# ENGINEERING GEOLOGY AND GEOTECHNICAL ENGINEERING REPORT

KITP HOUSING PROJECT
SOUTHWEST CORNER OF EL COLEGIO ROAD AND CAMINO PESCADERO
SANTA BARBARA COUNTY, CALIFORNIA

PROJECT NO.: 307035-001
JULY 9, 2025

PREPARED FOR: UNIVERSITY OF CALIFORNIA, SANTA BARBARA
ATTENTION: LARS BILDSTEN, DIRECTOR UCSB KITP

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July 9, 2025

Project No.: 307035-001
Report No.: 25-7-8

University of California, Santa Barbara
Attention: Lars Bildsten, Director UCSB KITP
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Project: KITP Housing Project
Santa Barbara County, California
Subject: Engineering Geology and Geotechnical Engineering Report

As authorized, Earth Systems Pacific (Earth Systems) has prepared this Engineering Geology and Geotechnical Engineering Report for proposed construction at a vacant lot on the southwest corner of El Colegio Road and Camino Pescadero in Santa Barbara County, California. The accompanying Engineering Geology and Geotechnical Engineering Report presents the results of our subsurface exploration and laboratory testing programs, and our conclusions and recommendations pertaining to geotechnical aspects of project design.

This report completes Phase 1 of the scope of services described within our Proposal No. SBA-24-09-003 dated September 18, 2024, second revision December 13, 2024, and authorized by Renée Bahl via an Authorization to Perform Services (Agreement No. FM250206PS/417-13, Authorization No. WA01) on January 21, 2025.

We appreciate the opportunity to be of service to you on this project. Please call if you have any questions, or if we can be of further service.

Respectfully submitted,

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## INTRODUCTION

Project Description

This report presents results of an Engineering Geology and Geotechnical Engineering study performed for the proposed KITP Housing Project on the southwest corner of the intersection of El Colegio Road and Camino Pescadero in Santa Barbara County, California (see Vicinity Map in Appendix A).

It is anticipated that the proposed KITP Housing Project will include a three- to four-story residential building, asphalt and concrete parking lots, and stormwater infiltration systems. This Engineering Geology and Geotechnical Engineering Report will address the proposed residential building and asphalt and concrete parking lots. We will prepare a separate Infiltration Testing Report to address the proposed stormwater infiltration systems.

Site grading is expected to be limited to preparing the building pads and shaping the site for drainage.

The project Structural Engineer, KPFF, has notified Earth Systems that they anticipate column dead loads of up to 340 kips, column live loads of up to 160 kips, wall dead loads of up to 25 kips per lineal foot, and wall live loads of up to 5 kips per lineal foot. These loads are used as a basis for the recommendations of this report.

Purpose and Scope of Work

The purpose of the geologic/geotechnical study that led to this report was to analyze the soil conditions at the project site and to provide geologic/geotechnical recommendations for design and construction. The soil/bedrock conditions include surface and subsurface soil/bedrock types, soil expansion potential, soil strength, settlement potential, bearing capacity, and the presence or absence of subsurface water. The scope of work included:

- Reviewing historical stereographic aerial photographs of project site.
- Performing a reconnaissance of the project site.
- Drilling, sampling, and logging six hollow-stem-auger borings (B-1 through B-6) on the project site to study soil and groundwater conditions.
- Performing twenty-eight Cone Penetrometer Test soundings (CPT-1 through CPT-28) on the project site to study soil/bedrock and groundwater conditions, and to evaluate the

liquefaction potential of the soils within the depth tested. Noted that CPT-24 also included sheave wave velocity measurements at about 5-foot intervals, and CPT-25 included sheave wave velocity measurements at about 10-foot intervals.

- Laboratory testing soil samples obtained during the subsurface exploration to determine their physical and engineering properties.
- Consulting with owner representatives and design professionals.
- Analyzing the geotechnical data obtained.
- Preparing this report.

Contained in this report are:

- Descriptions and results of field and laboratory tests that were performed.
- Conclusions and recommendations pertaining to site grading and structural design.

Site Setting

The project site is currently a vacant lot surrounded by chain link fencing and used for parking. The project site is bounded by El Colegio Road to the north, Camino Pescadero to the east, and multi-tenant residential lots to the south and west.

The project site can be accessed from Camino Pescadero via a gate in the chain link fencing.

The project site is relatively flat and has slight surface drainage to the north. According to a topographic survey performed by Stantec, the elevations near the north and south ends of the project site are about 33 and 38 feet, respectively. The property's length on the north-south orientation is about 300 feet, therefore, the project site's surface gradient is about 1.7%.

The geographic coordinates of the project site are 34.4168˚ North Latitude and 119.8591° West Longitude.

## REGIONAL GEOLOGY

The site lies within the western portion of the Transverse Ranges geologic province. Ongoing regional compression in the region produces the east-west trending faults that deform early Pleistocene- to Tertiary-aged marine and non-marine sedimentary bedrock units. These sedimentary bedrock units underlie the site at relatively shallow depths.

Geologic mapping by T.W. Dibblee, Jr (Geologic Map of the Goleta Quadrangle, 1987) places the east-west trending More Ranch fault about 1,400 feet north of the site (see Regional Geologic Map 1 in Appendix A).

Geologic mapping by United States Geologic Survey (Geologic Map of the Santa Barbara Coastal Plain, 2009) places the east-west trending South Branch Western More Ranch fault along the northern boundary of the site (see Regional Geologic Map 2 in Appendix A).

The site is mapped by T.W. Dibblee, Jr. and the United States Geologic Survey to be underlain by older alluvium. From the ground surface our field study sequentially encountered artificial fill, alluvium, older alluvium, and Sisquoc Formation bedrock.

## SITE CLASS DETERMINATIONS

Earth Systems followed the guidelines presented in Chapter 20 of the ASCE 7-16 to determine the project Site Class using shear wave velocity data gathered from CPT-24 and CPT-25. In addition, site class determinations were made using cone resistance data from CPT-4, CPT-11, and CPT-19 were.

The calculation results from these five CPTs indicated that the project's Site Class is D. The site class calculation sheets are included in Appendix D.

## SEISMICITY AND SEISMIC DESIGN

It is assumed that the 2022 CBC and ASCE 7-16 guidelines will apply for the seismic design parameters. The 2022 CBC includes several seismic design parameters that are influenced by the geographic site location with respect to active and potentially active faults, and with respect to subsurface soil or rock conditions. The "general procedure" (i.e., probabilistic) seismic design parameters presented below were retrieved from the ASCE Hazard Tool website which presents the data in a report format. The data were retrieved for the ASCE 7-16 design code, site coordinates 34.4168° North Latitude and 119.8591° West Longitude, Site Class D, and Occupancy (Risk) Category III. A listing of the 2022 CBC and ASCE 7-16 Seismic Parameters is presented below and again in Appendix D.

**Summary of Seismic Parameters – 2022 CBC "General Procedure"**

| | |
|---|---|
| Site Class (ASCE 7-16) | D |
| Occupancy (Risk) Category | III |
| Seismic Design Category | See ASCE 7-16 Section 11.4.8 |
| **Maximum Considered Earthquake (MCE) Ground Motion** | |
| Spectral Response Acceleration, Short Period – $S_s$ | 2.402 g |
| Spectral Response Acceleration at 1 sec. – $S_1$ | 0.841 g |
| Site Coefficient – $F_a$ | 1.0 |
| Site Coefficient – $F_v$ | See ASCE 7-16 Section 11.4.8 |
| Site-Modified Spectral Response Acceleration, Short Period – $S_{MS}$ | 2.402 g |
| Site-Modified Spectral Response Acceleration at 1 sec. – $S_{M1}$ | See ASCE 7-16 Section 11.4.8 |
| **Design Earthquake Ground Motion** | |
| Short Period Spectral Response – $S_{DS}$ | 1.601 g |
| One Second Spectral Response – $S_{D1}$ | See ASCE 7-16 Section 11.4.8 |
| Site Modified Peak Ground Acceleration - $PGA_M$ | 1.174 g |
| Values appropriate for a 2% probability of exceedance in 50 years | |

The site-specific study takes into account soil amplification effects. The United States Geological Survey (USGS, 2009) has undertaken a probabilistic earthquake analyses that covers the continental United States. A reasonable site-specific spectral response curve may be developed from the USGS Unified Hazard Tool web page, which adjusts for site-specific ground factors. The interactive webpage appears to provide a precise calculation based on site coordinates. For the purposes of this study, the Dynamic: Conterminous U.S. 2014 (Update) (Version 4.20) values have been chosen for use in the analysis. A site tested shear wave velocity of 350 meter per second was used.

NGA West 2014 attenuation relationships were used in the analyses. These attenuations included those of Abrahamson, Silva and Kamai, Boore and Stewart, Campbell and Bozorgnia, Chiou and Youngs, and Idriss.

**Summary of Seismic Parameters – 2022 CBC "Site-Specific Procedure"**

| | |
|---|---|
| Site Class (ASCE 7-16) | D |
| Occupancy (Risk) Category | III |
| Seismic Design Category | E |
| **Maximum Considered Earthquake (MCE) Ground Motion** | |
| Spectral Response Acceleration, Short Period – $S_s$ | 2.402 g |
| Spectral Response Acceleration at 1 sec. – $S_1$ | 0.841 g |
| Site Coefficient – $F_a$ | 1.0 |
| Site Coefficient – $F_v$ | 2.5 |
| Site-Modified Spectral Response Acceleration, Short Period – $S_{MS}$ | 2.489 g |
| Site-Modified Spectral Response Acceleration at 1 sec. – $S_{M1}$ | 1.812 g |
| **Design Earthquake Ground Motion** | |
| Short Period Spectral Response – $S_{DS}$ | 1.659 g |
| One Second Spectral Response – $S_{D1}$ | 1.208 g |
| Site Modified Peak Ground Acceleration - $PGA_M$ | 1.046 g |
| Values appropriate for a 2% probability of exceedance in 50 years | |

The Fault Parameters table in Appendix D lists the significant "active" and "potentially active" faults within an approximate 45-mile radius of the project site. The distance between the project site and the nearest portion of each fault is shown as well as the respective estimated maximum earthquake magnitudes.

## SOIL/BEDROCK AND GROUNDWATER CONDITIONS

Evaluation of the subsurface indicates that much of the project site is blanketed by a layer (about 1.5 feet thick) of artificial fill/disturbed soils (hereafter referred to as artificial fill) consisting of sandy clay with some gravels. The artificial fill is sequentially underlain by native soils (alluvium, older alluvium, and Sisquoc Formation bedrock) which are composed of silty sand and clayey sand. Earth Systems is not aware of any documentation about the placement and testing of this artificial fill. Hence, for the purposes of this report, the artificial fill is considered to be non-engineered and uncertified.

Testing indicates that anticipated bearing soils lie in the "Medium" to "High" expansion ranges based on measured expansion indices of 85 and 98, respectively. However, it is Earth Systems' judgement that the onsite soils should be considered in the "High" expansion range. Hence, the recommendations provided in this report are based on the "High" expansion range. A version of this classification of soil expansion is incorporated into a Minimum Foundation Design Table, which is included in Appendix C of this report. It appears that soils can be cut by normal grading equipment.

Groundwater was encountered in our onsite borings at depths of about 13 to 14 feet below the existing ground surface when our exploration was conducted. It should be noted that fluctuations in groundwater levels may occur because of variations in rainfall, regional climate, and other factors.

Samples of near-surface soils were tested for pH, resistivity, soluble sulfates, and soluble chlorides. The test results provided in Appendix B should be distributed to the design team for their interpretations pertaining to the corrosivity or reactivity of various construction materials (such as concrete and piping) with the soils. It should be noted that the sulfate contents (440 and 220 mg/Kg) are in the "S0" exposure class of Table 19.3.1.1 of ACI 318-14. Therefore, special concrete designs will not be necessary for the measured sulfate contents according to Table 19.3.2.1 of ACI 318-14.

Based on criteria established by the County of Los Angeles (2013), the measured resistivity values of near-surface soil samples (920 and 2,200 ohms-cm) indicates that near-surface soils are "Severely Corrosive" to "Corrosive" to ferrous metal (i.e., cast iron, etc.) pipes. It should be noted that Earth Systems does not practice soil corrosion engineering.

## HYDROCOLLAPSE POTENTIAL

Hydrocollapse is a phenomenon in which naturally occurring soil deposits, or non-engineered fill soils, collapse when wetted. Natural soils that are susceptible to this phenomenon are typically aeolian, debris flow, alluvial, or colluvial deposits with high apparent strength when dry. Loosely compacted fills can also be susceptible to this phenomenon. The dry strength is attributed to salts, clays, silts, and in some cases capillary tension, "bonding" larger soil grains together. So long as these soils remain dry, their strength and resistance to compression are retained. However, when wetted, the salt, clay, or silt bonding agent is weakened or dissolved,

or capillary tension reduced, eventually leading to collapse. Soils susceptible to this phenomenon are found throughout the southwestern United States.

Based on the consolidation tests run, the samples from Borings B-2@5', B-2@15', and B-6@15' appear to have hydrocollapse of about 0.5, 0.1, and 0.2 percent, respectively. These hydrocollapse potentials are classified as "Slight" according to ASTM D 5333. When applying the averaged 0.27 percent hydrocollapse to a non-bedrock soil layers' thickness of 17.5 feet, a hydrocollapse settlement of 0.56 inches is calculated. This hydrocollapse settlement can be reduced to 0.4 inches if the upper 5 feet of soils are overexcavated and recompacted.

## EARTHQUAKE-INDUCED HAZARDS

Earthquake-induced cyclic loading can be the cause of several significant phenomena, including liquefaction in fine sands and silty sands. Liquefaction results in a loss of soil strength and can cause structures to settle and, in extreme cases, to experience bearing failure. Cyclic softening in clays during earthquakes has resulted in buildings experiencing foundation failure and ground surface deformation similar to that resultant from liquefaction. If liquefaction or cyclic softening occurs beneath sloping ground, a phenomenon known as lateral spreading can occur. Liquefaction and cyclic softening typically are limited to the upper 50 feet of the subsurface soils. There are a number of conditions that need to be satisfied for liquefaction or cyclic softening to occur. Of primary importance is that groundwater, perched or otherwise, usually must be within the upper 50 feet of soils. In order for liquefaction to occur, a potentially liquefiable soil must be saturated and subjected to rapid cyclic loading that is sufficiently intense to overcome a soil's internal resistance to liquefaction.

Another type of ground damage caused by earthquakes is settlement in non-saturated (dry) sands. This occurs when ground motion causes the soil particles to reorient into a denser configuration. We have included analyses of this phenomenon within the same program that analyzes liquefaction.

The Sisquoc Formation bedrock is considered non-liquefiable because of it is about 4 to 6 million year old (Miocene age) and cemented. Liquefiable soils are typically limited to Holocene age sediments which less than 11,700 years old. The SPT blow counts from our onsite borings suggested that the Sisquoc Formation bedrock has high strength. Although the CPT soundings showed a moderate average 100 tsf tip resistance in the Sisquoc Formation, it is

thought that the bedrock's particle interlocking and bonding are not discernable by a large strain test such as CPT (Clayton and Johnson, 2013).

According to our onsite Borings B-1 through B-6, the Sisquoc Formation bedrock was encountered at depths ranging from about 16 to 17.5 feet below the existing grade. Therefore, our liquefaction and dry sand seismic settlement analyses included an analysis cut-off depth of 17.5 feet. The top 17.5 feet of soil profiles of CPT-4, CPT-11, and CPT-19 were analyzed for liquefaction using the methodology/parameters shown in the following table.

Methodology/Parameters Used in the Seismic Settlement Analyses

| | |
|---|---|
| Methodology | Robertson (NCEER R&W 1998, 2009) |
| Earthquake Moment Magnitude | 6.8 |
| Peak Ground Acceleration | 1.046 g |
| Groundwater Depth (In-Situ) | 13 feet |
| Groundwater Depth (During Earthquake) | 13 feet |
| Average Results Interval | 3 |
| Soil Behavior Type Index, $I_c$, Liquefaction Limit | 2.6 |
| Limit Analysis Depth | 17.5 feet |
| Auto Transition Layer Detection | Applied |
| Cetin's Weighting Factor (2009) | Not Applied |

The analyses predicted earthquake-induced settlements of about 0.2, zero, and 0.2 inches (none caused by dry sands, all caused by liquefaction) for CPT-4, CPT-11, and CPT-19, respectively. See Appendix E for Liquefaction and Dry Sand Seismic Settlement Analyses.

Lateral spreading can be experienced as two different phenomena: free face lateral spreading and ground oscillation. Free face lateral spreading does not appear to pose a potential hazard because there are no nearby sloped areas or canyons (Bartlett and Youd, 1995).

Ground oscillation, which is the other type of lateral spreading, occurs where sites are gently sloping, but not adjacent to sloped areas or canyons. Earth Systems performed ground-oscillation-type lateral spreading analyses with the software CLIQ (GeoLogismiki) with the on-site CPT data and a ground slope of 1.7% (about 5 feet of elevation difference over a south-north trending site length of 300 feet, measured from the project topographic survey performed by Stantec). The results of the analyses predict ground-oscillation-type of spreading

values of about 2.4, zero, and 3.9 inches for CPT-4, CPT-11, and CPT-19, respectively. See Appendix E for Lateral Spreading Analyses Results.

According to the ASCE 7-16 Table 12.13-2, Risk Category III buildings can have shallow foundations when the lateral spreading value is no greater than 12 inches.

## FAULT RUPTURE HAZARD

Surficial displacement along a fault trace is known as fault rupture. Fault rupture typically occurs along previously existing fault traces. As mentioned in the "Regional Geology" section of this report, geologic mapping by United States Geologic Survey (Geologic Map of the Santa Barbara Coastal Plain, 2009) places the east-west trending South Branch Western More Ranch fault along the northern boundary of the site.

To assess the potential hazard posed by fault rupture, a line of 26 cone penetration test soundings (CPT-1 through CPT-23, and CPT-26 through CPT-28) was advanced to obtain information pertaining to subsurface stratigraphy. See Site Plan in Appendix A.

The surface elevations and locations of the soundings were surveyed by the Project Surveyor. Utilizing these data, two CPT Profile Sections were prepared and are included in Appendix A. The upper section is a plot of soil-type interpretations for each sounding, and the lower section is a plot of friction ratios for each sounding. The sections were geologically interpreted to identify stratigraphic horizons projecting throughout the length of the line of soundings. The horizons are marked with red and black lines.

Multiple parallel laterally continuous units were identified across the section. All units appeared to be oriented parallel to the ground surface. The lack of significant variations in the parallel units observed in the CPT soundings leads Earth Systems to conclude that the hazard posed by fault rupture at the project site based on the CPT soundings is low.

## LANDSLIDES

Landsliding is a process where a distinct mass of rock or soil moves downslope because of gravity. No landslides are mapped on the project site by Dibblee or USGS (see Regional Geologic Maps in Appendix A). Because there are no identified landslides either on or trending

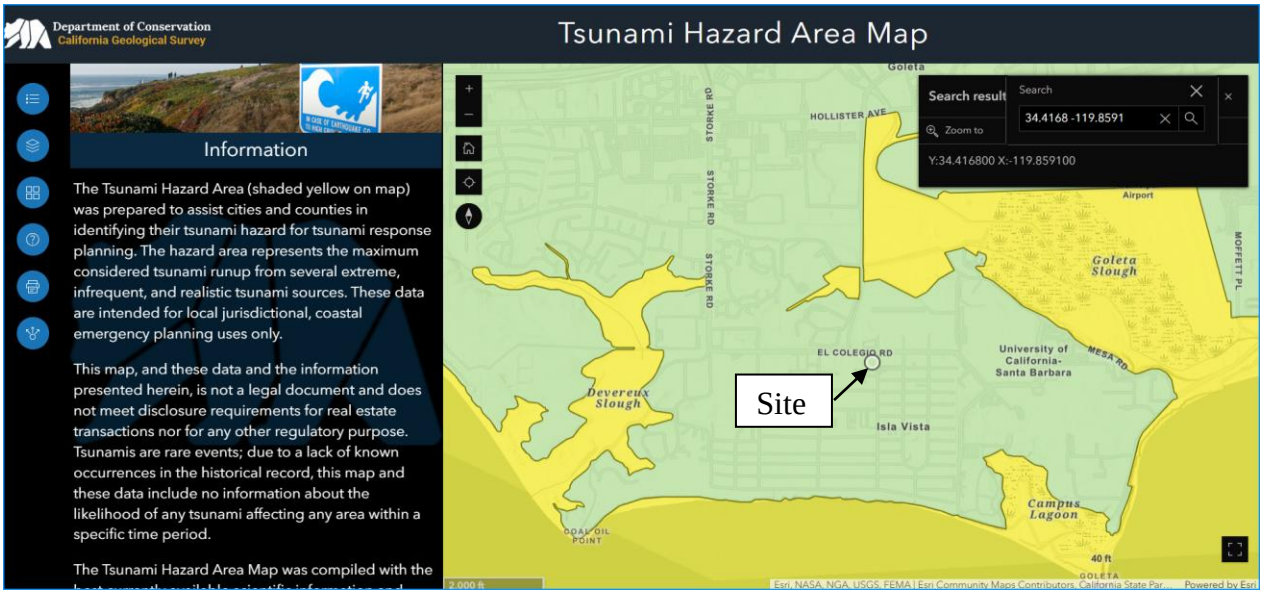
into the project site, and the site is essentially flat, hazards associated with this phenomenon are considered low.

## ROCKFALL

Loose boulder-sized rocks and/or weathering bedrock outcrops located upslope from construction can lead to a rockfall hazard. Because the project site is located on a relatively flat alluvial plain with no nearby slopes, the potential for rockfall onto the project site appears to be low.

## EARTHQUAKE-INDUCED FLOODING

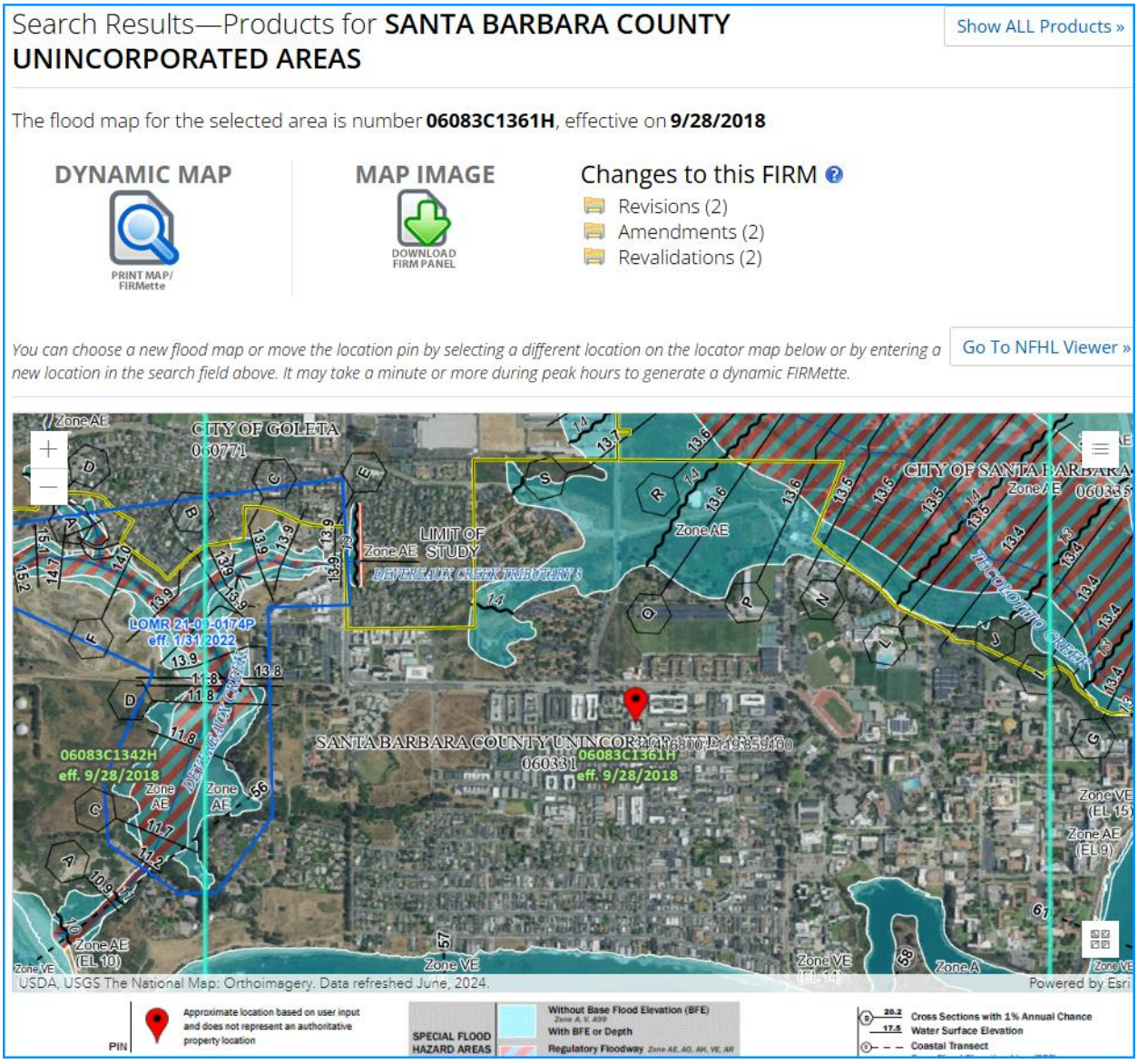
Earthquake-induced flooding include tsunamis, seiches, and reservoir failure. Earthquake-induced tsunamis is not considered a hazard because the project site is not located in a tsunami inundation area according to California Tsunami Maps and Data on a California Geological Survey website (https://www.conservation.ca.gov/cgs/tsunami/maps). The project site location is shown as a black circle in the snapshot below.




Because of the project site's relative position away from any reservoirs, the potential for seiche and reservoir failure are considered low.

**OTHER FLOODING**

The project site does not appear to be within any of the flood hazard areas mapped by Federal Emergency Management Agency (FEMA), FEMA Flood Map for Santa Barbara County Unincorporated Areas, effective September 28, 2018, Map No. 06083C1361H. See snapshot below.



## CONCLUSIONS AND RECOMMENDATIONS

Based on the data provided in this report, it appears that the project site is suitable for the proposed construction from an engineering geology and geotechnical engineering standpoint provided that the recommendations provided herein are properly implemented into the project. Because the current plans appear to be conceptual, Earth Systems reserves the right to modify our current recommendations based on the final project plans.

Earth Systems presumes that a conventional footing system with slab-on-grade floors will be suitable to support the proposed building. Given the site conditions encountered, we conclude that remedial grading (i.e., overexcavation and recompaction) will be needed to remove uncertified fill and to provide a more uniform and moisture-conditioned subgrade.

Any stormwater infiltration system and/or permeable paver should be placed at least 10 feet away from building foundations.

Specific conclusions and recommendations addressing these geologic/geotechnical considerations, as well as general recommendations regarding the geotechnical aspects of design and construction, are presented in the following sections.

A. Grading

1. Pre-Grading Considerations

   a. Roof draining systems should be designed so that water is not discharged into bearing soils or near structures. Final site grade should be designed so that all water is diverted away from the structures over paved surfaces, or over landscaped surfaces in accordance with current codes. Water should not be allowed to pond anywhere on the pad.

   b. Shrinkage of soils (uncertified fills) affected by compaction is estimated to be about 5 percent based on an anticipated average compaction of 92 percent. This does not include losses from removing oversized rocks.

   c. Earth Systems should be retained to provide engineering geology and geotechnical engineering services during site development and grading, and foundation construction phases of the work to observe compliance with the design concepts, specifications and recommendations. This will allow for timely

design changes in the event that subsurface conditions differ from those anticipated prior to the start of construction.

d. Plans and specifications should be provided to Earth Systems prior to grading. Plans should include the grading plans, foundation plans, and foundation details. Earth Systems will review these plans only for conformity with geotechnical parameters not including drainage. It is the responsibility of the Client and other Engineers to review and approve designs and plans for conformity with all engineering and design requirements necessary for the proper function and performance of the structure.

e. Compaction tests should be made per ASTM D 6938 or ASTM D 1556 to determine the relative compaction of the fills in accordance with the following minimum guidelines: two tests for each 1-foot vertical lift in every isolated area graded; one test for each 500 cubic yards of material placed; and two tests at finished subgrade elevation in every area of remedial grading.

2. Rough Grading/Areas of Development

a. Grading at a minimum should conform to Appendix J of the 2022 California Building Code and local grading ordinances.

b. The existing ground surface should be initially prepared for grading by removing the vegetation, trees, large roots, debris, other organic material and non-complying fill from construction areas. Organics and debris should be stockpiled away from areas to be graded, and ultimately removed from the project site to prevent their inclusion in fills. Voids created by removal of such material should be properly backfilled and compacted. No compacted fill should be placed unless the underlying soil has been observed by the Geotechnical Engineer or his or her representative.

c. To remove uncertified fill and to provide a more uniform and moisture-conditioned subgrade, overexcavation and recompaction of soils in these construction areas will be necessary.

d. Soils should be overexcavated throughout the proposed building area to the greater depth of the following: 1) 3 feet below the bottom of footings; 2) 5 feet below the finished pad grade; or 3) until all artificial fills or any loose soils are removed down to older alluvium.

e. Overexcavations should be extended to a distance of at least 5 feet laterally, but not less than a distance equal to the depth of removal, beyond the outside edge of the foundation elements.

f. The bottoms of all excavations should be observed by a representative of Earth Systems prior to processing or placing fill.

g. The resulting surface(s) should then be scarified an additional 6 inches, uniformly moisture conditioned to about 3 percent above the optimum moisture content, and compacted to achieve a minimum relative compaction of 90 percent of the ASTM D 1557 maximum dry density. Compaction of the prepared subgrade should be verified by testing prior to placing and compacted fill.

h. Areas outside of the proposed building to receive fill, exterior slabs-on-grade, sidewalks, or paving should be overexcavated either throughout the existing fill or to a minimum depth of 1 foot below finished subgrade, whichever is deeper. The resulting surfaces should then be scarified an additional 6 inches, moisture conditioned, and recompacted. If the owner decides to leave any existing fill in place under and/or within the influence of proposed exterior improvements, then the owner should aware that there is a risk of settlement that may cause displacement and cracking of exterior improvements.

i. On-site soils, including the removed existing fill, may be used for fill once they are cleaned of all organic material, rocks, debris, and irreducible material larger than 6 inches.

j. Fill and backfill placed about 3 percent above optimum moisture in layers with a loose thickness not greater than 6 inches should be compacted to a minimum of 90 percent of the maximum dry density obtainable by the ASTM D 1557 test method unless otherwise recommended or specified by the Geotechnical Engineer or his/her representative. Random compaction tests by Earth Systems can assist the Grading Contractor in evaluating whether the Grading Contractor is meeting compaction requirements. However, compaction tests pertain only to specific locations and do not guarantee that all fill has been compacted to the prescribed percentage of maximum density. It is the ultimate responsibility of the Grading Contractor to achieve uniform compaction in accordance with the requirements of this report and the grading ordinance.

k. Import soils used (if any) to raise site grade should be equal to, or better than, on-site soils in strength, expansion, and compressibility characteristics. Import soil can be evaluated, but will not be prequalified by the Geotechnical Engineer. Final comments on the characteristics of the import will be given after the material is at the project site.

l. According to the 2022 CBC Section 1804.4, the ground immediately adjacent to the foundation shall be sloped away from the building at a slope of not less than 5% for a minimum distance of 10 feet measured perpendicular to the face of the wall.

3. Utility Trenches

a. Utility trench backfill should be governed by the provisions of this report relating to minimum compaction standards. In general, on-site service lines may be backfilled with fill compacted to 90 percent of the maximum density obtained by the ASTM D 1557 test method. Backfill of offsite service lines will be subject to the specifications of the jurisdictional agency or this report, whichever are greater.

b. Utility trenches running parallel to footings should be located at least 5 feet outside the footing line, and above a 1-horizontal versus 1-vertical projection downward from the outside edge of the bottom of the footing. If the utility line is located below the 1:1 projection, the trench will need to be backfilled with slurry to a level above the 1:1 projection.

c. Compacted onsite soils should be utilized for backfill. Clean sand backfill should be avoided under structures because it provides a conduit for water to migrate under foundations.

d. Backfill operations should be observed and tested by the Geotechnical Engineer to monitor compliance with these recommendations.

e. Trenches deeper than 5 feet should be sloped or shored in accordance with OSHA guidelines. Because surficial clayey soils were encountered in our borings, shoring and/or sloping of shallow trenches should not be necessary.

f. Rocks greater than 6 inches in diameter should not be placed in trench zones (from 12 inches below pavement subgrade or ground surface to 12 inches above top of pipe or box); rocks greater than 2.5 inches in diameter should not be placed in pipe zones (from 12 inches above top of pipe or box to 6 inches below bottom of pipe or box exterior).

g. Jetting should not be utilized for compaction in utility trenches.

h. If any utilities will be constructed in public rights-of-way, the work will need to comply with the requirements of the public agency.

B. Structural Design

1. Conventional Shallow Foundations

a. Conventional continuous footings and/or interior pad footings supported by recompacted fill may be used to support the proposed building. It should be noted that if pad footings are to be used, they should be tied together by grade beams (each way) or by slabs because of the expansiveness of the soils.

b. Based on the three- to four-story construction and the "high" soil expansion range, perimeter continuous and/or pad footings should have a minimum embedment depth of 27 inches below lowest adjacent grade, and interior continuous and/or pad footings should have a minimum embedment depth of 24 inches below lowest adjacent grade. The expansion index should be re-evaluated at the completion of rough grading to confirm that these minimum footing depths are appropriate.

c. Footings should be embedded into recompacted fill as recommended elsewhere in this report. Foundation excavations should be observed by a representative of this firm after excavation, but prior to placing of reinforcing steel or concrete, to verify bearing conditions.

d. Footings embedded 27 and 24 inches deep into recompacted fill may be designed based on an allowable bearing value of 2,150 psf. This value includes a safety factor of 3. This allowable bearing value is net (weight of footing and soil surcharge may be neglected) and is applicable for dead plus reasonable live loads. Earth Systems understands that the project structural engineer was considering to reach out to a ground improvement if a higher bearing capacity is preferred.

e. A one-third increase in the allowable bearing values is permitted for use with the alternative load combinations given in Section 1806.1 of the 2022 CBC.

f. Lateral loads may be resisted by soil friction on floor slabs and foundations and by passive resistance of the soils acting on foundation stem walls. Lateral capacity assumes that any required backfill adjacent to foundations and grade beams is properly compacted.

g. The information that follows regarding reinforcement and premoistening for footings is the same as that given in the Minimum Foundation Design Table for the "High" expansion range. Actual footing designs should be provided by the project Structural Engineer, but the dimensions and reinforcement recommended should not be less than the criteria set forth in the Minimum Foundation Design Table for the appropriate expansion range. Premoistening of the subgrade may be difficult because of the clayey soils, so sufficient time should be allowed in the construction schedule to accomplish it.

h. Continuous footings bottomed in soils in the "High" expansion range should be reinforced, at a minimum, with two No. 4 bars along the bottom and two No. 4 bars along the top. In addition, bent No. 4 bars on 18-inch centers should extend from within the footings to a minimum of 3 feet into adjacent slabs.

i. Bearing soils in the "High" expansion range should be premoistened to about 3 percent above optimum moisture content to a depth of 24 inches below lowest adjacent grade. Premoistening should be confirmed by testing.

2. Slabs-on-Grade Floors

a. Concrete slabs on grade should be supported by firm recompacted fills as recommended elsewhere in this report.

b. The information that follows regarding design criteria for slabs is generally the same as that given in the Minimum Foundation Design Table for the "High" expansion range. Actual slab designs should be provided by the project Structural Engineer, but the reinforcement and slab thicknesses recommended should not be less than the criteria set forth in the Minimum Foundation Design Table for the appropriate expansion range, or as recommended below, whichever is more stringent.

c. Slabs bottomed on soils in the "High" expansion range should be underlaid with a minimum of 4 inches of clean sand. Areas where floor wetness would be undesirable should be underlaid with a vapor retarder (as specified by the Project Architect or Civil Engineer) to reduce moisture transmission from the subgrade soils to the slab. The retarder should be placed as specified by the project Structural Engineer or Architect.

d. Slabs bottomed on soils in the "High" expansion range should at a minimum be reinforced at mid-slab with No. 4 bars on 18-inch centers, each way. No. 4 bars

acting as dowels should also extend out of the perimeter footings, and should be bent so that they extend a minimum of 3 feet into adjacent slabs.

e. Soils underlying slabs that are in the "High" expansion range should be premoistened to about 3 percent above optimum moisture content to a depth of 24 inches below lowest adjacent grade. Premoistening should be confirmed by testing. Premoistening of the subgrade may be difficult because of the clayey soils, so sufficient time should be allowed in the construction schedule to accomplish it.

f. It should be anticipated that exterior concrete supported on grade will be susceptible to movement with seasonal change in soil moisture content. The following recommendations for concrete slabs on grade can help mitigate, but not eliminate, such movement. It is recommended that perimeter slabs (walkways, patios, etc.) be designed relatively independent of footing stems (i.e., free floating) so foundation adjustment will be less likely to cause cracking. Because of the soil expansion consideration, the exterior concrete slabs on grade should have turned-down edges of at least 9 inches into the soil.

3. Frictional and Lateral Coefficients

a. Resistance to lateral loading may be provided by soil friction acting on the base of foundations. A coefficient of friction of 0.41 may be applied to dead load forces. This value does not include a safety factor.

b. Passive resistance acting on the sides of foundation stems equal to 255 pcf of equivalent fluid weight may be included for resistance to lateral load. This value does not include a safety factor.

c. A minimum safety factor of 1.5 should be used when designing for sliding or overturning.

d. Passive resistance may be combined with frictional resistance provided that a one-third reduction in the coefficient of friction is used.

4. Settlement Considerations

a. For the foundations and floor slabs supported by recompacted fill as recommended, a maximum settlement of about half of an inch (static and seismic combined) is anticipated.

b. Differential settlement over a distance of 30 feet should be about one-half the maximum total settlement.

c. The Project Structural Engineer will need to design the foundation system to accommodate the potential settlement values.

5. Preliminary Asphalt Paving Sections

a. The following preliminary paving sections table summarizes thicknesses of asphalt and aggregate base required for different traffic indices (ranging from 4.0 to 7.0, with 0.5 intervals) and a design life of 20 years using the lower tested R-Value of 24. Asphalt and aggregate base should be compacted to a minimum of 95 percent of maximum dry density on subgrade soils compacted to a minimum of 90 percent of maximum dry density.

| Traffic Index | Asphalt Thickness (inches) | Min. Aggregate Base Thickness (inches) |
|---|---|---|
| 4.0 | 3.0 | 4.0 |
| 4.5 | 3.0 | 5.5 |
| 5.0 | 3.0 | 6.5 |
| 5.5 | 3.0 | 8.0 |
| 6.0 | 3.0 | 10.0 |
| 6.5 | 3.0 | 11.5 |
| 7.0 | 3.0 | 13.0 |

b. The preliminary paving sections provided above have been designed for the type of traffic indicated and the assumed design life. If the pavement is placed before project construction is complete, construction loads, which could increase the Traffic Indices above those assumed above, should be taken into account.

6. Preliminary Concrete Paving Sections

a. The concrete pavement design that follows is based on the Traffic Category A with an average daily truck traffic of 1 (per ACI 330R-08 Table 3.3), a coefficient of subgrade reaction of k = 122 pounds per cubic inch (approximately equivalent to our lower tested R-Value of 24), and a design life of 20 years. Based on these values and design methods described by the American Concrete Institute (ACI 330R-08), the minimum unreinforced paving section is:

1. Concrete thickness = 5.0 inches
2. Class II base thickness under concrete = 4.0 inches

3. Compressive strength of concrete, fc = 3,250 psi at 28 days
4. Modulus of flexural strength of 3,250 psi concrete = 500 psi
5. Maximum spacing of contraction joints, each way = 12.5 feet

b. The preliminary paving section presented above is designed for the type of traffic indicated and the assumed design life. If the Traffic Category or average daily truck traffic is expected to be higher or a longer design life is desired, this section should be reevaluated. If the pavement is placed before construction on the project is complete, construction loads should be taken into account. Traffic should not be allowed on the pavement until 28 days after concrete placement, or until the 28-day design strength is achieved.
c. The preliminary paving section presented above is an un-reinforced design. If rebars are incorporated into the paving section, extra crack control will be provided.
d. Performance of concrete pavement depends on a uniform subgrade upon which to cast the concrete. Because of the onsite soil's "Medium" to "High" expansion ranges, the subgrade should be compacted to a minimum of 90% of the maximum dry density determined by ASTM D 1557. Bearing soils in the "Medium" to "High" expansion ranges should be premoistened to about 3 percent above optimum moisture content to a depth of 24 inches below lowest adjacent grade. Premoistening should be confirmed by testing.

## ADDITIONAL SERVICES

This report is based on the assumption that an adequate program of monitoring and testing will be performed by Earth Systems during construction to check compliance with the recommendations given in this report. The recommended tests and observations include, but are not necessarily limited to the following:

- Review of the structural and grading plans during the design phase of the project.
- Observation and testing during site preparation, grading, placing of recompacted fill, and foundation construction.
- Consultation as required during construction.

**LIMITATIONS AND UNIFORMITY OF CONDITIONS**

The analyses and recommendations submitted in this report are based in part upon the data obtained from the on-site borings and CPT soundings. The nature and extent of variations between and beyond the points of exploration may not become evident until construction. If variations then appear evident, it will be necessary to reevaluate the recommendations of this report.

The scope of services did not include any environmental assessment or investigation for the presence or absence of wetlands, hazardous or toxic materials in the soil, surface water, groundwater or air, on, below, or around this site. Any statements in this report or on the soil boring logs regarding odors noted, unusual or suspicious items or conditions observed, are strictly for the information of the client.

Findings of this report are valid as of this date; however, changes in conditions of a property can occur with passage of time whether they are because of natural processes or works of man on this or adjacent properties. In addition, changes in applicable or appropriate standards may occur whether they result from legislation or broadening of knowledge. Accordingly, findings of this report may be invalidated wholly or partially by changes outside our control. Therefore, this report is subject to review and should not be relied upon after a period of 1 year.

In the event that any changes in the nature, design, or location of the proposed construction and/or other improvements are planned, the conclusions and recommendations contained in this report should not be considered valid unless the changes are reviewed and the conclusions of this report modified or verified in writing.

This report is issued with the understanding that it is the responsibility of the Owner, or of his representative to ensure that the information and recommendations contained herein are called to the attention of the Architect and Engineers for the project and incorporated into the plan and that the necessary steps are taken to see that the Contractor and Subcontractors carry out such recommendations in the field.

As the Geotechnical Engineers for this project, Earth Systems has striven to provide services in accordance with generally accepted geotechnical engineering practices in this community at this time. No warranty or guarantee is expressed or implied. This report was prepared for the

exclusive use of the Client for the purposes stated in this document for the referenced project only. No third party may use or rely on this report without express written authorization from Earth Systems for such use or reliance.

It is recommended that Earth Systems be provided the opportunity for a general review of final design and specifications in order that earthwork and foundation recommendations may be properly interpreted and implemented in the design and specifications. If Earth Systems is not accorded the privilege of making this recommended review, it can assume no responsibility for misinterpretation of the recommendations contained herein.

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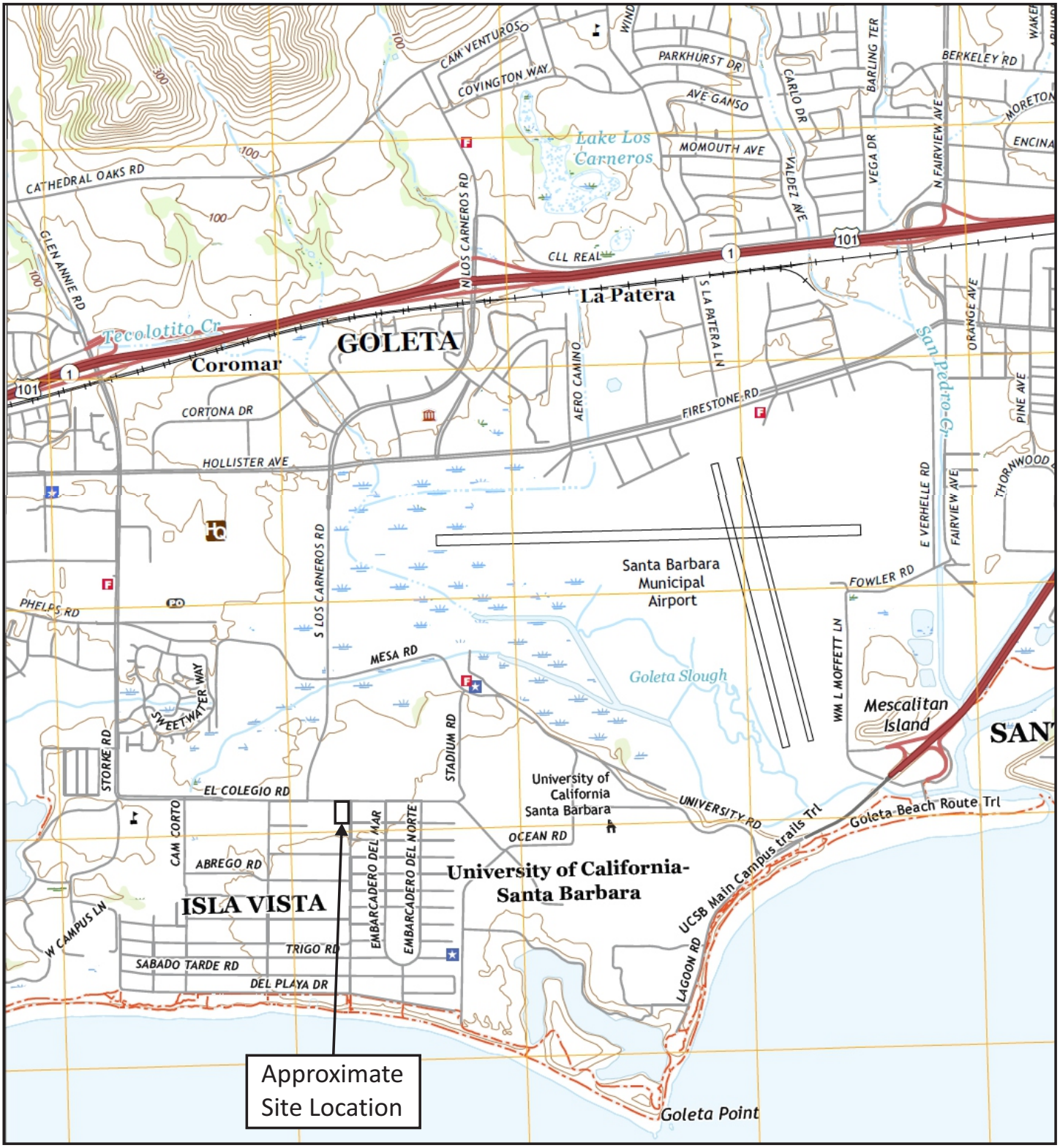
**APPENDIX A**

Vicinity Map
Regional Geologic Map 1 (Dibblee)
Regional Geologic Map 2 (USGS)
Field Study
Site Plan
CPT Profile Section
Logs of Borings
Logs of CPT Interpretations and Soundings
Boring Log Symbols
Unified Soil Classification System




*Taken from USGS Topo Map, Goleta Quadrangle, Santa Barbara County, California, 2022.

Approximate Scale: 1" = 2,000'

0 2,000' 4,000'

N

# VICINITY MAP

KITP Housing Project
Southwest Corner of El Colegio Road and Camino Pescadero
Goleta Area of Santa Barbara County, California

**Earth Systems**

| July 2025 | 307035-001 |
|---|---|




*Taken from Dibblee, T.W., and Ehrenspeck, H.E., ed., 1987, Geologic map of the Goleta quadrangle, Santa Barbara County, California: Dibblee Geological Foundation, Dibblee Foundation Map DF-07

Qs / Qg / Qa — **SURFICIAL SEDIMENTS**

Qog / Qoa — **OLDER DISSECTED SURFICIAL SEDIMENTS**

Tsq — **SISQUOC SHALE** *Marine; late Miocene age*

Tm / Tml — **MONTEREY SHALE** *Marine; early to late Miocene age*

**Qs** *Beach sand deposits*
**Qg** *Stream channel deposits, mostly gravel and sand*
**Qa** *Alluvium: unconsolidated floodplain deposits of silt, sand and gravel*
**Qoa** *Former alluvial deposits of silt, sand and gravel, in places weakly consolidated; local unconformities at base*
**Qog** *Cobble-boulder fan gravel and fanglomerate deposits composed largely of sandstone detritus*
**Tsq** *Light gray, silty diatomaceous clay shale; breccia of shale detritus and local unconformity at base west of Hope Ranch; Delmontian – Mohnian Stages*
**Tm** *Upper shale unit: white-weathering, thin bedded, hard, platy to brittle siliceous shale; Mohnian Stage*
**Tml** *Lower shale unit: white weathering, soft, fissle to punky organic, phosphatic, and calcareous shale with thin interbeds of hard siliceous shale and limestone; Luisian to uppermost Saucesian Stages*

## GEOLOGIC SYMBOLS

*not all symbols shown on each map*

**FORMATION CONTACT** *dashed where inferred or indefinite, dotted where concealed*
**MEMBER CONTACT** *between units of a formation* — Prominent bed
**CONTACT BETWEEN SURFICIAL SEDIMENTS** *located only approximately in places*

**FAULT:** *Dashed where indefinite or inferred, dotted where concealed, queried where existence is doubtful. Parallel arrows indicate inferred relative lateral movement. Relative vertical movement is shown by U/D (U=upthrown side, D=downthrown side). Short arrow indicates dip of fault plane. Sawteeth are on upper plate of low angle thrust fault.*

**FOLDS:** *overturned* — ANTICLINE — SYNCLINE
*arrow on axial trace of fold indicates direction of plunge; dotted where concealed by surficial sediments*

*Strike and dip of sedimentary rocks:* inclined (18) — inclined (approximate) (20) — overturned (80) — horizontal — vertical

*Strike and dip of metamorphic or igneous rock foliation or flow banding or compositional layers:* inclined (75) — inclined (approximate) — vertical — overturned (80)

**OTHER SYMBOLS:** Direction of landslide movement — outline of water bodies shown on map — water well — oil well — springs

N

Approximate Scale: 1" = 2,000'

0 2,000' 4,000'

# REGIONAL GEOLOGIC MAP 1

KITP Housing Project
Southwest Corner of El Colegio Road and Camino Pescadero
Goleta Area of Santa Barbara County, California

**Earth Systems**

| July 2025 | 307035-001 |
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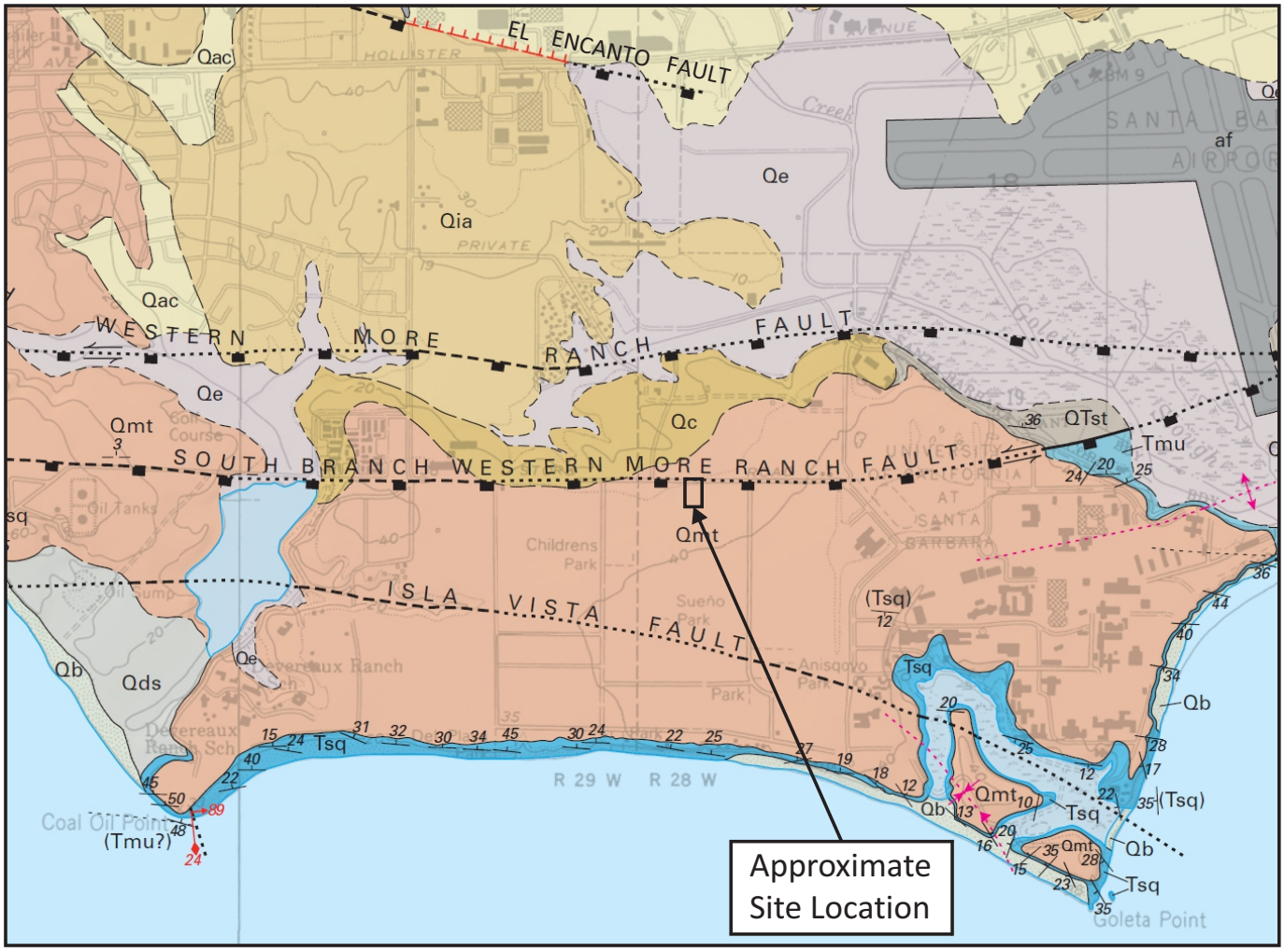


*Taken from Geologic Map of the Santa Barbara Coastal Plain Area, Santa Barbara County, California, 2009.

- **Contact**—Long-dashed where approximately located; short-dashed where inferred; dotted where concealed; tic shows direction and angle of dip
- **Trace of marker bed**
- **Outline of erosionally beveled geomorphic surface**
- **Marine-terrace shoreline angle**—Approximately located based on subtle to strong topographic steps of terrace surface; locally coincides with contact between Qmt and older units
- **Faults**—Long-dashed where approximately located; short dashed where inferred; dotted where concealed; queried where uncertain; small red arrow shows direction and angle of dip; red diamond-headed arrow shows bearing and rake of slickenlines and inferred slip direction of hanging-wall block
- **Strike-slip fault**—Opposing arrows show sense of strike-slip movement, queried where uncertain; bi-directional arrows indicate superposed dextral and sinistral slip on same fault
- **Normal fault**—Ball and bar on apparent downthrown side
- **Reverse fault**—Rectangles on apparent upthrown side
- **Thrust fault**—Sawteeth on apparent upthrown side
- **Fault-line scarp**—Inferred from aerial photographs; hachures point downscarp
- **Slide-block boundary**—Inferred; hachures on slide block
- **Fold and warp axial traces**—Long-dashed where approximately located; short-dashed where inferred; dotted where concealed
- **Anticline**—Large arrow indicates plunge direction
- **Overturned anticline**
- **Upwarp axis**—Large arrow indicates plunge direction; mapped in Quaternary deposits where geomorphically expressed
- **Syncline**—Large arrow indicates plunge direction
- **Overturned syncline**
- **Downwarp axis**—Mapped in Quaternary deposits where geomorphically expressed
- **Horizontal bedding**
- **Inclined bedding**—Showing strike and dip
- **Inclined bedding**—Showing approximate strike and dip
- **Inclined bedding**—Showing strike and dip of beds calculated from bedding trace
- **Vertical bedding**—Showing strike
- **Overturned bedding**—Showing strike and dip
- **Concealed bedding**—Measured in unit indicated where temporarily exposed at low tide or in construction excavation
- **Oil seep** ● **Qas**—Asphalt deposit ○ **Qtc**—Travertine and caliche? deposit

N

Approximate Scale: 1" = 2,000'

0 2,000' 4,000'

- **af** **Artificial fill (Holocene)**—Fill used for construction of highways, roads, buildings, airport runways, harbor facilities, breakwaters, and dams
- **Qb** **Beach deposits (Holocene)**—Unconsolidated sand along coastal beaches. Thickness varies seasonally and rarely exceeds 5 m
- **Qds** **Dune sand (Holocene)**—Unconsolidated wind-blown sand forming coastal dunes northwest of Coal Oil Point
- **Qe** **Estuarine deposits (Holocene)**—Locally organic-rich clay, silt, and subordinate sand deposited primarily in peritidal environment in low-lying coastal areas of modern and historically active sloughs. Maximum thickness probably less than 20 m
- **Qac** **Alluvium and colluvium (Holocene and upper Pleistocene)**—Poorly consolidated silt, sand, and gravel deposits of modern drainages and piedmont alluvial fans and floodplains. Exposed thickness generally less than 10 m
- **Qc** **Colluvium (Holocene and upper Pleistocene)**—Poorly consolidated, poorly stratified, and poorly sorted deposits that mantle gentle to moderate slopes and are chiefly derived from weathering and downslope movement of nearby bedrock. Maximum thickness probably less than 15 m
- **Qia** **Intermediate alluvial deposits (upper Pleistocene)**—Weakly consolidated, stratified silt, sand, and gravel that form low, rounded, moderately dissected terraces and piedmont alluvial fans that rest at higher elevations than the modern coastal piedmont surface underlain by unit Qac. Thickness probably locally exceeds 20 m
- **Qmt** **Marine-terrace deposits (upper Pleistocene)**—Basal (~1 m) weakly to moderately consolidated, variably stratified, fossiliferous gravel, sand, and silt deposited as marine intertidal, beach, and estuarine deposits and overlying nonmarine eolian, alluvial, and colluvial deposits. Marine-terrace deposits rest on elevated marine wave-cut platforms and form single terraces or flights of terraces ranging in elevation from 10 to 90 m (30–300 ft) and in age from 45 ka ( oxygen-isotope substage 3a) to 105 ka (substage 5c). Maximum exposed thickness about 20 m

# REGIONAL GEOLOGIC MAP 2

KITP Housing Project
Southwest Corner of El Colegio Road and Camino Pescadero
Goleta Area of Santa Barbara County, California

**Earth Systems**

| July 2025 | 307035-001 |
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## FIELD STUDY

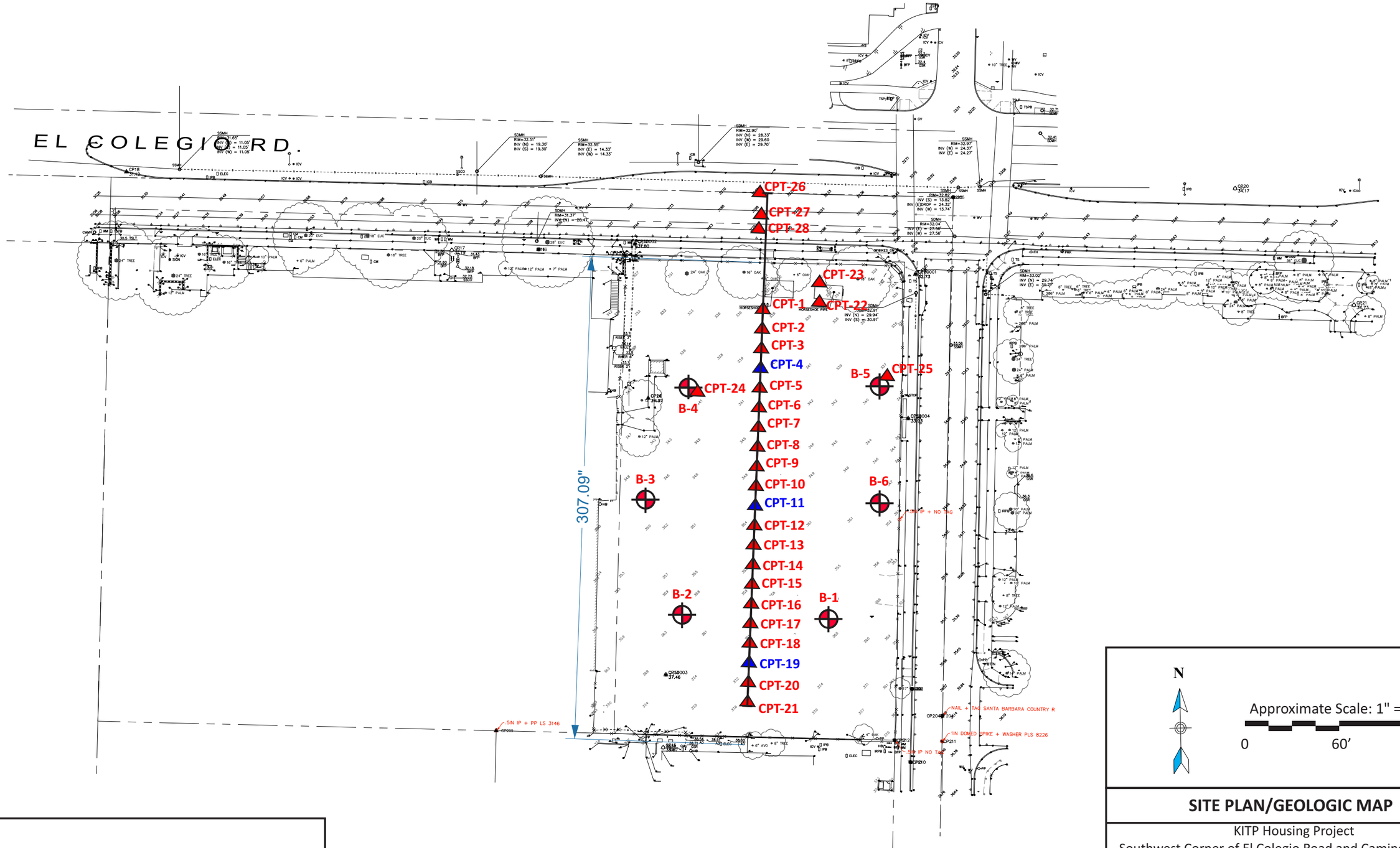
A. On January 29, 2025, six borings (B-1 through B-6) were drilled to a depth of about 31 feet below the existing ground surface to observe the soil profile and to obtain samples for laboratory analyses. The borings were drilled using 8-inch diameter hollow-stem continuous flight auger powered by a SIMCO 2800 truck mounted drilling rig. The approximate locations of the borings were determined in the field by pacing and sighting, and are shown on the Site Plan in this Appendix.

B. Samples were obtained within B-1 through B-6 with a Modified California (M.C.) ring sampler (ASTM D 3550 with a shoe similar to ASTM D 1586). The M.C. sampler has a 3-inch outside diameter, and a 2.42-inch inside diameter when used with brass ring liners (as it was during this study). The samples were obtained by driving the sampler with a 140-pound hammer dropping 30 inches in accordance with ASTM D 1586. The hammer was operated with an automatic trip mechanism.

C. Bulk soil samples were collected from the cuttings of the soils encountered in Borings B-1 through B-6 between depths of zero and 5 feet below the ground surface.

D. On January 30, January 31, and June 17 of 2025, twenty-eight Cone Penetrometer Test soundings (CPT-1 through CPT-28) were performed to obtain information pertaining to the soil profile. The CPT soundings were performed using equipment owned and operated by Kehoe Testing and Engineering. During advancement of the cone penetrometer, readings of sleeve friction (in tons per square foot), tip resistance (also in tons per square foot), and friction ratio (in percent) were recorded at 0.05-meter intervals as per ASTM D 5778 and ASTM D 3441. The approximate locations of the test soundings were determined in the field by pacing and sighting, and is shown on the Site Plan in this Appendix.

E. The final logs of the borings represent interpretations of the contents of the field logs obtained during the subsurface study and the results of laboratory testing performed on the samples. The final logs, as well as the interpretations of the CPT sounding, are included in this Appendix.




B-1 : Approximate Boring Location

CPT-1 CPT-1 : Approximate Cone Penetrometer Test Sounding Location (blue CPTs used for liquefaction analyses)

N

Approximate Scale: 1" = 60'

0 60' 120'

## SITE PLAN/GEOLOGIC MAP

KITP Housing Project
Southwest Corner of El Colegio Road and Camino Pescadero
Goleta Area of Santa Barbara County, California

**Earth Systems**

| July 2025 | 307035-001 |
|---|---|

North

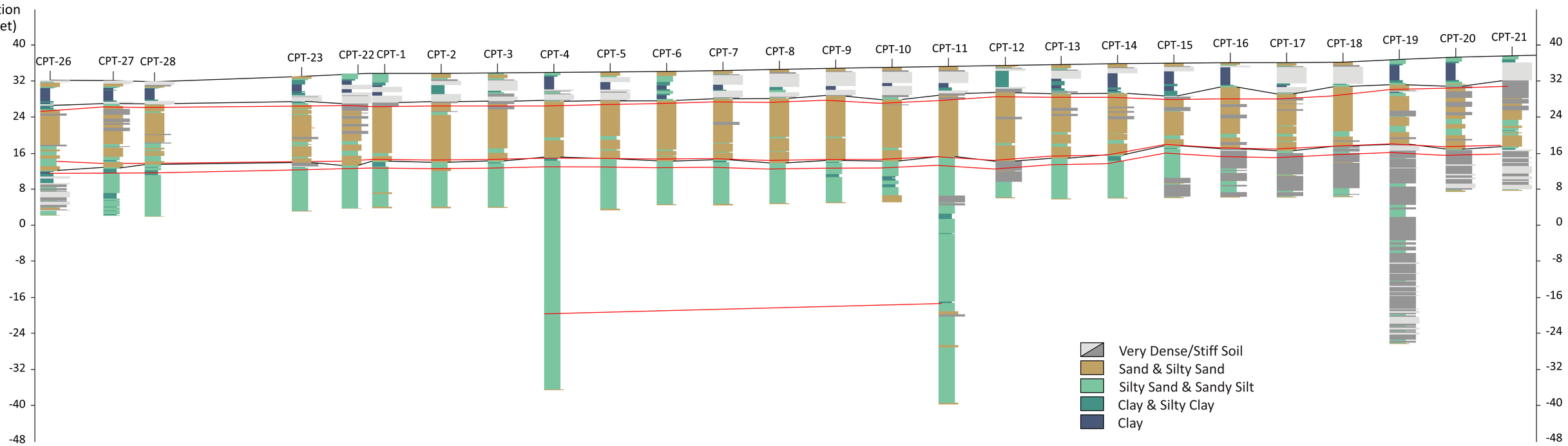
A

## NORMAL SOIL BEHAVIOR PROFILE

South

A’

Elevation
(In feet)




North

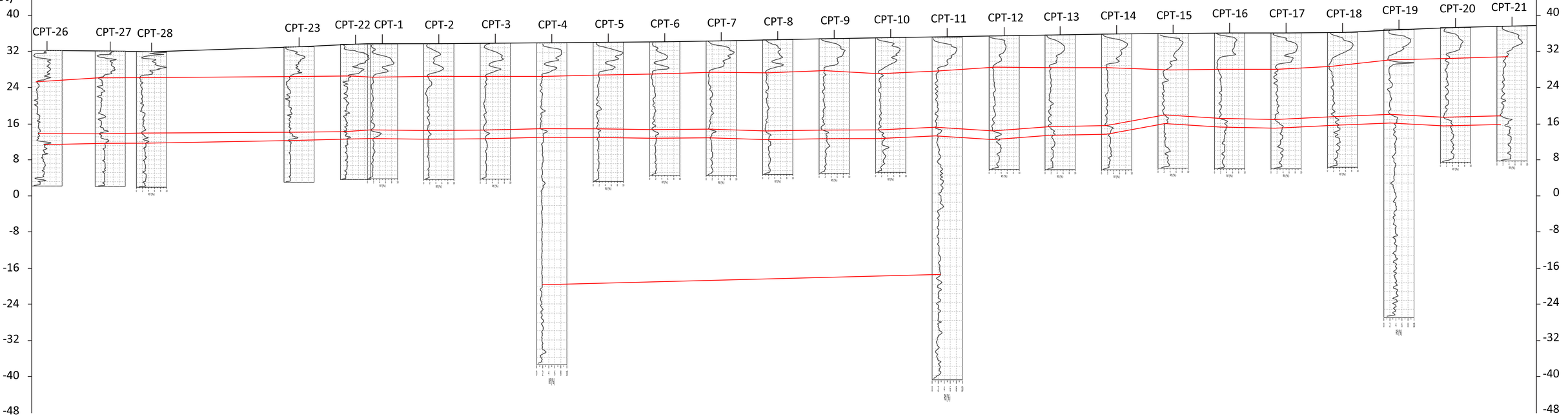
A

## FRICTION RATIO PROFILE

South

A’

Elevation
(In feet)




Scale: 1" = 8’

0 8’ 16’ 24’ 32’

**CPT PROFILE SECTION**

KITP Housing Project
Southwest Corner of El Colegio Road and Camino Pescadero
Goleta Area of Santa Barbara County, California

**Earth Systems**

| July 2025 | 307035-001 |
|---|---|

Logs of Borings

Earth Systems
5917 Olivas Park Drive Ste F, Ventura, CA 93003
PHONE: (805) 642-6727 FAX: (805) 642-1325

**BORING NO: B-1**
PROJECT NAME: KITP Housing Project
PROJECT NUMBER: 307035-001
BORING LOCATION: Per Plan

DRILLING DATE: January 29, 2025
DRILL RIG: SIMCO 2800
DRILLING METHOD: 8" Hollow Stem Auger
LOGGED BY: V. Wallace

| Vertical Depth | Sample Type: Bulk | Sample Type: SPT | Sample Type: Mod. Calif. | PENETRATION RESISTANCE (BLOWS/6") | SYMBOL | USCS CLASS | UNIT DRY WT. (pcf) | MOISTURE CONTENT (%) | DESCRIPTION OF UNITS |
|---|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | CL | | | **ARTIFICIAL FILL:** Dark yellowish brown clay, trace sand, trace gravel, very stiff, moist |
| | | | | 16/26/39 | | CL | 113.9 | 15.0 | **ALLUVIUM:** Dark yellowish brown clay, hard, moist |
| 5 | | | | 20/23/44 | | SC | 106.4 | 8.7 | **OLDER ALLUVIUM:** Yellowish brown fine medium sand, little clay, dense, moist |
| | | | | 24/32/39 | | SM | 93.9 | 8.6 | **OLDER ALLUVIUM:** Light yellowish brown sand, little silt, dense, moist-wet |
| 10 | | | | 24/45/39 | | SM | 93.3 | 29.0 | |
| 15 | | | | 16/20/36 | | SM | 91.8 | 28.7 | |
| | | | | | | Tsq | | | **SISQUOC FORMATION:** Light gray fine sand, little silt, some shells, dense, moist-wet |
| 20 | | | | 33/50-5" | | Tsq | 107.2 | 20.7 | **SISQUOC FORMATION:** Dark olive brown silty fine sand, very dense, moist |
| 25 | | | | 33/50-3" | | Tsq | 105.3 | 21.2 | **SISQUOC FORMATION:** Dark olive brown silty fine sand, trace shells, very dense, moist |
| 30 | | | | 32/50-4" | | Tsq | | | |
| | | | | | | | | | **Total Depth: 31 Feet**<br>**Groundwater Encountered at 14 Feet**<br>**Groundwater Perched Above Sisquoc Formation** |
| 35 | | | | | | | | | |

Note: The stratification lines shown represent the approximate boundaries between soil and/or rock types and the transitions may be gradual.

Earth Systems
5917 Olivas Park Drive Ste F, Ventura, CA 93003
PHONE: (805) 642-6727 FAX: (805) 642-1325

**BORING NO: B-2**
PROJECT NAME: KITP Housing Project
PROJECT NUMBER: 307035-001
BORING LOCATION: Per Plan

DRILLING DATE: January 29, 2025
DRILL RIG: SIMCO 2800
DRILLING METHOD: 8" Hollow Stem Auger
LOGGED BY: V. Wallace

| Vertical Depth | Sample Type: Bulk | Sample Type: SPT | Sample Type: Mod. Calif. | PENETRATION RESISTANCE (BLOWS/6") | SYMBOL | USCS CLASS | UNIT DRY WT. (pcf) | MOISTURE CONTENT (%) | DESCRIPTION OF UNITS |
|---|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | CL | | | **ARTIFICIAL FILL:** Dark brown clay, trace sand/gravel, very stiff, moist |
| | | | | **10/16/23** | | **CL** | **109.2** | **17.3** | **ALLUVIUM:** Dark brown clay, very stiff, moist |
| 5 | | | | **16/23/32** | | **SM** | **102.7** | **18.6** | **OLDER ALLUVIUM:** Yellowish brown silty fine sand, trace clay, trace gravel, dense, moist |
| | | | | **17/26/47** | | **SM** | **106.7** | **10.8** | |
| 10 | | | | **19/33/50-3"** | | **SM** | **97.6** | **20.8** | **OLDER ALLUVIUM:** Light olive brown silty fine sand, dense, moist to wet |
| 15 | | | | **12/12/41** | | **SM** | **89.1** | **30.9** | **OLDER ALLUVIUM:** Yellowish brown fine sand, little silt, dense, wet |
| 20 | | | | **20/22/33** | | **Tsq** | | | **SISQUOC FORMATION:** Dark olive brown silty fine sand, little shale fragments, some shells, dense, moist |
| | | | | | | **Tsq** | **102.2** | **22.7** | |
| 25 | | | | **36/46/50-4"** | | **Tsq** | **103.9** | **22.3** | **SISQUOC FORMATION:** Dark olive brown clay, trace fine sand, trace silt, hard, moist |
| 30 | | | | **16/30/27** | | **Tsq** | | | **SISQUOC FORMATION:** Dark olive brown clay, some fine sand, little silt, hard, moist |
| 35 | | | | | | | | | **Total Depth: 31.5 Feet**<br>**Groundwater Encountered at 13 Feet**<br>**Groundwater Perched Above Sisquoc Formation** |

Note: The stratification lines shown represent the approximate boundaries between soil and/or rock types and the transitions may be gradual.

Earth Systems
5917 Olivas Park Drive Ste F, Ventura, CA 93003
PHONE: (805) 642-6727 FAX: (805) 642-1325

**BORING NO: B-3**
PROJECT NAME: KITP Housing Project
PROJECT NUMBER: 307035-001
BORING LOCATION: Per Plan

DRILLING DATE: January 29, 2025
DRILL RIG: SIMCO 2800
DRILLING METHOD: 8" Hollow Stem Auger
LOGGED BY: V. Wallace

| Vertical Depth | Sample Type: Bulk | Sample Type: SPT | Sample Type: Mod. Calif. | PENETRATION RESISTANCE (BLOWS/6") | SYMBOL | USCS CLASS | UNIT DRY WT. (pcf) | MOISTURE CONTENT (%) | DESCRIPTION OF UNITS |
|---|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | CL | | | **ARTIFICIAL FILL:** Dark yellowish brown clay, trace sand, trace gravel, stiff, moist |
| | | | | **19/22/40** | | **CL** | **117.6** | **12.7** | **ALLUVIUM:** Dark yellowish brown clay, very stiff, moist |
| 5 | | | | **16/29/50-5"** | | **SM** | **116.6** | **10.8** | **OLDER ALLUVIUM:** Yellowish brown silty sand, trace gravel, dense, moist |
| | | | | **21/22/44** | | **SM** | **104.4** | **10.9** | **OLDER ALLUVIUM:** Light yellowish brown fine sand, little silt, very dense, moist |
| 10 | | | | **23/30/50-5"** | | **SM** | **96.3** | **21.8** | |
| 15 | | | | **17/29/31** | | **SM** | **89.3** | **32.4** | Wet |
| 20 | | | | **30/39/50-4"** | | **Tsq** | **101.9** | **23.4** | **SISQUOC FORMATION:** Dark olive brown weathered shale, hard, moist |
| 25 | | | | **19/50-6"** | | **Tsq** | **103.1** | **23.2** | |
| 30 | | | | **19/37/50-6"** | | **Tsq** | | | |
| 35 | | | | | | | | | **Total Depth: 31.5 Feet**<br>**Groundwater Encountered at 14 Feet**<br>**Groundwater Perched Above Sisquoc Formation** |

Note: The stratification lines shown represent the approximate boundaries between soil and/or rock types and the transitions may be gradual.

Earth Systems
5917 Olivas Park Drive Ste F, Ventura, CA 93003
PHONE: (805) 642-6727 FAX: (805) 642-1325

**BORING NO: B-4**
PROJECT NAME: KITP Housing Project
PROJECT NUMBER: 307035-001
BORING LOCATION: Per Plan

DRILLING DATE: January 29, 2025
DRILL RIG: SIMCO 2800
DRILLING METHOD: 8" Hollow Stem Auger
LOGGED BY: V. Wallace

| Vertical Depth | Sample Type: Bulk | Sample Type: SPT | Sample Type: Mod. Calif. | PENETRATION RESISTANCE (BLOWS/6") | SYMBOL | USCS CLASS | UNIT DRY WT. (pcf) | MOISTURE CONTENT (%) | DESCRIPTION OF UNITS |
|---|---|---|---|---|---|---|---|---|---|
| 0 | X | | | | | CL | | | **ARTIFICIAL FILL:** Dark brown clay, trace sand, trace gravel, stiff, moist |
| | X | | ■ | **7/12/18** | | CL | **109.7** | **19.1** | **ALLUVIUM:** Dark brown clay, very stiff, moist |
| 5 | | | ■ | **12/20/36** | | CL | **121.2** | **8.0** | **OLDER ALLUVIUM:** Yellowish brown sandy clay, little silt, hard, moist |
| | | | ■ | **25/33/46** | | SM | **107.3** | **12.0** | **OLDER ALLUVIUM:** Light yellowish brown fine sand, little silt, dense, moist to wet |
| 10 | | | ■ | **26/40/44** | | SM | **92.2** | **26.3** | |
| | | | | | | | | | |
| 15 | | | ■ | **16/26/33** | | SM | **95.3** | **16.5** | Wet |
| | | | | | | | | | |
| 20 | | | ■ | **28/46/50-3"** | | Tsq | **101.6** | **23.6** | **SISQUOC FORMATION:** Dark olive brown weathered shale, hard, moist |
| | | | | | | | | | |
| 25 | | | ■ | **26/50-6"** | | Tsq | **104.0** | **21.4** | |
| | | | | | | | | | |
| 30 | | | ■ | **37/50-4"** | | Tsq | | | |
| | | | | | | | | | **Total Depth: 31 Feet** |
| | | | | | | | | | **Groundwater Encountered at 14 Feet** |
| 35 | | | | | | | | | **Groundwater Perched Above Sisquoc Formation** |

Note: The stratification lines shown represent the approximate boundaries between soil and/or rock types and the transitions may be gradual.

Earth Systems
5917 Olivas Park Drive Ste F, Ventura, CA 93003
PHONE: (805) 642-6727 FAX: (805) 642-1325

**BORING NO: B-5**
PROJECT NAME: KITP Housing Project
PROJECT NUMBER: 307035-001
BORING LOCATION: Per Plan

DRILLING DATE: January 29, 2025
DRILL RIG: SIMCO 2800
DRILLING METHOD: 8" Hollow Stem Auger
LOGGED BY: V. Wallace

| Vertical Depth | Sample Type: Bulk | Sample Type: SPT | Sample Type: Mod. Calif. | PENETRATION RESISTANCE (BLOWS/6") | SYMBOL | USCS CLASS | UNIT DRY WT. (pcf) | MOISTURE CONTENT (%) | DESCRIPTION OF UNITS |
|---|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | CL | | | **ARTIFICIAL FILL:** Very dark brown clay, stiff, moist |
| | | | | 11/18/18 | | CL | 108.8 | 19.5 | **ALLUVIUM:** Very dark brown clay, stiff, moist |
| 5 | | | | 16/30/50-4" | | CL | 115.6 | 15.6 | **OLDER ALLUVIUM:** Yellowish brown sandy clay, trace gravel, very stiff, moist |
| | | | | 17/26/47 | | SC | 104.5 | 11.9 | **OLDER ALLUVIUM:** Light yellowish brown fine sand, little clay, dense, moist |
| 10 | | | | 25/38/50-5" | | SC | 94.3 | 14.7 | |
| 15 | | | | 12/28/40 | | SC | | | No Recovery; Wet |
| 20 | | | | 19/41/50-5" | | Tsq | 103.0 | 23.6 | **SISQUOC FORMATION:** Dark olive brown weathered shale, hard, moist |
| 25 | | | | 19/40/50-3" | | Tsq | 107.7 | 19.5 | |
| 30 | | | | 22/50-6" | | Tsq | | | |
| 35 | | | | | | | | | **Total Depth: 31 Feet**<br>**Groundwater Encountered at 14 Feet**<br>**Groundwater Perched Above Sisquoc Formation** |

Note: The stratification lines shown represent the approximate boundaries between soil and/or rock types and the transitions may be gradual.

Earth Systems
5917 Olivas Park Drive Ste F, Ventura, CA 93003
PHONE: (805) 642-6727 FAX: (805) 642-1325

**BORING NO: B-6**
PROJECT NAME: KITP Housing Project
PROJECT NUMBER: 307035-001
BORING LOCATION: Per Plan

DRILLING DATE: January 29, 2025
DRILL RIG: SIMCO 2800
DRILLING METHOD: 8" Hollow Stem Auger
LOGGED BY: V. Wallace

| Vertical Depth | Sample Type: Bulk | Sample Type: SPT | Sample Type: Mod. Calif. | PENETRATION RESISTANCE (BLOWS/6") | SYMBOL | USCS CLASS | UNIT DRY WT. (pcf) | MOISTURE CONTENT (%) | DESCRIPTION OF UNITS |
|---|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | CL | | | **ARTIFICIAL FILL:** Dark yellowish brown clay, trace sand, trace gravel, stiff, moist |
| | | | | **16/26/39** | | **CL** | **111.4** | **16.2** | **ALLUVIUM:** Dark yellowish brown clay, very stiff, moist |
| 5 | | | | **20/23/44** | | **SM** | **110.6** | **9.7** | **OLDER ALLUVIUM:** Yellowish brown silty fine sand, dense, moist |
| | | | | **24/32/39** | | **SM** | **101.1** | **6.6** | **OLDER ALLUVIUM:** Light yellowish brown silty fine sand, very dense, moist |
| 10 | | | | **24/45/39** | | **SM** | **96.9** | **14.4** | |
| 15 | | | | **16/20/36** | | **SM** | **91.1** | **29.8** | Wet |
| 20 | | | | **33/50-5"** | | **Tsq** | **102.9** | **22.0** | **SISQUOC FORMATION:** Olive brown fine-sandy silt, some shells, hard, moist |
| 25 | | | | **33/50-3"** | | **Tsq** | **105.7** | **20.7** | **SISQUOC FORMATION:** Dark olive brown fine sandy silt, hard, moist |
| 30 | | | | **32/50-4"** | | **Tsq** | | | |
| 35 | | | | | | | | | **Total Depth: 31 Feet**<br>**Groundwater Encountered at 14 Feet**<br>**Groundwater Perched Above Sisquoc Formation** |

Note: The stratification lines shown represent the approximate boundaries between soil and/or rock types and the transitions may be gradual.

Logs of CPT Interpretations and Soundings

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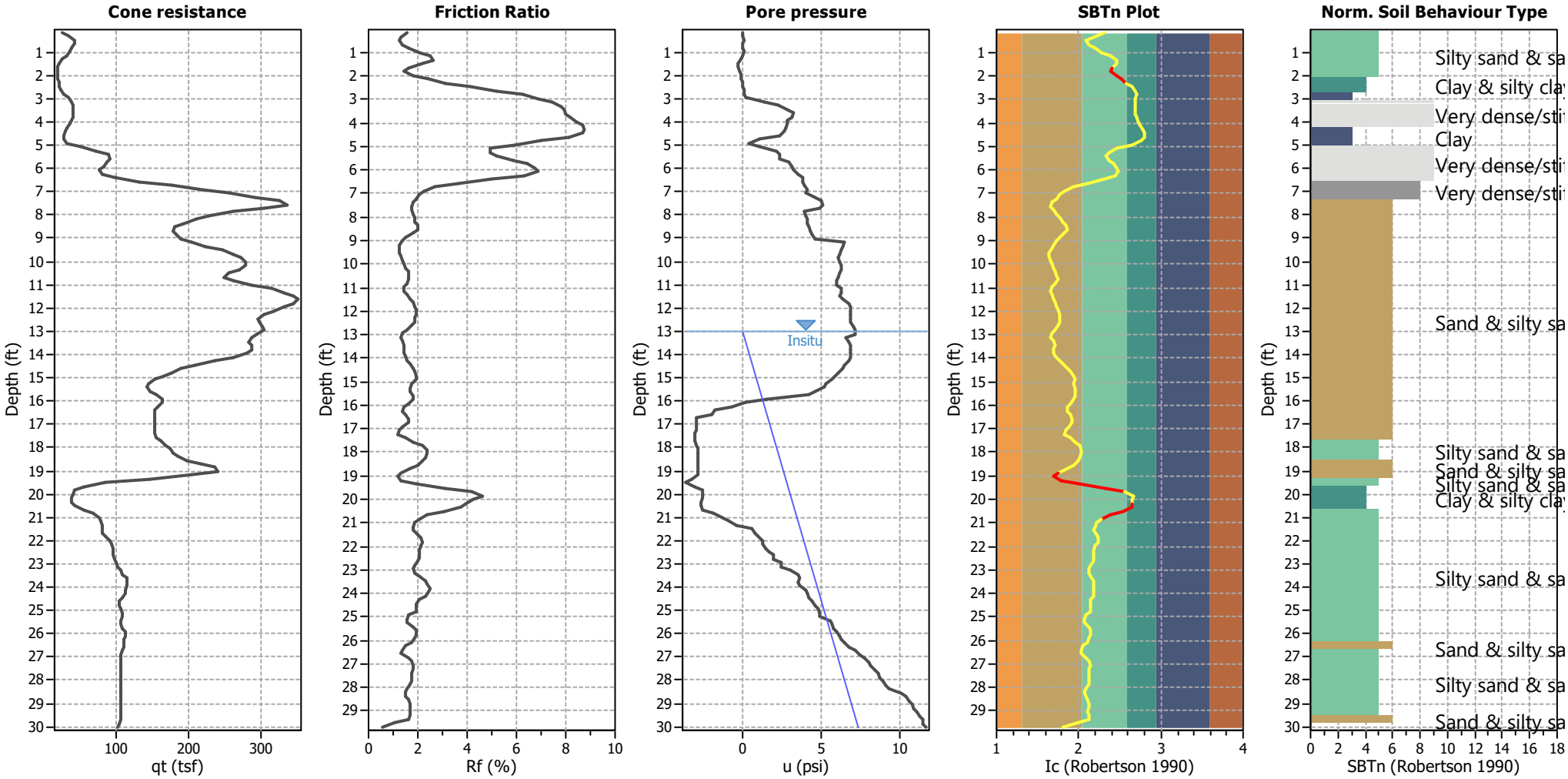
http://www.geologismiki.gr

**Project:** 307035-001 KITP Housing Project
**Location:** Goleta, CA 93117

**CPT: CPT-1**
Total depth: 30.02 ft




| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Analysis method: | NCEER (1998) | G.W.T. (in-situ): | 13.00 ft | Use fill: | No | Clay like behavior applied: | Sands only |
| Fines correction method: | NCEER (1998) | G.W.T. (earthq.): | 13.00 ft | Fill height: | N/A | Limit depth applied: | Yes |
| Points to test: | Based on Ic value | Average results interval: | 3 | Fill weight: | N/A | Limit depth: | 17.50 ft |
| Earthquake magnitude $M_w$: | 6.80 | Ic cut-off value: | 2.60 | Trans. detect. applied: | Yes | MSF method: | Method based |
| Peak ground acceleration: | 1.05 | Unit weight calculation: | Based on SBT | $K_\sigma$ applied: | Yes | | |

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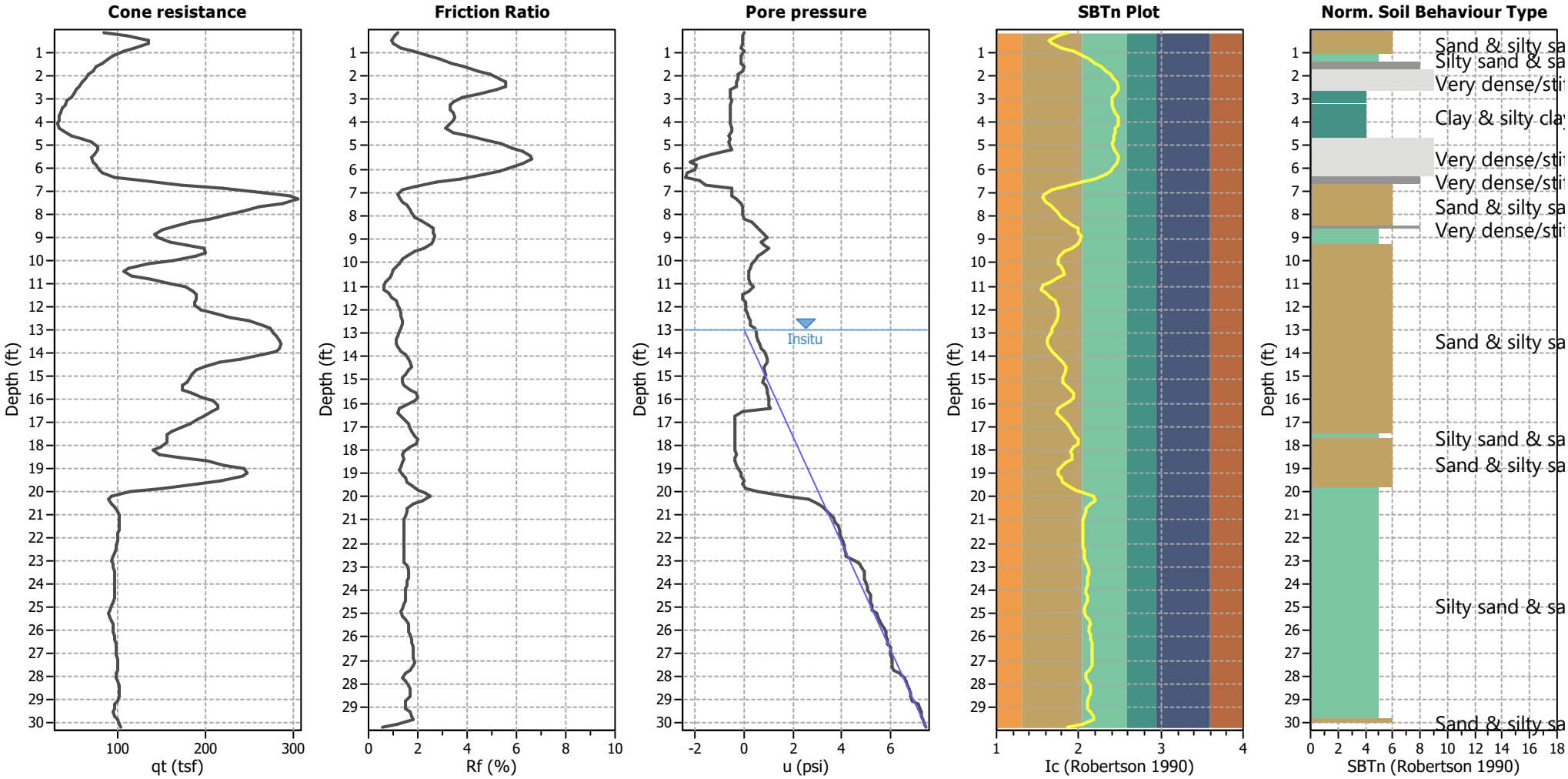
**Project:** 307035-001 KITP Housing Project
**Location:** Goleta, CA 93117

**CPT: CPT-2**
Total depth: 30.18 ft




| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Analysis method: | NCEER (1998) | G.W.T. (in-situ): | 13.00 ft | Use fill: | No | Clay like behavior applied: | Sands only |
| Fines correction method: | NCEER (1998) | G.W.T. (earthq.): | 13.00 ft | Fill height: | N/A | Limit depth applied: | Yes |
| Points to test: | Based on Ic value | Average results interval: | 3 | Fill weight: | N/A | Limit depth: | 17.50 ft |
| Earthquake magnitude $M_w$: | 6.80 | Ic cut-off value: | 2.60 | Trans. detect. applied: | Yes | MSF method: | Method based |
| Peak ground acceleration: | 1.05 | Unit weight calculation: | Based on SBT | $K_\sigma$ applied: | Yes | | |

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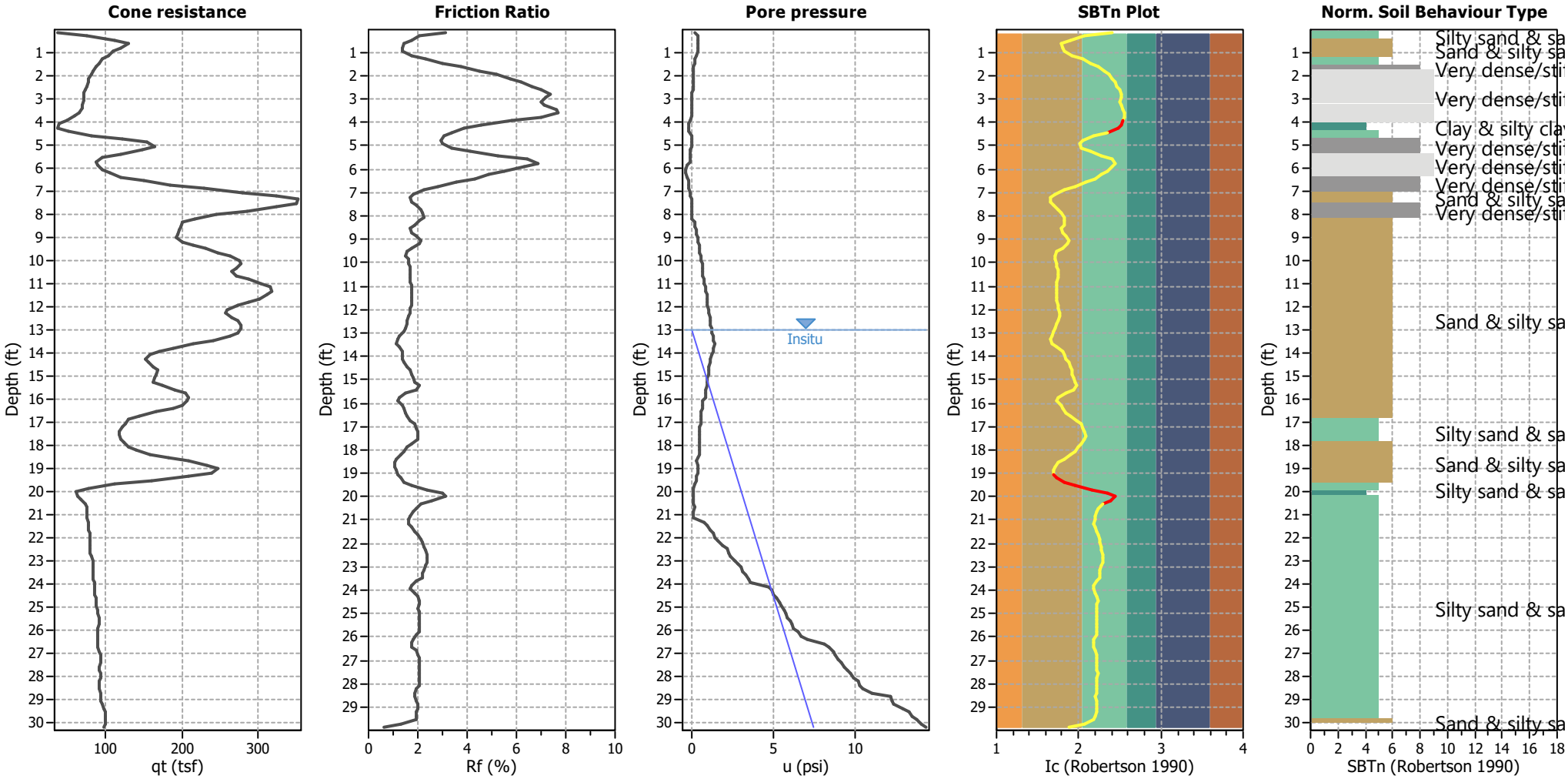
**Project:** 307035-001 KITP Housing Project
**Location:** Goleta, CA 93117

**CPT: CPT-3**
Total depth: 30.18 ft




| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Analysis method: | NCEER (1998) | G.W.T. (in-situ): | 13.00 ft | Use fill: | No | Clay like behavior applied: | Sands only |
| Fines correction method: | NCEER (1998) | G.W.T. (earthq.): | 13.00 ft | Fill height: | N/A | Limit depth applied: | Yes |
| Points to test: | Based on Ic value | Average results interval: | 3 | Fill weight: | N/A | Limit depth: | 17.50 ft |
| Earthquake magnitude $M_w$: | 6.80 | Ic cut-off value: | 2.60 | Trans. detect. applied: | Yes | MSF method: | Method based |
| Peak ground acceleration: | 1.05 | Unit weight calculation: | Based on SBT | $K_\sigma$ applied: | Yes | | |

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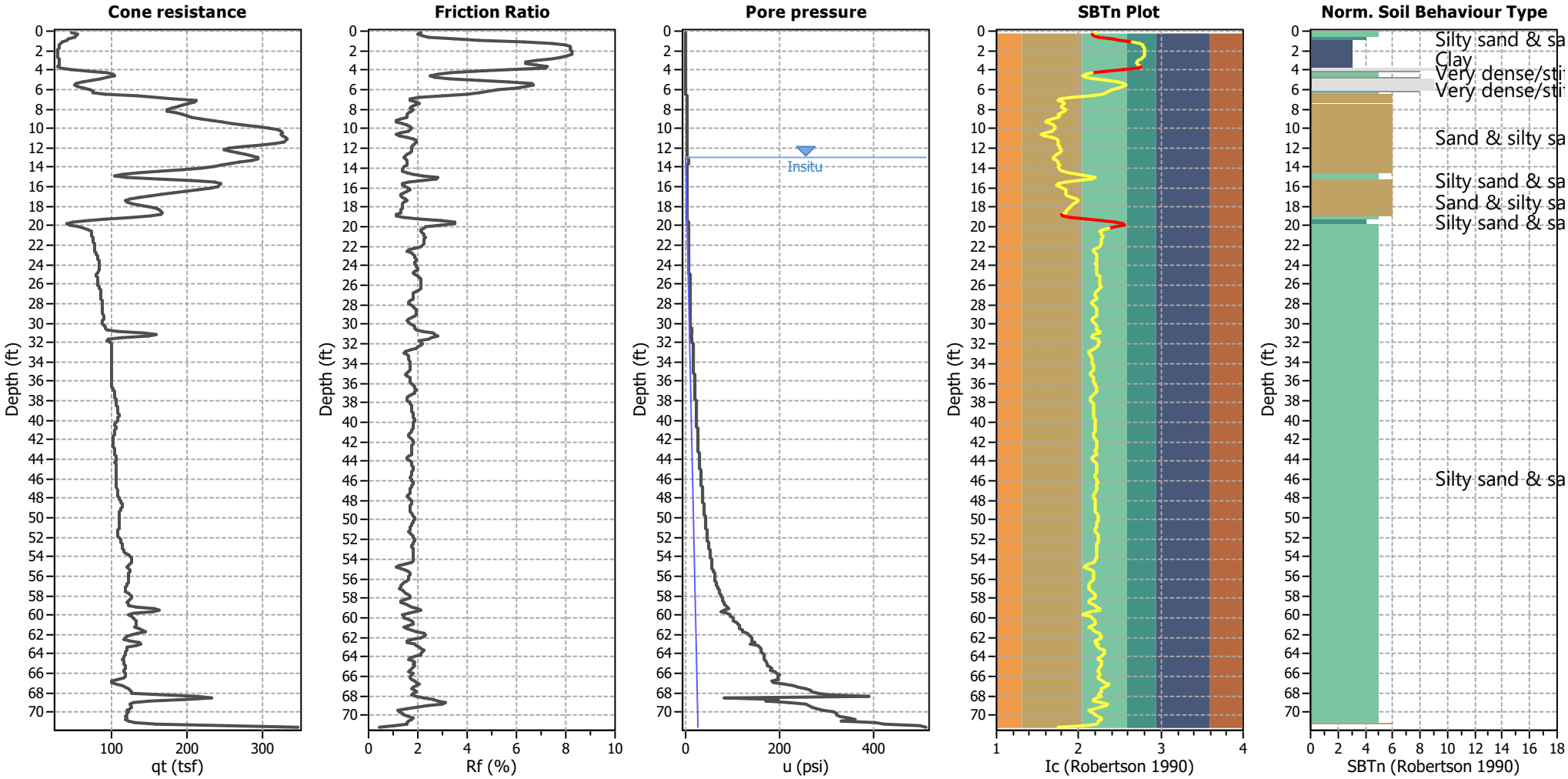
**Project:** 307035-001 KITP Housing Project
**Location:** Goleta, CA 93117

**CPT: CPT-4 (LIQ)**
Total depth: 71.52 ft




| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Analysis method: | NCEER (1998) | G.W.T. (in-situ): | 13.00 ft | Use fill: | No | Clay like behavior applied: | Sands only |
| Fines correction method: | NCEER (1998) | G.W.T. (earthq.): | 13.00 ft | Fill height: | N/A | Limit depth applied: | Yes |
| Points to test: | Based on Ic value | Average results interval: | 3 | Fill weight: | N/A | Limit depth: | 17.50 ft |
| Earthquake magnitude $M_w$: | 6.80 | Ic cut-off value: | 2.60 | Trans. detect. applied: | Yes | MSF method: | Method based |
| Peak ground acceleration: | 1.05 | Unit weight calculation: | Based on SBT | $K_\sigma$ applied: | Yes | | |

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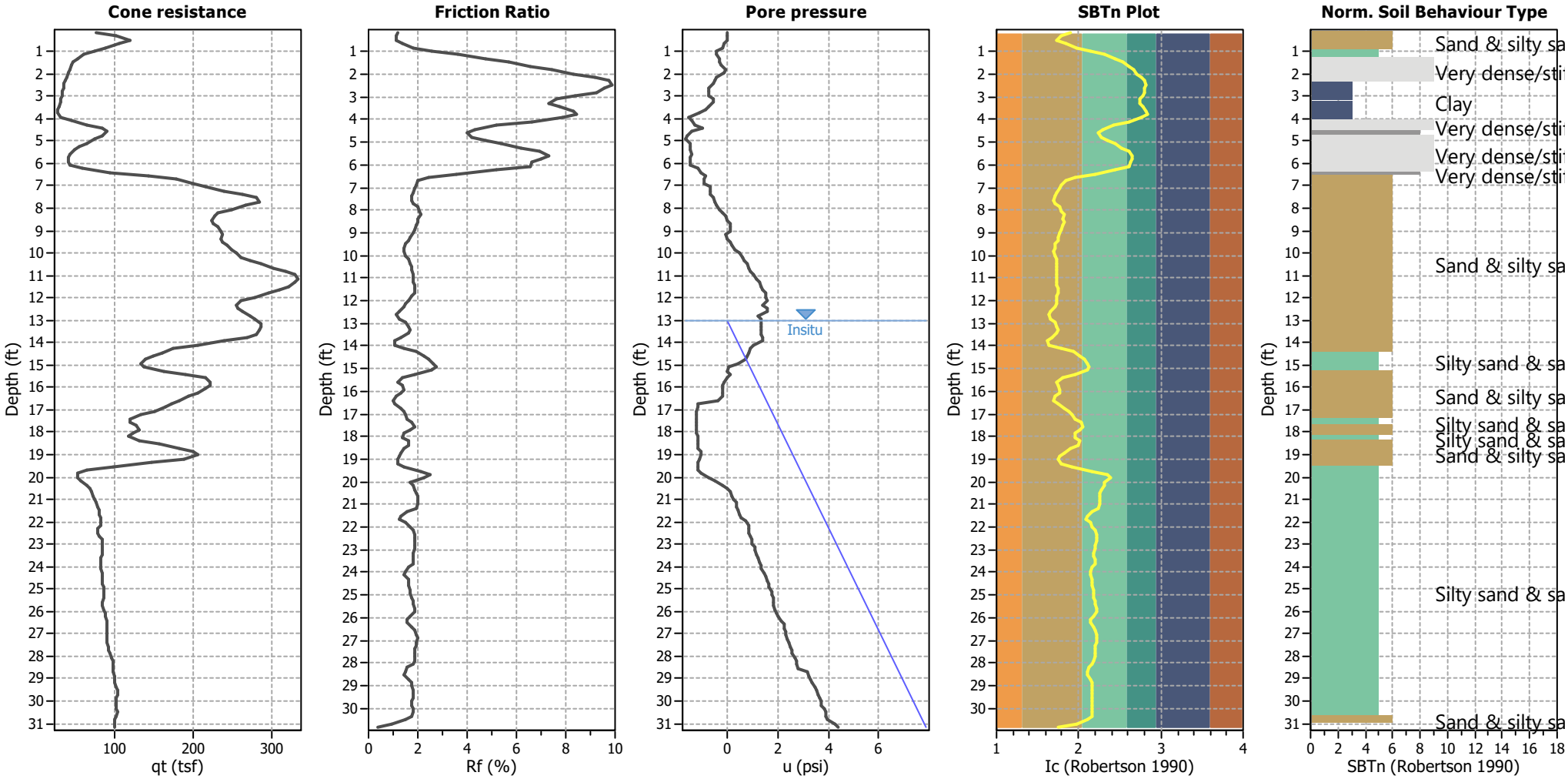
**Project:** 307035-001 KITP Housing Project
**Location:** Goleta, CA 93117

**CPT: CPT-5**
Total depth: 31.17 ft




| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Analysis method: | NCEER (1998) | G.W.T. (in-situ): | 13.00 ft | Use fill: | No | Clay like behavior applied: | Sands only |
| Fines correction method: | NCEER (1998) | G.W.T. (earthq.): | 13.00 ft | Fill height: | N/A | Limit depth applied: | Yes |
| Points to test: | Based on Ic value | Average results interval: | 3 | Fill weight: | N/A | Limit depth: | 17.50 ft |
| Earthquake magnitude $M_w$: | 6.80 | Ic cut-off value: | 2.60 | Trans. detect. applied: | Yes | MSF method: | Method based |
| Peak ground acceleration: | 1.05 | Unit weight calculation: | Based on SBT | $K_\sigma$ applied: | Yes | | |

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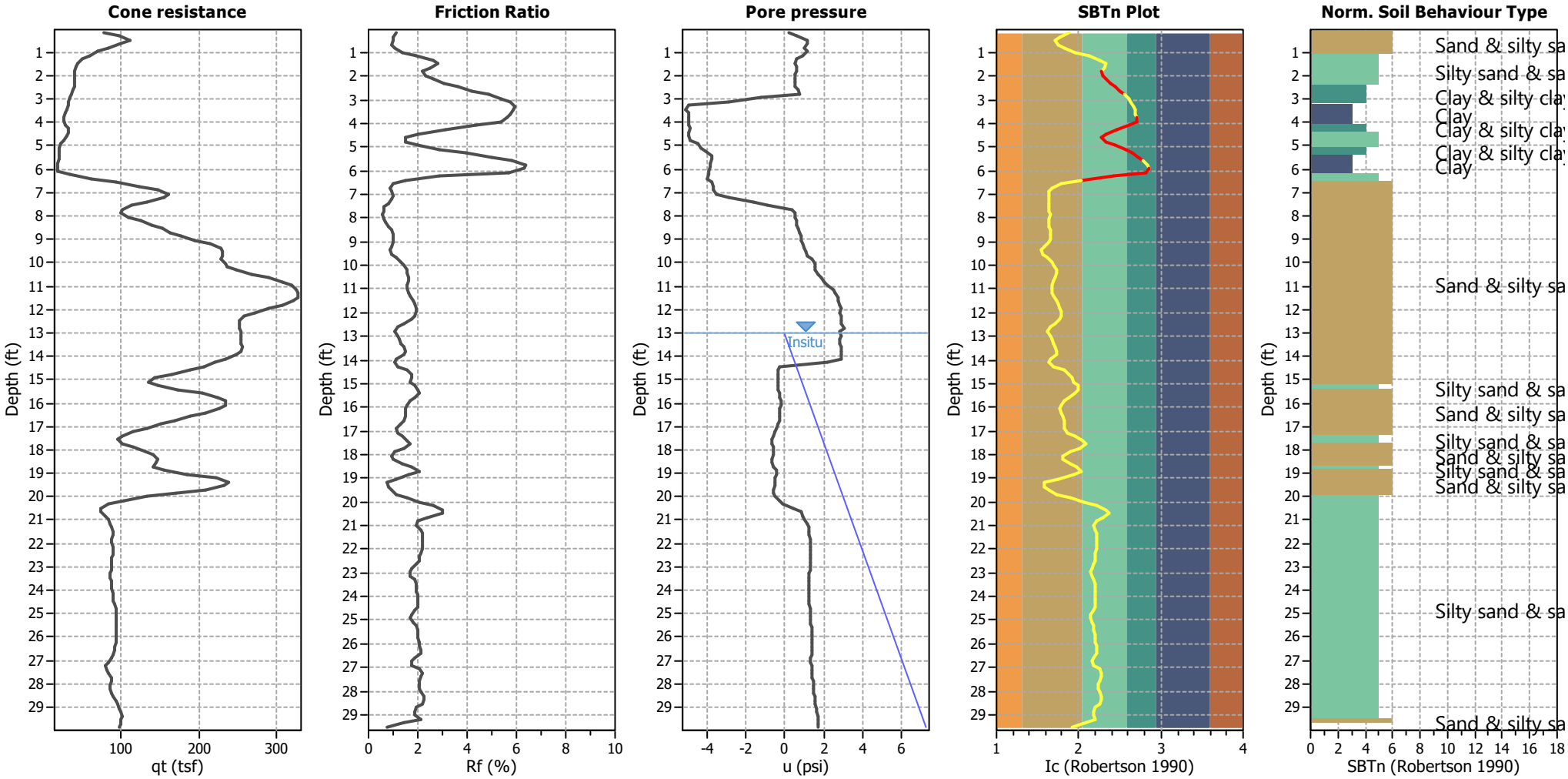
**Project:** 307035-001 KITP Housing Project
**Location:** Goleta, CA 93117

**CPT: CPT-6**
Total depth: 29.86 ft




| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Analysis method: | NCEER (1998) | G.W.T. (in-situ): | 13.00 ft | Use fill: | No | Clay like behavior applied: | Sands only |
| Fines correction method: | NCEER (1998) | G.W.T. (earthq.): | 13.00 ft | Fill height: | N/A | Limit depth applied: | Yes |
| Points to test: | Based on Ic value | Average results interval: | 3 | Fill weight: | N/A | Limit depth: | 17.50 ft |
| Earthquake magnitude $M_w$: | 6.80 | Ic cut-off value: | 2.60 | Trans. detect. applied: | Yes | MSF method: | Method based |
| Peak ground acceleration: | 1.05 | Unit weight calculation: | Based on SBT | $K_\sigma$ applied: | Yes | | |

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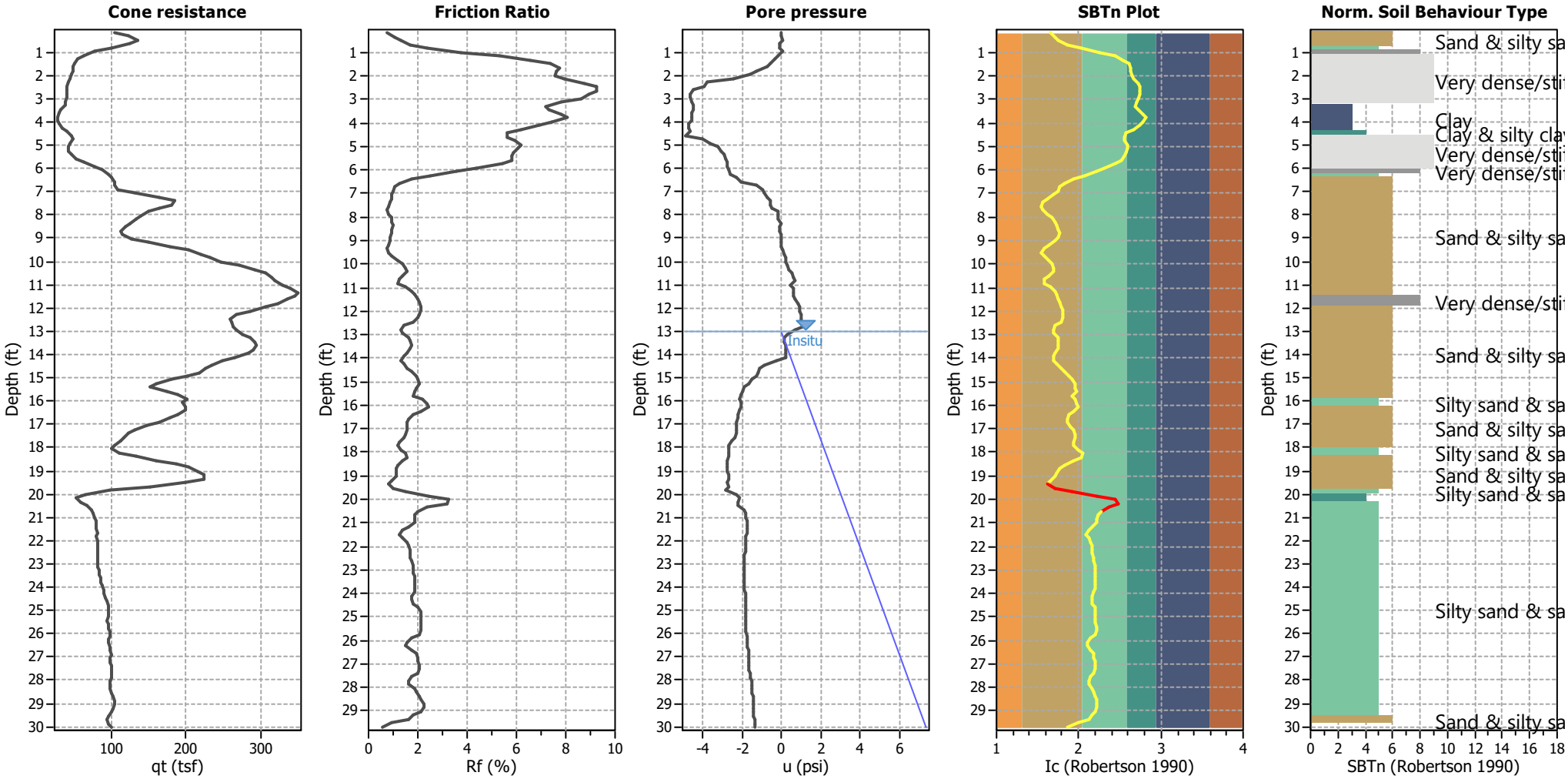
**Project:** 307035-001 KITP Housing Project
**Location:** Goleta, CA 93117

**CPT: CPT-7**
Total depth: 30.02 ft




| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Analysis method: | NCEER (1998) | G.W.T. (in-situ): | 13.00 ft | Use fill: | No | Clay like behavior applied: | Sands only |
| Fines correction method: | NCEER (1998) | G.W.T. (earthq.): | 13.00 ft | Fill height: | N/A | Limit depth applied: | Yes |
| Points to test: | Based on Ic value | Average results interval: | 3 | Fill weight: | N/A | Limit depth: | 17.50 ft |
| Earthquake magnitude $M_w$: | 6.80 | Ic cut-off value: | 2.60 | Trans. detect. applied: | Yes | MSF method: | Method based |
| Peak ground acceleration: | 1.05 | Unit weight calculation: | Based on SBT | $K_\sigma$ applied: | Yes | | |

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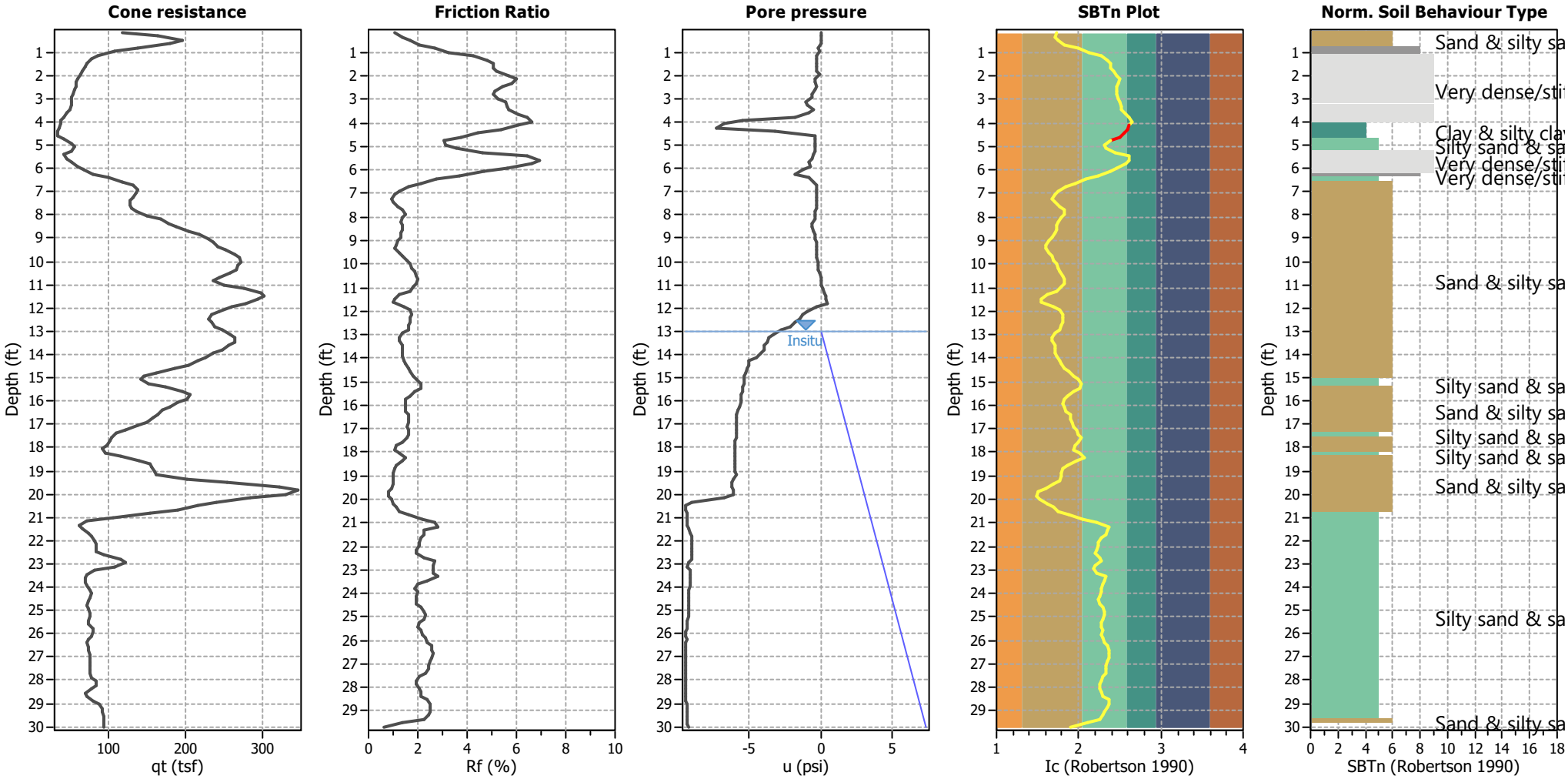
**Project:** 307035-001 KITP Housing Project
**Location:** Goleta, CA 93117

**CPT: CPT-8**
Total depth: 30.02 ft




| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Analysis method: | NCEER (1998) | G.W.T. (in-situ): | 13.00 ft | Use fill: | No | Clay like behavior applied: | Sands only |
| Fines correction method: | NCEER (1998) | G.W.T. (earthq.): | 13.00 ft | Fill height: | N/A | Limit depth applied: | Yes |
| Points to test: | Based on Ic value | Average results interval: | 3 | Fill weight: | N/A | Limit depth: | 17.50 ft |
| Earthquake magnitude $M_w$: | 6.80 | Ic cut-off value: | 2.60 | Trans. detect. applied: | Yes | MSF method: | Method based |
| Peak ground acceleration: | 1.05 | Unit weight calculation: | Based on SBT | $K_\sigma$ applied: | Yes | | |

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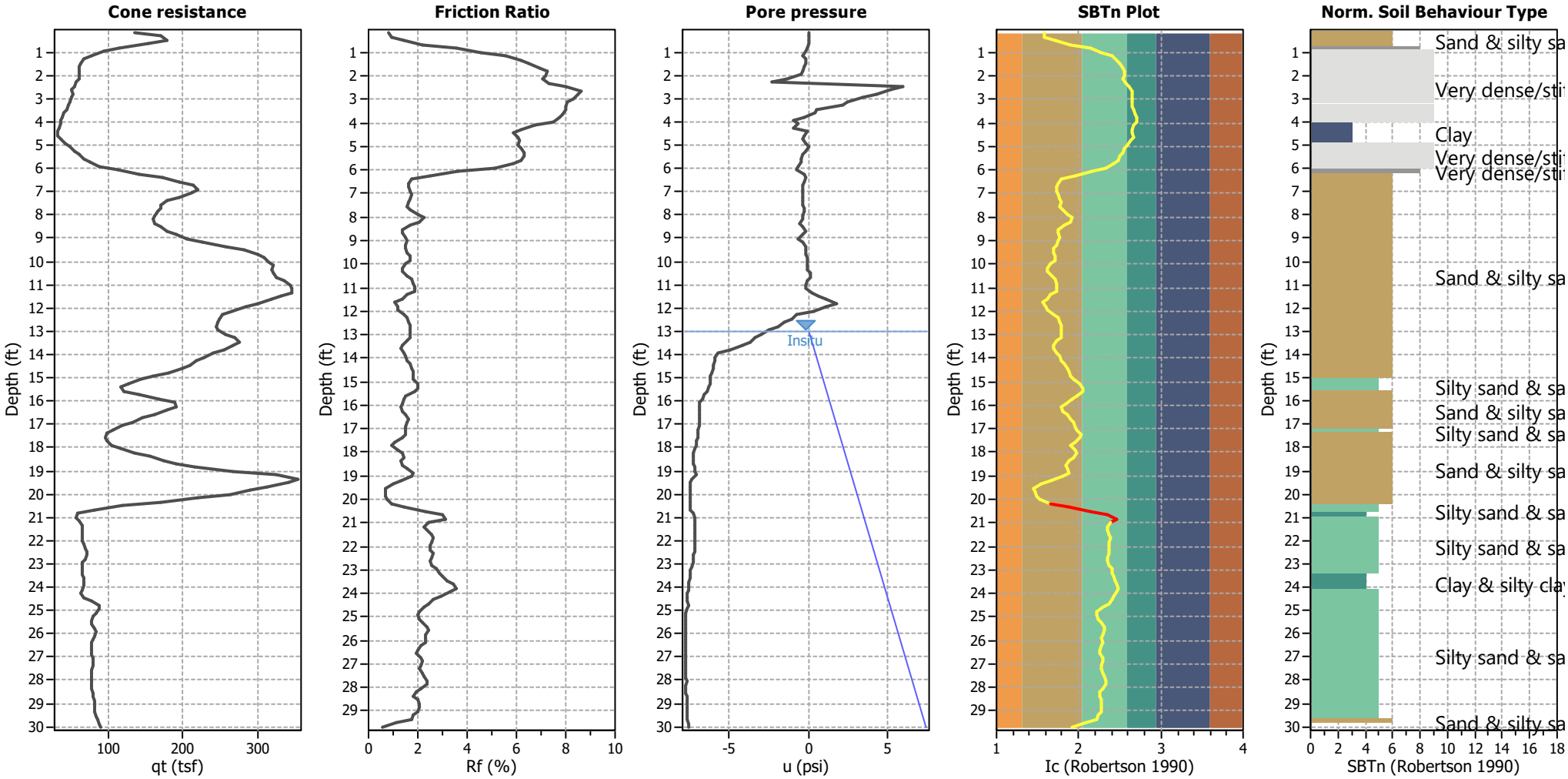
http://www.geologismiki.gr

**Project:** 307035-001 KITP Housing Project
**Location:** Goleta, CA 93117

**CPT: CPT-9**
Total depth: 30.02 ft




| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Analysis method: | NCEER (1998) | G.W.T. (in-situ): | 13.00 ft | Use fill: | No | Clay like behavior applied: | Sands only |
| Fines correction method: | NCEER (1998) | G.W.T. (earthq.): | 13.00 ft | Fill height: | N/A | Limit depth applied: | Yes |
| Points to test: | Based on Ic value | Average results interval: | 3 | Fill weight: | N/A | Limit depth: | 17.50 ft |
| Earthquake magnitude $M_w$: | 6.80 | Ic cut-off value: | 2.60 | Trans. detect. applied: | Yes | MSF method: | Method based |
| Peak ground acceleration: | 1.05 | Unit weight calculation: | Based on SBT | $K_\sigma$ applied: | Yes | | |

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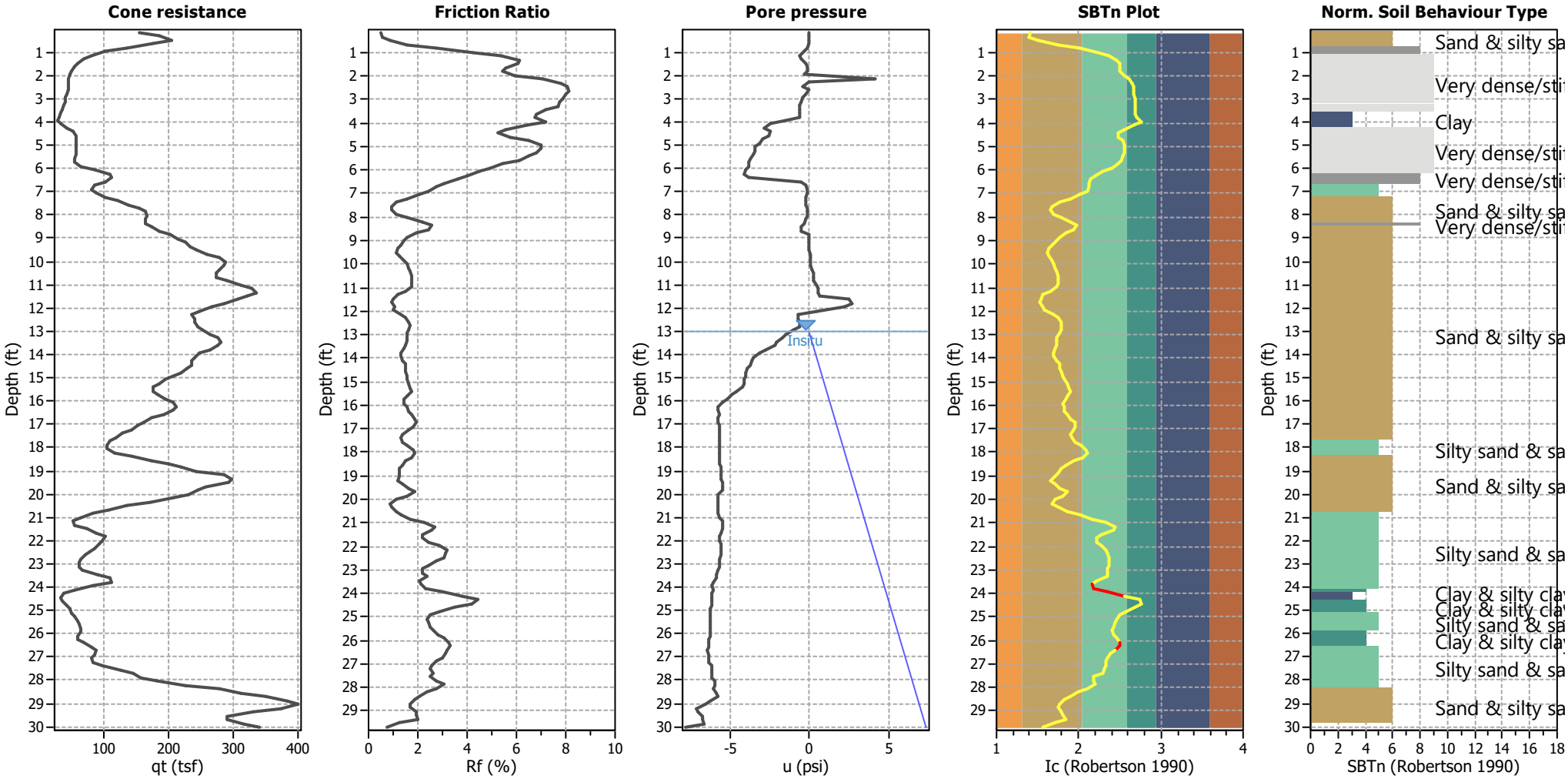
**Project:** 307035-001 KITP Housing Project
**Location:** Goleta, CA 93117

**CPT: CPT-10**
Total depth: 30.02 ft




| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Analysis method: | NCEER (1998) | G.W.T. (in-situ): | 13.00 ft | Use fill: | No | Clay like behavior applied: | Sands only |
| Fines correction method: | NCEER (1998) | G.W.T. (earthq.): | 13.00 ft | Fill height: | N/A | Limit depth applied: | Yes |
| Points to test: | Based on Ic value | Average results interval: | 3 | Fill weight: | N/A | Limit depth: | 17.50 ft |
| Earthquake magnitude $M_w$: | 6.80 | Ic cut-off value: | 2.60 | Trans. detect. applied: | Yes | MSF method: | Method based |
| Peak ground acceleration: | 1.05 | Unit weight calculation: | Based on SBT | $K_\sigma$ applied: | Yes | | |

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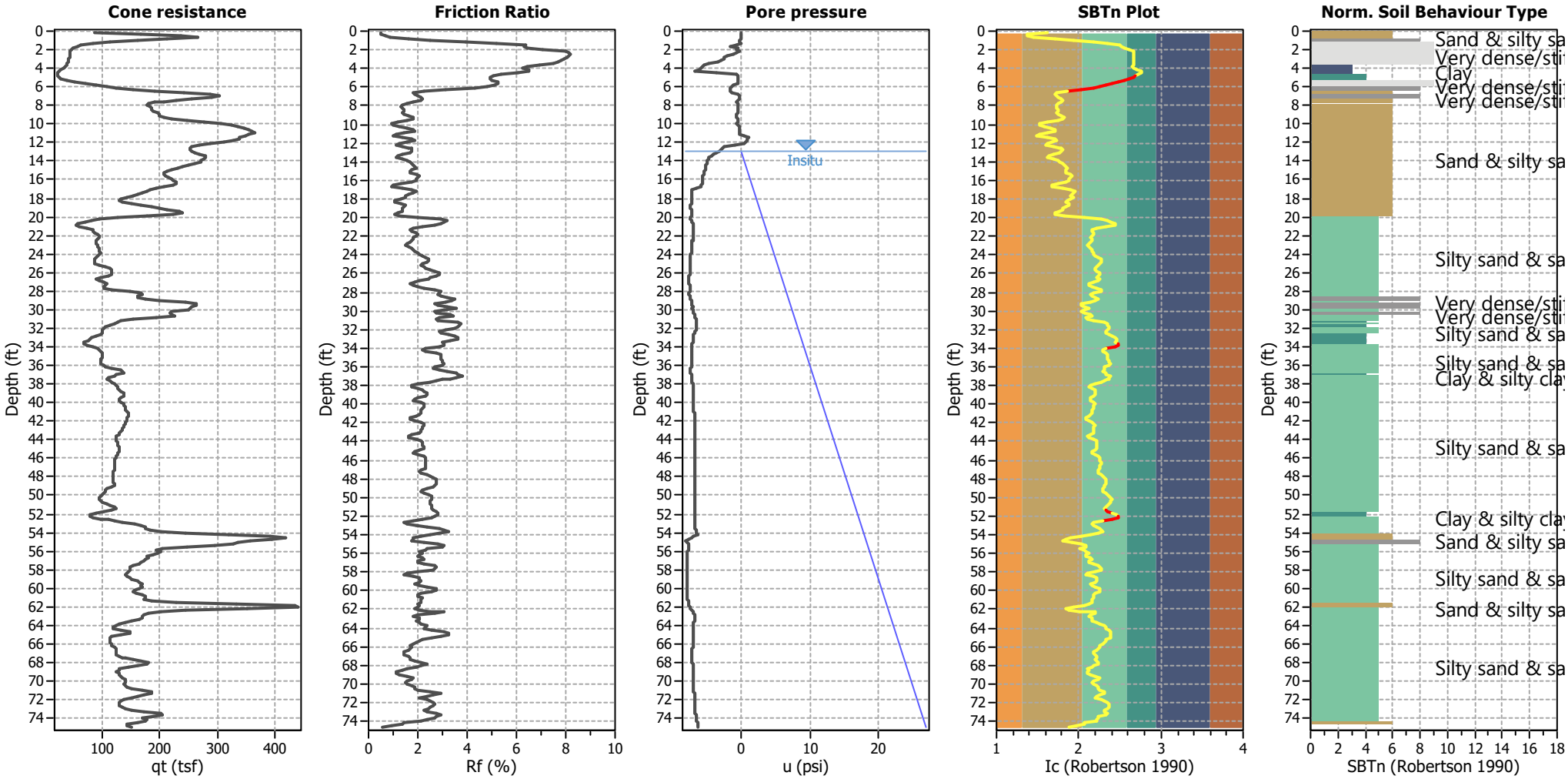
**Project:** 307035-001 KITP Housing Project
**Location:** Goleta, CA 93117

**CPT: CPT-11 (LIQ)**
Total depth: 74.97 ft




| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Analysis method: | NCEER (1998) | G.W.T. (in-situ): | 13.00 ft | Use fill: | No | Clay like behavior applied: | Sands only |
| Fines correction method: | NCEER (1998) | G.W.T. (earthq.): | 13.00 ft | Fill height: | N/A | Limit depth applied: | Yes |
| Points to test: | Based on Ic value | Average results interval: | 3 | Fill weight: | N/A | Limit depth: | 17.50 ft |
| Earthquake magnitude $M_w$: | 6.80 | Ic cut-off value: | 2.60 | Trans. detect. applied: | Yes | MSF method: | Method based |
| Peak ground acceleration: | 1.05 | Unit weight calculation: | Based on SBT | $K_\sigma$ applied: | Yes | | |

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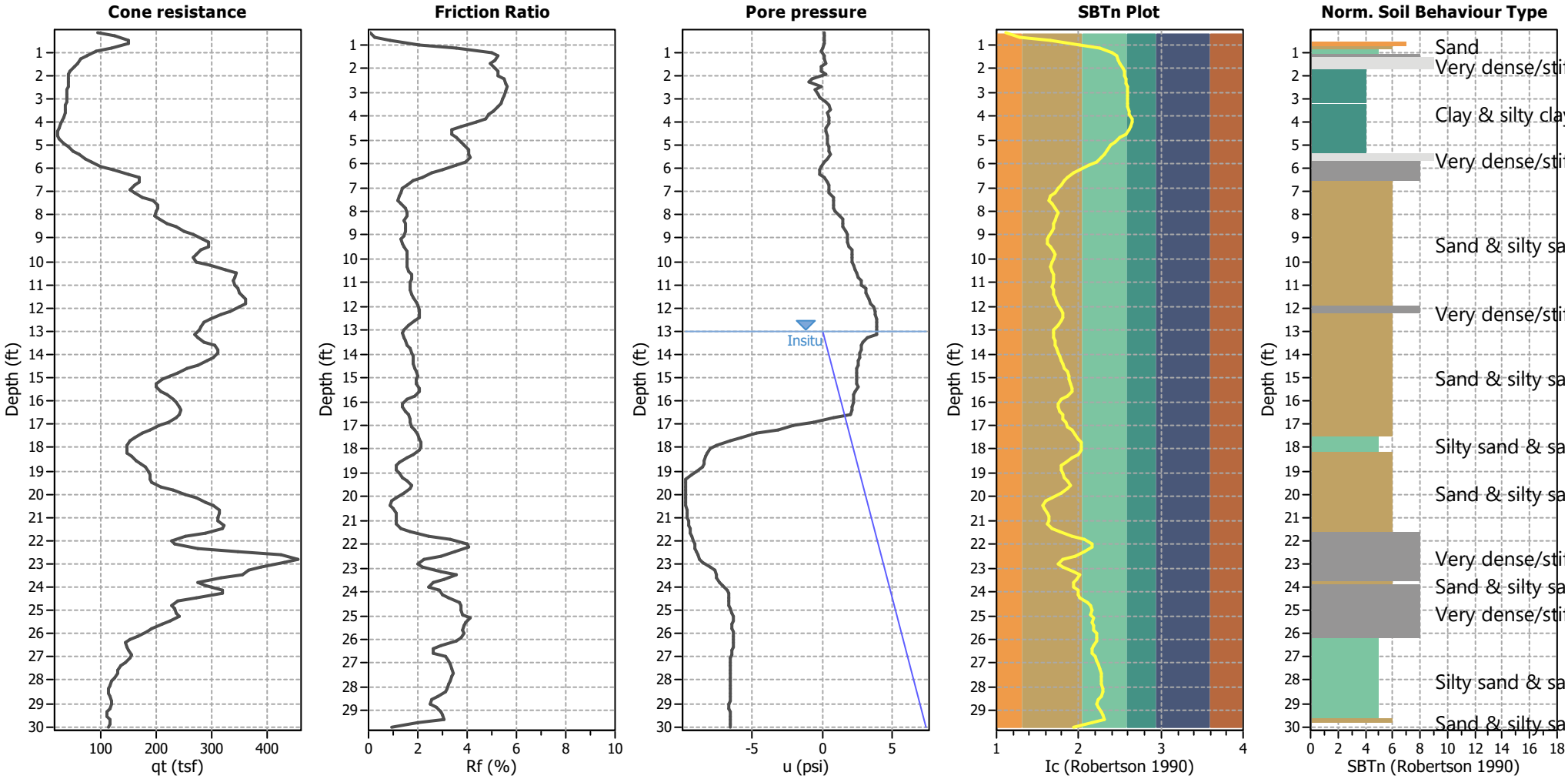
**Project:** 307035-001 KITP Housing Project
**Location:** Goleta, CA 93117

**CPT: CPT-12**
Total depth: 30.02 ft




| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Analysis method: | NCEER (1998) | G.W.T. (in-situ): | 13.00 ft | Use fill: | No | Clay like behavior applied: | Sands only |
| Fines correction method: | NCEER (1998) | G.W.T. (earthq.): | 13.00 ft | Fill height: | N/A | Limit depth applied: | Yes |
| Points to test: | Based on Ic value | Average results interval: | 3 | Fill weight: | N/A | Limit depth: | 17.50 ft |
| Earthquake magnitude $M_w$: | 6.80 | Ic cut-off value: | 2.60 | Trans. detect. applied: | Yes | MSF method: | Method based |
| Peak ground acceleration: | 1.05 | Unit weight calculation: | Based on SBT | $K_\sigma$ applied: | Yes | | |

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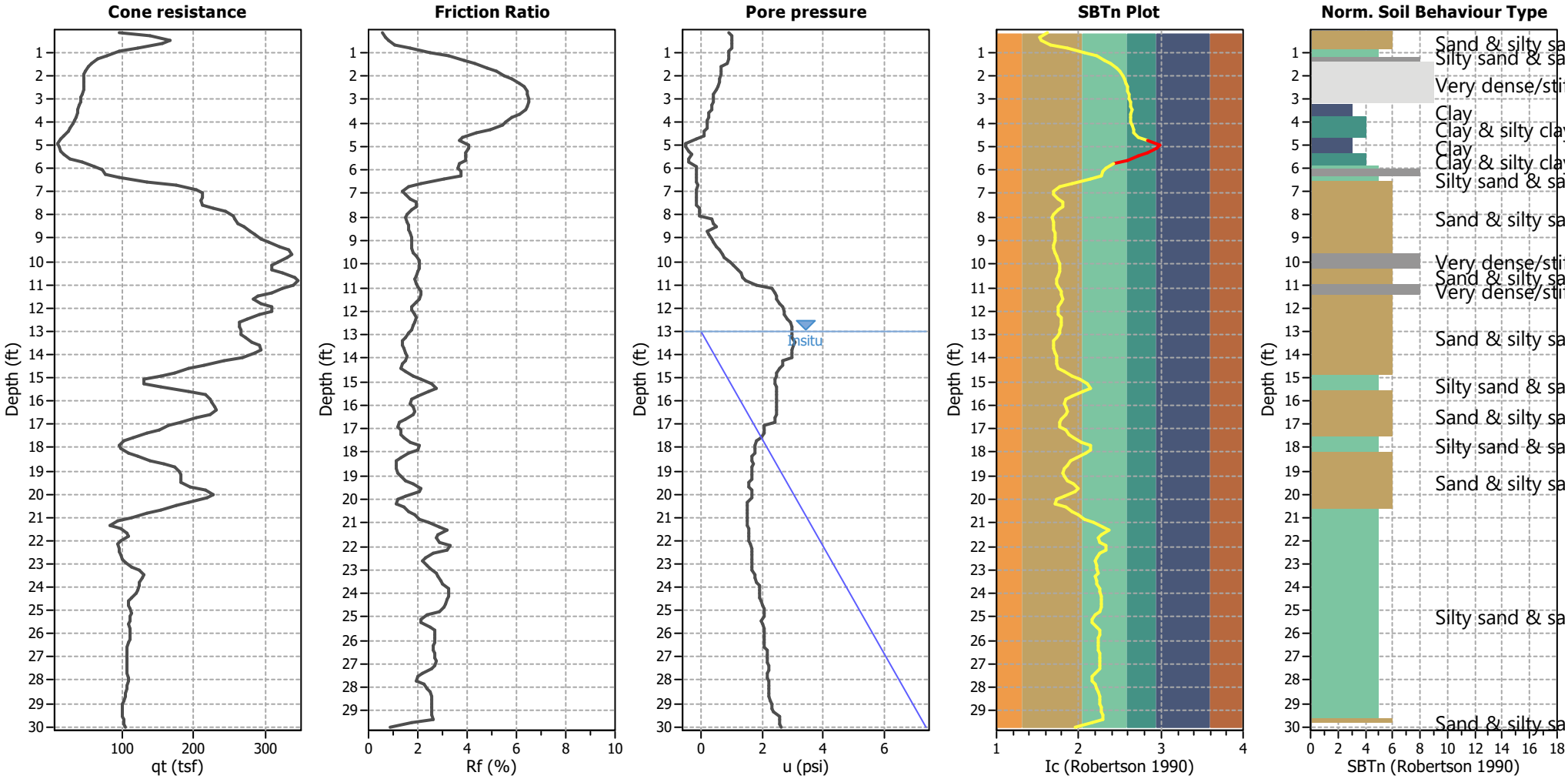
**Project:** 307035-001 KITP Housing Project
**Location:** Goleta, CA 93117

**CPT: CPT-13**
Total depth: 30.02 ft




| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Analysis method: | NCEER (1998) | G.W.T. (in-situ): | 13.00 ft | Use fill: | No | Clay like behavior applied: | Sands only |
| Fines correction method: | NCEER (1998) | G.W.T. (earthq.): | 13.00 ft | Fill height: | N/A | Limit depth applied: | Yes |
| Points to test: | Based on Ic value | Average results interval: | 3 | Fill weight: | N/A | Limit depth: | 17.50 ft |
| Earthquake magnitude $M_w$: | 6.80 | Ic cut-off value: | 2.60 | Trans. detect. applied: | Yes | MSF method: | Method based |
| Peak ground acceleration: | 1.05 | Unit weight calculation: | Based on SBT | $K_\sigma$ applied: | Yes | | |

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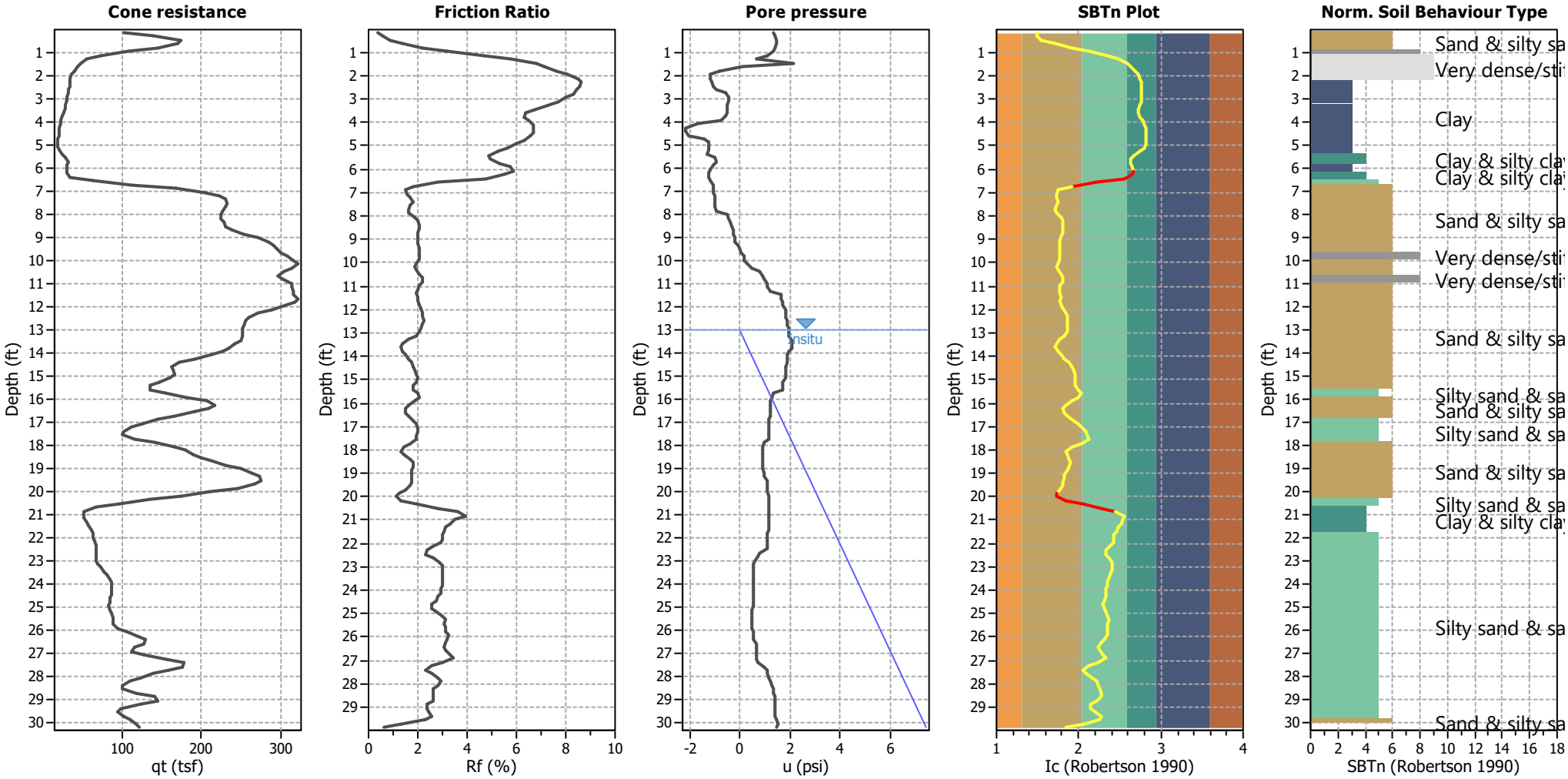
**Project:** 307035-001 KITP Housing Project
**Location:** Goleta, CA 93117

**CPT: CPT-14**
Total depth: 30.18 ft




| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Analysis method: | NCEER (1998) | G.W.T. (in-situ): | 13.00 ft | Use fill: | No | Clay like behavior applied: | Sands only |
| Fines correction method: | NCEER (1998) | G.W.T. (earthq.): | 13.00 ft | Fill height: | N/A | Limit depth applied: | Yes |
| Points to test: | Based on Ic value | Average results interval: | 3 | Fill weight: | N/A | Limit depth: | 17.50 ft |
| Earthquake magnitude $M_w$: | 6.80 | Ic cut-off value: | 2.60 | Trans. detect. applied: | Yes | MSF method: | Method based |
| Peak ground acceleration: | 1.05 | Unit weight calculation: | Based on SBT | $K_\sigma$ applied: | Yes | | |

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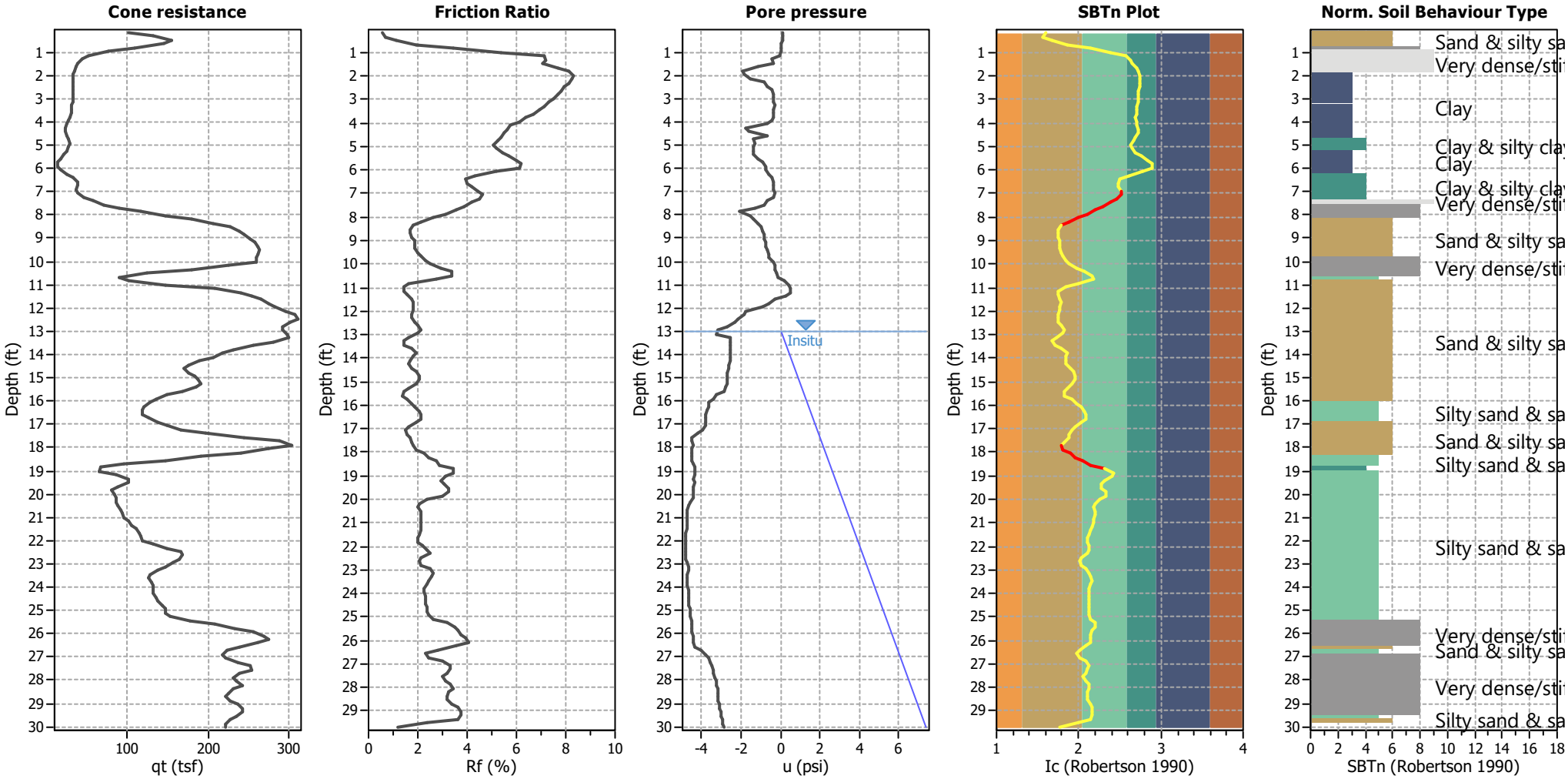
**Project:** 307035-001 KITP Housing Project
**Location:** Goleta, CA 93117

**CPT: CPT-15**
Total depth: 30.02 ft




| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Analysis method: | NCEER (1998) | G.W.T. (in-situ): | 13.00 ft | Use fill: | No | Clay like behavior applied: | Sands only |
| Fines correction method: | NCEER (1998) | G.W.T. (earthq.): | 13.00 ft | Fill height: | N/A | Limit depth applied: | Yes |
| Points to test: | Based on Ic value | Average results interval: | 3 | Fill weight: | N/A | Limit depth: | 17.50 ft |
| Earthquake magnitude $M_w$: | 6.80 | Ic cut-off value: | 2.60 | Trans. detect. applied: | Yes | MSF method: | Method based |
| Peak ground acceleration: | 1.05 | Unit weight calculation: | Based on SBT | $K_\sigma$ applied: | Yes | | |

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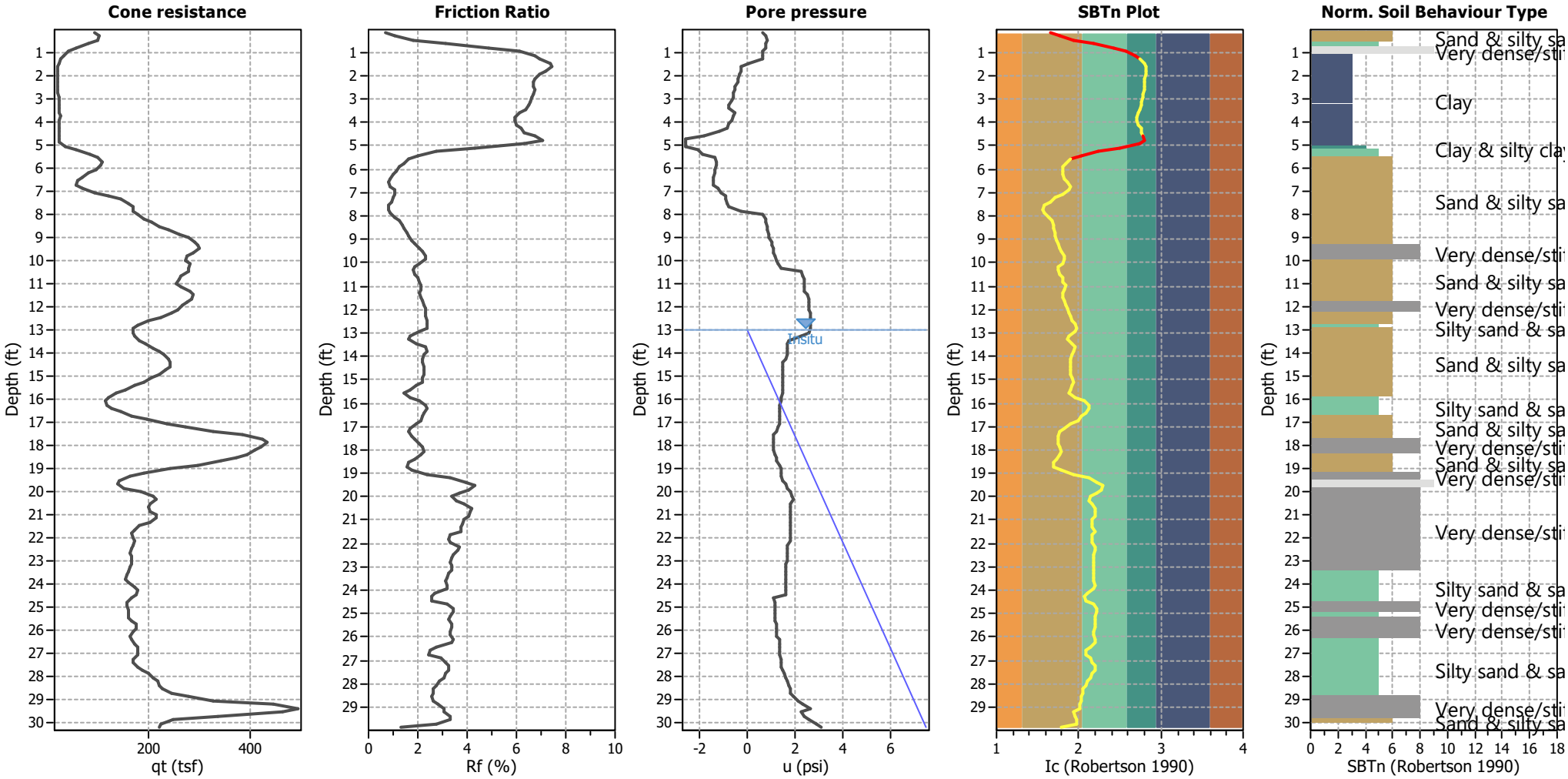
**Project:** 307035-001 KITP Housing Project
**Location:** Goleta, CA 93117

**CPT: CPT-16**
Total depth: 30.18 ft




| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Analysis method: | NCEER (1998) | G.W.T. (in-situ): | 13.00 ft | Use fill: | No | Clay like behavior applied: | Sands only |
| Fines correction method: | NCEER (1998) | G.W.T. (earthq.): | 13.00 ft | Fill height: | N/A | Limit depth applied: | Yes |
| Points to test: | Based on Ic value | Average results interval: | 3 | Fill weight: | N/A | Limit depth: | 17.50 ft |
| Earthquake magnitude $M_w$: | 6.80 | Ic cut-off value: | 2.60 | Trans. detect. applied: | Yes | MSF method: | Method based |
| Peak ground acceleration: | 1.05 | Unit weight calculation: | Based on SBT | $K_\sigma$ applied: | Yes | | |

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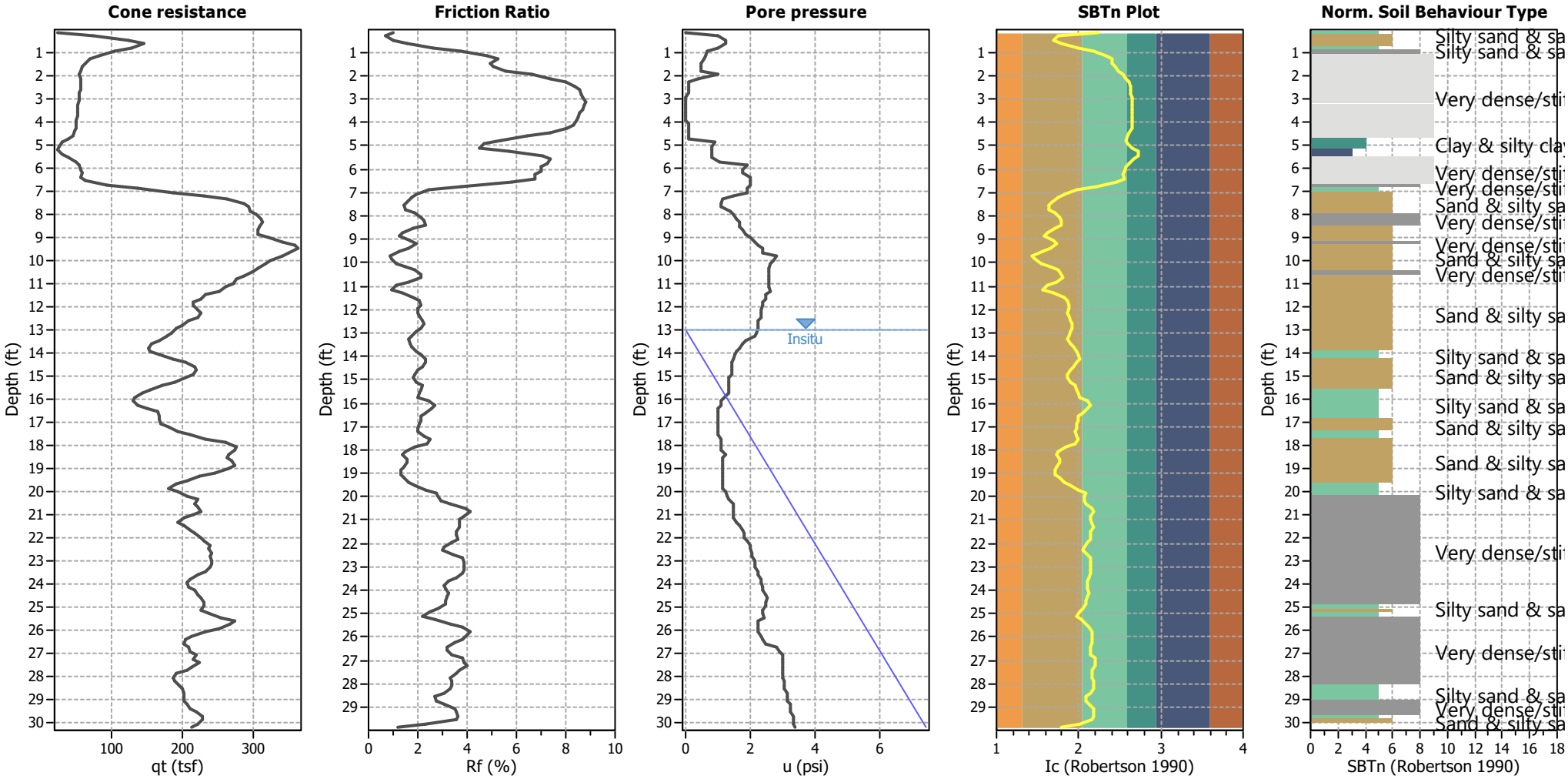
**Project:** 307035-001 KITP Housing Project
**Location:** Goleta, CA 93117

**CPT: CPT-17**
Total depth: 30.18 ft




| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Analysis method: | NCEER (1998) | G.W.T. (in-situ): | 13.00 ft | Use fill: | No | Clay like behavior applied: | Sands only |
| Fines correction method: | NCEER (1998) | G.W.T. (earthq.): | 13.00 ft | Fill height: | N/A | Limit depth applied: | Yes |
| Points to test: | Based on Ic value | Average results interval: | 3 | Fill weight: | N/A | Limit depth: | 17.50 ft |
| Earthquake magnitude $M_w$: | 6.80 | Ic cut-off value: | 2.60 | Trans. detect. applied: | Yes | MSF method: | Method based |
| Peak ground acceleration: | 1.05 | Unit weight calculation: | Based on SBT | $K_\sigma$ applied: | Yes | | |

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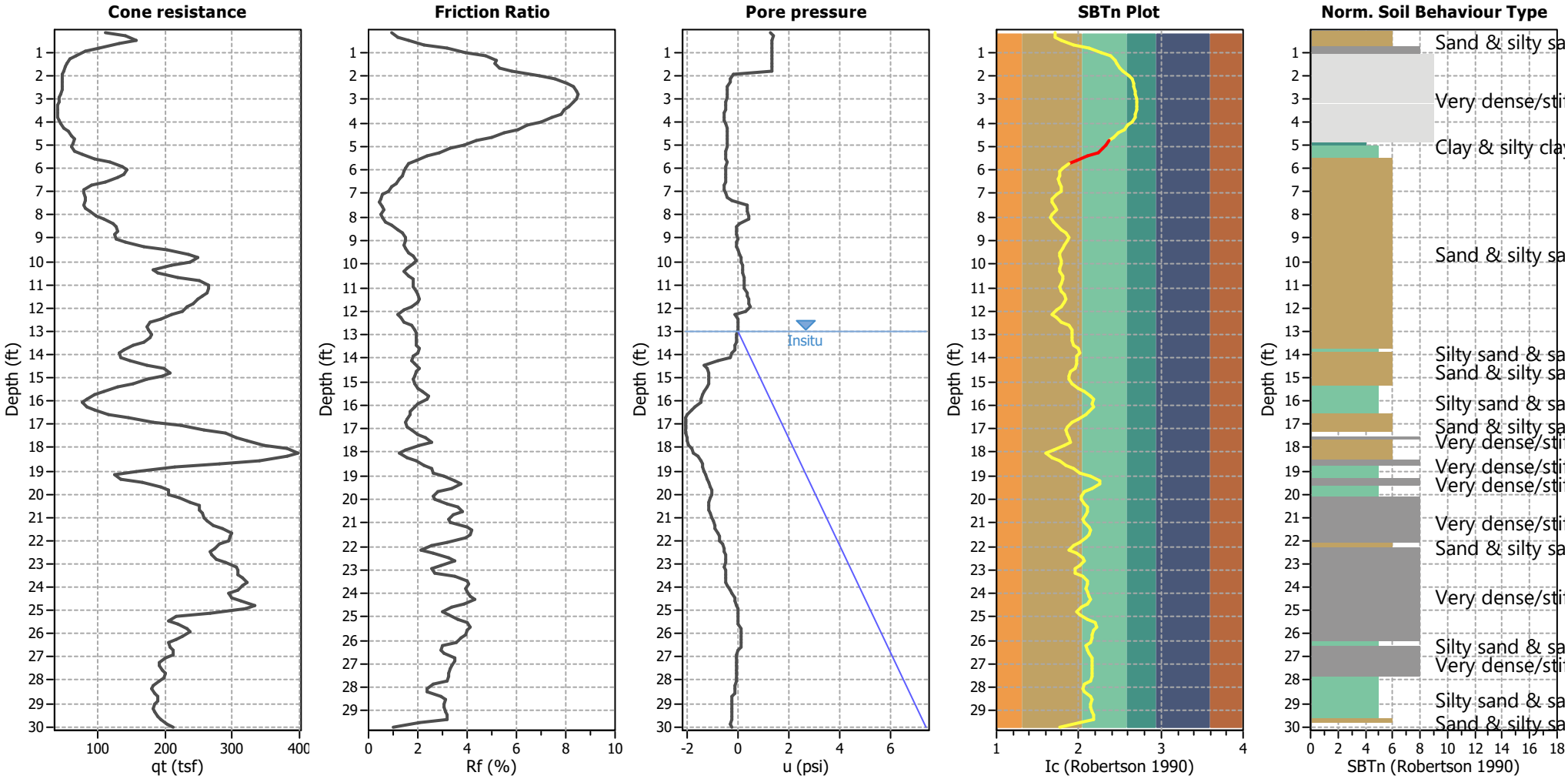
**Project:** 307035-001 KITP Housing Project
**Location:** Goleta, CA 93117

**CPT: CPT-18**
Total depth: 30.02 ft




| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Analysis method: | NCEER (1998) | G.W.T. (in-situ): | 13.00 ft | Use fill: | No | Clay like behavior applied: | Sands only |
| Fines correction method: | NCEER (1998) | G.W.T. (earthq.): | 13.00 ft | Fill height: | N/A | Limit depth applied: | Yes |
| Points to test: | Based on Ic value | Average results interval: | 3 | Fill weight: | N/A | Limit depth: | 17.50 ft |
| Earthquake magnitude $M_w$: | 6.80 | Ic cut-off value: | 2.60 | Trans. detect. applied: | Yes | MSF method: | Method based |
| Peak ground acceleration: | 1.05 | Unit weight calculation: | Based on SBT | $K_\sigma$ applied: | Yes | | |

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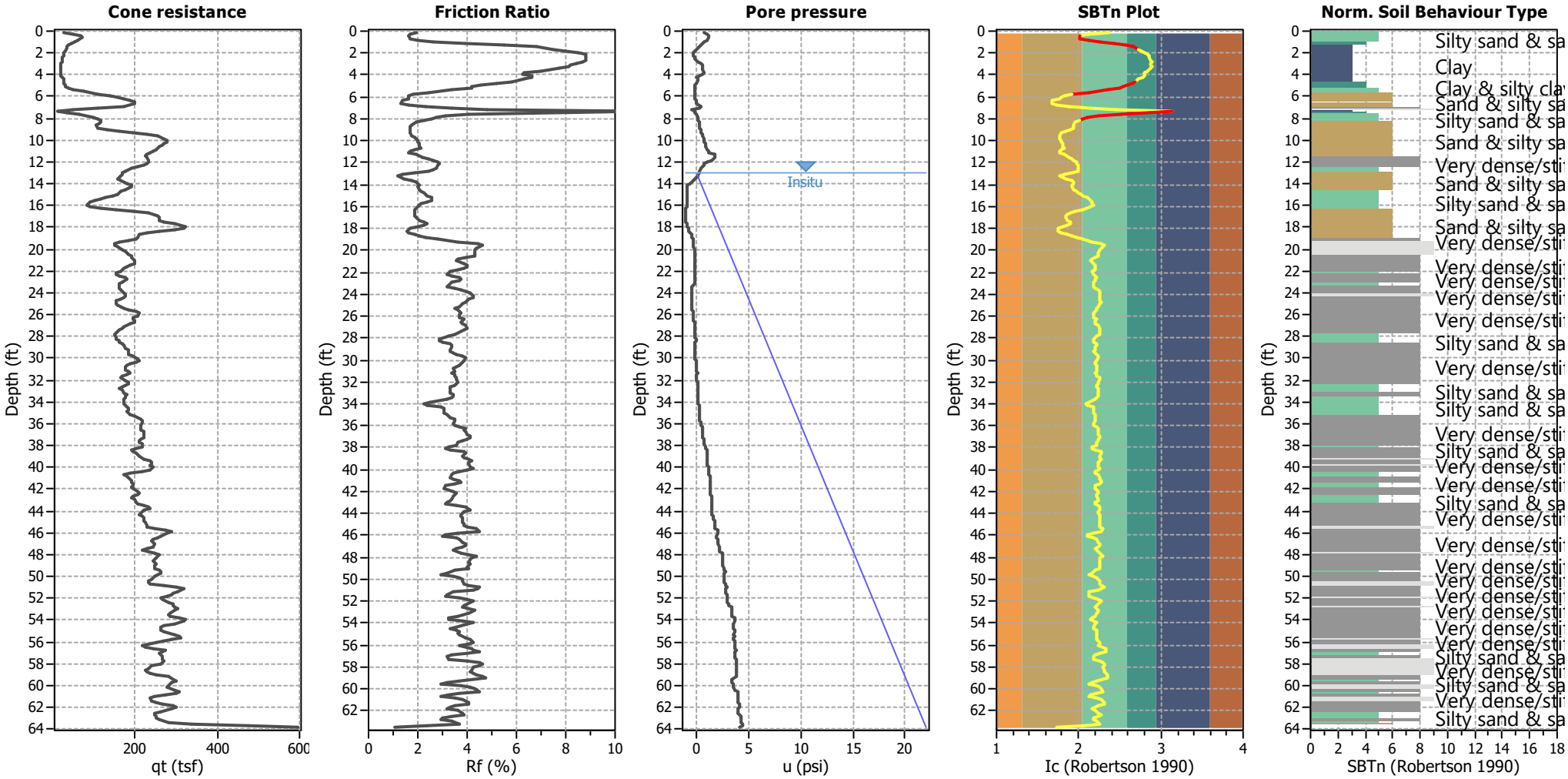
**Project:** 307035-001 KITP Housing Project
**Location:** Goleta, CA 93117

**CPT: CPT-19 (LIQ)**
Total depth: 63.81 ft




| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Analysis method: | NCEER (1998) | G.W.T. (in-situ): | 13.00 ft | Use fill: | No | Clay like behavior applied: | Sands only |
| Fines correction method: | NCEER (1998) | G.W.T. (earthq.): | 13.00 ft | Fill height: | N/A | Limit depth applied: | Yes |
| Points to test: | Based on Ic value | Average results interval: | 3 | Fill weight: | N/A | Limit depth: | 17.50 ft |
| Earthquake magnitude $M_w$: | 6.80 | Ic cut-off value: | 2.60 | Trans. detect. applied: | Yes | MSF method: | Method based |
| Peak ground acceleration: | 1.05 | Unit weight calculation: | Based on SBT | $K_\sigma$ applied: | Yes | | |

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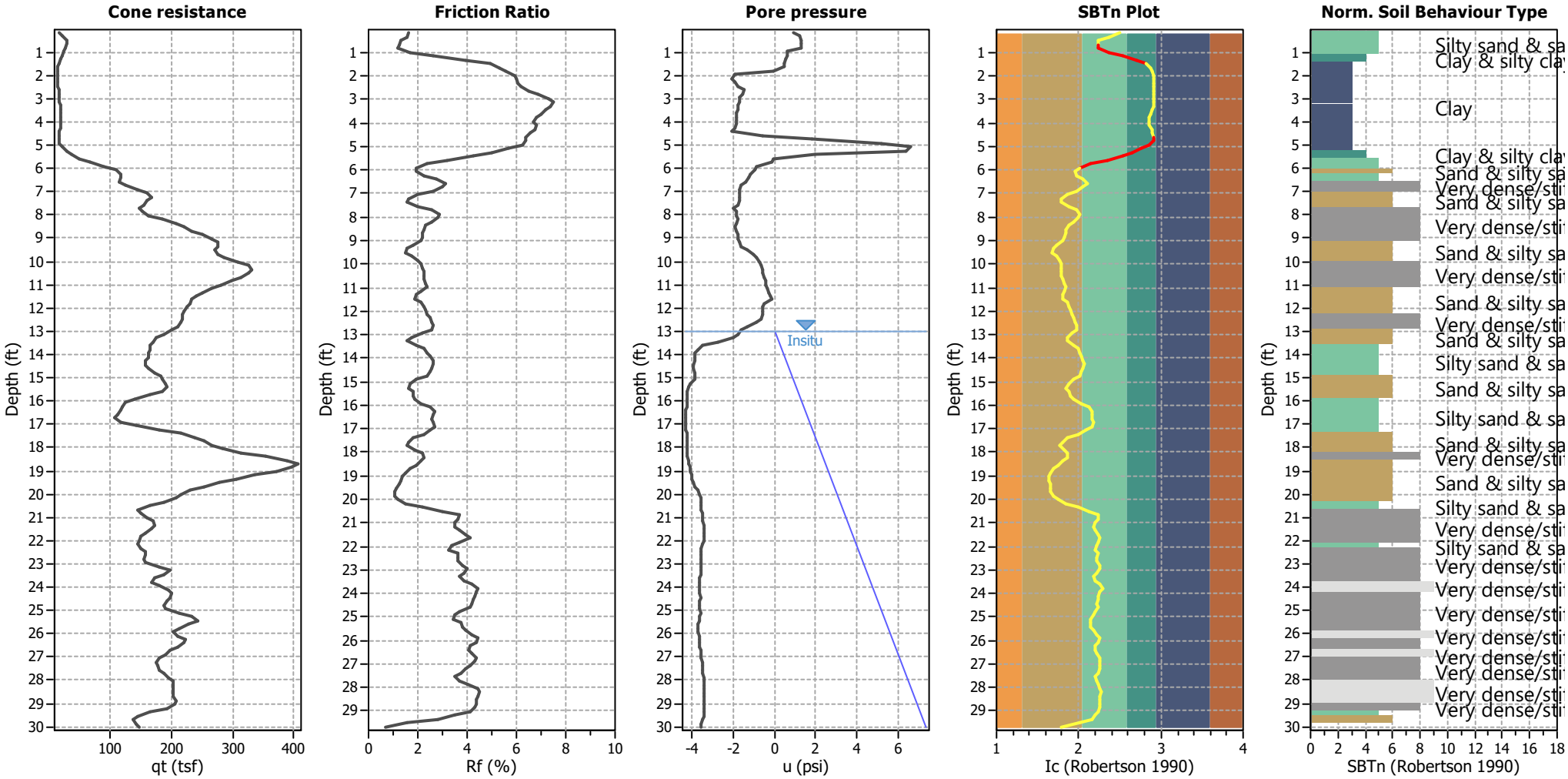
**Project:** 307035-001 KITP Housing Project
**Location:** Goleta, CA 93117

**CPT: CPT-20**
Total depth: 30.02 ft




| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Analysis method: | NCEER (1998) | G.W.T. (in-situ): | 13.00 ft | Use fill: | No | Clay like behavior applied: | Sands only |
| Fines correction method: | NCEER (1998) | G.W.T. (earthq.): | 13.00 ft | Fill height: | N/A | Limit depth applied: | Yes |
| Points to test: | Based on Ic value | Average results interval: | 3 | Fill weight: | N/A | Limit depth: | 17.50 ft |
| Earthquake magnitude $M_w$: | 6.80 | Ic cut-off value: | 2.60 | Trans. detect. applied: | Yes | MSF method: | Method based |
| Peak ground acceleration: | 1.05 | Unit weight calculation: | Based on SBT | $K_\sigma$ applied: | Yes | | |

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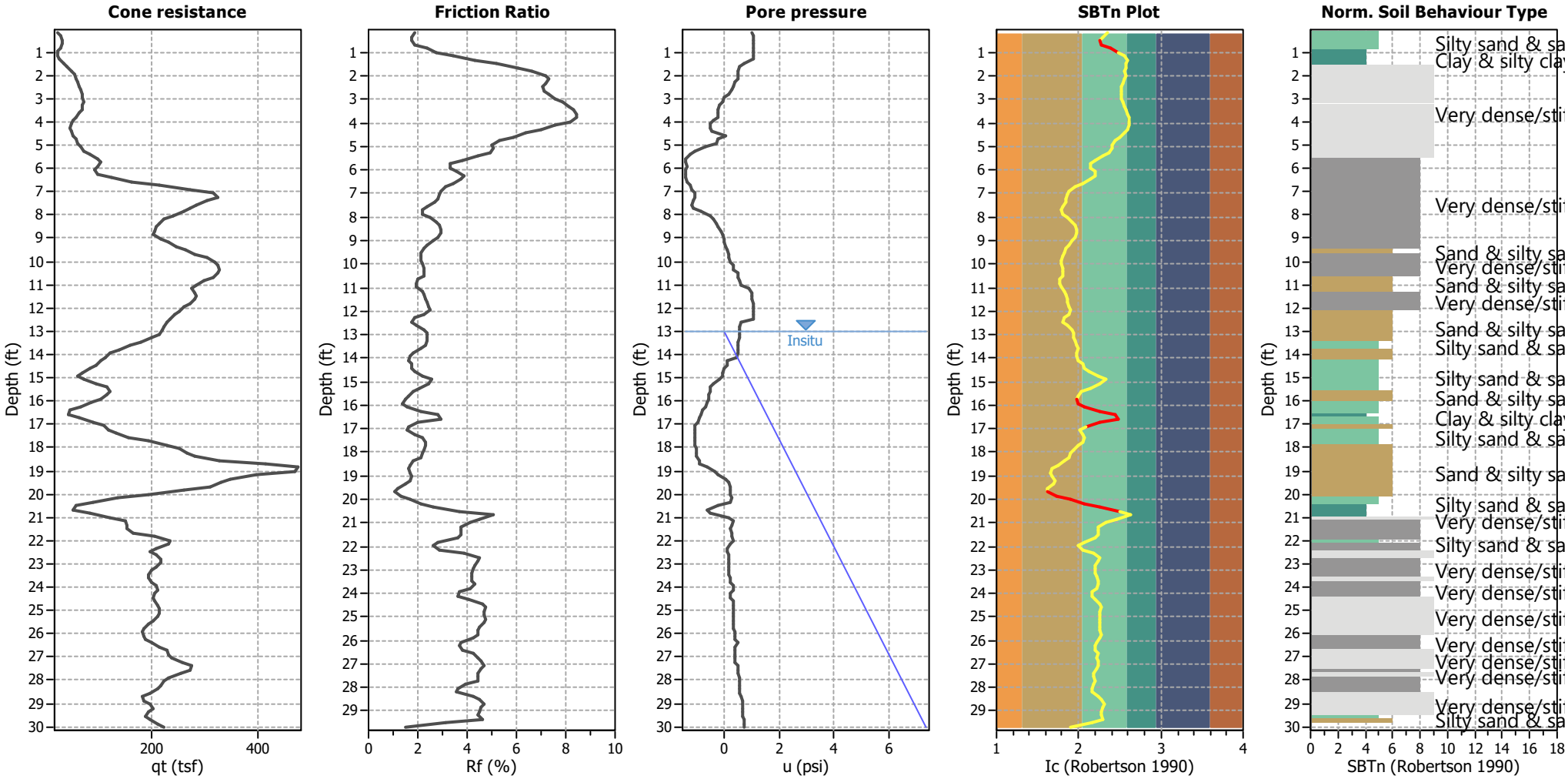
**Project:** 307035-001 KITP Housing Project
**Location:** Goleta, CA 93117

**CPT: CPT-21**
Total depth: 30.02 ft




| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Analysis method: | NCEER (1998) | G.W.T. (in-situ): | 13.00 ft | Use fill: | No | Clay like behavior applied: | Sands only |
| Fines correction method: | NCEER (1998) | G.W.T. (earthq.): | 13.00 ft | Fill height: | N/A | Limit depth applied: | Yes |
| Points to test: | Based on Ic value | Average results interval: | 3 | Fill weight: | N/A | Limit depth: | 17.50 ft |
| Earthquake magnitude $M_w$: | 6.80 | Ic cut-off value: | 2.60 | Trans. detect. applied: | Yes | MSF method: | Method based |
| Peak ground acceleration: | 1.05 | Unit weight calculation: | Based on SBT | $K_\sigma$ applied: | Yes | | |

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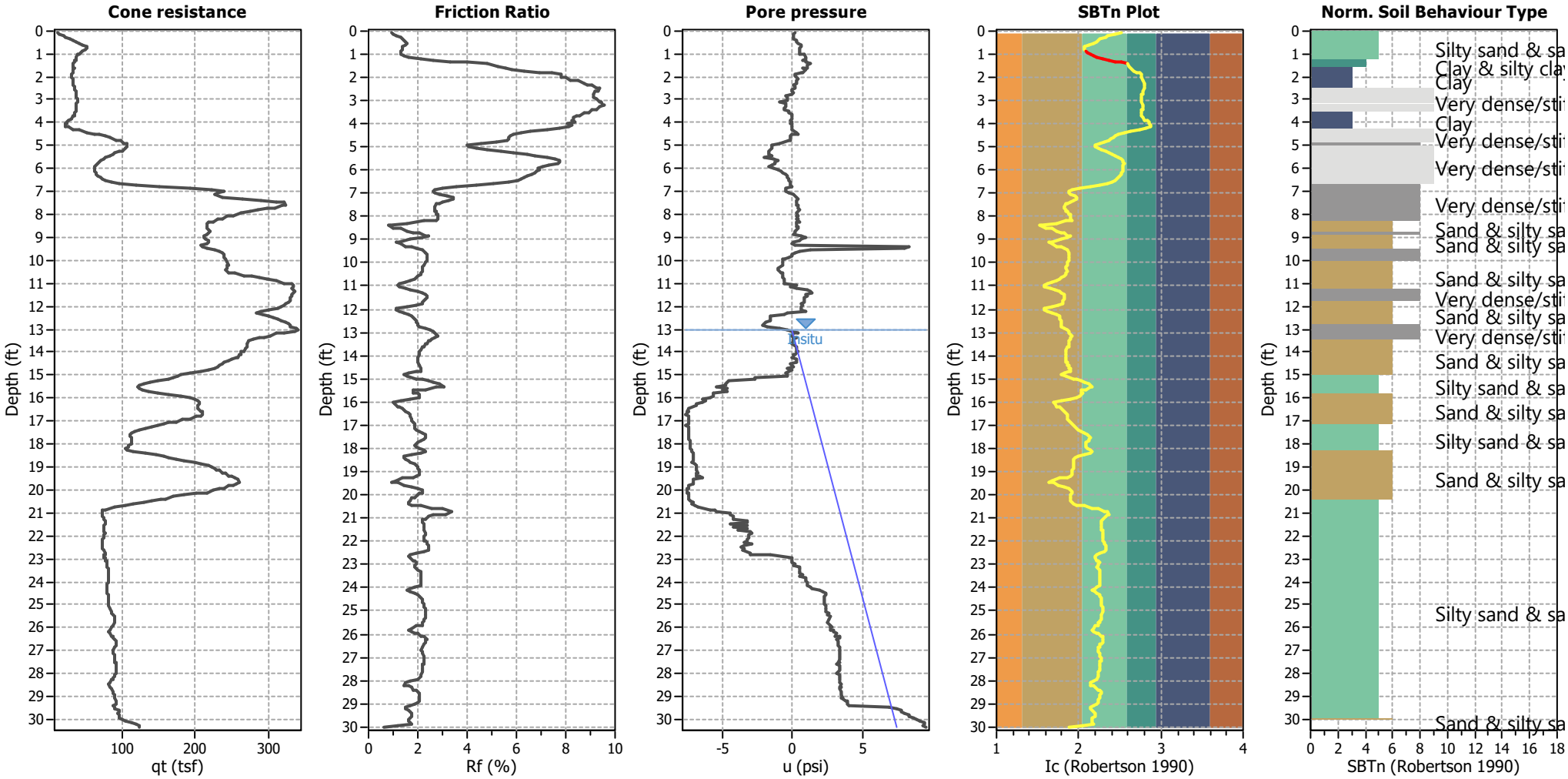
**Project:** 307035-001 KITP Housing Project
**Location:** Goleta, CA 93117

**CPT: CPT-22**
Total depth: 30.33 ft




| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Analysis method: | NCEER (1998) | G.W.T. (in-situ): | 13.00 ft | Use fill: | No | Clay like behavior applied: | Sands only |
| Fines correction method: | NCEER (1998) | G.W.T. (earthq.): | 13.00 ft | Fill height: | N/A | Limit depth applied: | Yes |
| Points to test: | Based on Ic value | Average results interval: | 3 | Fill weight: | N/A | Limit depth: | 17.50 ft |
| Earthquake magnitude $M_w$: | 6.80 | Ic cut-off value: | 2.60 | Trans. detect. applied: | Yes | MSF method: | Method based |
| Peak ground acceleration: | 1.05 | Unit weight calculation: | Based on SBT | $K_\sigma$ applied: | Yes | | |

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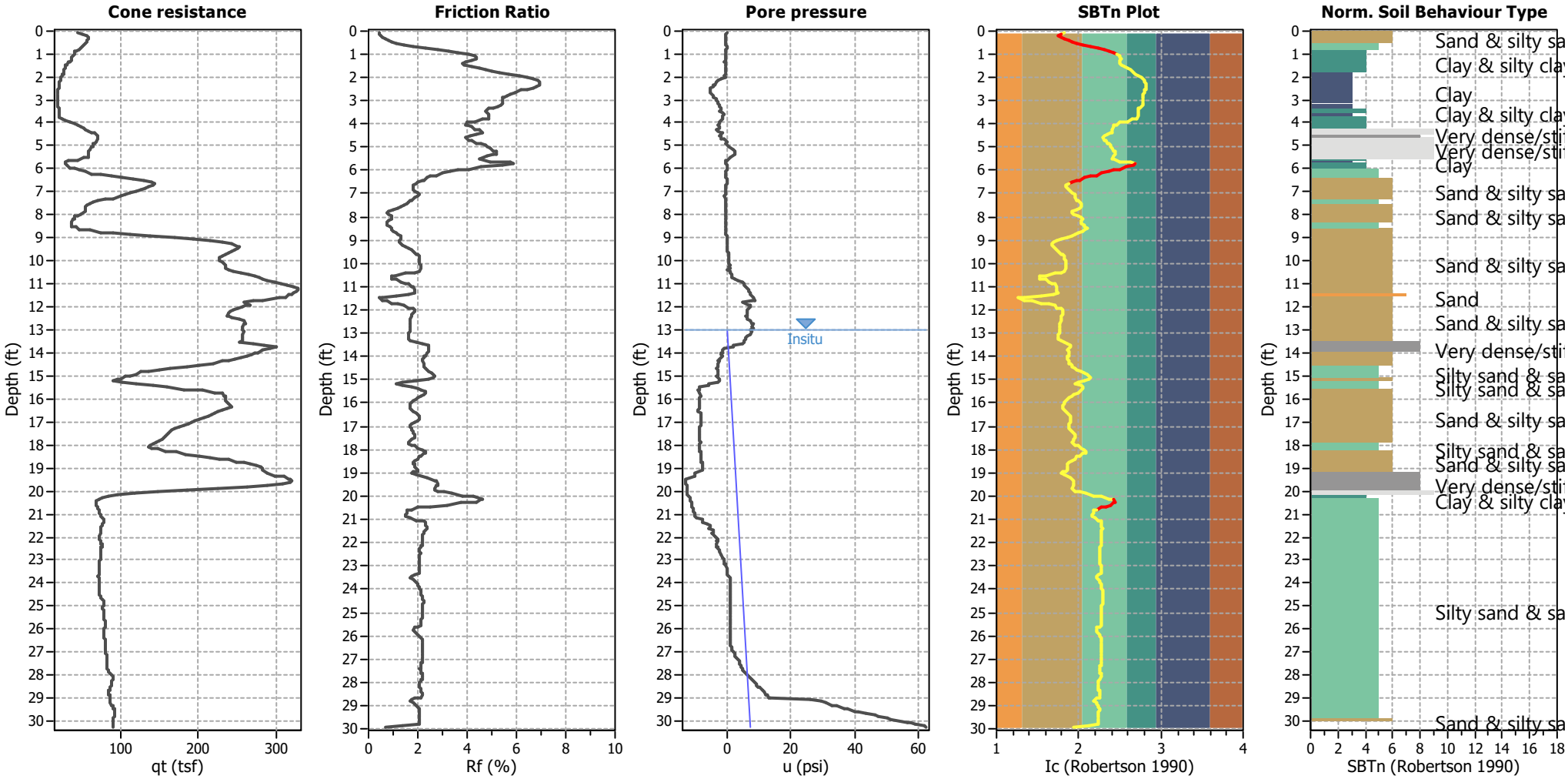
**Project:** 307035-001 KITP Housing Project
**Location:** Goleta, CA 93117

**CPT: CPT-23**
Total depth: 30.26 ft




| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Analysis method: | NCEER (1998) | G.W.T. (in-situ): | 13.00 ft | Use fill: | No | Clay like behavior applied: | Sands only |
| Fines correction method: | NCEER (1998) | G.W.T. (earthq.): | 13.00 ft | Fill height: | N/A | Limit depth applied: | Yes |
| Points to test: | Based on Ic value | Average results interval: | 3 | Fill weight: | N/A | Limit depth: | 17.50 ft |
| Earthquake magnitude $M_w$: | 6.80 | Ic cut-off value: | 2.60 | Trans. detect. applied: | Yes | MSF method: | Method based |
| Peak ground acceleration: | 1.05 | Unit weight calculation: | Based on SBT | $K_\sigma$ applied: | Yes | | |

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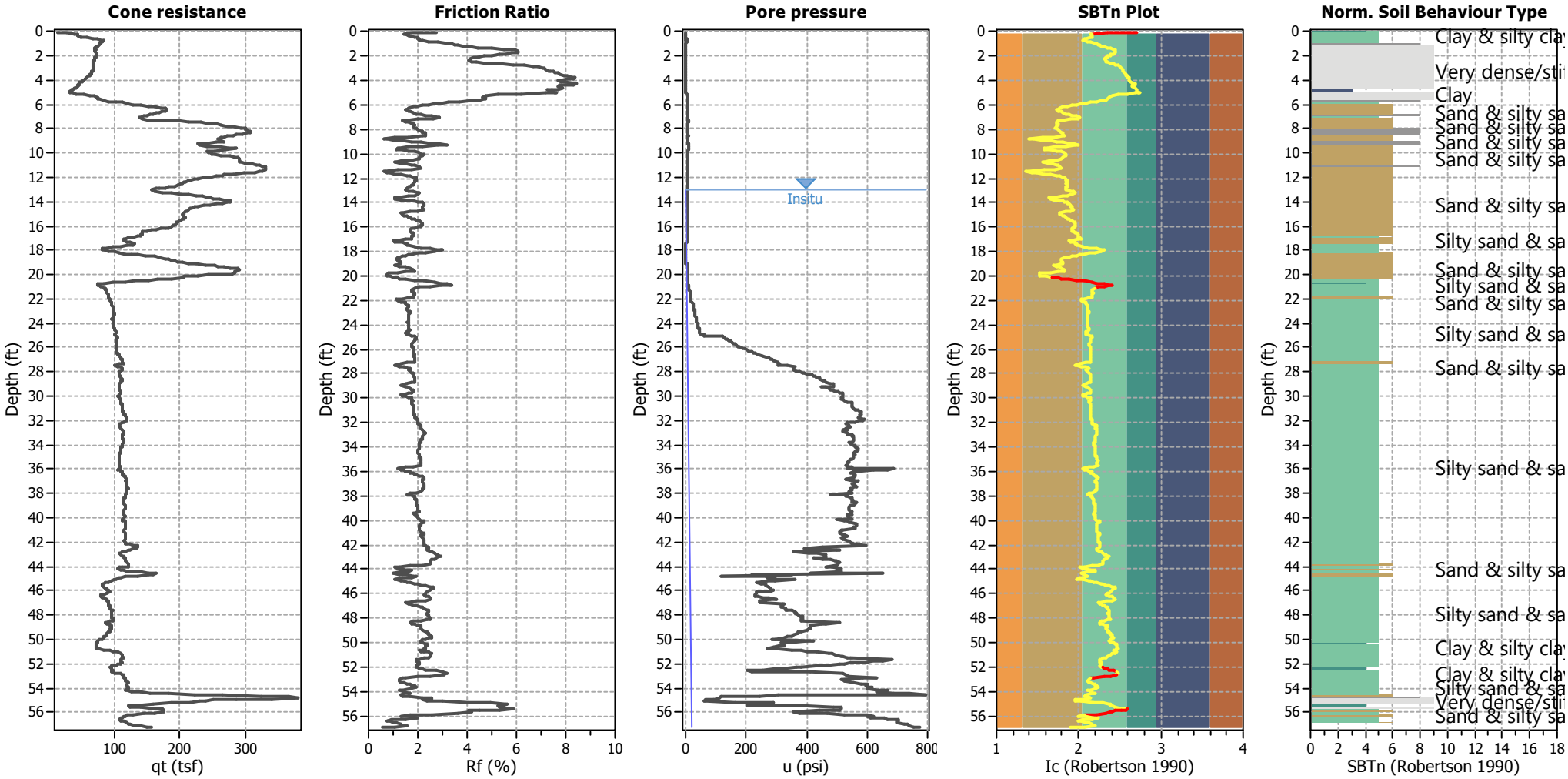
**Project:** 307035-001 KITP Housing Project
**Location:** Goleta, CA 93117

**CPT: CPT-24**
Total depth: 57.23 ft




| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Analysis method: | NCEER (1998) | G.W.T. (in-situ): | 13.00 ft | Use fill: | No | Clay like behavior applied: | Sands only |
| Fines correction method: | NCEER (1998) | G.W.T. (earthq.): | 13.00 ft | Fill height: | N/A | Limit depth applied: | Yes |
| Points to test: | Based on Ic value | Average results interval: | 3 | Fill weight: | N/A | Limit depth: | 17.50 ft |
| Earthquake magnitude $M_w$: | 6.80 | Ic cut-off value: | 2.60 | Trans. detect. applied: | Yes | MSF method: | Method based |
| Peak ground acceleration: | 1.05 | Unit weight calculation: | Based on SBT | $K_\sigma$ applied: | Yes | | |

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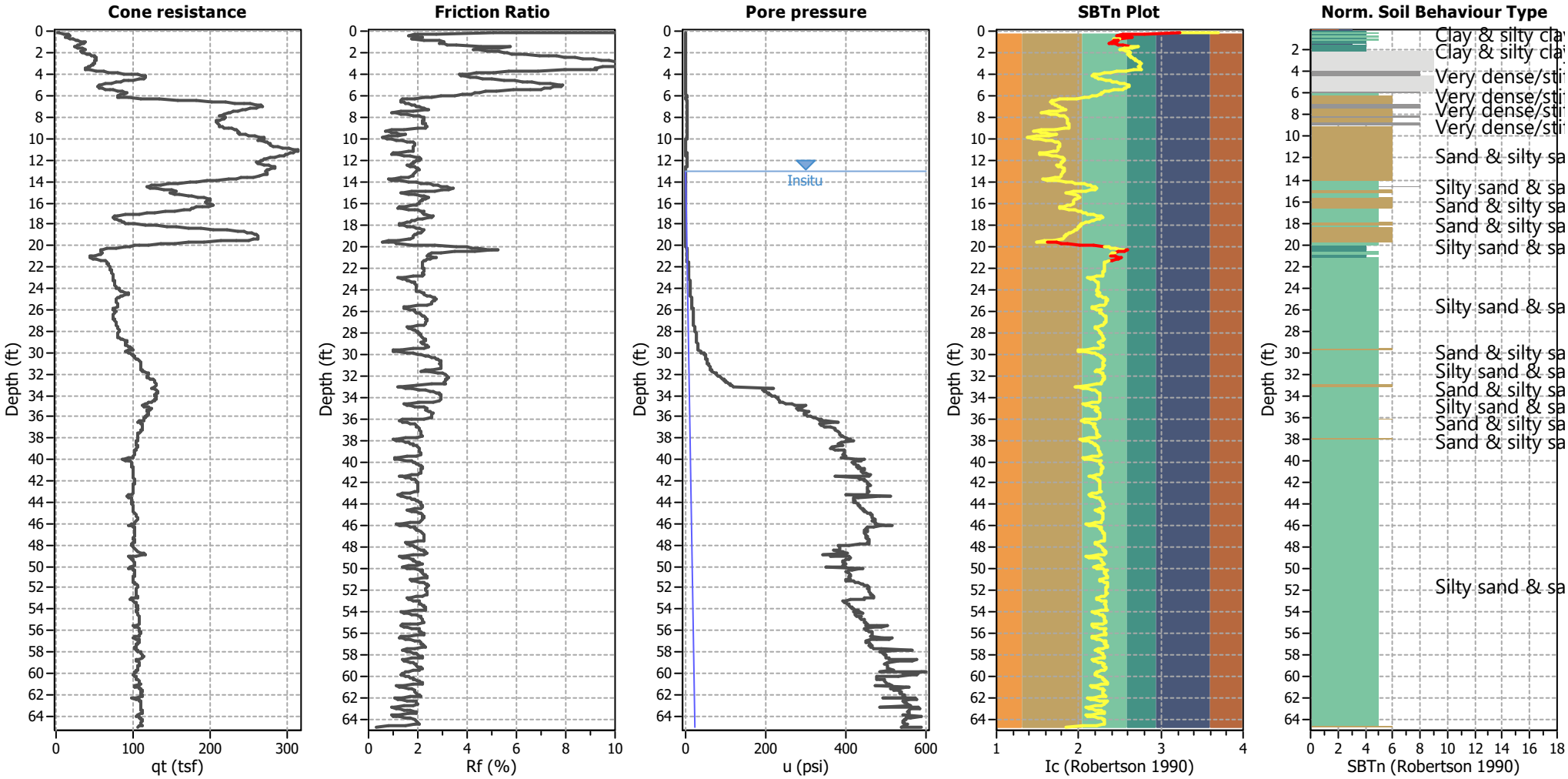
**Project:** 307035-001 KITP Housing Project
**Location:** Goleta, CA 93117

**CPT: CPT-25**
Total depth: 65.03 ft




| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Analysis method: | NCEER (1998) | G.W.T. (in-situ): | 13.00 ft | Use fill: | No | Clay like behavior applied: | Sands only |
| Fines correction method: | NCEER (1998) | G.W.T. (earthq.): | 13.00 ft | Fill height: | N/A | Limit depth applied: | Yes |
| Points to test: | Based on Ic value | Average results interval: | 3 | Fill weight: | N/A | Limit depth: | 17.50 ft |
| Earthquake magnitude $M_w$: | 6.80 | Ic cut-off value: | 2.60 | Trans. detect. applied: | Yes | MSF method: | Method based |
| Peak ground acceleration: | 1.05 | Unit weight calculation: | Based on SBT | $K_\sigma$ applied: | Yes | | |

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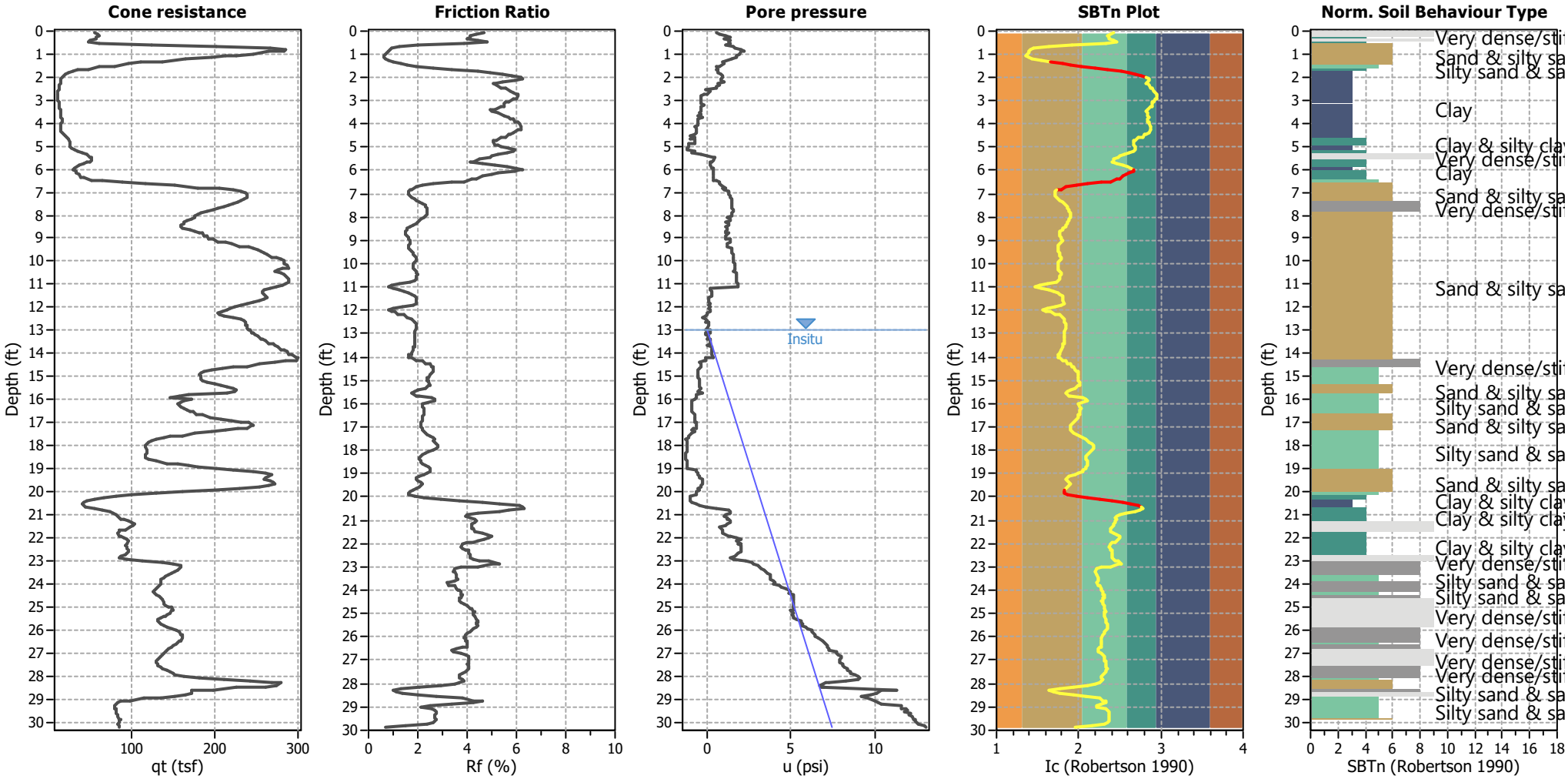
**Project:** 307035-001 KITP Housing Project
**Location:** Goleta, CA 93117

**CPT: CPT-26**
Total depth: 30.19 ft




| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Analysis method: | NCEER (1998) | G.W.T. (in-situ): | 13.00 ft | Use fill: | No | Clay like behavior applied: | Sands only |
| Fines correction method: | NCEER (1998) | G.W.T. (earthq.): | 13.00 ft | Fill height: | N/A | Limit depth applied: | Yes |
| Points to test: | Based on Ic value | Average results interval: | 3 | Fill weight: | N/A | Limit depth: | 17.50 ft |
| Earthquake magnitude $M_w$: | 6.80 | Ic cut-off value: | 2.60 | Trans. detect. applied: | Yes | MSF method: | Method based |
| Peak ground acceleration: | 1.05 | Unit weight calculation: | Based on SBT | $K_\sigma$ applied: | Yes | | |

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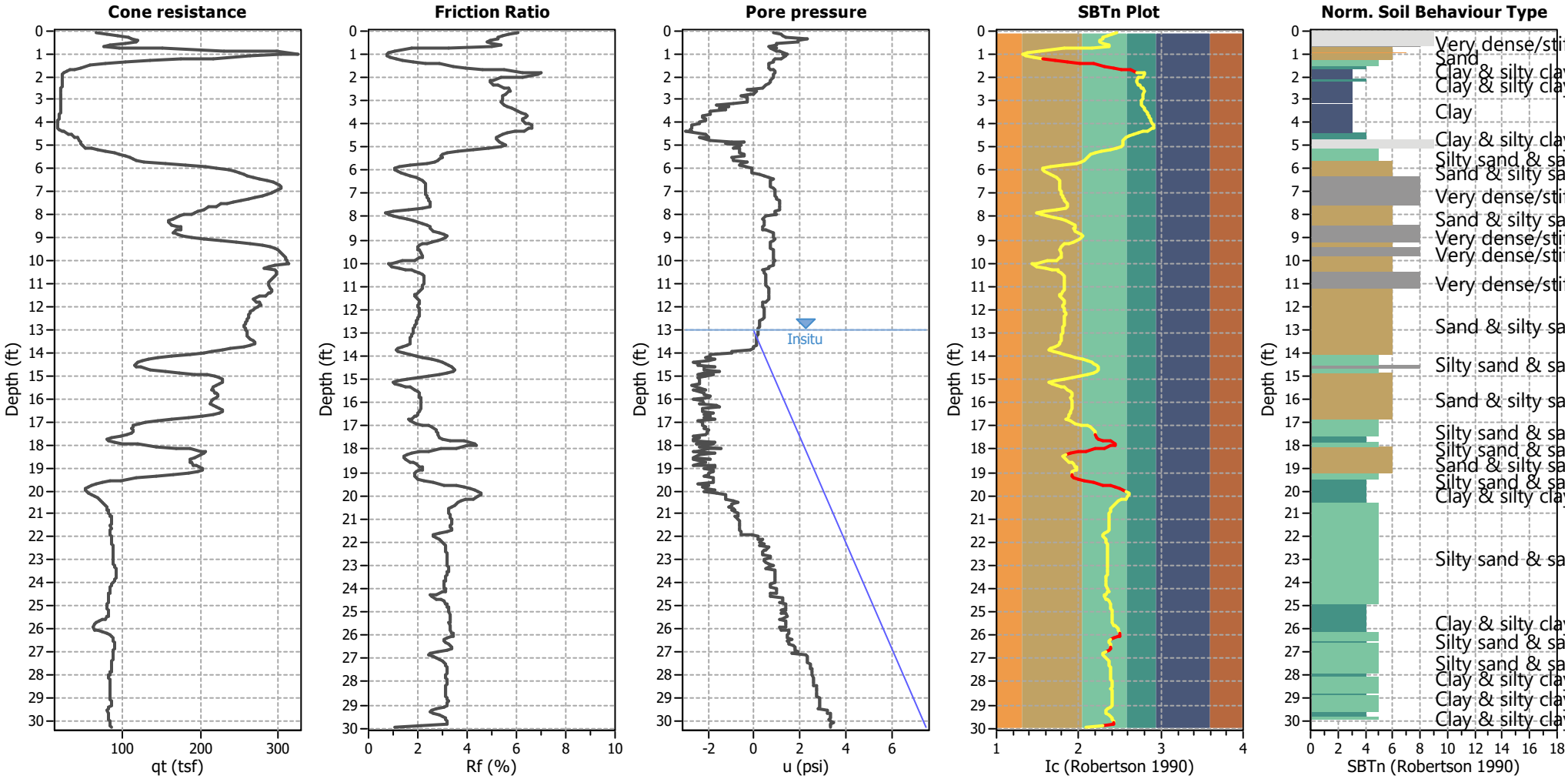
**Project:** 307035-001 KITP Housing Project
**Location:** Goleta, CA 93117

**CPT: CPT-27**
Total depth: 30.27 ft




| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Analysis method: | NCEER (1998) | G.W.T. (in-situ): | 13.00 ft | Use fill: | No | Clay like behavior applied: | Sands only |
| Fines correction method: | NCEER (1998) | G.W.T. (earthq.): | 13.00 ft | Fill height: | N/A | Limit depth applied: | Yes |
| Points to test: | Based on Ic value | Average results interval: | 3 | Fill weight: | N/A | Limit depth: | 17.50 ft |
| Earthquake magnitude $M_w$: | 6.80 | Ic cut-off value: | 2.60 | Trans. detect. applied: | Yes | MSF method: | Method based |
| Peak ground acceleration: | 1.05 | Unit weight calculation: | Based on SBT | $K_\sigma$ applied: | Yes | | |

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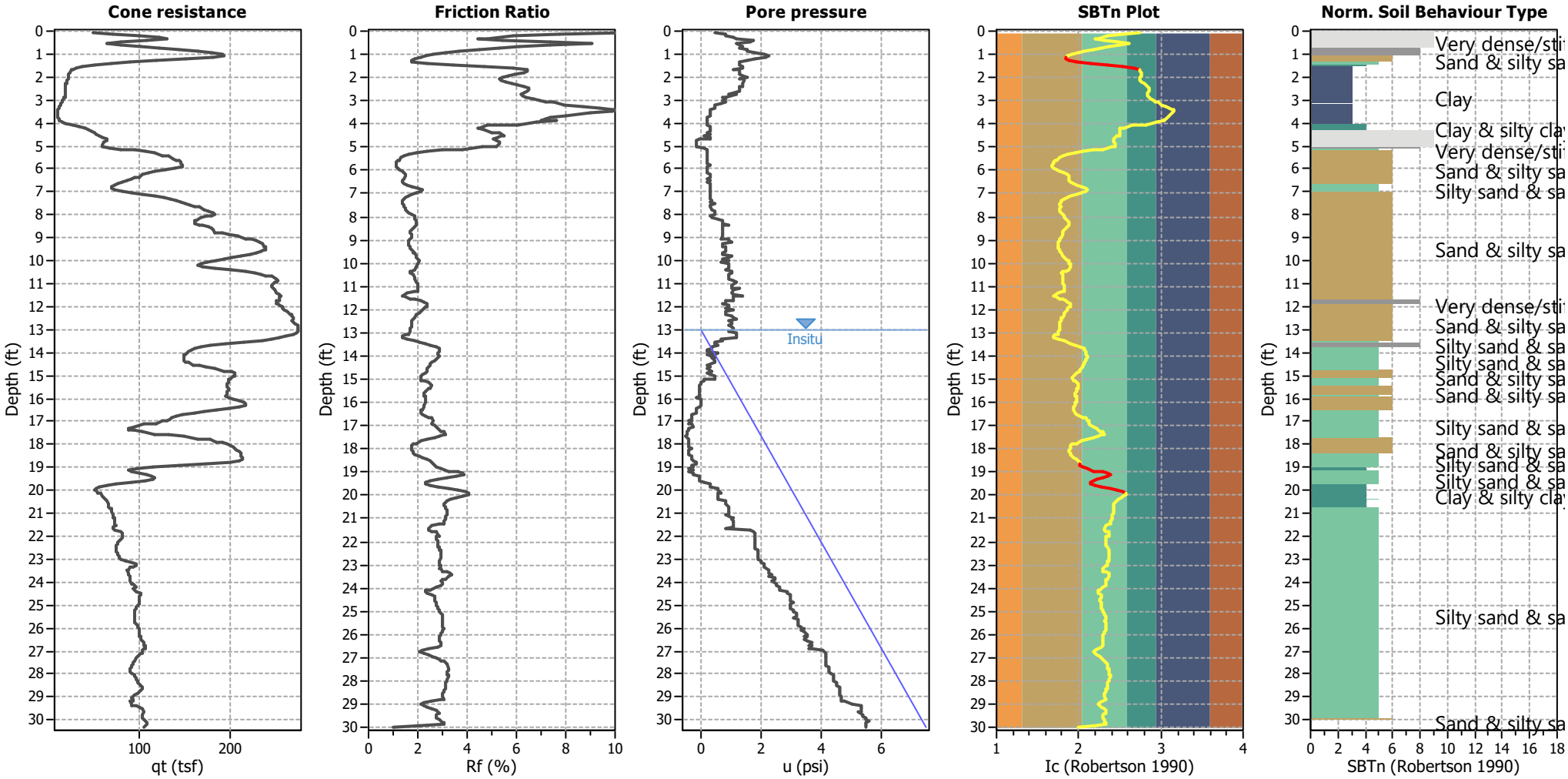
**Project:** 307035-001 KITP Housing Project
**Location:** Goleta, CA 93117

**CPT: CPT-28**
Total depth: 30.32 ft




| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Analysis method: | NCEER (1998) | G.W.T. (in-situ): | 13.00 ft | Use fill: | No | Clay like behavior applied: | Sands only |
| Fines correction method: | NCEER (1998) | G.W.T. (earthq.): | 13.00 ft | Fill height: | N/A | Limit depth applied: | Yes |
| Points to test: | Based on Ic value | Average results interval: | 3 | Fill weight: | N/A | Limit depth: | 17.50 ft |
| Earthquake magnitude $M_w$: | 6.80 | Ic cut-off value: | 2.60 | Trans. detect. applied: | Yes | MSF method: | Method based |
| Peak ground acceleration: | 1.05 | Unit weight calculation: | Based on SBT | $K_\sigma$ applied: | Yes | | |

# BORING LOG SYMBOLS


Modified California Split Barrel Sampler


Modified California Split Barrel Sampler - No Recovery


Standard Penetration Test (SPT) Sampler


Standard Penetration Test (SPT) Sampler - No Recovery


Perched Water Level


Water Level First Encountered


Water Level After Drilling


Pocket Penetrometer (tsf)


Vane Shear (ksf)

1. The location of borings were approximately determined by pacing and/or siting from visible features. Elevations of borings are approximately determined by interpolating between plan contours. The location and elevation of the borings should be considered.

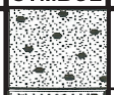
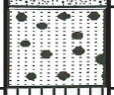
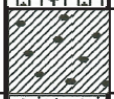
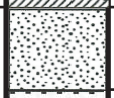
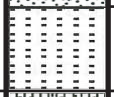
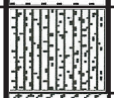
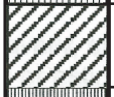
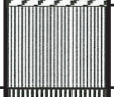
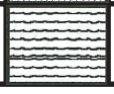
2. The stratification lines represent the approximate boundary between soil types and the transition may be gradual.

3. Water level readings have been made in the drill holes at times and under conditions stated on the boring logs. This data has been reviewed and interpretations made in the text of this report. However, it must be noted that fluctuations in the level of the groundwater may occur due to variations in rainfall, tides, temperature, and other factors at the time measurements were made.

**BORING LOG SYMBOLS**

Earth Systems

# UNIFIED SOIL CLASSIFICATION SYSTEM

| MAJOR DIVISIONS | | | GRAPH SYMBOL | LETTER SYMBOL | TYPICAL DESCRIPTIONS |
|---|---|---|---|---|---|
| COARSE GRAINED SOILS<br>MORE THAN 50% OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE | GRAVEL AND GRAVELLY SOILS<br>MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE | CLEAN GRAVELS (LITTLE OR NO FINES) |  | GW | WELL-GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES |
| | | |  | GP | POORLY-GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES |
| | | GRAVELS WITH FINES (APPRECIABLE AMOUNT OF FINES) |  | GM | SILTY GRAVELS, GRAVEL-SAND-SILT MIXTURES |
| | | |  | GC | CLAYEY GRAVELS, GRAVEL-SAND-CLAY MIXTURES |
| | SAND AND SANDY SOILS<br>MORE THAN 50% OF COARSE FRACTION PASSING NO. 4 SIEVE | CLEAN SAND (LITTLE OR NO FINES) |  | SW | WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES |
| | | |  | SP | POORLY-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES |
| | | SANDS WITH FINES (APPRECIABLE AMOUNTOF FINES) |  | SM | SILTY SANDS, SAND-SILT MIXTURES |
| | | |  | SC | CLAYEY SANDS, SAND-CLAY MIXTURES |
| FINE GRAINED SOILS<br>MORE THAN 50% OF MATERIAL IS SMALLER THAN NO. 200 SIEVE SIZE | SILTS AND CLAYS | LIQUID LIMIT LESS THAN 50 |  | ML | INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY |
| | | |  | CL | INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS |
| | | |  | OL | ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY |
| | SILTS AND CLAYS | LIQUID LIMIT GREATER THAN 50 |  | MH | INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILTY SOILS |
| | | |  | CH | INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS |
| | | |  | OH | ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS |
| HIGHLY ORGANIC SOILS | | |  | PT | PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENT |

NOTE: DUAL SYMBOLS ARE USED TO INDICATE BORDERLINE SOIL CLASSIFICATIONS

**UNIFIED SOIL CLASSIFICATION SYSTEM**

Earth Systems

**APPENDIX B**

Laboratory Testing
Tabulated Laboratory Test Results
Individual Laboratory Test Results

## LABORATORY TESTING

A. Samples were reviewed along with field logs to determine which would be analyzed further. Those chosen for laboratory analyses were considered representative of soils that would be exposed and/or used during grading, and those deemed to be within the influence of proposed construction. Test results are presented in graphic and tabular form in this Appendix.

B. In-situ moisture content and dry unit weight for the ring samples were determined in general accordance with ASTM D 2937.

C. Maximum density tests were performed to estimate the moisture-density relationship of typical soil materials. The tests were performed in accordance with ASTM D 1557.

D. The relative strength characteristics of soils were determined from the results of direct shear tests on two remolded samples. Test specimens were placed in contact with water at least 24 hours before testing, and then sheared under normal loads ranging from 1 to 3 ksf in general accordance with ASTM D 3080.

E. Settlement characteristics were developed from the results of one-dimensional consolidation/hydrocollapse tests performed in general accordance with ASTM D 2435. The samples were incrementally loaded to their approximate overburden pressure and then flooded with water. After monitoring for collapse, the samples were incrementally loaded up to 8 ksf. The samples were allowed to consolidate under each load increment. Rebound was measured under reverse alternate loading. Compression was measured by dial gauges accurate to 0.0001 inch. Results of the consolidation tests are presented in this Appendix in the form of percent consolidation versus log of pressure curves.

F. Expansion index tests were performed on bulk soil samples in accordance with ASTM D 4829. The samples were surcharged under 144 pounds per square foot at moisture content of near 50 percent saturation. Samples were then submerged in water for 24 hours and the amount of expansion was recorded with a dial indicator.

G. The gradation characteristics of certain samples were evaluated by hydrometer (in accordance with ASTM D 7928) and sieve analysis procedures. The samples were soaked in water until individual soil particles were separated, then washed on the No. 200 mesh sieve, oven dried, weighed to calculate the percent passing the No. 200 sieve, and mechanically sieved. Additionally, hydrometer analyses were performed to assess the distribution of the particles that passed the No. 200 screen. The hydrometer portions of the tests were run using sodium hexametaphosphate as a dispersing agent.

## LABORATORY TESTING (Continued)

H. Resistance ("R") Value tests were conducted on bulk samples secured during the field study. The tests were performed in accordance with California Method 301. Three specimens at different moisture contents were tested for each sample, and the R-Value at 300 psi exudation pressure was determined from the plotted results.

I. Portions of the bulk samples were sent to another laboratory for analyses of soil pH, resistivity, chloride contents, and sulfate contents. Soluble chloride and sulfate contents were determined on a dry weight basis. Resistivity testing was performed in accordance with California Test Method 424, wherein the ratio of soil to water was 1:3.

J. The plasticity indices of selected samples were evaluated in accordance with ASTM D 4318.

**TABULATED LABORATORY TEST RESULTS**

REMOLDED BULK SAMPLES

| BORING AND DEPTH | B-2@0'-5' | B-3@0'-5' | B-4@0'-5' | B-5@0'-5' |
|---|---|---|---|---|
| USCS | CL | CL | CL | CL |
| MAXIMUM DRY DENSITY (pcf) | -- | 116 | -- | 112 |
| OPTIMUM MOISTURE (%) | -- | 12 | -- | 13.5 |
| PEAK COHESION (psf) | -- | 620 | -- | 260 |
| PEAK FRICTION ANGLE | -- | 19° | -- | 24° |
| ULTIMATE COHESION (psf) | -- | 540 | -- | 180 |
| ULTIMATE FRICTION ANGLE | -- | 20° | -- | 24° |
| EXPANSION INDEX | -- | 98 | -- | 85 |
| R-VALUE | 26 | -- | 24 | -- |
| pH | -- | 8.3 | -- | 8.8 |
| RESISTIVITY (ohms-cm) | -- | 920 | -- | 2,200 |
| SOLUBLE CHLORIDES (mg/Kg) | -- | 550 | -- | 53 |
| SOLUBLE SULFATES (mg/Kg) | -- | 440 | -- | 220 |

*Corrected for Oversized Material (ASTM D4718)

GRADATION AND ATTERBERG LIMITS

| BORING AND DEPTH | B-3@25' | B-5@25' |
|---|---|---|
| USCS | ML | ML |
| GRAIN SIZE DISTRIBUTION (%) | | |
| GRAVEL | 0.0 | 0.0 |
| SAND | 20.5 | 27.0 |
| SILT | 49.9 | 55.0 |
| CLAY (2μm to 5μm) | 11.4 | 7.0 |
| CLAY (≤2μm) | 18.2 | 11.0 |
| LIQUID LIMIT | 34 | 28 |
| PLASTIC LIMIT | 27 | 25 |
| PLASTICITY INDEX | 7 | 3 |

Individual Laboratory Test Results

File Number: 307035-001 Lab Number: 098804

## MAXIMUM DENSITY / OPTIMUM MOISTURE

ASTM D 1557-12 (Modified)

Job Name: KITP Housing Project
Sample ID: B 3 @ 0-5'

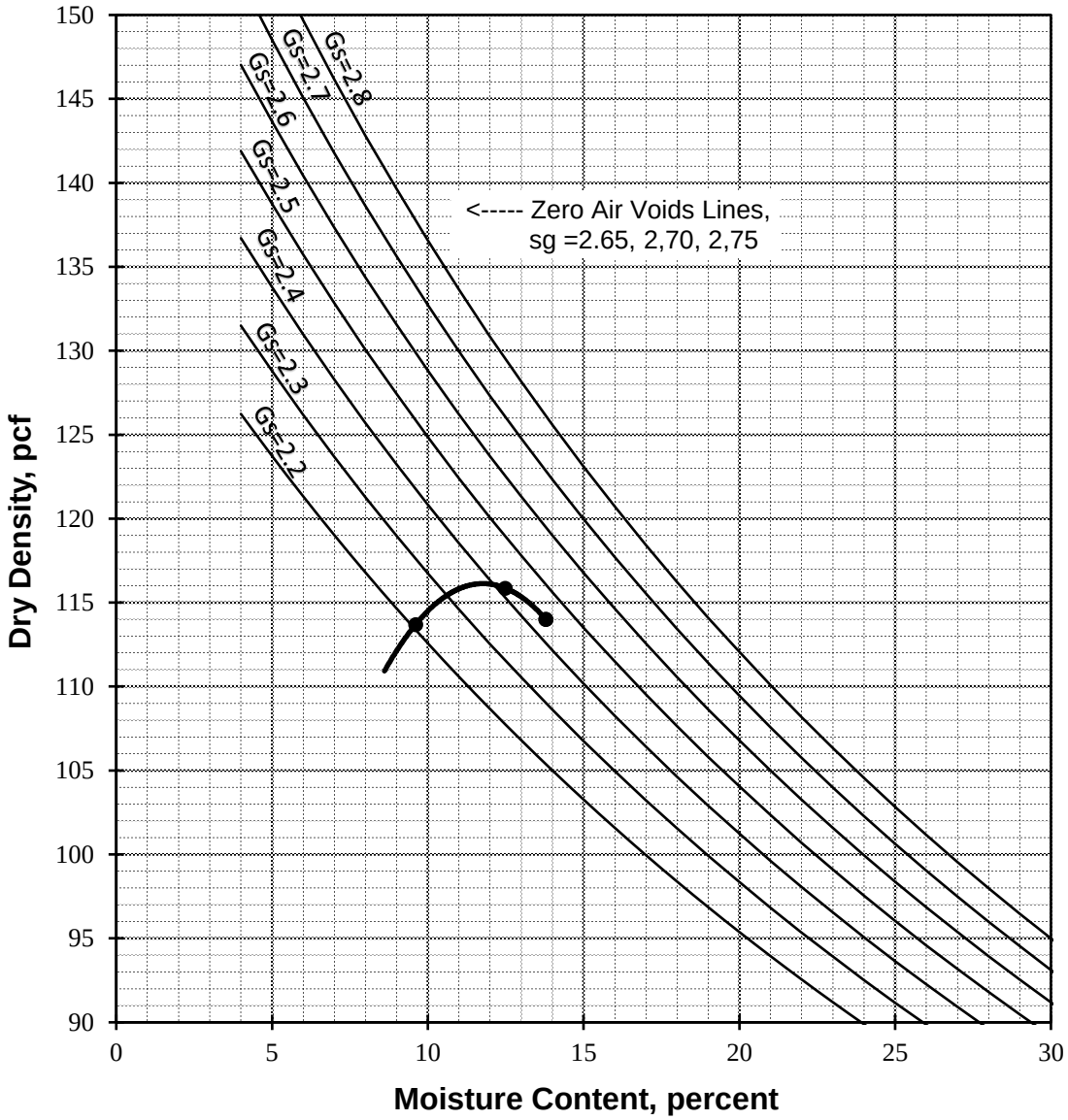
Procedure Used: A
Prep. Method: Moist

Date: 3/5/2025
Description: Silty Clay

Rammer Type: Automatic

**Maximum Density:** **116 pcf**
**Optimum Moisture:** **12%**

| Sieve Size | % Retained |
|---|---|
| 3/4" | 0.0 |
| 3/8" | 0.0 |
| #4 | 0.3 |



File Number: 307035-001 Lab Number: 098804

## MAXIMUM DENSITY / OPTIMUM MOISTURE

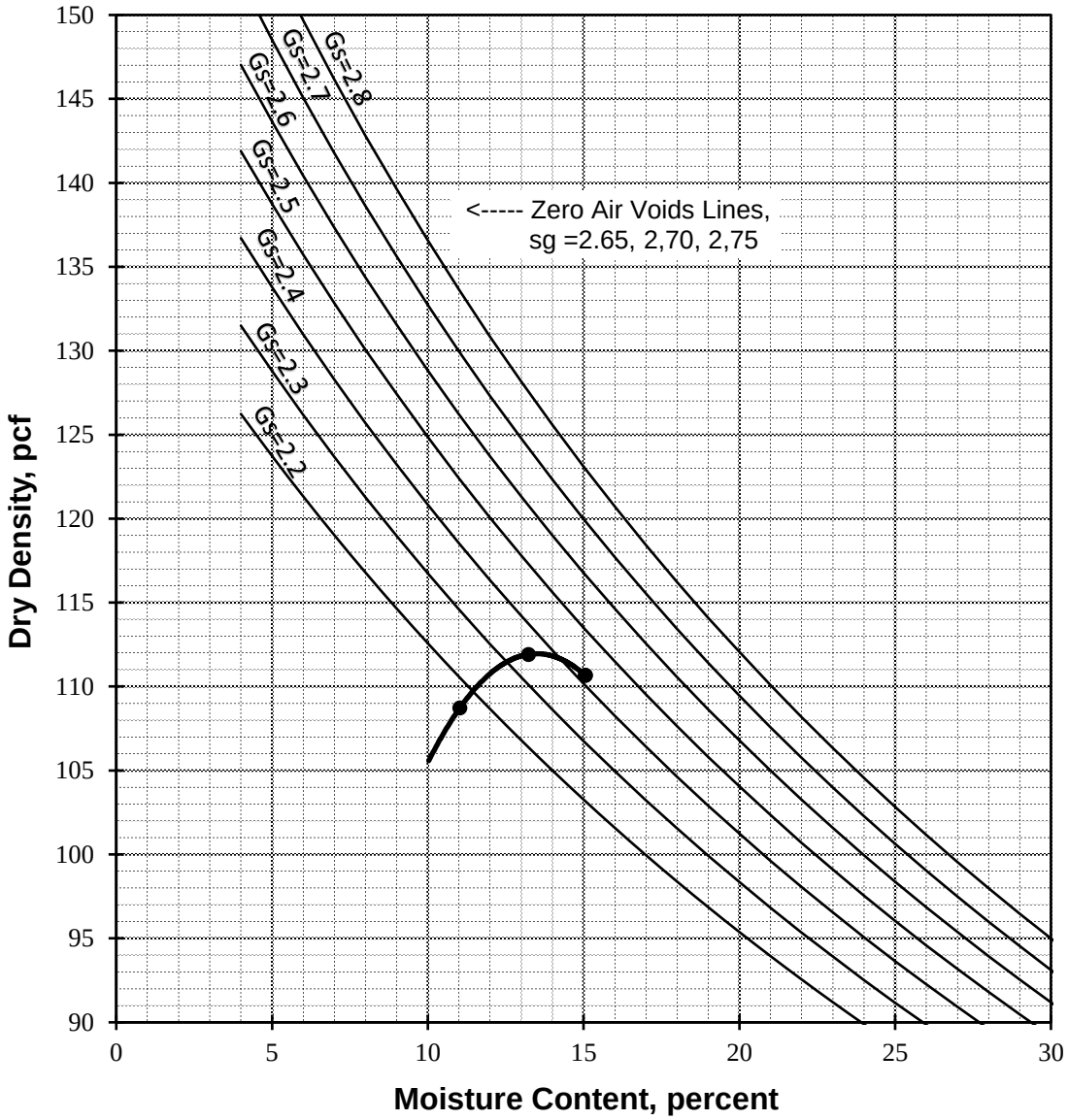
ASTM D 1557-12 (Modified)

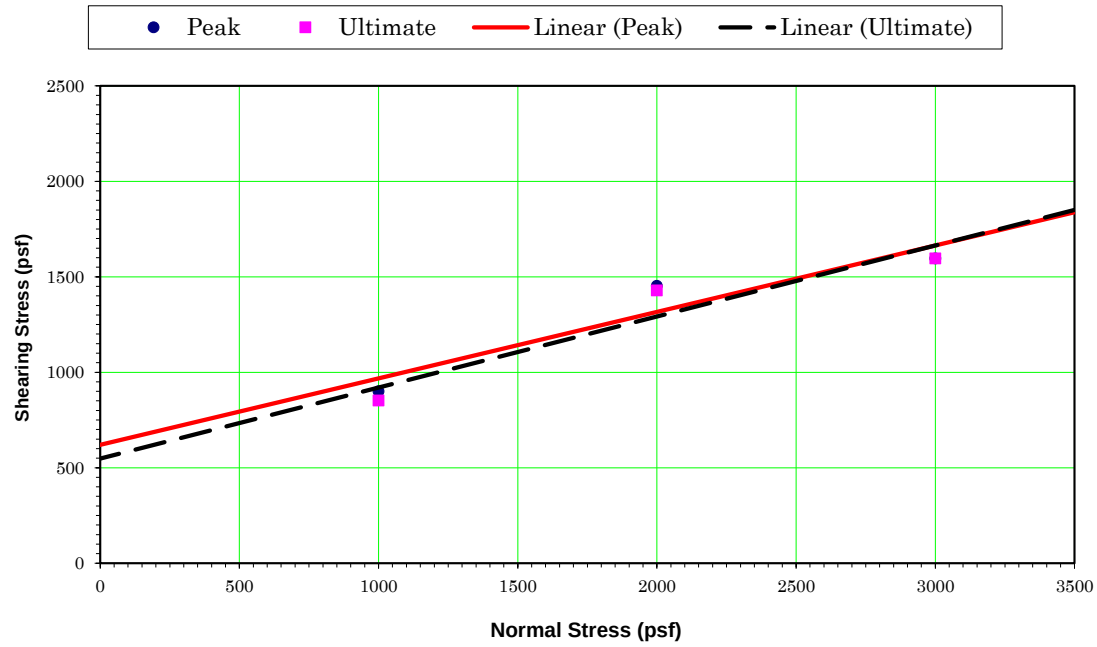
Job Name: KITP Housing Project
Sample ID: B 5 @ 0-5'
Date: 3/12/2025
Description: Silty Clay

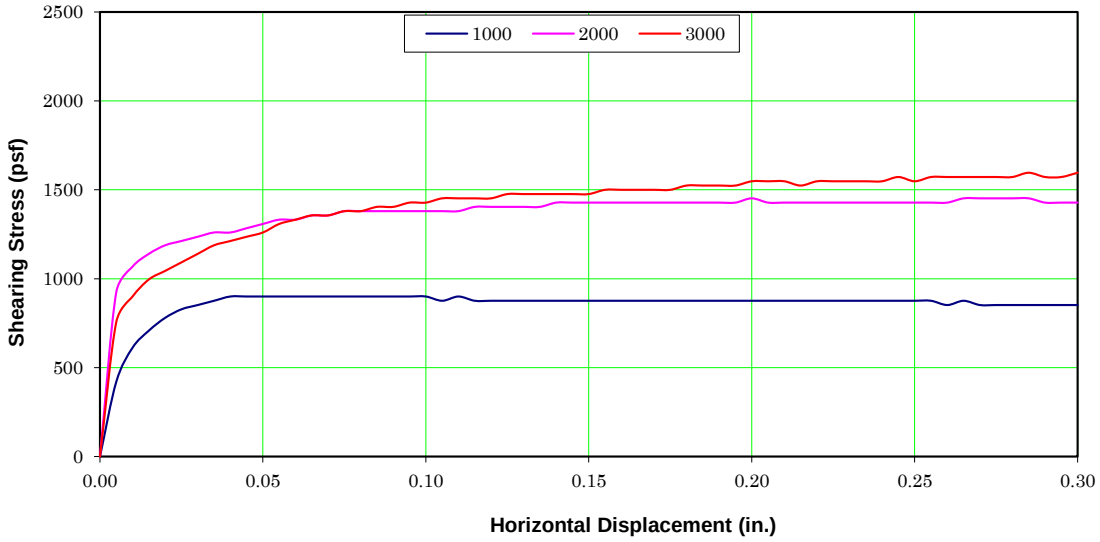
Procedure Used: A
Prep. Method: Moist
Rammer Type: Automatic

**Maximum Density:** **112 pcf**
**Optimum Moisture:** **13.5%**

| Sieve Size | % Retained |
|---|---|
| 3/4" | 0.0 |
| 3/8" | 0.0 |
| #4 | 0.3 |






## DIRECT SHEAR DATA*

Sample Location: B 3 @ 0-5'
Sample Description: CL
Dry Density (pcf): 103.8
Intial % Moisture: 11.8
Average Degree of Saturation: 100.0
Shear Rate (in/min): 0.0015 in/min

**Note**: Sample specimens were initially saturated before testing by partially immersing the specimens in water for about 24 hours while the specimens were restrained from swelling. Initial saturation was not performed in the direct shear machine, and is not prescribed by ASTM D 3080.

| Normal stress (psf) | 1000 | 2000 | 3000 |
|---|---|---|---|
| Peak stress (psf) | 900 | 1452 | 1596 |
| Ultimate stress (psf) | 852 | 1428 | 1596 |

| | Peak | Ultimate |
|---|---|---|
| $\phi$ Angle of Friction (degrees): | 19 | 20 |
| c Cohesive Strength (psf): | 620 | 540 |

Test Type: Peak & Ultimate

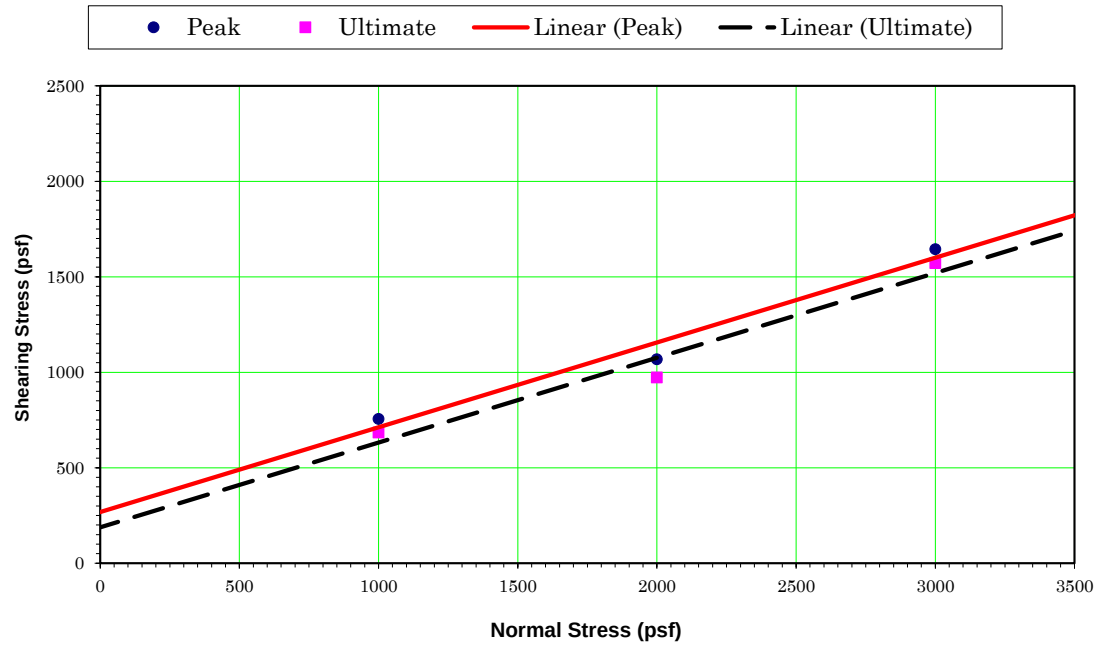
* Test Method: ASTM D-3080

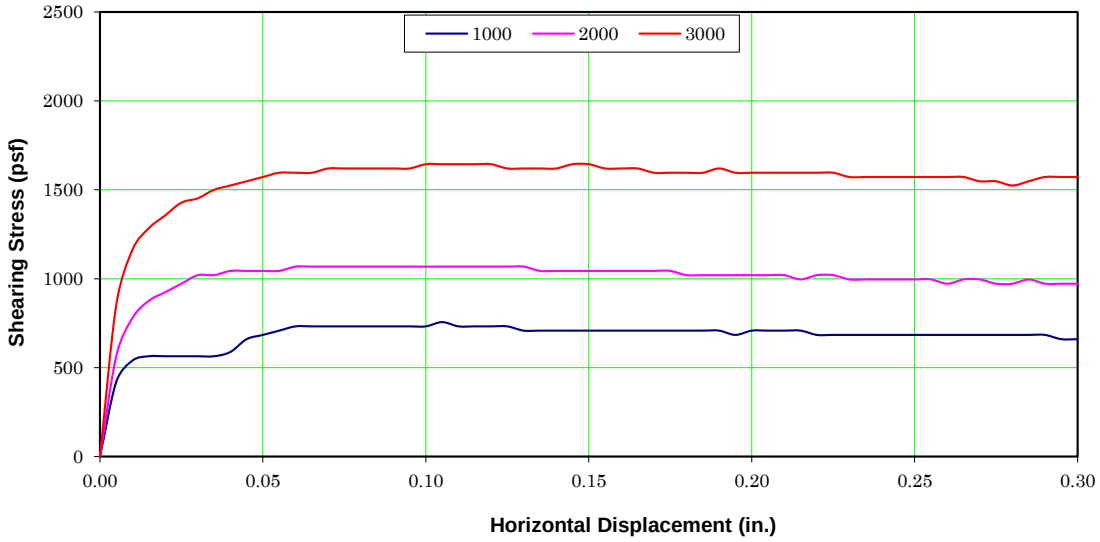
DIRECT SHEAR TEST

**KITP Housing Project**

**Earth Systems**

| 3/20/2025 | 307035-001 |
|---|---|




## DIRECT SHEAR DATA*

Sample Location: B 5 @ 0-5'
Sample Description: CL
Dry Density (pcf): 100.2
Intial % Moisture: 13.5
Average Degree of Saturation: 100.0
Shear Rate (in/min): 0.0015 in/min

**Note**: Sample specimens were initially saturated before testing by partially immersing the specimens in water for about 24 hours while the specimens were restrained from swelling. Initial saturation was not performed in the direct shear machine, and is not prescribed by ASTM D 3080.

| Normal stress (psf) | 1000 | 2000 | 3000 |
|---|---|---|---|
| Peak stress (psf) | 756 | 1068 | 1644 |
| Ultimate stress (psf) | 684 | 972 | 1572 |

| | Peak | Ultimate |
|---|---|---|
| $\phi$ Angle of Friction (degrees): | 24 | 24 |
| c Cohesive Strength (psf): | 260 | 180 |

Test Type: Peak & Ultimate

* Test Method: ASTM D-3080

DIRECT SHEAR TEST

**KITP Housing Project**

**Earth Systems**

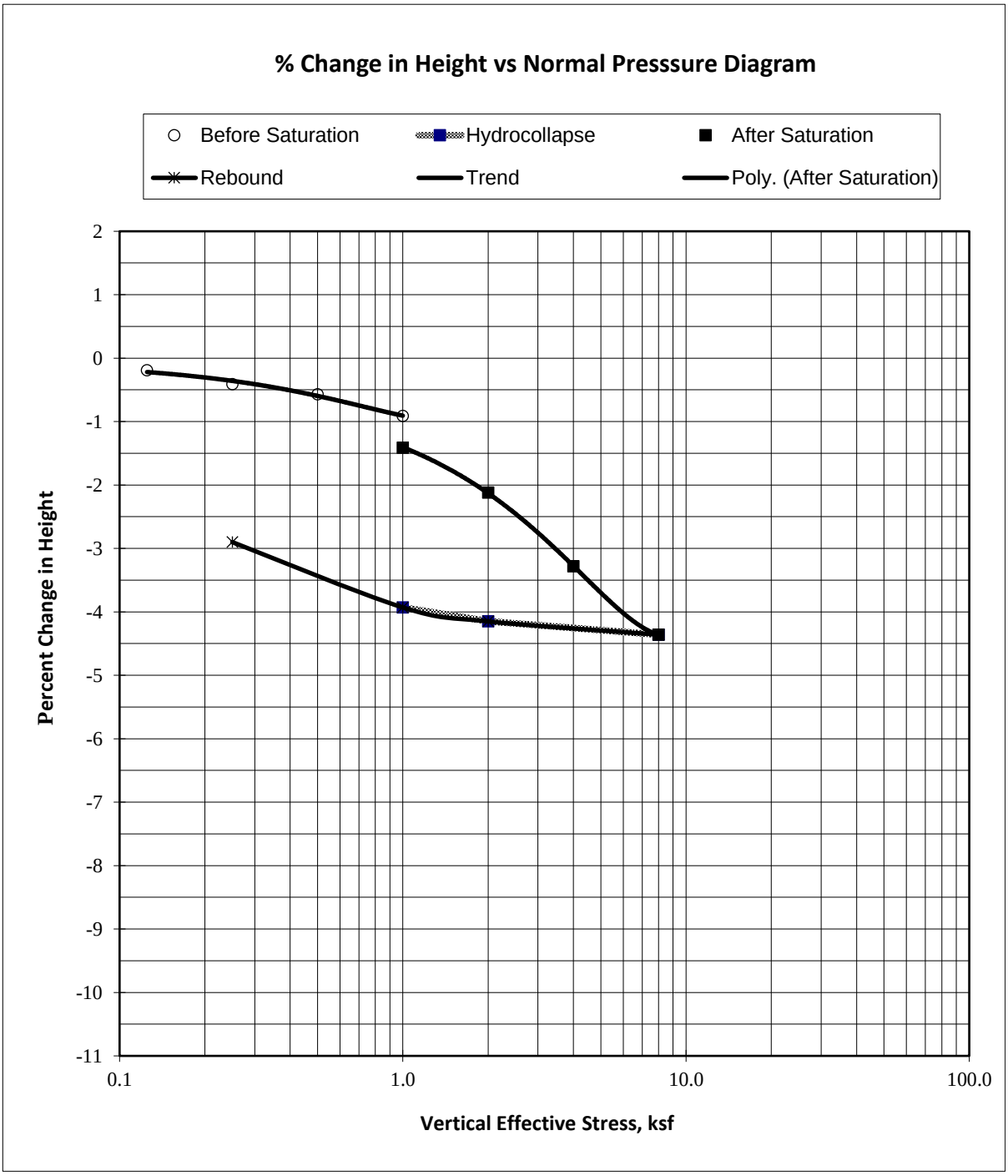
3/20/2025 | 307035-001

## CONSOLIDATION TEST

ASTM D 2435-90 & D5333

KITP Housing Project
B 2 @ 5'
SM
Ring Sample

Initial Dry Density: 103.0 pcf
Initial Moisture, %: 18.6%
Specific Gravity: 2.67 (assume
Initial Void Ratio: 0.618

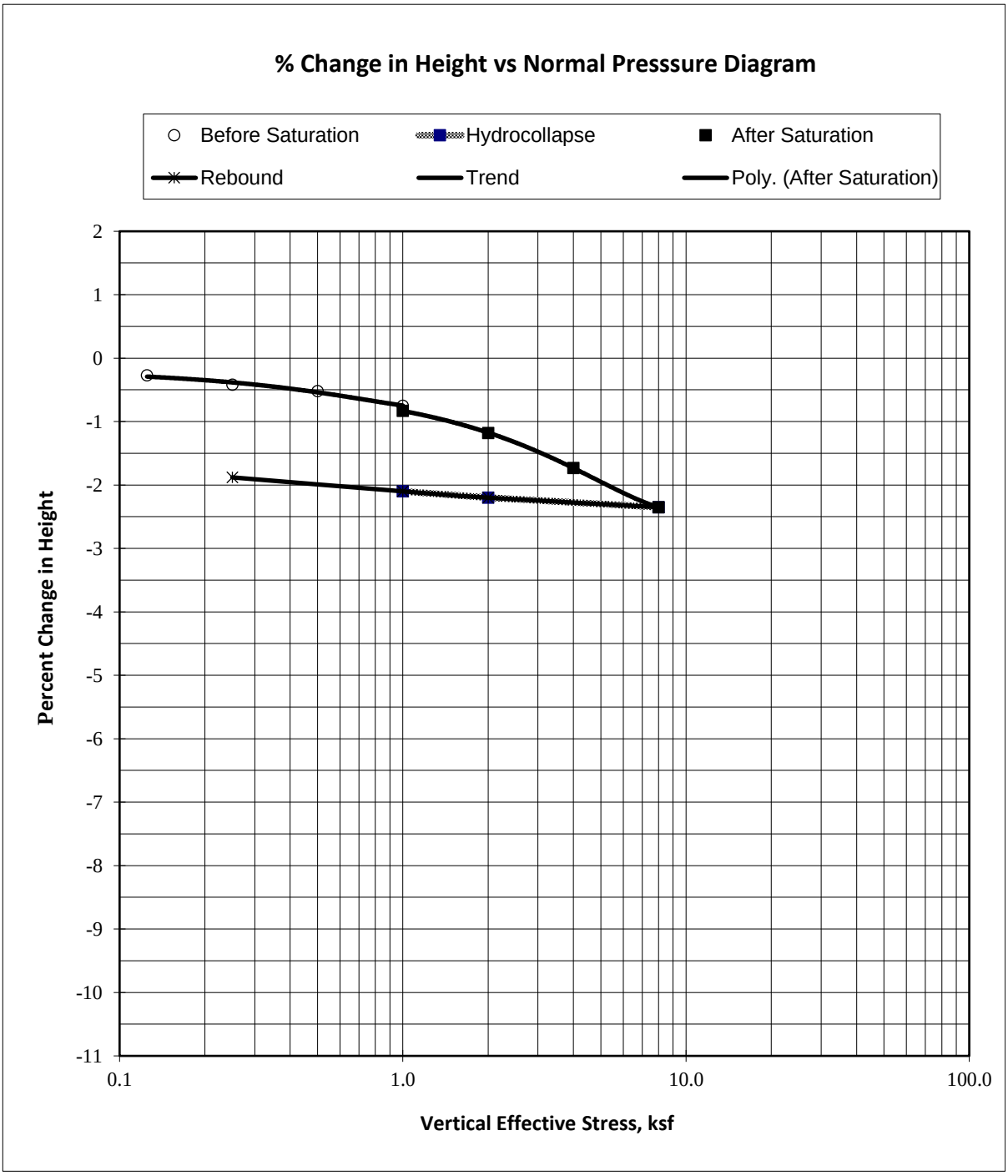


## CONSOLIDATION TEST

ASTM D 2435-90

KITP Housing Project
B 2 @ 15'
SM
Ring Sample

Initial Dry Density: 89.2 pcf
Initial Moisture, %: 30.9%
Specific Gravity: 2.67 (assume
Initial Void Ratio: 0.870

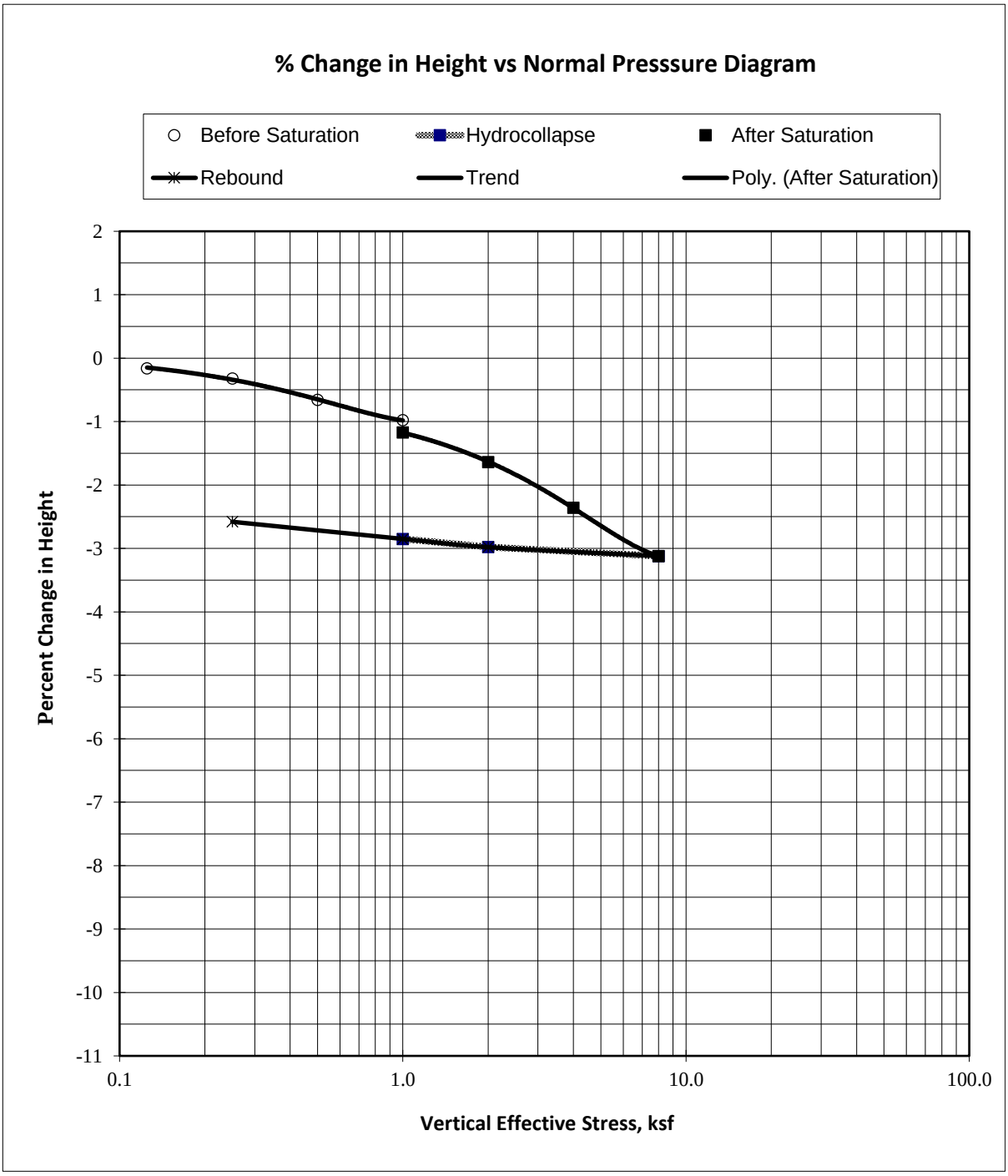


## CONSOLIDATION TEST

ASTM D 2435-90 & D5333

KITP Housing Project
B 6 @ 15'
SM
Ring Sample

Initial Dry Density: 91.1 pcf
Initial Moisture, %: 29.8%
Specific Gravity: 2.67 (assume
Initial Void Ratio: 0.831



File No.: 307035-001

## EXPANSION INDEX

ASTM D-4829, UBC 18-2

Job Name: KITP Housing Project
Sample ID: B 3 @ 0-5'
Soil Description: CL

| | |
|---|---|
| Initial Moisture, %: | 10.3 |
| Initial Compacted Dry Density, pcf: | 109.0 |
| Initial Saturation, %: | 51 |
| Final Moisture, %: | 21.4 |
| Volumetric Swell, %: | 9.8 |
| **Expansion Index:** | **98** **High** |

| EI | UBC Classification |
|---|---|
| 0-20 | Very Low |
| 21-50 | Low |
| 51-90 | Medium |
| 91-130 | High |
| 130+ | Very High |

File No.: 307035-001

## EXPANSION INDEX

ASTM D-4829, UBC 18-2

Job Name: KITP Housing Project
Sample ID: B 5 @ 0-5'
Soil Description: CL

| | |
|---|---|
| Initial Moisture, %: | 13.0 |
| Initial Compacted Dry Density, pcf: | 100.3 |
| Initial Saturation, %: | 52 |
| Final Moisture, %: | 28.4 |
| Volumetric Swell, %: | 8.5 |
| **Expansion Index:** | **85** **Medium** |

| EI | UBC Classification |
|---|---|
| 0-20 | Very Low |
| 21-50 | Low |
| 51-90 | Medium |
| 91-130 | High |
| 130+ | Very High |

# MECHANICAL ANALYSIS

CTM 203-08

Job Name: KITP Housing Project
Job No.: 307035-001
Sample ID: **B 3 @ 25'**
Soil Description: **ML**
Hydrometer ID: 504229

**Hydroscopic Moisture**

| | |
|---|---|
| Air Dry Wt, g: | 100.0 |
| Oven Dry Wt, g | 100.0 |
| % Moisture: | 0.0 |

| | |
|---|---|
| Air Dry Sample Wt., g: | 673.6 |
| Corrected Wt., g: | 673.6 |

**Sieve Analysis for +#10 Material**

| Sieve Size | Wt Ret | % Ret | % Passing |
|---|---|---|---|
| 1/2 inch | 0.0 | 0.00 | 100.00 |
| 3/8 inch | 0.0 | 0.00 | 100.00 |
| #4 | 0.0 | 0.00 | 100.00 |
| #8 | 0.0 | 0.00 | 100.00 |
| #10 | 0.0 | 0.00 | 100.00 |

| | |
|---|---|
| Air Dry Hydro Sample Wt., g: | 70.2 |
| Corrected Wt., g: | 70.2 |
| Calculation Factor | 0.7020 |

**Hydrometer Analysis for <#10 Material**

Start time: 8:30:00 AM

| Short Hydro | Time of Reading | Hydro Reading | Temp. at Reading, °C | Correction Factor | Corrected Hydro Reading |
|---|---|---|---|---|---|
| 20 sec | 8:30:20 AM | 61 | 18 | 5.2 | 55.8 |
| 1 hour | 9:30:00 AM | 26 | 18 | 5.2 | 20.8 |
| 6 hour | 2:30:00 PM | 18 | 18 | 5.2 | 12.8 |

| | |
|---|---|
| **% Gravel:** | 0.0 |
| **% Sand(2mm - 74µm):** | 20.5 |
| **% Silt(74µm- 5µm):** | 49.9 |
| **% Clay(5µm - 2µm):** | 11.4 |
| **% Clay(≤2µm):** | 18.2 |

# MECHANICAL ANALYSIS

CTM 203-08

Job Name: KITP Housing Project
Job No.: 307035-001
Sample ID: **B 5 @ 25'**
Soil Description: **ML**
Hydrometer ID: 504229

**Hydroscopic Moisture**

| | |
|---|---|
| Air Dry Wt, g: | 100.0 |
| Oven Dry Wt, g | 100.0 |
| % Moisture: | 0.0 |

| | |
|---|---|
| Air Dry Sample Wt., g: | 793.9 |
| Corrected Wt., g: | 793.9 |

**Sieve Analysis for +#10 Material**

| Sieve Size | Wt Ret | % Ret | % Passing |
|---|---|---|---|
| 1/2 inch | 0.0 | 0.00 | 100.00 |
| 3/8 inch | 0.0 | 0.00 | 100.00 |
| #4 | 0.0 | 0.00 | 100.00 |
| #8 | 0.0 | 0.00 | 100.00 |
| #10 | 0.0 | 0.00 | 100.00 |

| | |
|---|---|
| Air Dry Hydro Sample Wt., g: | 71 |
| Corrected Wt., g: | 71.0 |
| Calculation Factor | 0.7100 |

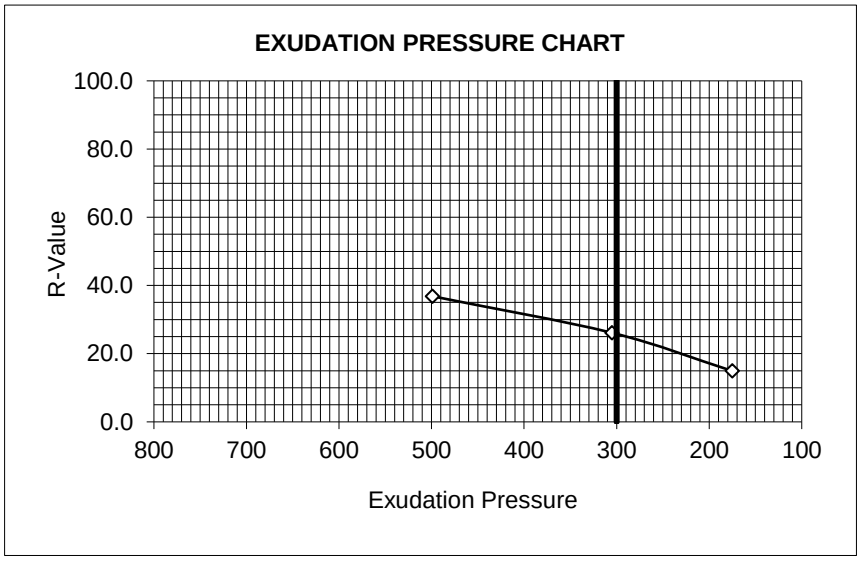
**Hydrometer Analysis for <#10 Material**

Start time: 8:23:00 AM

| Short Hydro | Time of Reading | Hydro Reading | Temp. at Reading, °C | Correction Factor | Corrected Hydro Reading |
|---|---|---|---|---|---|
| 20 sec | 8:23:20 AM | 57 | 18 | 5.2 | 51.8 |
| 1 hour | 9:23:00 AM | 18 | 18 | 5.2 | 12.8 |
| 6 hour | 2:23:00 PM | 13 | 18 | 5.2 | 7.8 |

| | |
|---|---|
| **% Gravel:** | 0.0 |
| **% Sand(2mm - 74µm):** | 27.0 |
| **% Silt(74µm- 5µm):** | 55.0 |
| **% Clay(5µm - 2µm):** | 7.0 |
| **% Clay(≤2µm):** | 11.0 |

**March 10, 2025** **File No.: 307035-001**



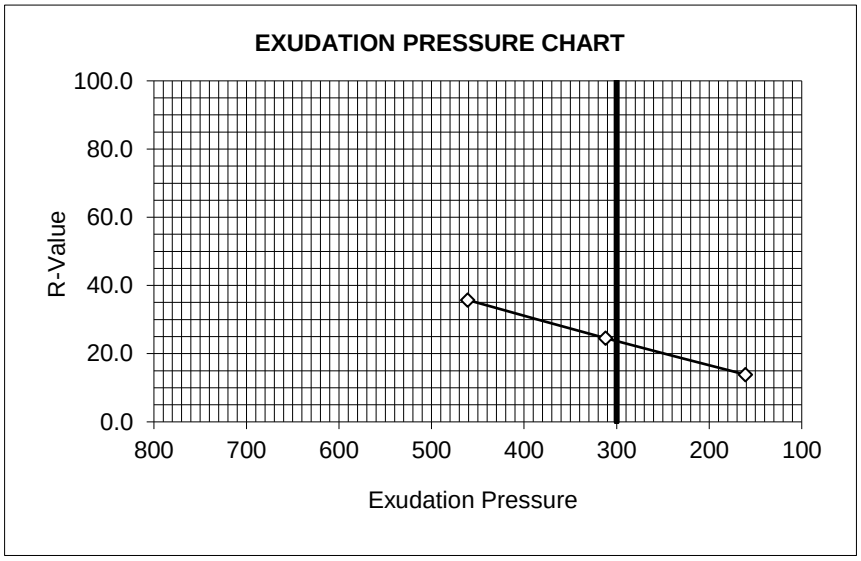

**JOB NAME:** KITP Housing Project
**SAMPLE I. D.:** B-2 @ 0-5'
**SOIL DESCRIPTION:** Silty Clay

| SPECIMEN NUMBER | D | E | F |
|---|---|---|---|
| EXUDATION PRESSURE | 499 | 305 | 175 |
| RESISTANCE VALUE | 36.8 | 26.1 | 14.9 |
| EXPANSION DIAL(0.0001") | 0 | 0 | 0 |
| EXPANSION PRESSURE (PSF) | 0.0 | 0.0 | 0.0 |
| % MOISTURE AT TEST | 13.0 | 13.5 | 14.1 |
| DRY DENSITY AT TEST | 109.6 | 110.0 | 108.0 |

| R-VALUE @ 300 PSI EXUDATION | 26 |
|---|---|

**Based on Traffic Index = 8.00 & Gravel Factor = 1.34*

**March 10, 2025** **File No.: 307035-001**




**JOB NAME:** KITP Housing Project
**SAMPLE I. D.:** B-4 @ 0-5'
**SOIL DESCRIPTION:** Silty Clay

| SPECIMEN NUMBER | D | E | F |
|---|---|---|---|
| EXUDATION PRESSURE | 461 | 312 | 161 |
| RESISTANCE VALUE | 35.7 | 24.6 | 13.9 |
| EXPANSION DIAL(0.0001") | 0 | 0 | 0 |
| EXPANSION PRESSURE (PSF) | 0.0 | 0.0 | 0.0 |
| % MOISTURE AT TEST | 13.7 | 14.2 | 14.7 |
| DRY DENSITY AT TEST | 108.4 | 108.6 | 107.8 |

**R-VALUE @ 300 PSI EXUDATION** **24**

**Based on Traffic Index = 8.00 & Gravel Factor = 1.34*

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# CERTIFICATE OF ANALYSIS

Client: Earth Systems Pacific
CAS LAB NO: 250362-01
Sample ID: B3@0-5' KITP Housing Project
Analyst: Gloria

Date Sampled: 03/04/25
Date Received: 03/04/25
Sample Matrix: Soil

## WET CHEMISTRY SUMMARY

| COMPOUND | RESULTS | UNITS | DF | PQL | METHOD | ANALYZED |
|---|---|---|---|---|---|---|
| pH (Corrosivity)** | 8.3 | S.U. | 1 | --- | 9045 | 03/07/25 |
| Resistivity* | 920 | Ohms-cm | 1 | --- | SM 120.1M | 03/06/25 |
| Chloride | 550 | mg/Kg | 4 | 2.4 | 300.0M | 03/06/25 |
| Sulfate | 440 | mg/Kg | 4 | 2.4 | 300.0M | 03/06/25 |

*Sample was extracted using a 1:3 ratio of soil and DI water.
**Sample was extracted using 1:1 ratio of soil and DI water.

DF: Dilution Factor
PQL: Practical Quantitation Limit
BQL: Below Quantitation Limit
mg/Kg: Milligrams/Kilograms(ppm)



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# CERTIFICATE OF ANALYSIS

Client: Earth Systems Pacific
CAS LAB NO: 250423-01
Sample ID: B5@0-5' KITP Housing Project
Analyst: Gloria

Date Sampled: 03/10/25
Date Received: 03/12/25
Sample Matrix: Soil

## WET CHEMISTRY SUMMARY

| COMPOUND | RESULTS | UNITS | DF | PQL | METHOD | ANALYZED |
|---|---|---|---|---|---|---|
| pH (Corrosivity)** | 8.8 | S.U. | 1 | --- | 9045 | 03/14/25 |
| Resistivity* | 2200 | Ohms-cm | 1 | --- | SM 120.1M | 03/14/25 |
| Chloride | 53 | mg/Kg | 1 | 0.6 | 300.0M | 03/14/25 |
| Sulfate | 220 | mg/Kg | 1 | 0.6 | 300.0M | 03/14/25 |

*Sample was extracted using a 1:3 ratio of soil and DI water.
**Sample was extracted using 1:1 ratio of soil and DI water.

DF: Dilution Factor
PQL: Practical Quantitation Limit
BQL: Below Quantitation Limit
mg/Kg: Milligrams/Kilograms(ppm)



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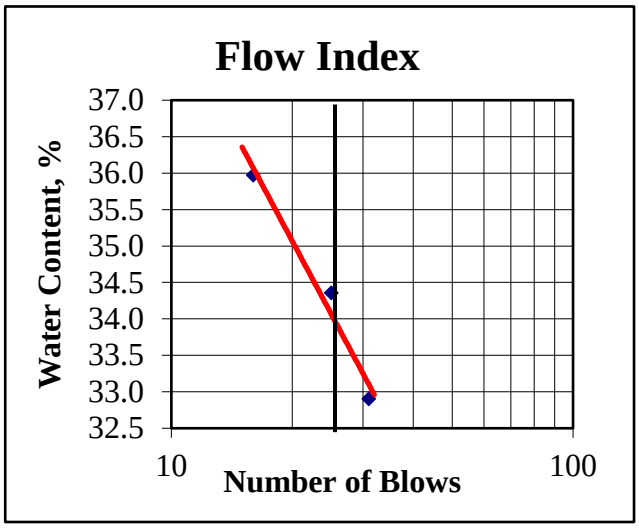
File No.: 307035-001 March 18, 2025

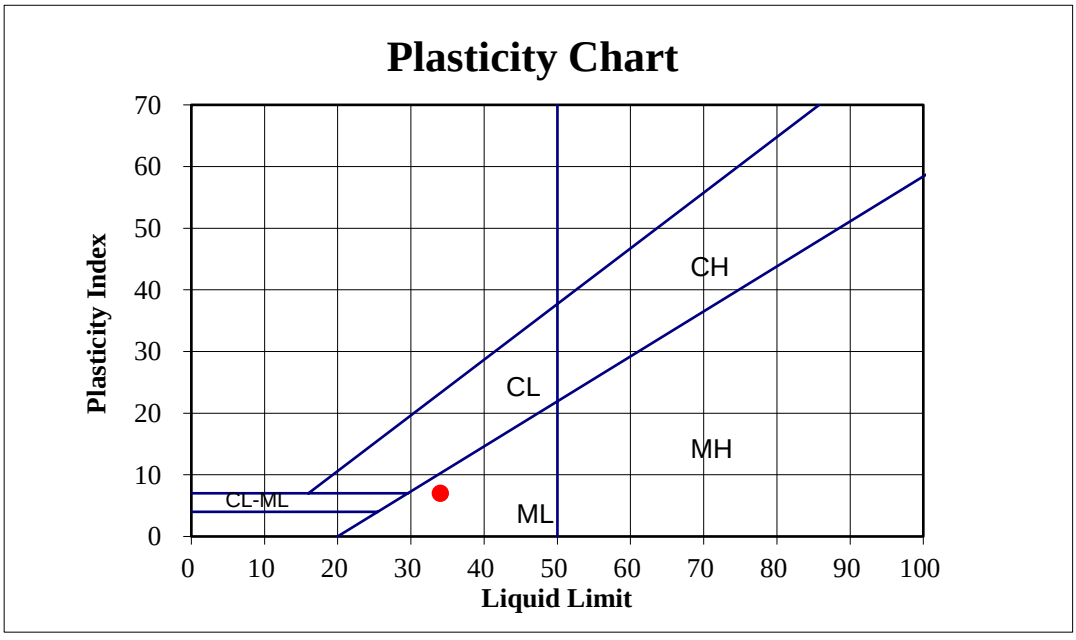
# PLASTICITY INDEX

ASTM D-4318

Job Name: KITP Housing Project
Sample ID: B 3 @ 25'
Soil Description: ML

| DATA SUMMARY | | | | TEST RESULTS | |
|---|---|---|---|---|---|
| Number of Blows: | 16 | 25 | 31 | **LIQUID LIMIT** | **34** |
| Water Content, % | 36.0 | 34.4 | 32.9 | **PLASTIC LIMIT** | **27** |
| Plastic Limit: | 26.9 | 27.1 | | **PLASTICITY INDEX** | **7** |



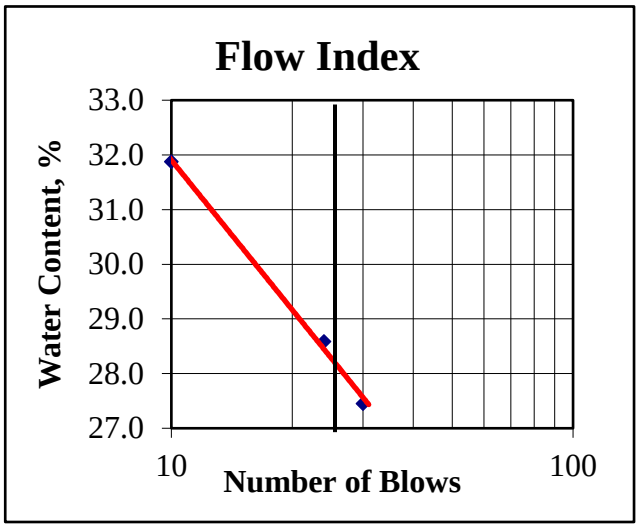
File No.: 307035-001 March 18, 2025

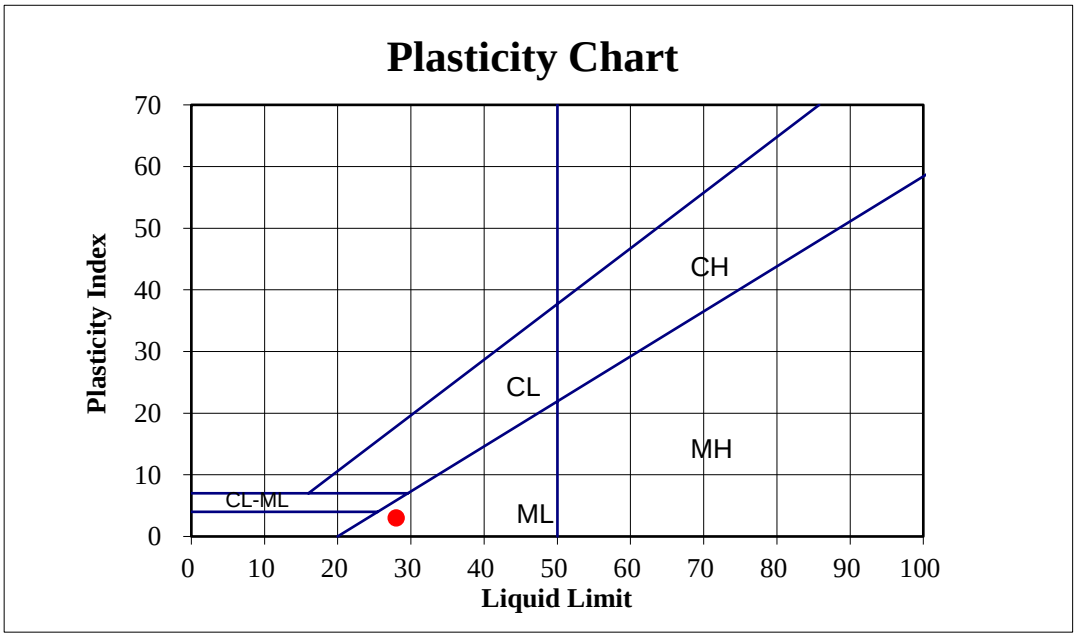
# PLASTICITY INDEX

ASTM D-4318

Job Name: KITP Housing Project
Sample ID: B 5 @ 25'
Soil Description: ML

| DATA SUMMARY | | | | TEST RESULTS | |
|---|---|---|---|---|---|
| Number of Blows: | 10 | 24 | 30 | **LIQUID LIMIT** | **28** |
| Water Content, % | 31.9 | 28.6 | 27.4 | **PLASTIC LIMIT** | **25** |
| Plastic Limit: | 24.3 | 24.8 | | **PLASTICITY INDEX** | **3** |



**APPENDIX C**

Minimum Foundation Design Table

# MINIMUM FOUNDATION DESIGN

## FOUNDATIONS FOR STUD BEARING WALLS – MINIMUM REQUIREMENTS

| EXPANSION INDEX (E. I.) | FOUNDATIONS FOR SLAB AND RAISED FLOOR SYSTEM | | | | | | REINFORCEMENT FOR FOUNDATIONS | CONCRETE SLAB 3-1/2" MINIMUM THICKNESS (4" WHEN OVER 51, E. I.) | | PREMOISTENING CONTROLS FOR SOILS UNDER FOOTINGS, PEIRS AND SLABS | PIERS UNDER RAISED FLOORS |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | NUMBER OF STORIES | STEM THICKNESS | FOOTING WIDTH | FOOTING THICKNESS | ALL PERIMETER FOOTINGS | INTERIOR FOOTINGS FOR SLAB AND RAISED FLOORS | | REINFORCEMENT | TOTAL THICKNESS OF SAND | | |
| | | | | | DEPTH BELOW NATURAL SURFACE OF GROUND & FINISH GRADE | | | | | | |
| | | INCHES | | | | | | | | | |
| 0 -20<br>VERY LOW<br>(NON-EXPANSIVE) | 1<br>2<br>3 | 6<br>8<br>10 | 12<br>15<br>18 | 6<br>7<br>8 | 12<br>18<br>24 | 12<br>18<br>24 | 1 - #4 @ TOP AND BOTTOM | #3 @ 24" O.C. EACH WAY | 2" | MOISTENING OF GROUND PRIOR TO PLACING CONCRETE IS RECOMMENDED | PIERS ALLOWED FOR SINGLE FLOOR LOADS ONLY |
| 21-50<br>LOW | 1<br>2<br>3 | 6<br>8<br>10 | 12<br>15<br>18 | 6<br>7<br>8 | 15<br>18<br>24 | 12<br>18<br>24 | 1 - #4 @ TOP AND BOTTOM | #3 @ 24" O.C. EACH WAY | 4" | 3% OVER OPTIMUM MOISTURE CONTENT TO A DEPTH OF 18" BELOW LOWEST ADJACENT GRADE TESTING REQ'D | PIERS ALLOWED FO SINGLE FLOOR LOADS ONLY |
| 51-90<br>MEDIUM | 1<br>2<br>3 | 6<br>8<br>10 | 12<br>15<br>18 | 6<br>8<br>8 | 21<br>21<br>24 | 12<br>18<br>24 | 1 - #4 @ TOP AND BOTTOM<br>#3 BARS @ 24" O.C. 12" INTO FOOTING AND BENT 3' INTO SLAB | #3 @ 24" O.C. EACH WAY | 4" | 3% OVER OPTIMUM MOISTURE CONTENT TO A DEPTH OF 18" BELOW LOWEST ADJ ACENT GRADE TESTING REQ'D | PIERS NOT ALLOWED |
| 91-130<br>HIGH | 1<br>2<br>3 | 6<br>8<br>10 | 12<br>15<br>18 | 8<br>8<br>8 | 27<br>27<br>27 | 12<br>18<br>24 | 2 - #4 @ TOP AND BOTTOM<br>#3 BARS @ 24" O.C. 12" INTO FOOTING AND BENT 3' INTO SLAB | #3 @ 24" O.C. EACH WAY | 4" | 3% OVER OPTIMUM MOISTURE CONTENT TO A DEPTH OF 24" BELOW LOWEST ADJACENT GRADE TESTING REQ'D | PIERS NOT ALLOWED |
| ABOVE 130<br>VERY HIGH | REQUIRES SPECIAL DESIGN BY A STATE LICENSED SOILS PROFESSIONAL | | | | | | | | | | |

**APPENDIX D**

Shear Wave Velocity Site Classification
CPT Site Classification
2022 CBC & ASCE 7-16 Seismic Parameters
US Seismic Design Maps
Spectral Response Values Table
Fault Parameters

Shear Wave Velocity Site Classification

**Earth Systems**

Job Number: 307035-001
Job Name: KITP Housing Project
Calc Date: 6/19/2025
CPT ID: CPT-24

| Sublayer Top Depth (ft) | Sublayer Bottom Depth (ft) | Sublayer Thick (ft) | Shear Wave Velocity (ft/s) | Sublayer Thick/Vs |
|---|---|---|---|---|
| 0.00 | 10.07 | 10.07 | 931.83 | 0.011 |
| 10.07 | 15.06 | 4.99 | 916.72 | 0.005 |
| 15.06 | 20.08 | 5.02 | 767.80 | 0.007 |
| 20.08 | 25.03 | 4.95 | 949.62 | 0.005 |
| 25.03 | 30.02 | 4.99 | 1015.46 | 0.005 |
| 30.02 | 35.04 | 5.02 | 1159.69 | 0.004 |
| 35.04 | 40.06 | 5.02 | 1113.88 | 0.005 |
| 40.06 | 45.05 | 4.99 | 1170.00 | 0.004 |
| 45.05 | 50.03 | 4.98 | 1162.48 | 0.004 |
| 50.03 | 55.05 | 5.02 | 1235.52 | 0.004 |
| 55.05 | 57.25 | 2.20 | 1570.40 | 0.001 |
| 57.25 | 100.00 | 42.75 | 1570.40 | 0.027 |

| | | |
|---|---|---|
| Total Thickness of Soil = | 100.00 | ft |
| Vs-bar Value = | 1205.0 | * |
| Site Classification = | Class C | |

*Equation 20.4-1 of ASCE 7-16

**Earth Systems**

Job Number: 307035-001
Job Name: KITP Housing Project
Calc Date: 6/19/2025
CPT ID: CPT-25

| Sublayer Top Depth (ft) | Sublayer Bottom Depth (ft) | Sublayer Thick (ft) | Shear Wave Velocity (ft/s) | Sublayer Thick/Vs |
|---|---|---|---|---|
| 0.00 | 20.05 | 20.05 | 926.60 | 0.022 |
| 20.05 | 30.05 | 10.00 | 750.31 | 0.013 |
| 30.05 | 40.06 | 10.01 | 1242.84 | 0.008 |
| 40.06 | 50.03 | 9.97 | 1177.26 | 0.008 |
| 50.03 | 60.01 | 9.98 | 1295.21 | 0.008 |
| 60.01 | 65.06 | 5.05 | 1417.79 | 0.004 |
| 65.06 | 100.00 | 34.94 | 1417.79 | 0.025 |

| | | |
|---|---|---|
| Total Thickness of Soil = | 100.00 | ft |
| Vs-bar Value = | 1144.2 | * |
| Site Classification = | Class D | |

*Equation 20.4-1 of ASCE 7-16

CPT Site Classification

**Earth Systems**

Job Number: 307035-001
Job Name: KITP Housing Project
Calc Date: 2/4/2025
CPT ID: CPT-4

| Depth (ft) | SPT $N_{60}$ | Sublayer Thick/$N_{60}$ | Su (tsf) | Su (psf) | Sublayer Thick/Su | Ic |
|---|---|---|---|---|---|---|
| 0.50 | 11.37 | 0.0440 | | N/A | N/A | 2.20 |
| 1.00 | 9.83 | 0.0509 | | N/A | N/A | 2.52 |
| 1.50 | 8.51 | 0.0587 | 1.79 | 3571 | 0.0001 | 2.77 |
| 2.00 | 8.20 | 0.0609 | 1.70 | 3398 | 0.0001 | 2.79 |
| 2.50 | 7.99 | 0.0626 | 1.65 | 3296 | 0.0002 | 2.80 |
| 3.00 | 8.14 | 0.0614 | 1.75 | 3491 | 0.0001 | 2.73 |
| 3.50 | 8.02 | 0.0624 | 1.71 | 3424 | 0.0001 | 2.73 |
| 4.00 | 11.63 | 0.0430 | | N/A | N/A | 2.58 |
| 4.50 | 20.95 | 0.0239 | | N/A | N/A | 2.09 |
| 5.00 | 18.39 | 0.0272 | | N/A | N/A | 2.20 |
| 5.50 | 13.14 | 0.0381 | | N/A | N/A | 2.56 |
| 6.00 | 16.70 | 0.0299 | | N/A | N/A | 2.40 |
| 6.50 | 19.25 | 0.0260 | | N/A | N/A | 2.16 |
| 7.00 | 37.73 | 0.0133 | | N/A | N/A | 1.73 |
| 7.50 | 35.33 | 0.0142 | | N/A | N/A | 1.79 |
| 8.00 | 31.92 | 0.0157 | | N/A | N/A | 1.81 |
| 8.50 | 34.77 | 0.0144 | | N/A | N/A | 1.74 |
| 9.00 | 38.17 | 0.0131 | | N/A | N/A | 1.67 |
| 9.50 | 44.99 | 0.0111 | | N/A | N/A | 1.64 |
| 10.00 | 54.39 | 0.0092 | | N/A | N/A | 1.70 |
| 10.50 | 54.23 | 0.0092 | | N/A | N/A | 1.52 |
| 11.00 | 58.54 | 0.0085 | | N/A | N/A | 1.71 |
| 11.50 | 56.33 | 0.0089 | | N/A | N/A | 1.73 |
| 12.00 | 45.95 | 0.0109 | | N/A | N/A | 1.75 |
| 12.50 | 47.66 | 0.0105 | | N/A | N/A | 1.73 |
| 13.00 | 51.27 | 0.0098 | | N/A | N/A | 1.66 |
| 13.50 | 47.90 | 0.0104 | | N/A | N/A | 1.71 |
| 14.00 | 41.69 | 0.0120 | | N/A | N/A | 1.71 |
| 14.50 | 30.36 | 0.0165 | | N/A | N/A | 1.85 |
| 15.00 | 21.88 | 0.0228 | | N/A | N/A | 2.15 |
| 15.50 | 37.96 | 0.0132 | | N/A | N/A | 1.82 |
| 16.00 | 42.16 | 0.0119 | | N/A | N/A | 1.76 |
| 16.50 | 32.98 | 0.0152 | | N/A | N/A | 1.79 |
| 17.00 | 25.64 | 0.0195 | | N/A | N/A | 1.87 |
| 17.50 | 22.93 | 0.0218 | | N/A | N/A | 1.93 |
| 18.00 | 27.74 | 0.0180 | | N/A | N/A | 1.84 |
| 18.50 | 30.10 | 0.0166 | | N/A | N/A | 1.80 |
| 19.00 | 28.40 | 0.0176 | | N/A | N/A | 1.88 |
| 19.50 | 15.83 | 0.0316 | | N/A | N/A | 2.39 |
| 20.00 | 10.33 | 0.0484 | | N/A | N/A | 2.38 |
| 20.50 | 15.60 | 0.0320 | | N/A | N/A | 2.21 |
| 21.00 | 15.91 | 0.0314 | | N/A | N/A | 2.23 |
| 21.50 | 16.27 | 0.0307 | | N/A | N/A | 2.22 |
| 22.00 | 16.44 | 0.0304 | | N/A | N/A | 2.20 |
| 22.50 | 15.87 | 0.0315 | | N/A | N/A | 2.12 |
| 23.00 | 16.70 | 0.0299 | | N/A | N/A | 2.16 |
| 23.50 | 17.18 | 0.0291 | | N/A | N/A | 2.16 |
| 24.00 | 17.53 | 0.0285 | | N/A | N/A | 2.16 |
| 24.50 | 17.65 | 0.0283 | | N/A | N/A | 2.17 |
| 25.00 | 16.82 | 0.0297 | | N/A | N/A | 2.17 |
| 25.50 | 17.35 | 0.0288 | | N/A | N/A | 2.21 |
| 26.00 | 17.50 | 0.0286 | | N/A | N/A | 2.21 |
| 26.50 | 17.90 | 0.0279 | | N/A | N/A | 2.18 |
| 27.00 | 17.75 | 0.0282 | | N/A | N/A | 2.15 |
| 27.50 | 17.81 | 0.0281 | | N/A | N/A | 2.14 |
| 28.00 | 18.35 | 0.0272 | | N/A | N/A | 2.14 |
| 28.50 | 18.41 | 0.0272 | | N/A | N/A | 2.17 |
| 29.00 | 18.61 | 0.0269 | | N/A | N/A | 2.17 |
| 29.50 | 18.31 | 0.0273 | | N/A | N/A | 2.12 |
| 30.00 | 18.48 | 0.0271 | | N/A | N/A | 2.16 |
| 30.50 | 19.32 | 0.0259 | | N/A | N/A | 2.17 |
| 31.00 | 29.96 | 0.0167 | | N/A | N/A | 2.15 |
| 31.50 | 23.85 | 0.0210 | | N/A | N/A | 2.17 |
| 32.00 | 20.68 | 0.0242 | | N/A | N/A | 2.20 |
| 32.50 | 20.66 | 0.0242 | | N/A | N/A | 2.16 |
| 33.00 | 20.18 | 0.0248 | | N/A | N/A | 2.07 |
| 33.50 | 20.52 | 0.0244 | | N/A | N/A | 2.11 |
| 34.00 | 20.51 | 0.0244 | | N/A | N/A | 2.12 |
| 34.50 | 20.61 | 0.0243 | | N/A | N/A | 2.13 |
| 35.00 | 20.41 | 0.0245 | | N/A | N/A | 2.10 |

| | | |
|---|---|---|
| Thickness of Cohesionless Soils = | 97.50 | ft |
| $N_{ch}$-bar Value = | 23.2 | * |
| Site Classification from N-bar = | Class D | |
| Thickness of Cohesive Soils = | 2.50 | ft |
| Su-bar Value = | 3434 | ** |
| Site Classification from Su-bar = | Class C | |

↓

Use the weaker Class if they are different.

*Equation 20.4-3 of ASCE 7-16

**Equation 20.4-4 of ASCE 7-16

| | | | | | |
|---|---|---|---|---|---|
| 35.50 | 20.69 | 0.0242 | N/A | N/A | 2.13 |
| 36.00 | 20.69 | 0.0242 | N/A | N/A | 2.14 |
| 36.50 | 20.88 | 0.0239 | N/A | N/A | 2.16 |
| 37.00 | 21.65 | 0.0231 | N/A | N/A | 2.15 |
| 37.50 | 21.07 | 0.0237 | N/A | N/A | 2.10 |
| 38.00 | 21.88 | 0.0229 | N/A | N/A | 2.12 |
| 38.50 | 22.10 | 0.0226 | N/A | N/A | 2.13 |
| 39.00 | 22.43 | 0.0223 | N/A | N/A | 2.14 |
| 39.50 | 22.74 | 0.0220 | N/A | N/A | 2.14 |
| 40.00 | 22.28 | 0.0224 | N/A | N/A | 2.15 |
| 40.50 | 21.82 | 0.0229 | N/A | N/A | 2.16 |
| 41.00 | 21.85 | 0.0229 | N/A | N/A | 2.15 |
| 41.50 | 21.51 | 0.0232 | N/A | N/A | 2.14 |
| 42.00 | 21.28 | 0.0235 | N/A | N/A | 2.18 |
| 42.50 | 21.48 | 0.0233 | N/A | N/A | 2.17 |
| 43.00 | 21.71 | 0.0230 | N/A | N/A | 2.16 |
| 43.50 | 21.63 | 0.0231 | N/A | N/A | 2.14 |
| 44.00 | 22.09 | 0.0226 | N/A | N/A | 2.14 |
| 44.50 | 22.03 | 0.0227 | N/A | N/A | 2.17 |
| 45.00 | 22.18 | 0.0225 | N/A | N/A | 2.17 |
| 45.50 | 22.17 | 0.0226 | N/A | N/A | 2.16 |
| 46.00 | 22.15 | 0.0226 | N/A | N/A | 2.17 |
| 46.50 | 22.17 | 0.0225 | N/A | N/A | 2.17 |
| 47.00 | 22.36 | 0.0224 | N/A | N/A | 2.16 |
| 47.50 | 22.49 | 0.0222 | N/A | N/A | 2.13 |
| 48.00 | 23.05 | 0.0217 | N/A | N/A | 2.16 |
| 48.50 | 23.58 | 0.0212 | N/A | N/A | 2.15 |
| 49.00 | 23.50 | 0.0213 | N/A | N/A | 2.15 |
| 49.50 | 23.16 | 0.0216 | N/A | N/A | 2.18 |
| 50.00 | 23.23 | 0.0215 | N/A | N/A | 2.19 |
| 50.50 | 23.13 | 0.0216 | N/A | N/A | 2.17 |
| 51.00 | 23.05 | 0.0217 | N/A | N/A | 2.16 |
| 51.50 | 22.64 | 0.0221 | N/A | N/A | 2.18 |
| 52.00 | 23.34 | 0.0214 | N/A | N/A | 2.20 |
| 52.50 | 23.77 | 0.0210 | N/A | N/A | 2.18 |
| 53.00 | 24.14 | 0.0207 | N/A | N/A | 2.18 |
| 53.50 | 24.57 | 0.0203 | N/A | N/A | 2.18 |
| 54.00 | 26.00 | 0.0192 | N/A | N/A | 2.16 |
| 54.50 | 25.58 | 0.0195 | N/A | N/A | 2.09 |
| 55.00 | 24.55 | 0.0204 | N/A | N/A | 2.07 |
| 55.50 | 25.50 | 0.0196 | N/A | N/A | 2.14 |
| 56.00 | 25.15 | 0.0199 | N/A | N/A | 2.14 |
| 56.50 | 24.72 | 0.0202 | N/A | N/A | 2.10 |
| 57.00 | 24.08 | 0.0208 | N/A | N/A | 2.08 |
| 57.50 | 24.51 | 0.0204 | N/A | N/A | 2.14 |
| 58.00 | 25.58 | 0.0195 | N/A | N/A | 2.10 |
| 58.50 | 24.90 | 0.0201 | N/A | N/A | 2.12 |
| 59.00 | 25.96 | 0.0193 | N/A | N/A | 2.21 |
| 59.50 | 32.80 | 0.0152 | N/A | N/A | 2.06 |
| 60.00 | 24.94 | 0.0200 | N/A | N/A | 2.12 |
| 60.50 | 27.52 | 0.0182 | N/A | N/A | 2.16 |
| 61.00 | 26.66 | 0.0188 | N/A | N/A | 2.09 |
| 61.50 | 30.04 | 0.0166 | N/A | N/A | 2.22 |
| 62.00 | 26.78 | 0.0187 | N/A | N/A | 2.23 |
| 62.50 | 24.21 | 0.0207 | N/A | N/A | 2.17 |
| 63.00 | 29.05 | 0.0172 | N/A | N/A | 2.20 |
| 63.50 | 25.78 | 0.0194 | N/A | N/A | 2.27 |
| 64.00 | 24.92 | 0.0201 | N/A | N/A | 2.23 |
| 64.50 | 24.53 | 0.0204 | N/A | N/A | 2.23 |
| 65.00 | 24.72 | 0.0202 | N/A | N/A | 2.23 |
| 65.50 | 24.50 | 0.0204 | N/A | N/A | 2.20 |
| 66.00 | 24.50 | 0.0204 | N/A | N/A | 2.21 |
| 66.50 | 24.53 | 0.0204 | N/A | N/A | 2.25 |
| 67.00 | 21.68 | 0.0231 | N/A | N/A | 2.32 |
| 67.50 | 24.90 | 0.0201 | N/A | N/A | 2.25 |
| 68.00 | 26.52 | 0.0189 | N/A | N/A | 2.23 |
| 68.50 | 48.21 | 0.0104 | N/A | N/A | 2.15 |
| 69.00 | 27.90 | 0.0179 | N/A | N/A | 2.28 |
| 69.50 | 24.80 | 0.0202 | N/A | N/A | 2.12 |
| 70.00 | 24.89 | 0.0201 | N/A | N/A | 2.21 |
| 70.50 | 24.68 | 0.0203 | N/A | N/A | 2.21 |
| 71.00 | 24.68 | 0.0203 | N/A | N/A | 2.21 |
| 71.50 | 24.68 | 0.0203 | N/A | N/A | 2.21 |
| 72.00 | 24.68 | 0.0203 | N/A | N/A | 2.21 |
| 72.50 | 24.68 | 0.0203 | N/A | N/A | 2.21 |

| | | | | | |
|---|---|---|---|---|---|
| 73.00 | 24.68 | 0.0203 | N/A | N/A | 2.21 |
| 73.50 | 24.68 | 0.0203 | N/A | N/A | 2.21 |
| 74.00 | 24.68 | 0.0203 | N/A | N/A | 2.21 |
| 74.50 | 24.68 | 0.0203 | N/A | N/A | 2.21 |
| 75.00 | 24.68 | 0.0203 | N/A | N/A | 2.21 |
| 75.50 | 24.68 | 0.0203 | N/A | N/A | 2.21 |
| 76.00 | 24.68 | 0.0203 | N/A | N/A | 2.21 |
| 76.50 | 24.68 | 0.0203 | N/A | N/A | 2.21 |
| 77.00 | 24.68 | 0.0203 | N/A | N/A | 2.21 |
| 77.50 | 24.68 | 0.0203 | N/A | N/A | 2.21 |
| 78.00 | 24.68 | 0.0203 | N/A | N/A | 2.21 |
| 78.50 | 24.68 | 0.0203 | N/A | N/A | 2.21 |
| 79.00 | 24.68 | 0.0203 | N/A | N/A | 2.21 |
| 79.50 | 24.68 | 0.0203 | N/A | N/A | 2.21 |
| 80.00 | 24.68 | 0.0203 | N/A | N/A | 2.21 |
| 80.50 | 24.68 | 0.0203 | N/A | N/A | 2.21 |
| 81.00 | 24.68 | 0.0203 | N/A | N/A | 2.21 |
| 81.50 | 24.68 | 0.0203 | N/A | N/A | 2.21 |
| 82.00 | 24.68 | 0.0203 | N/A | N/A | 2.21 |
| 82.50 | 24.68 | 0.0203 | N/A | N/A | 2.21 |
| 83.00 | 24.68 | 0.0203 | N/A | N/A | 2.21 |
| 83.50 | 24.68 | 0.0203 | N/A | N/A | 2.21 |
| 84.00 | 24.68 | 0.0203 | N/A | N/A | 2.21 |
| 84.50 | 24.68 | 0.0203 | N/A | N/A | 2.21 |
| 85.00 | 24.68 | 0.0203 | N/A | N/A | 2.21 |
| 85.50 | 24.68 | 0.0203 | N/A | N/A | 2.21 |
| 86.00 | 24.68 | 0.0203 | N/A | N/A | 2.21 |
| 86.50 | 24.68 | 0.0203 | N/A | N/A | 2.21 |
| 87.00 | 24.68 | 0.0203 | N/A | N/A | 2.21 |
| 87.50 | 24.68 | 0.0203 | N/A | N/A | 2.21 |
| 88.00 | 24.68 | 0.0203 | N/A | N/A | 2.21 |
| 88.50 | 24.68 | 0.0203 | N/A | N/A | 2.21 |
| 89.00 | 24.68 | 0.0203 | N/A | N/A | 2.21 |
| 89.50 | 24.68 | 0.0203 | N/A | N/A | 2.21 |
| 90.00 | 24.68 | 0.0203 | N/A | N/A | 2.21 |
| 90.50 | 24.68 | 0.0203 | N/A | N/A | 2.21 |
| 91.00 | 24.68 | 0.0203 | N/A | N/A | 2.21 |
| 91.50 | 24.68 | 0.0203 | N/A | N/A | 2.21 |
| 92.00 | 24.68 | 0.0203 | N/A | N/A | 2.21 |
| 92.50 | 24.68 | 0.0203 | N/A | N/A | 2.21 |
| 93.00 | 24.68 | 0.0203 | N/A | N/A | 2.21 |
| 93.50 | 24.68 | 0.0203 | N/A | N/A | 2.21 |
| 94.00 | 24.68 | 0.0203 | N/A | N/A | 2.21 |
| 94.50 | 24.68 | 0.0203 | N/A | N/A | 2.21 |
| 95.00 | 24.68 | 0.0203 | N/A | N/A | 2.21 |
| 95.50 | 24.68 | 0.0203 | N/A | N/A | 2.21 |
| 96.00 | 24.68 | 0.0203 | N/A | N/A | 2.21 |
| 96.50 | 24.68 | 0.0203 | N/A | N/A | 2.21 |
| 97.00 | 24.68 | 0.0203 | N/A | N/A | 2.21 |
| 97.50 | 24.68 | 0.0203 | N/A | N/A | 2.21 |
| 98.00 | 24.68 | 0.0203 | N/A | N/A | 2.21 |
| 98.50 | 24.68 | 0.0203 | N/A | N/A | 2.21 |
| 99.00 | 24.68 | 0.0203 | N/A | N/A | 2.21 |
| 99.50 | 24.68 | 0.0203 | N/A | N/A | 2.21 |
| 100.00 | 24.68 | 0.0203 | N/A | N/A | 2.21 |

**Earth Systems**

Job Number: 307035-001
Job Name: KITP Housing Project
Calc Date: 2/4/2025
CPT ID: CPT-11

| Depth (ft) | SPT $N_{(60)}$ | Sublayer Thick/$N_{(60)}$ | Su (tsf) | Su (psf) | Sublayer Thick/Su | Ic |
|---|---|---|---|---|---|---|
| 0.50 | 37.42 | 0.0134 | | N/A | N/A | 1.37 |
| 1.00 | 31.45 | 0.0159 | | N/A | N/A | 1.96 |
| 1.50 | 15.71 | 0.0318 | | N/A | N/A | 2.49 |
| 2.00 | 12.28 | 0.0407 | 2.80 | 5000 | 0.0001 | 2.61 |
| 2.50 | 12.07 | 0.0414 | 2.67 | 5000 | 0.0001 | 2.67 |
| 3.00 | 11.53 | 0.0434 | 2.55 | 5000 | 0.0001 | 2.67 |
| 3.50 | 10.65 | 0.0470 | 2.35 | 4695 | 0.0001 | 2.67 |
| 4.00 | 8.96 | 0.0558 | 1.98 | 3970 | 0.0001 | 2.66 |
| 4.50 | 6.57 | 0.0761 | 1.38 | 2765 | 0.0002 | 2.75 |
| 5.00 | 6.97 | 0.0717 | 1.54 | 3079 | 0.0002 | 2.66 |
| 5.50 | 14.89 | 0.0336 | | N/A | N/A | 2.42 |
| 6.00 | 26.82 | 0.0186 | | N/A | N/A | 2.19 |
| 6.50 | 43.00 | 0.0116 | | N/A | N/A | 1.72 |
| 7.00 | 51.86 | 0.0096 | | N/A | N/A | 1.74 |
| 7.50 | 37.48 | 0.0133 | | N/A | N/A | 1.76 |
| 8.00 | 31.63 | 0.0158 | | N/A | N/A | 1.70 |
| 8.50 | 33.15 | 0.0151 | | N/A | N/A | 1.73 |
| 9.00 | 35.71 | 0.0140 | | N/A | N/A | 1.76 |
| 9.50 | 39.48 | 0.0127 | | N/A | N/A | 1.73 |
| 10.00 | 50.17 | 0.0100 | | N/A | N/A | 1.49 |
| 10.50 | 60.72 | 0.0082 | | N/A | N/A | 1.68 |
| 11.00 | 60.23 | 0.0083 | | N/A | N/A | 1.50 |
| 11.50 | 59.35 | 0.0084 | | N/A | N/A | 1.69 |
| 12.00 | 52.80 | 0.0095 | | N/A | N/A | 1.58 |
| 12.50 | 45.38 | 0.0110 | | N/A | N/A | 1.73 |
| 13.00 | 45.95 | 0.0109 | | N/A | N/A | 1.76 |
| 13.50 | 47.60 | 0.0105 | | N/A | N/A | 1.59 |
| 14.00 | 48.05 | 0.0104 | | N/A | N/A | 1.71 |
| 14.50 | 45.36 | 0.0110 | | N/A | N/A | 1.78 |
| 15.00 | 40.57 | 0.0123 | | N/A | N/A | 1.80 |
| 15.50 | 38.88 | 0.0129 | | N/A | N/A | 1.86 |
| 16.00 | 41.14 | 0.0122 | | N/A | N/A | 1.84 |
| 16.50 | 38.33 | 0.0130 | | N/A | N/A | 1.63 |
| 17.00 | 34.36 | 0.0146 | | N/A | N/A | 1.86 |
| 17.50 | 30.56 | 0.0164 | | N/A | N/A | 1.87 |
| 18.00 | 24.89 | 0.0201 | | N/A | N/A | 1.85 |
| 18.50 | 27.84 | 0.0180 | | N/A | N/A | 1.83 |
| 19.00 | 35.88 | 0.0139 | | N/A | N/A | 1.77 |
| 19.50 | 42.04 | 0.0119 | | N/A | N/A | 1.68 |
| 20.00 | 25.93 | 0.0193 | | N/A | N/A | 2.07 |
| 20.50 | 16.33 | 0.0306 | | N/A | N/A | 2.32 |
| 21.00 | 13.70 | 0.0365 | | N/A | N/A | 2.28 |
| 21.50 | 17.73 | 0.0282 | | N/A | N/A | 2.11 |
| 22.00 | 19.73 | 0.0253 | | N/A | N/A | 2.10 |
| 22.50 | 18.66 | 0.0268 | | N/A | N/A | 2.10 |
| 23.00 | 18.29 | 0.0273 | | N/A | N/A | 2.05 |
| 23.50 | 19.51 | 0.0256 | | N/A | N/A | 2.10 |
| 24.00 | 20.13 | 0.0248 | | N/A | N/A | 2.13 |
| 24.50 | 19.30 | 0.0259 | | N/A | N/A | 2.21 |
| 25.00 | 18.45 | 0.0271 | | N/A | N/A | 2.20 |
| 25.50 | 22.21 | 0.0225 | | N/A | N/A | 2.15 |
| 26.00 | 24.89 | 0.0201 | | N/A | N/A | 2.20 |
| 26.50 | 22.01 | 0.0227 | | N/A | N/A | 2.19 |
| 27.00 | 20.98 | 0.0238 | | N/A | N/A | 2.07 |
| 27.50 | 21.51 | 0.0232 | | N/A | N/A | 2.16 |
| 28.00 | 31.01 | 0.0161 | | N/A | N/A | 2.15 |
| 28.50 | 33.92 | 0.0147 | | N/A | N/A | 2.16 |
| 29.00 | 41.12 | 0.0122 | | N/A | N/A | 2.10 |
| 29.50 | 52.88 | 0.0095 | | N/A | N/A | 2.04 |
| 30.00 | 49.14 | 0.0102 | | N/A | N/A | 1.99 |
| 30.50 | 45.70 | 0.0109 | | N/A | N/A | 2.12 |
| 31.00 | 32.46 | 0.0154 | | N/A | N/A | 2.15 |
| 31.50 | 27.03 | 0.0185 | | N/A | N/A | 2.30 |
| 32.00 | 22.90 | 0.0218 | | N/A | N/A | 2.29 |
| 32.50 | 22.86 | 0.0219 | | N/A | N/A | 2.31 |
| 33.00 | 19.48 | 0.0257 | | N/A | N/A | 2.41 |
| 33.50 | 16.36 | 0.0306 | | N/A | N/A | 2.42 |
| 34.00 | 18.96 | 0.0264 | | N/A | N/A | 2.27 |
| 34.50 | 21.45 | 0.0233 | | N/A | N/A | 2.28 |
| 35.00 | 22.50 | 0.0222 | | N/A | N/A | 2.29 |

| | | |
|---|---|---|
| Thickness of Cohesionless Soils = | 96.50 | ft |
| $N_{ch}$-bar Value = | 30.3 | * |
| Site Classification from N-bar = | Class D | |
| Thickness of Cohesive Soils = | 3.50 | ft |
| Su-bar Value = | 3997 | ** |
| Site Classification from Su-bar = | Class C | |

↓

Use the weaker Class if they are different.

*Equation 20.4-3 of ASCE 7-16

**Equation 20.4-4 of ASCE 7-16

| | | | | | |
|---|---|---|---|---|---|
| 35.50 | 21.92 | 0.0228 | N/A | N/A | 2.31 |
| 36.00 | 22.46 | 0.0223 | N/A | N/A | 2.27 |
| 36.50 | 28.62 | 0.0175 | N/A | N/A | 2.28 |
| 37.00 | 27.37 | 0.0183 | N/A | N/A | 2.31 |
| 37.50 | 24.07 | 0.0208 | N/A | N/A | 2.26 |
| 38.00 | 24.72 | 0.0202 | N/A | N/A | 2.09 |
| 38.50 | 26.77 | 0.0187 | N/A | N/A | 2.14 |
| 39.00 | 28.78 | 0.0174 | N/A | N/A | 2.15 |
| 39.50 | 26.86 | 0.0186 | N/A | N/A | 2.08 |
| 40.00 | 27.82 | 0.0180 | N/A | N/A | 2.14 |
| 40.50 | 28.94 | 0.0173 | N/A | N/A | 2.13 |
| 41.00 | 29.26 | 0.0171 | N/A | N/A | 2.11 |
| 41.50 | 29.11 | 0.0172 | N/A | N/A | 2.03 |
| 42.00 | 29.44 | 0.0170 | N/A | N/A | 2.12 |
| 42.50 | 28.97 | 0.0173 | N/A | N/A | 2.14 |
| 43.00 | 27.92 | 0.0179 | N/A | N/A | 2.13 |
| 43.50 | 26.05 | 0.0192 | N/A | N/A | 2.06 |
| 44.00 | 25.97 | 0.0193 | N/A | N/A | 2.16 |
| 44.50 | 26.90 | 0.0186 | N/A | N/A | 2.17 |
| 45.00 | 27.02 | 0.0185 | N/A | N/A | 2.15 |
| 45.50 | 26.84 | 0.0186 | N/A | N/A | 2.14 |
| 46.00 | 26.54 | 0.0188 | N/A | N/A | 2.20 |
| 46.50 | 25.99 | 0.0192 | N/A | N/A | 2.21 |
| 47.00 | 26.10 | 0.0192 | N/A | N/A | 2.19 |
| 47.50 | 25.74 | 0.0194 | N/A | N/A | 2.22 |
| 48.00 | 26.41 | 0.0189 | N/A | N/A | 2.27 |
| 48.50 | 26.57 | 0.0188 | N/A | N/A | 2.27 |
| 49.00 | 25.36 | 0.0197 | N/A | N/A | 2.24 |
| 49.50 | 23.09 | 0.0217 | N/A | N/A | 2.26 |
| 50.00 | 22.19 | 0.0225 | N/A | N/A | 2.33 |
| 50.50 | 21.91 | 0.0228 | N/A | N/A | 2.32 |
| 51.00 | 25.46 | 0.0196 | N/A | N/A | 2.28 |
| 51.50 | 26.15 | 0.0191 | N/A | N/A | 2.30 |
| 52.00 | 18.96 | 0.0264 | N/A | N/A | 2.42 |
| 52.50 | 21.42 | 0.0233 | N/A | N/A | 2.23 |
| 53.00 | 28.16 | 0.0178 | N/A | N/A | 2.12 |
| 53.50 | 37.52 | 0.0133 | N/A | N/A | 2.22 |
| 54.00 | 41.45 | 0.0121 | N/A | N/A | 2.11 |
| 54.50 | 71.84 | 0.0070 | N/A | N/A | 1.81 |
| 55.00 | 70.41 | 0.0071 | N/A | N/A | 2.00 |
| 55.50 | 57.43 | 0.0087 | N/A | N/A | 1.97 |
| 56.00 | 39.32 | 0.0127 | N/A | N/A | 2.08 |
| 56.50 | 38.60 | 0.0130 | N/A | N/A | 2.09 |
| 57.00 | 35.83 | 0.0140 | N/A | N/A | 2.08 |
| 57.50 | 34.26 | 0.0146 | N/A | N/A | 2.22 |
| 58.00 | 29.98 | 0.0167 | N/A | N/A | 2.06 |
| 58.50 | 29.83 | 0.0168 | N/A | N/A | 2.17 |
| 59.00 | 31.76 | 0.0157 | N/A | N/A | 2.14 |
| 59.50 | 35.59 | 0.0140 | N/A | N/A | 2.15 |
| 60.00 | 34.90 | 0.0143 | N/A | N/A | 2.20 |
| 60.50 | 32.81 | 0.0152 | N/A | N/A | 2.12 |
| 61.00 | 36.25 | 0.0138 | N/A | N/A | 2.11 |
| 61.50 | 45.21 | 0.0111 | N/A | N/A | 2.02 |
| 62.00 | 82.02 | 0.0061 | N/A | N/A | 1.86 |
| 62.50 | 42.02 | 0.0119 | N/A | N/A | 2.14 |
| 63.00 | 35.28 | 0.0142 | N/A | N/A | 2.12 |
| 63.50 | 31.76 | 0.0157 | N/A | N/A | 2.16 |
| 64.00 | 27.24 | 0.0184 | N/A | N/A | 2.26 |
| 64.50 | 30.14 | 0.0166 | N/A | N/A | 2.33 |
| 65.00 | 30.12 | 0.0166 | N/A | N/A | 2.32 |
| 65.50 | 25.14 | 0.0199 | N/A | N/A | 2.26 |
| 66.00 | 24.73 | 0.0202 | N/A | N/A | 2.20 |
| 66.50 | 25.93 | 0.0193 | N/A | N/A | 2.16 |
| 67.00 | 25.66 | 0.0195 | N/A | N/A | 2.13 |
| 67.50 | 28.05 | 0.0178 | N/A | N/A | 2.15 |
| 68.00 | 35.74 | 0.0140 | N/A | N/A | 2.15 |
| 68.50 | 29.42 | 0.0170 | N/A | N/A | 2.06 |
| 69.00 | 25.64 | 0.0195 | N/A | N/A | 2.08 |
| 69.50 | 28.13 | 0.0178 | N/A | N/A | 2.17 |
| 70.00 | 28.92 | 0.0173 | N/A | N/A | 2.12 |
| 70.50 | 29.54 | 0.0169 | N/A | N/A | 2.18 |
| 71.00 | 37.12 | 0.0135 | N/A | N/A | 2.26 |
| 71.50 | 36.30 | 0.0138 | N/A | N/A | 2.14 |
| 72.00 | 30.72 | 0.0163 | N/A | N/A | 2.30 |
| 72.50 | 29.15 | 0.0172 | N/A | N/A | 2.30 |

| | | | | | |
|---|---|---|---|---|---|
| 73.00 | 30.96 | 0.0162 | N/A | N/A | 2.26 |
| 73.50 | 42.99 | 0.0116 | N/A | N/A | 2.20 |
| 74.00 | 35.61 | 0.0140 | N/A | N/A | 2.15 |
| 74.50 | 35.61 | 0.0140 | N/A | N/A | 2.15 |
| 75.00 | 35.61 | 0.0140 | N/A | N/A | 2.15 |
| 75.50 | 35.61 | 0.0140 | N/A | N/A | 2.15 |
| 76.00 | 35.61 | 0.0140 | N/A | N/A | 2.15 |
| 76.50 | 35.61 | 0.0140 | N/A | N/A | 2.15 |
| 77.00 | 35.61 | 0.0140 | N/A | N/A | 2.15 |
| 77.50 | 35.61 | 0.0140 | N/A | N/A | 2.15 |
| 78.00 | 35.61 | 0.0140 | N/A | N/A | 2.15 |
| 78.50 | 35.61 | 0.0140 | N/A | N/A | 2.15 |
| 79.00 | 35.61 | 0.0140 | N/A | N/A | 2.15 |
| 79.50 | 35.61 | 0.0140 | N/A | N/A | 2.15 |
| 80.00 | 35.61 | 0.0140 | N/A | N/A | 2.15 |
| 80.50 | 35.61 | 0.0140 | N/A | N/A | 2.15 |
| 81.00 | 35.61 | 0.0140 | N/A | N/A | 2.15 |
| 81.50 | 35.61 | 0.0140 | N/A | N/A | 2.15 |
| 82.00 | 35.61 | 0.0140 | N/A | N/A | 2.15 |
| 82.50 | 35.61 | 0.0140 | N/A | N/A | 2.15 |
| 83.00 | 35.61 | 0.0140 | N/A | N/A | 2.15 |
| 83.50 | 35.61 | 0.0140 | N/A | N/A | 2.15 |
| 84.00 | 35.61 | 0.0140 | N/A | N/A | 2.15 |
| 84.50 | 35.61 | 0.0140 | N/A | N/A | 2.15 |
| 85.00 | 35.61 | 0.0140 | N/A | N/A | 2.15 |
| 85.50 | 35.61 | 0.0140 | N/A | N/A | 2.15 |
| 86.00 | 35.61 | 0.0140 | N/A | N/A | 2.15 |
| 86.50 | 35.61 | 0.0140 | N/A | N/A | 2.15 |
| 87.00 | 35.61 | 0.0140 | N/A | N/A | 2.15 |
| 87.50 | 35.61 | 0.0140 | N/A | N/A | 2.15 |
| 88.00 | 35.61 | 0.0140 | N/A | N/A | 2.15 |
| 88.50 | 35.61 | 0.0140 | N/A | N/A | 2.15 |
| 89.00 | 35.61 | 0.0140 | N/A | N/A | 2.15 |
| 89.50 | 35.61 | 0.0140 | N/A | N/A | 2.15 |
| 90.00 | 35.61 | 0.0140 | N/A | N/A | 2.15 |
| 90.50 | 35.61 | 0.0140 | N/A | N/A | 2.15 |
| 91.00 | 35.61 | 0.0140 | N/A | N/A | 2.15 |
| 91.50 | 35.61 | 0.0140 | N/A | N/A | 2.15 |
| 92.00 | 35.61 | 0.0140 | N/A | N/A | 2.15 |
| 92.50 | 35.61 | 0.0140 | N/A | N/A | 2.15 |
| 93.00 | 35.61 | 0.0140 | N/A | N/A | 2.15 |
| 93.50 | 35.61 | 0.0140 | N/A | N/A | 2.15 |
| 94.00 | 35.61 | 0.0140 | N/A | N/A | 2.15 |
| 94.50 | 35.61 | 0.0140 | N/A | N/A | 2.15 |
| 95.00 | 35.61 | 0.0140 | N/A | N/A | 2.15 |
| 95.50 | 35.61 | 0.0140 | N/A | N/A | 2.15 |
| 96.00 | 35.61 | 0.0140 | N/A | N/A | 2.15 |
| 96.50 | 35.61 | 0.0140 | N/A | N/A | 2.15 |
| 97.00 | 35.61 | 0.0140 | N/A | N/A | 2.15 |
| 97.50 | 35.61 | 0.0140 | N/A | N/A | 2.15 |
| 98.00 | 35.61 | 0.0140 | N/A | N/A | 2.15 |
| 98.50 | 35.61 | 0.0140 | N/A | N/A | 2.15 |
| 99.00 | 35.61 | 0.0140 | N/A | N/A | 2.15 |
| 99.50 | 35.61 | 0.0140 | N/A | N/A | 2.15 |
| 100.00 | 35.61 | 0.0140 | N/A | N/A | 2.15 |

**Earth Systems**

Job Number: 307035-001
Job Name: KITP Housing Project
Calc Date: 2/4/2025
CPT ID: CPT-19

| Depth (ft) | SPT $N_{60}$ | Sublayer Thick/$N_{60}$ | Su (tsf) | Su (psf) | Sublayer Thick/Su | Ic |
|---|---|---|---|---|---|---|
| 0.50 | 13.93 | 0.0359 | | N/A | N/A | 2.02 |
| 1.00 | 11.48 | 0.0436 | | N/A | N/A | 2.27 |
| 1.50 | 9.60 | 0.0521 | 2.12 | 4248 | 0.0001 | 2.67 |
| 2.00 | 8.38 | 0.0597 | 1.73 | 3455 | 0.0001 | 2.80 |
| 2.50 | 7.35 | 0.0680 | 1.46 | 2930 | 0.0002 | 2.86 |
| 3.00 | 6.60 | 0.0758 | 1.30 | 2593 | 0.0002 | 2.88 |
| 3.50 | 6.17 | 0.0810 | 1.22 | 2432 | 0.0002 | 2.87 |
| 4.00 | 6.07 | 0.0824 | 1.24 | 2489 | 0.0002 | 2.80 |
| 4.50 | 7.60 | 0.0658 | 1.63 | 3253 | 0.0002 | 2.72 |
| 5.00 | 7.68 | 0.0651 | | N/A | N/A | 2.59 |
| 5.50 | 14.53 | 0.0344 | | N/A | N/A | 2.24 |
| 6.00 | 28.54 | 0.0175 | | N/A | N/A | 1.79 |
| 6.50 | 34.90 | 0.0143 | | N/A | N/A | 1.66 |
| 7.00 | 26.01 | 0.0192 | | N/A | N/A | 2.46 |
| 7.50 | 8.93 | 0.0560 | 1.97 | 3938 | 0.0001 | 2.66 |
| 8.00 | 22.10 | 0.0226 | | N/A | N/A | 2.04 |
| 8.50 | 21.46 | 0.0233 | | N/A | N/A | 1.91 |
| 9.00 | 24.53 | 0.0204 | | N/A | N/A | 1.88 |
| 9.50 | 41.13 | 0.0122 | | N/A | N/A | 1.75 |
| 10.00 | 50.01 | 0.0100 | | N/A | N/A | 1.77 |
| 10.50 | 48.48 | 0.0103 | | N/A | N/A | 1.79 |
| 11.00 | 44.05 | 0.0114 | | N/A | N/A | 1.74 |
| 11.50 | 42.22 | 0.0118 | | N/A | N/A | 1.86 |
| 12.00 | 44.87 | 0.0111 | | N/A | N/A | 1.94 |
| 12.50 | 40.13 | 0.0125 | | N/A | N/A | 1.96 |
| 13.00 | 31.92 | 0.0157 | | N/A | N/A | 1.88 |
| 13.50 | 29.71 | 0.0168 | | N/A | N/A | 1.81 |
| 14.00 | 34.31 | 0.0146 | | N/A | N/A | 1.89 |
| 14.50 | 34.84 | 0.0144 | | N/A | N/A | 1.90 |
| 15.00 | 30.62 | 0.0163 | | N/A | N/A | 1.98 |
| 15.50 | 23.63 | 0.0212 | | N/A | N/A | 2.09 |
| 16.00 | 18.61 | 0.0269 | | N/A | N/A | 2.09 |
| 16.50 | 36.77 | 0.0136 | | N/A | N/A | 1.86 |
| 17.00 | 47.50 | 0.0105 | | N/A | N/A | 1.81 |
| 17.50 | 51.00 | 0.0098 | | N/A | N/A | 1.87 |
| 18.00 | 56.84 | 0.0088 | | N/A | N/A | 1.72 |
| 18.50 | 42.09 | 0.0119 | | N/A | N/A | 1.83 |
| 19.00 | 39.94 | 0.0125 | | N/A | N/A | 2.02 |
| 19.50 | 32.70 | 0.0153 | | N/A | N/A | 2.26 |
| 20.00 | 36.47 | 0.0137 | | N/A | N/A | 2.21 |
| 20.50 | 39.20 | 0.0128 | | N/A | N/A | 2.19 |
| 21.00 | 40.63 | 0.0123 | | N/A | N/A | 2.11 |
| 21.50 | 39.65 | 0.0126 | | N/A | N/A | 2.16 |
| 22.00 | 34.56 | 0.0145 | | N/A | N/A | 2.13 |
| 22.50 | 34.54 | 0.0145 | | N/A | N/A | 2.17 |
| 23.00 | 35.10 | 0.0142 | | N/A | N/A | 2.14 |
| 23.50 | 34.31 | 0.0146 | | N/A | N/A | 2.16 |
| 24.00 | 36.83 | 0.0136 | | N/A | N/A | 2.21 |
| 24.50 | 37.09 | 0.0135 | | N/A | N/A | 2.21 |
| 25.00 | 33.07 | 0.0151 | | N/A | N/A | 2.22 |
| 25.50 | 36.34 | 0.0138 | | N/A | N/A | 2.17 |
| 26.00 | 43.67 | 0.0114 | | N/A | N/A | 2.13 |
| 26.50 | 41.46 | 0.0121 | | N/A | N/A | 2.16 |
| 27.00 | 37.48 | 0.0133 | | N/A | N/A | 2.21 |
| 27.50 | 34.09 | 0.0147 | | N/A | N/A | 2.20 |
| 28.00 | 31.98 | 0.0156 | | N/A | N/A | 2.13 |
| 28.50 | 34.33 | 0.0146 | | N/A | N/A | 2.17 |
| 29.00 | 37.28 | 0.0134 | | N/A | N/A | 2.15 |
| 29.50 | 39.05 | 0.0128 | | N/A | N/A | 2.17 |
| 30.00 | 43.55 | 0.0115 | | N/A | N/A | 2.17 |
| 30.50 | 40.12 | 0.0125 | | N/A | N/A | 2.17 |
| 31.00 | 37.09 | 0.0135 | | N/A | N/A | 2.18 |
| 31.50 | 37.87 | 0.0132 | | N/A | N/A | 2.18 |
| 32.00 | 37.60 | 0.0133 | | N/A | N/A | 2.19 |
| 32.50 | 37.23 | 0.0134 | | N/A | N/A | 2.17 |
| 33.00 | 35.57 | 0.0141 | | N/A | N/A | 2.18 |
| 33.50 | 37.77 | 0.0132 | | N/A | N/A | 2.18 |
| 34.00 | 34.84 | 0.0144 | | N/A | N/A | 2.04 |
| 34.50 | 37.87 | 0.0132 | | N/A | N/A | 2.14 |
| 35.00 | 38.15 | 0.0131 | | N/A | N/A | 2.15 |

| | | |
|---|---|---|
| Thickness of Cohesionless Soils = | 96.00 | ft |
| $N_{ch}$-bar Value = | 42.8 | * |
| Site Classification from N-bar = | Class D | |
| Thickness of Cohesive Soils = | 4.00 | ft |
| Su-bar Value = | 3046 | ** |
| Site Classification from Su-bar = | Class C | |

↓

Use the weaker Class if they are different.

*Equation 20.4-3 of ASCE 7-16

**Equation 20.4-4 of ASCE 7-16

| | | | | | |
|---|---|---|---|---|---|
| 35.50 | 43.57 | 0.0115 | N/A | N/A | 2.15 |
| 36.00 | 45.52 | 0.0110 | N/A | N/A | 2.14 |
| 36.50 | 45.57 | 0.0110 | N/A | N/A | 2.20 |
| 37.00 | 47.58 | 0.0105 | N/A | N/A | 2.20 |
| 37.50 | 44.51 | 0.0112 | N/A | N/A | 2.17 |
| 38.00 | 44.56 | 0.0112 | N/A | N/A | 2.11 |
| 38.50 | 42.42 | 0.0118 | N/A | N/A | 2.23 |
| 39.00 | 45.50 | 0.0110 | N/A | N/A | 2.22 |
| 39.50 | 51.19 | 0.0098 | N/A | N/A | 2.19 |
| 40.00 | 51.35 | 0.0097 | N/A | N/A | 2.18 |
| 40.50 | 39.63 | 0.0126 | N/A | N/A | 2.19 |
| 41.00 | 39.91 | 0.0125 | N/A | N/A | 2.23 |
| 41.50 | 40.86 | 0.0122 | N/A | N/A | 2.16 |
| 42.00 | 41.51 | 0.0120 | N/A | N/A | 2.19 |
| 42.50 | 43.49 | 0.0115 | N/A | N/A | 2.17 |
| 43.00 | 41.62 | 0.0120 | N/A | N/A | 2.16 |
| 43.50 | 47.33 | 0.0106 | N/A | N/A | 2.21 |
| 44.00 | 47.50 | 0.0105 | N/A | N/A | 2.19 |
| 44.50 | 46.21 | 0.0108 | N/A | N/A | 2.20 |
| 45.00 | 47.59 | 0.0105 | N/A | N/A | 2.21 |
| 45.50 | 50.14 | 0.0100 | N/A | N/A | 2.25 |
| 46.00 | 58.17 | 0.0086 | N/A | N/A | 2.07 |
| 46.50 | 53.28 | 0.0094 | N/A | N/A | 2.16 |
| 47.00 | 51.82 | 0.0096 | N/A | N/A | 2.19 |
| 47.50 | 47.02 | 0.0106 | N/A | N/A | 2.21 |
| 48.00 | 55.69 | 0.0090 | N/A | N/A | 2.21 |
| 48.50 | 52.60 | 0.0095 | N/A | N/A | 2.22 |
| 49.00 | 53.08 | 0.0094 | N/A | N/A | 2.21 |
| 49.50 | 53.38 | 0.0094 | N/A | N/A | 2.08 |
| 50.00 | 52.80 | 0.0095 | N/A | N/A | 2.19 |
| 50.50 | 50.00 | 0.0100 | N/A | N/A | 2.23 |
| 51.00 | 63.83 | 0.0078 | N/A | N/A | 2.19 |
| 51.50 | 59.73 | 0.0084 | N/A | N/A | 2.08 |
| 52.00 | 56.61 | 0.0088 | N/A | N/A | 2.22 |
| 52.50 | 61.24 | 0.0082 | N/A | N/A | 2.16 |
| 53.00 | 64.41 | 0.0078 | N/A | N/A | 2.18 |
| 53.50 | 57.79 | 0.0087 | N/A | N/A | 2.11 |
| 54.00 | 67.61 | 0.0074 | N/A | N/A | 2.17 |
| 54.50 | 55.90 | 0.0089 | N/A | N/A | 2.13 |
| 55.00 | 55.62 | 0.0090 | N/A | N/A | 2.17 |
| 55.50 | 65.42 | 0.0076 | N/A | N/A | 2.18 |
| 56.00 | 57.75 | 0.0087 | N/A | N/A | 2.21 |
| 56.50 | 50.12 | 0.0100 | N/A | N/A | 2.28 |
| 57.00 | 55.84 | 0.0090 | N/A | N/A | 2.14 |
| 57.50 | 56.91 | 0.0088 | N/A | N/A | 2.24 |
| 58.00 | 56.86 | 0.0088 | N/A | N/A | 2.24 |
| 58.50 | 49.86 | 0.0100 | N/A | N/A | 2.28 |
| 59.00 | 55.76 | 0.0090 | N/A | N/A | 2.29 |
| 59.50 | 60.60 | 0.0083 | N/A | N/A | 2.08 |
| 60.00 | 60.83 | 0.0082 | N/A | N/A | 2.23 |
| 60.50 | 62.93 | 0.0079 | N/A | N/A | 2.11 |
| 61.00 | 53.52 | 0.0093 | N/A | N/A | 2.22 |
| 61.50 | 53.71 | 0.0093 | N/A | N/A | 2.19 |
| 62.00 | 62.50 | 0.0080 | N/A | N/A | 2.15 |
| 62.50 | 52.40 | 0.0095 | N/A | N/A | 2.18 |
| 63.00 | 53.37 | 0.0094 | N/A | N/A | 2.17 |
| 63.50 | 53.37 | 0.0094 | N/A | N/A | 2.17 |
| 64.00 | 53.37 | 0.0094 | N/A | N/A | 2.17 |
| 64.50 | 53.37 | 0.0094 | N/A | N/A | 2.17 |
| 65.00 | 53.37 | 0.0094 | N/A | N/A | 2.17 |
| 65.50 | 53.37 | 0.0094 | N/A | N/A | 2.17 |
| 66.00 | 53.37 | 0.0094 | N/A | N/A | 2.17 |
| 66.50 | 53.37 | 0.0094 | N/A | N/A | 2.17 |
| 67.00 | 53.37 | 0.0094 | N/A | N/A | 2.17 |
| 67.50 | 53.37 | 0.0094 | N/A | N/A | 2.17 |
| 68.00 | 53.37 | 0.0094 | N/A | N/A | 2.17 |
| 68.50 | 53.37 | 0.0094 | N/A | N/A | 2.17 |
| 69.00 | 53.37 | 0.0094 | N/A | N/A | 2.17 |
| 69.50 | 53.37 | 0.0094 | N/A | N/A | 2.17 |
| 70.00 | 53.37 | 0.0094 | N/A | N/A | 2.17 |
| 70.50 | 53.37 | 0.0094 | N/A | N/A | 2.17 |
| 71.00 | 53.37 | 0.0094 | N/A | N/A | 2.17 |
| 71.50 | 53.37 | 0.0094 | N/A | N/A | 2.17 |
| 72.00 | 53.37 | 0.0094 | N/A | N/A | 2.17 |
| 72.50 | 53.37 | 0.0094 | N/A | N/A | 2.17 |

| | | | | | |
|---|---|---|---|---|---|
| 73.00 | 53.37 | 0.0094 | N/A | N/A | 2.17 |
| 73.50 | 53.37 | 0.0094 | N/A | N/A | 2.17 |
| 74.00 | 53.37 | 0.0094 | N/A | N/A | 2.17 |
| 74.50 | 53.37 | 0.0094 | N/A | N/A | 2.17 |
| 75.00 | 53.37 | 0.0094 | N/A | N/A | 2.17 |
| 75.50 | 53.37 | 0.0094 | N/A | N/A | 2.17 |
| 76.00 | 53.37 | 0.0094 | N/A | N/A | 2.17 |
| 76.50 | 53.37 | 0.0094 | N/A | N/A | 2.17 |
| 77.00 | 53.37 | 0.0094 | N/A | N/A | 2.17 |
| 77.50 | 53.37 | 0.0094 | N/A | N/A | 2.17 |
| 78.00 | 53.37 | 0.0094 | N/A | N/A | 2.17 |
| 78.50 | 53.37 | 0.0094 | N/A | N/A | 2.17 |
| 79.00 | 53.37 | 0.0094 | N/A | N/A | 2.17 |
| 79.50 | 53.37 | 0.0094 | N/A | N/A | 2.17 |
| 80.00 | 53.37 | 0.0094 | N/A | N/A | 2.17 |
| 80.50 | 53.37 | 0.0094 | N/A | N/A | 2.17 |
| 81.00 | 53.37 | 0.0094 | N/A | N/A | 2.17 |
| 81.50 | 53.37 | 0.0094 | N/A | N/A | 2.17 |
| 82.00 | 53.37 | 0.0094 | N/A | N/A | 2.17 |
| 82.50 | 53.37 | 0.0094 | N/A | N/A | 2.17 |
| 83.00 | 53.37 | 0.0094 | N/A | N/A | 2.17 |
| 83.50 | 53.37 | 0.0094 | N/A | N/A | 2.17 |
| 84.00 | 53.37 | 0.0094 | N/A | N/A | 2.17 |
| 84.50 | 53.37 | 0.0094 | N/A | N/A | 2.17 |
| 85.00 | 53.37 | 0.0094 | N/A | N/A | 2.17 |
| 85.50 | 53.37 | 0.0094 | N/A | N/A | 2.17 |
| 86.00 | 53.37 | 0.0094 | N/A | N/A | 2.17 |
| 86.50 | 53.37 | 0.0094 | N/A | N/A | 2.17 |
| 87.00 | 53.37 | 0.0094 | N/A | N/A | 2.17 |
| 87.50 | 53.37 | 0.0094 | N/A | N/A | 2.17 |
| 88.00 | 53.37 | 0.0094 | N/A | N/A | 2.17 |
| 88.50 | 53.37 | 0.0094 | N/A | N/A | 2.17 |
| 89.00 | 53.37 | 0.0094 | N/A | N/A | 2.17 |
| 89.50 | 53.37 | 0.0094 | N/A | N/A | 2.17 |
| 90.00 | 53.37 | 0.0094 | N/A | N/A | 2.17 |
| 90.50 | 53.37 | 0.0094 | N/A | N/A | 2.17 |
| 91.00 | 53.37 | 0.0094 | N/A | N/A | 2.17 |
| 91.50 | 53.37 | 0.0094 | N/A | N/A | 2.17 |
| 92.00 | 53.37 | 0.0094 | N/A | N/A | 2.17 |
| 92.50 | 53.37 | 0.0094 | N/A | N/A | 2.17 |
| 93.00 | 53.37 | 0.0094 | N/A | N/A | 2.17 |
| 93.50 | 53.37 | 0.0094 | N/A | N/A | 2.17 |
| 94.00 | 53.37 | 0.0094 | N/A | N/A | 2.17 |
| 94.50 | 53.37 | 0.0094 | N/A | N/A | 2.17 |
| 95.00 | 53.37 | 0.0094 | N/A | N/A | 2.17 |
| 95.50 | 53.37 | 0.0094 | N/A | N/A | 2.17 |
| 96.00 | 53.37 | 0.0094 | N/A | N/A | 2.17 |
| 96.50 | 53.37 | 0.0094 | N/A | N/A | 2.17 |
| 97.00 | 53.37 | 0.0094 | N/A | N/A | 2.17 |
| 97.50 | 53.37 | 0.0094 | N/A | N/A | 2.17 |
| 98.00 | 53.37 | 0.0094 | N/A | N/A | 2.17 |
| 98.50 | 53.37 | 0.0094 | N/A | N/A | 2.17 |
| 99.00 | 53.37 | 0.0094 | N/A | N/A | 2.17 |
| 99.50 | 53.37 | 0.0094 | N/A | N/A | 2.17 |
| 100.00 | 53.37 | 0.0094 | N/A | N/A | 2.17 |

2022 CBC & ASCE 7-16 Seismic Parameters

34.4168 -119.8591 Lat/Long

## Table E-4 - Site Specific Spectral Response Values
## Probabilistic and Deterministic Response Spectra for MCE compared to Code Spectra for 5% Viscous Damping Ratio

| Natural Period T (seconds) | GeoMean Probab. 2% in 50 year MCE Spectrum (1) 2475-year (ASCE 21.2.1) | Rotated Probab. 2% in 50 year MCEr Spectrum (2) 2475-year (ASCE 21.2.1.1) | Rotated 84th Percentile Determ. MCE Spectrum (3) (ASCE 21.2.2) | Determ. Lower Limit MCE Spectrum (4) (3) * 1.00=Scaling (ASCE 21.2.2) | Determ. MCE Spectrum (5) Max (3),(4) (ASCE 21.2.2) | Site Specific $MCE_R$, Ground Response (SaM) (6) Min (2),(5) (ASCE 21.2.3) | Site Specific MCE Spectrum Comparator (6b) Max (6),1.5*(8) (ASCE 21.2.3) | 2022 CBC MCE Spectrum (7) | Site Specific Design Spectrum (Sa) (8) (ASCE 21.3) | 2022 CBC Design Spectrum (9) 2/3*(7) |
|---|---|---|---|---|---|---|---|---|---|---|
| **0.00** | 1.279 | 1.229 | 1.046 | 1.046 | 1.046 | 1.046 | 1.046 | 0.961 | 0.697 | 0.641 |
| **0.05** | 1.693 | 1.628 | 1.249 | 1.249 | 1.249 | 1.249 | 1.249 | 1.372 | 0.833 | 0.915 |
| **0.10** | 2.107 | 2.026 | 1.721 | 1.721 | 1.721 | 1.721 | 1.721 | 1.784 | 1.147 | 1.189 |
| **0.15** | 2.521 | 2.424 | 2.052 | 2.052 | 2.052 | 2.052 | 2.052 | 2.196 | 1.368 | 1.464 |
| **0.20** | 2.814 | 2.706 | 2.267 | 2.267 | 2.267 | 2.267 | 2.267 | 2.402 | 1.511 | 1.601 |
| **0.30** | 3.252 | 3.289 | 2.711 | 2.711 | 2.711 | 2.711 | 2.711 | 2.402 | 1.807 | 1.601 |
| **0.40** | 3.187 | 3.279 | 2.765 | 2.765 | 2.765 | 2.765 | 2.765 | 2.402 | 1.843 | 1.601 |
| **0.50** | 3.136 | 3.282 | 2.629 | 2.629 | 2.629 | 2.629 | 2.629 | 2.402 | 1.753 | 1.601 |
| **0.75** | 2.463 | 2.687 | 2.186 | 2.186 | 2.186 | 2.186 | 2.186 | 2.402 | 1.457 | 1.601 |
| **1.00** | 1.985 | 2.253 | 1.812 | 1.812 | 1.812 | 1.812 | 1.812 | 2.103 | 1.208 | 1.402 |
| **1.50** | 1.349 | 1.561 | 1.185 | 1.185 | 1.185 | 1.185 | 1.185 | 1.402 | 0.790 | 0.934 |
| **2.00** | 0.898 | 1.058 | 0.832 | 0.832 | 0.832 | 0.832 | 0.841 | 1.051 | 0.561 | 0.701 |
| **3.00** | 0.514 | 0.629 | 0.511 | 0.511 | 0.511 | 0.511 | 0.561 | 0.701 | 0.374 | 0.467 |
| **4.00** | 0.330 | 0.417 | 0.335 | 0.335 | 0.335 | 0.335 | 0.421 | 0.526 | 0.280 | 0.350 |
| **5.00** | 0.235 | 0.308 | 0.235 | 0.235 | 0.235 | 0.235 | 0.336 | 0.421 | 0.224 | 0.280 |
| **8.00** | 0.115 | 0.150 | 0.128 | 0.128 | 0.128 | 0.128 | 0.210 | 0.263 | 0.140 | 0.175 |
| **10.00** | 0.072 | 0.095 | 0.057 | 0.057 | 0.057 | 0.057 | 0.168 | 0.168 | 0.112 | 0.112 |
| | | | 0.026 | | | | | | | |

| | | |
|---|---|---|
| $C_{RS}$: | 0.874 | |
| $C_{R1}$: | 0.873 | |
| Site Specific To: | 0.146 | $= 0.2*S_{D1}/S_{DS}$ |
| Site Specific Ts: | 0.728 | $= S_{D1}/S_{DS}$ |

*The value of Fa used in Column (3) is defined within ASCE 21.2.2 Supplement 1. This Fa value only applies within Column (3).*

| Site Coefficients | |
|---|---|
| $F_{PGA}$ | 1.10 |
| $F_a$ | 1.00 |
| $F_v$ | 2.50 |

Probabilistic spectrum from 2018 USGS Ground Motion Mapping Program adjusted for site conditions and scaled to represent maximum response in a horizontal plane, in accordance with ASCE 7-16 Section 21.2

| Mapped MCE Acceleration Values | | |
|---|---|---|
| PGA | 1.067 | g |
| $S_S$ | 2.402 | g |
| $S_1$ | 0.841 | g |

Risk Coefficients have been applied to Column (2); If Method 1 was utilized the Risk Coefficients, CRS and CR1 are presented above, if Method 2 was utilized the Risk Coefficients were obtained from the USGS Risk Targeted Ground Motion Calculator (https://earthquake.usgs.gov/designmaps/rtgm).

| | |
|---|---|
| **Seismic Site Class** | **D** |
| **Risk Category** | **III** |

Reference: ASCE 7-16, Chapters 21.2, 21.3, 21.4, 21.5, 11.4, and 11.8

Calculation Utilized ASCE7-16, Section 21.2.1.1 - Method 1

| Site-Specific Design Acceleration Values | | |
|---|---|---|
| **$PGA_M$** | **1.046** | **g** |
| **$S_{DS}$** | **1.659** | **g** |
| **$S_{D1}$** | **1.208** | **g** |

| Short-Period Seismic Design Category: | 1-Second Period Seismic Design Category: |
|---|---|
| E | E |

| Vertical Coefficient ($C_V$) |
|---|
| 1.50 |

| Deterministic Fault Parameters | | | |
|---|---|---|---|
| Mission Ridge-Arroyo Parida-S | | $R_{JB}$ (km) | 0.0 |
| Magnitude | 6.80 | $R_{RUP}$ (km) | 0.0 |
| Distance (km) | 0.0 | $Z_{TOR}$ (km) | 0.0 |
| Width (km) | 8.09 | $Z_{BOT}$ (km) | 7.6 |
| Dip (Deg.) | 70 | $V_{S30}$ (m/s) | 350 |

| Site-Specific $MCE_R$, 5% damped, Spectral Response Acceleration Parameter | | |
|---|---|---|
| **$S_{MS}$** | **2.489** | **g** |
| **$S_{M1}$** | **1.812** | **g** |

1 g = 980.6 cm/sec$^2$ =32.2 ft/sec$^2$

PSV (ft/sec) = $32.2(S_a)T/(2p)$

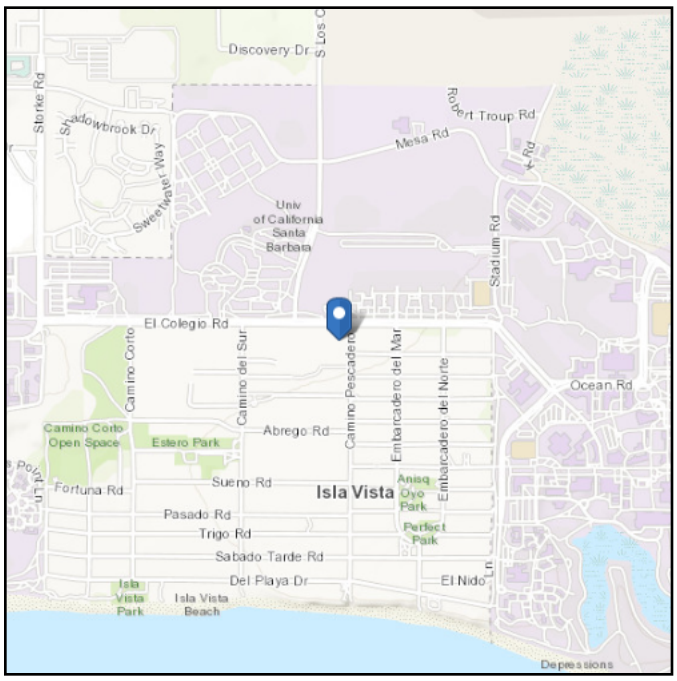
Key: Probab. = Probabilistic, Determ. = Deterministic, MCE = Maximum Considered Earthquake

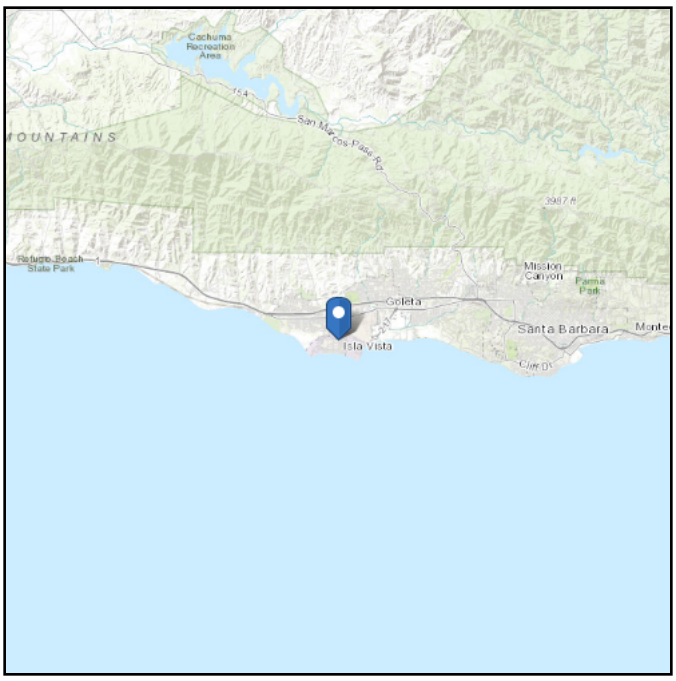
US Seismic Design Maps

# ASCE Hazards Report

**Address:**
No Address at This Location

| | | | |
|---|---|---|---|
| **Standard:** | ASCE/SEI 7-16 | **Latitude:** | 34.4168 |
| **Risk Category:** | III | **Longitude:** | -119.8591 |
| **Soil Class:** | D - Stiff Soil | **Elevation:** | 35.33335921465696 ft (NAVD 88) |



# Seismic

**Site Soil Class:** D - Stiff Soil

**Results:**

| | | | |
|---|---|---|---|
| $S_S$ : | 2.402 | $S_{D1}$ : | N/A |
| $S_1$ : | 0.841 | $T_L$ : | 8 |
| $F_a$ : | 1 | PGA : | 1.067 |
| $F_v$ : | N/A | $PGA_M$ : | 1.174 |
| $S_{MS}$ : | 2.402 | $F_{PGA}$ : | 1.1 |
| $S_{M1}$ : | N/A | $I_e$ : | 1.25 |
| $S_{DS}$ : | 1.601 | $C_v$ : | 1.5 |

Ground motion hazard analysis may be required. See ASCE/SEI 7-16 Section 11.4.8.

**Data Accessed:** Thu Jul 03 2025

**Date Source:** USGS Seismic Design Maps

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Spectral Response Values Table

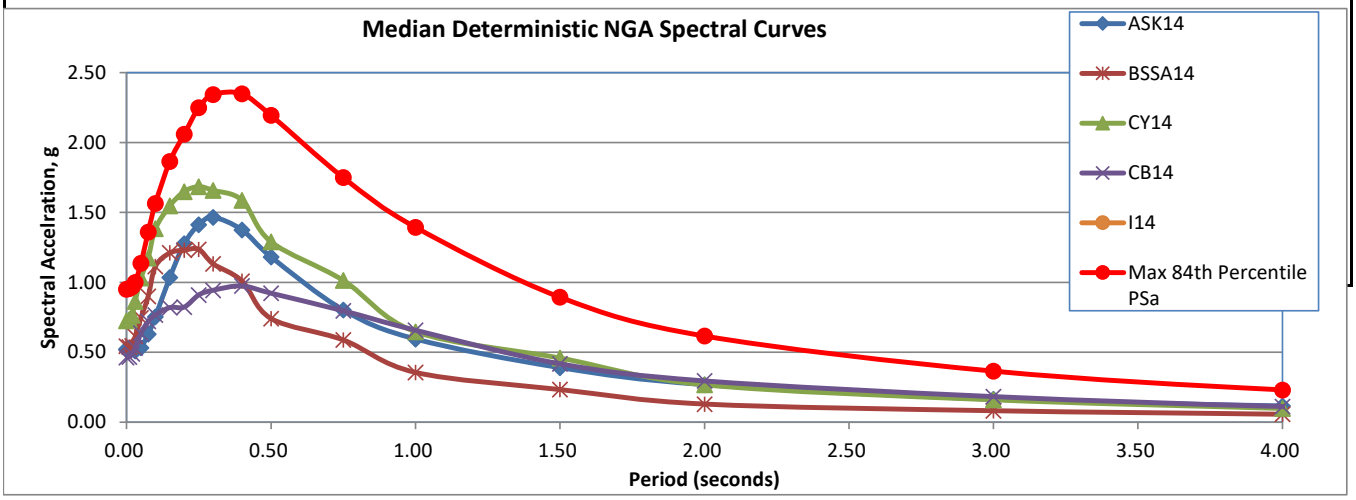
34.4168 -119.8591 Lat/Long

## Table E-3 - Deterministic Spectral Response Values
## Deterministic NGA Response Spectra for Largest Median Earthquake Ground Motion

Average of NGA: Abrahamson - Silva - Kamai (2014), Boore - Stewart - Seyhan - Atkinson (2013), Campbell-Bozorgnia (2013), Chiou - Youngs (2014), and Idriss (2013)

Mean Spectra Response from Attentuation Relationships

| Input Variables | ASK14 | | BSSA14 | CB14 | CY14 | I14 | Average | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Period (sec) | Median PSa (g) | Median PSa (g) | Median PSa (g) | Median PSa (g) | Median PSa (g) | Period (sec) | Mean PSa (g) | Max 84th Percentile PSa (g) | Max Rotated Determ. PSa |
| | **Weight:** | **0.25** | **0.25** | **0.25** | **0.25** | **0.00** | | | | |
| **M** 6.80 | **0.00** | 0.52 | 0.54 | 0.46 | 0.73 | - | **0.00** | 0.562 | 0.951 | **1.046** |
| | **0.01** | 0.52 | 0.54 | 0.47 | 0.73 | - | **0.01** | 0.565 | 0.957 | **1.052** |
| $R_{RUP}$ 0.00 | **0.02** | 0.52 | 0.54 | 0.49 | 0.73 | - | **0.02** | 0.572 | 0.970 | **1.066** |
| | **0.03** | 0.51 | 0.55 | 0.53 | 0.77 | - | **0.03** | 0.589 | 1.000 | **1.100** |
| $R_{JB}$ 0.00 | **0.05** | 0.53 | 0.61 | 0.64 | 0.86 | - | **0.05** | 0.662 | 1.136 | **1.249** |
| | **0.075** | 0.63 | 0.75 | 0.72 | 1.03 | - | **0.075** | 0.782 | 1.361 | **1.497** |
| $V_{S30}$ 350 | **0.10** | 0.75 | 0.90 | 0.77 | 1.18 | - | **0.10** | 0.899 | 1.564 | **1.721** |
| | **0.15** | 1.04 | 1.11 | 0.82 | 1.38 | - | **0.15** | 1.088 | 1.865 | **2.052** |
| $F_{RV}$ 1 | **0.20** | 1.28 | 1.21 | 0.82 | 1.55 | - | **0.20** | 1.215 | 2.060 | **2.267** |
| | **0.25** | 1.41 | 1.23 | 0.91 | 1.65 | - | **0.25** | 1.301 | 2.249 | **2.579** |
| $F_{NM}$ 0 | **0.30** | 1.47 | 1.24 | 0.94 | 1.68 | - | **0.30** | 1.332 | 2.342 | **2.711** |
| | **0.40** | 1.38 | 1.13 | 0.97 | 1.66 | - | **0.40** | 1.285 | 2.348 | **2.765** |
| ***W*** 8.09 | **0.50** | 1.18 | 1.01 | 0.92 | 1.59 | - | **0.50** | 1.175 | 2.195 | **2.629** |
| | **0.75** | 0.80 | 0.74 | 0.80 | 1.29 | - | **0.75** | 0.908 | 1.750 | **2.186** |
| $Z_{TOR}$ 0.00 | **1.00** | 0.60 | 0.59 | 0.66 | 1.01 | - | **1.00** | 0.714 | 1.394 | **1.812** |
| | **1.50** | 0.39 | 0.36 | 0.42 | 0.65 | - | **1.50** | 0.453 | 0.894 | **1.185** |
| $Z_{BOT}$ 7.60 | **2.00** | 0.27 | 0.23 | 0.30 | 0.46 | - | **2.00** | 0.314 | 0.616 | **0.832** |
| | **3.00** | 0.16 | 0.13 | 0.18 | 0.27 | - | **3.00** | 0.186 | 0.365 | **0.511** |
| ***dip*** 70 | **4.00** | 0.12 | 0.08 | 0.11 | 0.16 | - | **4.00** | 0.118 | 0.231 | **0.335** |
| | **5.00** | 0.09 | 0.06 | 0.08 | 0.10 | - | **5.00** | 0.079 | 0.156 | **0.235** |
| | **7.50** | 0.04 | 0.03 | 0.03 | 0.04 | - | **7.50** | 0.035 | 0.069 | **0.103** |
| | **10.00** | 0.02 | 0.01 | 0.02 | 0.02 | - | **10.00** | 0.020 | 0.038 | **0.057** |



Fault Parameters

**Table E-1**
**Fault Parameters**

| Fault Section Name | Distance (miles) | Distance (km) | Upper Seis. Depth (km) | Lower Seis. Depth (km) | Avg Dip Angle (deg.) | Avg Dip Direction (deg.) | Avg Rake (deg.) | Trace Length (km) | Fault Type | **Mean Mag** | Mean Return Interval (years) | Slip Rate (mm/yr) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Mission Ridge-Arroyo Parida-Santa Ana FM3.1, 3 | 0.0 | 0.0 | 0.0 | 7.6 | 70 | 176 | 90 | 69 | B | **6.8** | | 0.4 |
| Red Mountain FM3.1, 3.2 | 2.3 | 3.8 | 0.0 | 14.1 | 56 | 2 | 90 | 101 | B | **7.4** | | 2 |
| North Channel FM3.2 | 4.7 | 7.5 | 1.1 | 4.5 | 26 | 10 | 90 | 51 | B | **6.7** | | 1 |
| Pitas Point (Upper) FM3.2 | 5.4 | 8.7 | 1.4 | 10.0 | 42 | 15 | 90 | 35 | B | **6.8** | | 1 |
| Oak Ridge (Offshore), west extension FM3.2 | 7.2 | 11.7 | 0.0 | 3.1 | 67 | 195 | na | 28 | B' | **6.1** | | |
| Santa Ynez (West) FM3.1, 3.2 | 9.3 | 15.0 | 0.0 | 9.2 | 70 | 182 | 0 | 80 | B | **6.9** | | 2 |
| Pitas Point (Lower, West), FM 3.1 | 9.4 | 15.1 | 1.5 | 8.8 | 13 | 3 | 90 | 35 | B | **7.2** | | 2.5 |
| Santa Ynez River FM3.1, 3.2 | 9.5 | 15.3 | 0.0 | 12.0 | 70 | na | na | 73 | B' | **7.1** | | |
| Los Alamos extension FM3.1, 3.2 | 9.6 | 15.5 | 0.0 | 12.0 | 30 | na | na | 22 | B' | **6.8** | | |
| Channel Islands Western Deep Ramp FM3.1, 3.2 | 9.7 | 15.7 | 4.8 | 12.5 | 21 | 204 | 90 | 62 | B' | **7.3** | | |
| San Luis Range (So Margin) FM3.2 | 10.1 | 16.2 | 0.0 | 12.0 | 45 | 37 | 90 | 115 | B | **7.1** | | 0.2 |
| Santa Ynez (East) FM3.1, 3.2 | 13.9 | 22.4 | 0.0 | 13.3 | 70 | 172 | 0 | 68 | B | **7.2** | | 2 |
| Oak Ridge (Offshore) FM3.2 | 15.4 | 24.7 | 0.0 | 7.9 | 32 | 180 | 90 | 38 | B | **6.9** | | 3 |
| Ventura-Pitas Point FM3.1, 3.2 | 17.3 | 27.8 | 1.0 | 15.0 | 64 | 353 | 60 | 59 | B | **6.9** | | 1 |
| Pitas Point (Lower)-Montalvo, FM3.1 | 17.5 | 28.1 | 0.4 | 12.7 | 16 | 359 | 90 | 30 | B | **7.3** | | 2.5 |
| Los Alamos 2011 CFM FM3.1, 3.2 | 20.2 | 32.5 | 0.0 | 12.0 | 30 | na | na | 27 | B' | **6.9** | | |
| Lions Head 2011 CFM FM3.1, 3.2 | 21.2 | 34.1 | 0.0 | 12.0 | 75 | 29 | 90 | 65 | B | **6.7** | | 0.02 |
| Big Pine (West) FM3.1, 3.2 | 22.0 | 35.4 | 0.0 | 11.0 | 50 | 2 | na | 18 | B' | **6.5** | | |
| Santa Cruz Island FM3.1, 3.2 | 25.1 | 40.3 | 0.0 | 13.3 | 90 | 188 | 30 | 69 | B | **7.1** | | 1 |
| East Huasna 2011 CFM FM3.1, 3.2 | 26.9 | 43.3 | 0.0 | 15.0 | 90 | na | na | 74 | B' | **7.2** | | |
| San Luis Range 2011 CFM, FM3.1 | 27.9 | 44.9 | 0.0 | 12.0 | 52 | na | na | 79 | B' | **7.2** | | |
| Santa Rosa Island FM3.1, 3.2 | 28.1 | 45.3 | 0.0 | 8.7 | 90 | 1 | 30 | 58 | B | **6.8** | | 1 |
| Pine Mtn FM3.1, 3.2 | 30.0 | 48.2 | 0.0 | 16.3 | 45 | 5 | na | 62 | B' | **7.3** | | |
| Channel Islands Thrust FM3.1, 3.2 | 30.6 | 49.2 | 5.0 | 12.3 | 20 | 354 | 90 | 59 | B | **7.3** | | 1.5 |
| Ozena FM3.1, 3.2 | 31.5 | 50.6 | 0.0 | 13.9 | 33 | na | na | 41 | B' | **7.2** | | |
| Sisar FM3.1, 3.2 | 32.5 | 52.3 | 0.0 | 17.4 | 29 | 168 | na | 20 | B' | **7.0** | | |
| Big Pine (Central) FM3.1, 3.2 | 33.4 | 53.8 | 0.0 | 6.6 | 76 | 167 | na | 23 | B' | **6.3** | | |
| South Cuyama FM3.1, 3.2 | 33.5 | 54.0 | 0.0 | 13.9 | 33 | 210 | na | 83 | B' | **7.5** | | |
| Casmalia 2011 CFM | 36.3 | 58.3 | 0.0 | 12.0 | 75 | na | na | 48 | B' | **6.9** | | |
| Santa Cruz Catalina Ridge Alt2 FM3.2 | 36.6 | 58.9 | 0.0 | 11.0 | 90 | 38 | na | 137 | B' | **7.3** | | |
| Santa Cruz Catalina Ridge alt 1, FM3.1 | 36.6 | 58.9 | 0.0 | 11.0 | 90 | na | na | 114 | B' | **7.2** | | |
| Oak Ridge (Onshore) FM3.1, 3.2 | 38.4 | 61.9 | 1.0 | 19.4 | 65 | 159 | 90 | 50 | B | **7.2** | | 4 |
| Morales (West) FM3.1, 3.2 | 39.3 | 63.3 | 0.0 | 8.6 | 32 | 49 | na | 28 | B' | **6.8** | | |
| Malibu Coast (Extension), alt 1, FM3.1 | 39.7 | 63.8 | 0.0 | 7.8 | 74 | 4 | 30 | 35 | B' | **6.5** | | |
| Malibu Coast (Extension), alt 2 FM3.2 | 39.7 | 63.8 | 0.0 | 16.6 | 74 | 4 | 30 | 35 | B' | **6.9** | | |
| San Cayetano FM3.1, 3.2 | 39.9 | 64.3 | 0.0 | 16.0 | 42 | 3 | 90 | 42 | B | **7.2** | | 6 |
| Morales (East) FM3.1, 3.2 | 40.4 | 65.0 | 0.0 | 8.6 | 32 | 14 | na | 18 | B' | **6.6** | | |
| Big Pine (East) FM3.1, 3.2 | 42.2 | 68.0 | 0.0 | 14.3 | 73 | 338 | na | 23 | B' | **6.6** | | |
| Oceanic-West Huasna FM3.1, 3.2 | 43.3 | 69.6 | 0.0 | 7.0 | 58 | 49 | na | 122 | B' | **7.1** | | |
| San Andreas (Big Bend) FM3.1, 3.2 | 44.5 | 71.6 | 0.0 | 15.1 | 90 | 198 | 180 | 50 | A | **6.8** | 89 | 3.5 |

Reference: USGS OFR 2013-1165 (CGS SP 228) Based on Site Coordinates of 34.4168 Latitude, -119.8591 Longitude

Mean Magnitude for Type A Faults based on 0.1 weight for unsegmented section, 0.9 weight for segmented model (weighted by probability of each scenario with section listed as given on Table 3 of Appendix G in OFR 2008-1437). Mean magnitude is average of Ellworths-B and Hanks & Bakun moment area relationship.

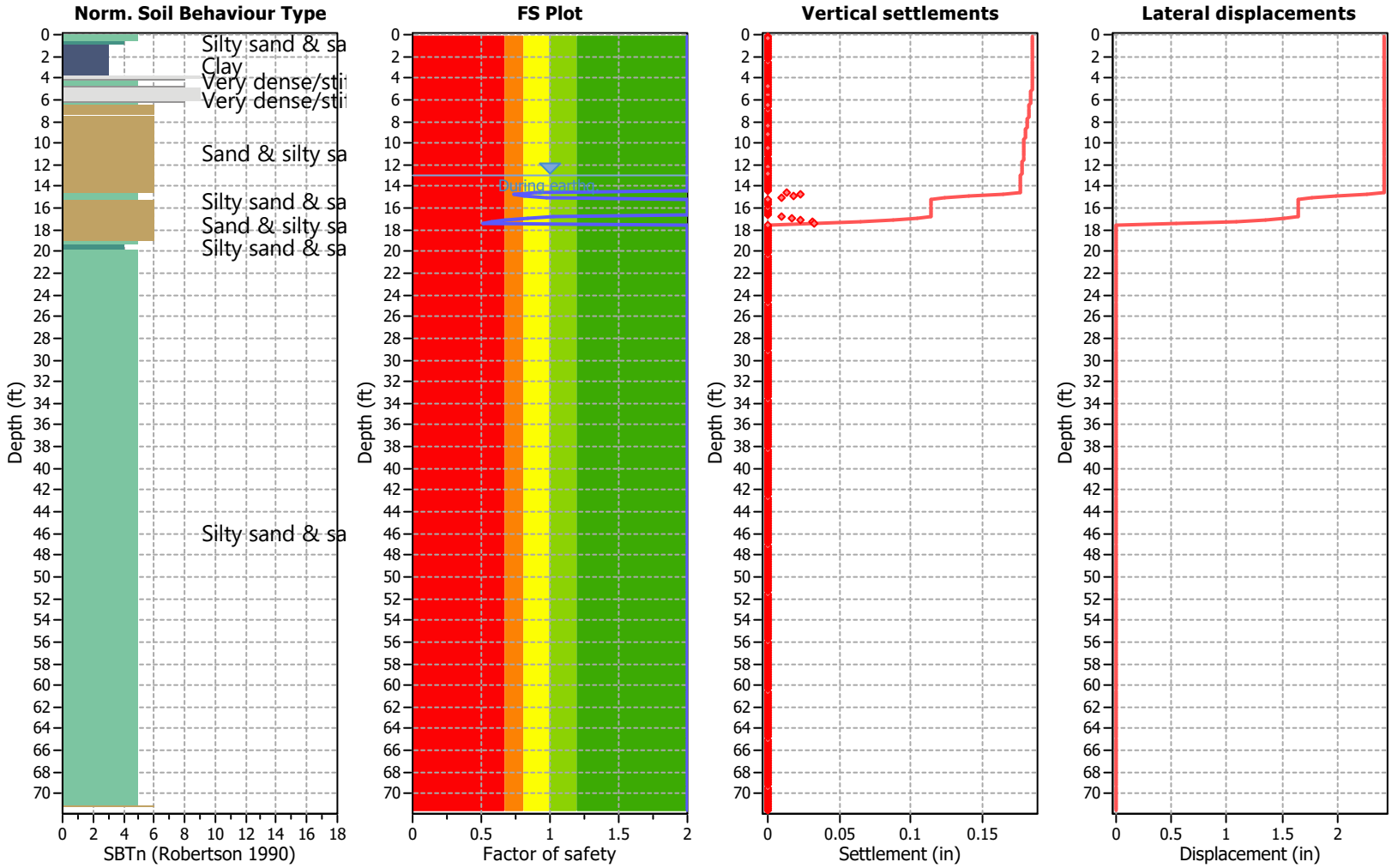
**APPENDIX E**

Liquefaction and Dry Sand Seismic Settlement Analyses (CPT-4, CPT-11, and CPT-19)
Lateral Spreading Analyses Results (CPT-4, CPT-11, and CPT-19)

**GeoLogismiki**
Geotechnical Engineers
Merarhias 56
http://www.geologismiki.gr

**Project:** 307035-001 KITP Housing Project
**Location:** Goleta, CA 93117

**CPT: CPT-4 (LIQ)**
Total depth: 71.52 ft




| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Analysis method: | NCEER (1998) | G.W.T. (in-situ): | 13.00 ft | Use fill: | No | Clay like behavior applied: | Sands only |
| Fines correction method: | NCEER (1998) | G.W.T. (earthq.): | 13.00 ft | Fill height: | N/A | Limit depth applied: | Yes |
| Points to test: | Based on Ic value | Average results interval: | 3 | Fill weight: | N/A | Limit depth: | 17.50 ft |
| Earthquake magnitude $M_w$: | 6.80 | Ic cut-off value: | 2.60 | Trans. detect. applied: | Yes | MSF method: | Method based |
| Peak ground acceleration: | 1.05 | Unit weight calculation: | Based on SBT | $K_\sigma$ applied: | Yes | | |

**:: Post-earthquake settlement of dry sands ::**

| Depth (ft) | Ic | $Q_{tn}$ | Kc | $Q_{tn,cs}$ | $N_{1,60}$ (blows) | $G_{max}$ (tsf) | CSR | Shear, γ (%) | $e_{vol(15)}$ (%) | $N_c$ | $e_v$ (%) | Settle. (in) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.16 | 2.22 | 74.89 | 1.68 | 125.72 | 29 | 702 | 0.69 | 0.001 | 0.00 | 9.34 | 0.00 | 0.000 |
| 0.33 | 2.16 | 86.39 | 1.52 | 130.97 | 29 | 742 | 0.69 | 0.002 | 0.00 | 9.34 | 0.00 | 0.000 |
| 0.49 | 2.19 | 85.51 | 1.59 | 136.01 | 0 | 0 | 0.69 | 0.000 | 0.00 | 0.00 | 0.00 | 0.000 |
| 0.66 | 2.24 | 80.95 | 1.73 | 140.15 | 0 | 0 | 0.69 | 0.000 | 0.00 | 0.00 | 0.00 | 0.000 |
| 0.82 | 2.41 | 67.49 | 2.43 | 163.79 | 0 | 0 | 0.69 | 0.000 | 0.00 | 0.00 | 0.00 | 0.000 |
| 0.98 | 2.51 | 64.02 | 3.03 | 194.10 | 0 | 0 | 0.69 | 0.000 | 0.00 | 0.00 | 0.00 | 0.000 |
| 1.15 | 2.66 | 55.00 | 4.29 | 236.01 | 0 | 0 | 0.69 | 0.000 | 0.00 | 0.00 | 0.00 | 0.000 |
| 1.31 | 2.74 | 50.83 | 5.11 | 259.78 | 0 | 0 | 0.69 | 0.000 | 0.00 | 0.00 | 0.00 | 0.000 |
| 1.48 | 2.77 | 48.71 | 5.53 | 269.25 | 0 | 0 | 0.69 | 0.000 | 0.00 | 0.00 | 0.00 | 0.000 |
| 1.64 | 2.79 | 47.60 | 5.70 | 271.36 | 0 | 0 | 0.69 | 0.000 | 0.00 | 0.00 | 0.00 | 0.000 |
| 1.80 | 2.79 | 47.00 | 5.74 | 269.81 | 0 | 0 | 0.69 | 0.000 | 0.00 | 0.00 | 0.00 | 0.000 |
| 1.97 | 2.79 | 46.35 | 5.79 | 268.17 | 0 | 0 | 0.69 | 0.000 | 0.00 | 0.00 | 0.00 | 0.000 |
| 2.13 | 2.80 | 45.48 | 5.88 | 267.22 | 0 | 0 | 0.69 | 0.000 | 0.00 | 0.00 | 0.00 | 0.000 |
| 2.30 | 2.81 | 44.78 | 5.95 | 266.29 | 0 | 0 | 0.69 | 0.000 | 0.00 | 0.00 | 0.00 | 0.000 |
| 2.46 | 2.80 | 44.96 | 5.85 | 262.80 | 0 | 0 | 0.69 | 0.000 | 0.00 | 0.00 | 0.00 | 0.000 |
| 2.62 | 2.78 | 45.68 | 5.64 | 257.85 | 0 | 0 | 0.69 | 0.000 | 0.00 | 0.00 | 0.00 | 0.000 |
| 2.79 | 2.76 | 46.63 | 5.40 | 251.65 | 0 | 0 | 0.69 | 0.000 | 0.00 | 0.00 | 0.00 | 0.000 |
| 2.95 | 2.73 | 47.61 | 5.00 | 238.23 | 0 | 0 | 0.69 | 0.000 | 0.00 | 0.00 | 0.00 | 0.000 |
| 3.12 | 2.70 | 48.74 | 4.68 | 228.26 | 0 | 0 | 0.69 | 0.000 | 0.00 | 0.00 | 0.00 | 0.000 |
| 3.28 | 2.71 | 47.51 | 4.78 | 227.07 | 0 | 0 | 0.69 | 0.000 | 0.00 | 0.00 | 0.00 | 0.000 |
| 3.44 | 2.73 | 46.68 | 5.07 | 236.58 | 0 | 0 | 0.69 | 0.000 | 0.00 | 0.00 | 0.00 | 0.000 |
| 3.61 | 2.76 | 45.87 | 5.37 | 246.47 | 0 | 0 | 0.69 | 0.000 | 0.00 | 0.00 | 0.00 | 0.000 |
| 3.77 | 2.73 | 50.83 | 5.01 | 254.54 | 0 | 0 | 0.69 | 0.000 | 0.00 | 0.00 | 0.00 | 0.000 |
| 3.94 | 2.55 | 73.52 | 3.32 | 244.00 | 0 | 0 | 0.69 | 0.000 | 0.00 | 0.00 | 0.00 | 0.000 |
| 4.10 | 2.35 | 109.33 | 2.12 | 232.04 | 0 | 0 | 0.69 | 0.000 | 0.00 | 0.00 | 0.00 | 0.000 |
| 4.27 | 2.17 | 150.09 | 1.54 | 231.47 | 0 | 0 | 0.69 | 0.000 | 0.00 | 0.00 | 0.00 | 0.000 |
| 4.43 | 2.09 | 164.80 | 1.40 | 231.03 | 0 | 0 | 0.68 | 0.000 | 0.00 | 0.00 | 0.00 | 0.000 |
| 4.59 | 2.05 | 165.45 | 1.35 | 224.11 | 48 | 1242 | 0.68 | 0.030 | 0.01 | 9.34 | 0.01 | 0.000 |
| 4.76 | 2.10 | 151.15 | 1.41 | 213.74 | 46 | 1205 | 0.68 | 0.034 | 0.01 | 9.34 | 0.01 | 0.000 |
| 4.92 | 2.19 | 138.10 | 1.59 | 220.12 | 49 | 1241 | 0.68 | 0.034 | 0.01 | 9.34 | 0.01 | 0.000 |
| 5.09 | 2.34 | 115.48 | 2.10 | 242.28 | 58 | 1257 | 0.68 | 0.034 | 0.01 | 9.34 | 0.01 | 0.000 |
| 5.25 | 2.48 | 96.28 | 2.81 | 270.85 | 69 | 1239 | 0.68 | 0.037 | 0.01 | 9.34 | 0.01 | 0.000 |
| 5.41 | 2.56 | 83.09 | 3.46 | 287.13 | 76 | 1197 | 0.68 | 0.043 | 0.01 | 9.34 | 0.01 | 0.000 |
| 5.58 | 2.57 | 81.84 | 3.53 | 288.83 | 77 | 1193 | 0.68 | 0.045 | 0.01 | 9.34 | 0.01 | 0.000 |
| 5.74 | 2.54 | 88.66 | 3.23 | 286.64 | 75 | 1232 | 0.68 | 0.044 | 0.01 | 9.34 | 0.01 | 0.000 |
| 5.91 | 2.48 | 99.21 | 2.87 | 284.99 | 73 | 1292 | 0.68 | 0.041 | 0.01 | 9.34 | 0.01 | 0.000 |
| 6.07 | 2.40 | 114.56 | 2.38 | 272.39 | 67 | 1342 | 0.68 | 0.039 | 0.01 | 9.34 | 0.01 | 0.000 |
| 6.23 | 2.33 | 120.89 | 2.06 | 249.08 | 59 | 1301 | 0.68 | 0.044 | 0.01 | 9.34 | 0.01 | 0.000 |
| 6.40 | 2.29 | 120.83 | 1.90 | 229.76 | 54 | 1236 | 0.68 | 0.052 | 0.02 | 9.34 | 0.01 | 0.000 |
| 6.56 | 2.14 | 146.61 | 1.48 | 217.52 | 48 | 1233 | 0.68 | 0.055 | 0.02 | 9.34 | 0.02 | 0.000 |
| 6.73 | 1.91 | 215.35 | 1.25 | 268.14 | 54 | 1359 | 0.68 | 0.045 | 0.01 | 9.34 | 0.01 | 0.000 |
| 6.89 | 1.77 | 278.36 | 1.11 | 309.65 | 59 | 1540 | 0.68 | 0.035 | 0.01 | 9.34 | 0.01 | 0.000 |
| 7.05 | 1.75 | 316.79 | 1.08 | 341.09 | 65 | 1736 | 0.68 | 0.029 | 0.01 | 9.34 | 0.01 | 0.000 |
| 7.22 | 1.80 | 316.07 | 1.15 | 363.38 | 70 | 1849 | 0.68 | 0.026 | 0.01 | 9.34 | 0.00 | 0.000 |
| 7.38 | 1.83 | 302.39 | 1.18 | 357.93 | 70 | 1854 | 0.68 | 0.027 | 0.01 | 9.34 | 0.00 | 0.000 |
| 7.55 | 1.81 | 283.81 | 1.17 | 331.05 | 64 | 1730 | 0.68 | 0.032 | 0.01 | 9.34 | 0.01 | 0.000 |
| 7.71 | 1.79 | 269.86 | 1.14 | 307.78 | 59 | 1626 | 0.68 | 0.037 | 0.01 | 9.34 | 0.01 | 0.000 |
| 7.87 | 1.80 | 256.48 | 1.15 | 295.11 | 57 | 1578 | 0.68 | 0.041 | 0.01 | 9.34 | 0.01 | 0.000 |

**:: Post-earthquake settlement of dry sands :: (continued)**

| Depth (ft) | Ic | $Q_{tn}$ | Kc | $Q_{tn,cs}$ | $N_{1,60}$ (blows) | $G_{max}$ (tsf) | CSR | Shear, γ (%) | $e_{vol(15)}$ (%) | $N_c$ | $e_v$ (%) | Settle. (in) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 8.04 | 1.83 | 246.36 | 1.19 | 292.64 | 57 | 1594 | 0.68 | 0.041 | 0.01 | 9.34 | 0.01 | 0.000 |
| 8.20 | 1.83 | 243.91 | 1.18 | 288.05 | 56 | 1585 | 0.68 | 0.043 | 0.01 | 9.34 | 0.01 | 0.000 |
| 8.37 | 1.78 | 253.63 | 1.13 | 287.26 | 55 | 1590 | 0.68 | 0.044 | 0.01 | 9.34 | 0.01 | 0.000 |
| 8.53 | 1.76 | 262.28 | 1.10 | 288.05 | 55 | 1620 | 0.68 | 0.044 | 0.01 | 9.34 | 0.01 | 0.000 |
| 8.69 | 1.76 | 266.81 | 1.11 | 295.14 | 56 | 1674 | 0.68 | 0.042 | 0.01 | 9.34 | 0.01 | 0.000 |
| 8.86 | 1.75 | 271.24 | 1.09 | 295.97 | 56 | 1702 | 0.68 | 0.042 | 0.01 | 9.34 | 0.01 | 0.000 |
| 9.02 | 1.68 | 282.06 | 1.00 | 282.06 | 52 | 1651 | 0.68 | 0.046 | 0.01 | 9.34 | 0.01 | 0.000 |
| 9.19 | 1.62 | 295.95 | 1.00 | 295.95 | 54 | 1632 | 0.68 | 0.048 | 0.01 | 9.34 | 0.01 | 0.000 |
| 9.35 | 1.61 | 310.25 | 1.00 | 310.25 | 56 | 1698 | 0.68 | 0.046 | 0.01 | 9.34 | 0.01 | 0.000 |
| 9.51 | 1.66 | 325.27 | 1.00 | 325.27 | 60 | 1913 | 0.68 | 0.037 | 0.01 | 9.34 | 0.01 | 0.000 |
| 9.68 | 1.69 | 344.09 | 1.00 | 344.09 | 64 | 2124 | 0.68 | 0.031 | 0.01 | 9.34 | 0.01 | 0.000 |
| 9.84 | 1.71 | 363.99 | 1.01 | 368.21 | 69 | 2310 | 0.68 | 0.027 | 0.01 | 9.34 | 0.01 | 0.000 |
| 10.01 | 1.72 | 378.09 | 1.02 | 386.90 | 73 | 2437 | 0.68 | 0.026 | 0.01 | 9.34 | 0.00 | 0.000 |
| 10.17 | 1.68 | 387.19 | 1.00 | 387.19 | 72 | 2411 | 0.68 | 0.027 | 0.01 | 9.34 | 0.00 | 0.000 |
| 10.33 | 1.60 | 387.61 | 1.00 | 387.61 | 70 | 2210 | 0.68 | 0.032 | 0.01 | 9.34 | 0.01 | 0.000 |
| 10.50 | 1.54 | 386.26 | 1.00 | 386.26 | 68 | 2062 | 0.68 | 0.037 | 0.01 | 9.34 | 0.01 | 0.000 |
| 10.66 | 1.58 | 381.67 | 1.00 | 381.67 | 68 | 2164 | 0.68 | 0.034 | 0.01 | 9.34 | 0.01 | 0.000 |
| 10.83 | 1.68 | 382.39 | 1.00 | 382.39 | 71 | 2456 | 0.68 | 0.028 | 0.01 | 9.34 | 0.00 | 0.000 |
| 10.99 | 1.73 | 386.15 | 1.04 | 403.45 | 76 | 2653 | 0.67 | 0.025 | 0.01 | 9.34 | 0.00 | 0.000 |
| 11.15 | 1.75 | 386.89 | 1.08 | 416.48 | 79 | 2735 | 0.67 | 0.025 | 0.00 | 9.34 | 0.00 | 0.000 |
| 11.32 | 1.75 | 378.74 | 1.09 | 411.54 | 78 | 2718 | 0.67 | 0.025 | 0.00 | 9.34 | 0.00 | 0.000 |
| 11.48 | 1.75 | 360.78 | 1.09 | 393.22 | 75 | 2617 | 0.67 | 0.027 | 0.01 | 9.34 | 0.00 | 0.000 |
| 11.65 | 1.75 | 336.91 | 1.08 | 364.84 | 69 | 2451 | 0.67 | 0.031 | 0.01 | 9.34 | 0.01 | 0.000 |
| 11.81 | 1.76 | 307.05 | 1.10 | 337.75 | 64 | 2280 | 0.67 | 0.036 | 0.01 | 9.34 | 0.01 | 0.000 |
| 11.98 | 1.78 | 286.05 | 1.12 | 321.02 | 62 | 2179 | 0.67 | 0.040 | 0.01 | 9.34 | 0.01 | 0.000 |
| 12.14 | 1.79 | 275.82 | 1.15 | 315.84 | 61 | 2163 | 0.67 | 0.041 | 0.01 | 9.34 | 0.01 | 0.000 |
| 12.30 | 1.78 | 282.68 | 1.13 | 318.81 | 61 | 2197 | 0.67 | 0.041 | 0.01 | 9.34 | 0.01 | 0.000 |
| 12.47 | 1.76 | 291.32 | 1.10 | 321.61 | 61 | 2236 | 0.67 | 0.040 | 0.01 | 9.34 | 0.01 | 0.000 |
| 12.63 | 1.73 | 299.87 | 1.06 | 317.00 | 60 | 2242 | 0.67 | 0.041 | 0.01 | 9.34 | 0.01 | 0.000 |
| 12.80 | 1.71 | 307.10 | 1.01 | 308.69 | 58 | 2243 | 0.67 | 0.042 | 0.01 | 9.34 | 0.01 | 0.000 |
| 12.96 | 1.69 | 312.84 | 1.00 | 312.84 | 58 | 2258 | 0.67 | 0.042 | 0.01 | 9.34 | 0.01 | 0.000 |

**Total estimated settlement: 0.01**

**Abbreviations**

$Q_{tn}$: Equivalent clean sand normalized cone resistance
$K_c$: Fines correction factor
$Q_{tn,cs}$: Post-liquefaction volumentric strain
$G_{max}$: Small strain shear modulus
CSR: Soil cyclic stress ratio
γ: Cyclic shear strain
$e_{vol(15)}$: Volumetric strain after 15 cycles
$N_c$: Equivalent number of cycles
$e_v$: Volumetric strain
Settle.: Calculated settlement

**:: Post-earthquake settlement due to soil liquefaction ::**

| Depth (ft) | $Q_{tn,cs}$ | FS | $e_v$ (%) | DF | Settlement (in) | Depth (ft) | $Q_{tn,cs}$ | FS | $e_v$ (%) | DF | Settlement (in) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 13.12 | 311.60 | 2.00 | 0.00 | 1.00 | 0.00 | 13.29 | 312.43 | 2.00 | 0.00 | 1.00 | 0.00 |
| 13.45 | 306.38 | 2.00 | 0.00 | 1.00 | 0.00 | 13.62 | 295.21 | 2.00 | 0.00 | 1.00 | 0.00 |
| 13.78 | 284.20 | 2.00 | 0.00 | 1.00 | 0.00 | 13.94 | 265.83 | 2.00 | 0.00 | 1.00 | 0.00 |
| 14.11 | 250.91 | 2.00 | 0.00 | 1.00 | 0.00 | 14.27 | 230.71 | 2.00 | 0.00 | 1.00 | 0.00 |

**:: Post-earthquake settlement due to soil liquefaction :: (continued)**

| Depth (ft) | $Q_{tn,cs}$ | FS | $e_v$ (%) | DF | Settlement (in) | Depth (ft) | $Q_{tn,cs}$ | FS | $e_v$ (%) | DF | Settlement (in) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 14.44 | 207.72 | 2.00 | 0.00 | 1.00 | 0.00 | 14.60 | 181.32 | 0.90 | 0.65 | 1.00 | 0.01 |
| 14.76 | 168.54 | 0.74 | 1.17 | 1.00 | 0.02 | 14.93 | 175.43 | 0.82 | 0.89 | 1.00 | 0.02 |
| 15.09 | 188.18 | 0.98 | 0.49 | 1.00 | 0.01 | 15.26 | 214.67 | 2.00 | 0.00 | 1.00 | 0.00 |
| 15.42 | 249.32 | 2.00 | 0.00 | 1.00 | 0.00 | 15.58 | 258.33 | 2.00 | 0.00 | 1.00 | 0.00 |
| 15.75 | 262.17 | 2.00 | 0.00 | 1.00 | 0.00 | 15.91 | 270.67 | 2.00 | 0.00 | 1.00 | 0.00 |
| 16.08 | 268.61 | 2.00 | 0.00 | 1.00 | 0.00 | 16.24 | 254.23 | 2.00 | 0.00 | 1.00 | 0.00 |
| 16.40 | 233.42 | 2.00 | 0.00 | 1.00 | 0.00 | 16.57 | 212.67 | 2.00 | 0.00 | 1.00 | 0.00 |
| 16.73 | 194.15 | 1.02 | 0.48 | 1.00 | 0.01 | 16.90 | 180.57 | 0.84 | 0.86 | 1.00 | 0.02 |
| 17.06 | 166.79 | 0.68 | 1.19 | 1.00 | 0.02 | 17.22 | 156.01 | 0.57 | 1.59 | 1.00 | 0.03 |
| 17.39 | 149.48 | 0.52 | 1.68 | 1.00 | 0.03 | 17.55 | 149.62 | 2.00 | 0.00 | 1.00 | 0.00 |
| 17.72 | 153.91 | 2.00 | 0.00 | 1.00 | 0.00 | 17.88 | 165.51 | 2.00 | 0.00 | 1.00 | 0.00 |
| 18.04 | 176.30 | 2.00 | 0.00 | 1.00 | 0.00 | 18.21 | 185.55 | 2.00 | 0.00 | 1.00 | 0.00 |
| 18.37 | 187.42 | 2.00 | 0.00 | 1.00 | 0.00 | 18.54 | 187.45 | 2.00 | 0.00 | 1.00 | 0.00 |
| 18.70 | 182.19 | 2.00 | 0.00 | 1.00 | 0.00 | 18.86 | 180.84 | 2.00 | 0.00 | 1.00 | 0.00 |
| 19.03 | 177.05 | 2.00 | 0.00 | 1.00 | 0.00 | 19.19 | 164.30 | 2.00 | 0.00 | 1.00 | 0.00 |
| 19.36 | 162.55 | 2.00 | 0.00 | 1.00 | 0.00 | 19.52 | 162.67 | 2.00 | 0.00 | 1.00 | 0.00 |
| 19.69 | 146.71 | 2.00 | 0.00 | 1.00 | 0.00 | 19.85 | 124.76 | 2.00 | 0.00 | 1.00 | 0.00 |
| 20.01 | 107.72 | 2.00 | 0.00 | 1.00 | 0.00 | 20.18 | 112.58 | 2.00 | 0.00 | 1.00 | 0.00 |
| 20.34 | 115.65 | 2.00 | 0.00 | 1.00 | 0.00 | 20.51 | 119.32 | 2.00 | 0.00 | 1.00 | 0.00 |
| 20.67 | 122.16 | 2.00 | 0.00 | 1.00 | 0.00 | 20.83 | 123.42 | 2.00 | 0.00 | 1.00 | 0.00 |
| 21.00 | 124.53 | 2.00 | 0.00 | 1.00 | 0.00 | 21.16 | 124.98 | 2.00 | 0.00 | 1.00 | 0.00 |
| 21.33 | 124.87 | 2.00 | 0.00 | 1.00 | 0.00 | 21.49 | 124.60 | 2.00 | 0.00 | 1.00 | 0.00 |
| 21.65 | 124.51 | 2.00 | 0.00 | 1.00 | 0.00 | 21.82 | 124.03 | 2.00 | 0.00 | 1.00 | 0.00 |
| 21.98 | 121.35 | 2.00 | 0.00 | 1.00 | 0.00 | 22.15 | 113.04 | 2.00 | 0.00 | 1.00 | 0.00 |
| 22.31 | 107.10 | 2.00 | 0.00 | 1.00 | 0.00 | 22.47 | 104.93 | 2.00 | 0.00 | 1.00 | 0.00 |
| 22.64 | 109.03 | 2.00 | 0.00 | 1.00 | 0.00 | 22.80 | 112.56 | 2.00 | 0.00 | 1.00 | 0.00 |
| 22.97 | 114.42 | 2.00 | 0.00 | 1.00 | 0.00 | 23.13 | 115.59 | 2.00 | 0.00 | 1.00 | 0.00 |
| 23.29 | 116.51 | 2.00 | 0.00 | 1.00 | 0.00 | 23.46 | 116.89 | 2.00 | 0.00 | 1.00 | 0.00 |
| 23.62 | 116.79 | 2.00 | 0.00 | 1.00 | 0.00 | 23.79 | 116.62 | 2.00 | 0.00 | 1.00 | 0.00 |
| 23.95 | 117.31 | 2.00 | 0.00 | 1.00 | 0.00 | 24.11 | 118.73 | 2.00 | 0.00 | 1.00 | 0.00 |
| 24.28 | 119.89 | 2.00 | 0.00 | 1.00 | 0.00 | 24.44 | 118.97 | 2.00 | 0.00 | 1.00 | 0.00 |
| 24.61 | 114.30 | 2.00 | 0.00 | 1.00 | 0.00 | 24.77 | 111.72 | 2.00 | 0.00 | 1.00 | 0.00 |
| 24.93 | 112.28 | 2.00 | 0.00 | 1.00 | 0.00 | 25.10 | 116.77 | 2.00 | 0.00 | 1.00 | 0.00 |
| 25.26 | 119.22 | 2.00 | 0.00 | 1.00 | 0.00 | 25.43 | 119.86 | 2.00 | 0.00 | 1.00 | 0.00 |
| 25.59 | 120.33 | 2.00 | 0.00 | 1.00 | 0.00 | 25.75 | 120.60 | 2.00 | 0.00 | 1.00 | 0.00 |
| 25.92 | 121.01 | 2.00 | 0.00 | 1.00 | 0.00 | 26.08 | 121.20 | 2.00 | 0.00 | 1.00 | 0.00 |
| 26.25 | 120.76 | 2.00 | 0.00 | 1.00 | 0.00 | 26.41 | 119.26 | 2.00 | 0.00 | 1.00 | 0.00 |
| 26.57 | 116.60 | 2.00 | 0.00 | 1.00 | 0.00 | 26.74 | 113.96 | 2.00 | 0.00 | 1.00 | 0.00 |
| 26.90 | 112.39 | 2.00 | 0.00 | 1.00 | 0.00 | 27.07 | 112.05 | 2.00 | 0.00 | 1.00 | 0.00 |
| 27.23 | 112.55 | 2.00 | 0.00 | 1.00 | 0.00 | 27.40 | 112.52 | 2.00 | 0.00 | 1.00 | 0.00 |
| 27.56 | 109.33 | 2.00 | 0.00 | 1.00 | 0.00 | 27.72 | 107.91 | 2.00 | 0.00 | 1.00 | 0.00 |
| 27.89 | 108.29 | 2.00 | 0.00 | 1.00 | 0.00 | 28.05 | 111.94 | 2.00 | 0.00 | 1.00 | 0.00 |
| 28.22 | 114.03 | 2.00 | 0.00 | 1.00 | 0.00 | 28.38 | 115.04 | 2.00 | 0.00 | 1.00 | 0.00 |
| 28.54 | 115.56 | 2.00 | 0.00 | 1.00 | 0.00 | 28.71 | 115.96 | 2.00 | 0.00 | 1.00 | 0.00 |
| 28.87 | 116.09 | 2.00 | 0.00 | 1.00 | 0.00 | 29.04 | 116.23 | 2.00 | 0.00 | 1.00 | 0.00 |
| 29.20 | 115.34 | 2.00 | 0.00 | 1.00 | 0.00 | 29.36 | 110.55 | 2.00 | 0.00 | 1.00 | 0.00 |
| 29.53 | 107.18 | 2.00 | 0.00 | 1.00 | 0.00 | 29.69 | 105.57 | 2.00 | 0.00 | 1.00 | 0.00 |
| 29.86 | 109.14 | 2.00 | 0.00 | 1.00 | 0.00 | 30.02 | 112.20 | 2.00 | 0.00 | 1.00 | 0.00 |

**:: Post-earthquake settlement due to soil liquefaction :: (continued)**

| Depth (ft) | $Q_{tn,cs}$ | FS | $e_v$ (%) | DF | Settlement (in) | Depth (ft) | $Q_{tn,cs}$ | FS | $e_v$ (%) | DF | Settlement (in) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 30.18 | 114.69 | 2.00 | 0.00 | 1.00 | 0.00 | 30.35 | 115.68 | 2.00 | 0.00 | 1.00 | 0.00 |
| 30.51 | 117.02 | 2.00 | 0.00 | 1.00 | 0.00 | 30.68 | 126.02 | 2.00 | 0.00 | 1.00 | 0.00 |
| 30.84 | 147.33 | 2.00 | 0.00 | 1.00 | 0.00 | 31.00 | 174.83 | 2.00 | 0.00 | 1.00 | 0.00 |
| 31.17 | 188.81 | 2.00 | 0.00 | 1.00 | 0.00 | 31.33 | 174.48 | 2.00 | 0.00 | 1.00 | 0.00 |
| 31.50 | 144.83 | 2.00 | 0.00 | 1.00 | 0.00 | 31.66 | 123.13 | 2.00 | 0.00 | 1.00 | 0.00 |
| 31.82 | 123.43 | 2.00 | 0.00 | 1.00 | 0.00 | 31.99 | 126.33 | 2.00 | 0.00 | 1.00 | 0.00 |
| 32.15 | 126.37 | 2.00 | 0.00 | 1.00 | 0.00 | 32.32 | 123.34 | 2.00 | 0.00 | 1.00 | 0.00 |
| 32.48 | 119.38 | 2.00 | 0.00 | 1.00 | 0.00 | 32.64 | 112.61 | 2.00 | 0.00 | 1.00 | 0.00 |
| 32.81 | 109.20 | 2.00 | 0.00 | 1.00 | 0.00 | 32.97 | 107.87 | 2.00 | 0.00 | 1.00 | 0.00 |
| 33.14 | 110.29 | 2.00 | 0.00 | 1.00 | 0.00 | 33.30 | 111.33 | 2.00 | 0.00 | 1.00 | 0.00 |
| 33.46 | 111.82 | 2.00 | 0.00 | 1.00 | 0.00 | 33.63 | 111.88 | 2.00 | 0.00 | 1.00 | 0.00 |
| 33.79 | 112.20 | 2.00 | 0.00 | 1.00 | 0.00 | 33.96 | 112.38 | 2.00 | 0.00 | 1.00 | 0.00 |
| 34.12 | 112.48 | 2.00 | 0.00 | 1.00 | 0.00 | 34.28 | 112.47 | 2.00 | 0.00 | 1.00 | 0.00 |
| 34.45 | 112.35 | 2.00 | 0.00 | 1.00 | 0.00 | 34.61 | 112.06 | 2.00 | 0.00 | 1.00 | 0.00 |
| 34.78 | 110.37 | 2.00 | 0.00 | 1.00 | 0.00 | 34.94 | 108.25 | 2.00 | 0.00 | 1.00 | 0.00 |
| 35.10 | 107.58 | 2.00 | 0.00 | 1.00 | 0.00 | 35.27 | 109.00 | 2.00 | 0.00 | 1.00 | 0.00 |
| 35.43 | 111.26 | 2.00 | 0.00 | 1.00 | 0.00 | 35.60 | 111.95 | 2.00 | 0.00 | 1.00 | 0.00 |
| 35.76 | 111.76 | 2.00 | 0.00 | 1.00 | 0.00 | 35.93 | 111.57 | 2.00 | 0.00 | 1.00 | 0.00 |
| 36.09 | 112.17 | 2.00 | 0.00 | 1.00 | 0.00 | 36.25 | 113.12 | 2.00 | 0.00 | 1.00 | 0.00 |
| 36.42 | 114.38 | 2.00 | 0.00 | 1.00 | 0.00 | 36.58 | 115.59 | 2.00 | 0.00 | 1.00 | 0.00 |
| 36.75 | 116.99 | 2.00 | 0.00 | 1.00 | 0.00 | 36.91 | 117.42 | 2.00 | 0.00 | 1.00 | 0.00 |
| 37.07 | 116.54 | 2.00 | 0.00 | 1.00 | 0.00 | 37.24 | 113.77 | 2.00 | 0.00 | 1.00 | 0.00 |
| 37.40 | 109.51 | 2.00 | 0.00 | 1.00 | 0.00 | 37.57 | 107.90 | 2.00 | 0.00 | 1.00 | 0.00 |
| 37.73 | 108.94 | 2.00 | 0.00 | 1.00 | 0.00 | 37.89 | 112.08 | 2.00 | 0.00 | 1.00 | 0.00 |
| 38.06 | 113.56 | 2.00 | 0.00 | 1.00 | 0.00 | 38.22 | 113.82 | 2.00 | 0.00 | 1.00 | 0.00 |
| 38.39 | 114.00 | 2.00 | 0.00 | 1.00 | 0.00 | 38.55 | 114.14 | 2.00 | 0.00 | 1.00 | 0.00 |
| 38.71 | 114.50 | 2.00 | 0.00 | 1.00 | 0.00 | 38.88 | 115.06 | 2.00 | 0.00 | 1.00 | 0.00 |
| 39.04 | 116.31 | 2.00 | 0.00 | 1.00 | 0.00 | 39.21 | 117.11 | 2.00 | 0.00 | 1.00 | 0.00 |
| 39.37 | 117.57 | 2.00 | 0.00 | 1.00 | 0.00 | 39.53 | 117.42 | 2.00 | 0.00 | 1.00 | 0.00 |
| 39.70 | 117.38 | 2.00 | 0.00 | 1.00 | 0.00 | 39.86 | 116.54 | 2.00 | 0.00 | 1.00 | 0.00 |
| 40.03 | 115.16 | 2.00 | 0.00 | 1.00 | 0.00 | 40.19 | 113.79 | 2.00 | 0.00 | 1.00 | 0.00 |
| 40.35 | 113.21 | 2.00 | 0.00 | 1.00 | 0.00 | 40.52 | 113.01 | 2.00 | 0.00 | 1.00 | 0.00 |
| 40.68 | 112.92 | 2.00 | 0.00 | 1.00 | 0.00 | 40.85 | 112.49 | 2.00 | 0.00 | 1.00 | 0.00 |
| 41.01 | 111.76 | 2.00 | 0.00 | 1.00 | 0.00 | 41.17 | 109.20 | 2.00 | 0.00 | 1.00 | 0.00 |
| 41.34 | 108.05 | 2.00 | 0.00 | 1.00 | 0.00 | 41.50 | 107.71 | 2.00 | 0.00 | 1.00 | 0.00 |
| 41.67 | 109.42 | 2.00 | 0.00 | 1.00 | 0.00 | 41.83 | 110.12 | 2.00 | 0.00 | 1.00 | 0.00 |
| 41.99 | 110.32 | 2.00 | 0.00 | 1.00 | 0.00 | 42.16 | 110.17 | 2.00 | 0.00 | 1.00 | 0.00 |
| 42.32 | 109.83 | 2.00 | 0.00 | 1.00 | 0.00 | 42.49 | 109.47 | 2.00 | 0.00 | 1.00 | 0.00 |
| 42.65 | 109.22 | 2.00 | 0.00 | 1.00 | 0.00 | 42.81 | 109.36 | 2.00 | 0.00 | 1.00 | 0.00 |
| 42.98 | 109.51 | 2.00 | 0.00 | 1.00 | 0.00 | 43.14 | 109.75 | 2.00 | 0.00 | 1.00 | 0.00 |
| 43.31 | 109.26 | 2.00 | 0.00 | 1.00 | 0.00 | 43.47 | 106.01 | 2.00 | 0.00 | 1.00 | 0.00 |
| 43.64 | 105.05 | 2.00 | 0.00 | 1.00 | 0.00 | 43.80 | 105.19 | 2.00 | 0.00 | 1.00 | 0.00 |
| 43.96 | 108.13 | 2.00 | 0.00 | 1.00 | 0.00 | 44.13 | 109.22 | 2.00 | 0.00 | 1.00 | 0.00 |
| 44.29 | 109.65 | 2.00 | 0.00 | 1.00 | 0.00 | 44.46 | 109.88 | 2.00 | 0.00 | 1.00 | 0.00 |
| 44.62 | 110.17 | 2.00 | 0.00 | 1.00 | 0.00 | 44.78 | 110.30 | 2.00 | 0.00 | 1.00 | 0.00 |
| 44.95 | 110.20 | 2.00 | 0.00 | 1.00 | 0.00 | 45.11 | 109.76 | 2.00 | 0.00 | 1.00 | 0.00 |
| 45.28 | 109.37 | 2.00 | 0.00 | 1.00 | 0.00 | 45.44 | 108.61 | 2.00 | 0.00 | 1.00 | 0.00 |
| 45.60 | 107.99 | 2.00 | 0.00 | 1.00 | 0.00 | 45.77 | 108.25 | 2.00 | 0.00 | 1.00 | 0.00 |

**:: Post-earthquake settlement due to soil liquefaction :: (continued)**

| Depth (ft) | $Q_{tn,cs}$ | FS | $e_v$ (%) | DF | Settlement (in) | Depth (ft) | $Q_{tn,cs}$ | FS | $e_v$ (%) | DF | Settlement (in) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 45.93 | 109.22 | 2.00 | 0.00 | 1.00 | 0.00 | 46.10 | 109.94 | 2.00 | 0.00 | 1.00 | 0.00 |
| 46.26 | 109.54 | 2.00 | 0.00 | 1.00 | 0.00 | 46.42 | 108.56 | 2.00 | 0.00 | 1.00 | 0.00 |
| 46.59 | 107.84 | 2.00 | 0.00 | 1.00 | 0.00 | 46.75 | 107.44 | 2.00 | 0.00 | 1.00 | 0.00 |
| 46.92 | 107.58 | 2.00 | 0.00 | 1.00 | 0.00 | 47.08 | 107.54 | 2.00 | 0.00 | 1.00 | 0.00 |
| 47.24 | 107.09 | 2.00 | 0.00 | 1.00 | 0.00 | 47.41 | 105.44 | 2.00 | 0.00 | 1.00 | 0.00 |
| 47.57 | 104.83 | 2.00 | 0.00 | 1.00 | 0.00 | 47.74 | 105.49 | 2.00 | 0.00 | 1.00 | 0.00 |
| 47.90 | 107.90 | 2.00 | 0.00 | 1.00 | 0.00 | 48.06 | 109.39 | 2.00 | 0.00 | 1.00 | 0.00 |
| 48.23 | 110.04 | 2.00 | 0.00 | 1.00 | 0.00 | 48.39 | 110.03 | 2.00 | 0.00 | 1.00 | 0.00 |
| 48.56 | 110.02 | 2.00 | 0.00 | 1.00 | 0.00 | 48.72 | 109.79 | 2.00 | 0.00 | 1.00 | 0.00 |
| 48.88 | 109.42 | 2.00 | 0.00 | 1.00 | 0.00 | 49.05 | 109.33 | 2.00 | 0.00 | 1.00 | 0.00 |
| 49.21 | 108.90 | 2.00 | 0.00 | 1.00 | 0.00 | 49.38 | 109.52 | 2.00 | 0.00 | 1.00 | 0.00 |
| 49.54 | 110.57 | 2.00 | 0.00 | 1.00 | 0.00 | 49.70 | 112.09 | 2.00 | 0.00 | 1.00 | 0.00 |
| 49.87 | 111.97 | 2.00 | 0.00 | 1.00 | 0.00 | 50.03 | 110.80 | 2.00 | 0.00 | 1.00 | 0.00 |
| 50.20 | 109.35 | 2.00 | 0.00 | 1.00 | 0.00 | 50.36 | 108.32 | 2.00 | 0.00 | 1.00 | 0.00 |
| 50.52 | 107.66 | 2.00 | 0.00 | 1.00 | 0.00 | 50.69 | 107.28 | 2.00 | 0.00 | 1.00 | 0.00 |
| 50.85 | 106.68 | 2.00 | 0.00 | 1.00 | 0.00 | 51.02 | 105.57 | 2.00 | 0.00 | 1.00 | 0.00 |
| 51.18 | 104.76 | 2.00 | 0.00 | 1.00 | 0.00 | 51.35 | 104.64 | 2.00 | 0.00 | 1.00 | 0.00 |
| 51.51 | 105.93 | 2.00 | 0.00 | 1.00 | 0.00 | 51.67 | 107.40 | 2.00 | 0.00 | 1.00 | 0.00 |
| 51.84 | 109.02 | 2.00 | 0.00 | 1.00 | 0.00 | 52.00 | 110.12 | 2.00 | 0.00 | 1.00 | 0.00 |
| 52.17 | 110.57 | 2.00 | 0.00 | 1.00 | 0.00 | 52.33 | 110.52 | 2.00 | 0.00 | 1.00 | 0.00 |
| 52.49 | 109.57 | 2.00 | 0.00 | 1.00 | 0.00 | 52.66 | 109.05 | 2.00 | 0.00 | 1.00 | 0.00 |
| 52.82 | 109.08 | 2.00 | 0.00 | 1.00 | 0.00 | 52.99 | 110.15 | 2.00 | 0.00 | 1.00 | 0.00 |
| 53.15 | 111.04 | 2.00 | 0.00 | 1.00 | 0.00 | 53.31 | 111.47 | 2.00 | 0.00 | 1.00 | 0.00 |
| 53.48 | 112.08 | 2.00 | 0.00 | 1.00 | 0.00 | 53.64 | 113.09 | 2.00 | 0.00 | 1.00 | 0.00 |
| 53.81 | 114.50 | 2.00 | 0.00 | 1.00 | 0.00 | 53.97 | 115.36 | 2.00 | 0.00 | 1.00 | 0.00 |
| 54.13 | 115.56 | 2.00 | 0.00 | 1.00 | 0.00 | 54.30 | 113.89 | 2.00 | 0.00 | 1.00 | 0.00 |
| 54.46 | 107.35 | 2.00 | 0.00 | 1.00 | 0.00 | 54.63 | 102.57 | 2.00 | 0.00 | 1.00 | 0.00 |
| 54.79 | 98.77 | 2.00 | 0.00 | 1.00 | 0.00 | 54.95 | 101.20 | 2.00 | 0.00 | 1.00 | 0.00 |
| 55.12 | 104.37 | 2.00 | 0.00 | 1.00 | 0.00 | 55.28 | 108.42 | 2.00 | 0.00 | 1.00 | 0.00 |
| 55.45 | 109.71 | 2.00 | 0.00 | 1.00 | 0.00 | 55.61 | 109.68 | 2.00 | 0.00 | 1.00 | 0.00 |
| 55.77 | 108.59 | 2.00 | 0.00 | 1.00 | 0.00 | 55.94 | 107.42 | 2.00 | 0.00 | 1.00 | 0.00 |
| 56.10 | 106.74 | 2.00 | 0.00 | 1.00 | 0.00 | 56.27 | 105.74 | 2.00 | 0.00 | 1.00 | 0.00 |
| 56.43 | 102.21 | 2.00 | 0.00 | 1.00 | 0.00 | 56.59 | 100.86 | 2.00 | 0.00 | 1.00 | 0.00 |
| 56.76 | 98.88 | 2.00 | 0.00 | 1.00 | 0.00 | 56.92 | 97.99 | 2.00 | 0.00 | 1.00 | 0.00 |
| 57.09 | 96.71 | 2.00 | 0.00 | 1.00 | 0.00 | 57.25 | 97.99 | 2.00 | 0.00 | 1.00 | 0.00 |
| 57.41 | 101.81 | 2.00 | 0.00 | 1.00 | 0.00 | 57.58 | 105.43 | 2.00 | 0.00 | 1.00 | 0.00 |
| 57.74 | 107.81 | 2.00 | 0.00 | 1.00 | 0.00 | 57.91 | 109.05 | 2.00 | 0.00 | 1.00 | 0.00 |
| 58.07 | 104.58 | 2.00 | 0.00 | 1.00 | 0.00 | 58.23 | 101.80 | 2.00 | 0.00 | 1.00 | 0.00 |
| 58.40 | 99.55 | 2.00 | 0.00 | 1.00 | 0.00 | 58.56 | 102.50 | 2.00 | 0.00 | 1.00 | 0.00 |
| 58.73 | 104.88 | 2.00 | 0.00 | 1.00 | 0.00 | 58.89 | 108.36 | 2.00 | 0.00 | 1.00 | 0.00 |
| 59.06 | 115.84 | 2.00 | 0.00 | 1.00 | 0.00 | 59.22 | 124.84 | 2.00 | 0.00 | 1.00 | 0.00 |
| 59.38 | 129.65 | 2.00 | 0.00 | 1.00 | 0.00 | 59.55 | 128.81 | 2.00 | 0.00 | 1.00 | 0.00 |
| 59.71 | 117.80 | 2.00 | 0.00 | 1.00 | 0.00 | 59.88 | 104.24 | 2.00 | 0.00 | 1.00 | 0.00 |
| 60.04 | 101.00 | 2.00 | 0.00 | 1.00 | 0.00 | 60.20 | 106.87 | 2.00 | 0.00 | 1.00 | 0.00 |
| 60.37 | 111.76 | 2.00 | 0.00 | 1.00 | 0.00 | 60.53 | 115.09 | 2.00 | 0.00 | 1.00 | 0.00 |
| 60.70 | 115.32 | 2.00 | 0.00 | 1.00 | 0.00 | 60.86 | 110.09 | 2.00 | 0.00 | 1.00 | 0.00 |
| 61.02 | 105.09 | 2.00 | 0.00 | 1.00 | 0.00 | 61.19 | 106.35 | 2.00 | 0.00 | 1.00 | 0.00 |
| 61.35 | 119.04 | 2.00 | 0.00 | 1.00 | 0.00 | 61.52 | 131.24 | 2.00 | 0.00 | 1.00 | 0.00 |

**:: Post-earthquake settlement due to soil liquefaction :: (continued)**

| Depth (ft) | $Q_{tn,cs}$ | FS | $e_v$ (%) | DF | Settlement (in) | Depth (ft) | $Q_{tn,cs}$ | FS | $e_v$ (%) | DF | Settlement (in) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 61.68 | 133.95 | 2.00 | 0.00 | 1.00 | 0.00 | 61.84 | 127.75 | 2.00 | 0.00 | 1.00 | 0.00 |
| 62.01 | 119.22 | 2.00 | 0.00 | 1.00 | 0.00 | 62.17 | 106.81 | 2.00 | 0.00 | 1.00 | 0.00 |
| 62.34 | 100.86 | 2.00 | 0.00 | 1.00 | 0.00 | 62.50 | 99.85 | 2.00 | 0.00 | 1.00 | 0.00 |
| 62.66 | 110.73 | 2.00 | 0.00 | 1.00 | 0.00 | 62.83 | 118.39 | 2.00 | 0.00 | 1.00 | 0.00 |
| 62.99 | 122.87 | 2.00 | 0.00 | 1.00 | 0.00 | 63.16 | 121.17 | 2.00 | 0.00 | 1.00 | 0.00 |
| 63.32 | 120.92 | 2.00 | 0.00 | 1.00 | 0.00 | 63.48 | 118.83 | 2.00 | 0.00 | 1.00 | 0.00 |
| 63.65 | 117.27 | 2.00 | 0.00 | 1.00 | 0.00 | 63.81 | 115.59 | 2.00 | 0.00 | 1.00 | 0.00 |
| 63.98 | 108.32 | 2.00 | 0.00 | 1.00 | 0.00 | 64.14 | 103.22 | 2.00 | 0.00 | 1.00 | 0.00 |
| 64.30 | 101.34 | 2.00 | 0.00 | 1.00 | 0.00 | 64.47 | 105.92 | 2.00 | 0.00 | 1.00 | 0.00 |
| 64.63 | 105.84 | 2.00 | 0.00 | 1.00 | 0.00 | 64.80 | 106.06 | 2.00 | 0.00 | 1.00 | 0.00 |
| 64.96 | 106.81 | 2.00 | 0.00 | 1.00 | 0.00 | 65.12 | 105.64 | 2.00 | 0.00 | 1.00 | 0.00 |
| 65.29 | 103.03 | 2.00 | 0.00 | 1.00 | 0.00 | 65.45 | 101.12 | 2.00 | 0.00 | 1.00 | 0.00 |
| 65.62 | 104.88 | 2.00 | 0.00 | 1.00 | 0.00 | 65.78 | 102.92 | 2.00 | 0.00 | 1.00 | 0.00 |
| 65.94 | 101.66 | 2.00 | 0.00 | 1.00 | 0.00 | 66.11 | 102.31 | 2.00 | 0.00 | 1.00 | 0.00 |
| 66.27 | 104.67 | 2.00 | 0.00 | 1.00 | 0.00 | 66.44 | 106.53 | 2.00 | 0.00 | 1.00 | 0.00 |
| 66.60 | 104.71 | 2.00 | 0.00 | 1.00 | 0.00 | 66.77 | 105.50 | 2.00 | 0.00 | 1.00 | 0.00 |
| 66.93 | 102.81 | 2.00 | 0.00 | 1.00 | 0.00 | 67.09 | 100.26 | 2.00 | 0.00 | 1.00 | 0.00 |
| 67.26 | 102.56 | 2.00 | 0.00 | 1.00 | 0.00 | 67.42 | 106.71 | 2.00 | 0.00 | 1.00 | 0.00 |
| 67.59 | 109.13 | 2.00 | 0.00 | 1.00 | 0.00 | 67.75 | 107.29 | 2.00 | 0.00 | 1.00 | 0.00 |
| 67.91 | 106.49 | 2.00 | 0.00 | 1.00 | 0.00 | 68.08 | 112.75 | 2.00 | 0.00 | 1.00 | 0.00 |
| 68.24 | 138.93 | 2.00 | 0.00 | 1.00 | 0.00 | 68.41 | 171.75 | 2.00 | 0.00 | 1.00 | 0.00 |
| 68.57 | 185.82 | 2.00 | 0.00 | 1.00 | 0.00 | 68.73 | 177.61 | 2.00 | 0.00 | 1.00 | 0.00 |
| 68.90 | 152.54 | 2.00 | 0.00 | 1.00 | 0.00 | 69.06 | 124.82 | 2.00 | 0.00 | 1.00 | 0.00 |
| 69.23 | 100.48 | 2.00 | 0.00 | 1.00 | 0.00 | 69.39 | 92.21 | 2.00 | 0.00 | 1.00 | 0.00 |
| 69.55 | 92.99 | 2.00 | 0.00 | 1.00 | 0.00 | 69.72 | 93.97 | 2.00 | 0.00 | 1.00 | 0.00 |
| 69.88 | 96.18 | 2.00 | 0.00 | 1.00 | 0.00 | 70.05 | 100.48 | 2.00 | 0.00 | 1.00 | 0.00 |
| 70.21 | 104.43 | 2.00 | 0.00 | 1.00 | 0.00 | 70.37 | 102.78 | 2.00 | 0.00 | 1.00 | 0.00 |
| 70.54 | 99.24 | 2.00 | 0.00 | 1.00 | 0.00 | 70.70 | 96.31 | 2.00 | 0.00 | 1.00 | 0.00 |
| 70.87 | 99.52 | 2.00 | 0.00 | 1.00 | 0.00 | 71.03 | 90.54 | 2.00 | 0.00 | 1.00 | 0.00 |
| 71.19 | 88.12 | 2.00 | 0.00 | 1.00 | 0.00 | 71.36 | -1.00 | 2.00 | 0.00 | 1.00 | 0.00 |
| 71.52 | -1.00 | 2.00 | 0.00 | 1.00 | 0.00 | | | | | | |

**Total estimated settlement: 0.18**

**Abbreviations**

| | |
|---|---|
| $Q_{tn,cs}$: | Equivalent clean sand normalized cone resistance |
| FS: | Factor of safety against liquefaction |
| $e_v$ (%): | Post-liquefaction volumentric strain |
| DF: | $e_v$ depth weighting factor |
| Settlement: | Calculated settlement |

**:: Lateral displacement index calculation ::**

| Depth (ft) | $q_t$ (tsf) | $Q_{tn}$ | $R_f$ (%) | $Q_{tn,cs}$ | FS | $D_r$ | $Gamma_{max}$ (%) | Lat. disp. (in) |
|---|---|---|---|---|---|---|---|---|
| 13.12 | 294.83 | 311.60 | 1.49 | 311.60 | 2.00 | 100.00 | 0.00 | 0.00 |
| 13.29 | 285.61 | 301.14 | 1.55 | 312.43 | 2.00 | 100.00 | 0.00 | 0.00 |
| 13.45 | 270.76 | 284.76 | 1.58 | 306.38 | 2.00 | 100.00 | 0.00 | 0.00 |
| 13.62 | 256.93 | 269.37 | 1.57 | 295.21 | 2.00 | 99.71 | 0.00 | 0.00 |
| 13.78 | 246.29 | 257.33 | 1.54 | 284.20 | 2.00 | 98.20 | 0.00 | 0.00 |
| 13.94 | 235.55 | 245.02 | 1.43 | 265.83 | 2.00 | 96.58 | 0.00 | 0.00 |
| 14.11 | 219.05 | 227.15 | 1.40 | 250.91 | 2.00 | 94.08 | 0.00 | 0.00 |
| 14.27 | 193.81 | 200.54 | 1.40 | 230.71 | 2.00 | 89.97 | 0.00 | 0.00 |
| 14.44 | 163.54 | 169.24 | 1.57 | 207.72 | 2.00 | 84.37 | 0.00 | 0.00 |
| 14.60 | 135.01 | 139.74 | 1.82 | 181.32 | 0.90 | 78.04 | 4.03 | 0.15 |
| 14.76 | 114.73 | 118.78 | 2.22 | 168.54 | 0.74 | 72.68 | 7.65 | 0.29 |
| 14.93 | 104.77 | 108.45 | 2.79 | 175.43 | 0.82 | 69.68 | 5.76 | 0.22 |
| 15.09 | 119.51 | 123.12 | 2.76 | 188.18 | 0.98 | 73.87 | 3.43 | 0.13 |
| 15.26 | 160.47 | 163.90 | 2.18 | 214.67 | 2.00 | 83.31 | 0.00 | 0.00 |
| 15.42 | 206.63 | 209.18 | 1.64 | 249.32 | 2.00 | 91.36 | 0.00 | 0.00 |
| 15.58 | 237.37 | 238.80 | 1.39 | 258.33 | 2.00 | 95.73 | 0.00 | 0.00 |
| 15.75 | 245.01 | 245.62 | 1.39 | 262.17 | 2.00 | 96.66 | 0.00 | 0.00 |
| 15.91 | 241.27 | 241.34 | 1.52 | 270.67 | 2.00 | 96.08 | 0.00 | 0.00 |
| 16.08 | 230.23 | 229.77 | 1.64 | 268.61 | 2.00 | 94.46 | 0.00 | 0.00 |
| 16.24 | 214.00 | 212.95 | 1.67 | 254.23 | 2.00 | 91.95 | 0.00 | 0.00 |
| 16.40 | 197.43 | 195.71 | 1.55 | 233.42 | 2.00 | 89.16 | 0.00 | 0.00 |
| 16.57 | 181.11 | 178.84 | 1.42 | 212.67 | 2.00 | 86.19 | 0.00 | 0.00 |
| 16.73 | 165.55 | 162.88 | 1.32 | 194.15 | 1.02 | 83.10 | 3.09 | 0.12 |
| 16.90 | 152.12 | 149.19 | 1.30 | 180.57 | 0.84 | 80.20 | 4.65 | 0.17 |
| 17.06 | 137.04 | 134.02 | 1.37 | 166.79 | 0.68 | 76.66 | 7.17 | 0.27 |
| 17.22 | 124.34 | 121.26 | 1.52 | 156.01 | 0.57 | 73.36 | 14.50 | 0.54 |
| 17.39 | 117.99 | 114.68 | 1.54 | 149.48 | 0.52 | 71.52 | 14.50 | 0.54 |
| 17.55 | 119.82 | 116.06 | 1.47 | 149.62 | 2.00 | 71.92 | 0.00 | 0.00 |
| 17.72 | 125.97 | 121.63 | 1.38 | 153.91 | 2.00 | 73.46 | 0.00 | 0.00 |
| 17.88 | 137.33 | 132.23 | 1.40 | 165.51 | 2.00 | 76.22 | 0.00 | 0.00 |
| 18.04 | 149.68 | 143.70 | 1.35 | 176.30 | 2.00 | 78.97 | 0.00 | 0.00 |
| 18.21 | 159.87 | 153.06 | 1.34 | 185.55 | 2.00 | 81.05 | 0.00 | 0.00 |
| 18.37 | 163.44 | 156.00 | 1.31 | 187.42 | 2.00 | 81.68 | 0.00 | 0.00 |
| 18.54 | 164.88 | 156.89 | 1.28 | 187.45 | 2.00 | 81.87 | 0.00 | 0.00 |
| 18.70 | 167.67 | 159.06 | 1.11 | 182.19 | 2.00 | 82.32 | 0.00 | 0.00 |
| 18.86 | 164.51 | 155.60 | 1.14 | 180.84 | 2.00 | 81.59 | 0.00 | 0.00 |
| 19.03 | 151.13 | 142.48 | 1.44 | 177.05 | 2.00 | 78.68 | 0.00 | 0.00 |
| 19.19 | 125.66 | 117.93 | 2.08 | 164.30 | 2.00 | 72.44 | 0.00 | 0.00 |
| 19.36 | 94.36 | 87.96 | 2.93 | 162.55 | 2.00 | 62.77 | 0.00 | 0.00 |
| 19.52 | 68.60 | 63.38 | 3.51 | 162.67 | 2.00 | 51.95 | 0.00 | 0.00 |
| 19.69 | 49.20 | 44.94 | 3.49 | 146.71 | 2.00 | 40.60 | 0.00 | 0.00 |
| 19.85 | 41.08 | 37.18 | 2.95 | 124.76 | 2.00 | 34.35 | 0.00 | 0.00 |
| 20.01 | 44.77 | 40.51 | 2.29 | 107.72 | 2.00 | 37.18 | 0.00 | 0.00 |
| 20.18 | 56.18 | 50.99 | 2.24 | 112.58 | 2.00 | 44.77 | 0.00 | 0.00 |
| 20.34 | 68.03 | 61.83 | 2.10 | 115.65 | 2.00 | 51.13 | 0.00 | 0.00 |
| 20.51 | 73.07 | 66.30 | 2.11 | 119.32 | 2.00 | 53.43 | 0.00 | 0.00 |
| 20.67 | 74.01 | 66.93 | 2.19 | 122.16 | 2.00 | 53.75 | 0.00 | 0.00 |
| 20.83 | 73.98 | 66.68 | 2.24 | 123.42 | 2.00 | 53.62 | 0.00 | 0.00 |

**:: Estimation of post-earthquake lateral Displacements :: (continued)**

| Depth (ft) | $q_t$ (tsf) | $Q_{tn}$ | $R_f$ (%) | $Q_{tn,cs}$ | FS | $D_r$ | $Gamma_{max}$ (%) | Lat. disp. (in) |
|---|---|---|---|---|---|---|---|---|
| 21.00 | 73.77 | 66.25 | 2.28 | 124.53 | 2.00 | 53.41 | 0.00 | 0.00 |
| 21.16 | 74.35 | 66.57 | 2.29 | 124.98 | 2.00 | 53.57 | 0.00 | 0.00 |
| 21.33 | 75.07 | 67.01 | 2.27 | 124.87 | 2.00 | 53.78 | 0.00 | 0.00 |
| 21.49 | 75.69 | 67.35 | 2.26 | 124.60 | 2.00 | 53.95 | 0.00 | 0.00 |
| 21.65 | 76.06 | 67.47 | 2.25 | 124.51 | 2.00 | 54.01 | 0.00 | 0.00 |
| 21.82 | 76.54 | 67.68 | 2.23 | 124.03 | 2.00 | 54.12 | 0.00 | 0.00 |
| 21.98 | 77.06 | 67.96 | 2.14 | 121.35 | 2.00 | 54.25 | 0.00 | 0.00 |
| 22.15 | 77.59 | 68.29 | 1.85 | 113.04 | 2.00 | 54.41 | 0.00 | 0.00 |
| 22.31 | 77.44 | 67.99 | 1.65 | 107.10 | 2.00 | 54.27 | 0.00 | 0.00 |
| 22.47 | 77.07 | 67.48 | 1.58 | 104.93 | 2.00 | 54.02 | 0.00 | 0.00 |
| 22.64 | 77.14 | 67.30 | 1.74 | 109.03 | 2.00 | 53.93 | 0.00 | 0.00 |
| 22.80 | 78.33 | 68.12 | 1.84 | 112.56 | 2.00 | 54.33 | 0.00 | 0.00 |
| 22.97 | 79.71 | 69.13 | 1.87 | 114.42 | 2.00 | 54.82 | 0.00 | 0.00 |
| 23.13 | 80.53 | 69.64 | 1.90 | 115.59 | 2.00 | 55.06 | 0.00 | 0.00 |
| 23.29 | 80.89 | 69.74 | 1.93 | 116.51 | 2.00 | 55.11 | 0.00 | 0.00 |
| 23.46 | 81.94 | 70.45 | 1.92 | 116.89 | 2.00 | 55.44 | 0.00 | 0.00 |
| 23.62 | 82.95 | 71.15 | 1.90 | 116.79 | 2.00 | 55.76 | 0.00 | 0.00 |
| 23.79 | 83.64 | 71.54 | 1.88 | 116.62 | 2.00 | 55.95 | 0.00 | 0.00 |
| 23.95 | 83.82 | 71.48 | 1.91 | 117.31 | 2.00 | 55.92 | 0.00 | 0.00 |
| 24.11 | 84.14 | 71.52 | 1.96 | 118.73 | 2.00 | 55.94 | 0.00 | 0.00 |
| 24.28 | 84.41 | 71.53 | 1.99 | 119.89 | 2.00 | 55.94 | 0.00 | 0.00 |
| 24.44 | 83.87 | 70.85 | 1.98 | 118.97 | 2.00 | 55.62 | 0.00 | 0.00 |
| 24.61 | 82.73 | 69.70 | 1.85 | 114.30 | 2.00 | 55.09 | 0.00 | 0.00 |
| 24.77 | 80.89 | 67.91 | 1.81 | 111.72 | 2.00 | 54.23 | 0.00 | 0.00 |
| 24.93 | 79.97 | 66.90 | 1.86 | 112.28 | 2.00 | 53.73 | 0.00 | 0.00 |
| 25.10 | 79.82 | 66.50 | 2.02 | 116.77 | 2.00 | 53.53 | 0.00 | 0.00 |
| 25.26 | 80.74 | 67.06 | 2.09 | 119.22 | 2.00 | 53.81 | 0.00 | 0.00 |
| 25.43 | 81.37 | 67.39 | 2.10 | 119.86 | 2.00 | 53.97 | 0.00 | 0.00 |
| 25.59 | 81.64 | 67.41 | 2.11 | 120.33 | 2.00 | 53.98 | 0.00 | 0.00 |
| 25.75 | 81.78 | 67.33 | 2.12 | 120.60 | 2.00 | 53.94 | 0.00 | 0.00 |
| 25.92 | 81.81 | 67.14 | 2.14 | 121.01 | 2.00 | 53.85 | 0.00 | 0.00 |
| 26.08 | 81.91 | 67.02 | 2.15 | 121.20 | 2.00 | 53.79 | 0.00 | 0.00 |
| 26.25 | 82.70 | 67.50 | 2.12 | 120.76 | 2.00 | 54.03 | 0.00 | 0.00 |
| 26.41 | 84.03 | 68.47 | 2.05 | 119.26 | 2.00 | 54.50 | 0.00 | 0.00 |
| 26.57 | 85.63 | 69.70 | 1.93 | 116.60 | 2.00 | 55.09 | 0.00 | 0.00 |
| 26.74 | 86.16 | 70.01 | 1.83 | 113.96 | 2.00 | 55.23 | 0.00 | 0.00 |
| 26.90 | 85.59 | 69.37 | 1.79 | 112.39 | 2.00 | 54.93 | 0.00 | 0.00 |
| 27.07 | 84.97 | 68.65 | 1.80 | 112.05 | 2.00 | 54.58 | 0.00 | 0.00 |
| 27.23 | 84.67 | 68.17 | 1.83 | 112.55 | 2.00 | 54.35 | 0.00 | 0.00 |
| 27.40 | 85.19 | 68.43 | 1.82 | 112.52 | 2.00 | 54.48 | 0.00 | 0.00 |
| 27.56 | 85.89 | 68.91 | 1.70 | 109.33 | 2.00 | 54.71 | 0.00 | 0.00 |
| 27.72 | 87.09 | 69.80 | 1.62 | 107.91 | 2.00 | 55.13 | 0.00 | 0.00 |
| 27.89 | 87.93 | 70.31 | 1.62 | 108.29 | 2.00 | 55.37 | 0.00 | 0.00 |
| 28.05 | 88.46 | 70.46 | 1.75 | 111.94 | 2.00 | 55.44 | 0.00 | 0.00 |
| 28.22 | 88.10 | 69.89 | 1.84 | 114.03 | 2.00 | 55.17 | 0.00 | 0.00 |
| 28.38 | 87.77 | 69.39 | 1.88 | 115.04 | 2.00 | 54.94 | 0.00 | 0.00 |
| 28.54 | 87.56 | 69.00 | 1.91 | 115.56 | 2.00 | 54.75 | 0.00 | 0.00 |
| 28.71 | 87.76 | 68.97 | 1.93 | 115.96 | 2.00 | 54.74 | 0.00 | 0.00 |

**:: Estimation of post-earthquake lateral Displacements :: (continued)**

| Depth (ft) | $q_t$ (tsf) | $Q_{tn}$ | $R_f$ (%) | $Q_{tn,cs}$ | FS | $D_r$ | $Gamma_{max}$ (%) | Lat. disp. (in) |
|---|---|---|---|---|---|---|---|---|
| 28.87 | 87.98 | 68.95 | 1.93 | 116.09 | 2.00 | 54.73 | 0.00 | 0.00 |
| 29.04 | 88.38 | 69.08 | 1.93 | 116.23 | 2.00 | 54.79 | 0.00 | 0.00 |
| 29.20 | 88.92 | 69.36 | 1.89 | 115.34 | 2.00 | 54.93 | 0.00 | 0.00 |
| 29.36 | 89.20 | 69.56 | 1.72 | 110.55 | 2.00 | 55.02 | 0.00 | 0.00 |
| 29.53 | 88.94 | 69.28 | 1.61 | 107.18 | 2.00 | 54.89 | 0.00 | 0.00 |
| 29.69 | 88.18 | 68.52 | 1.57 | 105.57 | 2.00 | 54.52 | 0.00 | 0.00 |
| 29.86 | 87.93 | 67.99 | 1.72 | 109.14 | 2.00 | 54.27 | 0.00 | 0.00 |
| 30.02 | 88.17 | 67.90 | 1.82 | 112.20 | 2.00 | 54.22 | 0.00 | 0.00 |
| 30.18 | 89.55 | 68.78 | 1.89 | 114.69 | 2.00 | 54.65 | 0.00 | 0.00 |
| 30.35 | 90.97 | 69.73 | 1.90 | 115.68 | 2.00 | 55.10 | 0.00 | 0.00 |
| 30.51 | 91.95 | 70.30 | 1.93 | 117.02 | 2.00 | 55.37 | 0.00 | 0.00 |
| 30.68 | 93.39 | 71.01 | 2.20 | 126.02 | 2.00 | 55.70 | 0.00 | 0.00 |
| 30.84 | 108.05 | 82.12 | 2.60 | 147.33 | 2.00 | 60.50 | 0.00 | 0.00 |
| 31.00 | 143.63 | 110.07 | 2.71 | 174.83 | 2.00 | 70.17 | 0.00 | 0.00 |
| 31.17 | 159.26 | 122.08 | 2.80 | 188.81 | 2.00 | 73.58 | 0.00 | 0.00 |
| 31.33 | 148.89 | 113.78 | 2.59 | 174.48 | 2.00 | 71.26 | 0.00 | 0.00 |
| 31.50 | 113.40 | 85.55 | 2.44 | 144.83 | 2.00 | 61.85 | 0.00 | 0.00 |
| 31.66 | 95.98 | 71.95 | 2.09 | 123.13 | 2.00 | 56.13 | 0.00 | 0.00 |
| 31.82 | 93.66 | 69.87 | 2.15 | 123.43 | 2.00 | 55.17 | 0.00 | 0.00 |
| 31.99 | 97.32 | 72.52 | 2.18 | 126.33 | 2.00 | 56.40 | 0.00 | 0.00 |
| 32.15 | 100.12 | 74.57 | 2.12 | 126.37 | 2.00 | 57.32 | 0.00 | 0.00 |
| 32.32 | 100.21 | 74.56 | 2.02 | 123.34 | 2.00 | 57.31 | 0.00 | 0.00 |
| 32.48 | 98.97 | 73.53 | 1.92 | 119.38 | 2.00 | 56.85 | 0.00 | 0.00 |
| 32.64 | 99.27 | 73.89 | 1.66 | 112.61 | 2.00 | 57.01 | 0.00 | 0.00 |
| 32.81 | 99.99 | 74.49 | 1.51 | 109.20 | 2.00 | 57.28 | 0.00 | 0.00 |
| 32.97 | 99.94 | 74.35 | 1.46 | 107.87 | 2.00 | 57.22 | 0.00 | 0.00 |
| 33.14 | 100.02 | 74.07 | 1.57 | 110.29 | 2.00 | 57.09 | 0.00 | 0.00 |
| 33.30 | 100.14 | 73.92 | 1.61 | 111.33 | 2.00 | 57.03 | 0.00 | 0.00 |
| 33.46 | 100.22 | 73.77 | 1.64 | 111.82 | 2.00 | 56.96 | 0.00 | 0.00 |
| 33.63 | 100.12 | 73.50 | 1.65 | 111.88 | 2.00 | 56.84 | 0.00 | 0.00 |
| 33.79 | 99.66 | 72.92 | 1.68 | 112.20 | 2.00 | 56.57 | 0.00 | 0.00 |
| 33.96 | 99.54 | 72.63 | 1.69 | 112.38 | 2.00 | 56.44 | 0.00 | 0.00 |
| 34.12 | 99.69 | 72.56 | 1.70 | 112.48 | 2.00 | 56.41 | 0.00 | 0.00 |
| 34.28 | 99.95 | 72.58 | 1.70 | 112.47 | 2.00 | 56.42 | 0.00 | 0.00 |
| 34.45 | 99.94 | 72.40 | 1.70 | 112.35 | 2.00 | 56.34 | 0.00 | 0.00 |
| 34.61 | 99.66 | 72.01 | 1.70 | 112.06 | 2.00 | 56.16 | 0.00 | 0.00 |
| 34.78 | 99.62 | 71.89 | 1.64 | 110.37 | 2.00 | 56.11 | 0.00 | 0.00 |
| 34.94 | 99.94 | 72.10 | 1.55 | 108.25 | 2.00 | 56.20 | 0.00 | 0.00 |
| 35.10 | 100.13 | 72.12 | 1.53 | 107.58 | 2.00 | 56.21 | 0.00 | 0.00 |
| 35.27 | 100.18 | 71.89 | 1.59 | 109.00 | 2.00 | 56.11 | 0.00 | 0.00 |
| 35.43 | 100.39 | 71.74 | 1.68 | 111.26 | 2.00 | 56.04 | 0.00 | 0.00 |
| 35.60 | 100.80 | 71.84 | 1.70 | 111.95 | 2.00 | 56.09 | 0.00 | 0.00 |
| 35.76 | 100.58 | 71.50 | 1.70 | 111.76 | 2.00 | 55.93 | 0.00 | 0.00 |
| 35.93 | 99.96 | 70.85 | 1.72 | 111.57 | 2.00 | 55.62 | 0.00 | 0.00 |
| 36.09 | 99.41 | 70.20 | 1.76 | 112.17 | 2.00 | 55.32 | 0.00 | 0.00 |
| 36.25 | 99.28 | 69.88 | 1.80 | 113.12 | 2.00 | 55.17 | 0.00 | 0.00 |
| 36.42 | 99.42 | 69.75 | 1.85 | 114.38 | 2.00 | 55.11 | 0.00 | 0.00 |
| 36.58 | 99.72 | 69.74 | 1.89 | 115.59 | 2.00 | 55.11 | 0.00 | 0.00 |

**:: Estimation of post-earthquake lateral Displacements :: (continued)**

| Depth (ft) | $q_t$ (tsf) | $Q_{tn}$ | $R_f$ (%) | $Q_{tn,cs}$ | FS | $D_r$ | $Gamma_{max}$ (%) | Lat. disp. (in) |
|---|---|---|---|---|---|---|---|---|
| 36.75 | 100.97 | 70.47 | 1.92 | 116.99 | 2.00 | 55.45 | 0.00 | 0.00 |
| 36.91 | 102.75 | 71.65 | 1.90 | 117.42 | 2.00 | 56.00 | 0.00 | 0.00 |
| 37.07 | 104.00 | 72.48 | 1.84 | 116.54 | 2.00 | 56.38 | 0.00 | 0.00 |
| 37.24 | 103.94 | 72.43 | 1.75 | 113.77 | 2.00 | 56.35 | 0.00 | 0.00 |
| 37.40 | 103.27 | 72.00 | 1.60 | 109.51 | 2.00 | 56.16 | 0.00 | 0.00 |
| 37.57 | 103.23 | 71.92 | 1.54 | 107.90 | 2.00 | 56.12 | 0.00 | 0.00 |
| 37.73 | 104.14 | 72.38 | 1.57 | 108.94 | 2.00 | 56.33 | 0.00 | 0.00 |
| 37.89 | 105.37 | 72.96 | 1.67 | 112.08 | 2.00 | 56.59 | 0.00 | 0.00 |
| 38.06 | 106.17 | 73.30 | 1.71 | 113.56 | 2.00 | 56.75 | 0.00 | 0.00 |
| 38.22 | 106.22 | 73.15 | 1.73 | 113.82 | 2.00 | 56.68 | 0.00 | 0.00 |
| 38.39 | 106.61 | 73.26 | 1.73 | 114.00 | 2.00 | 56.73 | 0.00 | 0.00 |
| 38.55 | 107.13 | 73.47 | 1.73 | 114.14 | 2.00 | 56.83 | 0.00 | 0.00 |
| 38.71 | 107.80 | 73.79 | 1.73 | 114.50 | 2.00 | 56.97 | 0.00 | 0.00 |
| 38.88 | 107.94 | 73.69 | 1.76 | 115.06 | 2.00 | 56.92 | 0.00 | 0.00 |
| 39.04 | 108.22 | 73.64 | 1.80 | 116.31 | 2.00 | 56.90 | 0.00 | 0.00 |
| 39.21 | 108.89 | 73.92 | 1.82 | 117.11 | 2.00 | 57.03 | 0.00 | 0.00 |
| 39.37 | 109.94 | 74.52 | 1.82 | 117.57 | 2.00 | 57.29 | 0.00 | 0.00 |
| 39.53 | 109.64 | 74.12 | 1.83 | 117.42 | 2.00 | 57.11 | 0.00 | 0.00 |
| 39.70 | 108.77 | 73.28 | 1.85 | 117.38 | 2.00 | 56.74 | 0.00 | 0.00 |
| 39.86 | 107.52 | 72.22 | 1.85 | 116.54 | 2.00 | 56.26 | 0.00 | 0.00 |
| 40.03 | 107.06 | 71.78 | 1.81 | 115.16 | 2.00 | 56.06 | 0.00 | 0.00 |
| 40.19 | 106.04 | 70.93 | 1.79 | 113.79 | 2.00 | 55.66 | 0.00 | 0.00 |
| 40.35 | 104.90 | 69.94 | 1.80 | 113.21 | 2.00 | 55.20 | 0.00 | 0.00 |
| 40.52 | 104.55 | 69.52 | 1.80 | 113.01 | 2.00 | 55.00 | 0.00 | 0.00 |
| 40.68 | 105.01 | 69.72 | 1.79 | 112.92 | 2.00 | 55.09 | 0.00 | 0.00 |
| 40.85 | 105.24 | 69.75 | 1.78 | 112.49 | 2.00 | 55.11 | 0.00 | 0.00 |
| 41.01 | 104.94 | 69.41 | 1.76 | 111.76 | 2.00 | 54.95 | 0.00 | 0.00 |
| 41.17 | 104.92 | 69.41 | 1.67 | 109.20 | 2.00 | 54.95 | 0.00 | 0.00 |
| 41.34 | 104.81 | 69.25 | 1.63 | 108.05 | 2.00 | 54.87 | 0.00 | 0.00 |
| 41.50 | 104.02 | 68.52 | 1.64 | 107.71 | 2.00 | 54.52 | 0.00 | 0.00 |
| 41.67 | 102.47 | 67.09 | 1.74 | 109.42 | 2.00 | 53.82 | 0.00 | 0.00 |
| 41.83 | 101.31 | 66.03 | 1.80 | 110.12 | 2.00 | 53.30 | 0.00 | 0.00 |
| 41.99 | 101.20 | 65.78 | 1.81 | 110.32 | 2.00 | 53.18 | 0.00 | 0.00 |
| 42.16 | 101.61 | 65.94 | 1.80 | 110.17 | 2.00 | 53.26 | 0.00 | 0.00 |
| 42.32 | 102.17 | 66.22 | 1.78 | 109.83 | 2.00 | 53.40 | 0.00 | 0.00 |
| 42.49 | 102.55 | 66.38 | 1.76 | 109.47 | 2.00 | 53.47 | 0.00 | 0.00 |
| 42.65 | 102.72 | 66.36 | 1.76 | 109.22 | 2.00 | 53.47 | 0.00 | 0.00 |
| 42.81 | 103.54 | 66.80 | 1.75 | 109.36 | 2.00 | 53.69 | 0.00 | 0.00 |
| 42.98 | 103.85 | 66.87 | 1.75 | 109.51 | 2.00 | 53.72 | 0.00 | 0.00 |
| 43.14 | 104.05 | 66.85 | 1.76 | 109.75 | 2.00 | 53.71 | 0.00 | 0.00 |
| 43.31 | 103.97 | 66.67 | 1.75 | 109.26 | 2.00 | 53.62 | 0.00 | 0.00 |
| 43.47 | 104.46 | 67.13 | 1.62 | 106.01 | 2.00 | 53.84 | 0.00 | 0.00 |
| 43.64 | 105.90 | 68.13 | 1.55 | 105.05 | 2.00 | 54.33 | 0.00 | 0.00 |
| 43.80 | 106.64 | 68.52 | 1.55 | 105.19 | 2.00 | 54.52 | 0.00 | 0.00 |
| 43.96 | 106.46 | 67.99 | 1.67 | 108.13 | 2.00 | 54.26 | 0.00 | 0.00 |
| 44.13 | 105.41 | 66.98 | 1.74 | 109.22 | 2.00 | 53.77 | 0.00 | 0.00 |
| 44.29 | 104.65 | 66.25 | 1.77 | 109.65 | 2.00 | 53.41 | 0.00 | 0.00 |
| 44.46 | 105.15 | 66.45 | 1.78 | 109.88 | 2.00 | 53.51 | 0.00 | 0.00 |

**:: Estimation of post-earthquake lateral Displacements :: (continued)**

| Depth (ft) | $q_t$ (tsf) | $Q_{tn}$ | $R_f$ (%) | $Q_{tn,cs}$ | FS | $D_r$ | $Gamma_{max}$ (%) | Lat. disp. (in) |
|---|---|---|---|---|---|---|---|---|
| 44.62 | 105.52 | 66.55 | 1.78 | 110.17 | 2.00 | 53.56 | 0.00 | 0.00 |
| 44.78 | 105.83 | 66.61 | 1.79 | 110.30 | 2.00 | 53.59 | 0.00 | 0.00 |
| 44.95 | 105.80 | 66.45 | 1.79 | 110.20 | 2.00 | 53.51 | 0.00 | 0.00 |
| 45.11 | 105.92 | 66.42 | 1.77 | 109.76 | 2.00 | 53.50 | 0.00 | 0.00 |
| 45.28 | 106.11 | 66.44 | 1.76 | 109.37 | 2.00 | 53.51 | 0.00 | 0.00 |
| 45.44 | 106.07 | 66.32 | 1.73 | 108.61 | 2.00 | 53.45 | 0.00 | 0.00 |
| 45.60 | 106.16 | 66.29 | 1.71 | 107.99 | 2.00 | 53.43 | 0.00 | 0.00 |
| 45.77 | 105.87 | 65.91 | 1.73 | 108.25 | 2.00 | 53.24 | 0.00 | 0.00 |
| 45.93 | 105.47 | 65.41 | 1.78 | 109.22 | 2.00 | 52.99 | 0.00 | 0.00 |
| 46.10 | 105.19 | 65.02 | 1.81 | 109.94 | 2.00 | 52.79 | 0.00 | 0.00 |
| 46.26 | 105.25 | 64.94 | 1.80 | 109.54 | 2.00 | 52.75 | 0.00 | 0.00 |
| 46.42 | 105.66 | 65.16 | 1.76 | 108.56 | 2.00 | 52.86 | 0.00 | 0.00 |
| 46.59 | 105.87 | 65.23 | 1.74 | 107.84 | 2.00 | 52.90 | 0.00 | 0.00 |
| 46.75 | 106.31 | 65.43 | 1.72 | 107.44 | 2.00 | 53.00 | 0.00 | 0.00 |
| 46.92 | 106.72 | 65.57 | 1.72 | 107.58 | 2.00 | 53.07 | 0.00 | 0.00 |
| 47.08 | 107.45 | 65.95 | 1.71 | 107.54 | 2.00 | 53.26 | 0.00 | 0.00 |
| 47.24 | 108.03 | 66.26 | 1.68 | 107.09 | 2.00 | 53.41 | 0.00 | 0.00 |
| 47.41 | 108.41 | 66.53 | 1.61 | 105.44 | 2.00 | 53.55 | 0.00 | 0.00 |
| 47.57 | 108.90 | 66.79 | 1.58 | 104.83 | 2.00 | 53.68 | 0.00 | 0.00 |
| 47.74 | 109.06 | 66.71 | 1.61 | 105.49 | 2.00 | 53.64 | 0.00 | 0.00 |
| 47.90 | 109.67 | 66.79 | 1.69 | 107.90 | 2.00 | 53.68 | 0.00 | 0.00 |
| 48.06 | 110.47 | 67.09 | 1.74 | 109.39 | 2.00 | 53.83 | 0.00 | 0.00 |
| 48.23 | 111.85 | 67.87 | 1.74 | 110.04 | 2.00 | 54.21 | 0.00 | 0.00 |
| 48.39 | 112.89 | 68.46 | 1.72 | 110.03 | 2.00 | 54.49 | 0.00 | 0.00 |
| 48.56 | 113.51 | 68.76 | 1.71 | 110.02 | 2.00 | 54.64 | 0.00 | 0.00 |
| 48.72 | 113.71 | 68.78 | 1.71 | 109.79 | 2.00 | 54.64 | 0.00 | 0.00 |
| 48.88 | 113.69 | 68.65 | 1.70 | 109.42 | 2.00 | 54.58 | 0.00 | 0.00 |
| 49.05 | 113.03 | 68.04 | 1.71 | 109.33 | 2.00 | 54.29 | 0.00 | 0.00 |
| 49.21 | 112.22 | 67.36 | 1.71 | 108.90 | 2.00 | 53.96 | 0.00 | 0.00 |
| 49.38 | 111.09 | 66.38 | 1.76 | 109.52 | 2.00 | 53.47 | 0.00 | 0.00 |
| 49.54 | 110.01 | 65.40 | 1.82 | 110.57 | 2.00 | 52.98 | 0.00 | 0.00 |
| 49.70 | 109.60 | 64.87 | 1.89 | 112.09 | 2.00 | 52.71 | 0.00 | 0.00 |
| 49.87 | 109.66 | 64.78 | 1.89 | 111.97 | 2.00 | 52.67 | 0.00 | 0.00 |
| 50.03 | 110.18 | 65.09 | 1.84 | 110.80 | 2.00 | 52.83 | 0.00 | 0.00 |
| 50.20 | 110.23 | 65.10 | 1.79 | 109.35 | 2.00 | 52.83 | 0.00 | 0.00 |
| 50.36 | 110.20 | 65.02 | 1.76 | 108.32 | 2.00 | 52.79 | 0.00 | 0.00 |
| 50.52 | 110.51 | 65.16 | 1.73 | 107.66 | 2.00 | 52.86 | 0.00 | 0.00 |
| 50.69 | 110.72 | 65.20 | 1.72 | 107.28 | 2.00 | 52.88 | 0.00 | 0.00 |
| 50.85 | 110.78 | 65.16 | 1.70 | 106.68 | 2.00 | 52.86 | 0.00 | 0.00 |
| 51.02 | 110.67 | 65.04 | 1.66 | 105.57 | 2.00 | 52.80 | 0.00 | 0.00 |
| 51.18 | 109.54 | 64.20 | 1.65 | 104.76 | 2.00 | 52.37 | 0.00 | 0.00 |
| 51.35 | 108.67 | 63.48 | 1.67 | 104.64 | 2.00 | 52.00 | 0.00 | 0.00 |
| 51.51 | 107.59 | 62.50 | 1.74 | 105.93 | 2.00 | 51.49 | 0.00 | 0.00 |
| 51.67 | 108.03 | 62.56 | 1.79 | 107.40 | 2.00 | 51.52 | 0.00 | 0.00 |
| 51.84 | 108.86 | 62.87 | 1.83 | 109.02 | 2.00 | 51.68 | 0.00 | 0.00 |
| 52.00 | 110.32 | 63.63 | 1.85 | 110.12 | 2.00 | 52.08 | 0.00 | 0.00 |
| 52.17 | 111.65 | 64.36 | 1.85 | 110.57 | 2.00 | 52.46 | 0.00 | 0.00 |
| 52.33 | 112.50 | 64.80 | 1.84 | 110.52 | 2.00 | 52.68 | 0.00 | 0.00 |

**:: Estimation of post-earthquake lateral Displacements :: (continued)**

| Depth (ft) | $q_t$ (tsf) | $Q_{tn}$ | $R_f$ (%) | $Q_{tn,cs}$ | FS | $D_r$ | $Gamma_{max}$ (%) | Lat. disp. (in) |
|---|---|---|---|---|---|---|---|---|
| 52.49 | 113.14 | 65.19 | 1.79 | 109.57 | 2.00 | 52.88 | 0.00 | 0.00 |
| 52.66 | 114.18 | 65.81 | 1.76 | 109.05 | 2.00 | 53.19 | 0.00 | 0.00 |
| 52.82 | 114.60 | 65.95 | 1.76 | 109.08 | 2.00 | 53.26 | 0.00 | 0.00 |
| 52.99 | 115.08 | 66.05 | 1.79 | 110.15 | 2.00 | 53.31 | 0.00 | 0.00 |
| 53.15 | 115.03 | 65.80 | 1.83 | 111.04 | 2.00 | 53.19 | 0.00 | 0.00 |
| 53.31 | 115.90 | 66.22 | 1.83 | 111.47 | 2.00 | 53.39 | 0.00 | 0.00 |
| 53.48 | 116.96 | 66.74 | 1.84 | 112.08 | 2.00 | 53.65 | 0.00 | 0.00 |
| 53.64 | 119.03 | 67.91 | 1.84 | 113.09 | 2.00 | 54.23 | 0.00 | 0.00 |
| 53.81 | 122.18 | 69.77 | 1.84 | 114.50 | 2.00 | 55.12 | 0.00 | 0.00 |
| 53.97 | 124.87 | 71.38 | 1.83 | 115.36 | 2.00 | 55.87 | 0.00 | 0.00 |
| 54.13 | 126.24 | 72.15 | 1.81 | 115.56 | 2.00 | 56.22 | 0.00 | 0.00 |
| 54.30 | 126.16 | 72.12 | 1.75 | 113.89 | 2.00 | 56.21 | 0.00 | 0.00 |
| 54.46 | 126.27 | 72.87 | 1.48 | 107.35 | 2.00 | 56.55 | 0.00 | 0.00 |
| 54.63 | 126.38 | 73.64 | 1.25 | 102.57 | 2.00 | 56.90 | 0.00 | 0.00 |
| 54.79 | 123.46 | 72.06 | 1.14 | 98.77 | 2.00 | 56.18 | 0.00 | 0.00 |
| 54.95 | 122.40 | 70.60 | 1.31 | 101.20 | 2.00 | 55.51 | 0.00 | 0.00 |
| 55.12 | 121.18 | 69.10 | 1.49 | 104.37 | 2.00 | 54.80 | 0.00 | 0.00 |
| 55.28 | 123.30 | 69.93 | 1.62 | 108.42 | 2.00 | 55.19 | 0.00 | 0.00 |
| 55.45 | 123.48 | 69.76 | 1.67 | 109.71 | 2.00 | 55.12 | 0.00 | 0.00 |
| 55.61 | 123.45 | 69.61 | 1.67 | 109.68 | 2.00 | 55.04 | 0.00 | 0.00 |
| 55.77 | 122.68 | 69.07 | 1.65 | 108.59 | 2.00 | 54.79 | 0.00 | 0.00 |
| 55.94 | 121.98 | 68.59 | 1.62 | 107.42 | 2.00 | 54.56 | 0.00 | 0.00 |
| 56.10 | 121.61 | 68.28 | 1.61 | 106.74 | 2.00 | 54.41 | 0.00 | 0.00 |
| 56.27 | 121.71 | 68.33 | 1.57 | 105.74 | 2.00 | 54.43 | 0.00 | 0.00 |
| 56.43 | 121.85 | 68.77 | 1.42 | 102.21 | 2.00 | 54.64 | 0.00 | 0.00 |
| 56.59 | 121.88 | 68.87 | 1.36 | 100.86 | 2.00 | 54.69 | 0.00 | 0.00 |
| 56.76 | 120.56 | 68.11 | 1.31 | 98.88 | 2.00 | 54.32 | 0.00 | 0.00 |
| 56.92 | 119.65 | 67.46 | 1.29 | 97.99 | 2.00 | 54.01 | 0.00 | 0.00 |
| 57.09 | 118.34 | 66.60 | 1.27 | 96.71 | 2.00 | 53.58 | 0.00 | 0.00 |
| 57.25 | 117.83 | 65.91 | 1.35 | 97.99 | 2.00 | 53.24 | 0.00 | 0.00 |
| 57.41 | 117.99 | 65.38 | 1.51 | 101.81 | 2.00 | 52.97 | 0.00 | 0.00 |
| 57.58 | 119.21 | 65.65 | 1.64 | 105.43 | 2.00 | 53.11 | 0.00 | 0.00 |
| 57.74 | 122.05 | 67.15 | 1.68 | 107.81 | 2.00 | 53.86 | 0.00 | 0.00 |
| 57.91 | 124.25 | 68.35 | 1.69 | 109.05 | 2.00 | 54.44 | 0.00 | 0.00 |
| 58.07 | 125.96 | 69.97 | 1.47 | 104.58 | 2.00 | 55.21 | 0.00 | 0.00 |
| 58.23 | 126.23 | 70.48 | 1.34 | 101.80 | 2.00 | 55.45 | 0.00 | 0.00 |
| 58.40 | 123.67 | 68.90 | 1.30 | 99.55 | 2.00 | 54.70 | 0.00 | 0.00 |
| 58.56 | 121.81 | 67.00 | 1.49 | 102.50 | 2.00 | 53.78 | 0.00 | 0.00 |
| 58.73 | 120.72 | 65.84 | 1.61 | 104.88 | 2.00 | 53.20 | 0.00 | 0.00 |
| 58.89 | 121.80 | 66.04 | 1.73 | 108.36 | 2.00 | 53.31 | 0.00 | 0.00 |
| 59.06 | 122.43 | 65.61 | 1.99 | 115.84 | 2.00 | 53.09 | 0.00 | 0.00 |
| 59.22 | 132.12 | 70.86 | 2.15 | 124.84 | 2.00 | 55.63 | 0.00 | 0.00 |
| 59.38 | 157.65 | 87.06 | 1.86 | 129.65 | 2.00 | 62.43 | 0.00 | 0.00 |
| 59.55 | 163.97 | 91.59 | 1.65 | 128.81 | 2.00 | 64.10 | 0.00 | 0.00 |
| 59.71 | 154.42 | 86.80 | 1.36 | 117.80 | 2.00 | 62.33 | 0.00 | 0.00 |
| 59.88 | 128.90 | 70.56 | 1.44 | 104.24 | 2.00 | 55.49 | 0.00 | 0.00 |
| 60.04 | 122.41 | 66.44 | 1.45 | 101.00 | 2.00 | 53.51 | 0.00 | 0.00 |
| 60.20 | 125.77 | 67.79 | 1.62 | 106.87 | 2.00 | 54.17 | 0.00 | 0.00 |

**:: Estimation of post-earthquake lateral Displacements :: (continued)**

| Depth (ft) | $q_t$ (tsf) | $Q_{tn}$ | $R_f$ (%) | $Q_{tn,cs}$ | FS | $D_r$ | $Gamma_{max}$ (%) | Lat. disp. (in) |
|---|---|---|---|---|---|---|---|---|
| 60.37 | 129.11 | 69.28 | 1.76 | 111.76 | 2.00 | 54.89 | 0.00 | 0.00 |
| 60.53 | 132.60 | 71.05 | 1.82 | 115.09 | 2.00 | 55.72 | 0.00 | 0.00 |
| 60.70 | 132.32 | 70.71 | 1.84 | 115.32 | 2.00 | 55.56 | 0.00 | 0.00 |
| 60.86 | 133.33 | 71.90 | 1.62 | 110.09 | 2.00 | 56.11 | 0.00 | 0.00 |
| 61.02 | 132.67 | 72.10 | 1.42 | 105.09 | 2.00 | 56.20 | 0.00 | 0.00 |
| 61.19 | 129.92 | 69.86 | 1.54 | 106.35 | 2.00 | 55.16 | 0.00 | 0.00 |
| 61.35 | 137.00 | 72.79 | 1.91 | 119.04 | 2.00 | 56.52 | 0.00 | 0.00 |
| 61.52 | 141.78 | 74.46 | 2.27 | 131.24 | 2.00 | 57.27 | 0.00 | 0.00 |
| 61.68 | 145.75 | 76.55 | 2.30 | 133.95 | 2.00 | 58.18 | 0.00 | 0.00 |
| 61.84 | 134.73 | 70.10 | 2.26 | 127.75 | 2.00 | 55.27 | 0.00 | 0.00 |
| 62.01 | 125.82 | 65.18 | 2.11 | 119.22 | 2.00 | 52.87 | 0.00 | 0.00 |
| 62.17 | 119.80 | 62.44 | 1.77 | 106.81 | 2.00 | 51.46 | 0.00 | 0.00 |
| 62.34 | 118.05 | 61.85 | 1.58 | 100.86 | 2.00 | 51.14 | 0.00 | 0.00 |
| 62.50 | 117.15 | 61.27 | 1.56 | 99.85 | 2.00 | 50.83 | 0.00 | 0.00 |
| 62.66 | 123.54 | 64.06 | 1.86 | 110.73 | 2.00 | 52.30 | 0.00 | 0.00 |
| 62.83 | 135.75 | 70.84 | 1.94 | 118.39 | 2.00 | 55.62 | 0.00 | 0.00 |
| 62.99 | 138.20 | 71.78 | 2.07 | 122.87 | 2.00 | 56.06 | 0.00 | 0.00 |
| 63.16 | 132.18 | 68.07 | 2.10 | 121.17 | 2.00 | 54.30 | 0.00 | 0.00 |
| 63.32 | 120.03 | 60.59 | 2.26 | 120.92 | 2.00 | 50.46 | 0.00 | 0.00 |
| 63.48 | 119.47 | 60.30 | 2.20 | 118.83 | 2.00 | 50.30 | 0.00 | 0.00 |
| 63.65 | 119.39 | 60.25 | 2.16 | 117.27 | 2.00 | 50.28 | 0.00 | 0.00 |
| 63.81 | 118.87 | 59.96 | 2.11 | 115.59 | 2.00 | 50.12 | 0.00 | 0.00 |
| 63.98 | 117.77 | 59.78 | 1.88 | 108.32 | 2.00 | 50.02 | 0.00 | 0.00 |
| 64.14 | 118.93 | 60.88 | 1.68 | 103.22 | 2.00 | 50.62 | 0.00 | 0.00 |
| 64.30 | 116.98 | 59.75 | 1.65 | 101.34 | 2.00 | 50.00 | 0.00 | 0.00 |
| 64.47 | 116.03 | 58.61 | 1.83 | 105.92 | 2.00 | 49.37 | 0.00 | 0.00 |
| 64.63 | 114.60 | 57.65 | 1.85 | 105.84 | 2.00 | 48.82 | 0.00 | 0.00 |
| 64.80 | 116.49 | 58.67 | 1.83 | 106.06 | 2.00 | 49.40 | 0.00 | 0.00 |
| 64.96 | 116.83 | 58.70 | 1.85 | 106.81 | 2.00 | 49.42 | 0.00 | 0.00 |
| 65.12 | 117.68 | 59.22 | 1.80 | 105.64 | 2.00 | 49.71 | 0.00 | 0.00 |
| 65.29 | 118.06 | 59.60 | 1.71 | 103.03 | 2.00 | 49.92 | 0.00 | 0.00 |
| 65.45 | 117.73 | 59.49 | 1.64 | 101.12 | 2.00 | 49.86 | 0.00 | 0.00 |
| 65.62 | 116.37 | 58.18 | 1.80 | 104.88 | 2.00 | 49.12 | 0.00 | 0.00 |
| 65.78 | 116.82 | 58.53 | 1.73 | 102.92 | 2.00 | 49.32 | 0.00 | 0.00 |
| 65.94 | 117.48 | 58.96 | 1.68 | 101.66 | 2.00 | 49.56 | 0.00 | 0.00 |
| 66.11 | 117.83 | 59.00 | 1.70 | 102.31 | 2.00 | 49.59 | 0.00 | 0.00 |
| 66.27 | 118.14 | 58.85 | 1.78 | 104.67 | 2.00 | 49.50 | 0.00 | 0.00 |
| 66.44 | 115.50 | 56.99 | 1.88 | 106.53 | 2.00 | 48.44 | 0.00 | 0.00 |
| 66.60 | 108.65 | 53.00 | 1.91 | 104.71 | 2.00 | 46.05 | 0.00 | 0.00 |
| 66.77 | 99.87 | 47.78 | 2.04 | 105.50 | 2.00 | 42.62 | 0.00 | 0.00 |
| 66.93 | 99.40 | 47.60 | 1.95 | 102.81 | 2.00 | 42.50 | 0.00 | 0.00 |
| 67.09 | 105.70 | 51.35 | 1.80 | 100.26 | 2.00 | 45.00 | 0.00 | 0.00 |
| 67.26 | 114.12 | 56.02 | 1.77 | 102.56 | 2.00 | 47.88 | 0.00 | 0.00 |
| 67.42 | 118.06 | 57.89 | 1.87 | 106.71 | 2.00 | 48.96 | 0.00 | 0.00 |
| 67.59 | 121.39 | 59.54 | 1.91 | 109.13 | 2.00 | 49.89 | 0.00 | 0.00 |
| 67.75 | 123.75 | 61.03 | 1.81 | 107.29 | 2.00 | 50.70 | 0.00 | 0.00 |
| 67.91 | 126.17 | 62.47 | 1.75 | 106.49 | 2.00 | 51.47 | 0.00 | 0.00 |
| 68.08 | 127.26 | 62.37 | 1.96 | 112.75 | 2.00 | 51.42 | 0.00 | 0.00 |

**:: Estimation of post-earthquake lateral Displacements :: (continued)**

| Depth (ft) | $q_t$ (tsf) | $Q_{tn}$ | $R_f$ (%) | $Q_{tn,cs}$ | FS | $D_r$ | $Gamma_{max}$ (%) | Lat. disp. (in) |
|---|---|---|---|---|---|---|---|---|
| 68.24 | 168.66 | 84.51 | 2.26 | 138.93 | 2.00 | 61.44 | 0.00 | 0.00 |
| 68.41 | 213.93 | 108.30 | 2.65 | 171.75 | 2.00 | 69.63 | 0.00 | 0.00 |
| 68.57 | 233.74 | 118.62 | 2.79 | 185.82 | 2.00 | 72.64 | 0.00 | 0.00 |
| 68.73 | 197.74 | 97.37 | 3.11 | 177.61 | 2.00 | 66.12 | 0.00 | 0.00 |
| 68.90 | 150.26 | 71.81 | 2.97 | 152.54 | 2.00 | 56.07 | 0.00 | 0.00 |
| 69.06 | 129.47 | 61.91 | 2.35 | 124.82 | 2.00 | 51.17 | 0.00 | 0.00 |
| 69.23 | 125.29 | 61.72 | 1.56 | 100.48 | 2.00 | 51.07 | 0.00 | 0.00 |
| 69.39 | 125.84 | 63.33 | 1.20 | 92.21 | 2.00 | 51.92 | 0.00 | 0.00 |
| 69.55 | 124.32 | 62.04 | 1.27 | 92.99 | 2.00 | 51.24 | 0.00 | 0.00 |
| 69.72 | 120.93 | 59.59 | 1.39 | 93.97 | 2.00 | 49.91 | 0.00 | 0.00 |
| 69.88 | 121.92 | 59.79 | 1.46 | 96.18 | 2.00 | 50.02 | 0.00 | 0.00 |
| 70.05 | 120.70 | 58.41 | 1.65 | 100.48 | 2.00 | 49.26 | 0.00 | 0.00 |
| 70.21 | 120.54 | 57.80 | 1.79 | 104.43 | 2.00 | 48.91 | 0.00 | 0.00 |
| 70.37 | 118.50 | 56.67 | 1.76 | 102.78 | 2.00 | 48.25 | 0.00 | 0.00 |
| 70.54 | 120.13 | 57.91 | 1.62 | 99.24 | 2.00 | 48.97 | 0.00 | 0.00 |
| 70.70 | 117.61 | 56.64 | 1.55 | 96.31 | 2.00 | 48.24 | 0.00 | 0.00 |
| 70.87 | 123.15 | 59.50 | 1.59 | 99.52 | 2.00 | 49.86 | 0.00 | 0.00 |
| 71.03 | 129.92 | 65.50 | 1.03 | 90.54 | 2.00 | 53.04 | 0.00 | 0.00 |
| 71.19 | 158.96 | 88.12 | 0.43 | 88.12 | 2.00 | 62.83 | 0.00 | 0.00 |
| 71.36 | 254.70 | N/A | 0.00 | -1.00 | 2.00 | 0.00 | 0.00 | 0.00 |
| 71.52 | 348.11 | N/A | 0.00 | -1.00 | 2.00 | 0.00 | 0.00 | 0.00 |

**Total estimated displacement: 2.42**

**Abbreviations**

$q_t$: Total cone resistance
$Q_{tn}$: Adjusted cone resistance to an effective overburden stress of 1 atm
$R_f$: Friction ration
$Q_{tn,cs}$: Adjusted and corrected cone resistance due to fines
FS: Calculated factor of safety against liquefaction
$D_r$: Calculated relative density
$Gamma_{max}$: Calculated maximum cyclic shear strain
Lat. disp.: Lateral displacement

**GeoLogismiki**
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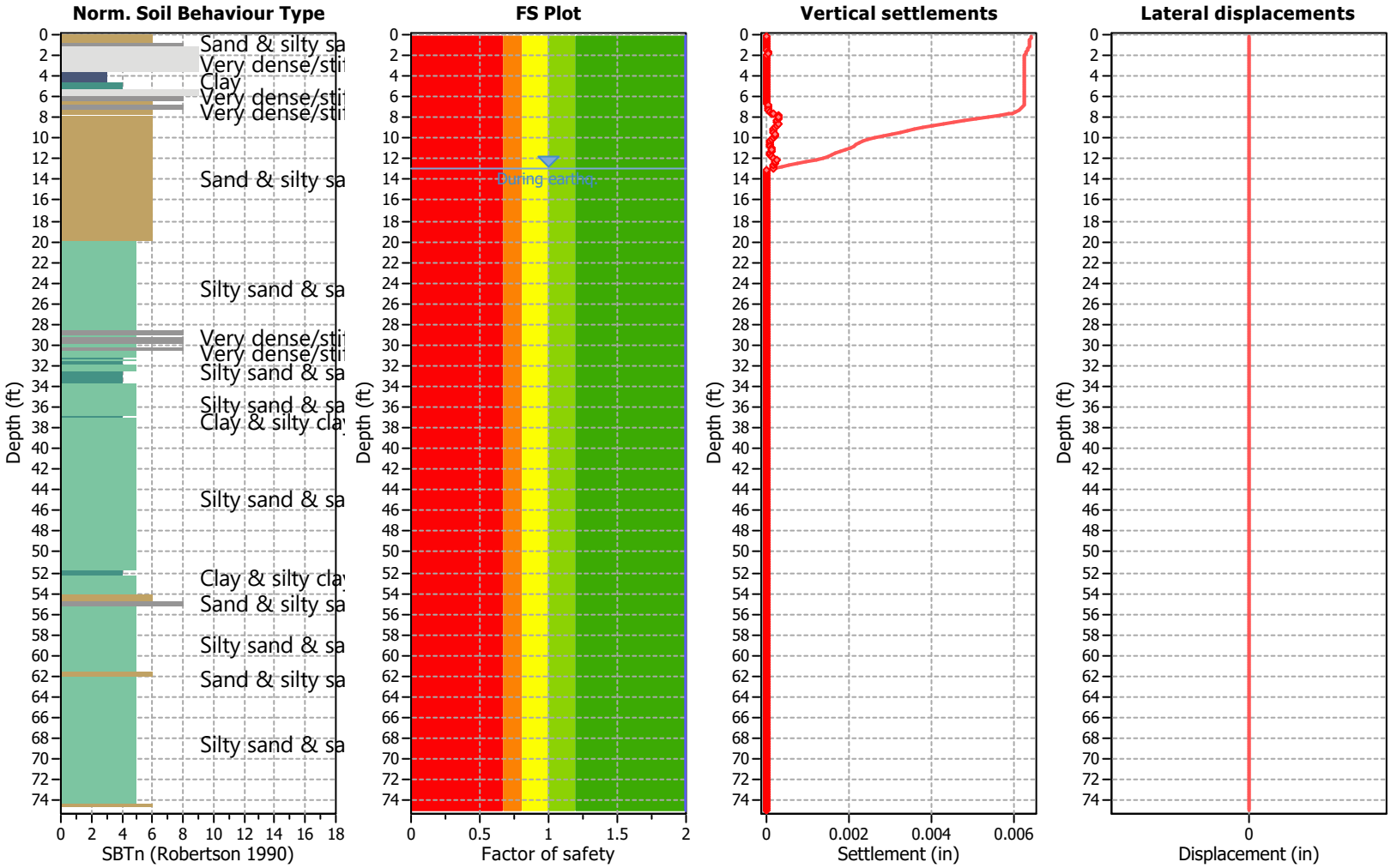
**Project:** 307035-001 KITP Housing Project
**Location:** Goleta, CA 93117

**CPT: CPT-11 (LIQ)**
Total depth: 74.97 ft




| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Analysis method: | NCEER (1998) | G.W.T. (in-situ): | 13.00 ft | Use fill: | No | Clay like behavior applied: | Sands only |
| Fines correction method: | NCEER (1998) | G.W.T. (earthq.): | 13.00 ft | Fill height: | N/A | Limit depth applied: | Yes |
| Points to test: | Based on Ic value | Average results interval: | 3 | Fill weight: | N/A | Limit depth: | 17.50 ft |
| Earthquake magnitude $M_w$: | 6.80 | Ic cut-off value: | 2.60 | Trans. detect. applied: | Yes | MSF method: | Method based |
| Peak ground acceleration: | 1.05 | Unit weight calculation: | Based on SBT | $K_\sigma$ applied: | Yes | | |

**:: Post-earthquake settlement of dry sands ::**

| Depth (ft) | Ic | $Q_{tn}$ | Kc | $Q_{tn,cs}$ | $N_{1,60}$ (blows) | $G_{max}$ (tsf) | CSR | Shear, γ (%) | $e_{vol(15)}$ (%) | $N_c$ | $e_v$ (%) | Settle. (in) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.16 | 1.62 | 142.41 | 1.00 | 142.41 | 26 | 618 | 0.69 | 0.001 | 0.00 | 9.34 | 0.00 | 0.000 |
| 0.33 | 1.37 | 270.68 | 1.00 | 270.68 | 45 | 860 | 0.69 | 0.002 | 0.00 | 9.34 | 0.00 | 0.000 |
| 0.49 | 1.37 | 379.82 | 1.00 | 379.82 | 64 | 1207 | 0.69 | 0.002 | 0.00 | 9.34 | 0.00 | 0.000 |
| 0.66 | 1.44 | 427.18 | 1.00 | 427.18 | 73 | 1488 | 0.69 | 0.002 | 0.00 | 9.34 | 0.00 | 0.000 |
| 0.82 | 1.71 | 341.35 | 1.00 | 341.35 | 64 | 1657 | 0.69 | 0.002 | 0.00 | 9.34 | 0.00 | 0.000 |
| 0.98 | 1.93 | 260.27 | 1.26 | 326.84 | 66 | 1677 | 0.69 | 0.003 | 0.00 | 9.34 | 0.00 | 0.000 |
| 1.15 | 2.18 | 182.08 | 1.57 | 286.13 | 64 | 1617 | 0.69 | 0.004 | 0.00 | 9.34 | 0.00 | 0.000 |
| 1.31 | 2.35 | 137.11 | 2.14 | 293.07 | 71 | 1509 | 0.69 | 0.005 | 0.00 | 9.34 | 0.00 | 0.000 |
| 1.48 | 2.49 | 103.88 | 2.92 | 303.82 | 78 | 1366 | 0.69 | 0.006 | 0.00 | 9.34 | 0.00 | 0.000 |
| 1.64 | 2.52 | 92.21 | 3.12 | 288.15 | 75 | 1257 | 0.69 | 0.008 | 0.00 | 9.34 | 0.00 | 0.000 |
| 1.80 | 2.56 | 82.35 | 3.40 | 280.33 | 74 | 1177 | 0.69 | 0.010 | 0.00 | 9.34 | 0.00 | 0.000 |
| 1.97 | 2.61 | 76.53 | 3.82 | 292.71 | 0 | 0 | 0.69 | 0.000 | 0.00 | 0.00 | 0.00 | 0.000 |
| 2.13 | 2.66 | 72.65 | 4.34 | 315.12 | 0 | 0 | 0.69 | 0.000 | 0.00 | 0.00 | 0.00 | 0.000 |
| 2.30 | 2.67 | 73.71 | 4.37 | 321.78 | 0 | 0 | 0.69 | 0.000 | 0.00 | 0.00 | 0.00 | 0.000 |
| 2.46 | 2.67 | 72.86 | 4.43 | 322.77 | 0 | 0 | 0.69 | 0.000 | 0.00 | 0.00 | 0.00 | 0.000 |
| 2.62 | 2.67 | 71.63 | 4.44 | 318.05 | 0 | 0 | 0.69 | 0.000 | 0.00 | 0.00 | 0.00 | 0.000 |
| 2.79 | 2.68 | 70.32 | 4.48 | 314.86 | 0 | 0 | 0.69 | 0.000 | 0.00 | 0.00 | 0.00 | 0.000 |
| 2.95 | 2.68 | 69.40 | 4.46 | 309.49 | 0 | 0 | 0.69 | 0.000 | 0.00 | 0.00 | 0.00 | 0.000 |
| 3.12 | 2.67 | 68.27 | 4.45 | 303.49 | 0 | 0 | 0.69 | 0.000 | 0.00 | 0.00 | 0.00 | 0.000 |
| 3.28 | 2.68 | 66.37 | 4.46 | 296.09 | 0 | 0 | 0.69 | 0.000 | 0.00 | 0.00 | 0.00 | 0.000 |
| 3.44 | 2.68 | 63.93 | 4.48 | 286.27 | 0 | 0 | 0.69 | 0.000 | 0.00 | 0.00 | 0.00 | 0.000 |
| 3.61 | 2.66 | 61.56 | 4.31 | 265.42 | 0 | 0 | 0.69 | 0.000 | 0.00 | 0.00 | 0.00 | 0.000 |
| 3.77 | 2.65 | 58.73 | 4.22 | 247.71 | 0 | 0 | 0.69 | 0.000 | 0.00 | 0.00 | 0.00 | 0.000 |
| 3.94 | 2.66 | 54.00 | 4.34 | 234.43 | 0 | 0 | 0.69 | 0.000 | 0.00 | 0.00 | 0.00 | 0.000 |
| 4.10 | 2.71 | 47.69 | 4.84 | 231.05 | 0 | 0 | 0.69 | 0.000 | 0.00 | 0.00 | 0.00 | 0.000 |
| 4.27 | 2.75 | 41.32 | 5.31 | 219.29 | 0 | 0 | 0.69 | 0.000 | 0.00 | 0.00 | 0.00 | 0.000 |
| 4.43 | 2.76 | 37.60 | 5.37 | 201.99 | 0 | 0 | 0.68 | 0.000 | 0.00 | 0.00 | 0.00 | 0.000 |
| 4.59 | 2.72 | 37.88 | 4.93 | 186.79 | 0 | 0 | 0.68 | 0.000 | 0.00 | 0.00 | 0.00 | 0.000 |
| 4.76 | 2.69 | 39.43 | 4.59 | 181.03 | 0 | 0 | 0.68 | 0.000 | 0.00 | 0.00 | 0.00 | 0.000 |
| 4.92 | 2.66 | 41.96 | 4.35 | 182.32 | 0 | 0 | 0.68 | 0.000 | 0.00 | 0.00 | 0.00 | 0.000 |
| 5.09 | 2.62 | 48.19 | 3.94 | 189.64 | 0 | 0 | 0.68 | 0.000 | 0.00 | 0.00 | 0.00 | 0.000 |
| 5.25 | 2.55 | 62.32 | 3.33 | 207.65 | 0 | 0 | 0.68 | 0.000 | 0.00 | 0.00 | 0.00 | 0.000 |
| 5.41 | 2.48 | 84.26 | 2.86 | 241.07 | 0 | 0 | 0.68 | 0.000 | 0.00 | 0.00 | 0.00 | 0.000 |
| 5.58 | 2.40 | 115.01 | 2.36 | 271.72 | 0 | 0 | 0.68 | 0.000 | 0.00 | 0.00 | 0.00 | 0.000 |
| 5.74 | 2.34 | 144.34 | 2.07 | 298.85 | 0 | 0 | 0.68 | 0.000 | 0.00 | 0.00 | 0.00 | 0.000 |
| 5.91 | 2.26 | 175.18 | 1.79 | 314.35 | 0 | 0 | 0.68 | 0.000 | 0.00 | 0.00 | 0.00 | 0.000 |
| 6.07 | 2.19 | 202.01 | 1.59 | 320.93 | 0 | 0 | 0.68 | 0.000 | 0.00 | 0.00 | 0.00 | 0.000 |
| 6.23 | 2.03 | 247.10 | 1.33 | 328.75 | 0 | 0 | 0.68 | 0.000 | 0.00 | 0.00 | 0.00 | 0.000 |
| 6.40 | 1.85 | 308.70 | 1.20 | 371.57 | 0 | 0 | 0.68 | 0.000 | 0.00 | 0.00 | 0.00 | 0.000 |
| 6.56 | 1.73 | 372.25 | 1.05 | 390.87 | 0 | 0 | 0.68 | 0.000 | 0.00 | 0.00 | 0.00 | 0.000 |
| 6.73 | 1.71 | 431.60 | 1.00 | 432.65 | 81 | 2236 | 0.68 | 0.018 | 0.00 | 9.34 | 0.00 | 0.000 |
| 6.89 | 1.72 | 453.14 | 1.04 | 469.98 | 88 | 2418 | 0.68 | 0.016 | 0.00 | 9.34 | 0.00 | 0.000 |
| 7.05 | 1.76 | 430.67 | 1.09 | 471.29 | 90 | 2406 | 0.68 | 0.017 | 0.00 | 9.34 | 0.00 | 0.000 |
| 7.22 | 1.79 | 379.67 | 1.15 | 435.45 | 84 | 2236 | 0.68 | 0.020 | 0.00 | 9.34 | 0.00 | 0.000 |
| 7.38 | 1.81 | 335.28 | 1.16 | 390.45 | 76 | 2033 | 0.68 | 0.024 | 0.00 | 9.34 | 0.00 | 0.000 |
| 7.55 | 1.79 | 299.94 | 1.14 | 340.79 | 66 | 1795 | 0.68 | 0.030 | 0.01 | 9.34 | 0.01 | 0.000 |
| 7.71 | 1.76 | 271.64 | 1.09 | 297.12 | 57 | 1595 | 0.68 | 0.040 | 0.01 | 9.34 | 0.01 | 0.000 |
| 7.87 | 1.72 | 250.09 | 1.04 | 259.73 | 49 | 1437 | 0.68 | 0.052 | 0.02 | 9.34 | 0.01 | 0.000 |

**:: Post-earthquake settlement of dry sands :: (continued)**

| Depth (ft) | Ic | $Q_{tn}$ | Kc | $Q_{tn,cs}$ | $N_{1,60}$ (blows) | $G_{max}$ (tsf) | CSR | Shear, γ (%) | $e_{vol(15)}$ (%) | $N_c$ | $e_v$ (%) | Settle. (in) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 8.04 | 1.72 | 246.13 | 1.04 | 255.25 | 48 | 1429 | 0.68 | 0.054 | 0.02 | 9.34 | 0.02 | 0.000 |
| 8.20 | 1.73 | 249.00 | 1.06 | 263.09 | 50 | 1477 | 0.68 | 0.052 | 0.02 | 9.34 | 0.01 | 0.000 |
| 8.37 | 1.75 | 250.20 | 1.08 | 270.44 | 51 | 1522 | 0.68 | 0.050 | 0.02 | 9.34 | 0.01 | 0.000 |
| 8.53 | 1.75 | 248.69 | 1.09 | 271.40 | 52 | 1539 | 0.68 | 0.050 | 0.02 | 9.34 | 0.01 | 0.000 |
| 8.69 | 1.74 | 250.44 | 1.06 | 265.97 | 50 | 1537 | 0.68 | 0.052 | 0.02 | 9.34 | 0.01 | 0.000 |
| 8.86 | 1.74 | 256.20 | 1.07 | 274.88 | 52 | 1599 | 0.68 | 0.049 | 0.02 | 9.34 | 0.01 | 0.000 |
| 9.02 | 1.78 | 258.52 | 1.13 | 292.93 | 56 | 1703 | 0.68 | 0.044 | 0.01 | 9.34 | 0.01 | 0.000 |
| 9.19 | 1.82 | 259.21 | 1.18 | 304.99 | 59 | 1800 | 0.68 | 0.040 | 0.01 | 9.34 | 0.01 | 0.000 |
| 9.35 | 1.81 | 267.74 | 1.16 | 310.76 | 60 | 1846 | 0.68 | 0.039 | 0.01 | 9.34 | 0.01 | 0.000 |
| 9.51 | 1.75 | 278.92 | 1.08 | 301.23 | 57 | 1818 | 0.68 | 0.041 | 0.01 | 9.34 | 0.01 | 0.000 |
| 9.68 | 1.62 | 302.06 | 1.00 | 302.06 | 55 | 1728 | 0.68 | 0.047 | 0.01 | 9.34 | 0.01 | 0.000 |
| 9.84 | 1.53 | 335.16 | 1.00 | 335.16 | 59 | 1724 | 0.68 | 0.048 | 0.01 | 9.34 | 0.01 | 0.000 |
| 10.01 | 1.52 | 367.70 | 1.00 | 367.70 | 65 | 1872 | 0.68 | 0.042 | 0.01 | 9.34 | 0.01 | 0.000 |
| 10.17 | 1.59 | 389.92 | 1.00 | 389.92 | 70 | 2192 | 0.68 | 0.032 | 0.01 | 9.34 | 0.01 | 0.000 |
| 10.33 | 1.66 | 400.36 | 1.00 | 400.36 | 74 | 2473 | 0.68 | 0.026 | 0.01 | 9.34 | 0.00 | 0.000 |
| 10.50 | 1.71 | 410.62 | 1.00 | 410.62 | 77 | 2696 | 0.68 | 0.024 | 0.00 | 9.34 | 0.00 | 0.000 |
| 10.66 | 1.72 | 416.39 | 1.02 | 425.73 | 80 | 2792 | 0.68 | 0.023 | 0.00 | 9.34 | 0.00 | 0.000 |
| 10.83 | 1.62 | 415.99 | 1.00 | 415.99 | 76 | 2520 | 0.68 | 0.027 | 0.01 | 9.34 | 0.00 | 0.000 |
| 10.99 | 1.53 | 419.14 | 1.00 | 419.14 | 74 | 2262 | 0.67 | 0.033 | 0.01 | 9.34 | 0.01 | 0.000 |
| 11.15 | 1.50 | 404.15 | 1.00 | 404.15 | 70 | 2120 | 0.67 | 0.038 | 0.01 | 9.34 | 0.01 | 0.000 |
| 11.32 | 1.62 | 393.12 | 1.00 | 393.12 | 71 | 2442 | 0.67 | 0.030 | 0.01 | 9.34 | 0.01 | 0.000 |
| 11.48 | 1.71 | 382.20 | 1.02 | 388.28 | 73 | 2659 | 0.67 | 0.027 | 0.01 | 9.34 | 0.00 | 0.000 |
| 11.65 | 1.74 | 379.38 | 1.06 | 403.25 | 76 | 2735 | 0.67 | 0.026 | 0.01 | 9.34 | 0.00 | 0.000 |
| 11.81 | 1.68 | 362.95 | 1.00 | 362.95 | 67 | 2471 | 0.67 | 0.032 | 0.01 | 9.34 | 0.01 | 0.000 |
| 11.98 | 1.62 | 341.76 | 1.00 | 341.76 | 62 | 2172 | 0.67 | 0.041 | 0.01 | 9.34 | 0.01 | 0.000 |
| 12.14 | 1.59 | 313.73 | 1.00 | 313.73 | 56 | 1942 | 0.67 | 0.052 | 0.01 | 9.34 | 0.01 | 0.000 |
| 12.30 | 1.69 | 293.05 | 1.00 | 293.05 | 54 | 2052 | 0.67 | 0.047 | 0.01 | 9.34 | 0.01 | 0.000 |
| 12.47 | 1.76 | 276.49 | 1.10 | 304.95 | 58 | 2129 | 0.67 | 0.045 | 0.01 | 9.34 | 0.01 | 0.000 |
| 12.63 | 1.79 | 272.17 | 1.14 | 311.32 | 60 | 2189 | 0.67 | 0.043 | 0.01 | 9.34 | 0.01 | 0.000 |
| 12.80 | 1.80 | 270.54 | 1.15 | 312.14 | 60 | 2214 | 0.67 | 0.043 | 0.01 | 9.34 | 0.01 | 0.000 |
| 12.96 | 1.80 | 271.57 | 1.15 | 312.08 | 60 | 2228 | 0.67 | 0.043 | 0.01 | 9.34 | 0.01 | 0.000 |

**Total estimated settlement: 0.01**

**Abbreviations**

$Q_{tn}$: Equivalent clean sand normalized cone resistance
$K_c$: Fines correction factor
$Q_{tn,cs}$: Post-liquefaction volumentric strain
$G_{max}$: Small strain shear modulus
CSR: Soil cyclic stress ratio
γ: Cyclic shear strain
$e_{vol(15)}$: Volumetric strain after 15 cycles
$N_c$: Equivalent number of cycles
$e_v$: Volumetric strain
Settle.: Calculated settlement

**:: Post-earthquake settlement due to soil liquefaction ::**

| Depth (ft) | $Q_{tn,cs}$ | FS | $e_v$ (%) | DF | Settlement (in) | Depth (ft) | $Q_{tn,cs}$ | FS | $e_v$ (%) | DF | Settlement (in) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 13.12 | 310.45 | 2.00 | 0.00 | 1.00 | 0.00 | 13.29 | 282.66 | 2.00 | 0.00 | 1.00 | 0.00 |
| 13.45 | 291.29 | 2.00 | 0.00 | 1.00 | 0.00 | 13.62 | 289.22 | 2.00 | 0.00 | 1.00 | 0.00 |
| 13.78 | 286.72 | 2.00 | 0.00 | 1.00 | 0.00 | 13.94 | 302.77 | 2.00 | 0.00 | 1.00 | 0.00 |
| 14.11 | 312.34 | 2.00 | 0.00 | 1.00 | 0.00 | 14.27 | 310.55 | 2.00 | 0.00 | 1.00 | 0.00 |

**:: Post-earthquake settlement due to soil liquefaction :: (continued)**

| Depth (ft) | $Q_{tn,cs}$ | FS | $e_v$ (%) | DF | Settlement (in) | Depth (ft) | $Q_{tn,cs}$ | FS | $e_v$ (%) | DF | Settlement (in) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 14.44 | 301.96 | 2.00 | 0.00 | 1.00 | 0.00 | 14.60 | 293.65 | 2.00 | 0.00 | 1.00 | 0.00 |
| 14.76 | 285.99 | 2.00 | 0.00 | 1.00 | 0.00 | 14.93 | 269.92 | 2.00 | 0.00 | 1.00 | 0.00 |
| 15.09 | 257.83 | 2.00 | 0.00 | 1.00 | 0.00 | 15.26 | 253.05 | 2.00 | 0.00 | 1.00 | 0.00 |
| 15.42 | 260.18 | 2.00 | 0.00 | 1.00 | 0.00 | 15.58 | 264.29 | 2.00 | 0.00 | 1.00 | 0.00 |
| 15.75 | 267.73 | 2.00 | 0.00 | 1.00 | 0.00 | 15.91 | 270.34 | 2.00 | 0.00 | 1.00 | 0.00 |
| 16.08 | 272.47 | 2.00 | 0.00 | 1.00 | 0.00 | 16.24 | 270.75 | 2.00 | 0.00 | 1.00 | 0.00 |
| 16.40 | 242.83 | 2.00 | 0.00 | 1.00 | 0.00 | 16.57 | 218.29 | 2.00 | 0.00 | 1.00 | 0.00 |
| 16.73 | 202.15 | 2.00 | 0.00 | 1.00 | 0.00 | 16.90 | 219.69 | 2.00 | 0.00 | 1.00 | 0.00 |
| 17.06 | 222.38 | 2.00 | 0.00 | 1.00 | 0.00 | 17.22 | 219.12 | 2.00 | 0.00 | 1.00 | 0.00 |
| 17.39 | 207.63 | 2.00 | 0.00 | 1.00 | 0.00 | 17.55 | 196.39 | 2.00 | 0.00 | 1.00 | 0.00 |
| 17.72 | 184.74 | 2.00 | 0.00 | 1.00 | 0.00 | 17.88 | 174.33 | 2.00 | 0.00 | 1.00 | 0.00 |
| 18.04 | 158.17 | 2.00 | 0.00 | 1.00 | 0.00 | 18.21 | 150.13 | 2.00 | 0.00 | 1.00 | 0.00 |
| 18.37 | 153.95 | 2.00 | 0.00 | 1.00 | 0.00 | 18.54 | 174.67 | 2.00 | 0.00 | 1.00 | 0.00 |
| 18.70 | 194.63 | 2.00 | 0.00 | 1.00 | 0.00 | 18.86 | 209.22 | 2.00 | 0.00 | 1.00 | 0.00 |
| 19.03 | 217.18 | 2.00 | 0.00 | 1.00 | 0.00 | 19.19 | 228.62 | 2.00 | 0.00 | 1.00 | 0.00 |
| 19.36 | 243.72 | 2.00 | 0.00 | 1.00 | 0.00 | 19.52 | 230.40 | 2.00 | 0.00 | 1.00 | 0.00 |
| 19.69 | 208.91 | 2.00 | 0.00 | 1.00 | 0.00 | 19.85 | 193.59 | 2.00 | 0.00 | 1.00 | 0.00 |
| 20.01 | 162.89 | 2.00 | 0.00 | 1.00 | 0.00 | 20.18 | 163.02 | 2.00 | 0.00 | 1.00 | 0.00 |
| 20.34 | 159.04 | 2.00 | 0.00 | 1.00 | 0.00 | 20.51 | 149.05 | 2.00 | 0.00 | 1.00 | 0.00 |
| 20.67 | 135.34 | 2.00 | 0.00 | 1.00 | 0.00 | 20.83 | 125.73 | 2.00 | 0.00 | 1.00 | 0.00 |
| 21.00 | 113.78 | 2.00 | 0.00 | 1.00 | 0.00 | 21.16 | 111.27 | 2.00 | 0.00 | 1.00 | 0.00 |
| 21.33 | 113.80 | 2.00 | 0.00 | 1.00 | 0.00 | 21.49 | 117.63 | 2.00 | 0.00 | 1.00 | 0.00 |
| 21.65 | 123.83 | 2.00 | 0.00 | 1.00 | 0.00 | 21.82 | 128.46 | 2.00 | 0.00 | 1.00 | 0.00 |
| 21.98 | 128.65 | 2.00 | 0.00 | 1.00 | 0.00 | 22.15 | 125.17 | 2.00 | 0.00 | 1.00 | 0.00 |
| 22.31 | 121.71 | 2.00 | 0.00 | 1.00 | 0.00 | 22.47 | 120.08 | 2.00 | 0.00 | 1.00 | 0.00 |
| 22.64 | 117.15 | 2.00 | 0.00 | 1.00 | 0.00 | 22.80 | 114.06 | 2.00 | 0.00 | 1.00 | 0.00 |
| 22.97 | 112.90 | 2.00 | 0.00 | 1.00 | 0.00 | 23.13 | 115.80 | 2.00 | 0.00 | 1.00 | 0.00 |
| 23.29 | 120.33 | 2.00 | 0.00 | 1.00 | 0.00 | 23.46 | 123.55 | 2.00 | 0.00 | 1.00 | 0.00 |
| 23.62 | 125.19 | 2.00 | 0.00 | 1.00 | 0.00 | 23.79 | 127.16 | 2.00 | 0.00 | 1.00 | 0.00 |
| 23.95 | 130.18 | 2.00 | 0.00 | 1.00 | 0.00 | 24.11 | 133.20 | 2.00 | 0.00 | 1.00 | 0.00 |
| 24.28 | 135.22 | 2.00 | 0.00 | 1.00 | 0.00 | 24.44 | 136.56 | 2.00 | 0.00 | 1.00 | 0.00 |
| 24.61 | 135.47 | 2.00 | 0.00 | 1.00 | 0.00 | 24.77 | 131.18 | 2.00 | 0.00 | 1.00 | 0.00 |
| 24.93 | 126.74 | 2.00 | 0.00 | 1.00 | 0.00 | 25.10 | 126.13 | 2.00 | 0.00 | 1.00 | 0.00 |
| 25.26 | 133.28 | 2.00 | 0.00 | 1.00 | 0.00 | 25.43 | 143.49 | 2.00 | 0.00 | 1.00 | 0.00 |
| 25.59 | 155.05 | 2.00 | 0.00 | 1.00 | 0.00 | 25.75 | 162.67 | 2.00 | 0.00 | 1.00 | 0.00 |
| 25.92 | 167.51 | 2.00 | 0.00 | 1.00 | 0.00 | 26.08 | 167.22 | 2.00 | 0.00 | 1.00 | 0.00 |
| 26.25 | 162.05 | 2.00 | 0.00 | 1.00 | 0.00 | 26.41 | 150.76 | 2.00 | 0.00 | 1.00 | 0.00 |
| 26.57 | 138.96 | 2.00 | 0.00 | 1.00 | 0.00 | 26.74 | 124.07 | 2.00 | 0.00 | 1.00 | 0.00 |
| 26.90 | 120.19 | 2.00 | 0.00 | 1.00 | 0.00 | 27.07 | 121.89 | 2.00 | 0.00 | 1.00 | 0.00 |
| 27.23 | 128.17 | 2.00 | 0.00 | 1.00 | 0.00 | 27.40 | 130.78 | 2.00 | 0.00 | 1.00 | 0.00 |
| 27.56 | 134.74 | 2.00 | 0.00 | 1.00 | 0.00 | 27.72 | 148.73 | 2.00 | 0.00 | 1.00 | 0.00 |
| 27.89 | 166.68 | 2.00 | 0.00 | 1.00 | 0.00 | 28.05 | 186.90 | 2.00 | 0.00 | 1.00 | 0.00 |
| 28.22 | 199.90 | 2.00 | 0.00 | 1.00 | 0.00 | 28.38 | 204.83 | 2.00 | 0.00 | 1.00 | 0.00 |
| 28.54 | 207.14 | 2.00 | 0.00 | 1.00 | 0.00 | 28.71 | 218.28 | 2.00 | 0.00 | 1.00 | 0.00 |
| 28.87 | 223.03 | 2.00 | 0.00 | 1.00 | 0.00 | 29.04 | 233.34 | 2.00 | 0.00 | 1.00 | 0.00 |
| 29.20 | 258.45 | 2.00 | 0.00 | 1.00 | 0.00 | 29.36 | 278.39 | 2.00 | 0.00 | 1.00 | 0.00 |
| 29.53 | 287.19 | 2.00 | 0.00 | 1.00 | 0.00 | 29.69 | 288.92 | 2.00 | 0.00 | 1.00 | 0.00 |
| 29.86 | 272.90 | 2.00 | 0.00 | 1.00 | 0.00 | 30.02 | 261.40 | 2.00 | 0.00 | 1.00 | 0.00 |

**:: Post-earthquake settlement due to soil liquefaction :: (continued)**

| Depth (ft) | $Q_{tn,cs}$ | FS | $e_v$ (%) | DF | Settlement (in) | Depth (ft) | $Q_{tn,cs}$ | FS | $e_v$ (%) | DF | Settlement (in) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 30.18 | 235.94 | 2.00 | 0.00 | 1.00 | 0.00 | 30.35 | 248.88 | 2.00 | 0.00 | 1.00 | 0.00 |
| 30.51 | 256.24 | 2.00 | 0.00 | 1.00 | 0.00 | 30.68 | 241.88 | 2.00 | 0.00 | 1.00 | 0.00 |
| 30.84 | 212.73 | 2.00 | 0.00 | 1.00 | 0.00 | 31.00 | 184.50 | 2.00 | 0.00 | 1.00 | 0.00 |
| 31.17 | 195.71 | 2.00 | 0.00 | 1.00 | 0.00 | 31.33 | 195.81 | 2.00 | 0.00 | 1.00 | 0.00 |
| 31.50 | 189.53 | 2.00 | 0.00 | 1.00 | 0.00 | 31.66 | 182.32 | 2.00 | 0.00 | 1.00 | 0.00 |
| 31.82 | 175.35 | 2.00 | 0.00 | 1.00 | 0.00 | 31.99 | 159.49 | 2.00 | 0.00 | 1.00 | 0.00 |
| 32.15 | 150.51 | 2.00 | 0.00 | 1.00 | 0.00 | 32.32 | 150.74 | 2.00 | 0.00 | 1.00 | 0.00 |
| 32.48 | 161.76 | 2.00 | 0.00 | 1.00 | 0.00 | 32.64 | 168.21 | 2.00 | 0.00 | 1.00 | 0.00 |
| 32.81 | 167.85 | 2.00 | 0.00 | 1.00 | 0.00 | 32.97 | 161.95 | 2.00 | 0.00 | 1.00 | 0.00 |
| 33.14 | 150.37 | 2.00 | 0.00 | 1.00 | 0.00 | 33.30 | 139.52 | 2.00 | 0.00 | 1.00 | 0.00 |
| 33.46 | 137.78 | 2.00 | 0.00 | 1.00 | 0.00 | 33.63 | 136.96 | 2.00 | 0.00 | 1.00 | 0.00 |
| 33.79 | 134.89 | 2.00 | 0.00 | 1.00 | 0.00 | 33.96 | 122.66 | 2.00 | 0.00 | 1.00 | 0.00 |
| 34.12 | 121.66 | 2.00 | 0.00 | 1.00 | 0.00 | 34.28 | 126.60 | 2.00 | 0.00 | 1.00 | 0.00 |
| 34.45 | 140.45 | 2.00 | 0.00 | 1.00 | 0.00 | 34.61 | 147.54 | 2.00 | 0.00 | 1.00 | 0.00 |
| 34.78 | 149.33 | 2.00 | 0.00 | 1.00 | 0.00 | 34.94 | 149.39 | 2.00 | 0.00 | 1.00 | 0.00 |
| 35.10 | 148.65 | 2.00 | 0.00 | 1.00 | 0.00 | 35.27 | 148.61 | 2.00 | 0.00 | 1.00 | 0.00 |
| 35.43 | 149.11 | 2.00 | 0.00 | 1.00 | 0.00 | 35.60 | 150.66 | 2.00 | 0.00 | 1.00 | 0.00 |
| 35.76 | 149.69 | 2.00 | 0.00 | 1.00 | 0.00 | 35.93 | 140.14 | 2.00 | 0.00 | 1.00 | 0.00 |
| 36.09 | 140.21 | 2.00 | 0.00 | 1.00 | 0.00 | 36.25 | 153.26 | 2.00 | 0.00 | 1.00 | 0.00 |
| 36.42 | 173.93 | 2.00 | 0.00 | 1.00 | 0.00 | 36.58 | 189.16 | 2.00 | 0.00 | 1.00 | 0.00 |
| 36.75 | 192.31 | 2.00 | 0.00 | 1.00 | 0.00 | 36.91 | 190.73 | 2.00 | 0.00 | 1.00 | 0.00 |
| 37.07 | 179.65 | 2.00 | 0.00 | 1.00 | 0.00 | 37.24 | 166.15 | 2.00 | 0.00 | 1.00 | 0.00 |
| 37.40 | 154.10 | 2.00 | 0.00 | 1.00 | 0.00 | 37.57 | 145.02 | 2.00 | 0.00 | 1.00 | 0.00 |
| 37.73 | 139.38 | 2.00 | 0.00 | 1.00 | 0.00 | 37.89 | 126.84 | 2.00 | 0.00 | 1.00 | 0.00 |
| 38.06 | 122.85 | 2.00 | 0.00 | 1.00 | 0.00 | 38.22 | 123.60 | 2.00 | 0.00 | 1.00 | 0.00 |
| 38.39 | 133.28 | 2.00 | 0.00 | 1.00 | 0.00 | 38.55 | 137.89 | 2.00 | 0.00 | 1.00 | 0.00 |
| 38.71 | 141.56 | 2.00 | 0.00 | 1.00 | 0.00 | 38.88 | 145.38 | 2.00 | 0.00 | 1.00 | 0.00 |
| 39.04 | 148.62 | 2.00 | 0.00 | 1.00 | 0.00 | 39.21 | 147.30 | 2.00 | 0.00 | 1.00 | 0.00 |
| 39.37 | 138.00 | 2.00 | 0.00 | 1.00 | 0.00 | 39.53 | 130.62 | 2.00 | 0.00 | 1.00 | 0.00 |
| 39.70 | 128.58 | 2.00 | 0.00 | 1.00 | 0.00 | 39.86 | 135.52 | 2.00 | 0.00 | 1.00 | 0.00 |
| 40.03 | 140.85 | 2.00 | 0.00 | 1.00 | 0.00 | 40.19 | 143.57 | 2.00 | 0.00 | 1.00 | 0.00 |
| 40.35 | 144.21 | 2.00 | 0.00 | 1.00 | 0.00 | 40.52 | 143.53 | 2.00 | 0.00 | 1.00 | 0.00 |
| 40.68 | 141.97 | 2.00 | 0.00 | 1.00 | 0.00 | 40.85 | 141.13 | 2.00 | 0.00 | 1.00 | 0.00 |
| 41.01 | 142.07 | 2.00 | 0.00 | 1.00 | 0.00 | 41.17 | 143.18 | 2.00 | 0.00 | 1.00 | 0.00 |
| 41.34 | 140.03 | 2.00 | 0.00 | 1.00 | 0.00 | 41.50 | 134.27 | 2.00 | 0.00 | 1.00 | 0.00 |
| 41.67 | 132.04 | 2.00 | 0.00 | 1.00 | 0.00 | 41.83 | 135.58 | 2.00 | 0.00 | 1.00 | 0.00 |
| 41.99 | 142.17 | 2.00 | 0.00 | 1.00 | 0.00 | 42.16 | 144.53 | 2.00 | 0.00 | 1.00 | 0.00 |
| 42.32 | 143.48 | 2.00 | 0.00 | 1.00 | 0.00 | 42.49 | 141.38 | 2.00 | 0.00 | 1.00 | 0.00 |
| 42.65 | 139.13 | 2.00 | 0.00 | 1.00 | 0.00 | 42.81 | 137.23 | 2.00 | 0.00 | 1.00 | 0.00 |
| 42.98 | 135.34 | 2.00 | 0.00 | 1.00 | 0.00 | 43.14 | 132.59 | 2.00 | 0.00 | 1.00 | 0.00 |
| 43.31 | 123.69 | 2.00 | 0.00 | 1.00 | 0.00 | 43.47 | 118.96 | 2.00 | 0.00 | 1.00 | 0.00 |
| 43.64 | 116.97 | 2.00 | 0.00 | 1.00 | 0.00 | 43.80 | 123.53 | 2.00 | 0.00 | 1.00 | 0.00 |
| 43.96 | 128.00 | 2.00 | 0.00 | 1.00 | 0.00 | 44.13 | 130.60 | 2.00 | 0.00 | 1.00 | 0.00 |
| 44.29 | 131.90 | 2.00 | 0.00 | 1.00 | 0.00 | 44.46 | 132.96 | 2.00 | 0.00 | 1.00 | 0.00 |
| 44.62 | 133.71 | 2.00 | 0.00 | 1.00 | 0.00 | 44.78 | 133.62 | 2.00 | 0.00 | 1.00 | 0.00 |
| 44.95 | 129.34 | 2.00 | 0.00 | 1.00 | 0.00 | 45.11 | 124.45 | 2.00 | 0.00 | 1.00 | 0.00 |
| 45.28 | 123.21 | 2.00 | 0.00 | 1.00 | 0.00 | 45.44 | 127.12 | 2.00 | 0.00 | 1.00 | 0.00 |
| 45.60 | 132.38 | 2.00 | 0.00 | 1.00 | 0.00 | 45.77 | 134.01 | 2.00 | 0.00 | 1.00 | 0.00 |

**:: Post-earthquake settlement due to soil liquefaction :: (continued)**

| Depth (ft) | $Q_{tn,cs}$ | FS | $e_v$ (%) | DF | Settlement (in) | Depth (ft) | $Q_{tn,cs}$ | FS | $e_v$ (%) | DF | Settlement (in) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 45.93 | 133.54 | 2.00 | 0.00 | 1.00 | 0.00 | 46.10 | 132.74 | 2.00 | 0.00 | 1.00 | 0.00 |
| 46.26 | 132.20 | 2.00 | 0.00 | 1.00 | 0.00 | 46.42 | 131.42 | 2.00 | 0.00 | 1.00 | 0.00 |
| 46.59 | 131.23 | 2.00 | 0.00 | 1.00 | 0.00 | 46.75 | 131.62 | 2.00 | 0.00 | 1.00 | 0.00 |
| 46.92 | 131.24 | 2.00 | 0.00 | 1.00 | 0.00 | 47.08 | 126.00 | 2.00 | 0.00 | 1.00 | 0.00 |
| 47.24 | 123.38 | 2.00 | 0.00 | 1.00 | 0.00 | 47.41 | 123.84 | 2.00 | 0.00 | 1.00 | 0.00 |
| 47.57 | 130.39 | 2.00 | 0.00 | 1.00 | 0.00 | 47.74 | 135.50 | 2.00 | 0.00 | 1.00 | 0.00 |
| 47.90 | 139.08 | 2.00 | 0.00 | 1.00 | 0.00 | 48.06 | 142.04 | 2.00 | 0.00 | 1.00 | 0.00 |
| 48.23 | 142.36 | 2.00 | 0.00 | 1.00 | 0.00 | 48.39 | 142.39 | 2.00 | 0.00 | 1.00 | 0.00 |
| 48.56 | 142.22 | 2.00 | 0.00 | 1.00 | 0.00 | 48.72 | 142.11 | 2.00 | 0.00 | 1.00 | 0.00 |
| 48.88 | 139.87 | 2.00 | 0.00 | 1.00 | 0.00 | 49.05 | 129.46 | 2.00 | 0.00 | 1.00 | 0.00 |
| 49.21 | 120.48 | 2.00 | 0.00 | 1.00 | 0.00 | 49.38 | 115.81 | 2.00 | 0.00 | 1.00 | 0.00 |
| 49.54 | 120.71 | 2.00 | 0.00 | 1.00 | 0.00 | 49.70 | 124.67 | 2.00 | 0.00 | 1.00 | 0.00 |
| 49.87 | 126.64 | 2.00 | 0.00 | 1.00 | 0.00 | 50.03 | 126.91 | 2.00 | 0.00 | 1.00 | 0.00 |
| 50.20 | 126.33 | 2.00 | 0.00 | 1.00 | 0.00 | 50.36 | 124.31 | 2.00 | 0.00 | 1.00 | 0.00 |
| 50.52 | 124.18 | 2.00 | 0.00 | 1.00 | 0.00 | 50.69 | 126.23 | 2.00 | 0.00 | 1.00 | 0.00 |
| 50.85 | 129.42 | 2.00 | 0.00 | 1.00 | 0.00 | 51.02 | 133.25 | 2.00 | 0.00 | 1.00 | 0.00 |
| 51.18 | 136.62 | 2.00 | 0.00 | 1.00 | 0.00 | 51.35 | 139.67 | 2.00 | 0.00 | 1.00 | 0.00 |
| 51.51 | 139.60 | 2.00 | 0.00 | 1.00 | 0.00 | 51.67 | 135.71 | 2.00 | 0.00 | 1.00 | 0.00 |
| 51.84 | 129.21 | 2.00 | 0.00 | 1.00 | 0.00 | 52.00 | 123.17 | 2.00 | 0.00 | 1.00 | 0.00 |
| 52.17 | 118.32 | 2.00 | 0.00 | 1.00 | 0.00 | 52.33 | 109.54 | 2.00 | 0.00 | 1.00 | 0.00 |
| 52.49 | 102.69 | 2.00 | 0.00 | 1.00 | 0.00 | 52.66 | 98.70 | 2.00 | 0.00 | 1.00 | 0.00 |
| 52.82 | 105.87 | 2.00 | 0.00 | 1.00 | 0.00 | 52.99 | 122.46 | 2.00 | 0.00 | 1.00 | 0.00 |
| 53.15 | 146.15 | 2.00 | 0.00 | 1.00 | 0.00 | 53.31 | 165.63 | 2.00 | 0.00 | 1.00 | 0.00 |
| 53.48 | 176.30 | 2.00 | 0.00 | 1.00 | 0.00 | 53.64 | 181.35 | 2.00 | 0.00 | 1.00 | 0.00 |
| 53.81 | 174.24 | 2.00 | 0.00 | 1.00 | 0.00 | 53.97 | 172.73 | 2.00 | 0.00 | 1.00 | 0.00 |
| 54.13 | 192.09 | 2.00 | 0.00 | 1.00 | 0.00 | 54.30 | 238.62 | 2.00 | 0.00 | 1.00 | 0.00 |
| 54.46 | 286.75 | 2.00 | 0.00 | 1.00 | 0.00 | 54.63 | 300.93 | 2.00 | 0.00 | 1.00 | 0.00 |
| 54.79 | 296.42 | 2.00 | 0.00 | 1.00 | 0.00 | 54.95 | 278.72 | 2.00 | 0.00 | 1.00 | 0.00 |
| 55.12 | 269.33 | 2.00 | 0.00 | 1.00 | 0.00 | 55.28 | 262.08 | 2.00 | 0.00 | 1.00 | 0.00 |
| 55.45 | 227.33 | 2.00 | 0.00 | 1.00 | 0.00 | 55.61 | 195.27 | 2.00 | 0.00 | 1.00 | 0.00 |
| 55.77 | 162.94 | 2.00 | 0.00 | 1.00 | 0.00 | 55.94 | 158.60 | 2.00 | 0.00 | 1.00 | 0.00 |
| 56.10 | 160.09 | 2.00 | 0.00 | 1.00 | 0.00 | 56.27 | 156.55 | 2.00 | 0.00 | 1.00 | 0.00 |
| 56.43 | 155.72 | 2.00 | 0.00 | 1.00 | 0.00 | 56.59 | 150.72 | 2.00 | 0.00 | 1.00 | 0.00 |
| 56.76 | 145.05 | 2.00 | 0.00 | 1.00 | 0.00 | 56.92 | 142.77 | 2.00 | 0.00 | 1.00 | 0.00 |
| 57.09 | 147.61 | 2.00 | 0.00 | 1.00 | 0.00 | 57.25 | 156.46 | 2.00 | 0.00 | 1.00 | 0.00 |
| 57.41 | 156.25 | 2.00 | 0.00 | 1.00 | 0.00 | 57.58 | 151.48 | 2.00 | 0.00 | 1.00 | 0.00 |
| 57.74 | 145.03 | 2.00 | 0.00 | 1.00 | 0.00 | 57.91 | 127.18 | 2.00 | 0.00 | 1.00 | 0.00 |
| 58.07 | 117.16 | 2.00 | 0.00 | 1.00 | 0.00 | 58.23 | 113.17 | 2.00 | 0.00 | 1.00 | 0.00 |
| 58.40 | 120.25 | 2.00 | 0.00 | 1.00 | 0.00 | 58.56 | 125.56 | 2.00 | 0.00 | 1.00 | 0.00 |
| 58.73 | 127.47 | 2.00 | 0.00 | 1.00 | 0.00 | 58.89 | 129.52 | 2.00 | 0.00 | 1.00 | 0.00 |
| 59.06 | 130.22 | 2.00 | 0.00 | 1.00 | 0.00 | 59.22 | 130.67 | 2.00 | 0.00 | 1.00 | 0.00 |
| 59.38 | 135.46 | 2.00 | 0.00 | 1.00 | 0.00 | 59.55 | 146.20 | 2.00 | 0.00 | 1.00 | 0.00 |
| 59.71 | 157.13 | 2.00 | 0.00 | 1.00 | 0.00 | 59.88 | 158.11 | 2.00 | 0.00 | 1.00 | 0.00 |
| 60.04 | 149.77 | 2.00 | 0.00 | 1.00 | 0.00 | 60.20 | 134.31 | 2.00 | 0.00 | 1.00 | 0.00 |
| 60.37 | 127.70 | 2.00 | 0.00 | 1.00 | 0.00 | 60.53 | 130.36 | 2.00 | 0.00 | 1.00 | 0.00 |
| 60.70 | 140.11 | 2.00 | 0.00 | 1.00 | 0.00 | 60.86 | 143.02 | 2.00 | 0.00 | 1.00 | 0.00 |
| 61.02 | 141.78 | 2.00 | 0.00 | 1.00 | 0.00 | 61.19 | 140.67 | 2.00 | 0.00 | 1.00 | 0.00 |
| 61.35 | 144.69 | 2.00 | 0.00 | 1.00 | 0.00 | 61.52 | 169.76 | 2.00 | 0.00 | 1.00 | 0.00 |

**:: Post-earthquake settlement due to soil liquefaction :: (continued)**

| Depth (ft) | $Q_{tn,cs}$ | FS | $e_v$ (%) | DF | Settlement (in) | Depth (ft) | $Q_{tn,cs}$ | FS | $e_v$ (%) | DF | Settlement (in) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 61.68 | 235.55 | 2.00 | 0.00 | 1.00 | 0.00 | 61.84 | 299.41 | 2.00 | 0.00 | 1.00 | 0.00 |
| 62.01 | 305.84 | 2.00 | 0.00 | 1.00 | 0.00 | 62.17 | 254.22 | 2.00 | 0.00 | 1.00 | 0.00 |
| 62.34 | 202.84 | 2.00 | 0.00 | 1.00 | 0.00 | 62.50 | 168.91 | 2.00 | 0.00 | 1.00 | 0.00 |
| 62.66 | 140.31 | 2.00 | 0.00 | 1.00 | 0.00 | 62.83 | 132.25 | 2.00 | 0.00 | 1.00 | 0.00 |
| 62.99 | 136.44 | 2.00 | 0.00 | 1.00 | 0.00 | 63.16 | 136.45 | 2.00 | 0.00 | 1.00 | 0.00 |
| 63.32 | 130.92 | 2.00 | 0.00 | 1.00 | 0.00 | 63.48 | 126.15 | 2.00 | 0.00 | 1.00 | 0.00 |
| 63.65 | 124.49 | 2.00 | 0.00 | 1.00 | 0.00 | 63.81 | 126.62 | 2.00 | 0.00 | 1.00 | 0.00 |
| 63.98 | 122.13 | 2.00 | 0.00 | 1.00 | 0.00 | 64.14 | 119.16 | 2.00 | 0.00 | 1.00 | 0.00 |
| 64.30 | 128.19 | 2.00 | 0.00 | 1.00 | 0.00 | 64.47 | 148.94 | 2.00 | 0.00 | 1.00 | 0.00 |
| 64.63 | 161.94 | 2.00 | 0.00 | 1.00 | 0.00 | 64.80 | 161.98 | 2.00 | 0.00 | 1.00 | 0.00 |
| 64.96 | 145.40 | 2.00 | 0.00 | 1.00 | 0.00 | 65.12 | 127.92 | 2.00 | 0.00 | 1.00 | 0.00 |
| 65.29 | 114.64 | 2.00 | 0.00 | 1.00 | 0.00 | 65.45 | 111.37 | 2.00 | 0.00 | 1.00 | 0.00 |
| 65.62 | 107.20 | 2.00 | 0.00 | 1.00 | 0.00 | 65.78 | 103.84 | 2.00 | 0.00 | 1.00 | 0.00 |
| 65.94 | 100.87 | 2.00 | 0.00 | 1.00 | 0.00 | 66.11 | 101.61 | 2.00 | 0.00 | 1.00 | 0.00 |
| 66.27 | 101.46 | 2.00 | 0.00 | 1.00 | 0.00 | 66.44 | 100.61 | 2.00 | 0.00 | 1.00 | 0.00 |
| 66.60 | 97.81 | 2.00 | 0.00 | 1.00 | 0.00 | 66.77 | 96.32 | 2.00 | 0.00 | 1.00 | 0.00 |
| 66.93 | 96.80 | 2.00 | 0.00 | 1.00 | 0.00 | 67.09 | 101.52 | 2.00 | 0.00 | 1.00 | 0.00 |
| 67.26 | 104.73 | 2.00 | 0.00 | 1.00 | 0.00 | 67.42 | 106.80 | 2.00 | 0.00 | 1.00 | 0.00 |
| 67.59 | 114.77 | 2.00 | 0.00 | 1.00 | 0.00 | 67.75 | 126.40 | 2.00 | 0.00 | 1.00 | 0.00 |
| 67.91 | 138.55 | 2.00 | 0.00 | 1.00 | 0.00 | 68.08 | 137.97 | 2.00 | 0.00 | 1.00 | 0.00 |
| 68.24 | 132.47 | 2.00 | 0.00 | 1.00 | 0.00 | 68.41 | 116.57 | 2.00 | 0.00 | 1.00 | 0.00 |
| 68.57 | 105.29 | 2.00 | 0.00 | 1.00 | 0.00 | 68.73 | 91.46 | 2.00 | 0.00 | 1.00 | 0.00 |
| 68.90 | 91.29 | 2.00 | 0.00 | 1.00 | 0.00 | 69.06 | 92.10 | 2.00 | 0.00 | 1.00 | 0.00 |
| 69.23 | 100.15 | 2.00 | 0.00 | 1.00 | 0.00 | 69.39 | 106.84 | 2.00 | 0.00 | 1.00 | 0.00 |
| 69.55 | 107.49 | 2.00 | 0.00 | 1.00 | 0.00 | 69.72 | 104.27 | 2.00 | 0.00 | 1.00 | 0.00 |
| 69.88 | 103.66 | 2.00 | 0.00 | 1.00 | 0.00 | 70.05 | 105.65 | 2.00 | 0.00 | 1.00 | 0.00 |
| 70.21 | 110.24 | 2.00 | 0.00 | 1.00 | 0.00 | 70.37 | 112.04 | 2.00 | 0.00 | 1.00 | 0.00 |
| 70.54 | 112.86 | 2.00 | 0.00 | 1.00 | 0.00 | 70.70 | 117.05 | 2.00 | 0.00 | 1.00 | 0.00 |
| 70.87 | 136.14 | 2.00 | 0.00 | 1.00 | 0.00 | 71.03 | 156.12 | 2.00 | 0.00 | 1.00 | 0.00 |
| 71.19 | 153.11 | 2.00 | 0.00 | 1.00 | 0.00 | 71.36 | 144.69 | 2.00 | 0.00 | 1.00 | 0.00 |
| 71.52 | 132.53 | 2.00 | 0.00 | 1.00 | 0.00 | 71.69 | 135.52 | 2.00 | 0.00 | 1.00 | 0.00 |
| 71.85 | 134.66 | 2.00 | 0.00 | 1.00 | 0.00 | 72.01 | 133.87 | 2.00 | 0.00 | 1.00 | 0.00 |
| 72.18 | 133.09 | 2.00 | 0.00 | 1.00 | 0.00 | 72.34 | 130.43 | 2.00 | 0.00 | 1.00 | 0.00 |
| 72.51 | 127.61 | 2.00 | 0.00 | 1.00 | 0.00 | 72.67 | 124.64 | 2.00 | 0.00 | 1.00 | 0.00 |
| 72.83 | 122.24 | 2.00 | 0.00 | 1.00 | 0.00 | 73.00 | 127.73 | 2.00 | 0.00 | 1.00 | 0.00 |
| 73.16 | 142.10 | 2.00 | 0.00 | 1.00 | 0.00 | 73.33 | 156.03 | 2.00 | 0.00 | 1.00 | 0.00 |
| 73.49 | 161.62 | 2.00 | 0.00 | 1.00 | 0.00 | 73.65 | 162.06 | 2.00 | 0.00 | 1.00 | 0.00 |
| 73.82 | 145.80 | 2.00 | 0.00 | 1.00 | 0.00 | 73.98 | 129.64 | 2.00 | 0.00 | 1.00 | 0.00 |
| 74.15 | 118.51 | 2.00 | 0.00 | 1.00 | 0.00 | 74.31 | 116.52 | 2.00 | 0.00 | 1.00 | 0.00 |
| 74.48 | 103.63 | 2.00 | 0.00 | 1.00 | 0.00 | 74.64 | 88.87 | 2.00 | 0.00 | 1.00 | 0.00 |
| 74.80 | -1.00 | 2.00 | 0.00 | 1.00 | 0.00 | 74.97 | -1.00 | 2.00 | 0.00 | 1.00 | 0.00 |

**Total estimated settlement: 0.00**

**Abbreviations**

$Q_{tn,cs}$: Equivalent clean sand normalized cone resistance
FS: Factor of safety against liquefaction
$e_v$ (%): Post-liquefaction volumentric strain
DF: $e_v$ depth weighting factor
Settlement: Calculated settlement

**:: Lateral displacement index calculation ::**

| Depth (ft) | $q_t$ (tsf) | $Q_{tn}$ | $R_f$ (%) | $Q_{tn,cs}$ | FS | $D_r$ | $Gamma_{max}$ (%) | Lat. disp. (in) |
|---|---|---|---|---|---|---|---|---|
| 13.12 | 262.02 | 277.10 | 1.68 | 310.45 | 2.00 | 100.00 | 0.00 | 0.00 |
| 13.29 | 269.56 | 282.66 | 1.36 | 282.66 | 2.00 | 100.00 | 0.00 | 0.00 |
| 13.45 | 279.67 | 291.29 | 1.16 | 291.29 | 2.00 | 100.00 | 0.00 | 0.00 |
| 13.62 | 278.62 | 289.22 | 1.11 | 289.22 | 2.00 | 100.00 | 0.00 | 0.00 |
| 13.78 | 276.35 | 286.72 | 1.36 | 286.72 | 2.00 | 100.00 | 0.00 | 0.00 |
| 13.94 | 271.80 | 281.80 | 1.56 | 302.77 | 2.00 | 100.00 | 0.00 | 0.00 |
| 14.11 | 270.75 | 280.08 | 1.67 | 312.34 | 2.00 | 100.00 | 0.00 | 0.00 |
| 14.27 | 261.78 | 270.15 | 1.76 | 310.55 | 2.00 | 99.80 | 0.00 | 0.00 |
| 14.44 | 249.88 | 257.17 | 1.81 | 301.96 | 2.00 | 98.18 | 0.00 | 0.00 |
| 14.60 | 239.03 | 245.35 | 1.88 | 293.65 | 2.00 | 96.62 | 0.00 | 0.00 |
| 14.76 | 230.98 | 236.34 | 1.92 | 285.99 | 2.00 | 95.39 | 0.00 | 0.00 |
| 14.93 | 222.16 | 226.26 | 1.75 | 269.92 | 2.00 | 93.95 | 0.00 | 0.00 |
| 15.09 | 213.61 | 216.70 | 1.67 | 257.83 | 2.00 | 92.53 | 0.00 | 0.00 |
| 15.26 | 208.12 | 210.48 | 1.71 | 253.05 | 2.00 | 91.56 | 0.00 | 0.00 |
| 15.42 | 208.38 | 210.36 | 1.96 | 260.18 | 2.00 | 91.55 | 0.00 | 0.00 |
| 15.58 | 211.22 | 212.54 | 2.03 | 264.29 | 2.00 | 91.89 | 0.00 | 0.00 |
| 15.75 | 215.62 | 216.15 | 2.02 | 267.73 | 2.00 | 92.44 | 0.00 | 0.00 |
| 15.91 | 220.15 | 219.81 | 1.97 | 270.34 | 2.00 | 93.00 | 0.00 | 0.00 |
| 16.08 | 224.45 | 223.24 | 1.92 | 272.47 | 2.00 | 93.51 | 0.00 | 0.00 |
| 16.24 | 229.72 | 227.46 | 1.74 | 270.75 | 2.00 | 94.13 | 0.00 | 0.00 |
| 16.40 | 229.80 | 226.24 | 1.31 | 242.83 | 2.00 | 93.95 | 0.00 | 0.00 |
| 16.57 | 222.83 | 218.29 | 1.02 | 218.29 | 2.00 | 92.77 | 0.00 | 0.00 |
| 16.73 | 207.00 | 202.15 | 0.96 | 202.15 | 2.00 | 90.23 | 0.00 | 0.00 |
| 16.90 | 193.05 | 188.44 | 1.38 | 219.69 | 2.00 | 87.91 | 0.00 | 0.00 |
| 17.06 | 183.79 | 179.09 | 1.76 | 222.38 | 2.00 | 86.23 | 0.00 | 0.00 |
| 17.22 | 177.24 | 172.22 | 1.96 | 219.12 | 2.00 | 84.94 | 0.00 | 0.00 |
| 17.39 | 169.51 | 164.08 | 1.82 | 207.63 | 2.00 | 83.34 | 0.00 | 0.00 |
| 17.55 | 162.84 | 157.01 | 1.64 | 196.39 | 2.00 | 81.89 | 0.00 | 0.00 |
| 17.72 | 155.11 | 148.99 | 1.48 | 184.74 | 2.00 | 80.16 | 0.00 | 0.00 |
| 17.88 | 144.47 | 138.30 | 1.53 | 174.33 | 2.00 | 77.70 | 0.00 | 0.00 |
| 18.04 | 133.62 | 127.40 | 1.28 | 158.17 | 2.00 | 74.99 | 0.00 | 0.00 |
| 18.21 | 130.28 | 123.79 | 1.08 | 150.13 | 2.00 | 74.04 | 0.00 | 0.00 |
| 18.37 | 135.82 | 128.71 | 1.05 | 153.95 | 2.00 | 75.33 | 0.00 | 0.00 |
| 18.54 | 150.68 | 142.52 | 1.33 | 174.67 | 2.00 | 78.70 | 0.00 | 0.00 |
| 18.70 | 168.19 | 158.73 | 1.48 | 194.63 | 2.00 | 82.25 | 0.00 | 0.00 |
| 18.86 | 185.52 | 174.65 | 1.43 | 209.22 | 2.00 | 85.40 | 0.00 | 0.00 |
| 19.03 | 198.52 | 186.41 | 1.36 | 217.18 | 2.00 | 87.56 | 0.00 | 0.00 |
| 19.19 | 211.90 | 198.47 | 1.39 | 228.62 | 2.00 | 89.62 | 0.00 | 0.00 |
| 19.36 | 232.88 | 217.60 | 1.39 | 243.72 | 2.00 | 92.66 | 0.00 | 0.00 |
| 19.52 | 239.95 | 223.65 | 1.21 | 230.40 | 2.00 | 93.57 | 0.00 | 0.00 |
| 19.69 | 224.81 | 208.91 | 1.09 | 208.91 | 2.00 | 91.32 | 0.00 | 0.00 |
| 19.85 | 177.54 | 164.13 | 1.27 | 193.59 | 2.00 | 83.36 | 0.00 | 0.00 |
| 20.01 | 128.32 | 117.68 | 2.03 | 162.89 | 2.00 | 72.37 | 0.00 | 0.00 |
| 20.18 | 96.81 | 87.99 | 2.94 | 163.02 | 2.00 | 62.78 | 0.00 | 0.00 |
| 20.34 | 81.71 | 73.75 | 3.16 | 159.04 | 2.00 | 56.95 | 0.00 | 0.00 |
| 20.51 | 72.70 | 65.23 | 3.06 | 149.05 | 2.00 | 52.90 | 0.00 | 0.00 |
| 20.67 | 59.04 | 52.51 | 2.92 | 135.34 | 2.00 | 45.74 | 0.00 | 0.00 |
| 20.83 | 54.34 | 48.06 | 2.72 | 125.73 | 2.00 | 42.82 | 0.00 | 0.00 |

**:: Estimation of post-earthquake lateral Displacements :: (continued)**

| Depth (ft) | $q_t$ (tsf) | $Q_{tn}$ | $R_f$ (%) | $Q_{tn,cs}$ | FS | $D_r$ | $Gamma_{max}$ (%) | Lat. disp. (in) |
|---|---|---|---|---|---|---|---|---|
| 21.00 | 61.96 | 54.89 | 2.19 | 113.78 | 2.00 | 47.20 | 0.00 | 0.00 |
| 21.16 | 74.89 | 66.54 | 1.84 | 111.27 | 2.00 | 53.55 | 0.00 | 0.00 |
| 21.33 | 83.82 | 74.48 | 1.69 | 113.80 | 2.00 | 57.27 | 0.00 | 0.00 |
| 21.49 | 86.26 | 76.44 | 1.78 | 117.63 | 2.00 | 58.13 | 0.00 | 0.00 |
| 21.65 | 88.78 | 78.44 | 1.94 | 123.83 | 2.00 | 58.98 | 0.00 | 0.00 |
| 21.82 | 93.80 | 82.71 | 1.97 | 128.46 | 2.00 | 60.73 | 0.00 | 0.00 |
| 21.98 | 96.25 | 84.67 | 1.92 | 128.65 | 2.00 | 61.51 | 0.00 | 0.00 |
| 22.15 | 95.53 | 83.81 | 1.82 | 125.17 | 2.00 | 61.17 | 0.00 | 0.00 |
| 22.31 | 91.99 | 80.38 | 1.80 | 121.71 | 2.00 | 59.79 | 0.00 | 0.00 |
| 22.47 | 91.23 | 79.48 | 1.77 | 120.08 | 2.00 | 59.42 | 0.00 | 0.00 |
| 22.64 | 91.07 | 79.14 | 1.67 | 117.15 | 2.00 | 59.28 | 0.00 | 0.00 |
| 22.80 | 90.89 | 78.80 | 1.55 | 114.06 | 2.00 | 59.14 | 0.00 | 0.00 |
| 22.97 | 90.91 | 78.62 | 1.51 | 112.90 | 2.00 | 59.06 | 0.00 | 0.00 |
| 23.13 | 92.18 | 79.47 | 1.60 | 115.80 | 2.00 | 59.42 | 0.00 | 0.00 |
| 23.29 | 93.63 | 80.44 | 1.74 | 120.33 | 2.00 | 59.82 | 0.00 | 0.00 |
| 23.46 | 95.30 | 81.64 | 1.83 | 123.55 | 2.00 | 60.31 | 0.00 | 0.00 |
| 23.62 | 95.66 | 81.68 | 1.89 | 125.19 | 2.00 | 60.32 | 0.00 | 0.00 |
| 23.79 | 95.44 | 81.20 | 1.97 | 127.16 | 2.00 | 60.13 | 0.00 | 0.00 |
| 23.95 | 97.08 | 82.35 | 2.04 | 130.18 | 2.00 | 60.59 | 0.00 | 0.00 |
| 24.11 | 96.55 | 81.58 | 2.17 | 133.20 | 2.00 | 60.28 | 0.00 | 0.00 |
| 24.28 | 94.25 | 79.26 | 2.30 | 135.22 | 2.00 | 59.33 | 0.00 | 0.00 |
| 24.44 | 90.00 | 75.28 | 2.44 | 136.56 | 2.00 | 57.63 | 0.00 | 0.00 |
| 24.61 | 88.01 | 73.33 | 2.45 | 135.47 | 2.00 | 56.76 | 0.00 | 0.00 |
| 24.77 | 86.95 | 72.24 | 2.34 | 131.18 | 2.00 | 56.27 | 0.00 | 0.00 |
| 24.93 | 86.58 | 71.77 | 2.21 | 126.74 | 2.00 | 56.05 | 0.00 | 0.00 |
| 25.10 | 88.74 | 73.43 | 2.15 | 126.13 | 2.00 | 56.80 | 0.00 | 0.00 |
| 25.26 | 95.82 | 79.21 | 2.24 | 133.28 | 2.00 | 59.31 | 0.00 | 0.00 |
| 25.43 | 106.06 | 87.64 | 2.34 | 143.49 | 2.00 | 62.64 | 0.00 | 0.00 |
| 25.59 | 115.03 | 94.89 | 2.51 | 155.05 | 2.00 | 65.27 | 0.00 | 0.00 |
| 25.75 | 117.46 | 96.52 | 2.71 | 162.67 | 2.00 | 65.83 | 0.00 | 0.00 |
| 25.92 | 116.72 | 95.49 | 2.88 | 167.51 | 2.00 | 65.48 | 0.00 | 0.00 |
| 26.08 | 116.54 | 95.04 | 2.89 | 167.22 | 2.00 | 65.32 | 0.00 | 0.00 |
| 26.25 | 116.35 | 94.68 | 2.74 | 162.05 | 2.00 | 65.19 | 0.00 | 0.00 |
| 26.41 | 110.47 | 89.61 | 2.52 | 150.76 | 2.00 | 63.38 | 0.00 | 0.00 |
| 26.57 | 98.21 | 79.16 | 2.42 | 138.96 | 2.00 | 59.28 | 0.00 | 0.00 |
| 26.74 | 90.95 | 73.08 | 2.09 | 124.07 | 2.00 | 56.65 | 0.00 | 0.00 |
| 26.90 | 94.73 | 76.20 | 1.87 | 120.19 | 2.00 | 58.03 | 0.00 | 0.00 |
| 27.07 | 103.75 | 83.70 | 1.69 | 121.89 | 2.00 | 61.13 | 0.00 | 0.00 |
| 27.23 | 109.08 | 87.82 | 1.79 | 128.17 | 2.00 | 62.71 | 0.00 | 0.00 |
| 27.40 | 105.82 | 84.67 | 1.99 | 130.78 | 2.00 | 61.51 | 0.00 | 0.00 |
| 27.56 | 102.41 | 81.41 | 2.22 | 134.74 | 2.00 | 60.21 | 0.00 | 0.00 |
| 27.72 | 102.45 | 80.87 | 2.68 | 148.73 | 2.00 | 59.99 | 0.00 | 0.00 |
| 27.89 | 116.40 | 91.85 | 2.95 | 166.68 | 2.00 | 64.19 | 0.00 | 0.00 |
| 28.05 | 148.43 | 117.85 | 2.87 | 186.90 | 2.00 | 72.42 | 0.00 | 0.00 |
| 28.22 | 167.89 | 133.52 | 2.81 | 199.90 | 2.00 | 76.54 | 0.00 | 0.00 |
| 28.38 | 170.34 | 134.99 | 2.92 | 204.83 | 2.00 | 76.90 | 0.00 | 0.00 |
| 28.54 | 161.65 | 127.18 | 3.22 | 207.14 | 2.00 | 74.93 | 0.00 | 0.00 |
| 28.71 | 162.85 | 127.44 | 3.52 | 218.28 | 2.00 | 75.00 | 0.00 | 0.00 |

**:: Estimation of post-earthquake lateral Displacements :: (continued)**

| Depth (ft) | $q_t$ (tsf) | $Q_{tn}$ | $R_f$ (%) | $Q_{tn,cs}$ | FS | $D_r$ | $Gamma_{max}$ (%) | Lat. disp. (in) |
|---|---|---|---|---|---|---|---|---|
| 28.87 | 175.18 | 137.13 | 3.40 | 223.03 | 2.00 | 77.42 | 0.00 | 0.00 |
| 29.04 | 200.53 | 157.57 | 3.12 | 233.34 | 2.00 | 82.01 | 0.00 | 0.00 |
| 29.20 | 243.81 | 192.96 | 2.70 | 258.45 | 2.00 | 88.70 | 0.00 | 0.00 |
| 29.36 | 263.79 | 208.38 | 2.83 | 278.39 | 2.00 | 91.23 | 0.00 | 0.00 |
| 29.53 | 264.25 | 207.41 | 3.18 | 287.19 | 2.00 | 91.08 | 0.00 | 0.00 |
| 29.69 | 254.19 | 198.04 | 3.54 | 288.92 | 2.00 | 89.55 | 0.00 | 0.00 |
| 29.86 | 253.47 | 197.85 | 3.04 | 272.90 | 2.00 | 89.52 | 0.00 | 0.00 |
| 30.02 | 250.96 | 196.05 | 2.69 | 261.40 | 2.00 | 89.22 | 0.00 | 0.00 |
| 30.18 | 220.98 | 171.38 | 2.72 | 235.94 | 2.00 | 84.78 | 0.00 | 0.00 |
| 30.35 | 218.13 | 167.59 | 3.28 | 248.88 | 2.00 | 84.04 | 0.00 | 0.00 |
| 30.51 | 221.71 | 169.67 | 3.44 | 256.24 | 2.00 | 84.45 | 0.00 | 0.00 |
| 30.68 | 226.14 | 173.79 | 2.85 | 241.88 | 2.00 | 85.24 | 0.00 | 0.00 |
| 30.84 | 195.15 | 149.00 | 2.72 | 212.73 | 2.00 | 80.16 | 0.00 | 0.00 |
| 31.00 | 155.16 | 116.94 | 2.82 | 184.50 | 2.00 | 72.17 | 0.00 | 0.00 |
| 31.17 | 133.41 | 98.80 | 3.60 | 195.71 | 2.00 | 66.60 | 0.00 | 0.00 |
| 31.33 | 127.20 | 93.62 | 3.73 | 195.81 | 2.00 | 64.82 | 0.00 | 0.00 |
| 31.50 | 121.65 | 89.14 | 3.66 | 189.53 | 2.00 | 63.21 | 0.00 | 0.00 |
| 31.66 | 114.14 | 83.18 | 3.60 | 182.32 | 2.00 | 60.92 | 0.00 | 0.00 |
| 31.82 | 107.20 | 77.70 | 3.53 | 175.35 | 2.00 | 58.67 | 0.00 | 0.00 |
| 31.99 | 103.12 | 74.68 | 3.14 | 159.49 | 2.00 | 57.36 | 0.00 | 0.00 |
| 32.15 | 101.82 | 73.68 | 2.90 | 150.51 | 2.00 | 56.92 | 0.00 | 0.00 |
| 32.32 | 101.14 | 72.93 | 2.92 | 150.74 | 2.00 | 56.58 | 0.00 | 0.00 |
| 32.48 | 102.28 | 73.33 | 3.24 | 161.76 | 2.00 | 56.76 | 0.00 | 0.00 |
| 32.64 | 98.29 | 69.92 | 3.50 | 168.21 | 2.00 | 55.19 | 0.00 | 0.00 |
| 32.81 | 91.32 | 64.42 | 3.62 | 167.85 | 2.00 | 52.49 | 0.00 | 0.00 |
| 32.97 | 83.38 | 58.34 | 3.60 | 161.95 | 2.00 | 49.22 | 0.00 | 0.00 |
| 33.14 | 79.88 | 55.75 | 3.30 | 150.37 | 2.00 | 47.72 | 0.00 | 0.00 |
| 33.30 | 76.33 | 53.13 | 3.02 | 139.52 | 2.00 | 46.13 | 0.00 | 0.00 |
| 33.46 | 69.63 | 47.99 | 3.09 | 137.78 | 2.00 | 42.77 | 0.00 | 0.00 |
| 33.63 | 69.46 | 47.74 | 3.07 | 136.96 | 2.00 | 42.60 | 0.00 | 0.00 |
| 33.79 | 75.57 | 52.21 | 2.90 | 134.89 | 2.00 | 45.55 | 0.00 | 0.00 |
| 33.96 | 86.26 | 60.45 | 2.34 | 122.66 | 2.00 | 50.38 | 0.00 | 0.00 |
| 34.12 | 92.16 | 64.83 | 2.21 | 121.66 | 2.00 | 52.69 | 0.00 | 0.00 |
| 34.28 | 95.21 | 66.82 | 2.32 | 126.60 | 2.00 | 53.69 | 0.00 | 0.00 |
| 34.45 | 97.22 | 67.73 | 2.73 | 140.45 | 2.00 | 54.14 | 0.00 | 0.00 |
| 34.61 | 99.69 | 69.20 | 2.91 | 147.54 | 2.00 | 54.85 | 0.00 | 0.00 |
| 34.78 | 101.48 | 70.30 | 2.94 | 149.33 | 2.00 | 55.37 | 0.00 | 0.00 |
| 34.94 | 101.33 | 70.00 | 2.94 | 149.39 | 2.00 | 55.23 | 0.00 | 0.00 |
| 35.10 | 100.40 | 69.13 | 2.94 | 148.65 | 2.00 | 54.82 | 0.00 | 0.00 |
| 35.27 | 98.77 | 67.73 | 2.97 | 148.61 | 2.00 | 54.14 | 0.00 | 0.00 |
| 35.43 | 97.86 | 66.86 | 3.01 | 149.11 | 2.00 | 53.71 | 0.00 | 0.00 |
| 35.60 | 97.17 | 66.12 | 3.07 | 150.66 | 2.00 | 53.35 | 0.00 | 0.00 |
| 35.76 | 98.82 | 67.19 | 3.02 | 149.69 | 2.00 | 53.87 | 0.00 | 0.00 |
| 35.93 | 102.41 | 69.96 | 2.67 | 140.14 | 2.00 | 55.21 | 0.00 | 0.00 |
| 36.09 | 105.84 | 72.34 | 2.61 | 140.21 | 2.00 | 56.31 | 0.00 | 0.00 |
| 36.25 | 115.76 | 79.08 | 2.85 | 153.26 | 2.00 | 59.25 | 0.00 | 0.00 |
| 36.42 | 133.71 | 91.48 | 3.16 | 173.93 | 2.00 | 64.06 | 0.00 | 0.00 |
| 36.58 | 136.81 | 92.98 | 3.56 | 189.16 | 2.00 | 64.60 | 0.00 | 0.00 |

**:: Estimation of post-earthquake lateral Displacements :: (continued)**

| Depth (ft) | $q_t$ (tsf) | $Q_{tn}$ | $R_f$ (%) | $Q_{tn,cs}$ | FS | $D_r$ | $Gamma_{max}$ (%) | Lat. disp. (in) |
|---|---|---|---|---|---|---|---|---|
| 36.75 | 138.80 | 94.08 | 3.62 | 192.31 | 2.00 | 64.99 | 0.00 | 0.00 |
| 36.91 | 125.28 | 83.97 | 3.81 | 190.73 | 2.00 | 61.23 | 0.00 | 0.00 |
| 37.07 | 122.49 | 82.04 | 3.55 | 179.65 | 2.00 | 60.46 | 0.00 | 0.00 |
| 37.24 | 112.51 | 74.97 | 3.32 | 166.15 | 2.00 | 57.49 | 0.00 | 0.00 |
| 37.40 | 108.79 | 72.45 | 3.03 | 154.10 | 2.00 | 56.36 | 0.00 | 0.00 |
| 37.57 | 110.22 | 73.63 | 2.73 | 145.02 | 2.00 | 56.90 | 0.00 | 0.00 |
| 37.73 | 114.10 | 76.53 | 2.49 | 139.38 | 2.00 | 58.17 | 0.00 | 0.00 |
| 37.89 | 117.46 | 79.53 | 2.00 | 126.84 | 2.00 | 59.44 | 0.00 | 0.00 |
| 38.06 | 121.40 | 82.68 | 1.76 | 122.85 | 2.00 | 60.72 | 0.00 | 0.00 |
| 38.22 | 123.76 | 84.27 | 1.73 | 123.60 | 2.00 | 61.35 | 0.00 | 0.00 |
| 38.39 | 128.23 | 86.73 | 2.01 | 133.28 | 2.00 | 62.30 | 0.00 | 0.00 |
| 38.55 | 128.71 | 86.56 | 2.18 | 137.89 | 2.00 | 62.24 | 0.00 | 0.00 |
| 38.71 | 130.62 | 87.55 | 2.27 | 141.56 | 2.00 | 62.61 | 0.00 | 0.00 |
| 38.88 | 133.19 | 89.01 | 2.36 | 145.38 | 2.00 | 63.16 | 0.00 | 0.00 |
| 39.04 | 137.83 | 92.07 | 2.38 | 148.62 | 2.00 | 64.27 | 0.00 | 0.00 |
| 39.21 | 138.90 | 92.74 | 2.31 | 147.30 | 2.00 | 64.51 | 0.00 | 0.00 |
| 39.37 | 137.47 | 92.15 | 2.01 | 138.00 | 2.00 | 64.30 | 0.00 | 0.00 |
| 39.53 | 132.03 | 88.39 | 1.86 | 130.62 | 2.00 | 62.93 | 0.00 | 0.00 |
| 39.70 | 129.81 | 86.65 | 1.84 | 128.58 | 2.00 | 62.27 | 0.00 | 0.00 |
| 39.86 | 129.33 | 85.50 | 2.13 | 135.52 | 2.00 | 61.83 | 0.00 | 0.00 |
| 40.03 | 133.62 | 88.13 | 2.23 | 140.85 | 2.00 | 62.83 | 0.00 | 0.00 |
| 40.19 | 137.26 | 90.45 | 2.25 | 143.57 | 2.00 | 63.69 | 0.00 | 0.00 |
| 40.35 | 138.92 | 91.42 | 2.25 | 144.21 | 2.00 | 64.04 | 0.00 | 0.00 |
| 40.52 | 139.88 | 91.97 | 2.21 | 143.53 | 2.00 | 64.24 | 0.00 | 0.00 |
| 40.68 | 140.00 | 91.97 | 2.15 | 141.97 | 2.00 | 64.24 | 0.00 | 0.00 |
| 40.85 | 140.39 | 92.11 | 2.12 | 141.13 | 2.00 | 64.29 | 0.00 | 0.00 |
| 41.01 | 142.49 | 93.40 | 2.11 | 142.07 | 2.00 | 64.75 | 0.00 | 0.00 |
| 41.17 | 145.57 | 95.41 | 2.09 | 143.18 | 2.00 | 65.45 | 0.00 | 0.00 |
| 41.34 | 147.03 | 96.63 | 1.92 | 140.03 | 2.00 | 65.87 | 0.00 | 0.00 |
| 41.50 | 146.19 | 96.48 | 1.69 | 134.27 | 2.00 | 65.82 | 0.00 | 0.00 |
| 41.67 | 144.11 | 94.90 | 1.66 | 132.04 | 2.00 | 65.27 | 0.00 | 0.00 |
| 41.83 | 143.48 | 93.71 | 1.86 | 135.58 | 2.00 | 64.86 | 0.00 | 0.00 |
| 41.99 | 142.86 | 92.35 | 2.15 | 142.17 | 2.00 | 64.37 | 0.00 | 0.00 |
| 42.16 | 142.11 | 91.38 | 2.26 | 144.53 | 2.00 | 64.02 | 0.00 | 0.00 |
| 42.32 | 140.48 | 90.05 | 2.26 | 143.48 | 2.00 | 63.54 | 0.00 | 0.00 |
| 42.49 | 139.48 | 89.27 | 2.21 | 141.38 | 2.00 | 63.25 | 0.00 | 0.00 |
| 42.65 | 138.27 | 88.35 | 2.16 | 139.13 | 2.00 | 62.91 | 0.00 | 0.00 |
| 42.81 | 136.59 | 87.06 | 2.14 | 137.23 | 2.00 | 62.43 | 0.00 | 0.00 |
| 42.98 | 134.47 | 85.46 | 2.12 | 135.34 | 2.00 | 61.81 | 0.00 | 0.00 |
| 43.14 | 132.35 | 83.94 | 2.07 | 132.59 | 2.00 | 61.22 | 0.00 | 0.00 |
| 43.31 | 130.89 | 83.51 | 1.76 | 123.69 | 2.00 | 61.05 | 0.00 | 0.00 |
| 43.47 | 129.30 | 82.66 | 1.60 | 118.96 | 2.00 | 60.72 | 0.00 | 0.00 |
| 43.64 | 126.19 | 80.33 | 1.61 | 116.97 | 2.00 | 59.77 | 0.00 | 0.00 |
| 43.80 | 124.61 | 78.31 | 1.92 | 123.53 | 2.00 | 58.93 | 0.00 | 0.00 |
| 43.96 | 123.64 | 77.09 | 2.11 | 128.00 | 2.00 | 58.41 | 0.00 | 0.00 |
| 44.13 | 125.46 | 78.02 | 2.17 | 130.60 | 2.00 | 58.81 | 0.00 | 0.00 |
| 44.29 | 126.47 | 78.46 | 2.20 | 131.90 | 2.00 | 58.99 | 0.00 | 0.00 |
| 44.46 | 127.57 | 78.99 | 2.22 | 132.96 | 2.00 | 59.22 | 0.00 | 0.00 |

**:: Estimation of post-earthquake lateral Displacements :: (continued)**

| Depth (ft) | $q_t$ (tsf) | $Q_{tn}$ | $R_f$ (%) | $Q_{tn,cs}$ | FS | $D_r$ | $Gamma_{max}$ (%) | Lat. disp. (in) |
|---|---|---|---|---|---|---|---|---|
| 44.62 | 128.40 | 79.35 | 2.23 | 133.71 | 2.00 | 59.37 | 0.00 | 0.00 |
| 44.78 | 129.18 | 79.73 | 2.22 | 133.62 | 2.00 | 59.52 | 0.00 | 0.00 |
| 44.95 | 129.52 | 80.12 | 2.07 | 129.34 | 2.00 | 59.68 | 0.00 | 0.00 |
| 45.11 | 130.16 | 80.84 | 1.87 | 124.45 | 2.00 | 59.98 | 0.00 | 0.00 |
| 45.28 | 129.64 | 80.40 | 1.84 | 123.21 | 2.00 | 59.80 | 0.00 | 0.00 |
| 45.44 | 128.84 | 79.28 | 2.01 | 127.12 | 2.00 | 59.34 | 0.00 | 0.00 |
| 45.60 | 126.73 | 77.21 | 2.24 | 132.38 | 2.00 | 58.46 | 0.00 | 0.00 |
| 45.77 | 125.47 | 76.05 | 2.33 | 134.01 | 2.00 | 57.96 | 0.00 | 0.00 |
| 45.93 | 124.27 | 75.08 | 2.34 | 133.54 | 2.00 | 57.54 | 0.00 | 0.00 |
| 46.10 | 123.07 | 74.14 | 2.33 | 132.74 | 2.00 | 57.12 | 0.00 | 0.00 |
| 46.26 | 121.90 | 73.20 | 2.34 | 132.20 | 2.00 | 56.70 | 0.00 | 0.00 |
| 46.42 | 121.22 | 72.62 | 2.33 | 131.42 | 2.00 | 56.44 | 0.00 | 0.00 |
| 46.59 | 121.72 | 72.81 | 2.32 | 131.23 | 2.00 | 56.53 | 0.00 | 0.00 |
| 46.75 | 122.33 | 73.05 | 2.32 | 131.62 | 2.00 | 56.63 | 0.00 | 0.00 |
| 46.92 | 123.36 | 73.61 | 2.30 | 131.24 | 2.00 | 56.89 | 0.00 | 0.00 |
| 47.08 | 122.92 | 73.51 | 2.13 | 126.00 | 2.00 | 56.84 | 0.00 | 0.00 |
| 47.24 | 121.91 | 72.85 | 2.06 | 123.38 | 2.00 | 56.54 | 0.00 | 0.00 |
| 47.41 | 120.17 | 71.46 | 2.11 | 123.84 | 2.00 | 55.91 | 0.00 | 0.00 |
| 47.57 | 119.49 | 70.41 | 2.35 | 130.39 | 2.00 | 55.42 | 0.00 | 0.00 |
| 47.74 | 120.30 | 70.49 | 2.50 | 135.50 | 2.00 | 55.46 | 0.00 | 0.00 |
| 47.90 | 120.58 | 70.31 | 2.62 | 139.08 | 2.00 | 55.38 | 0.00 | 0.00 |
| 48.06 | 120.09 | 69.68 | 2.72 | 142.04 | 2.00 | 55.08 | 0.00 | 0.00 |
| 48.23 | 119.58 | 69.17 | 2.74 | 142.36 | 2.00 | 54.83 | 0.00 | 0.00 |
| 48.39 | 118.93 | 68.59 | 2.76 | 142.39 | 2.00 | 54.55 | 0.00 | 0.00 |
| 48.56 | 120.75 | 69.63 | 2.73 | 142.22 | 2.00 | 55.05 | 0.00 | 0.00 |
| 48.72 | 122.99 | 70.95 | 2.69 | 142.11 | 2.00 | 55.67 | 0.00 | 0.00 |
| 48.88 | 121.91 | 70.21 | 2.64 | 139.87 | 2.00 | 55.33 | 0.00 | 0.00 |
| 49.05 | 116.91 | 67.36 | 2.39 | 129.46 | 2.00 | 53.96 | 0.00 | 0.00 |
| 49.21 | 110.01 | 63.21 | 2.20 | 120.48 | 2.00 | 51.86 | 0.00 | 0.00 |
| 49.38 | 106.60 | 61.11 | 2.10 | 115.81 | 2.00 | 50.75 | 0.00 | 0.00 |
| 49.54 | 105.39 | 59.90 | 2.28 | 120.71 | 2.00 | 50.09 | 0.00 | 0.00 |
| 49.70 | 104.05 | 58.70 | 2.43 | 124.67 | 2.00 | 49.42 | 0.00 | 0.00 |
| 49.87 | 101.17 | 56.63 | 2.53 | 126.64 | 2.00 | 48.23 | 0.00 | 0.00 |
| 50.03 | 98.50 | 54.79 | 2.58 | 126.91 | 2.00 | 47.14 | 0.00 | 0.00 |
| 50.20 | 96.69 | 53.55 | 2.59 | 126.33 | 2.00 | 46.39 | 0.00 | 0.00 |
| 50.36 | 96.67 | 53.52 | 2.52 | 124.31 | 2.00 | 46.36 | 0.00 | 0.00 |
| 50.52 | 97.40 | 53.87 | 2.51 | 124.18 | 2.00 | 46.58 | 0.00 | 0.00 |
| 50.69 | 101.64 | 56.34 | 2.52 | 126.23 | 2.00 | 48.06 | 0.00 | 0.00 |
| 50.85 | 108.68 | 60.53 | 2.53 | 129.42 | 2.00 | 50.43 | 0.00 | 0.00 |
| 51.02 | 115.56 | 64.59 | 2.56 | 133.25 | 2.00 | 52.57 | 0.00 | 0.00 |
| 51.18 | 122.35 | 68.61 | 2.58 | 136.62 | 2.00 | 54.57 | 0.00 | 0.00 |
| 51.35 | 124.13 | 69.43 | 2.65 | 139.67 | 2.00 | 54.96 | 0.00 | 0.00 |
| 51.51 | 117.64 | 65.15 | 2.74 | 139.60 | 2.00 | 52.86 | 0.00 | 0.00 |
| 51.67 | 103.65 | 56.42 | 2.82 | 135.71 | 2.00 | 48.11 | 0.00 | 0.00 |
| 51.84 | 89.74 | 47.98 | 2.79 | 129.21 | 2.00 | 42.76 | 0.00 | 0.00 |
| 52.00 | 80.75 | 42.62 | 2.72 | 123.17 | 2.00 | 38.85 | 0.00 | 0.00 |
| 52.17 | 79.59 | 42.00 | 2.57 | 118.32 | 2.00 | 38.37 | 0.00 | 0.00 |
| 52.33 | 85.58 | 45.94 | 2.21 | 109.54 | 2.00 | 41.33 | 0.00 | 0.00 |

**:: Estimation of post-earthquake lateral Displacements :: (continued)**

| Depth (ft) | $q_t$ (tsf) | $Q_{tn}$ | $R_f$ (%) | $Q_{tn,cs}$ | FS | $D_r$ | $Gamma_{max}$ (%) | Lat. disp. (in) |
|---|---|---|---|---|---|---|---|---|
| 52.49 | 99.14 | 54.78 | 1.81 | 102.69 | 2.00 | 47.13 | 0.00 | 0.00 |
| 52.66 | 111.44 | 63.18 | 1.46 | 98.70 | 2.00 | 51.85 | 0.00 | 0.00 |
| 52.82 | 122.21 | 69.67 | 1.53 | 105.87 | 2.00 | 55.07 | 0.00 | 0.00 |
| 52.99 | 136.17 | 77.21 | 1.91 | 122.46 | 2.00 | 58.46 | 0.00 | 0.00 |
| 53.15 | 156.64 | 88.45 | 2.39 | 146.15 | 2.00 | 62.95 | 0.00 | 0.00 |
| 53.31 | 167.77 | 93.89 | 2.85 | 165.63 | 2.00 | 64.92 | 0.00 | 0.00 |
| 53.48 | 174.30 | 97.09 | 3.09 | 176.30 | 2.00 | 66.03 | 0.00 | 0.00 |
| 53.64 | 174.82 | 96.85 | 3.24 | 181.35 | 2.00 | 65.94 | 0.00 | 0.00 |
| 53.81 | 183.52 | 102.84 | 2.88 | 174.24 | 2.00 | 67.92 | 0.00 | 0.00 |
| 53.97 | 202.00 | 115.31 | 2.47 | 172.73 | 2.00 | 71.70 | 0.00 | 0.00 |
| 54.13 | 245.35 | 143.97 | 2.10 | 192.09 | 2.00 | 79.03 | 0.00 | 0.00 |
| 54.30 | 318.74 | 192.91 | 1.82 | 238.62 | 2.00 | 88.69 | 0.00 | 0.00 |
| 54.46 | 392.09 | 240.75 | 1.81 | 286.75 | 2.00 | 96.00 | 0.00 | 0.00 |
| 54.63 | 418.94 | 258.69 | 1.76 | 300.93 | 2.00 | 98.37 | 0.00 | 0.00 |
| 54.79 | 395.12 | 237.67 | 2.23 | 296.42 | 2.00 | 95.57 | 0.00 | 0.00 |
| 54.95 | 357.58 | 209.04 | 2.80 | 278.72 | 2.00 | 91.34 | 0.00 | 0.00 |
| 55.12 | 335.48 | 193.31 | 3.07 | 269.33 | 2.00 | 88.76 | 0.00 | 0.00 |
| 55.28 | 327.24 | 188.21 | 3.01 | 262.08 | 2.00 | 87.87 | 0.00 | 0.00 |
| 55.45 | 295.31 | 171.82 | 2.35 | 227.33 | 2.00 | 84.87 | 0.00 | 0.00 |
| 55.61 | 248.38 | 142.41 | 2.31 | 195.27 | 2.00 | 78.67 | 0.00 | 0.00 |
| 55.77 | 206.07 | 117.17 | 2.04 | 162.94 | 2.00 | 72.23 | 0.00 | 0.00 |
| 55.94 | 193.49 | 108.51 | 2.20 | 158.60 | 2.00 | 69.69 | 0.00 | 0.00 |
| 56.10 | 201.25 | 113.65 | 2.06 | 160.09 | 2.00 | 71.22 | 0.00 | 0.00 |
| 56.27 | 197.48 | 111.34 | 2.01 | 156.55 | 2.00 | 70.55 | 0.00 | 0.00 |
| 56.43 | 189.11 | 105.20 | 2.21 | 155.72 | 2.00 | 68.67 | 0.00 | 0.00 |
| 56.59 | 179.02 | 98.75 | 2.24 | 150.72 | 2.00 | 66.59 | 0.00 | 0.00 |
| 56.76 | 180.52 | 100.51 | 1.97 | 145.05 | 2.00 | 67.17 | 0.00 | 0.00 |
| 56.92 | 176.60 | 97.91 | 1.98 | 142.77 | 2.00 | 66.30 | 0.00 | 0.00 |
| 57.09 | 173.71 | 94.98 | 2.25 | 147.61 | 2.00 | 65.30 | 0.00 | 0.00 |
| 57.25 | 168.41 | 90.38 | 2.66 | 156.46 | 2.00 | 63.66 | 0.00 | 0.00 |
| 57.41 | 164.55 | 87.77 | 2.72 | 156.25 | 2.00 | 62.69 | 0.00 | 0.00 |
| 57.58 | 155.14 | 82.10 | 2.71 | 151.48 | 2.00 | 60.49 | 0.00 | 0.00 |
| 57.74 | 148.74 | 78.47 | 2.60 | 145.03 | 2.00 | 59.00 | 0.00 | 0.00 |
| 57.91 | 147.90 | 79.51 | 2.00 | 127.18 | 2.00 | 59.43 | 0.00 | 0.00 |
| 58.07 | 148.66 | 81.37 | 1.57 | 117.16 | 2.00 | 60.20 | 0.00 | 0.00 |
| 58.23 | 146.25 | 80.29 | 1.44 | 113.17 | 2.00 | 59.75 | 0.00 | 0.00 |
| 58.40 | 143.53 | 77.04 | 1.83 | 120.25 | 2.00 | 58.39 | 0.00 | 0.00 |
| 58.56 | 141.81 | 75.14 | 2.07 | 125.56 | 2.00 | 57.57 | 0.00 | 0.00 |
| 58.73 | 144.83 | 76.73 | 2.09 | 127.47 | 2.00 | 58.26 | 0.00 | 0.00 |
| 58.89 | 147.85 | 78.29 | 2.12 | 129.52 | 2.00 | 58.92 | 0.00 | 0.00 |
| 59.06 | 152.43 | 81.02 | 2.06 | 130.22 | 2.00 | 60.05 | 0.00 | 0.00 |
| 59.22 | 162.57 | 87.55 | 1.88 | 130.67 | 2.00 | 62.61 | 0.00 | 0.00 |
| 59.38 | 164.44 | 87.92 | 2.04 | 135.46 | 2.00 | 62.75 | 0.00 | 0.00 |
| 59.55 | 170.03 | 90.03 | 2.34 | 146.20 | 2.00 | 63.53 | 0.00 | 0.00 |
| 59.71 | 168.14 | 87.55 | 2.75 | 157.13 | 2.00 | 62.61 | 0.00 | 0.00 |
| 59.88 | 169.01 | 87.82 | 2.77 | 158.11 | 2.00 | 62.71 | 0.00 | 0.00 |
| 60.04 | 163.77 | 85.17 | 2.59 | 149.77 | 2.00 | 61.70 | 0.00 | 0.00 |
| 60.20 | 157.56 | 82.71 | 2.15 | 134.31 | 2.00 | 60.74 | 0.00 | 0.00 |

**:: Estimation of post-earthquake lateral Displacements :: (continued)**

| Depth (ft) | $q_t$ (tsf) | $Q_{tn}$ | $R_f$ (%) | $Q_{tn,cs}$ | FS | $D_r$ | $Gamma_{max}$ (%) | Lat. disp. (in) |
|---|---|---|---|---|---|---|---|---|
| 60.37 | 153.37 | 80.67 | 1.99 | 127.70 | 2.00 | 59.91 | 0.00 | 0.00 |
| 60.53 | 158.97 | 83.83 | 1.99 | 130.36 | 2.00 | 61.18 | 0.00 | 0.00 |
| 60.70 | 169.43 | 89.17 | 2.17 | 140.11 | 2.00 | 63.22 | 0.00 | 0.00 |
| 60.86 | 176.19 | 93.04 | 2.15 | 143.02 | 2.00 | 64.62 | 0.00 | 0.00 |
| 61.02 | 176.53 | 93.26 | 2.10 | 141.78 | 2.00 | 64.70 | 0.00 | 0.00 |
| 61.19 | 173.93 | 91.53 | 2.11 | 140.67 | 2.00 | 64.08 | 0.00 | 0.00 |
| 61.35 | 187.37 | 99.79 | 1.98 | 144.69 | 2.00 | 66.93 | 0.00 | 0.00 |
| 61.52 | 227.99 | 123.33 | 2.06 | 169.76 | 2.00 | 73.92 | 0.00 | 0.00 |
| 61.68 | 332.24 | 186.63 | 1.98 | 235.55 | 2.00 | 87.59 | 0.00 | 0.00 |
| 61.84 | 433.93 | 249.97 | 1.90 | 299.41 | 2.00 | 97.24 | 0.00 | 0.00 |
| 62.01 | 439.32 | 251.00 | 2.06 | 305.84 | 2.00 | 97.38 | 0.00 | 0.00 |
| 62.17 | 351.91 | 193.34 | 2.50 | 254.22 | 2.00 | 88.76 | 0.00 | 0.00 |
| 62.34 | 243.70 | 126.70 | 3.09 | 202.84 | 2.00 | 74.81 | 0.00 | 0.00 |
| 62.50 | 201.63 | 104.03 | 2.68 | 168.91 | 2.00 | 68.30 | 0.00 | 0.00 |
| 62.66 | 180.66 | 94.39 | 2.01 | 140.31 | 2.00 | 65.09 | 0.00 | 0.00 |
| 62.83 | 173.14 | 90.59 | 1.83 | 132.25 | 2.00 | 63.74 | 0.00 | 0.00 |
| 62.99 | 171.14 | 88.35 | 2.06 | 136.44 | 2.00 | 62.91 | 0.00 | 0.00 |
| 63.16 | 171.42 | 88.36 | 2.06 | 136.45 | 2.00 | 62.92 | 0.00 | 0.00 |
| 63.32 | 165.37 | 85.09 | 1.97 | 130.92 | 2.00 | 61.67 | 0.00 | 0.00 |
| 63.48 | 151.57 | 76.79 | 2.04 | 126.15 | 2.00 | 58.28 | 0.00 | 0.00 |
| 63.65 | 141.24 | 70.49 | 2.15 | 124.49 | 2.00 | 55.46 | 0.00 | 0.00 |
| 63.81 | 131.11 | 64.16 | 2.36 | 126.62 | 2.00 | 52.35 | 0.00 | 0.00 |
| 63.98 | 124.35 | 60.46 | 2.30 | 122.13 | 2.00 | 50.39 | 0.00 | 0.00 |
| 64.14 | 118.55 | 57.23 | 2.28 | 119.16 | 2.00 | 48.58 | 0.00 | 0.00 |
| 64.30 | 119.13 | 56.84 | 2.57 | 128.19 | 2.00 | 48.36 | 0.00 | 0.00 |
| 64.47 | 133.76 | 63.69 | 3.05 | 148.94 | 2.00 | 52.11 | 0.00 | 0.00 |
| 64.63 | 149.19 | 71.42 | 3.26 | 161.94 | 2.00 | 55.89 | 0.00 | 0.00 |
| 64.80 | 149.31 | 71.35 | 3.26 | 161.98 | 2.00 | 55.86 | 0.00 | 0.00 |
| 64.96 | 134.15 | 63.75 | 2.94 | 145.40 | 2.00 | 52.14 | 0.00 | 0.00 |
| 65.12 | 118.15 | 55.77 | 2.58 | 127.92 | 2.00 | 47.73 | 0.00 | 0.00 |
| 65.29 | 115.20 | 54.89 | 2.18 | 114.64 | 2.00 | 47.20 | 0.00 | 0.00 |
| 65.45 | 114.70 | 54.75 | 2.08 | 111.37 | 2.00 | 47.12 | 0.00 | 0.00 |
| 65.62 | 115.12 | 55.23 | 1.94 | 107.20 | 2.00 | 47.40 | 0.00 | 0.00 |
| 65.78 | 114.90 | 55.29 | 1.83 | 103.84 | 2.00 | 47.44 | 0.00 | 0.00 |
| 65.94 | 115.88 | 56.05 | 1.72 | 100.87 | 2.00 | 47.89 | 0.00 | 0.00 |
| 66.11 | 117.50 | 56.84 | 1.72 | 101.61 | 2.00 | 48.35 | 0.00 | 0.00 |
| 66.27 | 121.03 | 58.86 | 1.67 | 101.46 | 2.00 | 49.51 | 0.00 | 0.00 |
| 66.44 | 123.73 | 60.50 | 1.60 | 100.61 | 2.00 | 50.41 | 0.00 | 0.00 |
| 66.60 | 125.43 | 61.82 | 1.47 | 97.81 | 2.00 | 51.13 | 0.00 | 0.00 |
| 66.77 | 124.57 | 61.39 | 1.42 | 96.32 | 2.00 | 50.90 | 0.00 | 0.00 |
| 66.93 | 123.82 | 60.75 | 1.46 | 96.80 | 2.00 | 50.55 | 0.00 | 0.00 |
| 67.09 | 124.15 | 60.23 | 1.64 | 101.52 | 2.00 | 50.26 | 0.00 | 0.00 |
| 67.26 | 129.20 | 62.79 | 1.68 | 104.73 | 2.00 | 51.64 | 0.00 | 0.00 |
| 67.42 | 134.49 | 65.64 | 1.68 | 106.80 | 2.00 | 53.11 | 0.00 | 0.00 |
| 67.59 | 140.60 | 68.23 | 1.89 | 114.77 | 2.00 | 54.38 | 0.00 | 0.00 |
| 67.75 | 154.08 | 74.82 | 2.10 | 126.40 | 2.00 | 57.43 | 0.00 | 0.00 |
| 67.91 | 166.38 | 80.61 | 2.35 | 138.55 | 2.00 | 59.89 | 0.00 | 0.00 |
| 68.08 | 179.58 | 88.62 | 2.11 | 137.97 | 2.00 | 63.01 | 0.00 | 0.00 |

**:: Estimation of post-earthquake lateral Displacements :: (continued)**

| Depth (ft) | $q_t$ (tsf) | $Q_{tn}$ | $R_f$ (%) | $Q_{tn,cs}$ | FS | $D_r$ | $Gamma_{max}$ (%) | Lat. disp. (in) |
|---|---|---|---|---|---|---|---|---|
| 68.24 | 176.95 | 87.72 | 1.94 | 132.47 | 2.00 | 62.68 | 0.00 | 0.00 |
| 68.41 | 162.94 | 81.54 | 1.53 | 116.57 | 2.00 | 60.27 | 0.00 | 0.00 |
| 68.57 | 146.18 | 72.54 | 1.41 | 105.29 | 2.00 | 56.40 | 0.00 | 0.00 |
| 68.73 | 129.93 | 64.54 | 1.12 | 91.46 | 2.00 | 52.55 | 0.00 | 0.00 |
| 68.90 | 128.99 | 63.81 | 1.14 | 91.29 | 2.00 | 52.17 | 0.00 | 0.00 |
| 69.06 | 126.11 | 61.58 | 1.25 | 92.10 | 2.00 | 51.00 | 0.00 | 0.00 |
| 69.23 | 129.42 | 62.23 | 1.54 | 100.15 | 2.00 | 51.34 | 0.00 | 0.00 |
| 69.39 | 129.35 | 61.24 | 1.79 | 106.84 | 2.00 | 50.81 | 0.00 | 0.00 |
| 69.55 | 133.58 | 63.55 | 1.76 | 107.49 | 2.00 | 52.04 | 0.00 | 0.00 |
| 69.72 | 136.43 | 65.61 | 1.59 | 104.27 | 2.00 | 53.09 | 0.00 | 0.00 |
| 69.88 | 141.02 | 68.49 | 1.48 | 103.66 | 2.00 | 54.51 | 0.00 | 0.00 |
| 70.05 | 140.01 | 67.39 | 1.59 | 105.65 | 2.00 | 53.97 | 0.00 | 0.00 |
| 70.21 | 139.64 | 66.38 | 1.78 | 110.24 | 2.00 | 53.48 | 0.00 | 0.00 |
| 70.37 | 137.34 | 64.69 | 1.88 | 112.04 | 2.00 | 52.62 | 0.00 | 0.00 |
| 70.54 | 139.86 | 65.96 | 1.88 | 112.86 | 2.00 | 53.26 | 0.00 | 0.00 |
| 70.70 | 142.49 | 66.89 | 1.99 | 117.05 | 2.00 | 53.73 | 0.00 | 0.00 |
| 70.87 | 151.38 | 69.93 | 2.52 | 136.14 | 2.00 | 55.19 | 0.00 | 0.00 |
| 71.03 | 169.76 | 78.28 | 2.93 | 156.12 | 2.00 | 58.92 | 0.00 | 0.00 |
| 71.19 | 185.28 | 87.22 | 2.63 | 153.11 | 2.00 | 62.49 | 0.00 | 0.00 |
| 71.36 | 185.00 | 87.95 | 2.35 | 144.69 | 2.00 | 62.76 | 0.00 | 0.00 |
| 71.52 | 174.17 | 83.03 | 2.08 | 132.53 | 2.00 | 60.86 | 0.00 | 0.00 |
| 71.69 | 161.59 | 75.11 | 2.38 | 135.52 | 2.00 | 57.55 | 0.00 | 0.00 |
| 71.85 | 151.76 | 69.52 | 2.49 | 134.66 | 2.00 | 55.00 | 0.00 | 0.00 |
| 72.01 | 138.09 | 61.98 | 2.63 | 133.87 | 2.00 | 51.21 | 0.00 | 0.00 |
| 72.18 | 133.33 | 59.37 | 2.66 | 133.09 | 2.00 | 49.79 | 0.00 | 0.00 |
| 72.34 | 130.09 | 57.73 | 2.61 | 130.43 | 2.00 | 48.86 | 0.00 | 0.00 |
| 72.51 | 130.85 | 58.24 | 2.52 | 127.61 | 2.00 | 49.15 | 0.00 | 0.00 |
| 72.67 | 129.50 | 57.63 | 2.44 | 124.64 | 2.00 | 48.81 | 0.00 | 0.00 |
| 72.83 | 136.58 | 61.57 | 2.28 | 122.24 | 2.00 | 50.99 | 0.00 | 0.00 |
| 73.00 | 141.43 | 63.65 | 2.40 | 127.73 | 2.00 | 52.09 | 0.00 | 0.00 |
| 73.16 | 150.97 | 67.52 | 2.76 | 142.10 | 2.00 | 54.03 | 0.00 | 0.00 |
| 73.33 | 171.86 | 77.56 | 2.95 | 156.03 | 2.00 | 58.61 | 0.00 | 0.00 |
| 73.49 | 201.85 | 93.62 | 2.73 | 161.62 | 2.00 | 64.82 | 0.00 | 0.00 |
| 73.65 | 205.24 | 95.35 | 2.70 | 162.06 | 2.00 | 65.43 | 0.00 | 0.00 |
| 73.82 | 190.18 | 88.58 | 2.37 | 145.80 | 2.00 | 63.00 | 0.00 | 0.00 |
| 73.98 | 170.17 | 78.94 | 2.10 | 129.64 | 2.00 | 59.20 | 0.00 | 0.00 |
| 74.15 | 177.47 | 85.92 | 1.44 | 118.51 | 2.00 | 61.99 | 0.00 | 0.00 |
| 74.31 | 175.35 | 84.91 | 1.39 | 116.52 | 2.00 | 61.60 | 0.00 | 0.00 |
| 74.48 | 161.86 | 80.05 | 0.96 | 103.63 | 2.00 | 59.66 | 0.00 | 0.00 |
| 74.64 | 142.68 | 72.25 | 0.57 | 88.87 | 2.00 | 56.27 | 0.00 | 0.00 |
| 74.80 | 142.97 | N/A | 0.00 | -1.00 | 2.00 | 0.00 | 0.00 | 0.00 |
| 74.97 | 151.79 | N/A | 0.00 | -1.00 | 2.00 | 0.00 | 0.00 | 0.00 |

**:: Estimation of post-earthquake lateral Displacements :: (continued)**

| Depth (ft) | $q_t$ (tsf) | $Q_{tn}$ | $R_f$ (%) | $Q_{tn,cs}$ | FS | $D_r$ | $Gamma_{max}$ (%) | Lat. disp. (in) |
|---|---|---|---|---|---|---|---|---|

**Total estimated displacement: 0.00**

**Abbreviations**

$q_t$: Total cone resistance
$Q_{tn}$: Adjusted cone resistance to an effective overburden stress of 1 atm
$R_f$: Friction ration
$Q_{tn,cs}$: Adjusted and corrected cone resistance due to fines
FS: Calculated factor of safety against liquefaction
$D_r$: Calculated relative density
$Gamma_{max}$: Calculated maximum cyclic shear strain
Lat. disp.: Lateral displacement

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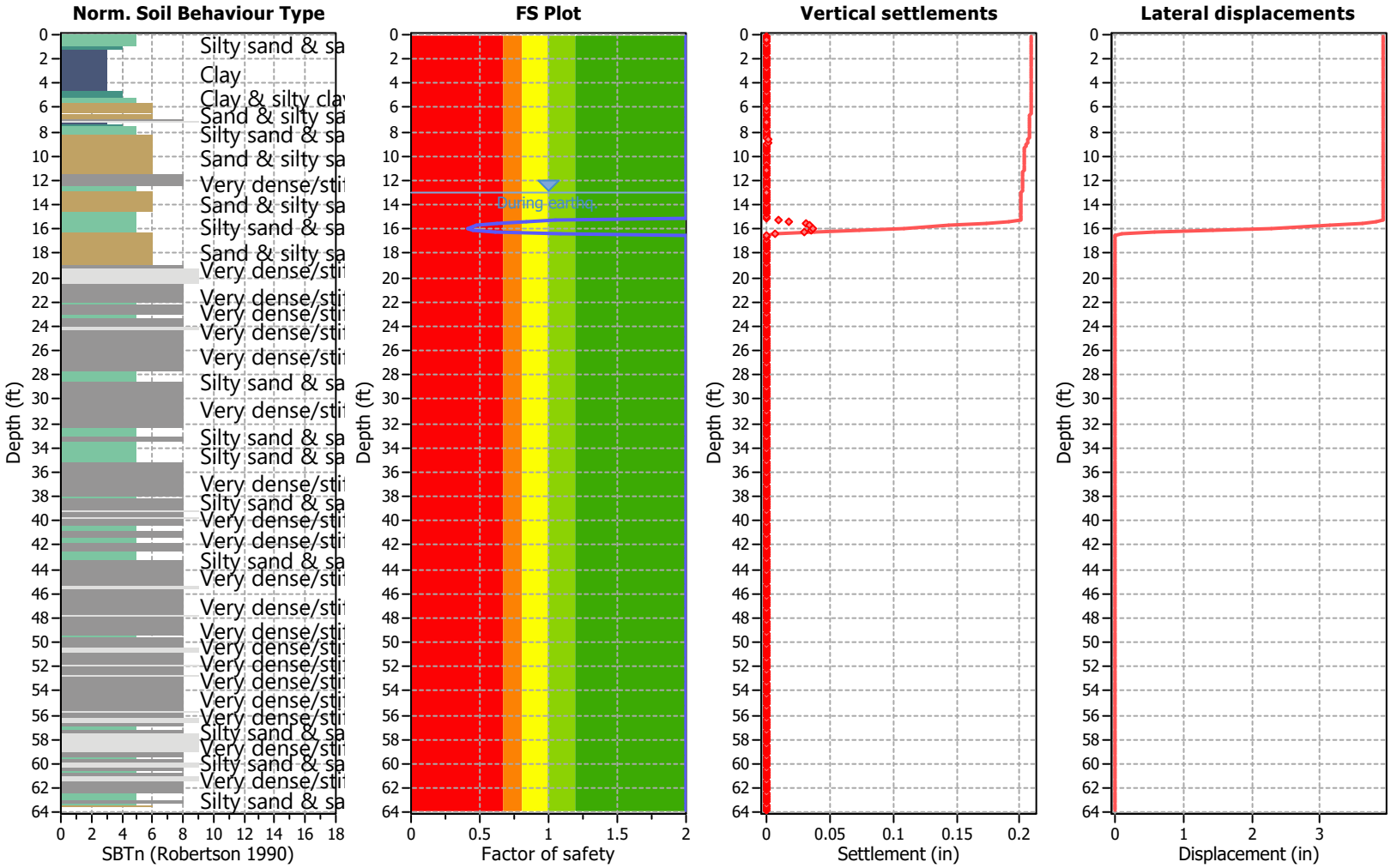
**Project:** 307035-001 KITP Housing Project
**Location:** Goleta, CA 93117

**CPT: CPT-19 (LIQ)**
Total depth: 63.81 ft




| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Analysis method: | NCEER (1998) | G.W.T. (in-situ): | 13.00 ft | Use fill: | No | Clay like behavior applied: | Sands only |
| Fines correction method: | NCEER (1998) | G.W.T. (earthq.): | 13.00 ft | Fill height: | N/A | Limit depth applied: | Yes |
| Points to test: | Based on Ic value | Average results interval: | 3 | Fill weight: | N/A | Limit depth: | 17.50 ft |
| Earthquake magnitude $M_w$: | 6.80 | Ic cut-off value: | 2.60 | Trans. detect. applied: | Yes | MSF method: | Method based |
| Peak ground acceleration: | 1.05 | Unit weight calculation: | Based on SBT | $K_\sigma$ applied: | Yes | | |

**:: Post-earthquake settlement of dry sands ::**

| Depth (ft) | Ic | $Q_{tn}$ | Kc | $Q_{tn,cs}$ | $N_{1,60}$ (blows) | $G_{max}$ (tsf) | CSR | Shear, γ (%) | $e_{vol(15)}$ (%) | $N_c$ | $e_v$ (%) | Settle. (in) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.16 | 2.36 | 44.64 | 2.20 | 98.04 | 24 | 499 | 0.69 | 0.002 | 0.00 | 9.34 | 0.00 | 0.000 |
| 0.33 | 2.12 | 82.51 | 1.45 | 119.40 | 26 | 676 | 0.69 | 0.003 | 0.00 | 9.34 | 0.00 | 0.000 |
| 0.49 | 2.02 | 112.74 | 1.32 | 149.34 | 31 | 815 | 0.69 | 0.003 | 0.00 | 9.34 | 0.00 | 0.000 |
| 0.66 | 2.02 | 117.99 | 1.32 | 156.01 | 0 | 0 | 0.69 | 0.000 | 0.00 | 0.00 | 0.00 | 0.000 |
| 0.82 | 2.12 | 98.96 | 1.45 | 143.74 | 0 | 0 | 0.69 | 0.000 | 0.00 | 0.00 | 0.00 | 0.000 |
| 0.98 | 2.26 | 84.04 | 1.77 | 148.97 | 0 | 0 | 0.69 | 0.000 | 0.00 | 0.00 | 0.00 | 0.000 |
| 1.15 | 2.43 | 72.17 | 2.53 | 182.48 | 0 | 0 | 0.69 | 0.000 | 0.00 | 0.00 | 0.00 | 0.000 |
| 1.31 | 2.57 | 64.02 | 3.53 | 226.04 | 0 | 0 | 0.69 | 0.000 | 0.00 | 0.00 | 0.00 | 0.000 |
| 1.48 | 2.67 | 57.98 | 4.42 | 256.32 | 0 | 0 | 0.69 | 0.000 | 0.00 | 0.00 | 0.00 | 0.000 |
| 1.64 | 2.72 | 54.11 | 4.94 | 267.27 | 0 | 0 | 0.69 | 0.000 | 0.00 | 0.00 | 0.00 | 0.000 |
| 1.80 | 2.76 | 50.33 | 5.42 | 272.94 | 0 | 0 | 0.69 | 0.000 | 0.00 | 0.00 | 0.00 | 0.000 |
| 1.97 | 2.80 | 47.13 | 5.87 | 276.84 | 0 | 0 | 0.69 | 0.000 | 0.00 | 0.00 | 0.00 | 0.000 |
| 2.13 | 2.83 | 44.11 | 6.28 | 277.06 | 0 | 0 | 0.69 | 0.000 | 0.00 | 0.00 | 0.00 | 0.000 |
| 2.30 | 2.85 | 42.08 | 6.46 | 271.84 | 0 | 0 | 0.69 | 0.000 | 0.00 | 0.00 | 0.00 | 0.000 |
| 2.46 | 2.86 | 39.96 | 6.65 | 265.80 | 0 | 0 | 0.69 | 0.000 | 0.00 | 0.00 | 0.00 | 0.000 |
| 2.62 | 2.87 | 38.13 | 6.84 | 260.73 | 0 | 0 | 0.69 | 0.000 | 0.00 | 0.00 | 0.00 | 0.000 |
| 2.79 | 2.88 | 36.40 | 6.99 | 254.29 | 0 | 0 | 0.69 | 0.000 | 0.00 | 0.00 | 0.00 | 0.000 |
| 2.95 | 2.88 | 35.37 | 6.95 | 245.96 | 0 | 0 | 0.69 | 0.000 | 0.00 | 0.00 | 0.00 | 0.000 |
| 3.12 | 2.88 | 34.42 | 6.95 | 239.22 | 0 | 0 | 0.69 | 0.000 | 0.00 | 0.00 | 0.00 | 0.000 |
| 3.28 | 2.89 | 33.48 | 7.03 | 235.42 | 0 | 0 | 0.69 | 0.000 | 0.00 | 0.00 | 0.00 | 0.000 |
| 3.44 | 2.87 | 33.18 | 6.85 | 227.13 | 0 | 0 | 0.69 | 0.000 | 0.00 | 0.00 | 0.00 | 0.000 |
| 3.61 | 2.84 | 33.28 | 6.38 | 212.28 | 0 | 0 | 0.69 | 0.000 | 0.00 | 0.00 | 0.00 | 0.000 |
| 3.77 | 2.80 | 33.85 | 5.90 | 199.60 | 0 | 0 | 0.69 | 0.000 | 0.00 | 0.00 | 0.00 | 0.000 |
| 3.94 | 2.80 | 33.95 | 5.88 | 199.50 | 0 | 0 | 0.69 | 0.000 | 0.00 | 0.00 | 0.00 | 0.000 |
| 4.10 | 2.80 | 35.59 | 5.90 | 209.93 | 0 | 0 | 0.69 | 0.000 | 0.00 | 0.00 | 0.00 | 0.000 |
| 4.27 | 2.77 | 39.70 | 5.51 | 218.92 | 0 | 0 | 0.69 | 0.000 | 0.00 | 0.00 | 0.00 | 0.000 |
| 4.43 | 2.73 | 44.36 | 4.98 | 221.05 | 0 | 0 | 0.68 | 0.000 | 0.00 | 0.00 | 0.00 | 0.000 |
| 4.59 | 2.68 | 47.25 | 4.50 | 212.70 | 0 | 0 | 0.68 | 0.000 | 0.00 | 0.00 | 0.00 | 0.000 |
| 4.76 | 2.64 | 47.07 | 4.14 | 194.87 | 0 | 0 | 0.68 | 0.000 | 0.00 | 0.00 | 0.00 | 0.000 |
| 4.92 | 2.60 | 47.92 | 3.73 | 178.86 | 0 | 0 | 0.68 | 0.000 | 0.00 | 0.00 | 0.00 | 0.000 |
| 5.09 | 2.54 | 52.76 | 3.30 | 174.05 | 0 | 0 | 0.68 | 0.000 | 0.00 | 0.00 | 0.00 | 0.000 |
| 5.25 | 2.50 | 60.86 | 2.98 | 181.43 | 0 | 0 | 0.68 | 0.000 | 0.00 | 0.00 | 0.00 | 0.000 |
| 5.41 | 2.34 | 82.11 | 2.10 | 172.78 | 0 | 0 | 0.68 | 0.000 | 0.00 | 0.00 | 0.00 | 0.000 |
| 5.58 | 2.12 | 122.22 | 1.45 | 176.84 | 0 | 0 | 0.68 | 0.000 | 0.00 | 0.00 | 0.00 | 0.000 |
| 5.74 | 1.92 | 174.09 | 1.25 | 218.11 | 0 | 0 | 0.68 | 0.000 | 0.00 | 0.00 | 0.00 | 0.000 |
| 5.91 | 1.82 | 221.67 | 1.18 | 260.61 | 0 | 0 | 0.68 | 0.000 | 0.00 | 0.00 | 0.00 | 0.000 |
| 6.07 | 1.79 | 251.59 | 1.14 | 286.35 | 55 | 1355 | 0.68 | 0.037 | 0.01 | 9.34 | 0.01 | 0.000 |
| 6.23 | 1.76 | 276.11 | 1.10 | 304.49 | 58 | 1439 | 0.68 | 0.034 | 0.01 | 9.34 | 0.01 | 0.000 |
| 6.40 | 1.68 | 296.14 | 1.00 | 296.14 | 55 | 1431 | 0.68 | 0.036 | 0.01 | 9.34 | 0.01 | 0.000 |
| 6.56 | 1.67 | 308.44 | 1.00 | 308.44 | 57 | 1487 | 0.68 | 0.034 | 0.01 | 9.34 | 0.01 | 0.000 |
| 6.73 | 1.73 | 308.88 | 1.06 | 326.25 | 62 | 1613 | 0.68 | 0.030 | 0.01 | 9.34 | 0.01 | 0.000 |
| 6.89 | 1.89 | 274.16 | 1.23 | 336.78 | 67 | 1691 | 0.68 | 0.028 | 0.01 | 9.34 | 0.01 | 0.000 |
| 7.05 | 2.14 | 174.16 | 1.49 | 258.83 | 57 | 1468 | 0.68 | 0.039 | 0.01 | 9.34 | 0.01 | 0.000 |
| 7.22 | 2.47 | 80.03 | 2.77 | 221.63 | 56 | 1021 | 0.68 | 0.112 | 0.03 | 9.34 | 0.03 | 0.001 |
| 7.38 | 3.14 | 20.42 | 11.42 | 233.21 | 0 | 0 | 0.68 | 0.000 | 0.00 | 0.00 | 0.00 | 0.000 |
| 7.55 | 2.53 | 53.66 | 3.17 | 170.22 | 0 | 0 | 0.68 | 0.000 | 0.00 | 0.00 | 0.00 | 0.000 |
| 7.71 | 2.25 | 105.27 | 1.74 | 183.22 | 0 | 0 | 0.68 | 0.000 | 0.00 | 0.00 | 0.00 | 0.000 |
| 7.87 | 2.10 | 149.72 | 1.43 | 213.45 | 0 | 0 | 0.68 | 0.000 | 0.00 | 0.00 | 0.00 | 0.000 |

**:: Post-earthquake settlement of dry sands :: (continued)**

| Depth (ft) | Ic | $Q_{tn}$ | Kc | $Q_{tn,cs}$ | $N_{1,60}$ (blows) | $G_{max}$ (tsf) | CSR | Shear, γ (%) | $e_{vol(15)}$ (%) | $N_c$ | $e_v$ (%) | Settle. (in) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 8.04 | 2.06 | 166.51 | 1.36 | 226.98 | 0 | 0 | 0.68 | 0.000 | 0.00 | 0.00 | 0.00 | 0.000 |
| 8.20 | 2.00 | 172.17 | 1.31 | 225.67 | 0 | 0 | 0.68 | 0.000 | 0.00 | 0.00 | 0.00 | 0.000 |
| 8.37 | 1.96 | 169.26 | 1.28 | 215.94 | 0 | 0 | 0.68 | 0.000 | 0.00 | 0.00 | 0.00 | 0.000 |
| 8.53 | 1.93 | 159.47 | 1.26 | 200.68 | 41 | 1170 | 0.68 | 0.099 | 0.04 | 9.34 | 0.03 | 0.001 |
| 8.69 | 1.95 | 147.27 | 1.27 | 186.72 | 38 | 1109 | 0.68 | 0.122 | 0.06 | 9.34 | 0.05 | 0.001 |
| 8.86 | 1.94 | 152.69 | 1.26 | 192.96 | 39 | 1155 | 0.68 | 0.111 | 0.05 | 9.34 | 0.04 | 0.001 |
| 9.02 | 1.90 | 177.23 | 1.24 | 219.17 | 44 | 1297 | 0.68 | 0.081 | 0.03 | 9.34 | 0.03 | 0.000 |
| 9.19 | 1.84 | 215.74 | 1.19 | 256.68 | 50 | 1492 | 0.68 | 0.057 | 0.02 | 9.34 | 0.02 | 0.000 |
| 9.35 | 1.80 | 256.45 | 1.15 | 294.27 | 57 | 1713 | 0.68 | 0.043 | 0.01 | 9.34 | 0.01 | 0.000 |
| 9.51 | 1.77 | 294.72 | 1.12 | 329.65 | 63 | 1939 | 0.68 | 0.035 | 0.01 | 9.34 | 0.01 | 0.000 |
| 9.68 | 1.77 | 324.53 | 1.12 | 363.94 | 70 | 2162 | 0.68 | 0.029 | 0.01 | 9.34 | 0.01 | 0.000 |
| 9.84 | 1.78 | 343.22 | 1.12 | 385.61 | 74 | 2313 | 0.68 | 0.027 | 0.01 | 9.34 | 0.00 | 0.000 |
| 10.01 | 1.79 | 346.70 | 1.14 | 393.77 | 76 | 2384 | 0.68 | 0.026 | 0.01 | 9.34 | 0.00 | 0.000 |
| 10.17 | 1.79 | 342.72 | 1.14 | 390.91 | 75 | 2390 | 0.68 | 0.026 | 0.01 | 9.34 | 0.00 | 0.000 |
| 10.33 | 1.80 | 334.04 | 1.15 | 384.65 | 74 | 2376 | 0.68 | 0.027 | 0.01 | 9.34 | 0.00 | 0.000 |
| 10.50 | 1.81 | 325.25 | 1.17 | 378.95 | 74 | 2368 | 0.68 | 0.028 | 0.01 | 9.34 | 0.00 | 0.000 |
| 10.66 | 1.82 | 314.80 | 1.18 | 370.92 | 72 | 2349 | 0.68 | 0.029 | 0.01 | 9.34 | 0.01 | 0.000 |
| 10.83 | 1.80 | 302.15 | 1.15 | 346.67 | 67 | 2200 | 0.68 | 0.033 | 0.01 | 9.34 | 0.01 | 0.000 |
| 10.99 | 1.77 | 291.00 | 1.11 | 323.17 | 62 | 2070 | 0.67 | 0.038 | 0.01 | 9.34 | 0.01 | 0.000 |
| 11.15 | 1.77 | 276.93 | 1.11 | 308.30 | 59 | 1991 | 0.67 | 0.042 | 0.01 | 9.34 | 0.01 | 0.000 |
| 11.32 | 1.83 | 269.74 | 1.18 | 319.62 | 62 | 2102 | 0.67 | 0.038 | 0.01 | 9.34 | 0.01 | 0.000 |
| 11.48 | 1.88 | 264.51 | 1.23 | 324.47 | 65 | 2211 | 0.67 | 0.036 | 0.01 | 9.34 | 0.01 | 0.000 |
| 11.65 | 1.92 | 265.83 | 1.25 | 332.11 | 67 | 2331 | 0.67 | 0.033 | 0.01 | 9.34 | 0.01 | 0.000 |
| 11.81 | 1.95 | 267.21 | 1.27 | 338.78 | 69 | 2442 | 0.67 | 0.031 | 0.01 | 9.34 | 0.01 | 0.000 |
| 11.98 | 1.97 | 267.86 | 1.28 | 343.90 | 71 | 2537 | 0.67 | 0.030 | 0.01 | 9.34 | 0.01 | 0.000 |
| 12.14 | 1.98 | 263.18 | 1.29 | 340.08 | 70 | 2548 | 0.67 | 0.030 | 0.01 | 9.34 | 0.01 | 0.000 |
| 12.30 | 1.99 | 250.38 | 1.30 | 324.86 | 67 | 2465 | 0.67 | 0.032 | 0.01 | 9.34 | 0.01 | 0.000 |
| 12.47 | 1.99 | 232.28 | 1.30 | 302.09 | 63 | 2317 | 0.67 | 0.037 | 0.01 | 9.34 | 0.01 | 0.000 |
| 12.63 | 2.00 | 213.44 | 1.31 | 278.69 | 58 | 2163 | 0.67 | 0.043 | 0.01 | 9.34 | 0.01 | 0.000 |
| 12.80 | 1.99 | 196.08 | 1.30 | 254.64 | 53 | 1983 | 0.67 | 0.052 | 0.02 | 9.34 | 0.01 | 0.000 |
| 12.96 | 1.92 | 184.49 | 1.25 | 230.82 | 47 | 1734 | 0.67 | 0.072 | 0.03 | 9.34 | 0.02 | 0.000 |

**Total estimated settlement: 0.01**

**Abbreviations**

$Q_{tn}$: Equivalent clean sand normalized cone resistance
$K_c$: Fines correction factor
$Q_{tn,cs}$: Post-liquefaction volumentric strain
$G_{max}$: Small strain shear modulus
CSR: Soil cyclic stress ratio
γ: Cyclic shear strain
$e_{vol(15)}$: Volumetric strain after 15 cycles
$N_c$: Equivalent number of cycles
$e_v$: Volumetric strain
Settle.: Calculated settlement

**:: Post-earthquake settlement due to soil liquefaction ::**

| Depth (ft) | $Q_{tn,cs}$ | FS | $e_v$ (%) | DF | Settlement (in) | Depth (ft) | $Q_{tn,cs}$ | FS | $e_v$ (%) | DF | Settlement (in) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 13.12 | 212.53 | 2.00 | 0.00 | 1.00 | 0.00 | 13.29 | 200.81 | 2.00 | 0.00 | 1.00 | 0.00 |
| 13.45 | 207.25 | 2.00 | 0.00 | 1.00 | 0.00 | 13.62 | 212.23 | 2.00 | 0.00 | 1.00 | 0.00 |
| 13.78 | 224.38 | 2.00 | 0.00 | 1.00 | 0.00 | 13.94 | 242.50 | 2.00 | 0.00 | 1.00 | 0.00 |
| 14.11 | 252.64 | 2.00 | 0.00 | 1.00 | 0.00 | 14.27 | 252.09 | 2.00 | 0.00 | 1.00 | 0.00 |

**:: Post-earthquake settlement due to soil liquefaction :: (continued)**

| Depth (ft) | $Q_{tn,cs}$ | FS | $e_v$ (%) | DF | Settlement (in) | Depth (ft) | $Q_{tn,cs}$ | FS | $e_v$ (%) | DF | Settlement (in) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 14.44 | 243.88 | 2.00 | 0.00 | 1.00 | 0.00 | 14.60 | 235.71 | 2.00 | 0.00 | 1.00 | 0.00 |
| 14.76 | 225.94 | 2.00 | 0.00 | 1.00 | 0.00 | 14.93 | 216.51 | 2.00 | 0.00 | 1.00 | 0.00 |
| 15.09 | 205.73 | 2.00 | 0.00 | 1.00 | 0.00 | 15.26 | 193.34 | 1.04 | 0.48 | 1.00 | 0.01 |
| 15.42 | 177.73 | 0.83 | 0.88 | 1.00 | 0.02 | 15.58 | 158.77 | 0.62 | 1.55 | 1.00 | 0.03 |
| 15.75 | 142.07 | 0.48 | 1.75 | 1.00 | 0.03 | 15.91 | 133.17 | 0.41 | 1.85 | 1.00 | 0.04 |
| 16.08 | 138.46 | 0.44 | 1.79 | 1.00 | 0.04 | 16.24 | 159.04 | 0.61 | 1.55 | 1.00 | 0.03 |
| 16.40 | 198.83 | 1.09 | 0.35 | 1.00 | 0.01 | 16.57 | 243.69 | 2.00 | 0.00 | 1.00 | 0.00 |
| 16.73 | 280.45 | 2.00 | 0.00 | 1.00 | 0.00 | 16.90 | 300.74 | 2.00 | 0.00 | 1.00 | 0.00 |
| 17.06 | 306.37 | 2.00 | 0.00 | 1.00 | 0.00 | 17.22 | 308.01 | 2.00 | 0.00 | 1.00 | 0.00 |
| 17.39 | 313.51 | 2.00 | 0.00 | 1.00 | 0.00 | 17.55 | 331.02 | 2.00 | 0.00 | 1.00 | 0.00 |
| 17.72 | 353.78 | 2.00 | 0.00 | 1.00 | 0.00 | 17.88 | 361.15 | 2.00 | 0.00 | 1.00 | 0.00 |
| 18.04 | 336.97 | 2.00 | 0.00 | 1.00 | 0.00 | 18.21 | 306.14 | 2.00 | 0.00 | 1.00 | 0.00 |
| 18.37 | 285.99 | 2.00 | 0.00 | 1.00 | 0.00 | 18.54 | 265.04 | 2.00 | 0.00 | 1.00 | 0.00 |
| 18.70 | 251.32 | 2.00 | 0.00 | 1.00 | 0.00 | 18.86 | 254.29 | 2.00 | 0.00 | 1.00 | 0.00 |
| 19.03 | 260.08 | 2.00 | 0.00 | 1.00 | 0.00 | 19.19 | 268.23 | 2.00 | 0.00 | 1.00 | 0.00 |
| 19.36 | 275.34 | 2.00 | 0.00 | 1.00 | 0.00 | 19.52 | 273.81 | 2.00 | 0.00 | 1.00 | 0.00 |
| 19.69 | 267.23 | 2.00 | 0.00 | 1.00 | 0.00 | 19.85 | 269.27 | 2.00 | 0.00 | 1.00 | 0.00 |
| 20.01 | 277.76 | 2.00 | 0.00 | 1.00 | 0.00 | 20.18 | 284.62 | 2.00 | 0.00 | 1.00 | 0.00 |
| 20.34 | 286.88 | 2.00 | 0.00 | 1.00 | 0.00 | 20.51 | 288.00 | 2.00 | 0.00 | 1.00 | 0.00 |
| 20.67 | 277.44 | 2.00 | 0.00 | 1.00 | 0.00 | 20.83 | 268.53 | 2.00 | 0.00 | 1.00 | 0.00 |
| 21.00 | 270.00 | 2.00 | 0.00 | 1.00 | 0.00 | 21.16 | 280.62 | 2.00 | 0.00 | 1.00 | 0.00 |
| 21.33 | 285.14 | 2.00 | 0.00 | 1.00 | 0.00 | 21.49 | 276.09 | 2.00 | 0.00 | 1.00 | 0.00 |
| 21.65 | 263.45 | 2.00 | 0.00 | 1.00 | 0.00 | 21.82 | 247.91 | 2.00 | 0.00 | 1.00 | 0.00 |
| 21.98 | 229.42 | 2.00 | 0.00 | 1.00 | 0.00 | 22.15 | 215.41 | 2.00 | 0.00 | 1.00 | 0.00 |
| 22.31 | 220.02 | 2.00 | 0.00 | 1.00 | 0.00 | 22.47 | 239.40 | 2.00 | 0.00 | 1.00 | 0.00 |
| 22.64 | 254.10 | 2.00 | 0.00 | 1.00 | 0.00 | 22.80 | 251.61 | 2.00 | 0.00 | 1.00 | 0.00 |
| 22.97 | 231.65 | 2.00 | 0.00 | 1.00 | 0.00 | 23.13 | 220.18 | 2.00 | 0.00 | 1.00 | 0.00 |
| 23.29 | 218.73 | 2.00 | 0.00 | 1.00 | 0.00 | 23.46 | 229.07 | 2.00 | 0.00 | 1.00 | 0.00 |
| 23.62 | 237.38 | 2.00 | 0.00 | 1.00 | 0.00 | 23.79 | 247.48 | 2.00 | 0.00 | 1.00 | 0.00 |
| 23.95 | 259.27 | 2.00 | 0.00 | 1.00 | 0.00 | 24.11 | 265.42 | 2.00 | 0.00 | 1.00 | 0.00 |
| 24.28 | 265.72 | 2.00 | 0.00 | 1.00 | 0.00 | 24.44 | 256.57 | 2.00 | 0.00 | 1.00 | 0.00 |
| 24.61 | 244.69 | 2.00 | 0.00 | 1.00 | 0.00 | 24.77 | 234.84 | 2.00 | 0.00 | 1.00 | 0.00 |
| 24.93 | 229.79 | 2.00 | 0.00 | 1.00 | 0.00 | 25.10 | 228.73 | 2.00 | 0.00 | 1.00 | 0.00 |
| 25.26 | 225.73 | 2.00 | 0.00 | 1.00 | 0.00 | 25.43 | 235.13 | 2.00 | 0.00 | 1.00 | 0.00 |
| 25.59 | 247.81 | 2.00 | 0.00 | 1.00 | 0.00 | 25.75 | 264.70 | 2.00 | 0.00 | 1.00 | 0.00 |
| 25.92 | 267.74 | 2.00 | 0.00 | 1.00 | 0.00 | 26.08 | 265.21 | 2.00 | 0.00 | 1.00 | 0.00 |
| 26.25 | 260.90 | 2.00 | 0.00 | 1.00 | 0.00 | 26.41 | 259.49 | 2.00 | 0.00 | 1.00 | 0.00 |
| 26.57 | 259.74 | 2.00 | 0.00 | 1.00 | 0.00 | 26.74 | 258.71 | 2.00 | 0.00 | 1.00 | 0.00 |
| 26.90 | 254.80 | 2.00 | 0.00 | 1.00 | 0.00 | 27.07 | 246.46 | 2.00 | 0.00 | 1.00 | 0.00 |
| 27.23 | 237.36 | 2.00 | 0.00 | 1.00 | 0.00 | 27.40 | 229.47 | 2.00 | 0.00 | 1.00 | 0.00 |
| 27.56 | 221.12 | 2.00 | 0.00 | 1.00 | 0.00 | 27.72 | 212.19 | 2.00 | 0.00 | 1.00 | 0.00 |
| 27.89 | 201.03 | 2.00 | 0.00 | 1.00 | 0.00 | 28.05 | 189.84 | 2.00 | 0.00 | 1.00 | 0.00 |
| 28.22 | 190.55 | 2.00 | 0.00 | 1.00 | 0.00 | 28.38 | 198.37 | 2.00 | 0.00 | 1.00 | 0.00 |
| 28.54 | 210.75 | 2.00 | 0.00 | 1.00 | 0.00 | 28.71 | 215.02 | 2.00 | 0.00 | 1.00 | 0.00 |
| 28.87 | 217.44 | 2.00 | 0.00 | 1.00 | 0.00 | 29.04 | 220.76 | 2.00 | 0.00 | 1.00 | 0.00 |
| 29.20 | 225.15 | 2.00 | 0.00 | 1.00 | 0.00 | 29.36 | 229.27 | 2.00 | 0.00 | 1.00 | 0.00 |
| 29.53 | 233.86 | 2.00 | 0.00 | 1.00 | 0.00 | 29.69 | 241.55 | 2.00 | 0.00 | 1.00 | 0.00 |
| 29.86 | 251.66 | 2.00 | 0.00 | 1.00 | 0.00 | 30.02 | 259.26 | 2.00 | 0.00 | 1.00 | 0.00 |

**:: Post-earthquake settlement due to soil liquefaction :: (continued)**

| Depth (ft) | $Q_{tn,cs}$ | FS | $e_v$ (%) | DF | Settlement (in) | Depth (ft) | $Q_{tn,cs}$ | FS | $e_v$ (%) | DF | Settlement (in) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 30.18 | 259.07 | 2.00 | 0.00 | 1.00 | 0.00 | 30.35 | 250.63 | 2.00 | 0.00 | 1.00 | 0.00 |
| 30.51 | 238.49 | 2.00 | 0.00 | 1.00 | 0.00 | 30.68 | 227.17 | 2.00 | 0.00 | 1.00 | 0.00 |
| 30.84 | 218.90 | 2.00 | 0.00 | 1.00 | 0.00 | 31.00 | 219.80 | 2.00 | 0.00 | 1.00 | 0.00 |
| 31.17 | 224.48 | 2.00 | 0.00 | 1.00 | 0.00 | 31.33 | 227.87 | 2.00 | 0.00 | 1.00 | 0.00 |
| 31.50 | 222.20 | 2.00 | 0.00 | 1.00 | 0.00 | 31.66 | 216.29 | 2.00 | 0.00 | 1.00 | 0.00 |
| 31.82 | 215.80 | 2.00 | 0.00 | 1.00 | 0.00 | 31.99 | 223.62 | 2.00 | 0.00 | 1.00 | 0.00 |
| 32.15 | 226.48 | 2.00 | 0.00 | 1.00 | 0.00 | 32.32 | 223.86 | 2.00 | 0.00 | 1.00 | 0.00 |
| 32.48 | 212.63 | 2.00 | 0.00 | 1.00 | 0.00 | 32.64 | 205.00 | 2.00 | 0.00 | 1.00 | 0.00 |
| 32.81 | 200.96 | 2.00 | 0.00 | 1.00 | 0.00 | 32.97 | 205.39 | 2.00 | 0.00 | 1.00 | 0.00 |
| 33.14 | 212.57 | 2.00 | 0.00 | 1.00 | 0.00 | 33.30 | 216.62 | 2.00 | 0.00 | 1.00 | 0.00 |
| 33.46 | 214.41 | 2.00 | 0.00 | 1.00 | 0.00 | 33.63 | 204.31 | 2.00 | 0.00 | 1.00 | 0.00 |
| 33.79 | 184.01 | 2.00 | 0.00 | 1.00 | 0.00 | 33.96 | 176.42 | 2.00 | 0.00 | 1.00 | 0.00 |
| 34.12 | 178.34 | 2.00 | 0.00 | 1.00 | 0.00 | 34.28 | 194.92 | 2.00 | 0.00 | 1.00 | 0.00 |
| 34.45 | 203.27 | 2.00 | 0.00 | 1.00 | 0.00 | 34.61 | 205.09 | 2.00 | 0.00 | 1.00 | 0.00 |
| 34.78 | 204.37 | 2.00 | 0.00 | 1.00 | 0.00 | 34.94 | 206.29 | 2.00 | 0.00 | 1.00 | 0.00 |
| 35.10 | 212.60 | 2.00 | 0.00 | 1.00 | 0.00 | 35.27 | 222.78 | 2.00 | 0.00 | 1.00 | 0.00 |
| 35.43 | 234.04 | 2.00 | 0.00 | 1.00 | 0.00 | 35.60 | 239.29 | 2.00 | 0.00 | 1.00 | 0.00 |
| 35.76 | 236.17 | 2.00 | 0.00 | 1.00 | 0.00 | 35.93 | 239.55 | 2.00 | 0.00 | 1.00 | 0.00 |
| 36.09 | 244.79 | 2.00 | 0.00 | 1.00 | 0.00 | 36.25 | 251.77 | 2.00 | 0.00 | 1.00 | 0.00 |
| 36.42 | 249.10 | 2.00 | 0.00 | 1.00 | 0.00 | 36.58 | 251.38 | 2.00 | 0.00 | 1.00 | 0.00 |
| 36.75 | 258.22 | 2.00 | 0.00 | 1.00 | 0.00 | 36.91 | 263.68 | 2.00 | 0.00 | 1.00 | 0.00 |
| 37.07 | 263.34 | 2.00 | 0.00 | 1.00 | 0.00 | 37.24 | 257.30 | 2.00 | 0.00 | 1.00 | 0.00 |
| 37.40 | 246.33 | 2.00 | 0.00 | 1.00 | 0.00 | 37.57 | 236.60 | 2.00 | 0.00 | 1.00 | 0.00 |
| 37.73 | 234.09 | 2.00 | 0.00 | 1.00 | 0.00 | 37.89 | 227.25 | 2.00 | 0.00 | 1.00 | 0.00 |
| 38.06 | 222.14 | 2.00 | 0.00 | 1.00 | 0.00 | 38.22 | 218.32 | 2.00 | 0.00 | 1.00 | 0.00 |
| 38.39 | 229.62 | 2.00 | 0.00 | 1.00 | 0.00 | 38.55 | 236.19 | 2.00 | 0.00 | 1.00 | 0.00 |
| 38.71 | 236.51 | 2.00 | 0.00 | 1.00 | 0.00 | 38.88 | 240.61 | 2.00 | 0.00 | 1.00 | 0.00 |
| 39.04 | 250.02 | 2.00 | 0.00 | 1.00 | 0.00 | 39.21 | 259.70 | 2.00 | 0.00 | 1.00 | 0.00 |
| 39.37 | 264.83 | 2.00 | 0.00 | 1.00 | 0.00 | 39.53 | 267.24 | 2.00 | 0.00 | 1.00 | 0.00 |
| 39.70 | 269.49 | 2.00 | 0.00 | 1.00 | 0.00 | 39.86 | 270.15 | 2.00 | 0.00 | 1.00 | 0.00 |
| 40.03 | 265.61 | 2.00 | 0.00 | 1.00 | 0.00 | 40.19 | 250.26 | 2.00 | 0.00 | 1.00 | 0.00 |
| 40.35 | 227.07 | 2.00 | 0.00 | 1.00 | 0.00 | 40.52 | 205.38 | 2.00 | 0.00 | 1.00 | 0.00 |
| 40.68 | 196.13 | 2.00 | 0.00 | 1.00 | 0.00 | 40.85 | 203.76 | 2.00 | 0.00 | 1.00 | 0.00 |
| 41.01 | 215.58 | 2.00 | 0.00 | 1.00 | 0.00 | 41.17 | 220.00 | 2.00 | 0.00 | 1.00 | 0.00 |
| 41.34 | 212.05 | 2.00 | 0.00 | 1.00 | 0.00 | 41.50 | 202.35 | 2.00 | 0.00 | 1.00 | 0.00 |
| 41.67 | 198.56 | 2.00 | 0.00 | 1.00 | 0.00 | 41.83 | 202.55 | 2.00 | 0.00 | 1.00 | 0.00 |
| 41.99 | 212.15 | 2.00 | 0.00 | 1.00 | 0.00 | 42.16 | 221.21 | 2.00 | 0.00 | 1.00 | 0.00 |
| 42.32 | 222.87 | 2.00 | 0.00 | 1.00 | 0.00 | 42.49 | 216.32 | 2.00 | 0.00 | 1.00 | 0.00 |
| 42.65 | 208.29 | 2.00 | 0.00 | 1.00 | 0.00 | 42.81 | 203.65 | 2.00 | 0.00 | 1.00 | 0.00 |
| 42.98 | 202.37 | 2.00 | 0.00 | 1.00 | 0.00 | 43.14 | 203.70 | 2.00 | 0.00 | 1.00 | 0.00 |
| 43.31 | 221.09 | 2.00 | 0.00 | 1.00 | 0.00 | 43.47 | 242.25 | 2.00 | 0.00 | 1.00 | 0.00 |
| 43.64 | 255.72 | 2.00 | 0.00 | 1.00 | 0.00 | 43.80 | 249.25 | 2.00 | 0.00 | 1.00 | 0.00 |
| 43.96 | 237.01 | 2.00 | 0.00 | 1.00 | 0.00 | 44.13 | 229.93 | 2.00 | 0.00 | 1.00 | 0.00 |
| 44.29 | 228.52 | 2.00 | 0.00 | 1.00 | 0.00 | 44.46 | 231.84 | 2.00 | 0.00 | 1.00 | 0.00 |
| 44.62 | 234.15 | 2.00 | 0.00 | 1.00 | 0.00 | 44.78 | 236.28 | 2.00 | 0.00 | 1.00 | 0.00 |
| 44.95 | 238.29 | 2.00 | 0.00 | 1.00 | 0.00 | 45.11 | 240.83 | 2.00 | 0.00 | 1.00 | 0.00 |
| 45.28 | 244.99 | 2.00 | 0.00 | 1.00 | 0.00 | 45.44 | 261.27 | 2.00 | 0.00 | 1.00 | 0.00 |
| 45.60 | 275.50 | 2.00 | 0.00 | 1.00 | 0.00 | 45.77 | 260.90 | 2.00 | 0.00 | 1.00 | 0.00 |

**:: Post-earthquake settlement due to soil liquefaction :: (continued)**

| Depth (ft) | $Q_{tn,cs}$ | FS | $e_v$ (%) | DF | Settlement (in) | Depth (ft) | $Q_{tn,cs}$ | FS | $e_v$ (%) | DF | Settlement (in) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 45.93 | 253.51 | 2.00 | 0.00 | 1.00 | 0.00 | 46.10 | 243.09 | 2.00 | 0.00 | 1.00 | 0.00 |
| 46.26 | 249.52 | 2.00 | 0.00 | 1.00 | 0.00 | 46.42 | 248.60 | 2.00 | 0.00 | 1.00 | 0.00 |
| 46.59 | 245.43 | 2.00 | 0.00 | 1.00 | 0.00 | 46.75 | 248.71 | 2.00 | 0.00 | 1.00 | 0.00 |
| 46.92 | 250.52 | 2.00 | 0.00 | 1.00 | 0.00 | 47.08 | 247.61 | 2.00 | 0.00 | 1.00 | 0.00 |
| 47.24 | 236.19 | 2.00 | 0.00 | 1.00 | 0.00 | 47.41 | 223.39 | 2.00 | 0.00 | 1.00 | 0.00 |
| 47.57 | 227.16 | 2.00 | 0.00 | 1.00 | 0.00 | 47.74 | 246.50 | 2.00 | 0.00 | 1.00 | 0.00 |
| 47.90 | 265.88 | 2.00 | 0.00 | 1.00 | 0.00 | 48.06 | 267.17 | 2.00 | 0.00 | 1.00 | 0.00 |
| 48.23 | 259.11 | 2.00 | 0.00 | 1.00 | 0.00 | 48.39 | 254.39 | 2.00 | 0.00 | 1.00 | 0.00 |
| 48.56 | 254.03 | 2.00 | 0.00 | 1.00 | 0.00 | 48.72 | 254.79 | 2.00 | 0.00 | 1.00 | 0.00 |
| 48.88 | 252.77 | 2.00 | 0.00 | 1.00 | 0.00 | 49.05 | 253.52 | 2.00 | 0.00 | 1.00 | 0.00 |
| 49.21 | 233.70 | 2.00 | 0.00 | 1.00 | 0.00 | 49.38 | 229.95 | 2.00 | 0.00 | 1.00 | 0.00 |
| 49.54 | 225.41 | 2.00 | 0.00 | 1.00 | 0.00 | 49.70 | 240.14 | 2.00 | 0.00 | 1.00 | 0.00 |
| 49.87 | 241.82 | 2.00 | 0.00 | 1.00 | 0.00 | 50.03 | 242.39 | 2.00 | 0.00 | 1.00 | 0.00 |
| 50.20 | 237.50 | 2.00 | 0.00 | 1.00 | 0.00 | 50.36 | 236.05 | 2.00 | 0.00 | 1.00 | 0.00 |
| 50.52 | 240.48 | 2.00 | 0.00 | 1.00 | 0.00 | 50.69 | 258.76 | 2.00 | 0.00 | 1.00 | 0.00 |
| 50.85 | 277.81 | 2.00 | 0.00 | 1.00 | 0.00 | 51.02 | 286.82 | 2.00 | 0.00 | 1.00 | 0.00 |
| 51.18 | 269.56 | 2.00 | 0.00 | 1.00 | 0.00 | 51.35 | 253.48 | 2.00 | 0.00 | 1.00 | 0.00 |
| 51.51 | 246.35 | 2.00 | 0.00 | 1.00 | 0.00 | 51.67 | 259.16 | 2.00 | 0.00 | 1.00 | 0.00 |
| 51.84 | 263.09 | 2.00 | 0.00 | 1.00 | 0.00 | 52.00 | 264.35 | 2.00 | 0.00 | 1.00 | 0.00 |
| 52.17 | 262.70 | 2.00 | 0.00 | 1.00 | 0.00 | 52.33 | 259.89 | 2.00 | 0.00 | 1.00 | 0.00 |
| 52.49 | 264.20 | 2.00 | 0.00 | 1.00 | 0.00 | 52.66 | 274.63 | 2.00 | 0.00 | 1.00 | 0.00 |
| 52.82 | 283.24 | 2.00 | 0.00 | 1.00 | 0.00 | 52.99 | 283.99 | 2.00 | 0.00 | 1.00 | 0.00 |
| 53.15 | 275.16 | 2.00 | 0.00 | 1.00 | 0.00 | 53.31 | 252.65 | 2.00 | 0.00 | 1.00 | 0.00 |
| 53.48 | 237.51 | 2.00 | 0.00 | 1.00 | 0.00 | 53.64 | 239.00 | 2.00 | 0.00 | 1.00 | 0.00 |
| 53.81 | 268.99 | 2.00 | 0.00 | 1.00 | 0.00 | 53.97 | 292.22 | 2.00 | 0.00 | 1.00 | 0.00 |
| 54.13 | 283.40 | 2.00 | 0.00 | 1.00 | 0.00 | 54.30 | 253.16 | 2.00 | 0.00 | 1.00 | 0.00 |
| 54.46 | 230.74 | 2.00 | 0.00 | 1.00 | 0.00 | 54.63 | 234.29 | 2.00 | 0.00 | 1.00 | 0.00 |
| 54.79 | 237.64 | 2.00 | 0.00 | 1.00 | 0.00 | 54.95 | 237.91 | 2.00 | 0.00 | 1.00 | 0.00 |
| 55.12 | 242.48 | 2.00 | 0.00 | 1.00 | 0.00 | 55.28 | 264.74 | 2.00 | 0.00 | 1.00 | 0.00 |
| 55.45 | 279.78 | 2.00 | 0.00 | 1.00 | 0.00 | 55.61 | 283.01 | 2.00 | 0.00 | 1.00 | 0.00 |
| 55.77 | 271.95 | 2.00 | 0.00 | 1.00 | 0.00 | 55.94 | 254.25 | 2.00 | 0.00 | 1.00 | 0.00 |
| 56.10 | 230.44 | 2.00 | 0.00 | 1.00 | 0.00 | 56.27 | 229.36 | 2.00 | 0.00 | 1.00 | 0.00 |
| 56.43 | 237.98 | 2.00 | 0.00 | 1.00 | 0.00 | 56.59 | 255.58 | 2.00 | 0.00 | 1.00 | 0.00 |
| 56.76 | 252.54 | 2.00 | 0.00 | 1.00 | 0.00 | 56.92 | 228.54 | 2.00 | 0.00 | 1.00 | 0.00 |
| 57.09 | 217.26 | 2.00 | 0.00 | 1.00 | 0.00 | 57.25 | 222.31 | 2.00 | 0.00 | 1.00 | 0.00 |
| 57.41 | 248.57 | 2.00 | 0.00 | 1.00 | 0.00 | 57.58 | 264.59 | 2.00 | 0.00 | 1.00 | 0.00 |
| 57.74 | 270.55 | 2.00 | 0.00 | 1.00 | 0.00 | 57.91 | 265.83 | 2.00 | 0.00 | 1.00 | 0.00 |
| 58.07 | 253.59 | 2.00 | 0.00 | 1.00 | 0.00 | 58.23 | 240.36 | 2.00 | 0.00 | 1.00 | 0.00 |
| 58.40 | 233.32 | 2.00 | 0.00 | 1.00 | 0.00 | 58.56 | 234.07 | 2.00 | 0.00 | 1.00 | 0.00 |
| 58.73 | 240.54 | 2.00 | 0.00 | 1.00 | 0.00 | 58.89 | 254.33 | 2.00 | 0.00 | 1.00 | 0.00 |
| 59.06 | 265.22 | 2.00 | 0.00 | 1.00 | 0.00 | 59.22 | 242.75 | 2.00 | 0.00 | 1.00 | 0.00 |
| 59.38 | 232.14 | 2.00 | 0.00 | 1.00 | 0.00 | 59.55 | 229.47 | 2.00 | 0.00 | 1.00 | 0.00 |
| 59.71 | 246.13 | 2.00 | 0.00 | 1.00 | 0.00 | 59.88 | 257.84 | 2.00 | 0.00 | 1.00 | 0.00 |
| 60.04 | 263.98 | 2.00 | 0.00 | 1.00 | 0.00 | 60.20 | 268.38 | 2.00 | 0.00 | 1.00 | 0.00 |
| 60.37 | 249.00 | 2.00 | 0.00 | 1.00 | 0.00 | 60.53 | 239.89 | 2.00 | 0.00 | 1.00 | 0.00 |
| 60.70 | 228.53 | 2.00 | 0.00 | 1.00 | 0.00 | 60.86 | 228.20 | 2.00 | 0.00 | 1.00 | 0.00 |
| 61.02 | 227.05 | 2.00 | 0.00 | 1.00 | 0.00 | 61.19 | 228.86 | 2.00 | 0.00 | 1.00 | 0.00 |
| 61.35 | 232.01 | 2.00 | 0.00 | 1.00 | 0.00 | 61.52 | 218.26 | 2.00 | 0.00 | 1.00 | 0.00 |

**:: Post-earthquake settlement due to soil liquefaction :: (continued)**

| Depth (ft) | $Q_{tn,cs}$ | FS | $e_v$ (%) | DF | Settlement (in) | Depth (ft) | $Q_{tn,cs}$ | FS | $e_v$ (%) | DF | Settlement (in) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 61.68 | 218.93 | 2.00 | 0.00 | 1.00 | 0.00 | 61.84 | 227.64 | 2.00 | 0.00 | 1.00 | 0.00 |
| 62.01 | 244.86 | 2.00 | 0.00 | 1.00 | 0.00 | 62.17 | 246.65 | 2.00 | 0.00 | 1.00 | 0.00 |
| 62.34 | 234.75 | 2.00 | 0.00 | 1.00 | 0.00 | 62.50 | 210.49 | 2.00 | 0.00 | 1.00 | 0.00 |
| 62.66 | 197.22 | 2.00 | 0.00 | 1.00 | 0.00 | 62.83 | 197.32 | 2.00 | 0.00 | 1.00 | 0.00 |
| 62.99 | 211.08 | 2.00 | 0.00 | 1.00 | 0.00 | 63.16 | 225.80 | 2.00 | 0.00 | 1.00 | 0.00 |
| 63.32 | 199.89 | 2.00 | 0.00 | 1.00 | 0.00 | 63.48 | 200.53 | 2.00 | 0.00 | 1.00 | 0.00 |
| 63.65 | -1.00 | 2.00 | 0.00 | 1.00 | 0.00 | 63.81 | -1.00 | 2.00 | 0.00 | 1.00 | 0.00 |

**Total estimated settlement: 0.20**

**Abbreviations**

$Q_{tn,cs}$: Equivalent clean sand normalized cone resistance
FS: Factor of safety against liquefaction
$e_v$ (%): Post-liquefaction volumentric strain
DF: $e_v$ depth weighting factor
Settlement: Calculated settlement

**:: Lateral displacement index calculation ::**

| Depth (ft) | $q_t$ (tsf) | $Q_{tn}$ | $R_f$ (%) | $Q_{tn,cs}$ | FS | $D_r$ | $Gamma_{max}$ (%) | Lat. disp. (in) |
|---|---|---|---|---|---|---|---|---|
| 13.12 | 168.49 | 180.77 | 1.37 | 212.53 | 2.00 | 86.54 | 0.00 | 0.00 |
| 13.29 | 167.33 | 178.34 | 1.18 | 200.81 | 2.00 | 86.09 | 0.00 | 0.00 |
| 13.45 | 162.12 | 172.94 | 1.43 | 207.25 | 2.00 | 85.08 | 0.00 | 0.00 |
| 13.62 | 159.35 | 170.10 | 1.73 | 212.23 | 2.00 | 84.53 | 0.00 | 0.00 |
| 13.78 | 166.20 | 177.08 | 1.96 | 224.38 | 2.00 | 85.86 | 0.00 | 0.00 |
| 13.94 | 181.67 | 192.72 | 2.01 | 242.50 | 2.00 | 88.66 | 0.00 | 0.00 |
| 14.11 | 190.81 | 201.57 | 2.04 | 252.64 | 2.00 | 90.14 | 0.00 | 0.00 |
| 14.27 | 191.29 | 201.27 | 2.03 | 252.09 | 2.00 | 90.09 | 0.00 | 0.00 |
| 14.44 | 183.58 | 192.58 | 2.09 | 243.88 | 2.00 | 88.63 | 0.00 | 0.00 |
| 14.60 | 175.68 | 183.76 | 2.15 | 235.71 | 2.00 | 87.08 | 0.00 | 0.00 |
| 14.76 | 166.30 | 173.46 | 2.22 | 225.94 | 2.00 | 85.18 | 0.00 | 0.00 |
| 14.93 | 156.76 | 163.04 | 2.30 | 216.51 | 2.00 | 83.13 | 0.00 | 0.00 |
| 15.09 | 145.62 | 151.02 | 2.39 | 205.73 | 2.00 | 80.61 | 0.00 | 0.00 |
| 15.26 | 129.92 | 134.45 | 2.56 | 193.34 | 1.04 | 76.77 | 2.94 | 0.11 |
| 15.42 | 115.73 | 119.33 | 2.53 | 177.73 | 0.83 | 72.83 | 5.44 | 0.20 |
| 15.58 | 101.22 | 103.92 | 2.38 | 158.77 | 0.62 | 68.27 | 12.60 | 0.47 |
| 15.75 | 90.94 | 92.90 | 2.14 | 142.07 | 0.48 | 64.57 | 22.70 | 0.85 |
| 15.91 | 84.03 | 85.49 | 2.06 | 133.17 | 0.41 | 61.83 | 22.70 | 0.85 |
| 16.08 | 91.43 | 92.65 | 2.02 | 138.46 | 0.44 | 64.48 | 22.70 | 0.85 |
| 16.24 | 115.80 | 116.81 | 1.90 | 159.04 | 0.61 | 72.13 | 13.07 | 0.49 |
| 16.40 | 154.78 | 155.40 | 1.85 | 198.83 | 1.09 | 81.55 | 2.67 | 0.10 |
| 16.57 | 196.93 | 196.90 | 1.87 | 243.69 | 2.00 | 89.36 | 0.00 | 0.00 |
| 16.73 | 232.90 | 231.93 | 1.89 | 280.45 | 2.00 | 94.77 | 0.00 | 0.00 |
| 16.90 | 253.68 | 251.69 | 1.90 | 300.74 | 2.00 | 97.47 | 0.00 | 0.00 |
| 17.06 | 259.26 | 256.34 | 1.93 | 306.37 | 2.00 | 98.07 | 0.00 | 0.00 |
| 17.22 | 257.40 | 253.75 | 2.05 | 308.01 | 2.00 | 97.73 | 0.00 | 0.00 |
| 17.39 | 257.52 | 253.16 | 2.26 | 313.51 | 2.00 | 97.66 | 0.00 | 0.00 |
| 17.55 | 271.76 | 266.28 | 2.38 | 331.02 | 2.00 | 99.33 | 0.00 | 0.00 |
| 17.72 | 298.25 | 291.06 | 2.26 | 353.78 | 2.00 | 100.00 | 0.00 | 0.00 |
| 17.88 | 321.16 | 312.05 | 1.98 | 361.15 | 2.00 | 100.00 | 0.00 | 0.00 |
| 18.04 | 320.38 | 309.99 | 1.70 | 336.97 | 2.00 | 100.00 | 0.00 | 0.00 |
| 18.21 | 295.05 | 284.45 | 1.57 | 306.14 | 2.00 | 100.00 | 0.00 | 0.00 |
| 18.37 | 259.08 | 249.01 | 1.65 | 285.99 | 2.00 | 97.11 | 0.00 | 0.00 |
| 18.54 | 227.53 | 218.00 | 1.84 | 265.04 | 2.00 | 92.72 | 0.00 | 0.00 |
| 18.70 | 209.61 | 200.18 | 2.05 | 251.32 | 2.00 | 89.91 | 0.00 | 0.00 |
| 18.86 | 207.77 | 197.79 | 2.30 | 254.29 | 2.00 | 89.51 | 0.00 | 0.00 |
| 19.03 | 201.52 | 191.21 | 2.84 | 260.08 | 2.00 | 88.39 | 0.00 | 0.00 |
| 19.19 | 185.45 | 175.27 | 3.62 | 268.23 | 2.00 | 85.52 | 0.00 | 0.00 |
| 19.36 | 160.91 | 151.35 | 4.42 | 275.34 | 2.00 | 80.68 | 0.00 | 0.00 |
| 19.52 | 149.34 | 139.81 | 4.65 | 273.81 | 2.00 | 78.06 | 0.00 | 0.00 |
| 19.69 | 150.17 | 140.03 | 4.49 | 267.23 | 2.00 | 78.11 | 0.00 | 0.00 |
| 19.85 | 159.38 | 148.11 | 4.34 | 269.27 | 2.00 | 79.96 | 0.00 | 0.00 |
| 20.01 | 170.52 | 157.93 | 4.32 | 277.76 | 2.00 | 82.08 | 0.00 | 0.00 |
| 20.18 | 178.18 | 164.43 | 4.33 | 284.62 | 2.00 | 83.41 | 0.00 | 0.00 |
| 20.34 | 181.72 | 167.08 | 4.32 | 286.88 | 2.00 | 83.94 | 0.00 | 0.00 |
| 20.51 | 184.60 | 169.09 | 4.30 | 288.00 | 2.00 | 84.34 | 0.00 | 0.00 |
| 20.67 | 190.39 | 173.85 | 3.91 | 277.44 | 2.00 | 85.25 | 0.00 | 0.00 |
| 20.83 | 191.69 | 174.46 | 3.65 | 268.53 | 2.00 | 85.37 | 0.00 | 0.00 |

**:: Estimation of post-earthquake lateral Displacements :: (continued)**

| Depth (ft) | $q_t$ (tsf) | $Q_{tn}$ | $R_f$ (%) | $Q_{tn,cs}$ | FS | $D_r$ | $Gamma_{max}$ (%) | Lat. disp. (in) |
|---|---|---|---|---|---|---|---|---|
| 21.00 | 197.91 | 179.54 | 3.55 | 270.00 | 2.00 | 86.32 | 0.00 | 0.00 |
| 21.16 | 197.96 | 178.83 | 3.86 | 280.62 | 2.00 | 86.19 | 0.00 | 0.00 |
| 21.33 | 198.65 | 178.77 | 3.98 | 285.14 | 2.00 | 86.17 | 0.00 | 0.00 |
| 21.49 | 188.76 | 169.13 | 4.00 | 276.09 | 2.00 | 84.35 | 0.00 | 0.00 |
| 21.65 | 180.73 | 161.28 | 3.87 | 263.45 | 2.00 | 82.78 | 0.00 | 0.00 |
| 21.82 | 175.10 | 155.71 | 3.60 | 247.91 | 2.00 | 81.62 | 0.00 | 0.00 |
| 21.98 | 167.18 | 148.16 | 3.28 | 229.42 | 2.00 | 79.98 | 0.00 | 0.00 |
| 22.15 | 155.63 | 137.33 | 3.18 | 215.41 | 2.00 | 77.47 | 0.00 | 0.00 |
| 22.31 | 154.36 | 135.65 | 3.36 | 220.02 | 2.00 | 77.06 | 0.00 | 0.00 |
| 22.47 | 163.79 | 143.42 | 3.69 | 239.40 | 2.00 | 78.90 | 0.00 | 0.00 |
| 22.64 | 178.26 | 155.72 | 3.77 | 254.10 | 2.00 | 81.62 | 0.00 | 0.00 |
| 22.80 | 179.18 | 156.03 | 3.69 | 251.61 | 2.00 | 81.68 | 0.00 | 0.00 |
| 22.97 | 168.89 | 146.55 | 3.39 | 231.65 | 2.00 | 79.61 | 0.00 | 0.00 |
| 23.13 | 162.93 | 140.89 | 3.22 | 220.18 | 2.00 | 78.31 | 0.00 | 0.00 |
| 23.29 | 162.31 | 139.88 | 3.21 | 218.73 | 2.00 | 78.08 | 0.00 | 0.00 |
| 23.46 | 163.46 | 140.25 | 3.49 | 229.07 | 2.00 | 78.17 | 0.00 | 0.00 |
| 23.62 | 162.59 | 138.86 | 3.75 | 237.38 | 2.00 | 77.84 | 0.00 | 0.00 |
| 23.79 | 166.29 | 141.48 | 3.95 | 247.48 | 2.00 | 78.45 | 0.00 | 0.00 |
| 23.95 | 171.80 | 145.64 | 4.15 | 259.27 | 2.00 | 79.41 | 0.00 | 0.00 |
| 24.11 | 176.30 | 148.96 | 4.22 | 265.42 | 2.00 | 80.15 | 0.00 | 0.00 |
| 24.28 | 176.42 | 148.53 | 4.24 | 265.72 | 2.00 | 80.06 | 0.00 | 0.00 |
| 24.44 | 173.45 | 145.57 | 4.08 | 256.57 | 2.00 | 79.39 | 0.00 | 0.00 |
| 24.61 | 164.93 | 137.85 | 3.97 | 244.69 | 2.00 | 77.59 | 0.00 | 0.00 |
| 24.77 | 155.60 | 129.46 | 3.92 | 234.84 | 2.00 | 75.52 | 0.00 | 0.00 |
| 24.93 | 154.07 | 127.78 | 3.83 | 229.79 | 2.00 | 75.09 | 0.00 | 0.00 |
| 25.10 | 159.56 | 132.09 | 3.69 | 228.73 | 2.00 | 76.19 | 0.00 | 0.00 |
| 25.26 | 166.12 | 137.36 | 3.47 | 225.73 | 2.00 | 77.48 | 0.00 | 0.00 |
| 25.43 | 172.77 | 142.42 | 3.60 | 235.13 | 2.00 | 78.67 | 0.00 | 0.00 |
| 25.59 | 184.41 | 151.68 | 3.70 | 247.81 | 2.00 | 80.75 | 0.00 | 0.00 |
| 25.75 | 203.33 | 167.04 | 3.75 | 264.70 | 2.00 | 83.93 | 0.00 | 0.00 |
| 25.92 | 210.82 | 172.85 | 3.67 | 267.74 | 2.00 | 85.06 | 0.00 | 0.00 |
| 26.08 | 206.87 | 168.95 | 3.71 | 265.21 | 2.00 | 84.31 | 0.00 | 0.00 |
| 26.25 | 194.29 | 157.74 | 3.89 | 260.90 | 2.00 | 82.04 | 0.00 | 0.00 |
| 26.41 | 196.11 | 158.80 | 3.83 | 259.49 | 2.00 | 82.27 | 0.00 | 0.00 |
| 26.57 | 199.90 | 161.50 | 3.76 | 259.74 | 2.00 | 82.82 | 0.00 | 0.00 |
| 26.74 | 198.02 | 159.39 | 3.79 | 258.71 | 2.00 | 82.39 | 0.00 | 0.00 |
| 26.90 | 187.36 | 149.97 | 3.93 | 254.80 | 2.00 | 80.38 | 0.00 | 0.00 |
| 27.07 | 175.32 | 139.57 | 3.97 | 246.46 | 2.00 | 78.01 | 0.00 | 0.00 |
| 27.23 | 169.17 | 134.19 | 3.87 | 237.36 | 2.00 | 76.71 | 0.00 | 0.00 |
| 27.40 | 163.57 | 129.28 | 3.78 | 229.47 | 2.00 | 75.48 | 0.00 | 0.00 |
| 27.56 | 159.85 | 125.98 | 3.64 | 221.12 | 2.00 | 74.62 | 0.00 | 0.00 |
| 27.72 | 154.32 | 121.21 | 3.51 | 212.19 | 2.00 | 73.35 | 0.00 | 0.00 |
| 27.89 | 152.42 | 119.55 | 3.24 | 201.03 | 2.00 | 72.89 | 0.00 | 0.00 |
| 28.05 | 154.29 | 121.11 | 2.87 | 189.84 | 2.00 | 73.32 | 0.00 | 0.00 |
| 28.22 | 155.22 | 121.50 | 2.88 | 190.55 | 2.00 | 73.43 | 0.00 | 0.00 |
| 28.38 | 160.86 | 125.56 | 3.00 | 198.37 | 2.00 | 74.51 | 0.00 | 0.00 |
| 28.54 | 162.97 | 126.49 | 3.34 | 210.75 | 2.00 | 74.76 | 0.00 | 0.00 |
| 28.71 | 168.70 | 130.69 | 3.35 | 215.02 | 2.00 | 75.83 | 0.00 | 0.00 |

**:: Estimation of post-earthquake lateral Displacements :: (continued)**

| Depth (ft) | $q_t$ (tsf) | $Q_{tn}$ | $R_f$ (%) | $Q_{tn,cs}$ | FS | $D_r$ | $Gamma_{max}$ (%) | Lat. disp. (in) |
|---|---|---|---|---|---|---|---|---|
| 28.87 | 172.35 | 133.22 | 3.35 | 217.44 | 2.00 | 76.47 | 0.00 | 0.00 |
| 29.04 | 178.70 | 137.92 | 3.32 | 220.76 | 2.00 | 77.61 | 0.00 | 0.00 |
| 29.20 | 183.83 | 141.56 | 3.34 | 225.15 | 2.00 | 78.47 | 0.00 | 0.00 |
| 29.36 | 185.89 | 142.66 | 3.43 | 229.27 | 2.00 | 78.73 | 0.00 | 0.00 |
| 29.53 | 185.79 | 141.97 | 3.57 | 233.86 | 2.00 | 78.57 | 0.00 | 0.00 |
| 29.69 | 186.17 | 141.56 | 3.79 | 241.55 | 2.00 | 78.47 | 0.00 | 0.00 |
| 29.86 | 193.98 | 147.11 | 3.92 | 251.66 | 2.00 | 79.74 | 0.00 | 0.00 |
| 30.02 | 206.65 | 156.65 | 3.87 | 259.26 | 2.00 | 81.81 | 0.00 | 0.00 |
| 30.18 | 210.89 | 159.62 | 3.79 | 259.07 | 2.00 | 82.43 | 0.00 | 0.00 |
| 30.35 | 203.51 | 153.48 | 3.73 | 250.63 | 2.00 | 81.14 | 0.00 | 0.00 |
| 30.51 | 190.23 | 142.75 | 3.68 | 238.49 | 2.00 | 78.75 | 0.00 | 0.00 |
| 30.68 | 181.68 | 135.87 | 3.55 | 227.17 | 2.00 | 77.12 | 0.00 | 0.00 |
| 30.84 | 176.66 | 131.75 | 3.43 | 218.90 | 2.00 | 76.10 | 0.00 | 0.00 |
| 31.00 | 175.57 | 130.45 | 3.49 | 219.80 | 2.00 | 75.77 | 0.00 | 0.00 |
| 31.17 | 186.45 | 138.59 | 3.40 | 224.48 | 2.00 | 77.77 | 0.00 | 0.00 |
| 31.33 | 187.08 | 138.53 | 3.50 | 227.87 | 2.00 | 77.76 | 0.00 | 0.00 |
| 31.50 | 179.14 | 132.02 | 3.51 | 222.20 | 2.00 | 76.17 | 0.00 | 0.00 |
| 31.66 | 167.99 | 123.03 | 3.58 | 216.29 | 2.00 | 73.84 | 0.00 | 0.00 |
| 31.82 | 167.19 | 122.06 | 3.59 | 215.80 | 2.00 | 73.58 | 0.00 | 0.00 |
| 31.99 | 176.80 | 128.96 | 3.63 | 223.62 | 2.00 | 75.39 | 0.00 | 0.00 |
| 32.15 | 183.85 | 134.01 | 3.58 | 226.48 | 2.00 | 76.66 | 0.00 | 0.00 |
| 32.32 | 185.19 | 134.78 | 3.49 | 223.86 | 2.00 | 76.85 | 0.00 | 0.00 |
| 32.48 | 177.07 | 128.49 | 3.34 | 212.63 | 2.00 | 75.27 | 0.00 | 0.00 |
| 32.64 | 168.01 | 121.33 | 3.31 | 205.00 | 2.00 | 73.38 | 0.00 | 0.00 |
| 32.81 | 163.73 | 117.81 | 3.28 | 200.96 | 2.00 | 72.41 | 0.00 | 0.00 |
| 32.97 | 168.12 | 120.70 | 3.33 | 205.39 | 2.00 | 73.21 | 0.00 | 0.00 |
| 33.14 | 173.88 | 124.53 | 3.44 | 212.57 | 2.00 | 74.24 | 0.00 | 0.00 |
| 33.30 | 179.33 | 128.23 | 3.45 | 216.62 | 2.00 | 75.21 | 0.00 | 0.00 |
| 33.46 | 179.03 | 127.75 | 3.40 | 214.41 | 2.00 | 75.08 | 0.00 | 0.00 |
| 33.63 | 176.17 | 125.65 | 3.17 | 204.31 | 2.00 | 74.54 | 0.00 | 0.00 |
| 33.79 | 175.06 | 125.69 | 2.53 | 184.01 | 2.00 | 74.55 | 0.00 | 0.00 |
| 33.96 | 174.04 | 125.19 | 2.26 | 176.42 | 2.00 | 74.41 | 0.00 | 0.00 |
| 34.12 | 174.34 | 124.92 | 2.35 | 178.34 | 2.00 | 74.34 | 0.00 | 0.00 |
| 34.28 | 176.27 | 124.89 | 2.91 | 194.92 | 2.00 | 74.34 | 0.00 | 0.00 |
| 34.45 | 182.43 | 128.86 | 3.05 | 203.27 | 2.00 | 75.37 | 0.00 | 0.00 |
| 34.61 | 185.38 | 130.70 | 3.05 | 205.09 | 2.00 | 75.84 | 0.00 | 0.00 |
| 34.78 | 184.52 | 129.71 | 3.06 | 204.37 | 2.00 | 75.59 | 0.00 | 0.00 |
| 34.94 | 182.61 | 127.76 | 3.17 | 206.29 | 2.00 | 75.09 | 0.00 | 0.00 |
| 35.10 | 188.22 | 131.37 | 3.26 | 212.60 | 2.00 | 76.01 | 0.00 | 0.00 |
| 35.27 | 199.42 | 139.06 | 3.34 | 222.78 | 2.00 | 77.88 | 0.00 | 0.00 |
| 35.43 | 208.39 | 144.91 | 3.50 | 234.04 | 2.00 | 79.24 | 0.00 | 0.00 |
| 35.60 | 215.07 | 149.34 | 3.53 | 239.29 | 2.00 | 80.24 | 0.00 | 0.00 |
| 35.76 | 216.40 | 150.14 | 3.42 | 236.17 | 2.00 | 80.41 | 0.00 | 0.00 |
| 35.93 | 218.79 | 151.35 | 3.48 | 239.55 | 2.00 | 80.68 | 0.00 | 0.00 |
| 36.09 | 216.09 | 148.56 | 3.70 | 244.79 | 2.00 | 80.06 | 0.00 | 0.00 |
| 36.25 | 212.92 | 145.38 | 3.96 | 251.77 | 2.00 | 79.35 | 0.00 | 0.00 |
| 36.42 | 212.90 | 145.11 | 3.90 | 249.10 | 2.00 | 79.29 | 0.00 | 0.00 |
| 36.58 | 214.41 | 145.72 | 3.94 | 251.38 | 2.00 | 79.43 | 0.00 | 0.00 |

**:: Estimation of post-earthquake lateral Displacements :: (continued)**

| Depth (ft) | $q_t$ (tsf) | $Q_{tn}$ | $R_f$ (%) | $Q_{tn,cs}$ | FS | $D_r$ | $Gamma_{max}$ (%) | Lat. disp. (in) |
|---|---|---|---|---|---|---|---|---|
| 36.75 | 220.50 | 149.51 | 4.02 | 258.22 | 2.00 | 80.28 | 0.00 | 0.00 |
| 36.91 | 223.37 | 150.97 | 4.12 | 263.68 | 2.00 | 80.59 | 0.00 | 0.00 |
| 37.07 | 222.93 | 150.24 | 4.13 | 263.34 | 2.00 | 80.44 | 0.00 | 0.00 |
| 37.24 | 220.73 | 148.51 | 4.02 | 257.30 | 2.00 | 80.05 | 0.00 | 0.00 |
| 37.40 | 216.04 | 145.22 | 3.82 | 246.33 | 2.00 | 79.31 | 0.00 | 0.00 |
| 37.57 | 211.19 | 141.78 | 3.65 | 236.60 | 2.00 | 78.52 | 0.00 | 0.00 |
| 37.73 | 212.52 | 142.54 | 3.56 | 234.09 | 2.00 | 78.70 | 0.00 | 0.00 |
| 37.89 | 218.27 | 146.97 | 3.25 | 227.25 | 2.00 | 79.71 | 0.00 | 0.00 |
| 38.06 | 216.47 | 145.62 | 3.13 | 222.14 | 2.00 | 79.40 | 0.00 | 0.00 |
| 38.22 | 202.44 | 134.91 | 3.32 | 218.32 | 2.00 | 76.88 | 0.00 | 0.00 |
| 38.39 | 191.99 | 126.22 | 3.85 | 229.62 | 2.00 | 74.69 | 0.00 | 0.00 |
| 38.55 | 196.94 | 129.15 | 3.95 | 236.19 | 2.00 | 75.44 | 0.00 | 0.00 |
| 38.71 | 204.99 | 134.63 | 3.83 | 236.51 | 2.00 | 76.81 | 0.00 | 0.00 |
| 38.88 | 208.55 | 136.64 | 3.88 | 240.61 | 2.00 | 77.30 | 0.00 | 0.00 |
| 39.04 | 211.75 | 138.09 | 4.09 | 250.02 | 2.00 | 77.65 | 0.00 | 0.00 |
| 39.21 | 221.82 | 144.48 | 4.18 | 259.70 | 2.00 | 79.14 | 0.00 | 0.00 |
| 39.37 | 236.16 | 154.18 | 4.07 | 264.83 | 2.00 | 81.29 | 0.00 | 0.00 |
| 39.53 | 241.67 | 157.64 | 4.05 | 267.24 | 2.00 | 82.02 | 0.00 | 0.00 |
| 39.70 | 240.33 | 156.12 | 4.14 | 269.49 | 2.00 | 81.70 | 0.00 | 0.00 |
| 39.86 | 237.43 | 153.59 | 4.22 | 270.15 | 2.00 | 81.16 | 0.00 | 0.00 |
| 40.03 | 242.52 | 157.14 | 4.02 | 265.61 | 2.00 | 81.92 | 0.00 | 0.00 |
| 40.19 | 236.50 | 153.39 | 3.71 | 250.26 | 2.00 | 81.12 | 0.00 | 0.00 |
| 40.35 | 217.72 | 140.92 | 3.41 | 227.07 | 2.00 | 78.32 | 0.00 | 0.00 |
| 40.52 | 187.03 | 119.78 | 3.35 | 205.38 | 2.00 | 72.96 | 0.00 | 0.00 |
| 40.68 | 172.88 | 109.91 | 3.34 | 196.13 | 2.00 | 70.12 | 0.00 | 0.00 |
| 40.85 | 179.22 | 113.70 | 3.46 | 203.76 | 2.00 | 71.24 | 0.00 | 0.00 |
| 41.01 | 185.22 | 116.99 | 3.70 | 215.58 | 2.00 | 72.18 | 0.00 | 0.00 |
| 41.17 | 191.30 | 120.73 | 3.73 | 220.00 | 2.00 | 73.22 | 0.00 | 0.00 |
| 41.34 | 191.11 | 120.75 | 3.51 | 212.05 | 2.00 | 73.22 | 0.00 | 0.00 |
| 41.50 | 195.11 | 123.95 | 3.16 | 202.35 | 2.00 | 74.09 | 0.00 | 0.00 |
| 41.67 | 194.24 | 123.31 | 3.06 | 198.56 | 2.00 | 73.92 | 0.00 | 0.00 |
| 41.83 | 190.54 | 120.05 | 3.26 | 202.55 | 2.00 | 73.03 | 0.00 | 0.00 |
| 41.99 | 195.54 | 122.66 | 3.47 | 212.15 | 2.00 | 73.74 | 0.00 | 0.00 |
| 42.16 | 207.13 | 129.95 | 3.53 | 221.21 | 2.00 | 75.65 | 0.00 | 0.00 |
| 42.32 | 211.70 | 132.76 | 3.51 | 222.87 | 2.00 | 76.35 | 0.00 | 0.00 |
| 42.49 | 206.34 | 129.08 | 3.42 | 216.32 | 2.00 | 75.43 | 0.00 | 0.00 |
| 42.65 | 194.56 | 121.00 | 3.40 | 208.29 | 2.00 | 73.29 | 0.00 | 0.00 |
| 42.81 | 191.76 | 119.05 | 3.32 | 203.65 | 2.00 | 72.75 | 0.00 | 0.00 |
| 42.98 | 198.65 | 123.72 | 3.16 | 202.37 | 2.00 | 74.03 | 0.00 | 0.00 |
| 43.14 | 202.93 | 126.37 | 3.13 | 203.70 | 2.00 | 74.72 | 0.00 | 0.00 |
| 43.31 | 207.56 | 128.02 | 3.58 | 221.09 | 2.00 | 75.15 | 0.00 | 0.00 |
| 43.47 | 221.24 | 135.83 | 3.94 | 242.25 | 2.00 | 77.11 | 0.00 | 0.00 |
| 43.64 | 233.22 | 142.92 | 4.11 | 255.72 | 2.00 | 78.79 | 0.00 | 0.00 |
| 43.80 | 237.30 | 145.83 | 3.88 | 249.25 | 2.00 | 79.45 | 0.00 | 0.00 |
| 43.96 | 223.39 | 136.66 | 3.79 | 237.01 | 2.00 | 77.31 | 0.00 | 0.00 |
| 44.13 | 214.92 | 130.95 | 3.74 | 229.93 | 2.00 | 75.90 | 0.00 | 0.00 |
| 44.29 | 212.13 | 128.81 | 3.76 | 228.52 | 2.00 | 75.36 | 0.00 | 0.00 |
| 44.46 | 216.37 | 131.18 | 3.78 | 231.84 | 2.00 | 75.96 | 0.00 | 0.00 |

**:: Estimation of post-earthquake lateral Displacements :: (continued)**

| Depth (ft) | $q_t$ (tsf) | $Q_{tn}$ | $R_f$ (%) | $Q_{tn,cs}$ | FS | $D_r$ | $Gamma_{max}$ (%) | Lat. disp. (in) |
|---|---|---|---|---|---|---|---|---|
| 44.62 | 220.65 | 133.65 | 3.78 | 234.15 | 2.00 | 76.57 | 0.00 | 0.00 |
| 44.78 | 222.34 | 134.34 | 3.82 | 236.28 | 2.00 | 76.74 | 0.00 | 0.00 |
| 44.95 | 222.49 | 133.98 | 3.88 | 238.29 | 2.00 | 76.66 | 0.00 | 0.00 |
| 45.11 | 227.28 | 136.76 | 3.88 | 240.83 | 2.00 | 77.33 | 0.00 | 0.00 |
| 45.28 | 228.51 | 136.99 | 3.98 | 244.99 | 2.00 | 77.39 | 0.00 | 0.00 |
| 45.44 | 230.68 | 137.11 | 4.39 | 261.27 | 2.00 | 77.42 | 0.00 | 0.00 |
| 45.60 | 248.33 | 147.75 | 4.49 | 275.50 | 2.00 | 79.88 | 0.00 | 0.00 |
| 45.77 | 274.75 | 166.68 | 3.65 | 260.90 | 2.00 | 83.86 | 0.00 | 0.00 |
| 45.93 | 287.91 | 176.79 | 3.13 | 253.51 | 2.00 | 85.81 | 0.00 | 0.00 |
| 46.10 | 278.23 | 170.66 | 2.99 | 243.09 | 2.00 | 84.64 | 0.00 | 0.00 |
| 46.26 | 261.31 | 157.17 | 3.59 | 249.52 | 2.00 | 81.92 | 0.00 | 0.00 |
| 46.42 | 253.92 | 151.74 | 3.71 | 248.60 | 2.00 | 80.76 | 0.00 | 0.00 |
| 46.59 | 243.71 | 144.64 | 3.81 | 245.43 | 2.00 | 79.18 | 0.00 | 0.00 |
| 46.75 | 240.31 | 141.75 | 3.96 | 248.71 | 2.00 | 78.51 | 0.00 | 0.00 |
| 46.92 | 243.57 | 143.48 | 3.97 | 250.52 | 2.00 | 78.92 | 0.00 | 0.00 |
| 47.08 | 248.19 | 146.50 | 3.82 | 247.61 | 2.00 | 79.60 | 0.00 | 0.00 |
| 47.24 | 244.42 | 144.56 | 3.56 | 236.19 | 2.00 | 79.16 | 0.00 | 0.00 |
| 47.41 | 230.65 | 135.93 | 3.43 | 223.39 | 2.00 | 77.13 | 0.00 | 0.00 |
| 47.57 | 219.98 | 128.11 | 3.74 | 227.16 | 2.00 | 75.18 | 0.00 | 0.00 |
| 47.74 | 232.93 | 135.04 | 4.07 | 246.50 | 2.00 | 76.91 | 0.00 | 0.00 |
| 47.90 | 246.36 | 142.27 | 4.38 | 265.88 | 2.00 | 78.64 | 0.00 | 0.00 |
| 48.06 | 260.61 | 151.26 | 4.20 | 267.17 | 2.00 | 80.66 | 0.00 | 0.00 |
| 48.23 | 251.68 | 145.59 | 4.13 | 259.11 | 2.00 | 79.40 | 0.00 | 0.00 |
| 48.39 | 247.67 | 142.95 | 4.08 | 254.39 | 2.00 | 78.79 | 0.00 | 0.00 |
| 48.56 | 245.12 | 140.96 | 4.12 | 254.03 | 2.00 | 78.33 | 0.00 | 0.00 |
| 48.72 | 248.81 | 143.02 | 4.09 | 254.79 | 2.00 | 78.81 | 0.00 | 0.00 |
| 48.88 | 250.61 | 144.04 | 4.01 | 252.77 | 2.00 | 79.04 | 0.00 | 0.00 |
| 49.05 | 247.78 | 141.79 | 4.08 | 253.52 | 2.00 | 78.52 | 0.00 | 0.00 |
| 49.21 | 248.81 | 143.84 | 3.51 | 233.70 | 2.00 | 79.00 | 0.00 | 0.00 |
| 49.38 | 258.70 | 150.74 | 3.21 | 229.95 | 2.00 | 80.55 | 0.00 | 0.00 |
| 49.54 | 262.95 | 154.06 | 2.97 | 225.41 | 2.00 | 81.26 | 0.00 | 0.00 |
| 49.70 | 263.55 | 152.23 | 3.46 | 240.14 | 2.00 | 80.87 | 0.00 | 0.00 |
| 49.87 | 253.78 | 145.12 | 3.70 | 241.82 | 2.00 | 79.29 | 0.00 | 0.00 |
| 50.03 | 249.06 | 141.61 | 3.80 | 242.39 | 2.00 | 78.48 | 0.00 | 0.00 |
| 50.20 | 239.54 | 135.45 | 3.83 | 237.50 | 2.00 | 77.01 | 0.00 | 0.00 |
| 50.36 | 233.74 | 131.48 | 3.88 | 236.05 | 2.00 | 76.03 | 0.00 | 0.00 |
| 50.52 | 231.60 | 129.47 | 4.05 | 240.48 | 2.00 | 75.53 | 0.00 | 0.00 |
| 50.69 | 235.71 | 130.59 | 4.48 | 258.76 | 2.00 | 75.81 | 0.00 | 0.00 |
| 50.85 | 269.95 | 150.79 | 4.47 | 277.81 | 2.00 | 80.56 | 0.00 | 0.00 |
| 51.02 | 300.79 | 169.75 | 4.23 | 286.82 | 2.00 | 84.47 | 0.00 | 0.00 |
| 51.18 | 317.58 | 182.81 | 3.43 | 269.56 | 2.00 | 86.91 | 0.00 | 0.00 |
| 51.35 | 303.94 | 175.20 | 3.18 | 253.48 | 2.00 | 85.51 | 0.00 | 0.00 |
| 51.51 | 294.56 | 169.22 | 3.14 | 246.35 | 2.00 | 84.36 | 0.00 | 0.00 |
| 51.67 | 289.34 | 163.47 | 3.68 | 259.16 | 2.00 | 83.22 | 0.00 | 0.00 |
| 51.84 | 276.58 | 154.26 | 4.02 | 263.09 | 2.00 | 81.31 | 0.00 | 0.00 |
| 52.00 | 263.03 | 145.09 | 4.27 | 264.35 | 2.00 | 79.28 | 0.00 | 0.00 |
| 52.17 | 268.50 | 148.41 | 4.15 | 262.70 | 2.00 | 80.03 | 0.00 | 0.00 |
| 52.33 | 283.32 | 157.98 | 3.85 | 259.89 | 2.00 | 82.09 | 0.00 | 0.00 |

**:: Estimation of post-earthquake lateral Displacements :: (continued)**

| Depth (ft) | $q_t$ (tsf) | $Q_{tn}$ | $R_f$ (%) | $Q_{tn,cs}$ | FS | $D_r$ | $Gamma_{max}$ (%) | Lat. disp. (in) |
|---|---|---|---|---|---|---|---|---|
| 52.49 | 292.64 | 163.34 | 3.82 | 264.20 | 2.00 | 83.20 | 0.00 | 0.00 |
| 52.66 | 294.42 | 163.10 | 4.09 | 274.63 | 2.00 | 83.15 | 0.00 | 0.00 |
| 52.82 | 296.70 | 163.42 | 4.30 | 283.24 | 2.00 | 83.21 | 0.00 | 0.00 |
| 52.99 | 304.31 | 167.92 | 4.21 | 283.99 | 2.00 | 84.11 | 0.00 | 0.00 |
| 53.15 | 297.35 | 163.90 | 4.09 | 275.16 | 2.00 | 83.31 | 0.00 | 0.00 |
| 53.31 | 286.16 | 158.60 | 3.64 | 252.65 | 2.00 | 82.22 | 0.00 | 0.00 |
| 53.48 | 281.79 | 157.27 | 3.24 | 237.51 | 2.00 | 81.95 | 0.00 | 0.00 |
| 53.64 | 285.47 | 159.26 | 3.23 | 239.00 | 2.00 | 82.36 | 0.00 | 0.00 |
| 53.81 | 306.67 | 169.26 | 3.79 | 268.99 | 2.00 | 84.37 | 0.00 | 0.00 |
| 53.97 | 320.74 | 175.57 | 4.22 | 292.22 | 2.00 | 85.58 | 0.00 | 0.00 |
| 54.13 | 319.87 | 175.58 | 4.00 | 283.40 | 2.00 | 85.58 | 0.00 | 0.00 |
| 54.30 | 294.79 | 162.25 | 3.55 | 253.16 | 2.00 | 82.97 | 0.00 | 0.00 |
| 54.46 | 270.47 | 148.55 | 3.30 | 230.74 | 2.00 | 80.06 | 0.00 | 0.00 |
| 54.63 | 261.93 | 142.19 | 3.57 | 234.29 | 2.00 | 78.62 | 0.00 | 0.00 |
| 54.79 | 262.27 | 141.76 | 3.67 | 237.64 | 2.00 | 78.52 | 0.00 | 0.00 |
| 54.95 | 264.10 | 142.61 | 3.66 | 237.91 | 2.00 | 78.71 | 0.00 | 0.00 |
| 55.12 | 269.38 | 145.22 | 3.71 | 242.48 | 2.00 | 79.31 | 0.00 | 0.00 |
| 55.28 | 295.75 | 159.50 | 3.93 | 264.74 | 2.00 | 82.41 | 0.00 | 0.00 |
| 55.45 | 309.47 | 166.37 | 4.14 | 279.78 | 2.00 | 83.80 | 0.00 | 0.00 |
| 55.61 | 310.73 | 166.50 | 4.22 | 283.01 | 2.00 | 83.83 | 0.00 | 0.00 |
| 55.77 | 290.72 | 154.62 | 4.23 | 271.95 | 2.00 | 81.38 | 0.00 | 0.00 |
| 55.94 | 270.20 | 143.11 | 4.07 | 254.25 | 2.00 | 78.83 | 0.00 | 0.00 |
| 56.10 | 251.27 | 133.20 | 3.69 | 230.44 | 2.00 | 76.46 | 0.00 | 0.00 |
| 56.27 | 217.22 | 112.19 | 4.17 | 229.36 | 2.00 | 70.80 | 0.00 | 0.00 |
| 56.43 | 227.06 | 117.25 | 4.27 | 237.98 | 2.00 | 72.25 | 0.00 | 0.00 |
| 56.59 | 244.79 | 126.39 | 4.49 | 255.58 | 2.00 | 74.73 | 0.00 | 0.00 |
| 56.76 | 273.60 | 143.90 | 4.00 | 252.54 | 2.00 | 79.01 | 0.00 | 0.00 |
| 56.92 | 268.30 | 142.83 | 3.39 | 228.54 | 2.00 | 78.77 | 0.00 | 0.00 |
| 57.09 | 260.02 | 138.61 | 3.18 | 217.26 | 2.00 | 77.78 | 0.00 | 0.00 |
| 57.25 | 265.27 | 141.08 | 3.26 | 222.31 | 2.00 | 78.36 | 0.00 | 0.00 |
| 57.41 | 267.91 | 139.59 | 4.01 | 248.57 | 2.00 | 78.01 | 0.00 | 0.00 |
| 57.58 | 266.07 | 136.85 | 4.47 | 264.59 | 2.00 | 77.35 | 0.00 | 0.00 |
| 57.74 | 268.60 | 137.62 | 4.60 | 270.55 | 2.00 | 77.54 | 0.00 | 0.00 |
| 57.91 | 265.93 | 136.11 | 4.52 | 265.83 | 2.00 | 77.18 | 0.00 | 0.00 |
| 58.07 | 262.79 | 134.92 | 4.24 | 253.59 | 2.00 | 76.89 | 0.00 | 0.00 |
| 58.23 | 241.98 | 123.26 | 4.19 | 240.36 | 2.00 | 73.90 | 0.00 | 0.00 |
| 58.40 | 231.62 | 117.40 | 4.15 | 233.32 | 2.00 | 72.29 | 0.00 | 0.00 |
| 58.56 | 226.38 | 114.02 | 4.24 | 234.07 | 2.00 | 71.33 | 0.00 | 0.00 |
| 58.73 | 229.07 | 114.91 | 4.39 | 240.54 | 2.00 | 71.59 | 0.00 | 0.00 |
| 58.89 | 238.21 | 119.06 | 4.63 | 254.33 | 2.00 | 72.76 | 0.00 | 0.00 |
| 59.06 | 251.56 | 125.83 | 4.74 | 265.22 | 2.00 | 74.58 | 0.00 | 0.00 |
| 59.22 | 282.08 | 145.81 | 3.70 | 242.75 | 2.00 | 79.45 | 0.00 | 0.00 |
| 59.38 | 291.38 | 152.92 | 3.21 | 232.14 | 2.00 | 81.02 | 0.00 | 0.00 |
| 59.55 | 298.74 | 158.08 | 2.96 | 229.47 | 2.00 | 82.12 | 0.00 | 0.00 |
| 59.71 | 288.51 | 148.55 | 3.72 | 246.13 | 2.00 | 80.06 | 0.00 | 0.00 |
| 59.88 | 285.72 | 145.29 | 4.10 | 257.84 | 2.00 | 79.33 | 0.00 | 0.00 |
| 60.04 | 281.50 | 141.91 | 4.34 | 263.98 | 2.00 | 78.55 | 0.00 | 0.00 |
| 60.20 | 277.63 | 138.97 | 4.51 | 268.38 | 2.00 | 77.86 | 0.00 | 0.00 |

**:: Estimation of post-earthquake lateral Displacements :: (continued)**

| Depth (ft) | $q_t$ (tsf) | $Q_{tn}$ | $R_f$ (%) | $Q_{tn,cs}$ | FS | $D_r$ | $Gamma_{max}$ (%) | Lat. disp. (in) |
|---|---|---|---|---|---|---|---|---|
| 60.37 | 296.08 | 151.74 | 3.71 | 249.00 | 2.00 | 80.76 | 0.00 | 0.00 |
| 60.53 | 306.45 | 159.42 | 3.25 | 239.89 | 2.00 | 82.39 | 0.00 | 0.00 |
| 60.70 | 301.98 | 158.26 | 2.93 | 228.53 | 2.00 | 82.15 | 0.00 | 0.00 |
| 60.86 | 272.76 | 138.92 | 3.48 | 228.20 | 2.00 | 77.85 | 0.00 | 0.00 |
| 61.02 | 249.00 | 124.36 | 3.82 | 227.05 | 2.00 | 74.19 | 0.00 | 0.00 |
| 61.19 | 237.50 | 117.20 | 4.03 | 228.86 | 2.00 | 72.24 | 0.00 | 0.00 |
| 61.35 | 241.55 | 119.07 | 4.07 | 232.01 | 2.00 | 72.76 | 0.00 | 0.00 |
| 61.52 | 253.14 | 126.99 | 3.52 | 218.26 | 2.00 | 74.89 | 0.00 | 0.00 |
| 61.68 | 268.20 | 135.92 | 3.30 | 218.93 | 2.00 | 77.13 | 0.00 | 0.00 |
| 61.84 | 291.05 | 148.92 | 3.19 | 227.64 | 2.00 | 80.14 | 0.00 | 0.00 |
| 62.01 | 298.95 | 151.11 | 3.62 | 244.86 | 2.00 | 80.63 | 0.00 | 0.00 |
| 62.17 | 288.64 | 144.28 | 3.84 | 246.65 | 2.00 | 79.10 | 0.00 | 0.00 |
| 62.34 | 262.42 | 129.60 | 3.89 | 234.75 | 2.00 | 75.56 | 0.00 | 0.00 |
| 62.50 | 247.79 | 123.17 | 3.40 | 210.49 | 2.00 | 73.88 | 0.00 | 0.00 |
| 62.66 | 247.51 | 124.45 | 2.98 | 197.22 | 2.00 | 74.22 | 0.00 | 0.00 |
| 62.83 | 250.90 | 126.33 | 2.93 | 197.32 | 2.00 | 74.72 | 0.00 | 0.00 |
| 62.99 | 253.52 | 125.85 | 3.35 | 211.08 | 2.00 | 74.59 | 0.00 | 0.00 |
| 63.16 | 258.76 | 127.10 | 3.72 | 225.80 | 2.00 | 74.92 | 0.00 | 0.00 |
| 63.32 | 280.17 | 144.95 | 2.39 | 199.89 | 2.00 | 79.25 | 0.00 | 0.00 |
| 63.48 | 335.94 | 191.49 | 1.07 | 200.53 | 2.00 | 88.44 | 0.00 | 0.00 |
| 63.65 | 474.60 | N/A | 0.00 | -1.00 | 2.00 | 0.00 | 0.00 | 0.00 |
| 63.81 | 594.73 | N/A | 0.00 | -1.00 | 2.00 | 0.00 | 0.00 | 0.00 |

**Total estimated displacement: 3.92**

**Abbreviations**

$q_t$: Total cone resistance
$Q_{tn}$: Adjusted cone resistance to an effective overburden stress of 1 atm
$R_f$: Friction ration
$Q_{tn,cs}$: Adjusted and corrected cone resistance due to fines
FS: Calculated factor of safety against liquefaction
$D_r$: Calculated relative density
$Gamma_{max}$: Calculated maximum cyclic shear strain
Lat. disp.: Lateral displacement