GEOTECHNICAL RECONNAISSANCE REPORT

OTAY RANCH TOWN CENTER
CHULA VISTA, CALIFORNIA

GEOCON
INCORPORATED

GEOTECHNICAL
ENVIRONMENTAL
MATERIALS

PREPARED FOR

Brookfield
Properties

FEBRUARY 4, 2022
PROJECT NO. G2883-52-01

GEOCON
INCORPORATED
GEOTECHNICAL ■ ENVIRONMENTAL ■ MATERIALS

Project No. G2883-52-01
February 4, 2022

Brookfield Properties
733 8th Avenue
San Diego, California 92101

Attention: Mr. Dan Buoye

Subject: GEOTECHNICAL RECONNAISSANCE REPORT
OTAY RANCH TOWN CENTER
CHULA VISTA, CALIFORNIA

Dear Mr. Buoye:

In accordance with your request and authorization of our Proposal No. LG-21061 revised January 11, 2022, we prepared this geotechnical reconnaissance report for the proposed Otay Ranch Town Center redevelopment in Chula Vista, California.

The accompanying report describes the general site soil and geologic conditions based on a desktop study and presents our findings. We should be contacted to prepare a geotechnical investigation for proposed redevelopment to the property, if planned.

Should you have any questions regarding this report, or if we may be of further service, please contact the undersigned at your convenience.

Very truly yours,

GEOCON INCORPORATED

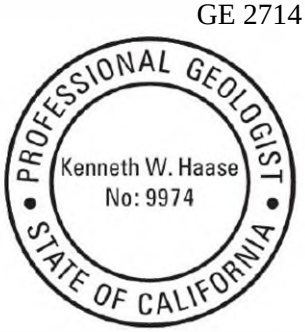
Ken W. Haase
PG 9974

Shawn Foy Weedon
GE 2714

John Hoobs
CEG 1524

KH:SFW:JH:arm

(e-mail) Addressee



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GEOTECHNICAL RECONNAISSANCE

1. PURPOSE AND SCOPE

This report presents the results of a geotechnical reconnaissance related to proposed redevelopment of the Otay Ranch Town Center in the City of Chula Vista, California (see Vicinity Map). The roughly 5-acre property is located north of Birch Road and the Otay Ranch Town Center Mall, south of Olympic Parkway and the Planning Area 12 development, west of Eastlake Parkway and east of State Route 125. The purpose of this study is to review published geotechnical documents and geologic information (see List of References) and evaluate the existing geologic conditions and geologic/geotechnical hazards that may affect the property.

Vicinity Map

The scope of our study included reviewing published and unpublished geotechnical information of the surrounding area. Appendix A presents the boring logs performed during the referenced investigation. In addition, Appendix B includes the laboratory test results from the previous investigation. The conclusions presented herein are based on a review of the available data and our experience with similar soil and geologic conditions in the surrounding area.

The scope of the study included a review of:

1. *As-Graded Geotechnical Report, McMillin Otay Ranch, Village 12 and Borrow and Fill Sites Within the Eastern Urban Center, Chula Vista, California*, prepared by Geotechnics Incorporated, dated February 16, 2006 (Project No. 0367-012-01, Document No. 05-1029).

2. *Preliminary Geotechnical Investigation, Otay Ranch Town Center Addition, Otay Ranch Village 12, 2015 Birch Road, Chula Vista, California,* prepared by Geocon Incorporated, dated June 26, 2014 (Project No. G1731-11-01).

2. SITE DESCRIPTION

The existing property consists of the northern parking area for the existing Otay Ranch Town Center mall. The area consists of surface grade asphalt concrete parking on the east and southwest, an outdoor soccer area and playground in the central portion with a landscape construction storage area in the northwest portion. The site was graded between 2004 and 2005 with observation and testing services provided by Geotechnics, Incorporated. The site is relatively flat with elevations between 624 feet Mean Sea Level (MSL) and 614 feet MSL, sloping gently to the southwest. An existing 10- to 15-foot-high cut and fill slope exists on the west limits of the site, descending towards State Route 125. The Existing Site Map shows the current conditions at the site. Based on the previous as-graded map, the site was partially situated over the upper portions of two canyon drainages with fill depths ranging up to about 25 feet at the site.

Existing Site Map

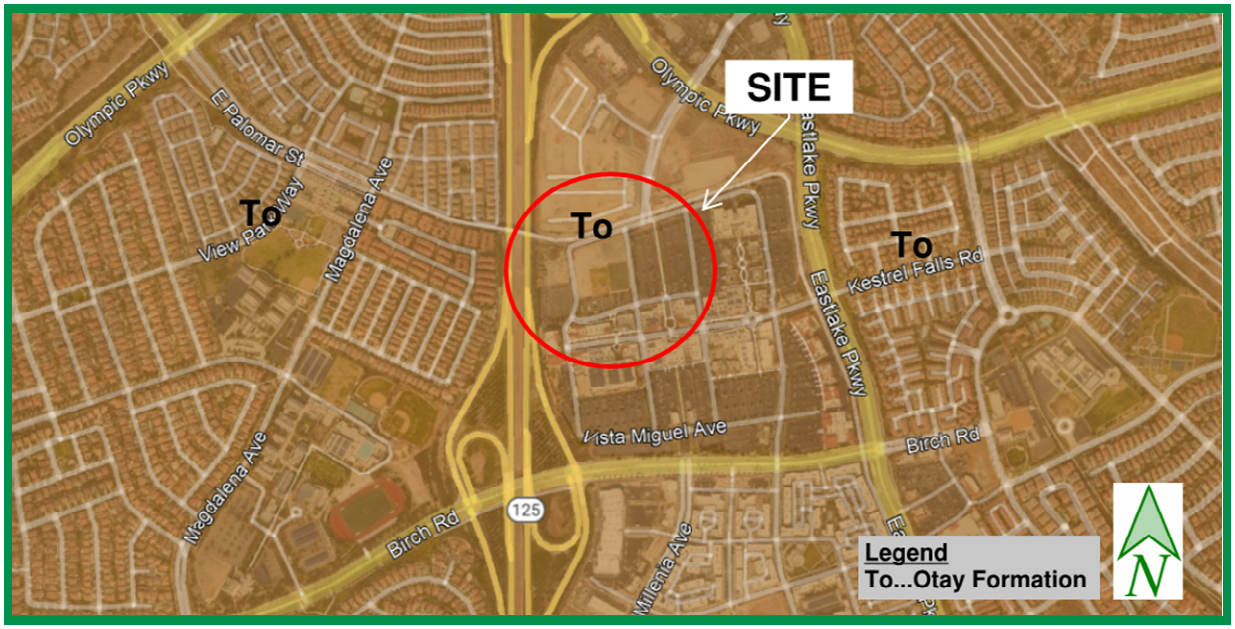
We understand the proposed redevelopment will consist of constructing 3, multi-family residential lots with commercial space, reconfiguring the existing Town Center Drive entrance and installing a new plaza area in the southeast portion of the site with accommodating utilities, flatwork, and landscaping. The Preliminary Site Plan shows a current concept of the proposed improvements.

Preliminary Site Plan

3. GEOLOGIC SETTING

The site is in the eastern portion of the coastal plain within the southern portion of the Peninsular Ranges Geomorphic Province of southern California. The Peninsular Ranges is a geologic and geomorphic province that extends from the Imperial Valley to the Pacific Ocean and from the Transverse Ranges to the north and into Baja California to the south. The coastal plain of San Diego County is underlain by a thick sequence of relatively undisturbed and non-conformable sedimentary rocks that thicken to the west and range in age from Upper Cretaceous through the Pleistocene with intermittent deposition. The sedimentary units are deposited on bedrock Cretaceous to Jurassic age igneous and metavolcanic rocks. Geomorphically, the coastal plain is characterized by a series of 21, stair-stepped marine terraces (younger to the west) that have been dissected by west flowing rivers. The coastal plain is a relatively stable block that is dissected by relatively few faults consisting of the potentially active La Nacion Fault Zone and the active Rose Canyon Fault Zone. The Peninsular Ranges Province is also dissected by the Elsinore Fault Zone that is associated with and sub-parallel to the San Andreas Fault Zone, which is the plate boundary between the Pacific and North American Plates.

The site consists of Oligocene-age (Tertiary) Otay Formation that generally consists of sandstones with interbeds of claystones and siltstones with a reported maximum thickness of roughly 400 feet. The Otay Formation contains multiple layers of bentonitic claystone that is highly expansive and has low shear strength. The Regional Geologic Map shows the geologic units around the site.



Regional Geologic Map

4. SOIL AND GEOLOGIC CONDITIONS

Based on our review of existing geologic information, the site is likely underlain by previously placed fill and the Otay Formation. The geologic units are described herein in order of increasing age.

4.1 Previously Placed Fill

Previously placed fill is present across most of the site based on the referenced as-graded map. The fill depths likely range up to about 25 feet on the site. We expect the fill soil consists of medium dense, damp to moist, sandy silts and clays and possess a "very low" to "high" expansion potential (expansion index of 130 or less) and a "S0" sulfate exposure. We expect the upper 2 to 3 feet of the existing fill will require remedial grading. However, deeper removals may be required during relocation of utilities or from demolishing foundations. The previously placed fill is suitable for the support of the proposed fill and structural loads.

4.2 Otay Formation

Tertiary-age Otay Formation located below the previously placed fill at may be exposed at grade in previous cut areas. This unit consists of interbeds of dense to very dense, slightly cemented, silty to

clayey sandstone and hard, siltstone and claystone layers. Excavations will generally be possible with heavy-duty grading equipment with heavy effort; however, moderately to highly cemented zones may create very difficult ripping and generate oversize cemented cobbles and boulders. The soil from this unit normally possesses a “very low” to “medium” expansion potential (expansion index of 90 or less); however, the claystones may possess a “high” expansion potential (expansion index of 91 to 130). The Otay Formation is suitable for the support of proposed fill and structural loads.

5. GROUNDWATER

We expect groundwater exists deeper than 100 feet below existing grade at the property; therefore, we do not expect groundwater to adversely impact future development. Seepage may be encountered at the fill/formational contact and within the previous canyon drainages. Groundwater elevations and seepage conditions are dependent on seasonal precipitation, irrigation, and land use, among other factors, and vary as a result. Seepage conditions can develop due to over watering or poor drainage practices. In addition, localized seepage conditions are occasionally encountered within deeper fills when drilled caisson foundations are excavated.

6. GEOLOGIC HAZARDS

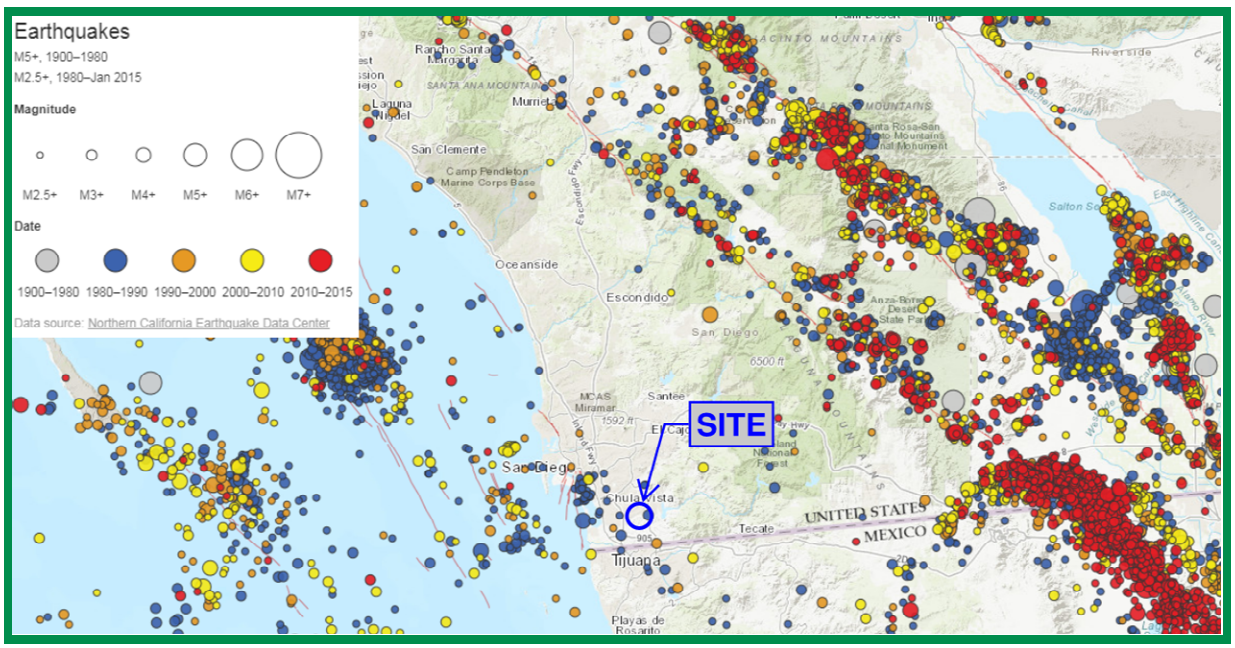
6.1 Faulting and Seismicity

A review of geologic literature and experience with the soil and geologic conditions in the general area indicate that known active, potentially active, or inactive faults are not located at the site. An active fault is defined by the California Geological Survey (CGS) as a fault showing evidence for activity within the last 11,700 years. The site is not located within a State of California Earthquake Fault Zone.

The USGS has developed a program to evaluate the approximate location of regional faulting in the area of properties. The following figure shows the location of the existing faulting in the San Diego County and Southern California region. The fault traces are shown as solid, dashed, and dotted that represent well-constrained, moderately constrained and inferred, respectively. The fault line colors represent fault with ages less than 150 years (red), 15,000 years (orange), 130,000 years (green), 750,000 years (blue, not shown) and 1.6 million years (black).

Faults in Southern California

The San Diego County and Southern California region is seismically active. The following figure presents the occurrence of earthquakes with a magnitude greater than 2.5 from the period of 1900 through 2015 according to the Bay Area Earthquake Alliance website.



Earthquakes in Southern California

Considerations important in seismic design include the frequency and duration of motion and the soil conditions underlying the site. Seismic design of structures should be evaluated in accordance with the California Building Code (CBC) guidelines currently adopted by the local agency.

6.2 Ground Rupture

Ground surface rupture occurs when movement along a fault is sufficient to cause a gap or rupture where the upper edge of the fault zone intersects the earth surface. The potential for ground rupture is considered to be negligible due to the absence of active faults at the subject site.

6.3 Tsunamis and Seiches

A tsunami is a series of long-period waves generated in the ocean by a sudden displacement of large volumes of water. The site is located approximately ten miles from the Pacific Ocean at an elevation greater than 610 feet MSL. Therefore, the risk of a tsunami affecting the site is considered negligible due to the distance of the site from the ocean and elevation.

Seiches are standing wave oscillations of an enclosed water body after the original driving force has dissipated. Driving forces are typically caused by seismic ground shaking. The site is not located near a body of water; therefore, the risk of a seiche affecting the site is considered negligible.

6.4 Liquefaction

Liquefaction typically occurs when a site is located in a zone with seismic activity, on-site soils are cohesionless or silt/clay with low plasticity, groundwater is encountered, and soil relative densities are less than about 70 percent. If the four previous criteria are met, a seismic event could result in a rapid pore-water pressure increase from the earthquake-generated ground accelerations. Seismically induced settlement may occur whether the potential for liquefaction exists or not. Due to the lack of a near surface groundwater table and the very dense nature of the fill and formational materials, the potential for liquefaction and seismically induced settlement occurring at the site is considered negligible.

6.5 Landslides

We did not observe evidence of previous or incipient slope instability at the site during our study and the property is relatively flat. Published geologic mapping indicates landslides are not present on or adjacent to the site. Therefore, we opine the potential for a landslide is not a concern for this project.

6.6 Erosion

The site is relatively flat and is not located adjacent to the Pacific Ocean coast or a free-flowing drainage where active erosion is occurring. Provided the engineering recommendations herein are

followed and the project civil engineer prepares the grading plans in accordance with generally accepted regional standards, we do not expect erosion to be a major impact to site development. In addition, we expect the proposed development would not increase the potential for erosion if properly designed.

6.7 Settlement

Fill is present across the majority of the site approaching maximum depths of about 25 feet. Fills are subject to long term settlement under gravity loading and also subject to settlements due to building loads. Based on previous experience for fill soils that are roughly 15 to 20 years old, long-term settlements due to gravity loading of roughly 0.1 percent could occur resulting in settlements of about 0.3 inches for a 20- to 25-foot deep fill. We should provide estimated settlements in the locations of the proposed buildings once a grading plan has been prepared with building locations.

7. CONCLUSIONS AND RECOMMENDATIONS

7.1 General

7.1.1 From a geotechnical engineering standpoint, we opine adverse soil or geologic conditions do not exist at the property and that the proposed redevelopment project can be performed.

7.1.2 Based on a review of the referenced geologic information and our experience in the area, we expect the site is generally underlain by previously placed fill with a maximum thickness of about 25 feet overlying the Otay Formation. The Otay Formation may be present at or near existing grade in the southwest and northeast portions of the site. The upper portion of the fill soil will require remedial grading where present across the site. The fill soil can be reused as new compacted fill. We should perform a geotechnical investigation to provide the design and remedial grading recommendations for the project once architecture and grading plans have been prepared.

7.1.3 We expect that formational materials will be exposed at or near proposed finish grades for portions of the proposed buildings. Due to the dense nature of the formational material, we expect the upper 5 feet of formational material to be removed and replaced with properly compacted fill.

7.1.4 Groundwater extends deeper than 100 feet below the site and will not affect development. It is not uncommon for near surface seepage conditions to develop from excessive irrigation where none previously existed due to the permeability characteristics of the geologic units on site.

7.1.5 We do not expect significant slopes or retaining walls will be constructed. Therefore, slope instability for planned and existing permanent slopes will not be a consideration for redevelopment.

7.1.6 We expect that most of the on-site soils will generally have a “low” to “medium” expansion potential (expansion index between 21 and 90) and an “S0” corrosion potential for design. Therefore, expansive soils will be a consideration for redevelopment.

7.1.7 Grading plans for future redevelopment and improvement for this property are not currently available. We should be contacted to perform a geotechnical investigation if the property will be redeveloped.

7.2 Excavation and Soil Characteristics

7.2.1 Excavation of the in-situ soil should be possible with moderate to heavy effort using conventional heavy-duty equipment. Some cemented zones exist in the formational materials that may require localized very difficult excavation and generation of oversize material, if encountered.

7.2.2 We expect the existing soil is considered to be "expansive" (expansion index [EI] of greater than 20) as defined by 2019 California Building Code (CBC) Section 1803.5.3. Table 7.2.1 presents soil classifications based on the expansion index. We expect the soil onsite to possess a "very low" to "high" expansion potential (expansion index of 130 or less) in accordance with ASTM D 4829.

TABLE 7.2.1
EXPANSION CLASSIFICATION BASED ON EXPANSION INDEX

Expansion Index (EI)	ASTM D 4829 Expansion Classification	2019 CBC Expansion Classification
0 – 20	Very Low	Non-Expansive
21 – 50	Low	Expansive
51 – 90	Medium	
91 – 130	High	
Greater Than 130	Very High	

7.2.3 We expect the onsite fill soils and formational materials will possess an "S0" sulfate exposure to concrete structures in contact with soil as defined by 2019 CBC Section 1904 and ACI 318-14 Chapter 19. The presence of water-soluble sulfates is not a visually discernible characteristic; therefore, other soil samples from the site could yield different concentrations. Additionally, over time landscaping activities (i.e., addition of fertilizers and other soil nutrients) may affect the concentration.

7.2.4 Geocon Incorporated does not practice in the field of corrosion engineering. Therefore, if improvements that could be susceptible to corrosion are planned, further evaluation by a corrosion engineer should be performed.

7.3 Seismic Design Criteria

7.3.1 Table 7.3.1 summarizes site-specific design criteria obtained from the 2019 California Building Code (CBC; Based on the 2018 International Building Code [IBC] and ASCE 7-16), Chapter 16 Structural Design, Section 1613 Earthquake Loads. We used the computer program *U.S. Seismic Design Maps*, provided by the Structural Engineers Association

(SEA) to calculate the seismic design parameters. The short spectral response uses a period of 0.2 second. We evaluated the Site Class based on the discussion in Section 1613.2.2 of the 2019 CBC and Table 20.3-1 of ASCE 7-16. The buildings and improvements should be designed using a Site Class C. The values presented herein are for the risk-targeted maximum considered earthquake (MCE_R). Sites designated as Site Class D, E and F may require additional analyses if requested by the project structural engineer and client.

TABLE 7.3.1
2019 CBC SEISMIC DESIGN PARAMETERS

Parameter	Value	2019 CBC Reference
Site Class	C	Section 1613.2.2
Fill Thickness, T (feet)	T<20	--
MCE_R Ground Motion Spectral Response Acceleration – Class B (short), S_S	0.748g	Figure 1613.2.1(1)
MCE_R Ground Motion Spectral Response Acceleration – Class B (1 sec), S_1	0.273g	Figure 1613.2.1(2)
Site Coefficient, F_A	1.201	Table 1613.2.3(1)
Site Coefficient, F_V	1.500*	Table 1613.2.3(2)
Site Class Modified MCE_R Spectral Response Acceleration (short), S_{MS}	0.898g	Section 1613.2.3 (Eqn 16-36)
Site Class Modified MCE_R Spectral Response Acceleration – (1 sec), S_{M1}	0.410g*	Section 1613.2.3 (Eqn 16-37)
5% Damped Design Spectral Response Acceleration (short), S_{DS}	0.599g	Section 1613.2.4 (Eqn 16-38)
5% Damped Design Spectral Response Acceleration (1 sec), S_{D1}	0.273g*	Section 1613.2.4 (Eqn 16-39)

7.3.2 Table 7.3.2 presents the mapped maximum considered geometric mean (MCE_G) seismic design parameters for projects located in Seismic Design Categories of D through F in accordance with ASCE 7-16.

TABLE 7.3.2
2019 CBC SITE ACCELERATION DESIGN PARAMETERS

Parameter	Value	ASCE 7-16
Site Class	C	--
Fill Thickness, T (Feet)	T≤20	--
Mapped MCE_G Peak Ground Acceleration, PGA	0.324g	Figure 22-9
Site Coefficient, F_{PGA}	1.200	Table 11.8-1
Site Class Modified MCE_G Peak Ground Acceleration, PGA_M	0.389g	Section 11.8.3 (Eqn 11.8-1)

7.3.3 Conformance to the criteria in Tables 7.3.1 and 7.3.2 for seismic design does not constitute any kind of guarantee or assurance that significant structural damage or ground failure will not occur in the event of a large earthquake. The primary goal of seismic design is to protect life, not to avoid all damage, since such design may be economically prohibitive.

7.3.4 The project structural engineer and architect should evaluate the appropriate Risk Category and Seismic Design Category for the planned structures. The values presented herein assume a Risk Category of II and resulting in a Seismic Design Category D. Table 7.3.3 presents a summary of the risk categories in accordance with ASCE 7-16.

TABLE 7.3.3
ASCE 7-16 RISK CATEGORIES

Risk Category	Building Use	Examples
I	Low risk to Human Life at Failure	Barn, Storage Shelter
II	Nominal Risk to Human Life at Failure (Buildings Not Designated as I, III or IV)	Residential, Commercial and Industrial Buildings
III	Substantial Risk to Human Life at Failure	Theaters, Lecture Halls, Dining Halls, Schools, Prisons, Small Healthcare Facilities, Infrastructure Plants, Storage for Explosives/Toxins
IV	Essential Facilities	Hazardous Material Facilities, Hospitals, Fire and Rescue, Emergency Shelters, Police Stations, Power Stations, Aviation Control Facilities, National Defense, Water Storage

7.4 General Grading Recommendations

7.4.1 Grading should be performed in accordance with the recommendations provided in this report and the local grading ordinance. Geocon Incorporated should observe the grading operations on a full-time basis and provide testing during the fill placement.

7.4.2 Prior to commencing grading, a preconstruction conference should be held at the site with the agency inspector, developer, grading and underground contractors, civil engineer, and geotechnical engineer in attendance. Special soil handling and/or the grading plans can be discussed at that time.

7.4.3 Site preparation should begin with the removal of deleterious material, debris, and vegetation. The depth of vegetation removal should be such that material exposed in cut areas or soil to be used as fill is relatively free of organic matter. Material generated during

stripping and/or site demolition should be exported from the site. Asphalt and concrete should not be mixed with the fill soil unless approved by the Geotechnical Engineer.

7.4.4 Abandoned foundations and buried utilities (if encountered) should be removed and the resultant depressions and/or trenches should be backfilled with properly compacted material as part of the remedial grading.

7.4.5 We expect the proposed structures will be supported on a shallow foundation system founded in compacted fill. Where formational material is exposed at grade or less than 5 feet of fill is present, the upper 5 feet below finish grade or 2 feet below the proposed foundations (whichever results in a deeper excavation) should be excavated and replaced with properly compacted fill. Where previously placed fill greater than 5 feet is present below the proposed structures, the upper 2 to 3 feet of material should be ripped, moisture conditioned and recompacted prior to receiving improvements. The excavations should extend at least 10 feet laterally outside of the proposed foundation system, where possible.

7.4.6 In areas of proposed improvements outside of the building areas, the upper 1 to 2 feet of existing soil should be processed, moisture conditioned as necessary and recompacted. Deeper excavations may be required in areas where loose or saturated materials are encountered. The excavations should extend at least 2 feet laterally outside of the improvement area, where possible. Table 7.4.1 provides a summary of the remedial grading recommendations.

TABLE 7.4.1
SUMMARY OF REMEDIAL GRADING RECOMMENDATIONS

Area	Remedial Grading Excavation Requirements
Proposed Buildings (Formational Material or Less Than 5 Feet of Fill)	Excavate 5 Feet Below Pad Grade and 2 Feet Below Footings
Proposed Buildings (Previously Placed Fill)	Remedial Grading of Upper 2 to 3 Feet of Existing Fill
Site Development (Outside Building Areas)	Process Upper 1 to 2 Feet of Existing Materials
Lateral Grading Limits	10 Feet Outside of Buildings
	2 Feet Outside of Improvement Areas
Exposed Bottoms of Excavations	Scarify Upper 12 Inches

7.4.7 The bottom of the excavations should be sloped 1 percent to the adjacent street or deepest fill. Prior to fill soil being placed, the existing ground surface should be scarified, moisture conditioned as necessary, and compacted to a depth of at least 12 inches. Deeper

excavations may be required if saturated or loose fill soil is encountered. A representative of Geocon should be on-site during excavations to evaluate the limits of the remedial grading.

7.4.8 The site should then be brought to final subgrade elevations with fill compacted in layers. In general, the existing soil is suitable for use from a geotechnical engineering standpoint as fill if relatively free from vegetation, debris, and other deleterious material. Layers of fill should be about 6 to 8 inches in loose thickness and no thicker than will allow for adequate bonding and compaction. Fill, including backfill and scarified ground surfaces, should be compacted to a dry density of at least 90 percent of the laboratory maximum dry density near to slightly above optimum moisture content in accordance with ASTM Test Procedure D 1557. Fill materials placed below optimum moisture content may require additional moisture conditioning prior to placing additional fill. The upper 12 inches of subgrade soil underlying pavement should be compacted to a dry density of at least 95 percent of the laboratory maximum dry density near to slightly above optimum moisture content shortly before paving operations.

7.4.9 The City of Chula Vista requires additional removals and grading requirements within the street and right-of-way areas. Based on the City of Chula Vista, the upper 5 feet of fill and upper 3 feet of formational materials within the public right of way areas should possess an expansion index of 90 or less. Additional removals of formational materials may be required if the expansion index is greater than 90.

7.4.10 Import fill (if necessary) should consist of the characteristics presented in Table 7.3.2. Geocon Incorporated should be notified of the import soil source and should perform laboratory testing of import soil prior to its arrival at the site to determine its suitability as fill material.

TABLE 7.3.2
SUMMARY OF IMPORT FILL RECOMMENDATIONS

Soil Characteristic	Values
Expansion Potential	“Very Low” to “Medium” (Expansion Index of 90 or less)
Particle Size	Maximum Dimension Less Than 3 Inches
	Generally Free of Debris

7.5 Geotechnical Design

7.5.1 The following geotechnical design items should be considered during due diligence.

- We expect that shallow conventional foundations that provide moderate bearing values can be used to support the proposed residential and mixed-use buildings founded in compacted fill.

- Typical subgrade preparation time of exterior concrete flatwork and sidewalk is expected. Expansive soils should be considered.

- We expect that relatively low R-Value laboratory test results for subgrade soils will be encountered that will require thicker pavement sections for the parking lots and driveways. Typical subgrade preparation time of pavement areas are expected.

- Typical design and use of landscape area drains and building roof drains is expected.

- Control of surface drainage and its discharge and containment to storm water management devices will be an important design consideration to reduce the potential for erosion and maintaining the geotechnical design parameters of the project.

- Potential elevated long-term maintenance costs for surface improvements that includes sidewalks and flatwork due to the anticipated "low" to "high" expansive soils at finish grade.

7.6 Site Drainage and Moisture Protection

7.6.1 Adequate site drainage is critical to reduce the potential for differential soil movement, erosion, and subsurface seepage. Under no circumstances should water be allowed to pond adjacent to footings and improvements. The site should be graded and maintained such that surface drainage is directed away from structures in accordance with 2019 CBC 1804.4 or other applicable standards. In addition, surface drainage should be directed away from the top of slopes into swales or other controlled drainage devices. Roof and pavement drainage should be directed into conduits that carry runoff away from the proposed structure.

7.6.2 Underground utilities should be leak free. Utility and irrigation lines should be checked periodically for leaks, and detected leaks should be repaired promptly. Detrimental soil movement could occur if water is allowed to infiltrate the soil for prolonged periods of time.

7.6.3 Landscaping planters adjacent to paved areas are not recommended due to the potential for surface or irrigation water to infiltrate the pavement's subgrade and base course. Area drains to collect excess irrigation water and transmit it to drainage structures or impervious above-grade planter boxes can be used. In addition, where landscaping is planned adjacent to the pavement, construction of a cutoff wall along the edge of the pavement that extends at least 6 inches below the bottom of the base material should be considered.

GRAPHIC SCALE

0' 30' 60' 90' 120' 180' 240'

SCALE 1"=60' (on 36x24)

GEOCON LEGEND

Qpf .....PREVIOUSLY PLACED FILL (Geotechnics, Inc. 2005)

To .....OTAY FORMATION (Dotted Where Buried)

.....APPROX. LOCATION OF GEOLOGIC CONTACT

B-13 .....APPROX. LOCATION OF BORING (Geocon, Inc. 2014)

(5'+) .....APPROX. DEPTH OF FILL (In Feet)

613 .....APPROX. ELEVATION AT BASE OF FILL (In Feet, MSL)

GEOLOGIC MAP

OTAY RANCH TOWN CENTER
CHULA VISTA, CALIFORNIA

GEOCON INCORPORATED
GEOTECHNICAL ■ ENVIRONMENTAL ■ MATERIALS
6960 FLANDERS DRIVE - SAN DIEGO, CALIFORNIA 92121 - 2974
PHONE 858 558-6900 - FAX 858 558-6159

SCALE	1" = 60'	DATE	02 - 04 - 2022
PROJECT NO.	G2883 - 52 - 01		FIGURE 1
SHEET	1 OF 1		

Plotted:02/04/2022 8:53AM | By:ALVIN LADRILLONO | File Location:Y:\PROJECTS\G2883-52-01 (OR Town Center)\SHEETS\G2883-52-01 Geo Map.dwg

APPENDIX A

APPENDIX A

PREVIOUS BORING LOGS

FROM

PRELIMINARY GEOTECHNICAL INVESTIGATION
OTAY RANCH TOWN CENTER ADDITION
OTAY RANCH VILLAGE 12

CHULA VISTA, CALIFORNIA
PROJECT NO. G1731-11-01

FOR

OTAY RANCH TOWN CENTER
CHULA VISTA, CALIFORNIA

PROJECT NO. G2883-52-01

PROJECT NO. G1731-11-01

BORING B 1

ELEV. (MSL.) **619'** DATE COMPLETED **06-05-2014**

EQUIPMENT **CME 55** BY: **L. RODRIGUEZ**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0	B1-1			ML	**PREVIOUSLY PLACED FILL (Qpf)** Stiff, moist, olive brown, Sandy SILT; trace gravel			
2								
4	B1-2			ML/SM	Very stiff, moist, light brown, Sandy SILT to Silty, fine SAND	45	97.1	21.8
6								
8	B1-3				-Becomes damp to moist, light olive brown	60	102.7	21.1
10								
12								
14	B1-4				-Trace bentonite	45	95.1	28.6
16								
18	B1-5			ML	**OTAY FORMATION (To)** Very dense, damp, grayish to yellowish brown, Sandy SILTSTONE; slightly cemented; micaceous	73/11.5"		
					BORING TERMINATED AT 19 FEET No groundwater encountered			

Figure A-1,
Log of Boring B 1, Page 1 of 1

G1731-11-01.GPJ

SAMPLE SYMBOLS

- ☐ ... SAMPLING UNSUCCESSFUL
- ◧ ... STANDARD PENETRATION TEST
- ■ ... DRIVE SAMPLE (UNDISTURBED)
- ⊠ ... DISTURBED OR BAG SAMPLE
- ◥ ... CHUNK SAMPLE
- ▼ ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. G1731-11-01

BORING B 2

ELEV. (MSL.) **621'** DATE COMPLETED **06-05-2014**

EQUIPMENT **CME 55** BY: **L. RODRIGUEZ**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0				CL	**PREVIOUSLY PLACED FILL (Qpf)** Stiff, moist, olive brown, Sandy CLAY			
2								
4	B2-1			CL/SC	Very stiff, moist, light olive brown, Sandy CLAY to Clayey fine SAND	47	105.9	19.6
6	B2-2			SM	Dense, damp, light brown to grayish brown, Silty, very fine SAND	52	96.6	26.0
8								
10	B2-3				-Becomes moist	53	99.8	22.7
12	B2-4				-Trace clay	42		
14								
16	B2-5			ML	**OTAY FORMATION (To)** Very stiff to hard, moist, gray, Sandy SILTSTONE; micaceous	52		
18					BORING TERMINATED AT 18 FEET No groundwater encountered			

Figure A-2,
Log of Boring B 2, Page 1 of 1

G1731-11-01.GPJ

SAMPLE SYMBOLS

- ... SAMPLING UNSUCCESSFUL
- ... STANDARD PENETRATION TEST
- ... DRIVE SAMPLE (UNDISTURBED)
- ... DISTURBED OR BAG SAMPLE
- ... CHUNK SAMPLE
- ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. G1731-11-01

BORING B 3

ELEV. (MSL.) **620'** DATE COMPLETED **06-05-2014**

EQUIPMENT **CME 55** BY: **L. RODRIGUEZ**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0	B3-1			CL	**PREVIOUSLY PLACED FILL (Qpf)** Stiff, moist, olive brown, Sandy CLAY			
2								
4	B3-2				-Becomes very stiff, olive brown to brown	57	101.5	22.9
6	B3-3			SM	**OTAY FORMATION (To)** Very dense, dry to damp, grayish brown, Silty, fine SANDSTONE; moderately to strongly cemented	50/5"		
8								
10	B3-4				-Becomes damp, light grayish brown	80		
					BORING TERMINATED AT 10 FEET No groundwater encountered			

Figure A-3,
Log of Boring B 3, Page 1 of 1

G1731-11-01.GPJ

SAMPLE SYMBOLS

- ☐ ... SAMPLING UNSUCCESSFUL
- ◧ ... STANDARD PENETRATION TEST
- ■ ... DRIVE SAMPLE (UNDISTURBED)
- ⊠ ... DISTURBED OR BAG SAMPLE
- ◪ ... CHUNK SAMPLE
- ▼ ... WATER TABLE OR SEEPAGE

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GEOCON

PROJECT NO. G1731-11-01

BORING B 4

ELEV. (MSL.) **617'** DATE COMPLETED **06-05-2014**

EQUIPMENT **CME 55** BY: **L. RODRIGUEZ**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0	B4-1			CL	**PREVIOUSLY PLACED FILL (Qpf)** Stiff, moist, olive brown, Sandy CLAY; trace gravel			
2								
4	B4-2			SC	Dense, moist, light gray, Clayey, fine SAND	52	106.0	19.9
					BORING TERMINATED AT 5 FEET No groundwater encountered			

Figure A-4,
Log of Boring B 4, Page 1 of 1

G1731-11-01.GPJ

SAMPLE SYMBOLS

- ☐ ... SAMPLING UNSUCCESSFUL
- ◧ ... STANDARD PENETRATION TEST
- ■ ... DRIVE SAMPLE (UNDISTURBED)
- ⊠ ... DISTURBED OR BAG SAMPLE
- ◪ ... CHUNK SAMPLE
- ▼ ... WATER TABLE OR SEEPAGE

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PROJECT NO. G1731-11-01

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	**BORING B 5** ELEV. (MSL.) **618'** DATE COMPLETED **06-05-2014** EQUIPMENT **CME 55** BY: **L. RODRIGUEZ**	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
0	B5-1			CL	**PREVIOUSLY PLACED FILL (Qpf)** Stiff, moist, olive brown, Sandy CLAY			
2	B5-2				-Becomes very stiff, light brown	59	96.9	26.0
4								
					BORING TERMINATED AT 15 FEET No groundwater encountered			

Figure A-5,
Log of Boring B 5, Page 1 of 1

G1731-11-01.GPJ

SAMPLE SYMBOLS

- ☐ ... SAMPLING UNSUCCESSFUL
- ◧ ... STANDARD PENETRATION TEST
- ■ ... DRIVE SAMPLE (UNDISTURBED)
- ⊠ ... DISTURBED OR BAG SAMPLE
- ◪ ... CHUNK SAMPLE
- ▼ ... WATER TABLE OR SEEPAGE

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GEOCON

PROJECT NO. G1731-11-01

BORING B 6

ELEV. (MSL.) **618'** DATE COMPLETED **06-05-2014**

EQUIPMENT **CME 55** BY: **L. RODRIGUEZ**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0	B6-1			CL	**PREVIOUSLY PLACED FILL (Qpf)** Stiff, damp, olive brown, Sandy CLAY			
2								
	B6-2				-Becomes moist, micaceous	63	99.0	26.1
4								
6	B6-3			SM	**OTAY FORMATION (To)** Very dense, moist, brown to olive brown, Silty, very fine SANDSTONE; micaceous	72/11.5"		
8								
	B6-4			ML	Hard, moist, grayish brown, Sandy SILTSTONE; micaceous	86/9.5"		
					BORING TERMINATED AT 9.75 FEET No groundwater encountered			

Figure A-6,
Log of Boring B 6, Page 1 of 1

G1731-11-01.GPJ

SAMPLE SYMBOLS

- ☐ ... SAMPLING UNSUCCESSFUL
- ◧ ... STANDARD PENETRATION TEST
- ■ ... DRIVE SAMPLE (UNDISTURBED)
- ⊠ ... DISTURBED OR BAG SAMPLE
- ◪ ... CHUNK SAMPLE
- ▼ ... WATER TABLE OR SEEPAGE

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GEOCON

PROJECT NO. G1731-11-01

BORING B 7

ELEV. (MSL.) **618'** DATE COMPLETED **06-05-2014**

EQUIPMENT **CME 55** BY: **L. RODRIGUEZ**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0	B7-1			ML	**PREVIOUSLY PLACED FILL (Qpf)** Stiff, damp to moist, light olive brown, Sandy SILT; trace organics; trace gravel			
2	B7-2				-Micaceous	51	93.5	26.4
4				ML	**OTAY FORMATION (To)** Hard, damp to moist, light grayish brown, Sandy SILTSTONE; micaceous			
6	B7-3					80/10"		
8								
	B7-4			SM	Very dense, damp, light brown, Silty SANDSTONE; micaceous	79/11.5"		
10					BORING TERMINATED AT 10 FEET No groundwater encountered			

Figure A-7,
Log of Boring B 7, Page 1 of 1

G1731-11-01.GPJ

SAMPLE SYMBOLS

- ☐ ... SAMPLING UNSUCCESSFUL
- ◧ ... STANDARD PENETRATION TEST
- ■ ... DRIVE SAMPLE (UNDISTURBED)
- ⊠ ... DISTURBED OR BAG SAMPLE
- ◪ ... CHUNK SAMPLE
- ▼ ... WATER TABLE OR SEEPAGE

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GEOCON

PROJECT NO. G1731-11-01

BORING B 8

ELEV. (MSL.) **616'** DATE COMPLETED **06-05-2014**

EQUIPMENT **CME 55** BY: **L. RODRIGUEZ**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0					5" **ASPHALT CONCRETE** over 5" **BASE MATERIAL**			
2	B8-1			CL	**PREVIOUSLY PLACED FILL (Qpf)** Stiff, damp to moist, light olive brown, Sandy CLAY			
4	B8-2			CL/SC	Very stiff, damp, Sandy CLAY to Clayey, fine SAND	43	102.8	22.2
6	B8-3			ML/SM	Very stiff, damp, olive brown, Sandy SILT to Silty, fine SAND	44	103.7	23.8
8	B8-4			SM	**OTAY FORMATION (To)** Very dense, damp, light grayish brown, Silty, fine SANDSTONE; micaceous	85/11.5		
10								
12	B8-5			ML	Hard, damp, gray, Sandy SILTSTONE; micaceous	86/10"		
					BORING TERMINATED AT 13 FEET No groundwater encountered			

Figure A-8,
Log of Boring B 8, Page 1 of 1

G1731-11-01.GPJ

SAMPLE SYMBOLS

- ... SAMPLING UNSUCCESSFUL
- ... STANDARD PENETRATION TEST
- ... DRIVE SAMPLE (UNDISTURBED)
- ... DISTURBED OR BAG SAMPLE
- ... CHUNK SAMPLE
- ... WATER TABLE OR SEEPAGE

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GEOCON

PROJECT NO. G1731-11-01

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	**BORING B 9** ELEV. (MSL.) **621'** DATE COMPLETED **06-05-2014** EQUIPMENT **CME 55** BY: **L. RODRIGUEZ**	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
0	B9-1			SC	**PREVIOUSLY PLACED FILL (Qpf)** Medium dense, dry to damp, olive brown, Clayey, fine to coarse SAND; trace gravel			
2	B9-2					41	101.0	17.2
4				CL/SC	Very stiff, moist, light olive brown, Sandy CLAY to Clayey, fine SAND			
					BORING TERMINATED AT 5 FEET No groundwater encountered			

Figure A-9,
Log of Boring B 9, Page 1 of 1

G1731-11-01.GPJ

SAMPLE SYMBOLS

- ☐ ... SAMPLING UNSUCCESSFUL
- ◧ ... STANDARD PENETRATION TEST
- ■ ... DRIVE SAMPLE (UNDISTURBED)
- ⊠ ... DISTURBED OR BAG SAMPLE
- ◪ ... CHUNK SAMPLE
- ▼ ... WATER TABLE OR SEEPAGE

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GEOCON

PROJECT NO. G1731-11-01

BORING B 10

ELEV. (MSL.) **622'** DATE COMPLETED **06-05-2014**

EQUIPMENT **CME 55** BY: **L. RODRIGUEZ**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0				SM	**PREVIOUSLY PLACED FILL (Qpf)** Dense, damp, light brown, Silty, fine to medium SAND			
2								
4				SM	**OTAY FORMATION (To)** Very dense, damp, brown, Silty, fine SANDSTONE; micaceous			
6	B10-1					50/5.5"		11.7
8								
10	B10-2			ML	Hard, damp, light brown, Sandy SILTSTONE; micaceous	86/9.5"	112.9	18.5
					BORING TERMINATED AT 10.75 FEET No groundwater encountered			

Figure A-10,
Log of Boring B 10, Page 1 of 1

G1731-11-01.GPJ

SAMPLE SYMBOLS

- ☐ ... SAMPLING UNSUCCESSFUL
- ◧ ... STANDARD PENETRATION TEST
- ■ ... DRIVE SAMPLE (UNDISTURBED)
- ⊠ ... DISTURBED OR BAG SAMPLE
- ◥ ... CHUNK SAMPLE
- ▼ ... WATER TABLE OR SEEPAGE

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GEOCON

PROJECT NO. G1731-11-01

BORING B 11

ELEV. (MSL.) **624'** DATE COMPLETED **06-05-2014**

EQUIPMENT **CME 55** BY: **L. RODRIGUEZ**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0	B11-1			SM/ML	**PREVIOUSLY PLACED FILL (Qpf)** Loose, moist, light brown, Silty, fine SAND to Sandy SILT			
2								
4				SM	**OTAY FORMATION (To)** Very dense, moist, light brown, Silty, fine SANDSTONE			
6	B11-2					50/4"	105.5	12.7
8								
10	B11-3					50/5.5"	112.1	16.6
12								
14								
	B11-4					50/5.5"		
					BORING TERMINATED AT 15.5 FEET No groundwater encountered			

Figure A-11,
Log of Boring B 11, Page 1 of 1

G1731-11-01.GPJ

SAMPLE SYMBOLS

- ☐ ... SAMPLING UNSUCCESSFUL
- ◧ ... STANDARD PENETRATION TEST
- ■ ... DRIVE SAMPLE (UNDISTURBED)
- ⊠ ... DISTURBED OR BAG SAMPLE
- ◪ ... CHUNK SAMPLE
- ▼ ... WATER TABLE OR SEEPAGE

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GEOCON

PROJECT NO. G1731-11-01

BORING B 12

ELEV. (MSL.) **622'** DATE COMPLETED **06-05-2014**

EQUIPMENT **CME 55** BY: **L. RODRIGUEZ**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0	B12-1			GC CL	**PREVIOUSLY PLACED FILL (Qpf)** Loose to medium dense, damp, grayish brown, Clayey GRAVEL; up to 2" diameter gravel			
2					Very stiff, moist, olive brown, Sandy CLAY; trace gravel; micaceous			
4	B12-2			SC/CL	Dense, moist, light brown, Clayey, fine SAND, to Sandy CLAY; micaceous	45	95.2	27.0
					BORING TERMINATED AT 5 FEET No groundwater encountered			

Figure A-12,
Log of Boring B 12, Page 1 of 1

G1731-11-01.GPJ

SAMPLE SYMBOLS

- ... SAMPLING UNSUCCESSFUL
- ... STANDARD PENETRATION TEST
- ... DRIVE SAMPLE (UNDISTURBED)
- ... DISTURBED OR BAG SAMPLE
- ... CHUNK SAMPLE
- ... WATER TABLE OR SEEPAGE

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GEOCON

PROJECT NO. G1731-11-01

BORING B 13

ELEV. (MSL.) **620'** DATE COMPLETED **06-05-2014**

EQUIPMENT **CME 55** BY: **L. RODRIGUEZ**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0	B13-1			CL	**PREVIOUSLY PLACED FILL (Qpf)** Stiff, moist, olive brown, Sandy CLAY; trace gravel; micaceous			
2								
4	B13-2			SC/CL	Dense, moist, light brown, Clayey fine SAND to Sandy CLAY; micaceous	58	104.6	18.4
					BORING TERMINATED AT 5 FEET No groundwater encountered			

Figure A-13,
Log of Boring B 13, Page 1 of 1

G1731-11-01.GPJ

SAMPLE SYMBOLS

- ☐ ... SAMPLING UNSUCCESSFUL
- ◧ ... STANDARD PENETRATION TEST
- ■ ... DRIVE SAMPLE (UNDISTURBED)
- ⊠ ... DISTURBED OR BAG SAMPLE
- ◪ ... CHUNK SAMPLE
- ▼ ... WATER TABLE OR SEEPAGE

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GEOCON

APPENDIX B

APPENDIX B

PREVIOUS LABORATORY TESTING

FROM

PRELIMINARY GEOTECHNICAL INVESTIGATION
OTAY RANCH TOWN CENTER ADDITION
OTAY RANCH VILLAGE 12

CHULA VISTA, CALIFORNIA
PROJECT NO. G1731-11-01

FOR

OTAY RANCH TOWN CENTER
CHULA VISTA, CALIFORNIA

PROJECT NO. G2883-52-01

APPENDIX B

LABORATORY TESTING

We performed laboratory tests in accordance with generally accepted test methods of the American Society for Testing and Materials (ASTM) or other suggested procedures during a previous investigation in 2014. We tested selected soil samples for in-place dry density/moisture content, maximum density/optimum moisture content, expansion index, water-soluble sulfate, R-Value, unconfined compressive strength, consolidation, gradation, and direct shear strength. The results of our current laboratory tests are presented herein. The in-place dry density and moisture content of the samples tested are presented on the boring logs in Appendix A.

SUMMARY OF LABORATORY MAXIMUM DRY DENSITY AND OPTIMUM MOISTURE CONTENT TEST RESULTS ASTM D 1557

Sample No.	Description	Maximum Dry Density (pcf)	Optimum Moisture Content (% dry wt.)
B1-1	Olive brown, Sandy SILT (Qpf)	115.7	15.3
B7-1	Light olive brown, Sandy SILT (Qpf)	116.6	14.5

SUMMARY OF LABORATORY EXPANSION INDEX TEST RESULTS ASTM D 4829

Sample No.	Moisture Content (%)		Dry Density (pcf)	Expansion Index	2019 CBC Expansion Classification	ASTM Soil Expansion Classification
	Before Test	After Test				
B3-1	12.7	28.1	100.6	82	Expansive	Medium
B6-1	13.3	31.0	98.9	97	Expansive	High
B11-1	12.0	27.1	102.7	67	Expansive	Medium

SUMMARY OF LABORATORY WATER-SOLUBLE SULFATE TEST RESULTS CALIFORNIA TEST NO. 417

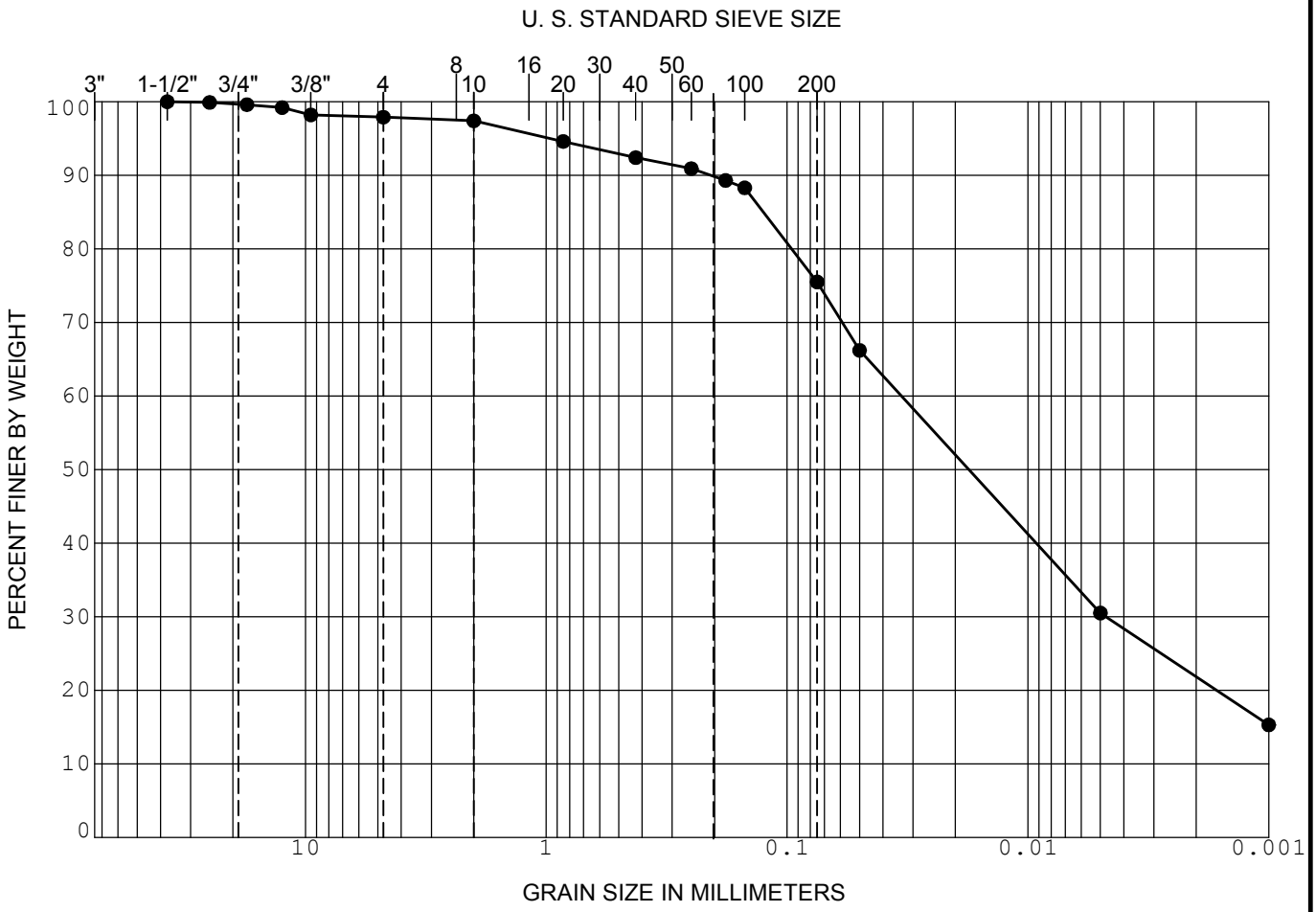
Sample No.	Depth (feet)	Geologic Unit	Water-Soluble Sulfate (%)	ACI 318 Sulfate Exposure
B3-1	0-3	Qpf	0.034	S0
B6-1	0-5	Qpf	0.069	S0
B11-1	0-5	Qpf/To	0.035	S0

SUMMARY OF LABORATORY RESISTANCE VALUE (R-VALUE) TEST RESULTS
ASTM D 2844

Sample No.	Depth (Feet)	Description (Geologic Unit)	R-Value
B4-1	0-5	Olive brown, Sandy CLAY (Qpf)	10
B9-1	0-5	Olive brown, Clayey SAND (Qpf)	21

PROJECT NO. G1731-11-01

GRAVEL		SAND			SILT OR CLAY
COARSE	FINE	COARSE	MEDIUM	FINE	



	SAMPLE	DEPTH (ft)	CLASSIFICATION	NAT WC	LL	PL	PI
●	B3-1	0.0	(CL) Sandy CLAY				
⊠							
▲							

GRADATION CURVE

OTAY RANCH TOWN CENTER ADDITION, OTAY RANCH VILLAGE 12
2015 BIRCH ROAD
CHULA VISTA, CALIFORNIA

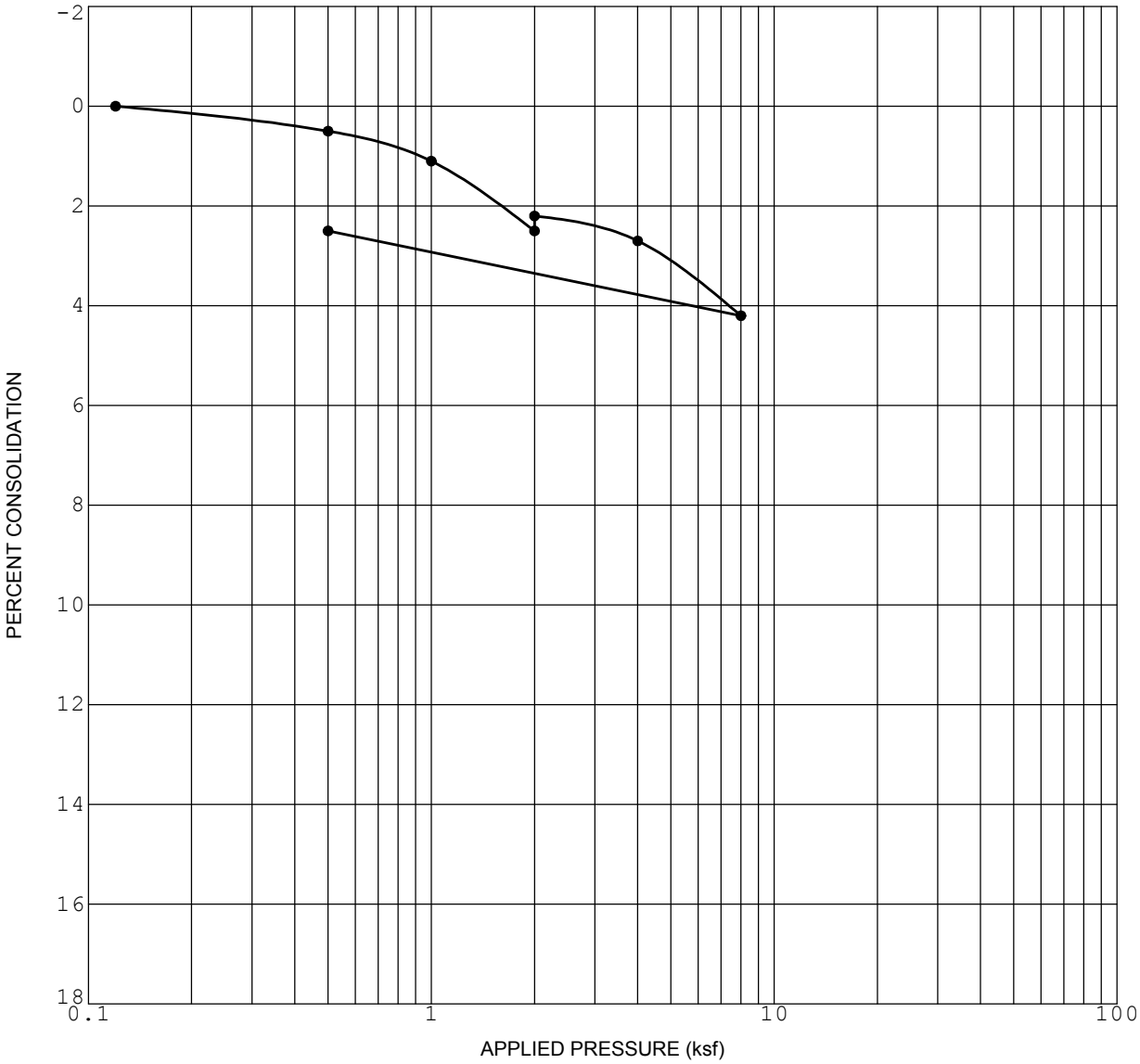
G1731-11-01.GPJ

Figure B-1

GEOCON

PROJECT NO. G1731-11-01

SAMPLE NO. B2-2



Initial Dry Density (pcf)	96.6
Initial Water Content (%)	26.0

Initial Saturation (%)	96.5
Sample Saturated at (ksf)	2.0

CONSOLIDATION CURVE

OTAY RANCH TOWN CENTER ADDITION, OTAY RANCH VILLAGE 12
2015 BIRCH ROAD
CHULA VISTA, CALIFORNIA

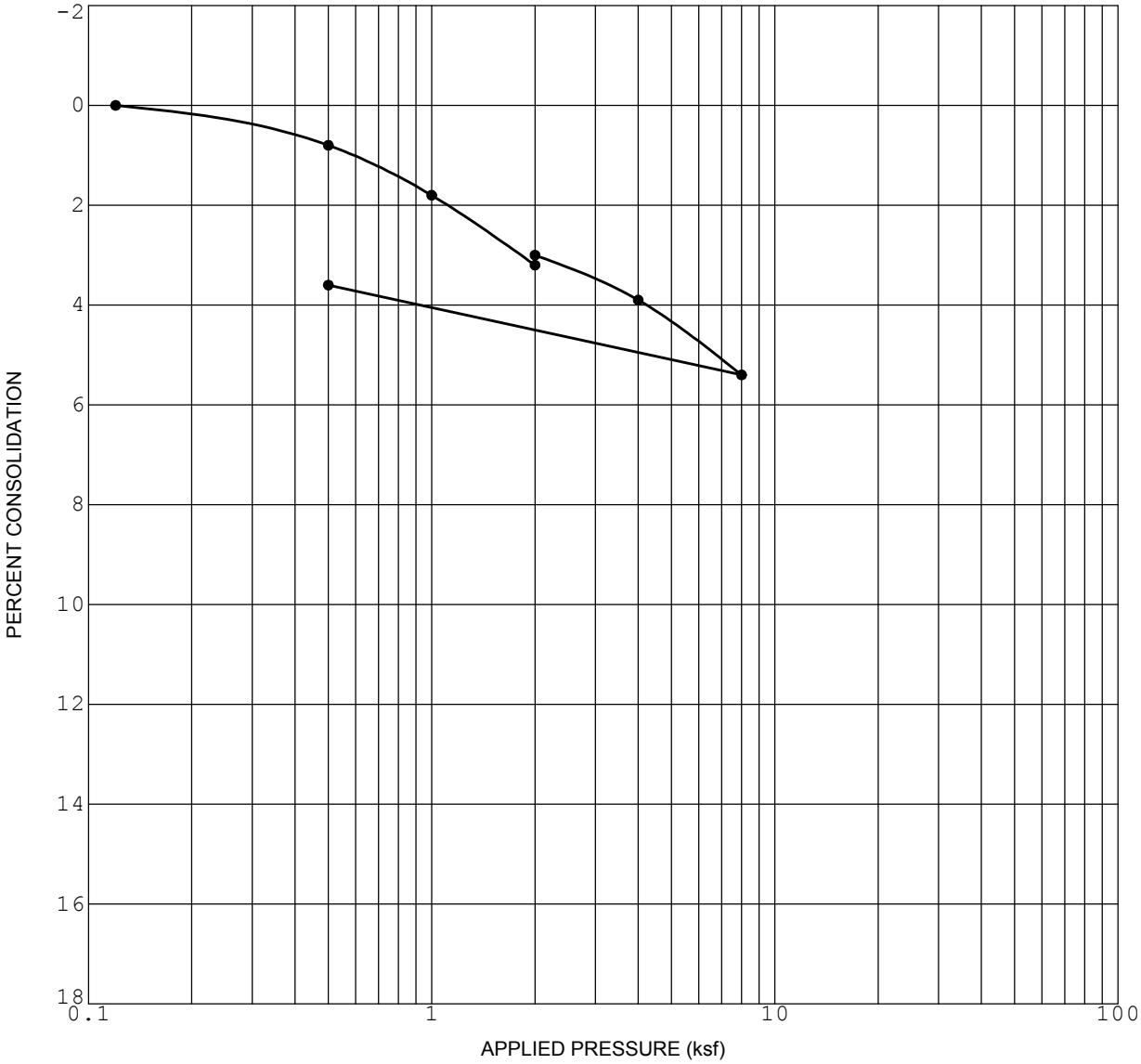
G1731-11-01.GPJ

Figure B-2

GEOCON

PROJECT NO. G1731-11-01

SAMPLE NO. B8-3



Initial Dry Density (pcf)	103.7	**Initial Saturation (%)**	100+
Initial Water Content (%)	23.8	**Sample Saturated at (ksf)**	2.0

CONSOLIDATION CURVE

OTAY RANCH TOWN CENTER ADDITION, OTAY RANCH VILLAGE 12
2015 BIRCH ROAD
CHULA VISTA, CALIFORNIA

G1731-11-01.GPJ

Figure B-3

GEOCON

SAMPLE NO.: B1-2
DEPTH OF SAMPLE: 3'

Test Data			
Load	1 K	3 K	5 K
INITIAL			
Water Content	23.8%	17.5%	24.2%
Dry Density (pcf)	96.3	95.8	99.1
Saturation*	87.7%	63.8%	95.8%
Height (inches)	1	1	1
AFTER TEST			
Water Content	27.3%	26.4%	26.3%
Dry Density (pcf)	92.4	95.6	100.3
FAILURE			
Normal Stress (psf)	952	2080	4350
Ultimate Stress (psf)	1416	1904	2702
Peak Stress (psf)	1625	1964	3809
Rate (in/min)	0.005	0.005	0.005

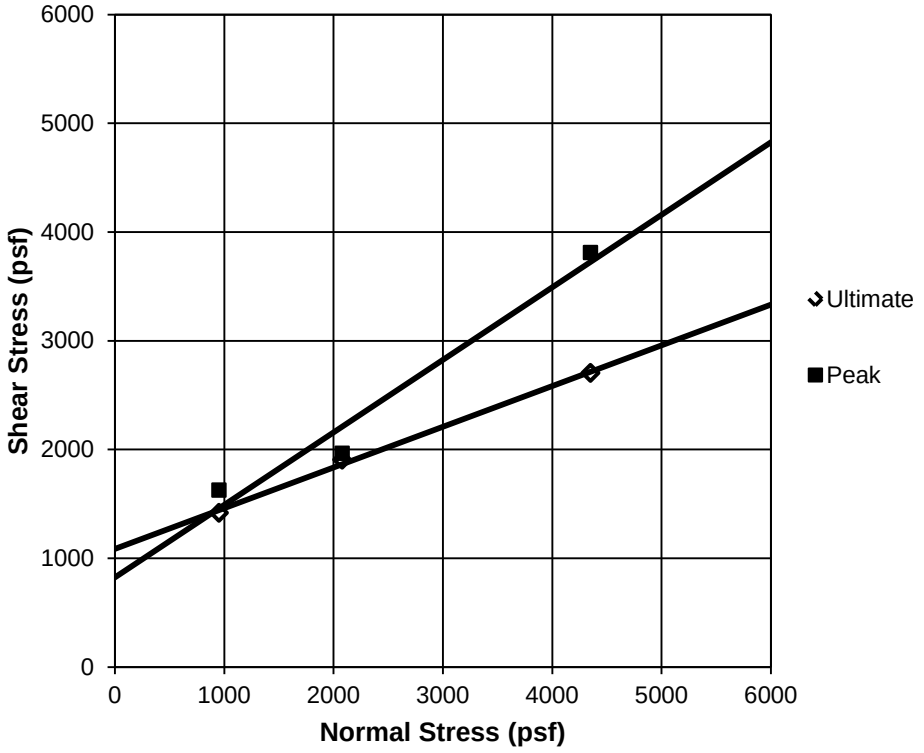
*Degree of saturation calculated with a specific gravity of 2.65

Results	
ϕ (Ultimate)	21 degrees
ϕ (Peak)	34 degrees
c (Ultimate)	1100 psf
c (Peak)	820 psf

DATE: 6/17/2014
DESCRIPTION: Qpf

☑ Natural

☐ Remold



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PHONE 858 558-6900 - FAX 858 558-6159

SW/LR

DIRECT SHEAR TEST DATA

OTAY RANCH TOWN CENTER ADDITION
OTAY RANCH VILLAGE 12
2015 BIRCH ROAD
CHULA VISTA, CALIFORNIA

PROJECT NO. G1731-11-01 | FIG. B-4

SAMPLE NO.: B7-1
DEPTH OF SAMPLE: 0'

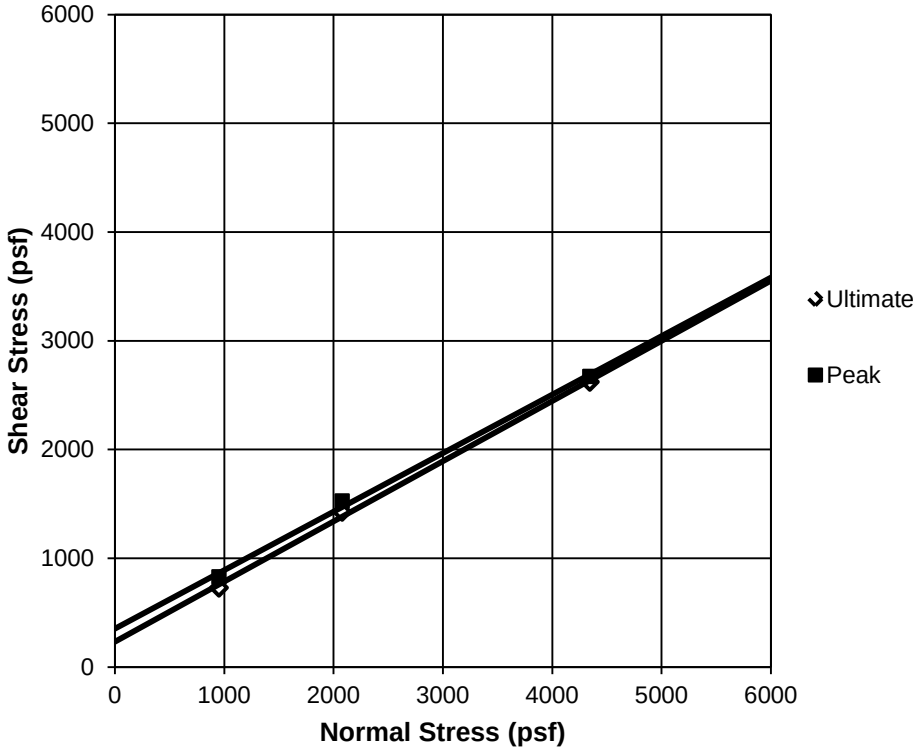
Test Data			
Load	1 K	3 K	5 K
INITIAL			
Water Content	13.7%	14.6%	14.2%
Dry Density (pcf)	105.3	104.6	104.7
Saturation*	63.7%	66.3%	65.0%
Height (inches)	1	1	1
AFTER TEST			
Water Content	26.9%	26.2%	23.6%
Dry Density (pcf)	104.9	105.2	107.1
FAILURE			
Normal Stress (psf)	952	2080	4346
Ultimate Stress (psf)	728	1426	2622
Peak Stress (psf)	828	1526	2672
Rate (in/min)	0.005	0.005	0.005

*Degree of saturation calculated with a specific gravity of 2.65

Results	
ϕ (Ultimate)	28 degrees
ϕ (Peak)	28 degrees
c (Ultimate)	230 psf
c (Peak)	350 psf

DATE: 6/23/2014
DESCRIPTION: Qpf

☐ Natural
☑ Remold



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SW/LR

DIRECT SHEAR TEST DATA

OTAY RANCH TOWN CENTER ADDITION
OTAY RANCH VILLAGE 12
2015 BIRCH ROAD
CHULA VISTA, CALIFORNIA

PROJECT NO. G1731-11-01 | FIG. B-5

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5. County of San Diego, San Diego County Multi Jurisdiction Hazard Mitigation Plan, San Diego, California – Final Draft, dated 2017.

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