Appendix E

Geotechnical Investigation

CORNERSTONE
EARTH GROUP

TYPE OF SERVICES	Geotechnical Investigation
PROJECT NAME	The Caterina Hotel
LOCATION	4256 El Camino Real Palo Alto, California
CLIENT	HXH Property, LLC
PROJECT NUMBER	1059-1-1
DATE	September 14, 2018

GEOTECHNICAL

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Project Name	**The Caterina Hotel**
Location	**4256 El Camino Real** **Palo Alto, California**
Client	**HXH Property, LLC**
Client Address	**2223 Bayshore Road, Suite 200** **Palo Alto, California**
Project Number	**1059-1-1**
Date	**September 14, 2018**

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TABLE OF CONTENTS

Type of Services | **Geotechnical Investigation**
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SECTION 1: INTRODUCTION

This geotechnical report was prepared for the sole use of HXH Property, LLC for the Caterina Hotel project located at 4256 El Camino Real in Palo Alto, California. The location of the site is shown on the Vicinity Map, Figure 1. For our use, we were provided with the following documents:

- Conceptual project plans titled "The Caterina Hotel, 4256 El Camino Real, Palo Alto, CA 94306", prepared by Studio T Square, dated June 26, 2018.
- A topographic plan titled "Topographic Survey, 4256 El Camino Real, Palo Alto, California", prepared by Lea & Braze Engineering, Inc., dated July 25, 2018.

1.1 PROJECT DESCRIPTION

The project will consist of a 5-story hotel building with one level of below-grade parking on an approximately 1.2-acre site. The structure will be of concrete- (parking level and first floor) and wood-frame (floors 2 through 5) construction and have a footprint of approximately 18,150 square feet.

Structural loads were not available at the time of this report and are anticipated to be typical of this type of structure. Based on the provided conceptual plans, finish floor of the below-grade parking level is 15½ feet below the adjacent grade. The depth of the car lift was not provided; however, it is assumed to be about 7 to 8 feet below the garage finish floor. Therefore, grading is anticipated to include cuts of 1 to 3 feet for installation of utilities and up to 18 feet for excavation of the below-grade garage level. Additionally, localized cuts of up to 26 feet are anticipated for the car lift pit.

1.2 SCOPE OF SERVICES

Our scope of services was presented in our proposal dated July 18, 2018 and consisted of field and laboratory programs to evaluate physical and engineering properties of the subsurface soils, engineering analysis to prepare recommendations for site work and grading, building foundations, flatwork, retaining walls, and pavements, and preparation of this report. Brief descriptions of our exploration and laboratory programs are presented below.

1.3 EXPLORATION PROGRAM

Field exploration consisted of three Cone Penetration Tests (CPTs) advanced on August 20, 2018, and two borings drilled on August 27, 2018 with truck-mounted, hollow-stem auger drilling equipment. The borings were drilled to depths of 10 to 40 feet; the CPTs were advanced to a depth of up to 45¾ feet. Our Exploratory Borings EB-1 and EB-2 were advanced adjacent to CPT-1 and CPT-3, respectively, for direct evaluation of physical samples to correlated soil behavior.

The borings and CPTs were backfilled with cement grout in accordance with local requirements.

The approximate locations of our CPTs and exploratory borings are shown on the Site Plan, Figure 2. Details regarding our field program are included in Appendix A.

1.4 LABORATORY TESTING PROGRAM

In addition to visual classification of samples, the laboratory program focused on obtaining data for foundation design and seismic ground deformation estimates. Testing included moisture contents, dry densities, a washed sieve analysis, and a Plasticity Index test. Details regarding our laboratory program are included in Appendix B.

1.5 ENVIRONMENTAL SERVICES

Environmental services were not requested for this project. If environmental concerns are determined to be present during future evaluations, the project environmental consultant should review our geotechnical recommendations for compatibility with the environmental concerns.

SECTION 2: REGIONAL SETTING

2.1 GEOLOGICAL SETTING

The site is located within the northern-most extents of the Santa Clara Valley. The San Andreas Fault system, including the Monte Vista-Shannon Fault, exists within the Santa Cruz Mountains to the southwest. The Hayward and Calaveras Fault systems exist within the Diablo Range to the east. The site is underlain by Holocene alluvial fan deposits, consisting of unconsolidated, interbedded fine-grained and coarse-grained soils. Adobe Creek is located approximately 400 feet to the southeast.

2.2 REGIONAL SEISMICITY

The San Francisco Bay area region is one of the most seismically active areas in the Country. While seismologists cannot predict earthquake events, the U.S. Geological Survey's Working Group on California Earthquake Probabilities 2015 revises earlier estimates from their 2008 (2008, UCERF2) publication. Compared to the previous assessment issued in 2008, the estimated rate of earthquakes around magnitude 6.7 (the size of the destructive 1994 Northridge earthquake) has gone down by about 30 percent. The expected frequency of such events statewide has dropped from an average of one per 4.8 years to about one per 6.3 years. However, in the new study, the estimate for the likelihood that California will experience a magnitude 8 or larger earthquake in the next 30 years has increased from about 4.7 percent for UCERF2 to about 7.0 percent for UCERF3.

UCERF3 estimates that each region of California will experience a magnitude 6.7 or larger earthquake in the next 30 years. Additionally, there is a 63 percent chance of at least one magnitude 6.7 or greater earthquake occurring in the Bay Area region between 2007 and 2036.

The faults considered capable of generating significant earthquakes are generally associated with the well-defined areas of crustal movement, which trend northwesterly. The table below presents the State-considered active faults within 25 kilometers of the site. The fault distances presented in Table 1 were determined from EZ Frisk (Version 7.65.04) and represent the rupture distance and may not be the distance to the surface expression of the fault that is shown on published geological maps and on-line resources such as Google Earth, etc. The seismic characteristics of some faults vary along its length so different segments of the same fault could be listed separately in the table.

Table 1: Approximate Fault Distances

Fault Name	Distance	
	(miles)	(kilometers)
Monte Vista-Shannon	3.2	5.1
Northern San Andreas	5.6	8.9
Hayward-Rodgers Creek	13.6	21.8

A regional fault map is presented as Figure 3, illustrating the relative distances of the site to significant fault zones.

SECTION 3: SITE CONDITIONS

3.1 SITE BACKGROUND

Based on aerial images provided on the website Historic Aerials (NETROnline, 2018) and Google Earth (2018), the site was occupied by an orchard and a driveway and El Camino Real is visible in images dated 1948, 1956 and 1960. The existing building and paved parking area are visible in an image dated 1968. Development of the surrounding properties is visible in an image dated 1987. Significant changes to the site were not observed in images dated after 1987.

3.2 SURFACE DESCRIPTION

The 1.2-acre site is bounded by W. El Camino Real to the east and existing residential and commercial development to the north, south and west. The site is currently occupied by a restaurant building and surrounding paved parking lot and driveways. The site is relatively level and near the elevations of the adjacent properties and roadway. Based on the referenced topographic survey prepared by Lea & Braze Engineering, Inc. (2018), the site ranges from approximately Elevation 60¾ feet in the northwest portion of the site to 63½ feet in the southeastern portion of the site (NAVD 88). The surrounding properties consist of residential and commercial/retail development. Several mature trees were observed along the north, south and west edges of the site.

Surface pavements generally consisted of 2 to 3 inches of asphalt concrete over 3 to 6 inches of aggregate base. Based on our observations, the existing pavements are in poor to fair condition with significant transverse and alligator cracking and some utility trench patches.

3.3 SUBSURFACE CONDITIONS

Below the surface pavements, our explorations encountered alluvial soil consisting primarily of stiff to hard, lean clay with sand and sandy lean clay to a depth of 40 feet below the existing grades A layer of medium dense to dense clayey sand and clayey sand with gravel was encountered within the planned garage excavation at depths of 12 to 16 feet (bottom of garage level excavation assumed to be at a depth of 16 feet, corresponding to Elevation 47 feet NAVD 88). Below a depth of 30 feet, interbedded layers of clayey sand were encountered at approximately 29½ to 30½ feet, 33 to 37 feet, and 39½ to 41 feet below the existing grades.

Our Cone Penetration Tests (CPT) indicated soil behavior types (SBT) consisting of clay, silty clay to clay, clayey silt to silty clay, and sandy silt to clayey silt to a depth of 45¾ feet, the maximum depth explored. Several layers of sand and gravelly sand were also indicated at our CPT locations.

Cross Section A-A’, Figure 4, shows the subsurface conditions generally encountered within our explorations at the site and the proposed finish floor of the below-grade garage level.

3.3.1 Plasticity/Expansion Potential

We performed one Plasticity Index (PI) test on a representative sample. Test results were used to evaluate expansion potential of surficial soils. The surficial PI test resulted in a PI of 26, indicating moderate expansion potential to wetting and drying cycles.

3.3.2 In-Situ Moisture Contents

Laboratory testing indicated that the in-situ moisture contents within the upper 18 feet range from about 0 to 5 percent below the estimated laboratory optimum moisture.

3.4 GROUNDWATER

Groundwater was encountered in EB-1 and indicated by CPT pore pressure dissipation test measurements at the depths and elevations presented in Table 2. All measurements were taken at the time of drilling and may not represent the stabilized levels that can be higher than the initial levels encountered.

Table 2: Depth to Groundwater

Boring/CPT Number	Date Drilled	Depth to Groundwater (feet)	Groundwater Elevation* (feet)	Depth of Boring/CPT
EB-1	08/27/18	24.0	39.1	40.0
EB-2	08/27/18	-	-	10.0
CPT-1	08/20/18	30.9	31.1	45.4
CPT-2	08/20/18	27.4	35.1	45.6
CPT-3	08/20/18	26.9	36.2	45.8

*Elevation datum (NAVD 88)

Based on our previous experience in the area and review of historic high groundwater maps (CGS, Mountain View 7.5-minute quadrangle, 2006), high groundwater levels are mapped at depths of approximately 17 feet below current grades. We recommend a high groundwater level of 17 feet used for design, which corresponds to approximately Elevation 46 feet NAVD88).

Fluctuations in groundwater levels occur due to many factors including seasonal fluctuation, underground drainage patterns, regional fluctuations, and other factors.

SECTION 4: GEOLOGIC HAZARDS

4.1 FAULT RUPTURE

As discussed above several significant faults are located within 25 kilometers of the site. The site is not located within a State-designated Alquist-Priolo Earthquake Fault Zone or a Santa Clara County Fault Hazard Zone. As shown in Figure 3, no known surface expression of fault traces is thought to cross the site; therefore, fault rupture hazard is not a significant geologic hazard at the site.

4.2 ESTIMATED GROUND SHAKING

Moderate to severe (design-level) earthquakes can cause strong ground shaking, which is the case for most sites within the Bay Area. A peak ground acceleration (PGA) of 0.615g was estimated for analysis using a value equal to $PGA_M = F_{PGA} \times PGA_G$ (Equation 11.8-1), as allowed in the 2016 California Building Code (CBC).

4.3 LIQUEFACTION POTENTIAL

The site is not mapped within a State-designated Liquefaction Hazard Zone (CGS, Mountain View Quadrangle, 2006) or a Santa Clara County Liquefaction Hazard Zone (Santa Clara County, 2003); however, the site is located about ½ mile from a mapped liquefaction hazard area. Our field and laboratory programs addressed this issue by testing and sampling potentially liquefiable layers to depths of approximately 45 feet, performing visual classification on sampled materials, evaluating CPT data, and performing various tests to further classify soil properties.

4.3.1 Background

During strong seismic shaking, cyclically induced stresses can cause increased pore pressures within the soil matrix that can result in liquefaction triggering, soil softening due to shear stress loss, potentially significant ground deformation due to settlement within sandy liquefiable layers as pore pressures dissipate, and/or flow failures in sloping ground or where open faces are present (lateral spreading) (NCEER 1998). Limited field and laboratory data is available regarding ground deformation due to settlement; however, in clean sand layers settlement on the order of 2 to 4 percent of the liquefied layer thickness can occur. Soils most susceptible to liquefaction are loose, non-cohesive soils that are saturated and are bedded with poor drainage, such as sand and silt layers bedded with a cohesive cap.

4.3.2 Analysis

As discussed in the “Subsurface” section above, several sand layers were encountered below the design groundwater depth of 17 feet. Following the liquefaction analysis framework in the 2008 monograph, *Soil Liquefaction During Earthquakes* (Idriss and Boulanger, 2008), incorporating updates in *CPT and SPT Based Liquefaction Triggering Procedures* (Boulanger and Idriss, 2014), and in accordance with CDMG Special Publication 117A guidelines (CDMG, 2008) for quantitative analysis, these layers were analyzed for liquefaction triggering and potential post-liquefaction settlement. These methods compare the ratio of the estimated cyclic shaking (Cyclic Stress Ratio - CSR) to the soil’s estimated resistance to cyclic shaking (Cyclic Resistance Ratio - CRR), providing a factor of safety against liquefaction triggering. Factors of safety less than or equal to 1.3 are considered to be potentially liquefiable and capable of post-liquefaction re-consolidation (i.e. settlement).

The CSR for each layer quantifies the stresses anticipated to be generated due to a design-level seismic event, is based on the peak horizontal acceleration generated at the ground surface discussed in the “Estimated Ground Shaking” section above, and is corrected for overburden and stress reduction factors as discussed in the procedure developed by Seed and Idriss (1971) and updated in the 2008 Idriss and Boulanger monograph.

The soil's CRR is estimated from the in-situ measurements from CPTs and laboratory testing on samples retrieved from our borings. SPT "N" values obtained from hollow-stem auger borings were not used in our analyses, as the "N" values obtained are less reliable in sands below groundwater. The tip pressures are corrected for effective overburden stresses, taking into consideration both the groundwater level at the time of exploration and the design groundwater level, and stress reduction versus depth factors. The CPT method utilizes the soil behavior type index (I_C) to estimate the plasticity of the layers. Selected soil samples collected from drilling borings EB-1 and EB-2 adjacent to CPT-1 and CPT-3, respectively, were tested to evaluate grain size, as well as visually observed for confirmation of CPT soil behavior types.

In estimating post-liquefaction settlement at the site, we have implemented a depth weighting factor proposed by Cetin (2009). Following evaluation of 49 high-quality, cyclically induced, ground settlement case histories from seven different earthquakes, Cetin proposed the use of a weighting factor based on the depth of layers. The weighting procedure was used to tune the surface observations at liquefaction sites to produce a better model fit with measured data. Aside from the better model fit it produced, the rationale behind the use of a depth weighting factor is based on the following: 1) upward seepage, triggering void ratio redistribution, and resulting in unfavorably higher void ratios for the shallower sublayers of soil layers; 2) reduced induced shear stresses and number of shear stress cycles transmitted to deeper soil layers due to initial liquefaction of surficial layers; and 3) possible arching effects due to non-liquefied soil layers. All these may significantly reduce the contribution of volumetric settlement of deeper soil layers to the overall ground surface settlement (Cetin, 2009).

The results of our CPT analyses (CPT-1 and CPT-2) are presented on Figures 5A and 5B of this report. Calculations for these CPTs are attached as Appendix C.

4.3.3 Summary

Our analyses indicate that several layers could potentially experience liquefaction triggering that could result in post-liquefaction total settlement at the ground surface of up to ½ inch based on the Yoshimine (2006) method. As discussed in SP 117A, differential movement for level ground sites over deep soil sites will be up to about two-thirds of the total settlement between independent foundation elements. In our opinion, differential settlement is anticipated to be about ⅓ inch between adjacent foundation elements, assumed to be spaced approximately 30 feet apart.

4.3.4 Ground Rupture Potential

The methods used to estimate liquefaction settlements assume that there is a sufficient cap of non-liquefiable material to prevent ground rupture or sand boils. For ground rupture to occur, the pore water pressure within the liquefiable soil layer will need to be great enough to break through the overlying non-liquefiable layer, which could cause significant ground deformation and settlement. The work of Youd and Garris (1995) indicates that the 12-foot thick layer of non-liquefiable cap is sufficient to prevent ground rupture; therefore, the above total settlement estimates are reasonable.

4.4 LATERAL SPREADING

Lateral spreading is horizontal/lateral ground movement of relatively flat-lying soil deposits towards a free face such as an excavation, channel, or open body of water; typically, lateral spreading is associated with liquefaction of one or more subsurface layers near the bottom of the exposed slope. As failure tends to propagate as block failures, it is difficult to analyze and estimate where the first tension crack will form.

Adobe Creek is located about 400 feet southeast of the site, which is not within a distance considered to be susceptible to lateral spreading. Therefore, in our opinion, the potential for lateral spreading to affect the site is low.

4.5 SEISMIC SETTLEMENT/UNSATURATED SAND SHAKING

Loose unsaturated sandy soils can settle during strong seismic shaking. We evaluated the potential for seismic compaction of the medium dense clayey sand encountered above the historic high groundwater level of 17 feet based on the work by Pradell (1998). Our analyses indicate the potential for seismic settlement of the medium dense clayey sand is low.

4.6 TSUNAMI/SEICHE

The terms tsunami or seiche are described as ocean waves or similar waves usually created by undersea fault movement or by a coastal or submerged landslide. Tsunamis may be generated at great distance from shore (far field events) or nearby (near field events). Waves are formed, as the displaced water moves to regain equilibrium, and radiates across the open water, similar to ripples from a rock being thrown into a pond. When the waveform reaches the coastline, it quickly raises the water level, with water velocities as high as 15 to 20 knots. The water mass, as well as vessels, vehicles, or other objects in its path create tremendous forces as they impact coastal structures.

Tsunamis have affected the coastline along the Pacific Northwest during historic times. The Fort Point tide gauge in San Francisco recorded approximately 21 tsunamis between 1854 and 1964. The 1964 Alaska earthquake generated a recorded wave height of 7.4 feet and drowned eleven people in Crescent City, California. For the case of a far-field event, the Bay area would have hours of warning; for a near field event, there may be only a few minutes of warning, if any.

A tsunami or seiche originating in the Pacific Ocean would lose much of its energy passing through San Francisco Bay. Based on the study of tsunami inundation potential for the San Francisco Bay Area (CGS, 2009), areas most likely to be inundated are marshlands, tidal flats, and former bay margin lands that are now artificially filled, but are still at or below sea level, and are generally within 1½ miles of the shoreline. The site is approximately 3½ miles inland from the San Francisco Bay shoreline and is approximately 60¾ to 63½ feet (NAVD 88) above mean sea level. Therefore, the potential for inundation due to tsunami or seiche is considered low.

4.7 FLOODING

Based on our internet search of the Federal Emergency Management Agency (FEMA, 2009) flood map public database, the site is located within Zone X described as “Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood”. We recommend the project civil engineer be retained to confirm this information and verify the base flood elevation, if appropriate.

SECTION 5: CONCLUSIONS

5.1 SUMMARY

From a geotechnical viewpoint, the project is feasible provided the concerns listed below are addressed in the project design. Descriptions of each concern with brief outlines of our recommendations follow the listed concerns.

- Presence of groundwater in car lift pit excavation
- Proximity of garage excavation to existing improvements
- Differential movement at on-grade to on-structure transitions
- Presence of expansive surficial soil
- Presence of cohesionless soil

5.1.1 Presence of Groundwater in Car Lift Pit Excavation

As discussed, portions of the below-grade garage level excavation will be deepened up to 8 feet to accommodate the car lift pits (total depth about 26 feet below existing grades, corresponding to Elevation 36 feet NAVD 88). Groundwater was encountered within our explorations as shallow as 24 feet, corresponding to Elevation 38 feet. Based on an estimated seasonal high design groundwater depth of 17 feet, the the car lift pits will be below the design groundwater depth. Groundwater will likely be encountered during excavation of the pits, depending on the time of year construction begins. Impacts associated with encountering groundwater typically consist of potentially wet and unstable subgrade, difficult underground utility installation, and difficulty achieving compaction.

Dewatering and shoring of the proposed car lift pit excavations and utility trenches would likely be required on the site for below-grade excavations extending below 24 feet. Shoring of the pit excavation, and other excavations within the garage level excavation exceeding OSHA standards will be required to be shored. The contractor should include provisions for controlling groundwater and temporary shoring designs will need to include surcharge pressures for groundwater. Recommendations addressing these concerns are presented in the “Earthwork” section below.

Because the car lift pits will likely be below seasonal ground water levels and the City of Palo Alto does not allow wall drainage systems, walls below design groundwater depths should be designed to resist undrained conditions (i.e. hydrostatic forces). If mitigation of the potential impacts of groundwater on the structure (e.g. car lift pits) is desired, waterproofing the car lift pit walls, and designing the pit foundation and walls, including construction joints, to resist hydrostatic pressure is recommended. We recommend that a design ground water level of 17 feet below the existing ground surface be used to design the structure.

5.1.2 Proximity of Garage Excavation to Existing Improvements

We understand that the basement will extend to within about 4 to 10 feet of the property lines. Shoring or underpinning of the existing buildings at 4250 and 4260 El Camino Real (adjacent properties to the northwest and southeast, respectively) will likely be required, as the existing buildings are a few to several feet from the proposed basement walls. Temporary shoring to support the approximately 18- to 26-foot deep excavation adjacent to 4250 and 4260 El Camino Real (adjacent properties to the northwest and southeast, respectively) will likely be necessary, and shoring for the basement walls near El Camino Real and the property to the southwest may also be necessary. Recommendations for both temporary shoring and underpinning piers are provided in this report.

5.1.3 Differential Movement from On-Grade to On-Structure Transitions

Some flatwork and/or paver areas may transition from on-grade support to overlying the basement (on-structure). These transition areas typically experience increased differential movement due to a variety of causes, including difficulty in achieving compaction of retaining wall backfill closest to the wall. We recommend consideration be given to where engineered fill is placed behind retaining walls extending to near finished grade, and that subslabs be included beneath flatwork or pavers that can cantilever at least 3 feet beyond the wall. If surface improvements are included that are highly sensitive to differential movement, additional measures may be necessary. We also recommend that retaining wall backfill be compacted to 95 percent where surface improvements are planned (see “Retaining Wall” section).

5.1.4 Presence of Expansive Surficial Soil

Moderately expansive surficial soils generally blanket the site. Expansive soils can undergo significant volume change with changes in moisture content. They shrink and harden when dried and expand and soften when wetted. Although this soil is anticipated to be removed during excavation of the below-grade garage level, at-grade surface improvements outside the basement footprint should be designed to resist expansive soils. To reduce the potential for damage to the planned surface improvements, flatwork (e.g. sidewalks and patios) should have sufficient reinforcement and be supported on a layer of non-expansive fill; any at-grade footings should extend below the zone of seasonal moisture fluctuation. In addition, it is important to limit moisture changes in the surficial soils by using positive drainage away from buildings as well as limiting landscaping watering. Grading and foundation recommendations addressing this concern are presented in the following sections.

5.1.5 Presence of Cohesionless Soil at Basement Level

As discussed, cohesionless (sandy) soils with variable amounts of fines were encountered within portions of the upper 16 feet of the soil profile that may be susceptible to localized sloughing or caving. Contractors should plan on forming footings where sand with low fines contents are encountered, as well as preparation of slab-on-grade subgrade just prior to concrete placement. Other similar construction issues as relates to temporary shoring, utility excavations, and granular material at the base of the basement excavation. These considerations are discussed further within the “Earthwork” and “Foundations” sections of this report.

5.2 PLANS AND SPECIFICATIONS REVIEW

We recommend that we be retained to review the geotechnical aspects of the project structural, civil, and landscape plans and specifications, allowing sufficient time to provide the design team with any comments prior to issuing the plans for construction.

5.3 CONSTRUCTION OBSERVATION AND TESTING

As site conditions may vary significantly between the small-diameter explorations performed during this investigation, we also recommend that a Cornerstone representative be present to provide geotechnical observation and testing during earthwork and foundation construction. This will allow us to form an opinion and prepare a letter at the end of construction regarding contractor compliance with project plans and specifications, and with the recommendations in our report. We will also be allowed to evaluate any conditions differing from those encountered during our investigation and provide supplemental recommendations as necessary. For these reasons, the recommendations in this report are contingent of Cornerstone providing observation and testing during construction. Contractors should provide at least a 48-hour notice when scheduling our field personnel.

SECTION 6: EARTHWORK

6.1 SITE DEMOLITION

All existing improvements not to be reused for the current development, including all foundations, flatwork, pavements, utilities, and other improvements should be demolished and removed from the site. Recommendations in this section apply to the removal of these improvements, which are currently present on the site, prior to the start of mass grading or the construction of new improvements for the project.

Cornerstone should be notified prior to the start of demolition and should be present on at least a part-time basis during all backfill and mass grading as a result of demolition. Occasionally, other types of buried structures (wells, cisterns, debris pits, etc.) can be found on sites with prior development. If encountered, Cornerstone should be contacted to address these types of structures on a case-by-case basis.

6.1.1 Demolition of Existing Slabs, Foundations and Pavements

Based on our understanding of the project, all slabs, foundations, and pavements will likely be completely removed from within planned building area during excavation of the below-grade garage level. A discussion of recycling existing improvements is provided later in this report.

6.1.2 Abandonment of Existing Utilities

All utilities should be completely removed from within planned building areas. For any utility line to be considered acceptable to remain within building areas, the utility line must be completely backfilled with grout or sand-cement slurry (sand slurry is not acceptable), the ends outside the building area capped with concrete, and the trench fills either removed and replaced as engineered fill with the trench side slopes flattened to at least 1:1, or the trench fills are determined not to be a risk to the structure. The assessment of the level of risk posed by the particular utility line will determine whether the utility may be abandoned in place or needs to be completely removed. The contractor should assume that all utilities will be removed from within building areas unless provided written confirmation from both the owner and the geotechnical engineer.

Utilities extending beyond the building area may be abandoned in place provided the ends are plugged with concrete, they do not conflict with planned improvements, and that the trench fills do not pose significant risk to the planned surface improvements.

The risk for owners associated with abandoning utilities in place include the potential for future differential settlement of existing trench fills, and/or partial collapse and potential ground loss into utility lines that are not completely filled with grout.

6.2 SITE CLEARING AND PREPARATION

6.2.1 Site Stripping

The site should be stripped of all surface vegetation, and surface and subsurface improvements to be removed within the proposed development area. Demolition of existing improvements is discussed in the prior paragraphs. Surface vegetation and topsoil should be stripped to a sufficient depth to remove all material greater than 3 percent organic content by weight. Based on our site observations, surficial stripping should extend about 3 to 6 inches below existing grade in vegetated areas.

6.2.2 Tree and Shrub Removal

Trees and shrubs designated for removal should have the root balls and any roots greater than ½-inch diameter removed completely. Mature trees are estimated to have root balls extending to depths of 2 to 4 feet, depending on the tree size. Significant root zones are anticipated to extend to the diameter of the tree canopy. Grade depressions resulting from root ball removal should be cleaned of loose material and backfilled in accordance with the recommendations in the “Compaction” section of this report.

6.3 REMOVAL OF EXISTING FILLS

Fills were not encountered in our explorations, and we anticipate any existing fill present within the proposed building footprint will be removed during the garage excavation that will extend about 18 to 26 feet below existing grades. If any fills are encountered in at-grade building areas, they should be completely removed from within building or improvement areas and to a lateral distance of at least 3 to 5 feet beyond the building footprint. Provided the fills meet the "Material for Fill" requirements below, the fills may be reused when backfilling the excavations. If materials are encountered that do not meet the requirements, such as debris, wood, trash, those materials should be screened out of the remaining material and be removed from the site. Backfill of excavations should be placed in lifts and compacted in accordance with the "Compaction" section below.

Fills extending into planned pavement and flatwork areas may be left in place provided they are determined to be a low risk for future differential settlement and that the upper 12 to 18 inches of fill below pavement subgrade is re-worked and compacted as discussed in the "Compaction" section below.

6.4 TEMPORARY CUT AND FILL SLOPES

The contractor is responsible for maintaining all temporary slopes and providing temporary shoring where required. Temporary shoring, bracing, and cuts/fills should be performed in accordance with the strictest government safety standards. On a preliminary basis, the upper 18 feet at the site may be classified as OSHA Soil Type C materials. Recommended soil parameters for temporary shoring are provided in the "Temporary Shoring" section of this report.

Excavations extending more than 5 feet below building subgrade and excavations in pavement and flatwork areas should be slope at a 1:1 inclination unless the OSHA soil classification indicates that slope should not exceed 1.5:1.

6.5 BELOW-GRADE EXCAVATIONS

Below-grade excavations may be constructed with temporary slopes in accordance with the "Temporary Cut and Fill Slopes" section above if space allows. Alternatively, temporary shoring may support the planned cuts up to 18 feet. We have provided geotechnical parameters for shoring design in the section below. The choice of shoring method should be left to the contractor's judgment based on experience, economic considerations and adjacent improvements such as utilities, pavements, and foundation loads. Temporary shoring should support adjacent improvements without distress and should be the contractor's responsibility. A pre-condition survey including photographs and installation of monitoring points for existing site improvements should be included in the contractor's scope. We should be provided the opportunity to review the geotechnical parameters of the shoring design prior to implementation; the project structural engineer should be consulted regarding support of adjacent structures.

6.5.1 Temporary Shoring

Based on the site conditions encountered during our investigation, the cuts may be supported by soldier beams and tie-backs, braced excavations, soil nailing, or potentially other methods. Where shoring will extend more than about 10 feet, restrained shoring will most likely be required to limit detrimental lateral deflections and settlement behind the shoring. In addition to soil earth pressures, the shoring system will need to support adjacent loads such as construction vehicles and incidental loading, existing structure foundation loads, and street loading. We recommend that heavy construction loads (cranes, etc.) and material stockpiles be kept at least 15 feet behind the shoring. Where this loading cannot be set back, the shoring will need to be designed to support the loading. The shoring designer should provide for timely and uniform mobilization of soil pressures that will not result in excessive lateral deflections. Minimum suggested geotechnical parameters for shoring design are provided in the table below.

Table 3: Suggested Temporary Shoring Design Parameters

Design Parameter	Design Value
Minimum Lateral Wall Surcharge (upper 5 feet)	120 psf
Cantilever Wall – Triangular Earth Pressure	40 pcf
Restrained Wall – Trapezoidal Earth Pressure	Increase from 0 to 25H* psf
Passive Pressure – Starting at 2 feet below the bottom of the excavation**	400 pcf up to 2,000 psf maximum uniform pressure

* H equals the height of the excavation; passive pressures are assumed to act over twice the soldier pile diameter

** Unless the bottom of excavation is assumed to be the bottom of the footing/foundation excavation

If shotcrete lagging is used for the shoring facing, the shoring will need to be designed for undrained conditions (i.e. hydrostatic forces), per the City of Palo Alto, wall drainage is not allowed.

We performed our borings with hollow-stem auger drilling equipment and as such were not able to evaluate the potential for caving soils, which can create difficult conditions during soldier beam, tie-back, or soil nail installation; caving soils can also be problematic during excavation and lagging placement. The contractor is responsible for evaluating excavation difficulties prior to construction. Where relatively clean sands were encountered during our exploration, pilot holes performed by the contractor may be desired to further evaluate these conditions prior to the finalization of the shoring budget.

In addition to anticipated deflection of the shoring system, other factors such as voids created by soil sloughing, and erosion of granular layers due to perched water conditions can create adverse ground subsidence and deflections. The contractor should attempt to cut the excavation as close to neat lines as possible; where voids are created they should be backfilled as soon as possible with sand, gravel, or grout.

As previously mentioned, we recommend that a monitoring program be developed and implemented to evaluate the effects of the shoring on adjacent improvements. All sensitive improvements should be located and monitored for horizontal and vertical deflections and distress cracking based on a pre-construction survey. For multi-level excavations, the installation of inclinometers at critical areas may be desired for more detailed deflection monitoring. The monitoring frequency should be established and agree to by the project team prior to start of shoring construction.

The above recommendations are for the use of the design team; the contractor in conjunction with input from the shoring designer should perform additional subsurface exploration they deem necessary to design the chosen shoring system. A California-licensed civil or structural engineer must design and be in responsible charge of the temporary shoring design. The contractor is responsible for means and methods of construction, as well as site safety.

6.5.2 Drilled Piers for Underpinning of Adjacent Structures

The structural loads of the adjacent buildings located at 4250 and 4260 El Camino Real may be supported on drilled, cast-in-place, straight-shaft friction piers, constructed as part of the temporary shoring system. The piers should have a minimum diameter of 16 inches and extend to a depth of at least 5 feet below the bottom of the planned excavation. Adjacent piers centers should be spaced at least three diameters apart, otherwise, a reduction for group effects may be required.

The vertical capacity of the piers may be designed based on an allowable skin friction of 500 psf for combined dead plus live loads based on a factor of safety of 2.0; dead loads should not exceed two-thirds of the allowable capacities. Where underpinning piers are less than 3 pier diameters from the excavation, only half the allowable skin friction should be used for vertical capacity.

The bottoms of pier excavations should be dry, reasonably clean, and free of loose soil before reinforcing steel is installed and concrete is placed. Piers extending more than about 17 feet below grade may encounter groundwater; therefore, for piers deeper than 17 feet, concrete may need to be placed by tremie pipe. The tops of the piers should be dry-packed and jacks used to engage the pier vertical support beneath the building foundations. We recommend that the excavation of all piers be performed under our direct observation to establish that the piers are founded in suitable materials and constructed in accordance with the recommendations presented in this report.

6.5.3 Construction Dewatering – Car Lift Pits

Depending on the time of year construction begins, groundwater levels could potentially be several feet above the planned excavation bottoms for the car lift pits; therefore, temporary and localized dewatering may be necessary during construction. Design, selection of the equipment and dewatering method, and construction of temporary dewatering should be the responsibility of the contractor. Modifications to the dewatering system are often required in layered alluvial soils and should be anticipated by the contractor. The dewatering plan, including planned dewatering well filter pack materials, should be forwarded to our office for review prior to implementation.

The dewatering design should maintain groundwater at least 5 feet below the bottom of the mass excavation, and at least 2 feet below localized excavations such as deepened footings, lift shafts, and utilities. If the dewatering system was to shut down for an extended period of time, destabilization and/or heave of the excavation bottom requiring over-excavation and stabilization, flooding and softening, and/or shoring failures could occur; therefore, we recommend that a backup power source be considered.

Temporary draw down of the groundwater table can cause the subsidence outside the excavation area, causing settlement of adjacent improvements. As a drawdown of up to 11 feet is anticipated, we evaluated the potential movement of the adjacent buildings, roadway, and utilities. We estimate there could be up to ¼ inch of settlement. If this settlement is deemed excessive, we recommend alternative shoring methods such as tied back slurry walls or soil mixed curtain walls be considered.

Depending on the groundwater quality and previous environmental impacts to the site and surrounding area, settlement and storage tanks, particulate filtration, and environmental testing may be required prior to discharge, either into storm or sanitary, or trucked to an off-site facility.

6.6 AT-GRADE SUBGRADE PREPARATION

After site clearing and demolition is complete, and prior to backfilling any excavations resulting from fill removal or demolition, at-grade excavation subgrade and subgrade within areas to receive additional site fills, slabs-on-grade and/or pavements should be scarified to a depth of at least 6 inches, moisture conditioned, and compacted in accordance with the “Compaction” section below.

6.7 SUBGRADE STABILIZATION MEASURES

Soil subgrade and fill materials, especially soils with high fines contents such as clays and silty soils, can become unstable due to high moisture content, whether from high in-situ moisture contents or from winter rains. As the moisture content increases over the laboratory optimum, it becomes more likely the materials will be subject to softening and yielding (pumping) from construction loading or become unworkable during placement and compaction.

As discussed in the “Subsurface” section in this report, the in-situ moisture contents are about 0 to 5 percent below the estimated laboratory optimum in the upper 18 feet of the soil profile; however, the in-situ moisture contents of the soil within the anticipated depth of the car lift pits are about 5 to 10 percent over the estimated laboratory optimum. The contractor should anticipate drying this soil prior to reusing as fill. In addition, repetitive rubber-tire loading will likely de-stabilize the soils.

There are several methods to address potential unstable soil conditions and facilitate fill placement and trench backfill. Some of the methods are briefly discussed below.

Implementation of the appropriate stabilization measures should be evaluated on a case-by-case basis according to the project construction goals and the particular site conditions.

6.7.1 Scarification and Drying

The subgrade may be scarified to a depth of 12 inches and allowed to dry to near optimum conditions, if sufficient dry weather is anticipated to allow sufficient drying. More than one round of scarification may be needed to break up the soil clods.

6.7.2 Removal and Replacement

As an alternative to scarification, the contractor may choose to over-excavate the unstable soils and replace them with dry on-site or import materials. A Cornerstone representative should be present to provide recommendations regarding the appropriate depth of over-excavation, whether a geosynthethic (stabilization fabric or geogrid) is recommended, and what materials are recommended for backfill.

6.7.3 Chemical Treatment

Where the unstable area exceeds about 5,000 to 10,000 square feet and/or site winterization is desired, chemical treatment with quicklime (CaO), kiln-dust, or cement may be more cost-effective than removal and replacement. Recommended chemical treatment depths will typically range from 12 to 18 inches depending on the magnitude of the instability.

6.7.4 Below-Grade Excavation Stabilization

Portions of the proposed basement excavation will extend into very moist or saturated clay and sand with varying strength. Due to the high moisture content of this material, it may become unstable under the weight of track-mounted or rubber-tired construction equipment. To provide a firm base for construction of the foundation, it may be necessary to remove an additional approximately 12 to 18 inches of native soil below the foundation level, place a layer of stabilization fabric (Mirafi 500X, or equivalent) at the bottom, and replace it with a bridging layer such as crushed rock. Otherwise, a layer of lean cement-sand slurry layer (“rat slab”) may be considered. If chemical treatment is considered at the basement subgrade level, a material suitable for both clayey and sandy soils should be considered. For planning purposes, a minimum of 4 percent chemical treatment should be considered that includes a 50/50 blend of high-calcium quicklime and cement, or as recommended by the stabilization contractor. Temporary dewatering to a depth of at least 5 feet below the bottom of the building excavation is recommended during construction.

6.8 MATERIAL FOR FILL

6.8.1 Re-Use of On-site Soils

On-site soils with an organic content less than 3 percent by weight may be reused as general fill. General fill should not have lumps, clods or cobble pieces larger than 6 inches in diameter; 85 percent of the fill should be smaller than 2½ inches in diameter. Minor amounts of oversize material (smaller than 12 inches in diameter) may be allowed provided the oversized pieces are not allowed to nest together and the compaction method will allow for loosely placed lifts not exceeding 12 inches.

6.8.2 Re-Use of On-Site Site Improvements

We anticipate that significant quantities of asphalt concrete (AC) grindings and aggregate base (AB) will be generated during site demolition. If the AC grindings are mixed with the underlying AB to meet Class 2 AB specifications, they may be reused within the new at-grade pavement and flatwork structural sections. AC/AB grindings may not be reused within the basement foundation area. Laboratory testing will be required to confirm the grindings meet project specifications. Due to the existing alligator cracking of the AC pavements, it is likely that the grinding operation will leave significant oversize chunks and won’t meet the Class 2 AB gradation requirements but may meet Caltrans subbase requirements. Depending on the quantities of oversized material, the grindings may still be used within the structural section; however, the pavement design will need to be modified to account for the difference, typically resulting in the addition of about 1 inch to the structural section.

6.8.3 Potential Import Sources

Imported and non-expansive material should be inorganic with a Plasticity Index (PI) of 15 or less, and not contain recycled asphalt concrete where it will be used within the building areas. To prevent significant caving during trenching or foundation construction, imported material should have sufficient fines. Samples of potential import sources should be delivered to our office at least 10 days prior to the desired import start date. Information regarding the import source should be provided, such as any site geotechnical reports. If the material will be derived from an excavation rather than a stockpile, potholes will likely be required to collect samples from throughout the depth of the planned cut that will be imported. At a minimum, laboratory testing will include PI tests. Material data sheets for select fill materials (Class 2 aggregate base, ¾ inch crushed rock, quarry fines, etc.) listing current laboratory testing data (not older than 6 months from the import date) may be provided for our review without providing a sample. If current data is not available, specification testing will need to be completed prior to approval.

Environmental and soil corrosion characterization should also be considered by the project team prior to acceptance. Suitable environmental laboratory data to the planned import quantity should be provided to the project environmental consultant; additional laboratory testing may be required based on the project environmental consultant’s review. The potential import source should also not be more corrosive than the on-site soils, based on pH, saturated resistivity, and soluble sulfate and chloride testing.

6.8.4 Non-Expansive Fill Using Lime Treatment

As discussed above, non-expansive fill should have a Plasticity Index (PI) of 15 or less. Due to the high clay content and PI of the near-surface soil materials, it is not likely that sufficient quantities of non-expansive fill would be generated from cut materials. As an alternative to importing non-expansive fill, chemical treatment can be considered to create non-expansive fill. It has been our experience that for high PI clayey soil and bedrock materials will likely need to be mixed with at least 4 percent quicklime (CaO) or approved equivalent to adequately reduce the PI of the on-site soils to 15 or less. If this option is considered, additional laboratory tests should be performed during initial site grading to further evaluate the optimum percentage of quicklime required.

6.9 COMPACTION REQUIREMENTS

All fills, and subgrade areas where fill, slabs-on-grade, and pavements are planned, should be placed in loose lifts 8 inches thick or less and compacted in accordance with ASTM D1557 (latest version) requirements as shown in the table below. In general, clayey soils should be compacted with sheepsfoot equipment and sandy/gravelly soils with vibratory equipment; open-graded materials such as crushed rock should be placed in lifts no thicker than 18 inches consolidated in place with vibratory equipment. Each lift of fill and all subgrade should be firm and unyielding under construction equipment loading in addition to meeting the compaction requirements to be approved. The contractor (with input from a Cornerstone representative) should evaluate the in-situ moisture conditions, as the use of vibratory equipment on soils with high moistures can cause unstable conditions. General recommendations for soil stabilization are provided in the "Subgrade Stabilization Measures" section of this report. Where the soil's PI is 20 or greater, the expansive soil criteria should be used.

Table 4: Compaction Requirements

Description	Material Description	Minimum Relative[1] Compaction (percent)	Moisture[2] Content (percent)
General Fill (within upper 5 feet)	On-Site Expansive Soils	87 – 92	>3
	Low Expansion Soils	90	>1
General Fill (below a depth of 5 feet)	On-Site Expansive Soils	95	>3
	Low Expansion Soils	95	>1
Basement Wall Backfill	Without Surface Improvements	90	>1
Basement Wall Backfill	With Surface Improvements	95[4]	>1

1 – Relative compaction based on maximum density determined by ASTM D1557 (latest version)
2 – Moisture content based on optimum moisture content determined by ASTM D1557 (latest version)
3 – Class 2 aggregate base shall conform to Caltrans Standard Specifications, latest edition, except that the relative compaction should be determined by ASTM D1557 (latest version)
4 – Using light-weight compaction or walls should be braced

Table 4 continued on next page

Table 4 (cont.): Compaction Requirements

Description	Material Description	Minimum Relative[1] Compaction (percent)	Moisture[2] Content (percent)
Trench Backfill	On-Site Expansive Soils	87 – 92	>3
Trench Backfill	Low Expansion Soils	90	>1
Trench Backfill (upper 6 inches of subgrade)	On-Site Low Expansion Soils	95	>1
Crushed Rock Fill	¾-inch Clean Crushed Rock	Consolidate In-Place	NA
Non-Expansive Fill	Imported Non-Expansive Fill	90	Optimum
Flatwork Subgrade	On-Site Expansive Soils	87 - 92	>3
Flatwork Subgrade	Low Expansion Soils	90	>1
Flatwork Aggregate Base	Class 2 Aggregate Base[3]	90	Optimum
Pavement Subgrade	On-Site Expansive Soils	87 - 92	>3
Pavement Subgrade	Low Expansion Soils	95	>1
Pavement Aggregate Base	Class 2 Aggregate Base[3]	95	Optimum
Asphalt Concrete	Asphalt Concrete	95 (Marshall)	NA

1 – Relative compaction based on maximum density determined by ASTM D1557 (latest version)
2 – Moisture content based on optimum moisture content determined by ASTM D1557 (latest version)
3 – Class 2 aggregate base shall conform to Caltrans Standard Specifications, latest edition, except that the relative compaction should be determined by ASTM D1557 (latest version)
4 – Using light-weight compaction or walls should be braced

6.9.1 Construction Moisture Conditioning

Expansive soils can undergo significant volume change when dried then wetted. The contractor should keep all exposed expansive soil subgrade (and also trench excavation side walls) moist until protected by overlying improvements (or trenches are backfilled). If expansive soils are allowed to dry out significantly, re-moisture conditioning may require several days of re-wetting (flooding is not recommended), or deep scarification, moisture conditioning, and re-compaction.

6.10 TRENCH BACKFILL

Utility lines constructed within public right-of-way should be trenched, bedded and shaded, and backfilled in accordance with the local or governing jurisdictional requirements. Utility lines in private improvement areas should be constructed in accordance with the following requirements unless superseded by other governing requirements.

All utility lines should be bedded and shaded to at least 6 inches over the top of the lines with crushed rock (⅜-inch-diameter or greater) or well-graded sand and gravel materials conforming to the pipe manufacturer’s requirements. Open-graded shading materials should be consolidated in place with vibratory equipment and well-graded materials should be compacted to at least 90 percent relative compaction with vibratory equipment prior to placing subsequent backfill materials.

General backfill over shading materials may consist of on-site native materials provided they meet the requirements in the “Material for Fill” section, and are moisture conditioned and compacted in accordance with the requirements in the “Compaction” section.

Where utility lines will cross perpendicular to strip footings, the footing should be deepened to encase the utility line, providing sleeves or flexible cushions to protect the pipes from anticipated foundation settlement, or the utility lines should be backfilled to the bottom of footing with sand-cement slurry or lean concrete. Where utility lines will parallel footings and will extend below the “foundation plane of influence,” an imaginary 1:1 plane projected down from the bottom edge of the footing, either the footing will need to be deepened so that the pipe is above the foundation plane of influence or the utility trench will need to be backfilled with sand-cement slurry or lean concrete within the influence zone. Sand-cement slurry used within foundation influence zones should have a minimum compressive strength of 75 psi.

On expansive soils sites it is desirable to reduce the potential for water migration into building and pavement areas through the granular shading materials. We recommend that a plug of low-permeability clay soil, sand-cement slurry, or lean concrete be placed within trenches just outside where the trenches pass into building and pavement areas.

6.11 SITE DRAINAGE

Ponding should not be allowed adjacent to building foundations, slabs-on-grade, or pavements. Hardscape surfaces should slope at least 2 percent towards suitable discharge facilities; landscape areas should slope at least 3 percent towards suitable discharge facilities. Roof runoff should be directed away from building areas in closed conduits, to approved infiltration facilities, or on to hardscaped surfaces that drain to suitable facilities. Retention, detention or infiltration facilities should be spaced at least 10 feet from buildings, and preferably at least 5 feet from slabs-on-grade or pavements. However, if retention, detention or infiltration facilities are located within these zones, we recommend that these treatment facilities meet the requirements in the Storm Water Treatment Design Considerations section of this report.

6.12 LOW-IMPACT DEVELOPMENT (LID) IMPROVEMENTS

The Municipal Regional Permit (MRP) requires regulated projects to treat 100 percent of the amount of runoff identified in Provision C.3.d from a regulated project’s drainage area with low impact development (LID) treatment measures onsite or at a joint stormwater treatment facility. LID treatment measures are defined as rainwater harvesting and use, infiltration, evapotranspiration, or biotreatment. A biotreatment system may only be used if it is infeasible to implement harvesting and use, infiltration, or evapotranspiration at a project site.

Technical infeasibility of infiltration may result from site conditions that restrict the operability of infiltration measures and devices. Various factors affecting the feasibility of infiltration treatment may create an environmental risk, structural stability risk, or physically restrict infiltration. The presence of any of these limiting factors may render infiltration technically infeasible for a proposed project. To aid in determining if infiltration may be feasible at the site, we provide the following site information regarding factors that may aid in determining the feasibility of infiltration facilities at the site.

- The near-surface soils at the site are clayey, and categorized as Hydrologic Soil Group D, and is expected to have infiltration rates of less than 0.2 inches per hour. In our opinion, these clayey soils will significantly limit the infiltration of stormwater.

- Locally, seasonal high groundwater is mapped at a depth of approximately 17 feet, and therefore is expected to be at least 10 feet below the base of the infiltration measure.

- In our opinion, infiltration locations within 10 feet of the building would create a geotechnical hazard.

6.12.1 Storm Water Treatment Design Considerations

If storm water treatment improvements, such as shallow bio-retention swales, basins or pervious pavements, are required as part of the site improvements to satisfy Storm Water Quality (C.3) requirements, we recommend the following items be considered for design and construction.

6.12.1.1 General Bioswale Design Guidelines

- If possible, avoid placing bioswales or basins within 10 feet of the building perimeter or within 5 feet of exterior flatwork or pavements. If bioswales must be constructed within these setbacks, the side(s) and bottom of the trench excavation should be lined with 10-mil visqueen to reduce water infiltration into the surrounding expansive clay.

- Bioswales constructed within 3 feet of proposed buildings may be within the foundation zone of influence for perimeter wall loads. Therefore, where bioswales will parallel foundations and will extend below the “foundation plane of influence,” an imaginary 1:1 plane projected down from the bottom edge of the foundation, the foundation will need to be deepened so that the bottom edge of the bioswale filter material is above the foundation plane of influence.

- The bottom of bioswale or detention areas should include a perforated drain placed at a low point, such as a shallow trench or sloped bottom, to reduce water infiltration into the surrounding soils near structural improvements, and to address the low infiltration capacity of the on-site clay soils.

6.12.1.2 Bioswale Infiltration Material

- Gradation specifications for bioswale filter material, if required, should be specified on the grading and improvement plans.

- Compaction requirements for bioswale filter material in non-landscaped areas or in pervious pavement areas, if any, should be indicated on the plans and specifications to satisfy the anticipated use of the infiltration area.

- If required, infiltration (percolation) testing should be performed on representative samples of potential bioswale materials prior to construction to check for general conformance with the specified infiltration rates.

- It should be noted that multiple laboratory tests may be required to evaluate the properties of the bioswale materials, including percolation, landscape suitability and possibly environmental analytical testing depending on the source of the material. We recommend that the landscape architect provide input on the required landscape suitability tests if bioswales are to be planted.

- If bioswales are to be vegetated, the landscape architect should select planting materials that do not reduce or inhibit the water infiltration rate, such as covering the bioswale with grass sod containing a clayey soil base.

- If required by governing agencies, field infiltration testing should be specified on the grading and improvement plans. The appropriate infiltration test method, duration and frequency of testing should be specified in accordance with local requirements.

- Due to the relatively loose consistency and/or high organic content of many bioswale filter materials, long-term settlement of the bioswale medium should be anticipated. To reduce initial volume loss, bioswale filter material should be wetted in 12-inch lifts during placement to pre-consolidate the material. Mechanical compaction should not be allowed, unless specified on the grading and improvement plans, since this could significantly decrease the infiltration rate of the bioswale materials.

- It should be noted that the volume of bioswale filter material may decrease over time depending on the organic content of the material. Additional filter material may need to be added to bioswales after the initial exposure to winter rains and periodically over the life of the bioswale areas, as needed.

6.12.1.3 Bioswale Construction Adjacent to Pavements

If bio-infiltration swales or basins are considered adjacent to proposed parking lots or exterior flatwork, we recommend that mitigative measures be considered in the design and construction of these facilities to reduce potential impacts to flatwork or pavements. Exterior flatwork, concrete curbs, and pavements located directly adjacent to bio-swales may be susceptible to settlement or lateral movement, depending on the configuration of the bioswale and the setback between the improvements and edge of the swale. To reduce the potential for distress to these improvements due to vertical or lateral movement, the following options should be considered by the project civil engineer:

- Improvements should be setback from the vertical edge of a bioswale such that there is at least 1 foot of horizontal distance between the edge of improvements and the top edge of the bioswale excavation for every 1 foot of vertical bioswale depth, or

- Concrete curbs for pavements, or lateral restraint for exterior flatwork, located directly adjacent to a vertical bioswale cut should be designed to resist lateral earth pressures in accordance with the recommendations in the “Retaining Walls” section of this report, or concrete curbs or edge restraint should be adequately keyed into the native soil or engineered to reduce the potential for rotation or lateral movement of the curbs.

6.13 LANDSCAPE CONSIDERATIONS

Since the near-surface soils are moderately expansive, we recommend greatly reducing the amount of surface water infiltrating these soils near foundations and exterior slabs-on-grade. This can typically be achieved by:

- Using drip irrigation

- Avoiding open planting within 3 feet of the building perimeter or near the top of existing slopes

- Regulating the amount of water distributed to lawns or planter areas by using irrigation timers
- Selecting landscaping that requires little or no watering, especially near foundations.

We recommend that the landscape architect consider these items when developing landscaping plans.

SECTION 7: FOUNDATIONS

7.1 SUMMARY OF RECOMMENDATIONS

We understand the proposed hotel building consists of 5 stories above grade with one level of below-grade parking. Based on the provided plans, the finish floor of the garage level is about 15½ feet below the existing grades. In our opinion, the proposed structure may be supported on shallow foundations provided the recommendations in the “Earthwork” section and the sections below are followed.

7.2 SEISMIC DESIGN CRITERIA

The 2016 California Building Code (CBC) provides criteria for the seismic design of buildings in Chapter 16. The “Seismic Coefficients” used to design buildings are established based on a series of tables and figures addressing different site factors, including the soil profile in the upper 100 feet below grade and mapped spectral acceleration parameters based on distance to the controlling seismic source/fault system. Based on our borings and review of local geology, the site is underlain by deep alluvial soils with typical SPT “N” values between 15 and 50 blows per foot. Therefore, we have classified the site as Soil Classification D. The mapped spectral acceleration parameters S_S and S_1 were calculated using the USGS web-based program *U.S. Seismic Design Maps*, located at http:earthquake.usgs.gov/designmaps/us/application.php, Version 3.1.0, revision date July 11, 2013, based on the site coordinates presented below and the site classification. The table below lists the various factors used to determine the seismic coefficients and other parameters.

Table 5: CBC Site Categorization and Site Coefficients

Classification/Coefficient	Design Value
Site Class	D
Site Latitude	37.407176°
Site Longitude	-122.121208°
0.2-second Period Mapped Spectral Acceleration[1], S_S	1.555g
1-second Period Mapped Spectral Acceleration[1], S_1	0.700g
Short-Period Site Coefficient – Fa	1.0
Long-Period Site Coefficient – Fv	1.5
0.2-second Period, Maximum Considered Earthquake Spectral Response Acceleration Adjusted for Site Effects - S_{MS}	1.555g
1-second Period, Maximum Considered Earthquake Spectral Response Acceleration Adjusted for Site Effects – S_{M1}	1.050g
0.2-second Period, Design Earthquake Spectral Response Acceleration – S_{DS}	1.037g
1-second Period, Design Earthquake Spectral Response Acceleration – S_{D1}	0.700g

[1] For Site Class B, 5 percent damped.

7.3 SHALLOW FOUNDATIONS

7.3.1 Spread Footings

Spread footings should bear on natural, undisturbed soil or engineered fill, be at least 18 inches wide, and extend at least 18 inches below the lowest adjacent grade. Lowest adjacent grade is defined as the deeper of the following: 1) bottom of the adjacent interior slab-on-grade, or 2) finished exterior grade, excluding landscaping topsoil.

Basement level footings constructed to the above dimensions and in accordance with the "Earthwork" recommendations of this report should be designed for maximum allowable bearing pressures of 3,000 psf for dead loads, 4,500 psf for combined dead plus live loads, and 6,000 psf for all loads including wind and seismic. Additionally, at-grade footings should be designed for maximum allowable bearing pressures of 2, 000 psf for dead loads, 3,000 psf for dead plus live loads, and 4,000 psf for all loads including wind and seismic. These pressures are based on factors of safety of 3.0, 2.0, and 1.5 applied to the ultimate bearing pressure for dead, dead plus live, and all loads, respectively. These pressures are net values; the weight of the footing may be neglected for the portion of the footing extending below grade (typically, the full footing depth). Top and bottom mats of reinforcing steel should be included in continuous footings to help span irregularities and differential settlement.

7.3.2 Footing Settlement

Structural loads were not provided to us at the time this report was prepared; therefore, we assumed the typical loading in the following table.

Table 6: Assumed Structural Loading

Foundation Area	Range of Assumed Loads
Interior Isolated Column Footing	750 to 800 kips
Perimeter Strip Footing	12 to 16 kips per lineal foot

Based on the above loading and the allowable bearing pressures presented above, we estimate that the total static footing settlement will be on the order of 1⅓ inches, with about ⅔ inch of post-construction differential settlement between adjacent foundation elements. In addition, we estimated that differential seismic movement will be about ⅓ inch, resulting in a total estimated differential foundation movement of 1 inch between independent foundation elements or over a lateral distance of 30 feet. If foundations designed in accordance with the above recommendations are not capable of resisting such differential movement, supplemental recommendations for mat foundations may be needed. As our footing loads were assumed, we recommend we be retained to review the final footing layout and loading and verify the settlement estimates above.

7.3.3 Lateral Loading

Lateral loads may be resisted by friction between the bottom of footing and the supporting subgrade, and also by passive pressures generated against footing sidewalls. An ultimate frictional resistance of 0.45 applied to the footing dead load, and ultimate passive pressures based on equivalent fluid pressures of 450 and 500 pcf for at-grade and basement level footings, respectively, may be used in design. The structural engineer should apply an appropriate factor of safety (such as 1.5) to the ultimate values above. Where at-grade footings are adjacent to landscape areas without hardscape, the upper 12 inches of soil should be neglected when determining passive pressure capacity.

7.3.4 Spread Footing Construction Considerations

Where utility lines will cross perpendicular to strip footings, the footing should be deepened to encase the utility line, providing sleeves or flexible cushions to protect the pipes from anticipated foundation settlement, or the utility lines should be backfilled to the bottom of footing with sand-cement slurry or lean concrete. Where utility lines will parallel footings and will extend below the “foundation plane of influence,” an imaginary 1:1 plane projected down from the bottom edge of the footing, either the footing will need to be deepened so that the pipe is above the foundation plane of influence or the utility trench will need to be backfilled with sand-cement slurry or lean concrete within the influence zone. Sand-cement slurry used within foundation influence zones should have a minimum compressive strength of 75 psi.

Due to the presence of shallow sands near the basement level, footing excavation walls may not stand vertical for extended periods of time and may need to be sloped to a minimum 1:1 inclination. Granular material encountered in the footing bottoms will likely be disturbed to a depth of 3 to 6 inches following excavation and will need to be compacted to 90 percent relative compaction prior to steel placement. Care should be taken to not disturb the compacted granular material during steel placement. Cornerstone Earth Group should re-observe the footing excavations in granular materials after reinforcing steel has been placed and just prior to concrete placement. Footing excavations should also be kept moist by regular sprinkling with water to reduce the potential for raveling of the granular materials. As an alternative, a rat slab can be placed over the granular material after Cornerstone field staff has observed and tested the footing excavation to protect the granular material prior to steel placement.   If there is a significant schedule delay between our initial observation and concrete placement, we may need to re-observe the excavations.

7.3.5 Hydrostatic Uplift and Waterproofing

As discussed in “Conclusions”, it is our current understanding the City of Palo Alto does not allow below-grade wall drainage systems. As previously discussed in the “Groundwater” section, the design ground water depth is 17 feet below the existing grades, corresponding to Elevation 45 feet NAVD 88.

We understand the finished floor of the garage level is 15½ feet below grade, corresponding to Elevation 46½ feet; however, the finish floor of the proposed car lift pits was not available but is assumed to be 7 to 8 feet below that of the garage level which will be below the design groundwater level and the groundwater level encountered within our explorations. Therefore, hydrostatic uplift and waterproofing of the car lift pits will need to be considered. If mitigation of potential impacts to the structure due to groundwater is desired, we recommend walls be designed for hydrostatic pressure (an additional 40 pcf of fluid pressure) and waterproofed. We also recommend that no drainage panels be used behind waterproofing or other materials that may allow the buildup of perched groundwater.

SECTION 8: CONCRETE SLABS AND PEDESTRIAN PAVEMENTS

8.1 BELOW-GRADE GARAGE SLAB-ON-GRADE

If spread footings with slab-on-grade floors are feasible with respect to the design groundwater elevation and hydrostatic uplift, the garage slab-on-grade should be at least 5 inches thick and if constructed with minimal reinforcement intended for shrinkage control only, should have a minimum compressive strength of 3,000 psi. If the slab will have heavier reinforcing because the slab will also serve as a structural diaphragm, the compressive strength may be reduced to 2,500 psi at the structural engineer’s discretion. The garage slab should also be supported on subgrade prepared in accordance with the recommendations in the “Earthwork” section of this report, and at least 4 inches of either Class 2 aggregate base or ¾-inch clean, crushed rock place and compacted in accordance with the “Compaction” section of this report. If there will be areas within the garage that are moisture sensitive, such as equipment and lift rooms, the recommendations in the “Interior Slabs Moisture Protection Considerations” section below may be incorporated in the project design if desired. Consideration should be given to limiting the control joint spacing to a maximum of about 2 feet in each direction for each inch of concrete thickness.

8.2 INTERIOR SLABS MOISTURE PROTECTION CONSIDERATIONS

The following general guidelines for concrete at-grade slab-on-grade construction where floor coverings are planned are presented for the consideration by the developer, design team, and contractor. These guidelines are based on information obtained from a variety of sources, including the American Concrete Institute (ACI) and are intended to reduce the potential for moisture-related problems causing floor covering failures, and may be supplemented as necessary based on project-specific requirements. The application of these guidelines or not will not affect the geotechnical aspects of the slab-on-grade performance.

- Place a minimum 10-mil vapor retarder conforming to ASTM E 1745, Class C requirements or better directly below the concrete slab; the vapor retarder should extend to the slab edges and be sealed at all seams and penetrations in accordance with manufacturer’s recommendations and ASTM E 1643 requirements. A 4-inch-thick capillary break, consisting of crushed rock should be placed below the vapor retarder and consolidated in place with vibratory equipment. The mineral aggregate shall be of such size that the percentage composition by dry weight as determined by laboratory sieves will conform to the following gradation:

Sieve Size	Percentage Passing Sieve
1”	100
¾”	90 – 100
No. 4	0 - 10

- The concrete water:cement ratio should be 0.45 or less. Mid-range plasticizers may be used to increase concrete workability and facilitate pumping and placement.

- Water should not be added after initial batching unless the slump is less than specified and/or the resulting water:cement ratio will not exceed 0.45.

- Polishing the concrete surface with metal trowels is not recommended.

- Where floor coverings are planned, all concrete surfaces should be properly cured.

- Water vapor emission levels and concrete pH should be determined in accordance with ASTM F1869-98 and F710-98 requirements and evaluated against the floor covering manufacturer’s requirements prior to installation.

8.3 EXTERIOR FLATWORK

Exterior concrete flatwork subject to pedestrian and/or occasional light pick up loading should be at least 4 inches thick and supported on at least 6 inches of Class 2 aggregate base overlying subgrade prepared in accordance with the "Earthwork" recommendations of this report. Flatwork that will be subject to heavier or frequent vehicular loading should be designed in accordance with the recommendations in the "Vehicular Pavements" section below. To help reduce the potential for uncontrolled shrinkage cracking, adequate expansion and control joints should be included. Consideration should be given to limiting the control joint spacing to a maximum of about 2 feet in each direction for each inch of concrete thickness. Flatwork should be isolated from adjacent foundations or retaining walls except where limited sections of structural slabs are included to help span irregularities in retaining wall backfill at the transitions between at-grade and on-structure flatwork.

SECTION 9: VEHICULAR PAVEMENTS

9.1 ASPHALT CONCRETE

The following asphalt concrete pavement recommendations tabulated below are based on the Procedure 608 of the Caltrans Highway Design Manual, estimated traffic indices for various pavement-loading conditions, and on a design R-value of 5. The design R-value was chosen based on engineering judgment considering the expansive clay soil conditions.

Table 6: Asphalt Concrete Pavement Recommendations, Design R-value = 5

Design Traffic Index (TI)	Asphalt Concrete (inches)	Class 2 Aggregate Base* (inches)	Total Pavement Section Thickness (inches)
4.0	2.5	7.5	10.0
4.5	2.5	9.0	11.5
5.0	3.0	10.0	13.0
5.5	3.0	11.5	14.5
6.0	3.5	12.0	15.5
6.5	4.0	12.0	16.0

*Caltrans Class 2 aggregate base; minimum R-value of 78

Frequently, the full asphalt concrete section is not constructed prior to construction traffic loading. This can result in significant loss of asphalt concrete layer life, rutting, or other pavement failures. To improve the pavement life and reduce the potential for pavement distress through construction, we recommend the full design asphalt concrete section be constructed prior to construction traffic loading. Alternatively, a higher traffic index may be chosen for the areas where construction traffic will be use the pavements.

Asphalt concrete pavements constructed on expansive subgrade where the adjacent areas will not be irrigated for several months after the pavements are constructed may experience longitudinal cracking parallel to the pavement edge. These cracks typically form within a few feet of the pavement edge and are due to seasonal wetting and drying of the adjacent soil. The cracking may also occur during construction where the adjacent grade is allowed to significantly dry during the summer, pulling moisture out of the pavement subgrade. Any cracks that form should be sealed with bituminous sealant prior to the start of winter rains. One alternative to reduce the potential for this type of cracking is to install a moisture barrier at least 24 inches deep behind the pavement curb.

9.2 PORTLAND CEMENT CONCRETE

The exterior Portland Cement Concrete (PCC) pavement recommendations tabulated below are based on methods presented in the Portland Cement Association (PCA) design manual (PCA, 1984). Recommendations for garage slabs-on-grade were provided in the “Concrete Slabs and Pedestrian Pavements” section above. We have provided a few pavement alternatives as an anticipated Average Daily Truck Traffic (ADTT) was not provided. An allowable ADTT should be chosen that is greater than what is expected for the development.

Table 7: PCC Pavement Recommendations, Design R-value = 5

Allowable ADTT	Minimum PCC Thickness (inches)
13	5½
130	6

The PCC thicknesses above are based on a concrete compressive strength of at least 3,500 psi, supporting the PCC on at least 6 inches of Class 2 aggregate base compacted as recommended in the “Earthwork” section, and laterally restraining the PCC with curbs or concrete shoulders. Adequate expansion and control joints should be included. Consideration should be given to limiting the control joint spacing to a maximum of about 2 feet in each direction for each inch of concrete thickness. Due to the expansive surficial soils present, we recommend that the construction and expansion joints be dowelled.

9.2.1 Stress Pads for Trash Enclosures

Pads where trash containers will be stored, and where garbage trucks will park while emptying trash containers, should be constructed on Portland Cement Concrete. We recommend that the trash enclosure pads and stress (landing) pads where garbage trucks will store, pick up, and empty trash be increased to a minimum PCC thickness of 8 inches and be underlain by at least 6 inches of Class 2 aggregate base. The compressive strength, underlayment, and construction details should be consistent with the above recommendations for PCC pavements.

9.3 PAVEMENT CUTOFF

Surface water penetration into the pavement section can significantly reduce the pavement life, due to the native expansive clays. While quantifying the life reduction is difficult, a normal 20-year pavement design could be reduced to less than 10 years; therefore, increased long-term maintenance may be required.

It would be beneficial to include a pavement cut-off, such as deepened curbs, redwood-headers, or “Deep-Root Moisture Barriers” that are keyed at least 4 inches into the pavement subgrade. This will help limit the additional long-term maintenance.

SECTION 10: RETAINING WALLS

10.1 STATIC LATERAL EARTH PRESSURES

The structural design of any site retaining wall should include resistance to lateral earth pressures that develop from the soil behind the wall, any undrained water pressure, and surcharge loads acting behind the wall. Provided a drainage system is constructed behind the wall to prevent the build-up of hydrostatic pressures as discussed in the section below, we recommend that the walls with level backfill be designed for the following pressures:

Table 8: Recommended Lateral Earth Pressures

Wall Condition	Lateral Earth Pressure*	Additional Surcharge Loads
Unrestrained – Cantilever Wall	85 pcf	⅓ of vertical loads at top of wall
Restrained – Braced Wall	85 pcf + 8H** psf	½ of vertical loads at top of wall

* Lateral earth pressures are based on an equivalent fluid pressure for level backfill conditions
** H is the distance in feet between the bottom of footing and top of retained soil

Basement walls should be designed as restrained walls. As discussed, the City of Palo Alto requires that basement walls be designed to resist undrained conditions (i.e. hydrostatic forces). Therefore, an additional equivalent fluid pressure of 40 pcf has been added to the required lateral earth pressures for both restrained and unrestrained walls. Damp proofing or waterproofing of the walls should be considered where moisture penetration and/or efflorescence are not desired.

10.2 SEISMIC LATERAL EARTH PRESSURES

The 2016 California Building Code (CBC) states that lateral pressures from earthquakes should be considered in the design of basement and retaining walls. We developed seismic earth pressures for the proposed basement using interim recommendations generally based on refinement of the Mononobe-Okabe method (Lew et al., SEAOC 2010). Because the walls are greater than 12 feet in height, and peak ground accelerations are greater than 0.40g, we checked the result of the total seismic increment when added to the recommended active earth pressure against the recommended fixed (restrained) wall earth pressures. Because the wall is restrained, or will act as a restrained wall, and will be designed for 85 pcf (equivalent fluid pressure) plus a uniform earth pressure of 8H psf, based on current recommendations for seismic earth pressures, it appears that active earth pressures plus a seismic increment do not exceed the fixed wall earth pressures. Therefore, an additional seismic increment above the design earth pressures is not required as long as the walls are designed for the restrained wall earth pressures recommended above in accordance with the CBC.

10.3 BACKFILL

Where surface improvements will be located over the retaining wall backfill, backfill placed behind the walls should be compacted to at least 95 percent relative compaction using light compaction equipment. Where no surface improvements are planned, backfill should be compacted to at least 90 percent. If heavy compaction equipment is used, the walls should be temporarily braced.

10.4 FOUNDATIONS

At-grade retaining walls may be supported on a continuous spread footing at least 12 inches wide and 18 inches below the lowest adjacent grade and designed in accordance with the recommendations presented in the “Foundations” section of this report.

SECTION 11: LIMITATIONS

This report, an instrument of professional service, has been prepared for the sole use of HXH Property, LLC specifically to support the design of the The Caterina Hotel project in Palo Alto, California. The opinions, conclusions, and recommendations presented in this report have been formulated in accordance with accepted geotechnical engineering practices that exist in Northern California at the time this report was prepared. No warranty, expressed or implied, is made or should be inferred.

Recommendations in this report are based upon the soil and groundwater conditions encountered during our subsurface exploration. If variations or unsuitable conditions are encountered during construction, Cornerstone must be contacted to provide supplemental recommendations, as needed.

HXH Property, LLC may have provided Cornerstone with plans, reports and other documents prepared by others. HXH Property, LLC understands that Cornerstone reviewed and relied on the information presented in these documents and cannot be responsible for their accuracy.

Cornerstone prepared this report with the understanding that it is the responsibility of the owner or his representatives to see that the recommendations contained in this report are presented to other members of the design team and incorporated into the project plans and specifications, and that appropriate actions are taken to implement the geotechnical recommendations during construction.

Conclusions and recommendations presented in this report are valid as of the present time for the development as currently planned. Changes in the condition of the property or adjacent properties may occur with the passage of time, whether by natural processes or the acts of other persons. In addition, changes in applicable or appropriate standards may occur through legislation or the broadening of knowledge. Therefore, the conclusions and recommendations presented in this report may be invalidated, wholly or in part, by changes beyond Cornerstone's control. This report should be reviewed by Cornerstone after a period of three (3) years has elapsed from the date of this report. In addition, if the current project design is changed, then Cornerstone must review the proposed changes and provide supplemental recommendations, as needed.

An electronic transmission of this report may also have been issued. While Cornerstone has taken precautions to produce a complete and secure electronic transmission, please check the electronic transmission against the hard copy version for conformity.

Recommendations provided in this report are based on the assumption that Cornerstone will be retained to provide observation and testing services during construction to confirm that conditions are similar to that assumed for design, and to form an opinion as to whether the work has been performed in accordance with the project plans and specifications. If we are not retained for these services, Cornerstone cannot assume any responsibility for any potential claims that may arise during or after construction as a result of misuse or misinterpretation of Cornerstone's report by others. Furthermore, Cornerstone will cease to be the Geotechnical-Engineer-of-Record if we are not retained for these services.

SECTION 12: REFERENCES

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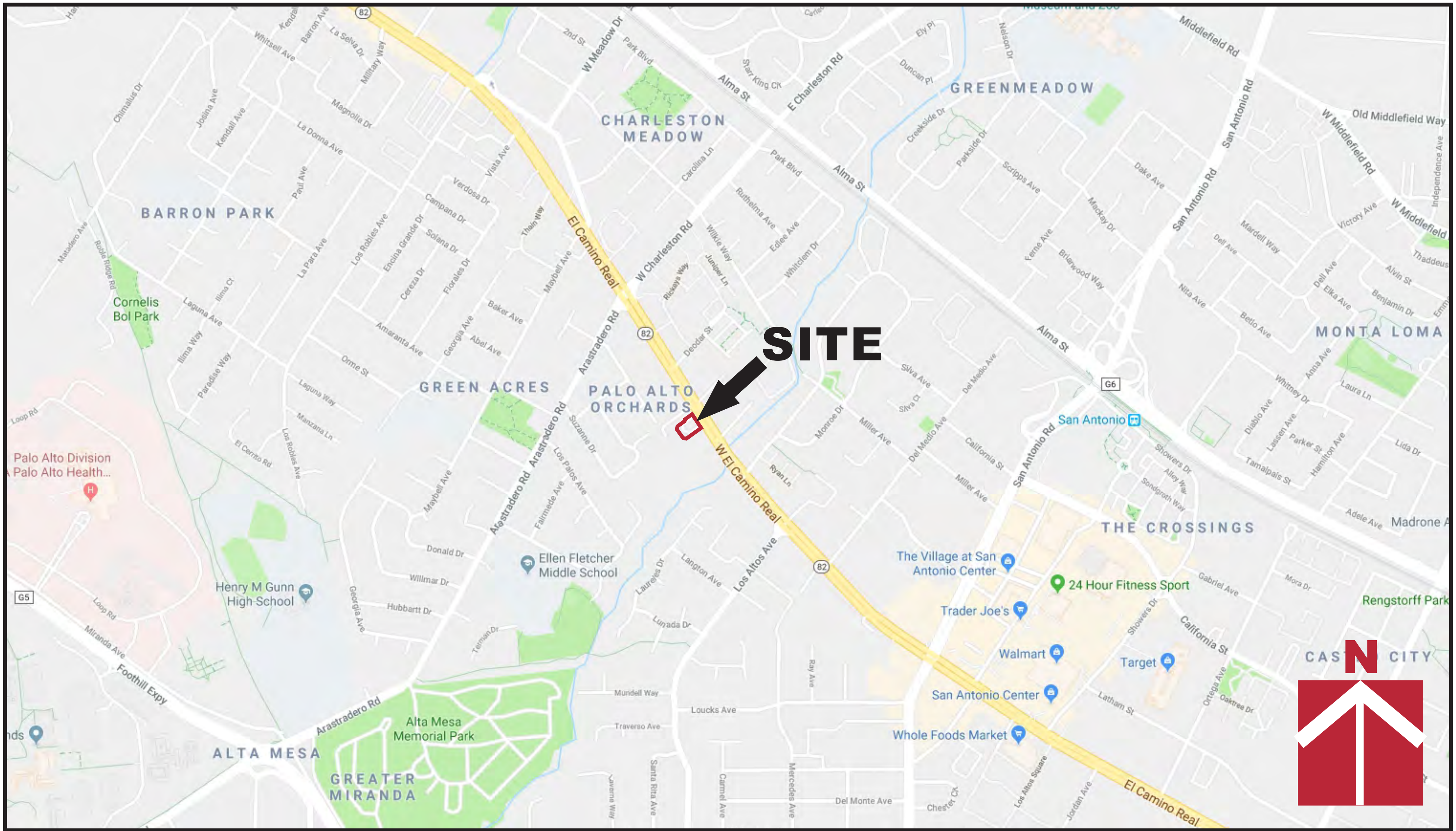

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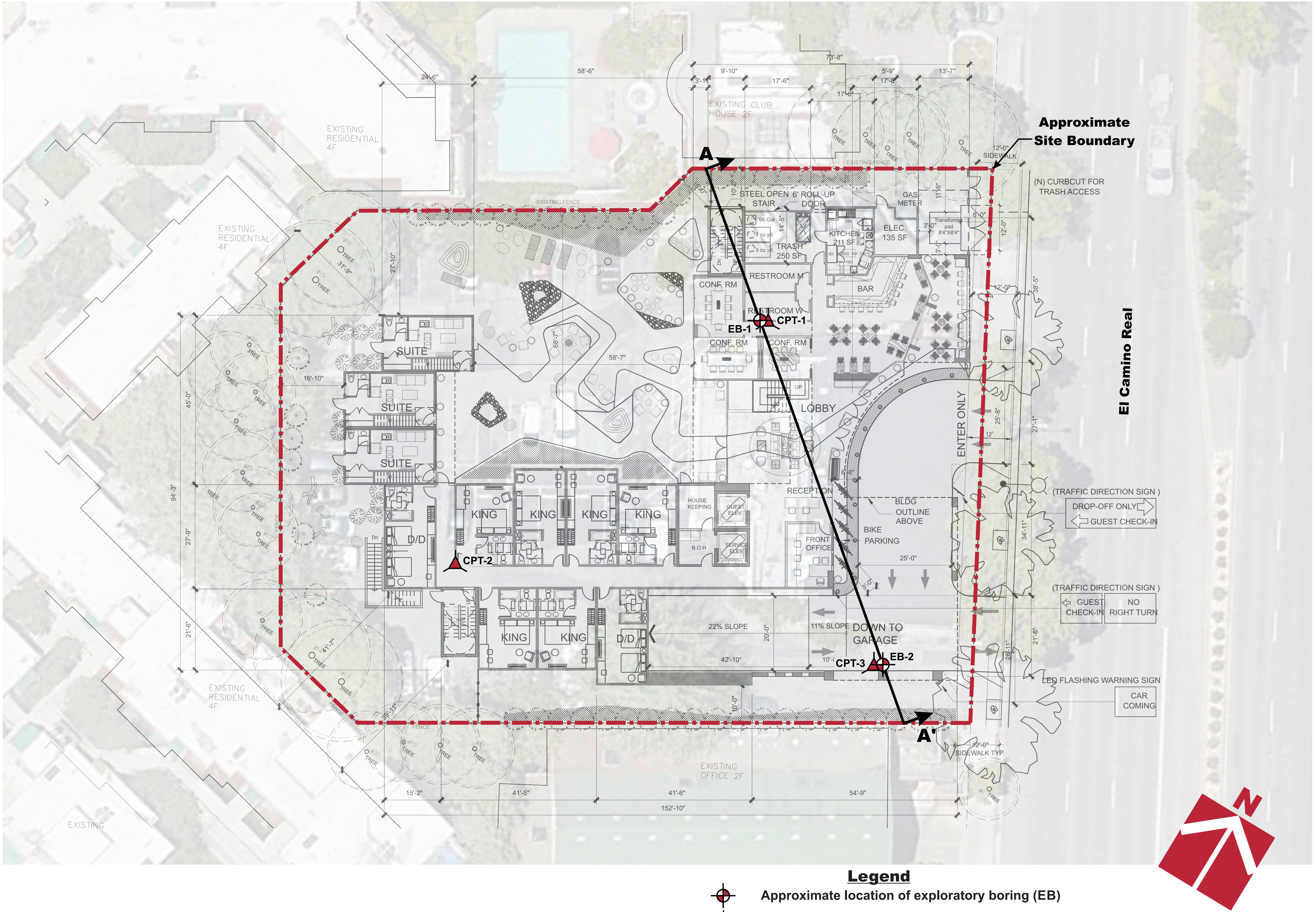
Vicinity Map

The Caterina Hotel
4256 El Camino Real
Palo Alto, CA

Project Number	1059-1-1
Figure Number	Figure 1
Date	September 2018
Drawn By	RRN



Legend

⊕ Approximate location of exploratory boring (EB)

▲ Approximate location of cone penetration test (CPT)

A A' Approximate location of cross section

0 25 50

APPROXIMATE SCALE (FEET)

Base by Google Earth, dated 5/17/2017
Overlay by Studio T-Square, Floor Plan - Site Plan - A-3.0, dated 6/26/2018

Project Number 1059-1-1

Figure Number Figure 2

Date September 2018

Drawn By RRN

Site Plan

The Caterina Hotel
4256 El Camino Real
Palo Alto, CA

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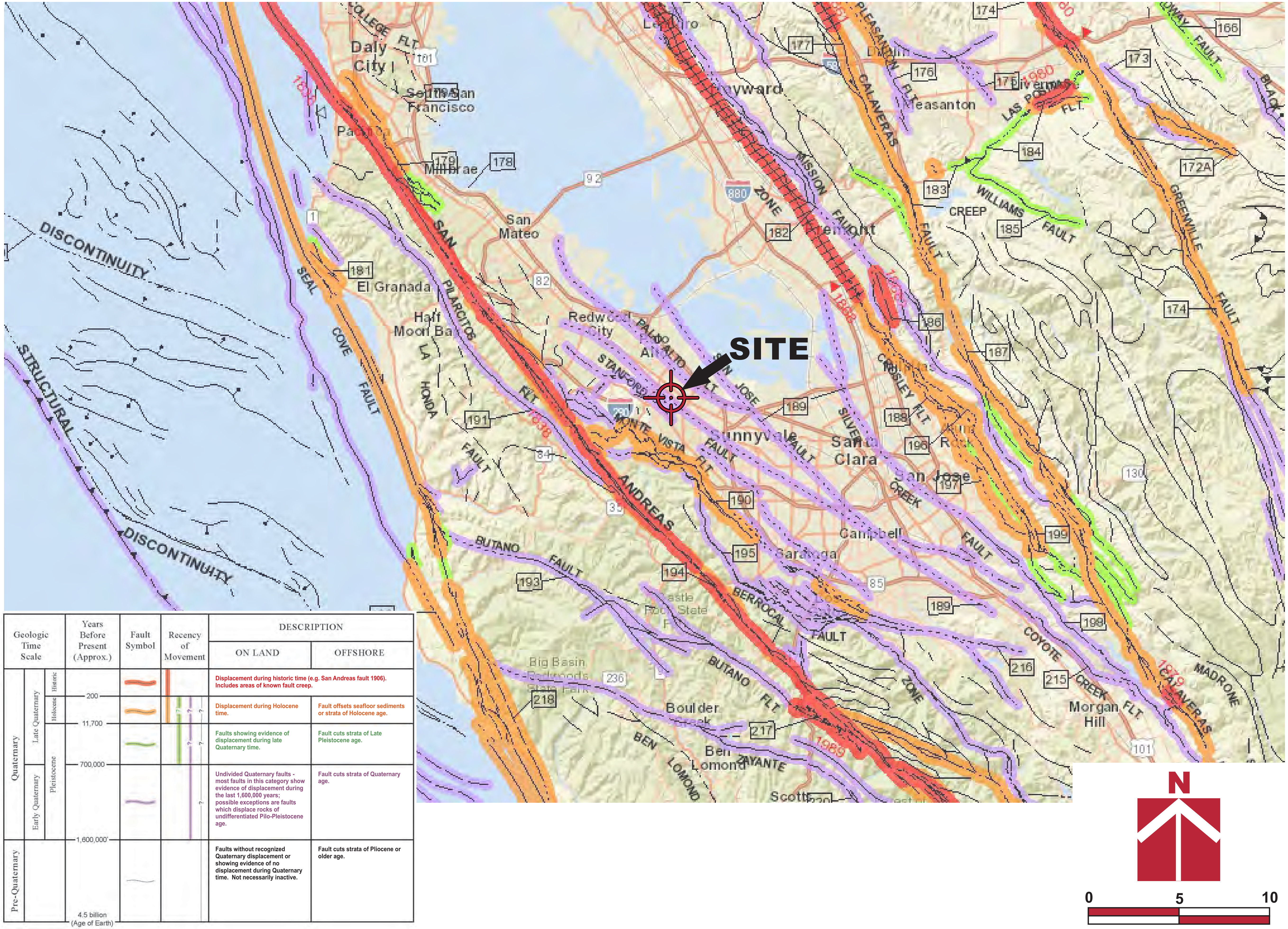

Geologic Time Scale			Years Before Present (Approx.)	Fault Symbol	Recency of Movement	DESCRIPTION	
						ON LAND	OFFSHORE
Quaternary	Late Quaternary	Historic		🟥		Displacement during historic time (e.g. San Andreas fault 1906). Includes areas of known fault creep.	
		Holocene	200	🟧		Displacement during Holocene time.	Fault offsets seafloor sediments or strata of Holocene age.
		Pleistocene	11,700	🟩		Faults showing evidence of displacement during late Quaternary time.	Fault cuts strata of Late Pleistocene age.
	Early Quaternary		700,000	🟪		Undivided Quaternary faults - most faults in this category show evidence of displacement during the last 1,600,000 years; possible exceptions are faults which displace rocks of undifferentiated Pilo-Pleistocene age.	Fault cuts strata of Quaternary age.
Pre-Quaternary			1,600,000	—		Faults without recognized Quaternary displacement or showing evidence of no displacement during Quaternary time. Not necessarily inactive.	Fault cuts strata of Pliocene or older age.
			4.5 billion (Age of Earth)				

Base by California Geological Survey - 2010 Fault Activity Map of California (Jennings and Bryant, 2010)

Project Number
1059-1-1

Figure Number
Figure 3

Drawn By
RRN

Date
September 2018

Regional Fault Map

The Caterina Hotel
4256 El Camino Real
Palo Alto, CA

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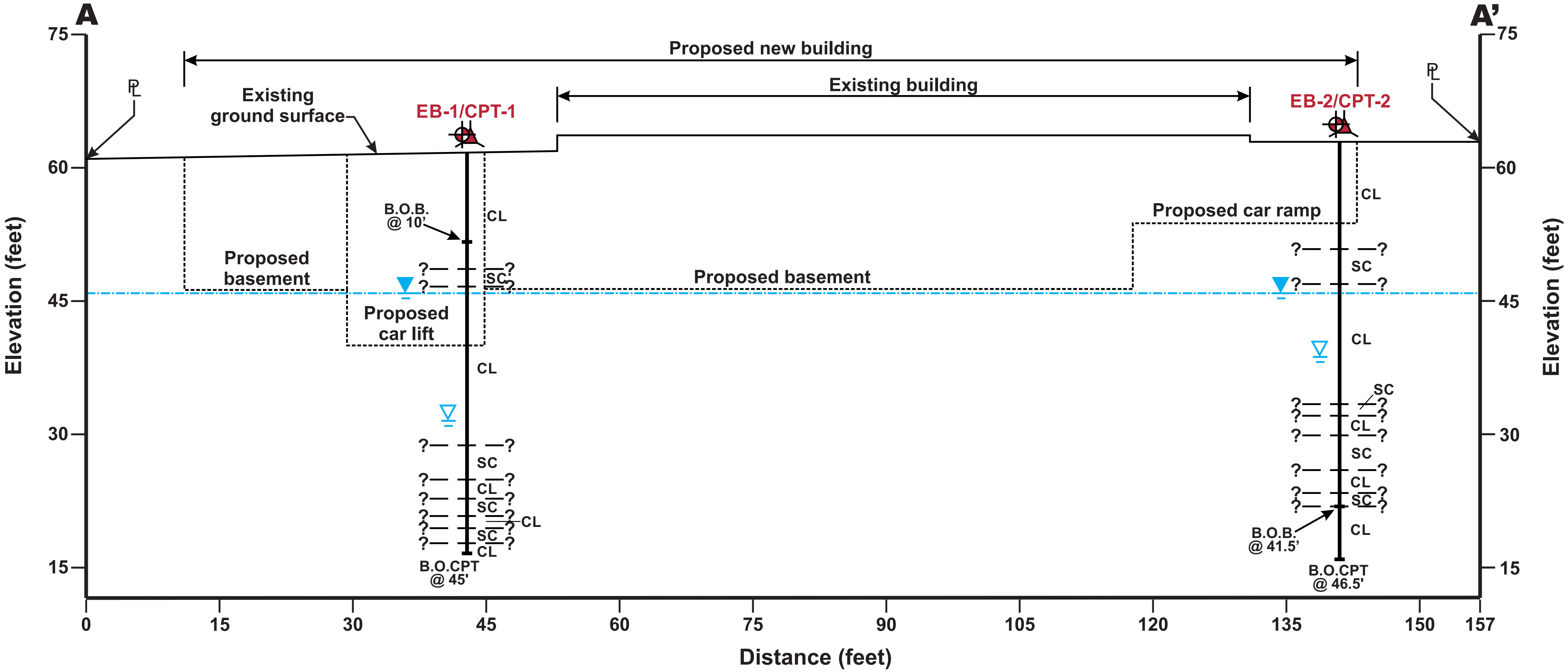

Section A-A'

(View Looking Northeast)
1"=15' H:V

Symbols

CL	Lean Clay with Sands to Sandy Lean Clay
SC	Clayey Sands
⊕	Approximate location of exploratory boring (EB)
▲	Approximate location of cone penetration test (CPT)
▽	Approximate ground water depth at time of drilling; actual depth may vary
▼	Design ground water depth based on historic high ground water maps (CGS, 2006)

Notes:
1) Surficial fills associated with existing pavements, landscaping or utilities are not shown.
2) The subsurface profile is conceptual and is based on limited subsurface data obtained from widely spaced borings. Actual subsurface conditions may vary significantly between borings.
3) See Figure 2 for location of cross section.

Project Number 1059-1-1

Figure Number Figure 4

Date September 2018

Drawn By RRN

Geologic Cross Section A-A'

The Caterina Hotel
4256 El Camino Real
Palo Alto, CA

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FIGURE 5A

CPT NO. 1

PROJECT/CPT DATA

Project Title **The Caterina Hotel**

Project No. **1059-1-1**

Project Manager **NSD**

SEISMIC PARAMETERS

Controlling Fault **San Andreas**

Earthquake Magnitude (Mw) **7.9**

PGA (Amax) **0.615** (g)

SITE SPECIFIC PARAMETERS

Ground Water Depth at Time of Drilling (feet) **24**

Design Water Depth (feet) **17**

Ave. Unit Weight Above GW (pcf) **125**

Ave. Unit Weight Below GW (pcf) **120**

CPT ANALYSIS RESULTS

DRY SAND SETTLEMENT FROM 17 **FEET**

0.03 **(Inches)**

LIQUEFACTION SETTLEMENT FROM 50 **FEET**

0.08 **(Inches)**

TOTAL SEISMIC SETTLEMENT 0.1 **INCHES**

POTENTIAL LATERAL DISPLACEMENT

LDI^2 0.00 **L/H** 70.0

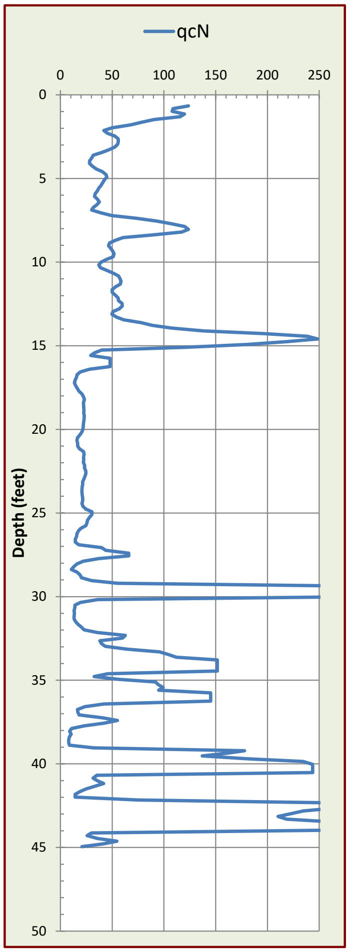
LDI$^1_{\text{Corrected for Distance}}$ 0.00 (4 < L/H < 40)

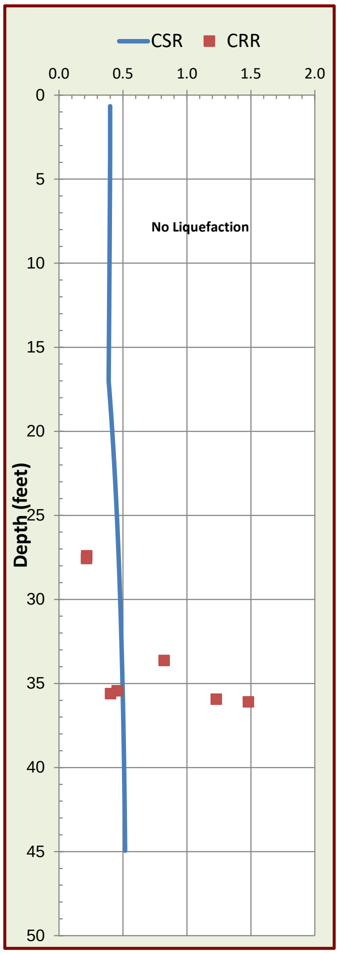
EXPECTED RANGE OF DISPLACEMENT

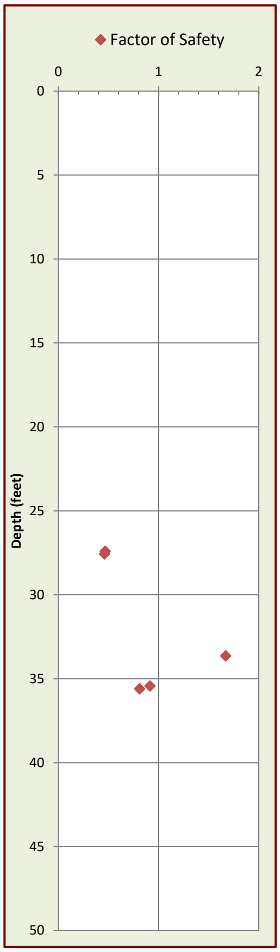
0.0 **to** **0.0** **feet**

[1] Not Valid for L/H Values < 4 and > 40.

[2] LDI Values Only Summed to 2H Below Grade.







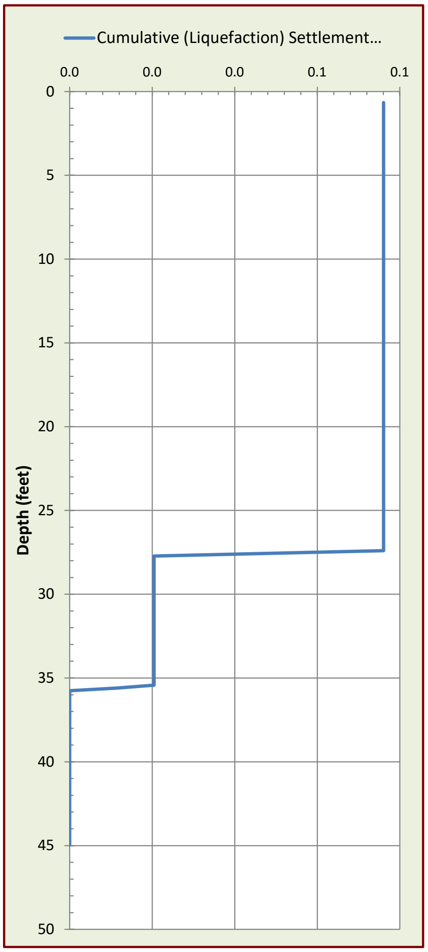


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FIGURE 5B

CPT NO. 2

PROJECT/CPT DATA

Project Title **The Caterina Hotel**

Project No. **1059-1-1**

Project Manager **NSD**

SEISMIC PARAMETERS

Controlling Fault **San Andreas**

Earthquake Magnitude (Mw) **7.9**

PGA (Amax) **0.615** (g)

SITE SPECIFIC PARAMETERS

Ground Water Depth at Time of Drilling (feet) **30.9**

Design Water Depth (feet) **17**

Ave. Unit Weight Above GW (pcf) **125**

Ave. Unit Weight Below GW (pcf) **120**

CPT ANALYSIS RESULTS

DRY SAND SETTLEMENT FROM 17 **FEET**

0.02 **(Inches)**

LIQUEFACTION SETTLEMENT FROM 50 **FEET**

0.27 **(Inches)**

TOTAL SEISMIC SETTLEMENT 0.3 **INCHES**

POTENTIAL LATERAL DISPLACEMENT

LDI[2] 0.00 **L/H** 52.5

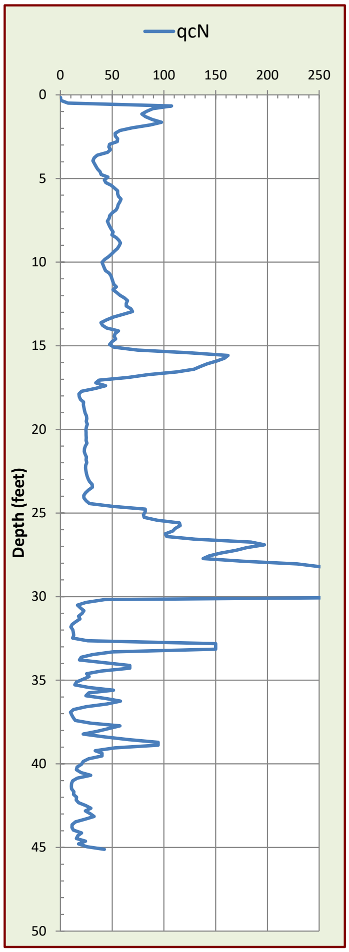
LDI[1]**Corrected for Distance** 0.00 (4 < L/H < 40)

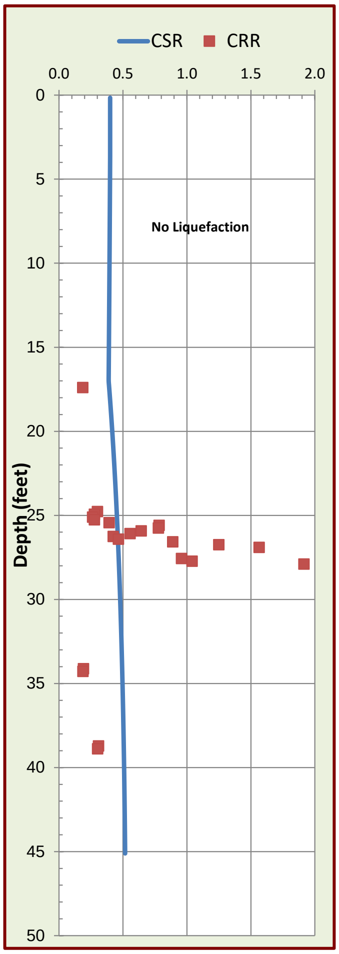
EXPECTED RANGE OF DISPLACEMENT

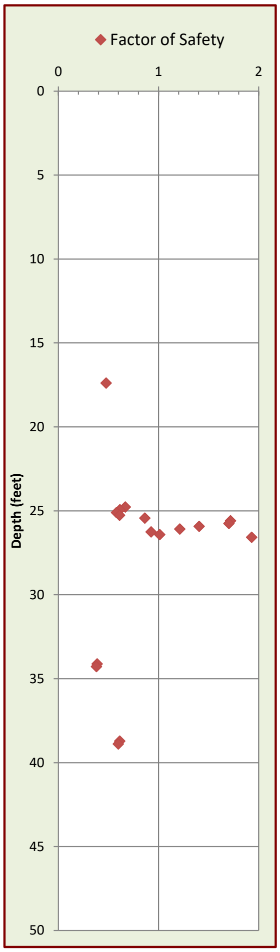
0.0 **to** **0.0** **feet**

[1] Not Valid for L/H Values < 4 and > 40.

[2] LDI Values Only Summed to 2H Below Grade.







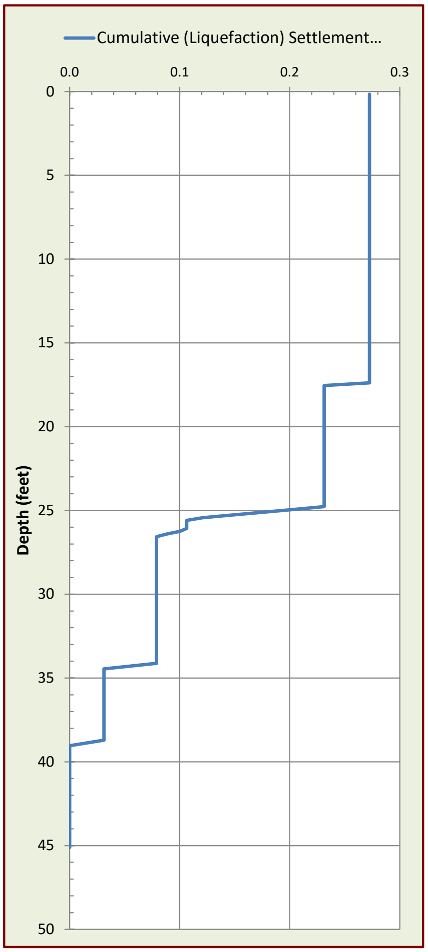


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FIGURE 5C

CPT NO. 3

PROJECT/CPT DATA

Project Title	**The Caterina Hotel**
Project No.	**1059-1-1**
Project Manager	**NSD**

SEISMIC PARAMETERS

Controlling Fault	**San Andreas**	
Earthquake Magnitude (Mw)	**7.9**	
PGA (Amax)	**0.615**	(g)

SITE SPECIFIC PARAMETERS

Ground Water Depth at Time of Drilling (feet)	**20**
Design Water Depth (feet)	**17**
Ave. Unit Weight Above GW (pcf)	**125**
Ave. Unit Weight Below GW (pcf)	**120**

CPT ANALYSIS RESULTS

DRY SAND SETTLEMENT FROM 17 **FEET**

0.08 **(Inches)**

LIQUEFACTION SETTLEMENT FROM 50 **FEET**

0.42 **(Inches)**

TOTAL SEISMIC SETTLEMENT 0.5 **INCHES**

POTENTIAL LATERAL DISPLACEMENT

LDI^2 0.00 **L/H** 50.0

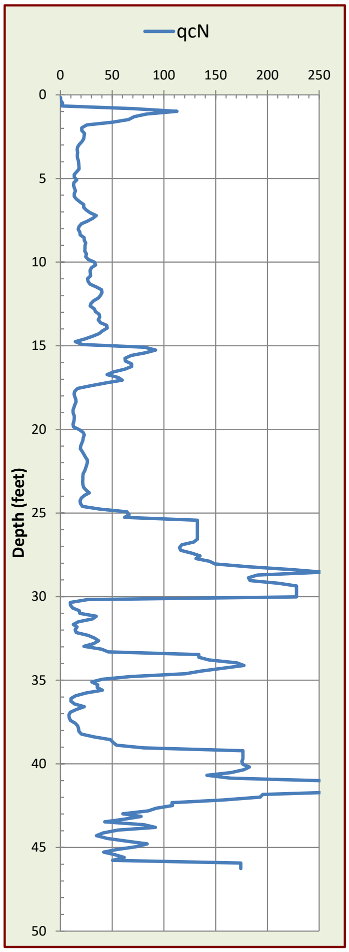
LDI^1$_{\text{Corrected for Distance}}$ 0.00 (4 < L/H < 40)

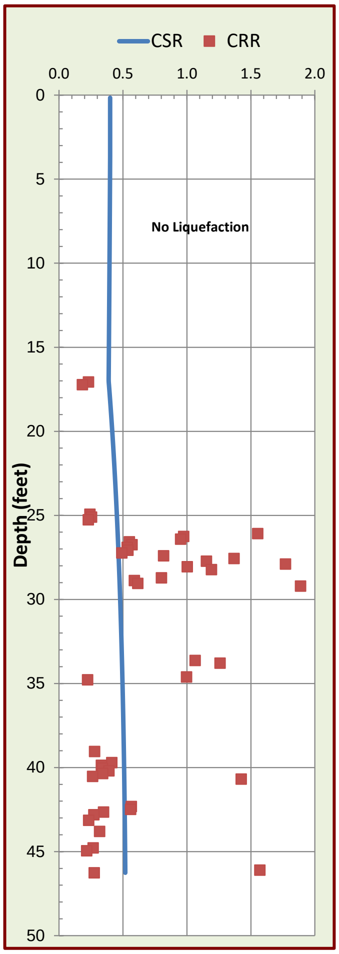
EXPECTED RANGE OF DISPLACEMENT

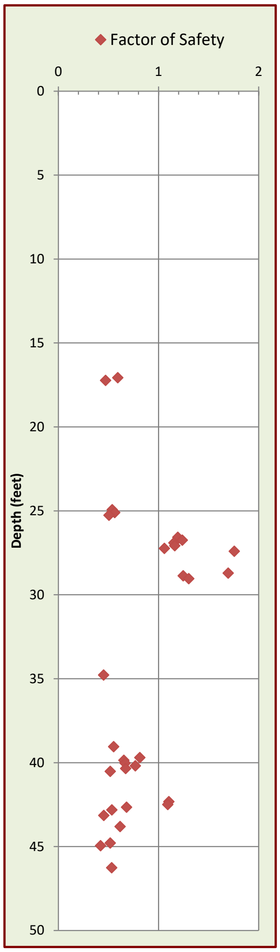
0.0 **to** **0.0** **feet**

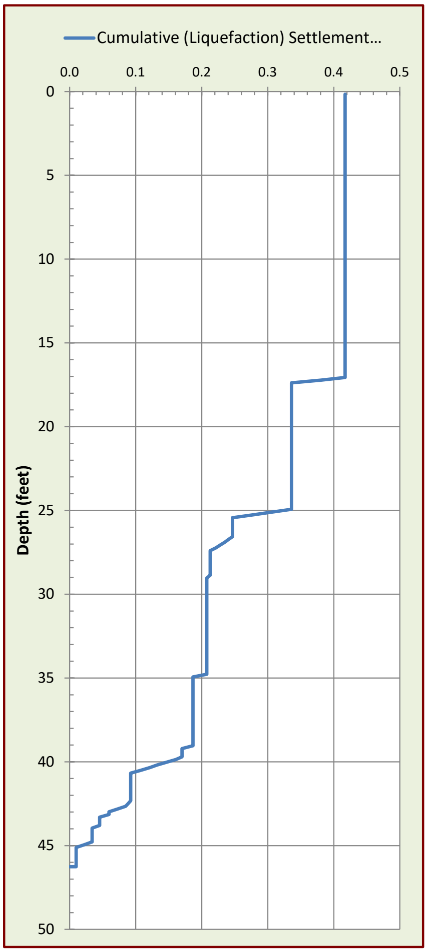
[1] Not Valid for L/H Values < 4 and > 40.

[2] LDI Values Only Summed to 2H Below Grade.









APPENDIX A: FIELD INVESTIGATION

The field investigation consisted of a surface reconnaissance and a subsurface exploration program using truck-mounted, hollow-stem auger drilling equipment and 20-ton truck-mounted Cone Penetration Test equipment. Two 8-inch-diameter exploratory borings were drilled on August 27, 2018 to depths of 10 to 45 feet. Three CPT soundings were also performed in accordance with ASTM D 5778-95 (revised, 2002) on August 20, 2018 to depths of 45 feet each. The approximate locations of exploratory borings and CPTs are shown on the Site Plan, Figure 2. The soils encountered were continuously logged in the field by our representative and described in accordance with the Unified Soil Classification System (ASTM D2488). Boring logs, as well as a key to the classification of the soil, are included as part of this appendix.

Boring and CPT locations were approximated using existing site boundaries and other site features as references. Boring and CPT elevations were based on interpolation of plan contours. The locations and elevations of the borings and CPTs should be considered accurate only to the degree implied by the method used.

Representative soil samples were obtained from the borings at selected depths. All samples were returned to our laboratory for evaluation and appropriate testing. The standard penetration resistance blow counts were obtained by dropping a 140-pound hammer through a 30-inch free fall. The 2-inch O.D. split-spoon sampler was driven 18 inches and the number of blows was recorded for each 6 inches of penetration (ASTM D1586). 2.5-inch I.D. samples were obtained using a Modified California Sampler driven into the soil with the 140-pound hammer previously described. Unless otherwise indicated, the blows per foot recorded on the boring log represent the accumulated number of blows required to drive the last 12 inches. The various samplers are denoted at the appropriate depth on the boring logs.

The CPT involved advancing an instrumented cone-tipped probe into the ground while simultaneously recording the resistance at the cone tip (q_c) and along the friction sleeve (f_s) at approximately 5-centimeter intervals. Based on the tip resistance and tip to sleeve ratio (R_f), the CPT classified the soil behavior type and estimated engineering properties of the soil, such as equivalent Standard Penetration Test (SPT) blow count, internal friction angle within sand layers, and undrained shear strength in silts and clays. A pressure transducer behind the tip of the CPT cone measured pore water pressure (u_2). Graphical logs of the CPT data is included as part of this appendix.

Field tests included an evaluation of the unconfined compressive strength of the soil samples using a pocket penetrometer device. The results of these tests are presented on the individual boring logs at the appropriate sample depths.

Attached boring and CPT logs and related information depict subsurface conditions at the locations indicated and on the date designated on the logs. Subsurface conditions at other locations may differ from conditions occurring at these boring and CPT locations. The passage of time may result in altered subsurface conditions due to environmental changes. In addition, any stratification lines on the logs represent the approximate boundary between soil types and the transition may be gradual.

UNIFIED SOIL CLASSIFICATION (ASTM D-2487-10)

MATERIAL TYPES	CRITERIA FOR ASSIGNING SOIL GROUP NAMES			GROUP SYMBOL	SOIL GROUP NAMES & LEGEND	
COARSE-GRAINED SOILS >50% RETAINED ON NO. 200 SIEVE	GRAVELS >50% OF COARSE FRACTION RETAINED ON NO 4. SIEVE	CLEAN GRAVELS <5% FINES	Cu>4 AND 1<Cc<3	GW	WELL-GRADED GRAVEL	▨
			Cu>4 AND 1>Cc>3	GP	POORLY-GRADED GRAVEL	▨
		GRAVELS WITH FINES >12% FINES	FINES CLASSIFY AS ML OR CL	GM	SILTY GRAVEL	▨
			FINES CLASSIFY AS CL OR CH	GC	CLAYEY GRAVEL	▨
	SANDS >50% OF COARSE FRACTION PASSES ON NO 4. SIEVE	CLEAN SANDS <5% FINES	Cu>6 AND 1<Cc<3	SW	WELL-GRADED SAND	▨
			Cu>6 AND 1>Cc>3	SP	POORLY-GRADED SAND	▨
		SANDS AND FINES >12% FINES	FINES CLASSIFY AS ML OR CL	SM	SILTY SAND	▨
			FINES CLASSIFY AS CL OR CH	SC	CLAYEY SAND	▨
FINE-GRAINED SOILS >50% PASSES NO. 200 SIEVE	SILTS AND CLAYS LIQUID LIMIT<50	INORGANIC	PI>7 AND PLOTS>"A" LINE	CL	LEAN CLAY	▨
			PI>4 AND PLOTS<"A" LINE	ML	SILT	▨
		ORGANIC	LL (oven dried)/LL (not dried)<0.75	OL	ORGANIC CLAY OR SILT	▨
	SILTS AND CLAYS LIQUID LIMIT>50	INORGANIC	PI PLOTS >"A" LINE	CH	FAT CLAY	▨
			PI PLOTS <"A" LINE	MH	ELASTIC SILT	▨
		ORGANIC	LL (oven dried)/LL (not dried)<0.75	OH	ORGANIC CLAY OR SILT	▨
HIGHLY ORGANIC SOILS	PRIMARILY ORGANIC MATTER, DARK IN COLOR, AND ORGANIC ODOR			PT	PEAT	▨

OTHER MATERIAL SYMBOLS

▨	Poorly-Graded Sand with Clay	▨	Sand
▨	Clayey Sand	▨	Silt
▨	Sandy Silt	▨	Well Graded Gravelly Sand
▨	Artificial/Undocumented Fill	▨	Gravelly Silt
▨	Poorly-Graded Gravelly Sand	■	Asphalt
▨	Topsoil	▨	Boulders and Cobble
▨	Well-Graded Gravel with Clay		
▨	Well-Graded Gravel with Silt		

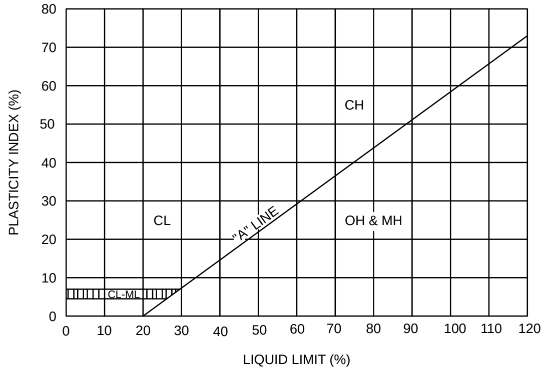
SAMPLER TYPES

☒	SPT	■	Shelby Tube
⧗	Modified California (2.5" I.D.)	○	No Recovery
▯	Rock Core	✋	Grab Sample

ADDITIONAL TESTS

CA	-	CHEMICAL ANALYSIS (CORROSIVITY)	PI	-	PLASTICITY INDEX
CD	-	CONSOLIDATED DRAINED TRIAXIAL	SW		SWELL TEST
CN	-	CONSOLIDATION	TC	-	CYCLIC TRIAXIAL
CU	-	CONSOLIDATED UNDRAINED TRIAXIAL	TV	-	TORVANE SHEAR
DS	-	DIRECT SHEAR	UC	-	UNCONFINED COMPRESSION
PP	-	POCKET PENETROMETER (TSF)	(1.5)	-	(WITH SHEAR STRENGTH IN KSF)
(3.0)	-	(WITH SHEAR STRENGTH IN KSF)		-	
RV	-	R-VALUE	UU	-	UNCONSOLIDATED UNDRAINED TRIAXIAL
SA	-	SIEVE ANALYSIS: % PASSING #200 SIEVE			
▼	-	WATER LEVEL			

PLASTICITY CHART



PENETRATION RESISTANCE (RECORDED AS BLOWS / FOOT)				
SAND & GRAVEL		SILT & CLAY		
RELATIVE DENSITY	BLOWS/FOOT*	CONSISTENCY	BLOWS/FOOT*	STRENGTH** (KSF)
VERY LOOSE	0 - 4	VERY SOFT	0 - 2	0 - 0.25
LOOSE	4 - 10	SOFT	2 - 4	0.25 - 0.5
MEDIUM DENSE	10 - 30	MEDIUM STIFF	4 - 8	0.5-1.0
DENSE	30 - 50	STIFF	8 - 15	1.0 - 2.0
VERY DENSE	OVER 50	VERY STIFF	15 - 30	2.0 - 4.0
		HARD	OVER 30	OVER 4.0

* NUMBER OF BLOWS OF 140 LB HAMMER FALLING 30 INCHES TO DRIVE A 2 INCH O.D. (1-3/8 INCH I.D.) SPLIT-BARREL SAMPLER THE LAST 12 INCHES OF AN 18-INCH DRIVE (ASTM-1586 STANDARD PENETRATION TEST).

** UNDRAINED SHEAR STRENGTH IN KIPS/SQ. FT. AS DETERMINED BY LABORATORY TESTING OR APPROXIMATED BY THE STANDARD PENETRATION TEST, POCKET PENETROMETER, TORVANE, OR VISUAL OBSERVATION.

CORNERSTONE
EARTH GROUP

LEGEND TO SOIL DESCRIPTIONS

Figure Number
A-1

BORING NUMBER EB-1

PAGE 1 OF 1

CORNERSTONE EARTH GROUP

PROJECT NAME The Caterina Hotel

PROJECT NUMBER 1059-1-1

PROJECT LOCATION 4256 El Camino Real, Palo Alto, CA

DATE STARTED 8/27/18 **DATE COMPLETED** 8/27/18

GROUND ELEVATION 62 FT +/- **BORING DEPTH** 10 ft.

DRILLING CONTRACTOR Exploration Geoservices, Inc.

LATITUDE **LONGITUDE**

DRILLING METHOD Mobile B-53, 8 inch Hollow-Stem Auger

GROUND WATER LEVELS:

LOGGED BY RPM

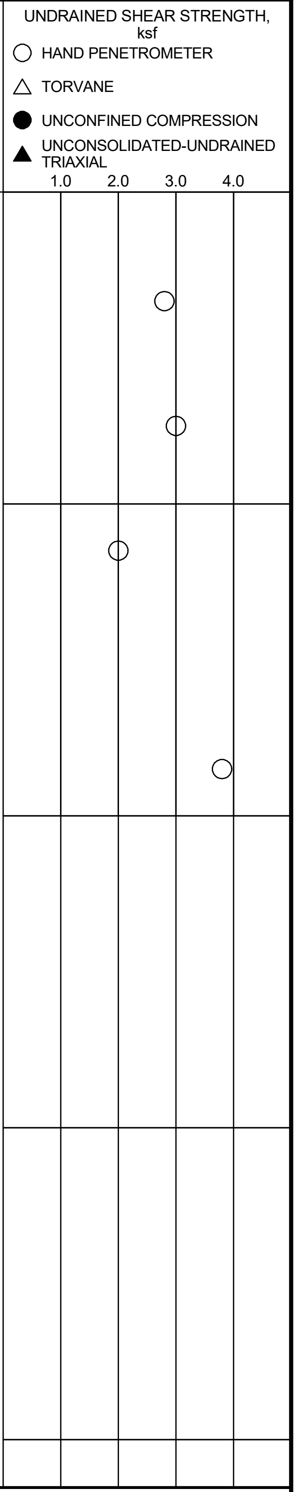
▽ **AT TIME OF DRILLING** Not Encountered

NOTES

▼ **AT END OF DRILLING** Not Encountered

This log is a part of a report by Cornerstone Earth Group, and should not be used as a stand-alone document. This description applies only to the location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with time. The description presented is a simplification of actual conditions encountered. Transitions between soil types may be gradual.

ELEVATION (ft)	DEPTH (ft)	SYMBOL	DESCRIPTION	N-Value (uncorrected) blows per foot	SAMPLES TYPE AND NUMBER	DRY UNIT WEIGHT PCF	NATURAL MOISTURE CONTENT	PLASTICITY INDEX, %	PERCENT PASSING No. 200 SIEVE
62.0	0		3 inches asphalt concrete over 3 inches aggregate base						
61.8									
61.5		▨	**Lean Clay with Sand (CL)** very stiff, moist, dark brown, fine to coarse sand, some fine subrounded gravel, moderate plasticity						
				9	MC-1B	106	13		
59.0		▨	**Sandy Lean Clay (CL)** very stiff, moist, brown, fine to coarse sand, some fine to coarse subangular to subrounded gravel, low to moderate plasticity						
				8	MC-2B	106	17		
	5			10	MC-3B	111	12		
				13	MC-4B	112	16		
52.0	10		Bottom of Boring at 10.0 feet.						
	15								
	20								



BORING NUMBER EB-2

PAGE 1 OF 2

CORNERSTONE
EARTH GROUP

PROJECT NAME The Caterina Hotel

PROJECT NUMBER 1059-1-1

PROJECT LOCATION 4256 El Camino Real, Palo Alto, CA

DATE STARTED 8/27/18 **DATE COMPLETED** 8/27/18

GROUND ELEVATION 63.1 FT +/- **BORING DEPTH** 41.5 ft.

DRILLING CONTRACTOR Exploration Geoservices, Inc.

LATITUDE **LONGITUDE**

DRILLING METHOD Mobile B-53, 8 inch Hollow-Stem Auger

GROUND WATER LEVELS:

LOGGED BY RPM

▽ **AT TIME OF DRILLING** 26 ft.

NOTES

▼ **AT END OF DRILLING** 24 ft.

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ELEVATION (ft)	DEPTH (ft)	DESCRIPTION	N-Value (uncorrected) blows per foot	SAMPLES TYPE AND NUMBER	DRY UNIT WEIGHT PCF	NATURAL MOISTURE CONTENT	PLASTICITY INDEX, %	PERCENT PASSING No. 200 SIEVE	UNDRAINED SHEAR STRENGTH, ksf ○ HAND PENETROMETER △ TORVANE ● UNCONFINED COMPRESSION ▲ UNCONSOLIDATED-UNDRAINED TRIAXIAL 1.0 2.0 3.0 4.0
63.1	0	2 inches asphalt concrete over 6 inches aggregate base							
62.9									
62.4		**Lean Clay with Sand (CL)** hard, moist, dark brown to brown, fine to coarse sand, some fine subrounded gravel, moderate plasticity Liquid Limit = 45, Plastic Limit = 19	30	MC-1B	100	13	26		>4.5 ○
60.6		**Sandy Lean Clay (CL)** hard, moist, brown, fine to coarse sand, some fine to coarse subangular to subrounded gravel, low to moderate plasticity	14	MC-2B	94	12			>4.5 ○
	5		15	MC-3B	107	9			>4.5 ○
			17	MC-4B	105	13			>4.5 ○
	10								
51.1		**Clayey Sand (SC)** medium dense, moist, brown, fine to coarse sand, some fine to coarse subangular to subrounded gravel							
			28	MC-5B	83	5			
	15		17	SPT-6B		16			
47.1		**Sandy Lean Clay (CL)** very stiff, moist, brown, fine to coarse sand, some fine to coarse subangular to subrounded gravel, low to moderate plasticity							
45.6		**Lean Clay with Sand (CL)** very stiff, moist, brown, fine to medium sand, moderate plasticity							
			30	MC-7B	94	27			○
43.1	20								

Continued Next Page

CORNERSTONE
EARTH GROUP

BORING NUMBER EB-2

PAGE 2 OF 2

PROJECT NAME The Caterina Hotel

PROJECT NUMBER 1059-1-1

PROJECT LOCATION 4256 El Camino Real, Palo Alto, CA

This log is a part of a report by Cornerstone Earth Group, and should not be used as a stand-alone document. This description applies only to the location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with time. The description presented is a simplification of actual conditions encountered. Transitions between soil types may be gradual.

UNDRAINED SHEAR STRENGTH, ksf
○ HAND PENETROMETER
△ TORVANE
● UNCONFINED COMPRESSION
▲ UNCONSOLIDATED-UNDRAINED TRIAXIAL
1.0 2.0 3.0 4.0

ELEVATION (ft)	DEPTH (ft)	DESCRIPTION	N-Value (uncorrected) blows per foot	SAMPLES TYPE AND NUMBER	DRY UNIT WEIGHT PCF	NATURAL MOISTURE CONTENT	PLASTICITY INDEX, %	PERCENT PASSING No. 200 SIEVE	UNDRAINED SHEAR STRENGTH, ksf
43.1	20	**Lean Clay with Sand (CL)** very stiff, moist, brown, fine to medium sand, moderate plasticity							
40.6		**Sandy Lean Clay (CL)** hard, moist, brown, fine to coarse sand, some fine to coarse subangular to subrounded gravel, low to moderate plasticity	26	MC-8B	106	21			○
	25								
			41	MC-9B	123	14			
33.6	30	**Clayey Sand (SC)** medium dense, moist, brown, fine to coarse sand, some fine to coarse subangular to subrounded gravel	11	SPT-10		30			○
32.6		**Lean Clay with Sand (CL)** stiff, moist, brown, fine to coarse sand, some fine subangular to subrounded gravel, moderate plasticity							
30.1		**Clayey Sand with Gravel (SC)** dense, moist, brown with reddish brown mottles, fine to coarse sand, fine to coarse subangular to subrounded gravel	72	MC-11B	113	19		34	
	35								
26.1		**Lean Clay with Sand (CL)** stiff, moist, gray, fine to coarse sand, some fine subangular to subrounded gravel, moderate plasticity	40	MC-12B	115	19			○
23.6	40	**Clayey Sand with Gravel (SC)** medium dense, moist, brown, fine to coarse sand, fine to coarse subangular to subrounded gravel	44	SPT-13B		25			○
22.1		**Lean Clay with Sand (CL)** stiff, moist, brown, fine to coarse sand, moderate plasticity							
21.6		Bottom of Boring at 41.5 feet.							

Cornerstone Earth Group

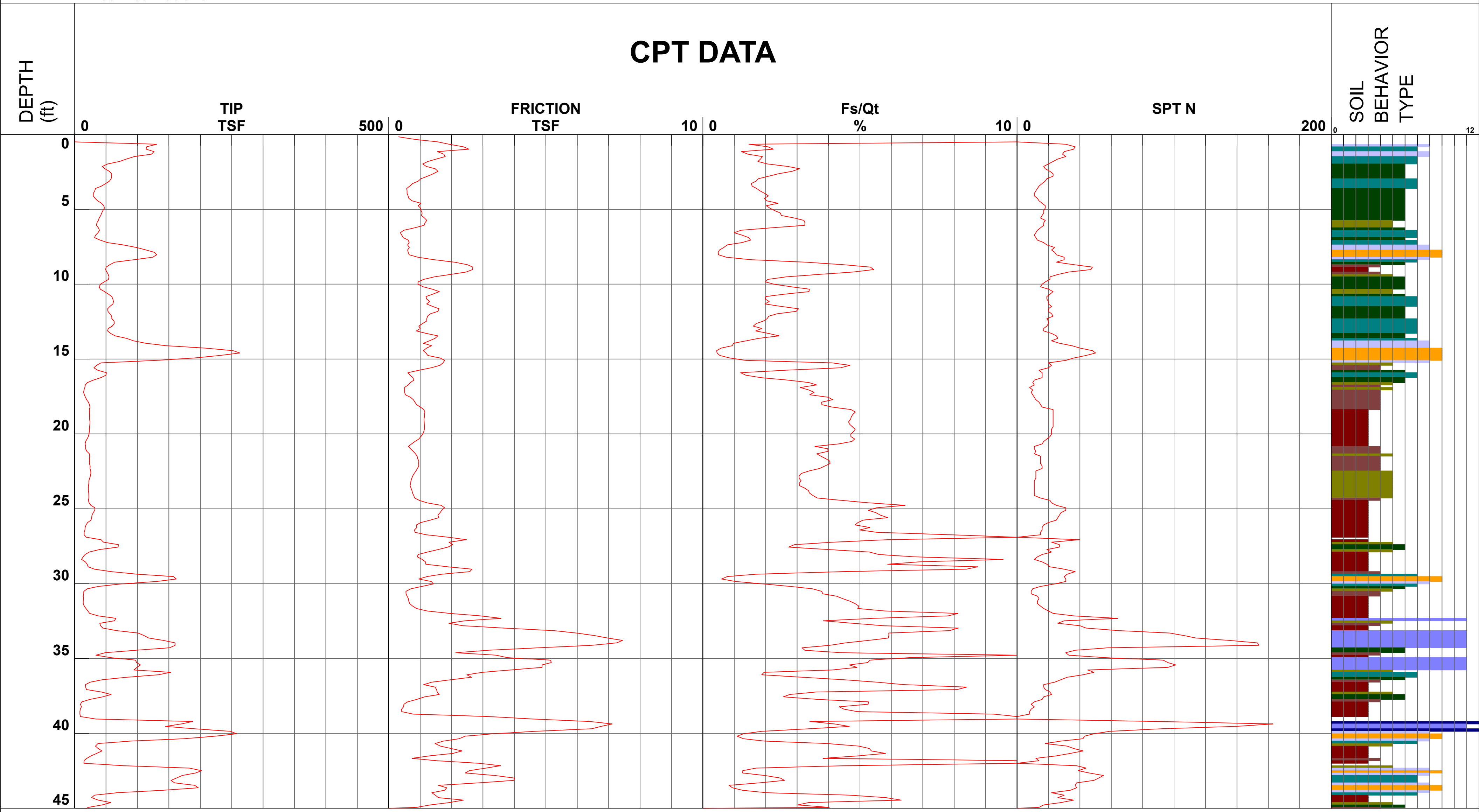
Project Caterina Hotel
Job Number 1059-1-1
Hole Number CPT-01
EST GW Depth During Test 30.90 ft

Operator RB-JM
Cone Number DDG1418
Date and Time 8/13/2018 2:13:14 PM

Filename SDF(092).cpt
GPS
Maximum Depth 45.44 ft

Net Area Ratio .8

CPT DATA



⬜ 1 - sensitive fine grained
⬛ 2 - organic material
🟥 3 - clay
🟫 4 - silty clay to clay
🟨 5 - clayey silt to silty clay
🟩 6 - sandy silt to clayey silt
🟦 7 - silty sand to sandy silt
🟪 8 - sand to silty sand
🟧 9 - sand
🟥 10 - gravelly sand to sand
🟪 11 - very stiff fine grained (*)
🟦 12 - sand to clayey sand (*)

Cone Size 10cm squared

S*Soil behavior type and SPT based on data from UBC-1983

Cornerstone Earth Group

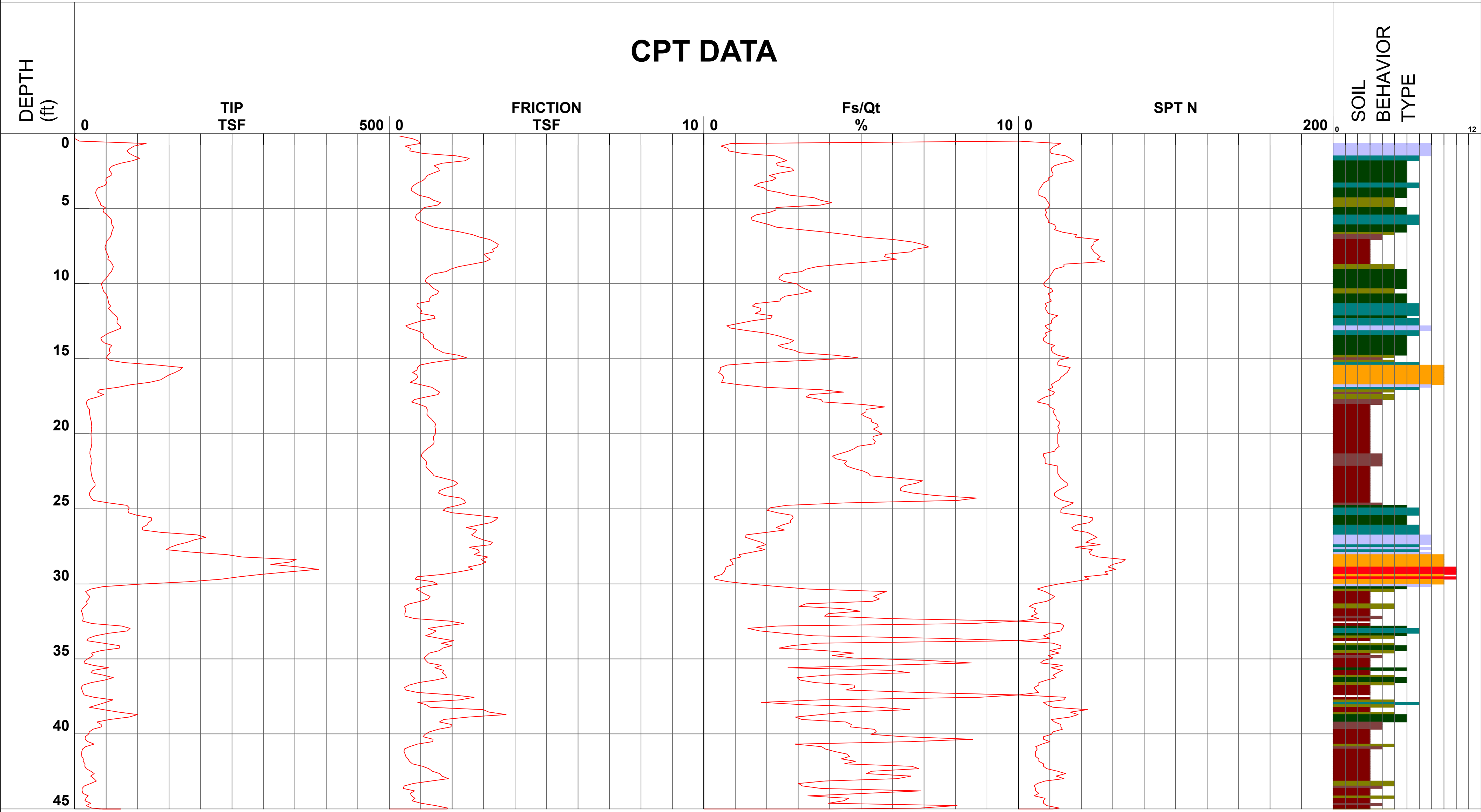
Middle Earth Geo Testing Inc.

Project Caterina Hotel
Job Number 1059-1-1
Hole Number CPT-02
EST GW Depth During Test 27.40 ft

Operator RB-JM
Cone Number DDG1418
Date and Time 8/13/2018 1:31:46 PM

Filename SDF(091).cpt
GPS
Maximum Depth 45.60 ft

Net Area Ratio .8



■ 1 - sensitive fine grained
■ 2 - organic material
■ 3 - clay
■ 4 - silty clay to clay
■ 5 - clayey silt to silty clay
■ 6 - sandy silt to clayey silt
■ 7 - silty sand to sandy silt
■ 8 - sand to silty sand
■ 9 - sand
■ 10 - gravelly sand to sand
■ 11 - very stiff fine grained (*)
■ 12 - sand to clayey sand (*)

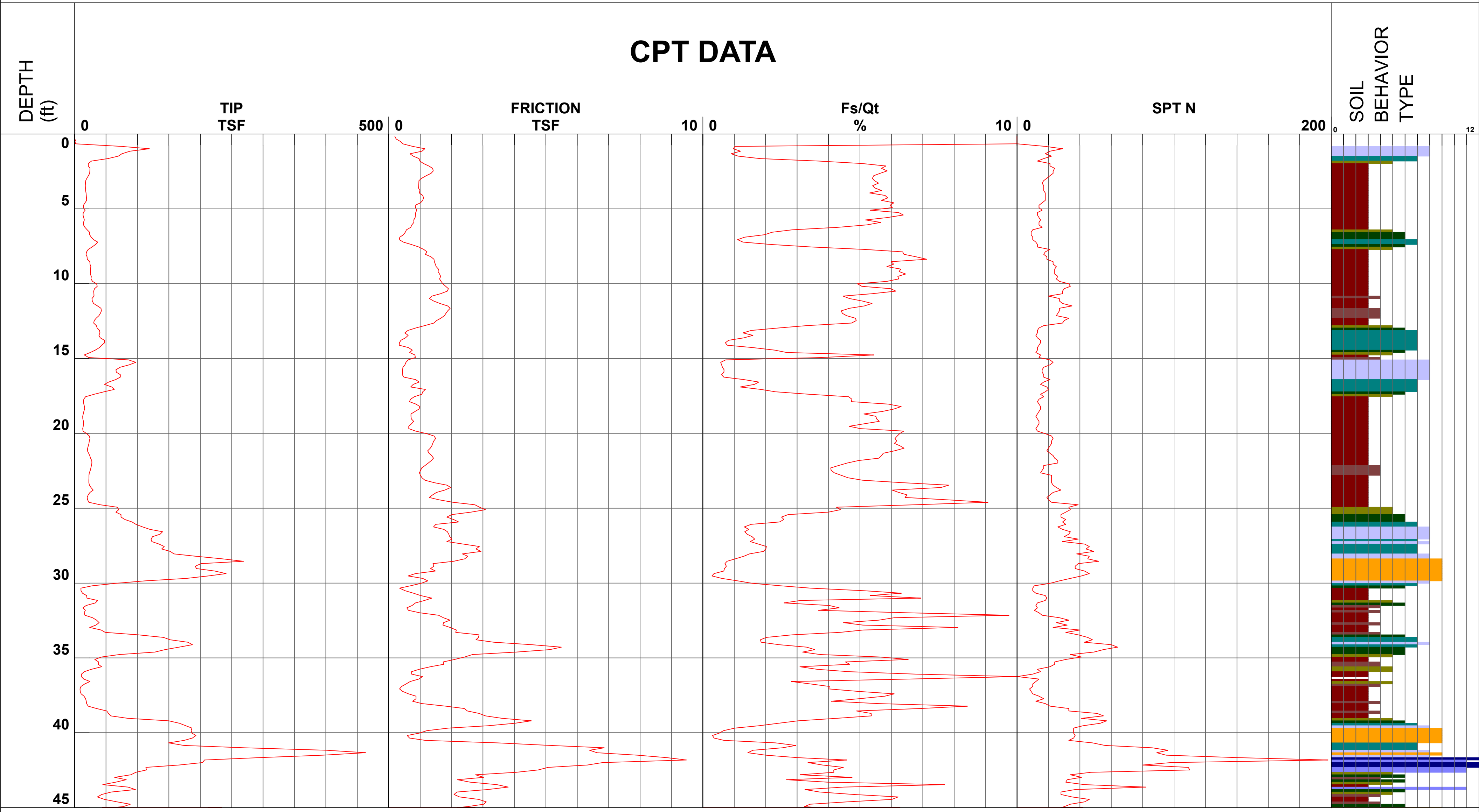
Cone Size 10cm squared

S*Soil behavior type and SPT based on data from UBC-1983

Cornerstone Earth Group

Project: Caterina Hotel
Job Number: 1059-1-1
Hole Number: CPT-03
EST GW Depth During Test: 26.90 ft
Operator: RB-JM
Cone Number: DDG1418
Date and Time: 8/13/2018 12:41:37 PM
Filename: SDF(090).cpt
GPS:
Maximum Depth: 46.75 ft

Net Area Ratio .8



■ 1 - sensitive fine grained
■ 2 - organic material
■ 3 - clay
■ 4 - silty clay to clay
■ 5 - clayey silt to silty clay
■ 6 - sandy silt to clayey silt
■ 7 - silty sand to sandy silt
■ 8 - sand to silty sand
■ 9 - sand
■ 10 - gravelly sand to sand
■ 11 - very stiff fine grained (*)
■ 12 - sand to clayey sand (*)

Cone Size 10cm squared

S*Soil behavior type and SPT based on data from UBC-1983

APPENDIX B: LABORATORY TEST PROGRAM

The laboratory testing program was performed to evaluate the physical and mechanical properties of the soils retrieved from the site to aid in verifying soil classification.

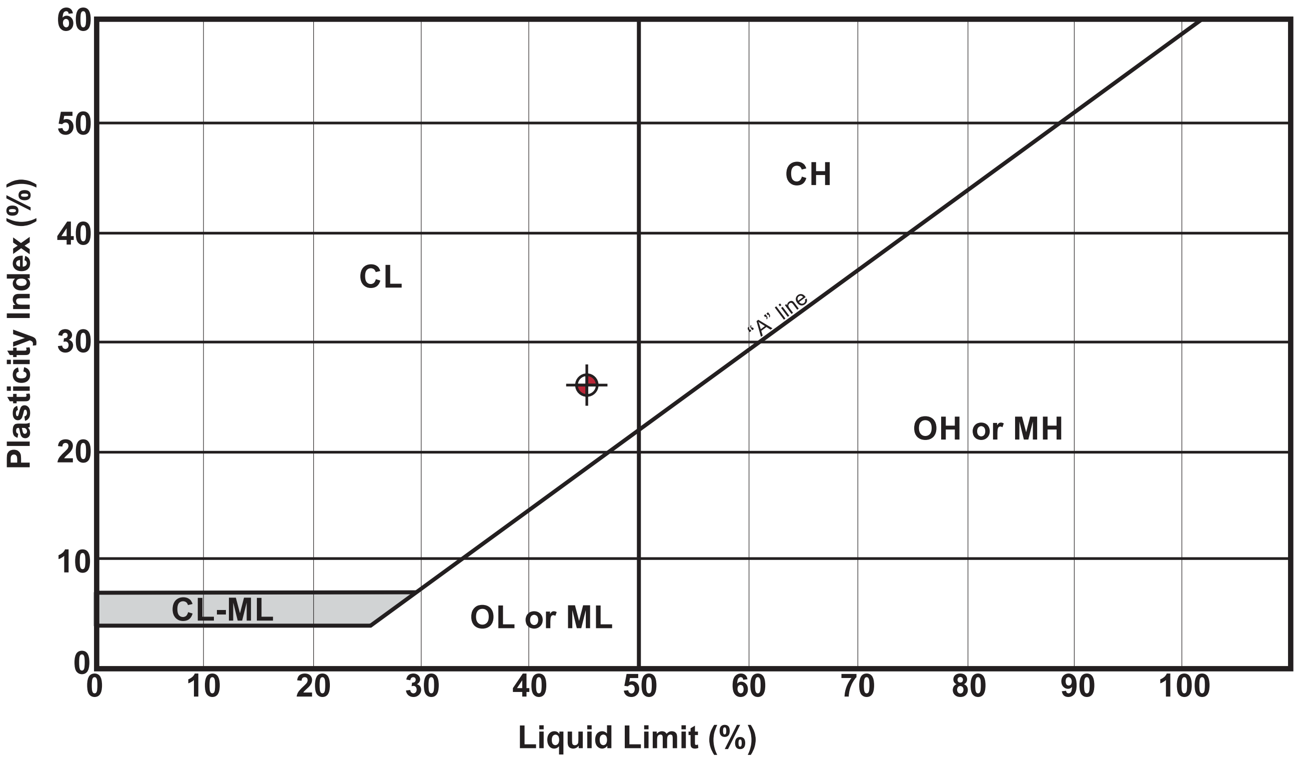
Moisture Content: The natural water content was determined (ASTM D2216) on 17 samples of the materials recovered from the borings. These water contents are recorded on the boring logs at the appropriate sample depths.

Dry Densities: In place dry density determinations (ASTM D2937) were performed on 14 samples to measure the unit weight of the subsurface soils. Results of these tests are shown on the boring logs at the appropriate sample depths.

Washed Sieve Analysis: The percent soil fraction passing the No. 200 sieve (ASTM D1140) was determined on a sample of the subsurface soils to aid in the classification of these soils. Results of this test are shown on the boring logs at the appropriate sample depths.

Plasticity Index: One Plasticity Index determination (ASTM D4318) was performed on a sample of the subsurface soil to measure the range of water contents over which this material exhibits plasticity. The Plasticity Index was used to classify the soil in accordance with the Unified Soil Classification System and to evaluate the soil expansion potential. Results of this test are shown on the boring log at the appropriate sample depth.

Plasticity Index (ASTM D4318) Testing Summary



Symbol	Boring No.	Depth (ft)	Natural Water Content (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index	Passing No. 200 (%)	Group Name (USCS - ASTM D2487)
⌖	EB-2	1.5	13	45	19	26	—	Lean Clay with Sand (CL)

CORNERSTONE
EARTH GROUP

Plasticity Index Testing Summary

The Caterina Hotel
4256 El Camino Real
Palo Alto, CA

Project Number
1059-1-1

Figure Number
Figure B1

Date
September 2018

Drawn By
FLL

APPENDIX C: LIQUEFACTION ANALYSES CALCULATIONS

CORNERSTONE EARTH GROUP

CPT No. 1

PGA (A_{max}) 0.62

Total Settlement: 0.08 (Inches)

Depth (ft)	q_c (tsf)	f_s (tsf)	σ_{vc} (psf)	Insitu σ'_{vc} (psf)	Q	F (%)	I_c	Layer "Plastic" PI > 7	Flag Soil Type	Fines (%)	q_{cN} near interfaces (soft layer)	Thin Layer Factor (K_H)	Interpreted q_{cN}	C_N	q_{c1N}	$q_{c1N\text{-}CS}$	Stress Reduction Coeff, r_d	CSR	K_σ for Sand	$CRR_{M=7.5,\ \sigma'vc = 1\ atm}$	CRR	Factor of Safety (CRR/CSR)	Vertical Strain ε_v	Settlement (Inches)
0.660	130.890	1.919	82.5	82.5	626.347	1.467	1.54		Unsaturated	0.0			123.71	1.70	210.31	210.31	1.00	0.400	1.100	n.a.	n.a.	n.a.	0.00	0.00
0.820	115.080	2.378	102.5	102.5	493.988	2.067	1.72		Unsaturated	0.6			108.77	1.70	184.91	184.91	1.00	0.400	1.100	n.a.	n.a.	n.a.	0.00	0.00
0.980	114.230	2.554	122.5	122.5	448.489	2.237	1.77		Unsaturated	4.6			107.97	1.70	183.55	183.65	1.00	0.400	1.100	n.a.	n.a.	n.a.	0.00	0.00
1.150	126.850	1.555	143.8	143.8	459.740	1.227	1.54		Unsaturated	0.0			119.90	1.70	203.82	203.82	1.00	0.400	1.100	n.a.	n.a.	n.a.	0.00	0.00
1.310	122.510	1.753	163.8	163.8	415.971	1.432	1.62		Unsaturated	0.0			115.79	1.70	196.85	196.85	1.00	0.400	1.100	n.a.	n.a.	n.a.	0.00	0.00
1.480	95.610	1.801	185.0	185.0	305.330	1.885	1.79		Unsaturated	6.3			90.37	1.70	153.63	154.58	1.00	0.400	1.100	n.a.	n.a.	n.a.	0.00	0.00
1.640	82.990	1.519	205.0	205.0	251.701	1.832	1.83		Unsaturated	9.3			78.44	1.70	133.35	139.82	1.00	0.400	1.100	n.a.	n.a.	n.a.	0.00	0.00
1.800	71.510	1.248	225.0	225.0	206.949	1.747	1.86		Unsaturated	12.0			67.59	1.70	114.90	129.37	1.00	0.400	1.100	n.a.	n.a.	n.a.	0.00	0.00
1.970	52.740	1.081	246.3	246.3	145.784	2.055	2.01		Unsaturated	24.1			49.85	1.70	84.74	128.17	1.00	0.400	1.100	n.a.	n.a.	n.a.	0.00	0.00
2.130	44.390	1.194	266.3	266.3	117.926	2.699	2.16		Unsaturated	36.1			41.96	1.70	71.33	127.37	1.00	0.400	1.100	n.a.	n.a.	n.a.	0.00	0.00
2.300	48.170	1.481	287.5	287.5	123.149	3.084	2.20		Unsaturated	38.7			45.53	1.70	77.40	137.02	1.00	0.400	1.100	n.a.	n.a.	n.a.	0.00	0.00
2.460	55.540	1.569	307.5	307.5	137.326	2.832	2.14		Unsaturated	34.0			52.50	1.70	89.24	147.34	1.00	0.400	1.100	n.a.	n.a.	n.a.	0.00	0.00
2.620	59.110	1.414	327.5	327.5	141.619	2.398	2.07		Unsaturated	28.9			55.87	1.70	94.98	147.96	1.00	0.400	1.100	n.a.	n.a.	n.a.	0.00	0.00
2.790	59.170	1.239	348.8	348.8	137.352	2.101	2.04		Unsaturated	26.0			55.93	1.70	95.07	143.68	1.00	0.400	1.100	n.a.	n.a.	n.a.	0.00	0.00
2.950	58.460	1.026	368.8	368.8	131.945	1.761	1.99		Unsaturated	22.4			55.26	1.70	93.93	135.49	1.00	0.400	1.100	n.a.	n.a.	n.a.	0.00	0.00
3.120	55.800	0.942	390.0	390.0	122.420	1.694	2.00		Unsaturated	23.2			52.74	1.70	89.66	132.16	1.00	0.400	1.100	n.a.	n.a.	n.a.	0.00	0.00
3.280	49.850	0.763	410.0	410.0	106.600	1.538	2.01		Unsaturated	24.2			47.12	1.70	80.10	122.86	1.00	0.400	1.100	n.a.	n.a.	n.a.	0.00	0.00
3.440	42.800	0.669	430.0	430.0	89.288	1.572	2.08		Unsaturated	29.2			40.45	1.70	68.77	116.95	1.00	0.400	1.100	n.a.	n.a.	n.a.	0.00	0.00
3.610	33.640	0.573	451.3	451.3	68.391	1.715	2.19		Unsaturated	38.1			31.80	1.70	54.05	107.65	1.00	0.400	1.100	n.a.	n.a.	n.a.	0.00	0.00
3.770	32.050	0.582	471.3	471.3	63.719	1.828	2.23		Unsaturated	41.4			30.29	1.70	51.50	106.72	1.00	0.400	1.100	n.a.	n.a.	n.a.	0.00	0.00
3.940	29.830	0.584	492.5	492.5	57.959	1.974	2.28		Unsaturated	45.6			28.19	1.70	47.93	104.62	1.00	0.400	1.100	n.a.	n.a.	n.a.	0.00	0.00
4.100	29.710	0.617	512.5	512.5	56.567	2.093	2.31		Unsaturated	47.6			28.08	1.70	47.74	105.33	1.00	0.399	1.100	n.a.	n.a.	n.a.	0.00	0.00
4.270	32.840	0.643	533.8	533.8	61.300	1.972	2.26		Unsaturated	44.1			31.04	1.70	52.77	109.92	1.00	0.399	1.100	n.a.	n.a.	n.a.	0.00	0.00
4.430	36.650	0.740	553.8	553.8	67.204	2.034	2.24		Unsaturated	42.5			34.64	1.70	58.89	116.63	1.00	0.399	1.100	n.a.	n.a.	n.a.	0.00	0.00
4.590	42.950	1.025	573.8	573.8	77.440	2.402	2.25		Unsaturated	43.0			40.60	1.70	69.01	129.57	1.00	0.399	1.100	n.a.	n.a.	n.a.	0.00	0.00
4.760	46.630	0.937	595.0	595.0	82.585	2.023	2.18		Unsaturated	37.2			44.07	1.70	74.93	132.73	1.00	0.399	1.100	n.a.	n.a.	n.a.	0.00	0.00
4.920	47.490	1.009	615.0	615.0	82.721	2.139	2.19		Unsaturated	38.5			44.89	1.70	76.20	135.37	1.00	0.399	1.100	n.a.	n.a.	n.a.	0.00	0.00
5.090	45.000	1.027	636.3	636.3	77.018	2.298	2.24		Unsaturated	42.0			42.53	1.68	71.64	132.24	1.00	0.399	1.100	n.a.	n.a.	n.a.	0.00	0.00
5.250	43.280	1.064	656.3	656.3	72.899	2.476	2.28		Unsaturated	45.2			40.91	1.67	68.31	130.00	1.00	0.399	1.100	n.a.	n.a.	n.a.	0.00	0.00
5.410	41.710	1.040	676.3	676.3	69.171	2.513	2.30		Unsaturated	46.9			39.42	1.66	65.36	127.17	1.00	0.398	1.100	n.a.	n.a.	n.a.	0.00	0.00
5.580	39.280	1.141	697.5	697.5	64.091	2.932	2.37		Unsaturated	52.5			37.13	1.64	61.07	124.31	1.00	0.398	1.100	n.a.	n.a.	n.a.	0.00	0.00
5.740	37.840	1.213	717.5	717.5	60.838	3.236	2.42		Unsaturated	56.2			35.77	1.63	58.34	122.22	1.00	0.398	1.100	n.a.	n.a.	n.a.	0.00	0.00
5.910	35.640	1.154	738.8	738.8	56.420	3.271	2.44		Unsaturated	58.3			33.69	1.62	54.67	118.22	1.00	0.398	1.100	n.a.	n.a.	n.a.	0.00	0.00
6.070	34.810	1.127	758.8	758.8	54.346	3.274	2.45		Unsaturated	59.3			32.90	1.61	52.95	116.30	1.00	0.398	1.100	n.a.	n.a.	n.a.	0.00	0.00
6.230	37.860	0.830	778.8	778.8	58.380	2.214	2.31		Unsaturated	48.1			35.78	1.59	56.82	117.02	1.00	0.398	1.100	n.a.	n.a.	n.a.	0.00	0.00
6.400	39.820	0.483	800.0	800.0	60.596	1.224	2.14		Unsaturated	33.8			37.64	1.59	59.71	111.07	0.99	0.398	1.100	n.a.	n.a.	n.a.	0.00	0.00
6.560	37.400	0.372	820.0	820.0	56.163	1.004	2.11		Unsaturated	31.8			35.35	1.59	56.13	104.76	0.99	0.398	1.100	n.a.	n.a.	n.a.	0.00	0.00
6.730	33.510	0.416	841.3	841.3	49.602	1.258	2.21		Unsaturated	39.9			31.67	1.57	49.78	103.66	0.99	0.397	1.100	n.a.	n.a.	n.a.	0.00	0.00
6.890	31.830	0.463	861.3	861.3	46.519	1.475	2.28		Unsaturated	45.0			30.09	1.56	46.81	102.92	0.99	0.397	1.098	n.a.	n.a.	n.a.	0.00	0.00
7.050	40.840	0.619	881.3	881.3	59.169	1.533	2.20		Unsaturated	39.3			38.60	1.51	58.22	113.73	0.99	0.397	1.100	n.a.	n.a.	n.a.	0.00	0.00
7.220	52.440	0.651	902.5	902.5	75.242	1.251	2.07		Unsaturated	28.4			49.57	1.47	73.02	121.05	0.99	0.397	1.100	n.a.	n.a.	n.a.	0.00	0.00
7.380	77.600	0.600	922.5	922.5	110.424	0.778	1.81		Unsaturated	7.7			73.35	1.48	108.72	111.31	0.99	0.397	1.096	n.a.	n.a.	n.a.	0.00	0.00
7.550	98.850	0.657	943.8	943.8	139.233	0.667	1.69		Unsaturated	0.0			93.43	1.42	132.56	132.56	0.99	0.397	1.100	n.a.	n.a.	n.a.	0.00	0.00
7.710	113.670	0.600	963.8	963.8	158.522	0.530	1.58		Unsaturated	0.0			107.44	1.38	147.93	147.93	0.99	0.397	1.100	n.a.	n.a.	n.a.	0.00	0.00
7.870	127.000	0.618	983.8	983.8	175.367	0.488	1.53		Unsaturated	0.0			120.04	1.34	161.24	161.24	0.99	0.397	1.100	n.a.	n.a.	n.a.	0.00	0.00
8.040	130.870	0.651	1005.0	1005.0	178.796	0.500	1.53		Unsaturated	0.0			123.70	1.33	164.22	164.22	0.99	0.396	1.100	n.a.	n.a.	n.a.	0.00	0.00
8.200	124.160	0.930	1025.0	1025.0	167.917	0.752	1.66		Unsaturated	0.0			117.35	1.33	156.08	156.08	0.99	0.396	1.100	n.a.	n.a.	n.a.	0.00	0.00
8.370	94.660	1.447	1046.3	1046.3	126.536	1.537	1.96		Unsaturated	20.0			89.47	1.32	117.89	157.21	0.99	0.396	1.100	n.a.	n.a.	n.a.	0.00	0.00
8.530	63.970	2.091	1066.3	1066.3	84.466	3.296	2.32		Unsaturated	48.9			60.46	1.32	80.01	146.70	0.99	0.396	1.100	n.a.	n.a.	n.a.	0.00	0.00
8.690	56.230	2.497	1086.3	1086.3	73.462	4.484	2.46		Unsaturated	60.2			53.15	1.32	70.42	138.94	0.99	0.396	1.097	n.a.	n.a.	n.a.	0.00	0.00
8.860	50.280	2.677	1107.5	1107.5	64.966	5.383	2.56		Unsaturated	67.8			47.52	1.33	62.99	131.46	0.99	0.396	1.088	n.a.	n.a.	n.a.	0.00	0.00
9.020	49.180	2.673	1127.5	1127.5	62.950	5.498	2.58		Unsaturated	69.1			46.48	1.32	61.27	129.53	0.99	0.396	1.085	n.a.	n.a.	n.a.	0.00	0.00
9.190	51.510	2.463	1148.8	1148.8	65.340	4.836	2.52		Unsaturated	64.8			48.69	1.30	63.52	131.40	0.99	0.395	1.083	n.a.	n.a.	n.a.	0.00	0.00
9.350	53.550	1.958	1168.8	1168.8	67.361	3.696	2.43		Unsaturated	57.2			50.61	1.29	65.52	131.69	0.99	0.395	1.081	n.a.	n.a.	n.a.	0.00	0.00
9.510	54.840	1.455	1188.8	1188.8	68.406	2.682	2.32		Unsaturated	48.7			51.83	1.29	66.74	129.83	0.99	0.395	1.078	n.a.	n.a.	n.a.	0.00	0.00
9.680	53.880	1.110	1210.0	1210.0	66.589	2.084	2.25		Unsaturated	43.3			50.93	1.28	65.37	125.21	0.99	0.395	1.073	n.a.	n.a.	n.a.	0.00	0.00
9.840	47.200	0.937	1230.0	1230.0	57.752	2.011	2.29		Unsaturated	46.1			44.61	1.29	57.36	116.73	0.99	0.395	1.066	n.a.	n.a.	n.a.	0.00	0.00
10.010	41.300	0.932	1251.3	1251.3	49.994	2.290	2.37		Unsaturated	52.9			39.04	1.28	50.12	110.54	0.99	0.395	1.061	n.a.	n.a.	n.a.	0.00	0.00
10.170	39.190	1.103	1271.3	1271.3	47.014	2.862	2.46		Unsaturated	59.7			37.04	1.28	47.27	109.14	0.99	0.395	1.058	n.a.	n.a.	n.a.	0.00	0.00
10.330	40.880	1.384	1291.3	1291.3	48.682	3.440	2.50		Unsaturated	63.2			38.64	1.26	48.80	112.06	0.99	0.395	1.058	n.a.	n.a.	n.a.	0.00	0.00
10.500	47.780	1.609	1312.5	1312.5	56.554	3.415	2.45		Unsaturated	59.4			45.16	1.24	56.15	120.41	0.99	0.394	1.060	n.a.	n.a.	n.a.	0.00	0.00
10.660	54.050	1.396	1332.5	1332.5	63.584	2.615	2.34		Unsaturated	49.9			51.09	1.23	62.80	125.40	0.99	0.394	1.060	n.a.	n.a.	n.a.	0.00	0.00
10.830	59.390	1.187	1353.8	1353.8	69.381	2.022	2.23		Unsaturated	41.5			56.13	1.22	68.38	127.86	0.99	0.394	1.059	n.a.	n.a.	n.a.	0.00	0.00
10.990	60.870	1.205	1373.8	1373.8	70.598	2.003	2.22		Unsaturated	40.9			57.53	1.21	69.58	128.90	0.99	0.394	1.058	n.a.	n.a.	n.a.	0.00	0.00

CPT No. 1

PGA (A_{max}) 0.62

Total Settlement: 0.08 (Inches)

Depth (ft)	q_c (tsf)	f_s (tsf)	σ_{vc} (psf)	Insitu σ'_{vc} (psf)	Q	F (%)	I_c	Layer "Plastic" PI > 7	Flag Soil Type	Fines (%)	q_{cN} near interfaces (soft layer)	Thin Layer Factor (K_H)	Interpreted q_{cN}	C_N	q_{c1N}	$q_{c1N\text{-}CS}$	Stress Reduction Coeff, r_d	CSR	K_σ for Sand	$CRR_{M=7.5,\ \sigma'vc = 1\ atm}$	CRR	Factor of Safety (CRR/CSR)	Vertical Strain ε_v	Settlement (Inches)
11.150	61.920	1.305	1393.8	1393.8	71.301	2.131	2.24		Unsaturated	42.1			58.53	1.20	70.24	130.54	0.99	0.394	1.057	n.a.	n.a.	n.a.	0.00	0.00
11.320	61.270	1.206	1415.0	1415.0	70.000	1.992	2.22		Unsaturated	41.0			57.91	1.19	69.15	128.43	0.98	0.394	1.054	n.a.	n.a.	n.a.	0.00	0.00
11.480	56.310	1.397	1435.0	1435.0	63.806	2.513	2.32		Unsaturated	48.9			53.22	1.19	63.29	125.55	0.98	0.393	1.051	n.a.	n.a.	n.a.	0.00	0.00
11.650	52.770	1.603	1456.3	1456.3	59.294	3.080	2.41		Unsaturated	55.6			49.88	1.18	59.04	122.89	0.98	0.393	1.048	n.a.	n.a.	n.a.	0.00	0.00
11.810	52.990	1.570	1476.3	1476.3	59.128	3.005	2.40		Unsaturated	55.1			50.09	1.18	58.93	122.57	0.98	0.393	1.046	n.a.	n.a.	n.a.	0.00	0.00
11.980	56.250	1.325	1497.5	1497.5	62.358	2.388	2.32		Unsaturated	48.2			53.17	1.17	62.11	123.74	0.98	0.393	1.044	n.a.	n.a.	n.a.	0.00	0.00
12.140	59.050	1.237	1517.5	1517.5	65.060	2.122	2.27		Unsaturated	44.3			55.81	1.16	64.76	125.04	0.98	0.393	1.043	n.a.	n.a.	n.a.	0.00	0.00
12.300	59.420	1.213	1537.5	1537.5	65.034	2.067	2.26		Unsaturated	43.7			56.16	1.15	64.80	124.73	0.98	0.393	1.041	n.a.	n.a.	n.a.	0.00	0.00
12.470	62.990	1.208	1558.8	1558.8	68.509	1.941	2.22		Unsaturated	40.9			59.54	1.15	68.17	127.17	0.98	0.393	1.040	n.a.	n.a.	n.a.	0.00	0.00
12.630	63.330	1.075	1578.8	1578.8	68.435	1.719	2.19		Unsaturated	38.1			59.86	1.14	68.23	125.19	0.98	0.392	1.038	n.a.	n.a.	n.a.	0.00	0.00
12.800	60.130	0.960	1600.0	1600.0	64.489	1.619	2.19		Unsaturated	38.3			56.83	1.14	64.55	120.78	0.98	0.392	1.035	n.a.	n.a.	n.a.	0.00	0.00
12.960	53.690	1.004	1620.0	1620.0	57.122	1.899	2.28		Unsaturated	45.1			50.75	1.13	57.44	116.30	0.98	0.392	1.032	n.a.	n.a.	n.a.	0.00	0.00
13.120	52.540	0.882	1640.0	1640.0	55.528	1.705	2.25		Unsaturated	43.4			49.66	1.13	55.97	113.51	0.98	0.392	1.030	n.a.	n.a.	n.a.	0.00	0.00
13.290	57.410	1.195	1661.3	1661.3	60.355	2.111	2.29		Unsaturated	46.1			54.26	1.12	60.58	120.78	0.98	0.392	1.030	n.a.	n.a.	n.a.	0.00	0.00
13.450	64.640	1.563	1681.3	1681.3	67.651	2.449	2.30		Unsaturated	46.8			61.10	1.11	67.57	129.92	0.98	0.392	1.031	n.a.	n.a.	n.a.	0.00	0.00
13.620	82.750	1.474	1702.5	1702.5	86.299	1.800	2.13		Unsaturated	33.3			78.21	1.09	85.63	142.11	0.98	0.392	1.032	n.a.	n.a.	n.a.	0.00	0.00
13.780	93.760	1.295	1722.5	1722.5	97.320	1.394	2.01		Unsaturated	24.1			88.62	1.09	96.55	142.01	0.98	0.391	1.031	n.a.	n.a.	n.a.	0.00	0.00
13.940	113.440	1.106	1742.5	1742.5	117.248	0.982	1.85		Unsaturated	11.2			107.22	1.09	116.80	128.65	0.98	0.391	1.026	n.a.	n.a.	n.a.	0.00	0.00
14.110	146.270	1.364	1763.8	1763.8	150.516	0.938	1.76		Unsaturated	3.7			138.25	1.08	148.84	148.85	0.98	0.391	1.029	n.a.	n.a.	n.a.	0.00	0.00
14.270	207.770	1.207	1783.8	1783.8	212.971	0.583	1.51		Unsaturated	0.0			196.38	1.06	207.41	207.41	0.98	0.391	1.049	n.a.	n.a.	n.a.	0.00	0.00
14.440	252.450	1.102	1805.0	1805.0	257.427	0.438	1.37		Unsaturated	0.0			238.61	1.04	249.05	249.05	0.98	0.391	1.048	n.a.	n.a.	n.a.	0.00	0.00
14.600	263.040	1.186	1825.0	1825.0	266.780	0.452	1.36		Unsaturated	0.0			248.62	1.04	258.52	258.52	0.98	0.391	1.044	n.a.	n.a.	n.a.	0.00	0.00
14.760	231.260	1.245	1845.0	1845.0	233.152	0.541	1.46		Unsaturated	0.0			218.58	1.04	227.59	227.59	0.98	0.390	1.041	n.a.	n.a.	n.a.	0.00	0.00
14.930	189.850	1.639	1866.3	1866.3	190.133	0.868	1.66		Unsaturated	0.0			179.44	1.04	187.43	187.43	0.98	0.390	1.029	n.a.	n.a.	n.a.	0.00	0.00
15.090	130.290	1.779	1886.3	1886.3	129.488	1.375	1.92		Unsaturated	16.6			123.15	1.05	128.76	159.70	0.98	0.390	1.020	n.a.	n.a.	n.a.	0.00	0.00
15.260	42.170	1.729	1907.5	1907.5	43.215	4.195	2.60		Unsaturated	71.0			39.86	1.05	41.93	104.95	0.98	0.390	1.011	n.a.	n.a.	n.a.	0.00	0.00
15.420	34.990	1.632	1927.5	1927.5	35.306	4.797	2.70		Unsaturated	79.3			33.07	1.05	34.67	96.96	0.97	0.390	1.010	n.a.	n.a.	n.a.	0.00	0.00
15.580	30.920	1.351	1947.5	1947.5	30.754	4.511	2.73		Unsaturated	81.2			29.22	1.04	30.51	91.83	0.97	0.390	1.008	n.a.	n.a.	n.a.	0.00	0.00
15.750	37.010	0.963	1968.8	1968.8	35.301	2.673	2.53		Unsaturated	65.5	47.93		47.93	1.03	49.58	113.64	0.97	0.389	1.009	n.a.	n.a.	n.a.	0.00	0.00
15.910	50.710	0.608	1988.8	1988.8	48.470	1.223	2.21		Unsaturated	40.0			47.93	1.03	49.41	103.24	0.97	0.389	1.007	n.a.	n.a.	n.a.	0.00	0.00
16.080	49.930	0.680	2010.0	2010.0	47.447	1.390	2.25		Unsaturated	43.2	47.93		47.93	1.03	49.15	104.89	0.97	0.389	1.006	n.a.	n.a.	n.a.	0.00	0.00
16.240	41.800	0.769	2030.0	2030.0	39.357	1.886	2.40		Unsaturated	54.9	47.93		47.93	1.02	48.89	109.70	0.97	0.389	1.005	n.a.	n.a.	n.a.	0.00	0.00
16.400	29.730	0.805	2050.0	2050.0	28.005	2.805	2.62		Unsaturated	72.7			28.10	1.02	28.57	88.01	0.97	0.389	1.003	n.a.	n.a.	n.a.	0.00	0.00
16.570	20.400	0.688	2071.3	2071.3	18.698	3.552	2.82		Unsaturated	88.8			19.28	1.01	19.51	78.43	0.97	0.389	1.002	n.a.	n.a.	n.a.	0.00	0.00
16.730	17.100	0.618	2091.3	2091.3	15.354	3.849	2.91		Unsaturated	95.9			16.16	1.01	16.27	74.90	0.97	0.388	1.001	n.a.	n.a.	n.a.	0.00	0.00
16.900	16.280	0.504	2112.5	2112.5	14.413	3.310	2.89		Unsaturated	94.4			15.39	1.00	15.40	73.63	0.97	0.388	1.000	n.a.	n.a.	n.a.	0.00	0.00
17.060	15.030	0.506	2132.5	2132.5	13.096	3.620	2.95		Clay	99.0			14.21	1.00	n.a.	n.a.	0.97	0.389	n.a.	n.a.	n.a.	n.a.	0.00	0.00
17.220	14.320	0.506	2152.5	2152.5	12.305	3.821	2.99		Clay	100.0			13.53	1.00	n.a.	n.a.	0.97	0.390	n.a.	n.a.	n.a.	n.a.	0.00	0.00
17.390	15.680	0.533	2173.8	2173.8	13.427	3.650	2.94		Clay	98.4			14.82	0.99	n.a.	n.a.	0.97	0.392	n.a.	n.a.	n.a.	n.a.	0.00	0.00
17.550	17.270	0.688	2193.8	2193.8	14.745	4.256	2.95		Clay	99.2			16.32	0.99	n.a.	n.a.	0.97	0.394	n.a.	n.a.	n.a.	n.a.	0.00	0.00
17.720	19.010	0.784	2215.0	2215.0	16.165	4.380	2.93		Clay	97.3			17.97	0.99	n.a.	n.a.	0.97	0.395	n.a.	n.a.	n.a.	n.a.	0.00	0.00
17.880	22.060	0.833	2235.0	2235.0	18.740	3.977	2.85		Clay	91.2			20.85	0.99	n.a.	n.a.	0.97	0.397	n.a.	n.a.	n.a.	n.a.	0.00	0.00
18.040	23.450	0.887	2255.0	2255.0	19.798	3.975	2.83		Clay	89.8			22.16	0.98	n.a.	n.a.	0.97	0.399	n.a.	n.a.	n.a.	n.a.	0.00	0.00
18.210	24.500	1.009	2276.3	2276.3	20.527	4.317	2.85		Clay	90.6			23.16	0.98	n.a.	n.a.	0.97	0.400	n.a.	n.a.	n.a.	n.a.	0.00	0.00
18.370	23.720	1.117	2296.3	2296.3	19.660	4.946	2.90		Clay	94.9			22.42	0.98	n.a.	n.a.	0.97	0.402	n.a.	n.a.	n.a.	n.a.	0.00	0.00
18.540	23.700	1.149	2317.5	2317.5	19.453	5.098	2.91		Clay	95.9			22.40	0.98	n.a.	n.a.	0.97	0.403	n.a.	n.a.	n.a.	n.a.	0.00	0.00
18.700	23.870	1.138	2337.5	2337.5	19.424	5.012	2.91		Clay	95.5			22.56	0.97	n.a.	n.a.	0.97	0.405	n.a.	n.a.	n.a.	n.a.	0.00	0.00
18.860	24.000	1.134	2357.5	2357.5	19.361	4.969	2.90		Clay	95.4			22.68	0.97	n.a.	n.a.	0.97	0.406	n.a.	n.a.	n.a.	n.a.	0.00	0.00
19.030	23.930	1.123	2378.8	2378.8	19.120	4.938	2.91		Clay	95.6			22.62	0.97	n.a.	n.a.	0.97	0.408	n.a.	n.a.	n.a.	n.a.	0.00	0.00
19.190	24.350	1.128	2398.8	2398.8	19.302	4.873	2.90		Clay	95.0			23.02	0.97	n.a.	n.a.	0.97	0.409	n.a.	n.a.	n.a.	n.a.	0.00	0.00
19.360	24.260	1.132	2420.0	2420.0	19.050	4.910	2.91		Clay	95.5			22.93	0.97	n.a.	n.a.	0.96	0.411	n.a.	n.a.	n.a.	n.a.	0.00	0.00
19.520	23.920	1.136	2440.0	2440.0	18.607	5.006	2.92		Clay	96.6			22.61	0.96	n.a.	n.a.	0.96	0.412	n.a.	n.a.	n.a.	n.a.	0.00	0.00
19.690	23.420	1.135	2461.3	2461.3	18.031	5.114	2.94		Clay	97.9			22.14	0.96	n.a.	n.a.	0.96	0.414	n.a.	n.a.	n.a.	n.a.	0.00	0.00
19.850	23.290	1.115	2481.3	2481.3	17.773	5.055	2.94		Clay	98.0			22.01	0.96	n.a.	n.a.	0.96	0.415	n.a.	n.a.	n.a.	n.a.	0.00	0.00
20.010	22.960	1.080	2501.3	2501.3	17.359	4.976	2.94		Clay	98.3			21.70	0.96	n.a.	n.a.	0.96	0.416	n.a.	n.a.	n.a.	n.a.	0.00	0.00
20.180	21.690	1.022	2522.5	2522.5	16.197	5.002	2.97		Clay	100.0			20.50	0.95	n.a.	n.a.	0.96	0.418	n.a.	n.a.	n.a.	n.a.	0.00	0.00
20.340	19.840	0.959	2542.5	2542.5	14.607	5.164	3.01		Clay	100.0			18.75	0.95	n.a.	n.a.	0.96	0.419	n.a.	n.a.	n.a.	n.a.	0.00	0.00
20.510	17.510	0.831	2563.8	2563.8	12.660	5.122	3.05		Clay	100.0			16.55	0.95	n.a.	n.a.	0.96	0.421	n.a.	n.a.	n.a.	n.a.	0.00	0.00
20.670	16.810	0.725	2583.8	2583.8	12.012	4.672	3.05		Clay	100.0			15.89	0.95	n.a.	n.a.	0.96	0.422	n.a.	n.a.	n.a.	n.a.	0.00	0.00
20.830	17.550	0.626	2603.8	2603.8	12.481	3.851	2.98		Clay	100.0			16.59	0.95	n.a.	n.a.	0.96	0.423	n.a.	n.a.	n.a.	n.a.	0.00	0.00
21.000	17.540	0.697	2625.0	2625.0	12.364	4.292	3.01		Clay	100.0			16.58	0.94	n.a.	n.a.	0.96	0.425	n.a.	n.a.	n.a.	n.a.	0.00	0.00
21.160	19.540	0.777	2645.0	2645.0	13.775	4.267	2.98		Clay	100.0			18.47	0.94	n.a.	n.a.	0.96	0.426	n.a.	n.a.	n.a.	n.a.	0.00	0.00
21.330	23.590	0.854	2666.3	2666.3	16.695	3.838	2.88		Clay	93.6			22.30	0.94	n.a.	n.a.	0.96	0.427	n.a.	n.a.	n.a.	n.a.	0.00	0.00
21.490	24.160	0.905	2686.3	2686.3	16.988	3.966	2.89		Clay	93.8			22.84	0.94	n.a.	n.a.	0.96	0.428	n.a.	n.a.	n.a.	n.a.	0.00	0.00

CORNERSTONE EARTH GROUP

CPT No. 1

PGA (A_{max}) 0.62

Total Settlement: 0.08 (Inches)

Depth (ft)	q_c (tsf)	f_s (tsf)	σ_{vc} (psf)	Insitu σ'_{vc} (psf)	Q	F (%)	I_c	Layer "Plastic" PI > 7	Flag Soil Type	Fines (%)	q_{cN} near interfaces (soft layer)	Thin Layer Factor (K_H)	Interpreted q_{cN}	C_N	q_{c1N}	q_{c1N-CS}	Stress Reduction Coeff, r_d	CSR	K_σ for Sand	$CRR_{M=7.5, \sigma'vc = 1 atm}$	CRR	Factor of Safety (CRR/CSR)	Vertical Strain ε_v	Settlement (Inches)
21.650	23.650	0.924	2706.3	2706.3	16.478	4.144	2.91		Clay	95.6			22.35	0.94	n.a.	n.a.	0.96	0.430	n.a.	n.a.	n.a.	n.a.	0.00	0.00
21.820	23.770	0.957	2727.5	2727.5	16.430	4.272	2.92		Clay	96.3			22.47	0.94	n.a.	n.a.	0.96	0.431	n.a.	n.a.	n.a.	n.a.	0.00	0.00
21.980	23.560	0.951	2747.5	2747.5	16.150	4.286	2.92		Clay	96.9			22.27	0.93	n.a.	n.a.	0.96	0.432	n.a.	n.a.	n.a.	n.a.	0.00	0.00
22.150	24.830	0.960	2768.8	2768.8	16.936	4.092	2.89		Clay	94.6			23.47	0.93	n.a.	n.a.	0.96	0.433	n.a.	n.a.	n.a.	n.a.	0.00	0.00
22.310	24.610	0.911	2788.8	2788.8	16.649	3.925	2.89		Clay	94.1			23.26	0.93	n.a.	n.a.	0.96	0.434	n.a.	n.a.	n.a.	n.a.	0.00	0.00
22.470	25.840	0.871	2808.8	2808.8	17.400	3.565	2.85		Clay	90.8			24.42	0.93	n.a.	n.a.	0.96	0.436	n.a.	n.a.	n.a.	n.a.	0.00	0.00
22.640	25.990	0.813	2830.0	2830.0	17.367	3.306	2.83		Clay	89.3			24.57	0.93	n.a.	n.a.	0.96	0.437	n.a.	n.a.	n.a.	n.a.	0.00	0.00
22.800	25.140	0.767	2850.0	2850.0	16.642	3.233	2.84		Clay	90.0			23.76	0.92	n.a.	n.a.	0.96	0.438	n.a.	n.a.	n.a.	n.a.	0.00	0.00
22.970	24.050	0.733	2871.3	2871.3	15.752	3.243	2.86		Clay	91.5			22.73	0.92	n.a.	n.a.	0.95	0.439	n.a.	n.a.	n.a.	n.a.	0.00	0.00
23.130	22.710	0.707	2891.3	2891.3	14.709	3.327	2.89		Clay	94.0			21.47	0.92	n.a.	n.a.	0.95	0.440	n.a.	n.a.	n.a.	n.a.	0.00	0.00
23.290	22.840	0.698	2911.3	2911.3	14.691	3.263	2.88		Clay	93.6			21.59	0.92	n.a.	n.a.	0.95	0.441	n.a.	n.a.	n.a.	n.a.	0.00	0.00
23.460	22.250	0.682	2932.5	2932.5	14.175	3.280	2.90		Clay	94.7			21.03	0.92	n.a.	n.a.	0.95	0.443	n.a.	n.a.	n.a.	n.a.	0.00	0.00
23.620	21.990	0.709	2952.5	2952.5	13.896	3.455	2.92		Clay	96.3			20.78	0.92	n.a.	n.a.	0.95	0.444	n.a.	n.a.	n.a.	n.a.	0.00	0.00
23.790	22.070	0.739	2973.8	2973.8	13.843	3.589	2.93		Clay	97.2			20.86	0.91	n.a.	n.a.	0.95	0.445	n.a.	n.a.	n.a.	n.a.	0.00	0.00
23.950	22.470	0.759	2993.8	2993.8	14.011	3.619	2.93		Clay	97.1			21.24	0.91	n.a.	n.a.	0.95	0.446	n.a.	n.a.	n.a.	n.a.	0.00	0.00
24.110	22.700	0.792	3013.2	3006.3	14.099	3.738	2.93		Clay	97.6			21.46	0.91	n.a.	n.a.	0.95	0.447	n.a.	n.a.	n.a.	n.a.	0.00	0.00
24.280	22.750	0.826	3033.6	3016.1	14.080	3.891	2.94		Clay	98.5			21.50	0.91	n.a.	n.a.	0.95	0.448	n.a.	n.a.	n.a.	n.a.	0.00	0.00
24.440	22.100	0.975	3052.8	3025.3	13.601	4.737	3.01		Clay	100.0			20.89	0.91	n.a.	n.a.	0.95	0.449	n.a.	n.a.	n.a.	n.a.	0.00	0.00
24.610	23.130	1.220	3073.2	3035.1	14.229	5.651	3.04		Clay	100.0			21.86	0.91	n.a.	n.a.	0.95	0.450	n.a.	n.a.	n.a.	n.a.	0.00	0.00
24.770	25.970	1.669	3092.4	3044.4	16.045	6.832	3.06		Clay	100.0			24.55	0.91	n.a.	n.a.	0.95	0.451	n.a.	n.a.	n.a.	n.a.	0.00	0.00
24.930	32.270	1.781	3111.6	3053.6	20.117	5.799	2.94		Clay	98.0			30.50	0.91	n.a.	n.a.	0.95	0.452	n.a.	n.a.	n.a.	n.a.	0.00	0.00
25.100	32.120	1.690	3132.0	3063.4	19.948	5.532	2.93		Clay	97.1			30.36	0.91	n.a.	n.a.	0.95	0.453	n.a.	n.a.	n.a.	n.a.	0.00	0.00
25.260	29.630	1.630	3151.2	3072.6	18.261	5.810	2.97		Clay	100.0			28.01	0.91	n.a.	n.a.	0.95	0.454	n.a.	n.a.	n.a.	n.a.	0.00	0.00
25.430	27.770	1.564	3171.6	3082.4	16.990	5.975	3.00		Clay	100.0			26.25	0.91	n.a.	n.a.	0.95	0.455	n.a.	n.a.	n.a.	n.a.	0.00	0.00
25.590	27.170	1.594	3190.8	3091.6	16.545	6.234	3.02		Clay	100.0			25.68	0.90	n.a.	n.a.	0.95	0.456	n.a.	n.a.	n.a.	n.a.	0.00	0.00
25.750	26.060	1.324	3210.0	3100.8	15.773	5.414	3.00		Clay	100.0			24.63	0.90	n.a.	n.a.	0.95	0.457	n.a.	n.a.	n.a.	n.a.	0.00	0.00
25.920	20.710	1.021	3230.4	3110.6	12.277	5.344	3.08		Clay	100.0			19.57	0.90	n.a.	n.a.	0.95	0.458	n.a.	n.a.	n.a.	n.a.	0.00	0.00
26.080	18.270	0.882	3249.6	3119.8	10.671	5.299	3.12		Clay	100.0			17.27	0.90	n.a.	n.a.	0.95	0.459	n.a.	n.a.	n.a.	n.a.	0.00	0.00
26.250	16.930	0.895	3270.0	3129.6	9.774	5.852	3.18		Clay	100.0			16.00	0.90	n.a.	n.a.	0.94	0.460	n.a.	n.a.	n.a.	n.a.	0.00	0.00
26.410	16.540	0.822	3289.2	3138.8	9.491	5.516	3.17		Clay	100.0			15.63	0.90	n.a.	n.a.	0.94	0.461	n.a.	n.a.	n.a.	n.a.	0.00	0.00
26.570	15.170	0.837	3308.4	3148.0	8.587	6.191	3.24		Clay	100.0			14.34	0.90	n.a.	n.a.	0.94	0.461	n.a.	n.a.	n.a.	n.a.	0.00	0.00
26.740	15.220	1.197	3328.8	3157.8	8.585	8.830	3.34		Clay	100.0			14.39	0.90	n.a.	n.a.	0.94	0.462	n.a.	n.a.	n.a.	n.a.	0.00	0.00
26.900	18.730	1.901	3348.0	3167.0	10.771	11.148	3.33		Clay	100.0			17.70	0.90	n.a.	n.a.	0.94	0.463	n.a.	n.a.	n.a.	n.a.	0.00	0.00
27.070	42.190	2.475	3368.4	3176.8	25.501	6.110	2.88		Clay	93.2			39.88	0.90	n.a.	n.a.	0.94	0.464	n.a.	n.a.	n.a.	n.a.	0.00	0.00
27.230	46.140	1.917	3387.6	3186.0	27.901	4.313	2.75		Clay	82.6			43.61	0.90	n.a.	n.a.	0.94	0.465	n.a.	n.a.	n.a.	n.a.	0.00	0.00
27.400	69.790	2.034	3408.0	3195.8	52.365	2.988	2.44		Sand	58.0			65.96	0.83	54.55	117.94	0.94	0.466	0.949	0.167	0.217	0.47	0.03	0.03
27.560	69.310	1.888	3427.2	3205.1	51.913	2.793	2.42		Sand	56.6	65.96		65.96	0.83	54.45	117.36	0.94	0.467	0.949	0.166	0.215	0.46	0.03	0.03
27.720	39.340	1.573	3446.4	3214.3	23.406	4.182	2.79		Clay	86.5			37.18	0.90	n.a.	n.a.	0.94	0.468	n.a.	n.a.	n.a.	n.a.	0.00	0.00
27.890	23.370	1.236	3466.8	3224.1	13.422	5.713	3.06		Clay	100.0			22.09	0.89	n.a.	n.a.	0.94	0.468	n.a.	n.a.	n.a.	n.a.	0.00	0.00
28.050	16.870	0.937	3486.0	3233.3	9.357	6.193	3.21		Clay	100.0			15.95	0.89	n.a.	n.a.	0.94	0.469	n.a.	n.a.	n.a.	n.a.	0.00	0.00
28.220	13.620	0.909	3506.4	3243.1	7.318	7.660	3.35		Clay	100.0			12.87	0.89	n.a.	n.a.	0.94	0.470	n.a.	n.a.	n.a.	n.a.	0.00	0.00
28.380	11.280	1.066	3525.6	3252.3	5.853	11.205	3.53		Clay	100.0			10.66	0.89	n.a.	n.a.	0.94	0.471	n.a.	n.a.	n.a.	n.a.	0.00	0.00
28.540	17.160	1.171	3544.8	3261.5	9.436	7.609	3.26		Clay	100.0			16.22	0.89	n.a.	n.a.	0.94	0.472	n.a.	n.a.	n.a.	n.a.	0.00	0.00
28.710	20.130	1.180	3565.2	3271.3	11.217	6.432	3.16		Clay	100.0			19.03	0.89	n.a.	n.a.	0.94	0.472	n.a.	n.a.	n.a.	n.a.	0.00	0.00
28.870	21.560	1.883	3584.4	3280.5	12.052	9.527	3.25		Clay	100.0			20.38	0.89	n.a.	n.a.	0.94	0.473	n.a.	n.a.	n.a.	n.a.	0.00	0.00
29.040	31.710	2.647	3604.8	3290.3	18.179	8.849	3.10		Clay	100.0			29.97	0.89	n.a.	n.a.	0.94	0.474	n.a.	n.a.	n.a.	n.a.	0.00	0.00
29.200	58.070	2.582	3624.0	3299.5	34.101	4.590	2.70		Clay	79.1			54.89	0.89	n.a.	n.a.	0.94	0.475	n.a.	n.a.	n.a.	n.a.	0.00	0.00
29.360	100.080	1.691	3643.2	3308.7	74.270	1.721	2.16		Sand	36.0	153	1.78	272.34	0.89	242.04	336.99	0.94	0.475	0.866	#########	########	##########	0.00	0.00
29.530	157.480	1.220	3663.6	3318.5	117.474	0.784	1.79		Sand	6.2	153	1.78	272.34	0.88	240.30	241.37	0.93	0.476	0.865	49.653	94.489	198.43	0.00	0.00
29.690	161.870	0.959	3682.8	3327.7	120.613	0.599	1.71		Sand	0.0		1.78	272.33	0.88	239.92	239.92	0.93	0.477	0.864	42.670	81.123	170.11	0.00	0.00
29.860	130.380	1.356	3703.2	3337.5	96.729	1.055	1.94		Sand	17.9	153	1.78	272.34	0.89	241.49	289.34	0.93	0.478	0.863	54867.311	########	218165.00	0.00	0.00
30.020	74.000	1.426	3722.4	3346.8	54.216	1.977	2.30		Sand	47.4	153	1.78	272.34	0.89	241.31	349.07	0.93	0.478	0.862	#########	########	##########	0.00	0.00
30.180	38.140	1.057	3741.6	3356.0	21.615	2.914	2.72		Clay	80.6			36.05	0.89	n.a.	n.a.	0.93	0.479	n.a.	n.a.	n.a.	n.a.	0.00	0.00
30.350	20.510	0.711	3762.0	3365.8	11.070	3.816	3.02		Clay	100.0			19.39	0.88	n.a.	n.a.	0.93	0.480	n.a.	n.a.	n.a.	n.a.	0.00	0.00
30.510	14.810	0.551	3781.2	3375.0	7.656	4.264	3.18		Clay	100.0			14.00	0.88	n.a.	n.a.	0.93	0.480	n.a.	n.a.	n.a.	n.a.	0.00	0.00
30.680	14.690	0.552	3801.6	3384.8	7.557	4.313	3.19		Clay	100.0			13.88	0.88	n.a.	n.a.	0.93	0.481	n.a.	n.a.	n.a.	n.a.	0.00	0.00
30.840	13.900	0.581	3820.8	3394.0	7.065	4.848	3.24		Clay	100.0			13.14	0.88	n.a.	n.a.	0.93	0.482	n.a.	n.a.	n.a.	n.a.	0.00	0.00
31.000	14.250	0.627	3840.0	3403.2	7.246	5.086	3.24		Clay	100.0			13.47	0.88	n.a.	n.a.	0.93	0.482	n.a.	n.a.	n.a.	n.a.	0.00	0.00
31.170	13.890	0.640	3860.4	3413.0	7.008	5.352	3.27		Clay	100.0			13.13	0.88	n.a.	n.a.	0.93	0.483	n.a.	n.a.	n.a.	n.a.	0.00	0.00
31.330	13.930	0.666	3879.6	3422.2	7.007	5.551	3.28		Clay	100.0			13.17	0.88	n.a.	n.a.	0.93	0.484	n.a.	n.a.	n.a.	n.a.	0.00	0.00
31.500	15.550	0.761	3900.0	3432.0	7.925	5.593	3.24		Clay	100.0			14.70	0.88	n.a.	n.a.	0.93	0.484	n.a.	n.a.	n.a.	n.a.	0.00	0.00
31.660	18.150	0.884	3919.2	3441.2	9.410	5.459	3.17		Clay	100.0			17.16	0.88	n.a.	n.a.	0.93	0.485	n.a.	n.a.	n.a.	n.a.	0.00	0.00
31.820	21.250	1.217	3938.4	3450.4	11.176	6.311	3.15		Clay	100.0			20.09	0.88	n.a.	n.a.	0.93	0.486	n.a.	n.a.	n.a.	n.a.	0.00	0.00
31.990	24.140	1.943	3958.8	3460.2	12.809	8.767	3.20		Clay	100.0			22.82	0.88	n.a.	n.a.	0.93	0.486	n.a.	n.a.	n.a.	n.a.	0.00	0.00

CORNERSTONE
EARTH GROUP

CPT No.	1

PGA (A_{max})	0.62

Total Settlement:	0.08	(Inches)

Depth (ft)	q_c (tsf)	f_s (tsf)	σ_{vc} (psf)	Insitu σ'_{vc} (psf)	Q	F (%)	Ic	Layer "Plastic" PI > 7	Flag Soil Type	Fines (%)	q_{cN} near interfaces (soft layer)	Thin Layer Factor (K_H)	Interpreted q_{cN}	C_N	q_{c1N}	$q_{c1N\text{-}CS}$	Stress Reduction Coeff, r_d	CSR	K_σ for Sand	$CRR_{M=7.5, \sigma'vc = 1\ atm}$	CRR	Factor of Safety (CRR/CSR)	Vertical Strain ε_v	Settlement (Inches)
32.150	37.830	2.921	3978.0	3469.4	20.661	8.150	3.03		Clay	100.0			35.76	0.88	n.a.	n.a.	0.93	0.487	n.a.	n.a.	n.a.	n.a.	0.00	0.00
32.320	66.350	3.576	3998.4	3479.2	36.991	5.557	2.73		Clay	81.8			62.71	0.88	n.a.	n.a.	0.93	0.488	n.a.	n.a.	n.a.	n.a.	0.00	0.00
32.480	63.610	2.425	4017.6	3488.4	35.317	3.937	2.64		Clay	74.5			60.12	0.88	n.a.	n.a.	0.92	0.488	n.a.	n.a.	n.a.	n.a.	0.00	0.00
32.640	40.310	1.915	4036.8	3497.7	21.896	5.001	2.87		Clay	92.3			38.10	0.88	n.a.	n.a.	0.92	0.489	n.a.	n.a.	n.a.	n.a.	0.00	0.00
32.810	42.000	2.367	4057.2	3507.5	22.792	5.921	2.90		Clay	95.3			39.70	0.88	n.a.	n.a.	0.92	0.489	n.a.	n.a.	n.a.	n.a.	0.00	0.00
32.970	45.860	3.665	4076.4	3516.7	24.922	8.364	2.98		Clay	100.0			43.35	0.87	n.a.	n.a.	0.92	0.490	n.a.	n.a.	n.a.	n.a.	0.00	0.00
33.140	68.170	5.259	4096.8	3526.5	37.500	7.954	2.84		Clay	90.6			64.43	0.87	n.a.	n.a.	0.92	0.490	n.a.	n.a.	n.a.	n.a.	0.00	0.00
33.300	101.290	5.965	4116.0	3535.7	56.132	6.011	2.64		Clay	74.0			95.74	0.87	n.a.	n.a.	0.92	0.491	n.a.	n.a.	n.a.	n.a.	0.00	0.00
33.460	110.440	6.530	4135.2	3544.9	61.143	6.026	2.61		Clay	72.1			104.39	0.87	n.a.	n.a.	0.92	0.492	n.a.	n.a.	n.a.	n.a.	0.00	0.00
33.630	118.550	6.972	4155.6	3554.7	84.936	5.986	2.52		Sand	64.8			112.05	0.82	92.28	168.38	0.92	0.492	0.902	0.477	0.822	1.67	0.00	0.00
33.790	141.290	7.441	4174.8	3563.9	101.381	5.346	2.44		Sand	57.9	151.59		151.59	0.85	128.77	212.76	0.92	0.493	0.844	4.201	7.796	15.82	0.00	0.00
33.960	159.850	7.260	4195.2	3573.7	114.733	4.602	2.35		Sand	51.2	151.59		151.59	0.85	128.34	209.00	0.92	0.493	0.846	3.263	6.076	12.32	0.00	0.00
34.120	160.380	6.461	4214.4	3582.9	114.964	4.082	2.31		Sand	47.8			151.59	0.84	128.03	206.66	0.92	0.494	0.850	2.810	5.255	10.64	0.00	0.00
34.280	151.570	4.773	4233.6	3592.1	108.418	3.194	2.24		Sand	42.5	151.59		151.59	0.84	127.54	202.28	0.92	0.494	0.857	2.154	4.062	8.22	0.00	0.00
34.450	97.660	3.165	4254.0	3601.9	69.208	3.313	2.38		Sand	53.7	151.59		151.59	0.85	128.11	210.01	0.92	0.495	0.842	3.487	6.460	13.06	0.00	0.00
34.610	48.630	2.133	4273.2	3611.1	25.750	4.588	2.79		Clay	86.2			45.96	0.87	n.a.	n.a.	0.92	0.495	n.a.	n.a.	n.a.	n.a.	0.00	0.00
34.780	34.540	3.419	4293.6	3620.9	17.892	10.553	3.15		Clay	100.0			32.65	0.87	n.a.	n.a.	0.92	0.496	n.a.	n.a.	n.a.	n.a.	0.00	0.00
34.940	58.840	3.773	4312.8	3630.1	31.229	6.657	2.84		Clay	90.4			55.61	0.87	n.a.	n.a.	0.92	0.496	n.a.	n.a.	n.a.	n.a.	0.00	0.00
35.100	97.180	5.153	4332.0	3639.4	52.215	5.423	2.62		Clay	73.0			91.85	0.87	n.a.	n.a.	0.92	0.497	n.a.	n.a.	n.a.	n.a.	0.00	0.00
35.270	100.230	5.175	4352.4	3649.2	53.741	5.278	2.61		Clay	71.6			94.74	0.87	n.a.	n.a.	0.92	0.497	n.a.	n.a.	n.a.	n.a.	0.00	0.00
35.430	104.990	4.883	4371.6	3658.4	73.899	4.750	2.48		Sand	61.6			99.23	0.80	79.66	151.21	0.92	0.498	0.912	0.297	0.455	0.91	0.01	0.01
35.600	100.490	4.879	4392.0	3668.2	70.563	4.964	2.51		Sand	63.8			94.98	0.80	75.87	147.00	0.91	0.498	0.914	0.270	0.403	0.81	0.02	0.01
35.760	94.680	3.880	4411.2	3677.4	66.302	4.196	2.47		Sand	60.8	145.21		145.21	0.84	121.43	204.49	0.91	0.499	0.847	2.457	4.578	9.18	0.00	0.00
35.930	153.630	2.983	4431.6	3687.2	108.416	1.970	2.09		Sand	29.9			145.21	0.82	118.91	178.16	0.91	0.499	0.885	0.675	1.230	2.46	0.00	0.00
36.090	133.070	2.488	4450.8	3696.4	93.571	1.901	2.12		Sand	32.6	145.21		145.21	0.82	119.18	182.14	0.91	0.500	0.879	0.792	1.481	2.96	0.00	0.00
36.250	83.450	2.637	4470.0	3705.6	58.007	3.247	2.43		Sand	57.5	145.21		145.21	0.83	120.96	202.59	0.91	0.500	0.848	2.194	4.094	8.19	0.00	0.00
36.420	44.570	1.987	4490.4	3715.4	22.783	4.694	2.84		Clay	89.8			42.13	0.86	n.a.	n.a.	0.91	0.501	n.a.	n.a.	n.a.	n.a.	0.00	0.00
36.580	24.880	1.373	4509.6	3724.6	12.149	6.067	3.11		Clay	100.0			23.52	0.86	n.a.	n.a.	0.91	0.501	n.a.	n.a.	n.a.	n.a.	0.00	0.00
36.750	17.500	1.111	4530.0	3734.4	8.159	7.292	3.30		Clay	100.0			16.54	0.86	n.a.	n.a.	0.91	0.501	n.a.	n.a.	n.a.	n.a.	0.00	0.00
36.910	17.850	1.476	4549.2	3743.6	8.321	9.478	3.37		Clay	100.0			16.87	0.86	n.a.	n.a.	0.91	0.502	n.a.	n.a.	n.a.	n.a.	0.00	0.00
37.070	19.050	1.522	4568.4	3752.8	8.935	9.076	3.33		Clay	100.0			18.01	0.86	n.a.	n.a.	0.91	0.502	n.a.	n.a.	n.a.	n.a.	0.00	0.00
37.240	42.940	1.541	4588.8	3762.6	21.605	3.791	2.79		Clay	86.4			40.59	0.86	n.a.	n.a.	0.91	0.503	n.a.	n.a.	n.a.	n.a.	0.00	0.00
37.400	58.230	1.608	4608.0	3771.8	29.654	2.875	2.61		Clay	71.8			55.04	0.86	n.a.	n.a.	0.91	0.503	n.a.	n.a.	n.a.	n.a.	0.00	0.00
37.570	44.710	1.143	4628.4	3781.6	22.422	2.696	2.69		Clay	77.9			42.26	0.86	n.a.	n.a.	0.91	0.504	n.a.	n.a.	n.a.	n.a.	0.00	0.00
37.730	24.310	0.891	4647.6	3790.8	11.600	4.053	3.02		Clay	100.0			22.98	0.86	n.a.	n.a.	0.91	0.504	n.a.	n.a.	n.a.	n.a.	0.00	0.00
37.890	11.440	0.600	4666.8	3800.1	4.793	6.585	3.45		Clay	100.0			10.81	0.86	n.a.	n.a.	0.91	0.504	n.a.	n.a.	n.a.	n.a.	0.00	0.00
38.060	9.330	0.486	4687.2	3809.9	3.668	6.949	3.56		Clay	100.0			8.82	0.86	n.a.	n.a.	0.91	0.505	n.a.	n.a.	n.a.	n.a.	0.00	0.00
38.220	11.030	0.474	4706.4	3819.1	4.544	5.461	3.43		Clay	100.0			10.43	0.86	n.a.	n.a.	0.91	0.505	n.a.	n.a.	n.a.	n.a.	0.00	0.00
38.390	9.230	0.410	4726.8	3828.9	3.587	5.969	3.53		Clay	100.0			8.72	0.86	n.a.	n.a.	0.90	0.505	n.a.	n.a.	n.a.	n.a.	0.00	0.00
38.550	8.490	0.413	4746.0	3838.1	3.188	6.753	3.61		Clay	100.0			8.02	0.85	n.a.	n.a.	0.90	0.506	n.a.	n.a.	n.a.	n.a.	0.00	0.00
38.710	8.530	0.782	4765.2	3847.3	3.196	12.716	3.77		Clay	100.0			8.06	0.85	n.a.	n.a.	0.90	0.506	n.a.	n.a.	n.a.	n.a.	0.00	0.00
38.880	9.260	3.191	4785.6	3857.1	3.561	46.469	4.11		Clay	100.0			8.75	0.85	n.a.	n.a.	0.90	0.507	n.a.	n.a.	n.a.	n.a.	0.00	0.00
39.040	34.050	4.599	4804.8	3866.3	16.371	14.531	3.28		Clay	100.0			32.18	0.85	n.a.	n.a.	0.90	0.507	n.a.	n.a.	n.a.	n.a.	0.00	0.00
39.210	188.160	6.399	4825.2	3876.1	129.717	3.445	2.22		Sand	40.6			177.84	0.84	148.76	227.15	0.90	0.507	0.818	12.778	23.006	45.35	0.00	0.00
39.370	169.980	7.115	4844.4	3885.3	116.876	4.247	2.32		Sand	48.6			160.66	0.83	132.89	213.25	0.90	0.508	0.818	4.346	7.819	15.40	0.00	0.00
39.530	144.940	6.753	4863.6	3894.5	99.285	4.739	2.40		Sand	55.1			136.99	0.81	111.02	188.88	0.90	0.508	0.858	1.067	2.014	3.96	0.00	0.00
39.700	191.350	6.462	4884.0	3904.3	131.447	3.421	2.21		Sand	40.1			180.86	0.84	151.25	229.81	0.90	0.508	0.816	16.131	28.967	56.98	0.00	0.00
39.860	248.220	4.649	4903.2	3913.5	170.810	1.892	1.94		Sand	18.4			234.61	0.84	197.87	242.43	0.90	0.509	0.816	55.546	99.659	195.92	0.00	0.00
40.030	257.830	3.330	4923.6	3923.3	177.260	1.304	1.81		Sand	7.8			243.70	0.82	199.32	202.96	0.90	0.509	0.832	2.242	4.104	8.06	0.00	0.00
40.190	224.390	2.433	4942.8	3932.5	153.861	1.096	1.80		Sand	6.9	243.7		243.70	0.82	198.79	200.67	0.90	0.509	0.836	1.963	3.609	7.09	0.00	0.00
40.350	174.150	2.244	4962.0	3941.8	118.883	1.307	1.93		Sand	17.5	243.7		243.70	0.85	205.99	248.33	0.90	0.510	0.813	107.059	191.572	375.90	0.00	0.00
40.520	89.200	1.749	4982.4	3951.6	59.972	2.017	2.28		Sand	45.2	243.7		243.70	0.85	206.68	303.63	0.90	0.510	0.813	#########	########	3831750.63	0.00	0.00
40.680	37.250	1.474	5001.6	3960.8	17.547	4.242	2.89		Clay	94.4			35.21	0.85	n.a.	n.a.	0.90	0.510	n.a.	n.a.	n.a.	n.a.	0.00	0.00
40.850	33.450	1.646	5022.0	3970.6	15.584	5.319	3.00		Clay	100.0			31.62	0.85	n.a.	n.a.	0.90	0.511	n.a.	n.a.	n.a.	n.a.	0.00	0.00
41.010	38.020	1.983	5041.2	3979.8	17.840	5.586	2.97		Clay	100.0			35.94	0.85	n.a.	n.a.	0.90	0.511	n.a.	n.a.	n.a.	n.a.	0.00	0.00
41.170	44.130	2.332	5060.4	3989.0	20.857	5.606	2.92		Clay	96.3			41.71	0.85	n.a.	n.a.	0.89	0.511	n.a.	n.a.	n.a.	n.a.	0.00	0.00
41.340	35.370	2.047	5080.8	3998.8	16.420	6.234	3.02		Clay	100.0			33.43	0.85	n.a.	n.a.	0.89	0.511	n.a.	n.a.	n.a.	n.a.	0.00	0.00
41.500	26.360	1.298	5100.0	4008.0	11.881	5.451	3.09		Clay	100.0			24.91	0.84	n.a.	n.a.	0.89	0.512	n.a.	n.a.	n.a.	n.a.	0.00	0.00
41.670	19.560	0.744	5120.4	4017.8	8.462	4.374	3.15		Clay	100.0			18.49	0.84	n.a.	n.a.	0.89	0.512	n.a.	n.a.	n.a.	n.a.	0.00	0.00
41.830	15.120	1.509	5139.6	4027.0	6.233	12.025	3.53		Clay	100.0			14.29	0.84	n.a.	n.a.	0.89	0.512	n.a.	n.a.	n.a.	n.a.	0.00	0.00
41.990	15.130	2.867	5158.8	4036.2	6.219	22.840	3.72		Clay	100.0			14.30	0.84	n.a.	n.a.	0.89	0.513	n.a.	n.a.	n.a.	n.a.	0.00	0.00
42.160	79.270	3.559	5179.2	4046.0	37.904	4.642	2.67		Clay	76.7			74.92	0.84	n.a.	n.a.	0.89	0.513	n.a.	n.a.	n.a.	n.a.	0.00	0.00
42.320	182.550	3.100	5198.4	4055.2	122.862	1.723	2.01		Sand	23.5		1.45	250.19	0.84	210.73	273.70	0.89	0.513	0.805	3482.912	6167.132	12018.76	0.00	0.00
42.490	202.190	2.569	5218.8	4065.0	136.100	1.287	1.88		Sand	13.8		1.45	277.10	0.84	233.26	261.93	0.89	0.513	0.804	601.218	1063.610	2071.71	0.00	0.00

CORNERSTONE
EARTH GROUP

CPT No. 1

PGA (A_{max}) 0.62

Total Settlement: 0.08 (Inches)

Depth (ft)	q_c (tsf)	f_s (tsf)	σ_{vc} (psf)	Insitu σ'_{vc} (psf)	Q	F (%)	I_c	Layer "Plastic" PI > 7	Flag Soil Type	Fines (%)	q_{cN} near interfaces (soft layer)	Thin Layer Factor (K_H)	Interpreted q_{cN}	C_N	q_{c1N}	q_{c1N-CS}	Stress Reduction Coeff, r_d	CSR	K_σ for Sand	$CRR_{M=7.5, \sigma'vc = 1 atm}$	CRR	Factor of Safety (CRR/CSR)	Vertical Strain ε_v	Settlement (Inches)
42.650	192.700	2.442	5238.0	4074.2	129.475	1.285	1.90		Sand	15.0		1.45	264.10	0.84	222.18	255.45	0.89	0.514	0.803	254.250	449.412	874.94	0.00	0.00
42.810	171.410	3.371	5257.2	4083.5	114.837	1.997	2.07		Sand	28.9		1.45	234.92	0.84	197.51	270.73	0.89	0.514	0.803	2179.473	3849.179	7490.22	0.00	0.00
42.980	162.310	4.001	5277.6	4093.2	108.509	2.506	2.16		Sand	36.0		1.45	222.45	0.84	186.91	269.31	0.89	0.514	0.802	1755.587	3097.776	6025.02	0.00	0.00
43.140	153.500	3.982	5296.8	4102.5	102.400	2.639	2.20		Sand	38.7		1.45	210.37	0.84	176.66	259.86	0.89	0.514	0.801	453.567	799.656	1554.57	0.00	0.00
43.310	159.320	2.863	5317.2	4112.3	106.217	1.828	2.07		Sand	28.5		1.45	218.35	0.84	183.07	252.73	0.89	0.515	0.801	181.048	318.910	619.68	0.00	0.00
43.470	191.160	1.585	5336.4	4121.5	127.655	0.841	1.78		Sand	5.4		1.45	261.99	0.81	212.73	213.16	0.89	0.515	0.800	4.318	7.600	14.76	0.00	0.00
43.640	197.030	1.850	5356.8	4131.3	131.468	0.952	1.81		Sand	7.5		1.45	270.03	0.82	221.16	224.39	0.89	0.515	0.799	10.126	17.807	34.57	0.00	0.00
43.800	141.550	1.778	5376.0	4140.5	93.828	1.280	2.00		Sand	23.1	186.23	1.45	270.03	0.84	226.21	290.44	0.89	0.515	0.799	67841.632	########	231295.83	0.00	0.00
43.960	67.810	1.372	5395.2	4149.7	43.947	2.107	2.39		Sand	54.3	186.23	1.45	270.03	0.84	226.07	334.95	0.88	0.516	0.798	#########	########	##########	0.00	0.00
44.130	31.660	1.484	5415.6	4159.5	13.921	5.124	3.02		Clay	100.0			29.92	0.84	n.a.	n.a.	0.88	0.516	n.a.	n.a.	n.a.	n.a.	0.00	0.00
44.290	27.270	1.580	5434.8	4168.7	11.779	6.435	3.14		Clay	100.0			25.78	0.84	n.a.	n.a.	0.88	0.516	n.a.	n.a.	n.a.	n.a.	0.00	0.00
44.460	37.880	2.377	5455.2	4178.5	16.825	6.762	3.04		Clay	100.0			35.80	0.84	n.a.	n.a.	0.88	0.516	n.a.	n.a.	n.a.	n.a.	0.00	0.00
44.620	57.700	1.933	5474.4	4187.7	26.250	3.517	2.71		Clay	79.5			54.54	0.84	n.a.	n.a.	0.88	0.516	n.a.	n.a.	n.a.	n.a.	0.00	0.00
44.780	43.860	1.325	5493.6	4196.9	19.592	3.223	2.78		Clay	85.4			41.46	0.83	n.a.	n.a.	0.88	0.517	n.a.	n.a.	n.a.	n.a.	0.00	0.00
44.950	22.010	0.881	5514.0	4206.7	9.153	4.577	3.14		Clay	100.0			20.80	0.83	n.a.	n.a.	0.88	0.517	n.a.	n.a.	n.a.	n.a.	0.00	0.00

CORNERSTONE EARTH GROUP

CPT No. 2

PGA (A_{max}) 0.62

Total Settlement: 0.27 (Inches)

Depth (ft)	q_c (tsf)	f_s (tsf)	σ_{vc} (psf)	Insitu σ'_{vc} (psf)	Q	F (%)	I_c	Layer "Plastic" PI > 7	Flag Soil Type	Fines (%)	q_{cN} near interfaces (soft layer)	Thin Layer Factor (K_H)	Interpreted q_{cN}	C_N	q_{c1N}	q_{c1N-CS}	Stress Reduction Coeff, r_d	CSR	K_σ for Sand	$CRR_{M=7.5, \sigma'vc = 1 atm}$	CRR	Factor of Safety (CRR/CSR)	Vertical Strain ε_v	Settlement (Inches)
0.160	0.170	0.329	20.0	20.0	16.000	205.438	4.20		Unsaturated	100.0			0.16	1.70	0.27	54.29	1.00	0.400	1.100	n.a.	n.a.	n.a.	0.00	0.00
0.330	0.360	0.741	41.3	41.3	16.455	218.195	4.21		Unsaturated	100.0			0.34	1.70	0.58	54.69	1.00	0.400	1.100	n.a.	n.a.	n.a.	0.00	0.00
0.490	7.730	0.936	61.3	61.3	86.867	12.152	2.77		Unsaturated	84.4			7.31	1.70	12.42	68.69	1.00	0.400	1.100	n.a.	n.a.	n.a.	0.00	0.00
0.660	113.660	0.980	82.5	82.5	543.870	0.863	1.37		Unsaturated	0.0			107.43	1.70	182.63	182.63	1.00	0.400	1.100	n.a.	n.a.	n.a.	0.00	0.00
0.820	94.510	0.512	102.5	102.5	405.651	0.542	1.29		Unsaturated	0.0			89.33	1.70	151.86	151.86	1.00	0.400	1.100	n.a.	n.a.	n.a.	0.00	0.00
0.980	88.190	0.675	122.5	122.5	346.196	0.766	1.44		Unsaturated	0.0			83.36	1.70	141.70	141.70	1.00	0.400	1.100	n.a.	n.a.	n.a.	0.00	0.00
1.150	83.140	0.651	143.8	143.8	301.233	0.783	1.49		Unsaturated	0.0			78.58	1.70	133.59	133.59	1.00	0.400	1.100	n.a.	n.a.	n.a.	0.00	0.00
1.310	87.130	1.082	163.8	163.8	295.761	1.243	1.65		Unsaturated	0.0			82.35	1.70	140.00	140.00	1.00	0.400	1.100	n.a.	n.a.	n.a.	0.00	0.00
1.480	94.090	2.126	185.0	185.0	300.471	2.262	1.86		Unsaturated	11.9			88.93	1.70	151.18	166.89	1.00	0.400	1.100	n.a.	n.a.	n.a.	0.00	0.00
1.640	103.330	2.545	205.0	205.0	313.466	2.465	1.88		Unsaturated	13.7			97.67	1.70	166.03	189.40	1.00	0.400	1.100	n.a.	n.a.	n.a.	0.00	0.00
1.800	91.910	2.413	225.0	225.0	266.080	2.629	1.94		Unsaturated	18.6			86.87	1.70	147.68	186.78	1.00	0.400	1.100	n.a.	n.a.	n.a.	0.00	0.00
1.970	73.470	1.681	246.3	246.3	203.220	2.291	1.96		Unsaturated	19.9			69.44	1.70	118.05	157.26	1.00	0.400	1.100	n.a.	n.a.	n.a.	0.00	0.00
2.130	60.800	1.423	266.3	266.3	161.651	2.345	2.03		Unsaturated	25.4			57.47	1.70	97.69	145.62	1.00	0.400	1.100	n.a.	n.a.	n.a.	0.00	0.00
2.300	55.980	1.554	287.5	287.5	143.176	2.782	2.12		Unsaturated	32.7			52.91	1.70	89.95	146.69	1.00	0.400	1.100	n.a.	n.a.	n.a.	0.00	0.00
2.460	56.070	1.598	307.5	307.5	138.640	2.858	2.14		Unsaturated	34.1			53.00	1.70	90.09	148.42	1.00	0.400	1.100	n.a.	n.a.	n.a.	0.00	0.00
2.620	58.480	1.395	327.5	327.5	140.106	2.392	2.08		Unsaturated	29.0			55.27	1.70	93.97	146.98	1.00	0.400	1.100	n.a.	n.a.	n.a.	0.00	0.00
2.790	58.060	1.203	348.8	348.8	134.768	2.078	2.04		Unsaturated	26.2			54.88	1.70	93.29	141.82	1.00	0.400	1.100	n.a.	n.a.	n.a.	0.00	0.00
2.950	50.260	1.153	368.8	368.8	113.379	2.302	2.12		Unsaturated	32.8			47.50	1.70	80.76	135.72	1.00	0.400	1.100	n.a.	n.a.	n.a.	0.00	0.00
3.120	49.560	1.074	390.0	390.0	108.682	2.176	2.12		Unsaturated	32.4			46.84	1.70	79.63	133.84	1.00	0.400	1.100	n.a.	n.a.	n.a.	0.00	0.00
3.280	51.070	0.905	410.0	410.0	109.219	1.780	2.05		Unsaturated	27.2			48.27	1.70	82.06	130.07	1.00	0.400	1.100	n.a.	n.a.	n.a.	0.00	0.00
3.440	48.220	0.773	430.0	430.0	100.652	1.610	2.05		Unsaturated	26.7			45.58	1.70	77.48	123.97	1.00	0.400	1.100	n.a.	n.a.	n.a.	0.00	0.00
3.610	37.590	0.714	451.3	451.3	76.475	1.910	2.18		Unsaturated	37.7			35.53	1.70	60.40	115.24	1.00	0.400	1.100	n.a.	n.a.	n.a.	0.00	0.00
3.770	34.520	0.694	471.3	471.3	68.666	2.024	2.24		Unsaturated	41.8			32.63	1.70	55.47	111.95	1.00	0.400	1.100	n.a.	n.a.	n.a.	0.00	0.00
3.940	33.210	0.808	492.5	492.5	64.581	2.452	2.31		Unsaturated	48.0			31.39	1.70	53.36	112.60	1.00	0.400	1.100	n.a.	n.a.	n.a.	0.00	0.00
4.100	34.650	0.944	512.5	512.5	66.055	2.745	2.34		Unsaturated	50.2			32.75	1.70	55.68	116.50	1.00	0.399	1.100	n.a.	n.a.	n.a.	0.00	0.00
4.270	36.380	1.271	533.8	533.8	67.962	3.519	2.41		Unsaturated	55.7			34.39	1.70	58.46	122.17	1.00	0.399	1.100	n.a.	n.a.	n.a.	0.00	0.00
4.430	37.950	1.400	553.8	553.8	69.606	3.716	2.42		Unsaturated	56.5			35.87	1.70	60.98	125.68	1.00	0.399	1.100	n.a.	n.a.	n.a.	0.00	0.00
4.590	40.560	1.641	573.8	573.8	73.101	4.074	2.43		Unsaturated	57.8			38.34	1.70	65.17	131.45	1.00	0.399	1.100	n.a.	n.a.	n.a.	0.00	0.00
4.760	41.590	1.535	595.0	595.0	73.601	3.717	2.40		Unsaturated	55.2			39.31	1.70	66.83	132.67	1.00	0.399	1.100	n.a.	n.a.	n.a.	0.00	0.00
4.920	48.610	1.111	615.0	615.0	84.685	2.300	2.21		Unsaturated	39.7			45.95	1.69	77.55	137.99	1.00	0.399	1.100	n.a.	n.a.	n.a.	0.00	0.00
5.090	44.960	1.028	636.3	636.3	76.949	2.302	2.24		Unsaturated	42.1			42.50	1.68	71.58	132.21	1.00	0.399	1.100	n.a.	n.a.	n.a.	0.00	0.00
5.250	46.350	0.963	656.3	656.3	78.109	2.092	2.20		Unsaturated	39.4			43.81	1.66	72.85	131.91	1.00	0.399	1.100	n.a.	n.a.	n.a.	0.00	0.00
5.410	51.880	0.860	676.3	676.3	86.174	1.668	2.11		Unsaturated	31.5			49.04	1.64	80.22	133.55	1.00	0.398	1.100	n.a.	n.a.	n.a.	0.00	0.00
5.580	55.420	0.836	697.5	697.5	90.662	1.518	2.06		Unsaturated	28.0			52.38	1.61	84.47	134.08	1.00	0.398	1.100	n.a.	n.a.	n.a.	0.00	0.00
5.740	58.540	0.876	717.5	717.5	94.437	1.506	2.05		Unsaturated	26.7			55.33	1.59	87.79	136.17	1.00	0.398	1.100	n.a.	n.a.	n.a.	0.00	0.00
5.910	58.570	1.045	738.8	738.8	93.100	1.795	2.10		Unsaturated	31.3			55.36	1.55	86.07	140.43	1.00	0.398	1.100	n.a.	n.a.	n.a.	0.00	0.00
6.070	59.380	1.234	758.8	758.8	93.128	2.091	2.15		Unsaturated	35.1			56.12	1.53	85.74	144.08	1.00	0.398	1.100	n.a.	n.a.	n.a.	0.00	0.00
6.230	61.900	1.431	778.8	778.8	95.835	2.327	2.18		Unsaturated	37.0			58.51	1.50	87.78	148.45	1.00	0.398	1.100	n.a.	n.a.	n.a.	0.00	0.00
6.400	60.670	1.871	800.0	800.0	92.646	3.105	2.28		Unsaturated	45.3			57.34	1.48	84.79	150.71	0.99	0.398	1.100	n.a.	n.a.	n.a.	0.00	0.00
6.560	59.080	2.288	820.0	820.0	89.080	3.899	2.36		Unsaturated	52.2			55.84	1.46	81.79	150.45	0.99	0.398	1.100	n.a.	n.a.	n.a.	0.00	0.00
6.730	58.270	2.644	841.3	841.3	86.718	4.570	2.43		Unsaturated	57.0			55.08	1.45	79.89	149.98	0.99	0.397	1.100	n.a.	n.a.	n.a.	0.00	0.00
6.890	56.910	2.872	861.3	861.3	83.675	5.085	2.47		Unsaturated	60.7			53.79	1.44	77.50	148.16	0.99	0.397	1.100	n.a.	n.a.	n.a.	0.00	0.00
7.050	53.120	3.199	881.3	881.3	77.155	6.072	2.55		Unsaturated	67.2			50.21	1.44	72.20	143.19	0.99	0.397	1.100	n.a.	n.a.	n.a.	0.00	0.00
7.220	50.470	3.343	902.5	902.5	85.841	6.684	2.56		Unsaturated	67.6			47.70	1.43	68.40	138.39	0.99	0.397	1.100	n.a.	n.a.	n.a.	0.00	0.00
7.380	49.880	3.465	922.5	922.5	83.520	7.011	2.58		Unsaturated	69.5			47.15	1.42	67.10	137.15	0.99	0.397	1.100	n.a.	n.a.	n.a.	0.00	0.00
7.550	48.040	3.431	943.8	943.8	79.121	7.212	2.61		Unsaturated	71.4			45.41	1.42	64.29	133.95	0.99	0.397	1.100	n.a.	n.a.	n.a.	0.00	0.00
7.710	49.170	3.282	963.8	963.8	79.804	6.740	2.58		Unsaturated	69.4			46.47	1.40	65.15	134.61	0.99	0.397	1.100	n.a.	n.a.	n.a.	0.00	0.00
7.870	50.420	3.322	983.8	983.8	80.668	6.654	2.57		Unsaturated	68.8			47.66	1.39	66.12	135.73	0.99	0.397	1.100	n.a.	n.a.	n.a.	0.00	0.00
8.040	52.150	3.013	1005.0	1005.0	70.833	5.835	2.56		Unsaturated	68.0			49.29	1.37	67.62	137.47	0.99	0.396	1.100	n.a.	n.a.	n.a.	0.00	0.00
8.200	53.850	3.089	1025.0	1025.0	72.434	5.791	2.55		Unsaturated	67.3			50.90	1.36	69.09	139.20	0.99	0.396	1.100	n.a.	n.a.	n.a.	0.00	0.00
8.370	52.550	3.213	1046.3	1046.3	69.933	6.176	2.59		Unsaturated	69.8			49.67	1.35	67.01	137.11	0.99	0.396	1.100	n.a.	n.a.	n.a.	0.00	0.00
8.530	57.020	3.052	1066.3	1066.3	75.213	5.402	2.52		Unsaturated	64.6			53.89	1.33	71.72	141.89	0.99	0.396	1.100	n.a.	n.a.	n.a.	0.00	0.00
8.690	59.770	2.640	1086.3	1086.3	78.131	4.458	2.45		Unsaturated	58.6			56.49	1.32	74.45	143.60	0.99	0.396	1.100	n.a.	n.a.	n.a.	0.00	0.00
8.860	61.400	2.212	1107.5	1107.5	79.494	3.636	2.37		Unsaturated	52.9			58.03	1.31	75.90	143.29	0.99	0.396	1.098	n.a.	n.a.	n.a.	0.00	0.00
9.020	60.100	1.953	1127.5	1127.5	77.090	3.280	2.35		Unsaturated	50.9			56.81	1.30	74.00	140.04	0.99	0.396	1.092	n.a.	n.a.	n.a.	0.00	0.00
9.190	58.340	1.812	1148.8	1148.8	74.102	3.136	2.35		Unsaturated	50.7			55.14	1.30	71.52	136.80	0.99	0.395	1.087	n.a.	n.a.	n.a.	0.00	0.00
9.350	55.140	1.389	1168.8	1168.8	69.383	2.545	2.30		Unsaturated	47.1			52.12	1.30	67.58	130.09	0.99	0.395	1.080	n.a.	n.a.	n.a.	0.00	0.00
9.510	52.360	1.264	1188.8	1188.8	65.278	2.442	2.31		Unsaturated	47.6			49.49	1.29	63.99	125.82	0.99	0.395	1.075	n.a.	n.a.	n.a.	0.00	0.00
9.680	49.130	1.168	1210.0	1210.0	60.652	2.406	2.33		Unsaturated	49.1			46.44	1.29	59.86	121.31	0.99	0.395	1.070	n.a.	n.a.	n.a.	0.00	0.00
9.840	45.200	1.147	1230.0	1230.0	55.272	2.572	2.38		Unsaturated	53.0			42.72	1.29	54.93	116.71	0.99	0.395	1.066	n.a.	n.a.	n.a.	0.00	0.00
10.010	42.460	1.255	1251.3	1251.3	51.420	3.000	2.44		Unsaturated	58.5			40.13	1.28	51.33	114.01	0.99	0.395	1.062	n.a.	n.a.	n.a.	0.00	0.00
10.170	43.620	1.331	1271.3	1271.3	52.416	3.097	2.45		Unsaturated	58.8			41.23	1.27	52.28	115.30	0.99	0.395	1.061	n.a.	n.a.	n.a.	0.00	0.00
10.330	44.660	1.427	1291.3	1291.3	53.255	3.241	2.46		Unsaturated	59.5			42.21	1.26	53.07	116.53	0.99	0.395	1.060	n.a.	n.a.	n.a.	0.00	0.00
10.500	45.950	1.573	1312.5	1312.5	54.358	3.473	2.47		Unsaturated	60.7			43.43	1.25	54.11	118.21	0.99	0.394	1.059	n.a.	n.a.	n.a.	0.00	0.00

CORNERSTONE EARTH GROUP

CPT No. 2

PGA (A_{max}) 0.62

Total Settlement: 0.27 (Inches)

Depth (ft)	q_c (tsf)	f_s (tsf)	σ_{vc} (psf)	Insitu σ'_{vc} (psf)	Q	F (%)	I_c	Layer "Plastic" PI > 7	Flag Soil Type	Fines (%)	q_{cN} near interfaces (soft layer)	Thin Layer Factor (K_H)	Interpreted q_{cN}	C_N	q_{c1N}	q_{c1N-CS}	Stress Reduction Coeff, r_d	CSR	K_σ for Sand	$CRR_{M=7.5, \sigma'vc = 1 atm}$	CRR	Factor of Safety (CRR/CSR)	Vertical Strain ε_v	Settlement (Inches)
10.660	49.950	1.532	1332.5	1332.5	58.701	3.109	2.41		Unsaturated	56.1			47.21	1.23	58.21	122.01	0.99	0.394	1.059	n.a.	n.a.	n.a.	0.00	0.00
10.830	51.690	1.337	1353.8	1353.8	60.282	2.621	2.35		Unsaturated	51.3			48.86	1.22	59.80	122.20	0.99	0.394	1.057	n.a.	n.a.	n.a.	0.00	0.00
10.990	52.670	1.285	1373.8	1373.8	60.979	2.472	2.33		Unsaturated	49.6			49.78	1.22	60.52	122.38	0.99	0.394	1.055	n.a.	n.a.	n.a.	0.00	0.00
11.150	53.530	1.291	1393.8	1393.8	61.530	2.443	2.33		Unsaturated	49.1			50.60	1.21	61.09	122.86	0.99	0.394	1.053	n.a.	n.a.	n.a.	0.00	0.00
11.320	54.380	0.889	1415.0	1415.0	62.036	1.656	2.21		Unsaturated	39.8			51.40	1.20	61.84	118.55	0.98	0.394	1.050	n.a.	n.a.	n.a.	0.00	0.00
11.480	57.140	0.879	1435.0	1435.0	64.759	1.558	2.18		Unsaturated	37.3			54.01	1.19	64.49	119.95	0.98	0.393	1.048	n.a.	n.a.	n.a.	0.00	0.00
11.650	53.680	0.971	1456.3	1456.3	60.330	1.833	2.25		Unsaturated	42.9			50.74	1.19	60.24	118.53	0.98	0.393	1.046	n.a.	n.a.	n.a.	0.00	0.00
11.810	57.340	1.032	1476.3	1476.3	64.051	1.823	2.23		Unsaturated	41.2			54.20	1.18	63.80	121.91	0.98	0.393	1.046	n.a.	n.a.	n.a.	0.00	0.00
11.980	60.860	0.991	1497.5	1497.5	67.537	1.648	2.18		Unsaturated	37.5			57.52	1.17	67.21	123.45	0.98	0.393	1.044	n.a.	n.a.	n.a.	0.00	0.00
12.140	65.510	1.422	1517.5	1517.5	72.270	2.196	2.24		Unsaturated	42.5			61.92	1.16	71.52	132.39	0.98	0.393	1.046	n.a.	n.a.	n.a.	0.00	0.00
12.300	68.580	1.455	1537.5	1537.5	75.191	2.146	2.22		Unsaturated	40.9			64.82	1.15	74.34	134.88	0.98	0.393	1.045	n.a.	n.a.	n.a.	0.00	0.00
12.470	67.330	1.043	1558.8	1558.8	73.289	1.567	2.14		Unsaturated	34.2			63.64	1.14	72.86	127.47	0.98	0.393	1.040	n.a.	n.a.	n.a.	0.00	0.00
12.630	67.240	0.773	1578.8	1578.8	72.713	1.164	2.06		Unsaturated	27.7			63.55	1.14	72.66	119.70	0.98	0.392	1.036	n.a.	n.a.	n.a.	0.00	0.00
12.800	72.210	0.525	1600.0	1600.0	77.620	0.735	1.92		Unsaturated	16.4			68.25	1.15	78.29	103.35	0.98	0.392	1.031	n.a.	n.a.	n.a.	0.00	0.00
12.960	73.640	0.627	1620.0	1620.0	78.673	0.861	1.95		Unsaturated	19.2			69.60	1.14	79.00	111.28	0.98	0.392	1.031	n.a.	n.a.	n.a.	0.00	0.00
13.120	64.270	0.881	1640.0	1640.0	68.121	1.388	2.13		Unsaturated	33.4			60.75	1.12	68.21	121.00	0.98	0.392	1.032	n.a.	n.a.	n.a.	0.00	0.00
13.290	54.120	1.064	1661.3	1661.3	56.845	1.996	2.29		Unsaturated	46.4			51.15	1.12	57.22	116.68	0.98	0.392	1.029	n.a.	n.a.	n.a.	0.00	0.00
13.450	47.350	1.103	1681.3	1681.3	49.317	2.370	2.39		Unsaturated	54.0			44.75	1.12	49.92	110.71	0.98	0.392	1.027	n.a.	n.a.	n.a.	0.00	0.00
13.620	41.530	1.078	1702.5	1702.5	42.864	2.650	2.47		Unsaturated	60.2			39.25	1.11	43.65	104.66	0.98	0.392	1.024	n.a.	n.a.	n.a.	0.00	0.00
13.780	43.050	1.231	1722.5	1722.5	44.197	2.917	2.48		Unsaturated	61.7			40.69	1.10	44.95	106.72	0.98	0.391	1.023	n.a.	n.a.	n.a.	0.00	0.00
13.940	47.270	1.286	1742.5	1742.5	48.327	2.772	2.44		Unsaturated	58.2			44.68	1.10	48.99	110.92	0.98	0.391	1.022	n.a.	n.a.	n.a.	0.00	0.00
14.110	59.450	1.399	1763.8	1763.8	60.634	2.389	2.32		Unsaturated	48.9			56.19	1.09	61.01	122.69	0.98	0.391	1.023	n.a.	n.a.	n.a.	0.00	0.00
14.270	56.010	1.414	1783.8	1783.8	56.741	2.566	2.37		Unsaturated	52.3			52.94	1.08	57.25	119.37	0.98	0.391	1.021	n.a.	n.a.	n.a.	0.00	0.00
14.440	55.060	1.585	1805.0	1805.0	55.423	2.927	2.41		Unsaturated	56.1			52.04	1.08	55.98	119.13	0.98	0.391	1.020	n.a.	n.a.	n.a.	0.00	0.00
14.600	56.530	1.719	1825.0	1825.0	56.605	3.090	2.42		Unsaturated	56.9			53.43	1.07	57.15	120.91	0.98	0.391	1.019	n.a.	n.a.	n.a.	0.00	0.00
14.760	52.750	2.184	1845.0	1845.0	52.461	4.214	2.54		Unsaturated	66.4			49.86	1.07	53.10	118.39	0.98	0.390	1.017	n.a.	n.a.	n.a.	0.00	0.00
14.930	50.170	2.456	1866.3	1866.3	50.814	4.989	2.61		Unsaturated	71.5			47.42	1.06	50.27	115.83	0.98	0.390	1.015	n.a.	n.a.	n.a.	0.00	0.00
15.090	54.870	1.905	1886.3	1886.3	53.986	3.532	2.48		Unsaturated	61.3			51.86	1.05	54.67	119.09	0.98	0.390	1.014	n.a.	n.a.	n.a.	0.00	0.00
15.260	78.620	1.360	1907.5	1907.5	77.317	1.751	2.15		Unsaturated	35.4			74.31	1.05	77.70	134.54	0.98	0.390	1.015	n.a.	n.a.	n.a.	0.00	0.00
15.420	131.330	0.974	1927.5	1927.5	129.104	0.747	1.74		Unsaturated	2.5			124.13	1.04	129.32	129.32	0.97	0.390	1.013	n.a.	n.a.	n.a.	0.00	0.00
15.580	171.360	0.895	1947.5	1947.5	167.868	0.525	1.56		Unsaturated	0.0			161.97	1.03	167.10	167.10	0.97	0.390	1.015	n.a.	n.a.	n.a.	0.00	0.00
15.750	167.490	0.882	1968.8	1968.8	163.157	0.530	1.57		Unsaturated	0.0			158.31	1.03	162.74	162.74	0.97	0.389	1.013	n.a.	n.a.	n.a.	0.00	0.00
15.910	159.770	0.745	1988.8	1988.8	154.798	0.469	1.56		Unsaturated	0.0			151.01	1.02	154.76	154.76	0.97	0.389	1.010	n.a.	n.a.	n.a.	0.00	0.00
16.080	149.930	0.879	2010.0	2010.0	144.425	0.590	1.64		Unsaturated	0.0			141.71	1.02	144.74	144.74	0.97	0.389	1.008	n.a.	n.a.	n.a.	0.00	0.00
16.240	143.020	0.900	2030.0	2030.0	137.034	0.633	1.68		Unsaturated	0.0			135.18	1.02	137.58	137.58	0.97	0.389	1.006	n.a.	n.a.	n.a.	0.00	0.00
16.400	136.560	0.818	2050.0	2050.0	130.151	0.603	1.68		Unsaturated	0.0			129.07	1.01	130.87	130.87	0.97	0.389	1.004	n.a.	n.a.	n.a.	0.00	0.00
16.570	118.980	0.667	2071.3	2071.3	112.676	0.565	1.72		Unsaturated	0.6			112.46	1.01	113.59	113.59	0.97	0.389	1.003	n.a.	n.a.	n.a.	0.00	0.00
16.730	89.730	0.999	2091.3	2091.3	84.317	1.126	2.00		Unsaturated	23.0			84.81	1.01	85.26	126.70	0.97	0.388	1.002	n.a.	n.a.	n.a.	0.00	0.00
16.900	69.180	1.348	2112.5	2112.5	64.442	1.979	2.25		Unsaturated	42.9			65.39	1.00	65.44	125.06	0.97	0.388	1.000	n.a.	n.a.	n.a.	0.00	0.00
17.060	39.510	1.477	2132.5	2132.5	36.055	3.842	2.63		Clay	73.4			37.34	1.00	n.a.	n.a.	0.97	0.389	n.a.	n.a.	n.a.	n.a.	0.00	0.00
17.220	36.140	1.601	2152.5	2152.5	32.580	4.567	2.71		Clay	80.1			34.16	1.00	n.a.	n.a.	0.97	0.390	n.a.	n.a.	n.a.	n.a.	0.00	0.00
17.390	46.150	1.550	2173.8	2173.8	42.023	3.439	2.55		Sand	66.9			43.62	0.99	43.05	105.55	0.97	0.392	0.997	0.145	0.187	0.48	0.03	0.04
17.550	35.960	1.162	2193.8	2193.8	31.784	3.333	2.63		Clay	73.3			33.99	0.99	n.a.	n.a.	0.97	0.394	n.a.	n.a.	n.a.	n.a.	0.00	0.00
17.720	21.690	0.804	2215.0	2215.0	18.585	3.907	2.85		Clay	91.1			20.50	0.99	n.a.	n.a.	0.97	0.395	n.a.	n.a.	n.a.	n.a.	0.00	0.00
17.880	18.960	0.711	2235.0	2235.0	15.966	3.987	2.91		Clay	95.6			17.92	0.99	n.a.	n.a.	0.97	0.397	n.a.	n.a.	n.a.	n.a.	0.00	0.00
18.040	19.350	0.965	2255.0	2255.0	16.162	5.296	2.98		Clay	100.0			18.29	0.98	n.a.	n.a.	0.97	0.399	n.a.	n.a.	n.a.	n.a.	0.00	0.00
18.210	20.540	1.168	2276.3	2276.3	17.047	6.020	3.00		Clay	100.0			19.41	0.98	n.a.	n.a.	0.97	0.400	n.a.	n.a.	n.a.	n.a.	0.00	0.00
18.370	23.610	1.209	2296.3	2296.3	19.564	5.384	2.92		Clay	97.0			22.32	0.98	n.a.	n.a.	0.97	0.402	n.a.	n.a.	n.a.	n.a.	0.00	0.00
18.540	23.480	1.202	2317.5	2317.5	19.263	5.386	2.93		Clay	97.4			22.19	0.98	n.a.	n.a.	0.97	0.403	n.a.	n.a.	n.a.	n.a.	0.00	0.00
18.700	24.070	1.197	2337.5	2337.5	19.595	5.226	2.92		Clay	96.2			22.75	0.97	n.a.	n.a.	0.97	0.405	n.a.	n.a.	n.a.	n.a.	0.00	0.00
18.860	24.670	1.257	2357.5	2357.5	19.929	5.350	2.92		Clay	96.3			23.32	0.97	n.a.	n.a.	0.97	0.406	n.a.	n.a.	n.a.	n.a.	0.00	0.00
19.030	25.390	1.347	2378.8	2378.8	20.347	5.566	2.92		Clay	96.7			24.00	0.97	n.a.	n.a.	0.97	0.408	n.a.	n.a.	n.a.	n.a.	0.00	0.00
19.190	26.680	1.408	2398.8	2398.8	21.245	5.524	2.91		Clay	95.4			25.22	0.97	n.a.	n.a.	0.97	0.409	n.a.	n.a.	n.a.	n.a.	0.00	0.00
19.360	26.970	1.474	2420.0	2420.0	21.289	5.722	2.92		Clay	96.2			25.49	0.97	n.a.	n.a.	0.96	0.411	n.a.	n.a.	n.a.	n.a.	0.00	0.00
19.520	26.350	1.449	2440.0	2440.0	20.598	5.767	2.93		Clay	97.2			24.91	0.96	n.a.	n.a.	0.96	0.412	n.a.	n.a.	n.a.	n.a.	0.00	0.00
19.690	27.440	1.467	2461.3	2461.3	21.298	5.598	2.91		Clay	95.7			25.94	0.96	n.a.	n.a.	0.96	0.414	n.a.	n.a.	n.a.	n.a.	0.00	0.00
19.850	26.650	1.468	2481.3	2481.3	20.481	5.777	2.93		Clay	97.4			25.19	0.96	n.a.	n.a.	0.96	0.415	n.a.	n.a.	n.a.	n.a.	0.00	0.00
20.010	26.000	1.465	2501.3	2501.3	19.790	5.918	2.95		Clay	98.9			24.57	0.96	n.a.	n.a.	0.96	0.416	n.a.	n.a.	n.a.	n.a.	0.00	0.00
20.180	26.230	1.404	2522.5	2522.5	19.797	5.621	2.93		Clay	97.7			24.79	0.95	n.a.	n.a.	0.96	0.418	n.a.	n.a.	n.a.	n.a.	0.00	0.00
20.340	26.280	1.403	2542.5	2542.5	19.673	5.608	2.93		Clay	97.8			24.84	0.95	n.a.	n.a.	0.96	0.419	n.a.	n.a.	n.a.	n.a.	0.00	0.00
20.510	26.390	1.427	2563.8	2563.8	19.587	5.684	2.94		Clay	98.2			24.94	0.95	n.a.	n.a.	0.96	0.421	n.a.	n.a.	n.a.	n.a.	0.00	0.00
20.670	26.310	1.413	2583.8	2583.8	19.366	5.649	2.94		Clay	98.3			24.87	0.95	n.a.	n.a.	0.96	0.422	n.a.	n.a.	n.a.	n.a.	0.00	0.00
20.830	27.210	1.319	2603.8	2603.8	19.901	5.092	2.90		Clay	95.2			25.72	0.95	n.a.	n.a.	0.96	0.423	n.a.	n.a.	n.a.	n.a.	0.00	0.00
21.000	25.520	1.206	2625.0	2625.0	18.444	4.982	2.92		Clay	96.7			24.12	0.94	n.a.	n.a.	0.96	0.425	n.a.	n.a.	n.a.	n.a.	0.00	0.00

CORNERSTONE EARTH GROUP

CPT No. 2

PGA (A_{max}) 0.62

Total Settlement: 0.27 (Inches)

Depth (ft)	q_c (tsf)	f_s (tsf)	σ_{vc} (psf)	Insitu σ'_{vc} (psf)	Q	F (%)	I_c	Layer "Plastic" PI > 7	Flag Soil Type	Fines (%)	q_{cN} near interfaces (soft layer)	Thin Layer Factor (K_H)	Interpreted q_{cN}	C_N	q_{c1N}	$q_{c1N\text{-}CS}$	Stress Reduction Coeff, r_d	CSR	K_σ for Sand	$CRR_{M=7.5,\ \sigma'vc = 1\ atm}$	CRR	Factor of Safety (CRR/CSR)	Vertical Strain ε_v	Settlement (Inches)
21.160	24.520	1.111	2645.0	2645.0	17.541	4.789	2.93		Clay	97.1			23.18	0.94	n.a.	n.a.	0.96	0.426	n.a.	n.a.	n.a.	n.a.	0.00	0.00
21.330	24.430	1.042	2666.3	2666.3	17.325	4.510	2.91		Clay	96.1			23.09	0.94	n.a.	n.a.	0.96	0.427	n.a.	n.a.	n.a.	n.a.	0.00	0.00
21.490	25.270	1.020	2686.3	2686.3	17.814	4.264	2.89		Clay	94.1			23.88	0.94	n.a.	n.a.	0.96	0.428	n.a.	n.a.	n.a.	n.a.	0.00	0.00
21.650	26.650	1.099	2706.3	2706.3	18.695	4.344	2.88		Clay	93.3			25.19	0.94	n.a.	n.a.	0.96	0.430	n.a.	n.a.	n.a.	n.a.	0.00	0.00
21.820	26.240	1.174	2727.5	2727.5	18.241	4.720	2.91		Clay	95.8			24.80	0.94	n.a.	n.a.	0.96	0.431	n.a.	n.a.	n.a.	n.a.	0.00	0.00
21.980	26.910	1.190	2747.5	2747.5	18.589	4.660	2.90		Clay	95.0			25.43	0.93	n.a.	n.a.	0.96	0.432	n.a.	n.a.	n.a.	n.a.	0.00	0.00
22.150	25.920	1.163	2768.8	2768.8	17.723	4.741	2.92		Clay	96.6			24.50	0.93	n.a.	n.a.	0.96	0.433	n.a.	n.a.	n.a.	n.a.	0.00	0.00
22.310	25.640	1.204	2788.8	2788.8	17.388	4.964	2.94		Clay	98.2			24.23	0.93	n.a.	n.a.	0.96	0.434	n.a.	n.a.	n.a.	n.a.	0.00	0.00
22.470	26.030	1.298	2808.8	2808.8	17.535	5.270	2.95		Clay	99.3			24.60	0.93	n.a.	n.a.	0.96	0.436	n.a.	n.a.	n.a.	n.a.	0.00	0.00
22.640	26.510	1.371	2830.0	2830.0	17.735	5.463	2.96		Clay	99.8			25.06	0.93	n.a.	n.a.	0.96	0.437	n.a.	n.a.	n.a.	n.a.	0.00	0.00
22.800	27.250	1.425	2850.0	2850.0	18.123	5.519	2.96		Clay	99.5			25.76	0.92	n.a.	n.a.	0.96	0.438	n.a.	n.a.	n.a.	n.a.	0.00	0.00
22.970	28.390	1.742	2871.3	2871.3	18.775	6.462	2.99		Clay	100.0			26.83	0.92	n.a.	n.a.	0.95	0.439	n.a.	n.a.	n.a.	n.a.	0.00	0.00
23.130	29.820	2.056	2891.3	2891.3	19.628	7.247	3.01		Clay	100.0			28.19	0.92	n.a.	n.a.	0.95	0.440	n.a.	n.a.	n.a.	n.a.	0.00	0.00
23.290	32.430	2.178	2911.3	2911.3	21.279	7.031	2.98		Clay	100.0			30.65	0.92	n.a.	n.a.	0.95	0.441	n.a.	n.a.	n.a.	n.a.	0.00	0.00
23.460	32.600	2.068	2932.5	2932.5	21.234	6.643	2.96		Clay	99.8			30.81	0.92	n.a.	n.a.	0.95	0.443	n.a.	n.a.	n.a.	n.a.	0.00	0.00
23.620	28.850	1.798	2952.5	2952.5	18.543	6.569	3.00		Clay	100.0			27.27	0.92	n.a.	n.a.	0.95	0.444	n.a.	n.a.	n.a.	n.a.	0.00	0.00
23.790	25.640	1.598	2973.8	2973.8	16.244	6.614	3.04		Clay	100.0			24.23	0.91	n.a.	n.a.	0.95	0.445	n.a.	n.a.	n.a.	n.a.	0.00	0.00
23.950	23.760	1.567	2993.8	2993.8	14.873	7.039	3.09		Clay	100.0			22.46	0.91	n.a.	n.a.	0.95	0.446	n.a.	n.a.	n.a.	n.a.	0.00	0.00
24.110	24.030	1.751	3013.8	3013.8	14.947	7.773	3.12		Clay	100.0			22.71	0.91	n.a.	n.a.	0.95	0.447	n.a.	n.a.	n.a.	n.a.	0.00	0.00
24.280	26.400	2.276	3035.0	3035.0	16.397	9.148	3.14		Clay	100.0			24.95	0.91	n.a.	n.a.	0.95	0.448	n.a.	n.a.	n.a.	n.a.	0.00	0.00
24.440	29.740	2.390	3055.0	3055.0	18.470	8.471	3.08		Clay	100.0			28.11	0.91	n.a.	n.a.	0.95	0.449	n.a.	n.a.	n.a.	n.a.	0.00	0.00
24.610	54.170	2.431	3076.3	3076.3	34.218	4.619	2.70		Clay	79.1			51.20	0.91	n.a.	n.a.	0.95	0.450	n.a.	n.a.	n.a.	n.a.	0.00	0.00
24.770	83.080	2.180	3096.3	3096.3	63.706	2.674	2.34		Sand	50.4	81.98		81.98	0.85	69.59	134.22	0.95	0.451	0.947	0.211	0.301	0.67	0.02	0.03
24.930	86.730	1.824	3116.3	3116.3	66.336	2.141	2.26		Sand	44.0			81.98	0.84	69.22	130.46	0.95	0.452	0.948	0.199	0.277	0.61	0.02	0.03
25.100	84.880	1.705	3137.5	3137.5	64.667	2.047	2.26		Sand	43.6			80.23	0.84	67.42	127.96	0.95	0.453	0.948	0.191	0.263	0.58	0.02	0.03
25.260	85.580	1.998	3157.5	3157.5	64.996	2.378	2.30		Sand	47.1			80.89	0.84	67.91	130.49	0.95	0.454	0.946	0.199	0.277	0.61	0.02	0.03
25.430	98.990	2.771	3178.8	3178.8	75.111	2.845	2.31		Sand	47.9			93.56	0.85	79.14	145.08	0.95	0.455	0.938	0.259	0.392	0.86	0.01	0.01
25.590	121.700	3.453	3198.8	3198.8	92.327	2.875	2.25		Sand	43.3			115.03	0.86	98.43	166.58	0.95	0.456	0.923	0.451	0.783	1.72	0.00	0.00
25.750	122.410	3.374	3218.8	3218.8	92.576	2.793	2.24		Sand	42.5			115.70	0.85	98.77	166.43	0.95	0.457	0.922	0.449	0.778	1.70	0.00	0.00
25.920	117.220	3.228	3240.0	3240.0	88.299	2.792	2.26		Sand	43.6			110.79	0.85	94.02	161.25	0.95	0.458	0.925	0.385	0.643	1.40	0.00	0.00
26.080	114.970	2.857	3260.0	3260.0	86.307	2.520	2.23		Sand	41.6			108.67	0.84	91.73	156.97	0.95	0.459	0.927	0.342	0.556	1.21	0.01	0.01
26.250	107.220	2.458	3281.3	3281.3	80.137	2.328	2.23		Sand	41.4			101.34	0.84	84.80	148.19	0.94	0.460	0.931	0.277	0.425	0.92	0.01	0.01
26.410	108.750	2.784	3301.3	3301.3	81.044	2.600	2.26		Sand	43.9			102.79	0.84	86.00	151.35	0.94	0.461	0.928	0.298	0.465	1.01	0.01	0.01
26.570	137.890	2.732	3321.3	3321.3	102.776	2.005	2.11		Sand	31.6			130.33	0.85	110.22	170.04	0.94	0.461	0.913	0.504	0.890	1.93	0.00	0.00
26.740	194.860	2.611	3342.5	3342.5	145.284	1.352	1.88		Sand	13.4			184.18	0.85	156.22	178.01	0.94	0.462	0.905	0.672	1.250	2.70	0.00	0.00
26.900	208.620	2.770	3362.5	3362.5	155.161	1.339	1.86		Sand	11.6			197.18	0.85	167.43	182.81	0.94	0.463	0.899	0.815	1.566	3.38	0.00	0.00
27.070	190.450	2.983	3383.8	3383.8	141.084	1.580	1.94		Sand	18.1			180.01	0.85	153.39	191.60	0.94	0.464	0.888	1.215	2.372	5.11	0.00	0.00
27.230	179.410	3.280	3403.8	3403.8	132.434	1.846	2.01		Sand	23.5			169.57	0.85	144.70	196.82	0.94	0.465	0.880	1.587	3.071	6.60	0.00	0.00
27.400	163.250	3.210	3425.0	3425.0	120.009	1.987	2.06		Sand	27.7			154.30	0.85	130.70	188.77	0.94	0.466	0.888	1.061	2.074	4.45	0.00	0.00
27.560	152.100	2.540	3445.0	3445.0	111.394	1.689	2.03		Sand	25.4			143.76	0.84	120.11	172.03	0.94	0.467	0.905	0.539	0.958	2.05	0.00	0.00
27.720	145.890	2.825	3465.0	3465.0	106.477	1.959	2.09		Sand	30.2			137.89	0.83	115.13	174.03	0.94	0.468	0.902	0.579	1.041	2.23	0.00	0.00
27.890	186.690	2.866	3486.3	3486.3	136.188	1.550	1.94		Sand	18.4			176.46	0.84	148.38	187.09	0.94	0.468	0.886	0.982	1.915	4.09	0.00	0.00
28.050	242.290	2.695	3506.3	3506.3	176.617	1.120	1.76		Sand	4.0			229.01	0.84	192.98	193.01	0.94	0.469	0.877	1.303	2.514	5.36	0.00	0.00
28.220	266.320	3.131	3527.5	3527.5	193.667	1.184	1.75		Sand	3.2			251.72	0.85	214.80	214.81	0.94	0.470	0.847	4.849	9.032	19.22	0.00	0.00
28.380	352.600	2.915	3547.5	3547.5	256.096	0.831	1.56		Sand	0.0			333.27	0.87	290.80	290.80	0.94	0.471	0.845	72830.338	########	287560.97	0.00	0.00
28.540	342.970	3.078	3567.5	3567.5	248.360	0.902	1.59		Sand	0.0			324.17	0.87	282.44	282.44	0.94	0.472	0.843	15247.840	28288.666	59985.56	0.00	0.00
28.710	312.590	2.909	3588.8	3588.8	225.567	0.936	1.63		Sand	0.0			295.45	0.87	257.02	257.02	0.94	0.472	0.842	311.108	575.966	1219.23	0.00	0.00
28.870	356.730	2.510	3608.8	3608.8	256.880	0.707	1.51		Sand	0.0			337.17	0.87	292.88	292.88	0.94	0.473	0.840	#########	########	429860.83	0.00	0.00
29.040	388.290	2.654	3630.0	3630.0	278.895	0.687	1.47		Sand	0.0			367.00	0.87	318.30	318.30	0.94	0.474	0.838	#########	########	##########	0.00	0.00
29.200	341.910	2.218	3650.0	3650.0	244.745	0.652	1.50		Sand	0.0	367		367.00	0.87	317.83	317.83	0.94	0.475	0.836	#########	########	##########	0.00	0.00
29.360	296.540	1.710	3670.0	3670.0	211.508	0.580	1.51		Sand	0.0	367		367.00	0.86	317.37	317.37	0.94	0.475	0.835	#########	########	##########	0.00	0.00
29.530	262.490	0.886	3691.3	3691.3	186.524	0.340	1.42		Sand	0.0	367		367.00	0.86	316.89	316.89	0.93	0.476	0.833	#########	########	##########	0.00	0.00
29.690	232.950	0.825	3711.3	3711.3	164.931	0.357	1.47		Sand	0.0	367		367.00	0.86	316.44	316.44	0.93	0.477	0.831	#########	########	##########	0.00	0.00
29.860	181.770	1.384	3732.5	3732.5	128.030	0.769	1.76		Sand	3.4	367		367.00	0.86	315.96	315.97	0.93	0.478	0.830	#########	########	##########	0.00	0.00
30.020	104.040	1.535	3752.5	3752.5	72.512	1.502	2.13		Sand	33.5	367		367.00	0.86	315.52	422.53	0.93	0.478	0.828	#########	########	##########	0.00	0.00
30.180	45.210	1.081	3772.5	3772.5	22.968	2.495	2.66		Clay	75.6			42.73	0.86	n.a.	n.a.	0.93	0.479	n.a.	n.a.	n.a.	n.a.	0.00	0.00
30.350	26.080	0.855	3793.8	3793.8	12.749	3.536	2.95		Clay	99.2			24.65	0.86	n.a.	n.a.	0.93	0.480	n.a.	n.a.	n.a.	n.a.	0.00	0.00
30.510	17.360	0.998	3813.8	3813.8	8.104	6.456	3.27		Clay	100.0			16.41	0.86	n.a.	n.a.	0.93	0.480	n.a.	n.a.	n.a.	n.a.	0.00	0.00
30.680	20.520	1.132	3835.0	3835.0	9.701	6.085	3.19		Clay	100.0			19.40	0.85	n.a.	n.a.	0.93	0.481	n.a.	n.a.	n.a.	n.a.	0.00	0.00
30.840	24.110	1.295	3855.0	3855.0	11.508	5.837	3.12		Clay	100.0			22.79	0.85	n.a.	n.a.	0.93	0.482	n.a.	n.a.	n.a.	n.a.	0.00	0.00
31.000	22.290	1.238	3874.5	3868.3	10.523	6.083	3.16		Clay	100.0			21.07	0.85	n.a.	n.a.	0.93	0.482	n.a.	n.a.	n.a.	n.a.	0.00	0.00
31.170	18.600	0.994	3894.9	3878.1	8.588	5.971	3.23		Clay	100.0			17.58	0.85	n.a.	n.a.	0.93	0.483	n.a.	n.a.	n.a.	n.a.	0.00	0.00
31.330	20.040	0.648	3914.1	3887.3	9.304	3.585	3.07		Clay	100.0			18.94	0.85	n.a.	n.a.	0.93	0.484	n.a.	n.a.	n.a.	n.a.	0.00	0.00
31.500	15.630	0.473	3934.5	3897.1	7.012	3.462	3.16		Clay	100.0			14.77	0.85	n.a.	n.a.	0.93	0.484	n.a.	n.a.	n.a.	n.a.	0.00	0.00

CORNERSTONE EARTH GROUP

CPT No. 2

PGA (A_{max}) 0.62

Total Settlement: 0.27 (Inches)

Depth (ft)	q_c (tsf)	f_s (tsf)	σ_{vc} (psf)	Insitu σ'_{vc} (psf)	Q	F (%)	I_c	Layer "Plastic" PI > 7	Flag Soil Type	Fines (%)	q_{cN} near interfaces (soft layer)	Thin Layer Factor (K_H)	Interpreted q_{cN}	C_N	q_{c1N}	$q_{c1N\text{-}CS}$	Stress Reduction Coeff, r_d	CSR	K_σ for Sand	$CRR_{M=7.5,\ \sigma'vc = 1\ atm}$	CRR	Factor of Safety (CRR/CSR)	Vertical Strain ε_v	Settlement (Inches)
31.660	11.890	0.528	3953.7	3906.3	5.075	5.321	3.38		Clay	100.0			11.24	0.85	n.a.	n.a.	0.93	0.485	n.a.	n.a.	n.a.	n.a.	0.00	0.00
31.820	10.570	0.521	3972.9	3915.5	4.384	6.069	3.47		Clay	100.0			9.99	0.85	n.a.	n.a.	0.93	0.486	n.a.	n.a.	n.a.	n.a.	0.00	0.00
31.990	12.640	0.496	3993.3	3925.3	5.423	4.655	3.32		Clay	100.0			11.95	0.85	n.a.	n.a.	0.93	0.486	n.a.	n.a.	n.a.	n.a.	0.00	0.00
32.150	13.200	0.503	4012.5	3934.5	5.690	4.496	3.30		Clay	100.0			12.48	0.85	n.a.	n.a.	0.93	0.487	n.a.	n.a.	n.a.	n.a.	0.00	0.00
32.320	13.620	0.804	4032.9	3944.3	5.884	6.929	3.40		Clay	100.0			12.87	0.85	n.a.	n.a.	0.93	0.488	n.a.	n.a.	n.a.	n.a.	0.00	0.00
32.480	12.510	1.914	4052.1	3953.5	5.304	18.257	3.70		Clay	100.0			11.82	0.85	n.a.	n.a.	0.92	0.488	n.a.	n.a.	n.a.	n.a.	0.00	0.00
32.640	27.950	2.373	4071.3	3962.7	13.079	9.157	3.21		Clay	100.0			26.42	0.85	n.a.	n.a.	0.92	0.489	n.a.	n.a.	n.a.	n.a.	0.00	0.00
32.810	74.440	1.752	4091.7	3972.5	49.939	2.420	2.39		Sand	54.2	83.36	1.8	150.05	0.81	122.20	202.71	0.92	0.489	0.829	2.209	4.029	8.23	0.00	0.00
32.970	88.200	1.234	4110.9	3981.7	59.356	1.432	2.18		Sand	37.7		1.8	150.06	0.80	120.78	189.79	0.92	0.490	0.852	1.113	2.086	4.26	0.00	0.00
33.140	83.710	1.493	4131.3	3991.5	56.186	1.829	2.27		Sand	44.7	83.36	1.8	150.05	0.81	121.34	196.16	0.92	0.490	0.840	1.532	2.833	5.78	0.00	0.00
33.300	53.500	1.364	4150.5	4000.7	25.708	2.653	2.64		Clay	73.8			50.57	0.85	n.a.	n.a.	0.92	0.491	n.a.	n.a.	n.a.	n.a.	0.00	0.00
33.460	33.080	1.154	4169.7	4010.0	15.459	3.723	2.90		Clay	95.0			31.27	0.84	n.a.	n.a.	0.92	0.492	n.a.	n.a.	n.a.	n.a.	0.00	0.00
33.630	21.270	1.602	4190.1	4019.7	9.540	8.356	3.28		Clay	100.0			20.10	0.84	n.a.	n.a.	0.92	0.492	n.a.	n.a.	n.a.	n.a.	0.00	0.00
33.790	19.520	2.053	4209.3	4029.0	8.645	11.786	3.42		Clay	100.0			18.45	0.84	n.a.	n.a.	0.92	0.493	n.a.	n.a.	n.a.	n.a.	0.00	0.00
33.960	45.950	1.660	4229.7	4038.8	21.707	3.786	2.79		Clay	86.2			43.43	0.84	n.a.	n.a.	0.92	0.493	n.a.	n.a.	n.a.	n.a.	0.00	0.00
34.120	70.710	1.983	4248.9	4048.0	46.869	2.891	2.46		Sand	60.0	67.13		67.13	0.74	49.40	111.96	0.92	0.494	0.924	0.155	0.191	0.39	0.03	0.02
34.280	71.020	1.696	4268.1	4057.2	47.021	2.462	2.41		Sand	56.1			67.13	0.73	49.26	110.59	0.92	0.494	0.925	0.153	0.187	0.38	0.03	0.02
34.450	41.840	1.601	4288.5	4067.0	19.521	4.033	2.84		Clay	90.4			39.55	0.84	n.a.	n.a.	0.92	0.495	n.a.	n.a.	n.a.	n.a.	0.00	0.00
34.610	26.820	1.274	4307.7	4076.2	12.103	5.163	3.07		Clay	100.0			25.35	0.84	n.a.	n.a.	0.92	0.495	n.a.	n.a.	n.a.	n.a.	0.00	0.00
34.780	29.400	1.196	4328.1	4086.0	13.331	4.390	2.99		Clay	100.0			27.79	0.84	n.a.	n.a.	0.92	0.496	n.a.	n.a.	n.a.	n.a.	0.00	0.00
34.940	23.200	1.098	4347.3	4095.2	10.269	5.222	3.13		Clay	100.0			21.93	0.84	n.a.	n.a.	0.92	0.496	n.a.	n.a.	n.a.	n.a.	0.00	0.00
35.100	16.470	1.165	4366.5	4104.4	6.962	8.154	3.38		Clay	100.0			15.57	0.84	n.a.	n.a.	0.92	0.497	n.a.	n.a.	n.a.	n.a.	0.00	0.00
35.270	14.760	1.243	4386.9	4114.2	6.109	9.894	3.48		Clay	100.0			13.95	0.84	n.a.	n.a.	0.92	0.497	n.a.	n.a.	n.a.	n.a.	0.00	0.00
35.430	29.320	1.656	4406.1	4123.4	13.153	6.107	3.09		Clay	100.0			27.71	0.84	n.a.	n.a.	0.92	0.498	n.a.	n.a.	n.a.	n.a.	0.00	0.00
35.600	54.250	1.451	4426.5	4133.2	25.180	2.789	2.66		Clay	75.5			51.28	0.84	n.a.	n.a.	0.91	0.498	n.a.	n.a.	n.a.	n.a.	0.00	0.00
35.760	29.030	1.732	4445.7	4142.4	12.943	6.460	3.11		Clay	100.0			27.44	0.84	n.a.	n.a.	0.91	0.499	n.a.	n.a.	n.a.	n.a.	0.00	0.00
35.930	25.970	1.689	4466.1	4152.2	11.433	7.115	3.18		Clay	100.0			24.55	0.84	n.a.	n.a.	0.91	0.499	n.a.	n.a.	n.a.	n.a.	0.00	0.00
36.090	46.040	1.793	4485.3	4161.4	21.049	4.095	2.82		Clay	88.8			43.52	0.84	n.a.	n.a.	0.91	0.500	n.a.	n.a.	n.a.	n.a.	0.00	0.00
36.250	61.350	1.818	4504.5	4170.7	28.340	3.076	2.64		Clay	74.5			57.99	0.84	n.a.	n.a.	0.91	0.500	n.a.	n.a.	n.a.	n.a.	0.00	0.00
36.420	47.410	1.451	4524.9	4180.5	21.599	3.214	2.75		Clay	82.7			44.81	0.84	n.a.	n.a.	0.91	0.501	n.a.	n.a.	n.a.	n.a.	0.00	0.00
36.580	26.500	0.937	4544.1	4189.7	11.566	3.866	3.01		Clay	100.0			25.05	0.84	n.a.	n.a.	0.91	0.501	n.a.	n.a.	n.a.	n.a.	0.00	0.00
36.750	13.440	0.640	4564.5	4199.5	5.314	5.740	3.38		Clay	100.0			12.70	0.83	n.a.	n.a.	0.91	0.501	n.a.	n.a.	n.a.	n.a.	0.00	0.00
36.910	10.230	0.486	4583.7	4208.7	3.772	6.124	3.52		Clay	100.0			9.67	0.83	n.a.	n.a.	0.91	0.502	n.a.	n.a.	n.a.	n.a.	0.00	0.00
37.070	11.650	0.521	4602.9	4217.9	4.433	5.576	3.44		Clay	100.0			11.01	0.83	n.a.	n.a.	0.91	0.502	n.a.	n.a.	n.a.	n.a.	0.00	0.00
37.240	13.210	0.897	4623.3	4227.7	5.156	8.231	3.49		Clay	100.0			12.49	0.83	n.a.	n.a.	0.91	0.503	n.a.	n.a.	n.a.	n.a.	0.00	0.00
37.400	15.180	2.028	4642.5	4236.9	6.070	15.771	3.61		Clay	100.0			14.35	0.83	n.a.	n.a.	0.91	0.503	n.a.	n.a.	n.a.	n.a.	0.00	0.00
37.570	30.920	2.699	4662.9	4246.7	13.464	9.439	3.21		Clay	100.0			29.22	0.83	n.a.	n.a.	0.91	0.504	n.a.	n.a.	n.a.	n.a.	0.00	0.00
37.730	60.810	2.254	4682.1	4255.9	27.477	3.854	2.72		Clay	80.4			57.48	0.83	n.a.	n.a.	0.91	0.504	n.a.	n.a.	n.a.	n.a.	0.00	0.00
37.890	49.470	0.903	4701.3	4265.1	22.095	1.917	2.60		Clay	71.3			46.76	0.83	n.a.	n.a.	0.91	0.504	n.a.	n.a.	n.a.	n.a.	0.00	0.00
38.060	37.280	1.166	4721.7	4274.9	16.337	3.340	2.85		Clay	91.2			35.24	0.83	n.a.	n.a.	0.91	0.505	n.a.	n.a.	n.a.	n.a.	0.00	0.00
38.220	23.340	1.298	4740.9	4284.1	9.789	6.192	3.19		Clay	100.0			22.06	0.83	n.a.	n.a.	0.91	0.505	n.a.	n.a.	n.a.	n.a.	0.00	0.00
38.390	45.690	2.988	4761.3	4293.9	20.172	6.899	2.99		Clay	100.0			43.19	0.83	n.a.	n.a.	0.90	0.505	n.a.	n.a.	n.a.	n.a.	0.00	0.00
38.550	69.790	3.171	4780.5	4303.1	31.326	4.705	2.73		Clay	81.8			65.96	0.83	n.a.	n.a.	0.90	0.506	n.a.	n.a.	n.a.	n.a.	0.00	0.00
38.710	99.840	3.714	4799.7	4312.4	64.514	3.812	2.45		Sand	59.0			94.37	0.74	69.77	137.72	0.90	0.506	0.898	0.225	0.310	0.61	0.02	0.02
38.880	86.760	2.524	4820.1	4322.1	55.784	2.992	2.42		Sand	56.4	94.37		94.37	0.74	69.62	136.66	0.90	0.507	0.898	0.220	0.302	0.60	0.02	0.02
39.040	55.530	1.731	4839.3	4331.4	24.524	3.258	2.71		Clay	79.6			52.49	0.83	n.a.	n.a.	0.90	0.507	n.a.	n.a.	n.a.	n.a.	0.00	0.00
39.210	35.600	1.595	4859.7	4341.2	15.282	4.809	2.97		Clay	100.0			33.65	0.83	n.a.	n.a.	0.90	0.507	n.a.	n.a.	n.a.	n.a.	0.00	0.00
39.370	42.530	1.970	4878.9	4350.4	18.431	4.913	2.92		Clay	96.4			40.20	0.83	n.a.	n.a.	0.90	0.508	n.a.	n.a.	n.a.	n.a.	0.00	0.00
39.530	42.480	1.965	4898.1	4359.6	18.365	4.908	2.92		Clay	96.5			40.15	0.83	n.a.	n.a.	0.90	0.508	n.a.	n.a.	n.a.	n.a.	0.00	0.00
39.700	28.760	1.557	4918.5	4369.4	12.039	5.918	3.11		Clay	100.0			27.18	0.83	n.a.	n.a.	0.90	0.508	n.a.	n.a.	n.a.	n.a.	0.00	0.00
39.860	23.380	1.280	4937.7	4378.6	9.552	6.123	3.20		Clay	100.0			22.10	0.83	n.a.	n.a.	0.90	0.509	n.a.	n.a.	n.a.	n.a.	0.00	0.00
40.030	21.550	1.141	4958.1	4388.4	8.692	5.983	3.22		Clay	100.0			20.37	0.82	n.a.	n.a.	0.90	0.509	n.a.	n.a.	n.a.	n.a.	0.00	0.00
40.190	16.990	1.073	4977.3	4397.6	6.595	7.399	3.38		Clay	100.0			16.06	0.82	n.a.	n.a.	0.90	0.509	n.a.	n.a.	n.a.	n.a.	0.00	0.00
40.350	16.390	1.395	4996.5	4406.8	6.305	10.041	3.47		Clay	100.0			15.49	0.82	n.a.	n.a.	0.90	0.510	n.a.	n.a.	n.a.	n.a.	0.00	0.00
40.520	21.130	1.382	5016.9	4416.6	8.433	7.424	3.29		Clay	100.0			19.97	0.82	n.a.	n.a.	0.90	0.510	n.a.	n.a.	n.a.	n.a.	0.00	0.00
40.680	30.950	0.898	5036.1	4425.8	12.848	3.158	2.92		Clay	96.7			29.25	0.82	n.a.	n.a.	0.90	0.510	n.a.	n.a.	n.a.	n.a.	0.00	0.00
40.850	17.260	0.644	5056.5	4435.6	6.642	4.369	3.24		Clay	100.0			16.31	0.82	n.a.	n.a.	0.90	0.511	n.a.	n.a.	n.a.	n.a.	0.00	0.00
41.010	12.550	0.481	5075.7	4444.8	4.505	4.808	3.40		Clay	100.0			11.86	0.82	n.a.	n.a.	0.90	0.511	n.a.	n.a.	n.a.	n.a.	0.00	0.00
41.170	11.370	0.468	5094.9	4454.1	3.962	5.308	3.47		Clay	100.0			10.75	0.82	n.a.	n.a.	0.89	0.511	n.a.	n.a.	n.a.	n.a.	0.00	0.00
41.340	11.180	0.502	5115.3	4463.8	3.863	5.822	3.50		Clay	100.0			10.57	0.82	n.a.	n.a.	0.89	0.511	n.a.	n.a.	n.a.	n.a.	0.00	0.00
41.500	11.450	0.525	5134.5	4473.1	3.972	5.909	3.49		Clay	100.0			10.82	0.82	n.a.	n.a.	0.89	0.512	n.a.	n.a.	n.a.	n.a.	0.00	0.00
41.670	13.770	0.597	5154.9	4482.9	4.993	5.332	3.39		Clay	100.0			13.02	0.82	n.a.	n.a.	0.89	0.512	n.a.	n.a.	n.a.	n.a.	0.00	0.00
41.830	13.440	0.643	5174.1	4492.1	4.832	5.922	3.43		Clay	100.0			12.70	0.82	n.a.	n.a.	0.89	0.512	n.a.	n.a.	n.a.	n.a.	0.00	0.00
41.990	16.580	0.736	5193.3	4501.3	6.213	5.266	3.31		Clay	100.0			15.67	0.82	n.a.	n.a.	0.89	0.513	n.a.	n.a.	n.a.	n.a.	0.00	0.00

CORNERSTONE EARTH GROUP

CPT No. 2

PGA (A_{max}) 0.62

Total Settlement: 0.27 (Inches)

Depth (ft)	q_c (tsf)	f_s (tsf)	σ_{vc} (psf)	Insitu σ'_{vc} (psf)	Q	F (%)	I_c	Layer "Plastic" PI > 7	Flag Soil Type	Fines (%)	q_{cN} near interfaces (soft layer)	Thin Layer Factor (K_H)	Interpreted q_{cN}	C_N	q_{c1N}	$q_{c1N\text{-}CS}$	Stress Reduction Coeff, r_d	CSR	K_σ for Sand	$CRR_{M=7.5,\ \sigma'vc = 1\ atm}$	CRR	Factor of Safety (CRR/CSR)	Vertical Strain ε_v	Settlement (Inches)
42.160	16.220	1.065	5213.7	4511.1	6.035	7.825	3.42		Clay	100.0			15.33	0.82	n.a.	n.a.	0.89	0.513	n.a.	n.a.	n.a.	n.a.	0.00	0.00
42.320	18.500	1.257	5232.9	4520.3	7.028	7.912	3.37		Clay	100.0			17.49	0.82	n.a.	n.a.	0.89	0.513	n.a.	n.a.	n.a.	n.a.	0.00	0.00
42.490	25.830	1.372	5253.3	4530.1	10.244	5.913	3.16		Clay	100.0			24.41	0.82	n.a.	n.a.	0.89	0.513	n.a.	n.a.	n.a.	n.a.	0.00	0.00
42.650	31.180	1.608	5272.5	4539.3	12.576	5.633	3.08		Clay	100.0			29.47	0.82	n.a.	n.a.	0.89	0.514	n.a.	n.a.	n.a.	n.a.	0.00	0.00
42.810	25.480	1.671	5291.7	4548.5	10.040	7.320	3.23		Clay	100.0			24.08	0.82	n.a.	n.a.	0.89	0.514	n.a.	n.a.	n.a.	n.a.	0.00	0.00
42.980	30.710	1.881	5312.1	4558.3	12.309	6.705	3.14		Clay	100.0			29.03	0.82	n.a.	n.a.	0.89	0.514	n.a.	n.a.	n.a.	n.a.	0.00	0.00
43.140	34.570	1.328	5331.3	4567.5	13.970	4.161	2.96		Clay	100.0			32.67	0.82	n.a.	n.a.	0.89	0.514	n.a.	n.a.	n.a.	n.a.	0.00	0.00
43.310	25.290	0.761	5351.7	4577.3	9.881	3.365	3.03		Clay	100.0			23.90	0.82	n.a.	n.a.	0.89	0.515	n.a.	n.a.	n.a.	n.a.	0.00	0.00
43.470	15.360	0.479	5370.9	4586.5	5.527	3.775	3.27		Clay	100.0			14.52	0.82	n.a.	n.a.	0.89	0.515	n.a.	n.a.	n.a.	n.a.	0.00	0.00
43.640	11.920	0.438	5391.3	4596.3	4.014	4.753	3.44		Clay	100.0			11.27	0.81	n.a.	n.a.	0.89	0.515	n.a.	n.a.	n.a.	n.a.	0.00	0.00
43.800	11.840	0.807	5410.5	4605.5	3.967	8.831	3.60		Clay	100.0			11.19	0.81	n.a.	n.a.	0.89	0.515	n.a.	n.a.	n.a.	n.a.	0.00	0.00
43.960	13.220	0.670	5429.7	4614.8	4.553	6.379	3.46		Clay	100.0			12.50	0.81	n.a.	n.a.	0.88	0.516	n.a.	n.a.	n.a.	n.a.	0.00	0.00
44.130	21.660	0.711	5450.1	4624.5	8.189	3.754	3.12		Clay	100.0			20.47	0.81	n.a.	n.a.	0.88	0.516	n.a.	n.a.	n.a.	n.a.	0.00	0.00
44.290	17.880	0.820	5469.3	4633.8	6.537	5.414	3.30		Clay	100.0			16.90	0.81	n.a.	n.a.	0.88	0.516	n.a.	n.a.	n.a.	n.a.	0.00	0.00
44.460	16.400	0.722	5489.7	4643.6	5.881	5.287	3.33		Clay	100.0			15.50	0.81	n.a.	n.a.	0.88	0.516	n.a.	n.a.	n.a.	n.a.	0.00	0.00
44.620	25.620	1.010	5508.9	4652.8	9.829	4.415	3.10		Clay	100.0			24.22	0.81	n.a.	n.a.	0.88	0.516	n.a.	n.a.	n.a.	n.a.	0.00	0.00
44.780	18.520	1.476	5528.1	4662.0	6.759	9.367	3.43		Clay	100.0			17.50	0.81	n.a.	n.a.	0.88	0.517	n.a.	n.a.	n.a.	n.a.	0.00	0.00
44.950	27.160	1.858	5548.5	4671.8	10.440	7.620	3.23		Clay	100.0			25.67	0.81	n.a.	n.a.	0.88	0.517	n.a.	n.a.	n.a.	n.a.	0.00	0.00
45.110	44.990	1.823	5567.7	4681.0	18.033	4.320	2.89		Clay	94.1			42.52	0.81	n.a.	n.a.	0.88	0.517	n.a.	n.a.	n.a.	n.a.	0.00	0.00

CORNERSTONE EARTH GROUP

CPT No. 3

PGA (A_{max}) 0.62

Total Settlement: 0.42 (Inches)

Depth (ft)	q_c (tsf)	f_s (tsf)	σ_{vc} (psf)	Insitu σ'_{vc} (psf)	Q	F (%)	I_c	Layer "Plastic" PI > 7	Flag Soil Type	Fines (%)	q_{cN} near interfaces (soft layer)	Thin Layer Factor (K_H)	Interpreted q_{cN}	C_N	q_{c1N}	q_{c1N-CS}	Stress Reduction Coeff, r_d	CSR	K_σ for Sand	$CRR_{M=7.5, \sigma'_{vc} = 1 atm}$	CRR	Factor of Safety (CRR/CSR)	Vertical Strain ε_v	Settlement (Inches)
0.160	0.150	0.196	20.0	20.0	14.000	140.071	4.09		Unsaturated	100.0			0.14	1.70	0.24	54.25	1.00	0.400	1.100	n.a.	n.a.	n.a.	0.00	0.00
0.330	0.270	0.238	41.3	41.3	12.091	95.599	3.99		Unsaturated	100.0			0.26	1.70	0.43	54.50	1.00	0.400	1.100	n.a.	n.a.	n.a.	0.00	0.00
0.490	2.160	0.373	61.3	61.3	69.531	17.517	2.95		Unsaturated	99.2			2.04	1.70	3.47	58.42	1.00	0.400	1.100	n.a.	n.a.	n.a.	0.00	0.00
0.660	1.390	0.447	82.5	82.5	32.697	33.112	3.37		Unsaturated	100.0			1.31	1.70	2.23	56.86	1.00	0.400	1.100	n.a.	n.a.	n.a.	0.00	0.00
0.820	74.400	0.761	102.5	102.5	319.289	1.023	1.56		Unsaturated	0.0			70.32	1.70	119.55	119.55	1.00	0.400	1.100	n.a.	n.a.	n.a.	0.00	0.00
0.980	119.050	1.150	122.5	122.5	467.423	0.967	1.45		Unsaturated	0.0			112.52	1.70	191.29	191.29	1.00	0.400	1.100	n.a.	n.a.	n.a.	0.00	0.00
1.150	88.210	1.057	143.8	143.8	319.619	1.199	1.62		Unsaturated	0.0			83.37	1.70	141.74	141.74	1.00	0.400	1.100	n.a.	n.a.	n.a.	0.00	0.00
1.310	75.300	0.678	163.8	163.8	255.567	0.901	1.58		Unsaturated	0.0			71.17	1.70	120.99	120.99	1.00	0.400	1.100	n.a.	n.a.	n.a.	0.00	0.00
1.480	69.580	0.781	185.0	185.0	222.123	1.124	1.70		Unsaturated	0.0			65.77	1.70	111.80	111.80	1.00	0.400	1.100	n.a.	n.a.	n.a.	0.00	0.00
1.640	53.010	0.966	205.0	205.0	160.662	1.826	1.95		Unsaturated	18.8			50.10	1.70	85.18	117.29	1.00	0.400	1.100	n.a.	n.a.	n.a.	0.00	0.00
1.800	26.920	0.991	225.0	225.0	77.703	3.696	2.39		Unsaturated	53.8			25.44	1.70	43.26	102.17	1.00	0.400	1.100	n.a.	n.a.	n.a.	0.00	0.00
1.970	21.870	1.107	246.3	246.3	60.253	5.092	2.56		Unsaturated	68.0			20.67	1.70	35.14	95.60	1.00	0.400	1.100	n.a.	n.a.	n.a.	0.00	0.00
2.130	21.920	1.276	266.3	266.3	87.875	5.855	2.51		Unsaturated	63.5			20.72	1.70	35.22	94.69	1.00	0.400	1.100	n.a.	n.a.	n.a.	0.00	0.00
2.300	24.570	1.395	287.5	287.5	62.634	5.713	2.59		Unsaturated	70.2			23.22	1.70	39.48	101.63	1.00	0.400	1.100	n.a.	n.a.	n.a.	0.00	0.00
2.460	24.200	1.419	307.5	307.5	87.686	5.900	2.51		Unsaturated	63.7			22.87	1.70	38.88	99.46	1.00	0.400	1.100	n.a.	n.a.	n.a.	0.00	0.00
2.620	23.900	1.347	327.5	327.5	82.821	5.675	2.51		Unsaturated	63.9			22.59	1.70	38.40	98.88	1.00	0.400	1.100	n.a.	n.a.	n.a.	0.00	0.00
2.790	21.970	1.194	348.8	348.8	72.775	5.479	2.53		Unsaturated	65.7			20.77	1.70	35.30	95.32	1.00	0.400	1.100	n.a.	n.a.	n.a.	0.00	0.00
2.950	19.430	1.048	368.8	368.8	61.801	5.444	2.58		Unsaturated	69.2			18.36	1.70	31.22	90.78	1.00	0.400	1.100	n.a.	n.a.	n.a.	0.00	0.00
3.120	17.630	0.962	390.0	390.0	53.833	5.518	2.62		Unsaturated	72.7			16.66	1.70	28.33	87.69	1.00	0.400	1.100	n.a.	n.a.	n.a.	0.00	0.00
3.280	17.120	0.957	410.0	410.0	50.431	5.658	2.65		Unsaturated	74.9			16.18	1.70	27.51	86.99	1.00	0.400	1.100	n.a.	n.a.	n.a.	0.00	0.00
3.440	17.680	0.955	430.0	430.0	50.364	5.466	2.64		Unsaturated	74.0			16.71	1.70	28.41	88.01	1.00	0.400	1.100	n.a.	n.a.	n.a.	0.00	0.00
3.610	17.290	0.947	451.3	451.3	47.574	5.547	2.66		Unsaturated	75.7			16.34	1.70	27.78	87.48	1.00	0.400	1.100	n.a.	n.a.	n.a.	0.00	0.00
3.770	17.470	0.993	471.3	471.3	46.612	5.763	2.68		Unsaturated	77.2			16.51	1.70	28.07	88.08	1.00	0.400	1.100	n.a.	n.a.	n.a.	0.00	0.00
3.940	18.310	0.972	492.5	492.5	47.370	5.379	2.65		Unsaturated	75.0			17.31	1.70	29.42	89.49	1.00	0.400	1.100	n.a.	n.a.	n.a.	0.00	0.00
4.100	18.630	1.081	512.5	512.5	46.858	5.881	2.68		Unsaturated	77.6			17.61	1.70	29.93	90.56	1.00	0.399	1.100	n.a.	n.a.	n.a.	0.00	0.00
4.270	18.860	1.110	533.8	533.8	46.088	5.969	2.69		Unsaturated	78.4			17.83	1.70	30.30	91.16	1.00	0.399	1.100	n.a.	n.a.	n.a.	0.00	0.00
4.430	19.000	1.080	553.8	553.8	45.231	5.769	2.69		Unsaturated	77.9			17.96	1.70	30.53	91.38	1.00	0.399	1.100	n.a.	n.a.	n.a.	0.00	0.00
4.590	16.670	1.015	573.8	573.8	57.109	6.193	2.64		Unsaturated	74.4			15.76	1.70	26.79	85.97	1.00	0.399	1.100	n.a.	n.a.	n.a.	0.00	0.00
4.760	14.180	0.845	595.0	595.0	46.664	6.085	2.69		Unsaturated	78.6			13.40	1.70	22.78	81.42	1.00	0.399	1.100	n.a.	n.a.	n.a.	0.00	0.00
4.920	14.170	0.855	615.0	615.0	45.081	6.168	2.71		Unsaturated	79.7			13.39	1.70	22.77	81.56	1.00	0.399	1.100	n.a.	n.a.	n.a.	0.00	0.00
5.090	16.720	0.890	636.3	636.3	51.558	5.428	2.63		Unsaturated	73.3			15.80	1.70	26.87	85.89	1.00	0.399	1.100	n.a.	n.a.	n.a.	0.00	0.00
5.250	13.790	0.860	656.3	656.3	41.027	6.390	2.75		Unsaturated	82.8			13.03	1.70	22.16	81.18	1.00	0.399	1.100	n.a.	n.a.	n.a.	0.00	0.00
5.410	13.350	0.853	676.3	676.3	38.482	6.553	2.77		Unsaturated	85.0			12.62	1.70	21.45	80.53	1.00	0.398	1.100	n.a.	n.a.	n.a.	0.00	0.00
5.580	14.350	0.842	697.5	697.5	40.147	6.014	2.73		Unsaturated	81.8			13.56	1.70	23.06	82.22	1.00	0.398	1.100	n.a.	n.a.	n.a.	0.00	0.00
5.740	15.440	0.800	717.5	717.5	42.038	5.307	2.68		Unsaturated	77.5			14.59	1.70	24.81	83.90	1.00	0.398	1.100	n.a.	n.a.	n.a.	0.00	0.00
5.910	14.170	0.803	738.8	738.8	37.362	5.816	2.75		Unsaturated	82.7			13.39	1.70	22.77	81.96	1.00	0.398	1.097	n.a.	n.a.	n.a.	0.00	0.00
6.070	14.110	0.738	758.8	758.8	36.193	5.373	2.73		Unsaturated	81.5			13.34	1.70	22.67	81.67	1.00	0.398	1.094	n.a.	n.a.	n.a.	0.00	0.00
6.230	16.300	0.701	778.8	778.8	40.862	4.405	2.63		Unsaturated	73.6			15.41	1.70	26.19	85.07	1.00	0.398	1.095	n.a.	n.a.	n.a.	0.00	0.00
6.400	19.970	0.569	800.0	800.0	36.543	2.906	2.54		Unsaturated	66.5			18.88	1.66	31.31	90.35	0.99	0.398	1.096	n.a.	n.a.	n.a.	0.00	0.00
6.560	23.920	0.526	820.0	820.0	35.696	2.238	2.48		Unsaturated	61.2			22.61	1.62	36.58	95.87	0.99	0.398	1.098	n.a.	n.a.	n.a.	0.00	0.00
6.730	23.870	0.469	841.3	841.3	35.151	2.001	2.45		Unsaturated	59.2			22.56	1.60	36.11	94.74	0.99	0.397	1.094	n.a.	n.a.	n.a.	0.00	0.00
6.890	26.410	0.351	861.3	861.3	38.489	1.350	2.32		Unsaturated	48.5			24.96	1.58	39.44	95.27	0.99	0.397	1.092	n.a.	n.a.	n.a.	0.00	0.00
7.050	30.230	0.335	881.3	881.3	43.630	1.123	2.23		Unsaturated	41.2			28.57	1.55	44.39	97.80	0.99	0.397	1.092	n.a.	n.a.	n.a.	0.00	0.00
7.220	36.690	0.468	902.5	902.5	52.447	1.291	2.20		Unsaturated	38.9			34.68	1.51	52.41	106.24	0.99	0.397	1.095	n.a.	n.a.	n.a.	0.00	0.00
7.380	33.230	0.717	922.5	922.5	46.908	2.188	2.38		Unsaturated	53.5			31.41	1.49	46.93	106.71	0.99	0.397	1.093	n.a.	n.a.	n.a.	0.00	0.00
7.550	27.640	0.964	943.8	943.8	38.451	3.548	2.59		Unsaturated	69.9			26.12	1.49	38.99	100.94	0.99	0.397	1.086	n.a.	n.a.	n.a.	0.00	0.00
7.710	21.560	1.120	963.8	963.8	43.742	5.312	2.67		Unsaturated	76.6			20.38	1.50	30.63	91.31	0.99	0.397	1.078	n.a.	n.a.	n.a.	0.00	0.00
7.870	19.150	1.218	983.8	983.8	37.933	6.529	2.78		Unsaturated	85.2			18.10	1.50	27.09	87.90	0.99	0.397	1.074	n.a.	n.a.	n.a.	0.00	0.00
8.040	18.180	1.164	1005.0	1005.0	35.179	6.586	2.80		Unsaturated	87.2			17.18	1.48	25.51	86.09	0.99	0.396	1.071	n.a.	n.a.	n.a.	0.00	0.00
8.200	19.790	1.343	1025.0	1025.0	37.615	6.966	2.80		Unsaturated	87.1			18.71	1.46	27.36	88.48	0.99	0.396	1.070	n.a.	n.a.	n.a.	0.00	0.00
8.370	20.170	1.438	1046.3	1046.3	37.557	7.317	2.82		Unsaturated	88.4			19.06	1.45	27.57	88.90	0.99	0.396	1.069	n.a.	n.a.	n.a.	0.00	0.00
8.530	24.250	1.454	1066.3	1066.3	44.487	6.132	2.71		Unsaturated	79.9			22.92	1.42	32.54	94.28	0.99	0.396	1.070	n.a.	n.a.	n.a.	0.00	0.00
8.690	24.400	1.483	1086.3	1086.3	43.925	6.214	2.72		Unsaturated	80.5			23.06	1.41	32.43	94.23	0.99	0.396	1.068	n.a.	n.a.	n.a.	0.00	0.00
8.860	25.810	1.513	1107.5	1107.5	45.609	5.990	2.70		Unsaturated	78.7			24.40	1.39	33.88	95.85	0.99	0.396	1.067	n.a.	n.a.	n.a.	0.00	0.00
9.020	25.060	1.580	1127.5	1127.5	43.452	6.450	2.73		Unsaturated	81.7			23.69	1.38	32.66	94.70	0.99	0.396	1.064	n.a.	n.a.	n.a.	0.00	0.00
9.190	25.160	1.572	1148.8	1148.8	42.804	6.395	2.74		Unsaturated	81.9			23.78	1.37	32.49	94.49	0.99	0.395	1.062	n.a.	n.a.	n.a.	0.00	0.00
9.350	25.020	1.616	1168.8	1168.8	41.815	6.614	2.75		Unsaturated	83.3			23.65	1.35	32.04	94.10	0.99	0.395	1.060	n.a.	n.a.	n.a.	0.00	0.00
9.510	26.640	1.654	1188.8	1188.8	43.820	6.351	2.73		Unsaturated	81.1			25.18	1.34	33.73	96.01	0.99	0.395	1.059	n.a.	n.a.	n.a.	0.00	0.00
9.680	25.950	1.619	1210.0	1210.0	41.893	6.387	2.74		Unsaturated	82.3			24.53	1.33	32.62	94.73	0.99	0.395	1.057	n.a.	n.a.	n.a.	0.00	0.00
9.840	28.480	1.668	1230.0	1230.0	45.309	5.986	2.70		Unsaturated	78.8			26.92	1.31	35.37	97.80	0.99	0.395	1.057	n.a.	n.a.	n.a.	0.00	0.00
10.010	34.960	1.719	1251.3	1251.3	46.877	5.007	2.63		Unsaturated	73.5			33.04	1.29	42.62	106.32	0.99	0.395	1.059	n.a.	n.a.	n.a.	0.00	0.00
10.170	35.890	1.816	1271.3	1271.3	47.602	5.151	2.64		Unsaturated	73.8			33.92	1.28	43.37	107.35	0.99	0.395	1.057	n.a.	n.a.	n.a.	0.00	0.00
10.330	31.770	1.900	1291.3	1291.3	48.208	6.104	2.69		Unsaturated	77.9			30.03	1.28	38.34	101.52	0.99	0.395	1.053	n.a.	n.a.	n.a.	0.00	0.00
10.500	30.310	1.863	1312.5	1312.5	45.187	6.281	2.71		Unsaturated	80.1			28.65	1.27	36.37	99.30	0.99	0.394	1.050	n.a.	n.a.	n.a.	0.00	0.00

CORNERSTONE EARTH GROUP

CPT No. 3

PGA (A_{max}) 0.62

Total Settlement: 0.42 (Inches)

Depth (ft)	q_c (tsf)	f_s (tsf)	σ_{vc} (psf)	Insitu σ'_{vc} (psf)	Q	F (%)	I_c	Layer "Plastic" PI > 7	Flag Soil Type	Fines (%)	q_{cN} near interfaces (soft layer)	Thin Layer Factor (K_H)	Interpreted q_{cN}	C_N	q_{c1N}	q_{c1N-CS}	Stress Reduction Coeff, r_d	CSR	K_σ for Sand	$CRR_{M=7.5, \sigma'vc = 1 atm}$	CRR	Factor of Safety (CRR/CSR)	Vertical Strain ε_v	Settlement (Inches)
10.660	30.640	1.649	1332.5	1332.5	44.989	5.502	2.67		Unsaturated	76.8			28.96	1.26	36.50	98.96	0.99	0.394	1.049	n.a.	n.a.	n.a.	0.00	0.00
10.830	30.900	1.380	1353.8	1353.8	44.651	4.565	2.62		Unsaturated	72.3			29.21	1.25	36.55	98.25	0.99	0.394	1.047	n.a.	n.a.	n.a.	0.00	0.00
10.990	27.700	1.292	1373.8	1373.8	39.328	4.784	2.67		Unsaturated	76.6			26.18	1.25	32.66	93.94	0.99	0.394	1.044	n.a.	n.a.	n.a.	0.00	0.00
11.150	28.170	1.430	1393.8	1393.8	39.423	5.204	2.69		Unsaturated	78.6			26.63	1.24	32.95	94.62	0.99	0.394	1.043	n.a.	n.a.	n.a.	0.00	0.00
11.320	30.200	1.628	1415.0	1415.0	41.686	5.518	2.70		Unsaturated	78.7			28.54	1.22	34.97	97.26	0.98	0.394	1.042	n.a.	n.a.	n.a.	0.00	0.00
11.480	36.450	1.876	1435.0	1435.0	49.801	5.249	2.63		Unsaturated	73.2			34.45	1.21	41.63	104.99	0.98	0.393	1.043	n.a.	n.a.	n.a.	0.00	0.00
11.650	41.950	1.958	1456.3	1456.3	50.610	4.751	2.59		Unsaturated	70.3			39.65	1.19	47.32	111.78	0.98	0.393	1.044	n.a.	n.a.	n.a.	0.00	0.00
11.810	42.630	1.878	1476.3	1476.3	47.405	4.482	2.59		Unsaturated	70.4			40.29	1.19	47.75	112.37	0.98	0.393	1.042	n.a.	n.a.	n.a.	0.00	0.00
11.980	41.030	1.821	1497.5	1497.5	48.498	4.522	2.59		Unsaturated	70.1			38.78	1.18	45.74	109.70	0.98	0.393	1.040	n.a.	n.a.	n.a.	0.00	0.00
12.140	38.810	1.775	1517.5	1517.5	45.389	4.665	2.62		Unsaturated	72.5			36.68	1.17	43.08	106.72	0.98	0.393	1.037	n.a.	n.a.	n.a.	0.00	0.00
12.300	34.110	1.657	1537.5	1537.5	43.371	4.971	2.65		Unsaturated	75.1			32.24	1.17	37.79	100.35	0.98	0.393	1.034	n.a.	n.a.	n.a.	0.00	0.00
12.470	31.170	1.521	1558.8	1558.8	38.994	5.006	2.69		Unsaturated	77.9			29.46	1.17	34.39	96.39	0.98	0.393	1.032	n.a.	n.a.	n.a.	0.00	0.00
12.630	30.380	1.438	1578.8	1578.8	37.486	4.861	2.69		Unsaturated	78.1			28.71	1.16	33.33	95.05	0.98	0.392	1.030	n.a.	n.a.	n.a.	0.00	0.00
12.800	34.620	1.145	1600.0	1600.0	36.761	3.386	2.59		Unsaturated	69.9			32.72	1.15	37.63	99.19	0.98	0.392	1.030	n.a.	n.a.	n.a.	0.00	0.00
12.960	35.780	0.862	1620.0	1620.0	37.776	2.466	2.49		Unsaturated	61.9			33.82	1.14	38.66	98.72	0.98	0.392	1.028	n.a.	n.a.	n.a.	0.00	0.00
13.120	39.650	0.611	1640.0	1640.0	41.689	1.573	2.33		Unsaturated	49.4			37.48	1.14	42.56	99.60	0.98	0.392	1.027	n.a.	n.a.	n.a.	0.00	0.00
13.290	40.200	0.513	1661.3	1661.3	41.997	1.302	2.28		Unsaturated	45.3			38.00	1.13	42.91	98.16	0.98	0.392	1.025	n.a.	n.a.	n.a.	0.00	0.00
13.450	38.690	0.617	1681.3	1681.3	40.134	1.630	2.35		Unsaturated	51.2			36.57	1.12	41.04	98.40	0.98	0.392	1.024	n.a.	n.a.	n.a.	0.00	0.00
13.620	40.930	0.536	1702.5	1702.5	42.232	1.338	2.28		Unsaturated	45.7			38.69	1.12	43.14	98.64	0.98	0.392	1.023	n.a.	n.a.	n.a.	0.00	0.00
13.780	47.380	0.389	1722.5	1722.5	48.733	0.836	2.12		Unsaturated	32.3			44.78	1.11	49.67	97.44	0.98	0.391	1.021	n.a.	n.a.	n.a.	0.00	0.00
13.940	47.860	0.343	1742.5	1742.5	48.942	0.729	2.08		Unsaturated	29.7			45.24	1.10	49.94	95.00	0.98	0.391	1.020	n.a.	n.a.	n.a.	0.00	0.00
14.110	42.920	0.331	1763.8	1763.8	43.521	0.788	2.14		Unsaturated	34.6			40.57	1.10	44.54	93.24	0.98	0.391	1.018	n.a.	n.a.	n.a.	0.00	0.00
14.270	39.650	0.628	1783.8	1783.8	39.900	1.620	2.35		Unsaturated	51.2			37.48	1.09	40.83	98.14	0.98	0.391	1.018	n.a.	n.a.	n.a.	0.00	0.00
14.440	32.850	0.752	1805.0	1805.0	32.694	2.353	2.52		Unsaturated	64.7			31.05	1.09	33.69	93.02	0.98	0.391	1.016	n.a.	n.a.	n.a.	0.00	0.00
14.600	24.950	0.666	1825.0	1825.0	26.342	2.769	2.64		Unsaturated	74.1			23.58	1.08	25.53	84.29	0.98	0.391	1.014	n.a.	n.a.	n.a.	0.00	0.00
14.760	15.290	0.833	1845.0	1845.0	15.575	5.796	3.02		Unsaturated	100.0			14.45	1.08	15.61	74.39	0.98	0.390	1.012	n.a.	n.a.	n.a.	0.00	0.00
14.930	22.390	0.846	1866.3	1866.3	22.995	3.943	2.78		Unsaturated	85.6			21.16	1.07	22.65	82.16	0.98	0.390	1.012	n.a.	n.a.	n.a.	0.00	0.00
15.090	85.700	0.621	1886.3	1886.3	84.849	0.733	1.89		Unsaturated	13.8			81.00	1.06	85.69	103.99	0.98	0.390	1.013	n.a.	n.a.	n.a.	0.00	0.00
15.260	97.400	0.551	1907.5	1907.5	96.012	0.571	1.78		Unsaturated	5.4			92.06	1.05	97.00	97.27	0.98	0.390	1.011	n.a.	n.a.	n.a.	0.00	0.00
15.420	87.120	0.517	1927.5	1927.5	85.322	0.600	1.83		Unsaturated	9.8			82.34	1.05	86.39	93.09	0.97	0.390	1.009	n.a.	n.a.	n.a.	0.00	0.00
15.580	72.320	0.452	1947.5	1947.5	70.292	0.634	1.92		Unsaturated	16.5			68.36	1.04	71.30	95.84	0.97	0.390	1.009	n.a.	n.a.	n.a.	0.00	0.00
15.750	65.910	0.442	1968.8	1968.8	63.620	0.681	1.97		Unsaturated	20.7			62.30	1.04	64.59	98.26	0.97	0.389	1.008	n.a.	n.a.	n.a.	0.00	0.00
15.910	66.420	0.444	1988.8	1988.8	63.787	0.679	1.97		Unsaturated	20.6			62.78	1.03	64.76	98.20	0.97	0.389	1.007	n.a.	n.a.	n.a.	0.00	0.00
16.080	72.820	0.432	2010.0	2010.0	69.645	0.601	1.91		Unsaturated	15.8			68.83	1.03	70.67	93.30	0.97	0.389	1.005	n.a.	n.a.	n.a.	0.00	0.00
16.240	72.820	0.486	2030.0	2030.0	69.291	0.677	1.94		Unsaturated	18.1			68.83	1.02	70.27	98.83	0.97	0.389	1.004	n.a.	n.a.	n.a.	0.00	0.00
16.400	65.540	0.855	2050.0	2050.0	61.952	1.325	2.15		Unsaturated	34.9			61.95	1.01	62.87	115.93	0.97	0.389	1.004	n.a.	n.a.	n.a.	0.00	0.00
16.570	54.260	0.968	2071.3	2071.3	50.847	1.818	2.30		Unsaturated	47.2			51.29	1.01	51.81	110.27	0.97	0.389	1.002	n.a.	n.a.	n.a.	0.00	0.00
16.730	47.700	0.781	2091.3	2091.3	44.357	1.674	2.33		Unsaturated	49.0			45.09	1.01	45.35	102.96	0.97	0.388	1.001	n.a.	n.a.	n.a.	0.00	0.00
16.900	58.970	0.698	2112.5	2112.5	54.784	1.206	2.17		Unsaturated	36.3			55.74	1.00	55.78	108.41	0.97	0.388	1.000	n.a.	n.a.	n.a.	0.00	0.00
17.060	63.180	1.167	2132.5	2132.5	58.481	1.879	2.27		Sand	44.2			59.72	1.00	59.50	118.41	0.97	0.389	0.999	0.168	0.230	0.59	0.03	0.04
17.220	46.940	1.084	2152.5	2152.5	42.980	2.363	2.43		Sand	57.5			44.37	0.99	44.00	104.32	0.97	0.390	0.998	0.143	0.184	0.47	0.03	0.04
17.390	31.220	1.054	2173.8	2173.8	27.725	3.498	2.69		Clay	78.0			29.51	0.99	n.a.	n.a.	0.97	0.392	n.a.	n.a.	n.a.	n.a.	0.00	0.00
17.550	17.640	0.817	2193.8	2193.8	15.082	4.936	2.99		Clay	100.0			16.67	0.99	n.a.	n.a.	0.97	0.394	n.a.	n.a.	n.a.	n.a.	0.00	0.00
17.720	14.770	0.699	2215.0	2215.0	12.336	5.113	3.06		Clay	100.0			13.96	0.99	n.a.	n.a.	0.97	0.395	n.a.	n.a.	n.a.	n.a.	0.00	0.00
17.880	13.990	0.659	2235.0	2235.0	11.519	5.119	3.09		Clay	100.0			13.22	0.99	n.a.	n.a.	0.97	0.397	n.a.	n.a.	n.a.	n.a.	0.00	0.00
18.040	14.690	0.864	2255.0	2255.0	12.029	6.373	3.13		Clay	100.0			13.88	0.98	n.a.	n.a.	0.97	0.399	n.a.	n.a.	n.a.	n.a.	0.00	0.00
18.210	15.820	0.996	2276.3	2276.3	12.900	6.781	3.13		Clay	100.0			14.95	0.98	n.a.	n.a.	0.97	0.400	n.a.	n.a.	n.a.	n.a.	0.00	0.00
18.370	15.950	0.967	2296.3	2296.3	12.892	6.533	3.12		Clay	100.0			15.08	0.98	n.a.	n.a.	0.97	0.402	n.a.	n.a.	n.a.	n.a.	0.00	0.00
18.540	14.750	0.839	2317.5	2317.5	11.729	6.171	3.13		Clay	100.0			13.94	0.98	n.a.	n.a.	0.97	0.403	n.a.	n.a.	n.a.	n.a.	0.00	0.00
18.700	13.840	0.707	2337.5	2337.5	10.842	5.582	3.13		Clay	100.0			13.08	0.97	n.a.	n.a.	0.97	0.405	n.a.	n.a.	n.a.	n.a.	0.00	0.00
18.860	12.900	0.708	2357.5	2357.5	9.944	6.038	3.18		Clay	100.0			12.19	0.97	n.a.	n.a.	0.97	0.406	n.a.	n.a.	n.a.	n.a.	0.00	0.00
19.030	13.070	0.721	2378.8	2378.8	9.989	6.065	3.18		Clay	100.0			12.35	0.97	n.a.	n.a.	0.97	0.408	n.a.	n.a.	n.a.	n.a.	0.00	0.00
19.190	14.170	0.793	2398.8	2398.8	10.814	6.117	3.16		Clay	100.0			13.39	0.97	n.a.	n.a.	0.97	0.409	n.a.	n.a.	n.a.	n.a.	0.00	0.00
19.360	14.170	0.728	2420.0	2420.0	10.711	5.619	3.14		Clay	100.0			13.39	0.97	n.a.	n.a.	0.96	0.411	n.a.	n.a.	n.a.	n.a.	0.00	0.00
19.520	13.730	0.638	2440.0	2440.0	10.254	5.098	3.12		Clay	100.0			12.98	0.96	n.a.	n.a.	0.96	0.412	n.a.	n.a.	n.a.	n.a.	0.00	0.00
19.690	12.770	0.638	2461.3	2461.3	9.377	5.527	3.18		Clay	100.0			12.07	0.96	n.a.	n.a.	0.96	0.414	n.a.	n.a.	n.a.	n.a.	0.00	0.00
19.850	13.450	0.857	2481.3	2481.3	9.841	7.022	3.23		Clay	100.0			12.71	0.96	n.a.	n.a.	0.96	0.415	n.a.	n.a.	n.a.	n.a.	0.00	0.00
20.010	19.300	1.206	2501.2	2500.6	14.436	6.682	3.09		Clay	100.0			18.24	0.96	n.a.	n.a.	0.96	0.416	n.a.	n.a.	n.a.	n.a.	0.00	0.00
20.180	23.360	1.443	2521.6	2510.4	17.606	6.530	3.01		Clay	100.0			22.08	0.96	n.a.	n.a.	0.96	0.418	n.a.	n.a.	n.a.	n.a.	0.00	0.00
20.340	24.460	1.492	2540.8	2519.6	18.407	6.436	3.00		Clay	100.0			23.12	0.95	n.a.	n.a.	0.96	0.419	n.a.	n.a.	n.a.	n.a.	0.00	0.00
20.510	23.320	1.436	2561.2	2529.4	17.427	6.517	3.02		Clay	100.0			22.04	0.95	n.a.	n.a.	0.96	0.421	n.a.	n.a.	n.a.	n.a.	0.00	0.00
20.670	22.980	1.398	2580.4	2538.6	17.088	6.446	3.02		Clay	100.0			21.72	0.95	n.a.	n.a.	0.96	0.422	n.a.	n.a.	n.a.	n.a.	0.00	0.00
20.830	21.890	1.372	2599.6	2547.8	16.163	6.661	3.05		Clay	100.0			20.69	0.95	n.a.	n.a.	0.96	0.423	n.a.	n.a.	n.a.	n.a.	0.00	0.00
21.000	20.680	1.322	2620.0	2557.6	15.147	6.823	3.08		Clay	100.0			19.55	0.95	n.a.	n.a.	0.96	0.425	n.a.	n.a.	n.a.	n.a.	0.00	0.00

CORNERSTONE
EARTH GROUP

CPT No. 3

PGA (A_{max}) 0.62

Total Settlement: 0.42 (Inches)

Depth (ft)	q_c (tsf)	f_s (tsf)	σ_{vc} (psf)	Insitu σ'_{vc} (psf)	Q	F (%)	I_c	Layer "Plastic" PI > 7	Flag Soil Type	Fines (%)	q_{cN} near interfaces (soft layer)	Thin Layer Factor (K_H)	Interpreted q_{cN}	C_N	q_{c1N}	$q_{c1N\text{-}CS}$	Stress Reduction Coeff, r_d	CSR	K_σ for Sand	$CRR_{M=7.5,\ \sigma'_{vc} = 1\ atm}$	CRR	Factor of Safety (CRR/CSR)	Vertical Strain ε_v	Settlement (Inches)
21.160	20.330	1.239	2639.2	2566.8	14.812	6.517	3.07		Clay	100.0			19.22	0.95	n.a.	n.a.	0.96	0.426	n.a.	n.a.	n.a.	n.a.	0.00	0.00
21.330	22.400	1.283	2659.6	2576.6	16.355	6.090	3.02		Clay	100.0			21.17	0.95	n.a.	n.a.	0.96	0.427	n.a.	n.a.	n.a.	n.a.	0.00	0.00
21.490	24.120	1.370	2678.8	2585.8	17.620	6.013	2.99		Clay	100.0			22.80	0.95	n.a.	n.a.	0.96	0.428	n.a.	n.a.	n.a.	n.a.	0.00	0.00
21.650	25.500	1.426	2698.0	2595.0	18.613	5.906	2.97		Clay	100.0			24.10	0.95	n.a.	n.a.	0.96	0.430	n.a.	n.a.	n.a.	n.a.	0.00	0.00
21.820	27.440	1.358	2718.4	2604.8	20.025	5.206	2.91		Clay	95.6			25.94	0.95	n.a.	n.a.	0.96	0.431	n.a.	n.a.	n.a.	n.a.	0.00	0.00
21.980	27.490	1.262	2737.6	2614.0	19.985	4.832	2.89		Clay	93.9			25.98	0.95	n.a.	n.a.	0.96	0.432	n.a.	n.a.	n.a.	n.a.	0.00	0.00
22.150	26.850	1.156	2758.0	2623.8	19.415	4.540	2.88		Clay	93.3			25.38	0.94	n.a.	n.a.	0.96	0.433	n.a.	n.a.	n.a.	n.a.	0.00	0.00
22.310	25.900	1.051	2777.2	2633.1	18.618	4.289	2.88		Clay	93.1			24.48	0.94	n.a.	n.a.	0.96	0.434	n.a.	n.a.	n.a.	n.a.	0.00	0.00
22.470	24.970	1.018	2796.4	2642.3	17.842	4.317	2.89		Clay	94.4			23.60	0.94	n.a.	n.a.	0.96	0.436	n.a.	n.a.	n.a.	n.a.	0.00	0.00
22.640	23.390	0.976	2816.8	2652.1	16.577	4.440	2.92		Clay	96.9			22.11	0.94	n.a.	n.a.	0.96	0.437	n.a.	n.a.	n.a.	n.a.	0.00	0.00
22.800	22.990	1.009	2836.0	2661.3	16.212	4.677	2.95		Clay	98.7			21.73	0.94	n.a.	n.a.	0.96	0.438	n.a.	n.a.	n.a.	n.a.	0.00	0.00
22.970	23.000	1.059	2856.4	2671.1	16.152	4.909	2.96		Clay	99.9			21.74	0.94	n.a.	n.a.	0.95	0.439	n.a.	n.a.	n.a.	n.a.	0.00	0.00
23.130	22.760	1.154	2875.6	2680.3	15.910	5.413	2.99		Clay	100.0			21.51	0.94	n.a.	n.a.	0.95	0.440	n.a.	n.a.	n.a.	n.a.	0.00	0.00
23.290	22.880	1.451	2894.8	2689.5	15.938	6.768	3.06		Clay	100.0			21.63	0.94	n.a.	n.a.	0.95	0.441	n.a.	n.a.	n.a.	n.a.	0.00	0.00
23.460	23.740	1.855	2915.2	2699.3	16.510	8.323	3.11		Clay	100.0			22.44	0.94	n.a.	n.a.	0.95	0.443	n.a.	n.a.	n.a.	n.a.	0.00	0.00
23.620	26.110	1.975	2934.4	2708.5	18.197	8.013	3.07		Clay	100.0			24.68	0.94	n.a.	n.a.	0.95	0.444	n.a.	n.a.	n.a.	n.a.	0.00	0.00
23.790	29.620	1.782	2954.8	2718.3	20.706	6.333	2.95		Clay	99.3			28.00	0.94	n.a.	n.a.	0.95	0.445	n.a.	n.a.	n.a.	n.a.	0.00	0.00
23.950	24.420	1.522	2974.0	2727.5	16.816	6.638	3.03		Clay	100.0			23.08	0.94	n.a.	n.a.	0.95	0.446	n.a.	n.a.	n.a.	n.a.	0.00	0.00
24.110	21.500	1.398	2993.2	2736.7	14.618	6.987	3.09		Clay	100.0			20.32	0.93	n.a.	n.a.	0.95	0.447	n.a.	n.a.	n.a.	n.a.	0.00	0.00
24.280	20.040	1.289	3013.6	2746.5	13.496	6.952	3.12		Clay	100.0			18.94	0.93	n.a.	n.a.	0.95	0.448	n.a.	n.a.	n.a.	n.a.	0.00	0.00
24.440	20.640	1.606	3032.8	2755.7	13.879	8.399	3.16		Clay	100.0			19.51	0.93	n.a.	n.a.	0.95	0.449	n.a.	n.a.	n.a.	n.a.	0.00	0.00
24.610	22.550	2.045	3053.2	2765.5	15.204	9.728	3.18		Clay	100.0			21.31	0.93	n.a.	n.a.	0.95	0.450	n.a.	n.a.	n.a.	n.a.	0.00	0.00
24.770	40.510	2.741	3072.4	2774.8	28.092	7.032	2.89		Clay	94.3			38.29	0.93	n.a.	n.a.	0.95	0.451	n.a.	n.a.	n.a.	n.a.	0.00	0.00
24.930	67.940	2.891	3091.6	2784.0	54.710	4.354	2.54		Sand	66.3			64.22	0.88	56.74	123.04	0.95	0.452	0.965	0.178	0.243	0.54	0.03	0.03
25.100	70.300	3.082	3112.0	2793.8	56.547	4.483	2.54		Sand	66.2			66.45	0.88	58.70	125.55	0.95	0.453	0.964	0.185	0.254	0.56	0.03	0.03
25.260	65.600	2.621	3131.2	2803.0	52.587	4.093	2.53		Sand	65.6			62.00	0.88	54.53	120.04	0.95	0.454	0.965	0.171	0.229	0.50	0.03	0.03
25.430	73.830	2.005	3151.6	2812.8	59.234	2.775	2.38		Sand	53.1	132.35		132.35	0.91	120.50	200.05	0.95	0.455	0.925	1.894	3.856	8.47	0.00	0.00
25.590	73.780	1.848	3170.8	2822.0	59.088	2.560	2.35		Sand	51.2	132.35		132.35	0.91	120.32	198.85	0.95	0.456	0.925	1.772	3.608	7.91	0.00	0.00
25.750	80.140	2.066	3190.0	2831.2	64.181	2.631	2.34		Sand	49.8	132.35		132.35	0.91	120.14	197.87	0.95	0.457	0.925	1.680	3.419	7.48	0.00	0.00
25.920	91.570	2.230	3210.4	2841.0	73.385	2.478	2.28		Sand	45.1	132.35		132.35	0.91	119.85	194.57	0.95	0.458	0.927	1.410	2.877	6.28	0.00	0.00
26.080	97.560	1.500	3229.6	2850.2	78.137	1.563	2.12		Sand	32.5	132.35		132.35	0.90	119.09	181.85	0.95	0.459	0.936	0.783	1.554	3.39	0.00	0.00
26.250	108.200	1.427	3250.0	2860.0	86.645	1.338	2.04		Sand	26.2	132.35		132.35	0.89	118.40	171.49	0.94	0.460	0.941	0.530	0.974	2.12	0.00	0.00
26.410	119.740	1.753	3269.2	2869.2	95.865	1.484	2.04		Sand	26.0	132.35		132.35	0.89	118.23	170.93	0.94	0.461	0.941	0.519	0.951	2.07	0.00	0.00
26.570	140.030	1.867	3288.4	2878.4	112.146	1.349	1.96		Sand	19.8			132.35	0.89	117.26	155.95	0.94	0.461	0.948	0.333	0.550	1.19	0.01	0.01
26.740	136.130	1.912	3308.8	2888.2	108.793	1.422	1.98		Sand	21.8			128.67	0.89	113.91	157.16	0.94	0.462	0.947	0.344	0.572	1.24	0.01	0.01
26.900	124.130	1.943	3328.0	2897.4	98.919	1.586	2.05		Sand	26.8			117.33	0.88	103.63	155.06	0.94	0.463	0.947	0.326	0.534	1.15	0.01	0.01
27.070	121.680	2.008	3348.4	2907.2	96.769	1.674	2.07		Sand	28.6			115.01	0.88	101.46	155.38	0.94	0.464	0.947	0.328	0.539	1.16	0.01	0.01
27.230	122.980	1.852	3367.6	2916.4	97.654	1.527	2.04		Sand	26.2			116.24	0.88	102.26	152.44	0.94	0.465	0.948	0.306	0.491	1.06	0.01	0.01
27.400	134.410	2.369	3388.0	2926.2	106.670	1.785	2.06		Sand	27.8			127.04	0.89	112.46	167.24	0.94	0.466	0.939	0.460	0.818	1.76	0.00	0.00
27.560	142.720	2.884	3407.2	2935.5	113.163	2.045	2.09		Sand	29.8			134.90	0.89	119.97	179.34	0.94	0.467	0.931	0.707	1.369	2.93	0.00	0.00
27.720	138.640	2.778	3426.4	2944.7	109.709	2.029	2.09		Sand	30.4			131.04	0.89	116.20	175.57	0.94	0.468	0.933	0.612	1.153	2.47	0.00	0.00
27.890	152.360	2.936	3446.8	2954.5	120.493	1.949	2.05		Sand	27.1			144.01	0.89	128.11	184.66	0.94	0.468	0.926	0.882	1.772	3.78	0.00	0.00
28.050	157.960	2.344	3466.0	2963.7	124.771	1.500	1.96		Sand	19.7			149.30	0.88	131.88	172.37	0.94	0.469	0.934	0.546	1.003	2.14	0.00	0.00
28.220	192.850	2.518	3486.4	2973.5	152.376	1.318	1.86		Sand	11.6			182.28	0.88	161.13	176.37	0.94	0.470	0.931	0.631	1.192	2.54	0.00	0.00
28.380	235.000	2.421	3505.6	2982.7	185.688	1.038	1.72		Sand	0.9			222.12	0.89	198.20	198.20	0.94	0.471	0.912	1.710	3.429	7.28	0.00	0.00
28.540	268.890	2.069	3524.8	2991.9	212.333	0.775	1.59		Sand	0.0			254.15	0.90	229.70	229.70	0.94	0.472	0.896	15.984	31.511	66.82	0.00	0.00
28.710	201.350	1.410	3545.2	3001.7	158.380	0.707	1.66		Sand	0.0			190.31	0.88	166.83	166.83	0.94	0.472	0.935	0.454	0.801	1.70	0.00	0.00
28.870	192.190	1.439	3564.4	3010.9	150.872	0.756	1.70		Sand	0.0			181.65	0.87	158.32	158.32	0.94	0.473	0.939	0.355	0.590	1.25	0.01	0.01
29.040	193.930	1.333	3584.8	3020.7	151.995	0.694	1.67		Sand	0.0			183.30	0.87	159.67	159.67	0.94	0.474	0.938	0.368	0.617	1.30	0.00	0.00
29.200	223.060	1.486	3604.0	3029.9	174.765	0.672	1.61		Sand	0.0			210.83	0.88	186.03	186.03	0.94	0.475	0.919	0.937	1.889	3.98	0.00	0.00
29.360	241.280	0.851	3623.2	3039.1	188.862	0.355	1.42		Sand	0.0			228.05	0.89	202.67	202.67	0.94	0.475	0.902	2.203	4.371	9.19	0.00	0.00
29.530	212.520	0.615	3643.6	3048.9	165.905	0.292	1.43		Sand	0.0	228.05		228.05	0.89	202.43	202.43	0.93	0.476	0.901	2.173	4.308	9.05	0.00	0.00
29.690	177.990	1.081	3662.8	3058.1	138.499	0.614	1.67		Sand	0.0	228.05		228.05	0.89	202.21	202.21	0.93	0.477	0.901	2.145	4.250	8.91	0.00	0.00
29.860	112.150	1.245	3683.2	3067.9	86.588	1.129	1.99		Sand	22.4	228.05		228.05	0.91	206.76	265.75	0.93	0.478	0.889	1033.127	2019.582	4228.19	0.00	0.00
30.020	65.360	1.029	3702.4	3077.2	49.777	1.620	2.28		Sand	45.2	228.05		228.05	0.91	206.60	303.52	0.93	0.478	0.888	#########	########	4353694.74	0.00	0.00
30.180	27.970	0.692	3721.6	3086.4	16.919	2.650	2.78		Clay	85.4			26.44	0.91	n.a.	n.a.	0.93	0.479	n.a.	n.a.	n.a.	n.a.	0.00	0.00
30.350	10.070	0.344	3742.0	3096.2	5.296	4.190	3.31		Clay	100.0			9.52	0.90	n.a.	n.a.	0.93	0.480	n.a.	n.a.	n.a.	n.a.	0.00	0.00
30.510	10.290	0.524	3761.2	3105.4	5.416	6.234	3.40		Clay	100.0			9.73	0.90	n.a.	n.a.	0.93	0.480	n.a.	n.a.	n.a.	n.a.	0.00	0.00
30.680	12.530	0.786	3781.6	3115.2	6.831	7.390	3.36		Clay	100.0			11.84	0.90	n.a.	n.a.	0.93	0.481	n.a.	n.a.	n.a.	n.a.	0.00	0.00
30.840	19.190	1.016	3800.8	3124.4	11.068	5.878	3.14		Clay	100.0			18.14	0.90	n.a.	n.a.	0.93	0.482	n.a.	n.a.	n.a.	n.a.	0.00	0.00
31.000	19.790	1.368	3820.0	3133.6	11.412	7.649	3.20		Clay	100.0			18.71	0.90	n.a.	n.a.	0.93	0.482	n.a.	n.a.	n.a.	n.a.	0.00	0.00
31.170	36.760	1.141	3840.4	3143.4	22.167	3.276	2.74		Clay	82.4			34.74	0.90	n.a.	n.a.	0.93	0.483	n.a.	n.a.	n.a.	n.a.	0.00	0.00
31.330	32.920	0.851	3859.6	3152.6	19.660	2.746	2.74		Clay	81.9			31.12	0.90	n.a.	n.a.	0.93	0.484	n.a.	n.a.	n.a.	n.a.	0.00	0.00
31.500	18.390	0.745	3880.0	3162.4	10.403	4.526	3.09		Clay	100.0			17.38	0.90	n.a.	n.a.	0.93	0.484	n.a.	n.a.	n.a.	n.a.	0.00	0.00

CPT No. 3

PGA (A_{max}) 0.62

Total Settlement: 0.42 (Inches)

Depth (ft)	q_c (tsf)	f_s (tsf)	σ_{vc} (psf)	Insitu σ'_{vc} (psf)	Q	F (%)	I_c	Layer "Plastic" PI > 7	Flag Soil Type	Fines (%)	q_{cN} near interfaces (soft layer)	Thin Layer Factor (K_H)	Interpreted q_{cN}	C_N	q_{c1N}	q_{c1N-CS}	Stress Reduction Coeff, r_d	CSR	K_σ for Sand	$CRR_{M=7.5, \sigma'_{vc} = 1 atm}$	CRR	Factor of Safety (CRR/CSR)	Vertical Strain ε_v	Settlement (Inches)
31.660	13.210	0.577	3899.2	3171.6	7.101	5.123	3.25		Clay	100.0			12.49	0.90	n.a.	n.a.	0.93	0.485	n.a.	n.a.	n.a.	n.a.	0.00	0.00
31.820	16.990	0.628	3918.4	3180.8	9.451	4.175	3.10		Clay	100.0			16.06	0.90	n.a.	n.a.	0.93	0.486	n.a.	n.a.	n.a.	n.a.	0.00	0.00
31.990	15.100	0.986	3938.8	3190.6	8.231	7.512	3.30		Clay	100.0			14.27	0.90	n.a.	n.a.	0.93	0.486	n.a.	n.a.	n.a.	n.a.	0.00	0.00
32.150	16.240	1.588	3958.0	3199.8	8.914	11.133	3.39		Clay	100.0			15.35	0.90	n.a.	n.a.	0.93	0.487	n.a.	n.a.	n.a.	n.a.	0.00	0.00
32.320	28.510	1.740	3978.4	3209.6	16.526	6.559	3.04		Clay	100.0			26.95	0.90	n.a.	n.a.	0.93	0.488	n.a.	n.a.	n.a.	n.a.	0.00	0.00
32.480	34.840	1.952	3997.6	3218.8	20.406	5.944	2.94		Clay	98.2			32.93	0.90	n.a.	n.a.	0.92	0.488	n.a.	n.a.	n.a.	n.a.	0.00	0.00
32.640	39.000	1.747	4016.8	3228.1	22.919	4.722	2.84		Clay	89.8			36.86	0.89	n.a.	n.a.	0.92	0.489	n.a.	n.a.	n.a.	n.a.	0.00	0.00
32.810	33.860	1.727	4037.2	3237.9	19.668	5.423	2.92		Clay	97.0			32.00	0.89	n.a.	n.a.	0.92	0.489	n.a.	n.a.	n.a.	n.a.	0.00	0.00
32.970	23.990	1.952	4056.4	3247.1	13.527	8.887	3.19		Clay	100.0			22.67	0.89	n.a.	n.a.	0.92	0.490	n.a.	n.a.	n.a.	n.a.	0.00	0.00
33.140	42.150	2.153	4076.8	3256.9	24.632	5.366	2.85		Clay	91.0			39.84	0.89	n.a.	n.a.	0.92	0.490	n.a.	n.a.	n.a.	n.a.	0.00	0.00
33.300	48.780	2.130	4096.0	3266.1	28.617	4.559	2.75		Clay	83.3			46.11	0.89	n.a.	n.a.	0.92	0.491	n.a.	n.a.	n.a.	n.a.	0.00	0.00
33.460	101.080	2.875	4115.2	3275.3	75.228	2.904	2.32		Sand	48.4	133.77		133.77	0.86	115.21	190.84	0.92	0.492	0.896	1.171	2.309	4.70	0.00	0.00
33.630	141.530	2.857	4135.6	3285.1	105.793	2.049	2.11		Sand	31.5			133.77	0.85	113.91	174.30	0.92	0.492	0.912	0.585	1.065	2.16	0.00	0.00
33.790	151.710	2.777	4154.8	3294.3	113.349	1.856	2.05		Sand	27.3			143.39	0.85	122.27	178.10	0.92	0.493	0.908	0.674	1.260	2.56	0.00	0.00
33.960	180.110	3.342	4175.2	3304.1	134.654	1.877	2.01		Sand	23.6			170.24	0.86	146.95	199.56	0.92	0.493	0.883	1.843	3.583	7.26	0.00	0.00
34.120	187.700	4.551	4194.4	3313.3	140.193	2.452	2.08		Sand	29.7			177.41	0.87	154.91	221.09	0.92	0.494	0.865	7.767	14.788	29.95	0.00	0.00
34.280	166.380	5.494	4213.6	3322.5	123.909	3.344	2.22		Sand	40.8			157.26	0.87	136.50	212.05	0.92	0.494	0.865	4.001	7.610	15.40	0.00	0.00
34.450	144.020	5.127	4234.0	3332.3	106.879	3.613	2.29		Sand	46.1			136.12	0.86	116.57	191.13	0.92	0.495	0.892	1.187	2.330	4.71	0.00	0.00
34.610	127.850	4.059	4253.2	3341.5	94.562	3.229	2.29		Sand	45.8			120.84	0.85	102.16	172.85	0.92	0.495	0.910	0.555	0.998	2.01	0.00	0.00
34.780	71.350	2.667	4273.6	3351.3	51.982	3.853	2.52		Sand	64.4			67.44	0.81	54.66	119.90	0.92	0.496	0.943	0.171	0.223	0.45	0.03	0.02
34.940	42.810	2.417	4292.8	3360.5	24.201	5.945	2.89		Clay	93.9			40.46	0.89	n.a.	n.a.	0.92	0.496	n.a.	n.a.	n.a.	n.a.	0.00	0.00
35.100	32.060	2.097	4312.0	3369.8	17.748	7.011	3.03		Clay	100.0			30.30	0.88	n.a.	n.a.	0.92	0.497	n.a.	n.a.	n.a.	n.a.	0.00	0.00
35.270	38.180	1.732	4332.4	3379.6	21.313	4.808	2.86		Clay	92.1			36.09	0.88	n.a.	n.a.	0.92	0.497	n.a.	n.a.	n.a.	n.a.	0.00	0.00
35.430	37.630	1.758	4351.6	3388.8	20.925	4.958	2.88		Clay	93.3			35.57	0.88	n.a.	n.a.	0.92	0.498	n.a.	n.a.	n.a.	n.a.	0.00	0.00
35.600	42.920	1.326	4372.0	3398.6	23.971	3.255	2.71		Clay	80.2			40.57	0.88	n.a.	n.a.	0.91	0.498	n.a.	n.a.	n.a.	n.a.	0.00	0.00
35.760	26.610	0.970	4391.2	3407.8	14.329	3.972	2.94		Clay	98.5			25.15	0.88	n.a.	n.a.	0.91	0.499	n.a.	n.a.	n.a.	n.a.	0.00	0.00
35.930	15.660	0.726	4411.6	3417.6	7.874	5.398	3.23		Clay	100.0			14.80	0.88	n.a.	n.a.	0.91	0.499	n.a.	n.a.	n.a.	n.a.	0.00	0.00
36.090	10.780	0.730	4430.8	3426.8	4.999	8.526	3.51		Clay	100.0			10.19	0.88	n.a.	n.a.	0.91	0.500	n.a.	n.a.	n.a.	n.a.	0.00	0.00
36.250	10.730	1.077	4450.0	3436.0	4.951	12.658	3.62		Clay	100.0			10.14	0.88	n.a.	n.a.	0.91	0.500	n.a.	n.a.	n.a.	n.a.	0.00	0.00
36.420	14.590	0.958	4470.4	3445.8	7.171	7.756	3.36		Clay	100.0			13.79	0.88	n.a.	n.a.	0.91	0.501	n.a.	n.a.	n.a.	n.a.	0.00	0.00
36.580	24.340	0.685	4489.6	3455.0	12.790	3.100	2.92		Clay	96.4			23.01	0.88	n.a.	n.a.	0.91	0.501	n.a.	n.a.	n.a.	n.a.	0.00	0.00
36.750	16.070	0.552	4510.0	3464.8	7.974	3.999	3.15		Clay	100.0			15.19	0.88	n.a.	n.a.	0.91	0.501	n.a.	n.a.	n.a.	n.a.	0.00	0.00
36.910	10.170	0.410	4529.2	3474.0	4.551	5.180	3.41		Clay	100.0			9.61	0.88	n.a.	n.a.	0.91	0.502	n.a.	n.a.	n.a.	n.a.	0.00	0.00
37.070	8.640	0.346	4548.4	3483.2	3.655	5.432	3.50		Clay	100.0			8.17	0.88	n.a.	n.a.	0.91	0.502	n.a.	n.a.	n.a.	n.a.	0.00	0.00
37.240	8.960	0.442	4568.8	3493.0	3.822	6.618	3.54		Clay	100.0			8.47	0.88	n.a.	n.a.	0.91	0.503	n.a.	n.a.	n.a.	n.a.	0.00	0.00
37.400	10.360	0.631	4588.0	3502.2	4.606	7.822	3.51		Clay	100.0			9.79	0.88	n.a.	n.a.	0.91	0.503	n.a.	n.a.	n.a.	n.a.	0.00	0.00
37.570	15.000	0.868	4608.4	3512.0	7.230	6.837	3.32		Clay	100.0			14.18	0.87	n.a.	n.a.	0.91	0.504	n.a.	n.a.	n.a.	n.a.	0.00	0.00
37.730	17.530	0.868	4627.6	3521.2	8.643	5.707	3.21		Clay	100.0			16.57	0.87	n.a.	n.a.	0.91	0.504	n.a.	n.a.	n.a.	n.a.	0.00	0.00
37.890	18.510	0.757	4646.8	3530.5	9.170	4.675	3.14		Clay	100.0			17.50	0.87	n.a.	n.a.	0.91	0.504	n.a.	n.a.	n.a.	n.a.	0.00	0.00
38.060	18.970	1.055	4667.2	3540.3	9.398	6.343	3.21		Clay	100.0			17.93	0.87	n.a.	n.a.	0.91	0.505	n.a.	n.a.	n.a.	n.a.	0.00	0.00
38.220	21.490	1.810	4686.4	3549.5	10.789	9.451	3.28		Clay	100.0			20.31	0.87	n.a.	n.a.	0.91	0.505	n.a.	n.a.	n.a.	n.a.	0.00	0.00
38.390	34.740	2.406	4706.8	3559.3	18.198	7.430	3.04		Clay	100.0			32.84	0.87	n.a.	n.a.	0.90	0.505	n.a.	n.a.	n.a.	n.a.	0.00	0.00
38.550	51.170	2.503	4726.0	3568.5	27.355	5.128	2.80		Clay	87.3			48.36	0.87	n.a.	n.a.	0.90	0.506	n.a.	n.a.	n.a.	n.a.	0.00	0.00
38.710	53.750	2.878	4745.2	3577.7	28.721	5.602	2.81		Clay	88.2			50.80	0.87	n.a.	n.a.	0.90	0.506	n.a.	n.a.	n.a.	n.a.	0.00	0.00
38.880	57.400	3.079	4765.6	3587.5	30.672	5.596	2.79		Clay	86.5			54.25	0.87	n.a.	n.a.	0.90	0.507	n.a.	n.a.	n.a.	n.a.	0.00	0.00
39.040	85.200	3.616	4784.8	3596.7	60.033	4.367	2.51		Sand	64.1			80.53	0.79	63.94	131.77	0.90	0.507	0.927	0.203	0.279	0.55	0.02	0.02
39.210	149.800	4.538	4805.2	3606.5	106.713	3.079	2.24		Sand	41.8	176.42		176.42	0.86	151.13	231.20	0.90	0.507	0.840	18.293	33.807	66.64	0.00	0.00
39.370	166.970	4.011	4824.4	3615.7	118.985	2.437	2.13		Sand	33.2	176.42		176.42	0.85	149.96	220.38	0.90	0.508	0.839	7.343	13.557	26.71	0.00	0.00
39.530	177.100	3.166	4843.6	3624.9	126.142	1.813	2.01		Sand	24.2	176.42		176.42	0.84	147.98	202.20	0.90	0.508	0.855	2.143	4.031	7.94	0.00	0.00
39.700	186.650	1.901	4864.0	3634.7	132.852	1.032	1.83		Sand	9.1			176.42	0.80	141.56	147.79	0.90	0.508	0.915	0.275	0.413	0.81	0.01	0.01
39.860	185.530	1.213	4883.2	3643.9	131.870	0.662	1.70		Sand	0.0			175.36	0.80	139.49	139.49	0.90	0.509	0.921	0.232	0.332	0.65	0.02	0.01
40.030	186.640	0.973	4903.6	3653.7	132.485	0.528	1.64		Sand	0.0			176.41	0.80	140.27	140.27	0.90	0.509	0.920	0.236	0.339	0.67	0.02	0.01
40.190	193.230	0.589	4922.8	3662.9	137.045	0.309	1.51		Sand	0.0			182.64	0.80	145.82	145.82	0.90	0.509	0.915	0.263	0.391	0.77	0.02	0.01
40.350	187.500	0.661	4942.0	3672.2	132.755	0.357	1.55		Sand	0.0			177.22	0.79	140.67	140.67	0.90	0.510	0.919	0.237	0.342	0.67	0.02	0.01
40.520	174.380	1.175	4962.4	3682.0	123.170	0.684	1.74		Sand	1.9			164.82	0.78	129.22	129.22	0.90	0.510	0.926	0.195	0.264	0.52	0.02	0.01
40.680	149.750	3.458	4981.6	3691.2	105.384	2.348	2.15		Sand	35.0			141.54	0.82	116.15	181.32	0.90	0.510	0.881	0.766	1.425	2.79	0.00	0.00
40.850	173.900	5.151	5002.0	3701.0	122.496	3.005	2.19		Sand	38.1			164.37	0.84	137.84	211.23	0.90	0.511	0.832	3.784	6.928	13.57	0.00	0.00
41.010	270.890	6.863	5021.2	3710.2	191.568	2.557	2.01		Sand	24.2			256.04	0.86	220.78	287.29	0.90	0.511	0.832	37073.703	67821.735	132754.86	0.00	0.00
41.170	401.440	6.392	5040.4	3719.4	284.395	1.602	1.75		Sand	3.0			379.43	0.86	326.97	326.97	0.89	0.511	0.831	#########	########	##########	0.00	0.00
41.340	463.320	6.631	5060.8	3729.2	328.071	1.439	1.68		Sand	0.0			437.92	0.86	377.11	377.11	0.89	0.511	0.830	#########	########	##########	0.00	0.00
41.500	394.960	7.916	5080.0	3738.4	279.049	2.017	1.84		Sand	10.0			373.31	0.86	321.26	334.94	0.89	0.512	0.829	#########	########	##########	0.00	0.00
41.670	294.210	8.854	5100.4	3748.2	207.128	3.036	2.06		Sand	27.5			278.08	0.86	239.15	317.44	0.89	0.512	0.828	#########	########	##########	0.00	0.00
41.830	206.980	9.473	5119.6	3757.4	144.995	4.634	2.30		Sand	46.6			195.63	0.86	168.13	256.35	0.89	0.512	0.828	285.442	519.798	1014.60	0.00	0.00
41.990	204.150	6.812	5138.8	3766.6	142.805	3.379	2.19		Sand	38.1			192.96	0.85	164.68	244.32	0.89	0.513	0.827	68.170	124.029	241.97	0.00	0.00

CORNERSTONE EARTH GROUP

CPT No. 3

PGA (A_{max}) 0.62

Total Settlement: 0.42 (Inches)

Depth (ft)	q_c (tsf)	f_s (tsf)	σ_{vc} (psf)	Insitu σ'_{vc} (psf)	Q	F (%)	I_c	Layer "Plastic" PI > 7	Flag Soil Type	Fines (%)	q_{cN} near interfaces (soft layer)	Thin Layer Factor (K_H)	Interpreted q_{cN}	C_N	q_{c1N}	q_{c1N-CS}	Stress Reduction Coeff, r_d	CSR	K_σ for Sand	$CRR_{M=7.5, \sigma'vc = 1 atm}$	CRR	Factor of Safety (CRR/CSR)	Vertical Strain ε_v	Settlement (Inches)
42.160	166.320	6.320	5159.2	3776.4	115.848	3.860	2.29		Sand	46.1			157.20	0.83	130.78	209.03	0.89	0.513	0.830	3.268	5.970	11.64	0.00	0.00
42.320	113.980	5.069	5178.4	3785.6	78.714	4.551	2.45		Sand	59.0			107.73	0.80	85.87	158.34	0.89	0.513	0.900	0.355	0.565	1.10	0.01	0.00
42.490	114.580	4.758	5198.8	3795.4	79.029	4.249	2.43		Sand	57.1			108.30	0.80	86.22	158.10	0.89	0.513	0.900	0.353	0.561	1.09	0.01	0.00
42.650	97.880	4.054	5218.0	3804.6	67.155	4.255	2.47		Sand	60.9			92.51	0.78	72.43	141.72	0.89	0.514	0.913	0.242	0.349	0.68	0.02	0.01
42.810	89.720	2.765	5237.2	3813.9	61.322	3.174	2.41		Sand	55.6			84.80	0.77	65.61	131.24	0.89	0.514	0.920	0.201	0.274	0.53	0.02	0.01
42.980	63.800	3.020	5257.6	3823.6	31.996	4.937	2.74		Clay	82.4			60.30	0.86	n.a.	n.a.	0.89	0.514	n.a.	n.a.	n.a.	n.a.	0.00	0.00
43.140	82.520	2.185	5276.8	3832.9	56.099	2.736	2.39		Sand	54.1			78.00	0.77	59.68	123.16	0.89	0.514	0.924	0.179	0.233	0.45	0.03	0.01
43.310	65.410	2.591	5297.2	3842.7	32.666	4.129	2.68		Clay	77.6			61.82	0.85	n.a.	n.a.	0.89	0.515	n.a.	n.a.	n.a.	n.a.	0.00	0.00
43.470	45.320	3.441	5316.4	3851.9	22.151	8.066	3.01		Clay	100.0			42.84	0.85	n.a.	n.a.	0.89	0.515	n.a.	n.a.	n.a.	n.a.	0.00	0.00
43.640	85.420	3.803	5336.8	3861.7	42.858	4.596	2.63		Clay	73.5			80.74	0.85	n.a.	n.a.	0.89	0.515	n.a.	n.a.	n.a.	n.a.	0.00	0.00
43.800	97.100	3.148	5356.0	3870.9	65.984	3.334	2.40		Sand	55.0			91.78	0.77	71.06	137.98	0.89	0.515	0.913	0.226	0.317	0.62	0.02	0.01
43.960	58.690	2.175	5375.2	3880.1	28.867	3.884	2.70		Clay	79.3			55.47	0.85	n.a.	n.a.	0.88	0.516	n.a.	n.a.	n.a.	n.a.	0.00	0.00
44.130	43.620	2.078	5395.6	3889.9	21.040	5.078	2.88		Clay	93.7			41.23	0.85	n.a.	n.a.	0.88	0.516	n.a.	n.a.	n.a.	n.a.	0.00	0.00
44.290	36.820	2.257	5414.8	3899.1	17.498	6.615	3.02		Clay	100.0			34.80	0.85	n.a.	n.a.	0.88	0.516	n.a.	n.a.	n.a.	n.a.	0.00	0.00
44.460	48.280	2.866	5435.2	3908.9	23.312	6.291	2.91		Clay	96.2			45.63	0.85	n.a.	n.a.	0.88	0.516	n.a.	n.a.	n.a.	n.a.	0.00	0.00
44.620	68.000	3.105	5454.4	3918.1	33.318	4.756	2.72		Clay	80.5			64.27	0.85	n.a.	n.a.	0.88	0.516	n.a.	n.a.	n.a.	n.a.	0.00	0.00
44.780	88.810	3.028	5473.6	3927.3	59.716	3.517	2.45		Sand	58.8			83.94	0.76	64.05	130.34	0.88	0.517	0.916	0.198	0.267	0.52	0.02	0.01
44.950	77.330	2.494	5494.0	3937.1	51.680	3.343	2.48		Sand	61.0			73.09	0.75	55.01	119.44	0.88	0.517	0.923	0.170	0.217	0.42	0.03	0.01
45.110	58.140	2.179	5513.2	3946.3	28.068	3.935	2.72		Clay	80.4			54.95	0.85	n.a.	n.a.	0.88	0.517	n.a.	n.a.	n.a.	n.a.	0.00	0.00
45.280	44.160	2.752	5533.6	3956.1	20.926	6.648	2.97		Clay	100.0			41.74	0.85	n.a.	n.a.	0.88	0.517	n.a.	n.a.	n.a.	n.a.	0.00	0.00
45.440	56.050	2.666	5552.8	3965.3	26.870	5.004	2.80		Clay	87.1			52.98	0.85	n.a.	n.a.	0.88	0.517	n.a.	n.a.	n.a.	n.a.	0.00	0.00
45.600	65.230	2.736	5572.0	3974.6	31.422	4.382	2.71		Clay	80.0			61.65	0.85	n.a.	n.a.	0.88	0.518	n.a.	n.a.	n.a.	n.a.	0.00	0.00
45.770	53.290	2.660	5592.4	3984.4	25.346	5.267	2.84		Clay	89.8			50.37	0.85	n.a.	n.a.	0.88	0.518	n.a.	n.a.	n.a.	n.a.	0.00	0.00
45.930	91.470	2.195	5611.6	3993.6	61.001	2.476	2.33		Sand	49.6	174.22		174.22	0.83	144.62	228.70	0.88	0.518	0.809	14.625	26.044	50.28	0.00	0.00
46.100	138.560	1.562	5632.0	4003.4	93.278	1.151	1.97		Sand	20.8	174.22		174.22	0.80	139.21	183.76	0.88	0.518	0.860	0.848	1.571	3.03	0.00	0.00
46.260	184.320	1.194	5651.2	4012.6	124.573	0.658	1.72		Sand	0.8			174.22	0.76	131.94	131.94	0.88	0.518	0.912	0.204	0.276	0.53	0.02	0.01