLE
- T TUBE SAMPLE

GROUNDWATER LEVEL
- WATER SEEP
- C CONTACT
- B BEDDING
- F FAULT
- J JOINTING
- S SHEAR

PACIFIC SOILS ENGINEERING, INC.

PLATE A-21

GEOTECHNICAL BORING LOG

PROJECT NO.	102453-T	PROJECT NAME	Lyons Canyon Ranch	BORING DESIG.	B-12
DATE STARTED	4/29/02	GROUND ELEV.	1557	LOGGED BY	CRN
DATE FINISHED	4/29/02	GW DEPTH (FT)		NOTE	0-27' 4500#; 27-52' 3500#; 52-80' 2500#; 80-104' 1000#
DRILLER	Dave's Drilling	DRIVE WT.	See Note		
TYPE OF DRILL RIG	30" Bucket Auger	DROP	12 inches		

DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	ATTITUDES	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
					B: N70W 69NE	Sandy Siltstone to Silty Sandstone; very fine-grained Sand, medium dark gray, slightly moist to moist, hard, slightly laminated generally massive, slightly fossiliferous, micaceous; some interlayered Silty Sandstone, very fine-grained, light gray, slightly moist, hard, and Claystone, brownish to olive black, moist, moderately firm, laminated.	14.2	118.6	95	
	1515									
45					B: N50W 57NE (Approx.)					
	1510									
50		R/B	8 for 8"			Silty sandstone; very fine- to fine-grained, medium dark to olive gray, slightly moist, hard, slightly laminated, generally massive, micaceous, slightly fossiliferous.	13.4	120.8	96	
	1505									
55										
	1500									
60		R/B	15 for 8"		B: N60W 63NE	Silty Sandstone; very fine- to fine-grained, medium dark gray, slightly moist, hard, slightly laminated, generally massive, micaceous, slightly fossiliferous; some interbedded Claystone lenses, 1 to 2± thick, brownish to olive black, moist, moderately firm to firm, laminated.	13.2	120.6	94	
	1495				B: N60W 53NE	Silty Sandstone lense; 8± inches thick, light to medium light gray, fine-grained, moist, moderately hard, fossiliferous; underlain by 1 to 2± inch thick soft Claystone lense.				
65										
	1490				B: N50W 52NE					
70		R	15 for 8"			Silty Sandstone; very fine- to fine-grained, medium dark gray, slightly moist, hard, slightly laminated, generally massive, micaceous, slightly fossiliferous.	13.0	122.1	97	
	1485									
75					B: N25W 77NE					
	1480									

SAMPLE TYPES:
[R] RING (DRIVE) SAMPLE
[S] SPT (SPLIT SPOON) SAMPLE
[B] BULK SAMPLE [T] TUBE SAMPLE

▼ GROUNDWATER LEVEL
WATER SEEP
[B] BEDDING [C] CONTACT
[J] JOINTING [F] FAULT
[S] SHEAR

PACIFIC SOILS ENGINEERING, INC.

PLATE A-22

GEOTECHNICAL BORING LOG

PROJECT NO.	102453-T	PROJECT NAME	Lyons Canyon Ranch		
DATE STARTED	4/29/02	GROUND ELEV.	1557	BORING DESIG.	B-12
DATE FINISHED	4/29/02	GW DEPTH (FT)		LOGGED BY	CRN
DRILLER	Dave's Drilling	DRIVE WT.	See Note	NOTE	0-27' 4500#; 27-52' 3500#; 52-80' 2500#; 80-104' 1000#
TYPE OF DRILL RIG	30" Bucket Auger	DROP	12 inches		

DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	ATTITUDES	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
		R/B	20 for 6"				13.3	108.9	68	
	1475				B: N65W 46NE	Silty Sandstone lense; interbedded with Sandy Siltstone, dark gray, slightly moist, hard, slightly lamainted, generally massive, 1/2 to 1± inch thick beds.				
85					B: N50W 63NE					
	1470									
90		R	25 for 5"				12.3	104.8	56	
						Total Depth 91 feet. No water, no caving. Hole backfilled with native materials and tamped.				

SAMPLE TYPES:
- [R] RING (DRIVE) SAMPLE
- [S] SPT (SPLIT SPOON) SAMPLE
- [B] BULK SAMPLE [T] TUBE SAMPLE

- ▼ GROUNDWATER LEVEL
- ► WATER SEEP
- [B] BEDDING [C] CONTACT
- [J] JOINTING [F] FAULT
- [S] SHEAR

PACIFIC SOILS ENGINEERING, INC.

PLATE A-23

GEOTECHNICAL BORING LOG

PROJECT NO.	102453-T	PROJECT NAME	Lyons Canyon Ranch	BORING DESIG.	B-13
DATE STARTED	5/1/02	GROUND ELEV.	1445	LOGGED BY	CRN
DATE FINISHED	5/1/02	GW DEPTH (FT)		NOTE	0-27' 4500#; 27-52' 3500#; 52-80' 2500#; 80-104' 1000#
DRILLER	Dave's Drilling	DRIVE WT.	See Note		
TYPE OF DRILL RIG	30" Bucket Auger	DROP	12 inches		

DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	ATTITUDES	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
	1445					**SAUGUS FORMATION - SUNSHINE RANCH MEMBER** (Tsr): Silty Sandstone; fine- to coarse-grained with pebbles, very pale orange to pale yellowish brown, dry, moderately hard to hard, abundant scour-infill, normal grading.				
					B: N80E 55NW					
5	1440									
10	1435	R/B	5 for 5"		B: N80E 39NW	Silty Sandstone; fine- to coarse-grained, pale yellowish brown, dry to slightly moist, moderately hard to hard.	4.5	116.1	28	
					B: N70E 50NW	Some interlayered Clayey Siltstone layers; 6± inches thick, pale olive gray, moist, moderately hard, laminated.				
15	1430									
						1 foot thick lense of 6 to 8± inch diameter cobbles, scour/infill with lower contact into underlying Siltstone.				
20	1425	R/B	5 for 6"			Sandy Siltstone; very fine- to fine-grained, pale olive gray, moist, moderately hard to hard, slightly laminated generally massive.	11.1	120.1	78	
25	1420									
					B: E-W 40N	Silty Sandstone; fine- to coarse-grained with some pebble lenses, grayish orange to light olive gray, slightly moist to moist, moderately hard to hard, abundant scour-fill, graded bedding, cross-bedding.				
30	1415	R	8 for 6"				5.1	105.6	24	
35	1410				B: N80W 43NE					
	1405									

SAMPLE TYPES:
- R RING (DRIVE) SAMPLE
- S SPT (SPLIT SPOON) SAMPLE
- B BULK SAMPLE
- T TUBE SAMPLE

- ▼ GROUNDWATER LEVEL
- ► WATER SEEP
- C CONTACT
- B BEDDING
- F FAULT
- J JOINTING
- S SHEAR

PACIFIC SOILS ENGINEERING, INC.

PLATE A-24

GEOTECHNICAL BORING LOG

PROJECT NO.	102453-T	PROJECT NAME	Lyons Canyon Ranch		
DATE STARTED	5/1/02	GROUND ELEV.	1445	BORING DESIG.	B-13
DATE FINISHED	5/1/02	GW DEPTH (FT)		LOGGED BY	CRN
DRILLER	Dave's Drilling	DRIVE WT.	See Note	NOTE	0-27' 4500#; 27-52' 3500#; 52-80' 2500#; 80-104' 1000#
TYPE OF DRILL RIG	30" Bucket Auger	DROP	12 inches		

DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	GROUP SYMBOL	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
		R/B	8 for 6"			Silty Sandstone; very fine- to fine-grained, pale olive gray, slightly moist to moist, moderately hard to hard; some interlayered Silty Sandstone, fine- to coarse-grained with pebbles, grayish orange, slightly moist, moderately hard to hard.	3.8	112.5	21	
45	1400					Silty Sandstone; fine- to coarse-grained with pebbles and cobbles, moderate yellowish to moderate brown, moist, moderately hard to hard.				
50	1395	B	N/R			Discontinuous Paleosol; Silty Sand to Sandy Silt, fine- to coarse-grained dark yellowish brown, moist, soft, 6± inches thick. Silty Sandstone; fine- to coarse-grained with pebbles and cobbles, some boulders up to 10± inches, moderate yellowish to moderate brown, moist, moderately hard to hard, massive 50/50± clast-matrix supported. @ 50 feet; no sample recovery due to cobbles.				
55	1390									
60	1385	R/B	10 for 5"			Silty Sandstone; fine- to coarse-grained with pebbles and some cobbles, moderate yellowish to moderate brown, moist, hard. FAULT ZONE: Clayey Siltstone; dusky blue green, moist, moderately hard to hard, massive, some polished surfaces, some scour-infill with overlying Sandstone.	7.5	112.7	43	
65	1380					FAULT: Claystone; olive gray, moist, moderately firm, slightly pliable, abundant polished surfaces and striations, laminated to 1± inch thick bedding. @ 66'; Trend and plunge of striations on fault plane: N60E 42W.				
70	1375	R/B	10 for 10"			Silty Sandstone; very fine- to fine-grained, light olive gray, moist, moderately hard, laminated to 2± inch, massive bedding. Silty Sandstone; fine- to coarse-grained with pebbles and cobbles, moderate yellowish brown, moist, moderately hard, scour-infill, generally massive, matrix supported.	14.6	119.0	99	
75	1370	B				Total Depth 78 feet. No water, no caving. Hole backfilled with native materials and tamped.				

SAMPLE TYPES:
- R RING (DRIVE) SAMPLE
- S SPT (SPLIT SPOON) SAMPLE
- B BULK SAMPLE
- T TUBE SAMPLE

Ground Water Seepage
MAX - Max. Density/Opt. Moist.
DS - Direct Shear
HYDR - Hydrometer Analysis
ASCE - Expansion Index
CONS - Consolidation

PACIFIC SOILS ENGINEERING, INC.

PLATE A-25

GEOTECHNICAL BORING LOG

PROJECT NO.	102453-T	PROJECT NAME	Lyons Canyon Ranch	BORING DESIG.	B-14
DATE STARTED	5/2/02	GROUND ELEV.	1338	LOGGED BY	CRN
DATE FINISHED	5/2/02	GW DEPTH (FT)		NOTE	0-27' 4500#; 27-52' 3500#; 52-80' 2500#; 80-104' 1000#
DRILLER	Dave's Drilling	DRIVE WT.	See Note		
TYPE OF DRILL RIG	30" Bucket Auger	DROP	12 inches		

DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	GROUP SYMBOL	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
5	1333	B				**SOIL:** Sandy Silt; very fine- to fine-grained, pale to moderate yellowish brown, dry, very loose, abundant rootlets. **ALLUVIUM (Qal):** Sandy Silt to Silty Sand; very fine- to medium-grained with pebbles and cobbles, pale yellowish brown, dry, loose. Silty Sand; fine- to coarse-grained with pebbles and cobbles, some boulders up to 10± inches, moderate to dark yellowish brown, slightly moist, loose to moderately dense, stratified cobbles consist of gneiss, granite and sandstone, some quartzite. Increase moisture content to slightly moist. Boulder lense: 2-1/2 to 3± feet in diameter, moderate to major caving. Total Depth 8 feet. No water. Moderate to major caving 5 to 8± feet. Hole backfilled.				

SAMPLE TYPES:
- R RING (DRIVE) SAMPLE
- S SPT (SPLIT SPOON) SAMPLE
- B BULK SAMPLE
- T TUBE SAMPLE

Ground Water Seepage
MAX - Max. Density/Opt. Moist.
DS - Direct Shear
HYDR - Hydrometer Analysis
ASCE - Expansion Index
CONS - Consolidation

PACIFIC SOILS ENGINEERING, INC.

GEOTECHNICAL BORING LOG

PROJECT NO.	102453-T	PROJECT NAME	Lyons Canyon Ranch	BORING DESIG.	B-14B
DATE STARTED	5/2/02	GROUND ELEV.	1338	LOGGED BY	CRN
DATE FINISHED	5/2/02	GW DEPTH (FT)		NOTE	0-27' 4500#; 27-52' 3500#; 52-80' 2500#; 80-104' 1000#
DRILLER	Dave's Drilling	DRIVE WT.	See Note		
TYPE OF DRILL RIG	30" Bucket Auger	DROP	12 inches		

DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	GROUP SYMBOL	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
						SOIL: Silty Sand to Sandy Silt; very fine- to fine-grained, pale yellowish brown, dry, very loose, abundant rootlets and gopher holes.				
						ALLUVIUM (Qal): Pebbly to cobbly Sand; fine- to coarse-grained, pale to moderate yellowish brown, dry, loose to moderately dense, stratified, some boulders to 10± inches.				
5	1333					Increase moisture to: slightly moist.				
		B				Boulder layer; up to 3± feet in diameter, moderate caving.				
						Increase moisture to: slightly moist to moist.				
10	1328					Boulder layer; up to 2± feet in diameter, predominantly Sandstone and Pebbly Sandstone, some granite.				
		B				Clayey Siltstone layer; 1 to 2± inch thick, mottled moderate yellowish brown and pale olive, moist to wet (perched/saturated), soft.				
15	1323					Boulder layer, need rippers/core to continue. Refusal.				
						Total Depth 14 feet.				
						No water. Moderate caving throughout.				
						Refusal - Boulders.				
						Hole backfilled.				
20	1318									
25	1313									
30	1308									
35	1303									

SAMPLE TYPES:
- R RING (DRIVE) SAMPLE
- S SPT (SPLIT SPOON) SAMPLE
- B BULK SAMPLE
- T TUBE SAMPLE

Ground Water Seepage
MAX - Max. Density/Opt. Moist.
DS - Direct Shear
HYDR - Hydrometer Analysis
ASCE - Expansion Index
CONS - Consolidation

PACIFIC SOILS ENGINEERING, INC.

PLATE A-27

GEOTECHNICAL BORING LOG

PROJECT NO.	102453-T	PROJECT NAME	Lyons Canyon Ranch				
DATE STARTED	4/4/02	GROUND ELEV.	1323	BORING DESIG.	RW-1		
DATE FINISHED	4/4/02	GW DEPTH (FT)		LOGGED BY	TMD		
DRILLER	A & W Drilling	DRIVE WT.	See Note	NOTE	140# for SPT; 400# for ring sample		
TYPE OF DRILL RIG	Rotary Wash	DROP	30 inches				

DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	GROUP SYMBOL	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
						ALLUVIUM (Qal):				
5	1318	SPT	11			Silty Sand; brown with pebbles, slightly moist, medium dense.				
10	1313	SPT	11			Silty Sand; brown with pebbles, slightly moist, medium dense.				
15	1308	SPT	16			Silty Sand; brown with pebbles, slightly moist, medium dense.				
20	1303	SPT	26			Silty Sand; light brown with pebbles, slightly moist, medium dense.				
25	1298	SPT	60			Gravelly Sand; brown, slightly moist, very dense.				
30	1293	R	25			Silty Sand; fine- to medium-grained, light brown, moist, medium dense, 2± feet thick layer.	12.0	108.4	61	
35	1288	SPT	40			Sand; fine- to medium-grained, brown with gravel, moist, dense.				
						Very firm drilling.				

SAMPLE TYPES:
- R RING (DRIVE) SAMPLE
- S SPT (SPLIT SPOON) SAMPLE
- B BULK SAMPLE
- T TUBE SAMPLE

Ground Water Seepage
MAX - Max. Density/Opt. Moist.
DS - Direct Shear
HYDR - Hydrometer Analysis
ASCE - Expansion Index
CONS - Consolidation

PACIFIC SOILS ENGINEERING, INC.

PLATE A-28

GEOTECHNICAL BORING LOG

PROJECT NO.	102453-T	PROJECT NAME	Lyons Canyon Ranch		
DATE STARTED	4/4/02	GROUND ELEV.	1323	BORING DESIG.	RW-1
DATE FINISHED	4/4/02	GW DEPTH (FT)		LOGGED BY	TMD
DRILLER	A & W Drilling	DRIVE WT.	See Note	NOTE	140# for SPT; 400# for ring sample
TYPE OF DRILL RIG	Rotary Wash	DROP	30 inches		

DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	GROUP SYMBOL	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
		SPT	34			Gravelly Sand; fine- to medium-grained, brown, slightly moist, dense, some silt.				
45	1278	SPT	17 for 12"			Gravelly Sand; fine- to medium-grained, brown, moist, dense.				
						SAUGUS FORMATION - SUNSHINE RANCH MEMBER (Tsr):				
50	1273	SPT	75 for 6"			Harder drilling. Sandstone; medium- to coarse-grained with gravel, grayish brown.				
55	1268	SPT	75 for 5"			Silty Sandstone; fine- to coarse-grained with gravel, grayish brown. 6 to 8 inch cobble layer.				
60	1263	SPT	50 for 1"			No recovery.				
65	1258	R	50 for 4"			Sandstone; medium- to coarse-grained, brown, hard. Total Depth 65 feet. No apparent water or caving. Hole backfilled.				

SAMPLE TYPES:
- R RING (DRIVE) SAMPLE
- S SPT (SPLIT SPOON) SAMPLE
- B BULK SAMPLE
- T TUBE SAMPLE

Ground Water Seepage
MAX - Max. Density/Opt. Moist.
DS - Direct Shear
HYDR - Hydrometer Analysis
ASCE - Expansion Index
CONS - Consolidation

PACIFIC SOILS ENGINEERING, INC.

GEOTECHNICAL BORING LOG

PROJECT NO.	102453-T	PROJECT NAME	Lyons Canyon Ranch		
DATE STARTED	4/4/02	GROUND ELEV.	1318	BORING DESIG.	RW-2
DATE FINISHED	4/4/02	GW DEPTH (FT)	69	LOGGED BY	TMD
DRILLER	A & W Drilling	DRIVE WT.	See Note	NOTE	140# for SPT; 400# for ring sample
TYPE OF DRILL RIG	Rotary Wash	DROP	30 inches		

DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	GROUP SYMBOL	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
						ALLUVIUM (Qal):				
5	1313	SPT	4			Sandy Silt; fine-grained, brown, slightly moist, soft.				
10	1308	SPT	16			Silty Sand; brown, slightly moist, medium dense, fine- to medium-grained with small pebbles, sample from spoils screen.				
15	1303	SPT	36			Slightly Silty Sand; brown, moist, dense, fine- to medium-grained with pebbles, sample obtained by driving ring sampler 6".				
20	1298					Cobbles.				
		SPT	22			Gravelly Silty Sand; fine- to coarse-grained, red/brown, slightly most, medium dense, with pebbles.				
25	1293	SPT	18			Sandy Silt; brown, slightly moist, very stiff.				
30	1288	SPT	19			Silty Sand to Sandy Silt; fine-grained Sand, light brown, moist, very stiff.				
35	1283	SPT	35			Silty Sand; fine- to coarse-grained, with gravel, light brown, slightly moist, dense.				

SAMPLE TYPES:
- R RING (DRIVE) SAMPLE
- S SPT (SPLIT SPOON) SAMPLE
- B BULK SAMPLE
- T TUBE SAMPLE

▼ Ground Water Seepage
MAX - Max. Density/Opt. Moist.
DS - Direct Shear
HYDR - Hydrometer Analysis
ASCE - Expansion Index
CONS - Consolidation

PACIFIC SOILS ENGINEERING, INC.

PLATE A-30

GEOTECHNICAL BORING LOG

PROJECT NO.	102453-T	PROJECT NAME	Lyons Canyon Ranch				
DATE STARTED	4/4/02	GROUND ELEV.	1318			BORING DESIG.	RW-2
DATE FINISHED	4/4/02	GW DEPTH (FT)	69			LOGGED BY	TMD
DRILLER	A & W Drilling	DRIVE WT.	See Note			NOTE	140# for SPT; 400# for ring sample
TYPE OF DRILL RIG	Rotary Wash	DROP	30 inches				

DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	GROUP SYMBOL	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
		R	32			Sand; fine to coarse-grained brown, slightly moist, dense, soil retrieved from sampler tip with large rock fragment.				
45	1273	R	28			Sand; with gravel, medium to coarse-grained, red brown, slightly moist, slightly dense, Siltstone fragments in sampler tip.	11.0	121.7	81	
50	1268	SPT	57 for 6"			Silty Sand; fine to coarse-grained with gravel, light brown, slightly moist, very dense, sample may be from side of boring.				
55	1263	SPT	22			Sandy to Silty Clay; dark brown, moist, very stiff, soil obtained by driving ring sampler 6".				
60	1258	SPT	18			Sandy to Silty Clay; dark brown, moist, very stiff, soil obtained by driving ring sampler 6".				
65	1253	SPT	15			Sandy Silty Clay; fine-grained Sand, light brown, slightly moist, stiff, soil obtained by driving ring sampler 6".				
70	1248	SPT	32			**SAUGUS FORMATION-SUNSHINE RANCH MEMBER (Tsr):** slightly Sandy Silty Clay; fine-grained Sand, grayish brown, soil obtained by driving ring sampler 6".				
75	1243	SPT	22 for 12"			Silty Sandstone; gray. Total Depth 75 feet. Water at 69 feet. No apparent caving. Hole backfilled.				

SAMPLE TYPES:
- R RING (DRIVE) SAMPLE
- S SPT (SPLIT SPOON) SAMPLE
- B BULK SAMPLE
- T TUBE SAMPLE

▼ Ground Water Seepage
MAX - Max. Density/Opt. Moist.
DS - Direct Shear
HYDR - Hydrometer Analysis
ASCE - Expansion Index
CONS - Consolidation

PACIFIC SOILS ENGINEERING, INC.

PLATE A-31

GEOTECHNICAL BORING LOG

PROJECT NO.	102453-T	PROJECT NAME	Lyons Canyon Ranch	BORING DESIG.	RW-3
DATE STARTED	4/4/02	GROUND ELEV.	1330	LOGGED BY	TMD
DATE FINISHED	4/5/02	GW DEPTH (FT)	54	NOTE	140# for SPT; 400# for ring sample
DRILLER	A & W Drilling	DRIVE WT.	See Note		
TYPE OF DRILL RIG	Rotary Wash	DROP	30 inches		

DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	GROUP SYMBOL	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
						ALLUVIUM (Qal):				
5	1325	SPT	19			Sandy Silt; fine-grained, light brown, slightly moist, very stiff.				
10	1320	SPT	20			Sandy Silt; fine-grained, light brown, slightly moist, very stiff.				
15	1315	SPT	14			Silty Sand; fine- to coarse-grained, light brown, slightly moist, medium dense.				
20	1310	SPT	30			Gravelly Sand; medium- to coarse-grained, light brown, slightly moist, dense.				
25	1305	R	17			Gravelly Sand; medium- to coarse-grained, light brown, slightly moist, medium dense.	8.1	111.0	44	
30	1300	SPT	50 for 11"			Silty Sand; medium- to coarse-grained, with gravel, light brown, slightly moist, very dense.				
35	1295	SPT	48			Gravelly Sand; medium- to coarse-grained, with silt, light brown, slightly moist, dense.				

SAMPLE TYPES:
- R RING (DRIVE) SAMPLE
- S SPT (SPLIT SPOON) SAMPLE
- B BULK SAMPLE
- T TUBE SAMPLE

Ground Water Seepage
MAX - Max. Density/Opt. Moist.
DS - Direct Shear
HYDR - Hydrometer Analysis
ASCE - Expansion Index
CONS - Consolidation

PACIFIC SOILS ENGINEERING, INC.

PLATE A-32

GEOTECHNICAL BORING LOG

PROJECT NO.	102453-T	PROJECT NAME	Lyons Canyon Ranch		
DATE STARTED	4/4/02	GROUND ELEV.	1330	BORING DESIG.	RW-3
DATE FINISHED	4/5/02	GW DEPTH (FT)	54	LOGGED BY	TMD
DRILLER	A & W Drilling	DRIVE WT.	See Note	NOTE	140# for SPT; 400# for ring sample
TYPE OF DRILL RIG	Rotary Wash	DROP	30 inches		

DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	GROUP SYMBOL	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
		SPT	30 for 11"			Silty Sand; medium- to coarse-grained, with gravel, light brown, slightly moist, very dense.				
45	1285	SPT	19			Sandy Silt; fine-grained, light brown, slightly moist, very stiff.				
50	1280	SPT	50 for 10.5"			Slightly Silty Sand; fine-grained, reddish brown, moist, very dense.				
55	1275	SPT	31			Sandy Silty Clay; fine-grained, light brown, moist, hard, soil obtained from ring sampler, driven 6".				
60	1270	SPT	75 for 5"			SAUGUS FORMATION - SUNSHINE RANCH MEMBER (Tsr): Slightly Clayey Sand; medium- to coarse-grained, gray.				
65	1265	R	60 for 6"			Sandstone; medium to coarse-grained; gray. No sample retrieved. Total Depth 65 feet. Groundwater at 54 feet. No apparent caving. Hole backfilled.				

SAMPLE TYPES:
- R RING (DRIVE) SAMPLE
- S SPT (SPLIT SPOON) SAMPLE
- B BULK SAMPLE
- T TUBE SAMPLE

▼ Ground Water Seepage
MAX - Max. Density/Opt. Moist.
DS - Direct Shear
HYDR - Hydrometer Analysis
ASCE - Expansion Index
CONS - Consolidation

PACIFIC SOILS ENGINEERING, INC.

PLATE A-33

GEOTECHNICAL BORING LOG

PROJECT NO.	102453-T	PROJECT NAME	Lyons Canyon Ranch		
DATE STARTED	4/5/02	GROUND ELEV.	1408	BORING DESIG.	RW-4
DATE FINISHED	4/5/02	GW DEPTH (FT)		LOGGED BY	TMD
DRILLER	A & W Drilling	DRIVE WT.	See Note	NOTE	140# for SPT; 400# for ring sample
TYPE OF DRILL RIG	Rotary Wash	DROP	30 Inches		

DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	GROUP SYMBOL	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
						ALLUVIUM (Qal):				
5	1403	SPT	7			Sandy Silty Clay; fine-grained Sand, light brown, slightly moist, firm.				
10	1398	SPT	11			Silty Sand; light brown, slightly moist, medium dense.				
15	1393	SPT	35 for 11"			SAUGUS FORMATION - SUNSHINE RANCH MEMBER (Tsr): Slightly Clayey Siltstone; grayish brown, weathered.				
20	1388	R	75 for 11"			Very fine Sandy Siltstone; gray, hard. Total Depth 20 feet. No apparent groundwater or caving. Hole backfilled.	14.5	119.3	100	

SAMPLE TYPES:
- R RING (DRIVE) SAMPLE
- S SPT (SPLIT SPOON) SAMPLE
- B BULK SAMPLE
- T TUBE SAMPLE

▼ Ground Water Seepage
MAX - Max. Density/Opt. Moist.
DS - Direct Shear
HYDR - Hydrometer Analysis
ASCE - Expansion Index
CONS - Consolidation

PACIFIC SOILS ENGINEERING, INC.

PLATE A-34

GEOTECHNICAL BORING LOG

PROJECT NO.	102453-T	PROJECT NAME	Lyons Canyon Ranch		
DATE STARTED	4/5/02	GROUND ELEV.	1348	BORING DESIG.	RW-5
DATE FINISHED	4/5/02	GW DEPTH (FT)	17	LOGGED BY	TMD
DRILLER	A & W Drilling	DRIVE WT.	See Note	NOTE	140# for SPT; 400# for ring sample
TYPE OF DRILL RIG	Rotary Wash	DROP	30 inches		

DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	GROUP SYMBOL	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
						ALLUVIUM (Qal):				
5	1343	SPT	17			Silty Sand; fine-grained, light brown, slightly moist, medium dense.				
10	1338	SPT	8			Silty Sand to Sandy Silt; dark brown, moist, loose.				
15	1333	R	5			Silty Sand; fine- to medium-grained, dark brown, slightly moist, slightly dense. ▼	17.3	112.9	99	
20	1328	SPT	6			Clayey to Silty Sand; brown, moist, loose.				
25	1323	SPT	10			Clayey to Sandy Silt; gray, very moist, stiff.				
						Some gravel.				
30	1318	SPT	50 for 8"			Silty fine- to medium-grained Sand; gray, moist, very dense.				
35	1313	SPT	57			**SAUGUS FORMATION - SUNSHINE RANCH MEMBER (Tsr):** Silty Sandstone/Sandy Siltstone; brown/gray.				

SAMPLE TYPES:
- R RING (DRIVE) SAMPLE
- S SPT (SPLIT SPOON) SAMPLE
- B BULK SAMPLE
- T TUBE SAMPLE

▼ Ground Water Seepage
MAX - Max. Density/Opt. Moist.
DS - Direct Shear
HYDR - Hydrometer Analysis
ASCE - Expansion Index
CONS - Consolidation

PACIFIC SOILS ENGINEERING, INC.

PLATE A-35

GEOTECHNICAL BORING LOG

PROJECT NO.	102453-T	PROJECT NAME	Lyons Canyon Ranch		
DATE STARTED	4/5/02	GROUND ELEV.	1348	BORING DESIG.	RW-5
DATE FINISHED	4/5/02	GW DEPTH (FT)	17	LOGGED BY	TMD
DRILLER	A & W Drilling	DRIVE WT.	See Note	NOTE	140# for SPT; 400# for ring sample
TYPE OF DRILL RIG	Rotary Wash	DROP	30 inches		

DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	GROUP SYMBOL	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
		R	50 for 10"			Silty Sandstone; medium- to coarse-grained, gray, hard. Total Depth 40 feet. No apparent caving. Groundwater at 17 feet. Hole backfilled.				

SAMPLE TYPES:
- R RING (DRIVE) SAMPLE
- S SPT (SPLIT SPOON) SAMPLE
- B BULK SAMPLE
- T TUBE SAMPLE

Ground Water Seepage
MAX - Max. Density/Opt. Moist.
DS - Direct Shear
HYDR - Hydrometer Analysis
ASCE - Expansion Index
CONS - Consolidation

PACIFIC SOILS ENGINEERING, INC.

PLATE A-36

GEOTECHNICAL BORING LOG

PROJECT NO.	102453-T	PROJECT NAME	Lyons Canyon Ranch		
DATE STARTED	4/5/02	GROUND ELEV.	1379	BORING DESIG.	RW-6
DATE FINISHED	4/5/02	GW DEPTH (FT)	18	LOGGED BY	TMD
DRILLER	A & W Drilling	DRIVE WT.	See Note	NOTE	140# for SPT; 400# for ring sample
TYPE OF DRILL RIG	Rotary Wash	DROP	30 inches		

DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	GROUP SYMBOL	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
						ALLUVIUM (Qal):				
5	1374	SPT	6			Silty Sand; brown, slightly moist, loose.				
10	1369	SPT	14			Gravelly Sand; fine- to medium-grained, brown, some silt, slightly moist, medium dense.				
15	1364	SPT	23			Gravelly Sand; fine- to medium-grained, with some silt, reddish brown, very moist, medium dense. ▼				
20	1359	R	11			SAUGUS FORMATION - SUNSHINE RANCH MEMBER (Tsr): Silty medium- to coarse-grained Sand; red brown, with gravel, ring sample disturbed.				
25	1354	R	50 for 6"			Sandy Siltstone; very fine-grained Sand, bluish gray, hard. Total Depth 25 feet. No apparent caving. Water at 17.5 feet. Hole backfilled.	15.6	116.6	99	

SAMPLE TYPES:
- R RING (DRIVE) SAMPLE
- S SPT (SPLIT SPOON) SAMPLE
- B BULK SAMPLE
- T TUBE SAMPLE

▼ Ground Water Seepage
MAX - Max. Density/Opt. Moist.
DS - Direct Shear
HYDR - Hydrometer Analysis
ASCE - Expansion Index
CONS - Consolidation

PACIFIC SOILS ENGINEERING, INC.

PLATE A-37

GEOTECHNICAL BORING LOG

PROJECT NO.	102453-T	PROJECT NAME	Lyons Canyon Ranch	BORING DESIG.	CPT/SPT-1
DATE STARTED	7/31/01	GROUND ELEV.	1317	LOGGED BY	CRN
DATE FINISHED	7/31/01	GW DEPTH (FT)		NOTE	Combo Rig - Truck Mounted, 4-1/2" Rotary Wash, SPT & CPT
DRILLER	Gregg In-Situ	DRIVE WT.	140 lbs.		
TYPE OF DRILL RIG	See Note	DROP	30 inches		

DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	GROUP SYMBOL	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
						ALLUVIUM (Qal): (Note: See adjacent exploratory boring B-1 for descriptive log of Alluvium from 0 to 70± feet).				
5	1312					Begin CPT.				
10	1307									
15	1302									
20	1297					Stop CPT - Drill through gravelly layers.				
25	1292					Begin CPT - Stop CPT - (Unable to advance) Drill through gravelly layers.				
30	1287	SPT	50 for 5"			Begin CPT - Stop CPT (6± inches of advancement). Drill through gravelly layers.				
35	1282									

SAMPLE TYPES:
- R RING (DRIVE) SAMPLE
- S SPT (SPLIT SPOON) SAMPLE
- B BULK SAMPLE
- T TUBE SAMPLE

▼ Ground Water Seepage
MAX - Max. Density/Opt. Moist.
DS - Direct Shear
HYDR - Hydrometer Analysis
ASCE - Expansion Index
CONS - Consolidation

PACIFIC SOILS ENGINEERING, INC.

PLATE A-38

GEOTECHNICAL BORING LOG

PROJECT NO. 102453-T
DATE STARTED 7/31/01
DATE FINISHED 7/31/01
DRILLER Gregg In-Situ
TYPE OF DRILL RIG See Note

PROJECT NAME Lyons Canyon Ranch
GROUND ELEV. 1317
GW DEPTH (FT)
DRIVE WT. 140 lbs.
DROP 30 inches

BORING DESIG. CPT/SPT-1
LOGGED BY CRN
NOTE Combo Rig - Truck Mounted, 4-1/2" Rotary Wash, SPT & CPT

DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	GROUP SYMBOL	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
						Begin CPT.				
						Stop CPT. Drill through gravelly layers.				
45	1272					Pebbles in auger tip.				
50	1267					Gravel lense. Begin CPT.				
						Stop CPT. Drill through gravelly layers.				
55	1262									
60	1257					Begin CPT.				
						Stop CPT. Drill through gravelly layers.				
65	1252									
70	1247	SPT	102 for 4"			Gravelly Sand; medium to coarse-grained with pebbles, moderate yellowish brown, moist to wet, dense, interlayered pebble lenses.				
75	1242									

SAMPLE TYPES:
R RING (DRIVE) SAMPLE
S SPT (SPLIT SPOON) SAMPLE
B BULK SAMPLE T TUBE SAMPLE

Ground Water Seepage
MAX - Max. Density/Opt. Moist.
DS - Direct Shear
HYDR - Hydrometer Analysis
ASCE - Expansion Index
CONS - Consolidation

GEOTECHNICAL BORING LOG

PROJECT NO.	102453-T	PROJECT NAME	Lyons Canyon Ranch	BORING DESIG.	CPT/SPT-1
DATE STARTED	7/31/01	GROUND ELEV.	1317	LOGGED BY	CRN
DATE FINISHED	7/31/01	GW DEPTH (FT)		NOTE	Combo Rig - Truck Mounted, 4-1/2" Rotary Wash, SPT & CPT
DRILLER	Gregg In-Situ	DRIVE WT.	140 lbs.		
TYPE OF DRILL RIG	See Note	DROP	30 inches		

DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	GROUP SYMBOL	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
		SPT	70			SAUGUS FORMATION - SUNSHINE RANCH MEMBER (Tsr): Silty Sandstone; fine to coarse-grained with some pebbles, yellowish gray, moist to wet, moderately hard.				
85	1232									
90	1227	SPT	50 for 2"			Gravelly Sandstone to Pebbly Conglomerate; medium to very coarse-grained, light to medium gray, moist, moderately hard.				
95	1222									
						Claystone; 1 to 2± foo thick layer/lense, olive gray, moist to wet, soft to firm.				
100	1217	SPT	50 for 3"			@ 100 feet; No recovery of SPT sample.				
						Total Depth 101± feet. Hole backfilled with on-site cuttings.				

SAMPLE TYPES:
- R RING (DRIVE) SAMPLE
- S SPT (SPLIT SPOON) SAMPLE
- B BULK SAMPLE
- T TUBE SAMPLE

Ground Water Seepage
MAX - Max. Density/Opt. Moist.
DS - Direct Shear
HYDR - Hydrometer Analysis
ASCE - Expansion Index
CONS - Consolidation

PACIFIC SOILS ENGINEERING, INC.

PLATE A-40

GEOTECHNICAL BORING LOG

PROJECT NO.	102453-T	PROJECT NAME	Lyons Canyon Ranch		
DATE STARTED	7/31/01	GROUND ELEV.	1363	BORING DESIG.	CPT/SPT-2
DATE FINISHED	7/31/01	GW DEPTH (FT)	15	LOGGED BY	CRN
DRILLER	Gregg In-Situ	DRIVE WT.	140 lbs.	NOTE	Combo Rig - Truck Mounted, 4-1/2" Rotary Wash, SPT & CPT
TYPE OF DRILL RIG	See Note	DROP	30 inches		

DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	GROUP SYMBOL	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
						ALLUVIUM (Qal):				
		SPT	10			Silt; dark yellowish brown, moist, soft to moderately firm.				
5	1358									
10	1353	SPT	3			Sandy Clay; fine-grained, moderate yellowish brown, moist, soft to moderately firm.				
15	1348	SPT	13			▼ Clayey Sand; fine- to medium- with some coarse-grained, olive gray, moist to wet, moderately dense.				
20	1343	SPT	3			**SAUGUS FORMATION - SUNSHINE RANCH MEMBER** (Tsr): Clayey Sandstone; fine- to very coarse-grained with pebbles, medium dark gray, moist, moderately hard to hard.				
25	1338					Begin CPT.				
30	1333	SPT	50 for 3"			Stop CPT. Silty Sandstone; fine- to coarse-grained, medium gray, slightly moist, hard to very hard.				
35	1328									

SAMPLE TYPES:
- [R] RING (DRIVE) SAMPLE
- [S] SPT (SPLIT SPOON) SAMPLE
- [B] BULK SAMPLE
- [T] TUBE SAMPLE

▼ Ground Water Seepage
MAX - Max. Density/Opt. Moist.
DS - Direct Shear
HYDR - Hydrometer Analysis
ASCE - Expansion Index
CONS - Consolidation

PACIFIC SOILS ENGINEERING, INC.

PLATE A-41

GEOTECHNICAL BORING LOG

PROJECT NO. 102453-T
DATE STARTED 7/31/01
DATE FINISHED 7/31/01
DRILLER Gregg In-Situ
TYPE OF DRILL RIG See Note

PROJECT NAME Lyons Canyon Ranch
GROUND ELEV. 1363
GW DEPTH (FT) 15
DRIVE WT. 140 lbs.
DROP 30 inches

BORING DESIG. CPT/SPT-2
LOGGED BY CRN
NOTE Combo Rig - Truck Mounted, 4-1/2" Rotary Wash, SPT & CPT

DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	GROUP SYMBOL	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
		SPT	50 for 3"			Silty Sandstone; fine- to coarse-grained, medium gray, slightly moist, hard to very hard. Total Depth 41 feet. Groundwater at 15 feet. No apparent caving. Hole backfilled.				

SAMPLE TYPES:
R RING (DRIVE) SAMPLE
S SPT (SPLIT SPOON) SAMPLE
B BULK SAMPLE T TUBE SAMPLE

Ground Water Seepage
MAX - Max. Density/Opt. Moist.
DS - Direct Shear
HYDR - Hydrometer Analysis
ASCE - Expansion Index
CONS - Consolidation

PACIFIC SOILS ENGINEERING, INC.

PLATE A-42

GEOTECHNICAL BORING LOG

PROJECT NO. 102453-T
DATE STARTED 1/13/04
DATE FINISHED 1/13/04
DRILLER JN Drilling
TYPE OF DRILL RIG 30" Bucket Auger

PROJECT NAME Lyons Ranch
GROUND ELEV. 1315
GW DEPTH (FT)
DRIVE WT. See Note
DROP 12 inches

BORING DESIG. B-101
LOGGED BY CRN
NOTE 0-24', 3548#; 24-47', 2577#; 47-75', 1648#

DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	GROUP SYMBOL	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
						ALLUVIUM (Qal): Silty to Clayey Sand; fine-grained, few pebbles, dark yellowish brown, moist, loose to medium dense, abundant roots and rootlets.				
5	1310	R/B	Push			Sandy Silt; very fine- to fine-grained Sand, moderate yellowish brown, slightly moist, very loose, slightly porous, some white carbonate.	10.0	82.4	26	
10	1305	R	Push for 6" 1 for 6"			Sand Silt; very fine- to fine-grained Sand, moderate yellowish brown, slightly moist, very loose, slightly porous, some white carbonate, some rootlets.	5.1	103.0	22	
15	1300	R	1			Silty Sand; fine- with some medium-grained, few pebbles, moderate to dark yellowish brown, slightly moist, loose.	6.2	107.3	29	
20	1295	R/B	1			Silty Sand; fine- to coarse-grained with some pebbles, moderate yellowish brown, slightly moist, loose.	6.2	105.1	28	
25	1290					Gravelly Sand; fine- to coarse-grained with pebbles and cobbles, few boulders to 1± foot, light to moderate yellowish brown, slightly moist, loose to medium dense; interlayered with Sand lenses, medium- to coarse-grained, light yellowish brown, slightly moist, loose to medium dense.				
30	1285	B				Increase abundance of cobbles and boulders (8 to 12± inches).				
35	1280	B				34 to 36± feet, some raveling in coarse-grained material, change to cork screw auger.				
						SAUGUS FORMATION-SUNSHINE RANCH FORMATION MEMBER (Tsr): Pebble and Cobble Conglomerate; medium- to very coarse-grained Sand matrix; pale yellowish gray, dry to slightly moist, hard to very hard.				

SAMPLE TYPES:
R RING (DRIVE) SAMPLE
S SPT (SPLIT SPOON) SAMPLE
B BULK SAMPLE T TUBE SAMPLE

▼ Ground Water Seepage
MAX - Max. Density/Opt. Moist.
DS - Direct Shear
HYDR - Hydrometer Analysis
ASCE - Expansion Index
CONS - Consolidation

PACIFIC SOILS ENGINEERING, INC.

PLATE A-43

GEOTECHNICAL BORING LOG

PROJECT NO.	102453-T	PROJECT NAME	Lyons Ranch		
DATE STARTED	1/13/04	GROUND ELEV.	1315	BORING DESIG.	B-101
DATE FINISHED	1/13/04	GW DEPTH (FT)		LOGGED BY	CRN
DRILLER	JN Drilling	DRIVE WT.	See Note	NOTE	0-24', 3548#; 24-47', 2577#; 47-75', 1648#
TYPE OF DRILL RIG	30" Bucket Auger	DROP	12 inches		

DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	GROUP SYMBOL	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
						Total Depth 40± feet. No water. Some raveling 34 to 36± feet. Hole backfilled.				

SAMPLE TYPES:
- R RING (DRIVE) SAMPLE
- S SPT (SPLIT SPOON) SAMPLE
- B BULK SAMPLE
- T TUBE SAMPLE

Ground Water Seepage
MAX - Max. Density/Opt. Moist.
DS - Direct Shear
HYDR - Hydrometer Analysis
ASCE - Expansion Index
CONS - Consolidation

PACIFIC SOILS ENGINEERING, INC.

PLATE A-44

GEOTECHNICAL BORING LOG

PROJECT NO.	102453-T	PROJECT NAME	Lyons Ranch		
DATE STARTED	1/13/04	GROUND ELEV.	1323	BORING DESIG.	B-102
DATE FINISHED	1/13/04	GW DEPTH (FT)		LOGGED BY	CRN
DRILLER	JN Drilling	DRIVE WT.	See Note	NOTE	0-24', 3548#; #; 24-47',
TYPE OF DRILL RIG	30" Bucket Auger	DROP	12 inches		2577#; 47-75', 1648#

DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	GROUP SYMBOL	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
						SOIL: Sandy Silt; very fine- to fine- with some medium-grained Sand, dark yellowish brown, moist, very loose, abundant roots and rootlets.				
						ALLUVIUM (Qal): Sand Silt; very fine- to fine-grained Sand, moderate yellowish brown, slightly moist to moist, loose.				
5	1318	R/B	1			Sandy Silt to Silty Sand; fine- to medium- with some coarse-grained Sand and pebbles, dry to slightly moist, loose, porous, some rootlets.	4.8	100.7	19	
10	1313	R	Push			Sandy Silt to Silty Sand; fine- to medium- with some coarse-grained Sand and pebbles, dry to slightly moist, very loose, porous, some rootlets.	9.4	105.1	42	
15	1308	R	Push			Sandy Silt to Silty Sand; fine- to medium- with some coarse-grained Sand and pebbles, moderate yellowish brown, slightly moist to moist, very loose.	9.8	106.8	46	
20	1303	R/B	1			Sandy Silt to Silty Sand; fine- to medium- with some coarse-grained Sand and pebbles, colour change to moderate yellowish brown, moisture increase to slightly moist to moist, dry to slightly moist, loose.	8.1	107.0	38	
25	1298	R/B	2			Silty Sand; fine- to coarse-grained with pebbles, pale to moderate yellowish brown, slightly moist, loose to medium dense.	3.0	115.6	18	
30	1293					Increase abundance of pebbles and cobbles.				
		R	3			Pebbly to Cobbly Sand; fine- to coarse-grained, pale to moderate yellowish brown, slightly moist to moist, medium dense; interlayered with Silty Sand; fine- to coarse-grained with pebbles, pale to moderate yellowish brown, slightly moist, medium dense.	3.8	118.3	24	
		B								
35	1288					Change to cork-screw auger due to abundant cobbles and boulders (up to 12± inches). 34 to 38± feet, moderate to severe raveling of coarse-grained materials.				
						SAUGUS FORMATION-SUNSHINE RANCH FORMATION MEMBER (Tsr)(?): Clayey to Sandy Silt; fine-grained Sand; moderate yellowish brown, moist, soft.				

SAMPLE TYPES:
- R RING (DRIVE) SAMPLE
- S SPT (SPLIT SPOON) SAMPLE
- B BULK SAMPLE
- T TUBE SAMPLE

Ground Water Seepage
MAX - Max. Density/Opt. Moist.
DS - Direct Shear
HYDR - Hydrometer Analysis
ASCE - Expansion Index
CONS - Consolidation

GEOTECHNICAL BORING LOG

PROJECT NO. 102453-T
DATE STARTED 1/13/04
DATE FINISHED 1/13/04
DRILLER JN Drilling
TYPE OF DRILL RIG 30" Bucket Auger

PROJECT NAME Lyons Ranch
GROUND ELEV. 1323
GW DEPTH (FT)
DRIVE WT. See Note
DROP 12 inches

BORING DESIG. B-102
LOGGED BY CRN
NOTE 0-24', 3548#; #: 24-47', 2577#; 47-75', 1648#

DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	GROUP SYMBOL	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
						(weathered Tsr?). "Hard Drilling" at auger tip/refusal. Total Depth 38 feet. No water. Moderate to severe raveling 34 to 38± feet. Hole backfilled.				

SAMPLE TYPES:
R RING (DRIVE) SAMPLE
S SPT (SPLIT SPOON) SAMPLE
B BULK SAMPLE T TUBE SAMPLE

Ground Water Seepage
MAX - Max. Density/Opt. Moist.
DS - Direct Shear
HYDR - Hydrometer Analysis
ASCE - Expansion Index
CONS - Consolidation

PACIFIC SOILS ENGINEERING, INC.

PLATE A-46

GEOTECHNICAL BORING LOG

PROJECT NO.	102453-T	PROJECT NAME	Lyons Ranch		
DATE STARTED	1/13/04	GROUND ELEV.	1324	BORING DESIG.	B-103
DATE FINISHED	1/13/04	GW DEPTH (FT)		LOGGED BY	CRN
DRILLER	JN Drilling	DRIVE WT.	See Note	NOTE	0-24', 3548#; 24-47', 2577#; 47-75', 1648#
TYPE OF DRILL RIG	30" Bucket Auger	DROP	12 inches		

DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	GROUP SYMBOL	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
						ALLUVIUM (Qal): Sandy Silt; very fine- to fine-grained Sand, dark to moderate yellowish brown, moist, very loose, abundant roots and rootlets.				
5	1319	R	Push			Silty Sand; fine- to medium-grained, moderate yellowish brown, slighty moist, very loose.	4.0	103.1	17	
						Increase abundance of pebbles.				
10	1314	R	Push			Silty Sand; fine- to coarse-grained with pebbles, moderate yellowish brown, slighty moist, loose to medium dense.	8.6	104.8	38	
						Some cobbles and boulders (up to 12± inches).				
15	1309	R	Push			Silty Sand; fine- to medium-grained with some pebbles, moderate yellowish brown, slightly moist, loose to medium dense.	8.9	107.4	42	
20	1304	R	1			Silty Sand; fine- to medium-grained with some pebbles, moderate yellowish brown, slightly moist, loose.	11.1	104.8	49	
25	1299	R	1			Silty Sand; fine- to coarse-grained with pebbles, pale to moderate yellowish brown, slightly moist, loose.	4.8	114.9	28	
30	1294	R	3			Silty Sand; fine- to coarse-grained with pebbles and cobbles, pale to moderate yellowish brown, slightly moist, medium dense.	6.3	111.6	33	
35	1289					Pebbly to cobbly Sand; fine- to coarse-grained, moderate yellowish brown, slightly moist, medium dense to dense.				

SAMPLE TYPES:
- [R] RING (DRIVE) SAMPLE
- [S] SPT (SPLIT SPOON) SAMPLE
- [B] BULK SAMPLE
- [T] TUBE SAMPLE

Ground Water Seepage
MAX - Max. Density/Opt. Moist.
DS - Direct Shear
HYDR - Hydrometer Analysis
ASCE - Expansion Index
CONS - Consolidation

GEOTECHNICAL BORING LOG

PROJECT NO.	102453-T	PROJECT NAME	Lyons Ranch		
DATE STARTED	1/13/04	GROUND ELEV.	1324	BORING DESIG.	B-103
DATE FINISHED	1/13/04	GW DEPTH (FT)		LOGGED BY	CRN
DRILLER	JN Drilling	DRIVE WT.	See Note	NOTE	0-24', 3548;:#; 24-47', 2577#; 47-75', 1648#
TYPE OF DRILL RIG	30" Bucket Auger	DROP	12 inches		

DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	GROUP SYMBOL	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
		B				Pebbly to cobbly Sand; fine- to coarse-grained with some boulders up to 12± inches, moderate yellowish brown, slightly moist, dense.				
45	1279					Increase abundant of cobbles and boulders.				
						SAUGUS FORMATION-SUNSHINE RANCH FORMATION MEMBER (Tsr): Pebble and Cobble Conglomerate; fine to very coarse-grained Sand matrix, pale yellowish gray, dry to slighty moist, hard.				
						Total Depth 49 feet. No water. No caving. Hole backfilled.				

SAMPLE TYPES:
- R RING (DRIVE) SAMPLE
- S SPT (SPLIT SPOON) SAMPLE
- B BULK SAMPLE
- T TUBE SAMPLE

▼ Ground Water Seepage
MAX - Max. Density/Opt. Moist.
DS - Direct Shear
HYDR - Hydrometer Analysis
ASCE - Expansion Index
CONS - Consolidation

GEOTECHNICAL BORING LOG

PROJECT NO. 102453-T
DATE STARTED 1/13/04
DATE FINISHED 1/13/04
DRILLER JN Drilling
TYPE OF DRILL RIG 30" Bucket Auger

PROJECT NAME Lyons Ranch
GROUND ELEV. 1315
GW DEPTH (FT)
DRIVE WT. See Note
DROP 12 inches

BORING DESIG. B-104
LOGGED BY CRN
NOTE 0-24', 3548;#: 24-47', 2577#: 47-75', 1648#

DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	GROUP SYMBOL	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
						ALLUVIUM (Qal): Silty Sand; fine- to coarse-grained with pebbles and cobbles, pale yellowish brown, slightly moist, loose to medium dense. Sandy Silt; very fine- to fine-grained Sand, moderate yellowish brown, moist, loose.				
5	1310	R	1			Silty Sand; very fine- to fine-grained Sand, moderate yellowish brown, moist, loose.	6.8	103.8	29	
10	1305	R/B	2			Silty Sand; fine- to coarse-grained with pebbles and cobbles, pale yellowish brown, slightly moist, medium dense.	6.4	100.4	25	
15	1300	R	3			Silty Sand; fine- to coarse-grained with pebbles and some cobbles, moderate yellowish brown, slightly moist, medium dense.	2.4	120.7	16	
20	1295	R	1			Silty Sand; fine- to medium-grained and pebbles, moderate yellowish brown, slightly moist, medium dense.	6.3	103.4	27	
25	1290	B				Pebbly to Cobbly Sand; fine- to coarse-grained, moderate yellowish brown, slightly moist to moist, medium dense. Some boulders up to 12+ inches.				
		R	2			Silty Sand; fine- to medium-grained and pebbles, moderate yellowish brown, slightly moist, medium dense.	6.9	108.2	33	
30	1285	B								
		R	3			Interlayered 1+ foot: Pebbly to cobbly Sand; medium- to very coarse-grained, moderate yellowish gray, slightly moist, medium dense. Silty Sand; fine- to coarse-grained with pebbles, moderate yellowish brown, slightly moist, medium dense.	3.5	107.7	17	
35	1280	R	2			Interlayered 1+ foot: Pebbly to cobbly Sand; medium- to very coarse-grained, moderate yellowish gray, slightly moist, medium dense.	4.0	111.1	21	

SAMPLE TYPES:
R RING (DRIVE) SAMPLE
S SPT (SPLIT SPOON) SAMPLE
B BULK SAMPLE T TUBE SAMPLE

Ground Water Seepage
MAX - Max. Density/Opt. Moist.
DS - Direct Shear
HYDR - Hydrometer Analysis
ASCE - Expansion Index
CONS - Consolidation

PACIFIC SOILS ENGINEERING, INC.

PLATE A-49

GEOTECHNICAL BORING LOG

PROJECT NO.	102453-T	PROJECT NAME	Lyons Ranch		
DATE STARTED	1/13/04	GROUND ELEV.	1315	BORING DESIG.	B-104
DATE FINISHED	1/13/04	GW DEPTH (FT)		LOGGED BY	CRN
DRILLER	JN Drilling	DRIVE WT.	See Note	NOTE	0-24', 3548;:#; 24-47',
TYPE OF DRILL RIG	30" Bucket Auger	DROP	12 inches		2577#; 47-75', 1648#

DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	GROUP SYMBOL	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT-URATION (%)	OTHER TESTS
45	1270	R/B	3			Silty Sand; fine- to coarse-grained with pebbles, moderate yellowish brown, slightly moist, medium dense. Interlayered 1± foot: Pebbly to Cobbly Sand; medium- to very coarse-grained, moderate yellowish gray, slightly moist, medium dense.	4.3	108.3	21	
50	1265	R	4			Silty Sand; very fine- to medium-grained with some pebbles, moderate yellowish brown, slightly moist, medium dense.	8.4	104.0	37	
						Pebbly to cobbly Sand; fine- to coarse-grained, pale to moderate yellowish brown, slightly moist, medium dense.				
55	1260					Silty Sand; fine- to very coarse-grained with pebbles and cobbles, moderate yellowish brown, slightly moist to moist, medium dense.				
60	1255									
65	1250	B				Silty Sand; fine- to very coarse-grained with pebbles and cobbles, moderate yellowish brown, slightly moist to moist, medium dense. Pebbly to cobbly Sand; fine- to coarse-grained, pale to moderate yellowish brown, slightly moist, medium dense.				
70	1245					**SAUGUS FORMATION-SUNSHINE RANCH FORMATION MEMBER (Tsr):** Pebble and cobble Conglomerate; medium to coarse-grained Sand matrix, pale yellowish gray, dry to slighty moist, hard. Total Depth 70 feet. No water. No caving. Hole backfilled.				

SAMPLE TYPES:
R RING (DRIVE) SAMPLE
S SPT (SPLIT SPOON) SAMPLE
B BULK SAMPLE T TUBE SAMPLE

Ground Water Seepage
MAX - Max. Density/Opt. Moist.
DS - Direct Shear
HYDR - Hydrometer Analysis
ASCE - Expansion Index
CONS - Consolidation

PACIFIC SOILS ENGINEERING, INC.

PLATE A-50

TABLE II

LOG OF EXPLORATORY PITS

Exploratory Pits	Depth (feet)	Description	Logged by: CRN Date Logged: 07/05/01
EP-1	0 to 6	COLLUVIUM (Qcol): Silty Sand to Sandy Silt; fine- to medium-grained, moderate yellowish brown, dry to slightly moist at depth, loose to moderately dense/soft to firm, abundant roots and rootlets.	
	6 to 8	SAUGUS FORMATION – SUNSHINE RANCH MEMBER (Tsr): Sandstone; fine- to medium-grained, olive gray, slightly moist, moderately hard to hard, abundant white carbonate stringers, moderately weathered top 1± foot.	
		Total Depth 8 feet. No water, no caving.	
EP-2	0 to 15	ALLUVIUM (Qal): Silty Sand; fine- to coarse-grained with pebbles and cobbles, moderate yellowish brown, dry to slightly moist at depth, loose to moderately dense at depth, abundant roots and rootlets.	
		Total Depth 15 feet No water, no caving.	
EP-3	0 to 2½	SOIL: Silty Sand to Sandy Silt; fine- to medium-grained, moderate yellowish brown, dry, loose/soft, abundant roots and rootlets.	
	2½ to 8	SAUGUS FORMATION – SUNSHINE RANCH MEMBER (Tsr): Sandstone; fine- to medium-grained, light olive, slightly moist, top 2± feet highly weathered and loose with abundant roots and rootlets, moderately hard at depth, massive.	
		Total Depth 8 feet. No water, no caving.	

TABLE II

LOG OF EXPLORATORY PITS

Exploratory Pits	Depth (feet)	Description	Logged by: CRN Date Logged: 07/05/01
EP-4	0 to 5	COLLUVIUM (Qcol): Silty Sand; fine- to medium-grained with pebbles and some cobbles, moderate yellowish brown, dry to slightly moist at depth, loose to moderately dense, abundant roots and rootlets.	
	5 to 9	SAUGUS FORMATION – SUNSHINE RANCH MEMBER (Tsr): Sandstone; fine- to coarse-grained with pebbles and cobbles, light yellowish gray, slightly moist, moderately hard, some interbedded pebbles lenses, generally massive. Bedding Attitude: @ 7 feet, N40W, 42NE Total Depth 9 feet. No water, no caving.	
EP-5	0 to 8	ALLUVIUM (Qal): Silty Sand; fine- to coarse-grained with pebbles and cobbles, moderate yellowish brown, dry to slightly moist at depth, loose to moderately dense at depth, abundant root, and rootlets.	
	8 to 10	Cobbly Sand; medium- to coarse-grained with pebbles, slightly moist, loose to moderately dense, roots to depth.	
	10 to 13	SAUGUS FORMATION – SUNSHINE RANCH MEMBER (Tsr): Sandstone; fine- to medium-grained, light olive gray, slightly moist, moderately hard, slight to moderate weathering, massive. Total Depth 13 feet. No water, no caving.	

TABLE II

LOG OF EXPLORATORY PITS

Exploratory Pits	Depth (feet)	Description	Logged by: CRN Date Logged: 07/05/01
EP-6	0 to 2	SOIL: Silty Sand; fine- to coarse-grained with pebbles and cobbles, moderate yellowish brown, dry, loose, abundant roots and rootlets.	
	2 to 4	SAUGUS FORMATION – SUNSHINE RANCH MEMBER (Tsr): Cobble Conglomerate; coarse-grained Sand matrix, slightly moist, moderately hard.	
	4 to 7	Siltstone; light bluish gray, slightly moist, moderately hard, laminated.	
		Bedding Attitude: @ 5 feet, N50W, 37 NE	
		Total Depth 7 feet.	
EP-7	0 to ½	SOIL: Silty Sand; fine- to coarse-grained with pebbles and cobbles, moderate yellowish brown, dry, loose, abundant roots and rootlets.	
	½ to 2	SAUGUS FORMATION – SUNSHINE RANCH MEMBER (Tsr): Pebble Conglomerate; medium- to coarse-grained Sand matrix, slightly moist, loose, abundant roots.	
	2 to 5	Silty Sandstone; fine- to medium-grained, light yellowish gray, slightly moist, moderately hard, abundant roots.	
		Bedding Attitude: @ 3 feet, N60W, 35 NE	
		Total Depth 5 feet.	

TABLE II

LOG OF EXPLORATORY PITS

Exploratory Pits	Depth (feet)	Description	Logged by: CRN Date Logged: 07/05/01
EP-8	0 to 1	SOIL: Sandy Silt; light to moderate yellowish brown, dry, soft, abundant roots and rootlets.	
	1 to 3	SAUGUS FORMATION – SUNSHINE RANCH MEMBER (Tsr): Sandy Siltstone; light olive gray, slightly moist, moderately hard, abundant white carbonate, highly jointed, slightly laminated, generally massive.	
	3 to 5	Claystone; reddish brown, moist, moderately hard, highly jointed, abundant white carbonate along joints.	
		Bedding Attitude: @ 4 feet, N70W, 45NE	
		Total Depth 5 feet. No water, no caving.	
EP-9	0 to 6	COLLUVIUM (Qcol): Silty Sand; fine- to coarse-grained with pebbles and cobbles, dark yellowish brown, dry to slightly moist at depth, loose to moderately dense at depth, abundant root and rootlets.	
	6 to 9	SAUGUS FORMATION – SUNSHINE RANCH MEMBER (Tsr): Pebble and Cobble Conglomerate; medium to coarse-grained Sand matrix, slightly moist, moderately hard, poorly indurated.	
	9 to 12	Silty Sandstone; fine-grained, light olive gray, slightly moist, moderately hard, moderately indurated, moderately bedded.	
		Bedding Attitude: @ 10 feet, N60W, 45NE	
		Total Depth 12 feet. No water, no caving.	

TABLE II

LOG OF EXPLORATORY PITS

Exploratory Pits	Depth (feet)	Description	Logged by: CRN Date Logged: 07/05/01
EP-10	0 to 2	SOIL: Sandy Silt; yellowish brown, moist, firm, abundant roots and rootlets.	
	2 to 5	SAUGUS FORMATION – SUNSHINE RANCH MEMBER (Tsr): Clayey Siltstone; light olive gray, moist, moderately hard, massive, slightly fractured; overlies Silty Sandstone; fine-grained, light yellowish gray, slightly moist, moderately hard, slightly bedded, generally massive. Bedding Attitude: @ 3 feet, N45W, 47NE Total Depth 5 feet. No water, no caving.	
EP-11	0 to 3	ALLUVIUM (Qal): Silty Sand; fine- to medium-grained, moderate yellowish brown, top 2± feet dry and loose, slightly moist to moderately dense at depth, abundant root and rootlets, porous.	
	3 to 20	Pebbly Sand; fine- to coarse-grained with cobbles, light to moderate yellowish brown, slightly moist to moist, moderately dense. Total Depth 20 feet. No water, no caving.	

TABLE II

LOG OF EXPLORATORY PITS

Exploratory Pits	Depth (feet)	Description	Logged by: CRN Date Logged: 07/05/01
EP-12	0 to 3	SOIL: Sandy Silt to Silty Sand; fine to coarse-grained with pebbles and cobbles, moderate yellowish brown, dry to slightly moist, soft/loose, abundant roots and rootlets.	
	3 to 10	SAUGUS FORMATION – SUNSHINE RANCH MEMBER (Tsr): Pebble and Cobble Conglomerate; fine- to coarse-grained Sand matrix, slightly moist, moderately hard, poorly to moderately indurated, moderately bedded. Bedding Attitudes: @ 5 feet, N50W, 44NE @ 8 feet, N45W, 42NE Total Depth 10 feet. No water, no caving.	
EP-13	0 to 6	COLLUVIUM (Qcol): Silty Sand; fine- to coarse-grained with pebbles and some cobbles, moderate to dark yellowish brown, dry to slightly moist, loose to moderately dense, porous, abundant roots and rootlets.	
	6 to 9	SAUGUS FORMATION – SUNSHINE RANCH MEMBER (Tsr): Pebble and Cobble Conglomerate; medium- to coarse-grained Sand matrix, slightly moist, moderately hard, moderately indurated, moderately bedded. Bedding Attitude: @ 8 feet, N50W, 46NE Total Depth 9 feet. No water, no caving.	

TABLE II

LOG OF EXPLORATORY PITS

Exploratory Pits	Depth (feet)	Description	Logged by: CRN Date Logged: 07/05/01
EP-14	0 to 6	COLLUVIUM (Qcol): Silty Sand; fine- to medium-grained, dark yellowish brown, dry to slightly moist, loose to moderately dense, porous, abundant roots and rootlets.	
	6 to 8	SAUGUS FORMATION – SUNSHINE RANCH MEMBER (Tsr): Clayey Siltstone; olive to light olive gray, moist, soft to moderately hard, massive, abundant white carbonate.	
		Total Depth 8 feet. No water, no caving.	
EP-15	0 to 2½	SOIL: Silty Sand; fine- to medium-grained, dark yellowish brown, dry to slightly moist, loose, porous, abundant roots and rootlets, gopher holes.	
	2½ to 7	SAUGUS FORMATION – SUNSHINE RANCH MEMBER (Tsr): Sandstone; fine- to medium-grained with pebbles, yellowish orange, slightly moist, moderately hard, slightly bedded; some interbedded lenses of pebbles and cobbles with scour-fill basal contacts.	
		Approximate Bedding Attitude: @ 5 feet, N50W, 38NE	
		Total Depth 7 feet. No water, no caving.	

TABLE II

LOG OF EXPLORATORY PITS

Exploratory Pits	Depth (feet)	Description	Logged by: CRN Date Logged: 07/05/01
EP-16	0 to 3	SOIL: Silty Sand to Sandy Silt; fine to medium-grained, moderate yellowish brown, dry to slightly moist, loose/soft, abundant roots and rootlets.	
	3 to 5	SAUGUS FORMATION – SUNSHINE RANCH MEMBER (Tsr): Pebble Conglomerate; medium- to coarse-grained Sand matrix, slightly moist, loose, highly weathered, abundant roots. @ 5 feet, Claystone; 1 to 4± inch thick layer, mottled moderate yellowish brown and olive gray, moist, soft, flaky, some polished surfaces, discontinuous layer.	
	5 to 9	Sandstone; fine-grained, light olive gray, slightly moist, moderately hard, highly weathered, abundant joints, abundant roots along joints. Bedding Attitude: @ 5 feet, N60W, 32NE Total Depth 9 feet. No water, no caving.	
EP-17	0 to ½	SOIL: Sandy Silt; dark yellowish brown, dry, soft, abundant roots and rootlets.	
	½ to 8	SAUGUS FORMATION – SUNSHINE RANCH MEMBER (Tsr): Sandstone; fine- to medium-grained, light yellowish gray, slightly moist, moderately hard to hard, top 1± foot moderately weathered, slight to moderate bedding with some rootlets along bedding planes. Bedding Attitudes: @ 3 feet, N65W, 43NE @ 6 feet, E-W, 49N Total Depth 8 feet. No water, no caving.	

TABLE II

LOG OF EXPLORATORY PITS

Exploratory Pits	Depth (feet)	Description	Logged by: CRN Date Logged: 07/05/01
EP-18	0 to 2	SOIL: Silty Sand; fine- to coarse-grained with pebbles and some cobbles, light to moderate yellowish brown, dry, loose, abundant roots and rootlets.	
	2 to 7	SAUGUS FORMATION – SUNSHINE RANCH MEMBER (Tsr): Silty Sandstone; fine-grained, mottled reddish orange and olive gray, moist, hard, top 2± feet slightly jointed, moderately bedded. Bedding Attitude: @ 5 feet, N60W, 40SW Total Depth 7 feet. No water, no caving.	
EP-19	0 to ½	SOIL: Silty Sand; fine-grained, light to moderate yellowish brown, dry, loose, abundant roots and rootlets.	
	½ to 6	SAUGUS FORMATION – SUNSHINE RANCH MEMBER (Tsr): Sandstone; fine-grained, light olive gray, slightly moist, moderately hard to hard, moderately bedded. Bedding Attitude: @ 4½ feet, N65W, 40NE Total Depth 6 feet. No water, no caving.	
EP-20	0 to 9	ALLUVIUM (Qal): Cobbly Sand; fine- to coarse-grained with abundant pebbles, light yellowish brown, top 2± feet dry and loose, slightly moist to moist and moderately dense to depth, some cobbles up to 12± inches diameter, abundant roots and rootlets to depth. Severe caving throughout. Total Depth 9 feet No water, caving from 0 to 9 feet.	

TABLE II

LOG OF EXPLORATORY PITS

Exploratory Pits	Depth (feet)	Description	Logged by: CRN Date Logged: 07/05/01
EP-21	0 to 13	ALLUVIUM (Qal): Silty Sand to Sandy Silt; fine- to medium-grained with some pebbles and cobbles; moderate yellowish brown, top 2+ feet dry and loose, slightly moist to moist and moderately dense to depth, poorly consolidated, some roots to depth.	
	13 to 14	SAUGUS FORMATION – SUNSHINE RANCH MEMBER (Tsr): Pebble and Cobble Conglomerate; medium to coarse-grained Sand matrix, moist, moderately hard to hard, weathered.	
		Total Depth 14 feet No water, no caving.	
EP-22	0 to 7	ALLUVIUM (Qal): Silty Sand; fine- to medium-grained with some pebbles, dark yellowish brown, top 2+ feet loose and dry, slightly moist to moist and moderately dense to depth, basal cobbles, abundant roots and rootlets.	
	7 to 10	SAUGUS FORMATION – SUNSHINE RANCH MEMBER (Tsr): Siltstone; moderate yellowish brown, moist, moderately hard, laminated, moderately fractured, some tectonic shears along bedding, some roots and rootlets.	
	10 to 12	Silty Sandstone; very fine- to fine-grained, olive gray, slightly moist to moist, moderately hard, slightly fractured.	
		Bedding Attitude: @ 10 feet, N60W, 40NE	
		Total Depth 12 feet. No water, no caving.	

TABLE II

LOG OF EXPLORATORY PITS

Exploratory Pits	Depth (feet)	Description	Logged by: CRN Date Logged: 07/05/01
EP-23	0 to 1	SOIL: Silty Sand; fine- to coarse-grained with pebbles, dark yellowish brown, dry, loose, abundant roots and rootlets.	
	1 to 5	SAUGUS FORMATION – SUNSHINE RANCH MEMBER (Tsr): Sandstone; fine- to medium-grained, pale yellowish gray, slightly moist, moderately hard to hard, some rootlets from 1 to 3± feet in depth. Bedding Attitude: @ 4 feet, N60W, 45NE Total Depth 5 feet. No water, no caving.	
EP-24	0 to 1	SOIL: Silty Sand; fine- to coarse-grained with pebbles and cobbles, dark yellowish brown, dry, loose, abundant roots and rootlets.	
	1 to 4	SAUGUS FORMATION – SUNSHINE RANCH MEMBER (Tsr): Pebble and Cobble Conglomerate; medium- to coarse-grained Sand matrix, slightly moist, moderately hard to hard, few roots to depth.	
	4 to 5	Sandstone; fine- to medium-grained, light yellowish gray, slightly moist, moderately hard, moderately bedded. Bedding Attitude: @ 4½ feet, N60W, 40NE Total Depth 5 feet. No water, no caving.	

TABLE II

LOG OF EXPLORATORY PITS

Exploratory Pits	Depth (feet)	Description	Logged by: CRN Date Logged: 07/05/01
EP-25	0 to 2½	COLLUVIUM (Qcol): Silty Sand to Sandy Silt; very fine- to fine-grained with some isolated pebbles, moderate to dark yellowish brown, dry to slightly moist, loose/soft, abundant roots and rootlets, porous.	
	2½ to 5	Clayey Silt; moderate to dark yellowish brown, slightly moist, soft to firm, porous, abundant caliche.	
	5 to 9	PICO FORMATION (Tp): Clayey Siltstone; mottled pale olive gray and light brown, slightly moist, moderately firm, laminated to ½±-inch thick bedding, weathered to a depth of 7± feet. Bedding Attitudes: @ 6 feet, N50E, 32SE @ 8 feet, N80E, 35SE Total Depth 9 feet. No water, no caving.	
EP-26	0 to 1½	SOIL: Silty Sand to Sandy Silt; very fine- to fine-grained, moderate yellowish brown, dry to slightly moist, loose, abundant roots and rootlets, porous.	
	1½ to 6	PICO FORMATION (Tp): Clayey Siltstone; pale olive, slightly moist, moderately firm, laminated to massive 2±-inch thick bedding, weathered with roots and caliche to a depth of 3½ feet. Bedding Attitudes: @ 4 feet, N30W, 40NE @ 4½ feet, N10W, 30NE @ 5 feet, N30E, 29SE Total Depth 6 feet. No water, no caving.	

TABLE II

LOG OF EXPLORATORY PITS

Exploratory Pits	Depth (feet)	Description	Logged by: CRN Date Logged: 07/05/01
EP-27	0 to 1	SOIL: Silty Sand to Sandy Silt; very fine- to fine-grained moderate yellowish brown, dry to slightly moist, loose/soft, abundant roots and rootlets.	
	1 to 5	PICO FORMATION (Tp): Sandy Siltstone; fine-grained, pale olive gray, slightly moist, moderately hard, 1 to 6± inch thick laminated beds; jointed/fractured, interbedded with Clayey Siltstone; pale olive to olive gray, moderately firm, laminated to 3±-inch thick massive beds; top 1½± feet highly weathered. Bedding Attitudes: @ 4 feet, N50W, 39NE Total Depth 5 feet. No water, no caving.	
EP-28	0 to 1	SOIL: Sandy Silt; very fine- to fine-grained, pale to moderate yellowish brown, dry, loose, abundant roots and rootlets.	
	1 to 7	PICO FORMATION (Tp): Interbedded Silty Sandstone; very fine- to fine-grained, pale olive, slightly moist, moderately hard, 2 to 6±-inch laminated bedding; with Clayey Siltstone, pale to dark olive, slightly moist to moist, moderately firm, laminated to 2±-inch thick bedding; top 3± feet highly weathered and abundant roots. Bedding Attitudes: @ 5 feet, EW, 49N @ 6 feet, N70E, 73NW Total Depth 7 feet. No water, no caving.	

TABLE II

LOG OF EXPLORATORY PITS

Exploratory Pits	Depth (feet)	Description	Logged by: CRN Date Logged: 07/05/01
EP-29	0 to 11	ALLUVIUM (Qal): Silty Sand to Sandy Silt; very fine- to fine-grained, moderate yellowish brown, dry to slightly moist at 6± feet to depth, loose/soft to moderately dense/firm with depth.	
	11 to 12	PICO FORMATION (Tp): Silty Claystone; dark olive green, moist, moderately firm to firm, laminated to ½±-inch thick bedding.	
		Total Depth 12 feet. No water; no caving.	
EP-30	0 to 14	COLLUVIUM (Qcol): Clayey to Sandy Silt; very fine-grained Sand, pale to moderate yellowish brown, dry to slightly moist, soft, porous, abundant rootlets and roots.	
		Total Depth 14 feet. No water, no caving.	
EP-31	0 to 1	SOIL: Clayey To Sandy Silt; very fine- to fine-grained, dark yellowish brown, slightly moist to moist, soft, porous, abundant roots and rootlets.	
	1 to 2	PICO FORMATION (Tp): Claystone; mottled olive gray and light brown, slightly moist to moist, moderately firm, highly weathered, abundant roots.	
	2 to 3	Silty Sandstone; light gray lenses 3 to 4± inches thick at top and bottom with light brown core, slightly moist, moderately hard, massive, scour-fill bottom, flat top.	
	3 to 4	Silty Sandstone to Sandy Siltstone; pale olive gray, slightly moist, firm, highly weathered, blocky, abundant caliche.	
	4 to 5	Sandy to Clay Siltstone; pale to dark olive gray, slightly moist to moist, moderately hard, laminated to ½±-inch bedding.	
		Bedding Attitudes: @ 3 feet, N80W, 59SW (overturned) @ 4 feet, N65W, 35SW (overturned)	
		Total Depth 5 feet. No water, no caving.	

TABLE II

LOG OF EXPLORATORY PITS

Exploratory Pits	Depth (feet)	Description	Logged by: CRN Date Logged: 07/05/01
EP-32	0 to 5	COLLUVIUM (Qcol): Sandy Silt; very fine-grained Sand, pale to moderate yellowish brown, dry to slightly moist, soft, abundant rootlets.	
	5 to 8	PICO FORMATION (Tp): Silty Sandstone; very fine- to fine-grained, pale to olive gray, slightly moist to moist, moderately hard, laminated to 3±-inch beds.	
		Bedding Attitude: @ 6 feet, N70E, 54NW	
		Total Depth 8 feet. No water, no caving.	
EP-33	0 to 12	COLLUVIUM (Qcol): Sandy Silt; very fine- to fine-grained Sand, pale yellowish brown, dry to slightly moist, loose/soft, abundant rootlets, 2± foot diameter boulder at 2± feet.	
		No water, no caving.	
EP-34	0 to ½	SOIL: Clayey Silt; moderate yellowish brown, dry, loose, abundant roots and rootlets.	
	½ to 4	PICO FORMATION (Tp): Silty Sandstone; very fine- to fine-grained, pale to olive gray, slightly moist, moderately firm, highly weathered, abundant roots and rootlets.	
	4 to 6	Silty Sandstone; fine-grained, pale olive gray, slightly moist, moderately hard, massive.	
		Bedding Attitudes: @ 3 feet, N45E, 65SE (overturned) @ 5 feet, N70E, 59SE (overturned)	
		Total Depth 6 feet. No water, no caving.	

TABLE II

LOG OF EXPLORATORY PITS

Exploratory Pits	Depth (feet)	Description	Logged by: CRN Date Logged: 07/05/01
EP-35	0 to 14	ALLUVIUM (Qal): Silty Sand to Sandy Silt; very fine- to fine- with some medium-grained, moderate yellowish orange, top 2± feet dry and loose/soft, slightly moist to moist and moderately dense/firm at depth, slightly porous, pocket of pebbles and cobbles @ 12± feet. Total Depth 14 feet. No water, no caving.	
EP-36	0 to ½	SOIL: Sandy Silt; very fine-grained Sand, moderate yellowish brown, dry, soft, abundant roots and rootlets.	
	½ to 6	PICO FORMATION (Tp): Silty Sandstone; very fine- to fine-grained, pale olive gray, slightly moist, moderately hard, laminated to 3±-inch bedding, upper 3± feet slightly creep affected.	
	6 to 8	Silty Sandstone, fine-grained, pale olive gray, slightly moist, moderately hard, massive. Bedding Attitudes: @ 2 feet, N10E, 50NW @ 4 feet, N30W, 30SW Total Depth 8 feet. No water, no caving.	

TABLE II

LOG OF EXPLORATORY PITS

Exploratory Pits	Depth (feet)	Description	Logged by: CRN Date Logged: 07/05/01
EP-37	0 to ½	SOIL: Sandy Silt; very fine-grained, moderate yellowish brown, dry, loose, abundant roots and rootlets.	
	½ to 5	PICO FORMATION (Tp): Silty Sandstone; very fine- to fine-grained, pale olive gray, slightly moist, moderately hard, laminated to 1± inch bedding, possibly creep affected.	
	5 to 7	Silty Sandstone; fine-grained, pale olive, slightly moist, moderately hard to hard, massive. Bedding Attitudes: @ 2 feet, N10E, 36NW @ 5 feet, N50E, 42 NW Total Depth 7 feet. No water, no caving.	
EP-38	0 to ½	SOIL: Silty Sand; fine- to medium-grained, moderate to dark yellowish brown, dry, loose, porous, abundant roots and rootlets..	
	½ to 2	SAUGUS FORMATION – SUNSHINE RANCH MEMBER (Tsr): Silty Sandstone; medium- to very coarse-grained with pebbles and cobbles of quartzite and granitics (Mt. Lowe), pale yellowish orange, slightly moist, moderately hard, poorly cemented, slightly layered generally massive.	
	2 to 6	PICO FORMATION (Tp): Sandy Siltstone; very fine-grained, moderate yellowish brown, slightly moist, moderately hard/firm, slightly laminated, generally massive. Contact Attitude: @ 2 feet, N65W, 67NE Bedding Attitude: @ 4 feet, N55W, 54NE Total Depth 6 feet. No water, no caving.	

TABLE II

LOG OF EXPLORATORY PITS

Exploratory Pits	Depth (feet)	Description	Logged by: CRN Date Logged: 07/05/01
EP-39	0 to 17	COLLUVIUM (Qcol): Sandy Silt; very fine-grained Sand, moderate yellowish brown, dry to slightly moist at depth, soft to firm at depth, wet at bottom. Total Depth 17 feet. No water, no caving.	
EP-40	0 to 9	ALLUVIUM (Qal): Silty Sand to Sandy Silt; fine-grained, moderate yellowish brown, dry to slightly moist at depth, loose/soft to moderately dense/firm at depth, roots to 5± feet in depth.	
	9 to 10	SAUGUS FORMATION – SUNSHINE RANCH MEMBER (Tsr): Silty Sandstone; fine- to medium-grained, yellowish gray, moist, hard, massive. Total Depth 10 feet. No water, no caving.	
EP-41	0 to 1	SOIL: Silty Sand; fine- to coarse-grained, dark yellowish brown, dry, loose, abundant roots and rootlets.	
	1 to 3	SAUGUS FORMATION – SUNSHINE RANCH MEMBER (Tsr): Pebbly Sandstone; medium- to very coarse-grained, yellowish gray, slightly moist, moderately hard, abundant roots, normal grading.	
	3 to 5	Silty Sandstone; fine- to medium-grained, yellowish gray, slightly moist, moderately hard, massive. Bedding Attitude: @ 3 feet, N70W, 32NE Total Depth at 5 feet. No water, no caving.	

TABLE II

LOG OF EXPLORATORY PITS

Exploratory Pits	Depth (feet)	Description	Logged by: CRN Date Logged: 07/05/01
EP-42	0 to 1½	SOIL: Silty Sand; fine- to coarse-grained with pebbles and cobbles, dark yellowish brown, dry, loose, abundant roots and rootlets.	
	1½ to 6	SAUGUS FORMATION – SUNSHINE RANCH MEMBER (Tsr): Silty Sandstone; fine- to medium-grained, mottled yellowish gray and light brown, slightly moist, hard, ¼ to 3±-inch beds. @ 4 feet; 6± inch thick carbonaceous layer, brownish black, abundant sulfur deposits. Bedding Attitude: @ 4 feet, N65W, 28NE Total Depth 6 feet. No water, no caving.	
EP-43	0 to 1½	SOIL: Sandy Silt; very fine-grained, dark yellowish brown, dry to slightly moist, soft, abundant rootlets.	
	1½ to 6	SAUGUS FORMATION – SUNSHINE RANCH MEMBER (Tsr): Silty Sandstone; very fine- to fine-grained, pale olive gray, slightly moist, moderately hard to hard, slightly bedded generally massive. Bedding Attitude: @ 4 feet, N70W, 45NE Total Depth 6 feet. No water, no caving.	

TABLE II

LOG OF EXPLORATORY PITS

Exploratory Pits	Depth (feet)	Description	Logged by: CRN Date Logged: 07/05/01
EP-44	0 to 1	SOIL: Sandy Silt to Silty Sand; very fine- to fine-grained, moderate to dark yellowish brown, slightly moist, soft/loose, abundant roots and rootlets.	
	1 to 5	SAUGUS FORMATION – SUNSHINE RANCH MEMBER (Tsr): Silty Sandstone; fine- to medium-grained with some coarse-grained layers with pebbles, pale yellowish gray, slightly moist, moderately hard, bedded. Bedding Attitude: @ 4 feet, N60W, 43NE Total Depth 5 feet. No water, no caving.	
EP-45	0 to 7	ALLUVIUM (Qal): Silty Sand; very fine- to medium-grained, pale to moderate yellowish brown, dry to slightly moist at depth, loose to moderately dense at depth.	
	7 to 14	Pebbly Sand; medium- to coarse-grained with cobbles, moderate yellowish brown, moist, moderately dense. Total Depth 14 feet. No water, no caving.	

TABLE II

LOG OF EXPLORATORY PITS

Exploratory Pits	Depth (feet)	Description	Logged by: CRN Date Logged: 07/05/01
EP-46	0 to 2½	SOIL: Silty Sand; fine- to coarse-grained, dark yellowish brown, dry, loose, abundant roots and rootlets.	
	2½ to 9	SAUGUS FORMATION – SUNSHINE RANCH MEMBER (Tsr): Pebbly Sandstone, medium- to coarse-grained with cobbles, yellowish orange, slightly moist, moderately hard to hard, bedded. Bedding Attitudes: @ 5 feet, N55W, 36NE @ 8 feet, N40W, 32NE Total Depth 9 feet. No water, no caving.	
EP-47	0 to 5	COLLUVIUM (Qcol): Silty Sand; fine- to coarse-grained with pebbles, dark yellowish brown, dry, loose to moderately dense, abundant roots and rootlets.	
	5 to 9	SAUGUS FORMATION – SUNSHINE RANCH MEMBER (Tsr): Pebbly Sandstone; medium- to coarse-grained with pebbles and cobbles, yellowish gray, slightly moist, moderately hard to hard, slightly layered, generally massive, some scour in fill structures. Bedding Attitude – Approximate: @ 8 feet, N50W, 30NE Total Depth 9 feet. No water, no caving.	

TABLE II

EXPLORATORY PITS

Log No.	Depth (ft.)	Description	Logged: 1-26-04 By: CRN
EP-101	0 to 2	SOIL: Sandy Silt; fine-, dark yellowish brown, slightly moist, loose, soft, abundant roots, and rootlets.	
	2 to 7	PICO FORMATION (Tp): Clayey Siltstone; pale yellowish green, slightly moist, moderately hard, massive to slightly bedded.	
		Attitude: Bedding @ 4 feet, N30E 50 SE	
		Total Depth 7 feet.	
EP-102	0 to 7	COLLUVIUM (Qcol): Sandy Silt to Silty Sand; fine-grained, moderate to light yellowish brown to yellowish green at depth, slightly moist, loose, abundant roots and rootlets.	
	7 to 9	PICO FORMATION (Tp): Clayey Siltstone; pale yellowish green, slightly moist, moderately hard, massive to slightly bedded, moderately weathered.	
		Attitude: Bedding @ 8 feet, N70E 41 SE	
		Total Depth 9 feet.	
EP-103	0 to 2	SOIL: Sandy Silt; fine-grained, moderate yellowish brown, slightly moist, loose, abundant roots and rootlets.	
	2 to 6	PICO FORMATION (Tp): Sandy Siltstone; fine-grained, pale yellowish green, dry to slightly moist, moderate hard, massive, upper 3 to 4± feet highly weathered with abundant roots and rootlets.	
		Total Depth 6 feet.	

TABLE II

EXPLORATORY PITS

Log No.	Depth (ft.)	Description	Logged: 1-26-04 By: CRN
EP-104	0 to 2	SOIL/COLLUVIUM (Qcol): Clayey Silt; moderate yellowish brown, slightly moist, soft, abundant roots and rootlets.	
	2 to 7	PICO FORMATION (Tp): Sandy Siltstone; fine-grained, pale yellowish green, dry to slightly moist, moderate hard, massive, weathered 2± feet, some shell fragments, some roots to depth.	
		Total Depth 7 feet.	
EP-105	0 to 5	COLLUVIUM (Qcol): Sandy to Clayey Silt; moderate yellowish brown to pale yellowish green, slightly moist, loose, abundant roots and rootlets.	
	5 to 8	PICO FORMATION (Tp): Sandy Siltstone; fine-grained, pale yellowish green, dry to slightly moist, moderate hard, massive, weathered 2± feet, some shell fragments, some roots to depth.	
		Total Depth 8 feet.	
EP-106	0 to 10	COLLUVIUM (Qcol): Sandy to Clayey Silt; moderate yellowish brown to pale yellowish green, slightly moist, loose, abundant roots and rootlets.	
	10 to 12	PICO FORMATION (Tp): Clayey Siltstone; pale yellowish green, slightly moist, moderately hard, massive, moderately weathered, some white carbonate.	
		Total Depth 12 feet.	

TABLE II

EXPLORATORY PITS

Log No.	Depth (ft.)	Description	Logged: 1-26-04 By: CRN
EP-107	0 to 1	SOIL: Sandy to Clayey Silt; fine-grained, moderate yellowish brown, slightly moist, loose, abundant roots and rootlets.	
	1 to 7	PICO FORMATION (Tp): Silty Sandstone; fine-grained, pale yellowish green, slightly moist, moderately hard, laminated to ½± inch bedding, top 2± feet highly weathered with abundant roots and rootlets, some white carbonate. Attitude: Bedding @ 6 feet, N50E 53NW Total Depth 7 feet.	
EP-108	0 to 1	SOIL: Sandy to Clayey Silt; fine-grained, moderate yellowish brown, slightly moist, loose, abundant roots and rootlets.	
	1 to 6	PICO FORMATION (Tp): Silty Sandstone; fine-grained, pale yellowish green, slightly moist, moderately hard to hard at depth, slightly bedded, generally massive, upper 2± feet highly weathered with abundant roots. Attitude: Bedding @ 5 feet, N10E 56NW Total Depth 6 feet.	
EP-109	0 to 2	SOIL: Sandy to Clayey Silt; fine-grained, moderate yellowish brown, slightly moist, loose, abundant roots and rootlets.	
	2 to 7	PICO FORMATION (Tp): Silty Sandstone; fine-grained, pale yellowish green, slightly moist, moderately hard, laminated to ½± inch bedding, top 2± feet highly weathered. Attitude: Bedding @ 6 feet, N80E 36NW Total Depth 7 feet.	

TABLE II

EXPLORATORY PITS

Log No.	Depth (ft.)	Description	Logged: 1-26-04 By: CRN
EP-110	0 to 2	SOIL: Silty Sand to Sandy Silt; fine-grained, moderate yellowish brown, slightly moist, loose, abundant roots and rootlets.	
	2 to 8	PICO FORMATION (Tp): Silty to Clayey Sandstone; fine-grained, pale yellowish green, slightly moist, moderately hard, laminated to ½± inch bedding, top 2± feet highly weathered.	
		Attitude: Bedding @ 6 feet, E-W 57N	
		Total Depth 8 feet.	
EP-111	0 to 7	COLLUVIUM (Qcol): Silty to Clayey Sand; fine-grained, dark to moderate yellowish brown, slightly moist, loose, abundant roots and rootlets.	
	7 to 9	PICO FORMATION (Tp): Silty Sandstone; fine- with some medium-grained, pale yellowish green, slightly moist, moderately hard, slightly bedded, generally massive.	
		Attitude: Bedding @ 8 feet, N50W 47NE	
		Total Depth 9 feet.	
EP-112	0 to 1	SOIL: Silty Sand to Sandy Silt; fine-grained, moderate yellowish brown, slightly moist, loose, abundant roots and rootlets.	
	1 to 6	PICO FORMATION (Tp): Silty Sandstone; fine-grained, pale yellowish green, slightly moist, moderately hard, top 2 to 3± feet highly weathered.	
		Attitude: Bedding @ 5 feet, N60E 52NE	
		Total Depth 6 feet.	

TABLE II

EXPLORATORY PITS

Log No.	Depth (ft.)	Description	Logged: 1-26-04 By: CRN
EP-113	0 to 2	SOIL: Silty Sand to Sandy Silt; fine-grained, moderate yellowish brown, slightly moist, loose, abundant roots and rootlets.	
	2 to 7	PICO FORMATION (Tp): Silty Sandstone; fine-grained, pale yellowish green, slightly moist, moderately hard, slightly bedded, generally massive.	
		Total Depth 7 feet.	
EP-114	0 to 6	COLLUVIUM (Qcol): Silty to Clayey Sand; fine-grained, dark yellowish brown to moderate yellowish brown at depth, slightly moist, loose, abundant roots and rootlets.	
	6 to 8	PICO FORMATION (Tp): Silty Claystone; mottled olive and moderate reddish brown, moist, firm, generally massive, abundant white carbonate.	
		Attitude: Bedding @ 7 feet, N70W 46NE	
		Total Depth 8 feet.	
EP-115	0 to 3	SOIL: Sandy to Clayey Silt; fine-grained, moderate yellowish brown, moist, loose, abundant roots and rootlets.	
	3 to 7	PICO FORMATION (Tp): Clayey Sandstone; fine-grained, pale olive, slightly moist to moist, moderately hard, laminated to massive, top 2± feet highly weathered with abundant white carbonate.	
		Attitude: Bedding @ 5 feet, EW33N	
		Total Depth 7 feet.	
EP-116	0 to 2	SOIL: Silty Sand; very fine- to fine-grained, moderate yellowish brown, moist, loose, abundant roots and rootlets.	
	2 to 9	PICO FORMATION (Tp): Silty Sandstone; very fine- to fine-grained, some interbeded, medium- to coarse-grained Sand with pebbles, pale yellowish gray, dry to slightly moist, medium hard, generally massive.	
		Attitude: Bedding @ 7 feet, E-W 37N	
		Total Depth 9 feet.	

TABLE II

EXPLORATORY PITS

Log No.	Depth (ft.)	Description	Logged: 1-26-04 By: CRN
EP-117	0 to ½	SOIL: Silty Sand to Sandy Silt; fine-grained, moderate yellowish brown, slightly moist, loose, abundant roots and rootlets.	
	½ to 6	PICO FORMATION (Tp): Silty Sandstone; very fine- to fine-grained, pale yellowish green, slightly moist, moderately hard, slightly bedded, massive, some shell fragments.	
		Total Depth 6 feet.	
EP-118	0 to 4	SOIL/COLLUVIUM (Qcol): Silty Sand to Sandy Silt; fine-grained, moderate yellowish brown, slightly moist, loose, abundant roots and rootlets.	
	4 to 6	PICO FORMATION (Tp): Clayey Sandstone; fine-grained, moderate yellowish green, slightly moist, moderate hard, slightly bedded, generally massive.	
		Attitude: Approximate Bedding @ 5 feet; E-W 27N	
		Total Depth 6 feet.	
EP-119	0 to 2	SOIL: Silty Sand to Sandy Silt; fine-grained, moderate yellowish brown, slightly moist, loose, abundant roots and rootlets.	
	2 to 8	PICO FORMATION (Tp): Clayey Sandstone; fine-grained, moderate yellowish brown, slightly moist, loose, laminated to ½± inch bedding.	
		Attitude: Bedding @ 6 feet, N70W 55NE	
		Total Depth 8 feet.	
EP-120	0 to 5	COLLUVIUM (Qcol): Silty to Clayey Sand; fine-grained, moderate yellowish brown, slightly moist to moist, loose, abundant roots and rootlets.	
	5 to 7	PICO FORMATION (Tp): Clayey Siltstone; pale olive, slightly moist, moderately hard, massive, top 1± foot highly weathered with abundant white carbonate.	
		Total Depth 7 feet.	

TABLE II

EXPLORATORY PITS

Log No.	Depth (ft.)	Description	Logged: 1-26-04 By: CRN
EP-121	0 to 1	SOIL: Silty Sand; fine-grained, moderate yellowish brown, slightly moist, loose, abundant roots and rootlets.	
	1 to 6	PICO FORMATION (Tp): Clayey Siltstone; fine-grained, pale yellowish, slightly moist, moderately hard to hard at depth, ½± inch bedding.	
		Attitude: Bedding @ 4 feet, E-W 40N	
		Total Depth 6 feet.	
EP-122	0 to 1	SOIL: Silty Sand; fine-grained, moderate yellowish brown, slightly moist, loose, abundant roots and rootlets.	
	1 to 6	PICO FORMATION (Tp): Clayey Siltstone; fine-, pale yellowish, slightly moist, moderately hard to hard at depth, laminated to ½± inch bedding.	
		Attitude: Bedding @ 5 feet, N80E 46NW	
		Total Depth 6 feet.	
EP-123	0 to 1	SOIL: Sandy Silt to Silty Sand; fine-grained, moderate yellowish brown, slightly moist, loose, abundant roots and rootlets.	
	1 to 7	PICO FORMATION (Tp): Sandy Siltstone; fine-grained, pale olive, slightly moist, moderately hard, laminated to ½± inch bedding, top 2± feet highly weathered.	
		Attitude: Bedding @ 5 feet, N70E 48NW	
		Total Depth 7 feet.	

TABLE II

EXPLORATORY PITS

Log No.	Depth (ft.)	Description	Logged: 1-26-04 By: CRN
EP-124	0 to ½	SOIL: Sandy Silt to Silty Sand; fine-grained, moderate yellowish brown, slightly moist, loose, abundant roots and rootlets.	
	½ to 6	PICO FORMATION (Tp): Silty Sandstone; very fine- to fine-grained, pale yellowish green, slightly moist, moderately hard, laminated to ½± inch bedding, top 2± feet highly weathered. Attitude: Bedding @ 4 feet, N70E 52NE Joint @ 4 feet, N25E Vertical Total Depth 6 feet.	
EP-125	0 to 1	SOIL: Sandy Silt to Silty Sand; fine- to coarse-grained with some pebbles and cobbles, moderate yellowish brown, slightly moist, loose, abundant roots and rootlets.	
	1 to 5	PICO FORMATION (Tp): Silty Sandstone; fine-grained, pale yellowish grey, dry to slightly moist, moderately hard to hard at depth, some thinly interlayered medium- to coarse-grained Sand lenses, generally massive. Attitude: Bedding @ 4 feet, N80W 52NE Total Depth at 5 feet.	
EP-126	1 to 3	SOIL/COLLUVIUM (Qcol): Silty Sand to Sand, Silt; fine-grained, moderate yellow brown, slightly moist, loose, abundant roots and rootlets.	
	3 to 7	PICO FORMATION (Tp): Sandy Siltstone; fine-grained Sand, pale yellowish green, dry to slightly moist, moderately hard, ½± inch bedding, top 2± feet highly weathered with abundant white carbonate. Attitude: Bedding @ 6 feet, N80E 36NW Total Depth 7 feet.	

TABLE II

EXPLORATORY PITS

Log No.	Depth (ft.)	Description	Logged: 1-26-04 By: CRN
EP-127	0 to 9	COLLUVIUM (Qcol): Silty Sand to Sand, Silt; fine-grained, moderate yellow brown, slightly moist, loose, abundant roots and rootlets.	
	9 to 10	PICO FORMATION (Tp): Silty Claystone; olive, moist, moderately firm to firm, some white carbonate.	
		Total Depth 10 feet.	
EP-128	0 to 4	COLLUVIUM/ALLUVIUM (Qcol/Qal): Silty Sand to Sandy Silt; fine-grained, moderate yellow brown, moist, loose to medium dense with depth, some roots and rootlets.	
	4 to 6	PICO FORMATION (Tp): Claystone; olive, moist, moderately firm, laminated to 1± inch bedding, slightly plastic, some white carbonate.	
		Attitude: Bedding @ 5 feet, N60W 52NE	
		Total Depth 6 feet.	
EP-129	0 to 5	COLLUVIUM/ALLUVIUM (Qcol/Qal): Silty Sand to Sandy Silt; fine-grained with some basal cobbles, moderate yellow brown, moist, loose to medium dense with depth, some roots and rootlets.	
	5 to 7	PICO FORMATION (Tp): Claystone; olive, moist, moderately firm, laminated to 1± inch bedding, slightly plastic, some white carbonate.	
		Attitude: Bedding @ 6 feet, N60W 42NE	
		Total Depth 7 feet.	

TABLE II

EXPLORATORY PITS

Log No.	Depth (ft.)	Description	Logged: 1-27-04 By: CRN
EP-130	0 to 1	SOIL: Silty Sand to Sandy, Silt; fine-grained, moderate yellow brown, slightly moist, loose, abundant roots and rootlets.	
	1 to 7	PICO FORMATION (Tp): Sandy Siltstone to Silty Sandstone; very fine- to fine-grained, pale yellowish green, slightly moist, moderately hard, laminated to ½± inch bedding, top 2 to 3± feet highly weathered with some roots and rootlets. Attitude: Bedding @ 6 feet, N30E 33NW Total Depth 7 Feet.	
EP-131	0 to 1½	SOIL: Silty Sand to Sandy, Silt; fine-grained, moderate yellow brown, slightly moist, loose, abundant roots and rootlets.	
	1½ to 6	PICO FORMATION (Tp) (south side of pit): Silty Claystone; mottled olive and moderate yellowish brown, slightly moist, moderately hard, laminated to 1± inch bedding, highly jointed/fractured, some roots and rootlets to depths. Attitude: Bedding @ 5 feet, N40E 48NW FAULT (2 to 3+ inches thick zone): Silty Sand; fine-grained, pale grey, dry, loose, some roots. Attitude: Fault @ 5 feet, N60W Vertical	
	1½ to 6	PICO FORMATION (Tp) (north side of pit): Silty Sandstone; fine-grained, layered pale grey and pale olive, slightly moist, moderately hard, 1 to 6± inch bedding, top 2± feet moderately weathered. Attitude: Bedding @ 5 feet, N60W Vertical Total Depth 6 feet.	

TABLE II

EXPLORATORY PITS

Log No.	Depth (ft.)	Description	Logged: 1-27-04 By: CRN
EP-132	0 to 1	SOIL: Clayey Silt; moderate yellow brown, slightly moist, loose, abundant roots, rootlets and white carbonate.	
	1 to 7	PICO FORMATION (Tp): Interbedded Silty Claystone; mottled olive and moderate yellowish brown, slightly moist, moderately hard, laminated to 1± inch bedding; with Silty Sandstone, fine-grained, pale olive, slightly moist, moderately hard, 2 to 3± inch bedding, top 3± inch bedding, top 3± feet highly weathered. Attitudes: Bedding @ 5 feet, N60W Vertical Bedding @ 6 feet, N30W Vertical Total Depth 7 feet.	
EP-133	0 to ½	SOIL: Clayey Silt; moderate yellow brown, slightly moist, loose, abundant roots, rootlets and white carbonate.	
	½ to 6	PICO FORMATION (Tp): Sandy Siltstone; very fine- to fine-grained, pale yellowish green, slightly moist, moderately hard, laminated to 1± inch bedding, top 2± feet highly weathered with abundant rootlets and some white carbonate. Attitude: Bedding @ 5 feet, N60E 69NW Total Depth 6 feet.	
EP-134	0 to 3	SOIL: Clayey Silt with Sand; fine-grained, moderate yellow brown, slightly moist, loose, abundant roots, rootlets and white carbonate.	
	3 to 5	PICO FORMATION (Tp): Silty Sandstone; fine- to coarse-grained, pale grey, dry, moderately hard, massive, abundant shells.	
	5 to 8	Silty Claystone; mottled olive and moderate yellow brown, slightly moist, moderately hard, slightly bedded generally massive. Attitude: Bedding @ 7 feet, N50W 58NE Total Depth 8 feet.	

TABLE II

EXPLORATORY PITS

Log No.	Depth (ft.)	Description	Logged: 1-27-04 By: CRN
EP-135	0 to 2½	SOIL: Sandy Silt; fine-grained, moderate yellow brown, dry to slightly moist, loose, abundant roots and rootlets.	
	2½ to 7	PICO FORMATION (Tp): Silty Sandstone; moderate yellow brown, slightly moist, loose, top 2± feet highly weathered with roots and rootlets. Attitude: Bedding @ 6 feet, N60W 49NE Total Depth 7 feet.	
EP-136	0 to 1	SOIL: Sandy Silt; fine-grained, moderate yellow brown, dry to slightly moist, loose, abundant roots and rootlets.	
	1 to 8	PICO FORMATION (Tp): Silty Claystone; moderate yellow brown, slightly moist, loose, top 3± feet highly weathered, with roots and rootlets; some interbedded Silty Sandstone, fine-grained, pale to moderate yellowish grey, dry, moderately hard, 1 to 2± inch bedding. Attitude: Bedding @ 7 feet, N40W 72SW Total Depth 8 feet.	
EP-137	0 to 5	SOIL/COLLUVIUM (Qcol): Sandy Silt to Silty Sand; fine-grained, moderate yellow brown, dry to slightly moist, loose, abundant roots and rootlets.	
	5 to 12	PICO FORMATION (Tp): Silty Claystone; moderate yellow brown, slightly moist, loose, top 3± feet highly weathered, with roots and rootlets; some interbedded Silty Sandstone, fine-grained, pale to moderate yellowish grey, dry, moderately hard, 1 to 2± inch bedding. Attitude: Bedding @ 11 feet, N50W 52NE Total Depth 12 feet.	

TABLE II

EXPLORATORY PITS

Log No.	Depth (ft.)	Description	Logged: 1-27-04 By: CRN
EP-138	0 to 7	SAUGUS FORMATION-SUNSHINE RANCH MEMBER (Tsr): Silty Sandstone; fine- to coarse-grained with pebbles and cobbles, pale yellowish brown to pale grey, slightly moist, moderately hard, slightly bedded generally massive with some scour fill structure. Attitude: Bedding @ 6 feet, N40W 37NE Note: Soil removed by dozer during recent fire fighting operations. Total Depth 7 feet.	
EP-139	0 to ½	SOIL: Silty Sand; fine- to coarse-grained with pebbles and cobbles, moderate yellowish brown, slightly moist, loose, some roots and rootlets.	
	½ to 5	SAUGUS FORMATION-SUNSHINE RANCH MEMBER (Tsr): Silty Sandstone; fine- to coarse-grained with pebbles and cobbles, pale yellowish brown to pale grey, slightly moist, moderately hard, slightly bedded generally massive with some scour fill structure. Attitude: Approximate Bedding @ 4 feet E-W 30N Total Depth 5 feet.	
EP-140	0 to ½	SOIL: Silty Sand; fine- to coarse-grained with pebbles and cobbles, moderate yellowish brown, slightly moist, loose, some roots and rootlets.	
	½ to 6	SAUGUS FORMATION-SUNSHINE RANCH MEMBER (Tsr): Silty Sandstone; fine- to coarse-grained with pebbles and cobbles, pale yellowish brown to pale grey, slightly moist, moderately hard, slightly bedded generally massive with some scour fill structure. Attitude: Bedding @ 5 feet, N80E 28NW Total Depth 6 feet.	

TABLE II

EXPLORATORY PITS

Log No.	Depth (ft.)	Description	Logged: 1-27-04 By: CRN
EP-141	0 to 3	SOIL: Silty to Clayey Sand; very fine- to medium-grained with some pebbles, dark yellowish brown, moist, soft, some roots and rootlets.	
	3 to 8	SAUGUS FORMATION-SUNSHINE RANCH MEMBER (Tsr): Gravelly Sandstone; fine- to coarse-grained with pebbles and cobbles, some boulders up to 18± inches, pale yellowish brown, slightly moist, moderately hard, massive, matrix supported, top 2± feet highly weathered.	
		Total Depth 8 feet.	
EP-142	0 to 3	SOIL/COLLUVIUM (Qcol): Silty Sand; fine- to coarse-grained with pebbles and cobbles, moderate to dark yellow brown, moist, loose some roots and rootlets.	
	3 to 9	SAUGUS FORMATION-SUNSHINE RANCH MEMBER (Tsr): Gravelly Sandstone; fine- to coarse-grained with pebbles and cobbles, pale yellowish grey to pale grey, slightly moist, moderately hard, massive with interlayered pebbles and cobbles lenses.	
		Attitude: Bedding @ 8 feet, E-W 33N	
		Total Depth 9 feet.	
EP-143	0 to ½	SOIL: Silty Sand; fine- to medium-grained, moderate yellowish brown, slightly moist, loose, some roots and rootlets. Note: Some soil removed during recent fire fighting operations.	
	½ to 6	SAUGUS FORMATION-SUNSHINE RANCH MEMBER (Tsr): Silty Sandstone; fine- to medium-grained, pale grey, slightly moist, moderately hard, slightly bedded generally massive.	
		Attitude: Bedding @ 4 feet, N60W 32NE	
		Total Depth 6 feet.	

TABLE II

EXPLORATORY PITS

Log No.	Depth (ft.)	Description	Logged: 1-27-04 By: CRN
EP-144	0 to 5	SOIL/COLLUVIUM (Qcol): Silty Sand; fine- to medium-grained, moderate yellow brown, slightly moist to moist, loose, abundant roots and rootlets.	
	5 to 9	SAUGUS FORMATION-SUNSHINE RANCH MEMBER (Tsr): Pebbly Sandstone; fine- to coarse-grained, pale grey, slightly moist, moderately hard, massive with some interlayered pebble and cobbles lenses. Attitude: Bedding @ 7 feet, N70W 32NE Total Depth 9 feet.	

TABLE I

EXPLORATORY TRENCH LOGS

Log No.	Depth (ft.)	Description	Logged: 1-31-06 By: RHS
EP-201	0 to 2	SOIL: Sandy Clay; dark yellowish brown, slightly moist, firm, rootlets common, clusters of small bi-valve shells.	
	2 to 9	SAUGUS FORMATION - SUNSHINE RANCH MEMBER (Tsr): Sandy Siltstone; light olive gray with reddish brown stain, dry, soft, highly fractured, weathered.	
	@ 9	Fine- to medium-grained Sandstone, pinkish gray, soft, poorly cemented, some pebbles, probable cross-bed.	
		Bedding Attitude: N65E, 28NW	
		Total Depth 9 feet.	
EP-202	0 to 2	SAUGUS FORMATION - SUNSHINE RANCH MEMBER (Tsr): Fine- to medium-grained Sandstone, pinkish gray, dry, soft, many pebbles and small cobbles.	
	2 to 5	Sandy Siltstone, pale yellowish brown, slightly moist, soft, moderately fractured, rootlet to depth.	
	5 to 6	Sandstone, pinkish gray, dry, soft.	
		Bedding Attitude: N55W, 35NE	
		Total Depth 6 feet.	
EP-203	0 to 2	SOIL: Sandy Silt; dark yellowish brown, slightly moist, stiff, many pebbles.	
	2 to 4½	SAUGUS FORMATION - SUNSHINE RANCH MEMBER (Tsr): Fine- to medium-grained Sandstone, pinkish gray, slightly moist, soft, poorly cemented.	
	4½ to 7	Siltstone, light olive gray, slightly moist, soft to moderately hard.	
		Bedding Attitude: N80E, 45NW	
		Total Depth 7 feet.	

RHS:cp-2453RT04logs

TABLE I

EXPLORATORY TRENCH LOGS

Log No.	Depth (ft.)	Description	Logged: 1-31-06 By: RHS
EP-204	0 to 6½	SAUGUS FORMATION - SUNSHINE RANCH MEMBER (Tsr): Fine- to coarse-grained Sandstone, soft to moderately hard, dry, poorly cemented, pebble and small cobble beds and lenses.	
		Bedding Attitude: EW, 40N	
		Total Depth 6½ feet.	
EP-205	0 to 2	SOIL: Silty Clay; dark yellowish brown, moist, stiff, porous.	
	2 to 10	SAUGUS FORMATION - SUNSHINE RANCH MEMBER (Tsr): Sandy Siltstone, light olive gray, slightly moist, soft to moderately hard at depth, white carbonate pods common.	
	@ 6 & 8	Silty Sandstone; very light olive gray, slightly moist, moderately hard, 6 to 12 inch thick interbeds.	
		Bedding Attitude: N85W, 30NE	
		Ring and Bulk samples at 6 and 10 feet.	
		Total Depth 8 feet.	
EP-206	0 to ¼	SOIL: Sandy Silt; moderate yellowish brown, dry, firm, porous.	
	¼ to 5	SAUGUS FORMATION - SUNSHINE RANCH MEMBER (Tsr): Fine- to medium-grained Sandstone, pinkish gray, dry, soft to moderately hard, poorly cemented, roots to depth.	
	@ 3	8 to 10-inch thick Silty Sandstone-pebble conglomerate, grayish orange, dry, soft, one small cobble.	
		Bedding Attitude: N70W, 45NE	
		Total Depth 5 feet.	

TABLE I

EXPLORATORY TRENCH LOGS

Log No.	Depth (ft.)	Description	Logged: 1-31-06 By: RHS
EP-207	0 to ½	SOIL: Sandy Silt; dark yellowish brown, moist, firm, abundant rootlets.	
	½ to 3½	PICO FORMATION (Tp): Silty Sandstone; very pale orange to yellowish gray, slightly moist, soft, red brown stain common.	
		Bedding Attitude: N55W, 40NE	
		Total Depth 3½ feet.	

RHS:cp-2453RT04logs

NUWI – Lyons Canyon, LLC
March 19, 2021
2020-200-001

APPENDIX C

LABORATORY TESTING

RTF&A
GEOTECHNICAL ENGINEERING & ENGINEERING GEOLOGY

APPENDIX C

LABORATORY TESTING

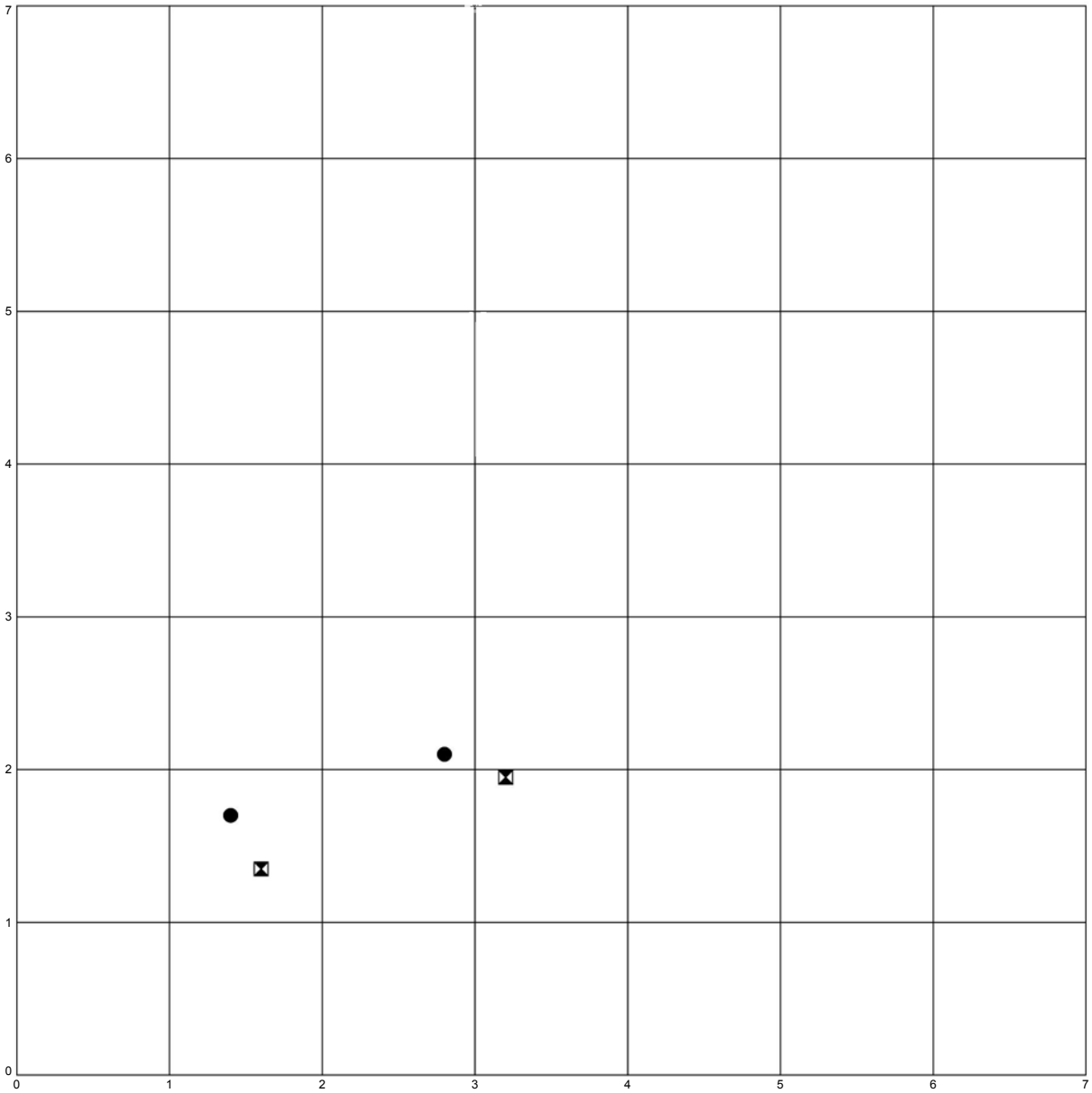
Laboratory tests were performed on selected samples obtained from the test pits to aid in the classification of the soils and to determine their engineering properties.

Direct shear tests were performed on selected undisturbed samples to determine the strength of the soils. The tests were performed after soaking the samples to near-saturated moisture content and at various surcharge pressures. The strength values determined from the direct shear tests are presented on the Shear Test Data page.

Confined consolidation tests were performed on remolded samples. Water was added during the tests to each of the samples to illustrate the effect of moisture on the compressibility. The results of the tests are presented on the Consolidation Test Data pages.

Atterberg limits (liquid and plastic limit) tests were conducted on selected samples to aid in classifying the soils and determining index properties. Test results are presented on the attached graphic, “Atterberg Limit’s Test Data.”

A sieve analysis was used to determine the distribution of grain sizes in selected soil samples. The results of the sieve analysis tests are presented as an attachment to this report.



Specimen Identification		Classification
●	**HS-1 (S-1)**	**SILT: Trace Clay, Brown (ML) Remolded to 102 pcf @ 11.9%**
⊠	**HS-2 (S-1)**	**SILT: Trace Fine Sand, Light Brown (ML) Remolded to 103 pcf @ 12.0%**

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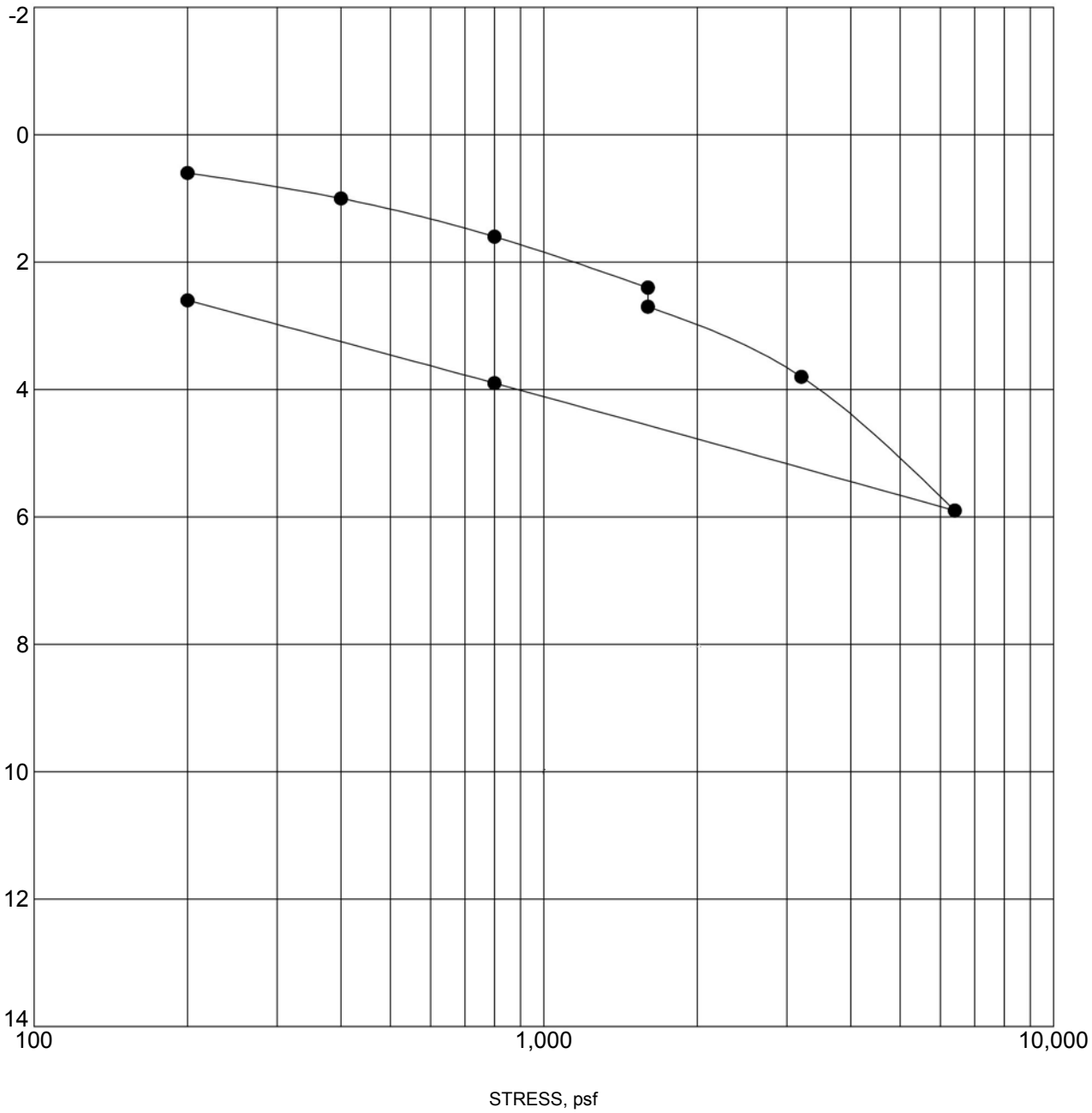
DIRECT SHEAR TEST

JOB NUMBER: 2020-200

REPORT DATED:



Water added at 1600 psf

Specimen Identification		Classification		
●	**HS-1 10.0'**			
⊠				
▲				
★				
⊙				
✪				

R. T. Frankian & Associates
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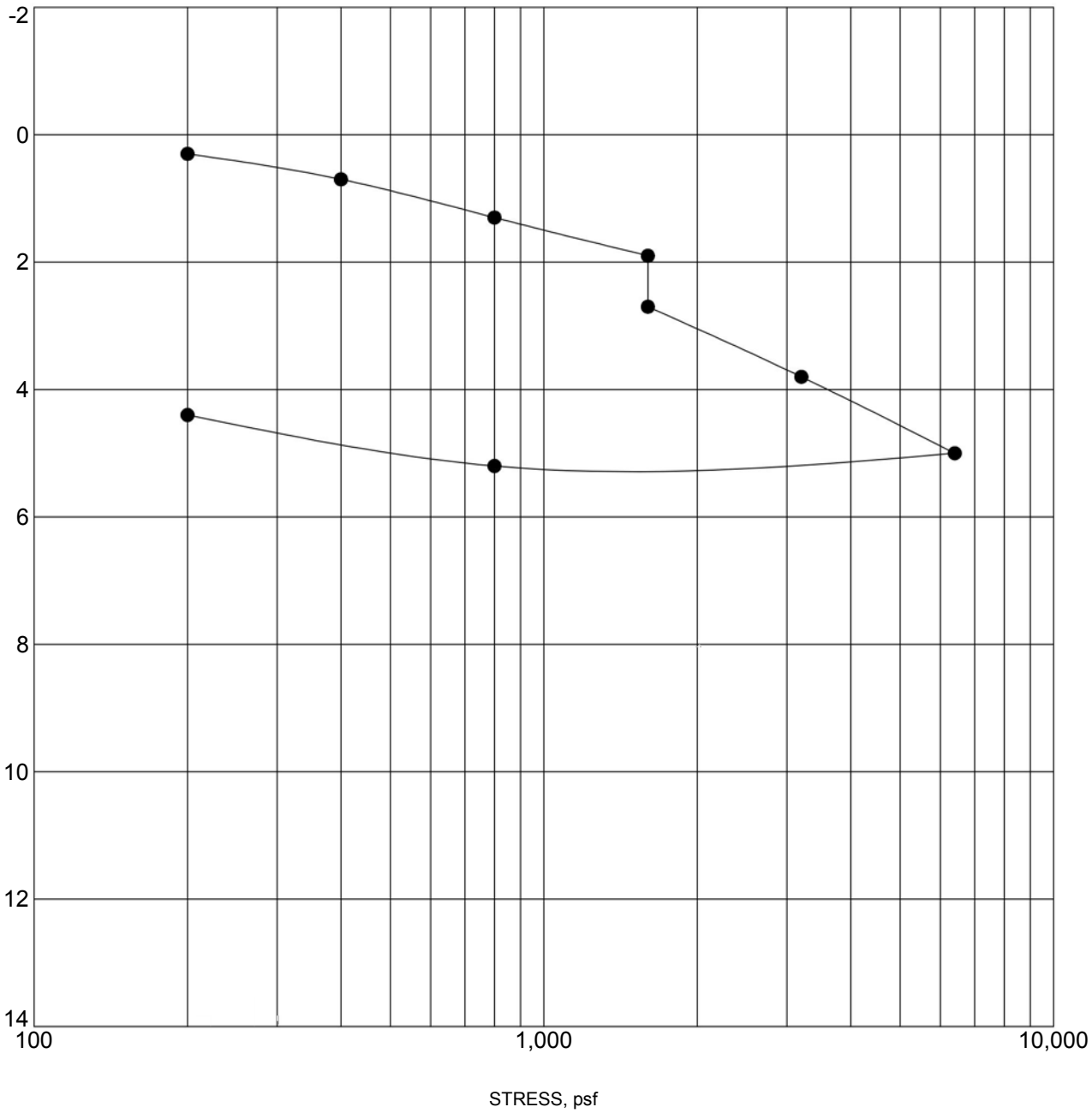
Santa Clarita CA 91355
Telephone: 818 531 1501
Fax: 818 531 1510

CONSOLIDATION TEST

JOB NUMBER: 2020-200

REPORT DATED:



Water added at 1600 psf

Specimen Identification		Classification		
●	**HS-1 12.0'**			
⊠				
▲				
★				
⊙				
✪				

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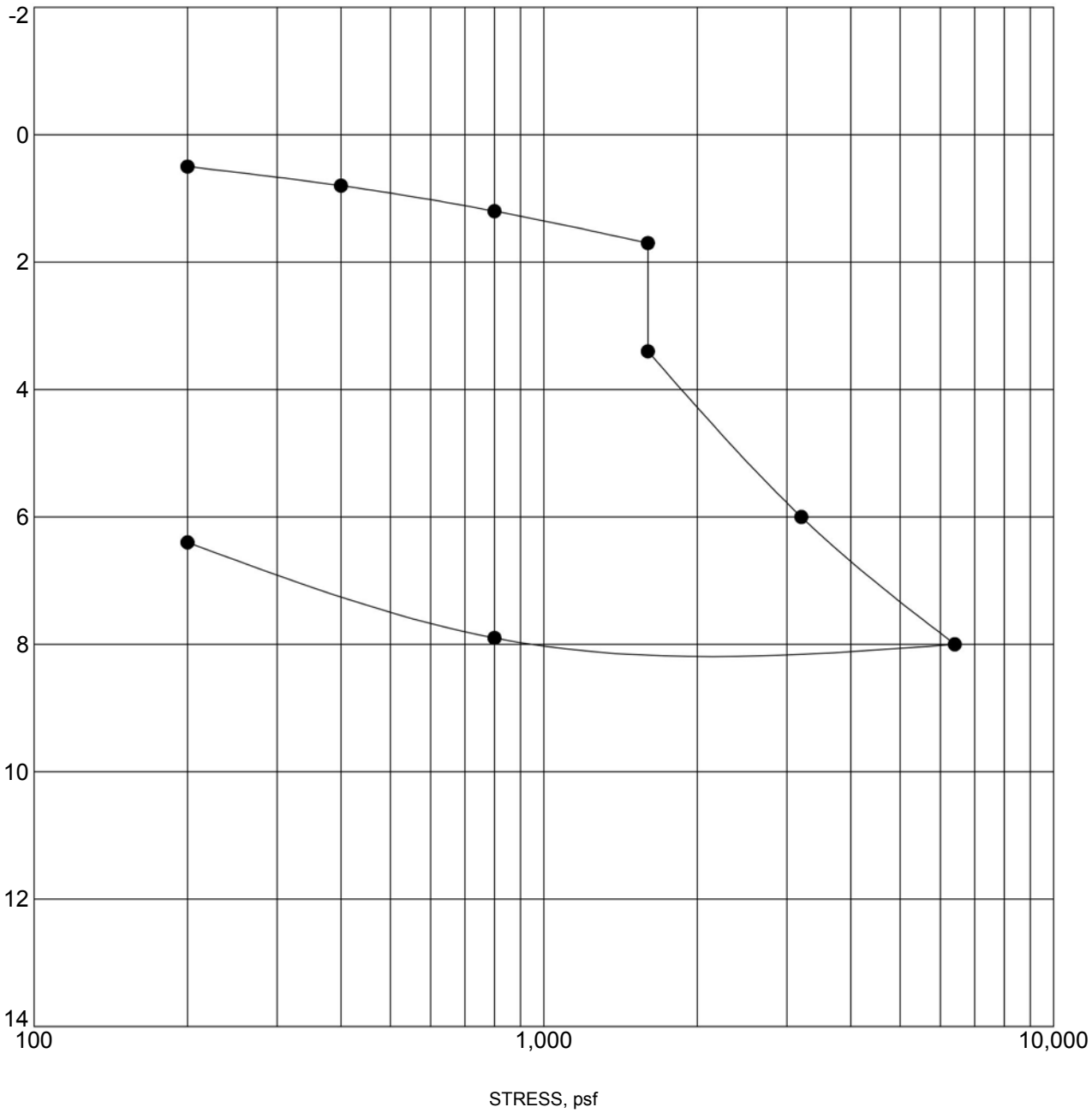
CONSOLIDATION TEST

JOB NUMBER: 2020-200

REPORT DATED:



Water added at 1600 psf

Specimen Identification		Classification		
●	**HS-2 8.0'**			
⊠				
▲				
★				
⊙				
✪				

R. T. Frankian & Associates
26027 Huntington Lane, Suite A
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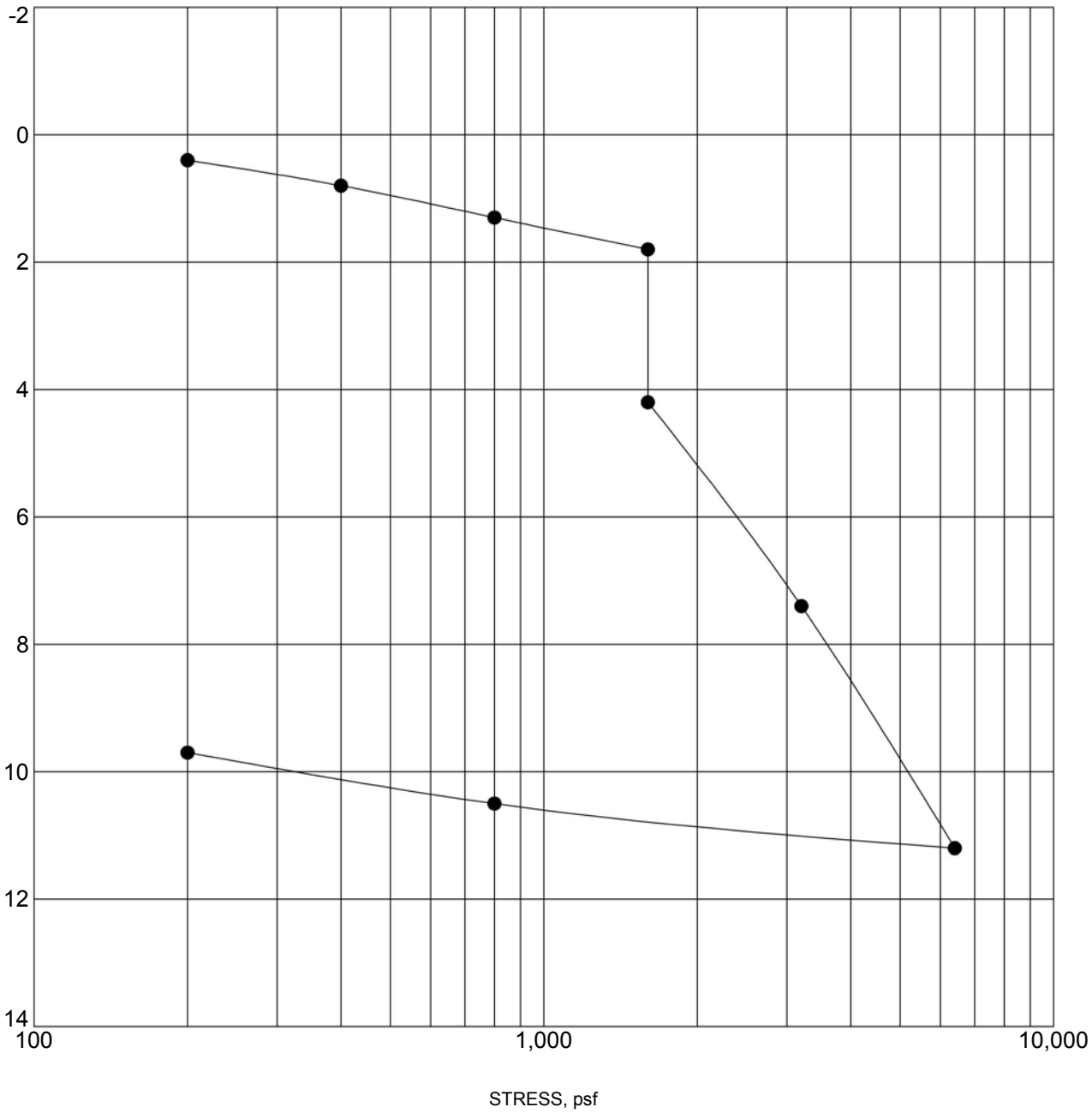
Fax: 818 531 1510

CONSOLIDATION TEST

JOB NUMBER: 2020-200

REPORT DATED:

US CONSOL STRAIN 2020-200.GPJ FRANKIAN.GDT 2/2/21



Water added at 1600 psf

Specimen Identification		Classification		
●	**HS-2 10.0'**			
⊠				
▲				
★				
⊙				
✪				

R. T. Frankian & Associates
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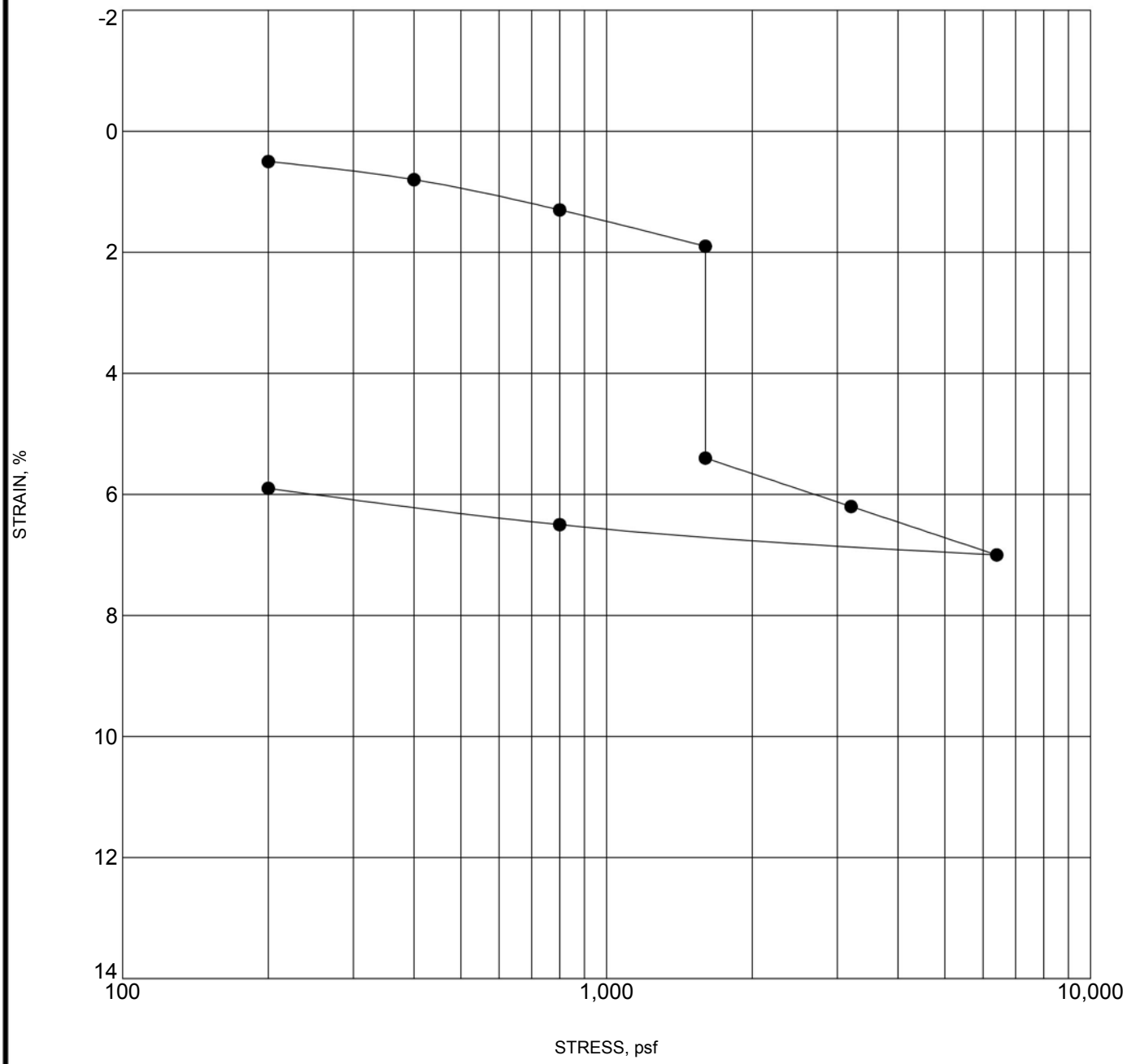
CONSOLIDATION TEST

JOB NUMBER: 2020-200

REPORT DATED:

US CONSOL STRAIN 2020-200.GPJ FRANKIAN.GDT 2/2/21



Water added at 1600 psf

Specimen Identification		Classification		
●	**HS-3 5.0'**			
⊠				
▲				
★				
⊙				
✪				

R. T. Frankian & Associates
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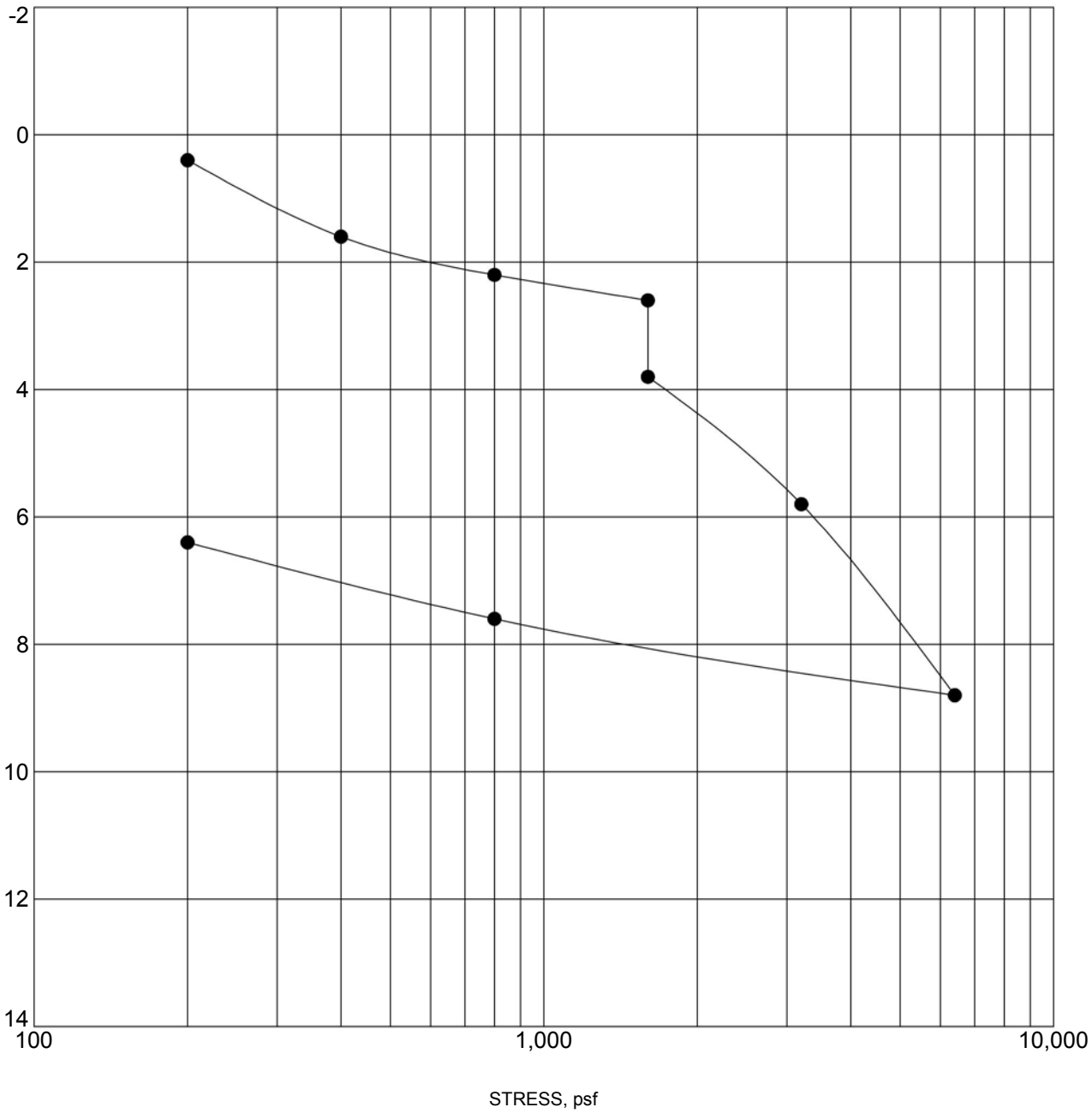
Fax: 818 531 1510

CONSOLIDATION TEST

JOB NUMBER: 2020-200

REPORT DATED:



Water added at 1600 psf

Specimen Identification		Classification		
●	**HS-3 8.0'**			
⊠				
▲				
★				
⊙				
✪				

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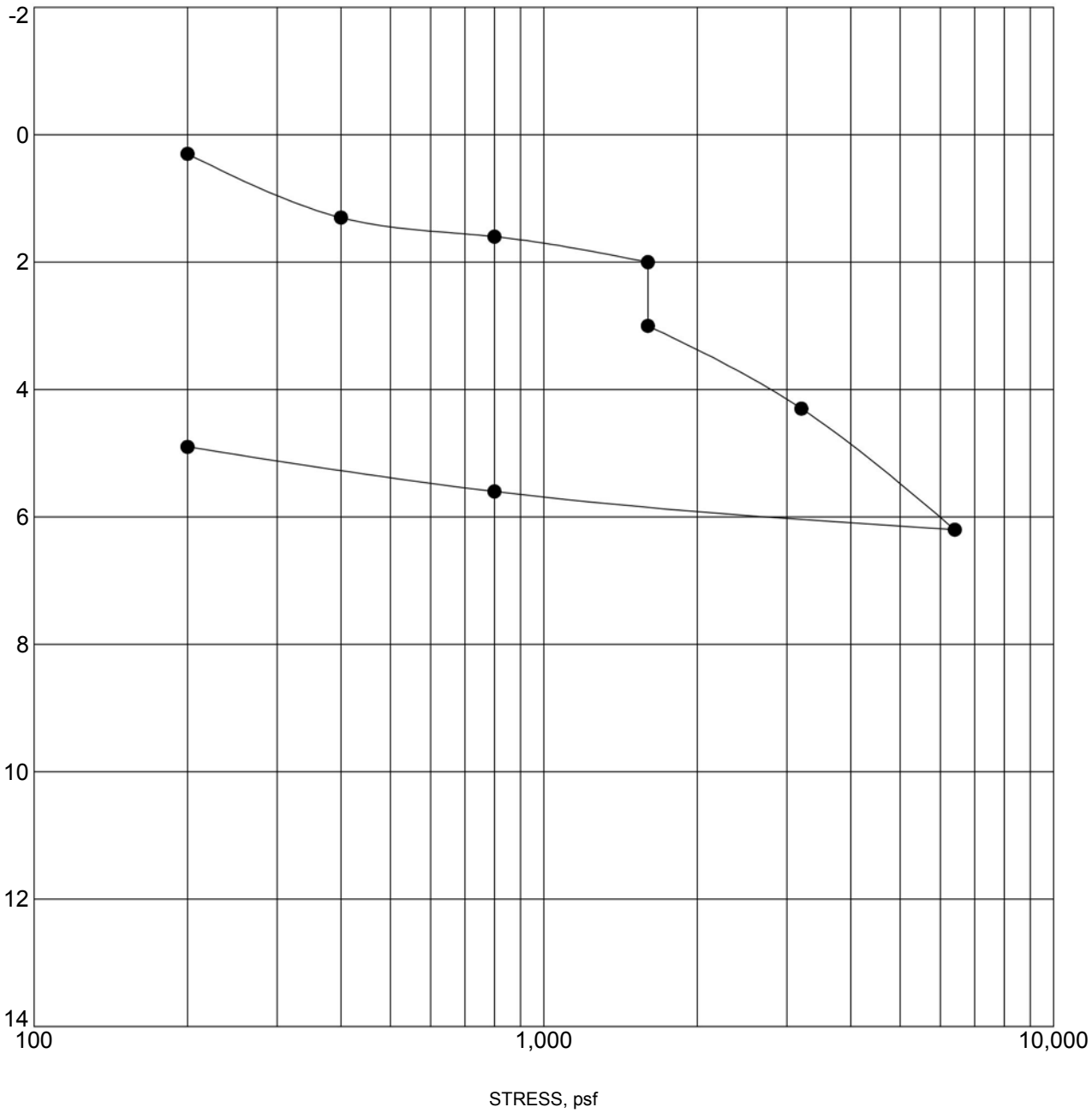
CONSOLIDATION TEST

JOB NUMBER: 2020-200

REPORT DATED:

US CONSOL STRAIN 2020-200.GPJ FRANKIAN.GDT 2/2/21



Water added at 1600 psf

Specimen Identification		Classification		
●	**HS-3 12.0'**			
⊠				
▲				
★				
⊙				
✪				

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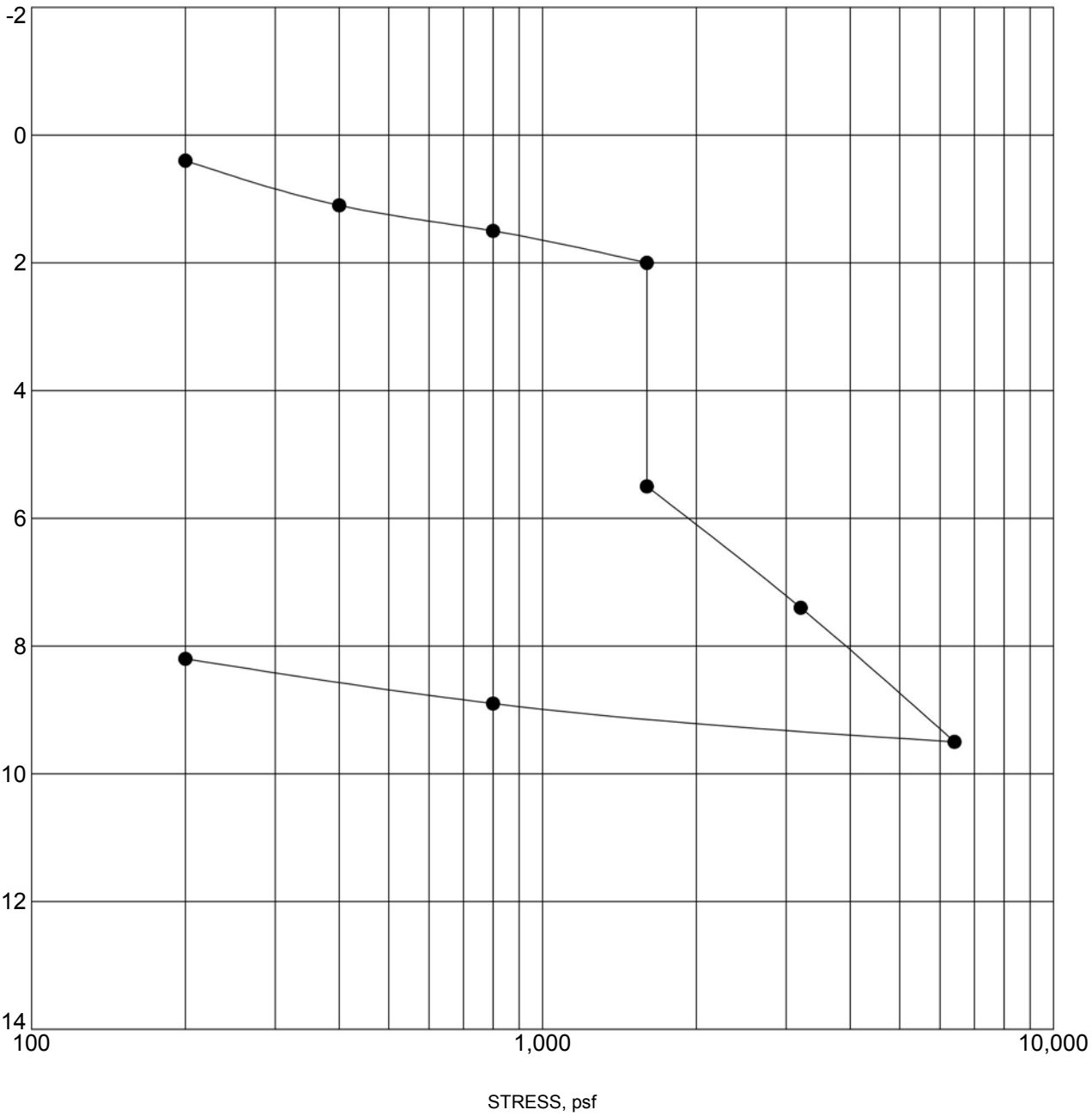
CONSOLIDATION TEST

JOB NUMBER: 2020-200

REPORT DATED:



Water added at 1600 psf

Specimen Identification		Classification		
●	**HS-4 8.0'**			
⊠				
▲				
★				
⊙				
✪				

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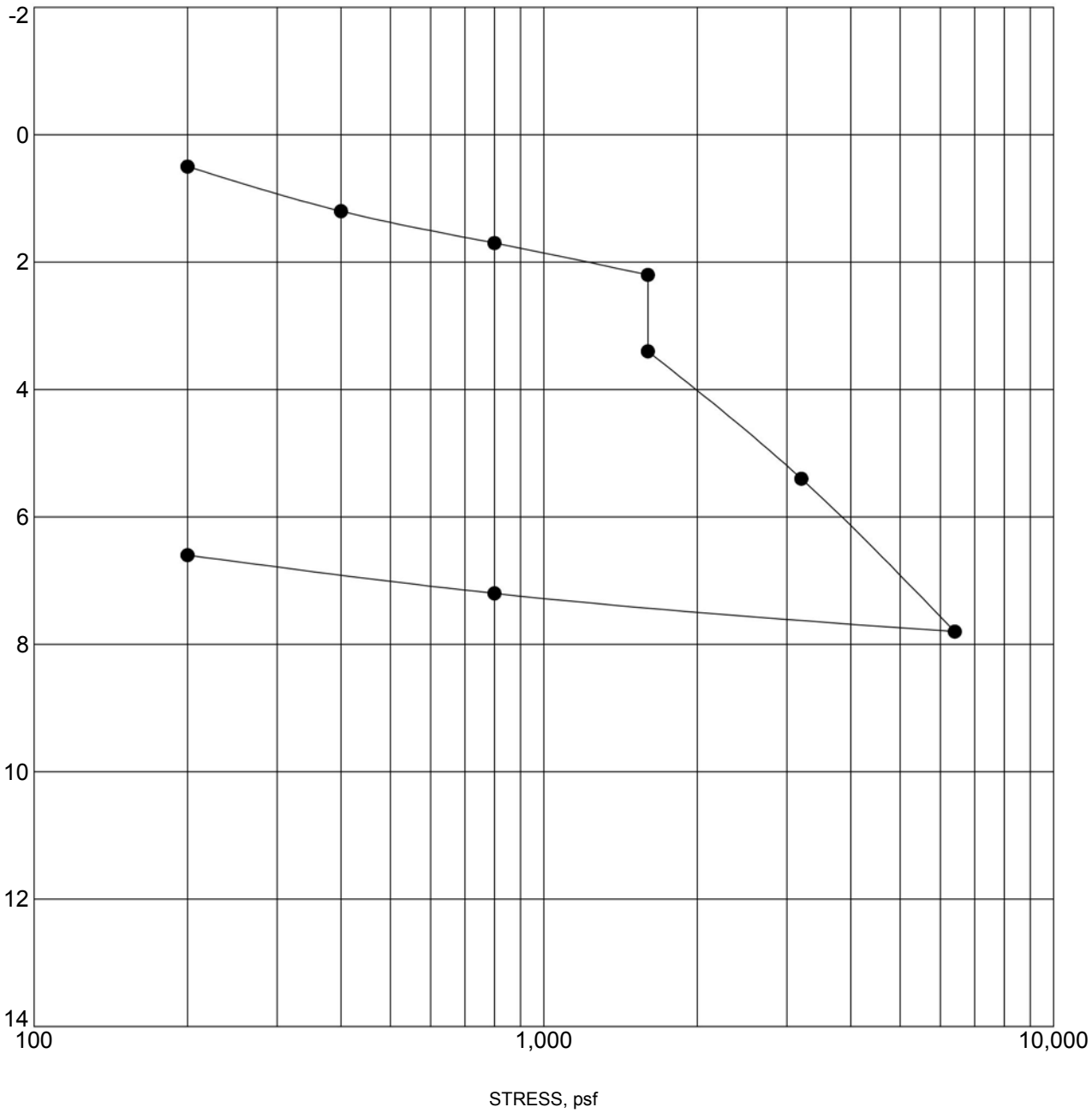
CONSOLIDATION TEST

JOB NUMBER: 2020-200

REPORT DATED:

US CONSOL STRAIN 2020-200.GPJ FRANKIAN.GDT 2/2/21



Water added at 1600 psf

Specimen Identification		Classification		
●	**HS-4 10.0'**			
⊠				
▲				
★				
⊙				
✪				

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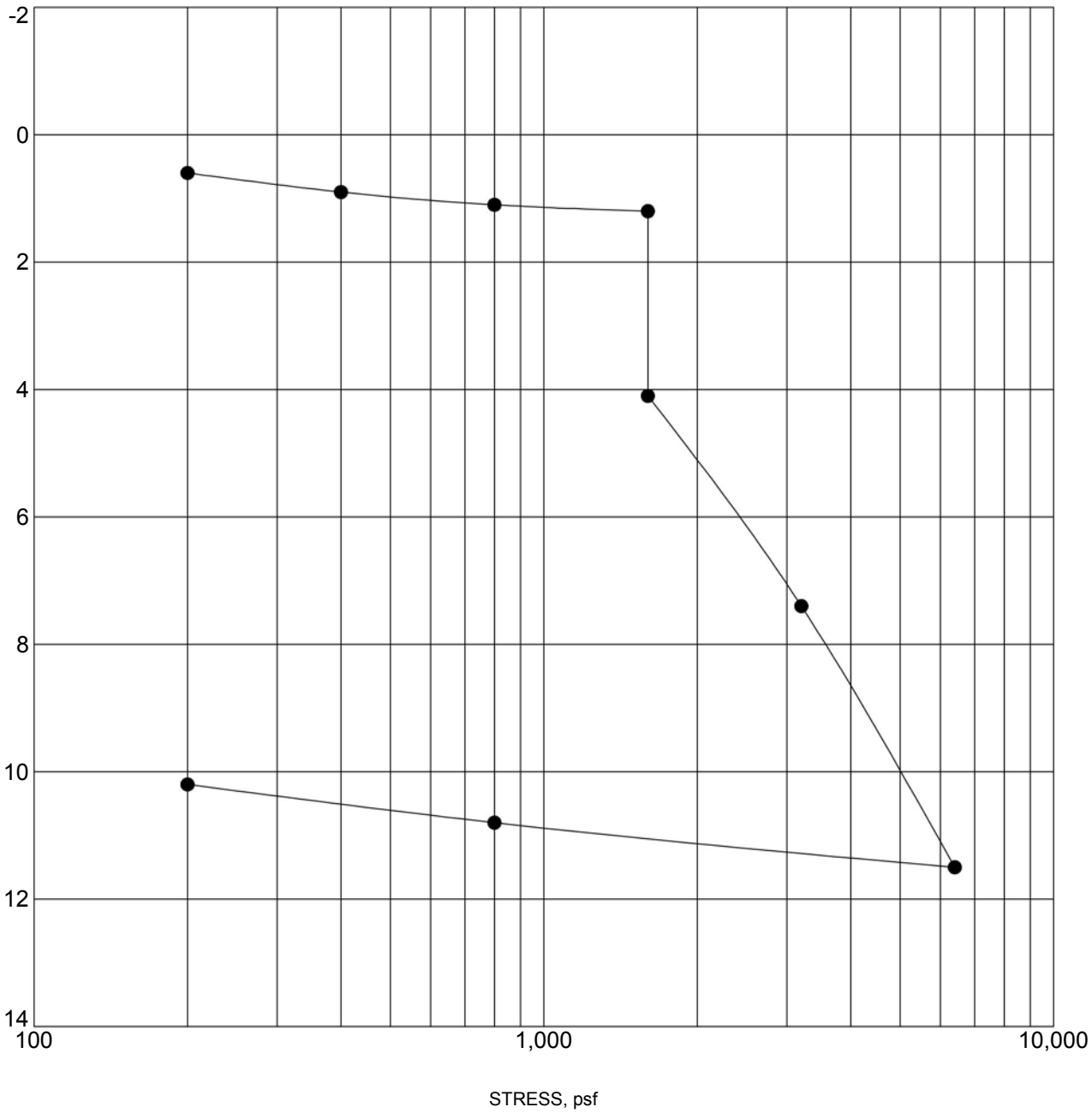
CONSOLIDATION TEST

JOB NUMBER: 2020-200

REPORT DATED:

US CONSOL STRAIN 2020-200.GPJ FRANKIAN.GDT 2/2/21



Water added at 1600 psf

Specimen Identification		Classification		
●	**HS-5 8.0'**			
⊠				
▲				
★				
⊙				
✪				

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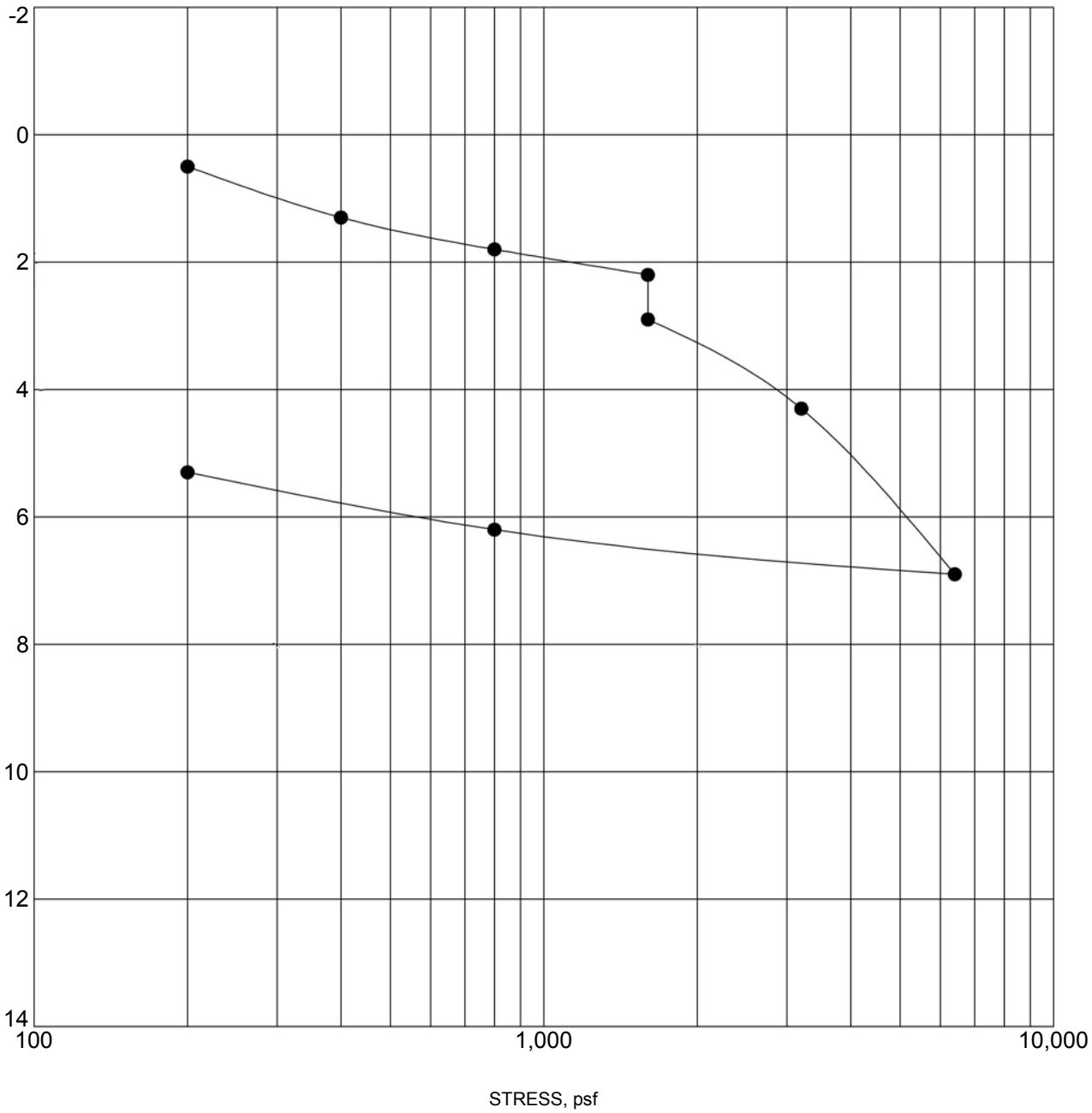
CONSOLIDATION TEST

JOB NUMBER: 2020-200

REPORT DATED:

US CONSOL STRAIN 2020-200.GPJ FRANKIAN.GDT 2/2/21



Water added at 1600 psf

Specimen Identification		Classification		
●	**HS-5 12.0'**			
⊠				
▲				
★				
⊙				
✪				

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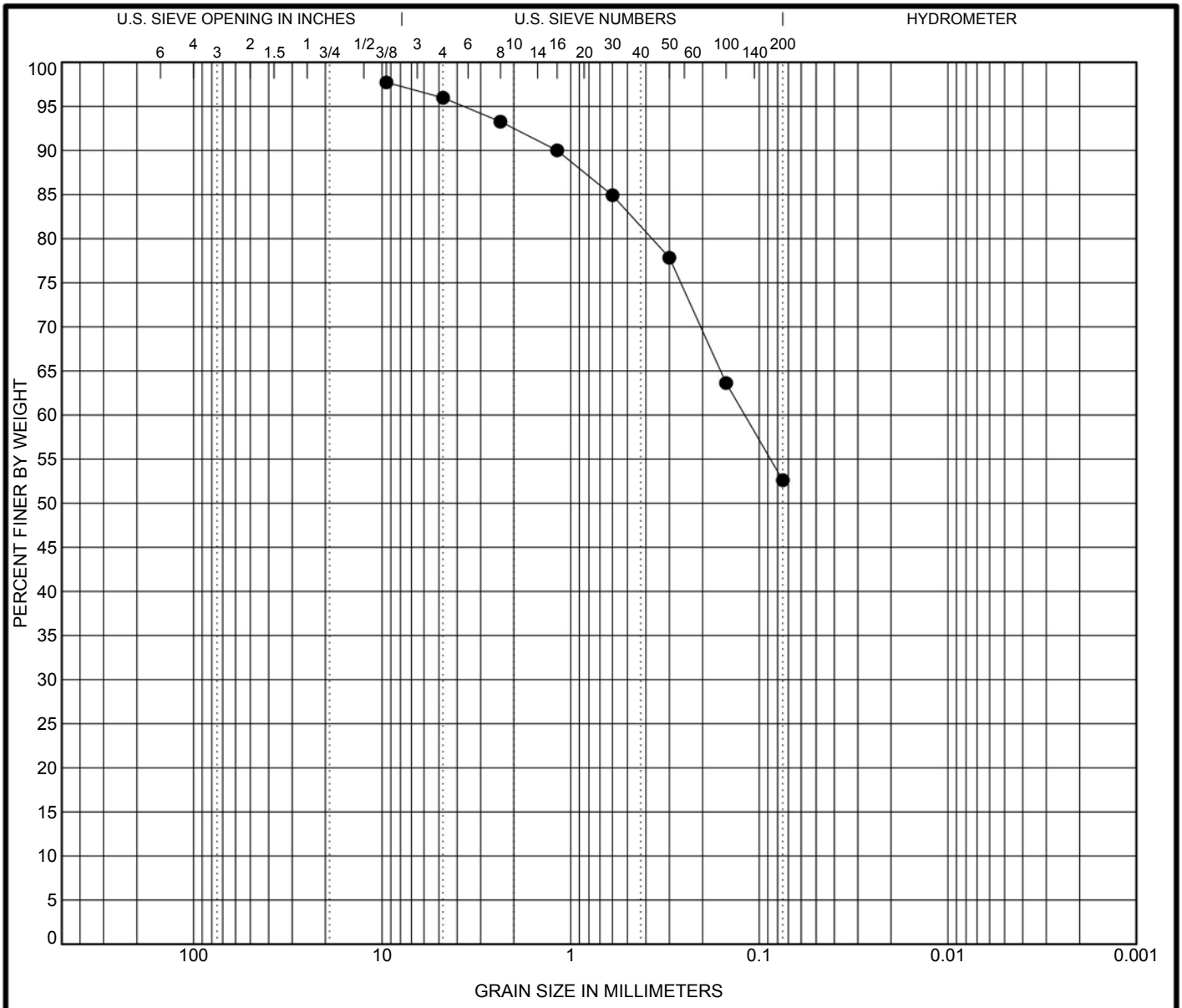
CONSOLIDATION TEST

JOB NUMBER: 2020-200

REPORT DATED:



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification		Classification	LL	PL	PI	Cc	Cu
●	**HS-1**	**1.0**						
⊠								
▲								
★								
⊙								

	Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	**HS-1**	**1.0**	**9.5**	**0.119**			**1.7**	**43.4**	**52.6**	
⊠										
▲										
★										
⊙										

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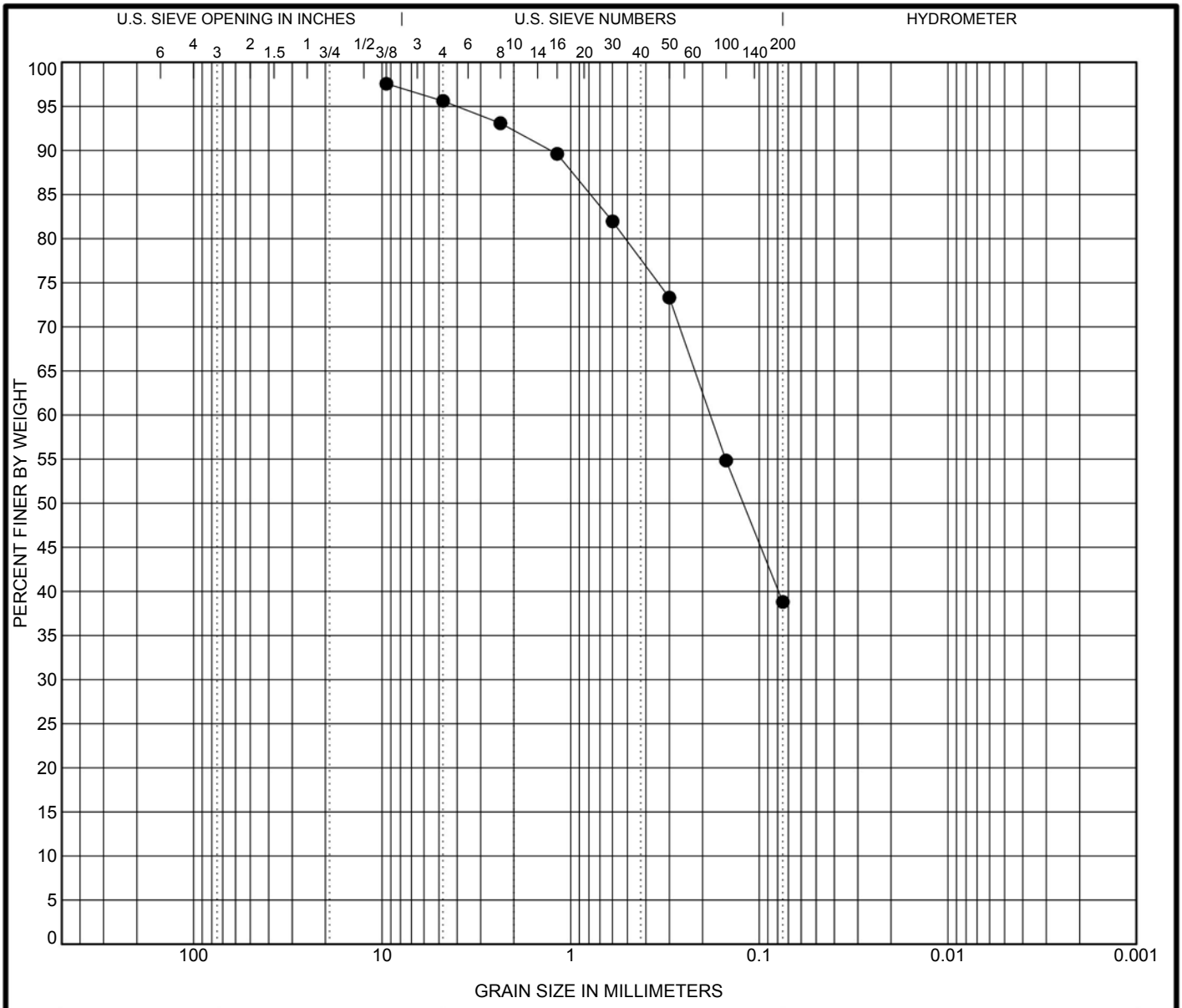
GRAIN SIZE DISTRIBUTION

JOB NUMBER: 2020-200

REPORT DATED:

US GRAIN SIZE 2020-200.GPJ FRANKIAN.GDT 1/29/21



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification		Classification	LL	PL	PI	Cc	Cu
●	**HS-2**	**2.0**						
⊠								
▲								
★								
⊙								

	Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	**HS-2**	**2.0**	**9.5**	**0.182**			**2.0**	**56.8**	**38.8**	
⊠										
▲										
★										
⊙										

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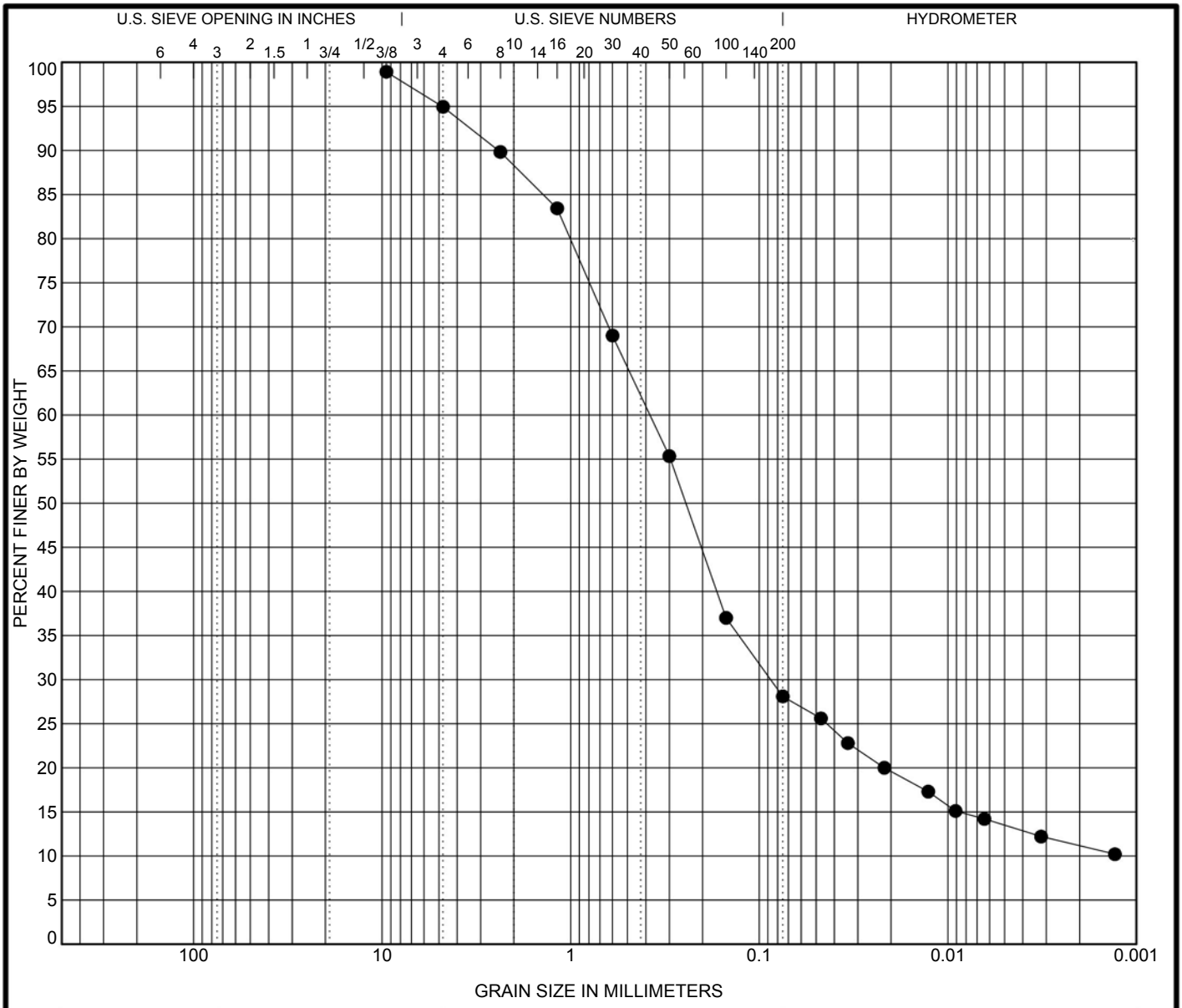
GRAIN SIZE DISTRIBUTION

JOB NUMBER: 2020-200

REPORT DATED:

US GRAIN SIZE 2020-200.GPJ FRANKIAN.GDT 1/29/21



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification		Classification	LL	PL	PI	Cc	Cu
●	**HS-3**	**1.0**	**CLAYEY SAND(SC)**	**30**	**18**	**12**		
⊠								
▲								
★								
⊙								

	Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	**HS-3**	**1.0**	**9.5**	**0.38**	**0.087**		**4.0**	**66.8**	**14.6**	**13.5**
⊠										
▲										
★										
⊙										

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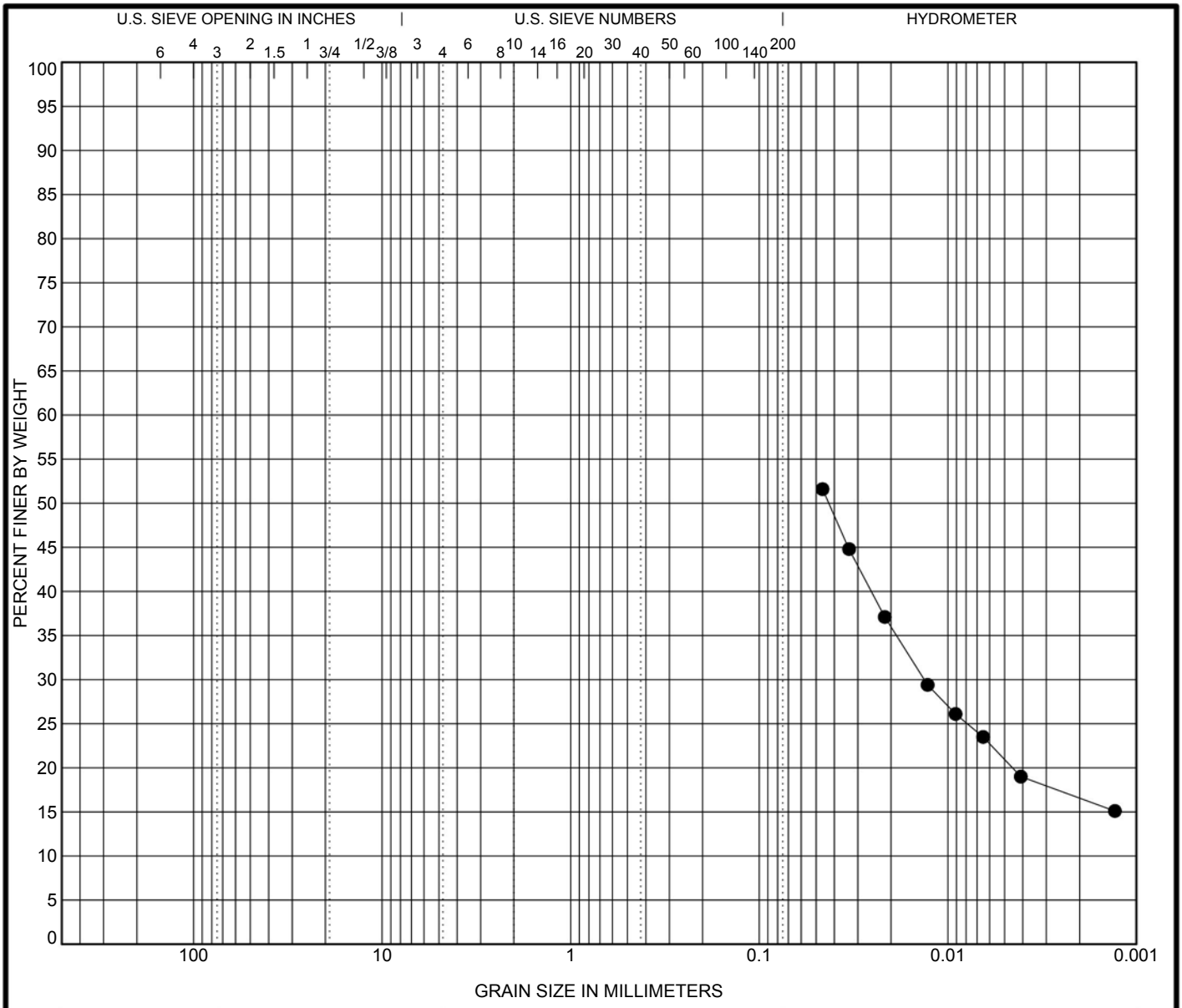
GRAIN SIZE DISTRIBUTION

JOB NUMBER: 2020-200

REPORT DATED:

US GRAIN SIZE 2020-200.GPJ FRANKIAN.GDT 2/2/21



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification		Classification	LL	PL	PI	Cc	Cu
●	**HS-4**	**1.0**						
⊠								
▲								
★								
⊙								

	Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	**HS-4**	**1.0**			**0.013**					**20.9**
⊠										
▲										
★										
⊙										

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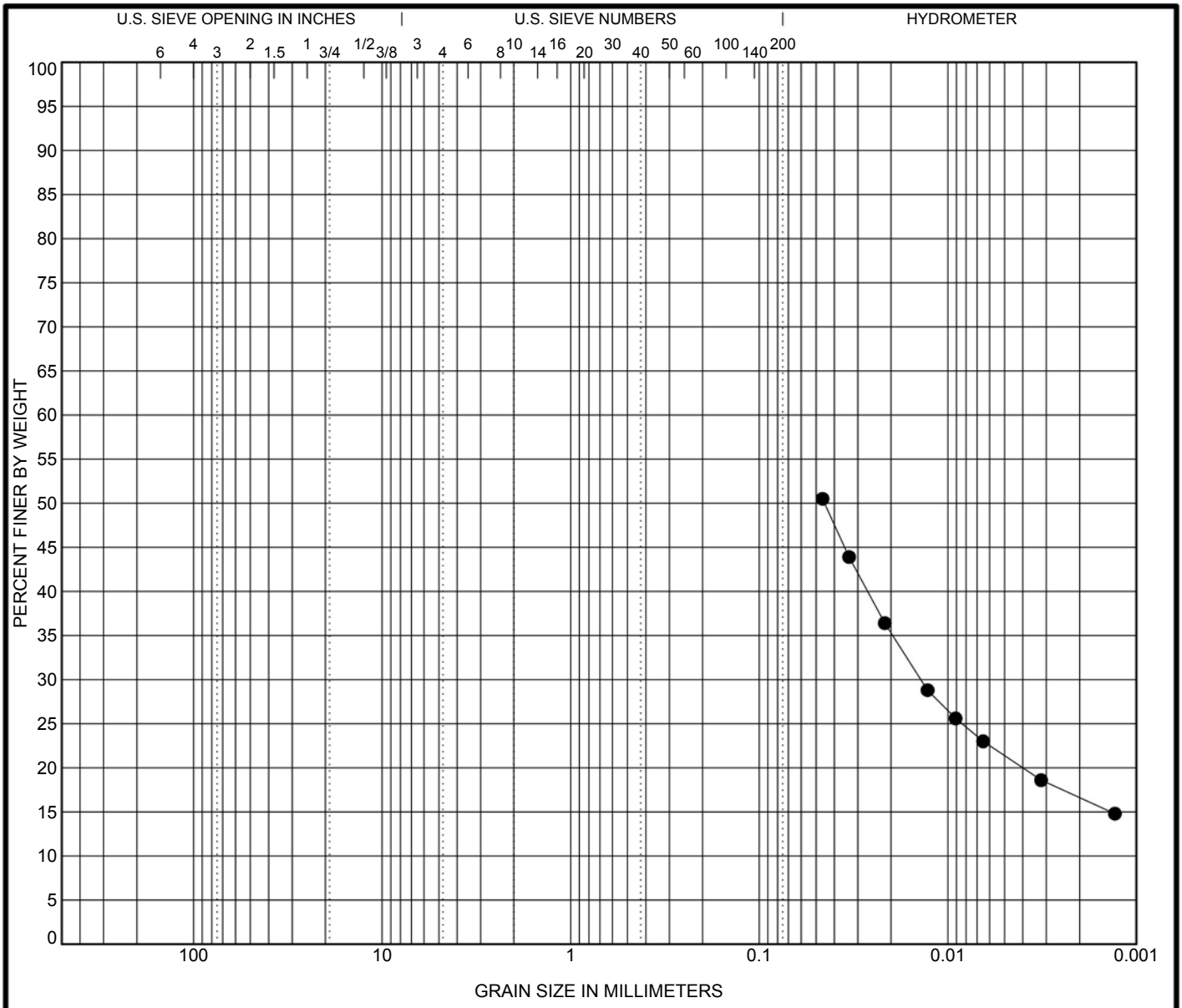
GRAIN SIZE DISTRIBUTION

JOB NUMBER: 2020-200

REPORT DATED:

US GRAIN SIZE 2020-200.GPJ FRANKIAN.GDT 1/29/21



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification		Classification	LL	PL	PI	Cc	Cu
●	Hole-4	20.0						
⊠								
▲								
★								
⊙								

	Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	Hole-4	20.0			0.014					21.4
⊠										
▲										
★										
⊙										

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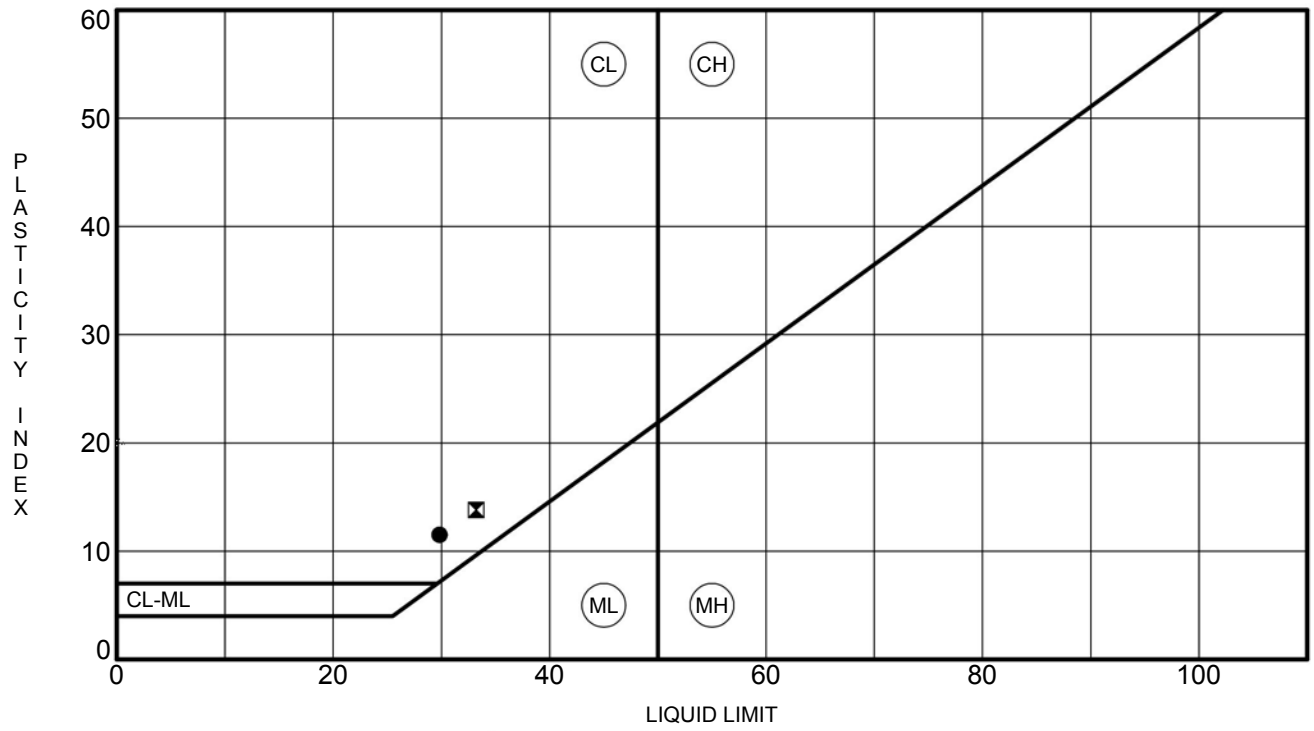
GRAIN SIZE DISTRIBUTION

JOB NUMBER: 2020-200

REPORT DATED:

US GRAIN SIZE 2020-200.GPJ FRANKIAN.GDT 1/29/21



	Specimen Identification		LL	PL	PI	Fines	Classification
●	**HS-3**	**1.0**	**30**	**18**	**12**	**33**	**CLAYEY SAND(SC)**
⊠	**HS-4**	**20.0**	**33**	**19**	**14**	**50**	**CLAYEY SAND(SC)**

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ATTERBERG LIMITS' RESULTS

JOB NUMBER: 2020-200

REPORT DATED:

NUWI – Lyons Canyon, LLC
March 19, 2021
2020-200-001

APPENDIX D

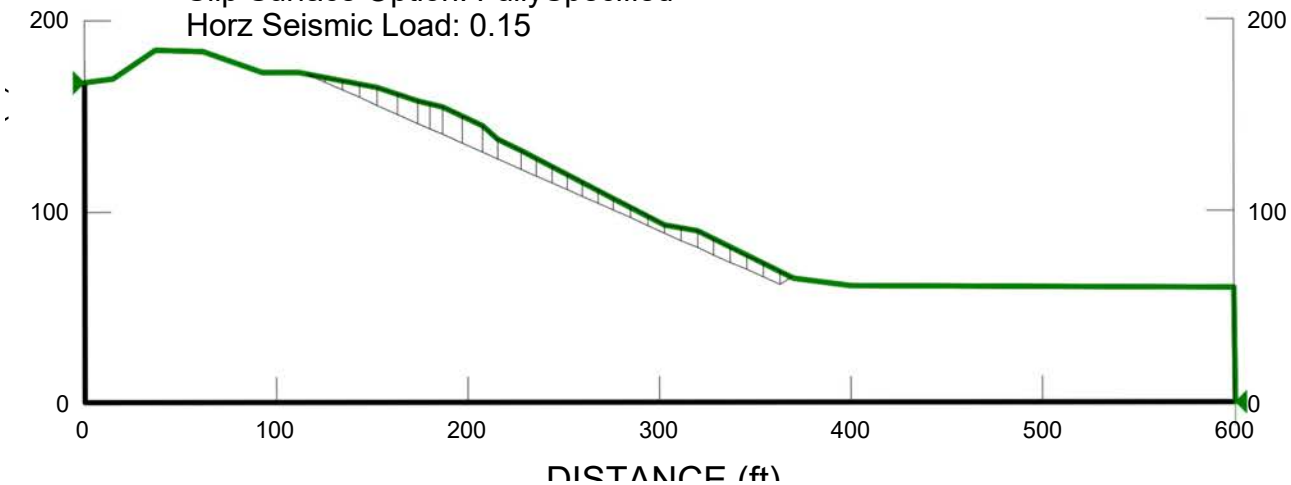
SLOPE STABILITY ANALYSES

RTF&A
GEOTECHNICAL ENGINEERING & ENGINEERING GEOLOGY

Title: Lyons Canyon
Comments: 2020-200
Name: Slope Stability C-C' Seismic.gsz
Date: 3/18/2021Time: 4:22:06 PM
Material #: 1 Wt: 130 C: 350 Phi: 30
Material #: 2 Wt: 130 C: 250 Phi: 20

1.14

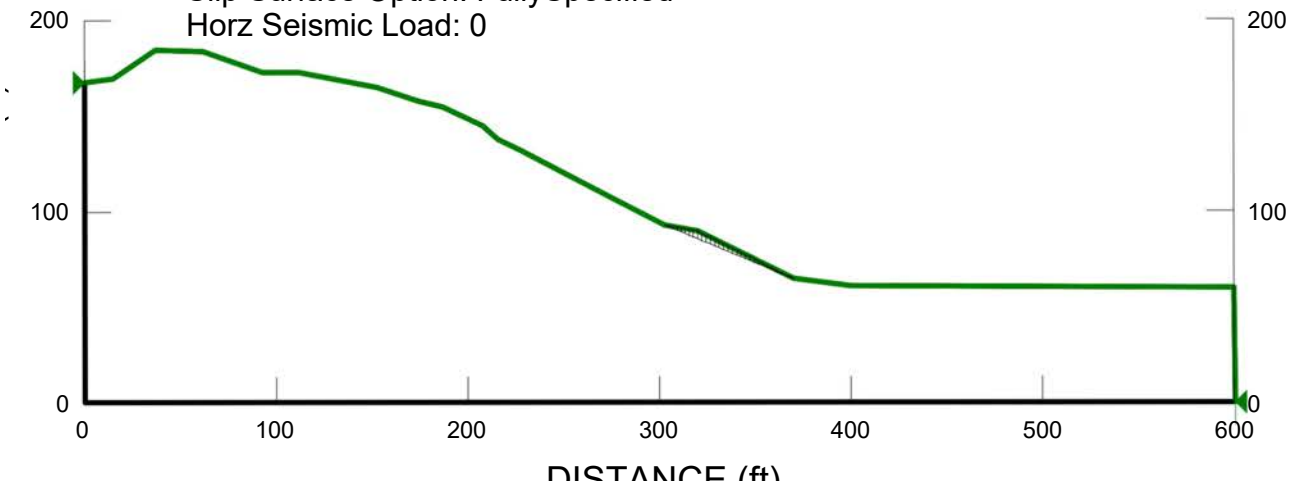
Method: Spencer
Slip Surface Option: FullySpecified
Horz Seismic Load: 0.15



Title: Lyons Canyon
Comments: 2020-200
Name: Slope Stability C-C' Static.gsz
Date: 3/18/2021Time: 4:16:19 PM
Material #: 1 Wt: 130 C: 350 Phi: 30
Material #: 2 Wt: 130 C: 250 Phi: 20

3.50

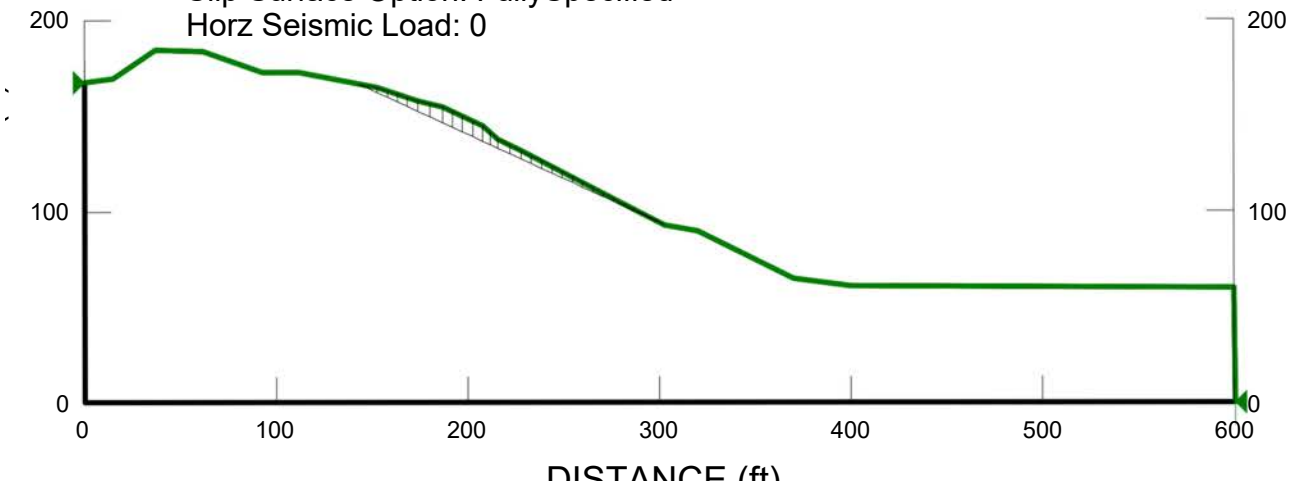
Method: Spencer
Slip Surface Option: FullySpecified
Horz Seismic Load: 0



Title: Lyons Canyon
Comments: 2020-200
Name: Slope Stability C-C' Static.gsz
Date: 3/18/2021Time: 4:16:19 PM
Material #: 1 Wt: 130 C: 350 Phi: 30
Material #: 2 Wt: 130 C: 250 Phi: 20

2.09

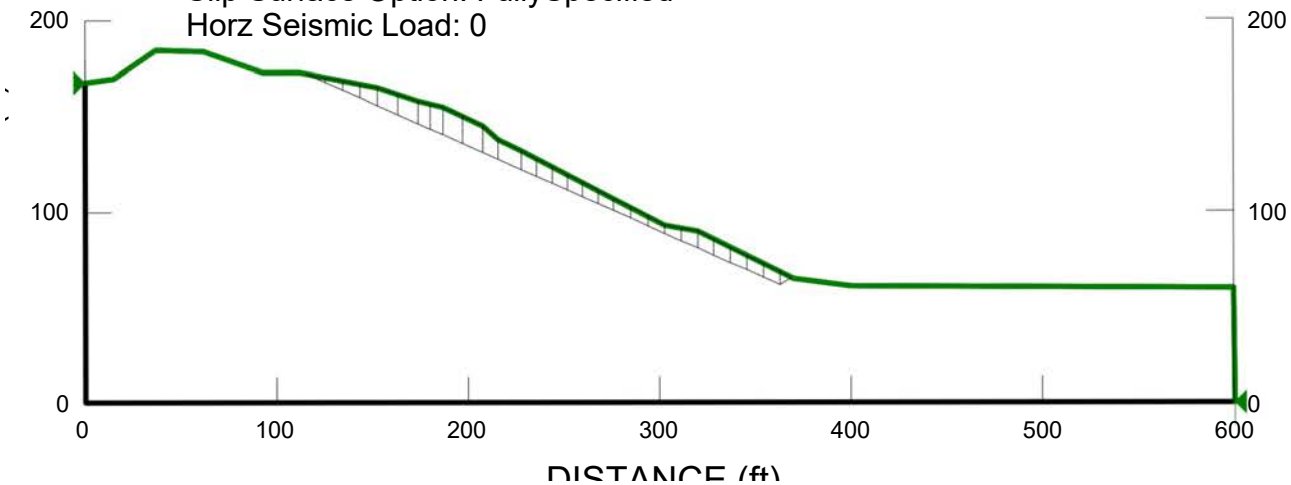
Method: Spencer
Slip Surface Option: FullySpecified
Horz Seismic Load: 0



Title: Lyons Canyon
Comments: 2020-200
Name: Slope Stability C-C' Static.gsz
Date: 3/18/2021Time: 4:16:19 PM
Material #: 1 Wt: 130 C: 350 Phi: 30
Material #: 2 Wt: 130 C: 250 Phi: 20

1.55

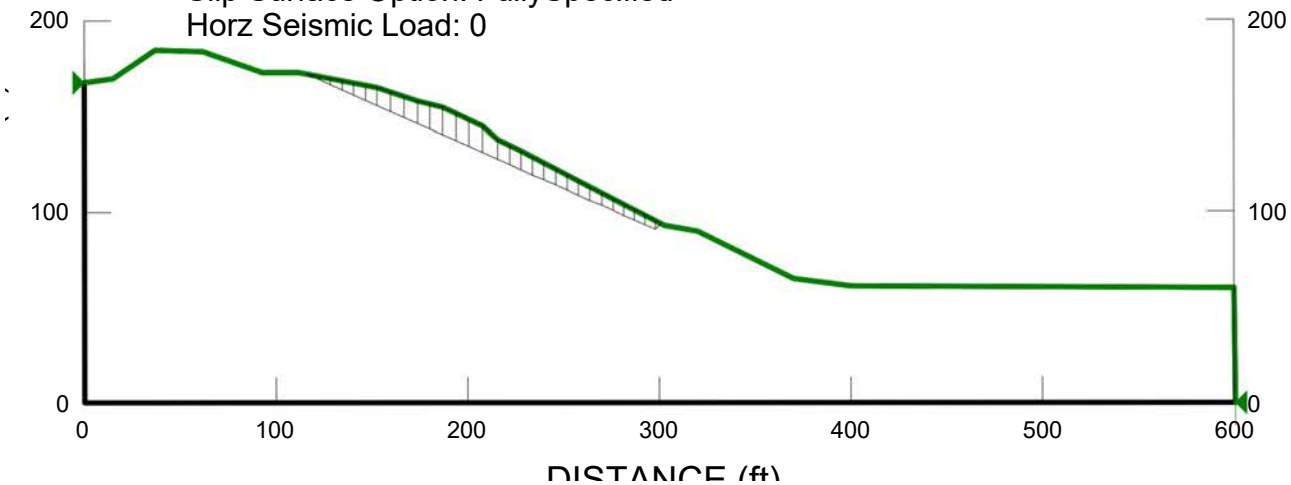
Method: Spencer
Slip Surface Option: FullySpecified
Horz Seismic Load: 0



Title: Lyons Canyon
Comments: 2020-200
Name: Slope Stability C-C' Static.gsz
Date: 3/18/2021Time: 4:16:19 PM
Material #: 1 Wt: 130 C: 350 Phi: 30
Material #: 2 Wt: 130 C: 250 Phi: 20

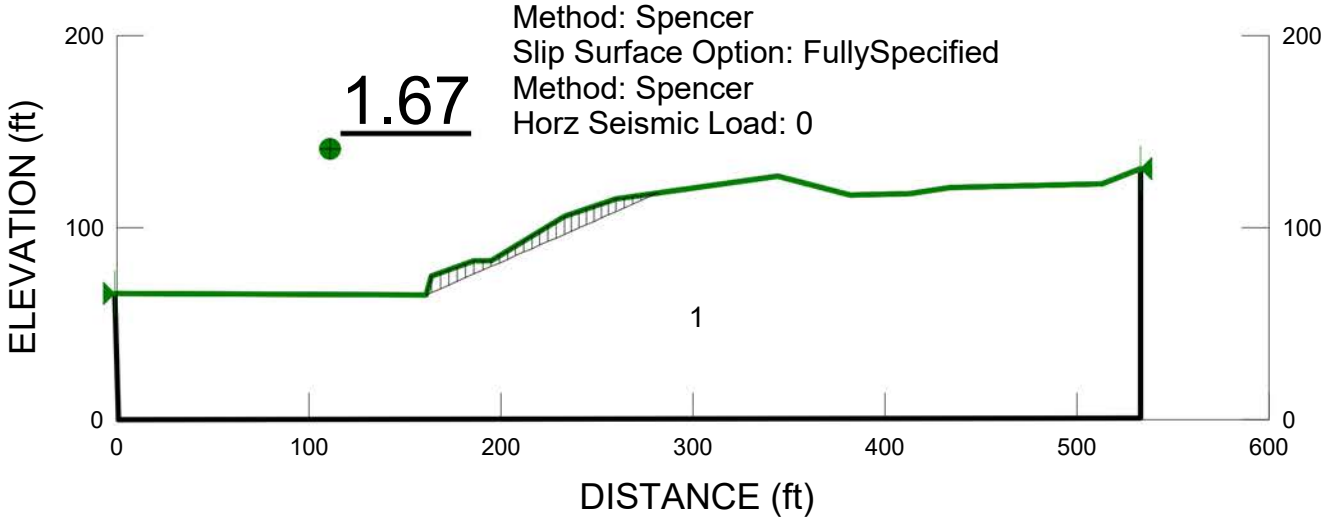
1.53

Method: Spencer
Slip Surface Option: FullySpecified
Horz Seismic Load: 0



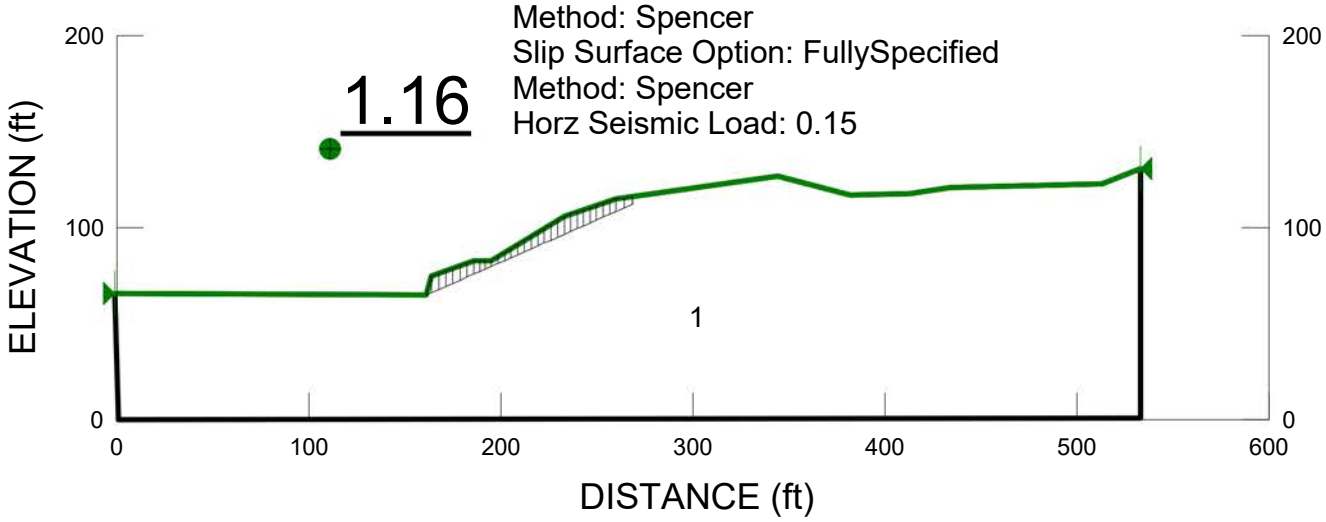
Title: Lyons Canyon
Comments: 2020-200
Name: Slope Stability F-F' Static.gsz
Date: 2/4/2021Time: 3:52:53 PM
Material #: 1 Wt: 130 C: 250 Phi: 20

Method: Spencer
Slip Surface Option: FullySpecified
Method: Spencer
Horz Seismic Load: 0



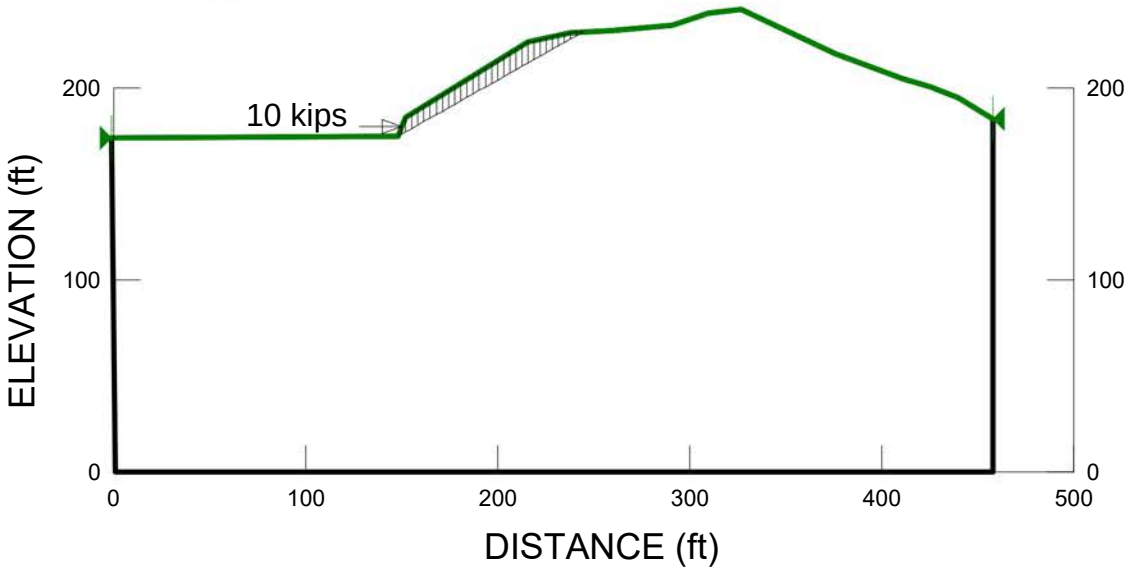
Title: Lyons Canyon
Comments: 2020-200
Name: Slope Stability F-F' Seismic.gsz
Date: 2/4/2021Time: 3:55:36 PM
Material #: 1 Wt: 130 C: 250 Phi: 20

Method: Spencer
Slip Surface Option: FullySpecified
Method: Spencer
Horz Seismic Load: 0.15



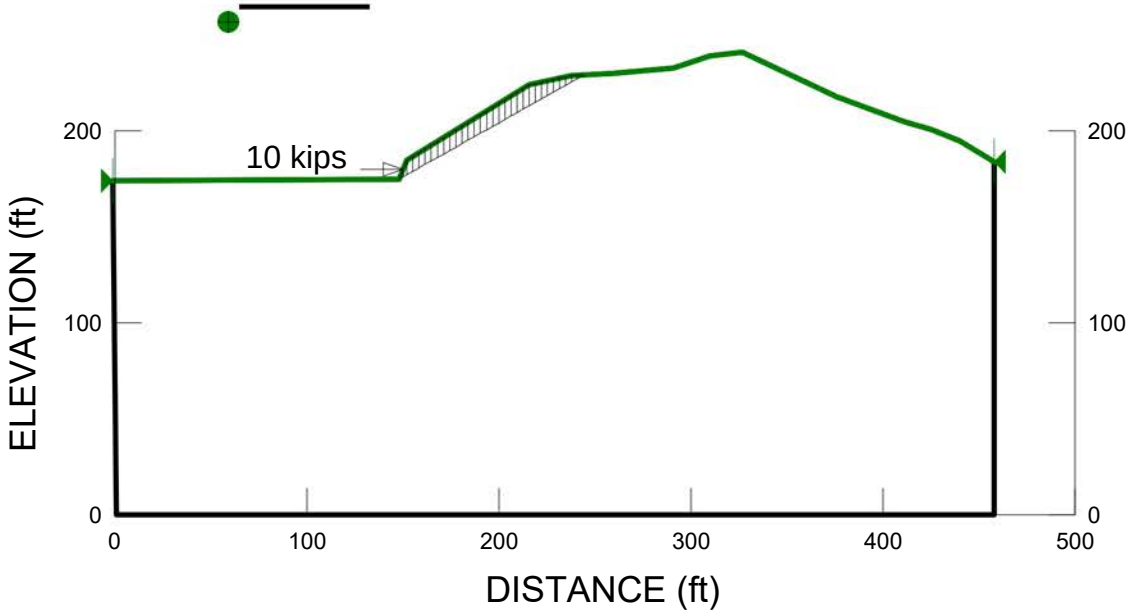
Title: Lyons Canyon
Comments: 2020-200
Name: Slope Stability G-G' Static Pile Supported Retaining Wall 10 kips Horizontal LIne Load.gsz
Date: 2/5/2021Time: 9:10:56 AM
Material #: 1 Wt: 130 C: 250 Phi: 20

Method: Spencer
Slip Surface Option: FullySpecified
Method: Spencer
Horz Seismic Load: 0 1.52



Title: Lyons Canyon
Comments: 2020-200
Name: Slope Stability G-G' Seismic Pile Supported Retaining Wall 10 kips Horizontal LIne Load.gsz
Date: 2/5/2021Time: 9:14:56 AM
Material #: 1 Wt: 130 C: 200 Phi: 30

Method: Spencer
Slip Surface Option: FullySpecified
Method: Spencer
Horz Seismic Load: 0.15



NUWI – Lyons Canyon, LLC
March 19, 2021
2020-200-001

APPENDIX E

GREGG CPT SOUNDINGS

RTF&A
GEOTECHNICAL ENGINEERING & ENGINEERING GEOLOGY

January 14, 2021

RT Frankian
Attn: Matt Marin

Subject: CPT Site Investigation
Lyons Canyon
Stevenson Ranch, California
GREGG Project Number: D1215005

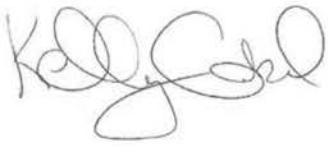
Dear Mr. Marin:

The following report presents the results of GREGG Drilling Cone Penetration Test investigation for the above referenced site. The following testing services were performed:

1	Cone Penetration Tests	(CPTU)	☒
2	Pore Pressure Dissipation Tests	(PPD)	☒
3	Seismic Cone Penetration Tests	(SCPTU)	☒
4	UVOST Laser Induced Fluorescence	(UVOST)	☐
5	Groundwater Sampling	(GWS)	☐
6	Soil Sampling	(SS)	☐
7	Vapor Sampling	(VS)	☐
8	Pressuremeter Testing	(PMT)	☐
9	Vane Shear Testing	(VST)	☐
10	Dilatometer Testing	(DMT)	☐

A list of reference papers providing additional background on the specific tests conducted is provided in the bibliography following the text of the report. If you would like a copy of any of these publications or should you have any questions or comments regarding the contents of this report, please do not hesitate to contact me at 949-903-6873.

Sincerely,
Gregg Drilling, LLC.



CPT Reports Team
Gregg Drilling, LLC.

Cone Penetration Test Sounding Summary

-Table 1-

CPT Sounding Identification	Date	Termination Depth (feet)	Depth of Groundwater Samples (feet)	Depth of Soil Samples (feet)	Depth of Pore Pressure Dissipation Tests (feet)
CPT-03	1/13/2021	34.45	-	-	34.4
CPT-04	1/13/2021	39.7	-	-	39.7
CPT-05	1/13/2021	50.36	-	-	-
SCPT-01	1/13/2021	36.42	-	-	-
SCPT-02	1/13/2021	30.02	-	-	30.0

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Copies of ASTM Standards are available through www.astm.org

Cone Penetration Testing Procedure (CPT)

Gregg Drilling carries out all Cone Penetration Tests (CPT) using an integrated electronic cone system, *Figure CPT*.

The cone takes measurements of tip resistance (q_c), sleeve resistance (f_s), and penetration pore water pressure (u_2). Measurements are taken at either 2.5 or 5 cm intervals during penetration to provide a nearly continuous profile. CPT data reduction and basic interpretation is performed in real time facilitating on-site decision making. The above mentioned parameters are stored electronically for further analysis and reference. All CPT soundings are performed in accordance with revised ASTM standards (D 5778-12).

The 5mm thick porous plastic filter element is located directly behind the cone tip in the u_2 location. A new saturated filter element is used on each sounding to measure both penetration pore pressures as well as measurements during a dissipation test (*PPDT*). Prior to each test, the filter element is fully saturated with oil under vacuum pressure to improve accuracy.

When the sounding is completed, the test hole is backfilled according to client specifications. If grouting is used, the procedure generally consists of pushing a hollow tremie pipe with a "knock out" plug to the termination depth of the CPT hole. Grout is then pumped under pressure as the tremie pipe is pulled from the hole. Disruption or further contamination to the site is therefore minimized.

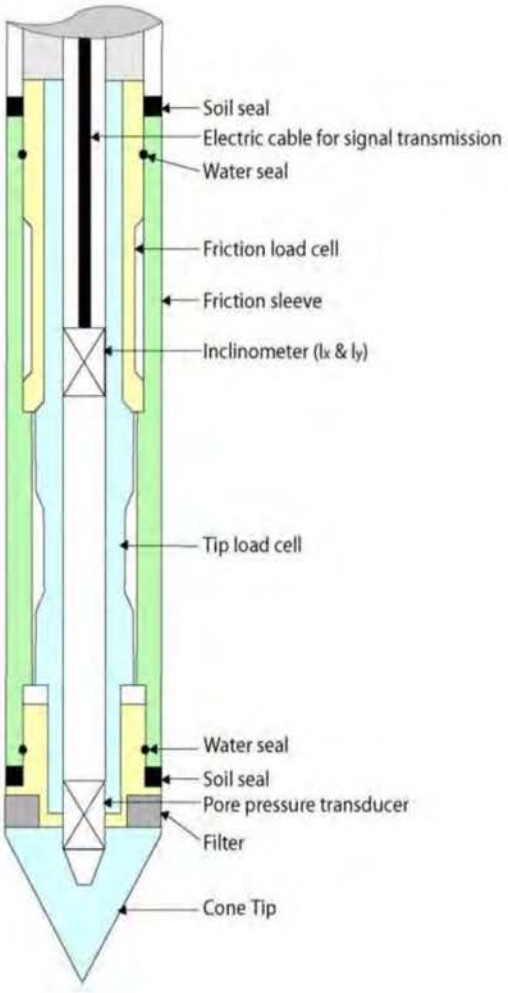


Figure CPT

Gregg 15cm^2 Standard Cone Specifications

Dimensions	
Cone base area	15 cm^2
Sleeve surface area	225 cm^2
Cone net area ratio	0.80
Specifications	
Cone load cell	
Full scale range	180 kN (20 tons)
Overload capacity	150%
Full scale tip stress	120 MPa (1,200 tsf)
Repeatability	120 kPa (1.2 tsf)
Sleeve load cell	
Full scale range	31 kN (3.5 tons)
Overload capacity	150%
Full scale sleeve stress	1,400 kPa (15 tsf)
Repeatability	1.4 kPa (0.015 tsf)
Pore pressure transducer	
Full scale range	7,000 kPa (1,000 psi)
Overload capacity	150%
Repeatability	7 kPa (1 psi)

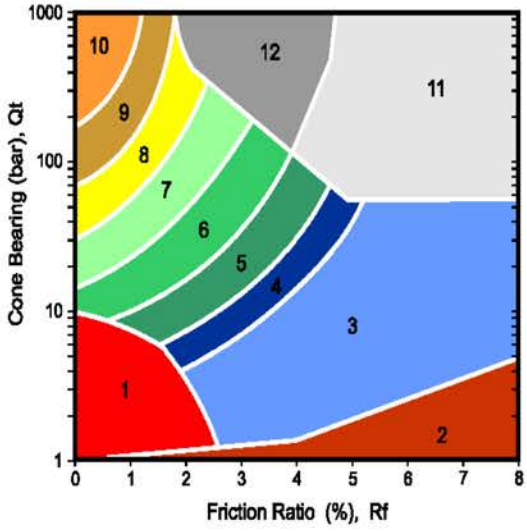
Note: The repeatability during field use will depend somewhat on ground conditions, abrasion, maintenance and zero load stability.

Cone Penetration Test Data & Interpretation

The Cone Penetration Test (CPT) data collected are presented in graphical and electronic form in the report. The plots include interpreted Soil Behavior Type (SBT) based on the charts described by Robertson (1990). Typical plots display SBT based on the non-normalized charts of Robertson et al (1986). For CPT soundings deeper than 30m, we recommend the use of the normalized charts of Robertson (1990) which can be displayed as SBTn, upon request. The report also includes spreadsheet output of computer calculations of basic interpretation in terms of SBT and SBTn and various geotechnical parameters using current published correlations based on the comprehensive review by Lunne, Robertson and Powell (1997), as well as recent updates by Professor Robertson (Guide to Cone Penetration Testing, 2015). The interpretations are presented only as a guide for geotechnical use and should be carefully reviewed. Gregg Drilling & Testing Inc. does not warranty the correctness or the applicability of any of the geotechnical parameters interpreted by the software and does not assume any liability for use of the results in any design or review. The user should be fully aware of the techniques and limitations of any method used in the software. Some interpretation methods require input of the groundwater level to calculate vertical effective stress. An estimate of the in-situ groundwater level has been made based on field observations and/or CPT results, but should be verified by the user.

A summary of locations and depths is available in Table 1. Note that all penetration depths referenced in the data are with respect to the existing ground surface.

Note that it is not always possible to clearly identify a soil type based solely on q_t, f_s, and u_2. In these situations, experience, judgment, and an assessment of the pore pressure dissipation data should be used to infer the correct soil behavior type.



ZONE	SBT
1	Sensitive, fine grained
2	Organic materials
3	Clay
4	Silty clay to clay
5	Clayey silt to silty clay
6	Sandy silt to clayey silt
7	Silty sand to sandy silt
8	Sand to silty sand
9	Sand
10	Gravely sand to sand
11	Very stiff fine grained*
12	Sand to clayey sand*

*over consolidated or cemented

Figure SBT (After Robertson et al., 1986) – Note: Colors may vary slightly compared to plots

Cone Penetration Test (CPT) Interpretation

Gregg uses a proprietary CPT interpretation and plotting software. The software takes the CPT data and performs basic interpretation in terms of soil behavior type (SBT) and various geotechnical parameters using current published empirical correlations based on the comprehensive review by Lunne, Robertson and Powell (1997). The interpretation is presented in tabular format using MS Excel. The interpretations are presented only as a guide for geotechnical use and should be carefully reviewed. Gregg does not warranty the correctness or the applicability of any of the geotechnical parameters interpreted by the software and does not assume any liability for any use of the results in any design or review. The user should be fully aware of the techniques and limitations of any method used in the software.

The following provides a summary of the methods used for the interpretation. Many of the empirical correlations to estimate geotechnical parameters have constants that have a range of values depending on soil type, geologic origin and other factors. The software uses 'default' values that have been selected to provide, in general, conservatively low estimates of the various geotechnical parameters.

Input:

1 Units for display (Imperial or metric) (atm. pressure, p_a = 0.96 tsf or 0.1 MPa)
2 Depth interval to average results (ft or m). Data are collected at either 0.02 or 0.05m and can be averaged every 1, 3 or 5 intervals.
3 Elevation of ground surface (ft or m)
4 Depth to water table, z_w (ft or m) – input required
5 Net area ratio for cone, a (default to 0.80)
6 Relative Density constant, C_{Dr} (default to 350)
7 Young's modulus number for sands, α (default to 5)
8 Small strain shear modulus number
  a. for sands, S_G (default to 180 for SBT_n 5, 6, 7)
  b. for clays, C_G (default to 50 for SBT_n 1, 2, 3 & 4)
9 Undrained shear strength cone factor for clays, N_{kt} (default to 15)
10 Over Consolidation ratio number, k_{ocr} (default to 0.3)
11 Unit weight of water, (default to γ_w = 62.4 lb/ft^3 or 9.81 kN/m^3)

Column

1 Depth, z, (m) – CPT data is collected in meters
2 Depth (ft)
3 Cone resistance, q_c (tsf or MPa)
4 Sleeve resistance, f_s (tsf or MPa)
5 Penetration pore pressure, u (psi or MPa), measured behind the cone (i.e. u_2)
6 Other – any additional data
7 Total cone resistance, q_t (tsf or MPa) $q_t = q_c + u\,(1\text{-}a)$

8	Friction Ratio, R_f (%)	$R_f = (f_s/q_t) \times 100\%$
9	Soil Behavior Type (non-normalized), SBT	see note
10	Unit weight, γ (pcf or kN/m^3)	based on SBT, see note
11	Total overburden stress, σ_v (tsf)	$\sigma_{vo} = \sigma\ z$
12	In-situ pore pressure, u_o (tsf)	$u_o = \gamma_w (z - z_w)$
13	Effective overburden stress, σ'_{vo} (tsf)	$\sigma'_{vo} = \sigma_{vo} - u_o$
14	Normalized cone resistance, Q_{t1}	$Q_{t1} = (q_t - \sigma_{vo}) / \sigma'_{vo}$
15	Normalized friction ratio, F_r (%)	$F_r = f_s / (q_t - \sigma_{vo}) \times 100\%$
16	Normalized Pore Pressure ratio, B_q	$B_q = u - u_o / (q_t - \sigma_{vo})$
17	Soil Behavior Type (normalized), SBT_n	see note
18	SBT_n Index, I_c	see note
19	Normalized Cone resistance, Q_{tn} (n varies with I_c)	see note
20	Estimated permeability, k_{SBT} (cm/sec or ft/sec)	see note
21	Equivalent SPT N_{60}, blows/ft	see note
22	Equivalent SPT $(N_1)_{60}$ blows/ft	see note
23	Estimated Relative Density, D_r, (%)	see note
24	Estimated Friction Angle, ϕ', (degrees)	see note
25	Estimated Young's modulus, E_s (tsf)	see note
26	Estimated small strain Shear modulus, Go (tsf)	see note
27	Estimated Undrained shear strength, s_u (tsf)	see note
28	Estimated Undrained strength ratio	s_u/σ_v'
29	Estimated Over Consolidation ratio, OCR	see note

Notes:

1 Soil Behavior Type (non-normalized), SBT (Lunne et al., 1997 and table below)

2 Unit weight, γ either constant at 119 pcf or based on Non-normalized SBT (Lunne et al., 1997 and table below)

3 Soil Behavior Type (Normalized), SBT_n Lunne et al. (1997)

4 SBT_n Index, I_c $I_c = ((3.47 - \log Q_{t1})^2 + (\log F_r + 1.22)^2)^{0.5}$

5 Normalized Cone resistance, Q_{tn} (n varies with Ic)

$Q_{tn} = ((q_t - \sigma_{vo})/pa)\ (pa/(\sigma'_{vo})^n$ and recalculate I_c, then iterate:

When $I_c < 1.64$, n = 0.5 (clean sand)
When $I_c > 3.30$, n = 1.0 (clays)
When $1.64 < I_c < 3.30$, $n = (I_c - 1.64)0.3 + 0.5$
Iterate until the change in n, $\Delta n < 0.01$

6 Estimated permeability, k_{SBT} based on Normalized SBT_n (Lunne et al., 1997 and table below)

7 Equivalent SPT N_{60}, blows/ft Lunne et al. (1997)

$$\frac{(q_t/p_a)}{N_{60}} = 8.5\left(1 - \frac{I_c}{4.6}\right)$$

8 Equivalent SPT $(N_1)_{60}$ blows/ft $(N_1)_{60} = N_{60}\, C_N$,
where $C_N = (pa/\sigma'_{vo})^{0.5}$

9 Relative Density, D_r, (%) $D_r^2 = Q_{tn} / C_{Dr}$
Only SBT_n 5, 6, 7 & 8 *Show 'N/A' in zones 1, 2, 3, 4 & 9*

10 Friction Angle, ϕ', (degrees) $\tan\phi' = \frac{1}{2.68}\left[\log\left(\frac{q_c}{\sigma'_{vo}}\right) + 0.29\right]$
Only SBT_n 5, 6, 7 & 8 *Show'N/A' in zones 1, 2, 3, 4 & 9*

11 Young's modulus, E_s $E_s = \alpha\, q_t$
Only SBT_n 5, 6, 7 & 8 *Show 'N/A' in zones 1, 2, 3, 4 & 9*

12 Small strain shear modulus, Go

a. $G_o = S_G\,(q_t\ \sigma'_{vo}\ pa)^{1/3}$ *For SBT_n 5, 6, 7*

b. $G_o = C_G\, q_t$ *For SBT_n 1, 2, 3& 4*

Show 'N/A' in zones 8 & 9

13 Undrained shear strength, s_u $s_u = (q_t - \sigma_{vo}) / N_{kt}$
Only SBT_n 1, 2, 3, 4 & 9 *Show 'N/A' in zones 5, 6, 7 & 8*

14 Over Consolidation ratio, OCR $OCR = k_{ocr}\, Q_{t1}$
Only SBT_n 1, 2, 3, 4 & 9 *Show 'N/A' in zones 5, 6, 7 & 8*

The following updated and simplified SBT descriptions have been used in the software:

SBT Zones		**SBT_n Zones**	
1	sensitive fine grained	1	sensitive fine grained
2	organic soil	2	organic soil
3	clay	3	clay
4	clay & silty clay	4	clay & silty clay
5	clay & silty clay		
6	sandy silt & clayey silt		

7	silty sand & sandy silt	5	silty sand & sandy silt
8	sand & silty sand	6	sand & silty sand
9	sand		
10	sand	7	sand
11	very dense/stiff soil*	8	very dense/stiff soil*
12	very dense/stiff soil*	9	very dense/stiff soil*

*heavily overconsolidated and/or cemented

Track when soils fall with zones of same description and print that description (i.e. if soils fall only within SBT zones 4 & 5, print 'clays & silty clays')

Estimated Permeability (see Lunne et al., 1997)

SBT_n	Permeability (ft/sec)	(m/sec)
1	$3x\ 10^{-8}$	$1x\ 10^{-8}$
2	$3x\ 10^{-7}$	$1x\ 10^{-7}$
3	$1x\ 10^{-9}$	$3x\ 10^{-10}$
4	$3x\ 10^{-8}$	$1x\ 10^{-8}$
5	$3x\ 10^{-6}$	$1x\ 10^{-6}$
6	$3x\ 10^{-4}$	$1x\ 10^{-4}$
7	$3x\ 10^{-2}$	$1x\ 10^{-2}$
8	$3x\ 10^{-6}$	$1x\ 10^{-6}$
9	$1x\ 10^{-8}$	$3x\ 10^{-9}$

Estimated Unit Weight (see Lunne et al., 1997)

SBT	Approximate Unit Weight (lb/ft^3)	(kN/m^3)
1	111.4	17.5
2	79.6	12.5
3	111.4	17.5
4	114.6	18.0
5	114.6	18.0
6	114.6	18.0
7	117.8	18.5
8	120.9	19.0
9	124.1	19.5
10	127.3	20.0
11	130.5	20.5
12	120.9	19.0

Pore Pressure Dissipation Tests (PPDT)

Pore Pressure Dissipation Tests (PPDT's) conducted at various intervals can be used to measure equilibrium water pressure (at the time of the CPT). If conditions are hydrostatic, the equilibrium water pressure can be used to determine the approximate depth of the ground water table. A PPDT is conducted when penetration is halted at specific intervals determined by the field representative. The variation of the penetration pore pressure (*u)* with time is measured behind the tip of the cone and recorded.

Pore pressure dissipation data can be interpreted to provide estimates of:

- Equilibrium piezometric pressure
- Phreatic Surface
- In situ horizontal coefficient of consolidation (c_h)
- In situ horizontal coefficient of permeability (k_h)

In order to correctly interpret the equilibrium piezometric pressure and/or the phreatic surface, the pore pressure must be monitored until it reaches equilibrium, *Figure PPDT*. This time is commonly referred to as t_{100}, the point at which 100% of the excess pore pressure has dissipated.

A complete reference on pore pressure dissipation tests is presented by Robertson et al. 1992 and Lunne et al. 1997.

A summary of the pore pressure dissipation tests are summarized in Table 1.

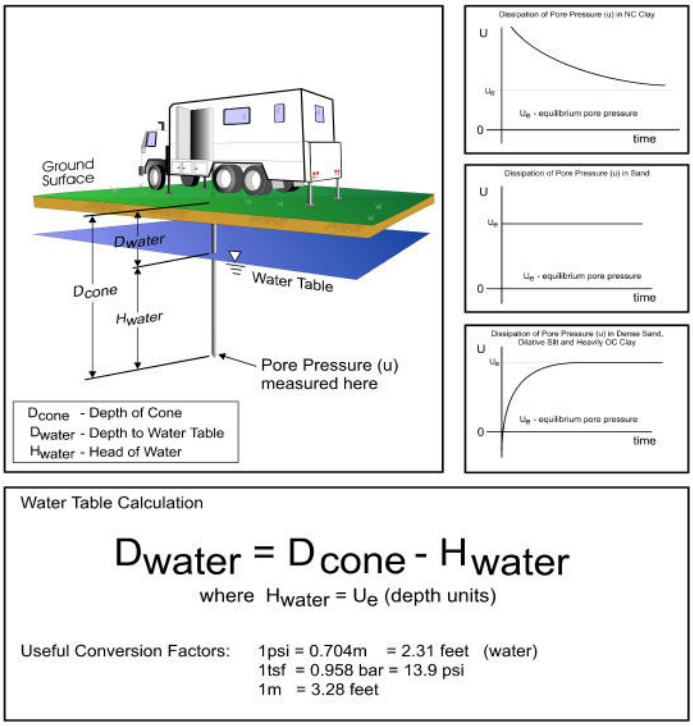


Figure PPDT

Seismic Cone Penetration Testing (SCPT)

Seismic Cone Penetration Testing (SCPT) can be conducted at various intervals during the Cone Penetration Test. Shear wave velocity (Vs) can then be calculated over a specified interval with depth. A small interval for seismic testing, such as 1-1.5m (3-5ft) allows for a detailed look at the shear wave profile with depth. Conversely, a larger interval such as 3-6m (10-20ft) allows for a more average shear wave velocity to be calculated. Gregg's cones have a horizontally active geophone located 0.2m (0.66ft) behind the tip.

To conduct the seismic shear wave test, the penetration of the cone is stopped and the rods are decoupled from the rig. An automatic hammer is triggered to send a shear wave into the soil. The distance from the source to the cone is calculated knowing the total depth of the cone and the horizontal offset distance between the source and the cone. To calculate an interval velocity, a minimum of two tests must be performed at two different depths. The arrival times between the two wave traces are compared to obtain the difference in time (Δt). The difference in depth is calculated (Δd) and velocity can be determined using the simple equation: $v = \Delta d/\Delta t$

Multiple wave traces can be recorded at the same depth to improve quality of the data.

A complete reference on seismic cone penetration tests is presented by Robertson et al. 1986 and Lunne et al. 1997.

A summary the shear wave velocities, arrival times and wave traces are provided with the report.

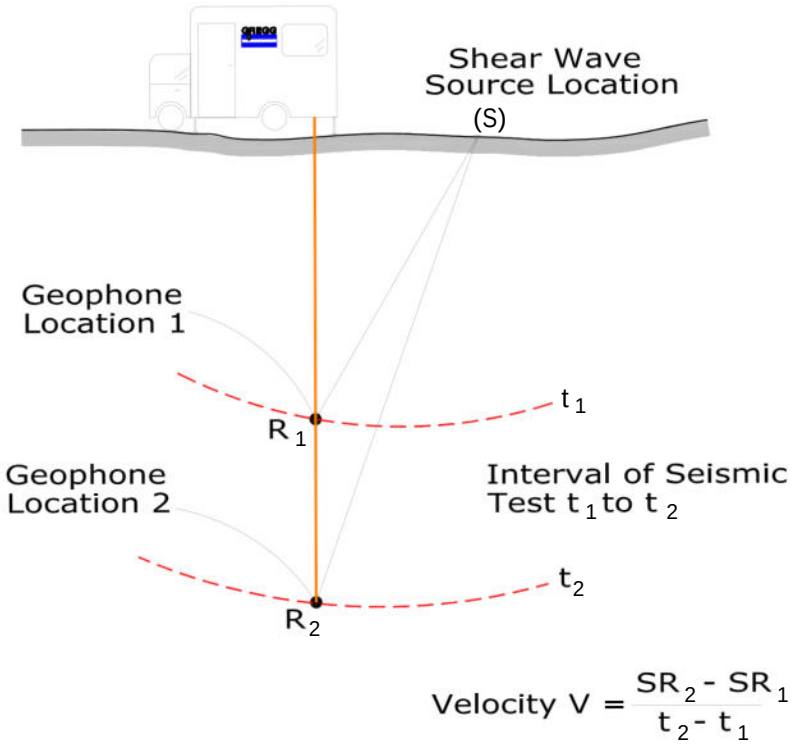


Figure SCPT

Groundwater Sampling

Gregg Drilling & Testing, Inc. conducts groundwater sampling using a sampler as shown in *Figure GWS*. The groundwater sampler has a retrievable stainless steel or disposable PVC screen with steel drop off tip. This allows for samples to be taken at multiple depth intervals within the same sounding location. In areas of slower water recharge, provisions may be made to set temporary PVC well screens during sampling to allow the pushing equipment to advance to the next sample location while the groundwater is allowed to infiltrate.

The groundwater sampler operates by advancing 44.5mm (1¾ inch) hollow push rods with the filter tip in a closed configuration to the base of the desired sampling interval. Once at the desired sample depth, the push rods are retracted; exposing the encased filter screen and allowing groundwater to infiltrate hydrostatically from the formation into the inlet screen. A small diameter bailer (approximately ½ or ¾ inch) is lowered through the push rods into the screen section for sample collection. The number of downhole trips with the bailer and time necessary to complete the sample collection at each depth interval is a function of sampling protocols, volume requirements, and the yield characteristics and storage capacity of the formation. Upon completion of sample collection, the push rods and sampler, with the exception of the PVC screen and steel drop off tip are retrieved to the ground surface, decontaminated and prepared for the next sampling event.

For a detailed reference on direct push groundwater sampling, refer to Zemo et. al., 1992.

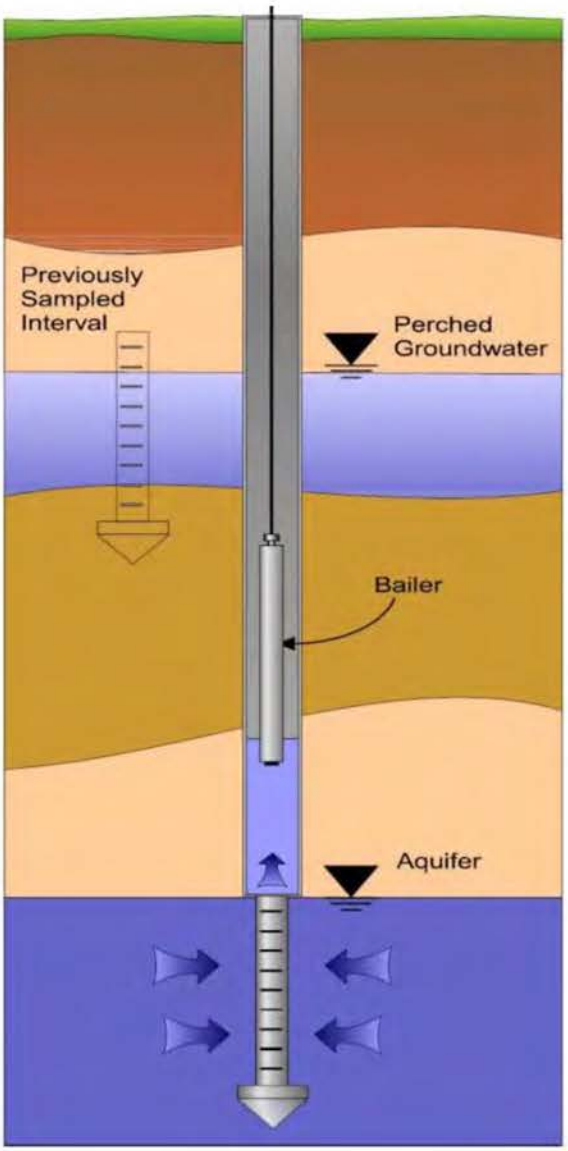


Figure GWS

Soil Sampling

Gregg Drilling & Testing, Inc. uses a piston-type push-in sampler to obtain small soil samples without generating any soil cuttings, *Figure SS*. Two different types of samplers (12 and 18 inch) are used depending on the soil type and density. The soil sampler is initially pushed in a "closed" position to the desired sampling interval using the CPT pushing equipment. Keeping the sampler closed minimizes the potential of cross contamination. The inner tip of the sampler is then retracted leaving a hollow soil sampler with inner 1¼" diameter sample tubes. The hollow sampler is then pushed in a locked "open" position to collect a soil sample. The filled sampler and push rods are then retrieved to the ground surface. Because the soil enters the sampler at a constant rate, the opportunity for 100% recovery is increased. For environmental analysis, the soil sample tube ends are sealed with Teflon and plastic caps. Often, a longer "split tube" can be used for geotechnical sampling.

For a detailed reference on direct push soil sampling, refer to Robertson et al, 1998.

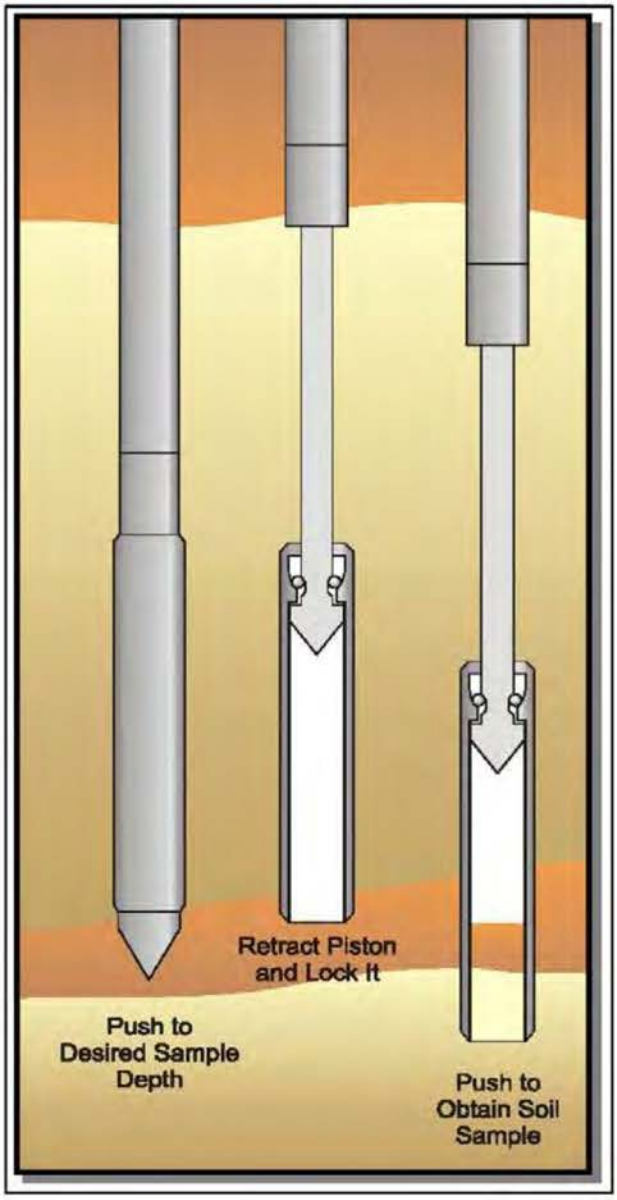


Figure SS

GREGG DRILLING, LLC
WWW.GREGGDRILLING.COM

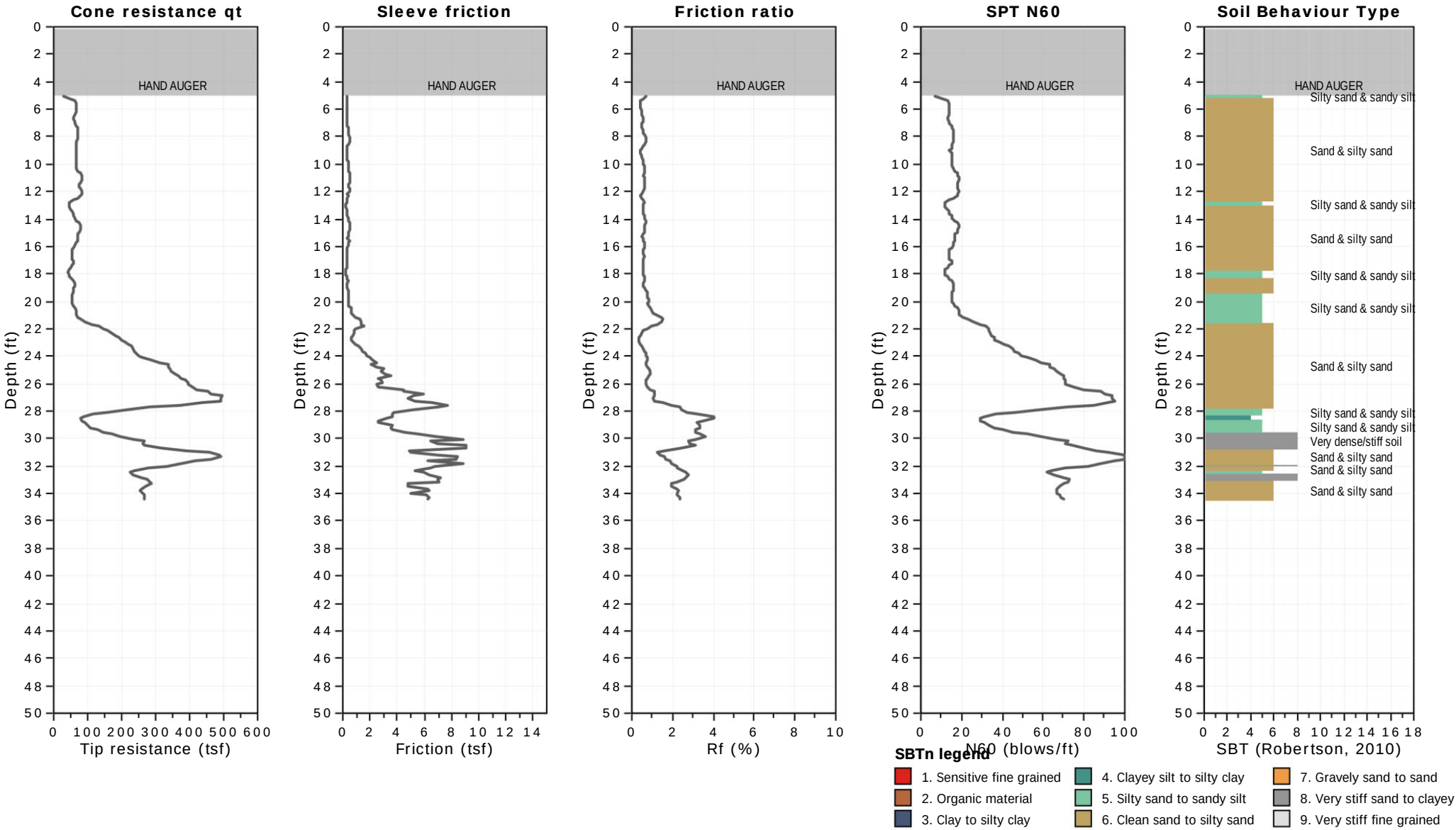
CPT: CPT-03

CLIENT: RT FRANKIAN

FIELD REP: MATT M

SITE: LYONS CANYON, STEVENSON RANCH, CA

Total depth: 34.45 ft, Date: 1/13/2021



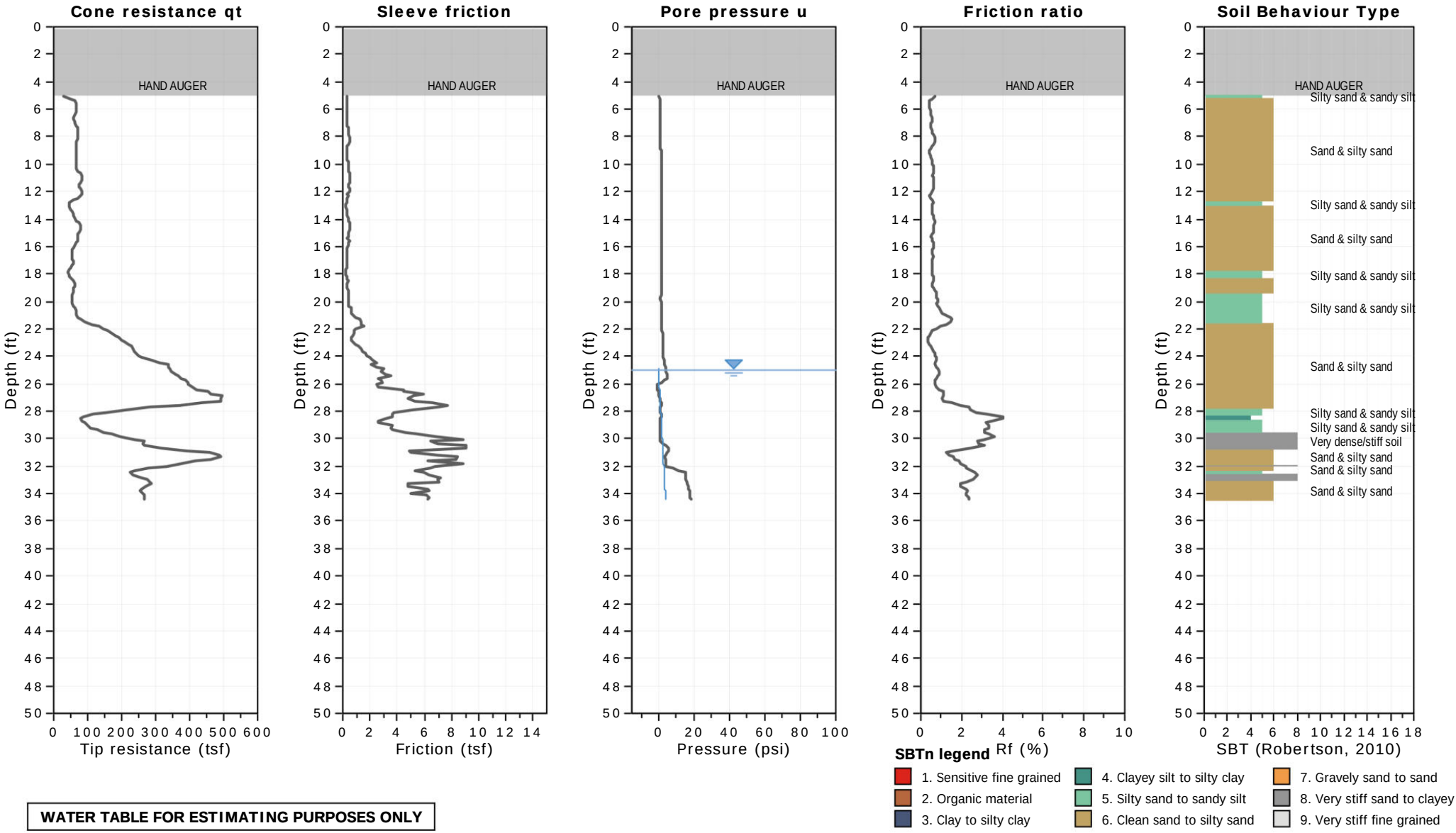
CPT: CPT-03

CLIENT: RT FRANKIAN

SITE: LYONS CANYON, STEVENSON RANCH, CA

FIELD REP: MATT M

Total depth: 34.45 ft, Date: 1/13/2021



WATER TABLE FOR ESTIMATING PURPOSES ONLY

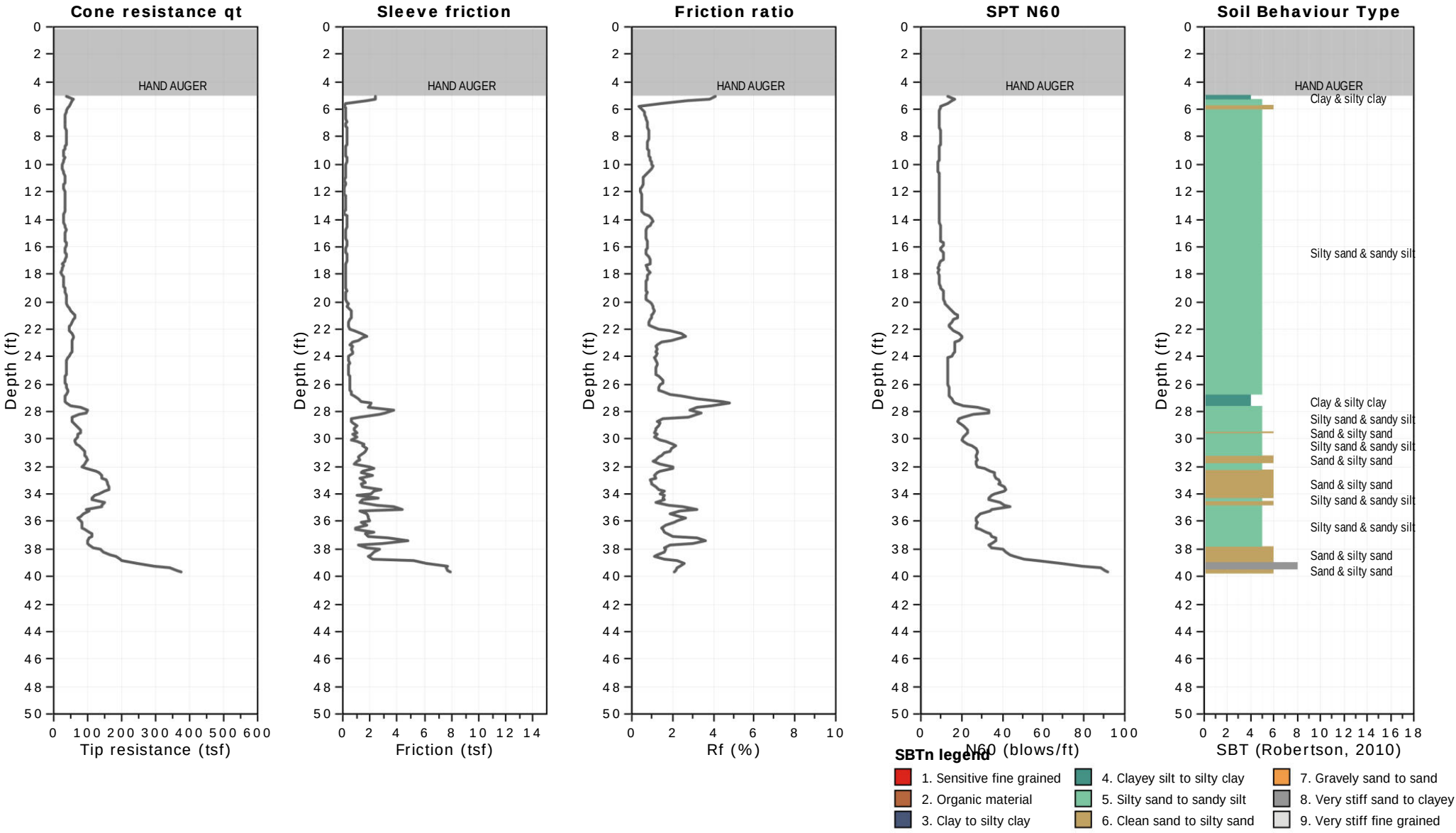
CPT: CPT-04

CLIENT: RT FRANKIAN

SITE: LYONS CANYON, STEVENSON RANCH, CA

FIELD REP: MATT M

Total depth: 39.70 ft, Date: 1/13/2021



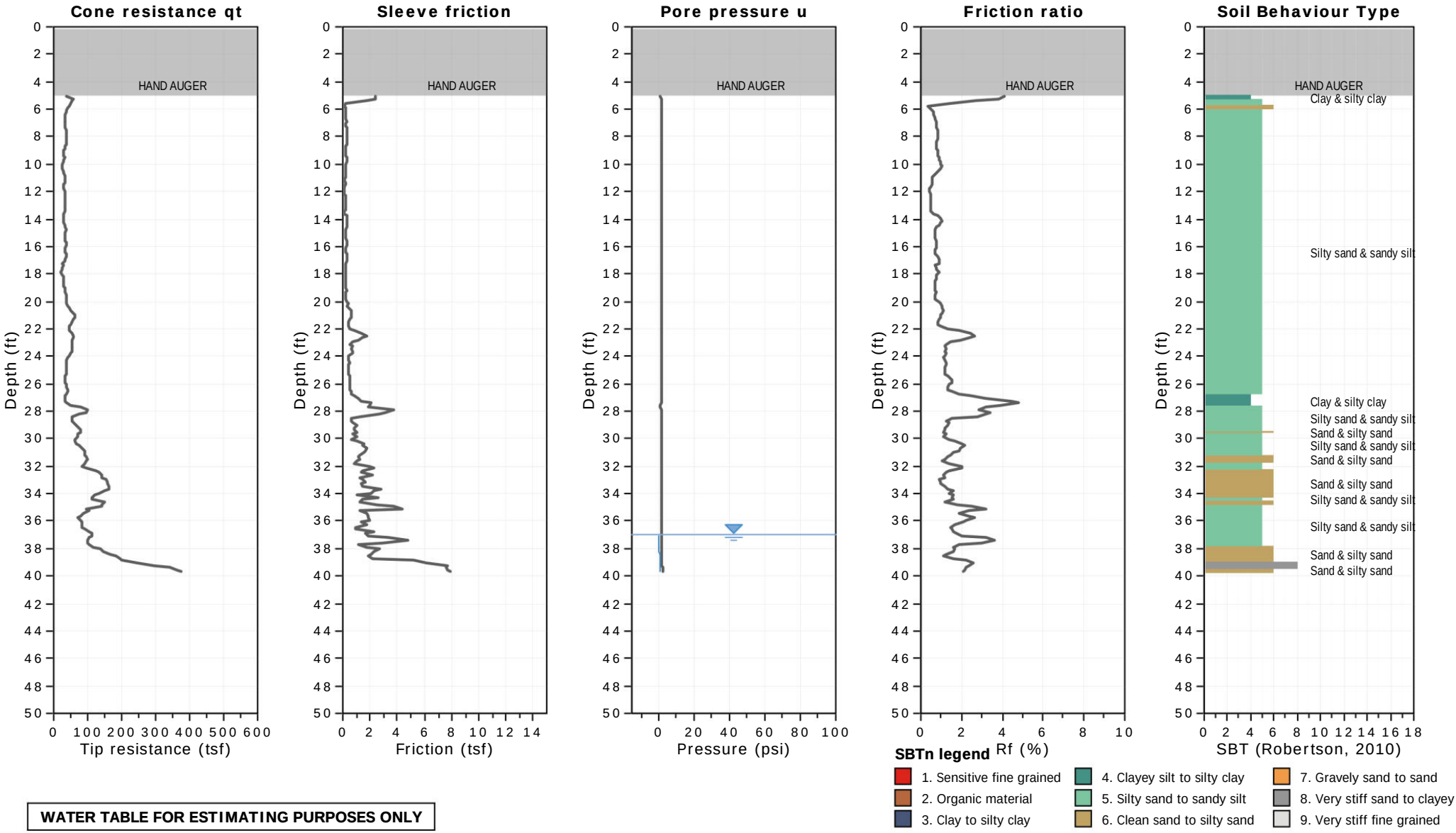
CPT: CPT-04

CLIENT: RT FRANKIAN

SITE: LYONS CANYON, STEVENSON RANCH, CA

FIELD REP: MATT M

Total depth: 39.70 ft, Date: 1/13/2021



WATER TABLE FOR ESTIMATING PURPOSES ONLY

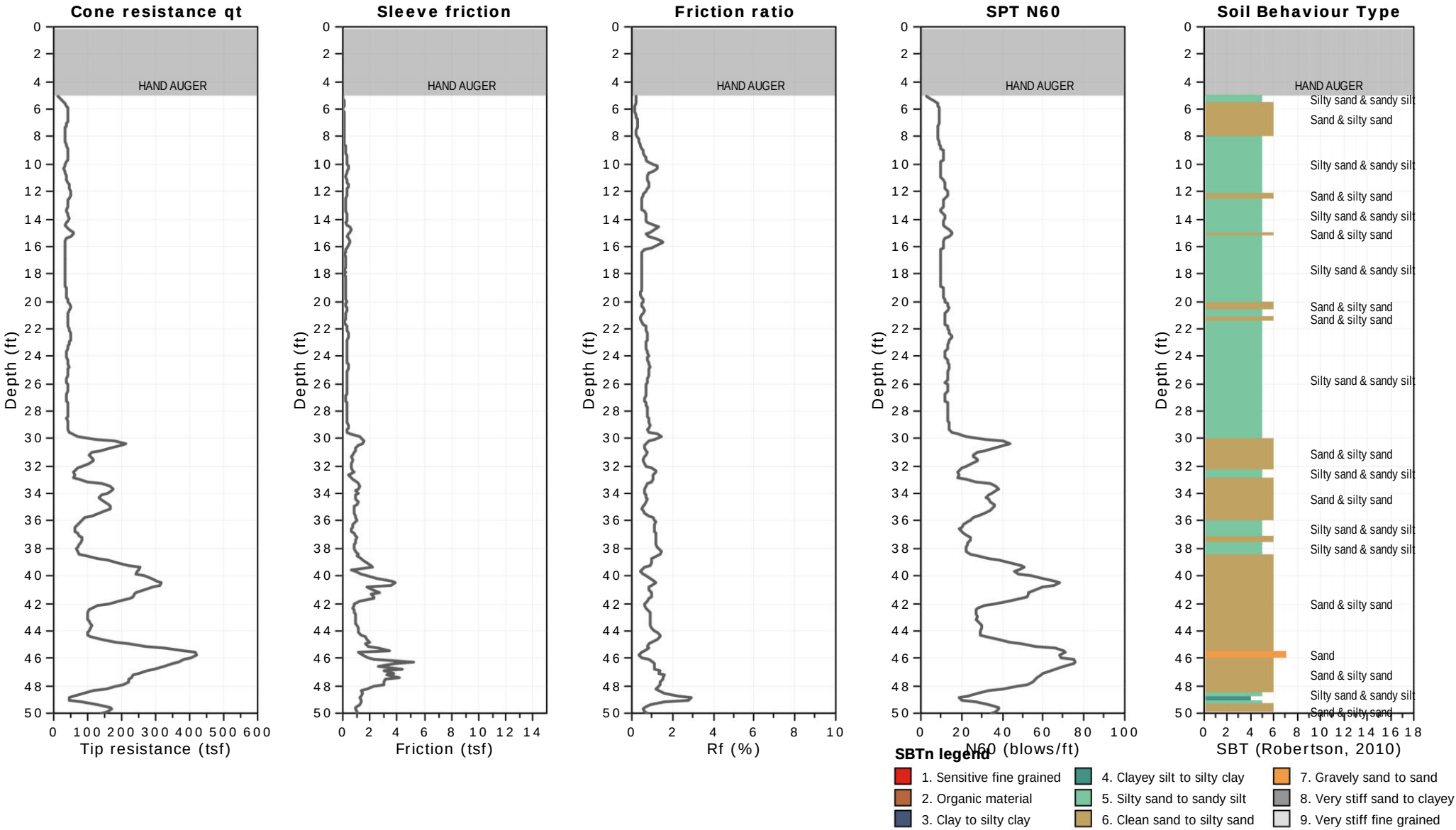
CPT: CPT-05

CLIENT: RT FRANKIAN

SITE: LYONS CANYON, STEVENSON RANCH, CA

FIELD REP: MATT M

Total depth: 50.36 ft, Date: 1/13/2021



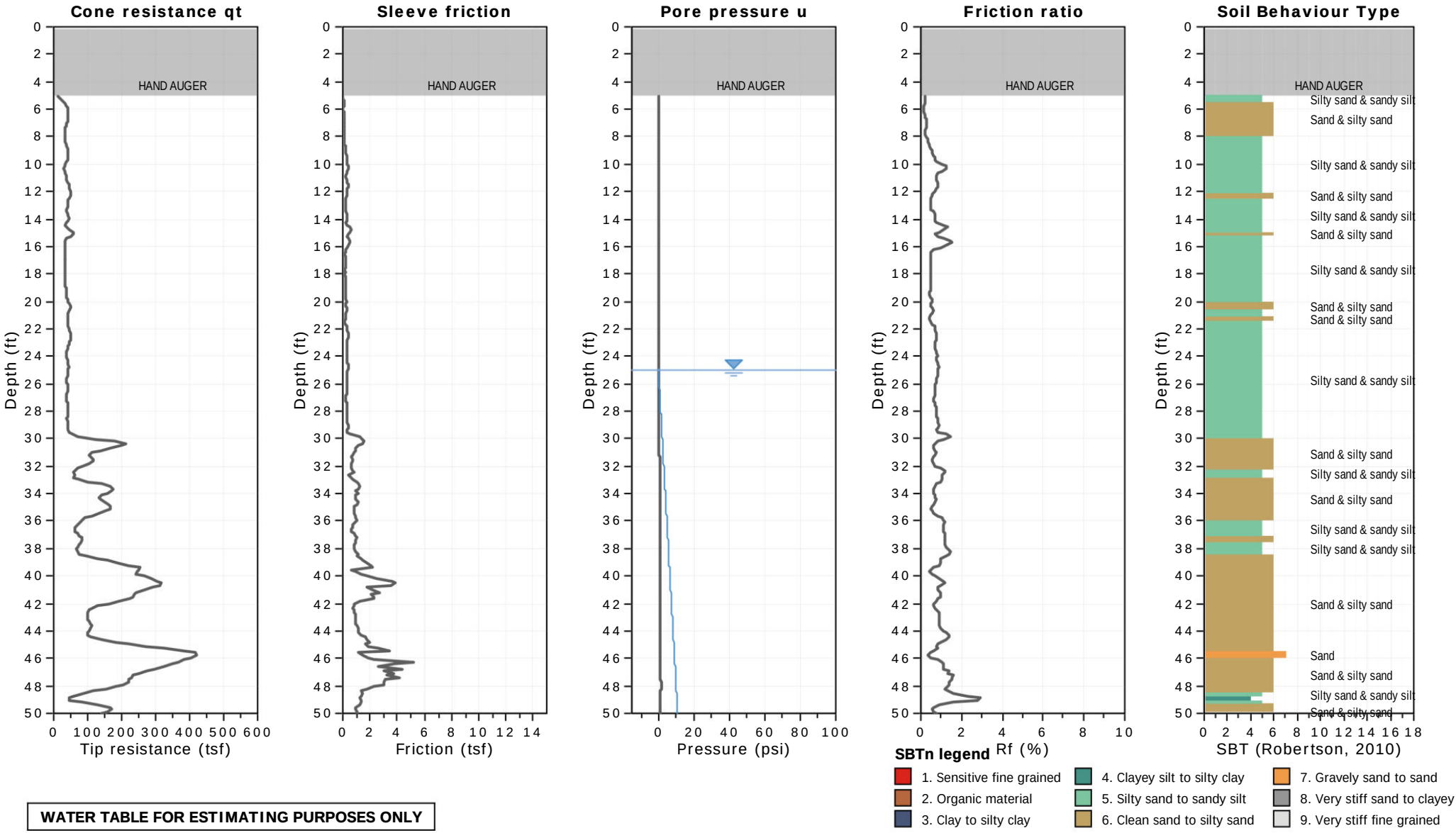
CPT: CPT-05

CLIENT: RT FRANKIAN

SITE: LYONS CANYON, STEVENSON RANCH, CA

FIELD REP: MATT M

Total depth: 50.36 ft, Date: 1/13/2021



WATER TABLE FOR ESTIMATING PURPOSES ONLY

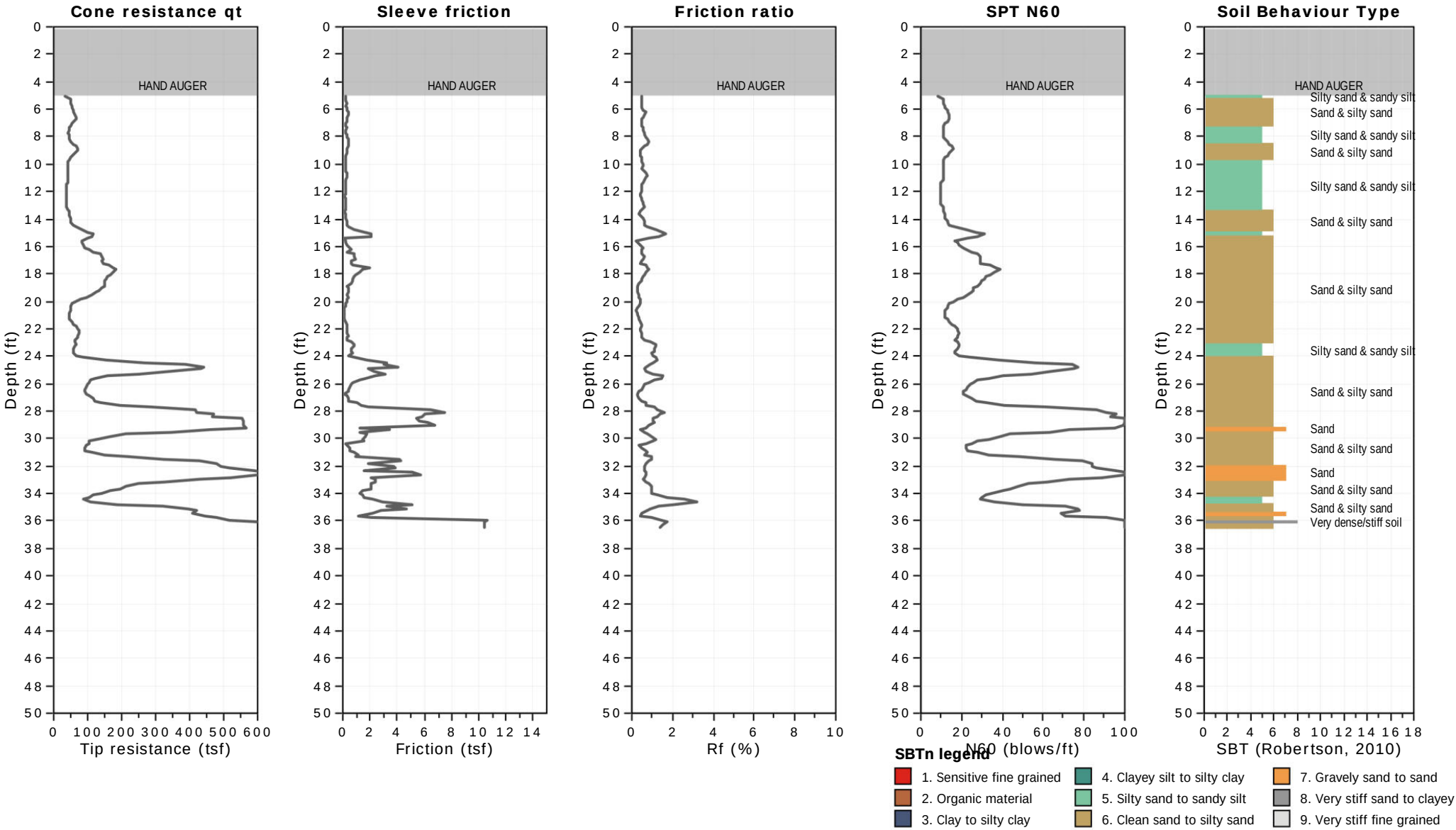
CPT: SCPT-01

CLIENT: RT FRANKIAN

SITE: LYONS CANYON, STEVENSON RANCH, CA

FIELD REP: MATT M

Total depth: 36.42 ft, Date: 1/13/2021



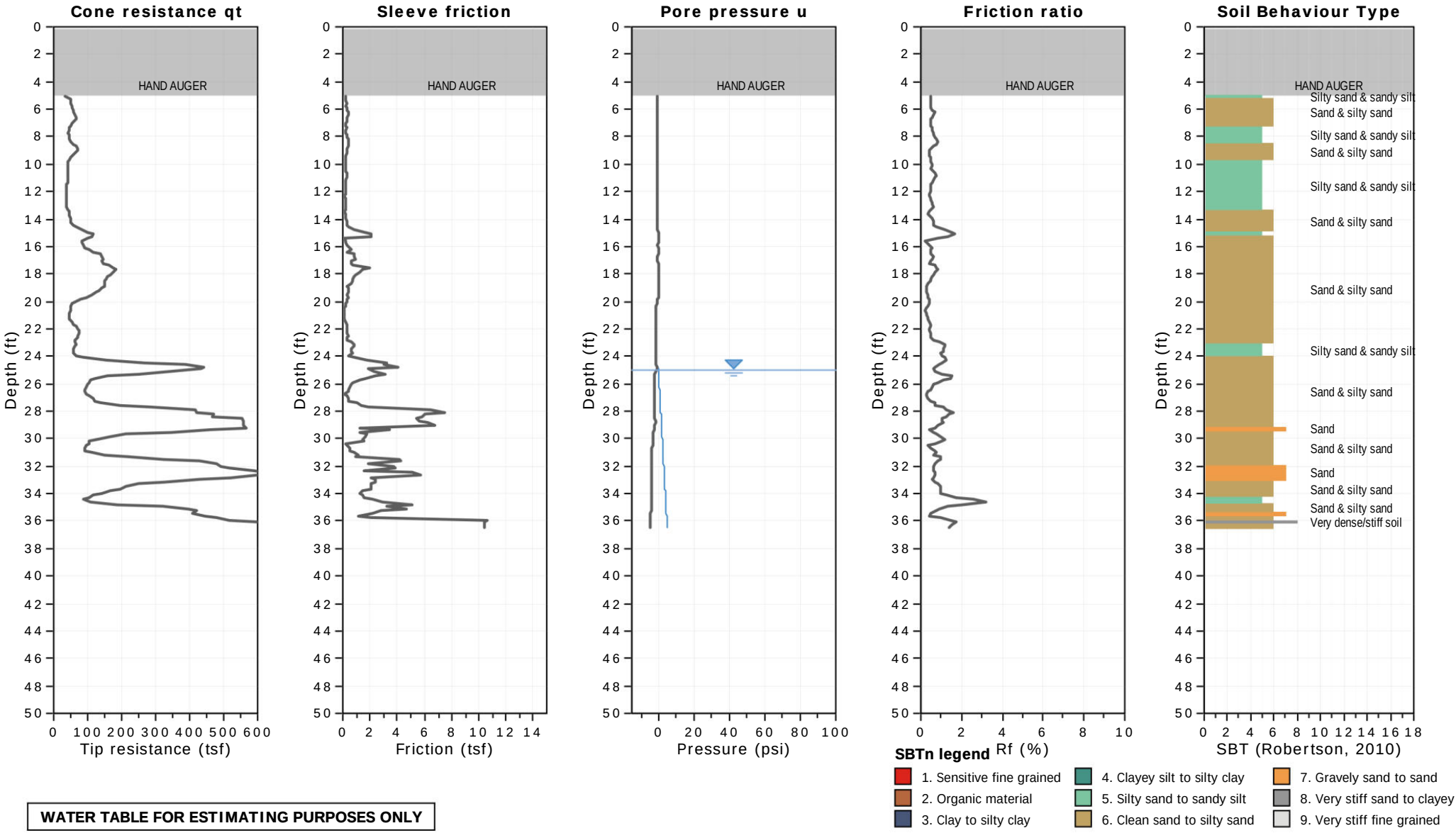
CPT: SCPT-01

CLIENT: RT FRANKIAN

SITE: LYONS CANYON, STEVENSON RANCH, CA

FIELD REP: MATT M

Total depth: 36.42 ft, Date: 1/13/2021



WATER TABLE FOR ESTIMATING PURPOSES ONLY

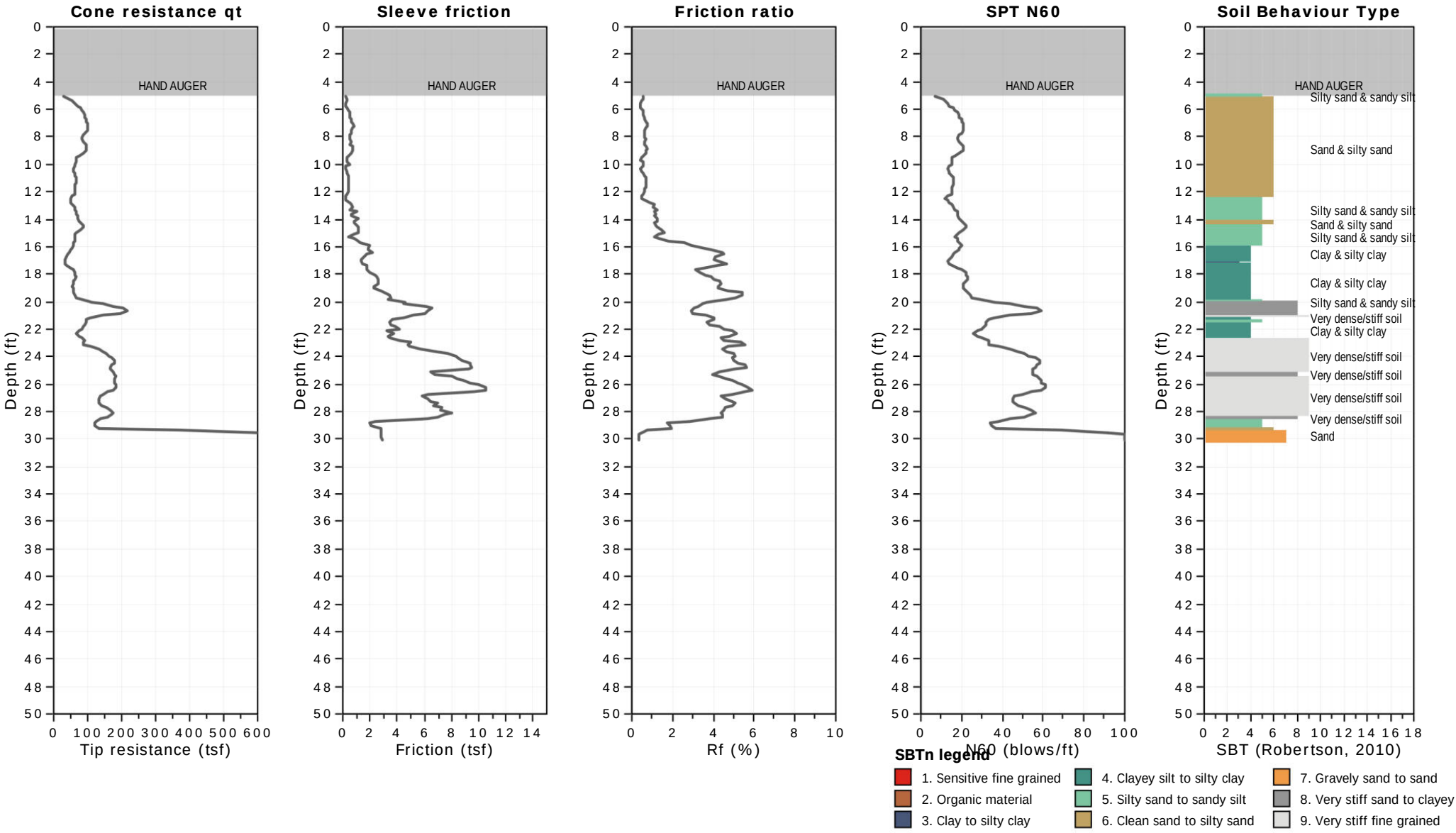
CPT: SCPT-02

CLIENT: RT FRANKIAN

SITE: LYONS CANYON, STEVENSON RANCH, CA

FIELD REP: MATT M

Total depth: 30.02 ft, Date: 1/13/2021



GREGG DRILLING, LLC
WWW.GREGGDRILLING.COM

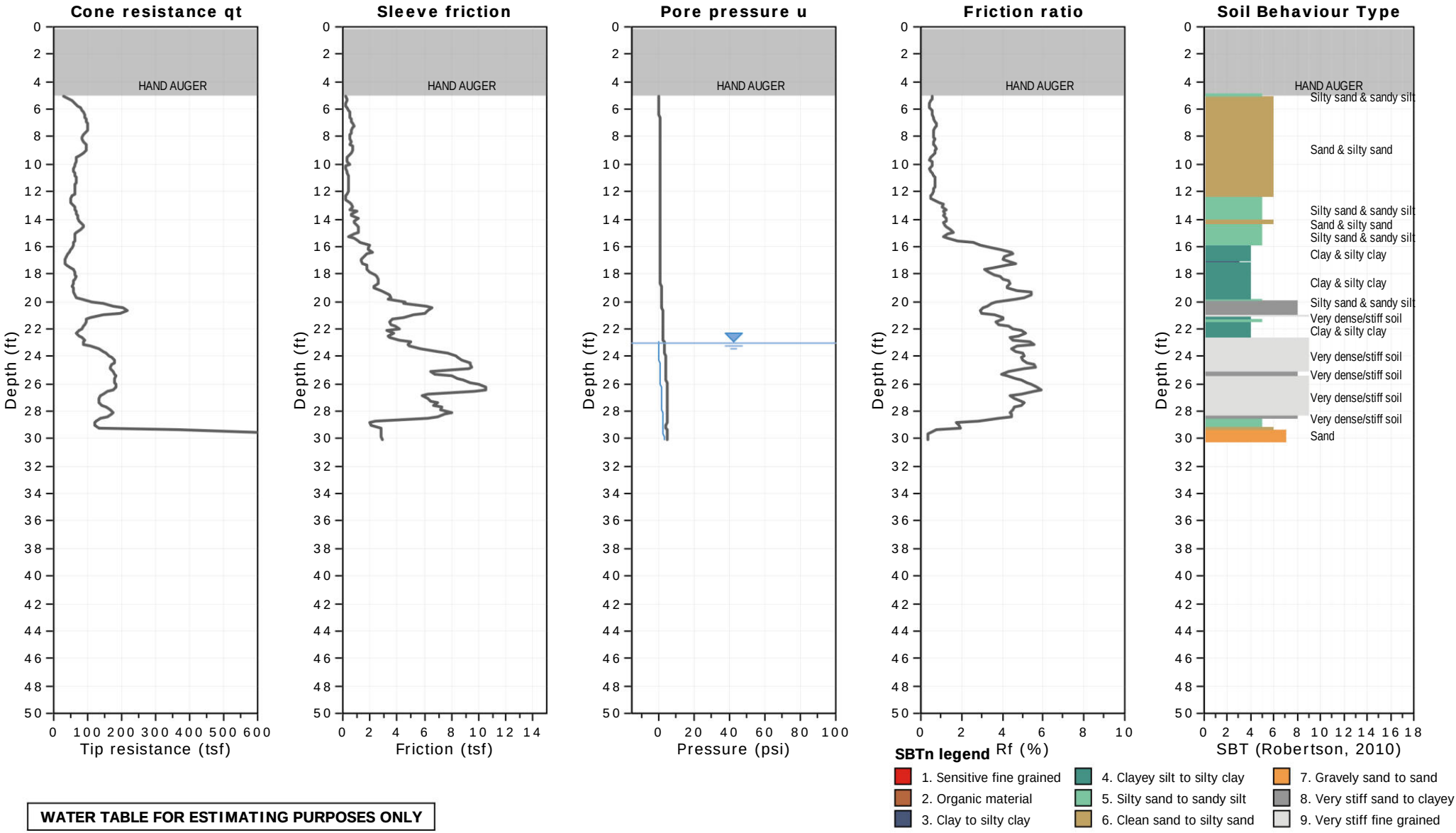
CPT: SCPT-02

CLIENT: RT FRANKIAN

SITE: LYONS CANYON, STEVENSON RANCH, CA

FIELD REP: MATT M

Total depth: 30.02 ft, Date: 1/13/2021



WATER TABLE FOR ESTIMATING PURPOSES ONLY

GREGG DRILLING, LLC
WWW.GREGGDRILLING.COM

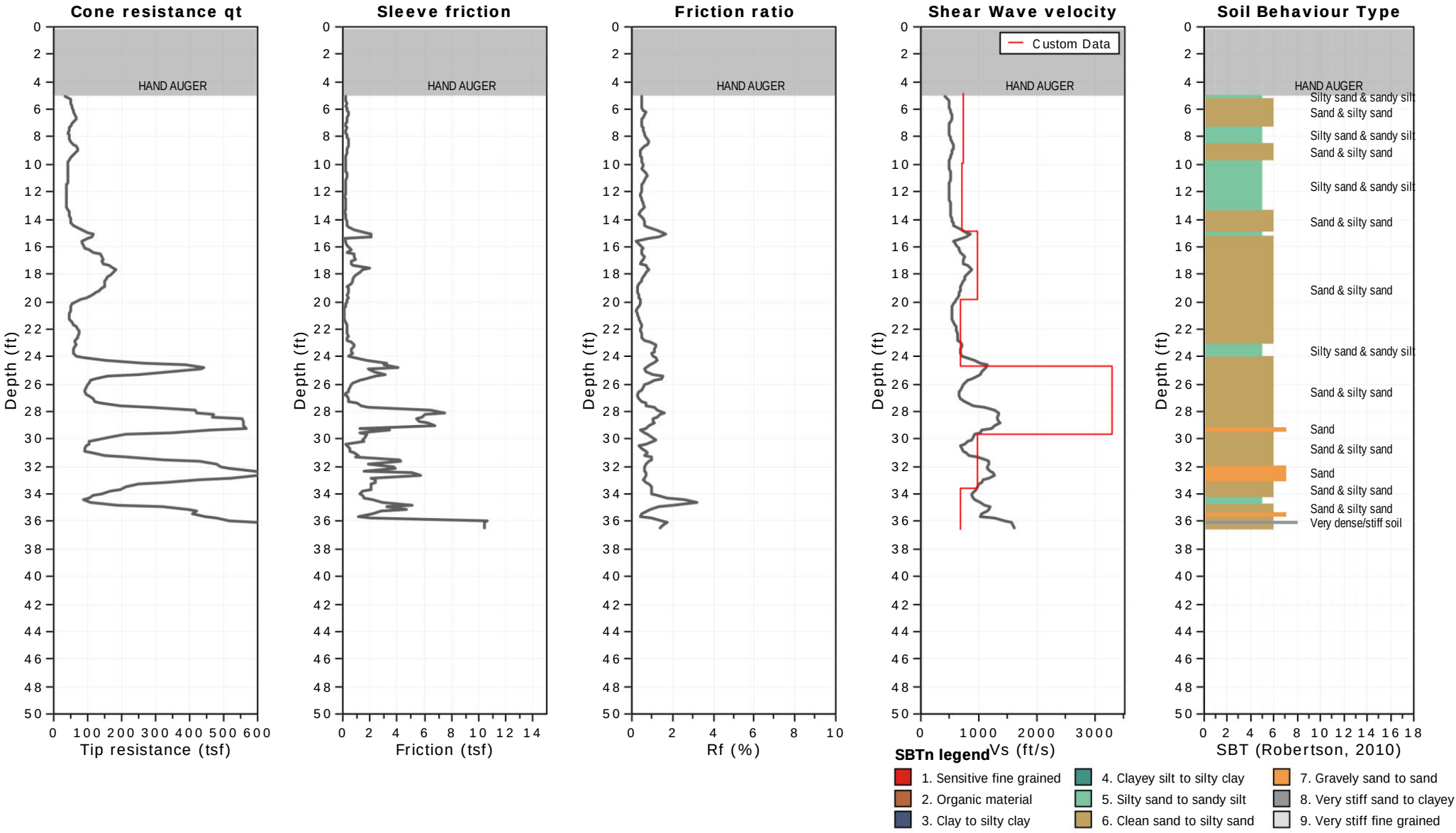
CPT: SCPT-01

CLIENT: RT FRANKIAN

SITE: LYONS CANYON, STEVENSON RANCH, CA

FIELD REP: MATT M

Total depth: 36.42 ft, Date: 1/13/2021



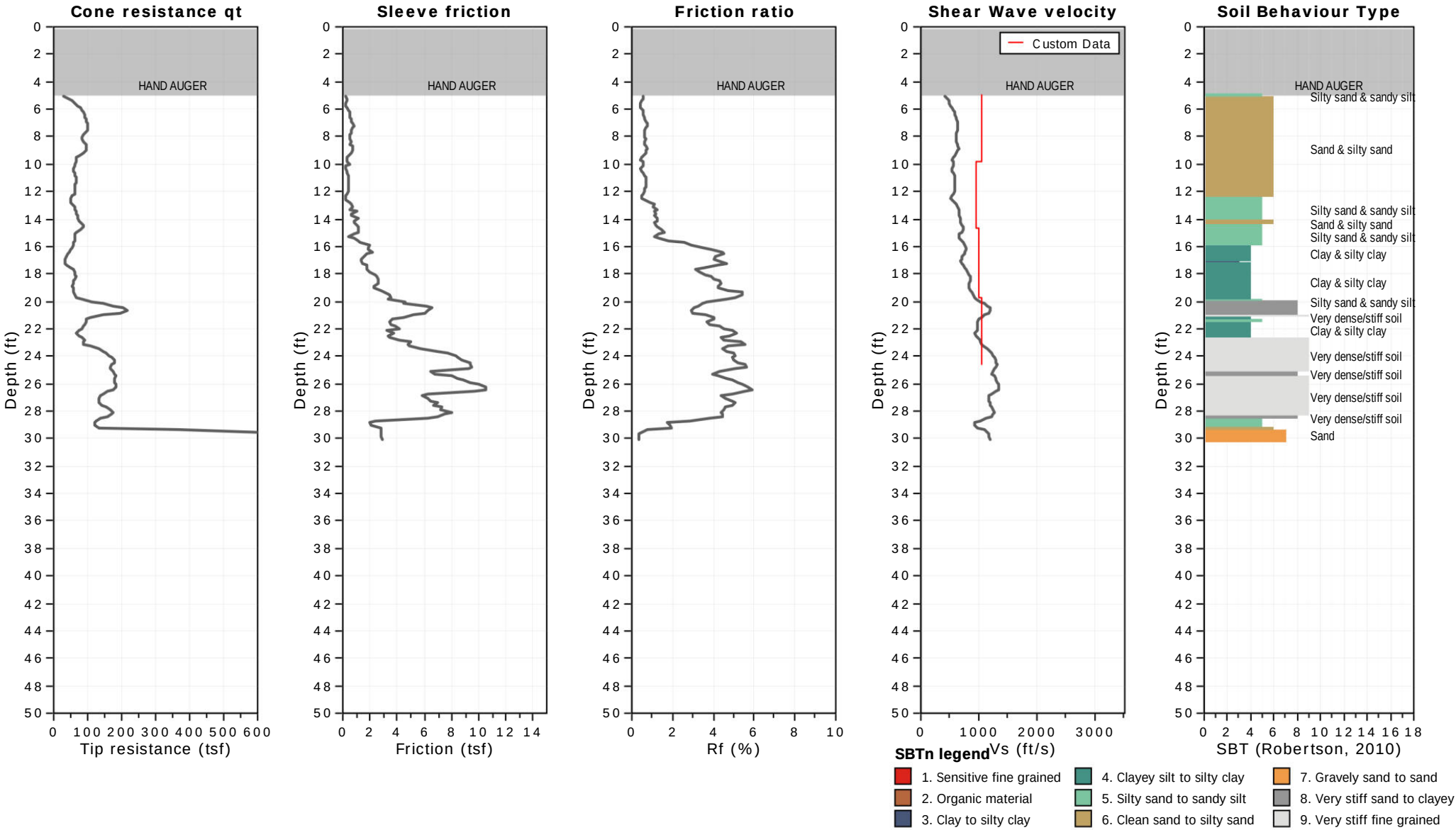
CPT: SCPT-02

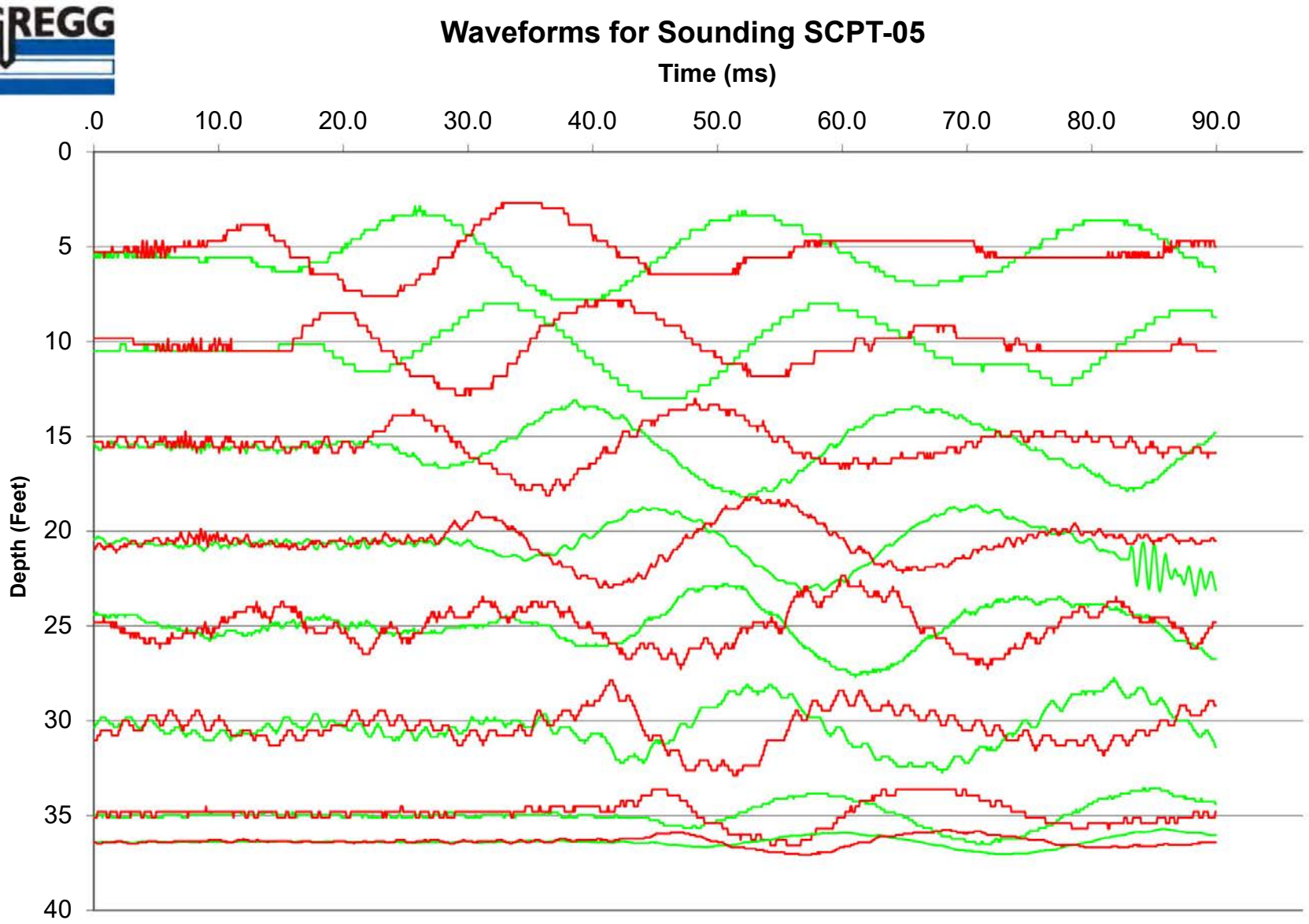
CLIENT: RT FRANKIAN

SITE: LYONS CANYON, STEVENSON RANCH, CA

FIELD REP: MATT M

Total depth: 30.02 ft, Date: 1/13/2021




Waveforms for Sounding SCPT-05
Time (ms)
.0
10.0
20.0
30.0
40.0
50.0
60.0
70.0
80.0
90.0
Depth (Feet)
0
5
10
15
20
25
30
35
40

Shear Wave Velocity Calculations

LYONS CANYON

SCPT-01

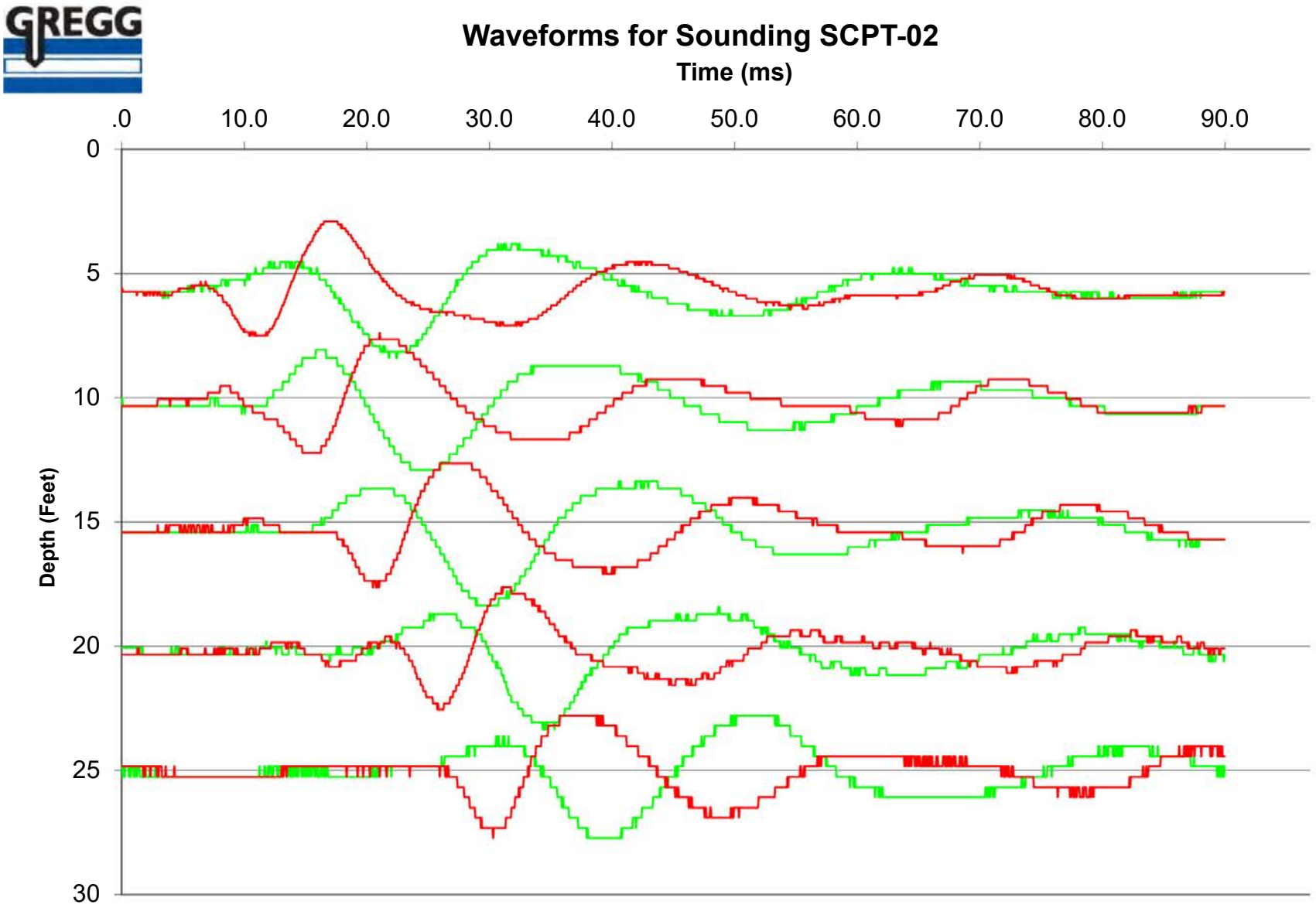
SCPT-05

Geophone Offset: 0.66 Feet

Source Offset: 1.67 Feet

01/13/21

Test Depth (Feet)	Geophone Depth (Feet)	Waveform Ray Path (Feet)	Incremental Distance (Feet)	Characteristic Arrival Time (ms)	Incremental Time Interval (ms)	Interval Velocity (Ft/Sec)	Interval Depth (Feet)
5.58	4.92	5.19	5.19	30.0000			
10.50	9.84	9.98	4.79	36.6500	6.6500	719.7	7.38
15.58	14.92	15.02	5.04	43.8500	7.2000	699.7	12.38
20.67	20.01	20.08	5.06	49.1000	5.2500	964.1	17.47
25.10	24.44	24.50	4.42	55.5000	6.4000	690.1	22.22
30.51	29.85	29.90	5.40	57.1500	1.6500	3274.6	27.15
35.10	34.44	34.49	4.59	61.9000	4.7500	965.7	32.15
36.42	35.76	35.80	1.31	63.8000	1.9000	689.9	35.10


GREGG
Waveforms for Sounding SCPT-02
Time (ms)
.0
10.0
20.0
30.0
40.0
50.0
60.0
70.0
80.0
90.0
Depth (Feet)
0
5
10
15
20
25
30

Shear Wave Velocity Calculations

LYONS CANYON

SCPT-02

Geophone Offset: 0.66 Feet
Source Offset: 1.67 Feet

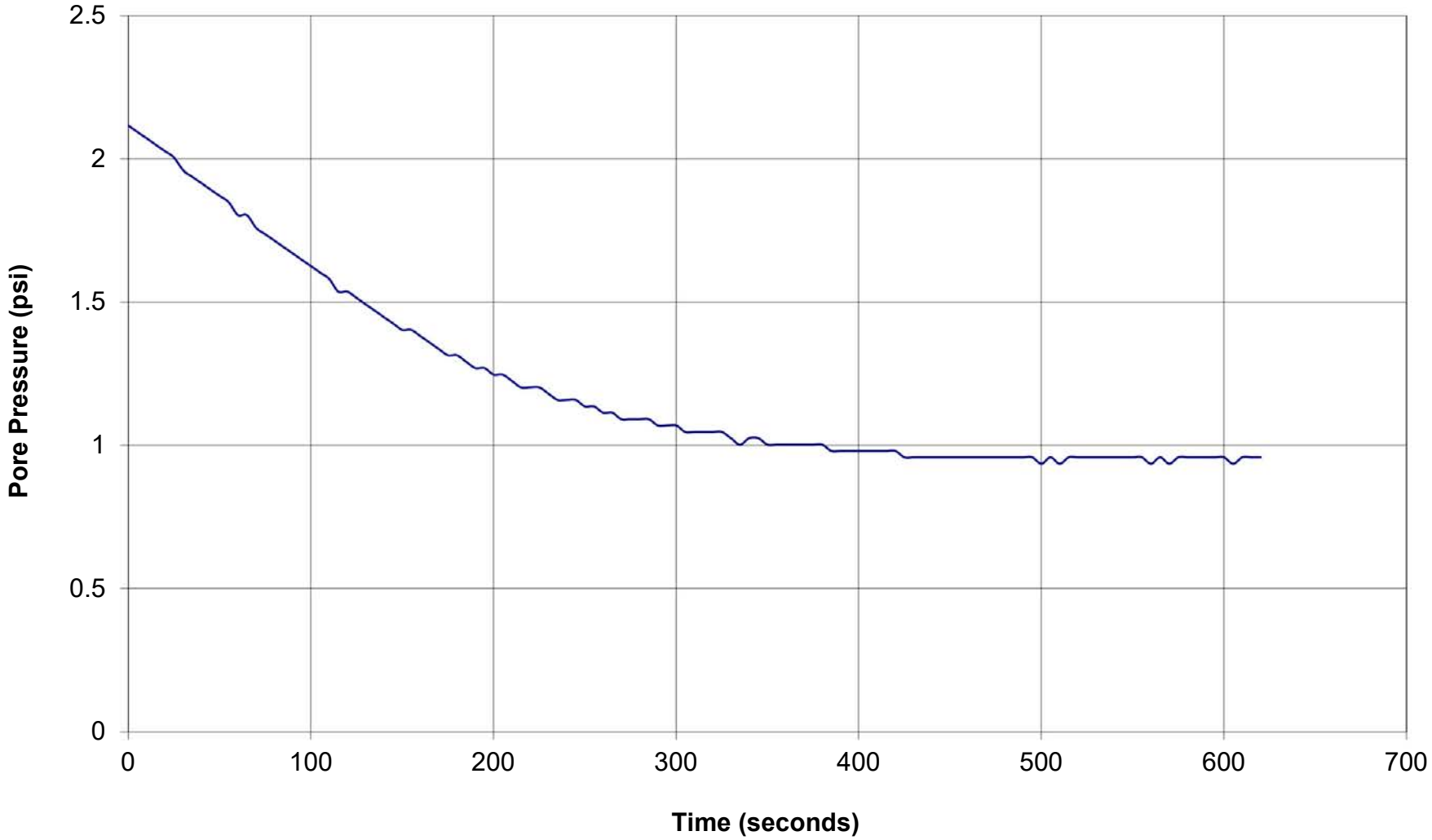
01/13/21

Test Depth (Feet)	Geophone Depth (Feet)	Waveform Ray Path (Feet)	Incremental Distance (Feet)	Characteristic Arrival Time (ms)	Incremental Time Interval (ms)	Interval Velocity (Ft/Sec)	Interval Depth (Feet)
5.74	5.08	5.35	5.35	14.4500			
10.33	9.67	9.82	4.47	18.7000	4.2500	1051.5	7.38
15.42	14.76	14.85	5.04	23.9500	5.2500	959.3	12.22
20.34	19.68	19.75	4.90	28.9000	4.9500	989.5	17.22
25.26	24.60	24.66	4.91	33.5500	4.6500	1055.3	22.14

GREGG DRILLING & TESTING

Pore Pressure Dissipation Test

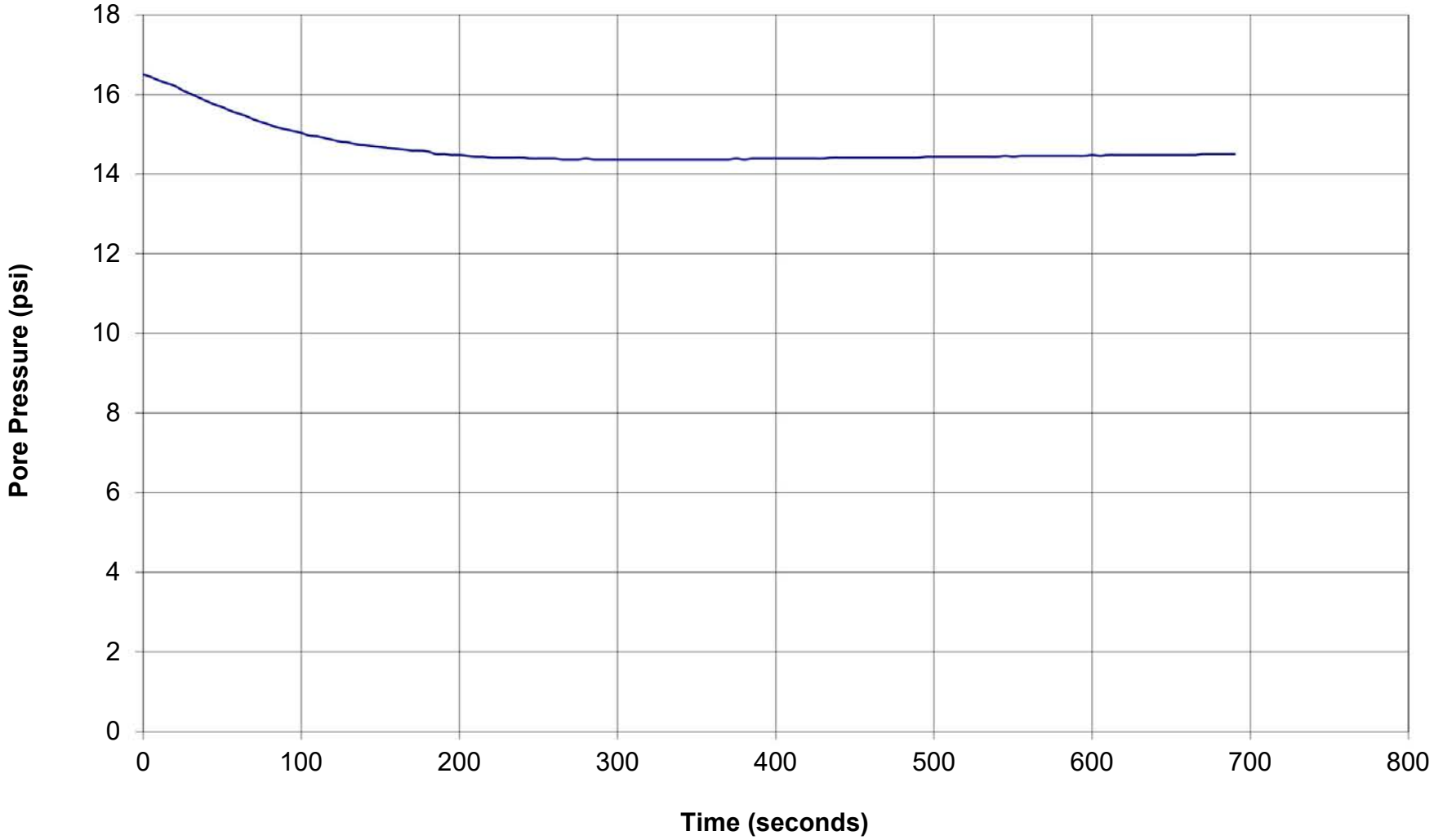
Sounding: CPT-04
Depth (ft): 39.70
Site: LYONS CANYON
Engineer: MATT M



GREGG DRILLING & TESTING

Pore Pressure Dissipation Test

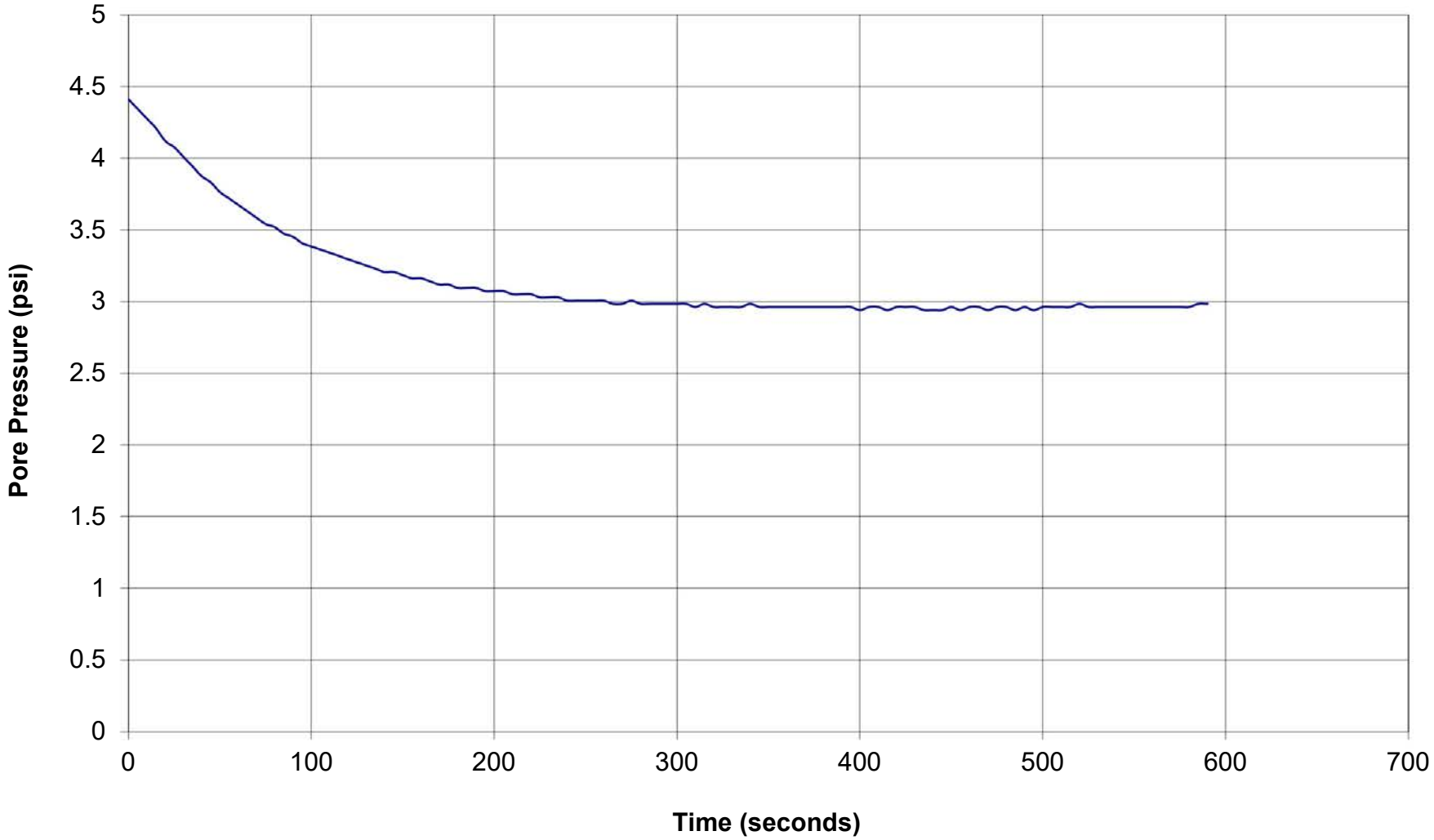
Sounding: CPT-03
Depth (ft): 34.45
Site: LYONS CANYON
Engineer: MATT M



GREGG DRILLING & TESTING

Pore Pressure Dissipation Test

Sounding: SCPT-02
Depth (ft): 30.02
Site: LYONS CANYON
Engineer: MATT M



NUWI – Lyons Canyon, LLC
March 19, 2021
2020-200-001

APPENDIX F

SEISMIC PARAMETERS

RTF&A
GEOTECHNICAL ENGINEERING & ENGINEERING GEOLOGY

Hazards by Location

Search Information

Coordinates: 34.369896, -118.562368

Elevation: 1321 ft

Timestamp: 2021-02-03T00:42:28.306Z

Hazard Type: Seismic

Reference Document: ASCE7-16

Risk Category: II

Site Class: D

Basic Parameters

Name	Value	Description
S_S	2.494	MCE_R ground motion (period=0.2s)
S_1	0.849	MCE_R ground motion (period=1.0s)
S_{MS}	2.494	Site-modified spectral acceleration value
S_{M1}	* null	Site-modified spectral acceleration value
S_{DS}	1.663	Numeric seismic design value at 0.2s SA
S_{D1}	* null	Numeric seismic design value at 1.0s SA

* See Section 11.4.8

Additional Information

Name	Value	Description
SDC	* null	Seismic design category
F_a	1	Site amplification factor at 0.2s
F_v	* null	Site amplification factor at 1.0s
CR_S	0.908	Coefficient of risk (0.2s)
CR_1	0.893	Coefficient of risk (1.0s)
PGA	1.062	MCE_G peak ground acceleration
F_{PGA}	1.1	Site amplification factor at PGA
PGA_M	1.168	Site modified peak ground acceleration
T_L	8	Long-period transition period (s)

SsRT	2.494	Probabilistic risk-targeted ground motion (0.2s)
SsUH	2.747	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
SsD	2.713	Factored deterministic acceleration value (0.2s)
S1RT	0.892	Probabilistic risk-targeted ground motion (1.0s)
S1UH	1	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
S1D	0.849	Factored deterministic acceleration value (1.0s)
PGAd	1.092	Factored deterministic acceleration value (PGA)

* See Section 11.4.8

The results indicated here DO NOT reflect any state or local amendments to the values or any delineation lines made during the building code adoption process. Users should confirm any output obtained from this tool with the local Authority Having Jurisdiction before proceeding with design.

Disclaimer

Hazard loads are provided by the U.S. Geological Survey Seismic Design Web Services.

While the information presented on this website is believed to be correct, ATC and its sponsors and contributors assume no responsibility or liability for its accuracy. The material presented in the report should not be used or relied upon for any specific application without competent examination and verification of its accuracy, suitability and applicability by engineers or other licensed professionals. ATC does not intend that the use of this information replace the sound judgment of such competent professionals, having experience and knowledge in the field of practice, nor to substitute for the standard of care required of such professionals in interpreting and applying the results of the report provided by this website. Users of the information from this website assume all liability arising from such use. Use of the output of this website does not imply approval by the governing building code bodies responsible for building code approval and interpretation for the building site described by latitude/longitude location in the report.

U.S. Geological Survey - Earthquake Hazards Program

Uni. ed Hazard Tool

Please do not use this tool to obtain ground motion parameter values for the design code reference documents covered by the U.S. Seismic Design Maps web tools (e.g., the International Building Code and the ASCE 7 or 41 Standard). The values returned by the two applications are not identical.

Input

Edition

Dynamic: Conterminous U.S. 2014 (u…

Spectral Period

Peak Ground Acceleration

Latitude

Decimal degrees

34.369896

Time Horizon

Return period in years

2475

Longitude

Decimal degrees, negative values for western longitudes

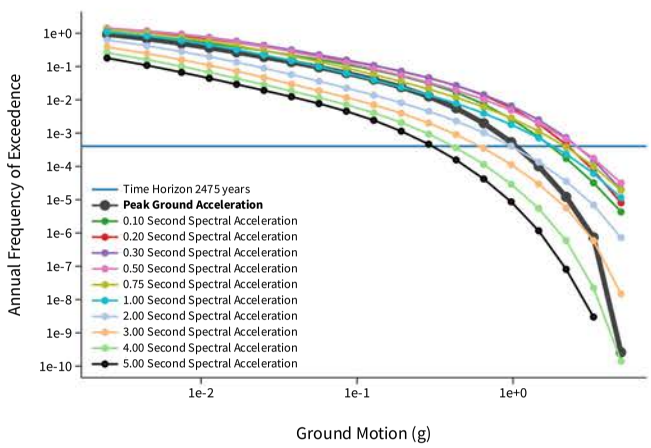
-118.562368

Site Class

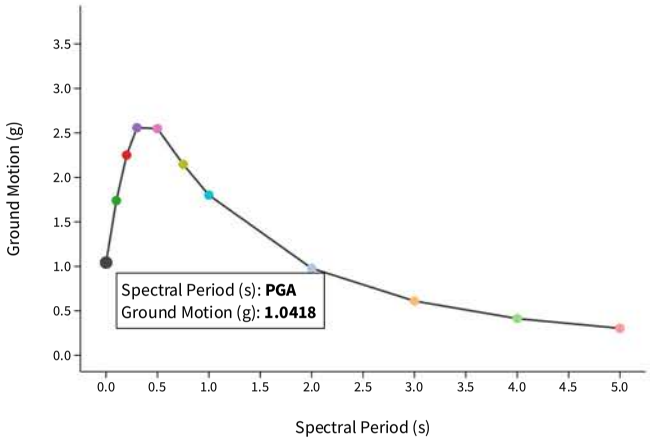
259 m/s (Site class D)

Hazard Curve

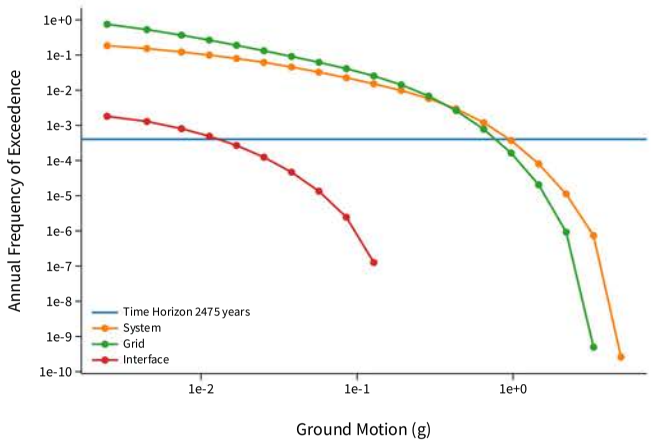
Hazard Curves



Uniform Hazard Response Spectrum



Component Curves for Peak Ground Acceleration

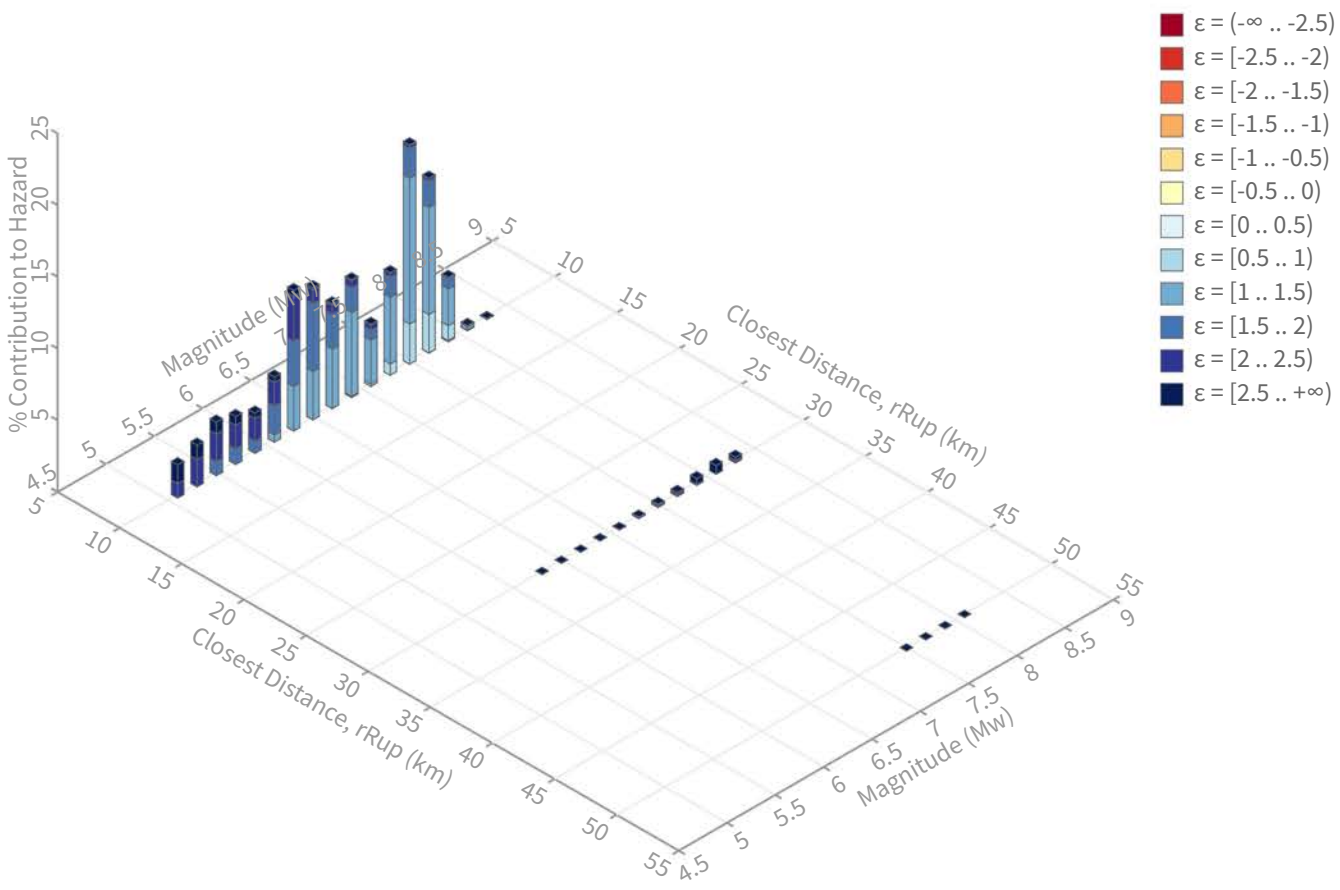


View Raw Data

Deaggregation

Component

Total



Summary statistics for, Deaggregation: Total

Deaggregation targets

Return period: 2475 yrs
Exceedance rate: 0.0004040404 yr^{-1}
PGA ground motion: 1.0417615 g

Recovered targets

Return period: 3149.6892 yrs
Exceedance rate: 0.00031749164 yr^{-1}

Totals

Binned: 100 %
Residual: 0 %
Trace: 0.04 %

Mean (over all sources)

m: 6.85
r: 7.27 km
ε_0: 1.6 σ

Mode (largest m-r bin)

m: 7.52
r: 5.72 km
ε_0: 1.21 σ
Contribution: 15.27 %

Mode (largest m-r-ε_0 bin)

m: 7.51
r: 5.72 km
ε_0: 1.18 σ
Contribution: 10.16 %

Discretization

r: min = 0.0, max = 1000.0, Δ = 20.0 km
m: min = 4.4, max = 9.4, Δ = 0.2
ε: min = -3.0, max = 3.0, Δ = 0.5 σ

Epsilon keys

ε0: [-∞ .. -2.5)
ε1: [-2.5 .. -2.0)
ε2: [-2.0 .. -1.5)
ε3: [-1.5 .. -1.0)
ε4: [-1.0 .. -0.5)
ε5: [-0.5 .. 0.0)
ε6: [0.0 .. 0.5)
ε7: [0.5 .. 1.0)
ε8: [1.0 .. 1.5)
ε9: [1.5 .. 2.0)
ε10: [2.0 .. 2.5)
ε11: [2.5 .. +∞]

Deaggregation Contributors

Source Set ↳ Source	Type	r	m	ε_0	lon	lat	az	%
UC33brAvg_FM32	System							38.97
Santa Susana alt 2 [3]		5.78	7.15	1.32	118.574°W	34.313°N	189.35	22.61
Northridge Hills [1]		5.64	7.65	1.06	118.608°W	34.305°N	210.41	4.59
Santa Susana alt 2 [2]		6.28	6.47	1.68	118.528°W	34.317°N	152.08	2.52
Northridge [2]		8.54	7.50	1.41	118.576°W	34.358°N	222.71	2.19
Holser alt 2 [1]		6.07	7.49	1.25	118.570°W	34.423°N	353.48	1.09
Santa Susana East (connector) [0]		8.60	6.39	2.27	118.499°W	34.314°N	136.86	1.03
UC33brAvg_FM31	System							35.56
Santa Susana alt 1 [0]		4.83	7.31	1.27	118.576°W	34.329°N	195.65	13.60
Mission Hills 2011 [1]		8.81	6.50	1.61	118.556°W	34.283°N	176.54	5.39
Northridge Hills [1]		5.64	7.65	1.04	118.608°W	34.305°N	210.41	4.73
Northridge [2]		8.54	7.30	1.45	118.576°W	34.358°N	222.71	4.20
Holser alt 1 [2]		4.63	7.06	1.32	118.544°W	34.405°N	22.92	2.94
Santa Susana alt 1 [1]		4.83	7.36	1.20	118.576°W	34.329°N	195.65	1.13
UC33brAvg_FM31 (opt)	Grid							13.35
PointSourceFinite: -118.562, 34.410		6.70	5.73	2.02	118.562°W	34.410°N	0.00	3.32
PointSourceFinite: -118.562, 34.410		6.70	5.73	2.02	118.562°W	34.410°N	0.00	3.32
PointSourceFinite: -118.562, 34.428		7.78	5.84	2.15	118.562°W	34.428°N	0.00	1.41
PointSourceFinite: -118.562, 34.428		7.78	5.84	2.15	118.562°W	34.428°N	0.00	1.41
UC33brAvg_FM32 (opt)	Grid							12.12
PointSourceFinite: -118.562, 34.410		6.69	5.72	2.03	118.562°W	34.410°N	0.00	3.01
PointSourceFinite: -118.562, 34.410		6.69	5.72	2.03	118.562°W	34.410°N	0.00	3.01
PointSourceFinite: -118.562, 34.428		7.80	5.82	2.17	118.562°W	34.428°N	0.00	1.20
PointSourceFinite: -118.562, 34.428		7.80	5.82	2.17	118.562°W	34.428°N	0.00	1.20

NUWI – Lyons Canyon, LLC
March 19, 2021
2020-200-001

APPENDIX G

LIQUEFACTION CALCULATIONS

RTF&A
GEOTECHNICAL ENGINEERING & ENGINEERING GEOLOGY

WORKBOOK TO CALCULATE LIQUEFACTION POTENTIAL AND SEISMIC SETTLEMENT

SUMMARY SHEET

REFERENCE:
Youd, T. L., Idriss, I. M., plus 19 others, 2001, "Liquefaction Resistance of Soils: Summary Report from the 1996 NCEER and 1998 NCEER/NSF Workshops on Evaluation of Liquefaction Resistance of Soils," Journal of Geotechnical and Geoenvironmental Engineering, ASCE, Vol. 127, No. 10 (October 2001), pp. 817-833.

CLIENT: **NUWI - Lyons Canyon, LLC**
RTF JOB: **2020-200**
PROJ. : **Lyons Canyon**
BY: **AWR**
DATE: **02/08/2021**

Z	Ic	Soil	rd#	Reference
3	>2.95	Clay to Silty Clay	1	Tokimatsu & Yoshimi (1983)
4	<2.95	Clayey Silt to Silty Clay	2	Seed & Idriss mean (1971) and Youd (1997)
5	<2.6	Silty Sand to Sandy Silt	3	Seed & Idriss lower limit (1971)
6	<2.05	Clean Sand to Silty Sand	4	Idriss & Golesorkhi (1997)
7	<1.31	Gravelly Sand to Sand	5	Site-Specific

FS = Threshold Factor of Safety = **1.30**
NL = Not liquefiable
Liquefiable Ic (between 1.5 and 2.6) = **2.60** (usu. 2.05 to 2.6)
Seismic Settlement Soil (Type) = **3**

amax = **1.17** g
Mag = **6.8** MSF **1.28**
Pa = 1.04427 tsf MSP calc 1.2846274
Fill Density = **125** pcf

Depth	CPT-1 1-13-21	CPT-2 1-13-21	CPT-3 1-13-21	CPT-4 1-13-21	CPT-5 1-13-21	CPT-*** 0-0-00	CPT-*** 0-0-00	CPT-*** 0-0-00
Elevation -->	1333 Sht. 1	1340 Sht. 2	1329 Sht. 3	1317 Sht. 4	1315 Sht. 5	1351 Sht. 6	1342 Sht. 7	*** Sht. 8
Meas. Water -->	A Water **55.0** 55.0	A Water **55.0** 55.0	A Water **55.0** 55.0	A Water **55.0** 55.0	A Water **55.0** 55.0	A Water **0.0** 0.0	A Water **0.0** 0.0	A Water *** ***
Design Water -->	D Water **30.0** 30.0 feet	D Water **30.0** 30.0 feet	D Water **30.0** 30.0 feet	D Water **30.0** 30.0 feet	D Water **30.0** 30.0 feet	D Water **0.0** 0.0 feet	D Water **0.0** 0.0 feet	D Water *** *** feet
Soil Density -->	Gamma **120** 120.0 pcf	Gamma **120** 120.0 pcf	Gamma **120** 120.0 pcf	Gamma **120** 120.0 pcf	Gamma **120** 120.0 pcf	Gamma **120** 120.0 pcf	Gamma **120** 120.0 pcf	Gamma **120** 120.0 pcf
Site rd -->	rd **2** 2.0	rd **2** 2.0	rd **2** 2.0	rd **2** 2.0	rd **2** 2.0	rd **2** 2.0	rd **2** 2.0	rd **2** 2.0
R & R -->	R and R **20.0** feet	R and R **20.0** feet	R and R **20.0** feet	R and R **20.0** feet	R and R **20.0** feet	R and R **0.0** feet	R and R **0.0** feet	R and R *** feet
Added Fill -->	Fill **21.0** feet	Fill **20.0** feet	Fill **35.0** feet	Fill **3.0** feet	Fill **15.0** feet	Fill **0.0** feet	Fill **0.0** feet	Fill *** feet
Ratio -->	**18.88**	**9999**	**9999**	**4.01**	**2.69**	**#NUM!**	**#NUM!**	**#VALUE!**
Liq Settlement	Liq. 0.16 0.16 inches	Liq. 0.00 0.00 inches	Liq. 0.00 0.00 inches	Liq. 0.37 0.37 inches	Liq. 1.22 1.22 inches	Liq. #NUM! #NUM! inches	Liq. #NUM! #NUM! inches	Liq. ####### ####### inches
Total After R&R	Total 0.16 inches	Total 0.00 inches	Total 0.00 inches	Total 0.37 inches	Total 1.22 inches	Total #NUM! inches	Total #NUM! inches	Total ####### inches

	meters	feet	Soil	CPT-1	Ishihara	F.S.	Soil	CPT-2	Ishihara	F.S.	Soil	CPT-3	Ishihara	F.S.	Soil	CPT-4	Ishihara	F.S.	Soil	CPT-5	Ishihara	F.S.	Soil	CPT-***	Ishihara	F.S.	Soil	CPT-***	Ishihara	F.S.	Soil	CPT-***	Ishihara	F.S.
	0	**0**	'1!'AF19	1			'2!'AF19	1			'3!'AF19	1			'4!'AF19	1			'5!'AF19	1			'6!'AF19	1			'7!'AF19	1			'8!'AF19	1		
1	0.05	**0.16**	**7 S**		---	**NL**	**7 S**		---	**NL**	**7 S**		---	**NL**	**6 S**		---	**NL**	**7 S**		---	**NL**	**#NUM!**	**#NUM!**	#NUM!	**#NUM!**	**#NUM!**	**#NUM!**	#NUM!	**#NUM!**	**#VALUE!**	**#VALUE!**	#VALUE!	**#VALUE!**
2	0.10	**0.33**	**7 S**		---	**NL**	**7 S**		---	**NL**	**7 S**		---	**NL**	**6 S**		---	**NL**	**7 S**		---	**NL**	**#NUM!**	**#NUM!**	#NUM!	**#NUM!**	**#NUM!**	**#NUM!**	#NUM!	**#NUM!**	**#NUM!**	**#NUM!**	#VALUE!	**#NUM!**
3	0.15	**0.49**	**7 S**		---	**NL**	**7 S**		---	**NL**	**7 S**		---	**NL**	**6 S**		---	**NL**	**7 S**		---	**NL**	**#NUM!**	**#NUM!**	#NUM!	**#NUM!**	**#NUM!**	**#NUM!**	#NUM!	**#NUM!**	**#NUM!**	**#NUM!**	#VALUE!	**#NUM!**
4	0.20	**0.66**	**7 S**		---	**NL**	**7 S**		---	**NL**	**7 S**		---	**NL**	**6 S**		---	**NL**	**7 S**		---	**NL**	**#NUM!**	**#NUM!**	#NUM!	**#NUM!**	**#NUM!**	**#NUM!**	#NUM!	**#NUM!**	**#NUM!**	**#NUM!**	#VALUE!	**#NUM!**
5	0.25	**0.82**	**7 S**		---	**NL**	**7 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**7 S**		---	**NL**	**#NUM!**	**#NUM!**	#NUM!	**#NUM!**	**#NUM!**	**#NUM!**	#NUM!	**#NUM!**	**0 C**		#VALUE!	
6	0.30	**0.98**	**7 S**		---	**NL**	**7 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**7 S**		---	**NL**	**0 C**		#NUM!		**#NUM!**	**#NUM!**	#NUM!	**#NUM!**	**0 C**		#VALUE!	
7	0.35	**1.15**	**7 S**		---	**NL**	**7 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**7 S**		---	**NL**	**0 C**		#NUM!		**#NUM!**	**#NUM!**	#NUM!	**#NUM!**	**0 C**		#VALUE!	
8	0.40	**1.31**	**7 S**		---	**NL**	**7 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**7 S**		---	**NL**	**0 C**		#NUM!		**#NUM!**	**#NUM!**	#NUM!	**#NUM!**	**0 C**		#VALUE!	
9	0.45	**1.48**	**7 S**		---	**NL**	**7 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**0 C**		#NUM!		**#NUM!**	**#NUM!**	#NUM!	**#NUM!**	**0 C**		#VALUE!	
10	0.50	**1.64**	**7 S**		---	**NL**	**7 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**0 C**		#NUM!		**0 C**		#NUM!		**0 C**		#VALUE!	
11	0.55	**1.80**	**7 S**		---	**NL**	**7 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**0 C**		#NUM!		**0 C**		#NUM!		**0 C**		#VALUE!	
12	0.60	**1.97**	**7 S**		---	**NL**	**7 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**0 C**		#NUM!		**0 C**		#NUM!		**0 C**		#VALUE!	
13	0.65	**2.13**	**7 S**		---	**NL**	**7 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**0 C**		#NUM!		**0 C**		#NUM!		**0 C**		#VALUE!	
14	0.70	**2.30**	**7 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**0 C**		#NUM!		**0 C**		#NUM!		**0 C**		#VALUE!	
15	0.75	**2.46**	**7 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**0 C**		#NUM!		**0 C**		#NUM!		**0 C**		#VALUE!	
16	0.80	**2.62**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**0 C**		#NUM!		**0 C**		#NUM!		**0 C**		#VALUE!	
17	0.85	**2.79**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**0 C**		#NUM!		**0 C**		#NUM!		**0 C**		#VALUE!	
18	0.90	**2.95**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**0 C**		#NUM!		**0 C**		#NUM!		**0 C**		#VALUE!	
19	0.95	**3.12**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**5 M**		---	**NL**	**6 S**		---	**NL**	**0 C**		#NUM!		**0 C**		#NUM!		**0 C**		#VALUE!	
20	1.00	**3.28**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**5 M**		---	**NL**	**6 S**		---	**NL**	**0 C**		#NUM!		**0 C**		#NUM!		**0 C**		#VALUE!	
21	1.05	**3.44**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**5 M**		---	**NL**	**6 S**		---	**NL**	**0 C**		#NUM!		**0 C**		#NUM!		**0 C**		#VALUE!	
22	1.10	**3.61**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**5 M**		---	**NL**	**6 S**		---	**NL**	**0 C**		#NUM!		**0 C**		#NUM!		**0 C**		#VALUE!	
23	1.15	**3.77**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**5 M**		---	**NL**	**6 S**		---	**NL**	**0 C**		#NUM!		**0 C**		#NUM!		**0 C**		#VALUE!	
24	1.20	**3.94**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**5 M**		---	**NL**	**6 S**		---	**NL**	**0 C**		#NUM!		**0 C**		#NUM!		**0 C**		#VALUE!	
25	1.25	**4.10**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**5 M**		---	**NL**	**6 S**		---	**NL**	**0 C**		#NUM!		**0 C**		#NUM!		**0 C**		#VALUE!	
26	1.30	**4.27**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**5 M**		---	**NL**	**6 S**		---	**NL**	**0 C**		#NUM!		**0 C**		#NUM!		**0 C**		#VALUE!	
27	1.35	**4.43**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**5 M**		---	**NL**	**6 S**		---	**NL**	**0 C**		#NUM!		**0 C**		#NUM!		**0 C**		#VALUE!	
28	1.40	**4.59**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**5 M**		---	**NL**	**6 S**		---	**NL**	**0 C**		#NUM!		**0 C**		#NUM!		**0 C**		#VALUE!	
29	1.45	**4.76**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**5 M**		---	**NL**	**6 S**		---	**NL**	**0 C**		#NUM!		**0 C**		#NUM!		**0 C**		#VALUE!	
30	1.50	**4.92**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**5 M**		---	**NL**	**6 S**		---	**NL**	**0 C**		#NUM!		**0 C**		#NUM!		**0 C**		#VALUE!	
31	1.55	**5.09**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**5 M**		---	**NL**	**6 S**		---	**NL**	**0 C**		#NUM!		**0 C**		#NUM!		**0 C**		#VALUE!	
32	1.60	**5.25**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**5 M**		---	**NL**	**6 S**		---	**NL**	**0 C**		#NUM!		**0 C**		#NUM!		**0 C**		#VALUE!	
33	1.65	**5.41**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**5 M**		---	**NL**	**6 S**		---	**NL**	**0 C**		#NUM!		**0 C**		#NUM!		**0 C**		#VALUE!	
34	1.70	**5.58**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**0 C**		#NUM!		**0 C**		#NUM!		**0 C**		#VALUE!	
35	1.75	**5.74**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**0 C**		#NUM!		**0 C**		#NUM!		**0 C**		#VALUE!	
36	1.80	**5.91**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**0 C**		#NUM!		**0 C**		#NUM!		**0 C**		#VALUE!	
37	1.85	**6.07**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**0 C**		#NUM!		**0 C**		#NUM!		**0 C**		#VALUE!	
38	1.90	**6.23**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**0 C**		#NUM!		**0 C**		#NUM!		**0 C**		#VALUE!	
39	1.95	**6.40**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**0 C**		#NUM!		**0 C**		#NUM!		**0 C**		#VALUE!	
40	2.00	**6.56**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**0 C**		#NUM!		**0 C**		#NUM!		**0 C**		#VALUE!	
41	2.05	**6.73**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**0 C**		#NUM!		**0 C**		#NUM!		**0 C**		#VALUE!	
42	2.10	**6.89**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**0 C**		#NUM!		**0 C**		#NUM!		**0 C**		#VALUE!	
43	2.15	**7.05**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**0 C**		#NUM!		**0 C**		#NUM!		**0 C**		#VALUE!	
44	2.20	**7.22**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**0 C**		#NUM!		**0 C**		#NUM!		**0 C**		#VALUE!	
45	2.25	**7.38**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**0 C**		#NUM!		**0 C**		#NUM!		**0 C**		#VALUE!	
46	2.30	**7.55**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**0 C**		#NUM!		**0 C**		#NUM!		**0 C**		#VALUE!	
47	2.35	**7.71**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**0 C**		#NUM!		**0 C**		#NUM!		**0 C**		#VALUE!	
48	2.40	**7.87**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**0 C**		#NUM!		**0 C**		#NUM!		**0 C**		#VALUE!	
49	2.45	**8.04**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**0 C**		#NUM!		**0 C**		#NUM!		**0 C**		#VALUE!	
50	2.50	**8.20**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**0 C**		#NUM!		**0 C**		#NUM!		**0 C**		#VALUE!	
51	2.55	**8.37**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**0 C**		#NUM!		**0 C**		#NUM!		**0 C**		#VALUE!	
52	2.60	**8.53**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**0 C**		#NUM!		**0 C**		#NUM!		**0 C**		#VALUE!	
53	2.65	**8.69**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**0 C**		#NUM!		**0 C**		#NUM!		**0 C**		#VALUE!	
54	2.70	**8.86**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**0 C**		#NUM!		**0 C**		#NUM!		**0 C**		#VALUE!	
55	2.75	**9.02**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**5 M**		---	**NL**	**6 S**		---	**NL**	**0 C**		#NUM!		**0 C**		#NUM!		**0 C**		#VALUE!	
56	2.80	**9.19**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**5 M**		---	**NL**	**6 S**		---	**NL**	**0 C**		#NUM!		**0 C**		#NUM!		**0 C**		#VALUE!	
57	2.85	**9.35**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**5 M**		---	**NL**	**6 S**		---	**NL**	**0 C**		#NUM!		**0 C**		#NUM!		**0 C**		#VALUE!	
58	2.90	**9.51**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**5 M**		---	**NL**	**6 S**		---	**NL**	**0 C**		#NUM!		**0 C**		#NUM!		**0 C**		#VALUE!	
59	2.95	**9.68**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**5 M**		---	**NL**	**6 S**		---	**NL**	**0 C**		#NUM!		**0 C**		#NUM!		**0 C**		#VALUE!	
60	3.00	**9.84**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**5 M**		---	**NL**	**6 S**		---	**NL**	**0 C**		#NUM!		**0 C**		#NUM!		**0 C**		#VALUE!	
61	3.05	**10.01**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**5 M**		---	**NL**	**5 M**		---	**NL**	**0 C**		#NUM!		**0 C**		#NUM!		**0 C**		#VALUE!	
62	3.10	**10.17**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**5 M**		---	**NL**	**5 M**		---	**NL**	**0 C**		#NUM!		**0 C**		#NUM!		**0 C**		#VALUE!	
63	3.15	**10.33**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**5 M**		---	**NL**	**5 M**		---	**NL**	**0 C**		#NUM!		**0 C**		#NUM!		**0 C**		#VALUE!	
64	3.20	**10.50**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**5 M**		---	**NL**	**5 M**		---	**NL**	**0 C**		#NUM!		**0 C**		#NUM!		**0 C**		#VALUE!	
65	3.25	**10.66**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**5 M**		---	**NL**	**5 M**		---	**NL**	**0 C**		#NUM!		**0 C**		#NUM!		**0 C**		#VALUE!	
66	3.30	**10.83**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**5 M**		---	**NL**	**6 S**		---	**NL**	**0 C**		#NUM!		**0 C**		#NUM!		**0 C**		#VALUE!	
67	3.35	**10.99**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**0 C**		#NUM!		**0 C**		#NUM!		**0 C**		#VALUE!	
68	3.40	**11.15**	**6 S**		---	**NL**	**6 S**		---	**NL**	**6 S**		---	**NL**	**5 M**		---	**NL**	**6 S**		---	**NL**	**0 C**		#NUM!		**0 C**		#NUM!		**0 C**		#VALUE!	

SUMMARY SHEET

of Geotechnical and Geoenvironmental Engineering, ASCE, Vol. 127, No. 10 (October 2001), pp. 817-833.

CLIENT: **NUWI - Lyons Canyon, LLC**
RTF JOB: **2020-200**
PROJ. : **Lyons Canyon**
BY: **AWR**
DATE: **02/08/2021**

Z	Ic	Soil	rd#	Reference
3	>2.95	Clay to Silty Clay	1	Tokimatsu & Yoshimi (1983)
4	<2.95	Clayey Silt to Silty Clay	2	Seed & Idriss mean (1971) and Youd (1997)
5	<2.6	Silty Sand to Sandy Silt	3	Seed & Idriss lower limit (1971)
6	<2.05	Clean Sand to Silty Sand	4	Idriss & Golesorkhi (1997)
7	<1.31	Gravelly Sand to Sand	5	Site-Specific

FS = Threshold Factor of Safety = **1.30**
NL = Not liquefiable
Liquefiable Ic (between 1.5 and 2.6) = **2.60** (usu. 2.05 to 2.6)
Seismic Settlement Soil (Type) = **3**

amax = **1.17** g
Mag = **6.8** MSF **1.28**
Pa = 1.04427 tsf MSP calc 1.2846274
Fill Density = **125** pcf

Depth			CPT-1 1-13-21			CPT-2 1-13-21			CPT-3 1-13-21			CPT-4 1-13-21			CPT-5 1-13-21			CPT-*** 0-0-00		CPT-*** 0-0-00		CPT-*** 0-0-00	
69	3.45	11.32	6 S	---	NL	6 S	---	NL	6 S	---	NL	5 M	---	NL	6 S	---	NL	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
70	3.50	11.48	6 S	---	NL	6 S	---	NL	6 S	---	NL	5 M	---	NL	6 S	---	NL	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
71	3.55	11.65	6 S	---	NL	6 S	---	NL	6 S	---	NL	6 S	---	NL	6 S	---	NL	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
72	3.60	11.81	6 S	---	NL	6 S	---	NL	6 S	---	NL	6 S	---	NL	6 S	---	NL	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
73	3.65	11.98	6 S	---	NL	6 S	---	NL	6 S	---	NL	6 S	---	NL	6 S	---	NL	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
74	3.70	12.14	6 S	---	NL	6 S	---	NL	6 S	---	NL	6 S	---	NL	6 S	---	NL	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
75	3.75	12.30	6 S	---	NL	6 S	---	NL	6 S	---	NL	6 S	---	NL	6 S	---	NL	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
76	3.80	12.47	6 S	---	NL	6 S	---	NL	6 S	---	NL	5 M	---	NL	6 S	---	NL	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
77	3.85	12.63	6 S	---	NL	6 S	---	NL	6 S	---	NL	5 M	---	NL	6 S	---	NL	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
78	3.90	12.80	6 S	---	NL	5 M	---	NL	6 S	---	NL	5 M	---	NL	6 S	---	NL	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
79	3.95	12.96	5 M	---	NL	5 M	---	NL	6 S	---	NL	6 S	---	NL	6 S	---	NL	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
80	4.00	13.12	5 M	---	NL	5 M	---	NL	6 S	---	NL	5 M	---	NL	6 S	---	NL	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
81	4.05	13.29	5 M	---	NL	6 S	---	NL	6 S	---	NL	5 M	---	NL	6 S	---	NL	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
82	4.10	13.45	6 S	---	NL	5 M	---	NL	6 S	---	NL	5 M	---	NL	5 M	---	NL	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
83	4.15	13.62	6 S	---	NL	6 S	---	NL	6 S	---	NL	5 M	---	NL	5 M	---	NL	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
84	4.20	13.78	6 S	---	NL	6 S	---	NL	6 S	---	NL	5 M	---	NL	5 M	---	NL	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
85	4.25	13.94	6 S	---	NL	5 M	---	NL	6 S	---	NL	5 M	---	NL	5 M	---	NL	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
86	4.30	14.11	6 S	---	NL	6 S	---	NL	6 S	---	NL	5 M	---	NL	5 M	---	NL	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
87	4.35	14.27	6 S	---	NL	6 S	---	NL	6 S	---	NL	5 M	---	NL	5 M	---	NL	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
88	4.40	14.44	6 S	---	NL	6 S	---	NL	6 S	---	NL	5 M	---	NL	5 M	---	NL	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
89	4.45	14.60	6 S	---	NL	6 S	---	NL	6 S	---	NL	5 M	---	NL	5 M	---	NL	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
90	4.50	14.76	6 S	---	NL	5 M	---	NL	6 S	---	NL	5 M	---	NL	5 M	---	NL	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
91	4.55	14.93	6 S	---	NL	5 M	---	NL	6 S	---	NL	5 M	---	NL	6 S	---	NL	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
92	4.60	15.09	6 S	---	NL	5 M	---	NL	6 S	---	NL	5 M	---	NL	6 S	---	NL	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
93	4.65	15.26	6 S	---	NL	6 S	---	NL	6 S	---	NL	5 M	---	NL	5 M	---	NL	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
94	4.70	15.42	6 S	---	NL	5 M	---	NL	6 S	---	NL	5 M	---	NL	5 M	---	NL	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
95	4.75	15.58	6 S	---	NL	5 M	---	NL	6 S	---	NL	5 M	---	NL	5 M	---	NL	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
96	4.80	15.75	6 S	---	NL	5 M	---	NL	6 S	---	NL	5 M	---	NL	5 M	---	NL	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
97	4.85	15.91	6 S	---	NL	5 M	---	NL	6 S	---	NL	5 M	---	NL	5 M	---	NL	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
98	4.90	16.08	6 S	---	NL	5 M	---	NL	6 S	---	NL	5 M	---	NL	5 M	---	NL	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
99	4.95	16.24	6 S	---	NL	5 M	---	NL	6 S	---	NL	5 M	---	NL	5 M	---	NL	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
100	5.00	16.40	6 S	---	NL	4 C	---	NL	6 S	---	NL	5 M	---	NL	5 M	---	NL	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
101	5.05	16.57	6 S	---	NL	4 C	---	NL	6 S	---	NL	5 M	---	NL	5 M	---	NL	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
102	5.10	16.73	6 S	---	NL	4 C	---	NL	6 S	---	NL	5 M	---	NL	5 M	---	NL	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
103	5.15	16.90	6 S	---	NL	4 C	---	NL	6 S	---	NL	5 M	---	NL	5 M	---	NL	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
104	5.20	17.06	6 S	---	NL	4 C	---	NL	6 S	---	NL	5 M	---	NL	5 M	---	NL	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
105	5.25	17.22	6 S	---	NL	4 C	---	NL	6 S	---	NL	5 M	---	NL	5 M	---	NL	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
106	5.30	17.39	6 S	---	NL	4 C	---	NL	6 S	---	NL	4 C	---	NL	5 M	---	NL	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
107	5.35	17.55	6 S	---	NL	5 M	---	NL	5 M	---	NL	5 M	---	NL	5 M	---	NL	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
108	5.40	17.72	6 S	---	NL	5 M	---	NL	5 M	---	NL	5 M	---	NL	5 M	---	NL	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
109	5.45	17.88	6 S	---	NL	5 M	---	NL	5 M	---	NL	5 M	---	NL	5 M	---	NL	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
110	5.50	18.04	6 S	---	NL	5 M	---	NL	5 M	---	NL	5 M	---	NL	5 M	---	NL	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
111	5.55	18.21	6 S	---	NL	5 M	---	NL	5 M	---	NL	5 M	---	NL	5 M	---	NL	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
112	5.60	18.37	6 S	---	NL	5 M	---	NL	5 M	---	NL	5 M	---	NL	5 M	---	NL	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
113	5.65	18.54	6 S	---	NL	5 M	---	NL	6 S	---	NL	5 M	---	NL	5 M	---	NL	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
114	5.70	18.70	6 S	---	NL	4 C	---	NL	6 S	---	NL	5 M	---	NL	5 M	---	NL	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
115	5.75	18.86	6 S	---	NL	5 M	---	NL	6 S	---	NL	5 M	---	NL	5 M	---	NL	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
116	5.80	19.03	6 S	---	NL	5 M	---	NL	6 S	---	NL	5 M	---	NL	5 M	---	NL	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
117	5.85	19.19	6 S	---	NL	4 C	---	NL	5 M	---	NL	5 M	---	NL	5 M	---	NL	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
118	5.90	19.36	6 S	---	NL	4 C	---	NL	5 M	---	NL	5 M	---	NL	5 M	---	NL	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
119	5.95	19.52	6 S	---	NL	4 C	---	NL	5 M	---	NL	5 M	---	NL	5 M	---	NL	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
120	6.00	19.69	6 S	---	NL	5 M	---	NL	5 M	---	NL	5 M	---	NL	5 M	---	NL	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
121	6.05	19.85	6 S	---	NL	5 M	---	NL	5 M	---	NL	5 M	---	NL	5 M	---	NL	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
122	6.10	20.01	6 S	---	NL	5 M	---	NL	5 M	---	NL	5 M	---	NL	5 M	---	NL	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
123	6.15	20.18	6 S	---	NL	5 M	---	NL	5 M	---	NL	5 M	---	NL	5 M	---	NL	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
124	6.20	20.34	6 S	---	NL	5 M	---	NL	5 M	---	NL	5 M	---	NL	6 S	---	NL	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
125	6.25	20.51	6 S	---	NL	5 M	---	NL	5 M	---	NL	5 M	---	NL	5 M	---	NL	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
126	6.30	20.67	6 S	---	NL	6 S	---	NL	5 M	---	NL	5 M	---	NL	5 M	---	NL	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
127	6.35	20.83	6 S	---	NL	5 M	---	NL	5 M	---	NL	5 M	---	NL	5 M	---	NL	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
128	6.40	21.00	5 M	---	NL	5 M	---	NL	5 M	---	NL	5 M	---	NL	5 M	---	NL	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
129	6.45	21.16	5 M	---	NL	5 M	---	NL	5 M	---	NL	5 M	---	NL	5 M	---	NL	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
130	6.50	21.33	5 M	---	NL	5 M	---	NL	5 M	---	NL	5 M	---	NL	5 M	---	NL	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
131	6.55	21.49	6 S	---	NL	5 M	---	NL	5 M	---	NL	5 M	---	NL	5 M	---	NL	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
132	6.60	21.65	5 M	---	NL	5 M	---	NL	6 S	---	NL	5 M	---	NL	5 M	---	NL	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
133	6.65	21.82	6 S	---	NL	5 M	---	NL	6 S	---	NL	5 M	---	NL	5 M	---	NL	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
134	6.70	21.98	6 S	---	NL	5 M	---	NL	6 S	---	NL	5 M	---	NL	5 M	---	NL	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
135	6.75	22.15	6 S	---	NL	5 M	---	NL	6 S	---	NL	5 M	---	NL	5 M	---	NL	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
136	6.80	22.31	6 S	---	NL	4 C	---	NL	6 S	---	NL	5 M	---	NL	5 M	---	NL	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
137	6.85	22.47	6 S	---	NL	4 C	---	NL	6 S	---	NL	5 M	---	NL	5 M	---	NL	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
138	6.90	22.64	6 S	---	NL	5 M	---	NL	6 S	---	NL	5 M	---	NL	5 M	---	NL	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
139	6.95	22.80	6 S	---	NL	5 M	---	NL	6 S	---	NL	5 M	---	NL	5 M	---	NL	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
140	7.00	22.97	5 M	---	NL	4 C	---	NL	6 S	---	NL	5 M	---	NL	5 M	---	NL	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
141	7.05	23.13	5 M	---	NL	4 C	---	NL	6 S	---	NL	5 M	---	NL	5 M	---	NL	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
142	7.10	23.29	5 M	---	NL	5 M	---	NL	6 S	---	NL	5 M	---	NL	5 M	---	NL	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
143	7.15	23.46	5 M	---	NL	5 M	---	NL	6 S	---	NL	5 M	---	NL	5 M	---	NL	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
144	7.20	23.62	5 M	---	NL	5 M	---	NL	6 S	---	NL	5 M	---	NL	5 M	---	NL	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
145	7.25	23.79	5 M	---	NL	5 M	---	NL	6 S	---	NL	5 M	---	NL	5 M	---	NL	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
146	7.30	23.95	5 M	---	NL	5 M	---	NL	6 S	---	NL	5 M	---	NL	5 M	---	NL	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
147	7.35	24.11	5 M	---	NL	5 M	---	NL	6 S	---	NL	5 M	---	NL	5 M	---	NL	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
148	7.40	24.28	5 M	---	NL	5 M	---	NL	6 S	---	NL	5 M	---	NL	5 M	---	NL	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
149	7.45	24.44	6 S	---	NL	5 M	---	NL	6 S	---	NL	5 M	---	NL	5 M	---	NL	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
150	7.50	24.61	6 S	---	NL	5 M	---	NL	6 S	---	NL	5 M	---	NL	5 M	---	NL	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
151	7.55	24.77	6 S	---	NL	5 M	---	NL	6 S	---	NL	5 M	---	NL	5 M	---	NL	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
152	7.60	24.93	6 S	---	NL	5 M	---	NL	6 S	---	NL	5 M	---	NL	5 M	---	NL	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
153	7.65	25.10	6 S	---	NL	5 M	---	NL	6 S	---	NL	5 M	---	NL	5 M	---	NL	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!
154	7.70	25.26	6 S	---	NL	5 M	---	NL	6 S	---	NL	5 M	---	NL	5 M	---	NL	0 C	#NUM!	0 C	#NUM!	0 C	#VALUE!

SUMMARY SHEET

of Geotechnical and Geoenvironmental Engineering, ASCE, Vol. 127, No. 10 (October 2001), pp. 817-833.

CLIENT: **NUWI - Lyons Canyon, LLC**
RTF JOB: **2020-200**
PROJ. : **Lyons Canyon**
BY: **AWR**
DATE: **02/08/2021**

Z	Ic	Soil	rd#	Reference
3	>2.95	Clay to Silty Clay	1	Tokimatsu & Yoshimi (1983)
4	<2.95	Clayey Silt to Silty Clay	2	Seed & Idriss mean (1971) and Youd (1997)
5	<2.6	Silty Sand to Sandy Silt	3	Seed & Idriss lower limit (1971)
6	<2.05	Clean Sand to Silty Sand	4	Idriss & Golesorkhi (1997)
7	<1.31	Gravelly Sand to Sand	5	Site-Specific

FS = Threshold Factor of Safety = **1.30**
NL = Not liquefiable
Liquefiable Ic (between 1.5 and 2.6) = **2.60** (usu. 2.05 to 2.6)
Seismic Settlement Soil (Type) = **3**

amax = **1.17** g
Mag = **6.8** MSF **1.28**
Pa = 1.04427 tsf MSP calc 1.2846274
Fill Density = **125** pcf

Depth			CPT-1	1-13-21			CPT-2	1-13-21			CPT-3	1-13-21			CPT-4	1-13-21			CPT-5	1-13-21			CPT-***	0-0-00		CPT-***	0-0-00		CPT-***	0-0-00	
155	7.75	**25.43**	5 M		---	NL	5 M		---	NL	6 S		---	NL	5 M		---	NL	5 M		---	NL	0 C		#NUM!	0 C		#NUM!	0 C		#VALUE!
156	7.80	**25.59**	5 M		---	NL	5 M		---	NL	6 S		---	NL	5 M		---	NL	5 M		---	NL	0 C		#NUM!	0 C		#NUM!	0 C		#VALUE!
157	7.85	**25.75**	5 M		---	NL	5 M		---	NL	6 S		---	NL	5 M		---	NL	5 M		---	NL	0 C		#NUM!	0 C		#NUM!	0 C		#VALUE!
158	7.90	**25.92**	6 S		---	NL	5 M		---	NL	6 S		---	NL	5 M		---	NL	5 M		---	NL	0 C		#NUM!	0 C		#NUM!	0 C		#VALUE!
159	7.95	**26.08**	6 S		---	NL	5 M		---	NL	6 S		---	NL	5 M		---	NL	5 M		---	NL	0 C		#NUM!	0 C		#NUM!	0 C		#VALUE!
160	8.00	**26.25**	6 S		---	NL	5 M		---	NL	6 S		---	NL	5 M		---	NL	5 M		---	NL	0 C		#NUM!	0 C		#NUM!	0 C		#VALUE!
161	8.05	**26.41**	6 S		---	NL	5 M		---	NL	6 S		---	NL	5 M		---	NL	5 M		---	NL	0 C		#NUM!	0 C		#NUM!	0 C		#VALUE!
162	8.10	**26.57**	6 S		---	NL	5 M		---	NL	6 S		---	NL	5 M		---	NL	5 M		---	NL	0 C		#NUM!	0 C		#NUM!	0 C		#VALUE!
163	8.15	**26.74**	6 S		---	NL	5 M		---	NL	6 S		---	NL	5 M		---	NL	5 M		---	NL	0 C		#NUM!	0 C		#NUM!	0 C		#VALUE!
164	8.20	**26.90**	6 S		---	NL	5 M		---	NL	6 S		---	NL	4 C		---	NL	5 M		---	NL	0 C		#NUM!	0 C		#NUM!	0 C		#VALUE!
165	8.25	**27.07**	6 S		---	NL	5 M		---	NL	6 S		---	NL	4 C		---	NL	5 M		---	NL	0 C		#NUM!	0 C		#NUM!	0 C		#VALUE!
166	8.30	**27.23**	6 S		---	NL	5 M		---	NL	6 S		---	NL	4 C		---	NL	5 M		---	NL	0 C		#NUM!	0 C		#NUM!	0 C		#VALUE!
167	8.35	**27.40**	6 S		---	NL	5 M		---	NL	6 S		---	NL	4 C		---	NL	5 M		---	NL	0 C		#NUM!	0 C		#NUM!	0 C		#VALUE!
168	8.40	**27.56**	6 S		---	NL	5 M		---	NL	6 S		---	NL	4 C		---	NL	5 M		---	NL	0 C		#NUM!	0 C		#NUM!	0 C		#VALUE!
169	8.45	**27.72**	6 S		---	NL	5 M		---	NL	6 S		---	NL	5 M		---	NL	5 M		---	NL	0 C		#NUM!	0 C		#NUM!	0 C		#VALUE!
170	8.50	**27.89**	6 S		---	NL	5 M		---	NL	5 M		---	NL	5 M		---	NL	5 M		---	NL	0 C		#NUM!	0 C		#NUM!	0 C		#VALUE!
171	8.55	**28.05**	6 S		---	NL	5 M		---	NL	5 M		---	NL	5 M		---	NL	5 M		---	NL	0 C		#NUM!	0 C		#NUM!	0 C		#VALUE!
172	8.60	**28.22**	6 S		---	NL	5 M		---	NL	5 M		---	NL	4 C		---	NL	5 M		---	NL	0 C		#NUM!	0 C		#NUM!	0 C		#VALUE!
173	8.65	**28.38**	6 S		---	NL	5 M		---	NL	5 M		---	NL	5 M		---	NL	5 M		---	NL	0 C		#NUM!	0 C		#NUM!	0 C		#VALUE!
174	8.70	**28.54**	6 S		---	NL	5 M		---	NL	4 C		---	NL	5 M		---	NL	5 M		---	NL	0 C		#NUM!	0 C		#NUM!	0 C		#VALUE!
175	8.75	**28.71**	6 S		---	NL	5 M		---	NL	5 M		---	NL	5 M		---	NL	5 M		---	NL	0 C		#NUM!	0 C		#NUM!	0 C		#VALUE!
176	8.80	**28.87**	6 S		---	NL	5 M		---	NL	5 M		---	NL	5 M		---	NL	5 M		---	NL	0 C		#NUM!	0 C		#NUM!	0 C		#VALUE!
177	8.85	**29.04**	6 S		---	NL	5 M		---	NL	5 M		---	NL	5 M		---	NL	5 M		---	NL	0 C		#NUM!	0 C		#NUM!	0 C		#VALUE!
178	8.90	**29.20**	7 S		---	NL	5 M		---	NL	5 M		---	NL	5 M		---	NL	5 M		---	NL	0 C		#NUM!	0 C		#NUM!	0 C		#VALUE!
179	8.95	**29.36**	6 S		---	NL	5 M		---	NL	5 M		---	NL	5 M		---	NL	5 M		---	NL	0 C		#NUM!	0 C		#NUM!	0 C		#VALUE!
180	9.00	**29.53**	6 S		---	NL	7 S		---	NL	5 M		---	NL	5 M		---	NL	5 M		---	NL	0 C		#NUM!	0 C		#NUM!	0 C		#VALUE!
181	9.05	**29.69**	6 S		---	NL	7 S		---	NL	5 M		---	NL	5 M		---	NL	5 M		---	NL	0 C		#NUM!	0 C		#NUM!	0 C		#VALUE!
182	9.10	**29.86**	6 S		---	NL	7 S		---	NL	5 M		---	NL	5 M		---	NL	5 M		---	NL	0 C		#NUM!	0 C		#NUM!	0 C		#VALUE!
183	9.15	**30.02**	5 M	<1>	310.02	**0.38**	7 S		---	**38.74**	5 M		---	**3.83**	5 M	<1>	200.29	**0.22**	5 M	<1>	273.44	**0.36**	0 C		#NUM!	0 C		#NUM!	0 C		#VALUE!
184	9.20	**30.18**	5 M	<1>	155.01	**0.40**	0 C		---		6 S		---	**2.99**	5 M	<1>	100.14	**0.29**	6 S	<1>	136.72	**0.81**	0 C		#NUM!	0 C		#NUM!	0 C		#VALUE!
185	9.25	**30.35**	6 S	<1>	103.34	**0.22**	0 C		---		5 M		---	**3.26**	5 M	<1>	66.76	**0.39**	6 S	<1>	91.15	**0.89**	0 C		#NUM!	0 C		#NUM!	0 C		#VALUE!
186	9.30	**30.51**	6 S	<1>	77.50	**0.23**	0 C		---		5 M		---	**3.87**	5 M	<1>	50.07	**0.36**	6 S	<1>	68.36	**0.66**	0 C		#NUM!	0 C		#NUM!	0 C		#VALUE!
187	9.35	**30.68**	5 M	<1>	62.00	**0.22**	0 C		---		5 M		---	**4.51**	5 M	<1>	40.06	**0.43**	6 S	<1>	54.69	**0.48**	0 C		#NUM!	0 C		#NUM!	0 C		#VALUE!
188	9.40	**30.84**	5 M	<1>	51.67	**0.23**	0 C		---		6 S		---	**5.25**	5 M	<1>	33.38	**0.40**	6 S	<1>	45.57	**0.36**	0 C		#NUM!	0 C		#NUM!	0 C		#VALUE!
189	9.45	**31.00**	5 M	<1>	44.29	**0.28**	0 C		---		6 S		---	**5.42**	5 M	<1>	28.61	**0.38**	6 S	<1>	39.06	**0.29**	0 C		#NUM!	0 C		#NUM!	0 C		#VALUE!
190	9.50	**31.17**	6 S	<1>	38.75	**0.41**	0 C		---		6 S		---	**8.11**	5 M	<1>	25.04	**0.32**	5 M	<1>	34.18	**0.26**	0 C		#NUM!	0 C		#NUM!	0 C		#VALUE!
191	9.55	**31.33**	6 S	<1>	34.45	**0.65**	0 C		---		6 S		---	**9.52**	5 M	<1>	22.25	**0.31**	6 S	<1>	30.38	**0.26**	0 C		#NUM!	0 C		#NUM!	0 C		#VALUE!
192	9.60	**31.50**	6 S		34.56	**2.40**	0 C		---		6 S		---	**7.33**	5 M	<1>	20.03	**0.32**	6 S	<1>	27.34	**0.30**	0 C		#NUM!	0 C		#NUM!	0 C		#VALUE!
193	9.65	**31.66**	6 S		34.67	**6.37**	0 C		---		6 S		---	**5.29**	5 M	<1>	18.21	**0.30**	6 S	<1>	24.86	**0.31**	0 C		#NUM!	0 C		#NUM!	0 C		#VALUE!
194	9.70	**31.82**	6 S		34.78	**7.96**	0 C		---		6 S		---	**5.85**	5 M	<1>	16.69	**0.25**	6 S	<1>	22.79	**0.25**	0 C		#NUM!	0 C		#NUM!	0 C		#VALUE!
195	9.75	**31.99**	6 S		34.89	**6.16**	0 C		---		6 S		---	**3.56**	5 M	<1>	15.41	**0.46**	5 M	<1>	21.03	**0.22**	0 C		#NUM!	0 C		#NUM!	0 C		#VALUE!
196	9.80	**32.15**	6 S		35.00	**7.76**	0 C		---		6 S		---	**2.91**	5 M	<1>	14.31	**0.55**	5 M	<1>	19.53	**0.22**	0 C		#NUM!	0 C		#NUM!	0 C		#VALUE!
197	9.85	**32.32**	7 S		35.11	**11.11**	0 C		---		5 M		---	**1.87**	5 M	<1>	13.35	**0.39**	5 M	<1>	18.23	**0.23**	0 C		#NUM!	0 C		#NUM!	0 C		#VALUE!
198	9.90	**32.48**	6 S		35.22	**19.33**	0 C		---		5 M		---	**1.93**	6 S	<1>	12.52	**0.49**	5 M	<1>	17.09	**0.25**	0 C		#NUM!	0 C		#NUM!	0 C		#VALUE!
199	9.95	**32.64**	6 S		35.34	**11.26**	0 C		---		5 M		---	**2.35**	5 M	<1>	11.78	**0.51**	5 M	<1>	16.08	**0.19**	0 C		#NUM!	0 C		#NUM!	0 C		#VALUE!
200	10.00	**32.81**	6 S		35.45	**8.92**	0 C		---		5 M		---	**2.88**	6 S	<1>	11.13	**0.39**	5 M	<1>	15.19	**0.21**	0 C		#NUM!	0 C		#NUM!	0 C		#VALUE!
201	10.05	**32.97**	6 S		35.56	**5.06**	0 C		---		5 M		---	**2.86**	6 S	<1>	10.54	**0.51**	5 M	<1>	14.39	**0.24**	0 C		#NUM!	0 C		#NUM!	0 C		#VALUE!
202	10.10	**33.14**	6 S		35.67	**1.81**	0 C		---		5 M		---	**3.15**	6 S	<1>	10.01	**0.52**	5 M	<1>	13.67	**0.30**	0 C		#NUM!	0 C		#NUM!	0 C		#VALUE!
203	10.15	**33.30**	6 S	<1>	32.10	**0.92**	0 C		---		6 S		---	**2.15**	6 S	<1>	9.54	**0.43**	6 S	<1>	13.02	**0.40**	0 C		#NUM!	0 C		#NUM!	0 C		#VALUE!
204	10.20	**33.46**	6 S	<1>	29.18	**0.83**	0 C		---		6 S		---	**2.12**	6 S	<1>	9.10	**0.49**	6 S	<1>	12.43	**0.50**	0 C		#NUM!	0 C		#NUM!	0 C		#VALUE!
205	10.25	**33.63**	6 S	<1>	26.75	**0.76**	0 C		---		5 M		---	**2.34**	5 M	<1>	8.71	**0.76**	6 S	<1>	11.89	**0.53**	0 C		#NUM!	0 C		#NUM!	0 C		#VALUE!
206	10.30	**33.79**	6 S	<1>	24.69	**0.53**	0 C		---		5 M		---	**2.26**	5 M	<1>	8.35	**0.58**	6 S	<1>	11.39	**0.45**	0 C		#NUM!	0 C		#NUM!	0 C		#VALUE!
207	10.35	**33.96**	5 M	<1>	22.93	**0.38**	0 C		---		6 S		---	**2.08**	5 M	<1>	8.01	**0.48**	6 S	<1>	10.94	**0.43**	0 C		#NUM!	0 C		#NUM!	0 C		#VALUE!
208	10.40	**34.12**	5 M	<1>	21.40	**0.39**	0 C		---		5 M		---	**2.38**	5 M	<1>	7.70	**0.32**	6 S	<1>	10.52	**0.37**	0 C		#NUM!	0 C		#NUM!	0 C		#VALUE!
209	10.45	**34.28**	5 M	<1>	20.06	**0.36**	0 C		---		5 M		---	**2.37**	5 M	<1>	7.42	**0.57**	6 S	<1>	10.13	**0.31**	0 C		#NUM!	0 C		#NUM!	0 C		#VALUE!
210	10.50	**34.45**	5 M	<1>	18.88	**0.51**	0 C		---		5 M		---	**2.48**	5 M	<1>	7.15	**0.35**	6 S	<1>	9.77	**0.34**	0 C		#NUM!	0 C		#NUM!	0 C		#VALUE!
211	10.55	**34.61**	4 C		18.94	NL	0 C		---		0 C		---		5 M	<1>	6.91	**0.34**	6 S	<1>	9.43	**0.42**	0 C		#NUM!	0 C		#NUM!	0 C		#VALUE!
212	10.60	**34.78**	5 M		19.00	**1.40**	0 C		---		0 C		---		6 S	<1>	6.68	**0.96**	6 S	<1>	9.11	**0.42**	0 C		#NUM!	0 C		#NUM!	0 C		#VALUE!
213	10.65	**34.94**	6 S		19.06	**1.96**	0 C		---		0 C		---		4 C		6.71	NL	6 S	<1>	8.82	**0.42**	0 C		#NUM!	0 C		#NUM!	0 C		#VALUE!
214	10.70	**35.10**	6 S		19.12	**5.79**	0 C		---		0 C		---		5 M	<1>	6.49	**1.13**	6 S	<1>	8.55	**0.42**	0 C		#NUM!	0 C		#NUM!	0 C		#VALUE!
215	10.75	**35.27**	6 S		19.18	**3.14**	0 C		---		0 C		---		5 M	<1>	6.29	**0.30**	6 S	<1>	8.29	**0.38**	0 C		#NUM!	0 C		#NUM!	0 C		#VALUE!
216	10.80	**35.43**	6 S		19.24	**3.32**	0 C		---		0 C		---		5 M	<1>	6.10	**0.39**	6 S	<1>	8.04	**0.33**	0 C		#NUM!	0 C		#NUM!	0 C		#VALUE!
217	10.85	**35.60**	6 S		19.30	**4.52**	0 C		---		0 C		---		4 C		6.13	NL	5 M	<1>	7.81	**0.28**	0 C		#NUM!	0 C		#NUM!	0 C		#VALUE!
218	10.90	**35.76**	6 S		19.35	**6.23**	0 C		---		0 C		---		4 C		6.16	NL	5 M	<1>	7.60	**0.26**	0 C		#NUM!	0 C		#NUM!	0 C		#VALUE!
219	10.95	**35.93**	6 S		19.41	**8.73**	0 C		---		0 C		---		5 M	<1>	5.98	**0.42**	5 M	<1>	7.39	**0.26**	0 C		#NUM!	0 C		#NUM!	0 C		#VALUE!
220	11.00	**36.09**	6 S		19.47	**10.55**	0 C		---		0 C		---		5 M	<1>	5.81	**0.31**	5 M	<1>	7.20	**0.25**	0 C		#NUM!	0 C		#NUM!	0 C		#VALUE!
221	11.05	**36.25**	6 S		19.53	**20.25**	0 C		---		0 C		---		5 M	<1>	5.65	**0.40**	5 M	<1>	7.01	**0.23**	0 C		#NUM!	0 C		#NUM!	0 C		#VALUE!
222	11.10	**36.42**	6 S		19.59	**19.02**	0 C		---		0 C		---		5 M	<1>	5.49	**0.26**	5 M	<1>	6.84	**0.22**	0 C		#NUM!	0 C		#NUM!	0 C		#VALUE!
223	11.15	**36.58**	0 C		19.65		0 C		---		0 C		---		5 M	<1>	5.35	**0.25**	5 M	<1>	6.67	**0.21**	0 C		#NUM!	0 C		#NUM!	0 C		#VALUE!
224	11.20	**36.75**	0 C		19.71		0 C		---		0 C		---		5 M	<1>	5.21	**0.49**	5 M	<1>	6.51	**0.21**	0 C		#NUM!	0 C		#NUM!	0 C		#VALUE!
225	11.25	**36.91**	0 C		19.77		0 C		---		0 C		---		5 M	<1>	5.08	**0.39**	5 M	<1>	6.36	**0.23**	0 C		#NUM!	0 C		#NUM!	0 C		#VALUE!
226	11.30	**37.07**	0 C		19.82		0 C		---		0 C		---		5 M	<1>	4.96	**0.41**	5 M	<1>	6.21	**0.25**	0 C		#NUM!	0 C		#NUM!	0 C		#VALUE!
227	11.35	**37.24**	0 C		19.88		0 C		---		0 C		---		5 M	<1>	4.84	**0.76**	5 M	<1>	6.08	**0.26**	0 C		#NUM!	0 C		#NUM!	0 C		#VALUE!
228	11.40	**37.40**	0 C		19.94		0 C		---		0 C		---		4 C		4.86	NL	5 M	<1>	5.94	**0.25**	0 C		#NUM!	0 C		#NUM!	0 C		#VALUE!
229	11.45	**37.57**	0 C		20.00		0 C		---		0 C		---		5 M	<1>	4.75	**0.62**	5 M	<1>	5.82	**0.24**	0 C		#NUM!	0 C		#NUM!	0 C		#VALUE!
230	11.50	**37.73**	0 C		20.06		0 C		---		0 C		---		5 M	<1>	4.64	**0.27**	5 M	<1>	5.70	**0.24**	0 C		#NUM!	0 C		#NUM!	0 C		#VALUE!
231	11.55	**37.89**	0 C		20.12		0 C		---		0 C		---		5 M	<1>	4.54	**0.40**	5 M	<1>	5.58	**0.24**	0 C		#NUM!	0 C		#NUM!	0 C		#VALUE!
232	11.60	**38.06**	0 C		20.18		0 C		---		0 C		---		5 M	<1>	4.44	**0.59**	5 M	<1>	5.47	**0.24**	0 C		#NUM!	0 C		#NUM!	0 C		#VALUE!
233	11.65	**38.22**	0 C		20.24		0 C		---		0 C		---		5 M	<1>	4.35	**0.52**	5 M	<1>	5.36	**0.24**	0 C		#NUM!	0 C		#NUM!	0 C		#VALUE!
234	11.70	**38.39**	0 C		20.30		0 C		---		0 C		---		5 M	<1>	4.26	**0.50**	5 M	<1>	5.26	**0.28**	0 C		#NUM!	0 C		#NUM!	0 C		#VALUE!
235	11.75	**38.55**	0 C		20.35		0 C		---		0 C		---		6 S	<1>	4.17	**0.66**	5 M	<1>	5.16	**0.27**	0 C		#NUM!	0 C		#NUM!	0 C		#VALUE!
236	11.80	**38.71**	0 C		20.41		0 C		---		0 C		---		6 S	<1>	4.09	**0.64**	5 M	<1>	5.06	**0.35**	0 C		#NUM!	0 C		#NUM!	0 C		#VALUE!
237	11.85	**38.88**	0 C		20.47		0 C		---		0 C		---		5 M	<1>	4.01	**1.29**	6 S	<1>	4.97	**0.46**	0 C		#NUM!	0 C		#NUM!	0 C		#VALUE!
238	11.90	**39.04**	0 C		20.53		0 C		---		0 C		---		5 M		4.03	**1.73**	6 S	<1>	4.88	**0.52**	0 C		#NUM!	0 C		#NUM!	0 C		#VALUE!
239	11.95	**39.21**	0 C		20.59		0 C		---		0 C		---		5 M		4.04	**3.13**	6 S	<1>	4.80	**0.75**	0 C		#NUM!	0 C		#NUM!	0 C		#VALUE!
240	12.00	**39.37**	0 C		20.65		0 C		---		0 C		---		6 S		4.06	**3.21**	6 S	<1>	4.71	**1.04**	0 C		#NUM!	0 C		#NUM!	0 C		#VALUE!

SUMMARY SHEET

of Geotechnical and Geoenvironmental Engineering, ASCE, Vol. 127, No. 10 (October 2001), pp. 817-833.

CLIENT: **NUWI - Lyons Canyon, LLC**
RTF JOB: **2020-200**
PROJ. : **Lyons Canyon**
BY: **AWR**
DATE: **02/08/2021**

Z	Ic	Soil	rd#	Reference
3	>2.95	Clay to Silty Clay	1	Tokimatsu & Yoshimi (1983)
4	<2.95	Clayey Silt to Silty Clay	2	Seed & Idriss mean (1971) and Youd (1997)
5	<2.6	Silty Sand to Sandy Silt	3	Seed & Idriss lower limit (1971)
6	<2.05	Clean Sand to Silty Sand	4	Idriss & Golesorkhi (1997)
7	<1.31	Gravelly Sand to Sand	5	Site-Specific

FS = Threshold Factor of Safety = **1.30**
NL = Not liquefiable
Liquefiable Ic (between 1.5 and 2.6) = **2.60** (usu. 2.05 to 2.6)
Seismic Settlement Soil (Type) = **3**

amax = **1.17** g
Mag = **6.8** MSF 1.28
Pa = 1.04427 tsf MSP calc 1.2846274
Fill Density = **125** pcf

Depth			CPT-1	1-13-21	CPT-2	1-13-21	CPT-3	1-13-21	CPT-4	1-13-21		CPT-5	1-13-21		CPT-***	0-0-00	CPT-***	0-0-00	CPT-***	0-0-00
241	12.05	**39.53**	**0 C**	20.71	**0 C**	---	**0 C**	---	**6 S**	4.08	**3.52**	**6 S**	<1>	4.63	**1.06**	**0 C**	#NUM!	**0 C**	#NUM!	**0 C**	#VALUE!
242	12.10	**39.70**	**0 C**	20.77	**0 C**	---	**0 C**	---	**6 S**	4.10	**3.85**	**6 S**	<1>	4.56	**0.52**	**0 C**	#NUM!	**0 C**	#NUM!	**0 C**	#VALUE!
243	12.15	**39.86**	**0 C**	20.82	**0 C**	---	**0 C**	---	**0 C**	4.12		**6 S**	<1>	4.48	**0.79**	**0 C**	#NUM!	**0 C**	#NUM!	**0 C**	#VALUE!
244	12.20	**40.03**	**0 C**	20.88	**0 C**	---	**0 C**	---	**0 C**	4.14		**6 S**	<1>	4.41	**1.01**	**0 C**	#NUM!	**0 C**	#NUM!	**0 C**	#VALUE!
245	12.25	**40.19**	**0 C**	20.94	**0 C**	---	**0 C**	---	**0 C**	4.16		**6 S**	<1>	4.34	**1.17**	**0 C**	#NUM!	**0 C**	#NUM!	**0 C**	#VALUE!
246	12.30	**40.35**	**0 C**	21.00	**0 C**	---	**0 C**	---	**0 C**	4.18		**6 S**		4.36	**1.65**	**0 C**	#NUM!	**0 C**	#NUM!	**0 C**	#VALUE!
247	12.35	**40.52**	**0 C**	21.06	**0 C**	---	**0 C**	---	**0 C**	4.20		**6 S**		4.37	**1.87**	**0 C**	#NUM!	**0 C**	#NUM!	**0 C**	#VALUE!
248	12.40	**40.68**	**0 C**	21.12	**0 C**	---	**0 C**	---	**0 C**	4.22		**6 S**		4.39	**1.64**	**0 C**	#NUM!	**0 C**	#NUM!	**0 C**	#VALUE!
249	12.45	**40.85**	**0 C**	21.18	**0 C**	---	**0 C**	---	**0 C**	4.24		**6 S**	<1>	4.32	**1.22**	**0 C**	#NUM!	**0 C**	#NUM!	**0 C**	#VALUE!
250	12.50	**41.01**	**0 C**	21.24	**0 C**	---	**0 C**	---	**0 C**	4.26		**6 S**	<1>	4.25	**0.98**	**0 C**	#NUM!	**0 C**	#NUM!	**0 C**	#VALUE!
251	12.55	**41.17**	**0 C**	21.30	**0 C**	---	**0 C**	---	**0 C**	4.28		**6 S**	<1>	4.19	**0.92**	**0 C**	#NUM!	**0 C**	#NUM!	**0 C**	#VALUE!
252	12.60	**41.34**	**0 C**	21.35	**0 C**	---	**0 C**	---	**0 C**	4.30		**6 S**	<1>	4.13	**0.73**	**0 C**	#NUM!	**0 C**	#NUM!	**0 C**	#VALUE!
253	12.65	**41.50**	**0 C**	21.41	**0 C**	---	**0 C**	---	**0 C**	4.32		**6 S**	<1>	4.07	**0.90**	**0 C**	#NUM!	**0 C**	#NUM!	**0 C**	#VALUE!
254	12.70	**41.67**	**0 C**	21.47	**0 C**	---	**0 C**	---	**0 C**	4.34		**6 S**	<1>	4.01	**0.77**	**0 C**	#NUM!	**0 C**	#NUM!	**0 C**	#VALUE!
255	12.75	**41.83**	**0 C**	21.53	**0 C**	---	**0 C**	---	**0 C**	4.36		**6 S**	<1>	3.95	**0.50**	**0 C**	#NUM!	**0 C**	#NUM!	**0 C**	#VALUE!
256	12.80	**41.99**	**0 C**	21.59	**0 C**	---	**0 C**	---	**0 C**	4.38		**6 S**	<1>	3.89	**0.34**	**0 C**	#NUM!	**0 C**	#NUM!	**0 C**	#VALUE!
257	12.85	**42.16**	**0 C**	21.65	**0 C**	---	**0 C**	---	**0 C**	4.40		**5 M**	<1>	3.84	**0.28**	**0 C**	#NUM!	**0 C**	#NUM!	**0 C**	#VALUE!
258	12.90	**42.32**	**0 C**	21.71	**0 C**	---	**0 C**	---	**0 C**	4.42		**5 M**	<1>	3.79	**0.24**	**0 C**	#NUM!	**0 C**	#NUM!	**0 C**	#VALUE!
259	12.95	**42.49**	**0 C**	21.77	**0 C**	---	**0 C**	---	**0 C**	4.44		**5 M**	<1>	3.74	**0.24**	**0 C**	#NUM!	**0 C**	#NUM!	**0 C**	#VALUE!
260	13.00	**42.65**	**0 C**	21.82	**0 C**	---	**0 C**	---	**0 C**	4.46		**5 M**	<1>	3.69	**0.24**	**0 C**	#NUM!	**0 C**	#NUM!	**0 C**	#VALUE!
261	13.05	**42.81**	**0 C**	21.88	**0 C**	---	**0 C**	---	**0 C**	4.48		**5 M**	<1>	3.64	**0.25**	**0 C**	#NUM!	**0 C**	#NUM!	**0 C**	#VALUE!
262	13.10	**42.98**	**0 C**	21.94	**0 C**	---	**0 C**	---	**0 C**	4.50		**5 M**	<1>	3.59	**0.25**	**0 C**	#NUM!	**0 C**	#NUM!	**0 C**	#VALUE!
263	13.15	**43.14**	**0 C**	22.00	**0 C**	---	**0 C**	---	**0 C**	4.52		**5 M**	<1>	3.54	**0.25**	**0 C**	#NUM!	**0 C**	#NUM!	**0 C**	#VALUE!
264	13.20	**43.31**	**0 C**	22.06	**0 C**	---	**0 C**	---	**0 C**	4.54		**5 M**	<1>	3.50	**0.25**	**0 C**	#NUM!	**0 C**	#NUM!	**0 C**	#VALUE!
265	13.25	**43.47**	**0 C**	22.12	**0 C**	---	**0 C**	---	**0 C**	4.55		**5 M**	<1>	3.46	**0.26**	**0 C**	#NUM!	**0 C**	#NUM!	**0 C**	#VALUE!
266	13.30	**43.64**	**0 C**	22.18	**0 C**	---	**0 C**	---	**0 C**	4.57		**5 M**	<1>	3.41	**0.28**	**0 C**	#NUM!	**0 C**	#NUM!	**0 C**	#VALUE!
267	13.35	**43.80**	**0 C**	22.24	**0 C**	---	**0 C**	---	**0 C**	4.59		**5 M**	<1>	3.37	**0.28**	**0 C**	#NUM!	**0 C**	#NUM!	**0 C**	#VALUE!
268	13.40	**43.96**	**0 C**	22.30	**0 C**	---	**0 C**	---	**0 C**	4.61		**5 M**	<1>	3.33	**0.28**	**0 C**	#NUM!	**0 C**	#NUM!	**0 C**	#VALUE!
269	13.45	**44.13**	**0 C**	22.35	**0 C**	---	**0 C**	---	**0 C**	4.63		**5 M**	<1>	3.29	**0.27**	**0 C**	#NUM!	**0 C**	#NUM!	**0 C**	#VALUE!
270	13.50	**44.29**	**0 C**	22.41	**0 C**	---	**0 C**	---	**0 C**	4.65		**5 M**	<1>	3.25	**0.29**	**0 C**	#NUM!	**0 C**	#NUM!	**0 C**	#VALUE!
271	13.55	**44.46**	**0 C**	22.47	**0 C**	---	**0 C**	---	**0 C**	4.67		**5 M**	<1>	3.21	**0.34**	**0 C**	#NUM!	**0 C**	#NUM!	**0 C**	#VALUE!
272	13.60	**44.62**	**0 C**	22.53	**0 C**	---	**0 C**	---	**0 C**	4.69		**5 M**	<1>	3.18	**0.38**	**0 C**	#NUM!	**0 C**	#NUM!	**0 C**	#VALUE!
273	13.65	**44.78**	**0 C**	22.59	**0 C**	---	**0 C**	---	**0 C**	4.71		**5 M**	<1>	3.14	**0.54**	**0 C**	#NUM!	**0 C**	#NUM!	**0 C**	#VALUE!
274	13.70	**44.95**	**0 C**	22.65	**0 C**	---	**0 C**	---	**0 C**	4.73		**6 S**	<1>	3.11	**0.64**	**0 C**	#NUM!	**0 C**	#NUM!	**0 C**	#VALUE!
275	13.75	**45.11**	**0 C**	22.71	**0 C**	---	**0 C**	---	**0 C**	4.75		**6 S**	<1>	3.07	**0.77**	**0 C**	#NUM!	**0 C**	#NUM!	**0 C**	#VALUE!
276	13.80	**45.28**	**0 C**	22.77	**0 C**	---	**0 C**	---	**0 C**	4.77		**6 S**		3.08	**1.52**	**0 C**	#NUM!	**0 C**	#NUM!	**0 C**	#VALUE!
277	13.85	**45.44**	**0 C**	22.82	**0 C**	---	**0 C**	---	**0 C**	4.79		**6 S**		3.09	**2.24**	**0 C**	#NUM!	**0 C**	#NUM!	**0 C**	#VALUE!
278	13.90	**45.60**	**0 C**	22.88	**0 C**	---	**0 C**	---	**0 C**	4.81		**6 S**		3.10	**2.78**	**0 C**	#NUM!	**0 C**	#NUM!	**0 C**	#VALUE!
279	13.95	**45.77**	**0 C**	22.94	**0 C**	---	**0 C**	---	**0 C**	4.83		**6 S**		3.12	**3.09**	**0 C**	#NUM!	**0 C**	#NUM!	**0 C**	#VALUE!
280	14.00	**45.93**	**0 C**	23.00	**0 C**	---	**0 C**	---	**0 C**	4.85		**6 S**		3.13	**2.39**	**0 C**	#NUM!	**0 C**	#NUM!	**0 C**	#VALUE!
281	14.05	**46.10**	**0 C**	23.06	**0 C**	---	**0 C**	---	**0 C**	4.87		**6 S**		3.14	**1.97**	**0 C**	#NUM!	**0 C**	#NUM!	**0 C**	#VALUE!
282	14.10	**46.26**	**0 C**	23.12	**0 C**	---	**0 C**	---	**0 C**	4.89		**6 S**		3.15	**2.48**	**0 C**	#NUM!	**0 C**	#NUM!	**0 C**	#VALUE!
283	14.15	**46.42**	**0 C**	23.18	**0 C**	---	**0 C**	---	**0 C**	4.91		**6 S**		3.16	**1.88**	**0 C**	#NUM!	**0 C**	#NUM!	**0 C**	#VALUE!
284	14.20	**46.59**	**0 C**	23.24	**0 C**	---	**0 C**	---	**0 C**	4.93		**6 S**		3.17	**1.33**	**0 C**	#NUM!	**0 C**	#NUM!	**0 C**	#VALUE!
285	14.25	**46.75**	**0 C**	23.30	**0 C**	---	**0 C**	---	**0 C**	4.95		**6 S**		3.18	**1.47**	**0 C**	#NUM!	**0 C**	#NUM!	**0 C**	#VALUE!
286	14.30	**46.92**	**0 C**	23.35	**0 C**	---	**0 C**	---	**0 C**	4.97		**6 S**	<1>	3.15	**1.08**	**0 C**	#NUM!	**0 C**	#NUM!	**0 C**	#VALUE!
287	14.35	**47.08**	**0 C**	23.41	**0 C**	---	**0 C**	---	**0 C**	4.99		**5 M**	<1>	3.11	**1.10**	**0 C**	#NUM!	**0 C**	#NUM!	**0 C**	#VALUE!
288	14.40	**47.24**	**0 C**	23.47	**0 C**	---	**0 C**	---	**0 C**	5.01		**5 M**	<1>	3.08	**0.84**	**0 C**	#NUM!	**0 C**	#NUM!	**0 C**	#VALUE!
289	14.45	**47.41**	**0 C**	23.53	**0 C**	---	**0 C**	---	**0 C**	5.03		**5 M**	<1>	3.05	**1.00**	**0 C**	#NUM!	**0 C**	#NUM!	**0 C**	#VALUE!
290	14.50	**47.57**	**0 C**	23.59	**0 C**	---	**0 C**	---	**0 C**	5.04		**5 M**	<1>	3.02	**0.88**	**0 C**	#NUM!	**0 C**	#NUM!	**0 C**	#VALUE!
291	14.55	**47.74**	**0 C**	23.65	**0 C**	---	**0 C**	---	**0 C**	5.06		**5 M**	<1>	2.98	**0.76**	**0 C**	#NUM!	**0 C**	#NUM!	**0 C**	#VALUE!
292	14.60	**47.90**	**0 C**	23.71	**0 C**	---	**0 C**	---	**0 C**	5.08		**5 M**	<1>	2.95	**0.74**	**0 C**	#NUM!	**0 C**	#NUM!	**0 C**	#VALUE!
293	14.65	**48.06**	**0 C**	23.77	**0 C**	---	**0 C**	---	**0 C**	5.10		**5 M**	<1>	2.92	**0.59**	**0 C**	#NUM!	**0 C**	#NUM!	**0 C**	#VALUE!
294	14.70	**48.23**	**0 C**	23.82	**0 C**	---	**0 C**	---	**0 C**	5.12		**5 M**	<1>	2.89	**0.38**	**0 C**	#NUM!	**0 C**	#NUM!	**0 C**	#VALUE!
295	14.75	**48.39**	**0 C**	23.88	**0 C**	---	**0 C**	---	**0 C**	5.14		**5 M**	<1>	2.86	**0.31**	**0 C**	#NUM!	**0 C**	#NUM!	**0 C**	#VALUE!
296	14.80	**48.56**	**0 C**	23.94	**0 C**	---	**0 C**	---	**0 C**	5.16		**5 M**	<1>	2.84	**0.31**	**0 C**	#NUM!	**0 C**	#NUM!	**0 C**	#VALUE!
297	14.85	**48.72**	**0 C**	24.00	**0 C**	---	**0 C**	---	**0 C**	5.18		**4 C**		2.85	**NL**	**0 C**	#NUM!	**0 C**	#NUM!	**0 C**	#VALUE!
298	14.90	**48.88**	**0 C**	24.06	**0 C**	---	**0 C**	---	**0 C**	5.20		**3 C**		2.86	**NL**	**0 C**	#NUM!	**0 C**	#NUM!	**0 C**	#VALUE!
299	14.95	**49.05**	**0 C**	24.12	**0 C**	---	**0 C**	---	**0 C**	5.22		**4 C**		2.87	**NL**	**0 C**	#NUM!	**0 C**	#NUM!	**0 C**	#VALUE!
300	15.00	**49.21**	**0 C**	24.18	**0 C**	---	**0 C**	---	**0 C**	5.24		**4 C**		2.88	**NL**	**0 C**	#NUM!	**0 C**	#NUM!	**0 C**	#VALUE!
301	15.05	**49.38**	**0 C**	24.24	**0 C**	---	**0 C**	---	**0 C**	5.26		**5 M**	1	2.85	**0.32**	**0 C**	#NUM!	**0 C**	#NUM!	**0 C**	#VALUE!
302	15.10	**49.54**	**0 C**	24.30	**0 C**	---	**0 C**	---	**0 C**	5.28		**6 S**	1	2.82	**0.38**	**0 C**	#NUM!	**0 C**	#NUM!	**0 C**	#VALUE!
303	15.15	**49.70**	**0 C**	24.35	**0 C**	---	**0 C**	---	**0 C**	5.30		**6 S**	1	2.79	**0.37**	**0 C**	#NUM!	**0 C**	#NUM!	**0 C**	#VALUE!
304	15.20	**49.87**	**0 C**	24.41	**0 C**	---	**0 C**	---	**0 C**	5.32		**5 M**	1	2.77	**0.32**	**0 C**	#NUM!	**0 C**	#NUM!	**0 C**	#VALUE!
305	15.25	**50.03**	**0 C**	24.47	**0 C**	---	**0 C**	---	**0 C**	5.34		**5 M**	1	2.74	**0.30**	**0 C**	#NUM!	**0 C**	#NUM!	**0 C**	#VALUE!
306	15.30	**50.20**	**0 C**	24.53	**0 C**	---	**0 C**	---	**0 C**	5.36		**5 M**	1	2.71	**0.29**	**0 C**	#NUM!	**0 C**	#NUM!	**0 C**	#VALUE!
307	15.35	**50.36**	**0 C**	24.59	**0 C**	---	**0 C**	---	**0 C**	5.38		**5 M**	1	2.69	**0.29**	**0 C**	#NUM!	**0 C**	#NUM!	**0 C**	#VALUE!
308	15.40	**50.52**	**0 C**	24.65	**0 C**	---	**0 C**	---	**0 C**	5.40		**0 C**		2.70		**0 C**	#NUM!	**0 C**	#NUM!	**0 C**	#VALUE!
309	15.45	**50.69**	**0 C**	24.71	**0 C**	---	**0 C**	---	**0 C**	5.42		**0 C**		2.71		**0 C**	#NUM!	**0 C**	#NUM!	**0 C**	#VALUE!
310	15.50	**50.85**	**0 C**	24.77	**0 C**	---	**0 C**	---	**0 C**	5.44		**0 C**		2.72		**0 C**	#NUM!	**0 C**	#NUM!	**0 C**	#VALUE!

GREGG DRILLING & TESTING, INC.

SCPT-1

Average Unit Weight (psf)	120.00
Depth to Water (ft)	51.00

Interval Depth (ft)	Interval Velocity (ft/sec)	Vs (m/s)	Total Stress (psf)	Effective Stress (psf)	Effective Stress (kpa)	(Pa/∂')	(Pa/∂')0.25	Vsi (m/s)
4.9	9.8	719.7	588.0	588.0	28.1	3.6	1.4	988.1
9.8	14.9	699.7	1176.0	1176.0	56.3	1.8	1.2	807.8
14.9	20	964.1	1788.0	1788.0	85.6	1.2	1.0	1002.3
20	24.4	690.1	2400.0	2400.0	114.9	0.9	1.0	666.6
24.4	29.9	3274.6	2928.0	2928.0	140.2	0.7	0.9	3009.5
29.9	34.4	965.7	3588.0	3588.0	171.8	0.6	0.9	843.6
34.4	35.8	689.9	4128.0	4128.0	197.6	0.5	0.8	581.9

GREGG DRILLING & TESTING, INC.

SCPT-2

Average Unit Weight (psf)	120.00
Depth to Water (ft)	55.00

Interval Depth (ft)	Interval Velocity (ft/sec)	Vs (m/s)	Total Stress (psf)	Effective Stress (psf)	Effective Stress (kpa)	(Pa/∂')	(Pa/∂')0.25	Vsi (m/s)
5.1	9.7	1051.5	612.0	612.0	29.3	3.4	1.4	1429.2
9.7	14.8	959.3	1164.0	1164.0	55.7	1.8	1.2	1110.3
14.8	19.7	989.5	1776.0	1776.0	85.0	1.2	1.0	1030.5
19.7	24.6	1055.3	2364.0	2364.0	113.2	0.9	1.0	1023.2

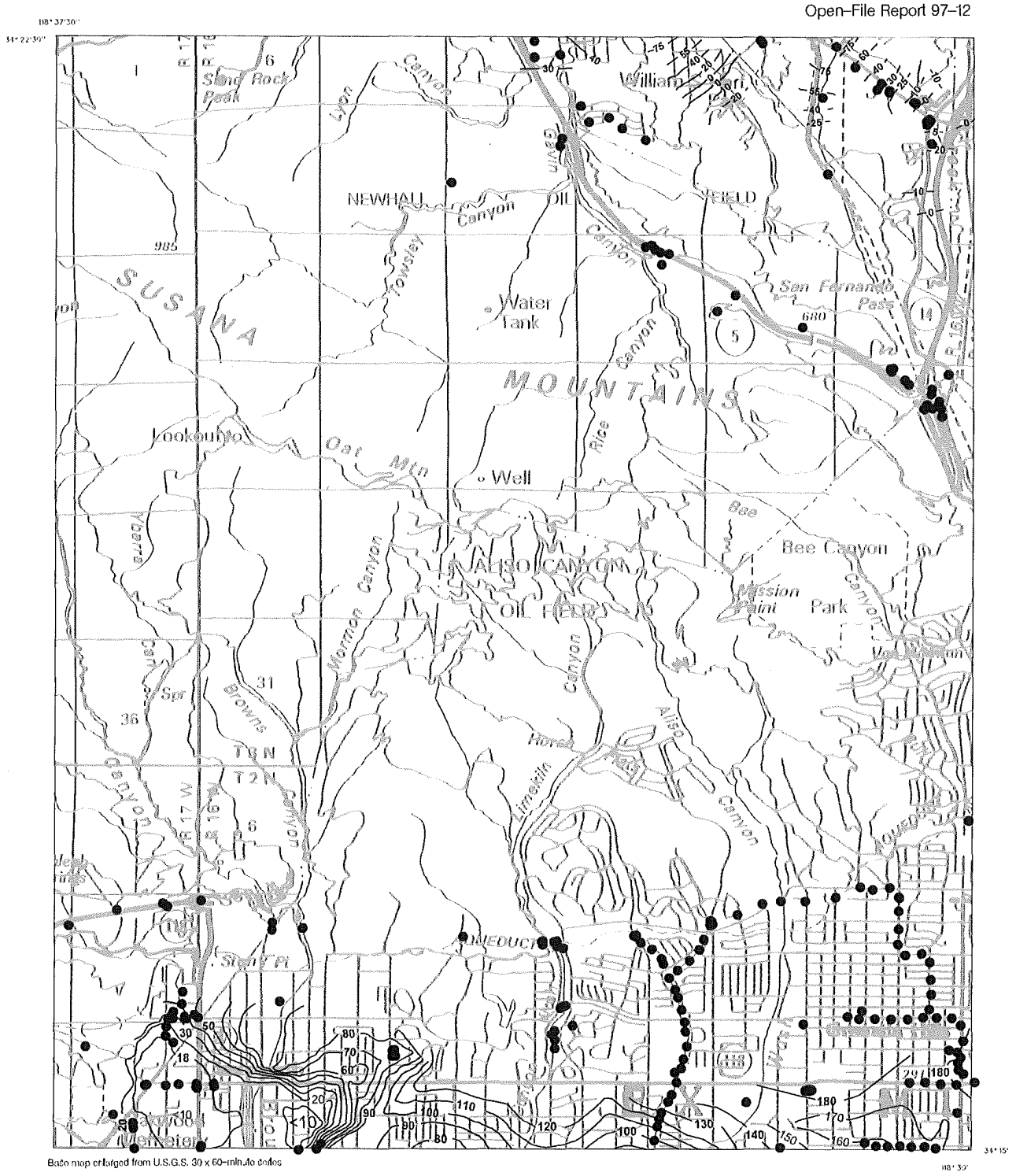
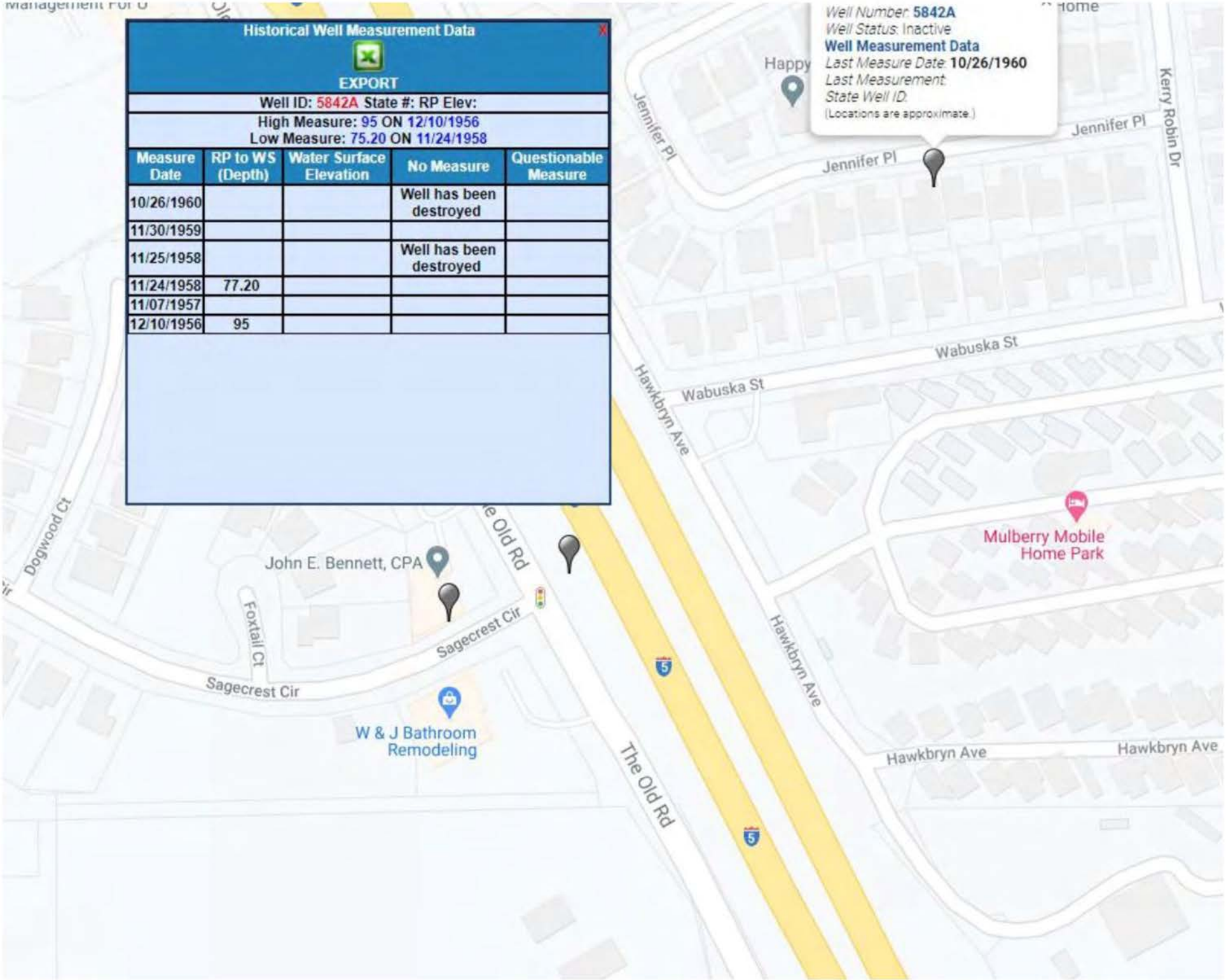


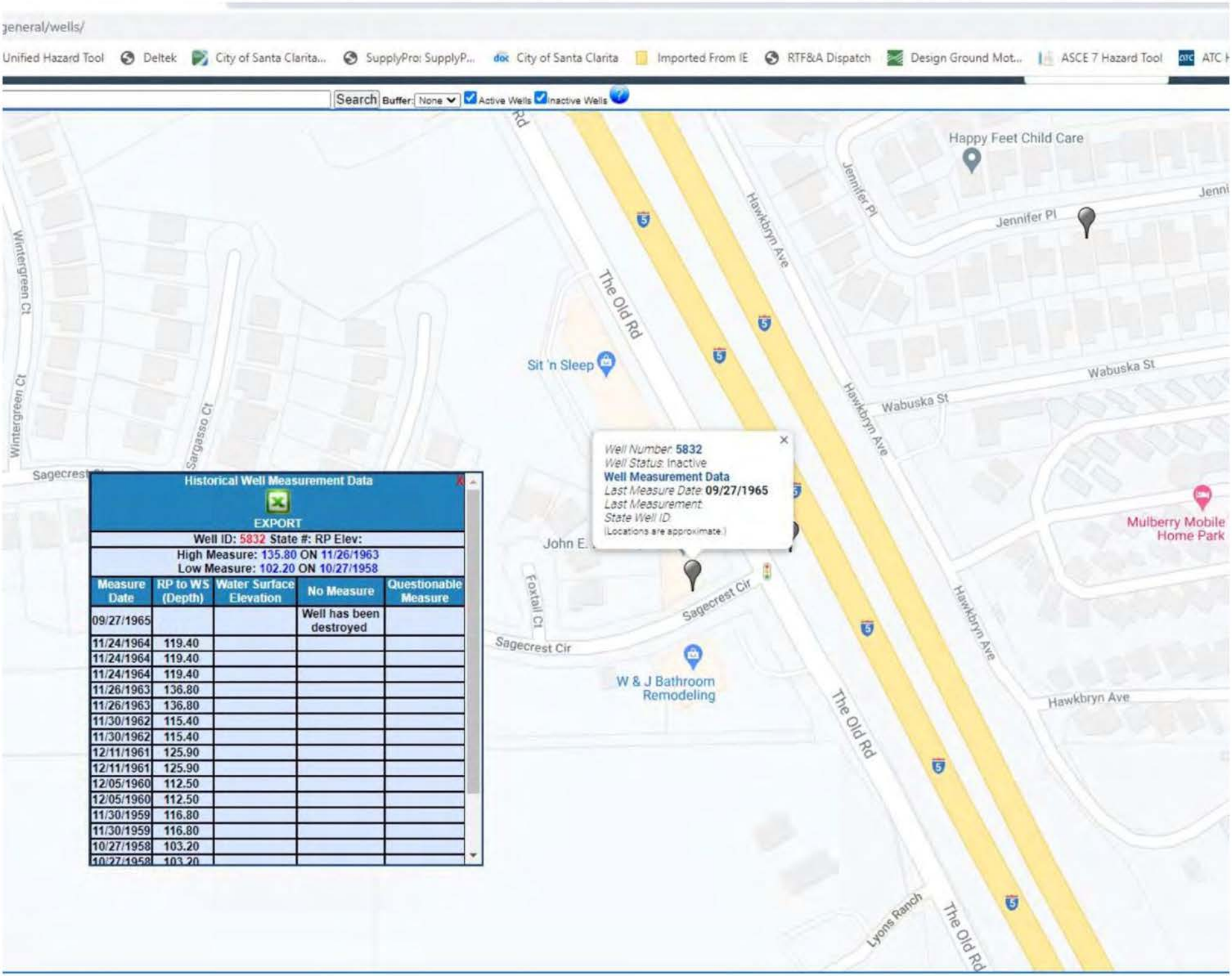
Plate 1.2 Historically Highest Ground Water Contours and Borehole Log Data Locations, Oat Mountain 7.5-minute Quadrangle, California.

● Borehole Site

30 Depth to ground water in feet

ONE MILE
SCALE


Historical Well Measurement Data
EXPORT
Well ID: 5842A State #: RP Elev:
High Measure: 95 ON 12/10/1956
Low Measure: 75.20 ON 11/24/1958
Measure Date | RP to WS (Depth) | Water Surface Elevation | No Measure | Questionable Measure
10/26/1960 | | | Well has been destroyed |
11/30/1959 | | | |
11/25/1958 | | | Well has been destroyed |
11/24/1958 | 77.20 | | |
11/07/1957 | | | |
12/10/1956 | 95 | | |
Well Number: 5842A
Well Status: Inactive
Well Measurement Data
Last Measure Date: 10/26/1960
Last Measurement:
State Well ID:
(Locations are approximate.)
Jennifer Pl
Kerry Robin Dr
Wabuska St
Hawkbryn Ave
Mulberry Mobile Home Park
John E. Bennett, CPA
Dogwood Ct
Foxtail Ct
Sagecrest Cir
W & J Bathroom Remodeling
The Old Rd



Measure Date	RP to WS (Depth)	Water Surface Elevation	No Measure	Questionable Measure
09/27/1965			Well has been destroyed	
11/24/1964	119.40			
11/24/1964	119.40			
11/24/1964	119.40			
11/26/1963	136.80			
11/26/1963	136.80			
11/30/1962	115.40			
11/30/1962	115.40			
12/11/1961	125.90			
12/11/1961	125.90			
12/05/1960	112.50			
12/05/1960	112.50			
11/30/1959	116.80			
11/30/1959	116.80			
10/27/1958	103.20			
10/27/1958	103.20			

NUWI – Lyons Canyon, LLC
March 19, 2021
2020-200-001

APPENDIX H

AYERS OIL WELL DOCUMENTATION

RTF&A
GEOTECHNICAL ENGINEERING & ENGINEERING GEOLOGY

GEOPHYSICAL EVALUATION

LYONS CANYON RANCH WELL

Santa Clarita, California

PREPARED FOR:
Qtative Development Solutions
100 Spectrum Center Drive, Suite 1400
Irvine, CA 92618

PREPARED BY:
Atlas Technical Consultants, LLC
6280 Riverdale Street
San Diego, CA 92120

December 28, 2020

6280 Riverdale Street
San Diego, CA 92120
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December 28, 2020

Atlas No. 120513SWG
Report No. 1

MR. DEREK BARBOUR
QTATIVE DEVELOPMENT SOLUTIONS
100 SPECTRUM DRIVE, SUITE 1400
IRVINE, CALIFORNIA 92618

Subject: Geophysical Evaluation
Lyons Canyon Ranch Well
Santa Clarita, California

Dear Mr. Barbour:

In accordance with your authorization, Atlas has performed a geophysical evaluation pertaining to the Lyons Canyon Ranch Well project located in Santa Clarita, California. Specifically, our services included the performance of a magnetic (MAG) evaluation for portions of the property. The primary purpose of the study was to assess the presence and location of a former oil well within a study area designated by you and your office. Our services were conducted on December 9, 2020. This report presents the methodology, equipment used, analysis, and findings.

If you have any questions, please call us at 619.280.4321.

Respectfully submitted,
Atlas Technical Consultants LLC

REGISTERED PROFESSIONAL GEOPHYSICIST
PATRICK F. LEHRMANN
No. 1043
Exp. 1/31/2022
STATE OF CALIFORNIA

Evan C. Anderson
Senior Staff Geophysicist

Patrick F. Lehrmann, P.G., P.Gp.
Principal Geologist/Geophysicist

ECA:PFL:pfl:ds

Distribution: dbarbour@qtative.com

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FIGURES

1. INTRODUCTION

In accordance with your authorization, Atlas has performed a geophysical evaluation pertaining to the Lyons Canyon Ranch Well project located in Santa Clarita, California (Figure 1). Specifically, our services included the performance of a magnetic (MAG) evaluation for portions of the property. The primary purpose of the study was to assess the presence and location of former oil wells within three study areas designated by you and your office. Our services were conducted on December 9, 2020. This report presents the methodology, equipment used, analysis, and findings.

2. SCOPE OF SERVICES

Our scope of services included:

- Performance of magnetic evaluations across the study areas using a Geometrics G858 cesium vapor magnetometer, Schonstedt GA-52 magnetic gradiometer and a Trimble Pro XRS global positioning system (GPS) for spatial control.
- Compilation and analysis of the data collected.
- Site reconnaissance and mapping.
- Preparation of this report presenting our findings, conclusions, and recommendations.

3. SITE AND PROJECT DESCRIPTION

The project site is located at Lyons Canyon Ranch in Santa Clarita, California (Figure 1). The study site is currently a vacant and undeveloped lot. Based on historical images, former buildings and/or structures occupied areas adjacent to the study area. However, no structures are currently in the area. The site contains active trails, dirt roads, tall trees, grass and brush. Figure 3 depicts the general site conditions in the study areas.

Based on our discussions with you, it is our understanding that an oil well formerly occupied a portion of the property with GPS coordinates provided by DOGGR.

4. GEOPHYSICAL INSTRUMENTATION AND APPLICATIONS

Our evaluation included the use of a Geometrics G858 cesium vapor magnetometer and Schonstedt GA-52 magnetic gradiometer. These instruments provide real-time results and facilitates the delineation of subsurface ferrous metallic features.

4.1 GEOMETRICS G-858 MAGNETOMETER

The Geometrics G-858 cesium vapor magnetometer measures the strength of the earth's magnetic field and the superposed magnetic field of ferromagnetic materials in its vicinity. The precision of the instrument is approximately 1/10th gamma. The earth's field strength is roughly 46,676 gammas at this latitude. The earth's magnetic field is inclined in the direction of the north

magnetic pole. Because of this inclination, a buried ferromagnetic object generally is expressed as a paired anomaly with a positive (above background) slightly to the south and a negative slightly in the direction of magnetic north, whereas a long vertical ferromagnetic object (i.e., well) would generally be expressed as a positive (monopole). However, it should be noted that surface and subsurface metal objects (i.e., fence poles, fences, and metal debris) can influence the location and size of the magnetic response. In addition, the depth of burial can substantially change the amplitude and areal extent of the magnetic response. Typically, the pipe produces an alignment of high and low responses along the length of the feature. Detection depths of more than 20 feet are possible over large ferrous pipes.

4.2 SCHONSTEDT GA-52C MAGNETIC GRADIOMETER

The magnetic gradiometer has two fluxgate magnetic fixed sensors that are passed closely to and over the ground. When not near a magnetic object, that is, only in the earth's field, the instrument emits an audible sound signal at a low frequency. When the instrument passes over buried iron or steel objects, so that the field is significantly different at the two sensors, the frequency of the emitted sound increases. Frequency is a function of the gradient between the two sensors. The gradiometer is less sensitive to surface features than the single sensor magnetometers. Limitations may include obstructions from surface objects and interference from nearby ferrous magnetic objects.

5. SURVEY METHODOLOGY

Our evaluation of the site primarily included the collection of magnetic (MAG) data using a cesium vapor magnetometer. The MAG data were collected in conjunction with a Trimble Pro XRS Global Positioning System (GPS) with sub-meter accuracy for spatial control. Measurements were collected at 0.2-second intervals along generally north-south and/or east-west traverses spaced approximately 10 feet apart across the study areas. Collected MAG data were downloaded to a portable computer in the field for preliminary analysis. The gradiometer was used to delineate the surface expression of anomalies detected during the MAG study. Detected anomalies were delineated on the surface with pin feathers and/or flags.

6. FINDINGS AND CONCLUSIONS

The primary purpose of our study was to evaluate the presence and location of an abandoned oil well within the designated study area through the collection of magnetic data. The results of the MAG study are presented in Figure 2 with areas of high and low magnetic responses illustrated in the figures by hot (pink/red) and cool (blue/purple) colors, respectively. Our evaluation revealed a significant candidate oil well anomaly in the study area.

The candidate oil well anomaly is located towards the western portion of the study area. The anomaly was found roughly 30 feet northwest of a former excavation and survey stake, and approximately 30 feet southwest of the DOGGR coordinates for the abandoned well. The anomaly produced a relatively high amplitude monopole magnetic response in the shape of a bull's eye

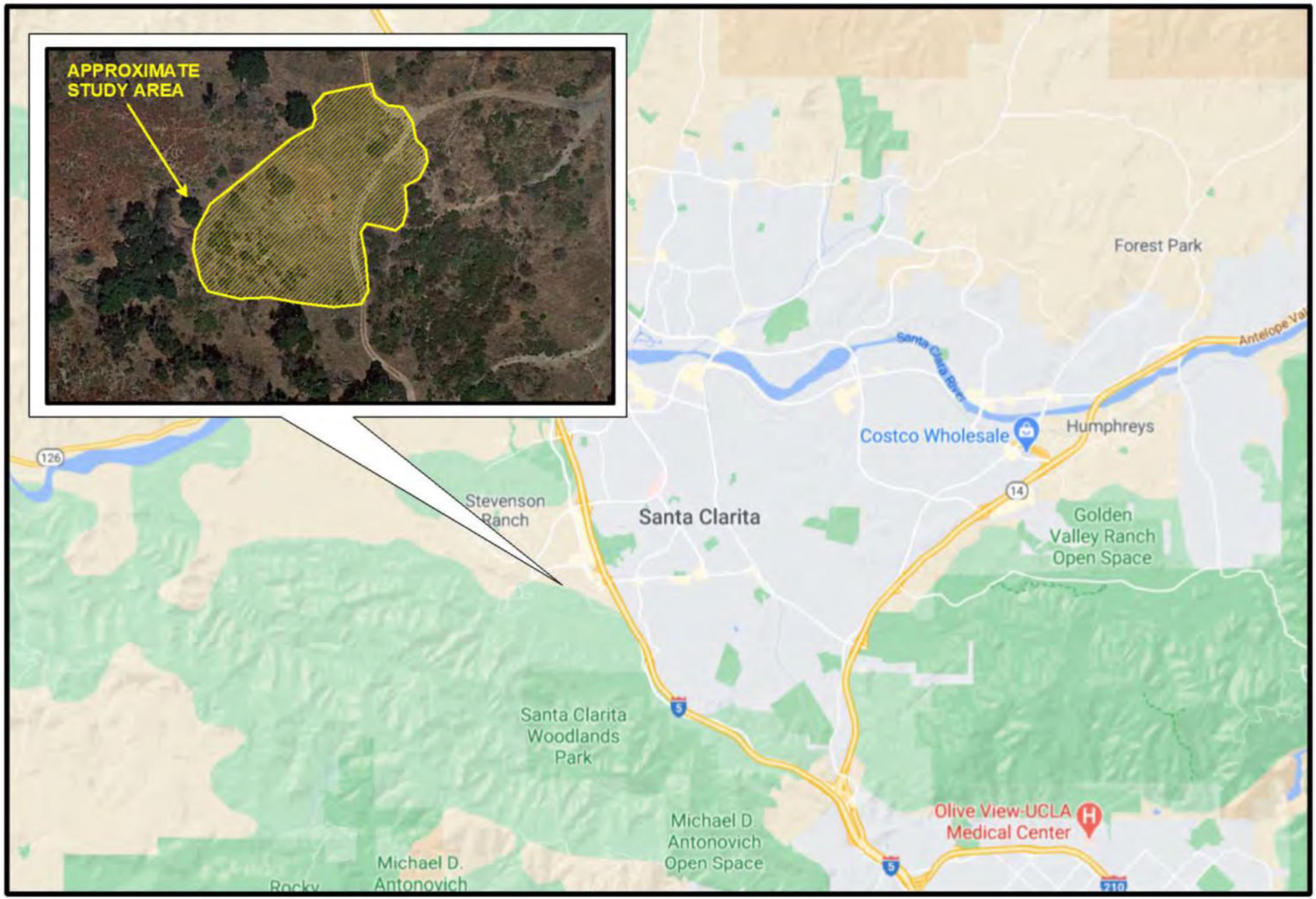
(Figure 2). This feature is similar in magnetic response and shape to former magnetic studies which revealed buried oil wells. Using the Peter's half-slope method and straight slope method, the top and/or cap of the oil well was estimated between 7 ½ feet to 11 feet below the ground surface. Figure 4 details the approach to this estimate.

Our survey utilized industry standard equipment (i.e. magnetic instruments) and was conducted in general accordance with current practice. It should be noted, however, that the presence of existing structures and surface objects (i.e., buildings, metal fences, manholes, etc.) potentially limited the survey. Where obstructions were present subsurface data could not be collected. Moreover, magnetic responses produced by metal surface objects and underground lines can potentially obscure subsurface features.

7. LIMITATIONS

The field evaluation and geophysical analyses presented in this report have been conducted in general accordance with current practice and the standard of care exercised by consultants performing similar tasks in the project area. No warranty, express or implied, is made regarding the conclusions and opinions presented in this report. There is no evaluation detailed enough to reveal every subsurface condition. Variations may exist, and conditions not observed or described in this report may be present. Uncertainties relative to subsurface conditions can be reduced through additional subsurface exploration. Additional subsurface surveying will be performed upon request.

This document is intended to be used only in its entirety. No portion of the document, by itself, is designed to completely represent any aspect of the project described herein. Atlas should be contacted if the reader requires additional information or has questions regarding the content, interpretations presented, or completeness of this document. This report is intended exclusively for use by the client. Any use or reuse of the findings, conclusions, and/or recommendations of this report by parties other than the client is undertaken at said parties' sole responsibility.



SITE LOCATION MAP

N

Lyons Canyon Ranch Well
Santa Clarita, California

Project No.: 120513SWG | Date: 12/20

ATLAS

Figure 1

DOGGR GPS location

Candidate Oil Well Anomaly

Survey Stake/Former Excavation

12480250
12480230
12480210
12480190
12480170
12480150
12480130
12480110
12480090
12480070
12480050
12480030
12480010
12479990
12479970
12479950

1168120 1168140 1168160 1168180 1168200 1168220 1168240 1168260 1168280 1168300 1168320 1168340 1168360 1168380 1168400 1168420

57000
54000
51000
48000
45000
42000

MAG Data
(in gammas)

GIS Coordinate System:

System = UTM
Zone = 11 north
Datum = NAD 1983 (Conus)
Coordinate Units = Feet

SITE DATA MAP
MAG Data CI= 1000 gammas

N

Lyons Canyon Ranch Well
Santa Clarita, California

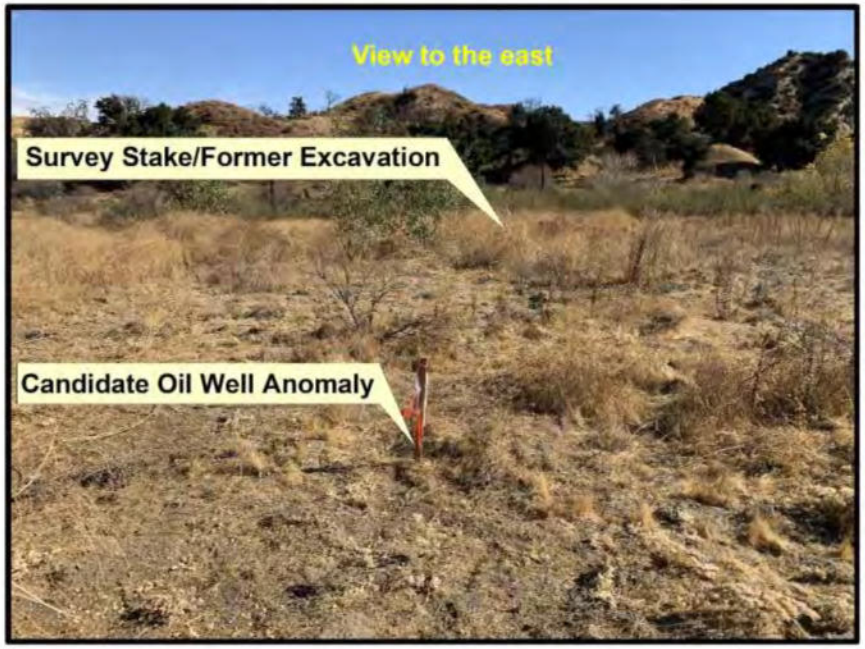
Project No.: 120513SWG | Date: 12/20

ATLAS

Figure 2

0 40 80 120 160

approximate scale in feet



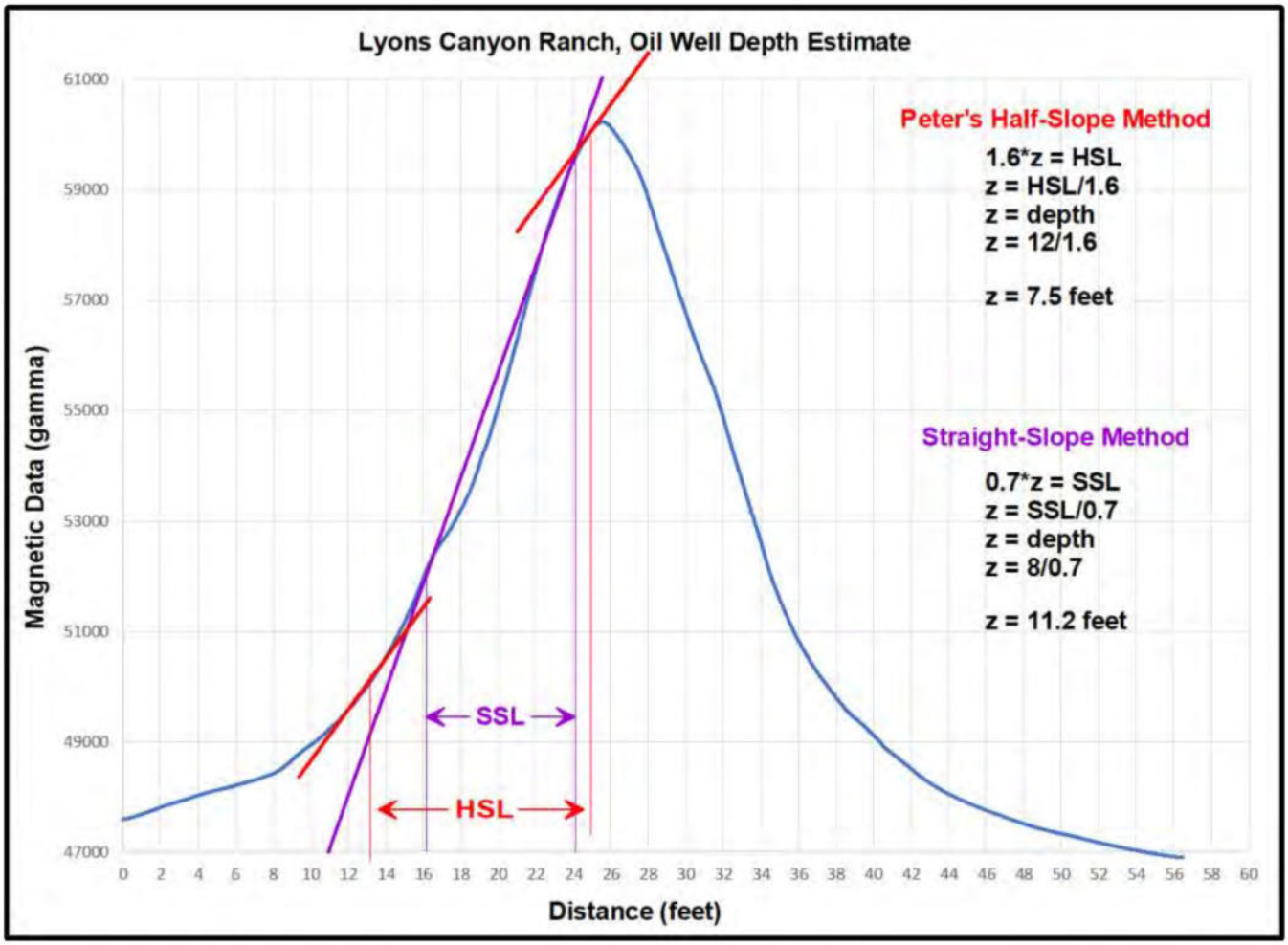
SITE PHOTOGRAPHS

Lyons Canyon Ranch Well
Santa Clarita, California

Project No.: 120513SWG | Date: 12/20

ATLAS

Figure 3



OIL WELL DEPTH ESTIMATE	Lyons Canyon Ranch Well Santa Clarita, California	ATLAS Figure 4
	Project No.: 120513SWG / Date: 12/20	

NUWI – Lyons Canyon, LLC
September 15, 2023
2020-200-001

APPENDIX K

RESPONSE TO COUNTY COMMENTS

(RTF&A, 2021b)

RTF&A
GEOTECHNICAL ENGINEERING & ENGINEERING GEOLOGY

RTF&A
GEOTECHNICAL ENGINEERING & ENGINEERING GEOLOGY

July 27, 2021

NUWI – Lyons Canyon, LLC
2001 Wilshire Blvd., Suite 401
Santa Monica, California 90403

Job No. 2020-200-001

Attention: Jason Han

Subject: Response to County Comments
Proposed Lyons Canyon Development
Tentative Tract Map 83301
Los Angeles County, California

References: See attached References

Ladies and Gentlemen:

R. T. Frankian and Associates, Inc., (RTF&A) is pleased to present this response to address review comments provided by the County of Los Angeles Department of Public Works (County), Geotechnical and Materials Engineering Division (GMED), Geologic and Soils Engineering Sections, in their May 3, 2021 review comments concerning the subject site. The review comments are in response to the R.T. Frankian & Associates (RTF&A) Geotechnical 100-Scale Plan Review, dated March 19, 2021.

The GMED review sheet comments are shown below in bold type. Our response follows each comment in regular type. A copy of the GMED Review sheet is attached near the end of this report.

GEOLOGIC AND SOILS ENGINEERING REVIEW SHEET

S1. Independent analyses for cross-sections C-C' and G-G' do not meet the county's minimum factor of safety for static slope stability of 1.5. Recommend mitigation and provide revised analysis that includes mitigation measures.

Based on this comment, the independent slope stability calculations were requested and provided by the reviewer. The analysis for Section C-C' presented in the referenced report was performed using a single daylighted bedding angle of 24 degrees which was a conservative interpretation of existing site conditions. The true geologic bedding attitudes at the upper portion of Cut Slope CS-11 was measured at a dip of 40 degrees with the lower portion of the slope having a measured true bedding dip of 45 degrees. Based on review of the provided independent slope stability analysis performed by the county, we recommend that the apparent bedding in the upper portion of the slope remain at 24 degrees and the daylighted bedding in the lower portion of the slope be revised from 24 to 35 degrees based on the two bedding attitudes along Section C-C' originally presented in the reviewed report. These bedding attitudes are also highlighted on the Geotechnical Map, Figure 1. The revised apparent bedding for slope stability purposes is indicated on Geologic Section C-C'. Slope stability calculations for the revised bedding shown on Geologic Section C-C' meet County requirements for stable slopes and is presented in the Appendix and shown on Geotechnical Section C-C'.

Relative to Section G-G', additional slope stability calculations have been provided showing deeper failure planes below the bottom of the proposed retaining wall without including the benefit of lateral support provided by the pile supported retaining wall. This includes a calculation on a lower bedding plan that obtains a factor of safety of 1.67, which is greater than 1.5 without relying on any lateral support from the pile supported retaining wall. This bedding plane that meets County factor of safety requirements is at a depth of 15 feet below the bottom of the proposed retaining wall. Accordingly, the proposed piles should neglect passive pressure resistance to a depth of 15 feet below the proposed retaining wall or lowest adjacent grade, whichever is shallower. The piles must be sufficiently stiff to provide resistance of 10 kips per foot of wall at the mid-height of the proposed retaining wall. After a 10 kip horizontal load from the recommended pile is applied at the mid-height of the proposed retaining wall, the factor of safety of all failure planes is increased above 1.5 as presented in the Appendix.

The proposed pile supported retaining wall has not yet been designed but will be under separate permit. The purpose of the provided calculations is to show feasibility that the daylighted bedding could be mitigated by construction of the recommended pile supported retaining wall. Additional evaluation and geotechnical parameters will be provided at the Rough Grading Plan level of approval to support the final pile supported retaining wall design. The final pile supported retaining wall design will be closely coordinated with the Geotechnical Consultant and Project Structural Engineer/Shoring Designer as part of obtaining the separate retaining wall permit

required for wall construction. The following geotechnical pile design parameters are provided for general planning purposes.

For the design of shoring piles spaced at least 2½ diameters on centers, the allowable lateral bearing value (passive value) of the soils starting at a depth of 15 feet below the lowest adjacent grade may be assumed to be zero at the excavated surface, increasing at the rate of 600 psf of depth, to a maximum of 4,500 psf. To develop the full lateral value, provisions should be taken to assure firm contact between the piles and the undisturbed soils. The concrete placed in the pile excavations above the excavation bottom may be a lean-mix concrete. The concrete used in that portion of the shoring pile which is below the planned excavated level should be of sufficient strength to adequately transfer the imposed loads to the surrounding soils. It should be noted that in the unlikely event that groundwater is encountered, it will be required to increase the design strength of concrete by 1,000 pounds per square inch (psi) where it is required to utilize a rigid tremie pipe and cast concrete in standing water more than 12 inches in depth.

The piles 15 feet below the excavated level may be used to resist downward loads, provided that the portion of the piles below the excavated level is backfilled with structural concrete. The frictional resistance between the concrete piles and the soils 15 feet below lowest adjacent grade may be taken as equal to 600 psf.

S2. It appears portions of the drainage channels is located in a mapped area with a potential for liquefaction. Verify and address the potential of liquefaction lateral spreading. Recommend mitigation as necessary.

In general, the site elevation will be raised within the alluvial areas. The mitigation for liquefaction at the site consists of deep removals of either 15 or 20 feet during grading, a general increase in the existing site elevations within liquefaction areas, and structural mitigation.

Lateral spreading can occur when a site is sloped or is adjacent to a free face. The portions of the site subject to liquefaction will be essentially level at the completion of grading and with the recommended removals and general increase in the existing site grades, there will not be any soil layers subject to liquefaction relative to the drainage channels that will present a free face to the site. If the site is graded as recommended, soils that could potentially liquefy and be subject to lateral spreading will be removed and replaced with compacted fill. The potential for lateral spreading occurring at the site after completion of the recommended grading is low.

S3. Show the following on the geotechnical map:

a. Revised location and dimensions of stabilization fill, if applicable.

b. All recommended mitigation measures, as necessary.

There were not any revisions to stability fills or mitigation measures recommended as part of our response to GMED comments. Accordingly, the mitigation measures shown on the Geotechnical Map presented in the reviewed report, remain applicable.

S4. The geotechnical consultant(s) must sign, stamp, and indicate the date of signature on all reports and addenda.

Acknowledged.

Submittal of this response to EPIC-LA is referred to Alliance.

REGULATORY STATEMENT

Based on the findings summarized in this submittal, it is our professional opinion that the proposed grading will be safe from hazards of settlement, slippage, or landslide, provided that the recommendations of the referenced reports, this submittal, and those of the County of Los Angeles are incorporated into the proposed construction. Additionally, the proposed site development will not adversely affect the geotechnical conditions on adjacent properties.

LIMITATIONS

Our professional services have been performed using that degree of care and skill ordinarily exercised, under similar circumstances, by reputable geotechnical engineers and geologists practicing in this or similar localities. No other warranty, expressed or implied, is made as to the professional advice included in this report. This report has been prepared for the client and their design consultants, to be used solely for planning and design of the subject site and its associated grading. The report has not been prepared for use by other parties and may not contain sufficient information for purposes of other parties or other uses.

oOo

The following are attached and complete this report.

- References
- Geologic and Soils Engineering Review Sheet
- Geotechnical Exhibit – Figures 1
- Geologic Section C-C' – Figure 2
- Geotechnical Sections – Figure 3
- Appendix – Slope Stability Calculations

Respectfully submitted,

R. T. FRANKIAN & ASSOCIATES

by: Alan W. Rasplicka
Principal Geotechnical Engineer

and: Timothy P. Latiolait
Principal Engineering Geologist

TPL/AWR/jh

Distribution:
New Urban West, Inc. Attn: Mr. Jason Han, Mr. Jonathan Frankel
Alliance Land Planning and Engineering Attn: Mr. Craig Whiteker, Mr. Michael La Bounty, Mr. Chris Stucky
Madison Real Estate Consulting, LLC Attn: Mr. Benny Sam

RTF&A
GEOTECHNICAL ENGINEERING & ENGINEERING GEOLOGY

REFERENCES

Bailey, T. L., and Jahns, R. H., 1954, "Geology of the Transverse Range Province, Southern California," in Geology of Southern California, California Division of Mines Bull 170, Vol. 1, pp. 83-106.

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California Division of Mines and Geology, 1998, "State of California Seismic Hazard Zones Newhall Quadrangle."

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PCA GMTR/A864
EPIC LA ESTU2021000187
Telephone: (626) 458-4925

County of Los Angeles Department of Public Works
Geotechnical and Materials Engineering Division
GEOLOGIC AND SOILS ENGINEERING REVIEW SHEET
900 S. Fremont Avenue, Alhambra, CA 91803

Tentative Tract / Parcel Map	83301	**Tentative Map Dated**	**3/24/21 (Tent/Exhib)** **Parent Tract**
Grading By Subdivider? [Y] (Y or N)	2,600,000 yd³	**Location**	Lyons Canyon
Geologist	R.T. Frankian	**Subdivider**	NUWI-LYONS CANYON, LLC
Soils Engineer	R.T. Frankian	**Engineer/Arch.**	Alliance Land Planning & Engineering

Review No. 2 of:
Geologic Report(s) Dated:
Soils Engineering Report(s) Dated:
Geotechnical Report(s) Dated: **3/19/21**
References:

TENTATIVE MAP FEASIBILITY IS NOT RECOMMENDED FOR APPROVAL. PRIOR TO RECOMMENDING APPROVAL OF THE TENTATIVE TRACT OR PARCEL MAP:

S1. Independent analyses for cross-sections C-C' and G-G' do not meet the county's minimum factor of safety for static slope stability of 1.50. Recommend mitigation and provide revised analysis that includes mitigation measures.

S2. It appears portions of the drainage channels is located in a mapped area with a potential for liquefaction. Verify and address the potential of liquefaction lateral spreading, Recommend mitigation as necessary.

S3. Show the following on the geotechnical map:
   a. Revised location and dimensions of stabilization fill, if applicable.
   b. All recommended mitigation measures, as necessary.

S4. The geotechnical consultant(s) must sign, stamp, and indicate the date of signature on all reports and addenda.

S5. Please submit documents in response to this review using the EPIC-LA system at the following URL: https://epicla.lacounty.gov/SelfService/#/home. The documents must be submitted to the EPIC-LA geotechnical study plan case number ESTU2021000187. Please contact GMED staff at (626) 458-4925 if documents cannot be uploaded to the plan case.

NOTE: Provide a copy of this review sheet with your resubmittal.

NOTE(S) TO THE PLAN CHECKER/BUILDING AND SAFETY DISTRICT ENGINEER:
PER THE SOILS ENGINEER:
A. ON-SITE SOILS ARE CORROSIVE TO FERROUS METALS.
B. EXPANSION INDEX OF NEAR-SURFACE CERTIFIED ENGINEERED FILL ON BUILDING LOTS SHOULD BE EVALUATED AT THE COMPLETION OF GRADING.
C. THE SOILS REPORT DATED 3/19/21 INDICATES THERE MAY BE ENVIRONMENTAL CONCERNS REGARDING THE PRESENCE OF OILS WELLS.

Prepared by

George Molina
Soils Section

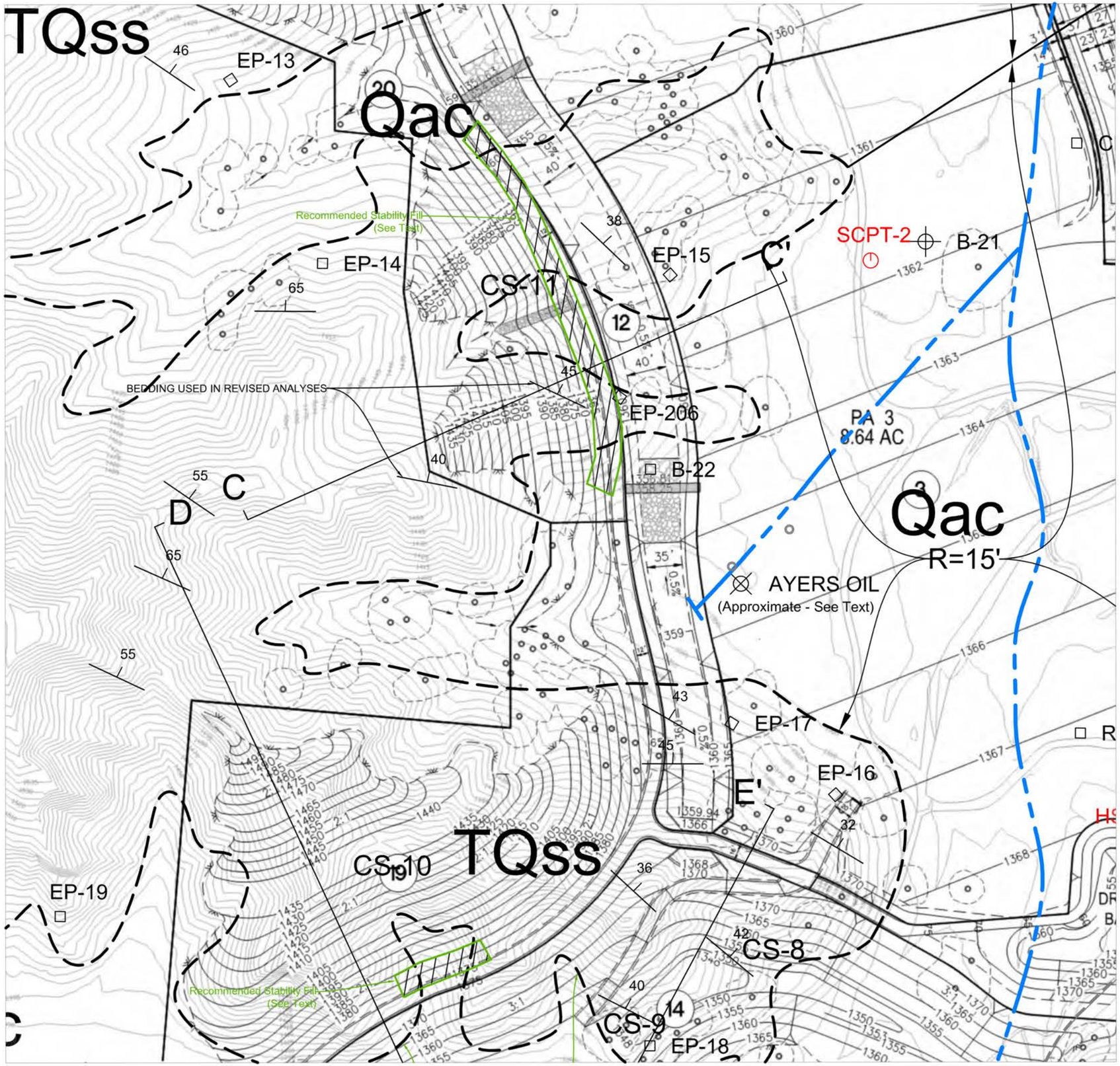
PROFESSIONAL ENGINEER
GEORGE MOLINA
C 91931
CIVIL
STATE OF CALIFORNIA

Matthew Cruz
Geology Section

PROFESSIONAL GEOLOGIST
Geir R. Mathisen
No. 2376
CERTIFIED ENGINEERING GEOLOGIST
STATE OF CALIFORNIA

Date 05/03/21

Please complete a Customer Service Survey at http://dpw.lacounty.gov/go/gmedsurvey
NOTICE: Public safety, relative to geotechnical subsurface exploration, shall be provided in accordance with current codes for excavations, inclusive of the Los Angeles County Code, Chapter 11.48, and the State of California, Title 8, Construction Safety Orders.



GRAPHIC SCALE

0 50 100 200

(IN FEET)
1 inch = 100 ft.

Geotechnical Exhibit

Prepared For:

NUWI - LYONS CANYON, LLC

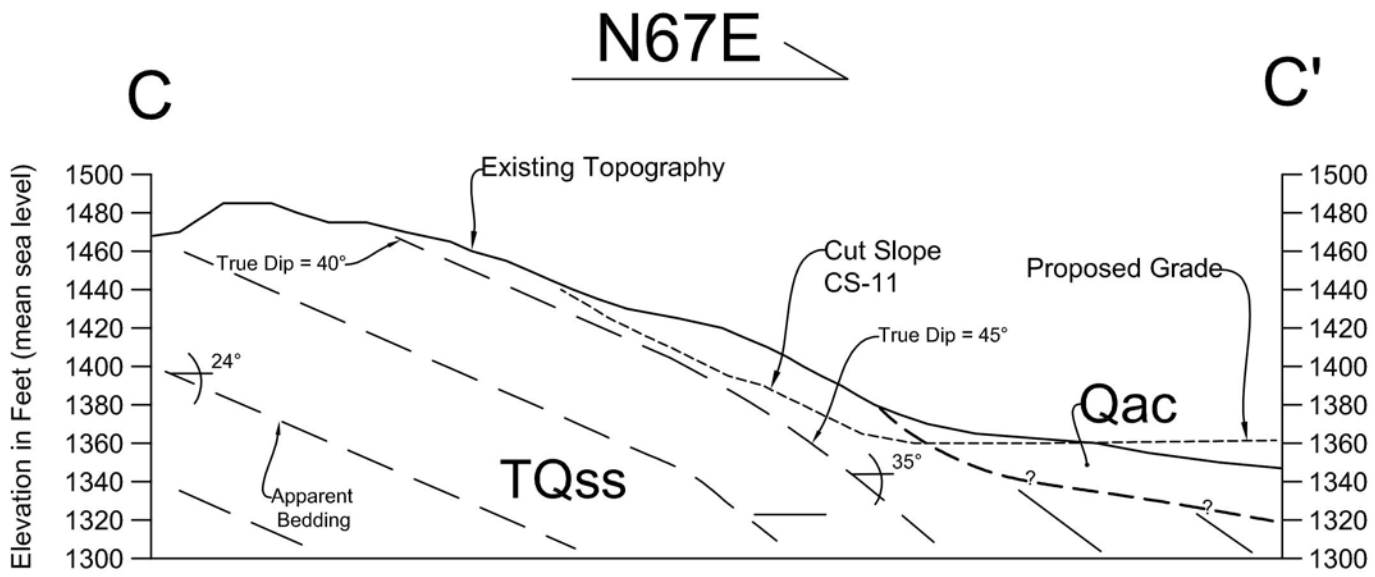
Proposed Lyons Canyon Development
Tentative Tract Map 83301
Santa Clarita, California

Scale:	Drawn By:	Checked By:
AS SHOWN	JH	AWR
Date: 7/27/2021	Figure 1	2020-200-001

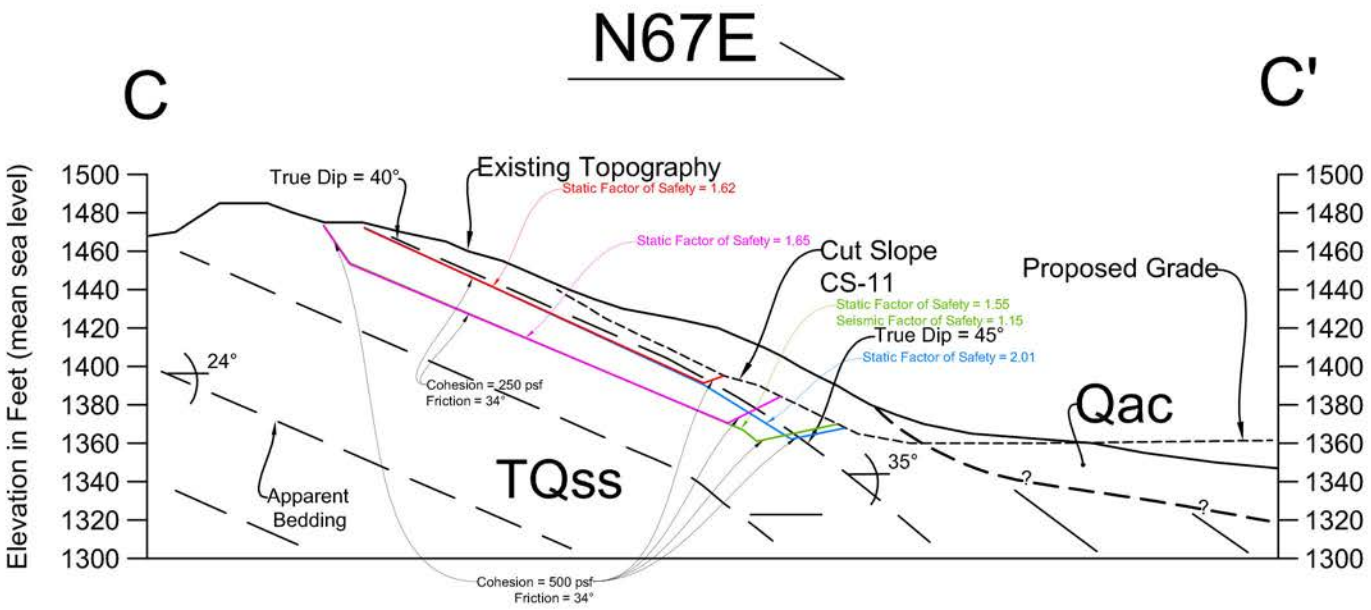
R. T. FRANKIAN & ASSOCIATES
26027 Huntington Lane, Unit A
Santa Clarita, California 91355
(818) 531-1501
www.RTFrankian.com

MAJOR LAND DIVISION
VESTING TENTATIVE TRACT MAP NO. 083301
THE TRAILS AT LYONS CANYON
LOCATED IN THE UNINCORPORATED TERRITORY OF
THE COUNTY OF LOS ANGELES

DATE MARCH 11, 2021
SHEET 2
OF 2



GEOLOGIC SECTION C-C'
FIGURE 2
2020-200-001
July 27, 2021



GEOTECHNICAL SECTION C-C'
FIGURE 3
2020-200-001
July 27, 2021

NUWI – Lyons Canyon, LLC
July 27, 2021
2020-200-001

APPENDIX

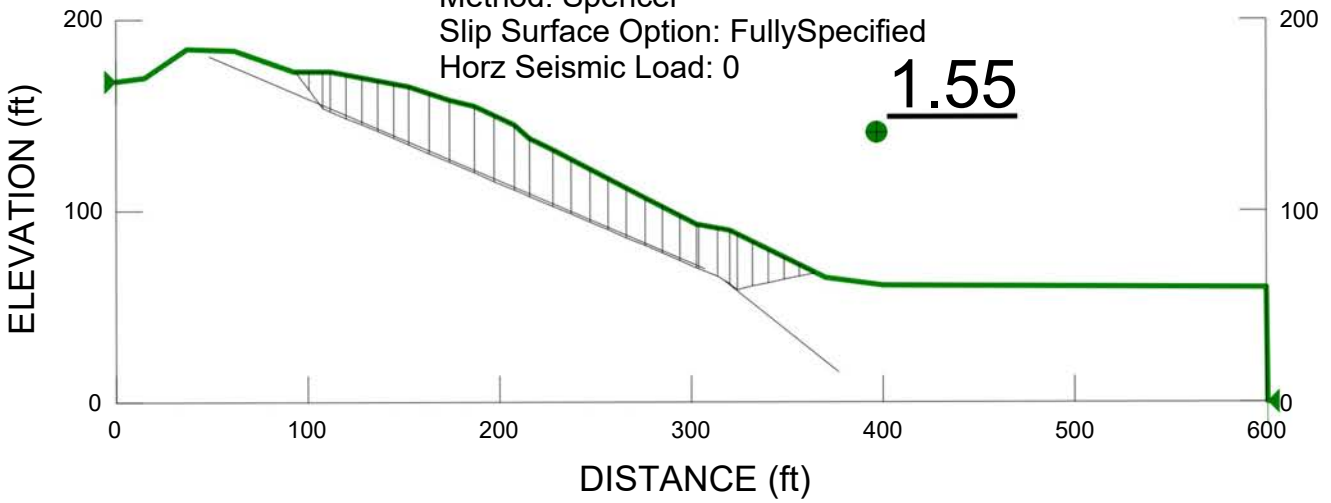
SLOPE STABILTY CALCULATIONS

RTF&A
GEOTECHNICAL ENGINEERING & ENGINEERING GEOLOGY

Title: Lyons Canyon
Comments: 2020-200
Name: Slope Stability Revised C-C' Static.gsz
Date: 7/27/2021Time: 2:40:42 PM
Material #: 1 Wt: 130 C: 350 Phi: 30
Material #: 2 Wt: 130 C: 250 Phi: 20

Method: Spencer
Slip Surface Option: FullySpecified
Horz Seismic Load: 0

1.55



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Material #: 2 Wt: 130 C: 250 Phi: 20

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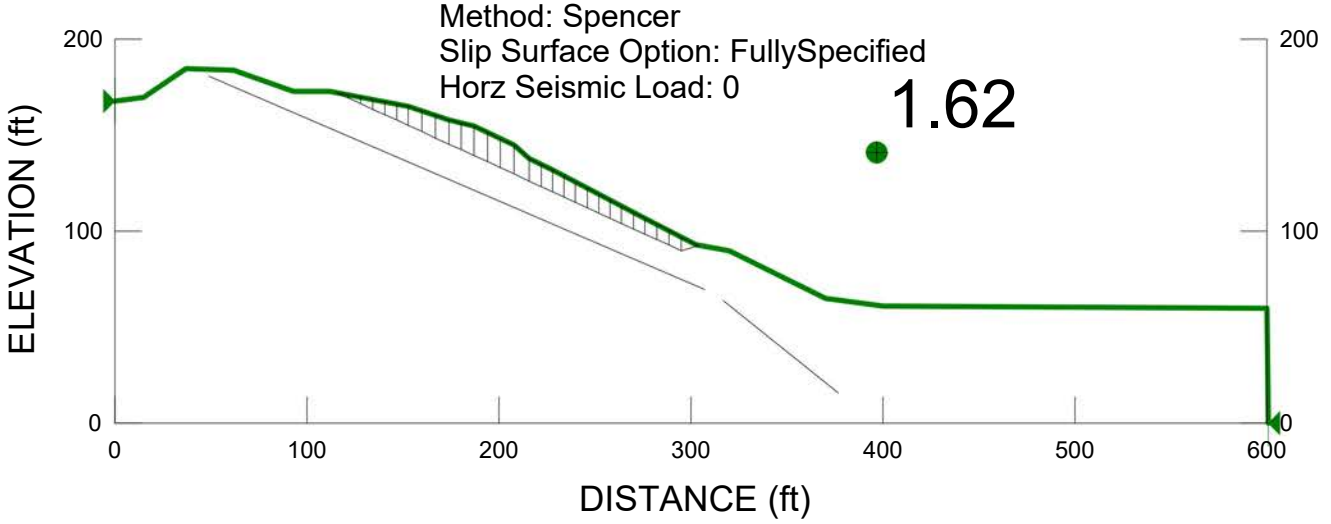
Slip Surface Option: FullySpecified
Horz Seismic Load: 0



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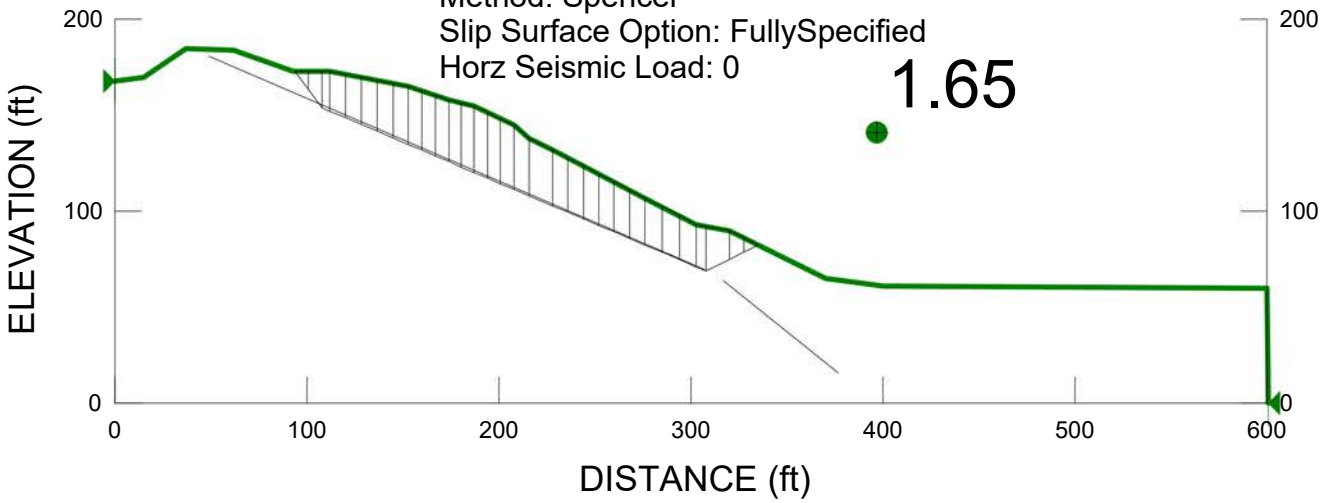
Horz Seismic Load: 0



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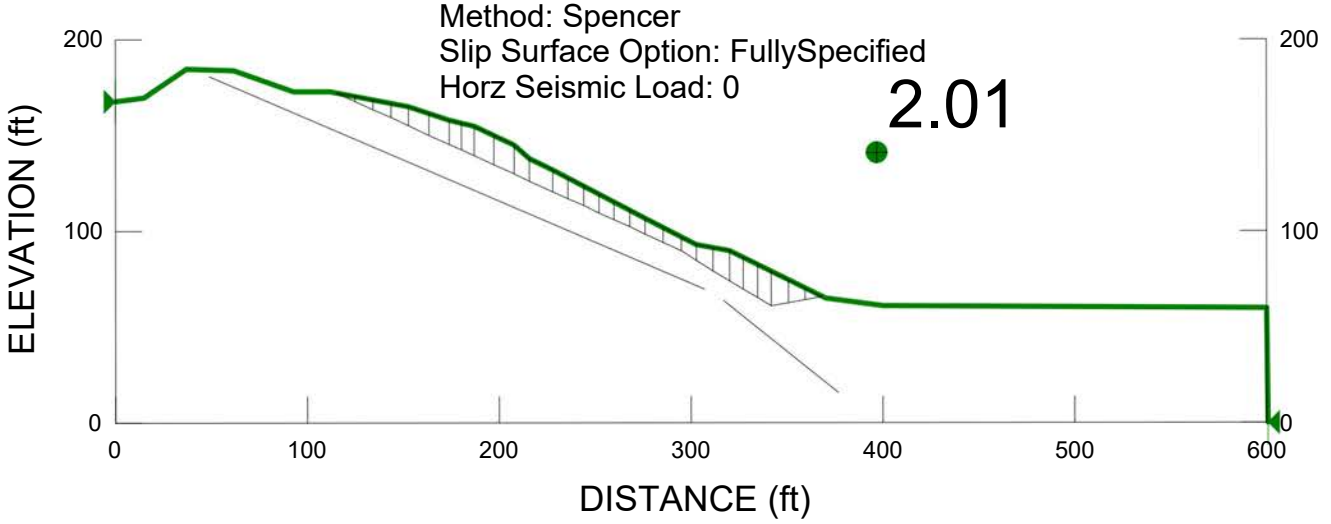
Material #: 2 Wt: 130 C: 250 Phi: 20

Method: Spencer
Slip Surface Option: FullySpecified
Horz Seismic Load: 0



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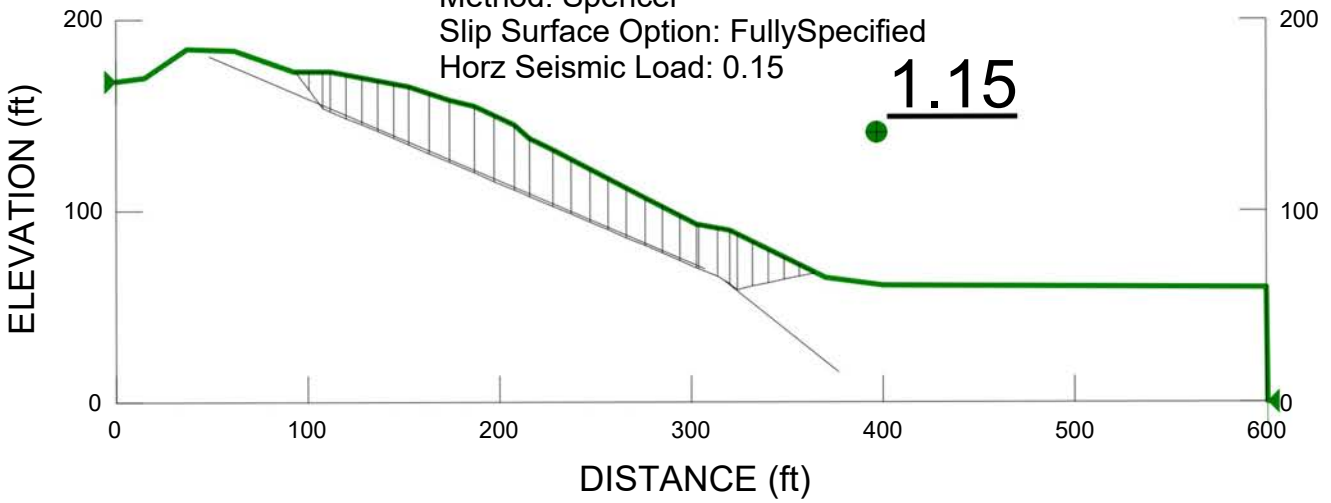
Method: Spencer
Slip Surface Option: FullySpecified
Horz Seismic Load: 0.15



itle: Lyons Canyon
omments: 2020-200
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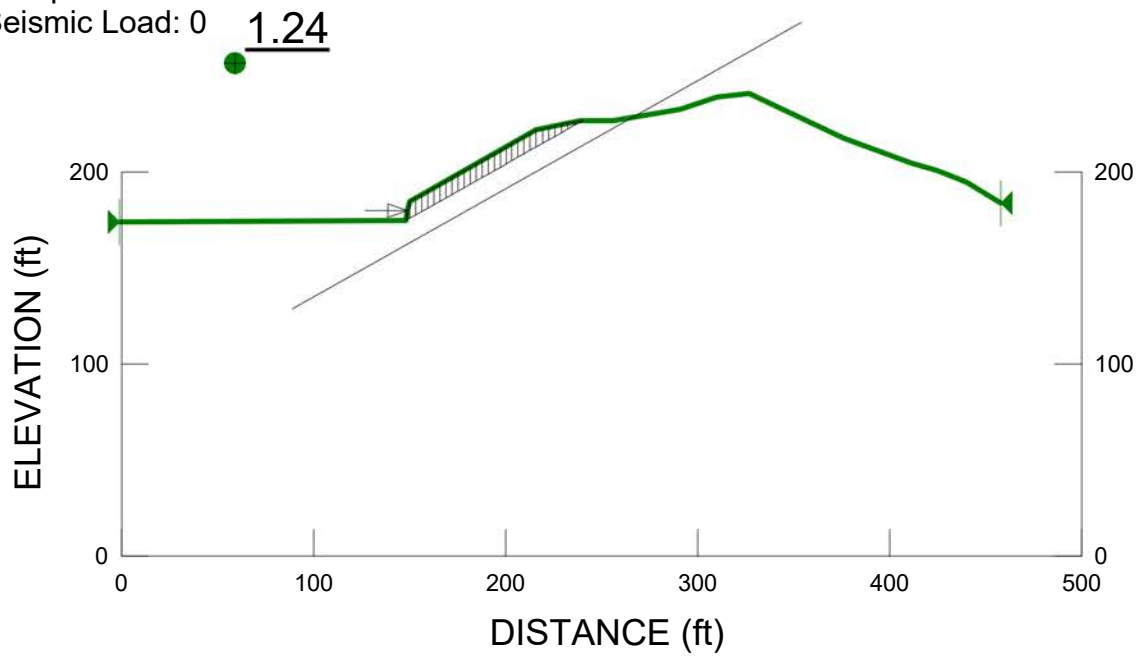
ate: 7/26/2021Time: 3:28:25 PM
aterial #: 1 Wt: 130 C: 250 Phi: 20

ethod: Spencer
lip Surface Option: FullySpecified
ethod: Spencer
orz Seismic Load: 0



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Comments: 2020-200
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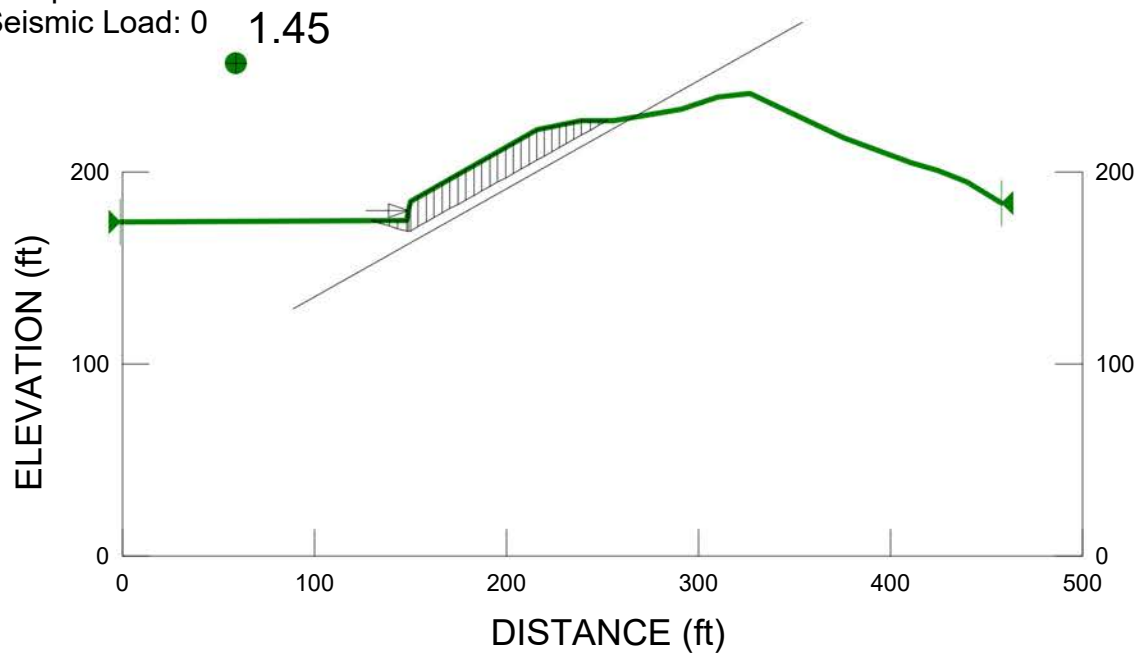
Slip Surface Option: FullySpecified
Method: Spencer
Horz Seismic Load: 0



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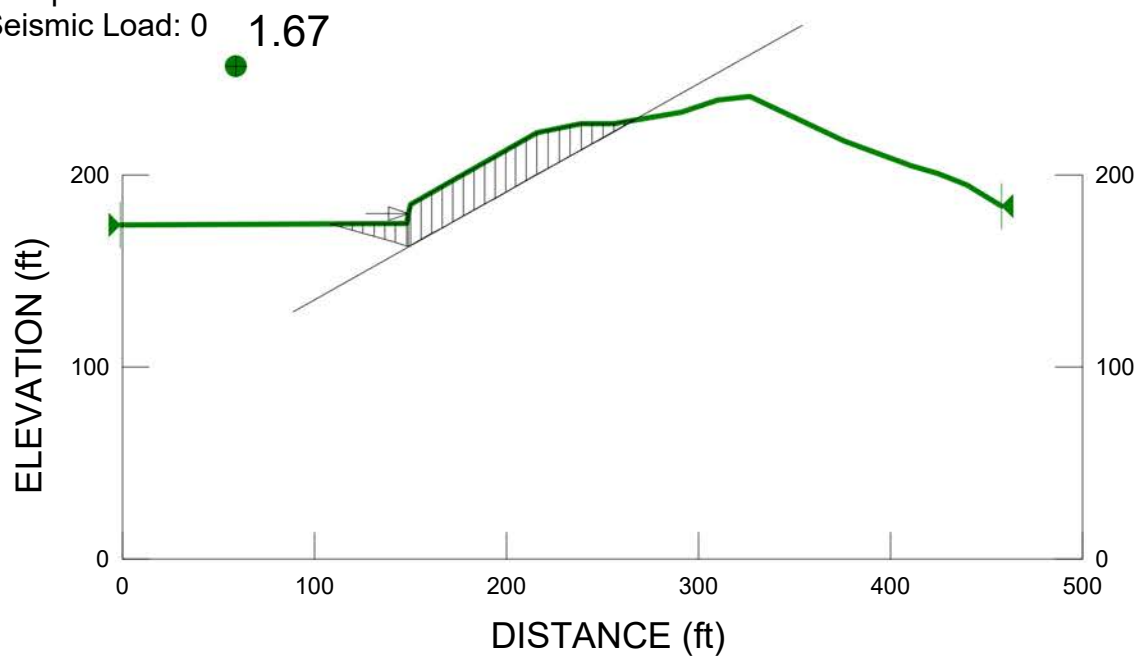
Slip Surface Option: FullySpecified
Method: Spencer
Horz Seismic Load: 0



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Comments: 2020-200
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Method: Spencer
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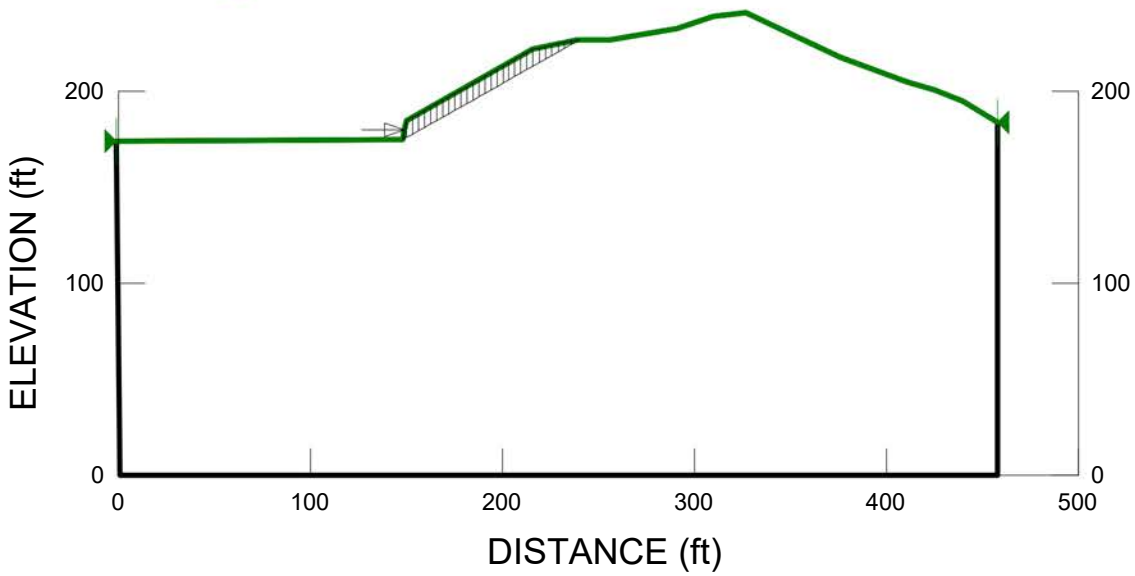
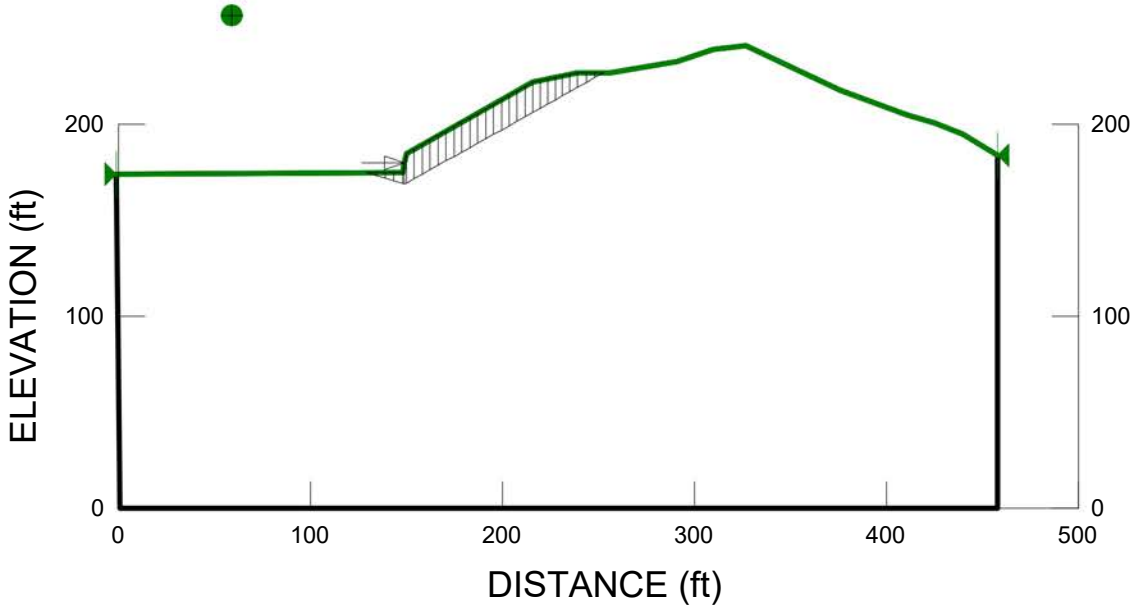
Method: Spencer
Horz Seismic Load: 0 1.59



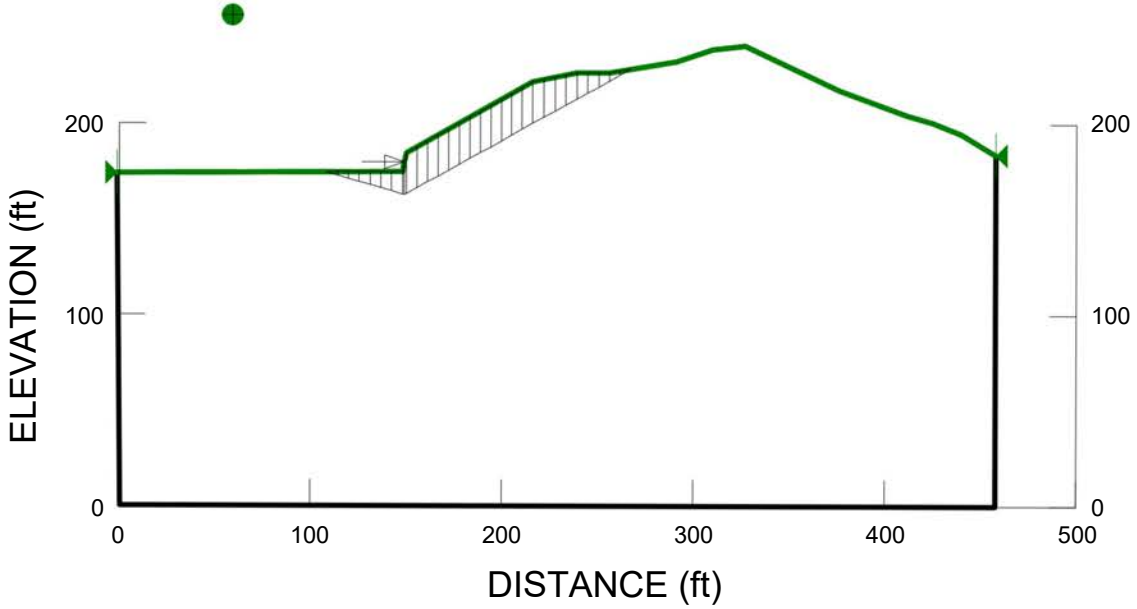
Title: Lyons Canyon
Comments: 2020-200
Name: Slope Stability G-G' Static Pile RW 10 kips Horizontal LIne Load.gsz
Date: 7/26/2021Time: 3:37:19 PM
Material #: 1 Wt: 130 C: 250 Phi: 20

Method: Spencer
Slip Surface Option: FullySpecified
Method: Spencer
Horz Seismic Load: 0



Title: Lyons Canyon
Comments: 2020-200
Name: Slope Stability G-G' Static Pile RW 10 kips Horizontal LIne Load.gsz
Date: 7/26/2021Time: 3:37:19 PM
Material #: 1 Wt: 130 C: 250 Phi: 20

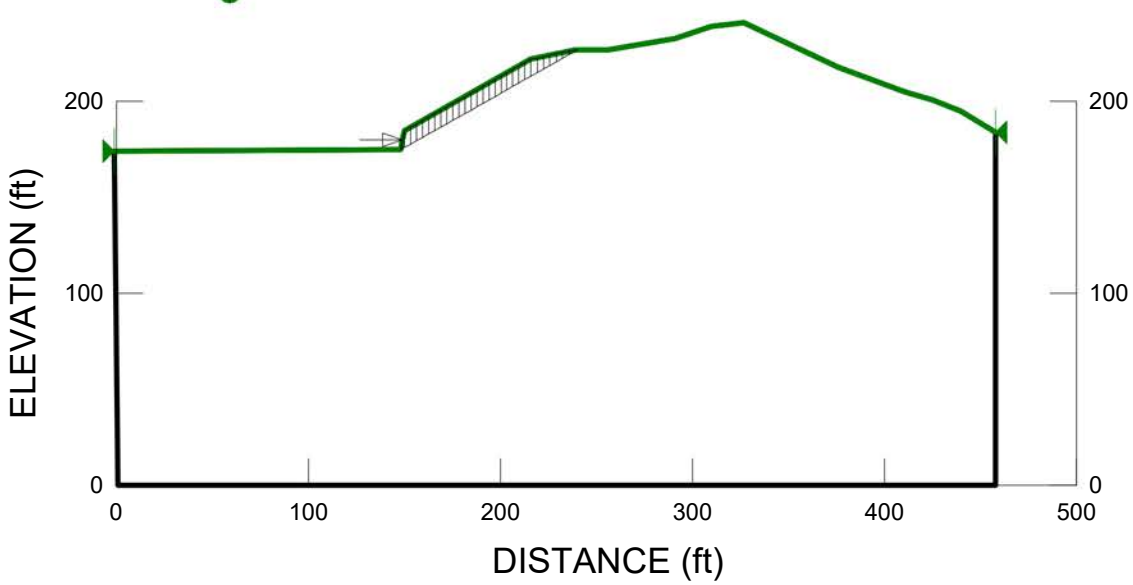
Method: Spencer
Slip Surface Option: FullySpecified
Method: Spencer
Horz Seismic Load: 0 1.85



Title: Lyons Canyon
Comments: 2020-200
Name: Slope Stability G-G' Seismic Pile RW 10 kips Horizontal LIne Load.gsz
Date: 7/26/2021Time: 3:42:05 PM
Material #: 1 Wt: 130 C: 250 Phi: 20

Method: Spencer
Slip Surface Option: FullySpecified
Method: Spencer
Horz Seismic Load: 0.15

1.15



NUWI – Lyons Canyon, LLC
September 15, 2023
2020-200-001

APPENDIX L

AERIAL IMAGERY AND LIDAR

RTF&A
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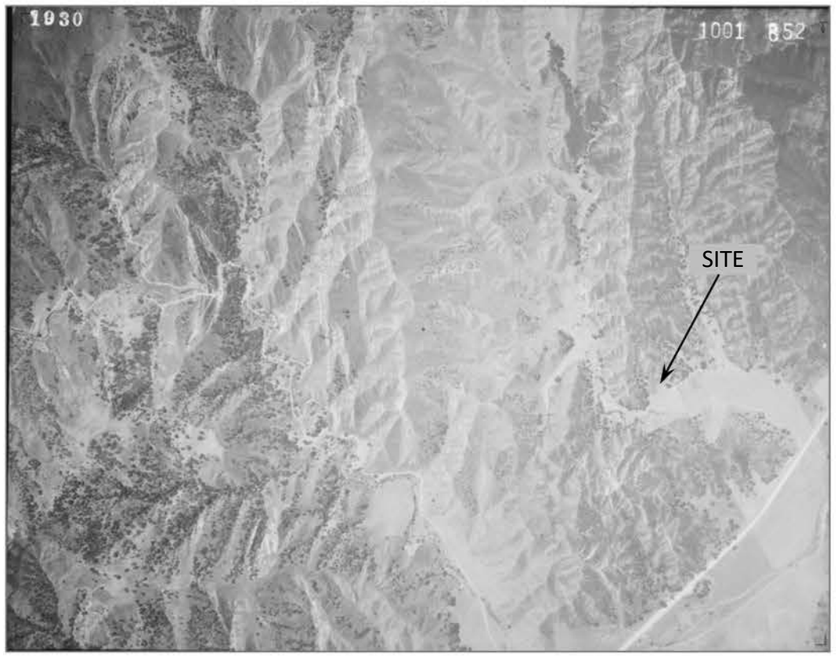
HISTORICAL AERIAL IMAGE - 1930



Imagery Report: Flight C-1001B

Digital

View Index

Country:	United States
State(s):	California
Counties:	California: Los Angeles
Filed by (catalog):	C-1001B
Filed by (collection):	C-1001B
Imagery Location:	Map Room--Utility Shelves Off-site storage--UCLA
Index type:	mosaic, SmartIndex
Index scale:	1:100,000
Size:	frames 9 X 7 inches
Height:	7
Width:	9

Begin date:	1930-07-18
End date:	1930-08-25
Scale:	1:16,800
Overlap:	60
Directional orientation:	Northwest-Southeast
Lens focal length:	12 inches
Film type:	Nitrate
Generation held:	1st and 2nd generation

Note:
Santa Clarita to Sylmar (from Santa Clara River to intersection of Interstate 5 and Interstate 210/Foothill Freeway.) Acquired from Whittier College, January 2013. Nitrate negatives scanned, 2015.

Physical Details:	black and white; paper prints; negative transparencies; cut frame; vertical view;
Copyright:	Copyright © UC Regents. All Rights Reserved.
Flown by:	Fairchild Aerial Surveys
Contractor/requestor:	Standard Oil Company
Acquired from:	Whittier College
Est. frame count:	193

RTF&A
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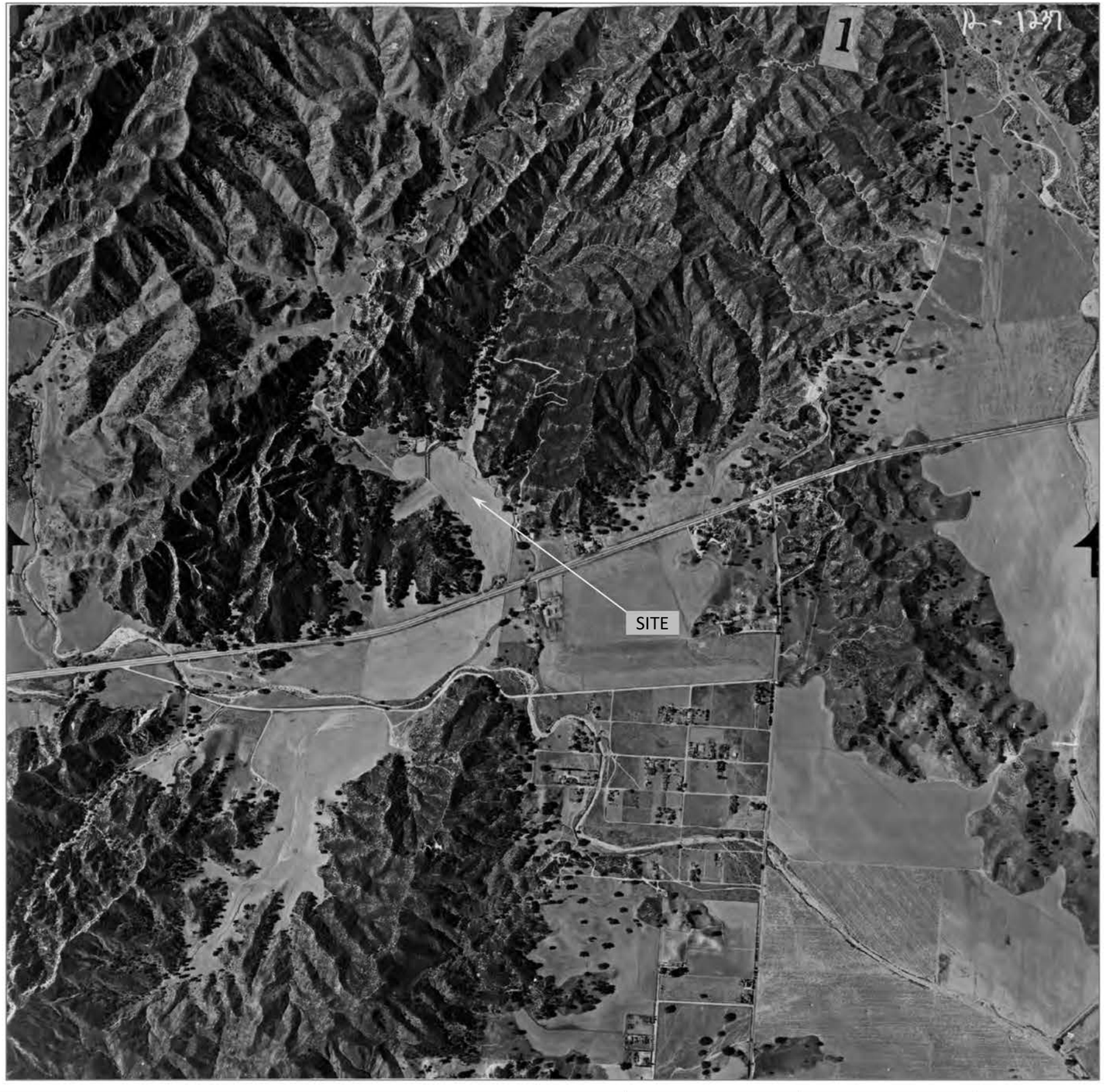
R. T. FRANKIAN AND ASSOCIATES
26027 Huntington Lane Unit A
Santa Clarita, California 91355
(818) 531-1501
www.RTFrankian.com

Prepared For: NUWI – LYONS CANYON, LLC	Scale: N/A	Drawn By:	Project Number: 2020-200-001
Site: Lyons Canyon Development, Vesting Tentative Tract 83301, Los Angeles County, CA	Date: May 2023	Checked By: GL	Figure Number:

HISTORICAL AERIAL IMAGE – 1945



Imagery Report: Flight C-9800

Digital

View Index

Country:	United States
State(s):	California
Counties:	California: Los Angeles, Ventura
Filed by (catalog):	C-9800
Filed by (collection):	C-9800
Imagery Location:	Map Room--Utility Shelves Room 2552
Index type:	mosaic, SmartIndex
Index scale:	1:75,000
Size:	frames 9 x 9 inches
Height:	9
Width:	9

Begin date:	1945-10-24
End date:	1945-11-26
Scale:	1:14,400
Overlap:	60%
Sidelap:	20%
Directional orientation:	East-West
Altitude:	14,400
Lens focal length:	12 inches (304.8mm)
Camera:	Fairchild
Film type:	Copy
Spectral range:	400-700nm
Generation held:	1st and 2nd generation

Note:
Ventura County: area south of Township 5N from Sulfur Mountains and Santa Susana Mountains to Santa Monica Mountains. Los Angeles County: area from Malibu to Chatsworth. Some photographs held in collection do not appear on the indexes. Paper prints stored at Annex2. Frames 3-177, 3-179, 3-180, 3-182, 3-183, 3-185, and 3-201 on roll 3 have holes in them. Imagery acquired from Whittier College, January 2013.

Physical Details:	black and white; paper prints; negative transparencies; film roll; cut frame; vertical view;
Copyright:	Copyright © UC Regents. All Rights Reserved.
Flown by:	Fairchild Aerial Surveys
Contractor/requestor:	Ventura County
Acquired from:	Teledyne Inc.; Whittier College
Est. frame count:	1702

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Prepared For: NUWI – LYONS CANYON, LLC	Scale: N/A	Drawn By:	Project Number: 2020-200-001
Site: Lyons Canyon Development, Vesting Tentative Tract 83301, Los Angeles County, CA	Date: May 2023	Checked By: GL	Figure Number:

HISTORICAL AERIAL IMAGE - 1968

Imagery Report: Flight TG-2445

Digital

View Index

Country:	United States
State(s):	California
Counties:	California: Kern, Los Angeles, San Bernardino, Ventura
Filed by (catalog):	TG-2445
Filed by (collection):	TG-2445
Imagery Location:	Map Room--Utility Shelves Off-site storage--Iron Mountain Room 2552
Index type:	mosaic
Index scale:	1:72,000
Size:	frames 9 x 9 inches
Height:	9
Width:	9

Begin date:	1968-03-25
End date:	1968-05-01
Scale:	1:24,000
Overlap:	60%
Sidelap:	20%
Directional orientation:	East-West
Generation held:	1st, 2nd and 3rd generations

Note:
North half of county. All frames held as paper prints; only part of flight in negative format. Many of the negatives for this flight were made from the paper prints.

Physical Details:	black and white; paper prints; negative transparencies; cut frame; vertical view;
Copyright:	Copyright © UC Regents. All Rights Reserved.
Flown by:	Teledyne Geotronics
Contractor/requestor:	Department of County Engineers, County of Los Angeles
Acquired from:	Teledyne, Inc.
Est. frame count:	734

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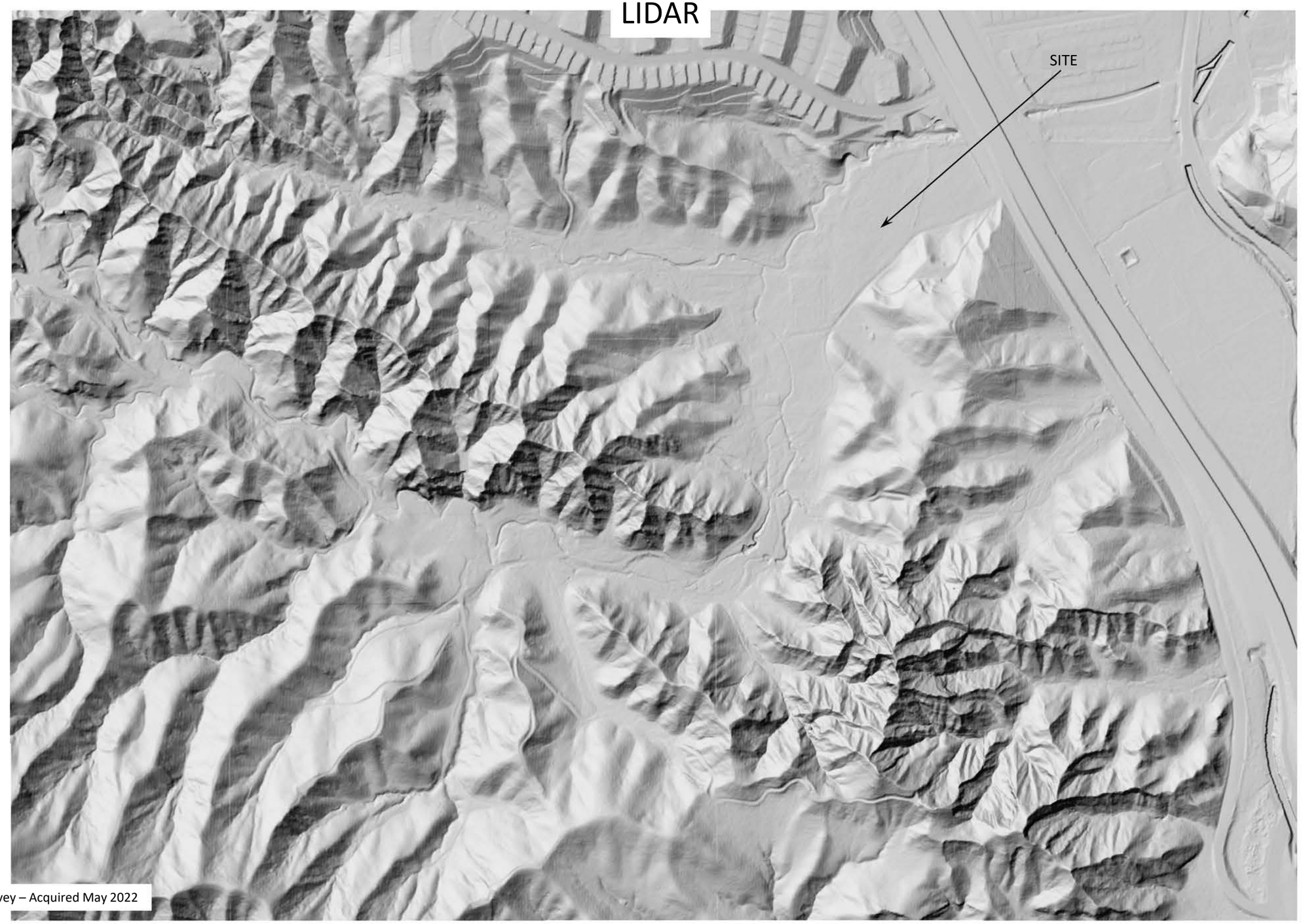
www.RTFrankian.com

Prepared For: NUWI – LYONS CANYON, LLC	Scale: N/A	Drawn By:	Project Number: 2020-200-001
Site: Lyons Canyon Development, Vesting Tentative Tract 83301, Los Angeles County, CA	Date: May 2023	Checked By: GL	Figure Number:

LIDAR



United States Geological Survey – Acquired May 2022

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Prepared For: NUWI – LYONS CANYON, LLC	Scale: N/A	Drawn By:	Project Number: 2020-200-001
Site: Lyons Canyon Development, Vesting Tentative Tract 83301, Los Angeles County, CA	Date: May 2023	Checked By: GL	Figure Number: