GEOTECHNICAL INVESTIGATION
DESIGN PHASE

FOR
GEOTECHNICAL FEASIBILITY STUDY
5606 SOQUEL DRIVE
SANTA CRUZ COUNTY, CALIFORNIA

PREPARED FOR
STEVE AND JOHN SELISKER
PROJECT NO. 25-237-SC

PREPARED BY

BUTANO GEOTECHNICAL ENGINEERING, INC.
JANUARY 2025

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January 2, 2025
Project No. 25-237-SC

Steve and John Selisker
5606 Soquel Drive
Soquel, California, 95073

SUBJECT: **GEOTECHNICAL INVESTIGATION – FEASIBILITY LEVEL**
5606 Soquel Drive (APN 037-191-13)
Soquel, Santa Cruz County, California

In accordance with your authorization, we have completed a geotechnical investigation for the subject project. This report summarizes the findings, conclusions, and recommendations from our field exploration and engineering analysis. It is a pleasure being associated with you on this project. If you have any questions, or if we may be of further assistance, please do not hesitate to contact our office.

Sincerely,

BUTANO GEOTECHNICAL ENGINEERING, INC.

Greg Bloom, PE, GE
Principal Engineer
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Appendices:	1.	Appendix A	Figures and Standard Details
	2.	Appendix B	Field Exploration Program
	3.	Appendix C	Laboratory Testing Program

1.0 INTRODUCTION

This report presents the results of our feasibility level geotechnical investigation at 5606 Soquel Drive in Soquel, Santa Cruz County, California.

The purpose of our investigation is to provide geotechnical data from our field and laboratory investigation and discuss the geotechnical restraints at the site.

This work included site reconnaissance, subsurface exploration, laboratory testing engineering analyses, and preparation of this report. The scope of services for this investigation is outlined in our agreement dated November 16, 2025.

The recommendations contained in this report are subject to the limitations presented in Section 8.0 of this report. The Association of Engineering Firms Practicing the Geosciences has produced a pamphlet for your information titled *Important Information About Your Geotechnical Report*. This pamphlet has been included with the copies of your report.

2.0 PROJECT DESCRIPTION

Based on our discussions with the client, it is our understanding that fill was imported to the site during the construction and widening of Soquel Drive. The fill was placed at the southwest corner of the site during the 1960s and a 4 ½-foot diameter concrete culvert was placed beneath the fill. The project consists of determining the approximate extent of the fill and other geotechnical considerations for future development.

3.0 FIELD EXPLORATION AND LABORATORY TESTING PROGRAMS

Our field exploration program included logging and interval sampling of a total of eight (8) borings. Our borings were advanced on December 2, 2025 using 6-inch diameter solid stem augers advanced with a truck mounted drill rig. Details of the field exploration program, including the Boring Logs and the Key to the Logs, are presented in Appendix B, Figures B-3 through B-11.

Representative samples obtained during the field investigation were taken to the laboratory for testing. Laboratory tests were used to determine physical and engineering properties of the in-situ soils. Details of the laboratory testing program are presented in Appendix C. Test results are presented on the boring logs and in Appendix C.

4.0 SITE DESCRIPTION

4.1 Location

The project site is located north of Highway 1 at 5606 Soquel Drive in Soquel, Santa Cruz County, California. The site location is shown on the Site Location Plan, Appendix B, Figure B-1.

4.2 Surface Conditions

The parcel is approximately 5.8 acres in size and semi-rectangular in shape. The north half of the property is developed with a small residence, a barn that was demolished and accessory structures. The remainder of the site is undeveloped and has been used historically for agricultural purposes and grazing.

Historically, a natural drainage cut through the southwest side of the property. Aerial imagery from 1931 and 1956 of the site shows a heavily vegetated creek basin that is approximately 100 to 150 feet wide located at the southwest corner of the site. This appears to have been the junction of three separate drainages that approached from the southeast and two from the northwest before combining into one larger drainage to the south of the site. The southwest side of the property gradually sloped towards the basin and created a large bowl amphitheater.

The drainage basin was infilled with undocumented fill in the 1960's. The fill was imported to the site from various locations along Soquel Drive during a road construction project. A 4 ½-foot diameter concrete culvert was placed at the southwest corner of the site to connect the drainages and is buried by approximately 20 to 25 feet of fill. The approximate location of the culvert is shown on the Boring Site Plan, Figure B-2. The northern 2/3 of the site is generally unaltered and slopes towards the southwest at gradients between 2 and 5 percent. The slope along the southern 1/3 of the site where the undocumented fill was placed slopes at approximately 5 to 6 percent towards the top of the fill slope. The slope at the southwest corner of the site breaks abruptly and slopes at approximately 50 percent to the toe of the fill slope. The fill slope varies in height between 10 and 30 feet.

The site was historically used for farming and grazing purposes and is vegetated with grass on the gentle slopes and with large oak and redwood trees on the steeper slopes and in the drainage below the fill slope.

4.3 Subsurface Conditions

Eight exploratory borings were advanced at the site. The site is mapped as being underlain by lowest emergent marine terrace deposits (Qmt) which is consistent with our investigation. Alluvial deposits (Qa) were encountered in the location of the old stream bed.

Borings B1 through B6 were advanced across the southwest side of the site and encountered non-engineered/undocumented fill consisting of firm to stiff sandy lean clay with gravel and clayey sand overlying in-situ soil. The fill thickness varied and was up to 24 feet deep. Borings B4 through B6 encountered marine terrace deposits (Qmt) below the fill. The marine terrace deposits consisted of stiff to very stiff sandy lean clay and medium dense clayey sand. Borings B1 and B2 encountered refusal on rubble within the non-engineered/undocumented fill. Boring B3 encountered the old stream bed/floodplain (Qa) below the fill at a depth of 24 feet. The soil below the fill consisted of loose to medium dense silty sand with organics. Boring B3 was terminated at a depth of 36 ½ feet.

Borings B7 and B8 were advanced at the center of the site and encountered layers of loose to medium dense silty sand and clayey sand with gravel (Qmt).

Groundwater was encountered in Boring B3 at a depth of 32 feet. Depth to groundwater may vary seasonally.

Complete soil profiles are presented in the Boring Logs, Appendix B, Figures B-4 through B-11.

5.0 GEOTECHNICAL HAZARDS

5.1 General

In our opinion the geotechnical hazards that could potentially affect the proposed project are:

- Intense seismic shaking
- Collateral seismic hazards
  Liquefaction and Lateral Spreading
  Landsliding

5.1.1 Intense Seismic Shaking

The hazard of intense seismic shaking is present throughout central California. Intense seismic shaking may occur at the site during the design lifetime of the proposed structure from an earthquake along one of the regions many faults. Generally, the intensity of shaking will increase the closer the site is to the epicenter of an earthquake, however, seismic shaking is a complex phenomenon and may be modified by local topography and soil conditions. The transmission of earthquake vibrations from the ground into the structure may cause structural damage.

The County of Santa Cruz has adopted the seismic provisions set forth in the 2025 California Building Code to address seismic shaking. The seismic provisions in the 2025 CBC are minimum load requirements for the seismic design for the proposed structure. The provisions set forth in the 2025 CBC will not prevent structural and nonstructural damage from direct fault ground surface rupture, coseismic ground cracking, liquefaction and lateral spreading, seismically induced differential compaction, seismically induced landsliding, or seismically induced inundation.

Table 1 has been constructed based on the 2025 CBC requirements for the seismic design of the proposed structure. The Site Class has been determined based on our field investigation.

Table 1. Seismic Design Parameters

S_S	S_1	Site Class	S_{MS}	S_{M1}	S_{DS}	S_{D1}	PGA_M	Risk Category	Seismic Design Category
1.51	0.6	D	1.63	1.78	1.09	1.19	0.59	II	D

Longitude: 36.987067 Latitude: -121.942442

5.1.2 Collateral Seismic Hazards

In addition to intense seismic shaking, other seismic hazards that may have an adverse affect to the site and/or the structure are: fault ground surface rupture, coseismic ground cracking, seismically induced liquefaction and lateral spreading, seismically induced differential compaction, seismically induced landsliding, and seismically induced inundation (tsunami and seiche). It is our opinion that the potential for collateral seismic hazards to affect the site and to damage the proposed structure is low outside the fill area.

Additional field exploration and analysis is needed to determine the potential for liquefaction, lateral spread and landsliding at the southwest side of the site where alluvial deposits were encountered below the non-engineered fill.

6.0 DISCUSSIONS AND CONCLUSIONS

The subject site is underlain by marine terrace deposits, non-engineered fill and alluvial deposits. The feasibility study was aimed at determining the extent of the non-engineered fill at the site. The fill was imported to the site and placed during a Soquel Drive road construction project during the 1960's.

Six borings were advanced along the southwest corner of the site which encountered non-engineered fill. Two borings were advanced near the center or northern side of the site outside of the limits of the non-engineered fill. The Boring Site Plan (Figure B-2) and cross sections (Figures B-13 through B-15) detail the approximate location and depth of the non-engineered fill. The fill generally consisted of firm to very stiff sandy lean clay with gravel and medium dense clayey sand with gravel. Atterberg limits tests performed on the fill yielded plasticity index results between 18.5 and 33. These results indicate that the material exhibits low to moderate expansion properties. The fill at the site may be reused as engineered fill. Additional tests will need to be conducted to determine if this material may be used.

Alluvial deposits were encountered in Boring B3. The thickness of the alluvial deposits is unknown. The location of the alluvial deposits is estimated based on aerial photographs from before the fill was placed and using the data from our borings. Figure B-12 shows the approximate limits of the alluvial deposits. **In order to determine the susceptibility of the alluvial deposits to liquefaction and lateral spread, additional subsurface investigation will need to be completed during the design level investigation.**

Borings B7 and B8 advanced at the center and north side of the site outside of the non-engineered fill encountered very loose silty sand and sandy lean clay in the upper 3 feet underlain by medium dense/stiff clayey sand and sandy lean clay.

Geotechnical issues associated with the large mass of non-engineered fill along the southwest corner of the site consist of rubble within the fill, settlement of the fill and global stability of the fill slope. Potential mitigations include regrading the site by removing and replacing the fill or supporting improvements on deep foundations. If the site is regraded, conventional shallow foundations setback from slopes could be used to support proposed improvements. If the fill is left in place, improvements would need to be supported using drilled piers. Areas outside of the limits of the non-engineered fill may be supported by conventional shallow foundations.

Additional sub-surface investigation should be completed to determine the limits of the alluvial deposits and the design implications of the material on the regrading process. A more detailed subsurface investigation should be undertaken once a site plan is developed to determine specific geotechnical recommendations.

7.0 LIMITATIONS

The recommendations contained in this report are based on our field explorations, laboratory testing, and our understanding of the proposed construction. The subsurface data used in the preparation of this report was obtained from the borings drilled during our field investigation. Variation in soil, geologic, and groundwater conditions can vary significantly between sample locations. As in most projects, conditions revealed during construction excavation may be at variance with preliminary findings. If this occurs, the changed conditions must be evaluated by the Project Geotechnical Engineer, and revised recommendations be provided as required. In addition, if the scope of the proposed construction changes from the described in this report, our firm should also be notified.

Our investigation was performed in accordance with the usual and current standards of the profession, as they relate to this and similar localities. No other warranty, expressed or implied, is provided as to the conclusions and professional advice presented in this report.

This report is issued with the understanding that it is the responsibility of the Owner, or of his Representative, to ensure that the information and recommendations contained herein are brought to the attention of the Engineer for the project and incorporated into the plans, and that it is ensured that the Contractor and Subcontractors implement such recommendations in the field. The use of information contained in this report for bidding purposes should be done at the Contractor’s option and risk.

This firm does not practice or consult in the field of safety engineering. We do not direct the Contractor's operations, and we are not responsible for other than our own personnel on the site; therefore, the safety of others is the responsibility of the Contractor. The Contractor should notify the Owner if he considers any of the recommended actions presented herein to be unsafe.

The findings of this report are considered valid as of the present date. However, changes in the conditions of a site can occur with the passage of time, whether they are due to natural events or to human activities on this or adjacent sites. In addition, changes in applicable or appropriate codes and standards may occur, whether they result from legislation or the broadening of knowledge. Accordingly, this report may become invalidated wholly or partially by changes outside our control. Therefore, this report is subject to review and revision as changed conditions are identified.

The scope of our services mutually agreed upon did not include any environmental assessment or study for the presence of hazardous to toxic materials in the soil, surface water, or air, on or below or around the site. Butano Geotechnical Engineering, Inc. is not a mold prevention consultant; none of our services performed in connection with the proposed project are for the purpose of mold prevention. Proper implementation of the recommendations conveyed in our reports will not itself be sufficient to prevent mold from growing in or on the structures involved.

REFERENCES

ASTM International (2015).*Annual Book of ASTM Standards, Section Four, Construction*. Volume 4.08, Soil and Rock (I): D 430 - D 5611.

ASTM International (2016).*Annual Book of ASTM Standards, Section Four, Construction*. Volume 4.09, Soil and Rock (II): D 5714 - Latest.

California Building Code (2025).

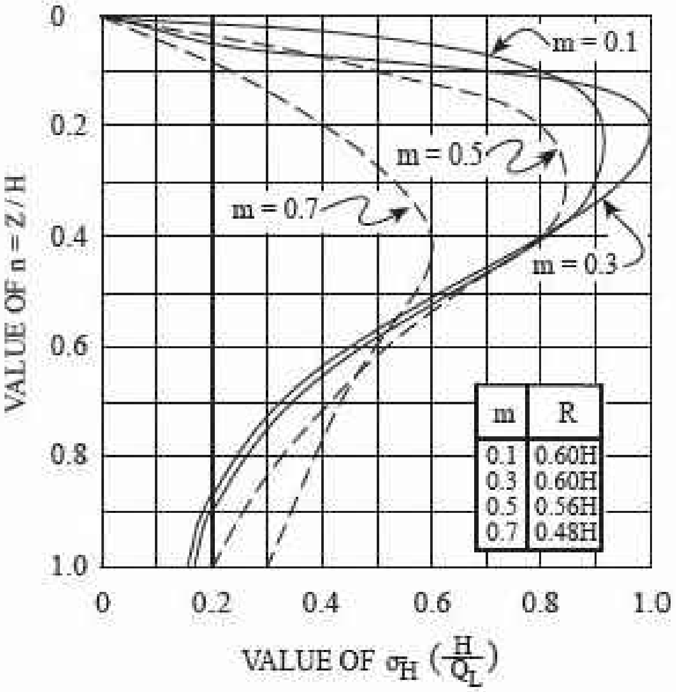
Cochrane, G.R., Johnson, S.Y., Dartnell, P., Greene, H.G., Erdey, M.D., Dieter, B.E., … and Krigsman, L.M., 2016, California State Waters Map Series—offshore of Aptos, California, U.S. Geological Survey, Open-File Report OF-2016-1025, 1:24,000.

APPENDIX A

FIGURES AND STANDARD DETAILS

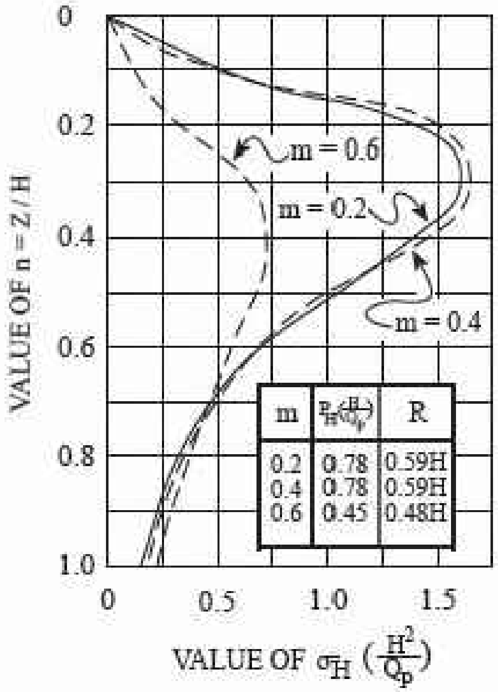
Surcharge Pressure Diagram	Figure A-1

LINE LOAD

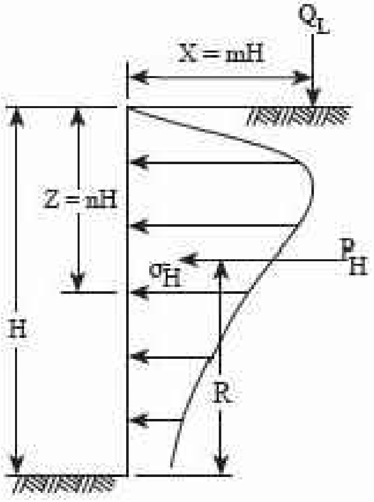


m	R
0.1	0.60H
0.3	0.60H
0.5	0.56H
0.7	0.48H

POINT LOAD



m	$\frac{P_H}{H}(\frac{H}{Q_p})$	R
0.2	0.78	0.59H
0.4	0.78	0.59H
0.6	0.45	0.48H



FOR m ≦ 0.4:

$$\sigma_H (\frac{H}{Q_L}) = \frac{0.20\ n}{(0.16 + n^2)^2}$$

$$P_H = 0.55\ Q_L$$

FOR m > 0.4:

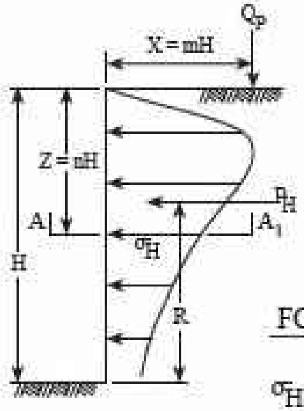
$$\sigma_H (\frac{H}{Q_L}) = \frac{1.28\ m^2 n}{(m^2 + n^2)^2}$$

$$\text{RESULTANT}\quad P_H = \frac{0.64\ Q_L}{(m^2 + 1)}$$

PRESSURES FROM LINE LOAD Q_L

(BOISSINESQ EQUATION MODIFIED BY EXPERMENT)

REFERENCE: Design Manual
NAVFAC DM-7.02
Figure 11
Page 7.2-74

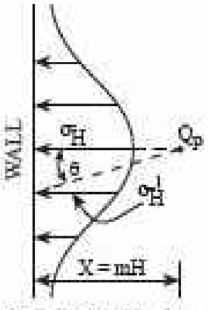


FOR m ≦ 0.4:

$$\sigma_H (\frac{H^2}{Q_p}) = \frac{0.28\ n^2}{(0.16 + n^2)^3}$$

FOR m > 0.4:

$$\sigma_H (\frac{H^2}{Q_p}) = \frac{1.77\ m^2 n^2}{(m^2 + n^2)^3}$$



SECTION A-A_1

$$\sigma_H^1 = \sigma_H \cos^2(1.1\ \theta)$$

PRESSURES FROM POINT LOAD Q_P

(BOISSINESQ EQUATION MODIFIED
BY EXPERMENT)

BUTANO GEOTECHNICAL ENGINEERING, INC.	**SURCHARGE PRESSURE DIAGRAM**	FIGURE A-1

APPENDIX B

FIELD EXPLORATION PROGRAM

Field Exploration Procedures	Page B-1
Site Location Plan	Figure B-1
Boring Site Plan	Figure B-2
Key to the Logs	Figure B-3
Logs of the Borings	Figures B-4 through B-11
Historic Aerial Photo	Figure B-12
Cross Section X-X’	Figure B-13
Cross Section Y-Y’	Figure B-14
Cross Section Z-Z’	Figure B-15

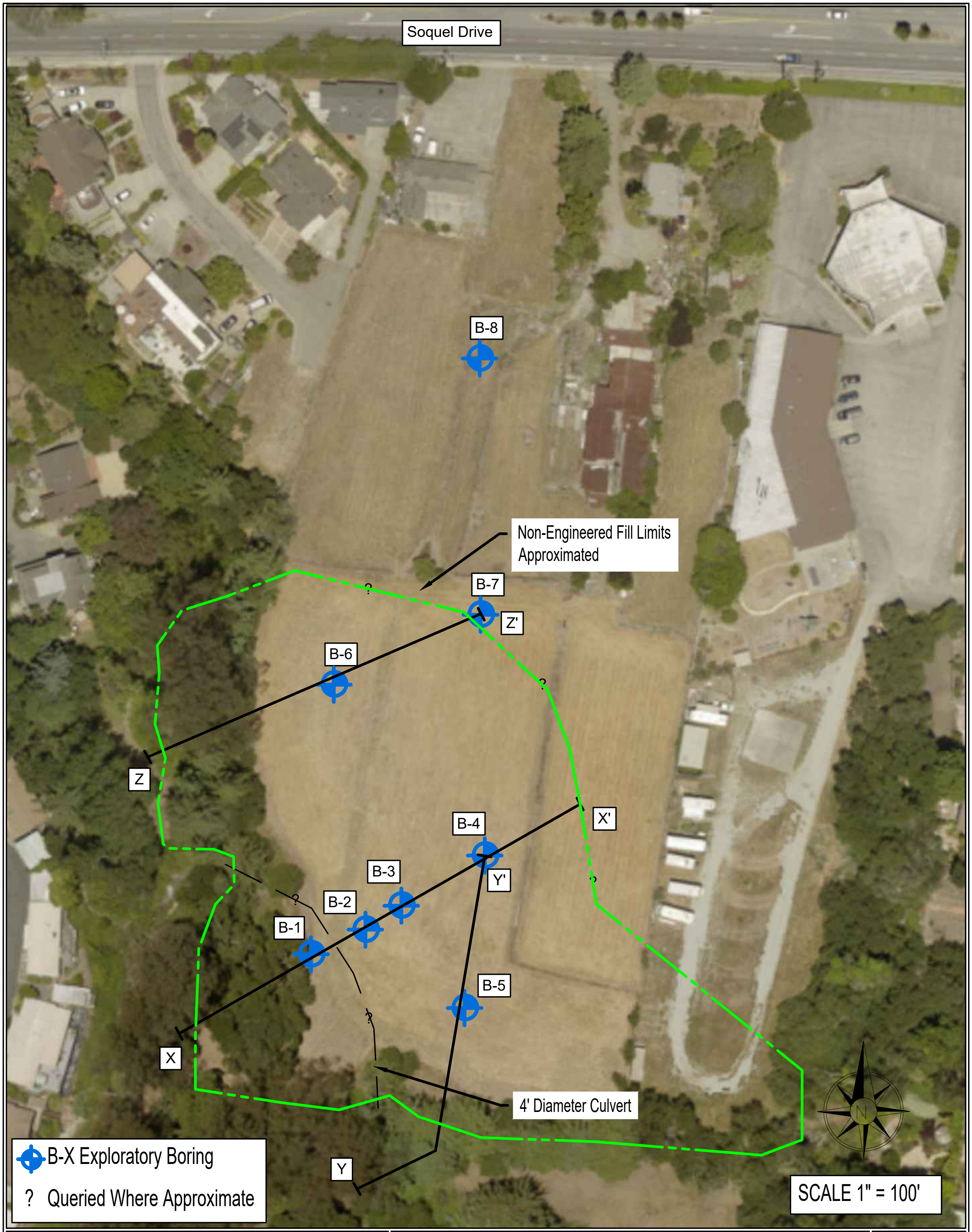
FIELD EXPLORATION PROCEDURES

Subsurface conditions were explored by advancing two borings below the existing grade. The borings were advanced by 6-inch diameter solid stem augers on a truck mounted drill rig. The Key to The Logs and the Logs of the Borings are included in Appendix B, Figures B-3 through B-11. The approximate locations of the borings are shown on the Boring Site Plan, Figure B-2. The borings were located in the field by GPS. Their locations as shown are therefore within the accuracy of such measurement.

The soils encountered in the borings were continuously logged in the field by a representative of Butano Geotechnical Engineering, Inc. Bulk and relatively undisturbed soil samples for identification and laboratory testing were obtained in the field. These soils were classified based on field observations and laboratory tests. The classifications are in accordance with the Unified Soil Classification System (USCS: Figure B-3).

The historic aerial image of the site was obtained from the UCSB aerial photo database. The photo was dated June 2, 1956. The limits of the alluvial deposits were approximated based on vegetation, boring data, and lidar imagery.

The cross sections were created using a tape and clinometer. The cross sections are accurate to within the tolerances of these instruments. The subsurface data obtained by our borings was mapped on the cross sections to approximate the soil contacts.



BUTANO	**BORING SITE PLAN**	FIGURE
GEOTECHNICAL ENGINEERING, INC.	5606 Soquel Drive	B-2

KEY TO LOGS

UNIFIED SOIL CLASSIFICATION SYSTEM

PRIMARY DIVISIONS			GROUP SYMBOL	SECONDARY DIVISIONS
COARSE GRAINED SOILS More than half of the material is larger than the No. 200 sieve	GRAVELS More than half of the coarse fraction is larger than the No. 4 sieve	CLEAN GRAVELS (Less than 5% fines)	GW	Well graded gravels, gravel-sand mixtures, little or no fines
			GP	Poorly graded gravels, gravel-sand mixtures, little or no fines
		GRAVEL WITH FINES	GM	Silty gravels, gravel-sand-silt mixtures, non-plastic fines
			GC	Clayey gravels, gravel-sand-clay mixtures, plastic fines
	SANDS More than half of the coarse fraction is smaller than the No. 4 sieve	CLEAN SANDS (Less than 5% fines)	SW	Well graded sands, gravelly sands, little or no fines
			SP	Poorly graded sands, gravelly sands, little or no fines
		SAND WITH FINES	SM	Silty sands, sand-silt mixtures, non-plastic fines
			SC	Clayey sands, sand-clay mixtures, plastic fines
FINE GRAINED SOILS More than half of the material is smaller than the No. 200 sieve	SILTS AND CLAYS Liquid limit less than 50		ML	Inorganic silts and very fine sands, silty or clayey fine sands or clayey silts with slight plasticity
			CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays
			OL	Organic silts and organic silty clays of low plasticity
	SILTS AND CLAYS Liquid limit greater than 50		MH	Inorganic silts, micaceous or diatomacaceous fine sandy or silty soils, elastic silts
			CH	Inorganic clays of high plasticity, fat clays
			OH	Organic clays of medium to high plasticity, organic silts
HIGHLY ORGANIC SOILS			Pt	Peat and other highly organic soils

GRAIN SIZE LIMITS

SILT AND CLAY	SAND			GRAVEL		COBBLES	BOULDERS
	FINE	MEDIUM	COARSE	FINE	COARSE		

No. 200 No. 40 No. 10 No. 4 3/4 in. 3 in. 12 in.

US STANDARD SIEVE SIZE

RELATIVE DENSITY

SAND AND GRAVEL	BLOWS/FT*
VERY LOOSE	0 - 4
LOOSE	4 - 10
MEDIUM DENSE	10 - 30
DENSE	30 - 50
VERY DENSE	OVER 50

CONSISTENCY

SILT AND CLAY	BLOWS/FT*
VERY SOFT	0 - 2
SOFT	2 - 4
FIRM	4 - 8
STIFF	8 - 16
VERY STIFF	16 - 32
HARD	OVER 32

MOISTURE CONDITION

CLAY	DRY
	MOIST
	SATURATED
SAND	DRY
	DAMP
	WET
	SATURATED

* Number of blows of 140 pound hammer falling 30 inches to drive a 2 inch O.D. (1 3/8 inch I.D.) split spoon (ASTM D-1586).

BUTANO GEOTECHNICAL ENGINEERING, INC.	FIGURE B-3

LOG OF EXPLORATORY BORING

Project No.: 25-237-SC
Project: 5606 Soquel Drive
Date: December 2, 2025
Logged By: SC

Boring: B1
Location: See Figure B-2
Elevation:
Method of Drilling: 6-inch diameter solid stem auger
CCD Truck

⧄ 2" Ring Sample
⧅ 2.5" Ring Sample
◫ Terzaghi Split Spoon Sample
☒ Bulk Sample

Perched Water Table ▽
Static Water Table ▽
Water Encountered During Drilling ▼

Change in Soil Classification ————
Gradation or Minor Change in Classification - - - - - -

Depth (ft.)	Soil Type	Undisturbed	Bulk	Description	Blows / Foot	N_{60}	Dry Density (pcf)	Moisture Content (%)	Sat. Moisture Content (%)	Swell Pressure (Psf)	Expansion Index	Atterberg Limits L.L.	Atterberg Limits P.I.
	CL (Af)	⧅		Dark yellowish brown Sandy LEAN CLAY with Gravel firm, moist, trace asphalt (Non-Engineered Fill)	15	8	109.2	14.4					
5		◫		some subrounded gravel	19	15		12.5					
10		◫		dark gray, with organic debris	33	30		14.6					
15		◫		consistent	19	15		11.2					
	SM			Black Silty SAND (Cemented), very dense, damp, shells	50/0"	NA							
20				Boring terminated at a depth of 20 feet No groundwater encountered during drilling.									
25													
30													
35													

BUTANO GEOTECHNICAL ENGINEERING, INC.

FIGURE
B-4

LOG OF EXPLORATORY BORING

Project No.:	25-237-SC	Boring:	B2
Project:	5606 Soquel Drive	Location:	See Figure B-2
		Elevation:	
Date:	December 2, 2025	Method of Drilling:	6-inch diameter solid stem auger
Logged By:	SC		CCD Truck

⧄ 2" Ring Sample   ⧅ 2.5" Ring Sample   ◫ Terzaghi Split Spoon Sample   ☒ Bulk Sample

Perched Water Table ▽   Static Water Table ▽   Water Encountered During Drilling ▼

Change in Soil Classification ———   Gradation or Minor Change in Classification - - - - -

Depth (ft.)	Soil Type	Undisturbed	Bulk	Description	Blows / Foot	N_{60}	Dry Density (pcf)	Moisture Content (%)	Sat. Moisture Content (%)	Swell Pressure (Psf)	Expansion Index	Atterberg Limits L.L.	Atterberg Limits P.I.
	CL (Af)	◫		Dark yellowish brown Sandy LEAN CLAY with Gravel firm, moist (Non-Engineered Fill)	6	4		12.9				32.2	18.5
5		◫			18	14		13.0					
10		⧅			20	11	112.1	14.5					
15		◫			50/1"	NA							
				Boring terminated at a depth of 16 feet 1 inch No groundwater encountered during drilling. Refusal on rubble									
20													
25													
30													
35													

LOG OF EXPLORATORY BORING

Project No.: 25-237-SC
Project: 5606 Soquel Drive
Date: December 2, 2025
Logged By: SC

Boring: B3
Location: See Figure B-2
Elevation:
Method of Drilling: 6-inch diameter solid stem auger
CCD Truck

2" Ring Sample ◿
2.5" Ring Sample ◺
Terzaghi Split Spoon Sample ▯
Bulk Sample ☒
Perched Water Table ▽
Static Water Table ▽
Water Encountered During Drilling ▼
Change in Soil Classification ———
Gradation or Minor Change in Classification - - - -

Depth (ft.)	Soil Type	Undisturbed	Bulk	Description	Blows / Foot	N_{60}	Dry Density (pcf)	Moisture Content (%)	Sat. Moisture Content (%)	Swell Pressure (Psf)	Expansion Index	Atterberg Limits L.L.	Atterberg Limits P.I.
	CL (Af)			Dark yellowish brown Sandy LEAN CLAY with Gravel firm, moist (Non-Engineered Fill)	8	5		14.3				31.3	16.9
5					17	13							
10				trace asphalt	15	12		15.4					
				trace angular sandstone gravel									
15					20	16		16.1				38.3	24.2
20					32	29							
	SC- SM			Gray and black Silty-Clayey SAND, loose, very moist									
25					12	9		20.2					
30					12	9							
				organic debris ▽									
35					21	17		34.2					

Boring terminated at a depth of 36 1/2 feet
Groiundwater encountered at a depth of 32 feet

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FIGURE B-6

LOG OF EXPLORATORY BORING

Project No.:	25-237-SC	Boring:	B4
Project:	5606 Soquel Drive	Location:	See Figure B-2
		Elevation:	
Date:	December 2, 2025	Method of Drilling:	6-inch diameter solid stem auger
Logged By:	SC		CCD Truck

⧄ 2" Ring Sample ⧅ 2.5" Ring Sample ◫ Terzaghi Split Spoon Sample ⊠ Bulk Sample

Perched Water Table ▽ Static Water Table ▽ Water Encountered During Drilling ▼

Change in Soil Classification ——— Gradation or Minor Change in Classification - - - -

Depth (ft.)	Soil Type	Undisturbed	Bulk	Description	Blows / Foot	N_{60}	Dry Density (pcf)	Moisture Content (%)	Sat. Moisture Content (%)	Swell Pressure (Psf)	Expansion Index	Atterberg Limits	
												L.L.	P.I.
	CL (Af)	⧅		Dark brown Sandy LEAN CLAY with Gravel, firm moist (Non-Engineered Fill)	5	4							
5		◫			7	5							
10	SC (Af)	◫		Dark yellowish brown Clayey SAND with Gravel medium dense, moist (Non-Engineered Fill)	22	18							
15		◫			22	18							
	CL			Dark yellowish brown Sandy LEAN CLAY, stiff, moist	10	8							
20		◫											
				Boring terminated at a depth of 20 feet No groundwater encountered during drilling.									
25													
30													
35													

BUTANO GEOTECHNICAL ENGINEERING, INC.

FIGURE
B-7

LOG OF EXPLORATORY BORING

Project No.: 25-237-SC
Project: 5606 Soquel Drive
Date: December 2, 2025
Logged By: SC

Boring: B5
Location: See Figure B-2
Elevation:
Method of Drilling: 6-inch diameter solid stem auger
CCD Truck

2" Ring Sample
2.5" Ring Sample
Terzaghi Split Spoon Sample
Bulk Sample
Perched Water Table
Static Water Table
Water Encountered During Drilling
Change in Soil Classification
Gradation or Minor Change in Classification

Depth (ft.)	Soil Type	Undisturbed	Bulk	Description	Blows / Foot	N_{60}	Dry Density (pcf)	Moisture Content (%)	Sat. Moisture Content (%)	Swell Pressure (Psf)	Expansion Index	Atterberg Limits L.L.	Atterberg Limits P.I.
	CL (Af)	12		Dark yellowish brown Sandy LEAN CLAY with Gravel, stiff, moist (Non-Engineered Fill)									
5					12	9		12.1					
10					10	8		16.7				34.5	20.7
	SC (Af)			Dark yellowish brown Clayey SAND with Gravel medium dense, moist (Non-Engineered Fill)									
15					20	16		16.8					
	CL			Dark yellowish brown Sandy LEAN CLAY, stiff, moist trace aluvial gravel	19	15		18.9					
20													
				Boring terminated at a depth of 21 1/2 feet No groundwater encountered during drilling.									
25													
30													
35													

LOG OF EXPLORATORY BORING

Project No.:	25-237-SC	Boring:	B6
Project:	5606 Soquel Drive	Location:	See Figure B-2
		Elevation:	
Date:	December 2, 2025	Method of Drilling:	6-inch diameter solid stem auger
Logged By:	SC		CCD Truck

⧄ 2" Ring Sample ⧅ 2.5" Ring Sample ◫ Terzaghi Split Spoon Sample ☒ Bulk Sample

Perched Water Table ▽ Static Water Table ▽ Water Encountered During Drilling ▼

Change in Soil Classification ——— Gradation or Minor Change in Classification - - - - -

Depth (ft.)	Soil Type	Undisturbed	Bulk	Description	Blows / Foot	N_{60}	Dry Density (pcf)	Moisture Content (%)	Sat. Moisture Content (%)	Swell Pressure (Psf)	Expansion Index	Atterberg Limits	
												L.L.	P.I.
	CL (Af)			Dark yellowish brown Sandy LEAN CLAY with Gravel, stiff, moist (Non-Engineered Fill)									
5		◫			15	12		15.4				39.4	25.2
10		◫			22	18		15.8					
				Dark yellowish brown Sandy LEAN CLAY, stiff, moist									
15		◫			13	10		20.1					
	SM			Native									
					18	14		15.7					
20		◫		Dark brown Silty SAND, medium dense, wet									
				Boring terminated at a depth of 21 1/2 feet No groundwater encountered during drilling.									
25													
30													
35													

LOG OF EXPLORATORY BORING

Project No.: 25-237-SC
Project: 5606 Soquel Drive
Date: December 2, 2025
Logged By: SC

Boring: B7
Location: See Figure B-2
Elevation:
Method of Drilling: 6-inch diameter solid stem auger
CCD Truck

⧄ 2" Ring Sample ⧅ 2.5" Ring Sample ◫ Terzaghi Split Spoon Sample ☒ Bulk Sample
Perched Water Table ▽ Static Water Table ▽ Water Encountered During Drilling ▼
Change in Soil Classification ——— Gradation or Minor Change in Classification - - - - -

Depth (ft.)	Soil Type	Undisturbed	Bulk	Description	Blows / Foot	N_{60}	Dry Density (pcf)	Moisture Content (%)	Sat. Moisture Content (%)	Swell Pressure (Psf)	Expansion Index	Atterberg Limits L.L.	Atterberg Limits P.I.
	SM	◫		Dark brown Silty SAND, very loose, damp stiff, moist	4	3		14.2					
5	SC	◫		Dark yellowish brown Clayey SAND with Gravel medium dense, moist	15	12		16.5					
	SM			Grayish brown Silty SAND with Gravel, dense, moist									
10		◫			34	31		13.5					
				Boring terminated at a depth of 11 1/2 feet No groundwater encountered during drilling.									
15													
20													
25													
30													
35													

LOG OF EXPLORATORY BORING

Project No.:	25-237-SC	Boring:	B8
Project:	5606 Soquel Drive	Location:	See Figure B-2
		Elevation:	
Date:	December 2, 2025	Method of Drilling:	6-inch diameter solid stem auger
Logged By:	SC		CCD Truck

▨ 2" Ring Sample ▧ 2.5" Ring Sample ▯ Terzaghi Split Spoon Sample ☒ Bulk Sample

Perched Water Table ▽ Static Water Table ▽ Water Encountered During Drilling ▼

Change in Soil Classification ——— Gradation or Minor Change in Classification - - - - -

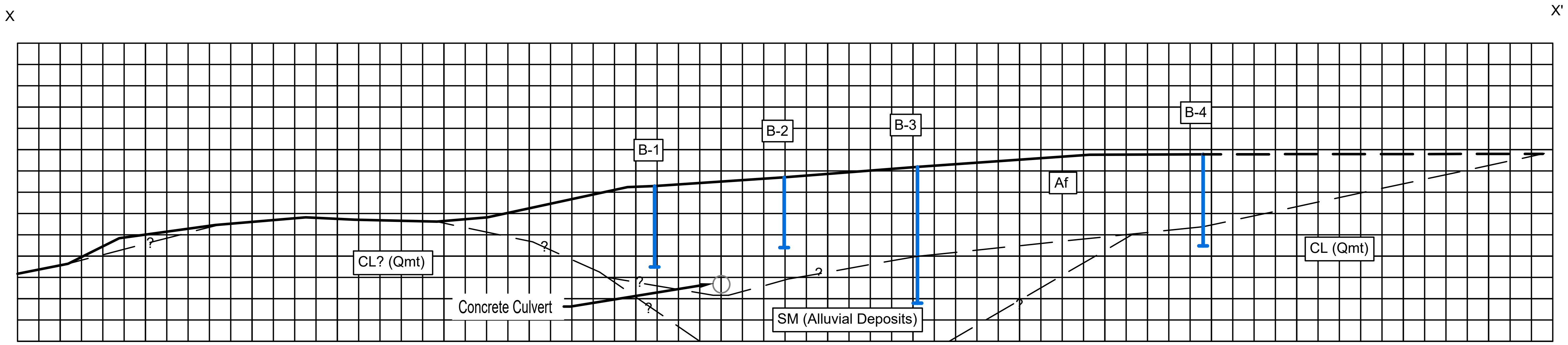
Depth (ft.)	Soil Type	Undisturbed	Bulk	Description	Blows / Foot	N_{60}	Dry Density (pcf)	Moisture Content (%)	Sat. Moisture Content (%)	Swell Pressure (Psf)	Expansion Index	Atterberg Limits L.L.	Atterberg Limits P.I.
	SM	▯		Dark brown Silty SAND, loose, moist	4	4		20.1				45.7	33.0
	CL			Grayish brown Sandy LEAN CLAY, firm, moist									
5	SC	▯		Dark yellowish brown Clayey SAND with Gravel medium dense, moist	26	33		12.8					
				Boring terminated at a depth of 6 1/2 feet No groundwater encountered during drilling.									
10													
15													
20													
25													
30													
35													

? Queried Where Approximate

Photo From UCSB Aerial Database June 2, 1956

SCALE 1" = 100'

BUTANO GEOTECHNICAL ENGINEERING, INC.	**HISTORIC AERIAL PHOTO** 5606 Soquel Drive	FIGURE B-12



LEGEND

Af	- Non-Engineered Fill
CL	- Sandy LEAN CLAY
SM	- Silty SAND
?	- Queried Where Approximate
B-X	- Exploratory Boring

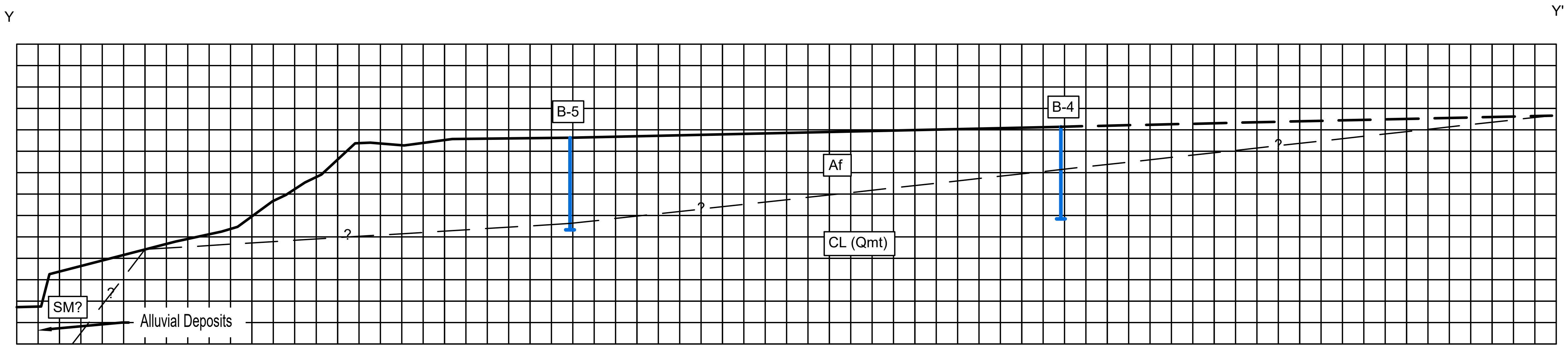
⊥

Scale 1" = 30'
Horizontal = Vertical

BUTANO
GEOTECHNICAL ENGINEERING, INC.

Cross Section X-X'
5606 Soquel Avenue

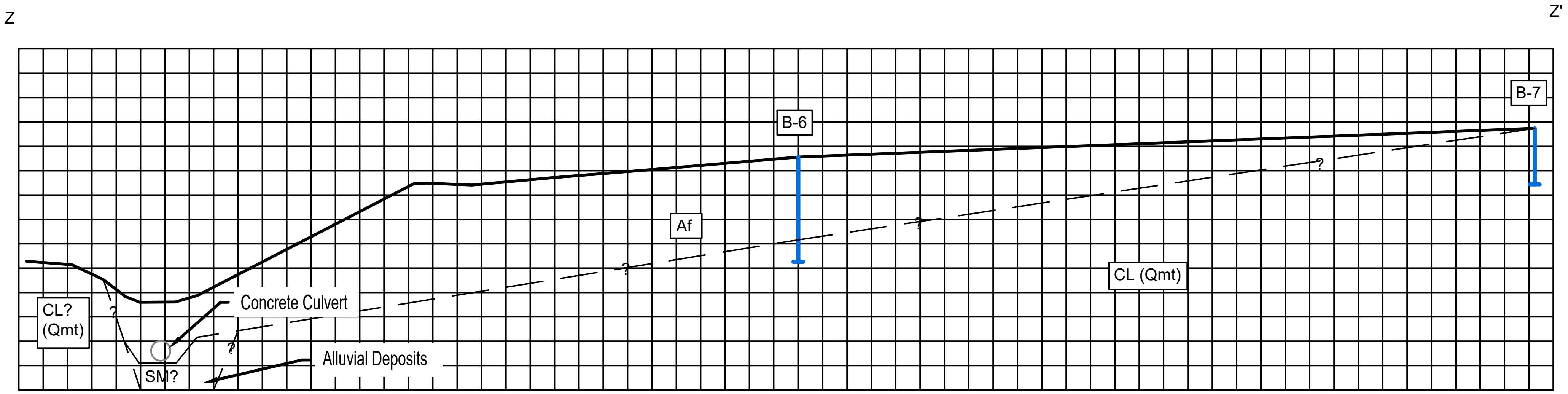
FIGURE
B-13



LEGEND
Af - Non-Engineered Fill
CL - Sandy LEAN CLAY
SM - Silty SAND
? - Queried Where Approximate
B-X - Exploratory Boring
⊥

Scale 1" = 30'
Horizontal = Vertical

BUTANO GEOTECHNICAL ENGINEERING, INC.	Cross Section Y-Y' 5606 Soquel Drive	FIGURE B-14



LEGEND
Af - Non-engineered Fill
CL - Sandy LEAN CLAY
SM - Silty SAND
? - Queried Where Approximate
B-X - Exploratory Boring
⊥

Scale 1" = 30'
Horizontal = Vertical

BUTANO GEOTECHNICAL ENGINEERING, INC.	Cross Section Z-Z' 5606 Soquel Drive	FIGURE B-15

APPENDIX C

LABORATORY TESTING PROGRAM

Laboratory Testing Procedures Page C-1

LABORATORY TESTING PROCEDURES

Classification

Soils were classified according to the Unified Soil Classification System in accordance with ASTM D 2487 and D 2488. Moisture content and density determinations were made for representative samples in accordance with ASTM D 2216. Results of moisture density determinations, together with classifications, are shown on the Boring Logs, Figures B-4 through B-11.

Atterberg Limits

Six Atterberg limit tests were performed in accordance with ASTM D-4318. The results are presented in on the boring logs Figures B-4 though B-11.

Important Information about Your

Geotechnical Engineering Report

Subsurface problems are a principal cause of construction delays, cost overruns, claims, and disputes.

While you cannot eliminate all such risks, you can manage them. The following information is provided to help.

Geotechnical Services Are Performed for Specific Purposes, Persons, and Projects

Geotechnical engineers structure their services to meet the specific needs of their clients. A geotechnical engineering study conducted for a civil engineer may not fulfill the needs of a construction contractor or even another civil engineer. Because each geotechnical engineering study is unique, each geotechnical engineering report is unique, prepared *solely* for the client. No one except you should rely on your geotechnical engineering report without first conferring with the geotechnical engineer who prepared it. *And no one — not even you* — should apply the report for any purpose or project except the one originally contemplated.

Read the Full Report

Serious problems have occurred because those relying on a geotechnical engineering report did not read it all. Do not rely on an executive summary. Do not read selected elements only.

A Geotechnical Engineering Report Is Based on A Unique Set of Project-Specific Factors

Geotechnical engineers consider a number of unique, project-specific factors when establishing the scope of a study. Typical factors include: the client's goals, objectives, and risk management preferences; the general nature of the structure involved, its size, and configuration; the location of the structure on the site; and other planned or existing site improvements, such as access roads, parking lots, and underground utilities. Unless the geotechnical engineer who conducted the study specifically indicates otherwise, do not rely on a geotechnical engineering report that was:

- not prepared for you,
- not prepared for your project,
- not prepared for the specific site explored, or
- completed before important project changes were made.

Typical changes that can erode the reliability of an existing geotechnical engineering report include those that affect:

- the function of the proposed structure, as when it's changed from a parking garage to an office building, or from a light industrial plant to a refrigerated warehouse,
- elevation, configuration, location, orientation, or weight of the proposed structure,
- composition of the design team, or
- project ownership.

As a general rule, *always* inform your geotechnical engineer of project changes—even minor ones—and request an assessment of their impact. *Geotechnical engineers cannot accept responsibility or liability for problems that occur because their reports do not consider developments of which they were not informed.*

Subsurface Conditions Can Change

A geotechnical engineering report is based on conditions that existed at the time the study was performed. *Do not rely on a geotechnical engineering report* whose adequacy may have been affected by: the passage of time; by man-made events, such as construction on or adjacent to the site; or by natural events, such as floods, earthquakes, or groundwater fluctuations. *Always* contact the geotechnical engineer before applying the report to determine if it is still reliable. A minor amount of additional testing or analysis could prevent major problems.

Most Geotechnical Findings Are Professional Opinions

Site exploration identifies subsurface conditions only at those points where subsurface tests are conducted or samples are taken. Geotechnical engineers review field and laboratory data and then apply their professional judgment to render an opinion about subsurface conditions throughout the site. Actual subsurface conditions may differ—sometimes significantly—from those indicated in your report. Retaining the geotechnical engineer who developed your report to provide construction observation is the most effective method of managing the risks associated with unanticipated conditions.

A Report's Recommendations Are *Not* Final

Do not overrely on the construction recommendations included in your report. *Those recommendations are not final,* because geotechnical engineers develop them principally from judgment and opinion. Geotechnical engineers can finalize their recommendations only by observing actual subsurface conditions revealed during construction. *The geotechnical engineer who developed your report cannot assume responsibility or liability for the report's recommendations if that engineer does not perform construction observation.*

A Geotechnical Engineering Report Is Subject to Misinterpretation

Other design team members' misinterpretation of geotechnical engineering reports has resulted in costly problems. Lower that risk by having your geotechnical engineer confer with appropriate members of the design team after submitting the report. Also retain your geotechnical engineer to review pertinent elements of the design team's plans and specifications. Contractors can also misinterpret a geotechnical engineering report. Reduce that risk by having your geotechnical engineer participate in prebid and preconstruction conferences, and by providing construction observation.

Do Not Redraw the Engineer's Logs

Geotechnical engineers prepare final boring and testing logs based upon their interpretation of field logs and laboratory data. To prevent errors or omissions, the logs included in a geotechnical engineering report should *never* be redrawn for inclusion in architectural or other design drawings. Only photographic or electronic reproduction is acceptable, *but recognize that separating logs from the report can elevate risk.*

Give Contractors a Complete Report and Guidance

Some owners and design professionals mistakenly believe they can make contractors liable for unanticipated subsurface conditions by limiting what they provide for bid preparation. To help prevent costly problems, give contractors the complete geotechnical engineering report, *but* preface it with a clearly written letter of transmittal. In that letter, advise contractors that the report was not prepared for purposes of bid development and that the report's accuracy is limited; encourage them to confer with the geotechnical engineer who prepared the report (a modest fee may be required) and/or to conduct additional study to obtain the specific types of information they need or prefer. A prebid conference can also be valuable. *Be sure contractors have sufficient time* to perform additional study. Only then might you be in a position to give contractors the best information available to you, while requiring them to at least share some of the financial responsibilities stemming from unanticipated conditions.

Read Responsibility Provisions Closely

Some clients, design professionals, and contractors do not recognize that geotechnical engineering is far less exact than other engineering disciplines. This lack of understanding has created unrealistic expectations that have led to disappointments, claims, and disputes. To help reduce the risk of such outcomes, geotechnical engineers commonly include a variety of explanatory provisions in their reports. Sometimes labeled "limitations" many of these provisions indicate where geotechnical engineers' responsibilities begin and end, to help others recognize their own responsibilities and risks. *Read these provisions closely.* Ask questions. Your geotechnical engineer should respond fully and frankly.

Geoenvironmental Concerns Are Not Covered

The equipment, techniques, and personnel used to perform a *geoenvironmental* study differ significantly from those used to perform a *geotechnical* study. For that reason, a geotechnical engineering report does not usually relate any geoenvironmental findings, conclusions, or recommendations; e.g., about the likelihood of encountering underground storage tanks or regulated contaminants. *Unanticipated environmental problems have led to numerous project failures.* If you have not yet obtained your own geoenvironmental information, ask your geotechnical consultant for risk management guidance. *Do not rely on an environmental report prepared for someone else.*

Obtain Professional Assistance To Deal with Mold

Diverse strategies can be applied during building design, construction, operation, and maintenance to prevent significant amounts of mold from growing on indoor surfaces. To be effective, all such strategies should be devised for the *express purpose* of mold prevention, integrated into a comprehensive plan, and executed with diligent oversight by a professional mold prevention consultant. Because just a small amount of water or moisture can lead to the development of severe mold infestations, a number of mold prevention strategies focus on keeping building surfaces dry. While groundwater, water infiltration, and similar issues may have been addressed as part of the geotechnical engineering study whose findings are conveyed in this report, the geotechnical engineer in charge of this project is not a mold prevention consultant; ***none of the services performed in connection with the geotechnical engineer's study were designed or conducted for the purpose of mold prevention. Proper implementation of the recommendations conveyed in this report will not of itself be sufficient to prevent mold from growing in or on the structure involved.***

Rely, on Your ASFE-Member Geotechncial Engineer for Additional Assistance

Membership in ASFE/The Best People on Earth exposes geotechnical engineers to a wide array of risk management techniques that can be of genuine benefit for everyone involved with a construction project. Confer with your ASFE-member geotechnical engineer for more information.

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