UPDATED GEOTECHNICAL AND INFILTRATION EVALUATION
PROPOSED MIXED-USE DEVELOPMENT – FORSTER & EL CAMINO
31872, 31878, AND 31882 CAMINO CAPISTRANO
SAN JUAN CAPISTRANO, ORANGE COUNTY, CALIFORNIA

PREPARED FOR

CAMINO CAPISTRANO OZ, LLC
C/O URBAN ADVISORY & BUILDING GROUP, LLC.
2777 PARADISE ROAD, UNIT 3406
LAS VEGAS, NEVADA 89109

PREPARED BY

GEOTEK, INC.
1548 NORTH MAPLE STREET
CORONA, CALIFORNIA 92878

PROJECT NO. 3653-CR **OCTOBER 13, 2023**

GEOTEK

GeoTek, Inc.
1548 North Maple Street, Corona, California 92878
(951) 710-1160 Office (951) 710-1167 Fax www.geotekusa.com

October 13, 2023
Project No. 3653-CR

Camino Capistrano OZ, LLC
c/o Urban Advisory & Building Group, LLC
2777 Paradise Road, Unit 3406
Las Vegas, Nevada 89109

Attention: Mr. Brent A. Little

Subject: **Updated Geotechnical and Infiltration Evaluation**
Proposed Mixed-Use Development – Forster & El Camino
31872, 31878, and 31882 Camino Capistrano
San Juan Capistrano, Orange County, California

Dear Mr. Little:

GeoTek, Inc. (GeoTek) is pleased to provide the results of this Updated Geotechnical and Infiltration Evaluation for a proposed mixed-use development project to be located in San Juan Capistrano, Orange County, California. This report presents the results of GeoTek's evaluation, discussion of findings, and provides geotechnical recommendations for foundation design and construction.

Based upon review and evaluation, site development appears feasible from a geotechnical viewpoint provided that the recommendations included in this report are incorporated into the design and construction phases of the project.

The opportunity to be of service is sincerely appreciated. If you should have any questions, please do not hesitate to contact GeoTek.

Respectfully submitted,
GeoTek, Inc.

Edward LaMont
CEG 1892, Exp. 07/31/24
Principal Geologist

Gaby M. Bogdanoff
GE 3133, Exp. 06/30/24
Project Engineer

Kyle R. McHargue
PG 9790, Exp. 02/29/24
Project Geologist

Distribution: (1) Addressee via email (one PDF file)

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ENCLOSURES

1. PURPOSE AND SCOPE OF SERVICES

The purpose of this study was to evaluate the geotechnical engineering and geologic conditions at the project site, as outlined in GeoTek's proposal P-0804023-CR, dated August 21, 2023. Services provided for this study included the following:

- Research and review of available geologic data and general information pertinent to the site,
- Review of previous reports prepared by Salem Engineering Group, Inc.,
- Site exploration consisting of six (6) exploratory borings and four (4) Cone Penetration Test (CPT) soundings to depths ranging from about 6 to 60 feet below grade,
- Percolation testing and infiltration analysis conducted in four (4) borings drilled within the planned site underground infiltration areas,
- Laboratory testing of soil samples collected during the field investigation,
- Review and evaluation of site seismicity, and
- Preparation of this updated geotechnical report which presents GeoTek's findings, conclusions, and recommendations for this site.
- Geotechnical response to review comments prepared by LGC Geotechnical Group (dated July 20, 2021) under separate cover.

2. SITE DESCRIPTION AND PROPOSED DEVELOPMENT

2.1 SITE DESCRIPTION

The approximate 3.1-acre site is located at 31872, 31878, and 31882 Camino Capistrano in the City of San Juan Capistrano, Orange County, California. The site contains remnants of three previously existing commercial buildings which were demolished in late 2016 or early 2017. The property currently contains a decorative water fountain in the northwestern portion of the site and various parking/drive areas. Some concrete stairs, slopes and walls can also be

observed particularly in the southern portion of the site. Existing block walls are present along the south, east, and a portion of the north property lines.

Site topography is gently sloping descending to the south, from a topographic high of approximately 114 feet above mean sea level (amsl) to a low of about 101 feet amsl.

The area surrounding the site is largely characterized by commercial development. The site is bound by Camino Capistrano to the west and Historic Town Center Park to the north. Commercial buildings are present in the south and east. The property is situated about 0.25-mile northwest of San Juan Creek and approximately 0.25-mile west of Trabuco Creek. The general location of the site is shown on Figure 1.

2.2 PROPOSED DEVELOPMENT

According to the *Master Overall Site Plan* prepared by Summa Architects and dated May 02, 2023 (Figure 2), the site will be developed with four buildings (Buildings A through D). These will consist of a restaurant (Building A), a fitness/residential structure (Building B), a garage/residential structure (Building C), and a club house/leasing office (Building D). Most of the buildings will range from one to three stories in height. However, Building C will be composed of four stories and a partial basement for parking. All structures are anticipated to use slab-on-grade floors and conventional foundations.

In addition, the project will include the construction of a recreation area with a swimming pool, retaining/perimeter walls, parking/drive areas, underground utilities, and landscape as well as hardscape improvements. Per the *Preliminary WQMP Plan* by C3 Engineering, undated, two underground biofiltration chambers for stormwater management are proposed within the southern and south-eastern portions of the site. The bottoms of both chambers are planned to be about four feet below existing site grades.

Design cuts and fills of up to about five feet are anticipated to construct conventional level building pads; however, remedial grading (over-excavation and recompaction) of the building pads will also be necessary. In the area of Building C, excavations up to eight feet in height will be required to accommodate the proposed garage, which is anticipated to be partial subterranean.

No site-specific structural loads were available at the time of this evaluation. Thus, for the preparation of this report, GeoTek has assumed that the proposed five-story building (Building C) will have a wall footing load up to 4,000 pounds per linear foot and a pad footing load of up

to 30,000 pounds. Other smaller buildings are anticipated to involve lighter loads. In addition, all structures were assumed to be wood-framed.

If site development differs from the information cited above, the recommendations included in this report should be subject to further review and evaluation. Final site development and grading plans should be reviewed by GeoTek when they become available.

3. REPORT REVIEW

Salem Engineering Group, Inc. (Salem) issued a report entitled *Geotechnical and Engineering Investigation* for the subject site on July 28, 2020. The investigation by Salem included nine (9) exploratory borings which were advanced to a maximum depth of 36.5 feet below the existing grades. Salem reportedly encountered a layer of undocumented fill overlaying alluvial deposits. Salem further reported that groundwater was encountered in the southern portion of the site at approximately 29 feet below grade. Salem stated that the historic high groundwater in the site area is about 5 feet deep. Salem concluded that the liquefaction potential at the site is low with total liquefaction-induced settlement of about 1.25 inches and a differential settlement of 0.63 inches over 40 feet.

Salem recommended the removal of all unsuitable soils to expose dense natural soils prior to construction of improvements and structures. Removals on the order of three feet below existing grade or two feet below proposed footing bottom were recommended. In addition, the upper 18 inches of soil within exterior flatwork and building areas were recommended to be replaced with selected granular soils to prevent potential soil movement due to expansive soils.

Salem reported that two infiltration tests were performed at depths of approximately ten and 5.5 feet below the existing site grades within the northern portion of the site. Salem reported that the infiltration rates obtained were 0.01 inches per hour and 0.27 inches per hour. These rates do not include a factor of safety.

Seismic design parameters were provided for the project per the 2019 California Building Code (CBC). Conventional shallow foundation design recommendations were also provided for the project.

Site soils were assumed to have moderate potential for expansion with an R-value of approximately 15. Limited soil corrosivity indicated negligible concentrations of sulfates and chlorides.

Copies of the exploration logs, laboratory test results, and infiltration rates by Salem are included in Appendix A. The locations of these explorations are shown in Figure 2.

On May 4, 2023, Salem issued a letter entitled *Geotechnical Investigation Report Update*. This document provided seismic design criteria based on the 2022 CBC.

4. FIELD EXPLORATION, LABORATORY TESTING, AND PERCOLATION TESTING

4.1 FIELD EXPLORATION

The field exploration by GeoTek for this project was conducted on September 8 and September 11, 2023, and consisted of drilling six (6) exploration borings with an eight-inch hollow-stem auger drill rig and the performance of four (4) Cone Penetration Test (CPT) soundings with a 40-ton CPT truck. Because gravelly soils were encountered at various locations of the property, several of the explorations experienced refusal at shallow depths. Borings B-4 and B-5 were the deepest explorations and extended to approximately 36.5 and 51.5 feet below existing grades, respectively. The remaining borings extended to between 6 to 18 feet. It should also be noted that Boring B-4 was terminated at 36.5 feet below grade due to a localized gas pocket (hypothesized by the drillers to potentially be methane gas based on their previous experience) encountered at that depth and location. In addition, four borings for percolation testing and infiltration analysis were excavated to approximately 4 feet below grade within the area of the planned underground chambers. An engineer from GeoTek logged the excavations and collected soil samples for use in subsequent laboratory testing.

Similarly, CPT-1 and CPT-4 soundings were able to achieve a total exploration depth of about 60 feet, with the other soundings were limited to 10 to 20 feet below existing grades.

The approximate locations of the GeoTek excavations are shown on the attached Exploration Location Map (Figure 2). The logs of the exploratory borings and interpreted CPT logs are included in Appendix B.

4.2 LABORATORY TESTING

Laboratory testing was performed on selected bulk and relatively undisturbed samples collected during the field exploration. The purpose of the laboratory testing was to confirm the field classification of the materials encountered and to evaluate their physical properties for use in the engineering design and analysis. Results of the laboratory testing program along with a brief description and relevant information regarding testing procedures are included in Appendix C.

4.3 PERCOLATION TESTING

The percolation borings conducted by GeoTek for this study were eight inches in diameter and were excavated to the approximate bottom elevation of the proposed underground infiltration chambers. Two test borings were drilled per infiltration chamber (four test borings total). Percolation testing was conducted in the boreholes in general accordance with the procedures of the County of Orange.

Approximately two inches of gravel were placed in the bottom of the boreholes. A three-inch diameter perforated PVC pipe, wrapped in a filter sock, was placed in the holes and the annular space was filled with gravel to prevent caving within each borehole. Water was then placed in the borings to presoak the holes and percolation testing was performed the following the pre-soak period. The percolation tests were then performed which consisted of adding water to each test hole and measuring the water drop over a 30-minute period. The water drop was recorded for twelve test intervals. Water was added to the test holes after each test interval. The field percolation rates were then converted to an infiltration rate using the Porchet Method. The results obtained are summarized in the following table:

SUMMARY OF INFILTRATION RATES

Infiltration Chamber	Test Location	Test Depth (feet)	"Raw" Infiltration Rates (Inches/Hour)
A	I-1	4	0.0
A	I-2	4	0.0
B	I-3	4	0.3
B	I-4	4	0.0

The results of the conversions indicate infiltration rates ranged from approximately 0 to 0.3 inches per hour, indicating negligible to poor infiltration rates. Copies of the percolation data sheets and the Porchet infiltration rate conversion calculations are presented in Appendix D. No factors of safety were applied to the rates provided. Over the lifetime of the infiltration areas, the infiltration rates may be affected by sediment build up and biological activities, as well

as local variations in near surface soil conditions. A suitable factor of safety should be applied to the field rate in designing the infiltration system. Infiltration systems should satisfy setback requirements as established by the regulatory agency of jurisdiction.

It should be noted that the infiltration rates obtained above were mostly obtained in relatively undisturbed on-site soils. Infiltration rates will vary and are mostly dependent on the underlying consistency of the site soils and relative density. Infiltration rates may be impacted by weight of equipment travelling over the soils, placement of engineered fill and other various factors. GeoTek assumes no responsibility or liability for the ultimate design or performance of the storm water facility.

5. GEOLOGIC AND SOILS CONDITIONS

5.1 REGIONAL SETTING

The subject property is situated in the Peninsular Ranges geomorphic province. The Peninsular Ranges province is one of the largest geomorphic units in western North America. It extends approximately 975 miles south of the Transverse Ranges geomorphic province to the tip of Baja California. This province varies in width from about 30 to 100 miles. It is bounded on the west by the Pacific Ocean, on the south by the Gulf of California and on the east by the Colorado Desert Province.

The Peninsular Ranges are essentially a series of northwest-southeast oriented fault blocks. Several major fault zones are found in this province. The Elsinore Fault zone and the San Jacinto Fault zone trend northwest-southeast and are found near the middle of the province. The San Andreas Fault zone borders the northeasterly margin of the province.

More specific to the subject property, the site is located in an area geologically mapped to be underlain by younger alluvium (Tan, S.S., 1999).

5.2 GENERAL SOIL CONDITIONS

A brief description of the earth materials encountered is presented in the following section. Based on the site reconnaissance, the exploratory excavations by GeoTek and Salem (2020), and review of published geologic maps, the area investigated is locally underlain by undocumented fill that was placed over alluvial deposits.

5.2.1 Undocumented Fill

Undocumented fill soils were encountered all GeoTek's borings ranging in depth from approximately 2 feet to more than 7 feet. The average fill depth is about 4 feet. The fill is present throughout the property and is associated with the previous commercial usage of the site.

The fill encountered consists of silty sand, sandy clay, and clayey sand with various amounts gravel which was brown in color, slightly moist, and in a medium dense/stiff state. The fill was noted to contain trace debris and organics in some locations.

5.2.2 Alluvial Deposits

Below the undocumented fill, alluvial deposits were encountered in all the explorations and extended to about the maximum depth explored of 60 feet. The alluvium is composed of interbedded layers of lean-to fat clay, sandy clay and clayey sand with gravel, and clean to silty gravel. Fine-grained alluvial soils are predominant near the southeastern portion of the property (GeoTek's explorations B-4, CPT-1 and CPT-4; and Salem's boring B-5). More gravelly, coarse-grained soils were present across the remainder of the property where all site explorations experienced early refusal. Based on field observations, the alluvial soils are grey brown to brown, moist, and medium dense/stiff in the upper portions becoming slightly denser/stiffer with depth.

Boring B-4 encountered what was hypothesized by the driller to potentially be methane gas at a depth of 36.5 feet below grade. No other boring by GeoTek or Salem encountered gas pockets. Based on the isolated nature and depth encountered, GeoTek is of the opinion this gas will have no impact on the proposed development.

Laboratory test results indicate that the near surface soils have a "very low" expansion potential with expansion indexes ranging from 6 to 11. This is consistent with the expansion index of 6 reported by Salem (2020). However, the site grading particularly within the south-eastern portion of the site could expose some expansive soils. The laboratory test results are provided in Appendix C.

5.3 SURFACE WATER AND GROUNDWATER

5.3.1 Surface Water

If encountered during earthwork operations, surface water on this site will likely be the result of precipitation or possibly some minor surface run-off from the surrounding areas. Natural drainage at the site is interpreted to be to the south following the existing site topography in the

area. Provisions for surface drainage will need to be accounted for by the project civil engineer.

5.3.2 Groundwater

Groundwater was encountered in Boring B-4 by GeoTek at a depth of approximately 32.5 feet below existing grade and in Boring B-5 by Salem at 29 feet. Based on this, current groundwater levels are not anticipated to adversely affect the proposed development.

According to the *Seismic Hazard Zone Report for the Dana Pointe Quadrangle,* prepared by California Department of Conservation (2001), historic high groundwater in the site region is approximately 5 feet deep.

5.4 FAULTING AND SEISMICITY

5.4.1 Faulting

The geologic structure of the entire California area is dominated mainly by northwest-trending faults associated with the San Andreas system. The site is in a seismically active region. However, the site is not situated within a State of California designated *"Alquist-Priolo"* Earthquake Fault Zone or a County of San Bernardino Designated Fault Zone. The subject property is not located within a State of California Seismic Hazard Zone for earthquake-induced landsliding. The nearest zoned faults are the Elsinore Fault Zone – Glen Ivy South Fault located 19.7 miles northeast and the Newport-Inglewood-Rose Canyon Fault Zone located approximately 21.2 miles northwest of the site.

5.4.2 Seismic Design Parameters

The property is located at approximately 33.4994 degrees Latitude and -117.6616 degrees Longitude. Based on the blow counts recorded in the deepest site boring, a Site Class "D" (blow counts (Ñ) in excess of 15) seems appropriate for the site. It should be noted that while some of the site borings showed some layers of fat clays, these layers do not satisfy the requirements (Plasticity Index greater than 20, moisture content greater than 40, and undrained shear strength less than 500 psf) indicated by ASCE 7-16 for Site Class "E".

Site spectral accelerations (S_a and S_I), for 0.2 and 1.0 second periods for a Class "D" site, was determined from the SEAOC/OSHPD web interface that utilizes the USGS web services and retrieves the seismic design data and presents that information in a report format. Using the ASCE 7-16 option on the SEAOC/OSHPD website results in the values for S_{MI} and S_{DI} reported as "null-See Section 11.4.8" (of ASCE 7-16). As noted in ASCE 7-16, Section 11.4.8,

a site-specific ground motion procedure is recommended for Site Class "D" when the value S_1 exceeds 0.2. The value S_1 for the subject site exceeds 0.2.

For a site Class "D", an exception to performing a site-specific ground motion analysis is allowed in ASCE 7-16 where S_1 exceeds 0.2 provided the value of the seismic response coefficient, Cs, is conservatively calculated by Eq 12.8-2 of ASCE 7-16 for values of $T \leq 1.5Ts$ and taken as equal to 1.5 times the value computed in accordance with either Eq. 12.8-3 for $T_L \geq T > 1.5Ts$ or Eq. 12.8-4 for $T > T_L$.

The results, based on the 2015 NEHRP and the 2022 CBC, are presented in the following table as it is assumed that the exception as allowed in ASCE 7-16 is applicable. If the exception is deemed not appropriate, a site-specific ground motion analysis will be required.

SITE SEISMIC PARAMETERS BASED ON 2022 CBC VALUES	
Mapped 0.2 sec Period Spectral Acceleration, S_S	1.176g
Mapped 1.0 sec Period Spectral Acceleration, S_1	0.422g
Site Coefficient for Site Class "D", F_a	1.03
Site Coefficient for Site Class "D", F_V	1.878
Maximum Considered Earthquake Spectral Response Acceleration for 0.2 Second, S_{MS}	1.211g
Maximum Considered Earthquake Spectral Response Acceleration for 1.0 Second, S_{M1}	0.793g
5% Damped Design Spectral Response Acceleration Parameter at 0.2 Second, S_{DS}	0.807g
5% Damped Design Spectral Response Acceleration Parameter at 1 second, S_{D1}	0.529g
Peak Ground Acceleration (PGA_M)	0.554g
Seismic Design Category	D

Final selection of the appropriate seismic design coefficients should be made by the project structural engineer based upon the local practices and ordinances, expected building response and desired level of conservatism.

5.5 LIQUEFACTION AND SEISMICALLY INDUCED SETTLEMENT

Liquefaction describes a phenomenon in which cyclic stresses, produced by earthquake-induced ground motion, create excess pore pressures in relatively cohesionless soils. These soils may thereby acquire a high degree of mobility, which can lead to lateral movement, sliding, settlement of loose sediments, sand boils and other damaging deformations. This phenomenon occurs only below the water table, but, after liquefaction has developed, the effects can propagate upward into overlying non-saturated soil as excess pore water dissipates.

The factors known to influence liquefaction potential include soil type and grain size, relative density, groundwater level, soil plasticity, confining pressures, and both intensity and duration of ground shaking. In general, materials that are susceptible to liquefaction are loose, saturated granular soils having low fines content and some low plastic silts and clays under low confining pressures.

The project site is located within an area mapped by the State of California for liquefaction potential. *The City of San Juan Capistrano Safety Element* (2022) also places the site in a zone with liquefaction potential.

For GeoTek's site liquefaction analysis, a high groundwater depth of 5 feet, a peak ground acceleration (PGA_M) of 0.55g, and a modal earthquake magnitude of 7.69 were used. The ground acceleration and earthquake magnitudes were obtained from USGS websites. GeoTek evaluated the liquefaction potential of the on-site soils using the computer program *Cliq* version 3.5.2.5 (Geologismiki, 2006) along with the continuous penetration data obtained from two deep CPT soundings (i.e. CPT-1 and CPT-4). The results of the analyses indicated the presence of some scattered layers of loose sands and silty sands that would be prone to liquefaction and settlement. The following table summarizes the amount of total settlement (liquefaction settlement plus settlement of dry sands) estimated at each CPT location:

ESTIMATED SEISMICALLY INDUCED TOTAL SETTLEMENT	
CPT Sounding	Estimated Total Settlement (inches)
1	0.2
4	0.9

As noted above, seismically induced settlement could be up to 1-inch total and 0.5-inch differential over a 30-foot span. The results of the liquefaction and seismic settlement analyses are presented within Appendix E.

The site is located about 0.25-mile from both San Juan Creek and Trabuco Creek. Thus, the potential for lateral spread due to a nearby free face is nil.

5.6 OTHER SEISMIC HAZARDS

Due to the general flat terrain, the potential for seismic induced landslides is considered nil. The potential for secondary seismic hazards such as a seiche and tsunami is considered negligible due to site elevation and distance from an open body of water.

5.7 STATIC SETTLEMENT

Static settlement of the heaviest site foundations (Building C) was estimated using the computer program CPeT-IT version 3.9.1.3 (Geologismiki, 2007). The analysis was performed using an allowable soil bearing capacity of 2,500 psf and an assumed wall footing loading of about 4,000 pounds per linear foot and a pad footing loading of up to 30,000 pounds. These parameters result in a minimum wall footing width of about 1.6 feet and square pad footing of 3.5 feet. In addition, a footing depth of at least 1 foot was utilized along with a minimum depth of soil recompaction of 3 feet below the base of the footing. The analysis indicated a static settlements of approximately 0.5-inch total and 0.25-inch differential over a horizontal distance of 30 feet should be anticipated. Detailed static settlement analyses are included in Appendix F. It should be noted that the cited static settlement estimates should be updated when actual structural loads are provided by the project structural engineer.

6. CONCLUSIONS AND RECOMMENDATIONS

6.1 GENERAL

Development of the site appears feasible from a geotechnical engineering viewpoint. The following recommendations should be incorporated into the design and construction phases of development.

6.2 EARTHWORK CONSIDERATIONS

6.2.1 General

Earthwork and grading should be performed in accordance with the applicable grading ordinances of the City of San Juan Capistrano, the 2022 California Building Code (CBC), and recommendations contained in this report. The Grading Guidelines included in Appendix G outline general procedures and do not anticipate all site-specific situations. In the event of conflict, the recommendations presented in the text of this report should supersede those contained in Appendix G.

6.2.2 Site Clearing

Initial site preparation should start with demolition of existing site improvements and removal of deleterious materials and vegetation. Demolition should include removal of all pavements, floor slabs, foundations, and any other below-grade construction. These materials should be

properly disposed of off-site. Voids resulting from site clearing (such as removals of underground utilities, foundations, etc.) should be replaced with engineered fill materials.

6.2.3 Remedial Grading

All topsoil, undocumented fill, and loose alluvium should be removed to expose competent native materials. Competent native materials are defined as alluvial soils which are not visibly porous and have an in-place compaction of at least 85 percent of the soil's maximum dry density (per ASTM D 1557). A representative of this firm should observe and approve the bottom of all excavations.

Based on the data available, removals generally ranging from five to eight feet from existing grade or to a minimum of three feet below the base of footings, whichever is greater, should be performed within planned structural areas. Actual depths of removals should be determined in the field based on observation and in-place density testing. As a minimum, removals should extend down and away from foundation elements at a 1:1 (h:v) projection to the recommended removal depth, or a minimum of five feet laterally, whichever is greater. Building pads should be graded such that the maximum differential fill thickness across the pad does not exceed a 2:1 ratio.

All undocumented fills should be removed from planned pavement and hardscape areas. The subject improvement areas should be provided with a minimum of one foot of engineered compacted fill which should extend laterally at least two feet beyond the edge of the improvements.

Removals/overexcavations near property lines and/or existing improvements should be evaluated on a case-by-case basis. GeoTek estimates that removals/over-excavations near the existing wall improvements (along south, east and a portion of the north property line) should start about three feet away from the structures and extend at a 1:1 (h:v) projection into the project site to reach competent soils.

Following removal/over-excavation, the exposed materials should be scarified to a depth of about 12 inches, be moisture conditioned to slightly above the soil's optimum moisture content and then be compacted to at least 90 percent of the soil's maximum dry density as determined by ASTM D-1557 test procedures.

6.2.4 Engineered Fill

The on-site soils are generally considered suitable for reuse as engineered fill provided they are free from vegetation (including roots), debris, oversized materials (six inch diameter or

greater) and other deleterious material. Rock with a diameter of greater than six inches should be kept at least three feet below finish grade.

Concrete generated from the demolition of existing site improvements may be incorporated into site fills provided the following guidelines are implemented: 1) concrete should be free of rebar or other deleterious materials and should be broken down to a maximum dimension of six inches; 2) concrete should not be placed within three feet of finish grade in the building pad areas or within one foot of subgrade elevations in the street/drive areas; 3) concrete should be distributed in the fill and should not be "nested" or placed in concentrated pockets.

All areas should be brought to final subgrade elevations with fill materials that are placed and compacted in general accordance with minimum project standards. Engineered fill should be placed in six- to eight-inch loose lifts, moisture conditioned to slightly above the optimum moisture content, and compacted to a minimum relative compaction of 90 percent as determined by ASTM D-1557 test procedures. Placement of engineered fill should be observed and tested on a full-time basis by a GeoTek representative during grading activities.

6.2.5 Excavation Characteristics

Excavations in the existing undocumented fill and alluvium should be readily accomplished with heavy-duty earthmoving or excavating equipment in good operating condition. All excavations should be formed in accordance with current Cal-OSHA requirements.

6.2.6 Trench Excavations and Backfill

Temporary trench excavations within the on-site materials should be stable at a 1:1 (h:v) inclination for short durations during construction and where cuts do not exceed ten feet in height. Deeper temporary excavations should be reviewed by GeoTek prior to their planned excavation to determine if supplemental recommendations or analysis are warranted. It is anticipated that temporary cuts to a maximum height of four feet can be excavated vertically.

Trench excavations should conform to Cal-OSHA regulations. The contractor should have a competent person, per OSHA requirements, on site during construction to observe conditions and to make the appropriate recommendations.

Utility trench backfill should be compacted to at least 90 percent relative compaction (as determined by ASTM D-1557 test procedures). Under-slab trenches should also be compacted to project specifications. Where applicable, based on jurisdictional requirements, the top 12 inches of backfill below subgrade for road pavements should be compacted to at least 95 percent relative compaction. The onsite soils should be suitable as backfill provided particles larger than six inches are removed.

Compaction should be achieved with a mechanical compaction device. Ponding or jetting of trench backfill is not recommended. If backfill soils have dried out, they should be properly moisture conditioned prior to placement in trenches.

6.2.7 Shrinkage and Subsidence

Several factors will impact earthwork balancing on the site, including shrinkage, subsidence, trench spoil from utilities and footing excavations, as well as the accuracy of topography.

Shrinkage is primarily dependent upon the degree of compactive effort achieved during construction. For planning purposes, a shrinkage factor of 10 to 15 percent may be considered for excavations within the undocumented fill/alluvium. Site balance areas should be available to adjust project grades, depending on actual field conditions at the conclusion of site earthwork construction. A subsidence loss of up to about 0.2 foot is estimated for this site.

6.2.8 Grading Plan Review

Upon completion of the final grading plans for the site, it is recommended that those plans be provided to GeoTek for review. Based on that review, some modifications to the recommendations provided in this report may be necessary.

6.3 DESIGN RECOMMENDATIONS

6.3.1 Foundation Design Criteria

Foundation design criteria for a conventional shallow foundation system, in general conformance with the 2022 CBC, are presented below. The soils are classified as having a "very low" expansion potential in accordance with ASTM D 4829. Typical design criteria for the site based upon a "very low" expansion index is tabulated below. Portions of the site have fine-grained soils at depth that could be expansive. Foundation recommendations for "low" and/or above expansion potential may be provided based on the final site conditions.

The foundation recommendations provided below are minimal recommendations and are not intended to supersede the design by the project structural engineer. Once structural loading information is provided, revisions to the recommendations provided in this report may be necessary. The conventional foundation elements for the proposed buildings should bear entirely in engineered fill soils.

Expansion index and soluble sulfate evaluation of the soils should be performed during construction to evaluate the as-graded conditions. Final recommendations should be based upon the as-graded soils conditions.

GEOTECHNICAL RECOMMENDATIONS FOR FOUNDATION DESIGN	
Design Parameter	"Very Low" Expansion Index
Foundation Depth or Minimum Perimeter Beam Depth (inches below lowest adjacent grade)	12 – One- and Two-story 18 – Three-story 24 - Four-story and above
Minimum Foundation Width (Inches)*	12 – One- and two-story 15 – Three-story 18- Four-story and above
Minimum Slab Thickness (actual)	4 – Actual
Minimum Slab Reinforcing	6" x 6" – W1.4/W1.4 welded wire fabric, or No. 3 bars at 24-inch centers, placed in middle of slab
Minimum Footing Reinforcement	Two No. 4 reinforcing bars, one placed near the top and one near the bottom
Effective Plasticity Index	15
Presaturation of Subgrade Soil (Percent of Optimum)	Minimum of 100% of the optimum moisture content to a depth of at least 12 inches prior to placing concrete

*Code minimums per Table 1809.7 of the 2022 CBC

An allowable bearing capacity of 2,500 pounds per square foot (psf) may be used for design of continuous and perimeter footings 12 inches deep and 12 inches wide, and pad footings 24 inches square and 12 inches deep. This allowable soil bearing capacity may be increased by 400 psf for each additional foot of footing depth and 200 psf for each additional foot of footing width to a maximum value of 4,000 psf. An increase of one-third may be applied when considering short-term live loads (e.g., seismic and wind loads).

Structural foundations should be designed in accordance with the 2022 CBC, and to withstand a total static settlement of 0.5-inch and differential static settlement of one-half of the total settlement over a horizontal distance of 30 feet. Total and differential seismic settlements are anticipated to be approximately one-inch and 0.5-inch over a horizontal distance of 30 feet, respectively.

The passive earth pressure may be computed as an equivalent fluid having a density of 230 psf per foot of depth, to a maximum earth pressure of 2,500 psf for footings founded on engineered fill. A coefficient of friction between soil and concrete of 0.30 may be used with dead load forces. Passive pressure and frictional resistance may be combined without

reduction. The upper one foot of soil should be ignored in the passive pressure calculations unless the surface is covered with asphalt or concrete.

A grade beam, a minimum of 12 inches wide and 12 inches deep, should be utilized across large entrances. The base of the grade beam should be at the same elevation as the bottom of the adjoining footings.

A moisture and vapor retarding system should be placed below slabs-on-grade where moisture migration through the slab is undesirable. Guidelines for these are provided in the 2022 California Green Building Standards Code (CALGreen) Section 4.505.2, the 2022 CBC Section 1907.1, and ACI 360R-10. The vapor retarder design and construction should also meet the requirements of ASTM E 1643. A portion of the vapor retarder design should be the implementation of a moisture vapor retardant membrane.

It should be realized that the effectiveness of the vapor retarding membrane can be adversely impacted as a result of construction related punctures (e.g., stake penetrations, tears, punctures from walking on the vapor retarder placed atop the underlying aggregate layer, etc.). These occurrences should be limited as much as possible during construction. Thicker membranes are generally more resistant to accidental puncture than thinner ones. Products specifically designed for use as moisture/vapor retarders may also be more puncture resistant. Although the CBC specifies a six-mil vapor retarder membrane, it is GeoTek's opinion that a minimum ten-mil thick membrane with joints properly overlapped and sealed should be considered, unless otherwise specified by the slab design professional. The membrane should consist of Stego wrap or the equivalent.

Moisture and vapor retarding systems are intended to provide a certain level of resistance to vapor and moisture transmission through the concrete, but do not eliminate it. The acceptable level of moisture transmission through the slab is to a large extent based on the type of flooring used and environmental conditions. Ultimately, the vapor retarding system should be comprised of suitable elements to limit migration of water and reduce transmission of water vapor through the slab to acceptable levels. The selected elements should have suitable properties (i.e., thickness, composition, strength, and permeability) to achieve the desired performance level.

Moisture retarders can reduce, but not eliminate, moisture vapor rise from the underlying soils up through the slab. Moisture retarder systems should be designed and constructed in accordance with applicable American Concrete Institute, Portland Cement Association, Post-Tensioning Concrete Institute, ASTM and California Building Code requirements and guidelines.

GeoTek recommends that a qualified person, such as the flooring contractor, structural engineer, architect, and/or other experts specializing in moisture control within the building be consulted to evaluate the general and specific moisture and vapor transmission paths and associated potential impact on the proposed construction. That person (or persons) should provide recommendations relative to the slab moisture and vapor retarder systems and for migration of potential adverse impact of moisture vapor transmission on various components of the structures, as deemed appropriate.

In addition, the recommendations in this report and GeoTek's services in general are not intended to address mold prevention; since GeoTek, along with geotechnical consultants in general, do not practice in the area of mold prevention. If specific recommendations addressing potential mold issues are desired, then a professional mold prevention consultant should be contacted.

It is recommended that control joints be placed in two directions spaced approximately 24 to 36 times the thickness of the slab in inches. These joints are a widely accepted means to control cracks and should be reviewed by the project structural engineer.

6.3.2 Miscellaneous Foundation Recommendations

To reduce moisture penetration beneath the slab on grade areas, utility trench excavations should be backfilled with engineered fill, lean concrete, or concrete slurry where they intercept the perimeter footing or thickened slab edge.

Soils from the footing excavations should not be placed in the slab-on-grade areas unless properly compacted and tested. The excavations should be free of loose/sloughed materials and be neatly trimmed at the time of concrete placement.

6.3.3 Foundation Setbacks

Minimum setbacks for all foundations should comply with the 2022 CBC or City of San Juan Capistrano requirements, whichever is more stringent. Improvements not conforming to these setbacks are subject to the increased likelihood of excessive lateral movements and/or differential settlements. If large enough, these movements can compromise the integrity of the improvements. The top outside edge of all footings should be setback a minimum of H/3 (where H is the slope height) from the face of any descending slope. The setback should be at least five feet and need not exceed 40 feet.

6.4 SOIL CORROSIVITY

The soil resistivity was tested in the laboratory on two samples collected during our field exploration. The results of the testing (389 and 737 ohm-cm) indicate that the soil samples are "extremely corrosive" to buried ferrous metals, based on the guidelines provided in *Corrosion Basics: An Introduction* (Roberge, 2005). Consideration should be given to consulting with a corrosion engineer.

6.5 SULFATE AND CHLORIDE CONTENT

The sulfate content was determined in the laboratory for two soil samples obtained during GeoTek's field exploration. The results (0.028 and 0.059 percent) indicate that the water-soluble sulfate range is less than 0.1 percent by weight which is considered "not applicable" (i.e. negligible) as per Table 4.2.1 of ACI 318. Based upon the test results, no special concrete mix design is required by Code for sulfate attack resistance. In addition, the chloride content of the samples tested (22 and 156 ppm) was also very low. Additional testing of soils collected near finish grade should be performed after site grading.

6.6 RETAINING AND GARDEN WALL DESIGN AND CONSTRUCTION

6.6.1 General Design Criteria

Retaining wall foundations should be embedded a minimum of 12 inches into engineered fill. Retaining wall foundations should be designed in accordance with Section 6.3 of this report. Structural needs may govern and should be evaluated by the project structural engineer.

All earth retention structure plans, as applicable, should be reviewed by this office prior to finalization.

Earthwork considerations, site clearing and remedial earthwork for all earth retention structures should meet the requirements of this report, unless specifically provided otherwise, or more stringent requirements or recommendations are made by the designer. The backfill material placement for all earth retention structures should meet the requirement of Section 6.6.3 in this report.

In general, cantilever earth retention structures, which are designed to yield at least 0.001H, where H is equal to the height of the earth retention structure, may be designed using the "active" condition. Rigid earth retention structures (including but not limited to rigid walls,

and walls braced at top, such as typical basement walls) should be designed using the "at-rest" condition.

In addition to the design lateral forces due to retained earth, surcharges due to improvements, such as an adjacent building or traffic loading, should be considered in the design of the earth retention structures. Loads applied within a 1:1 (h:v) projection from the surcharge on the stem/footing of the earth retention structure should be considered in the design.

Proposed screen/retaining walls near property lines will require a case-by-case evaluation. If remedial grading cannot be performed within the wall foundation area, deepened footings or drilled piers embedded into competent native soil may be utilized. Alternatively, reduced soil bearing pressure and passive resistance as well as friction resistance may be recommended for conventional wall foundation design.

Final selection of the appropriate design parameters should be made by the designer of the earth retention structures.

6.6.2 Cantilevered Walls

Active earth pressure may be used for retaining wall design, provided the top of the wall is not restrained from minor deflections. An equivalent fluid pressure approach may be used to compute the horizontal pressure against the wall. Appropriate fluid unit weights are given below for specific slope gradients of the retained material. These do not include other superimposed loading conditions such as traffic, structures, seismic events, or adverse geologic conditions.

ACTIVE EARTH PRESSURES		
Surface Slope of Retained Materials (h:v)	Equivalent Fluid Pressure (pcf) Selected Native Soils*	Equivalent Fluid Pressure (pcf) Imported Soils**
Level	45	36
2:1	82	53

*The design pressures assume the backfill material consists of selected native soils with an expansion index of less than or equal to 50 and a friction angle of at least 28 degrees. Backfill zone includes area between back of the wall to a plane (1:1 horizontal: vertical) up from bottom of the wall foundation (on the backside of the wall) to the ground surface.

**The design pressures assume the backfill material consists of imported granular soils with an expansion index of less than or equal to 20 and a friction angle of at least 34 degrees. Backfill zone includes area between back of the wall to a plane (1:1 horizontal: vertical) up from bottom of the wall foundation (on the backside of the wall) to the ground surface.

According to the 2022 California Building Code, walls with retained heights greater than six feet require an incremental seismic load to be included into the wall design. Based on the Whitman and Seed Method and using a seismic coefficient of 0.18g, an equivalent fluid pressure of 17 pcf is recommended for design of walls for seismic conditions. The incremental seismic pressure can be approximated by a conventional triangular distribution.

6.6.3 Restrained Retaining Walls

Retaining walls that will be restrained at the top that support level backfill or that have reentrant or male corners, should be designed for an equivalent at-rest fluid pressure of 67 pcf, plus any applicable surcharge loading, if selected native materials are utilized as backfill. For imported granular backfill, an at-rest equivalent fluid pressure of 57 pcf should be used. For areas of male or reentrant corners, the restrained wall design should extend a minimum distance of twice the height of the wall laterally from the corner, or a distance otherwise determined by the project structural engineer.

6.6.4 Retaining Wall Backfill and Drainage

The wall backfill should also include a minimum one-foot-wide section of ¾- to 1-inch clean crushed rock (or an approved equivalent) and should have the properties outlined in section 6.6.2. The rock should be placed immediately adjacent to the back of the wall and extend up from a back drain to within approximately 24 inches of the finish grade. The upper 24 inches should consist of compacted on-site materials. The rock should be separated from the earth with filter fabric. The presence of other materials might necessitate revision of the parameters provided and modification of the wall designs. The backfill materials should be placed in lifts no greater than eight inches in thickness and compacted to a minimum of 90% relative compaction as determined by ASTM D 1557 test procedures. Proper surface drainage needs to be provided and maintained.

As an alternative to the drain, rock and fabric, a pre-manufactured wall drainage product (example: Mira Drain 6000 or approved equivalent) may be used behind the retaining wall. The wall drainage product should extend from the base of the wall to within two feet of the ground surface. The subdrain should be placed in direct contact with the wall drainage product.

Retaining walls should be provided with an adequate pipe and gravel back drain system to help prevent buildup of hydrostatic pressures. Backdrains should consist of a four-inch diameter perforated collector pipe (Schedule 40, SDR 35, or approved equivalent) embedded in a minimum of one-cubic foot per linear foot of ¾ to 1-inch clean crushed rock or an approved equivalent, wrapped in filter fabric (Mirafi 140N or an approved equivalent). The drain system should be connected to a suitable outlet. Waterproofing of site walls should be performed where moisture migration through the walls is undesirable.

6.6.5 Other Design Considerations

- Wall design should consider the additional surcharge loads from superjacent slopes and/or footings, where appropriate.
- No backfill should be placed against concrete until minimum design strengths are evident by compression tests of cylinders.
- The retaining wall footing excavations, backcuts, and backfill materials should be approved by the project geotechnical engineer or their authorized representative.
- Positive separations should be provided in garden walls at horizontal distances not exceeding 20 feet.

6.7 POOL CONSTRUCTION

The proposed swimming pool should derive support entirely from engineered fill. A minimum 12 inches of fill compacted to at least 90 percent of the soil's maximum dry density per ASTM D 1557 should be provided below the pool shell.

The pool walls should be designed for at-rest soil conditions using an equivalent fluid pressure of 67 pcf. Pool walls surcharged by adjacent structures should be designed for additional pressures. Alternatively, the pool walls may be designed as freestanding walls using the active soil state conditions provided that some lateral movement of the pool walls would be acceptable. If the active state is to be used, an equivalent fluid pressure of 45 pcf is considered suitable. These recommended pressures assume that native soil is used as wall backfill and is in a drained condition. If a drain system adjacent/beneath the pool is not provided, the pool walls should then be designed for an equivalent fluid pressure of 100 pcf for the at-rest condition and 90 pcf for the active condition. Due to the historical high groundwater depth, GeoTek recommends drains with a relief valve to relieve potential hydrostatic pressure.

As noted above, the use of the lower (drained condition) at-rest or active soil pressures will require a subdrain system beneath/adjacent to the pool. A typical subdrain system includes a series of four-inch diameter perforated drain pipes encapsulated with at least one cubic foot of free-draining material per linear foot of pipe. The free-draining material should be encapsulated within a geotextile to prevent migration of fines into the drainage medium. The drain pipes should be routed to an acceptable discharge location, as determined by the civil engineer/pool designer. If desired, GeoTek can review the subdrain system once designed to determine if additional measures are warranted.

Pool decking supported on grade should be separated from the pool bond beam by a full-depth, mastic construction joint. If it is desired to extend the pool deck over the bond beam,

consideration should be given to designing the deck as a structural slab supported by the pool shell. This will reduce the possibility of deck cracking occurring along the outer edge of the bond beam. GeoTek also recommends that the pool decking subgrade be "pre-saturated" prior to concrete placement. The subgrade soils should be moisture conditioned to at least 100 percent of the soil's optimum moisture content to a depth of 12 inches, prior to concrete placement. Testing by the geotechnical engineer is recommended to confirm that the soil has been adequately moisture treated.

Pool decking may consist of five-inch-thick concrete and the use of reinforcement is suggested. A minimum of No. 4 rebars spaced 24 inches each way or equivalent should be placed at mid-height of the concrete slab. Control joints should be placed in two directions and located a distance apart approximately equal to 24 to 36 times the slab thickness. The pool designer should provide final design recommendations.

While the site soil was tested and determined to have a negligible (S0 Category) sulfate content (see Section 6.5), concrete in swimming pool areas will be subject to moisture and external sources of chloride (C2 Category). Therefore, concrete for pool construction should have a minimum compressive strength of 5,000 psi and maximum water-cement ratio of 0.4. A minimum concrete cover of 3 inches should be provided for steel reinforcement to prevent corrosion.

6.8 PRELIMINARY PAVEMENT DESIGN RECOMMENDATIONS

The following preliminary pavement design recommendations are based on assumed Traffic Indexes (TI) of 5.0 and 6.0 for onsite parking and driving areas. Based on the variable nature of the site soils, R-values ranging from 5 to 30 are anticipated to be encountered within pavement areas. The following preliminary pavement recommendations are provided for the site per CalTrans Highway Design Manual (2018)

PRELIMINARY PAVEMENT SECTIONS		
TI (Pavement Area)	Design R-Value	Estimated Pavement Section
5.0	5	3" AC/10" AB
	30	3" AC/6" AB
6.0	5	4" AC/12" AB
	30	4" AC/7" AB

Once the traffic loading information becomes more defined, revision to the pavement design recommendations may be warranted. It is recommended that the final pavement design be based on R-value testing of the as-graded subgrade soils within the pavement areas.

TIs used in the pavement design should provide a pavement life of approximately 20 years with a normal amount of flexible pavement maintenance. Irrigation adjacent to pavements, without a deep curb or other cutoff to separate landscaping from the paving may result in premature pavement failure.

All base material and the upper 12 inches of subgrade should be compacted to at least 95 percent of the material's maximum dry density as determined by ASTM D 1557 test procedures. All materials and methods of construction should conform to the requirements of the City of San Juan Capistrano.

6.9 CONCRETE CONSTRUCTION

6.9.1 General

Concrete construction should follow the 2022 CBC and ACI guidelines regarding design, mix placement and curing of the concrete. If desired, GeoTek could provide quality control testing of the concrete during construction.

6.9.2 Concrete Mix Design

As discussed in Section 6.5 and Appendix D, no special recommendations for concrete are required for this project due to soil sulfate exposure. Additional testing should be performed during grading, so that additional recommendations (if required) can be formulated based on the as-graded conditions. Special concrete mix designs will be required for planned pool improvements (See Section 6.7).

6.9.3 Concrete Flatwork

Exterior concrete slabs, sidewalks, and driveways should be designed using a four-inch minimum thickness. No specific reinforcement is required from a geotechnical perspective. However, some shrinkage and cracking of the concrete should be anticipated as a result of typical mix designs and curing practices commonly utilized in construction.

Sidewalks and driveways may be under the jurisdiction of the governing agency. If so, jurisdictional design and construction criteria would apply, if more restrictive than the recommendations presented in this report.

Subgrade soils should be pre-moistened prior to placing concrete. The subgrade soils below exterior flatwork should be pre-saturated to a minimum of 100 percent of optimum moisture content to a depth of at least 12 inches.

All concrete installation, including preparation and compaction of subgrade, should be done in accordance with the City of San Juan Capistrano specifications, and under the observation and testing of GeoTek and a City inspector, if necessary

6.9.4 Concrete Performance

Concrete cracks should be expected. These cracks can vary from sizes that are hairline to more than 1/8 inch in width. Most cracks in concrete while unsightly do not significantly impact long-term performance. While it is possible to take measures (proper concrete mix, placement, curing, control joints, etc.) to reduce the extent and size of cracks that occur, some cracking will occur despite the best efforts to minimize it. Concrete undergoes chemical processes that are dependent on a wide range of variables, which are difficult, at best, to control. Concrete, while seemingly a stable material, is subject to internal expansion and contraction due to external changes over time.

One of the simplest means to control cracking is to provide weakened control joints for cracking to occur along. These do not prevent cracks from developing; they simply provide a relief point for the stresses that develop. These joints are a widely accepted means to control cracks but are not always effective. Control joints are more effective the more closely spaced they are. GeoTek suggests that control joints be placed in two orthogonal directions and located a distance apart approximately equal to 24 to 36 times the slab thickness.

6.10 PLAN REVIEW AND CONSTRUCTION OBSERVATIONS

It is recommended that site grading, specifications, and foundation plans be reviewed by this office prior to construction to check for conformance with the recommendations of this report. It is also recommended that GeoTek representatives be present during site grading and foundation construction to observe and document for proper implementation of the geotechnical recommendations. The owner/developer should have GeoTek perform at least the following duties:

- Observe site clearing and grubbing operations for proper removal of all unsuitable materials.
- Observe and test bottom of removals prior to fill placement.

- Evaluate the suitability of on-site and import materials for fill placement and collect soil samples for laboratory testing where necessary.
- Observe the fill for uniformity during placement, including utility trench excavation backfill. Also, test the fill for density, relative compaction and moisture content.
- Observe and probe foundation excavations to confirm suitability of bearing materials with respect to density.

If requested, a construction observation and compaction report can be provided by GeoTek which can comply with the requirements of the governmental agencies having jurisdiction over the project. It is recommended that these agencies be notified prior to commencement of construction so that necessary grading permits can be obtained.

7. INTENT

It is the intent of this report to aid in the design and construction of the proposed development. Implementation of the advice presented in this report is intended to reduce risk associated with construction projects. The professional opinions and geotechnical advice contained in this report are not intended to imply total performance of the project or guarantee that unusual or variable conditions will not be discovered during or after construction.

The scope of GeoTek's evaluation is limited to the area explored that is shown on the Exploration Location Map (Figure 2). This evaluation does not and should in no way be construed to encompass any areas beyond the specific area of the proposed construction as indicated to GeoTek by the client. Further, no evaluation of any existing site improvements is included. The scope is based on GeoTek's understanding of the project and the client's needs, GeoTek's proposal (Proposal No. P-0804023-CR) dated August 21, 2023, and geotechnical engineering standards normally used on similar projects in this region.

8. LIMITATIONS

GeoTek's findings are based on site conditions observed and the stated sources. Thus, GeoTek's comments are professional opinions that are limited to the extent of the available data.

GeoTek has prepared this report in a manner consistent with that level of care and skill ordinarily exercised by members of the engineering at this time and location and science professions currently practicing under similar conditions in the jurisdiction in which the services are provided, subject to the time limits and physical constraints applicable to this report.

Since GeoTek's recommendations are based on the site conditions observed and encountered at the stated times and laboratory testing. Thus, GeoTek's conclusions and recommendations are professional opinions that are limited to the extent of the available data. Observations during construction are important to allow for any change in recommendations found to be warranted. These opinions have been derived in accordance with current standards of practice and no warranty of any kind is expressed or implied. Standards of care/practice are subject to change with time.

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APPENDIX A

LOGS OF EXPLORATIONS AND LABORATORY TEST RESULTS BY SALEM ENGINEERING GROUP, INC. (2020)

Updated Geotechnical and Infiltration Evaluation

San Juan Capistrano, California

Project No. 3653-CR

GEOTEK

SALEM
engineering group, inc.

Test Boring: B-1 **Page** 1 **Of:** 1

Project Number: 3-220-0514

Date: 07/09/2020

Client: Frontier Real Estate Investments

Project: Proposed Apartment and Retail Development

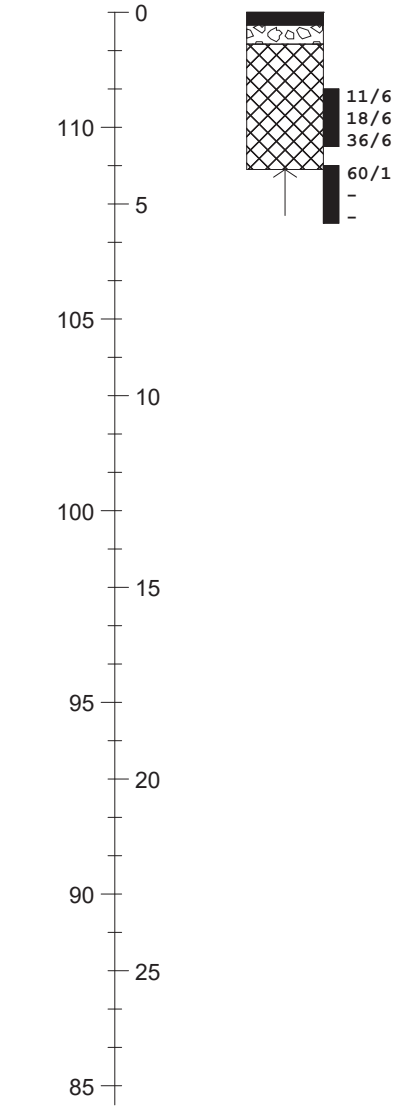
Location: 31872, 31878, 31882 Camino Capristrano, San Juan Capristrano, California

Drilled By: SALEM **Logged By:** EGR

Drill Type: CME 55 **Elevation:** 113'

Auger Type: 6 in Solid Flight Auger **Initial Depth to Groundwater:** N/A

Hammer Type: Automatic Trip - 140 lb/30 in **Final Depth to Groundwater:** N/A



ELEVATION/ DEPTH (feet)	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Soil Description	N-Values blows/ft.	Moisture Content %	Dry Density, PCF	Remarks
		AC	Asphalt Concrete = 4 in.				
		AB	Aggregate Base = 6 in.				
		GM	FILL Silty GRAVEL with Sand Dense; moist; brown; fine to coarse gravel; fine to medium grain sand; trace clay. Very dense at 4'.	54 60/1"	6.4 3.8	111.2 -	
			Auger refusal at 4 feet due to excessive gravel.				

Notes:

Figure Number A-1

SALEM
engineering group, inc.

Test Boring: B-2 **Page** 1 **Of:** 1

Project Number: 3-220-0514

Date: 07/09/2020

Client: Frontier Real Estate Investments

Project: Proposed Apartment and Retail Development

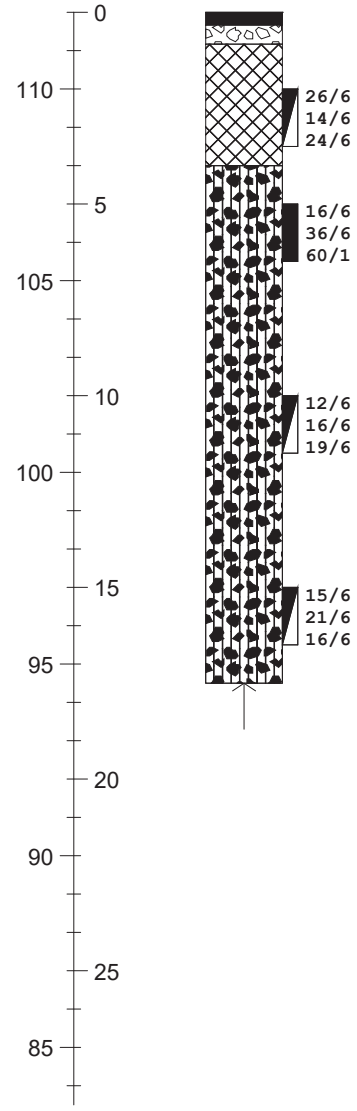
Location: 31872, 31878, 31882 Camino Capristrano, San Juan Capristrano, California

Drilled By: SALEM **Logged By:** EGR

Drill Type: CME 55 **Elevation:** 112'

Auger Type: 6 in Solid Flight Auger **Initial Depth to Groundwater:** N/A

Hammer Type: Automatic Trip - 140 lb/30 in **Final Depth to Groundwater:** N/A



ELEVATION/ DEPTH (feet)	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Soil Description	N-Values blows/ft.	Moisture Content %	Dry Density, PCF	Remarks
		AC	Asphalt Concrete = 4 in.				
		AB	Aggregate Base = 6 in.				
		SC	FILL Clayey SAND Dense; moist; brown; fine to	38	9.5	-	
		GM	medium grain sand; with fine gravel.	96/7"	9.6	95.2	Partially disturbed sample.
			Silty GRAVEL with Sand Very dense; moist; brown; fine to coarse gravel; medium to coarse grain sand.				
			Grades as above; dense.	35	8.1	-	
			Grades as above.	37	10.1	-	
			Auger refusal at 17.5 feet BSG.				

Notes:

Figure Number A-2

SALEM
engineering group, inc.

Test Boring: B-3 **Page** 1 **Of:** 1

Project Number: 3-220-0514

Date: 07/09/2020

Client: Frontier Real Estate Investments

Project: Proposed Apartment and Retail Development

Location: 31872, 31878, 31882 Camino Capristrano, San Juan Capristrano, California

Drilled By: SALEM **Logged By:** EGR

Drill Type: CME 55 **Elevation:** 113'

Auger Type: 6 in Solid Flight Auger **Initial Depth to Groundwater:** N/A

Hammer Type: Automatic Trip - 140 lb/30 in **Final Depth to Groundwater:** N/A

ELEVATION/ DEPTH (feet)	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Soil Description	N-Values blows/ft.	Moisture Content %	Dry Density, PCF	Remarks
0 / 110	60/2 - -	AC	Asphalt Concrete = 4 in.	60/2"	-	-	No recovery.
		AB	Aggregate Base = 6 in.				
		GM	FILL Silty GRAVEL with Sand Very dense; moist; brown; fine to coarse gravel; fine to coarse grain sand.				
5 / 105			Auger refusal at 1.5 feet BSG.				
10 / 100							
15 / 95							
20 / 90							
25 / 85							

Notes:

Figure Number A-3

SALEM engineering group, inc.

Test Boring: B-4 **Page** 1 **Of:** 1

Project Number: 3-220-0514

Date: 07/09/2020

Client: Frontier Real Estate Investments

Project: Proposed Apartment and Retail Development

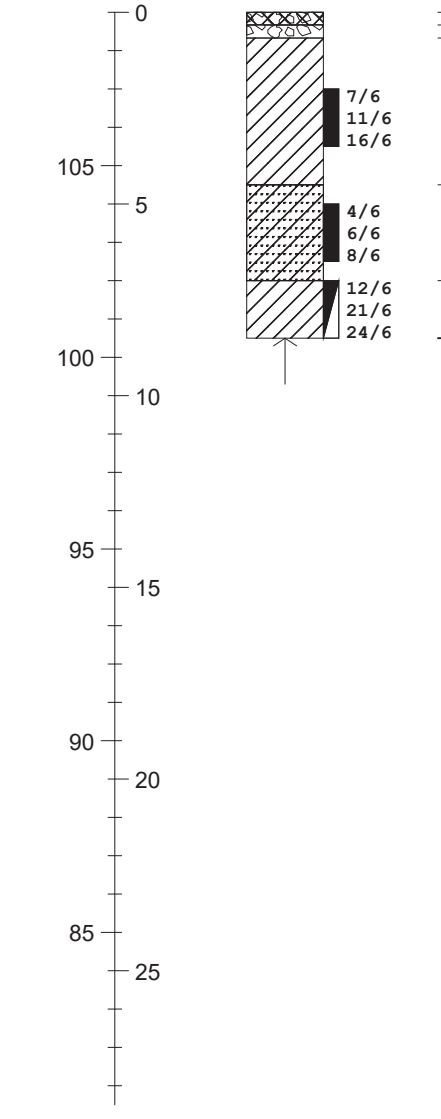
Location: 31872, 31878, 31882 Camino Capristrano, San Juan Capristrano, California

Drilled By: SALEM **Logged By:** EGR

Drill Type: CME 55 **Elevation:** 109'

Auger Type: 6 in Solid Flight Auger **Initial Depth to Groundwater:** N/A

Hammer Type: Automatic Trip - 140 lb/30 in **Final Depth to Groundwater:** N/A



ELEVATION/ DEPTH (feet)	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Soil Description	N-Values blows/ft.	Moisture Content %	Dry Density, PCF	Remarks
		PCC	portland Cement Concrete = 4 in.				
		AB	Aggregate Base = 4 in.				
		CL	POTENTIAL FILL Sandy CLAY Very stiff; moist; dark brown; fine grain sand; with gravel.	27	9.8	110.8	
		SC	Clayey SAND Loose; moist; dark brown; fine to medium grain sand.	14	8.8	104.3	
		CL	Sandy CLAY Hard; moist; dark brown; fine grain sand; with gravel and cobbles.	45	20.7	-	
			Auger refusal at 8.5 feet BSG.				

Notes:

Figure Number A-4

SALEM
engineering group, inc.

Test Boring: B-5 **Page** 1 **Of:** 2

Project Number: 3-220-0514

Date: 07/09/2020

Client: Frontier Real Estate Investments

Project: Proposed Apartment and Retail Development

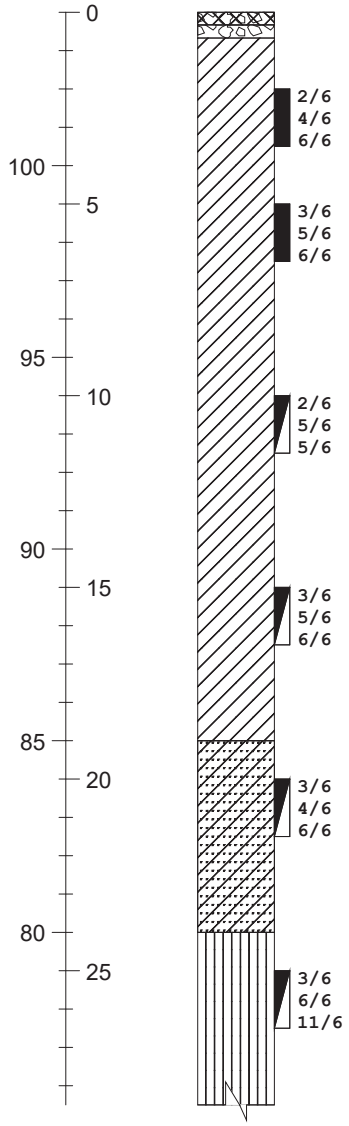
Location: 31872, 31878, 31882 Camino Capristrano, San Juan Capristrano, California

Drilled By: SALEM **Logged By:** EGR

Drill Type: CME 55 **Elevation:** 104'

Auger Type: 6 in Solid Flight Auger **Initial Depth to Groundwater:** 29'

Hammer Type: Automatic Trip - 140 lb/30 in **Final Depth to Groundwater:** 29'



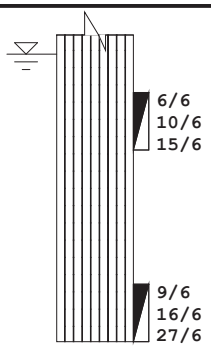
ELEVATION/ DEPTH (feet)	USCS	Soil Description	N-Values blows/ft.	Moisture Content %	Dry Density, PCF	Remarks
	PCC	portland Cement Concrete = 4 in.				
	AB	Aggregate Base = 4 in.				
	CL	CLAY with Sand Firm; moist; dark brown; fine grain sand.	10	23.1	99.5	LL=36 PI=17
		Grades as above; stiff.	11	24.8	98.3	
		Grades as above.	10	23.1	-	
		Grades as above; with gravel.	11	17.8	-	
	SC	Clayey SAND Loose; very moist; brown; fine to medium grain sand; trace gravel.	10	13.8	-	
	ML	Clayey SILT with Sand Very stiff; wet; dark gray; fine grain sand.	17	36.6	-	

Notes:

Figure Number A-5

SALEM engineering group, inc.

Project Number: 3-220-0514
Date: 07/09/2020
Test Boring: B-5

ELEVATION/ DEPTH (feet)	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Soil Description	N-Values blows/ft.	Moisture Content %	Dry Density, PCF	Remarks
75 / 30		ML	SILT with Sand Very stiff; saturated; dark gray; fine grain sand.	25	29.9	-	
70 / 35			Grades as above; hard.	43	27.1	-	
65 / 40			End of boring at 36.5 feet BSG.				
60 / 45							
55 / 50							
50 / 55							
45 / 60							

Notes:

Figure Number A-5

SALEM
engineering group, inc.

Test Boring: B-6 **Page** 1 **Of:** 1

Project Number: 3-220-0514

Date: 07/09/2020

Client: Frontier Real Estate Investments

Project: Proposed Apartment and Retail Development

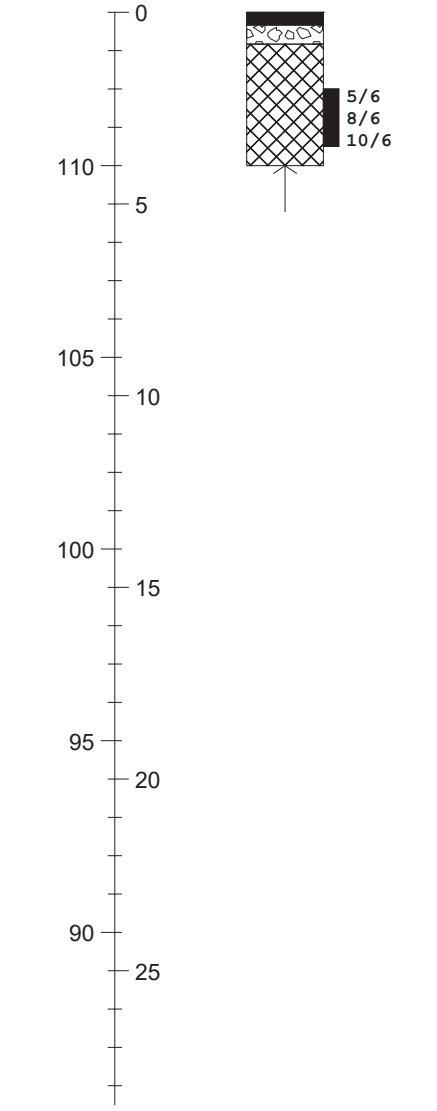
Location: 31872, 31878, 31882 Camino Capristrano, San Juan Capristrano, California

Drilled By: SALEM **Logged By:** EGR

Drill Type: CME 55 **Elevation:** 114'

Auger Type: 6 in Solid Flight Auger **Initial Depth to Groundwater:** N/A

Hammer Type: Automatic Trip - 140 lb/30 in **Final Depth to Groundwater:** N/A



ELEVATION/ DEPTH (feet)	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Soil Description	N-Values blows/ft.	Moisture Content %	Dry Density, PCF	Remarks
		AC	Asphalt Concrete = 4 in.				
		AB	Aggregate Base = 6 in.				
	5/6 8/6 10/6	SC	FILL Gravelly Clayey SAND Medium dense; moist; brown; fine to coarse grain sand; fine to coarse gravel.	18	9.0	-	Disturbed sample.
			Auger refusal at 4 feet.				

Notes:

Figure Number A-6

SALEM
engineering group, inc.

Test Boring: B-7 **Page** 1 **Of:** 1

Project Number: 3-220-0514

Date: 07/09/2020

Client: Frontier Real Estate Investments

Project: Proposed Apartment and Retail Development

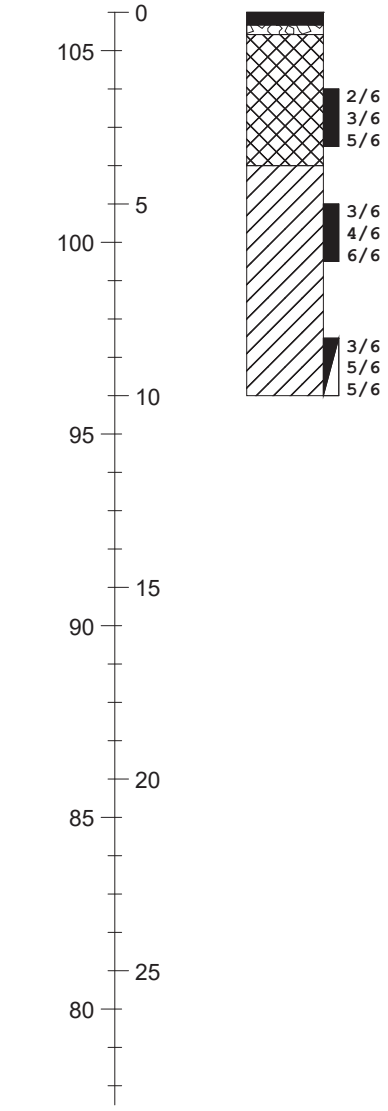
Location: 31872, 31878, 31882 Camino Capristrano, San Juan Capristrano, California

Drilled By: SALEM **Logged By:** EGR

Drill Type: CME 55 **Elevation:** 106'

Auger Type: 6 in Solid Flight Auger **Initial Depth to Groundwater:** N/A

Hammer Type: Automatic Trip - 140 lb/30 in **Final Depth to Groundwater:** N/A



ELEVATION/ DEPTH (feet)	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Soil Description	N-Values blows/ft.	Moisture Content %	Dry Density, PCF	Remarks
		AC	Asphalt Concrete = 4 in.				
		AB	Aggregete Base = 3 in.				
		CL	FILL Sandy CLAY Firm; moist; dark brown; fine to	8	21.7	94.4	
		CL	medium grain sand; with fine gravel.	10	20.2	100.7	
			Sandy CLAY Firm; moist; brown; fine grain sand.				
			Grades as above; stiff.	10	22.0	-	
			End of boring at 10 feet BSG.				

Notes:

Figure Number A-7

SALEM
engineering group, inc.

Test Boring: B-8 **Page** 1 **Of:** 1

Project Number: 3-220-0514

Date: 07/09/2020

Client: Frontier Real Estate Investments

Project: Proposed Apartment and Retail Development

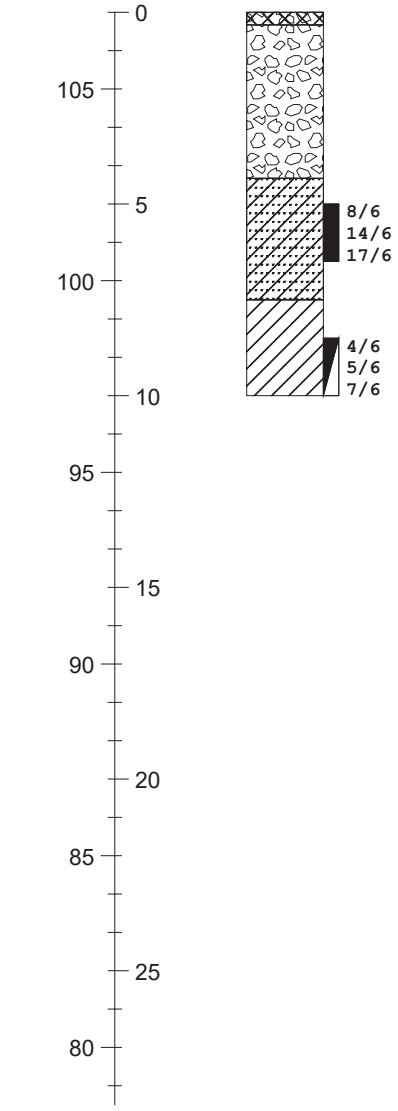
Location: 31872, 31878, 31882 Camino Capristrano, San Juan Capristrano, California

Drilled By: SALEM **Logged By:** EGR

Drill Type: CME 55 **Elevation:** 107'

Auger Type: 6 in Solid Flight Auger **Initial Depth to Groundwater:** N/A

Hammer Type: Automatic Trip - 140 lb/30 in **Final Depth to Groundwater:** N/A



ELEVATION/ DEPTH (feet)	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Soil Description	N-Values blows/ft.	Moisture Content %	Dry Density, PCF	Remarks
		PCC	portland Cement Concrete = 4 in.				
		AB	Aggregate Base = 48 in.				
	8/6 14/6 17/6	SC	Clayey SAND Medium dense; moist; brown; fine grain sand; with gravel.	31	9.7	99.3	
	4/6 5/6 7/6	CL	Sandy CLAY Stiff; moist; dark gray; fine grain sand.	12	24.2	-	
			End of boring at 10 feet BSG.				

Notes:

Figure Number A-8

SALEM
engineering group, inc.

Test Boring: B-9 **Page** 1 **Of:** 1

Project Number: 3-220-0514

Date: 07/09/2020

Client: Frontier Real Estate Investments

Project: Proposed Apartment and Retail Development

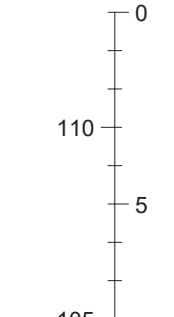
Location: 31872, 31878, 31882 Camino Capristrano, San Juan Capristrano, California

Drilled By: SALEM **Logged By:** EGR

Drill Type: CME 55 **Elevation:** 113'

Auger Type: 6 in. Solid Flight Auger **Initial Depth to Groundwater:** N/A

Hammer Type: Automatic Trip - 140 lb/30 in **Final Depth to Groundwater:** N/A



ELEVATION/ DEPTH (feet)	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Soil Description	N-Values blows/ft.	Moisture Content %	Dry Density, PCF	Remarks
		PCC	portland Cement Concrete = 4 in.				
		AB	Aggregate Base = 8 in.				
		CL	FILL CLAY with Sand Very stiff; moist; brown; fine grain sand.	21	17.8	113.1	LL=39 PI=24
		SC	Clayey SAND Very dense; moist; brown; fine grain sand; with gravel and cobbles.	60/4"	6.5	111.2	
			Auger refusal at 6.5 feet BSG.				

Notes:

Figure Number A-9

KEY TO SYMBOLS

Symbol	Description
Strata symbols	
	Asphaltic Concrete
	Aggregate Base
	Fill
	Silty gravel
	Portland Cement Concrete
	Lean Clay
	Clayey sand
	Silt
Misc. Symbols	
	Drill rejection
	Boring continues
	Water table during drilling

Symbol	Description
Soil Samplers	
	California sampler
	Standard penetration test

Notes:

Granular Soils
Blows Per Foot (Uncorrected)

	MCS	SPT
Very loose	<5	<4
Loose	5-15	4-10
Medium dense	16-40	11-30
Dense	41-65	31-50
Very dense	>65	>50

Cohesive Soils
Blows Per Foot (Uncorrected)

	MCS	SPT
Very soft	<3	<2
Soft	3-5	2-4
Firm	6-10	5-8
Stiff	11-20	9-15
Very Stiff	21-40	16-30
Hard	>40	>30

MCS = Modified California Sampler
SPT = Standard Penetration Test Sampler

Percolation Test Worksheet

Project: **Proposed Apartment and Retail Development** **Job No.:** **3-220-0514**
31872, 31878, 31882 Camino Capistro **Date Drilled:** **7/9/2020**
San Juan Capistrano, California **Soil Classification:** **Sandy CLAY (CL)**

Hole Radius: 4 in.
Pipe Dia.: 3 in.
Total Depth of Hole: 120 in.

Test Hole No.: **P-1** **Presoaking Date:** **7/9/2020**
Tested by: **JC** **Test Date:** **7/10/2020**
Drilled Hole Depth: **10.0** ft. Pipe Stick up: 2.0 ft.

Time Start	Time Finish	Depth of Test Hole (ft)#	Refill-Yes or No	Elapsed Time (hrs:min)	Initial Water Level# (ft)	Final Water Level# (ft)	Δ Water Level (in.)	Δ Min.	Meas. Perc Rate (min/in)	Initial Height of Water (in)	Final Height of Water (in)	Average Height of Water (in)	Infiltration Rate, It (in/hr)
11:55	12:25	12.0	Y	0:30	8.35	8.36	0.12	30	250.0	43.8	43.7	43.7	0.01
12:25	12:55	12.0	N	0:30	8.36	8.37	0.12	30	250.0	43.7	43.6	43.6	0.01
12:55	13:25	12.0	N	0:30	8.37	8.38	0.12	30	250.0	43.6	43.4	43.5	0.01
13:25	13:55	12.0	N	0:30	8.38	8.39	0.12	30	250.0	43.4	43.3	43.4	0.01
13:55	14:25	12.0	N	0:30	8.39	8.40	0.12	30	250.0	43.3	43.2	43.3	0.01
14:25	14:55	12.0	N	0:30	8.40	8.41	0.12	30	250.0	43.2	43.1	43.1	0.01
14:55	15:25	12.0	N	0:30	8.41	8.42	0.12	30	250.0	43.1	43.0	43.0	0.01
15:25	15:55	12.0	N	0:30	8.42	8.43	0.12	30	250.0	43.0	42.8	42.9	0.01
15:55	16:25	12.0	N	0:30	8.43	8.44	0.12	30	250.0	42.8	42.7	42.8	0.01
16:25	16:55	12.0	N	0:30	8.44	8.45	0.12	30	250.0	42.7	42.6	42.7	0.01
16:55	17:25	12.0	N	0:30	8.45	8.46	0.12	30	250.0	42.6	42.5	42.5	0.01
17:25	17:55	12.0	N	0:30	8.46	8.47	0.12	30	250.0	42.5	42.4	42.4	0.01
Recommended for Design:										**Infiltration Rate**			**0.01**

SALEM engineering group, inc.

Percolation Test Worksheet

Project: **Proposed Apartment and Retail Development** **Job No.:** **3-220-0514**
31872, 31878, 31882 Camino Capistrono **Date Drilled:** **7/9/2020**
San Juan Capistrano, California **Soil Classification:** **Clayey SAND (SC)**

Hole Radius: 4 in.
Pipe Dia.: 3 in.
Total Depth of Hole: 66 in.

Test Hole No.: **P-2** **Presoaking Date:** **7/9/2020**
Tested by: **JC** **Test Date:** **7/10/2020**
Drilled Hole Depth: **5.5** ft.
Pipe Stick up: 2.0 ft.

Time Start	Time Finish	Depth of Test Hole (ft)#	Refill-Yes or No	Elapsed Time (hrs:min)	Initial Water Level# (ft)	Final Water Level# (ft)	Δ Water Level (in.)	Δ Min.	Meas. Perc Rate (min/in)	Initial Height of Water (in)	Final Height of Water (in)	Average Height of Water (in)	Infiltration Rate, It (in/hr)
11:50	12:20	7.5	Y	0:30	4.65	4.92	3.24	30	9.3	34.2	31.0	32.6	0.37
12:20	12:50	7.5	N	0:30	4.92	5.15	2.76	30	10.9	31.0	28.2	29.6	0.35
12:50	13:20	7.5	N	0:30	5.15	5.34	2.28	30	13.2	28.2	25.9	27.1	0.31
13:20	13:50	7.5	N	0:30	5.34	5.51	2.04	30	14.7	25.9	23.9	24.9	0.30
13:50	14:20	7.5	N	0:30	5.51	5.67	1.92	30	15.6	23.9	22.0	22.9	0.31
14:20	14:50	7.5	N	0:30	5.67	5.81	1.68	30	17.9	22.0	20.3	21.1	0.29
14:50	15:20	7.5	N	0:30	5.81	5.94	1.56	30	19.2	20.3	18.7	19.5	0.29
15:20	15:50	7.5	N	0:30	5.94	6.06	1.44	30	20.8	18.7	17.3	18.0	0.29
15:50	16:20	7.5	N	0:30	6.06	6.17	1.32	30	22.7	17.3	16.0	16.6	0.28
16:20	16:50	7.5	N	0:30	6.17	6.27	1.20	30	25.0	16.0	14.8	15.4	0.28
16:50	17:20	7.5	N	0:30	6.27	6.36	1.08	30	27.8	14.8	13.7	14.2	0.27
17:20	17:50	7.5	N	0:30	6.36	6.45	1.08	30	27.8	13.7	12.6	13.1	0.29
Recommended for Design:										**Infiltration Rate**			**0.27**

SALEM engineering group, inc.

APPENDIX B

BORING AND CPT LOGS BY GEOTEK

Updated Geotechnical and Infiltration Evaluation
San Juan Capistrano, California
Project No. 3653-CR

GEOTEK

A - FIELD TESTING AND SAMPLING PROCEDURES

The Modified Split-Barrel Sampler (Ring)

The ring sampler is driven into the ground in accordance with ASTM Test Method D 3550. The sampler, with an external diameter of 3.0 inches, is lined with 1-inch long, thin brass rings with inside diameters of approximately 2.4 inches. The sampler is typically driven into the ground 12 or 18 inches with a 140-pound hammer free falling from a height of 30 inches. Blow counts are recorded for every 6 inches of penetration as indicated on the logs of borings. The samples are removed from the sample barrel in the brass rings, sealed, and transported to the laboratory for testing.

Bulk Samples (Large)

These samples are normally large bags of earth materials over 20 pounds in weight collected from the field by means of hand digging or exploratory cuttings.

Bulk Samples (Small)

These are plastic bag samples which are normally airtight and contain less than five pounds in weight of earth materials collected from the field by means of hand digging or exploratory cuttings. These samples are primarily used for determining natural moisture content and classification indices.

B - BORING LOG LEGEND

The following abbreviations and symbols often appear in the classification and description of soil and rock on the logs of borings:

SOILS

USCS	Unified Soil Classification System
f-c	Fine to coarse
f-m	Fine to medium

GEOLOGIC

B: Attitudes	Bedding: strike/dip
J: Attitudes	Joint: strike/dip
C: Contact line	
……..	Dashed line denotes USCS material change
———	Solid Line denotes unit / formational change
———	Thick solid line denotes end of boring

(Additional denotations and symbols are provided on the boring logs)

GeoTek, Inc.

LOG OF EXPLORATORY BORING

CLIENT:	Urban Advisory & Building Group	**DRILLER:**	2R Drilling	**LOGGED BY:**	KIG
PROJECT NAME:	31872 Camino Capistrano	**DRILL METHOD:**	Hollow Stem	**OPERATOR:**	Jeff
PROJECT NO.:	3653-CR	**HAMMER:**	140#/30"	**RIG TYPE:**	CME 75 Track Rig
LOCATION:	See Exploration Location Map			**DATE:**	9/8/2023

Depth (ft)	SAMPLES: Sample Type	SAMPLES: Blows/ 6 in	SAMPLES: Sample Number	USCS Symbol	Boring No.: B-1 / MATERIAL DESCRIPTION AND COMMENTS	Laboratory Testing: Water Content (%)	Laboratory Testing: Dry Density (pcf)	Laboratory Testing: Others
				SM	**Undocumented Fill:** Silty f-m SAND, brown, slightly moist, few organics, few gravels, trace cobble, dense			MD, SH
		21 50/6"	R1		Trace clay			
5		50/1"	R2	SM/GM	**Alluvium:** Gravelly silty f-c SAND to f-c sandy silty GRAVEL, brown, slightly moist to moist, dense			
		50/4"	R3		No recovery, rock in sampler tip			
10					**BORING TERMINATED AT 8.0 FEET** No groundwater encountered Boring backfilled with soil cuttings			
15								
20								
25								
30								

LEGEND

Sample type: ---Ring ---SPT ---Small Bulk ---Large Bulk ---No Recovery ---Water Table

Lab testing: AL = Atterberg Limits; EI = Expansion Index; SA = Sieve Analysis; RV = R-Value Test; SR = Sulfate/Resisitivity Test; SH = Shear Test; HC= Consolidation; MD = Maximum Density

GeoTek, Inc.

LOG OF EXPLORATORY BORING

CLIENT:	Urban Advisory & Building Group	**DRILLER:**	2R Drilling	**LOGGED BY:**	KIG
PROJECT NAME:	31872 Camino Capistrano	**DRILL METHOD:**	Hollow Stem	**OPERATOR:**	Jeff
PROJECT NO.:	3653-CR	**HAMMER:**	140#/30"	**RIG TYPE:**	CME 75 Track Rig
LOCATION:	See Exploration Location Map			**DATE:**	9/8/2023

Boring No.: B-2

Depth (ft)	SAMPLES: Sample Type	SAMPLES: Blows/ 6 in	SAMPLES: Sample Number	USCS Symbol	MATERIAL DESCRIPTION AND COMMENTS	Laboratory Testing: Water Content (%)	Laboratory Testing: Dry Density (pcf)	Laboratory Testing: Others
					4" Portland Cement Concrete:			
					Undocumented Fill:			
				CL	F-c sandy CLAY, dark brown, moist, stiff to hard			RV
		6 9 22	R1			17.5	113.8	
					Few gravels			
5		21 21 22	R2	GM	F-c sandy silty GRAVEL, grey, moist, dense No ring sample revovery			
		50/4"	R3					
					BORING TERMINATED AT 7.5 FEET			
					No groundwater encountered Boring backfilled with soil cuttings			
10								
15								
20								
25								
30								

LEGEND

Sample type: ---Ring ---SPT ---Small Bulk ---Large Bulk ---No Recovery ---Water Table

Lab testing: AL = Atterberg Limits; EI = Expansion Index; SA = Sieve Analysis; RV = R-Value Test; SR = Sulfate/Resisitivity Test; SH = Shear Test; HC= Consolidation; MD = Maximum Density

GeoTek, Inc.

LOG OF EXPLORATORY BORING

CLIENT:	Urban Advisory & Building Group	**DRILLER:**	2R Drilling	**LOGGED BY:**	KIG
PROJECT NAME:	31872 Camino Capistrano	**DRILL METHOD:**	Hollow Stem	**OPERATOR:**	Jeff
PROJECT NO.:	3653-CR	**HAMMER:**	140#/30"	**RIG TYPE:**	CME 75 Track Rig
LOCATION:	See Exploration Location Map			**DATE:**	9/8/2023

Boring No.: B-3

Depth (ft)	SAMPLES: Sample Type	SAMPLES: Blows/ 6 in	SAMPLES: Sample Number	USCS Symbol	MATERIAL DESCRIPTION AND COMMENTS	Laboratory Testing: Water Content (%)	Laboratory Testing: Dry Density (pcf)	Laboratory Testing: Others
					2" Asphaltic Concrete over 3" Aggregate Base:			
					Undocumented Fill:			
				SC	Clayey f-c SAND, dark brown, moist, few gravel, medium dense to dense			
	■	8 15 12	R1			12.3	120.9	
5	■	16 37 14	R2		Trace cobble	9.3	89.4	
					Alluvium:			
	■	15 24 34	R3	CL	F-c sandy CLAY, light brown, moist, few gravel, trace cobble, hard	6.5	110.1	
10		50/4"	R4		No recovery			
15		50/3"	R5		No recovery			
					BORING REFUSAL AT 18.0 FEET			
20					No groundwater encountered Boring backfilled with soil cuttings			
25								
30								

LEGEND

Sample type: ■ ---Ring ■ ---SPT ▨ ---Small Bulk ▩ ---Large Bulk □ ---No Recovery ▽ ---Water Table

Lab testing: AL = Atterberg Limits; EI = Expansion Index; SA = Sieve Analysis; RV = R-Value Test; SR = Sulfate/Resisitivity Test; SH = Shear Test; HC= Consolidation; MD = Maximum Density

GeoTek, Inc.

LOG OF EXPLORATORY BORING

CLIENT:	Urban Advisory & Building Group	**DRILLER:**	2R Drilling	**LOGGED BY:**	KIG
PROJECT NAME:	31872 Camino Capistrano	**DRILL METHOD:**	Hollow Stem	**OPERATOR:**	Jeff
PROJECT NO.:	3653-CR	**HAMMER:**	140#/30"	**RIG TYPE:**	CME 75 Track Rig
LOCATION:	See Exploration Location Map			**DATE:**	9/8/2023

Boring No.: B-4

Depth (ft)	Sample Type	Blows/ 6 in	Sample Number	USCS Symbol	MATERIAL DESCRIPTION AND COMMENTS	Water Content (%)	Dry Density (pcf)	Others
					Undocumented Fill:			
				SM	Silty f SAND, brown, slightly moist, medium dense, few organics			
		10 15 18	R1			12.0	91.1	
					Alluvium:			
5				SC	Clayey f SAND, grey-brown, slightly moist, medium dense			
		6 10 9	R2			12.5	104.6	EI, SA, MD, SH, SR
		14 8 9	R3	CL	Silty CLAY, grey-brown, moist, stiff	19.6	104.1	
10		4 8 11	R4		Becomes dark grey-brown	22.6	106.9	
15		4 8 8	R5	CH	Silty CLAY, dark grey-brown, moist, stiff	28.6	97.9	AL, SA, HC
20		4 6 7	R6		trace oxidation staining, trace gravel fragments	25.6	102.0	
25		3 4 5	S1		F-m sandy CLAY, reddish-brown, moist, stiff	19.7		
30		5 5 7	S2		Becomes dark brown, trace coarse sand	15.5		

LEGEND

Sample type: ---Ring ---SPT ---Small Bulk ---Large Bulk ---No Recovery ---Water Table

Lab testing: AL = Atterberg Limits; EI = Expansion Index; SA = Sieve Analysis; RV = R-Value Test; SR = Sulfate/Resisitivity Test; SH = Shear Test; HC= Consolidation; MD = Maximum Density

GeoTek, Inc.

LOG OF EXPLORATORY BORING

CLIENT:	Urban Advisory & Building Group	**DRILLER:**	2R Drilling	**LOGGED BY:**	KIG
PROJECT NAME:	31872 Camino Capistrano	**DRILL METHOD:**	Hollow Stem	**OPERATOR:**	Jeff
PROJECT NO.:	3653-CR	**HAMMER:**	140#/30"	**RIG TYPE:**	CME 75 Track Rig
LOCATION:	See Exploration Location Map			**DATE:**	9/8/2023

Boring No.: B-4 (continued)

Depth (ft)	SAMPLES: Sample Type	SAMPLES: Blows/ 6 in	SAMPLES: Sample Number	USCS Symbol	MATERIAL DESCRIPTION AND COMMENTS	Laboratory Testing: Water Content (%)	Laboratory Testing: Dry Density (pcf)	Laboratory Testing: Others
					groundwater at about 32 ft			▽
35	■	4 6 7	S3	CL	Silty CLAY, bluish grey-brown, wet, stiff to hard			
					BORING TERMINATED AT 36.5 FEET			
					Groundwater encountered at 32 feet 4 inches Boring backfilled with bentonite chips			
40								
45								
50								

LEGEND

Sample type: ---Ring ---SPT ---Small Bulk ---Large Bulk ---No Recovery ▽ ---Water Table

Lab testing: AL = Atterberg Limits; EI = Expansion Index; SA = Sieve Analysis; RV = R-Value Test; SR = Sulfate/Resisitivity Test; SH = Shear Test; HC= Consolidation; MD = Maximum Density

GeoTek, Inc.

LOG OF EXPLORATORY BORING

CLIENT:	Urban Advisory & Building Group	**DRILLER:**	2R Drilling	**LOGGED BY:**	KIG
PROJECT NAME:	31872 Camino Capistrano	**DRILL METHOD:**	Hollow Stem	**OPERATOR:**	Jeff
PROJECT NO.:	3653-CR	**HAMMER:**	140#/30"	**RIG TYPE:**	CME 75 Track Rig
LOCATION:	See Exploration Location Map			**DATE:**	9/8/2023

Depth (ft)	SAMPLES: Sample Type	SAMPLES: Blows/ 6 in	SAMPLES: Sample Number	USCS Symbol	**Boring No.: B-5** / MATERIAL DESCRIPTION AND COMMENTS	Laboratory Testing: Water Content (%)	Laboratory Testing: Dry Density (pcf)	Laboratory Testing: Others
					3" Asphaltic Concrete over 3" Aggregate Base:			
					Undocumented Fill:			
				CL	F- sandy CLAY, dark brown, moist, stiff			EI, SA, SR, RV
		6 7 9	R1			18.1	113.2	
					Alluvium:			
5				CL	F-m sandy CLAY, brown, moist, stiff			
		5 9 12	R2			22.1	104.0	
		3 6 8	R3	CH	Silty CLAY, blackish brown, moist, stiff	25.4	101.1	AL, SA, HC
10		5 6 10	R4		Silty CLAY, brown, moist, stiff	23.8	103.4	
15		4 7 9	R5		Becomes grey-brown	31.5	94.8	
20		3 5 6	R6		Silty CLAY, dark grey-brown, very moist, stiff, medium to high plasticity	32.6		
25		1 2 2	S1		Silty CLAY, grey-brown, moist, medium stiff, trace oxidation staining			
30		2 2 4	S2		Silty CLAY, olive grey, very moist, stiff, medium to high plasticity			

LEGEND

Sample type: ---Ring ---SPT ---Small Bulk ---Large Bulk ---No Recovery ---Water Table

Lab testing: AL = Atterberg Limits; EI = Expansion Index; SA = Sieve Analysis; RV = R-Value Test; SR = Sulfate/Resisitivity Test; SH = Shear Test; HC= Consolidation; MD = Maximum Density

GeoTek, Inc.

LOG OF EXPLORATORY BORING

CLIENT:	Urban Advisory & Building Group	**DRILLER:**	2R Drilling	**LOGGED BY:**	KIG
PROJECT NAME:	31872 Camino Capistrano	**DRILL METHOD:**	Hollow Stem	**OPERATOR:**	Jeff
PROJECT NO.:	3653-CR	**HAMMER:**	140#/30"	**RIG TYPE:**	CME 75 Track Rig
LOCATION:	See Exploration Location Map			**DATE:**	9/8/2023

Boring No.: B-5 (continued)

Depth (ft)	SAMPLES: Sample Type	SAMPLES: Blows/ 6 in	SAMPLES: Sample Number	USCS Symbol	MATERIAL DESCRIPTION AND COMMENTS	Laboratory Testing: Water Content (%)	Laboratory Testing: Dry Density (pcf)	Laboratory Testing: Others
35		3 5 4	S3	CL	Sandy CLAY, greyish brown, very moist, stiff	14.0		
40		4 4 7	S3		Silty CLAY, orangish grey-brown, very moist, stiff, mottled structure, trace fine gravel			
45		5 4 7	S4		Laminated orange-grey color	34.3		
50		7 10 16	S5		Silty Clay, grey, moist, very stiff			
					BORING TERMINATED AT 51.5 FEET No groundwater encountered Boring backfilled with bentonite chips			

LEGEND

Sample type: ---Ring ---SPT ---Small Bulk ---Large Bulk ---No Recovery ---Water Table

Lab testing: AL = Atterberg Limits; EI = Expansion Index; SA = Sieve Analysis; RV = R-Value Test; SR = Sulfate/Resisitivity Test; SH = Shear Test; HC= Consolidation; MD = Maximum Density

GeoTek, Inc.

LOG OF EXPLORATORY BORING

CLIENT:	Urban Advisory & Building Group	**DRILLER:**	2R Drilling	**LOGGED BY:**	KIG
PROJECT NAME:	31872 Camino Capistrano	**DRILL METHOD:**	Hollow Stem	**OPERATOR:**	Jeff
PROJECT NO.:	3653-CR	**HAMMER:**	140#/30"	**RIG TYPE:**	CME 75 Track Rig
LOCATION:	See Exploration Location Map			**DATE:**	9/8/2023

Depth (ft)	SAMPLES: Sample Type	SAMPLES: Blows/ 6 in	SAMPLES: Sample Number	USCS Symbol	**Boring No.: B-6** / MATERIAL DESCRIPTION AND COMMENTS	Laboratory Testing: Water Content (%)	Laboratory Testing: Dry Density (pcf)	Laboratory Testing: Others
					3" Asphaltic Concrete over 2" Aggregate Base:			
		6 9 17	R1	SC	**Undocumented Fill:** Clayey f-m SAND with few gravels, dark brown, moist, few cobbles, trace brick debris, medium dense			EI, AL, SA
5		50/6"	R2	GP	GRAVEL, grey, slightly moist, dense, disturbed sample			
					BORING REFUSAL AT 6.0 FEET No groundwater encountered Boring backfilled with soil cuttings			
10								
15								
20								
25								
30								

LEGEND

Sample type: ---Ring ---SPT ---Small Bulk ---Large Bulk ---No Recovery ---Water Table

Lab testing: AL = Atterberg Limits; EI = Expansion Index; SA = Sieve Analysis; RV = R-Value Test; SR = Sulfate/Resisitivity Test; SH = Shear Test; HC= Consolidation; MD = Maximum Density

GeoTek, Inc.

LOG OF EXPLORATORY BORING

CLIENT:	Urban Advisory & Building Group	**DRILLER:**	2R Drilling	**LOGGED BY:**	KIG
PROJECT NAME:	31872 Camino Capistrano	**DRILL METHOD:**	Hollow Stem	**OPERATOR:**	Jeff
PROJECT NO.:	3653-CR	**HAMMER:**	140#/30"	**RIG TYPE:**	CME 75 Track Rig
LOCATION:	See Exploration Location Map			**DATE:**	9/8/2023

Depth (ft)	SAMPLES: Sample Type	SAMPLES: Blows/ 6 in	SAMPLES: Sample Number	USCS Symbol	Boring No.: P-1 / MATERIAL DESCRIPTION AND COMMENTS	Laboratory Testing: Water Content (%)	Laboratory Testing: Dry Density (pcf)	Laboratory Testing: Others
				SC/GC	**Undocumented Fill:** Clayey f-c sandy GRAVEL to gravelly clayey f-c SAND, brown, slightly moist, medium dense, trace debris			
5					**BORING TERMINATED AT 4 FEET** No groundwater encountered Boring set with pipe, sock, and gravel			
10								
15								
20								
25								
30								

LEGEND

Sample type: ---Ring ---SPT ---Small Bulk ---Large Bulk ---No Recovery ---Water Table

Lab testing: AL = Atterberg Limits; EI = Expansion Index; SA = Sieve Analysis; RV = R-Value Test; SR = Sulfate/Resisitivity Test; SH = Shear Test; HC= Consolidation; MD = Maximum Density

GeoTek, Inc.

LOG OF EXPLORATORY BORING

CLIENT:	Urban Advisory & Building Group	**DRILLER:**	2R Drilling	**LOGGED BY:**	KIG
PROJECT NAME:	31872 Camino Capistrano	**DRILL METHOD:**	Hollow Stem	**OPERATOR:**	Jeff
PROJECT NO.:	3653-CR	**HAMMER:**	140#/30"	**RIG TYPE:**	CME 75 Track Rig
LOCATION:	See Exploration Location Map			**DATE:**	9/8/2023

Depth (ft)	SAMPLES: Sample Type	SAMPLES: Blows/ 6 in	SAMPLES: Sample Number	USCS Symbol	**Boring No.: P-2** / MATERIAL DESCRIPTION AND COMMENTS	Laboratory Testing: Water Content (%)	Laboratory Testing: Dry Density (pcf)	Laboratory Testing: Others
				SM	**Undocumented Fill:** Silty f-m SAND, brown, slightly moist, medium dense, few organics			
				CL	**Alluvium:** F-c sandy CLAY, brown, moist, stiff			
5					**BORING TERMINATED AT 4 FEET** No groundwater encountered Boring set with pipe, sock, and gravel			
10								
15								
20								
25								
30								

LEGEND

Sample type: ---Ring ---SPT ---Small Bulk ---Large Bulk ---No Recovery ---Water Table

Lab testing: AL = Atterberg Limits; EI = Expansion Index; SA = Sieve Analysis; RV = R-Value Test; SR = Sulfate/Resisitivity Test; SH = Shear Test; HC= Consolidation; MD = Maximum Density

GeoTek, Inc.

LOG OF EXPLORATORY BORING

CLIENT:	Urban Advisory & Building Group	**DRILLER:**	2R Drilling	**LOGGED BY:**	KIG
PROJECT NAME:	31872 Camino Capistrano	**DRILL METHOD:**	Hollow Stem	**OPERATOR:**	Jeff
PROJECT NO.:	3653-CR	**HAMMER:**	140#/30"	**RIG TYPE:**	CME 75 Track Rig
LOCATION:	See Exploration Location Map			**DATE:**	9/8/2023

Depth (ft)	SAMPLES: Sample Type	SAMPLES: Blows/ 6 in	SAMPLES: Sample Number	USCS Symbol	Boring No.: P-3 / MATERIAL DESCRIPTION AND COMMENTS	Laboratory Testing: Water Content (%)	Laboratory Testing: Dry Density (pcf)	Laboratory Testing: Others
				SM	**Undocumented Fill:** Silty f-m SAND, brown, slightly moist, medium dense, few organics			
				CL	**Alluvium:** F-c sandy CLAY, brown, moist, stiff			
5					**BORING TERMINATED AT 4 FEET** No groundwater encountered Boring set with pipe, sock, and gravel			
10								
15								
20								
25								
30								

LEGEND

Sample type: ---Ring ---SPT ---Small Bulk ---Large Bulk ---No Recovery ---Water Table

Lab testing: AL = Atterberg Limits; EI = Expansion Index; SA = Sieve Analysis; RV = R-Value Test; SR = Sulfate/Resisitivity Test; SH = Shear Test; HC= Consolidation; MD = Maximum Density

GeoTek, Inc.

LOG OF EXPLORATORY BORING

CLIENT:	Urban Advisory & Building Group	**DRILLER:**	2R Drilling	**LOGGED BY:**	KIG
PROJECT NAME:	31872 Camino Capistrano	**DRILL METHOD:**	Hollow Stem	**OPERATOR:**	Jeff
PROJECT NO.:	3653-CR	**HAMMER:**	140#/30"	**RIG TYPE:**	CME 75 Track Rig
LOCATION:	See Exploration Location Map			**DATE:**	9/8/2023

Depth (ft)	SAMPLES: Sample Type	SAMPLES: Blows/ 6 in	SAMPLES: Sample Number	USCS Symbol	**Boring No.: P-4** / MATERIAL DESCRIPTION AND COMMENTS	Laboratory Testing: Water Content (%)	Laboratory Testing: Dry Density (pcf)	Laboratory Testing: Others
				SM	**Undocumented Fill:** Silty f-m SAND, brown, slightly moist, medium dense, few organics			
				CL	**Alluvium:** F-c sandy CLAY, brown, moist, stiff			
5					**BORING TERMINATED AT 4 FEET** No groundwater encountered Boring set with pipe, sock, and gravel			
10								
15								
20								
25								
30								

LEGEND

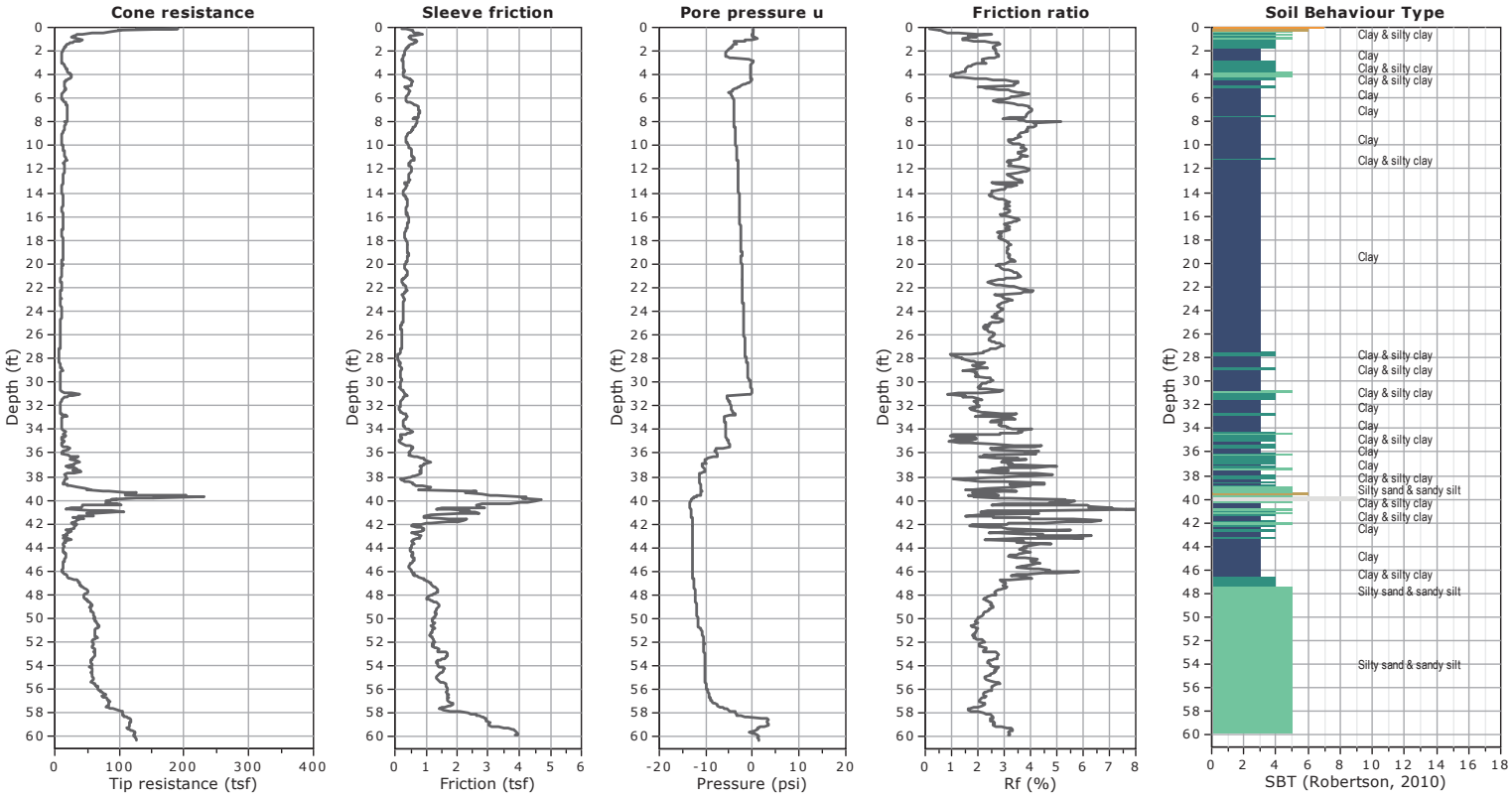
Sample type: ---Ring ---SPT ---Small Bulk ---Large Bulk ---No Recovery ---Water Table

Lab testing: AL = Atterberg Limits; EI = Expansion Index; SA = Sieve Analysis; RV = R-Value Test; SR = Sulfate/Resisitivity Test; SH = Shear Test; HC= Consolidation; MD = Maximum Density

Kehoe Testing and Engineering
714-901-7270
steve@kehoetesting.com
www.kehoetesting.com

Project: GeoTek
Location: 31986 Camino Capistrano, San Juan Capistrano, CA

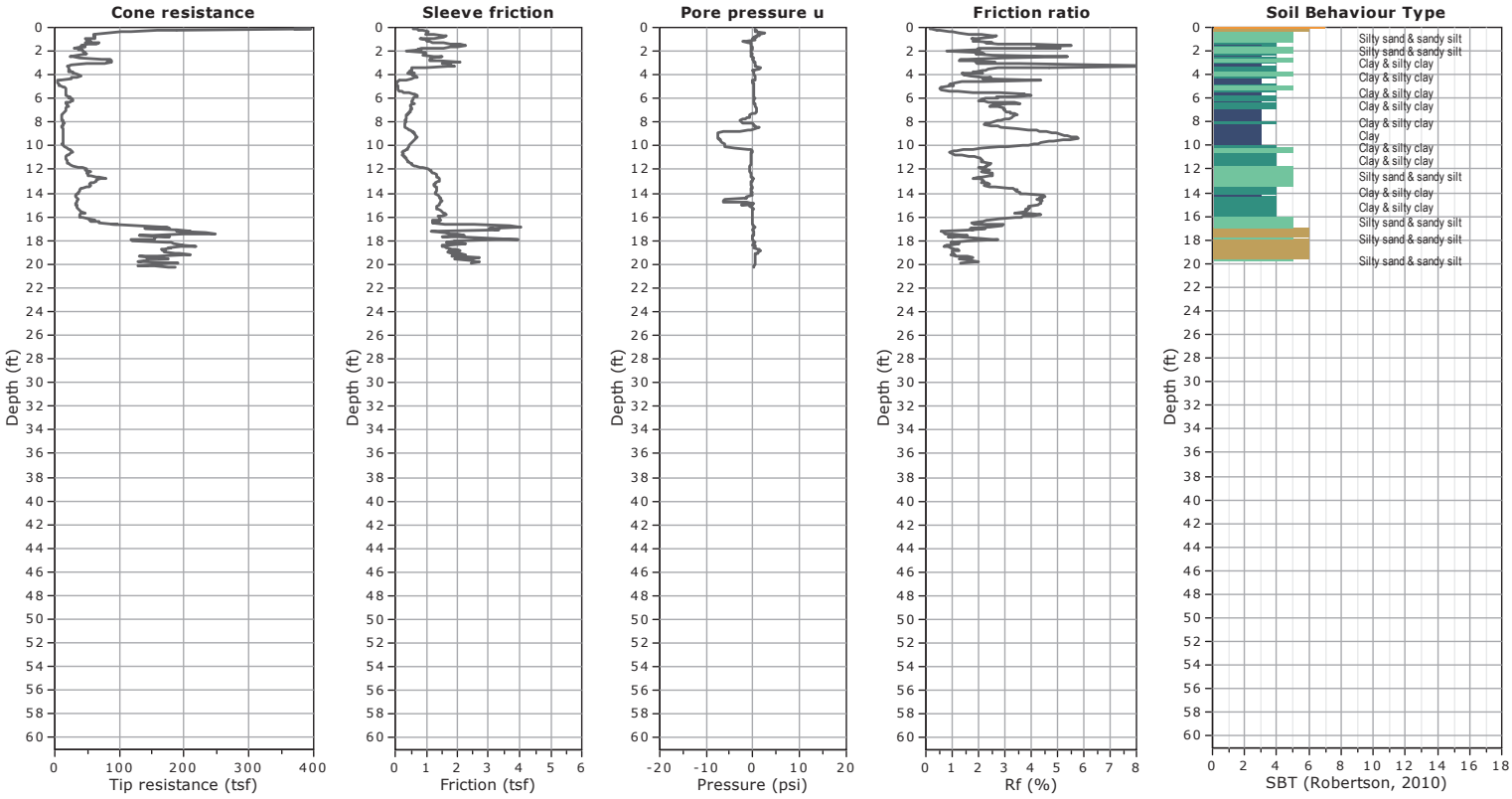
CPT-1
Total depth: 60.24 ft, Date: 9/11/2023



Kehoe Testing and Engineering
714-901-7270
steve@kehoetesting.com
www.kehoetesting.com

Project: GeoTek
Location: 31986 Camino Capistrano, San Juan Capistrano, CA

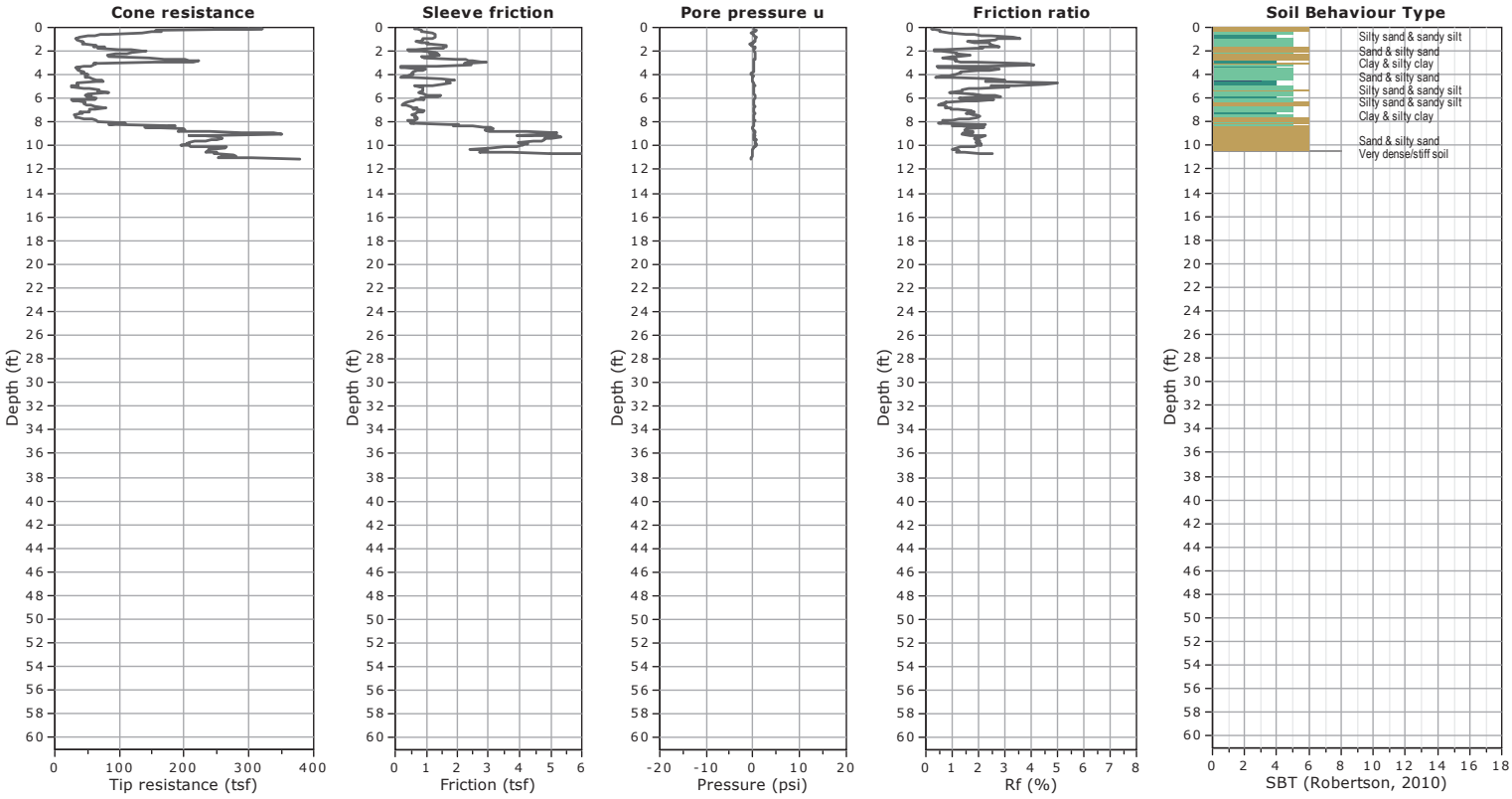
CPT-2A
Total depth: 20.29 ft, Date: 9/11/2023



Kehoe Testing and Engineering
714-901-7270
steve@kehoetesting.com
www.kehoetesting.com

Project: GeoTek
Location: 31986 Camino Capistrano, San Juan Capistrano, CA

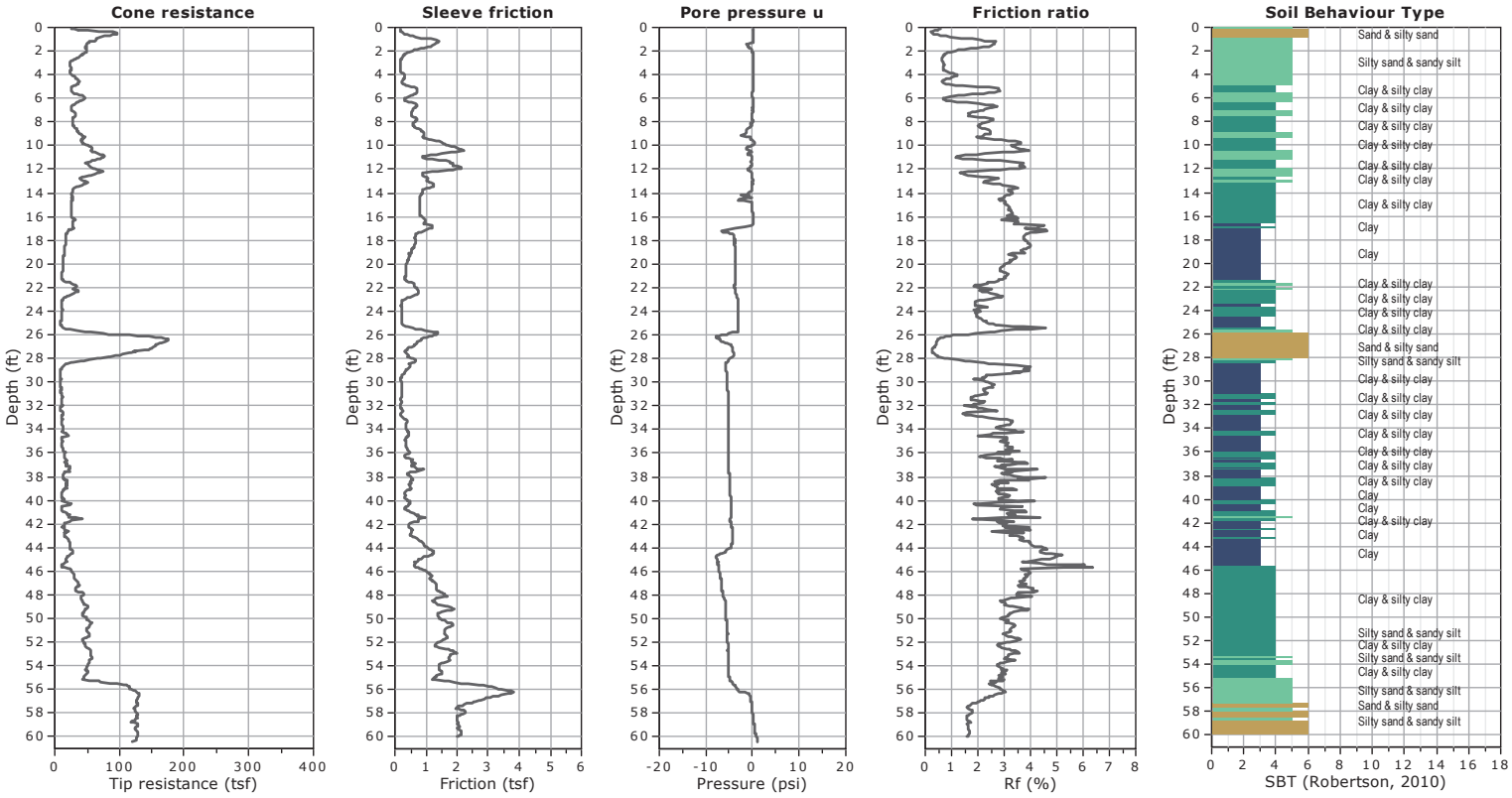
CPT-3A
Total depth: 11.10 ft, Date: 9/11/2023



Kehoe Testing and Engineering
714-901-7270
steve@kehoetesting.com
www.kehoetesting.com

Project: GeoTek
Location: 31986 Camino Capistrano, San Juan Capistrano, CA

CPT-4
Total depth: 60.39 ft, Date: 9/11/2023



APPENDIX C

RESULTS OF LABORATORY TESTING

Updated Geotechnical and Infiltration Evaluation
San Juan Capistrano, California
Project No. 3653-CR

GEOTEK

SUMMARY OF LABORATORY TESTING

Atterberg Limits
Selected fine-grained soil samples were tested for Atterberg Limits in general accordance with ASTM D 4318. The results of these tests are provided herein.

Classification
Soils were classified visually in general accordance with the Unified Soil Classification System (ASTM Test Method D 2487). The soil classifications are shown on the boring logs in Appendix B.

Consolidation
Representative soil samples were tested for consolidation properties in general accordance with ASTM D 2435. The results of these tests are presented herein.

Direct Shear
Shear testing was performed in a direct shear machine of the strain-control type in general accordance with ASTM D 3080 test procedures. The rate of deformation was approximately 0.01 inch per minute. The sample was sheared under varying confining loads in order to determine the coulomb shear strength parameters, angle of internal friction and cohesion. The tests were performed on soil samples remolded to approximately 90 percent of maximum dry density as determined by ASTM D 1557 test procedures. The shear test results are presented herein.

Expansion Index
Expansion Index testing was performed on three soil samples obtained from the field exploration. Testing was performed in general accordance with ASTM D 4829 test procedures. The results of the testing are provided herein.

Moisture-Density Relationship
Laboratory testing was performed on two samples collected during the subsurface exploration. The laboratory maximum dry density and optimum moisture content for the soils were determined in general accordance with ASTM D 1557 test procedures. The results are presented herein.

Percent Passing No. 200 Sieve
Selected samples were tested to determine the fraction of soil passing No. 200 sieve. Testing was conducted in general accordance with ASTM D 1140 and the results are provided herein.

R-Value
Laboratory testing was performed on one sample collected during the subsurface exploration. The sample was tested in accordance with California Test Method 301. The results are presented herein.

Sulfate Content, Resistivity and Chloride Content
Testing to determine the water-soluble sulfate content was performed in general accordance with ASTM D4327 test procedures. Resistivity testing was completed in general accordance with ASTM G187 test procedures. Testing to determine the chloride content was performed in general accordance with ASTM D4327 test procedures. Testing was conducted by our sub-consultant Project X and the results are presented herein.

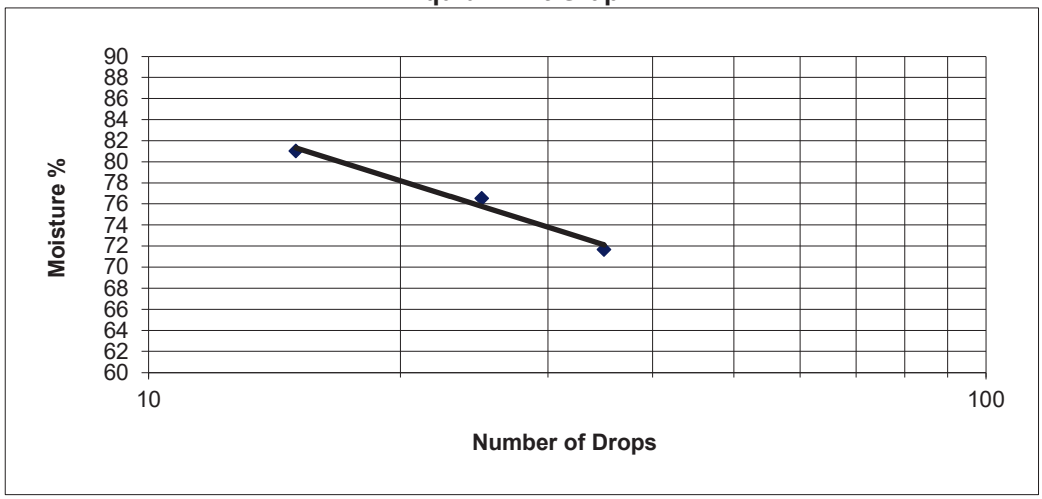
GEOTEK

ATTERBERG LIMITS DATA

Field Classification		Job No.	3653-CR
Sample Number		Client	Urban Advisory & Bldg Group
Sample Type		Project	Camino Capistrano
Location	B-4 @ 15 feet		
Tested by:	MP		

	Plastic Limit			Liquid Limit		
Number of Blows				15	25	35
Wt. of Dish + Wet Soil	36.92	36.62		19.40	20.47	19.42
Wt. of Dish + Dry Soil	35.63	35.53		13.51	14.31	13.93
Wt. of Moisture	1.29	1.09		5.89	6.16	5.49
Wt. of Dish	30.59	31.18		6.24	6.26	6.27
Wt. of Dry Soil	5.04	4.35		7.27	8.05	7.66
Moisture Content %	25.6	25.1		81.0	76.5	71.7

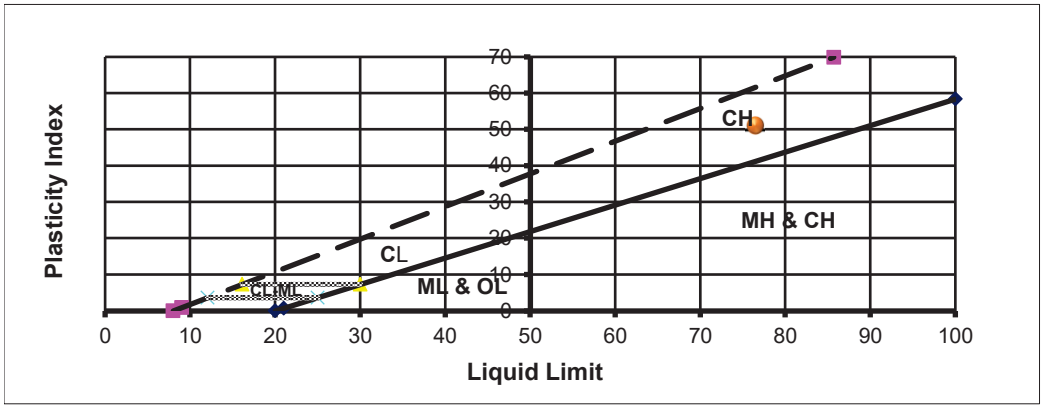
Liquid Limit Graph



Liquid Limit
76

Plastic Limit
25

Plasticity Index
51



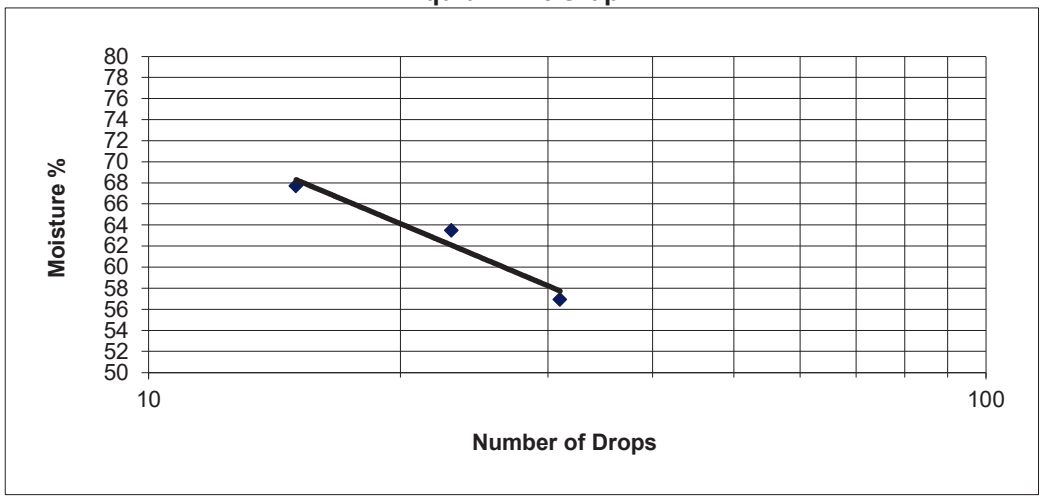
GEOTEK

ATTERBERG LIMITS DATA

Field Classification		Job No.	3653-CR
Sample Number		Client	Urban Advisory & Bldg Group
Sample Type		Project	Camino Capistrano
Location	B-5 @ 7 feet		
Tested by:	MP		

	Plastic Limit			Liquid Limit		
Number of Blows				15	23	31
Wt. of Dish + Wet Soil	37.03	36.86		18.43	17.02	20.69
Wt. of Dish + Dry Soil	35.86	35.69		13.52	12.83	15.39
Wt. of Moisture	1.17	1.17		4.91	4.19	5.30
Wt. of Dish	30.32	30.49		6.27	6.23	6.08
Wt. of Dry Soil	5.54	5.20		7.25	6.60	9.31
Moisture Content %	21.1	22.5		67.7	63.5	56.9

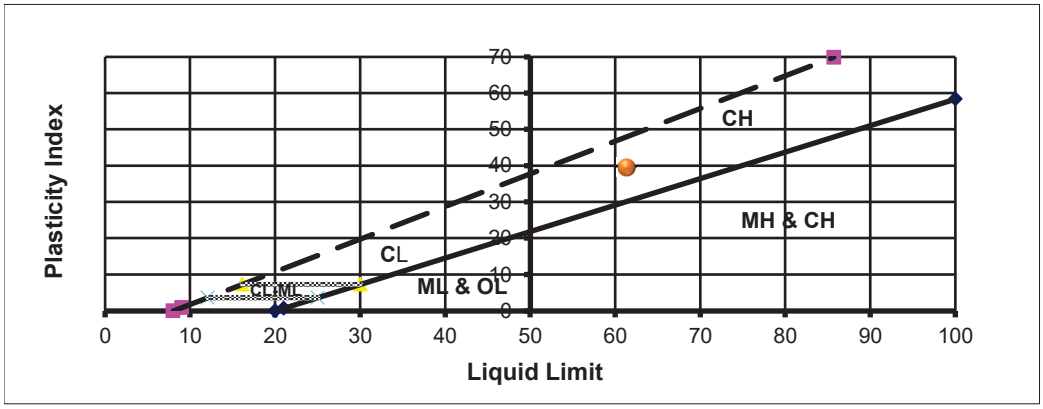
Liquid Limit Graph



Liquid Limit
61

Plastic Limit
22

Plasticity Index
40

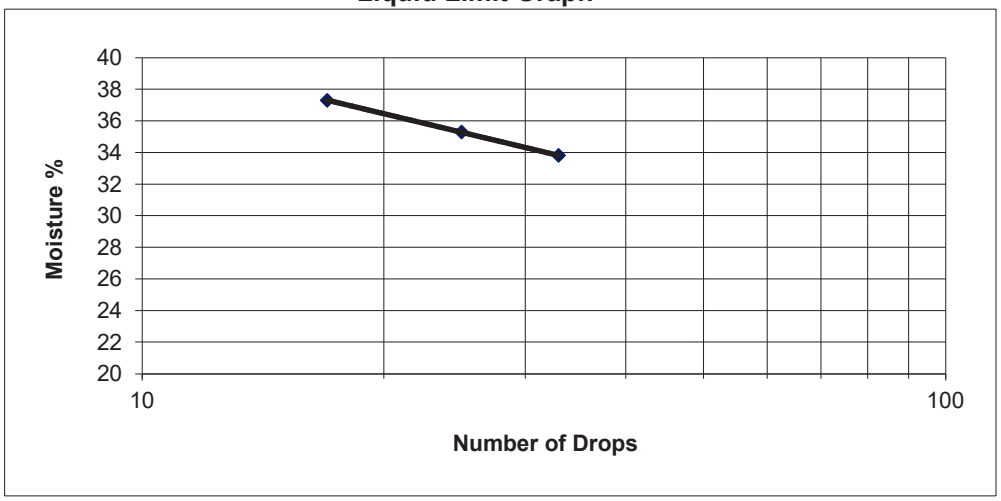


ATTERBERG LIMITS DATA

Field Classification		Job No.	3653-CR
Sample Number		Client	Urban Advisory & Bldg Group
Sample Type		Project	Camino Capistrano
Location	B-6 @ 1-5 feet		
Tested by:	MP		

	Plastic Limit			Liquid Limit		
Number of Blows				15	25	32
Wt. of Dish + Wet	36.81	37.21		25.42	23.89	23.11
Wt. of Dish + Dry	35.91	36.32		20.62	19.70	19.20
Wt. of Moisture	0.90	0.89		4.80	4.19	3.91
Wt. of Dish	30.46	30.97		6.27	6.30	6.10
Wt. of Dry Soil	5.45	5.35		14.35	13.40	13.10
Moisture Content %	16.5	16.6		33.4	31.3	29.8

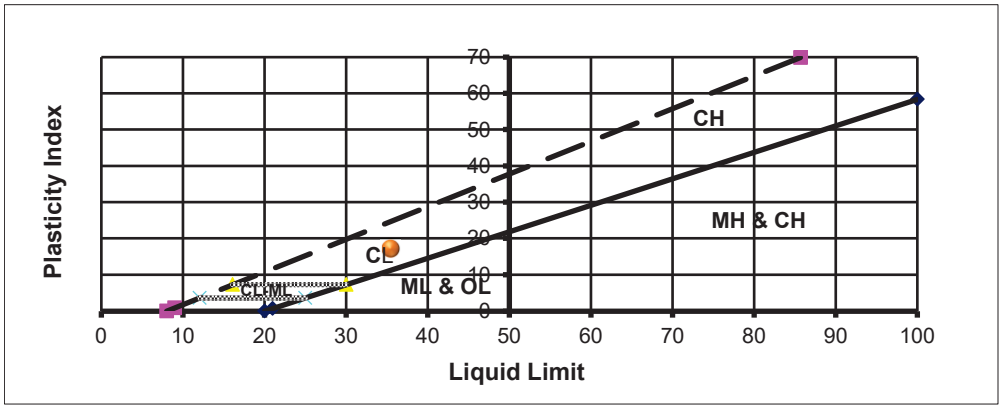
Liquid Limit Graph

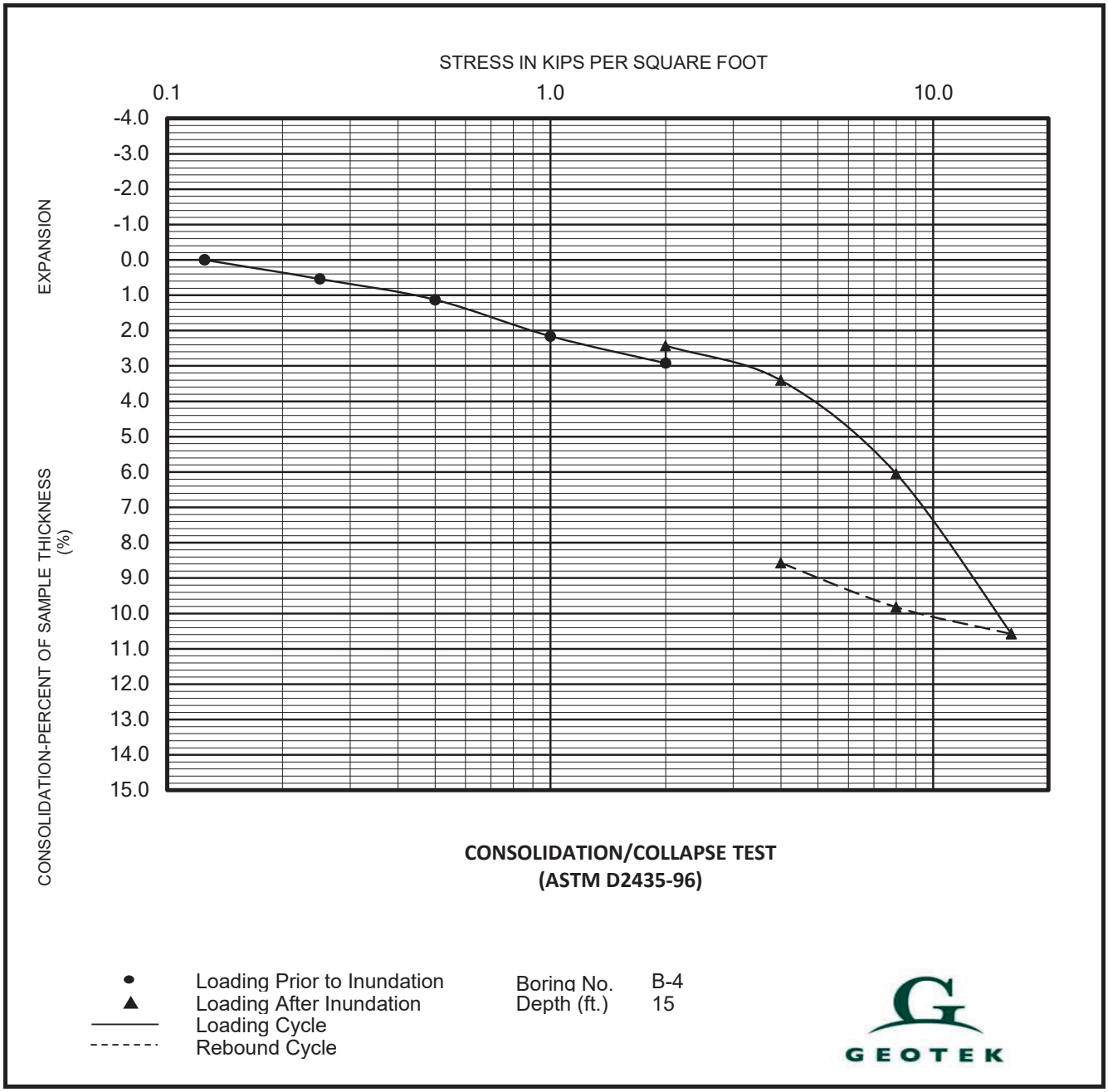


Liquid Limit
31

Plastic Limit
17

Plasticity Index
15





CONSOLIDATION/COLLAPSE TEST
(ASTM D2435-96)

● Loading Prior to Inundation
▲ Loading After Inundation
——— Loading Cycle
- - - - - - - Rebound Cycle

Boring No. B-4
Depth (ft.) 15

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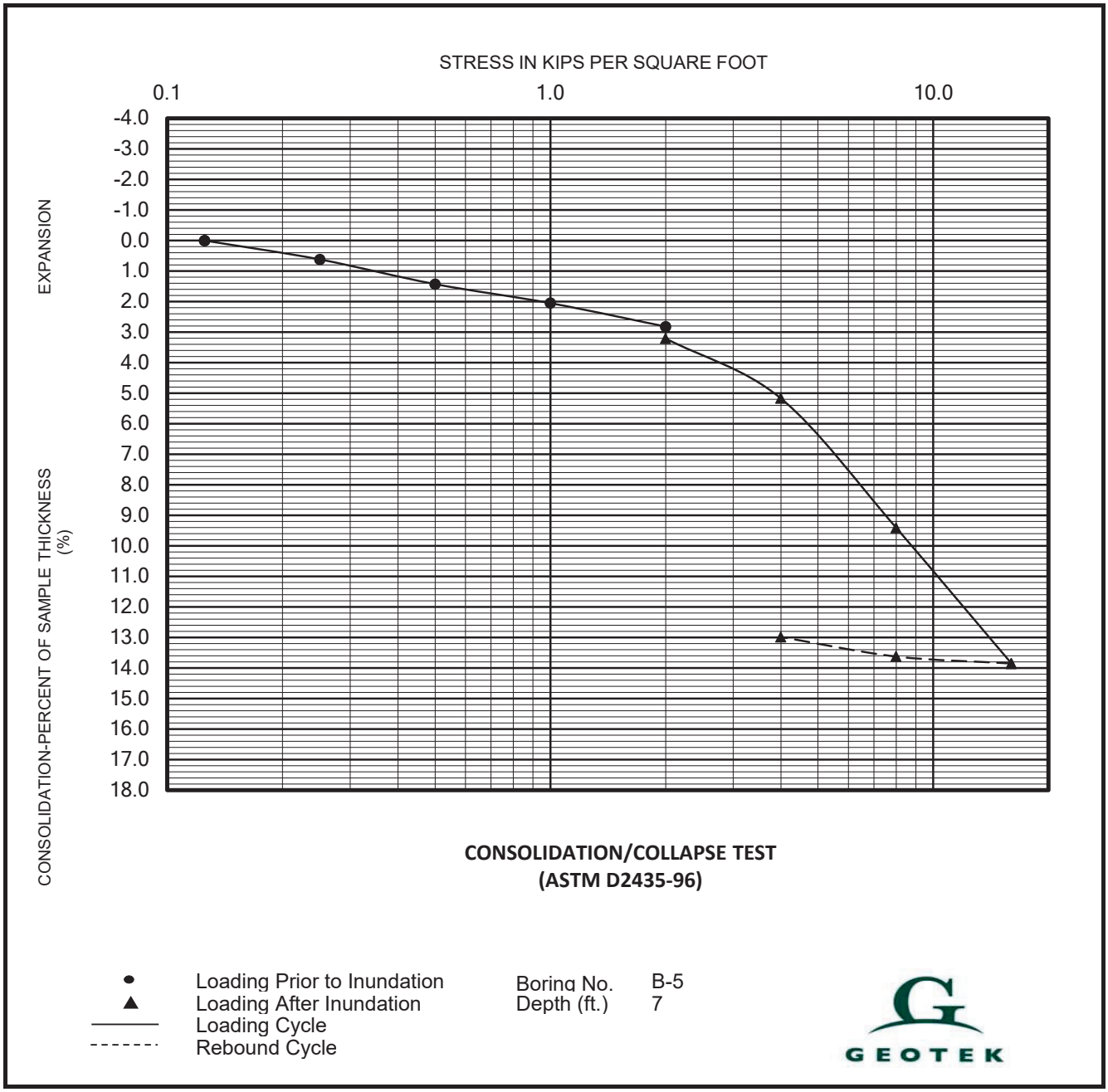


CONSOLIDATION/COLLAPSE TEST
(ASTM D2435-96)

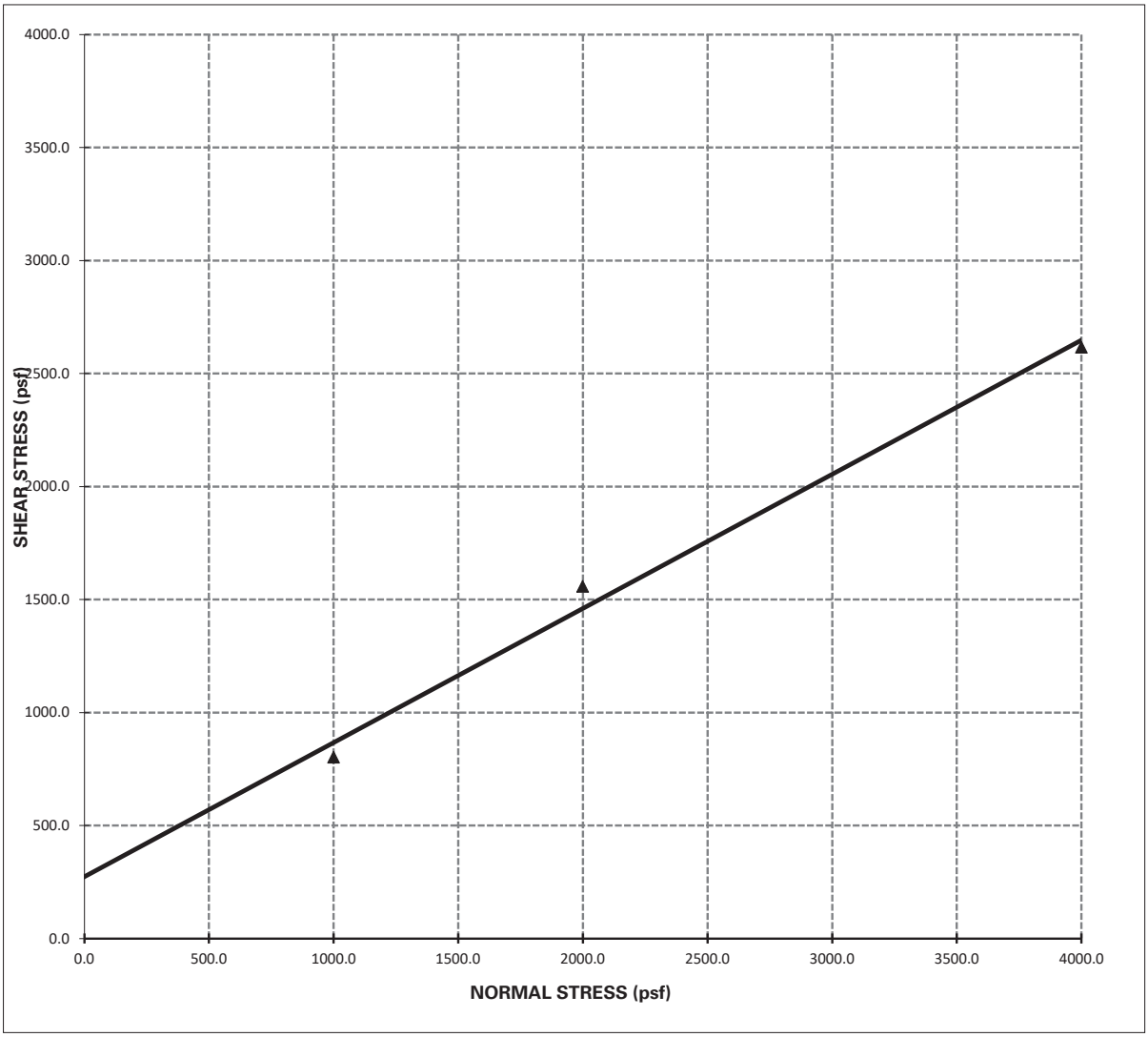
● Loading Prior to Inundation
▲ Loading After Inundation
——— Loading Cycle
- - - - - - - Rebound Cycle

Boring No. B-5
Depth (ft.) 7

GEOTEK

DIRECT SHEAR TEST

Project Name:	Camino Capistrano	***Sample Location:***	B-1 @ 1-5 feet
Project Number:	3653-CR	***Date Tested:***	10/2/2023



Shear Strength: Φ = **31°** , **C = 273 psf**

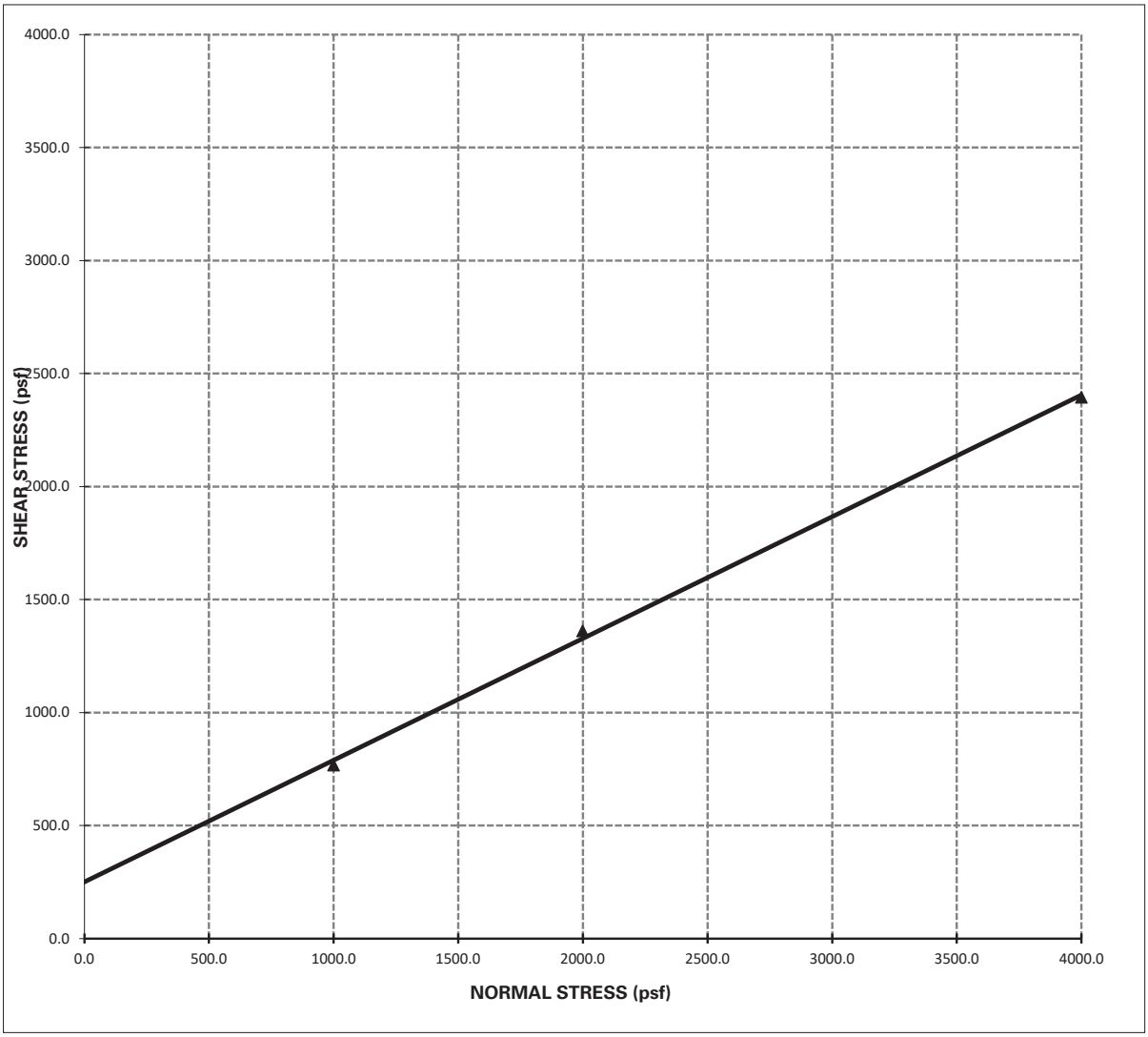
Notes: 1 - The soil specimen used in the shear box was a ring sample remolded to approximately 90% relative compaction from a bulk sample collected during the field investigation.

2 - The above reflect direct shear strength at saturated conditions.

3 - The tests were run at a shear rate of 0.01 in/min.

DIRECT SHEAR TEST

Project Name:	Camino Capistrano	***Sample Location:***	B-4 @ 4-8 feet
Project Number:	3653-CR	***Date Tested:***	10/2/2023



Shear Strength: Φ = **28°** , **C = 250 psf**

Notes: 1 - The soil specimen used in the shear box was a ring sample remolded to approximately 90% relative compaction from a bulk sample collected during the field investigation.

2 - The above reflect direct shear strength at saturated conditions.

3 - The tests were run at a shear rate of 0.01 in/min.

GEOTEK

EXPANSION INDEX TEST

(ASTM D4829)

Client:	Urban Advisory & Buildng Group	***Tested/ Checked By:***	MP Lab No Corona
Project Number:	3653-CR	***Date Tested:***	9/28/2023
Project Location:	31872, 31878 & 31882 Camino Capistrano	***Sample Source:***	B-6 @ 1'-5'
		Sample Description:	

Ring #: ____ Ring Dia. : 4.01" Ring Ht. 1"

DENSITY DETERMINATION

Weight of compacted sample & ring (gm)	770.3
Weight of ring (gm)	366.8
Net weight of sample (gm)	**403.5**
Wet Density, lb / ft3 (C*0.3016)	**121.7**
Dry Density, lb / ft3 (D/1.F)	**110.6**

SATURATION DETERMINATION

Moisture Content, %	10.0
Specific Gravity, assumed	**2.70**
Unit Wt. of Water @ 20 °C, (pcf)	**62.4**
% Saturation	**51.6**

READINGS

DATE	TIME	READING	
9/28/2023		0.4780	Initial
9/28/2023		0.4760	10 min/Dry
9/29/2023		0.4840	Final

FINAL MOISTURE

Final Weight of wet sample & tare	% Moisture
801.8	**17.8**

EXPANSION INDEX = 8

GEOTEK

EXPANSION INDEX TEST

(ASTM D4829)

Client:	Urban Advisory & Buildng Group	***Tested/ Checked By:***	MP Lab No Corona
Project Number:	3653-CR	***Date Tested:***	9/26/2023
Project Location:	31872, 31878 & 31882 Camino Capistrano	***Sample Source:***	B-4 @ 4-8 feet
		Sample Description:	

Ring #: _____ Ring Dia. : 4.01" Ring Ht. 1"

DENSITY DETERMINATION

Weight of compacted sample & ring (gm)	768.7
Weight of ring (gm)	370.7
Net weight of sample (gm)	**398.0**
Wet Density, lb / ft3 (C*0.3016)	**120.0**
Dry Density, lb / ft3 (D/1.F)	**108.6**

SATURATION DETERMINATION

Moisture Content, %	10.5
Specific Gravity, assumed	**2.70**
Unit Wt. of Water @ 20 °C, (pcf)	**62.4**
% Saturation	**51.5**

READINGS

DATE	TIME	READING	
9/26/2023		0.3520	Initial
9/26/2023		0.3520	10 min/Dry
9/27/2023		0.3630	Final

FINAL MOISTURE

Final Weight of wet sample & tare	% Moisture
796.2	**17.4**

EXPANSION INDEX = 11

GEOTEK

EXPANSION INDEX TEST

(ASTM D4829)

Client:	Urban Advisory & Buildng Group	***Tested/ Checked By:***	MP Lab No Corona
Project Number:	3653-CR	***Date Tested:***	9/26/2023
Project Location:	31872, 31878 & 31882 Camino Capistrano	***Sample Source:***	B-5 @ 1-5 feet
		Sample Description:	

Ring #: _____ Ring Dia. : 4.01" Ring Ht. 1"

DENSITY DETERMINATION

Weight of compacted sample & ring (gm)	760.7
Weight of ring (gm)	364.4
Net weight of sample (gm)	**396.3**
Wet Density, lb / ft3 (C*0.3016)	**119.5**
Dry Density, lb / ft3 (D/1.F)	**108.0**

SATURATION DETERMINATION

Moisture Content, %	10.7
Specific Gravity, assumed	**2.70**
Unit Wt. of Water @ 20 °C, (pcf)	**62.4**
% Saturation	**51.6**

READINGS

DATE	TIME	READING	
9/26/2023		0.2830	Initial
9/26/2023		0.2850	10 min/Dry
9/27/2023		0.2910	Final

FINAL MOISTURE

Final Weight of wet sample & tare	% Moisture
790.2	**18.1**

EXPANSION INDEX = 6

GeoTek - Corona
1548 N. Maple St.
Corona, CA 92880
Phone: (951) 710-1160
Fax: (951) 710-1167

Proctor Report

Report No: PTR:23-00200-S01

Client: Urban Advisory & Building Group, Inc.
2777 Paradise Road
Las Vegas NV 89109

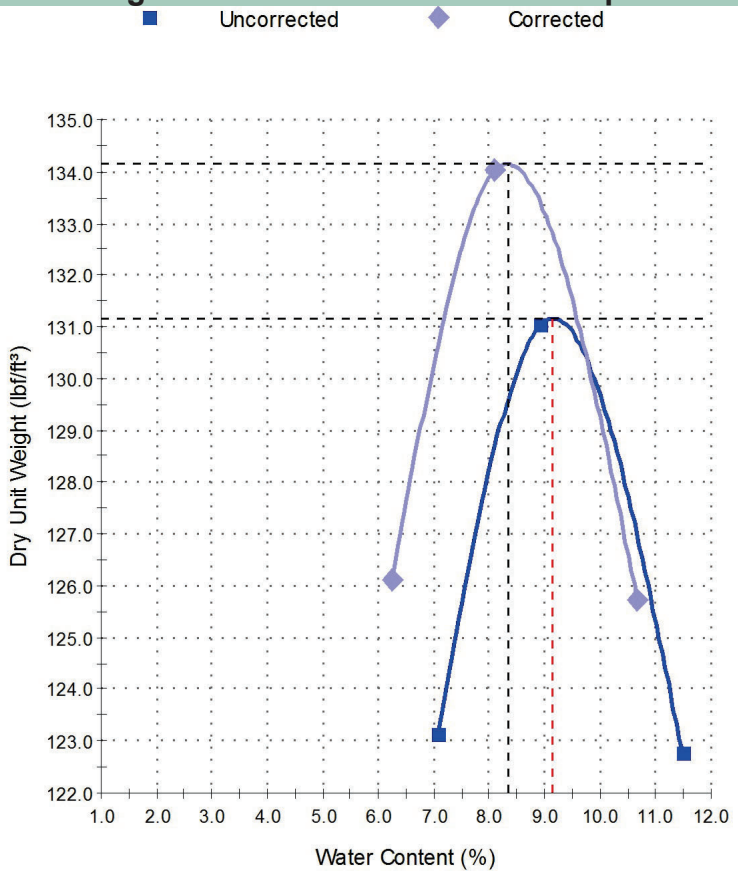
CC:

Project: 3653-CR
31872, 31878, and 31882 Camino Capistrano, San Juan Capistrano

Sample Details

Sample ID: 23-00200-S01 **Date Sampled:** 9/11/2023
Sampled By: Kase Gebbie
Location: B-1 @ 1-5 feet / Gravelly silty fine to medium sand with clay

Dry Unit Weight - Water Content Relationship



Test Results

ASTM D 1557

Maximum Dry Unit Weight (lbf/ft³):	**131.2**
Optimum Water Content (%):	**9.2**
Method:	C
Preparation Method:	Moist
Retained Sieve 3/4" (19mm) (%):	10
Passing Sieve 3/4" (19mm) (%):	90
Tested By:	Mycheal Phillips
Date Tested:	9/26/2023

ASTM D 4718

Corrected Maximum Dry Unit Weight (lbf/ft³):	**134.1**
Corrected Optimum Water Content (%):	**8.3**
Specific Gravity (Oversize):	2.70
Sieve Size (Oversize):	3/4
Oversize Particles (%):	10

Comments

GeoTek - Corona
1548 N. Maple St.
Corona, CA 92880
Phone: (951) 710-1160
Fax: (951) 710-1167

Proctor Report

Report No: PTR:23-00200-S02

Client: Urban Advisory & Building Group, Inc.
2777 Paradise Road
Las Vegas NV 89109

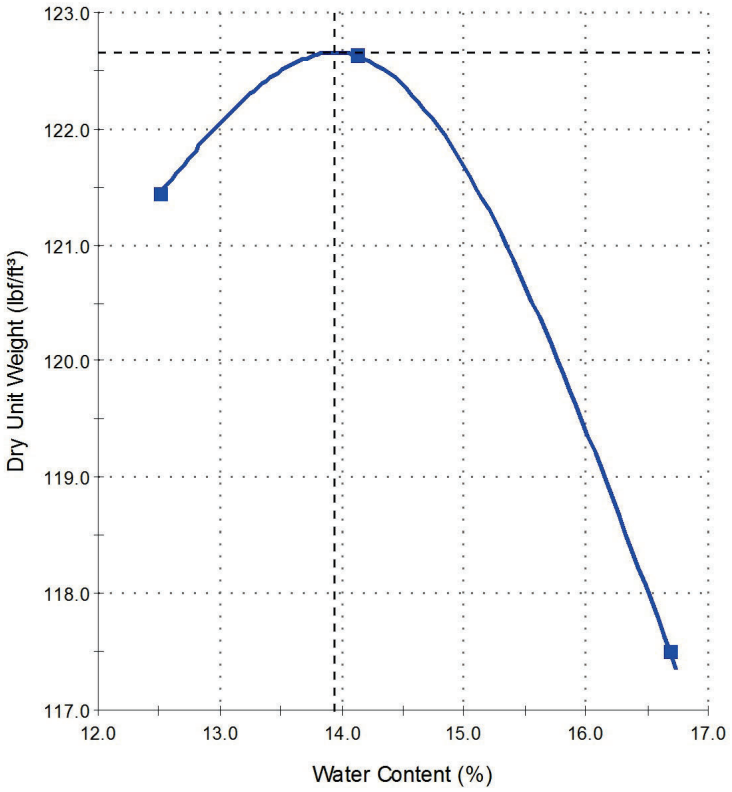
CC:

Project: 3653-CR
31872, 31878, and 31882 Camino
Capistrano, San Juan Capistrano

Sample Details

Sample ID: 23-00200-S02 **Date Sampled:** 9/11/2023
Sampled By: Kase Gebbie
Location: B-4 @ 4-8 feet / Clayey fine to medium sand to silty clay

Dry Unit Weight - Water Content Relationship



Test Results

ASTM D 1557

Maximum Dry Unit Weight (lbf/ft³):	**122.7**
Optimum Water Content (%):	**13.9**
Method:	B
Preparation Method:	Moist
Retained Sieve 3/8" (9.5mm) (%):	2
Passing Sieve 3/8" (9.5mm) (%):	98
Tested By:	Mycheal Phillips
Date Tested:	9/26/2023

Comments

GEOTEK

-200 WASH

Date:
W.O.: 3653-CR sample ID B-4
Client: Urban Advisory & Building depth 4-8 feet
Project: 31872, 31878, & 31882 Camino Capistrano

Sieve Size	Particle Diameter		Wt. Retained	Wt. Passing	% Passing	Specs
	in.	mm.				
#200	0.0029	0.074	312.2	241.5	43.6%	

Dry Weight 553.7

Soak Time 1440 Minutes

GEOTEK

-200 WASH

Date:
W.O.: 3653-CR sample ID B-4
Client: Urban Advisory & Building depth 15 feet
Project: 31872, 31878, & 31882 Camino Capistrano

Sieve Size	Particle Diameter		Wt. Retained	Wt. Passing	% Passing	Specs
	in.	mm.				
#200	0.0029	0.074	28.2	198.7	87.6%	

Dry Weight 226.9

Soak Time 1440 Minutes

GEOTEK

-200 WASH

Date:
W.O.: 3653-CR sample ID B-5
Client: Urban Advisory & Building depth 1-5 feet
Project: 31872, 31878, & 31882 Camino Capistrano

Sieve Size	Particle Diameter		Wt. Retained	Wt. Passing	% Passing	Specs
	in.	mm.				
#200	0.0029	0.074	164.1	196.8	54.5%	

Dry Weight 360.9

Soak Time 1440 Minutes

GEOTEK

-200 WASH

Date:
W.O.: 3653-CR sample ID B-5
Client: Urban Advisory & Building depth 7 feet
Project: 31872, 31878, & 31882 Camino Capistrano

Sieve Size	Particle Diameter		Wt. Retained	Wt. Passing	% Passing	Specs
	in.	mm.				
#200	0.0029	0.074	36.3	185.8	83.7%	

Dry Weight 222.1

Soak Time 1440 Minutes

GEOTEK

-200 WASH

Date:
W.O.: 3653-CR sample ID B-6
Client: Urban Advisory & Building depth 1-5 feet
Project: 31872, 31878, & 31882 Camino Capistrano

Sieve Size	Particle Diameter		Wt. Retained	Wt. Passing	% Passing	Specs
	in.	mm.				
#200	0.0029	0.074	153.5	152.4	49.8%	

Dry Weight 305.9

Soak Time 1440 Minutes

LaBelle Marvin

R - VALUE DATA SHEET

PROJECT No. 49499

DATE: 9/19/2023

BORING NO. B-2 & B-5 Combined @ 1'-5', Bulk

Urban Advisory & Building Group

W.O.# 3653-CR

SAMPLE DESCRIPTION: Brown Sandy Clay

R-VALUE TESTING DATA | CA TEST 301			
Item	a	b	c
Mold Number	1		
Water added, grams	70		
Initial Test Water, %	16.4		
Compact Gage Pressure,psi	50		
Exudation Pressure, psi	364		
Height Sample, Inches	2.63		
Gross Weight Mold, grams	3071		
Tare Weight Mold, grams	1949		
Sample Wet Weight, grams	1122		
Expansion, Inches x 10exp-4	0		
Stability 2,000 lbs (160psi)	59 / 136		
Turns Displacement	3.46		
R-Value Uncorrected	11		
R-Value Corrected	12		
Dry Density, pcf	111.0		

DESIGN CALCULATION DATA

Traffic Index	Assumed:	4.0		
G.E. by Stability		0.90		
G. E. by Expansion		0.00		

Equilibrium R-Value	**5 or less** by EXUDATION	Examined & Checked: 9 /19/ 23
REMARKS:	Gf = 1.25 Sample Exuded @ 364 psi.	REGISTERED PROFESSIONAL ENGINEER STEVEN R. MARVIN No. 30659 CIVIL STATE OF CALIFORNIA Steven R. Marvin, RCE 30659

The data above is based upon processing and testing samples as received from the field. Test procedures in accordance with latest revisions to Department of Transportation, State of California, Materials & Research Test Method No. 301.

Soil Analysis Lab Results

Client: Geotek USA
Job Name: 31872, 31878, 31882 Camino Capistrano, San Juan Capistrano, CA
Client Job Number: 3653-CR Urban Advisory & Building Group
Project X Job Number: S230913I
September 14, 2023

	Method	ASTM D4327		ASTM D4327		ASTM G187		ASTM G51	ASTM G200	SM 4500-D	ASTM D4327	ASTM D6919	ASTM D6919	ASTM D6919	ASTM D6919	ASTM D6919	ASTM D6919	ASTM D6919	ASTM D4327	ASTM D4327
Bore# / Description	**Depth**	**Sulfates** SO_4^{2-}		**Chlorides** Cl^-		**Resistivity** As Rec'd | Minimum		**pH**	**Redox**	**Sulfide** S^{2-}	**Nitrate** NO_3^-	**Ammonium** NH_4^+	**Lithium** Li^+	**Sodium** Na^+	**Potassium** K^+	**Magnesium** Mg^{2+}	**Calcium** Ca^{2+}	**Fluoride** F_2^-	**Phosphate** PO_4^{3-}
	(ft)	(mg/kg)	(wt%)	(mg/kg)	(wt%)	(Ohm-cm)	(Ohm-cm)		(mV)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)
B-4	4-8	279.8	0.0280	156.3	0.0156	737	389	7.4	170	0.1	1.3	2.3	ND	178.3	8.0	31.5	130.8	4.5	1.1
B-5	1-5	597.5	0.0598	22.4	0.0022	3,350	737	6.7	160	ND	0.5	4.5	ND	128.6	15.2	49.8	217.7	4.7	0.7

Cations and Anions, except Sulfide and Bicarbonate, tested with Ion Chromatography
mg/kg = milligrams per kilogram (parts per million) of dry soil weight
ND = 0 = Not Detected | NT = Not Tested | Unk = Unknown
Chemical Analysis performed on 1:3 Soil-To-Water extract
PPM = mg/kg (soil) = mg/L (Liquid)

Note: Sometimes a bad sulfate hit is a contaminated spot. Typical fertilizers are Potassium chloride, ammonium sulfate or ammonium sulfate nitrate (ASN). So this is another reason why testing full corrosion series is good because we then have the data to see if those other ingredients are present meaning the soil sample is just fertilizer-contaminated soil. This can happen often when the soil samples collected are simply surface scoops which is why it's best to dig in a foot, throw away the top and test the deeper stuff. Dairy farms are also notorious for these items.

Orange Coast Analytical, Inc.
3002 Dow, Suite 532, Tustin, CA 92780 (714) 832-0064 Fax (714) 832-0067
4620 E. Elwood, Suite 4, Phoenix, AZ 85040 (480) 736-0960 Fax (480) 736-0970

LABORATORY REPORT FORM

ORANGE COAST ANALYTICAL, INC.

3002 Dow Suite 532 Tustin, CA 92780

(714) 832-0064

Laboratory Certification (ELAP) No.:2576
Expiration Date: 2025
Los Angeles County Sanitation District Lab ID# 10206

Laboratory Director's Name:
Mark Noorani

Client:	GeoTek, Inc.
Laboratory Reference:	GTK 28122
Project Name:	San Juan Capistrano
Project Number:	2653-CR
Date Received:	9/8/2023
Date Reported:	9/15/2023
Chain of Custody Received:	☑
Analytical Method:	8015B,

Mark Noorani, Laboratory Director

Mr Kyle Mchargue
GeoTek, Inc.
1548 N. Maple St
Corona, CA, 92880

Lab Reference #: GTK 28122
Project Name: San Juan Capistrano
Project #: 2653-CR

Case Narrative

Sample Receipt:

All samples on the Chain of Custody were received by OCA at 29ºC, on ice.

Holding Times:

All samples were analyzed within required holding times unless otherwise noted in the data qualifier section of the report.

Analytical Methods:

Sample analysis was performed following the analytical methods listed on the cover page.

Data Qualifiers:

Within this report, data qualifiers may have been assigned to clarify deviations in common laboratory procedures or any divergence from laboratory QA/QC criteria. If a data qualifier has been used, it will appear in the back of the report along with its description. All method QA/QC criteria have been met unless otherwise noted in the data qualifier section.

Definition of Terms:

The definitions of common terms and acronyms used in the report have been placed at the back of the report to assist data users.

Comments:

None

Mr Kyle Mchargue
GeoTek, Inc.
1548 N. Maple St
Corona, CA, 92880

Lab Reference #: GTK 28122
Project Name: San Juan Capistrano
Project #: 2653-CR

Client Sample Summary

Client Sample ID	Lab Sample Number	Date Received	Date Sampled	Matrix
#1	28122-001	9/8/2023	9/8/2023	Soil

Mr Kyle Mchargue
GeoTek, Inc.
1548 N. Maple St
Corona, CA, 92880

Lab Reference #: GTK 28122
Project Name: San Juan Capistrano
Project #: 2653-CR

Extractable Fuel Hydrocarbons (EPA 8015B)

Client Sample ID	Lab Sample Number	Date Received	Date Sampled	Date Extracted	Date Analyzed	Matrix
#1	28122-001	9/8/2023 15:01	9/8/2023	9/14/2023 12:24	9/14/2023 21:27	Soil

ANALYTE	mg/kg	Surrogate:	% RC*
DROs	<10	Octacosane	104

Dilution Factor: 1
Data Qualifiers: None

* Acc Recovery: 33-186 %

Client Sample ID	Lab Sample Number	Date Received	Date Sampled	Date Extracted	Date Analyzed	Matrix
#1	28122-001	9/8/2023 15:01	9/8/2023	9/14/2023 12:24	9/14/2023 21:27	Soil

ANALYTE	mg/kg	Surrogate:	% RC*
MROs	<50	Octacosane	104

Dilution Factor: 1
Data Qualifiers: None

* Acc Recovery: 33-186 %

Client Sample ID	Lab Sample Number	Date Received	Date Sampled	Date Extracted	Date Analyzed	Matrix
Method Blank	MBBL0914231			9/14/2023 12:24	9/14/2023 18:37	Soil

ANALYTE	mg/kg	Surrogate:	% RC*
DROs	<10	Octacosane	109

Dilution Factor: 1
Data Qualifiers: None

* Acc Recovery: 33-186 %

Client Sample ID	Lab Sample Number	Date Received	Date Sampled	Date Extracted	Date Analyzed	Matrix
Method Blank	MBBL0914231			9/14/2023 12:24	9/14/2023 18:37	Soil

ANALYTE	mg/kg	Surrogate:	% RC*
MROs	<50	Octacosane	109

Dilution Factor: 1
Data Qualifiers: None

* Acc Recovery: 33-186 %

Mr Kyle Mchargue
GeoTek, Inc.
1548 N. Maple St
Corona, CA, 92880

Lab Reference #: GTK 28122
Project Name: San Juan Capistrano
Project #: 2653-CR

Gasoline Range Organics - GROs (EPA 8015B)

Client Sample ID	Lab Sample Number	Date Received	Date Sampled	Date Extracted	Date Analyzed	Matrix
#1	28122-001	9/8/2023 15:01	9/8/2023	9/12/2023 10:00	9/12/2023 12:23	Soil

ANALYTE	mg/kg	Surrogate:	% RC*
GROs[1]	<0.20	α-α-α-Trifluorotoluene	88

Dilution Factor: 1
Data Qualifiers: None

* Acceptable Recovery: 33-132 %

Client Sample ID	Lab Sample Number	Date Received	Date Sampled	Date Extracted	Date Analyzed	Matrix
Method Blank	MBLY0912231			9/12/2023 10:00	9/12/2023 10:27	Soil

ANALYTE	mg/kg	Surrogate:	% RC*
GROs[1]	<0.20	α-α-α-Trifluorotoluene	105

Dilution Factor: 1
Data Qualifiers: None

* Acceptable Recovery: 33-132 %

Gasoline Range Organics (GROs) are quantitated against a gasoline standard.

QA/QC Report
for
Extactable Fuel Hydrocarbons (EPA 8015B/8015M)
Reporting units: ppm

Matrix Spike (MS) / Matrix Spike Duplicate (MSD)

Date of Extraction: 9/14/2023 12:24
Date of Analysis: 9/14/2023 20:01
Dup Date of Analysis: 9/14/2023 20:23
Laboratory Sample #: 28122-001
MS/MSD Qualifiers: None
Reference #: GTK 28122

Analyte	R	SPC CONC	MS	MSD	%MS	%MSD	RPD	ACP %MS	ACP RPD	Qual
EFH as Diesel	0.00	1000	898	891	90	89	1	13-167	20	☐

Surrogate Recoveries for Spike Samples

Surrogate (%RC)	MS	MSD	Qual
Octacosane	108	103	☐

LCS	LCSD	Qual
63	64	☐

ACP % RC
33-186

Laboratory Control Sample

Date of Extraction: 9/14/2023 12:24
Date of Analysis: 9/14/2023 19:20
Dup Date of Analysis: 9/14/2023 19:40
Laboratory Sample #: BL0914231
LCS Qualifiers: None

Analyte	SPC CONC	LCS	LCSD	%LCS	%LCSD	RPD	ACP %LCS	ACP RPD	Qual
EFH as Diesel	1000	549	571	55	57	4	33-130	20	☐

QA/QC Report
for
Volatile Fuel Hydrocarbons (EPA 8015B)
Reporting units: ppm

Matrix Spike (MS) / Matrix Spike Duplicate (MSD)

Date of Extraction: 9/12/2023 10:00
Date of Analysis: 9/12/2023 11:25
Dup Date of Analysis: 9/12/2023 11:44
Laboratory Sample #: 28119-001
MS/MSD Qualifiers: None
Reference #: GTK 28122

Analyte	R	SPC CONC	MS	MSD	%MS	%MSD	RPD	ACP %MS	ACP RPD	Qual
VFH as Gasoline	0.00	0.250	0.266	0.262	106	105	2	20-130	50	☐

Surrogate Recoveries for Spike Samples

Surrogate (%RC)	MS	MSD	Qual
α-α-α-Trifluorotoluene	88	89	☐

LCS	LCSD	Qual
80	100	☐

ACP % RC
33-132

Laboratory Control Sample

Date of Extraction: 9/12/2023 10:00
Date of Analysis: 9/12/2023 10:46
Dup Date of Analysis: 9/12/2023 11:06
Laboratory Sample #: LY0912231
LCS Qualifiers: None

Analyte	SPC CONC	LCS	LCSD	%LCS	%LCSD	RPD	ACP %LCS	ACP RPD	Qual
VFH as Gasoline	0.250	0.254	0.233	102	93	9	33-130	31	☐

Definition of terms:

R	Result of unspiked laboratory sample used for matrix spike determination.
SP CONC (or Spike Conc.)	Spike concentration added to sample or blank
MS	Matrix Spike sample result
MSD	Matrix Spike Duplicate sample result
%MS	Percent recovery of MS: {(MS-R1) / SP CONC} x100
%MSD	Percent recovery of MSD: {(MSD-R1) / SP CONC} x 100
RPD (for MS/MSD)	Relative Percent Difference: {(MS-MSD) / (MS+MSD)} x 100 x 2
LCS	Laboratory Control Sample result
LCSD	Laboratory Control Sample Duplicate result
%LCS	Percent recovery of LCS: {(LCS) / SP CONC} x100
%LCSD	Percent recovery of LCSD: {(LCSD) / SP CONC} x 100
RPD (for LCS/LCSD)	Relative Percent Difference: {(LCS-LCSD) / (LCS+LCSD)} x 100 x 2
ACP %LCS	Acceptable percent recovery range for Laboratory Control Samples.
ACP %MS	Acceptable percent recovery range for Matrix Spike samples
ACP RPD	Acceptable Relative Percent Difference
D	Detectable, result must be greater than zero
Qual	A checked box indicates a data qualifier was utilized and/or required for this analyte see attached explanation.
ND	Analyte Not Detected

Analysis Request and Chain of Custody Record

Lab Job No: 23122 ~~23022~~
Page 1 of 1

ORANGE COAST ANALYTICAL, INC. www.ocalab.com

3002 Dow, Suite 532
Tustin, CA 92780
(714) 832-0064 Fax (714) 832-0067

4620 E. Elwood, Suite 4
Phoenix, AZ 85040
(480) 736-0960 Fax (480) 736-0970

REQUIRED TURN AROUND TIME: Standard: X
72 Hours: 48 Hours: 24 Hours:

CUSTOMER INFORMATION		PROJECT INFORMATION	
COMPANY:	GEOTEK, INC.	PROJECT NAME:	SAN JUAN CAPISTRANO
SEND REPORT TO:	KYLE MCHARGUE	NUMBER:	3653-CR
EMAIL:	KMCHARGUE@GEOTEKUSA.COM	ADDRESS:	
ADDRESS:			
		P.O. #:	
PHONE:	951-220-5443 FAX:	SAMPLED BY:	KASE G.

SAMPLE ID	NO. OF CONTAINERS	SAMPLE DATE	SAMPLE TIME	SAMPLE MATRIX	CONTAINER TYPE	ANALYSIS REQUEST / PRESERVATIVE: TPH BOISB	REMARKS/PRECAUTIONS
#1	1	9/8		SS	Glass		

Total No. of Samples: 1 Method of Shipment:

Preservative: 1 = Ice 2 = HCl 3 = HNO_3 4 = H_2SO_4 5 = NaOH 6 = Other

Relinquished By:	Date/Time:	Received By:	Date/Time:
	09/08/2023 3:01 PM		
Relinquished By:	Date/Time:	Received By:	Date/Time:
Relinquished By:	Date/Time:	Received For Lab By: OCHCA	Date/Time: 9/8/23 1501

Sample Matrix:
GW - Groundwater DW - Drinking Water
WW - Wastewater W - Water
SW - Stormwater SS - Soil/Solid
OT - Other IR#3

Sample Integrity:
Intact: ✓ On Ice: Yes / No @ 29 °C

By signing above, client acknowledges responsibility for payment of all services requested on this chain of custody form and any additional services provided in support of this project. Payment is due within 30 days of invoice date unless otherwise agreed upon in writing with Orange Coast Analytical, Inc. All samples remain the property of the client. A disposal fee may be imposed if client fails to pickup sample.

Sample Receipt Report

Laboratory Reference: GTK 28122 Logged in by: MM

Received:	09/08/23 15:01	Company Name:	GeoTek, Inc.
Method of Shipment:	Hand Delivered	Project Manager:	Mr Kyle Mcharque
Shipping Container:	Cooler	Project Name:	San Juan Capistrano
# Shipping Containers:	1	Project #:	2653-CR

Sample Quantity
1 Soil

Chain of Custody		Complete ☑	Incomplete ☐	None ☐
Samples On Ice		Yes, Wet ☑	Yes, Blue ☐	No ☐
Observed Temp. (°C):	29	Thermometer ID: IR#3	Adjusted Temp.:	29+(-0)=29
Shipping Intact		Yes ☐	N/A ☑	No ☐
Shipping Custody Seals Intact		Yes ☐	N/A ☑	No ☐
Samples Intact		Yes ☑		No ☐
Sample Custody Seals Intact		Yes ☐	N/A ☑	No ☐
Custody Seals Signed & Dated		Yes ☐	N/A ☑	No ☐
Proper Test Containers		Yes ☑		No ☐
Proper Test Preservations		Yes ☑		No ☐
Samples Within Hold Times		Yes ☑		No ☐
VOAs Have Zero Headspace		Yes ☐	N/A ☑	No ☐
Sample Labels		Complete ☑	Incomplete ☐	None ☐
Sample Information Matches COC		Yes ☑	N/A ☐	No ☐

Notes

Client Notified _____ By _____ On _____

APPENDIX D

PERCOLATION/INFILTRATION RATES

Updated Geotechnical and Infiltration Evaluation
San Juan Capistrano, California
Project No. 3653-CR

GEOTEK

Client:	**Urban Advisory and Building Group**
Project:	**San Juan Capistrano**
Project No:	**3653-CR**
Date:	**9/11/2023**

Boring No. **I-1**

Infiltration Rate (Porchet Method)

Time Interval, Δt =	30	min
Final Depth to Water, D_F =	26	in
Test Hole Radius, r =	4	in
Initial Depth to Water, D_O =	26	in
Total Test Hole Depth, D_T =	48	in

Equation - $I_t = \dfrac{\Delta H\,(60r)}{\Delta t\,(r+2H_{avg})}$

$H_O = D_T - D_O$ =	22	in
$H_F = D_T - D_F$ =	22	in
$\Delta H = \Delta D = H_O - H_F$ =	0	in
$Havg = (H_O+H_F)/2$ =	22	in

I_t = 0.00 **Inches per Hour**

GEOTEK

Client:	**Urban Advisory and Building Group**
Project:	**San Juan Capistrano**
Project No:	**3653-CR**
Date:	**9/11/2023**

Boring No. **I-2**

Infiltration Rate (Porchet Method)

Time Interval, Δt =	30	min
Final Depth to Water, D_F =	24.125	in
Test Hole Radius, r =	4	in
Initial Depth to Water, D_O =	24	in
Total Test Hole Depth, D_T =	48	in

Equation - $I_t = \dfrac{\Delta H\,(60r)}{\Delta t\,(r+2H_{avg})}$

$H_O = D_T - D_O$ =	24	in
$H_F = D_T - D_F$ =	23.88	in
$\Delta H = \Delta D = H_O - H_F$ =	0.13	in
$Havg = (H_O+H_F)/2$ =	23.94	in

I_t = 0.02 **Inches per Hour**

GEOTEK

Client:	**Urban Advisory and Building Group**
Project:	**San Juan Capistrano**
Project No:	**3653-CR**
Date:	**9/11/2023**

Boring No. **I-3**

Infiltration Rate (Porchet Method)

Time Interval, Δt =	30	min
Final Depth to Water, D_F =	26.25	in
Test Hole Radius, r =	4	in
Initial Depth to Water, D_O =	24	in
Total Test Hole Depth, D_T =	48	in

Equation - $I_t = \dfrac{\Delta H\,(60r)}{\Delta t\,(r+2H_{avg})}$

$H_O = D_T - D_O$ =	24	in
$H_F = D_T - D_F$ =	21.75	in
$\Delta H = \Delta D = H_O - H_F$ =	2.25	in
$H_{avg} = (H_O+H_F)/2$ =	22.875	in

I_t = 0.36 **Inches per Hour**

GEOTEK

Client:	**Urban Advisory and Building Group**
Project:	**San Juan Capistrano**
Project No:	**3653-CR**
Date:	**9/11/2023**

Boring No. **I-4**

Infiltration Rate (Porchet Method)

Time Interval, Δt =	30	min
Final Depth to Water, D_F =	26.25	in
Test Hole Radius, r =	4	in
Initial Depth to Water, D_O =	26	in
Total Test Hole Depth, D_T =	48	in

Equation - $I_t = \dfrac{\Delta H\,(60r)}{\Delta t\,(r+2H_{avg})}$

$H_O = D_T - D_O$ =	22	in
$H_F = D_T - D_F$ =	21.75	in
$\Delta H = \Delta D = H_O - H_F$ =	0.25	in
$Havg = (H_O+H_F)/2$ =	21.875	in

I_t = 0.04 **Inches per Hour**

GEOTEK

PERCOLATION DATA SHEET

Project: Urban Advisory and Building Group, San Juan Capistrano **Job No.:** 3653-CR

Test Hole No.: I-I **Tested By:** JR **Date:** 9/11/2023

Depth of Hole As Drilled: 48 **Before Test:** 48 **After Test:** 48

Reading No.	Time	Time Interval (Min)	Total Depth of Hole (Inches)	Initial Water Level (Inches)	Final Water Level (Inches)	Δ in Water Level (Inches)	Rate (Minutes per Inch)	Comments
1	7:01 AM		48	22				
	7:26 AM	25			20.875	1.125	22.2	
2	7:27 AM		48	22				
	7:52 AM	25			22	0	0.0	
1	7:53 AM		48	22				
	8:23 AM	30			21.875	0.125	240.0	
2	8:24 AM		48	22				
	8:54 AM	30			21.875	0.125	240.0	
3	8:55 AM		48	22				
	9:25 AM	30			22	0	0.0	
4	9:26 AM		48	22				
	9:56 AM	30			21.875	0.125	240.0	
5	9:57 AM		48	22				
	10:27 AM	30			22	0	0.0	
6	10:28 AM		48	22				
	10:58 AM	30			21.875	0.125	240.0	
7	10:59 AM		48	22				
	11:29 AM	30			22	0	0.0	
8	11:30 AM		48	22				
	12:00 PM	30			22	0	0.0	
9	12:01 PM		48	22				
	12:31 PM	30			22	0	0.0	
10	12:32 PM		48	22				
	1:02 PM	30			21.875	0.125	240.0	
11	1:03 PM		48	22				
	1:33 PM	30			22	0	0.0	
12	1:34 PM		48	22				
	2:04 PM	30			22	0	0.0	

GEOTEK

PERCOLATION DATA SHEET

Project: Urban Advisory and Building Group, San Juan Capistrano **Job No.:** 3653-CR

Test Hole No.: I-2 **Tested By:** JR **Date:** 9/11/2023

Depth of Hole As Drilled: 48 **Before Test:** 48 **After Test:** 48

Reading No.	Time	Time Interval (Min)	Total Depth of Hole (Inches)	Initial Water Level (Inches)	Final Water Level (Inches)	Δ in Water Level (Inches)	Rate (Minutes per Inch)	Comments
1	7:04 AM		48	24				
	7:29 AM	25			23.25	0.75	33.3	
2	7:30 AM		48	24				
	7:55 AM	25			23.625	0.375	66.7	
1	7:56 AM		48	24				
	8:26 AM	30			23.625	0.375	80.0	
2	8:27 AM		48	24				
	8:57 AM	30			23.625	0.375	80.0	
3	8:58 AM		48	24				
	9:28 AM	30			23.625	0.375	80.0	
4	9:29 AM		48	24				
	9:59 AM	30			24	0	0.0	
5	10:00 AM		48	24				
	10:30 AM	30			23.75	0.25	120.0	
6	10:31 AM		48	24				
	11:01 AM	30			23.875	0.125	240.0	
7	11:02 AM		48	24				
	11:32 AM	30			24	0	0.0	
8	11:33 AM		48	24				
	12:03 PM	30			23.625	0.375	80.0	
9	12:04 PM		48	24				
	12:34 PM	30			23.75	0.25	120.0	
10	12:35 PM		48	24				
	1:05 PM	30			23.875	0.125	240.0	
11	1:06 PM		48	24				
	1:36 PM	30			23.875	0.125	240.0	
12	1:37 PM		48	24				
	2:07 PM	30			23.875	0.125	240.0	

GEOTEK

PERCOLATION DATA SHEET

Project: Urban Advisory and Building Group, San Juan Capistrano **Job No.:** 3653-CR

Test Hole No.: I-3 **Tested By:** JR **Date:** 9/11/2023

Depth of Hole As Drilled: 48 **Before Test:** 48 **After Test:** 48

Reading No.	Time	Time Interval (Min)	Total Depth of Hole (Inches)	Initial Water Level (Inches)	Final Water Level (Inches)	Δ in Water Level (Inches)	Rate (Minutes per Inch)	Comments
1	7:06 AM		48	24				
	7:31 AM	25			18.875	5.125	4.9	
2	7:32 AM		48	24				
	7:57 AM	25			19.25	4.75	5.3	
1	7:58 AM		48	24				
	8:28 AM	30			19.375	4.625	6.5	
2	8:29 AM		48	24				
	8:59 AM	30			20.625	3.375	8.9	
3	9:00 AM		48	24				
	9:30 AM	30			19.875	4.125	7.3	
4	9:31 AM		48	24				
	10:01 AM	30			20.875	3.125	9.6	
5	10:02 AM		48	24				
	10:32 AM	30			21	3	10.0	
6	10:33 AM		48	24				
	11:03 AM	30			21.25	2.75	10.9	
7	11:04 AM		48	24				
	11:34 AM	30			21.125	2.875	10.4	
8	11:35 AM		48	24				
	12:05 PM	30			21.375	2.625	11.4	
9	12:06 PM		48	24				
	12:36 PM	30			21.125	2.875	10.4	
10	12:37 PM		48	24				
	1:07 PM	30			21.25	2.75	10.9	
11	1:08 PM		48	24				
	1:38 PM	30			21.625	2.375	12.6	
12	1:39 PM		48	24				
	2:09 PM	30			21.75	2.25	13.3	

GEOTEK

PERCOLATION DATA SHEET

Project: Urban Advisory and Building Group, San Juan Capistrano **Job No.:** 3653-CR

Test Hole No.: I-4 **Tested By:** JR **Date:** 9/11/2023

Depth of Hole As Drilled: 48 **Before Test:** 48 **After Test:** 48

Reading No.	Time	Time Interval (Min)	Total Depth of Hole (Inches)	Initial Water Level (Inches)	Final Water Level (Inches)	Δ in Water Level (Inches)	Rate (Minutes per Inch)	Comments
1	7:09 AM		48	22				
	7:34 AM	25			20	2	12.5	
2	7:35 AM		48	22				
	8:00 AM	25			20.875	1.125	22.2	
1	8:01 AM		48	22				
	8:31 AM	30			21.125	0.875	34.3	
2	8:32 AM		48	22				
	9:02 AM	30			21.5	0.5	60.0	
3	9:03 AM		48	22				
	9:33 AM	30			21.625	0.375	80.0	
4	9:34 AM		48	22				
	10:04 AM	30			21.625	0.375	80.0	
5	10:05 AM		48	22				
	10:35 AM	30			21.625	0.375	80.0	
6	10:36 AM		48	22				
	11:06 AM	30			21.875	0.125	240.0	
7	11:07 AM		48	22				
	11:37 AM	30			21.75	0.25	120.0	
8	11:38 AM		48	22				
	12:08 PM	30			21.75	0.25	120.0	
9	12:09 PM		48	22				
	12:39 PM	30			21.75	0.25	120.0	
10	12:40 PM		48	22				
	1:10 PM	30			21.75	0.25	120.0	
11	1:11 PM		48	22				
	1:41 PM	30			21.75	0.25	120.0	
12	1:42 PM		48	22				
	2:12 PM	30			21.75	0.25	120.0	

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APPENDIX E

LIQUEFACTION AND SEISMICALLY INDUCED SETTLEMENT ANALYSIS

Updated Geotechnical and Infiltration Evaluation

San Juan Capistrano, California

Project No. 3653-CR

GEOTEK

GEOLOGISMIKI Geotechnical Software

LIQUEFACTION ANALYSIS REPORT

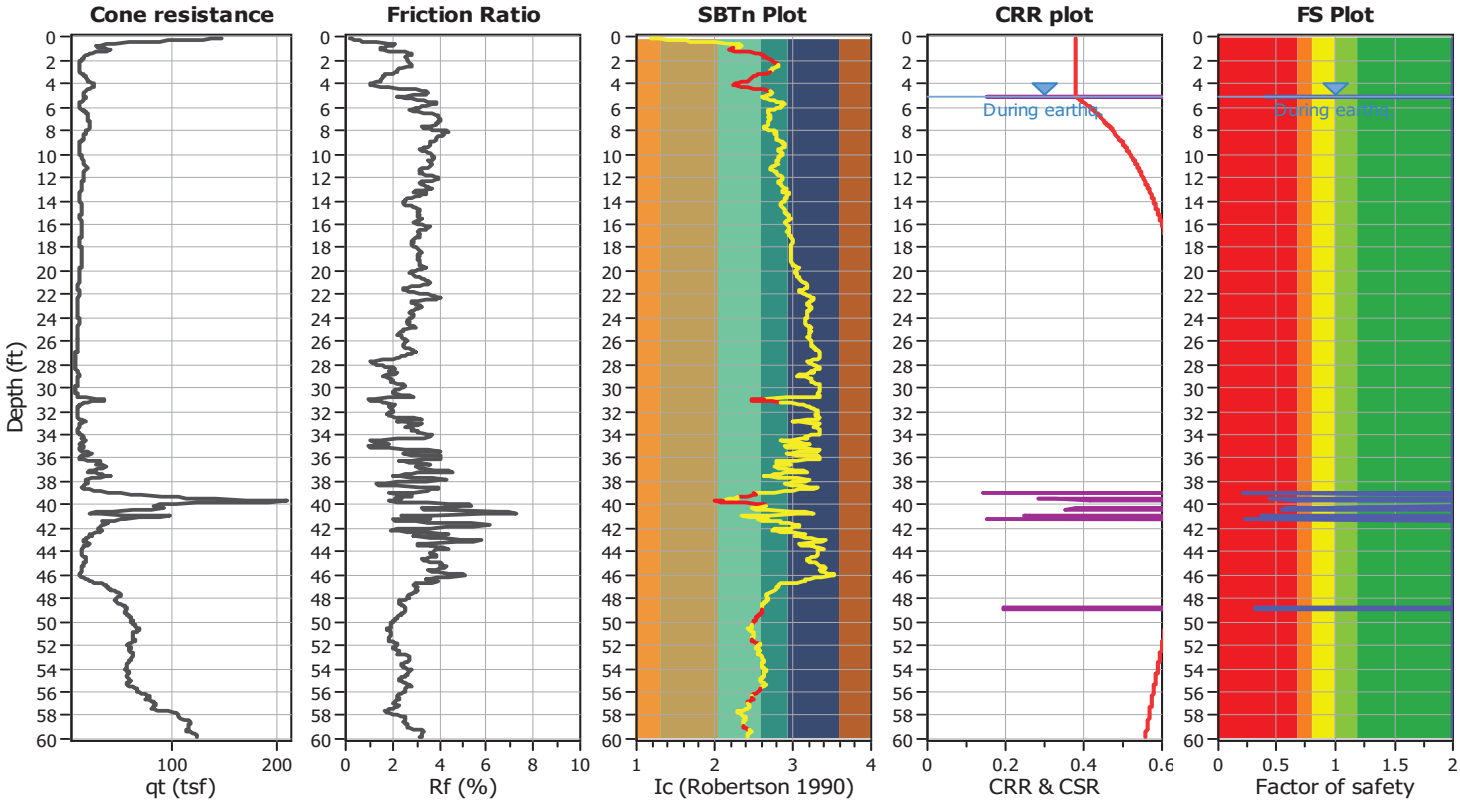
Project title : Mixed-Use development

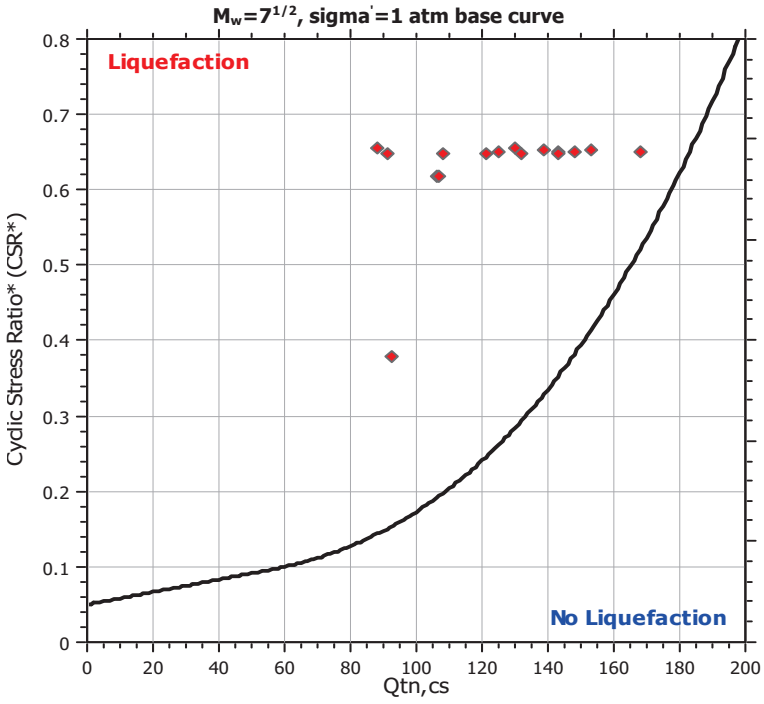
Location : San Juan Capistrano, CA

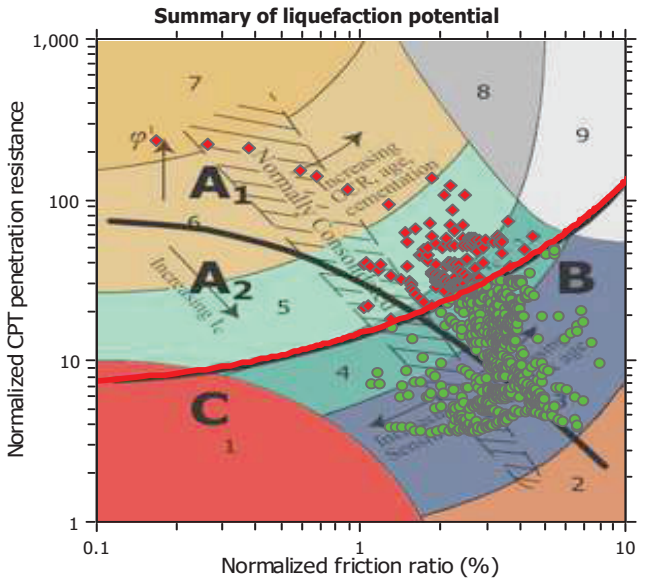
CPT file : CPT-1

Input parameters and analysis data

Analysis method:	NCEER (1998)	G.W.T. (in-situ):	32.50 ft	Use fill:	No	Clay like behavior applied:	Sands only
Fines correction method:	NCEER (1998)	G.W.T. (earthq.):	5.00 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:	50.00 ft
Earthquake magnitude M_w:	7.69	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method based
Peak ground acceleration:	0.55	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

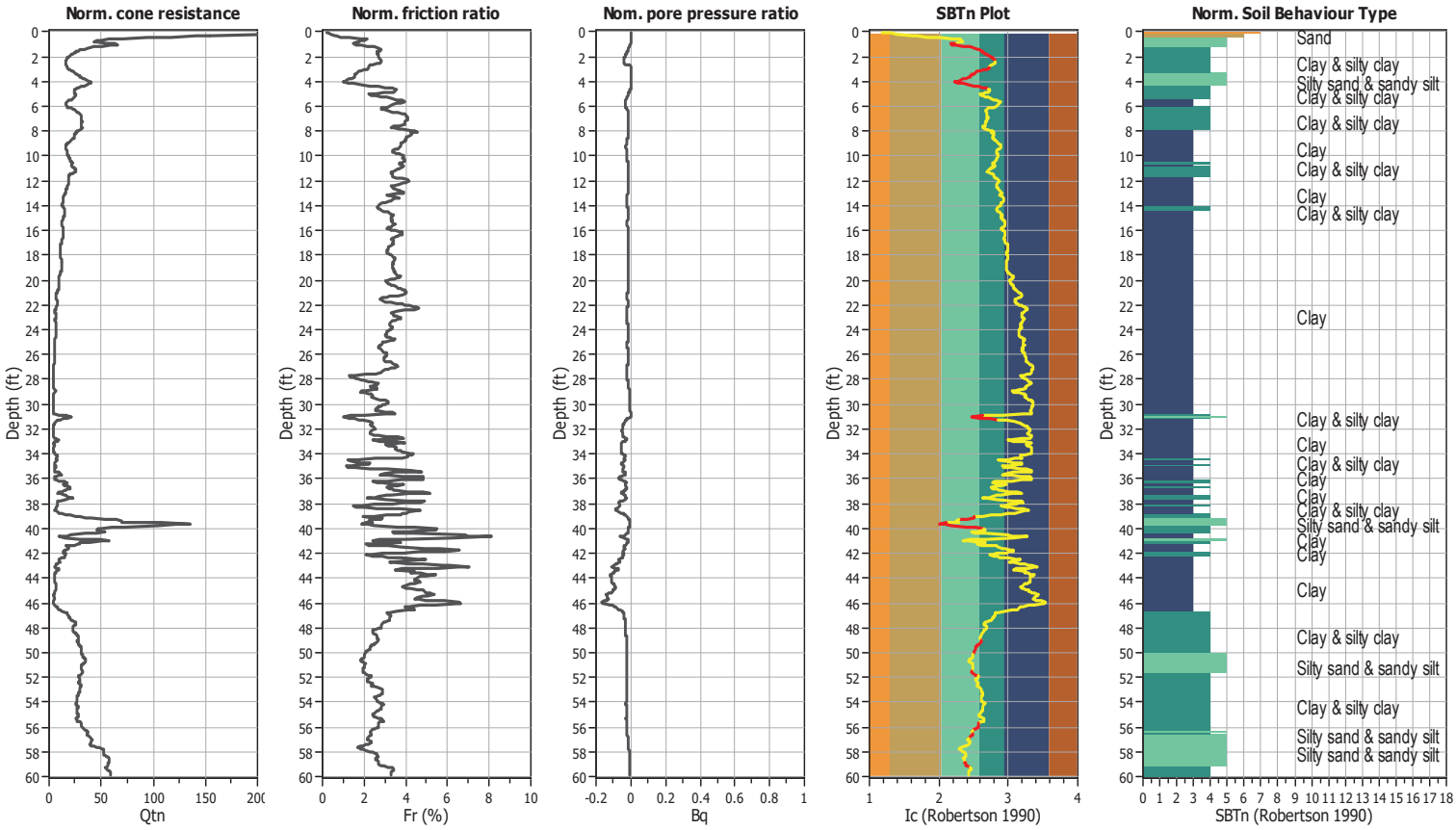






Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and strength loss possible depending on soil plasticity, brittleness/sensitivity, strain to peak undrained strength and ground geometry

CPT basic interpretation plots (normalized)



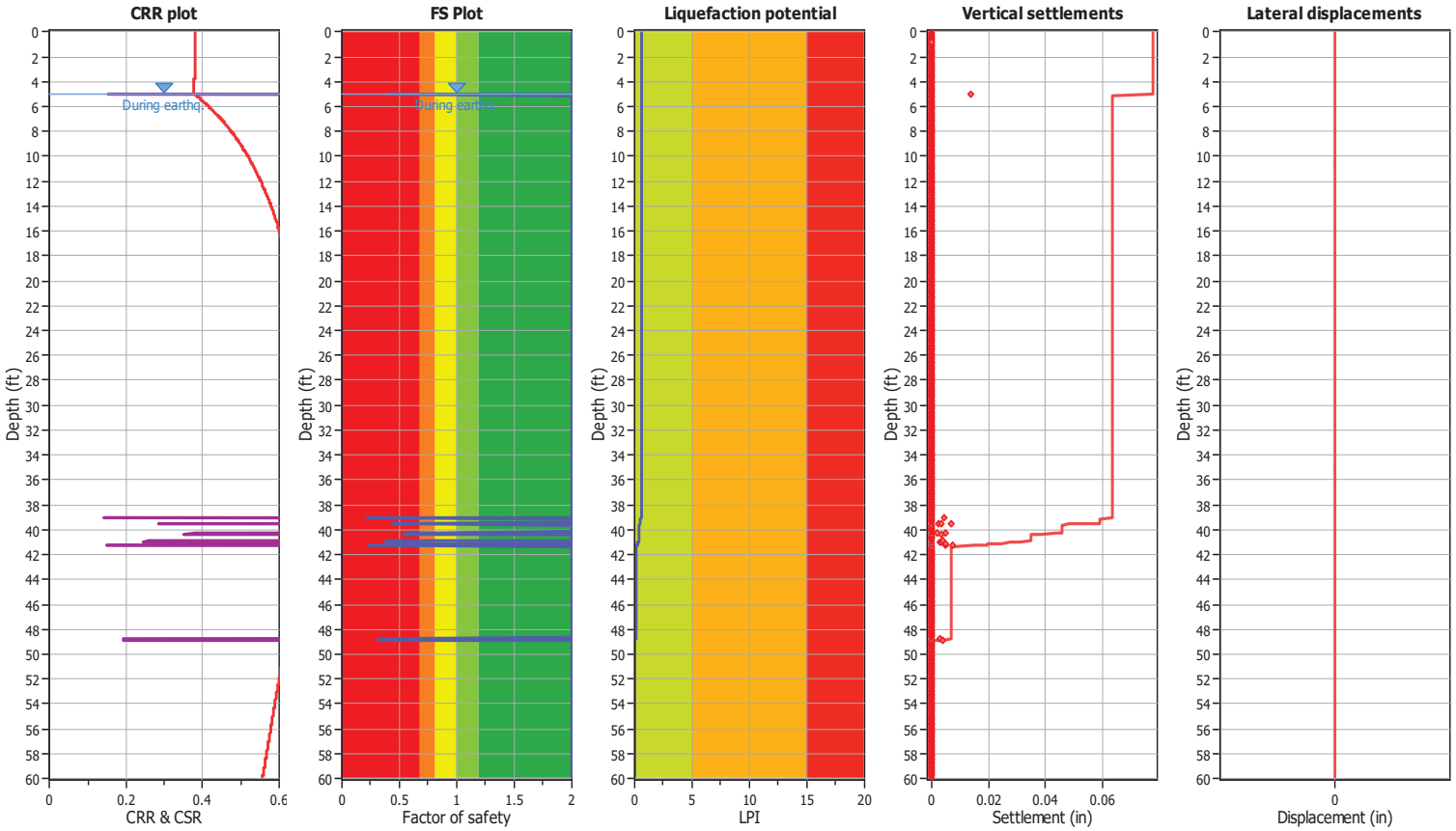
Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	5.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.69	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.55	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	32.50 ft	Fill height:	N/A	Limit depth:	50.00 ft

SBTn legend

1. Sensitive fine grained
2. Organic material
3. Clay to silty clay
4. Clayey silt to silty
5. Silty sand to sandy silt
6. Clean sand to silty sand
7. Gravely sand to sand
8. Very stiff sand to
9. Very stiff fine grained

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	5.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.69	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.55	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	32.50 ft	Fill height:	N/A	Limit depth:	50.00 ft

F.S. color scheme

- Almost certain it will liquefy
- Very likely to liquefy
- Liquefaction and no liq. are equally likely
- Unlike to liquefy
- Almost certain it will not liquefy

LPI color scheme

- Very high risk
- High risk
- Low risk

:: 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)
0.09	1.18	236.53	1.00	236.53	37	593	0.38	0.000	0.00	17.00	0.00	0.000
0.14	1.29	221.85	1.00	221.85	36	638	0.38	0.000	0.00	17.00	0.00	0.000
0.22	1.40	209.02	1.00	209.02	35	686	0.38	0.001	0.00	17.00	0.00	0.000
0.27	1.62	153.87	1.00	153.87	28	672	0.38	0.001	0.00	17.00	0.00	0.000
0.34	1.69	140.86	1.00	140.86	26	670	0.38	0.001	0.00	17.00	0.00	0.000
0.41	1.83	117.02	1.18	138.05	27	662	0.38	0.001	0.00	17.00	0.00	0.000
0.46	2.00	93.56	1.31	122.50	26	662	0.38	0.002	0.00	17.00	0.00	0.000
0.56	2.19	71.67	1.60	114.46	26	645	0.38	0.002	0.00	17.00	0.00	0.000
0.60	2.30	57.69	1.94	112.10	26	598	0.38	0.003	0.00	17.00	0.00	0.000
0.69	2.34	50.20	2.07	103.88	25	542	0.38	0.003	0.00	17.00	0.00	0.000
0.74	2.33	45.64	2.06	94.20	23	492	0.38	0.004	0.00	17.00	0.00	0.000
0.79	2.35	42.99	2.14	91.94	22	473	0.38	0.005	0.00	17.00	0.00	0.000
0.86	2.32	45.60	1.99	90.71	21	480	0.38	0.005	0.00	17.00	0.00	0.000
0.93	2.22	54.78	1.68	92.01	21	514	0.38	0.005	0.00	17.00	0.00	0.000
1.01	2.17	62.98	1.55	97.49	0	0	0.38	0.000	0.00	17.00	0.00	0.000
1.06	2.18	65.52	1.57	102.97	0	0	0.38	0.000	0.00	17.00	0.00	0.000
1.13	2.26	59.49	1.77	105.51	0	0	0.38	0.000	0.00	17.00	0.00	0.000
1.22	2.35	51.53	2.12	109.48	0	0	0.38	0.000	0.00	17.00	0.00	0.000
1.26	2.45	43.01	2.65	114.00	0	0	0.38	0.000	0.00	17.00	0.00	0.000
1.32	2.51	37.53	3.08	115.68	0	0	0.38	0.000	0.00	17.00	0.00	0.000
1.41	2.57	33.06	3.49	115.24	0	0	0.38	0.000	0.00	17.00	0.00	0.000
1.46	2.60	29.89	3.74	111.86	0	0	0.38	0.000	0.00	17.00	0.00	0.000
1.55	2.62	27.69	3.91	108.21	0	0	0.38	0.000	0.00	0.00	0.00	0.000
1.60	2.63	26.15	4.00	104.60	0	0	0.38	0.000	0.00	0.00	0.00	0.000
1.65	2.64	24.89	4.12	102.47	0	0	0.38	0.000	0.00	0.00	0.00	0.000
1.74	2.66	23.67	4.29	101.53	0	0	0.38	0.000	0.00	0.00	0.00	0.000
1.79	2.68	22.55	4.49	101.16	0	0	0.38	0.000	0.00	0.00	0.00	0.000
1.84	2.70	21.57	4.66	100.49	0	0	0.38	0.000	0.00	0.00	0.00	0.000
1.93	2.71	20.57	4.85	99.79	0	0	0.38	0.000	0.00	0.00	0.00	0.000
1.97	2.73	19.54	5.05	98.77	0	0	0.38	0.000	0.00	0.00	0.00	0.000
2.06	2.75	18.75	5.24	98.19	0	0	0.38	0.000	0.00	0.00	0.00	0.000
2.11	2.76	18.00	5.42	97.49	0	0	0.38	0.000	0.00	0.00	0.00	0.000
2.20	2.78	17.48	5.56	97.14	0	0	0.38	0.000	0.00	0.00	0.00	0.000
2.24	2.79	16.92	5.74	97.19	0	0	0.38	0.000	0.00	0.00	0.00	0.000
2.30	2.80	16.45	5.90	97.12	0	0	0.38	0.000	0.00	0.00	0.00	0.000
2.39	2.82	16.02	6.04	96.82	0	0	0.38	0.000	0.00	0.00	0.00	0.000
2.44	2.82	15.78	6.09	96.04	0	0	0.38	0.000	0.00	0.00	0.00	0.000
2.50	2.82	15.73	6.05	95.13	0	0	0.38	0.000	0.00	0.00	0.00	0.000
2.58	2.80	15.88	5.86	93.05	0	0	0.38	0.000	0.00	0.00	0.00	0.000
2.63	2.77	16.24	5.52	89.63	0	0	0.38	0.000	0.00	0.00	0.00	0.000
2.72	2.75	16.63	5.24	87.13	0	0	0.38	0.000	0.00	0.00	0.00	0.000
2.77	2.73	17.12	5.03	86.15	0	0	0.38	0.000	0.00	0.00	0.00	0.000
2.85	2.72	17.49	4.96	86.70	0	0	0.38	0.000	0.00	0.00	0.00	0.000
2.90	2.71	17.86	4.85	86.67	0	0	0.38	0.000	0.00	0.00	0.00	0.000
2.96	2.72	17.62	4.94	87.11	0	0	0.38	0.000	0.00	0.00	0.00	0.000
3.03	2.70	18.31	4.71	86.19	0	0	0.38	0.000	0.00	0.00	0.00	0.000
3.09	2.66	19.70	4.28	84.21	0	0	0.38	0.000	0.00	0.00	0.00	0.000
3.19	2.60	21.78	3.74	81.40	0	0	0.38	0.000	0.00	17.00	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)
3.22	2.56	23.39	3.40	79.51	0	0	0.38	0.000	0.00	17.00	0.00	0.000
3.31	2.53	24.64	3.18	78.39	0	0	0.38	0.000	0.00	17.00	0.00	0.000
3.38	2.50	25.93	2.99	77.63	0	0	0.38	0.000	0.00	17.00	0.00	0.000
3.42	2.48	27.19	2.84	77.29	0	0	0.38	0.000	0.00	17.00	0.00	0.000
3.49	2.46	28.25	2.74	77.49	0	0	0.38	0.000	0.00	17.00	0.00	0.000
3.56	2.45	29.41	2.65	77.86	0	0	0.38	0.000	0.00	17.00	0.00	0.000
3.65	2.44	30.10	2.60	78.19	0	0	0.38	0.000	0.00	17.00	0.00	0.000
3.71	2.42	30.98	2.51	77.61	0	0	0.38	0.000	0.00	17.00	0.00	0.000
3.74	2.39	32.28	2.34	75.57	0	0	0.38	0.000	0.00	17.00	0.00	0.000
3.83	2.35	34.17	2.13	72.76	0	0	0.38	0.000	0.00	17.00	0.00	0.000
3.89	2.30	36.53	1.93	70.54	0	0	0.38	0.000	0.00	17.00	0.00	0.000
3.98	2.26	38.47	1.80	69.09	0	0	0.38	0.000	0.00	17.00	0.00	0.000
4.03	2.24	39.96	1.71	68.37	0	0	0.38	0.000	0.00	17.00	0.00	0.000
4.08	2.24	40.42	1.72	69.51	0	0	0.38	0.000	0.00	17.00	0.00	0.000
4.17	2.27	40.13	1.82	73.08	0	0	0.38	0.000	0.00	17.00	0.00	0.000
4.22	2.34	38.55	2.10	81.03	0	0	0.38	0.000	0.00	17.00	0.00	0.000
4.30	2.43	36.03	2.51	90.47	0	0	0.38	0.000	0.00	17.00	0.00	0.000
4.35	2.51	33.24	3.02	100.48	0	0	0.38	0.000	0.00	17.00	0.00	0.000
4.41	2.58	30.54	3.57	109.09	0	0	0.38	0.000	0.00	17.00	0.00	0.000
4.49	2.64	28.49	4.07	115.99	0	0	0.38	0.000	0.00	0.00	0.00	0.000
4.54	2.69	26.58	4.58	121.66	0	0	0.38	0.000	0.00	0.00	0.00	0.000
4.61	2.71	25.50	4.85	123.76	0	0	0.38	0.000	0.00	0.00	0.00	0.000
4.68	2.73	24.79	5.01	124.23	0	0	0.38	0.000	0.00	0.00	0.00	0.000
4.73	2.73	24.64	5.00	123.26	0	0	0.38	0.000	0.00	0.00	0.00	0.000
4.82	2.72	24.67	4.97	122.51	0	0	0.38	0.000	0.00	0.00	0.00	0.000
4.86	2.72	24.80	4.91	121.74	0	0	0.38	0.000	0.00	0.00	0.00	0.000
4.93	2.68	24.79	4.48	111.04	0	0	0.38	0.000	0.00	0.00	0.00	0.000

Total estimated settlement: 0.00

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)
5.01	101.09	2.00	0.00	0.92	0.00	5.06	92.50	0.40	2.28	0.91	0.01
5.15	96.48	2.00	0.00	0.91	0.00	5.19	102.19	2.00	0.00	0.91	0.00
5.29	107.93	2.00	0.00	0.91	0.00	5.32	113.38	2.00	0.00	0.91	0.00
5.41	116.84	2.00	0.00	0.91	0.00	5.48	118.74	2.00	0.00	0.91	0.00
5.52	120.19	2.00	0.00	0.91	0.00	5.62	120.29	2.00	0.00	0.90	0.00
5.66	118.49	2.00	0.00	0.90	0.00	5.73	114.48	2.00	0.00	0.90	0.00
5.80	110.07	2.00	0.00	0.90	0.00	5.85	107.36	2.00	0.00	0.90	0.00
5.93	106.63	2.00	0.00	0.90	0.00	5.99	105.67	2.00	0.00	0.90	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)
6.08	103.98	2.00	0.00	0.90	0.00	6.13	101.80	2.00	0.00	0.90	0.00
6.17	103.05	2.00	0.00	0.90	0.00	6.27	105.74	2.00	0.00	0.89	0.00
6.30	110.73	2.00	0.00	0.89	0.00	6.37	116.77	2.00	0.00	0.89	0.00
6.46	123.24	2.00	0.00	0.89	0.00	6.50	129.63	2.00	0.00	0.89	0.00
6.56	135.21	2.00	0.00	0.89	0.00	6.64	139.88	2.00	0.00	0.89	0.00
6.73	142.71	2.00	0.00	0.89	0.00	6.78	143.21	2.00	0.00	0.89	0.00
6.83	143.46	2.00	0.00	0.88	0.00	6.92	143.77	2.00	0.00	0.88	0.00
6.97	144.25	2.00	0.00	0.88	0.00	7.03	144.36	2.00	0.00	0.88	0.00
7.11	144.36	2.00	0.00	0.88	0.00	7.16	143.68	2.00	0.00	0.88	0.00
7.24	142.98	2.00	0.00	0.88	0.00	7.30	142.23	2.00	0.00	0.88	0.00
7.39	141.99	2.00	0.00	0.87	0.00	7.44	141.88	2.00	0.00	0.87	0.00
7.48	141.20	2.00	0.00	0.87	0.00	7.58	135.89	2.00	0.00	0.87	0.00
7.62	128.47	2.00	0.00	0.87	0.00	7.69	126.05	2.00	0.00	0.87	0.00
7.77	129.37	2.00	0.00	0.87	0.00	7.86	135.53	2.00	0.00	0.87	0.00
7.88	137.76	2.00	0.00	0.87	0.00	7.95	143.71	2.00	0.00	0.87	0.00
8.01	145.01	2.00	0.00	0.86	0.00	8.09	145.88	2.00	0.00	0.86	0.00
8.14	141.76	2.00	0.00	0.86	0.00	8.23	141.28	2.00	0.00	0.86	0.00
8.28	139.70	2.00	0.00	0.86	0.00	8.37	137.46	2.00	0.00	0.86	0.00
8.42	134.75	2.00	0.00	0.86	0.00	8.47	132.89	2.00	0.00	0.86	0.00
8.56	131.55	2.00	0.00	0.85	0.00	8.61	130.30	2.00	0.00	0.85	0.00
8.70	128.98	2.00	0.00	0.85	0.00	8.74	127.79	2.00	0.00	0.85	0.00
8.80	125.51	2.00	0.00	0.85	0.00	8.88	122.68	2.00	0.00	0.85	0.00
8.93	119.32	2.00	0.00	0.85	0.00	9.00	116.95	2.00	0.00	0.85	0.00
9.07	115.02	2.00	0.00	0.85	0.00	9.12	113.85	2.00	0.00	0.85	0.00
9.21	113.23	2.00	0.00	0.84	0.00	9.26	112.60	2.00	0.00	0.84	0.00
9.33	111.73	2.00	0.00	0.84	0.00	9.39	110.90	2.00	0.00	0.84	0.00
9.49	109.89	2.00	0.00	0.84	0.00	9.54	109.13	2.00	0.00	0.84	0.00
9.59	109.04	2.00	0.00	0.84	0.00	9.68	109.83	2.00	0.00	0.84	0.00
9.73	110.99	2.00	0.00	0.84	0.00	9.78	113.18	2.00	0.00	0.83	0.00
9.87	115.55	2.00	0.00	0.83	0.00	9.91	118.16	2.00	0.00	0.83	0.00
10.00	119.59	2.00	0.00	0.83	0.00	10.05	120.41	2.00	0.00	0.83	0.00
10.15	121.00	2.00	0.00	0.83	0.00	10.20	121.99	2.00	0.00	0.83	0.00
10.24	124.03	2.00	0.00	0.83	0.00	10.33	125.27	2.00	0.00	0.82	0.00
10.38	126.22	2.00	0.00	0.82	0.00	10.48	125.40	2.00	0.00	0.82	0.00
10.53	124.57	2.00	0.00	0.82	0.00	10.57	123.37	2.00	0.00	0.82	0.00
10.68	123.25	2.00	0.00	0.82	0.00	10.71	123.47	2.00	0.00	0.82	0.00
10.79	125.02	2.00	0.00	0.82	0.00	10.85	125.72	2.00	0.00	0.82	0.00
10.92	126.51	2.00	0.00	0.81	0.00	10.96	126.89	2.00	0.00	0.81	0.00
11.06	127.43	2.00	0.00	0.81	0.00	11.11	126.68	2.00	0.00	0.81	0.00
11.19	123.66	2.00	0.00	0.81	0.00	11.25	120.12	2.00	0.00	0.81	0.00
11.29	116.80	2.00	0.00	0.81	0.00	11.38	114.79	2.00	0.00	0.81	0.00
11.43	113.32	2.00	0.00	0.81	0.00	11.52	112.76	2.00	0.00	0.80	0.00
11.57	112.33	2.00	0.00	0.80	0.00	11.62	111.98	2.00	0.00	0.80	0.00
11.71	112.51	2.00	0.00	0.80	0.00	11.75	116.01	2.00	0.00	0.80	0.00
11.85	120.57	2.00	0.00	0.80	0.00	11.90	124.42	2.00	0.00	0.80	0.00
11.95	125.40	2.00	0.00	0.80	0.00	12.04	125.44	2.00	0.00	0.80	0.00
12.09	124.92	2.00	0.00	0.80	0.00	12.18	123.46	2.00	0.00	0.79	0.00
12.22	120.77	2.00	0.00	0.79	0.00	12.27	116.02	2.00	0.00	0.79	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)
12.37	111.68	2.00	0.00	0.79	0.00	12.41	108.62	2.00	0.00	0.79	0.00
12.50	108.42	2.00	0.00	0.79	0.00	12.55	108.76	2.00	0.00	0.79	0.00
12.60	109.45	2.00	0.00	0.79	0.00	12.69	110.17	2.00	0.00	0.78	0.00
12.74	111.86	2.00	0.00	0.78	0.00	12.84	113.23	2.00	0.00	0.78	0.00
12.87	114.61	2.00	0.00	0.78	0.00	12.93	114.91	2.00	0.00	0.78	0.00
13.02	114.76	2.00	0.00	0.78	0.00	13.06	107.70	2.00	0.00	0.78	0.00
13.16	100.97	2.00	0.00	0.78	0.00	13.21	98.03	2.00	0.00	0.78	0.00
13.30	102.94	2.00	0.00	0.77	0.00	13.34	106.52	2.00	0.00	0.77	0.00
13.39	105.63	2.00	0.00	0.77	0.00	13.45	102.86	2.00	0.00	0.77	0.00
13.52	100.49	2.00	0.00	0.77	0.00	13.59	98.58	2.00	0.00	0.77	0.00
13.67	97.37	2.00	0.00	0.77	0.00	13.72	94.65	2.00	0.00	0.77	0.00
13.81	91.87	2.00	0.00	0.77	0.00	13.85	89.67	2.00	0.00	0.77	0.00
13.93	89.16	2.00	0.00	0.76	0.00	13.99	89.01	2.00	0.00	0.76	0.00
14.04	89.03	2.00	0.00	0.76	0.00	14.13	88.93	2.00	0.00	0.76	0.00
14.18	89.78	2.00	0.00	0.76	0.00	14.28	91.21	2.00	0.00	0.76	0.00
14.32	93.16	2.00	0.00	0.76	0.00	14.37	95.32	2.00	0.00	0.76	0.00
14.46	97.17	2.00	0.00	0.75	0.00	14.51	99.02	2.00	0.00	0.75	0.00
14.57	100.29	2.00	0.00	0.75	0.00	14.65	101.59	2.00	0.00	0.75	0.00
14.74	102.65	2.00	0.00	0.75	0.00	14.79	103.18	2.00	0.00	0.75	0.00
14.84	102.62	2.00	0.00	0.75	0.00	14.90	101.57	2.00	0.00	0.75	0.00
14.98	100.77	2.00	0.00	0.75	0.00	15.07	100.69	2.00	0.00	0.74	0.00
15.12	100.91	2.00	0.00	0.74	0.00	15.16	100.09	2.00	0.00	0.74	0.00
15.26	98.65	2.00	0.00	0.74	0.00	15.30	97.38	2.00	0.00	0.74	0.00
15.39	97.62	2.00	0.00	0.74	0.00	15.44	99.24	2.00	0.00	0.74	0.00
15.49	99.99	2.00	0.00	0.74	0.00	15.55	99.86	2.00	0.00	0.74	0.00
15.63	98.95	2.00	0.00	0.74	0.00	15.72	98.38	2.00	0.00	0.73	0.00
15.77	97.52	2.00	0.00	0.73	0.00	15.82	97.10	2.00	0.00	0.73	0.00
15.90	97.84	2.00	0.00	0.73	0.00	15.96	100.26	2.00	0.00	0.73	0.00
16.01	103.26	2.00	0.00	0.73	0.00	16.10	105.57	2.00	0.00	0.73	0.00
16.15	107.66	2.00	0.00	0.73	0.00	16.22	107.81	2.00	0.00	0.73	0.00
16.31	107.29	2.00	0.00	0.72	0.00	16.36	106.21	2.00	0.00	0.72	0.00
16.42	104.31	2.00	0.00	0.72	0.00	16.50	102.83	2.00	0.00	0.72	0.00
16.54	100.86	2.00	0.00	0.72	0.00	16.64	99.36	2.00	0.00	0.72	0.00
16.68	98.53	2.00	0.00	0.72	0.00	16.77	98.80	2.00	0.00	0.72	0.00
16.82	99.37	2.00	0.00	0.71	0.00	16.86	99.03	2.00	0.00	0.71	0.00
16.96	98.17	2.00	0.00	0.71	0.00	17.01	97.45	2.00	0.00	0.71	0.00
17.08	97.14	2.00	0.00	0.71	0.00	17.15	96.33	2.00	0.00	0.71	0.00
17.20	93.71	2.00	0.00	0.71	0.00	17.29	91.71	2.00	0.00	0.71	0.00
17.38	90.38	2.00	0.00	0.71	0.00	17.41	90.83	2.00	0.00	0.70	0.00
17.48	90.37	2.00	0.00	0.70	0.00	17.53	90.05	2.00	0.00	0.70	0.00
17.63	89.74	2.00	0.00	0.70	0.00	17.68	89.78	2.00	0.00	0.70	0.00
17.72	90.07	2.00	0.00	0.70	0.00	17.80	90.85	2.00	0.00	0.70	0.00
17.86	91.76	2.00	0.00	0.70	0.00	17.93	92.78	2.00	0.00	0.70	0.00
18.00	93.81	2.00	0.00	0.69	0.00	18.05	95.07	2.00	0.00	0.69	0.00
18.14	96.04	2.00	0.00	0.69	0.00	18.19	96.86	2.00	0.00	0.69	0.00
18.25	97.55	2.00	0.00	0.69	0.00	18.33	98.00	2.00	0.00	0.69	0.00
18.38	98.26	2.00	0.00	0.69	0.00	18.47	97.91	2.00	0.00	0.69	0.00
18.52	97.43	2.00	0.00	0.69	0.00	18.61	96.98	2.00	0.00	0.68	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)
18.66	96.91	2.00	0.00	0.68	0.00	18.71	97.08	2.00	0.00	0.68	0.00
18.79	97.05	2.00	0.00	0.68	0.00	18.85	96.94	2.00	0.00	0.68	0.00
18.93	96.84	2.00	0.00	0.68	0.00	18.99	96.97	2.00	0.00	0.68	0.00
19.03	97.26	2.00	0.00	0.68	0.00	19.12	97.65	2.00	0.00	0.68	0.00
19.17	98.07	2.00	0.00	0.68	0.00	19.26	98.00	2.00	0.00	0.67	0.00
19.31	97.45	2.00	0.00	0.67	0.00	19.36	96.76	2.00	0.00	0.67	0.00
19.44	96.35	2.00	0.00	0.67	0.00	19.50	96.03	2.00	0.00	0.67	0.00
19.57	95.98	2.00	0.00	0.67	0.00	19.64	95.80	2.00	0.00	0.67	0.00
19.69	95.82	2.00	0.00	0.67	0.00	19.75	94.70	2.00	0.00	0.67	0.00
19.83	93.31	2.00	0.00	0.66	0.00	19.92	91.41	2.00	0.00	0.66	0.00
19.97	89.81	2.00	0.00	0.66	0.00	20.02	87.93	2.00	0.00	0.66	0.00
20.09	86.73	2.00	0.00	0.66	0.00	20.16	86.44	2.00	0.00	0.66	0.00
20.25	86.79	2.00	0.00	0.66	0.00	20.30	87.07	2.00	0.00	0.66	0.00
20.34	87.72	2.00	0.00	0.66	0.00	20.44	88.64	2.00	0.00	0.65	0.00
20.48	89.93	2.00	0.00	0.65	0.00	20.54	91.37	2.00	0.00	0.65	0.00
20.62	92.62	2.00	0.00	0.65	0.00	20.67	93.79	2.00	0.00	0.65	0.00
20.76	94.36	2.00	0.00	0.65	0.00	20.81	94.60	2.00	0.00	0.65	0.00
20.91	94.14	2.00	0.00	0.65	0.00	20.95	93.36	2.00	0.00	0.64	0.00
21.00	92.10	2.00	0.00	0.64	0.00	21.07	89.99	2.00	0.00	0.64	0.00
21.14	86.47	2.00	0.00	0.64	0.00	21.24	82.79	2.00	0.00	0.64	0.00
21.28	79.57	2.00	0.00	0.64	0.00	21.33	77.34	2.00	0.00	0.64	0.00
21.40	75.58	2.00	0.00	0.64	0.00	21.46	74.56	2.00	0.00	0.64	0.00
21.56	74.42	2.00	0.00	0.63	0.00	21.59	75.81	2.00	0.00	0.63	0.00
21.70	78.01	2.00	0.00	0.63	0.00	21.75	80.97	2.00	0.00	0.63	0.00
21.79	84.15	2.00	0.00	0.63	0.00	21.89	87.11	2.00	0.00	0.63	0.00
21.94	89.69	2.00	0.00	0.63	0.00	21.98	90.98	2.00	0.00	0.63	0.00
22.07	91.73	2.00	0.00	0.63	0.00	22.12	92.33	2.00	0.00	0.63	0.00
22.21	92.47	2.00	0.00	0.62	0.00	22.26	92.12	2.00	0.00	0.62	0.00
22.32	90.21	2.00	0.00	0.62	0.00	22.40	88.00	2.00	0.00	0.62	0.00
22.45	83.12	2.00	0.00	0.62	0.00	22.55	78.68	2.00	0.00	0.62	0.00
22.59	76.09	2.00	0.00	0.62	0.00	22.68	77.23	2.00	0.00	0.62	0.00
22.73	79.23	2.00	0.00	0.61	0.00	22.78	79.90	2.00	0.00	0.61	0.00
22.84	80.65	2.00	0.00	0.61	0.00	22.93	81.59	2.00	0.00	0.61	0.00
22.98	82.55	2.00	0.00	0.61	0.00	23.05	82.56	2.00	0.00	0.61	0.00
23.12	81.69	2.00	0.00	0.61	0.00	23.16	79.88	2.00	0.00	0.61	0.00
23.26	78.38	2.00	0.00	0.61	0.00	23.31	77.34	2.00	0.00	0.60	0.00
23.37	77.18	2.00	0.00	0.60	0.00	23.44	77.11	2.00	0.00	0.60	0.00
23.49	77.11	2.00	0.00	0.60	0.00	23.59	77.30	2.00	0.00	0.60	0.00
23.63	77.97	2.00	0.00	0.60	0.00	23.72	78.79	2.00	0.00	0.60	0.00
23.77	79.51	2.00	0.00	0.60	0.00	23.83	79.56	2.00	0.00	0.60	0.00
23.91	79.29	2.00	0.00	0.59	0.00	23.96	78.96	2.00	0.00	0.59	0.00
24.03	78.63	2.00	0.00	0.59	0.00	24.10	78.19	2.00	0.00	0.59	0.00
24.18	77.64	2.00	0.00	0.59	0.00	24.24	77.31	2.00	0.00	0.59	0.00
24.28	77.42	2.00	0.00	0.59	0.00	24.38	77.51	2.00	0.00	0.59	0.00
24.41	77.12	2.00	0.00	0.59	0.00	24.52	76.59	2.00	0.00	0.58	0.00
24.57	76.38	2.00	0.00	0.58	0.00	24.62	76.96	2.00	0.00	0.58	0.00
24.70	77.41	2.00	0.00	0.58	0.00	24.75	77.72	2.00	0.00	0.58	0.00
24.80	77.05	2.00	0.00	0.58	0.00	24.89	75.29	2.00	0.00	0.58	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)
24.94	72.92	2.00	0.00	0.58	0.00	25.03	71.22	2.00	0.00	0.58	0.00
25.08	70.07	2.00	0.00	0.57	0.00	25.17	69.14	2.00	0.00	0.57	0.00
25.22	68.20	2.00	0.00	0.57	0.00	25.27	67.75	2.00	0.00	0.57	0.00
25.33	67.59	2.00	0.00	0.57	0.00	25.43	67.59	2.00	0.00	0.57	0.00
25.47	68.00	2.00	0.00	0.57	0.00	25.54	68.66	2.00	0.00	0.57	0.00
25.61	69.34	2.00	0.00	0.57	0.00	25.66	70.10	2.00	0.00	0.57	0.00
25.76	70.83	2.00	0.00	0.56	0.00	25.80	71.69	2.00	0.00	0.56	0.00
25.89	72.05	2.00	0.00	0.56	0.00	25.94	71.94	2.00	0.00	0.56	0.00
26.00	71.35	2.00	0.00	0.56	0.00	26.08	70.84	2.00	0.00	0.56	0.00
26.12	70.27	2.00	0.00	0.56	0.00	26.20	69.61	2.00	0.00	0.56	0.00
26.27	68.93	2.00	0.00	0.55	0.00	26.32	68.54	2.00	0.00	0.55	0.00
26.40	68.55	2.00	0.00	0.55	0.00	26.46	69.01	2.00	0.00	0.55	0.00
26.54	69.64	2.00	0.00	0.55	0.00	26.60	70.29	2.00	0.00	0.55	0.00
26.64	70.97	2.00	0.00	0.55	0.00	26.74	71.52	2.00	0.00	0.55	0.00
26.77	71.92	2.00	0.00	0.55	0.00	26.87	71.60	2.00	0.00	0.54	0.00
26.92	71.02	2.00	0.00	0.54	0.00	26.97	69.88	2.00	0.00	0.54	0.00
27.07	68.70	2.00	0.00	0.54	0.00	27.11	66.87	2.00	0.00	0.54	0.00
27.20	65.31	2.00	0.00	0.54	0.00	27.25	63.46	2.00	0.00	0.54	0.00
27.34	62.37	2.00	0.00	0.54	0.00	27.39	61.56	2.00	0.00	0.54	0.00
27.44	61.28	2.00	0.00	0.53	0.00	27.53	59.48	2.00	0.00	0.53	0.00
27.58	54.68	2.00	0.00	0.53	0.00	27.67	49.78	2.00	0.00	0.53	0.00
27.72	46.91	2.00	0.00	0.53	0.00	27.76	48.01	2.00	0.00	0.53	0.00
27.86	48.71	2.00	0.00	0.53	0.00	27.90	49.70	2.00	0.00	0.53	0.00
27.99	50.47	2.00	0.00	0.53	0.00	28.02	51.77	2.00	0.00	0.53	0.00
28.09	53.29	2.00	0.00	0.52	0.00	28.19	55.09	2.00	0.00	0.52	0.00
28.23	56.82	2.00	0.00	0.52	0.00	28.28	59.01	2.00	0.00	0.52	0.00
28.36	60.43	2.00	0.00	0.52	0.00	28.42	60.71	2.00	0.00	0.52	0.00
28.51	59.73	2.00	0.00	0.52	0.00	28.56	59.65	2.00	0.00	0.52	0.00
28.65	60.96	2.00	0.00	0.51	0.00	28.68	63.61	2.00	0.00	0.51	0.00
28.75	65.65	2.00	0.00	0.51	0.00	28.84	66.37	2.00	0.00	0.51	0.00
28.89	64.25	2.00	0.00	0.51	0.00	28.98	61.74	2.00	0.00	0.51	0.00
29.02	59.92	2.00	0.00	0.51	0.00	29.07	60.06	2.00	0.00	0.51	0.00
29.15	60.36	2.00	0.00	0.51	0.00	29.22	60.93	2.00	0.00	0.50	0.00
29.31	61.18	2.00	0.00	0.50	0.00	29.35	61.48	2.00	0.00	0.50	0.00
29.40	61.52	2.00	0.00	0.50	0.00	29.46	61.06	2.00	0.00	0.50	0.00
29.54	61.77	2.00	0.00	0.50	0.00	29.64	62.80	2.00	0.00	0.50	0.00
29.68	64.45	2.00	0.00	0.50	0.00	29.73	65.12	2.00	0.00	0.50	0.00
29.82	65.20	2.00	0.00	0.49	0.00	29.87	64.84	2.00	0.00	0.49	0.00
29.96	64.08	2.00	0.00	0.49	0.00	30.01	63.14	2.00	0.00	0.49	0.00
30.06	61.92	2.00	0.00	0.49	0.00	30.15	60.71	2.00	0.00	0.49	0.00
30.20	59.87	2.00	0.00	0.49	0.00	30.29	59.48	2.00	0.00	0.49	0.00
30.34	59.15	2.00	0.00	0.49	0.00	30.39	59.10	2.00	0.00	0.48	0.00
30.47	59.61	2.00	0.00	0.48	0.00	30.52	61.29	2.00	0.00	0.48	0.00
30.59	64.46	2.00	0.00	0.48	0.00	30.66	67.70	2.00	0.00	0.48	0.00
30.72	70.66	2.00	0.00	0.48	0.00	30.80	72.16	2.00	0.00	0.48	0.00
30.85	71.60	2.00	0.00	0.48	0.00	30.94	64.48	2.00	0.00	0.48	0.00
30.99	59.47	2.00	0.00	0.47	0.00	31.04	60.76	2.00	0.00	0.47	0.00
31.13	65.10	2.00	0.00	0.47	0.00	31.18	68.41	2.00	0.00	0.47	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)
31.27	67.98	2.00	0.00	0.47	0.00	31.32	66.86	2.00	0.00	0.47	0.00
31.37	67.83	2.00	0.00	0.47	0.00	31.46	67.04	2.00	0.00	0.47	0.00
31.50	64.54	2.00	0.00	0.47	0.00	31.60	62.43	2.00	0.00	0.46	0.00
31.64	60.91	2.00	0.00	0.46	0.00	31.74	60.71	2.00	0.00	0.46	0.00
31.79	60.53	2.00	0.00	0.46	0.00	31.83	60.34	2.00	0.00	0.46	0.00
31.91	60.22	2.00	0.00	0.46	0.00	31.97	60.08	2.00	0.00	0.46	0.00
32.04	59.20	2.00	0.00	0.46	0.00	32.11	57.38	2.00	0.00	0.46	0.00
32.16	56.53	2.00	0.00	0.45	0.00	32.23	56.44	2.00	0.00	0.45	0.00
32.30	57.22	2.00	0.00	0.45	0.00	32.37	57.48	2.00	0.00	0.45	0.00
32.44	58.40	2.00	0.00	0.45	0.00	32.51	60.51	2.00	0.00	0.45	0.00
32.56	64.77	2.00	0.00	0.45	0.00	32.62	71.51	2.00	0.00	0.45	0.00
32.71	76.69	2.00	0.00	0.45	0.00	32.75	78.60	2.00	0.00	0.44	0.00
32.81	76.85	2.00	0.00	0.44	0.00	32.89	76.18	2.00	0.00	0.44	0.00
32.94	77.47	2.00	0.00	0.44	0.00	33.03	78.29	2.00	0.00	0.44	0.00
33.08	76.54	2.00	0.00	0.44	0.00	33.15	73.36	2.00	0.00	0.44	0.00
33.22	70.60	2.00	0.00	0.44	0.00	33.27	69.52	2.00	0.00	0.44	0.00
33.36	70.10	2.00	0.00	0.43	0.00	33.41	70.84	2.00	0.00	0.43	0.00
33.49	70.99	2.00	0.00	0.43	0.00	33.55	70.71	2.00	0.00	0.43	0.00
33.60	70.74	2.00	0.00	0.43	0.00	33.69	71.40	2.00	0.00	0.43	0.00
33.73	72.80	2.00	0.00	0.43	0.00	33.82	73.63	2.00	0.00	0.43	0.00
33.86	75.47	2.00	0.00	0.43	0.00	33.96	78.88	2.00	0.00	0.42	0.00
34.01	83.47	2.00	0.00	0.42	0.00	34.06	88.33	2.00	0.00	0.42	0.00
34.15	91.53	2.00	0.00	0.42	0.00	34.19	91.71	2.00	0.00	0.42	0.00
34.29	88.13	2.00	0.00	0.42	0.00	34.32	82.22	2.00	0.00	0.42	0.00
34.39	71.67	2.00	0.00	0.42	0.00	34.48	62.11	2.00	0.00	0.42	0.00
34.53	55.13	2.00	0.00	0.41	0.00	34.62	57.34	2.00	0.00	0.41	0.00
34.66	60.27	2.00	0.00	0.41	0.00	34.76	62.06	2.00	0.00	0.41	0.00
34.81	61.41	2.00	0.00	0.41	0.00	34.85	58.42	2.00	0.00	0.41	0.00
34.95	54.54	2.00	0.00	0.41	0.00	34.99	52.02	2.00	0.00	0.41	0.00
35.04	53.30	2.00	0.00	0.41	0.00	35.11	56.24	2.00	0.00	0.40	0.00
35.18	62.93	2.00	0.00	0.40	0.00	35.27	70.11	2.00	0.00	0.40	0.00
35.32	79.56	2.00	0.00	0.40	0.00	35.41	87.12	2.00	0.00	0.40	0.00
35.46	91.84	2.00	0.00	0.40	0.00	35.51	90.97	2.00	0.00	0.40	0.00
35.60	88.15	2.00	0.00	0.40	0.00	35.65	87.15	2.00	0.00	0.40	0.00
35.71	86.46	2.00	0.00	0.39	0.00	35.79	87.68	2.00	0.00	0.39	0.00
35.83	87.68	2.00	0.00	0.39	0.00	35.93	86.83	2.00	0.00	0.39	0.00
35.97	86.20	2.00	0.00	0.39	0.00	36.03	86.89	2.00	0.00	0.39	0.00
36.11	85.17	2.00	0.00	0.39	0.00	36.20	86.08	2.00	0.00	0.39	0.00
36.25	87.09	2.00	0.00	0.39	0.00	36.30	93.54	2.00	0.00	0.38	0.00
36.38	99.66	2.00	0.00	0.38	0.00	36.44	106.23	2.00	0.00	0.38	0.00
36.48	107.61	2.00	0.00	0.38	0.00	36.57	108.98	2.00	0.00	0.38	0.00
36.62	109.84	2.00	0.00	0.38	0.00	36.72	109.50	2.00	0.00	0.38	0.00
36.77	110.50	2.00	0.00	0.38	0.00	36.85	109.14	2.00	0.00	0.38	0.00
36.91	107.38	2.00	0.00	0.37	0.00	36.95	107.60	2.00	0.00	0.37	0.00
37.01	107.08	2.00	0.00	0.37	0.00	37.09	108.25	2.00	0.00	0.37	0.00
37.14	107.30	2.00	0.00	0.37	0.00	37.23	104.78	2.00	0.00	0.37	0.00
37.28	102.76	2.00	0.00	0.37	0.00	37.36	100.90	2.00	0.00	0.37	0.00
37.42	97.27	2.00	0.00	0.37	0.00	37.51	93.89	2.00	0.00	0.36	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)
37.53	89.88	2.00	0.00	0.36	0.00	37.60	93.19	2.00	0.00	0.36	0.00
37.70	100.42	2.00	0.00	0.36	0.00	37.75	103.43	2.00	0.00	0.36	0.00
37.83	102.19	2.00	0.00	0.36	0.00	37.89	97.20	2.00	0.00	0.36	0.00
37.94	90.69	2.00	0.00	0.36	0.00	38.02	85.51	2.00	0.00	0.36	0.00
38.08	76.60	2.00	0.00	0.35	0.00	38.15	67.05	2.00	0.00	0.35	0.00
38.22	61.29	2.00	0.00	0.35	0.00	38.31	60.36	2.00	0.00	0.35	0.00
38.34	65.84	2.00	0.00	0.35	0.00	38.40	72.26	2.00	0.00	0.35	0.00
38.46	81.49	2.00	0.00	0.35	0.00	38.54	88.66	2.00	0.00	0.35	0.00
38.59	92.26	2.00	0.00	0.35	0.00	38.68	93.25	2.00	0.00	0.34	0.00
38.73	98.14	2.00	0.00	0.34	0.00	38.81	104.95	2.00	0.00	0.34	0.00
38.87	112.76	2.00	0.00	0.34	0.00	38.92	109.02	2.00	0.00	0.34	0.00
39.01	99.72	2.00	0.00	0.34	0.00	39.05	88.01	0.22	0.88	0.34	0.00
39.11	107.49	2.00	0.00	0.34	0.00	39.19	123.44	2.00	0.00	0.34	0.00
39.24	131.19	2.00	0.00	0.33	0.00	39.31	121.95	2.00	0.00	0.33	0.00
39.38	123.56	2.00	0.00	0.33	0.00	39.47	130.23	0.44	0.62	0.33	0.01
39.52	138.44	0.50	0.59	0.33	0.00	39.57	153.43	0.64	0.54	0.33	0.00
39.65	177.57	2.00	0.00	0.33	0.00	39.71	171.21	2.00	0.00	0.33	0.00
39.77	163.35	2.00	0.00	0.33	0.00	39.84	171.53	2.00	0.00	0.32	0.00
39.94	187.08	2.00	0.00	0.32	0.00	39.97	204.02	2.00	0.00	0.32	0.00
40.03	202.46	2.00	0.00	0.32	0.00	40.13	198.10	2.00	0.00	0.32	0.00
40.17	189.24	2.00	0.00	0.32	0.00	40.23	168.20	0.80	0.30	0.32	0.00
40.31	147.88	0.58	0.55	0.32	0.00	40.36	143.00	0.54	0.55	0.32	0.00
40.42	155.59	2.00	0.00	0.31	0.00	40.50	172.47	2.00	0.00	0.31	0.00
40.58	163.61	2.00	0.00	0.31	0.00	40.64	151.87	2.00	0.00	0.31	0.00
40.69	139.61	2.00	0.00	0.31	0.00	40.76	145.54	2.00	0.00	0.31	0.00
40.86	139.90	2.00	0.00	0.31	0.00	40.92	124.89	0.40	0.60	0.31	0.00
40.97	121.01	0.38	0.61	0.31	0.00	41.01	131.77	0.45	0.57	0.30	0.00
41.09	143.31	0.55	0.53	0.30	0.00	41.15	135.26	2.00	0.00	0.30	0.00
41.21	108.36	0.31	0.66	0.30	0.00	41.29	91.33	0.23	0.76	0.30	0.01
41.35	92.31	2.00	0.00	0.30	0.00	41.43	104.26	2.00	0.00	0.30	0.00
41.48	117.15	2.00	0.00	0.30	0.00	41.58	137.77	2.00	0.00	0.30	0.00
41.62	149.12	2.00	0.00	0.29	0.00	41.71	156.00	2.00	0.00	0.29	0.00
41.75	150.18	2.00	0.00	0.29	0.00	41.81	136.92	2.00	0.00	0.29	0.00
41.90	121.14	2.00	0.00	0.29	0.00	41.95	107.84	2.00	0.00	0.29	0.00
41.99	97.10	2.00	0.00	0.29	0.00	42.09	86.84	2.00	0.00	0.29	0.00
42.13	82.80	2.00	0.00	0.29	0.00	42.22	88.72	2.00	0.00	0.28	0.00
42.27	96.22	2.00	0.00	0.28	0.00	42.33	100.47	2.00	0.00	0.28	0.00
42.41	102.42	2.00	0.00	0.28	0.00	42.46	106.77	2.00	0.00	0.28	0.00
42.54	106.63	2.00	0.00	0.28	0.00	42.60	99.16	2.00	0.00	0.28	0.00
42.69	90.95	2.00	0.00	0.28	0.00	42.74	88.33	2.00	0.00	0.28	0.00
42.80	93.51	2.00	0.00	0.27	0.00	42.88	98.29	2.00	0.00	0.27	0.00
42.93	102.24	2.00	0.00	0.27	0.00	42.98	103.69	2.00	0.00	0.27	0.00
43.05	104.31	2.00	0.00	0.27	0.00	43.15	102.93	2.00	0.00	0.27	0.00
43.20	100.75	2.00	0.00	0.27	0.00	43.25	94.25	2.00	0.00	0.27	0.00
43.32	89.74	2.00	0.00	0.27	0.00	43.40	87.09	2.00	0.00	0.26	0.00
43.44	88.27	2.00	0.00	0.26	0.00	43.53	88.28	2.00	0.00	0.26	0.00
43.58	89.79	2.00	0.00	0.26	0.00	43.66	90.20	2.00	0.00	0.26	0.00
43.72	89.44	2.00	0.00	0.26	0.00	43.81	87.56	2.00	0.00	0.26	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)
43.86	86.24	2.00	0.00	0.26	0.00	43.91	85.68	2.00	0.00	0.26	0.00
44.00	85.08	2.00	0.00	0.25	0.00	44.05	84.25	2.00	0.00	0.25	0.00
44.10	83.77	2.00	0.00	0.25	0.00	44.18	83.84	2.00	0.00	0.25	0.00
44.23	85.18	2.00	0.00	0.25	0.00	44.32	86.56	2.00	0.00	0.25	0.00
44.37	87.59	2.00	0.00	0.25	0.00	44.46	87.83	2.00	0.00	0.25	0.00
44.51	87.91	2.00	0.00	0.25	0.00	44.56	87.49	2.00	0.00	0.24	0.00
44.65	86.80	2.00	0.00	0.24	0.00	44.70	87.11	2.00	0.00	0.24	0.00
44.79	88.21	2.00	0.00	0.24	0.00	44.84	89.72	2.00	0.00	0.24	0.00
44.89	90.81	2.00	0.00	0.24	0.00	44.97	91.42	2.00	0.00	0.24	0.00
45.03	91.24	2.00	0.00	0.24	0.00	45.12	90.15	2.00	0.00	0.24	0.00
45.17	88.92	2.00	0.00	0.23	0.00	45.22	87.53	2.00	0.00	0.23	0.00
45.30	86.08	2.00	0.00	0.23	0.00	45.35	84.39	2.00	0.00	0.23	0.00
45.45	82.88	2.00	0.00	0.23	0.00	45.49	81.69	2.00	0.00	0.23	0.00
45.54	80.79	2.00	0.00	0.23	0.00	45.64	80.34	2.00	0.00	0.23	0.00
45.68	81.22	2.00	0.00	0.23	0.00	45.77	82.64	2.00	0.00	0.22	0.00
45.81	84.46	2.00	0.00	0.22	0.00	45.87	85.44	2.00	0.00	0.22	0.00
45.96	86.73	2.00	0.00	0.22	0.00	46.01	88.38	2.00	0.00	0.22	0.00
46.10	89.65	2.00	0.00	0.22	0.00	46.15	90.20	2.00	0.00	0.22	0.00
46.22	89.67	2.00	0.00	0.22	0.00	46.29	89.21	2.00	0.00	0.22	0.00
46.33	90.39	2.00	0.00	0.21	0.00	46.40	93.39	2.00	0.00	0.21	0.00
46.48	98.23	2.00	0.00	0.21	0.00	46.57	101.84	2.00	0.00	0.21	0.00
46.61	103.21	2.00	0.00	0.21	0.00	46.67	102.05	2.00	0.00	0.21	0.00
46.76	103.56	2.00	0.00	0.21	0.00	46.80	103.66	2.00	0.00	0.21	0.00
46.86	105.11	2.00	0.00	0.21	0.00	46.93	107.01	2.00	0.00	0.20	0.00
46.99	108.58	2.00	0.00	0.20	0.00	47.08	109.28	2.00	0.00	0.20	0.00
47.13	109.21	2.00	0.00	0.20	0.00	47.23	109.57	2.00	0.00	0.20	0.00
47.27	110.65	2.00	0.00	0.20	0.00	47.32	111.92	2.00	0.00	0.20	0.00
47.41	112.64	2.00	0.00	0.20	0.00	47.46	112.41	2.00	0.00	0.20	0.00
47.55	111.82	2.00	0.00	0.19	0.00	47.59	110.83	2.00	0.00	0.19	0.00
47.65	109.64	2.00	0.00	0.19	0.00	47.74	108.37	2.00	0.00	0.19	0.00
47.78	107.69	2.00	0.00	0.19	0.00	47.84	107.02	2.00	0.00	0.19	0.00
47.92	106.49	2.00	0.00	0.19	0.00	47.97	104.64	2.00	0.00	0.19	0.00
48.05	101.99	2.00	0.00	0.19	0.00	48.11	98.84	2.00	0.00	0.18	0.00
48.19	96.65	2.00	0.00	0.18	0.00	48.25	95.55	2.00	0.00	0.18	0.00
48.30	95.91	2.00	0.00	0.18	0.00	48.39	96.88	2.00	0.00	0.18	0.00
48.44	98.61	2.00	0.00	0.18	0.00	48.52	100.20	2.00	0.00	0.18	0.00
48.57	102.38	2.00	0.00	0.18	0.00	48.63	104.46	2.00	0.00	0.18	0.00
48.71	105.92	2.00	0.00	0.17	0.00	48.77	106.51	0.31	0.38	0.17	0.00
48.86	106.87	0.31	0.38	0.17	0.00	48.90	107.38	2.00	0.00	0.17	0.00
48.96	107.66	2.00	0.00	0.17	0.00	49.02	107.15	2.00	0.00	0.17	0.00
49.10	105.90	2.00	0.00	0.17	0.00	49.19	104.86	2.00	0.00	0.17	0.00
49.22	104.11	2.00	0.00	0.17	0.00	49.28	103.20	2.00	0.00	0.16	0.00
49.37	101.86	2.00	0.00	0.16	0.00	49.43	100.37	2.00	0.00	0.16	0.00
49.51	99.67	2.00	0.00	0.16	0.00	49.56	99.42	2.00	0.00	0.16	0.00
49.61	99.23	2.00	0.00	0.16	0.00	49.70	98.69	2.00	0.00	0.16	0.00
49.75	97.55	2.00	0.00	0.16	0.00	49.84	96.36	2.00	0.00	0.16	0.00
49.89	95.06	2.00	0.00	0.15	0.00	49.94	94.18	2.00	0.00	0.15	0.00
50.03	93.50	2.00	0.00	0.15	0.00	50.07	92.85	2.00	0.00	0.15	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)
50.17	92.39	2.00	0.00	0.15	0.00	50.22	92.25	2.00	0.00	0.15	0.00
50.27	92.63	2.00	0.00	0.15	0.00	50.33	93.60	2.00	0.00	0.15	0.00
50.40	93.66	2.00	0.00	0.15	0.00	50.50	92.30	2.00	0.00	0.14	0.00
50.55	90.03	2.00	0.00	0.14	0.00	50.60	89.23	2.00	0.00	0.14	0.00
50.68	89.96	2.00	0.00	0.14	0.00	50.73	92.23	2.00	0.00	0.14	0.00
50.83	93.70	2.00	0.00	0.14	0.00	50.87	94.01	2.00	0.00	0.14	0.00
50.93	93.18	2.00	0.00	0.14	0.00	51.00	92.52	2.00	0.00	0.14	0.00
51.07	92.32	2.00	0.00	0.13	0.00	51.15	91.91	2.00	0.00	0.13	0.00
51.19	91.31	2.00	0.00	0.13	0.00	51.29	90.75	2.00	0.00	0.13	0.00
51.32	89.86	2.00	0.00	0.13	0.00	51.38	89.84	2.00	0.00	0.13	0.00
51.48	90.14	2.00	0.00	0.13	0.00	51.52	90.88	2.00	0.00	0.13	0.00
51.61	91.23	2.00	0.00	0.13	0.00	51.66	92.03	2.00	0.00	0.12	0.00
51.71	94.10	2.00	0.00	0.12	0.00	51.80	96.29	2.00	0.00	0.12	0.00
51.85	98.54	2.00	0.00	0.12	0.00	51.94	98.85	2.00	0.00	0.12	0.00
51.99	97.71	2.00	0.00	0.12	0.00	52.08	95.88	2.00	0.00	0.12	0.00
52.13	94.72	2.00	0.00	0.12	0.00	52.18	94.48	2.00	0.00	0.12	0.00
52.27	94.41	2.00	0.00	0.11	0.00	52.31	94.71	2.00	0.00	0.11	0.00
52.36	96.43	2.00	0.00	0.11	0.00	52.45	98.62	2.00	0.00	0.11	0.00
52.50	100.79	2.00	0.00	0.11	0.00	52.59	101.37	2.00	0.00	0.11	0.00
52.64	101.00	2.00	0.00	0.11	0.00	52.73	100.29	2.00	0.00	0.11	0.00
52.76	104.06	2.00	0.00	0.11	0.00	52.83	108.59	2.00	0.00	0.10	0.00
52.92	113.26	2.00	0.00	0.10	0.00	52.96	114.05	2.00	0.00	0.10	0.00
53.02	114.18	2.00	0.00	0.10	0.00	53.11	113.91	2.00	0.00	0.10	0.00
53.16	113.53	2.00	0.00	0.10	0.00	53.25	113.27	2.00	0.00	0.10	0.00
53.30	112.91	2.00	0.00	0.10	0.00	53.35	111.40	2.00	0.00	0.10	0.00
53.43	109.29	2.00	0.00	0.09	0.00	53.49	106.25	2.00	0.00	0.09	0.00
53.55	103.69	2.00	0.00	0.09	0.00	53.63	102.21	2.00	0.00	0.09	0.00
53.72	102.49	2.00	0.00	0.09	0.00	53.75	103.49	2.00	0.00	0.09	0.00
53.81	104.11	2.00	0.00	0.09	0.00	53.90	104.27	2.00	0.00	0.09	0.00
53.95	105.42	2.00	0.00	0.09	0.00	54.04	107.67	2.00	0.00	0.08	0.00
54.09	110.26	2.00	0.00	0.08	0.00	54.14	111.70	2.00	0.00	0.08	0.00
54.23	111.70	2.00	0.00	0.08	0.00	54.28	110.86	2.00	0.00	0.08	0.00
54.37	110.23	2.00	0.00	0.08	0.00	54.40	109.79	2.00	0.00	0.08	0.00
54.47	109.60	2.00	0.00	0.08	0.00	54.56	108.88	2.00	0.00	0.08	0.00
54.61	107.33	2.00	0.00	0.07	0.00	54.70	105.77	2.00	0.00	0.07	0.00
54.74	104.17	2.00	0.00	0.07	0.00	54.80	102.55	2.00	0.00	0.07	0.00
54.88	101.05	2.00	0.00	0.07	0.00	54.93	99.86	2.00	0.00	0.07	0.00
55.02	99.82	2.00	0.00	0.07	0.00	55.07	100.28	2.00	0.00	0.07	0.00
55.12	101.87	2.00	0.00	0.07	0.00	55.21	103.53	2.00	0.00	0.06	0.00
55.25	106.02	2.00	0.00	0.06	0.00	55.35	108.58	2.00	0.00	0.06	0.00
55.40	111.58	2.00	0.00	0.06	0.00	55.49	112.84	2.00	0.00	0.06	0.00
55.54	112.59	2.00	0.00	0.06	0.00	55.58	110.99	2.00	0.00	0.06	0.00
55.68	109.98	2.00	0.00	0.06	0.00	55.72	109.37	2.00	0.00	0.06	0.00
55.78	109.65	2.00	0.00	0.05	0.00	55.87	109.79	2.00	0.00	0.05	0.00
55.92	109.93	2.00	0.00	0.05	0.00	56.00	109.70	2.00	0.00	0.05	0.00
56.06	108.79	2.00	0.00	0.05	0.00	56.12	107.16	2.00	0.00	0.05	0.00
56.20	105.52	2.00	0.00	0.05	0.00	56.23	104.49	2.00	0.00	0.05	0.00
56.34	104.17	2.00	0.00	0.05	0.00	56.38	104.08	2.00	0.00	0.04	0.00

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

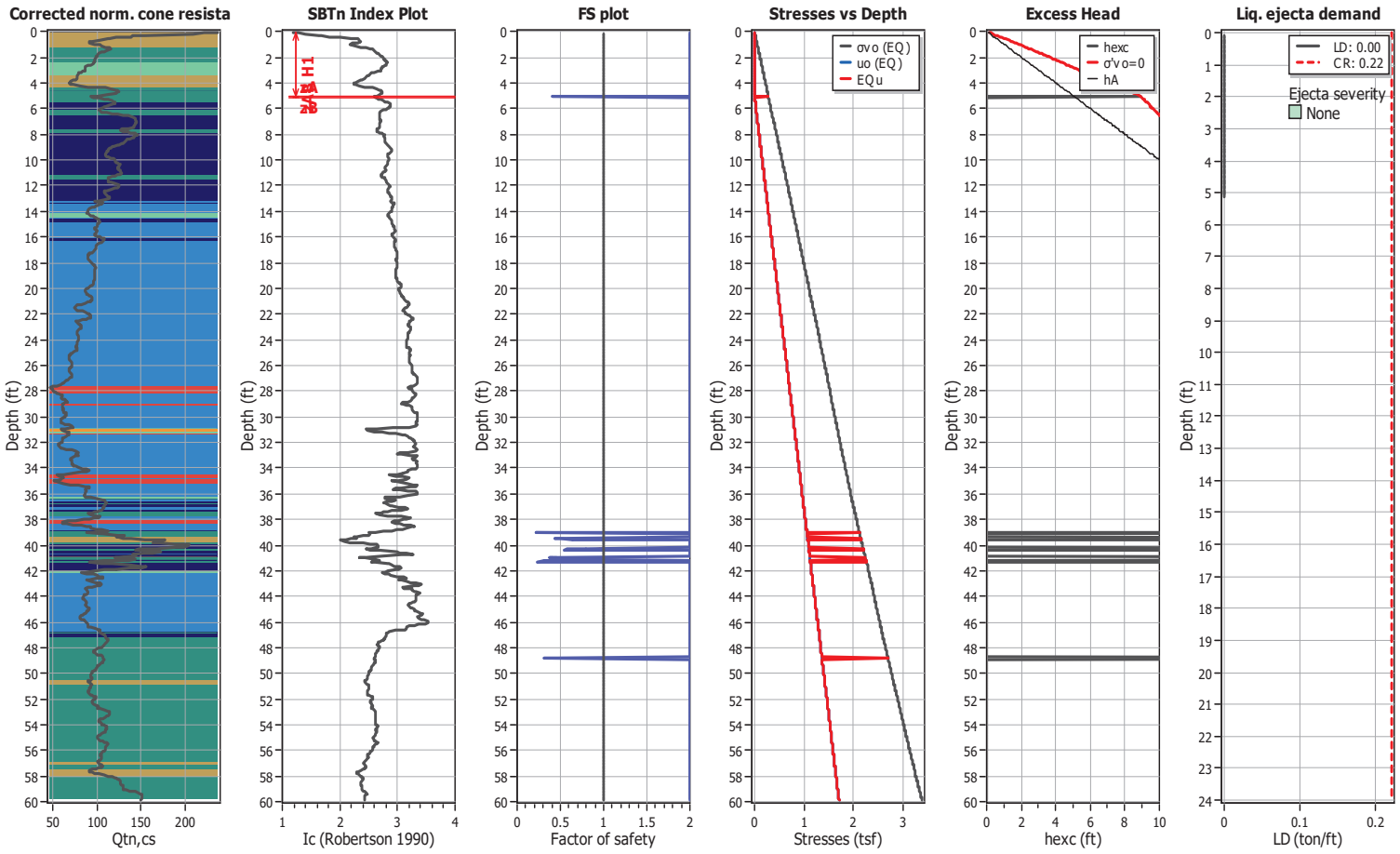
Depth (ft)	$Q_{tn,cs}$	FS	e_v (%)	DF	Settlement (in)	Depth (ft)	$Q_{tn,cs}$	FS	e_v (%)	DF	Settlement (in)
56.43	104.27	2.00	0.00	0.04	0.00	56.53	104.97	2.00	0.00	0.04	0.00
56.57	105.23	2.00	0.00	0.04	0.00	56.66	104.80	2.00	0.00	0.04	0.00
56.71	103.56	2.00	0.00	0.04	0.00	56.77	102.47	2.00	0.00	0.04	0.00
56.85	101.48	2.00	0.00	0.04	0.00	56.90	101.09	2.00	0.00	0.04	0.00
56.99	101.43	2.00	0.00	0.03	0.00	57.04	103.17	2.00	0.00	0.03	0.00
57.13	105.30	2.00	0.00	0.03	0.00	57.18	106.95	2.00	0.00	0.03	0.00
57.23	106.41	2.00	0.00	0.03	0.00	57.31	104.91	2.00	0.00	0.03	0.00
57.36	102.10	2.00	0.00	0.03	0.00	57.46	98.94	2.00	0.00	0.03	0.00
57.50	94.68	2.00	0.00	0.03	0.00	57.55	91.97	2.00	0.00	0.02	0.00
57.64	91.32	2.00	0.00	0.02	0.00	57.68	94.11	2.00	0.00	0.02	0.00
57.78	97.91	2.00	0.00	0.02	0.00	57.83	102.62	2.00	0.00	0.02	0.00
57.89	107.71	2.00	0.00	0.02	0.00	57.97	112.68	2.00	0.00	0.02	0.00
58.02	117.59	2.00	0.00	0.02	0.00	58.11	120.31	2.00	0.00	0.02	0.00
58.16	122.52	2.00	0.00	0.01	0.00	58.23	123.88	2.00	0.00	0.01	0.00
58.29	125.29	2.00	0.00	0.01	0.00	58.34	126.32	2.00	0.00	0.01	0.00
58.41	126.51	2.00	0.00	0.01	0.00	58.47	126.40	2.00	0.00	0.01	0.00
58.53	126.14	2.00	0.00	0.01	0.00	58.60	126.83	2.00	0.00	0.01	0.00
58.66	127.60	2.00	0.00	0.01	0.00	58.74	129.07	2.00	0.00	0.00	0.00
58.80	129.42	2.00	0.00	0.00	0.00	58.88	129.52	2.00	0.00	0.00	0.00
58.93	128.89	2.00	0.00	0.00	0.00	59.02	129.51	2.00	0.00	0.00	0.00
59.07	132.46	2.00	0.00	0.00	0.00	59.16	137.38	2.00	0.00	0.00	0.00
59.21	142.69	2.00	0.00	0.00	0.00	59.26	146.99	2.00	0.00	0.00	0.00
59.34	149.55	2.00	0.00	0.00	0.00	59.39	150.98	2.00	0.00	0.00	0.00
59.45	150.86	2.00	0.00	0.00	0.00	59.52	150.32	2.00	0.00	0.00	0.00
59.59	150.19	2.00	0.00	0.00	0.00	59.67	150.48	2.00	0.00	0.00	0.00
59.72	150.88	2.00	0.00	0.00	0.00	59.80	150.15	2.00	0.00	0.00	0.00
59.86	149.45	2.00	0.00	0.00	0.00						

Total estimated settlement: 0.08

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

Ejecta Severity Estimation



GEOLOGISMIKI Geotechnical Software

LIQUEFACTION ANALYSIS REPORT

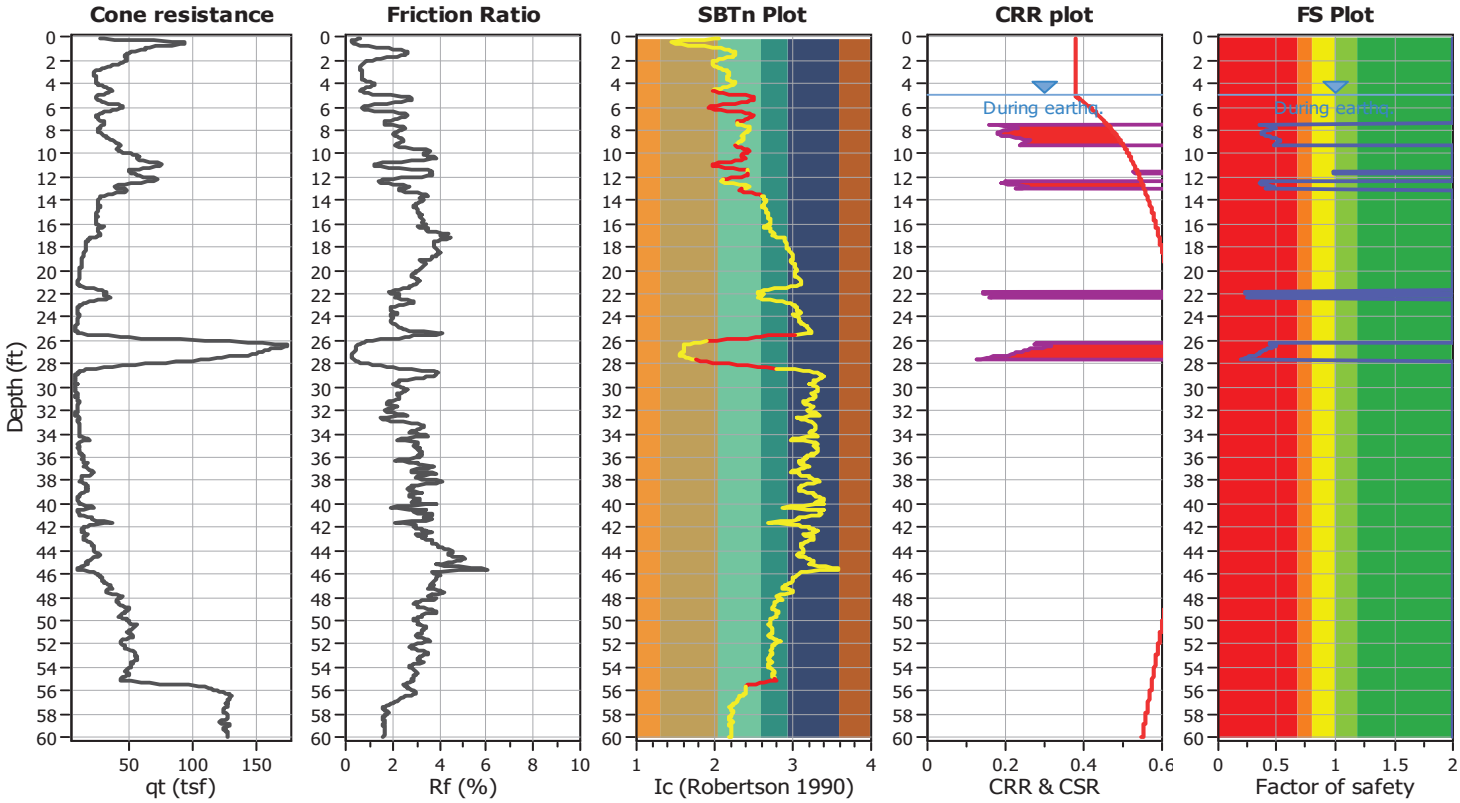
Project title : Mixed-Use development

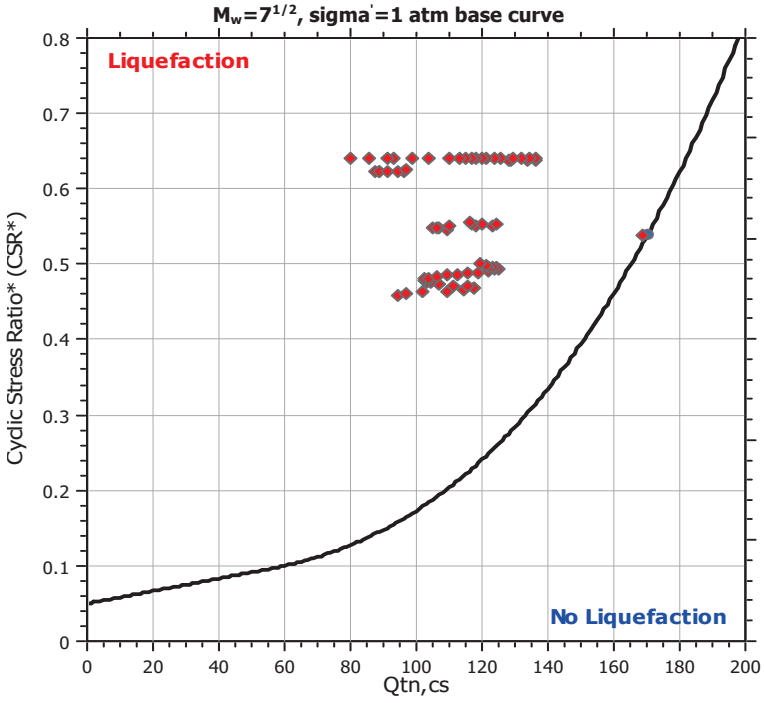
Location : San Juan Capistrano, CA

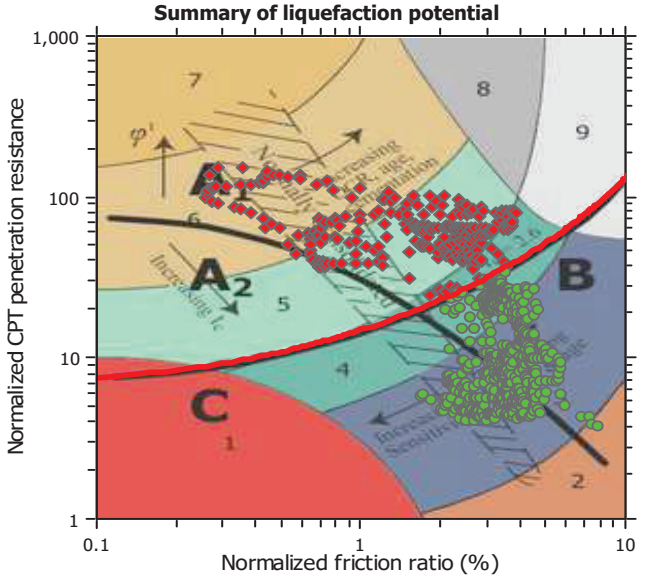
CPT file : CPT-4

Input parameters and analysis data

Analysis method:	NCEER (1998)	G.W.T. (in-situ):	32.50 ft	Use fill:	No	Clay like behavior applied:	Sands only
Fines correction method:	NCEER (1998)	G.W.T. (earthq.):	5.00 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:	50.00 ft
Earthquake magnitude M_w:	7.69	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method based
Peak ground acceleration:	0.55	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

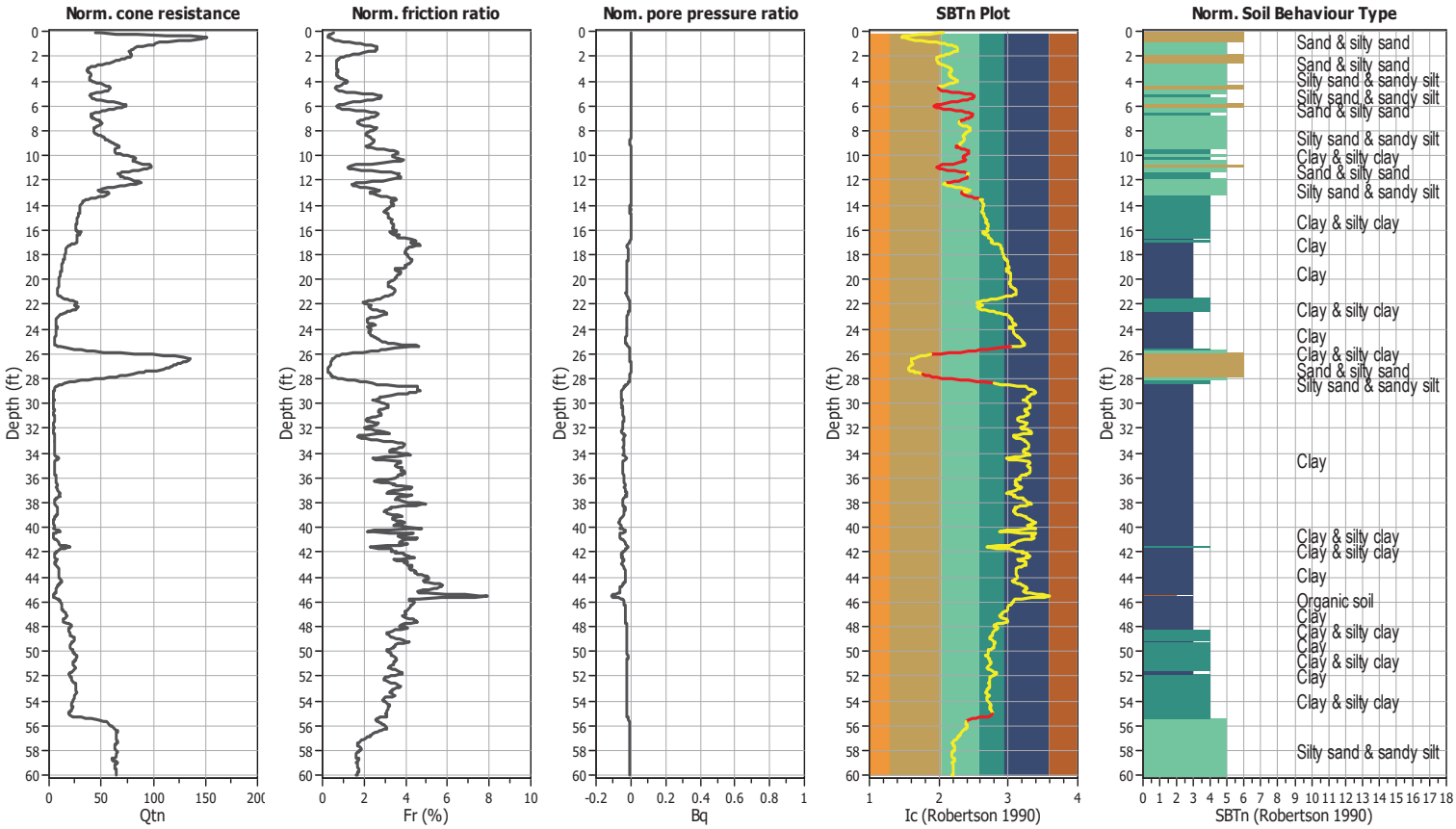






Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and strength loss possible depending on soil plasticity, brittleness/sensitivity, strain to peak undrained strength and ground geometry

CPT basic interpretation plots (normalized)



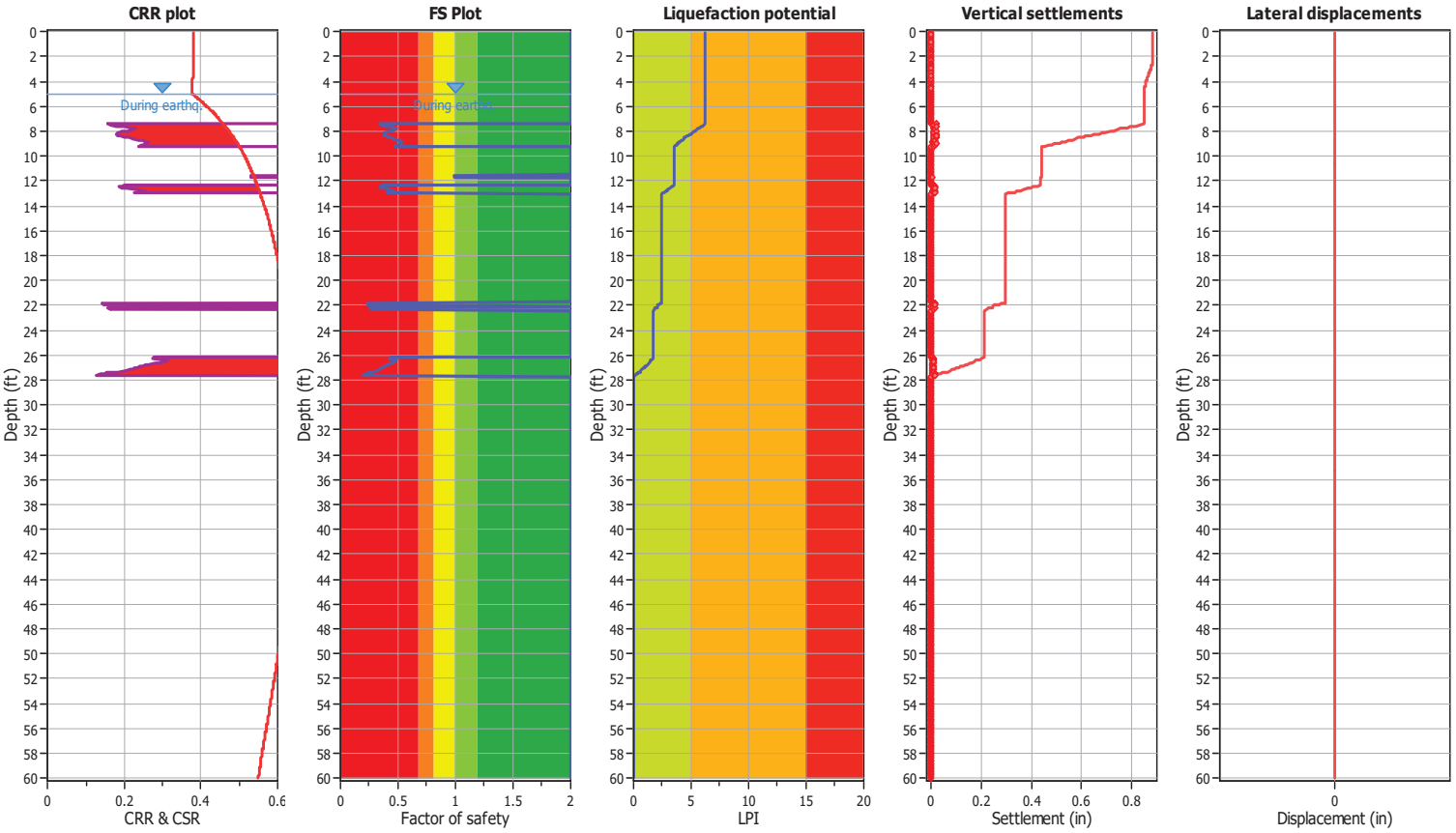
Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	5.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.69	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.55	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	32.50 ft	Fill height:	N/A	Limit depth:	50.00 ft

SBTn legend

1. Sensitive fine grained
2. Organic material
3. Clay to silty clay
4. Clayey silt to silty
5. Silty sand to sandy silt
6. Clean sand to silty sand
7. Gravely sand to sand
8. Very stiff sand to
9. Very stiff fine grained

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	5.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.69	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.55	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	32.50 ft	Fill height:	N/A	Limit depth:	50.00 ft

F.S. color scheme

- Almost certain it will liquefy
- Very likely to liquefy
- Liquefaction and no liq. are equally likely
- Unlike to liquefy
- Almost certain it will not liquefy

LPI color scheme

- Very high risk
- High risk
- Low risk

:: 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)
0.10	2.06	44.80	1.37	61.42	13	343	0.38	0.001	0.00	17.00	0.00	0.000
0.16	2.00	50.18	1.31	65.75	14	355	0.38	0.001	0.00	17.00	0.00	0.000
0.20	1.87	64.08	1.00	64.08	13	384	0.38	0.001	0.00	17.00	0.00	0.000
0.29	1.72	83.96	1.00	83.96	16	417	0.38	0.002	0.00	17.00	0.00	0.000
0.34	1.57	112.40	1.00	112.40	20	458	0.38	0.002	0.00	17.00	0.00	0.000
0.40	1.49	135.96	1.00	135.96	24	500	0.38	0.002	0.00	17.00	0.00	0.000
0.48	1.46	151.33	1.00	151.33	26	537	0.38	0.002	0.00	17.00	0.00	0.000
0.53	1.50	151.79	1.00	151.79	27	571	0.38	0.002	0.00	17.00	0.00	0.000
0.62	1.57	146.11	1.00	146.11	26	596	0.38	0.002	0.00	17.00	0.00	0.000
0.67	1.66	135.51	1.00	135.51	25	624	0.38	0.003	0.00	17.00	0.00	0.000
0.76	1.75	125.23	1.09	136.07	26	644	0.38	0.003	0.00	17.00	0.00	0.000
0.80	1.87	113.52	1.21	137.86	27	677	0.38	0.003	0.00	17.00	0.00	0.000
0.90	1.96	106.45	1.28	136.01	28	714	0.38	0.003	0.00	17.00	0.00	0.000
0.94	2.04	102.45	1.34	137.31	29	756	0.38	0.003	0.00	17.00	0.00	0.000
0.99	2.08	102.35	1.39	142.65	31	801	0.38	0.003	0.00	17.00	0.00	0.000
1.08	2.12	101.22	1.45	146.94	32	832	0.38	0.003	0.00	17.00	0.00	0.000
1.13	2.18	95.64	1.56	149.57	33	846	0.38	0.003	0.00	17.00	0.00	0.000
1.22	2.22	89.59	1.67	149.50	34	836	0.38	0.004	0.00	17.00	0.00	0.000
1.27	2.26	83.91	1.77	148.77	34	819	0.38	0.004	0.00	17.00	0.00	0.000
1.31	2.26	81.95	1.79	146.48	34	804	0.38	0.004	0.00	17.00	0.00	0.000
1.40	2.27	80.26	1.80	144.82	34	793	0.38	0.004	0.00	17.00	0.00	0.000
1.45	2.27	78.90	1.81	142.55	33	780	0.38	0.005	0.00	17.00	0.00	0.000
1.54	2.27	77.40	1.80	139.42	32	763	0.38	0.005	0.00	17.00	0.00	0.000
1.60	2.25	77.01	1.75	134.92	31	745	0.38	0.006	0.00	17.00	0.00	0.000
1.64	2.23	76.63	1.68	129.02	29	720	0.38	0.006	0.00	17.00	0.00	0.000
1.73	2.19	77.46	1.59	123.24	28	695	0.38	0.007	0.00	17.00	0.00	0.000
1.78	2.15	77.95	1.50	116.90	26	663	0.38	0.008	0.01	17.00	0.01	0.000
1.87	2.10	78.79	1.42	112.20	24	633	0.38	0.009	0.01	17.00	0.01	0.000
1.92	2.06	79.30	1.37	108.33	23	603	0.38	0.010	0.01	17.00	0.01	0.000
1.97	2.02	78.69	1.33	104.46	22	571	0.38	0.011	0.01	17.00	0.01	0.000
2.06	1.99	77.28	1.30	100.59	21	540	0.38	0.013	0.01	17.00	0.01	0.000
2.11	1.97	74.96	1.29	96.32	20	510	0.38	0.015	0.01	17.00	0.02	0.000
2.18	1.97	72.26	1.28	92.61	19	488	0.38	0.017	0.02	17.00	0.02	0.000
2.25	1.97	69.74	1.28	89.35	18	471	0.38	0.019	0.02	17.00	0.02	0.000
2.30	1.97	67.41	1.28	86.34	18	455	0.38	0.021	0.02	17.00	0.03	0.000
2.38	1.97	64.80	1.28	83.25	17	440	0.38	0.024	0.03	17.00	0.03	0.000
2.43	1.98	61.64	1.29	79.57	16	423	0.38	0.028	0.04	17.00	0.04	0.000
2.52	2.00	58.24	1.30	75.90	16	408	0.38	0.032	0.04	17.00	0.04	0.000
2.57	2.02	54.56	1.32	72.04	15	392	0.38	0.037	0.05	17.00	0.05	0.000
2.64	2.04	50.93	1.35	68.53	14	378	0.38	0.043	0.06	17.00	0.06	0.001
2.71	2.07	46.88	1.38	64.73	14	362	0.38	0.052	0.08	17.00	0.08	0.001
2.80	2.10	43.71	1.42	62.01	13	350	0.38	0.062	0.10	17.00	0.10	0.001
2.85	2.13	40.92	1.47	59.98	13	340	0.38	0.071	0.12	17.00	0.12	0.001
2.90	2.15	39.06	1.51	58.90	13	334	0.38	0.078	0.13	17.00	0.13	0.001
2.98	2.17	37.75	1.54	58.17	13	329	0.38	0.088	0.15	17.00	0.15	0.002
3.03	2.18	37.09	1.56	57.79	13	327	0.38	0.093	0.16	17.00	0.16	0.001
3.10	2.18	36.81	1.58	58.01	13	328	0.38	0.096	0.16	17.00	0.16	0.001
3.17	2.19	36.75	1.59	58.56	13	330	0.38	0.098	0.16	17.00	0.16	0.001

:: 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)
3.22	2.19	37.26	1.58	58.94	13	333	0.38	0.098	0.16	17.00	0.16	0.001
3.31	2.17	38.23	1.55	59.23	13	335	0.38	0.101	0.17	17.00	0.17	0.002
3.36	2.15	39.34	1.51	59.53	13	337	0.38	0.101	0.17	17.00	0.17	0.001
3.42	2.15	39.98	1.50	59.85	13	339	0.38	0.102	0.17	17.00	0.17	0.001
3.50	2.15	40.07	1.50	60.12	13	341	0.38	0.106	0.17	17.00	0.17	0.002
3.59	2.16	39.64	1.52	60.24	13	341	0.38	0.111	0.18	17.00	0.18	0.002
3.63	2.17	39.08	1.55	60.48	13	342	0.38	0.112	0.18	17.00	0.18	0.001
3.68	2.19	38.71	1.58	61.18	14	345	0.38	0.111	0.17	17.00	0.17	0.001
3.78	2.20	38.56	1.63	62.71	14	352	0.38	0.108	0.16	17.00	0.16	0.002
3.82	2.23	38.55	1.70	65.54	15	365	0.38	0.097	0.14	17.00	0.14	0.001
3.88	2.26	39.01	1.77	69.17	16	381	0.38	0.085	0.11	17.00	0.11	0.001
3.96	2.27	39.84	1.81	72.21	17	395	0.38	0.078	0.10	17.00	0.10	0.001
4.00	2.26	41.38	1.80	74.50	17	408	0.38	0.071	0.08	17.00	0.08	0.000
4.07	2.25	43.41	1.74	75.51	17	418	0.38	0.068	0.08	17.00	0.08	0.001
4.14	2.21	46.30	1.64	75.79	17	425	0.38	0.066	0.08	17.00	0.08	0.001
4.23	2.17	49.17	1.54	75.51	17	428	0.38	0.068	0.08	17.00	0.08	0.001
4.28	2.11	52.18	1.44	75.09	16	425	0.38	0.071	0.09	17.00	0.09	0.000
4.37	2.07	54.45	1.38	75.15	16	420	0.38	0.076	0.10	17.00	0.10	0.001
4.40	2.03	56.64	1.34	75.66	16	416	0.38	0.080	0.11	17.00	0.10	0.000
4.47	2.00	58.16	1.31	76.21	16	412	0.38	0.085	0.11	17.00	0.11	0.001
4.55	1.98	59.32	1.29	76.70	16	409	0.38	0.091	0.12	17.00	0.12	0.001
4.60	1.98	59.40	1.29	76.73	0	0	0.38	0.000	0.00	17.00	0.00	0.000
4.67	2.01	58.28	1.31	76.57	0	0	0.38	0.000	0.00	17.00	0.00	0.000
4.74	2.05	56.32	1.36	76.41	0	0	0.38	0.000	0.00	17.00	0.00	0.000
4.79	2.12	53.30	1.45	77.05	0	0	0.38	0.000	0.00	17.00	0.00	0.000
4.87	2.19	49.85	1.59	79.32	0	0	0.38	0.000	0.00	17.00	0.00	0.000
4.93	2.29	45.62	1.89	86.22	0	0	0.38	0.000	0.00	17.00	0.00	0.000

Total estimated settlement: 0.03

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)
5.01	96.72	2.00	0.00	0.92	0.00	5.06	109.43	2.00	0.00	0.91	0.00
5.16	117.23	2.00	0.00	0.91	0.00	5.21	120.93	2.00	0.00	0.91	0.00
5.25	121.62	2.00	0.00	0.91	0.00	5.34	121.68	2.00	0.00	0.91	0.00
5.39	120.58	2.00	0.00	0.91	0.00	5.46	117.65	2.00	0.00	0.91	0.00
5.53	113.47	2.00	0.00	0.91	0.00	5.58	107.36	2.00	0.00	0.91	0.00
5.67	101.33	2.00	0.00	0.90	0.00	5.72	97.66	2.00	0.00	0.90	0.00
5.78	95.79	2.00	0.00	0.90	0.00	5.86	94.70	2.00	0.00	0.90	0.00
5.95	93.55	2.00	0.00	0.90	0.00	6.00	92.45	2.00	0.00	0.90	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)
6.04	91.05	2.00	0.00	0.90	0.00	6.12	88.72	2.00	0.00	0.90	0.00
6.18	85.78	2.00	0.00	0.90	0.00	6.24	84.50	2.00	0.00	0.89	0.00
6.32	86.91	2.00	0.00	0.89	0.00	6.38	94.53	2.00	0.00	0.89	0.00
6.46	103.82	2.00	0.00	0.89	0.00	6.51	112.03	2.00	0.00	0.89	0.00
6.57	116.44	2.00	0.00	0.89	0.00	6.65	118.54	2.00	0.00	0.89	0.00
6.70	117.38	2.00	0.00	0.89	0.00	6.79	115.25	2.00	0.00	0.88	0.00
6.84	111.33	2.00	0.00	0.88	0.00	6.92	108.24	2.00	0.00	0.88	0.00
6.97	104.65	2.00	0.00	0.88	0.00	7.03	101.62	2.00	0.00	0.88	0.00
7.12	98.87	2.00	0.00	0.88	0.00	7.16	96.09	2.00	0.00	0.88	0.00
7.25	94.32	2.00	0.00	0.88	0.00	7.30	93.47	2.00	0.00	0.88	0.00
7.36	93.47	2.00	0.00	0.88	0.00	7.43	94.09	0.34	2.15	0.87	0.02
7.48	96.89	0.36	2.09	0.87	0.01	7.58	102.06	0.39	2.00	0.87	0.02
7.62	109.35	0.43	1.89	0.87	0.01	7.71	114.33	0.47	1.82	0.87	0.02
7.76	117.23	0.49	1.78	0.87	0.01	7.81	117.21	0.49	1.78	0.87	0.01
7.90	115.35	0.47	1.80	0.87	0.02	7.95	111.08	0.44	1.85	0.87	0.01
8.04	107.06	0.41	1.91	0.86	0.02	8.09	104.12	0.39	1.95	0.86	0.01
8.14	103.00	0.38	1.97	0.86	0.01	8.23	102.54	0.38	1.97	0.86	0.02
8.27	102.63	0.38	1.97	0.86	0.01	8.37	103.86	0.38	1.94	0.86	0.02
8.41	106.37	0.40	1.90	0.86	0.01	8.50	109.25	0.41	1.86	0.86	0.02
8.55	112.38	0.44	1.82	0.86	0.01	8.60	115.81	0.46	1.77	0.85	0.01
8.69	119.00	0.48	1.73	0.85	0.02	8.73	122.14	0.51	1.69	0.85	0.01
8.83	123.81	0.52	1.67	0.85	0.02	8.86	125.24	0.53	1.65	0.85	0.01
8.97	124.36	0.52	1.66	0.85	0.02	9.02	123.29	0.51	1.67	0.85	0.01
9.06	121.88	0.50	1.68	0.85	0.01	9.16	120.95	0.49	1.69	0.84	0.02
9.20	119.13	0.47	1.71	0.84	0.01	9.28	118.11	2.00	0.00	0.84	0.00
9.33	118.83	2.00	0.00	0.84	0.00	9.39	124.43	2.00	0.00	0.84	0.00
9.47	131.64	2.00	0.00	0.84	0.00	9.52	141.47	2.00	0.00	0.84	0.00
9.61	149.58	2.00	0.00	0.84	0.00	9.66	158.32	2.00	0.00	0.84	0.00
9.75	163.58	2.00	0.00	0.83	0.00	9.80	166.36	2.00	0.00	0.83	0.00
9.85	165.59	2.00	0.00	0.83	0.00	9.94	164.49	2.00	0.00	0.83	0.00
9.99	165.30	2.00	0.00	0.83	0.00	10.07	168.04	2.00	0.00	0.83	0.00
10.12	172.51	2.00	0.00	0.83	0.00	10.19	177.06	2.00	0.00	0.83	0.00
10.26	181.45	2.00	0.00	0.83	0.00	10.30	186.26	2.00	0.00	0.83	0.00
10.40	187.93	2.00	0.00	0.82	0.00	10.44	183.32	2.00	0.00	0.82	0.00
10.53	172.35	2.00	0.00	0.82	0.00	10.59	157.10	2.00	0.00	0.82	0.00
10.68	144.93	2.00	0.00	0.82	0.00	10.72	136.14	2.00	0.00	0.82	0.00
10.77	131.03	2.00	0.00	0.82	0.00	10.84	128.12	2.00	0.00	0.82	0.00
10.91	125.72	2.00	0.00	0.82	0.00	10.98	123.98	2.00	0.00	0.81	0.00
11.05	123.06	2.00	0.00	0.81	0.00	11.10	123.67	2.00	0.00	0.81	0.00
11.17	127.70	2.00	0.00	0.81	0.00	11.24	136.50	2.00	0.00	0.81	0.00
11.30	148.27	2.00	0.00	0.81	0.00	11.38	159.34	2.00	0.00	0.81	0.00
11.43	166.30	2.00	0.00	0.81	0.00	11.52	169.53	2.00	0.00	0.80	0.00
11.56	168.99	0.98	0.44	0.80	0.00	11.65	169.05	0.98	0.44	0.80	0.00
11.70	170.79	1.01	0.43	0.80	0.00	11.75	174.71	2.00	0.00	0.80	0.00
11.84	176.24	2.00	0.00	0.80	0.00	11.89	172.93	2.00	0.00	0.80	0.00
11.97	164.19	2.00	0.00	0.80	0.00	12.03	155.02	2.00	0.00	0.80	0.00
12.08	143.27	2.00	0.00	0.80	0.00	12.16	133.86	2.00	0.00	0.79	0.00
12.21	123.74	2.00	0.00	0.79	0.00	12.31	116.16	2.00	0.00	0.79	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)
12.35	109.52	0.37	1.71	0.79	0.01	12.44	106.63	0.35	1.75	0.79	0.02
12.49	105.21	0.34	1.77	0.79	0.01	12.54	106.52	0.35	1.75	0.79	0.01
12.63	110.29	0.37	1.69	0.79	0.02	12.68	118.10	0.42	1.60	0.79	0.01
12.77	122.96	0.46	1.55	0.78	0.02	12.80	124.10	0.47	1.53	0.78	0.01
12.90	120.00	0.43	1.57	0.78	0.02	12.96	116.74	0.41	1.61	0.78	0.01
13.00	116.38	0.41	1.61	0.78	0.01	13.10	117.51	2.00	0.00	0.78	0.00
13.13	121.02	2.00	0.00	0.78	0.00	13.23	125.26	2.00	0.00	0.78	0.00
13.28	130.44	2.00	0.00	0.77	0.00	13.33	135.20	2.00	0.00	0.77	0.00
13.42	138.04	2.00	0.00	0.77	0.00	13.47	140.12	2.00	0.00	0.77	0.00
13.55	138.41	2.00	0.00	0.77	0.00	13.61	134.92	2.00	0.00	0.77	0.00
13.66	130.32	2.00	0.00	0.77	0.00	13.74	126.97	2.00	0.00	0.77	0.00
13.79	126.61	2.00	0.00	0.77	0.00	13.88	127.35	2.00	0.00	0.76	0.00
13.92	127.77	2.00	0.00	0.76	0.00	14.02	127.07	2.00	0.00	0.76	0.00
14.05	125.99	2.00	0.00	0.76	0.00	14.11	124.54	2.00	0.00	0.76	0.00
14.21	122.43	2.00	0.00	0.76	0.00	14.26	120.79	2.00	0.00	0.76	0.00
14.35	119.80	2.00	0.00	0.76	0.00	14.37	119.29	2.00	0.00	0.76	0.00
14.44	117.79	2.00	0.00	0.76	0.00	14.51	116.57	2.00	0.00	0.75	0.00
14.58	116.58	2.00	0.00	0.75	0.00	14.64	118.09	2.00	0.00	0.75	0.00
14.72	119.21	2.00	0.00	0.75	0.00	14.77	119.19	2.00	0.00	0.75	0.00
14.85	118.77	2.00	0.00	0.75	0.00	14.90	118.64	2.00	0.00	0.75	0.00
15.00	118.82	2.00	0.00	0.75	0.00	15.04	119.42	2.00	0.00	0.75	0.00
15.13	120.14	2.00	0.00	0.74	0.00	15.18	121.02	2.00	0.00	0.74	0.00
15.23	121.72	2.00	0.00	0.74	0.00	15.29	121.55	2.00	0.00	0.74	0.00
15.37	121.31	2.00	0.00	0.74	0.00	15.46	121.14	2.00	0.00	0.74	0.00
15.51	121.61	2.00	0.00	0.74	0.00	15.55	122.17	2.00	0.00	0.74	0.00
15.64	122.31	2.00	0.00	0.73	0.00	15.69	122.51	2.00	0.00	0.73	0.00
15.75	122.20	2.00	0.00	0.73	0.00	15.83	120.84	2.00	0.00	0.73	0.00
15.92	121.14	2.00	0.00	0.73	0.00	15.97	123.31	2.00	0.00	0.73	0.00
16.02	127.16	2.00	0.00	0.73	0.00	16.11	128.03	2.00	0.00	0.73	0.00
16.16	126.32	2.00	0.00	0.73	0.00	16.21	122.95	2.00	0.00	0.73	0.00
16.29	123.97	2.00	0.00	0.72	0.00	16.34	126.24	2.00	0.00	0.72	0.00
16.43	129.56	2.00	0.00	0.72	0.00	16.48	128.91	2.00	0.00	0.72	0.00
16.55	127.40	2.00	0.00	0.72	0.00	16.62	127.74	2.00	0.00	0.72	0.00
16.67	135.62	2.00	0.00	0.72	0.00	16.80	142.99	2.00	0.00	0.72	0.00
16.89	147.84	2.00	0.00	0.71	0.00	16.94	143.52	2.00	0.00	0.71	0.00
17.00	140.74	2.00	0.00	0.71	0.00	17.09	139.42	2.00	0.00	0.71	0.00
17.13	140.07	2.00	0.00	0.71	0.00	17.20	137.09	2.00	0.00	0.71	0.00
17.27	131.02	2.00	0.00	0.71	0.00	17.36	124.94	2.00	0.00	0.71	0.00
17.41	121.31	2.00	0.00	0.70	0.00	17.45	119.49	2.00	0.00	0.70	0.00
17.54	118.18	2.00	0.00	0.70	0.00	17.59	117.10	2.00	0.00	0.70	0.00
17.68	116.46	2.00	0.00	0.70	0.00	17.73	115.94	2.00	0.00	0.70	0.00
17.82	115.77	2.00	0.00	0.70	0.00	17.87	115.85	2.00	0.00	0.70	0.00
17.91	116.14	2.00	0.00	0.70	0.00	18.01	116.34	2.00	0.00	0.69	0.00
18.05	116.63	2.00	0.00	0.69	0.00	18.15	116.70	2.00	0.00	0.69	0.00
18.20	116.81	2.00	0.00	0.69	0.00	18.24	116.78	2.00	0.00	0.69	0.00
18.32	116.63	2.00	0.00	0.69	0.00	18.38	116.30	2.00	0.00	0.69	0.00
18.47	115.67	2.00	0.00	0.69	0.00	18.52	114.71	2.00	0.00	0.69	0.00
18.61	113.51	2.00	0.00	0.68	0.00	18.66	112.18	2.00	0.00	0.68	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)
18.70	110.70	2.00	0.00	0.68	0.00	18.78	109.11	2.00	0.00	0.68	0.00
18.84	107.71	2.00	0.00	0.68	0.00	18.90	107.01	2.00	0.00	0.68	0.00
18.98	106.79	2.00	0.00	0.68	0.00	19.08	104.60	2.00	0.00	0.68	0.00
19.12	101.58	2.00	0.00	0.68	0.00	19.17	99.13	2.00	0.00	0.68	0.00
19.24	99.52	2.00	0.00	0.67	0.00	19.31	100.67	2.00	0.00	0.67	0.00
19.36	100.92	2.00	0.00	0.67	0.00	19.45	100.33	2.00	0.00	0.67	0.00
19.50	99.37	2.00	0.00	0.67	0.00	19.59	98.24	2.00	0.00	0.67	0.00
19.63	96.88	2.00	0.00	0.67	0.00	19.73	95.93	2.00	0.00	0.67	0.00
19.76	95.12	2.00	0.00	0.67	0.00	19.82	94.55	2.00	0.00	0.66	0.00
19.91	93.71	2.00	0.00	0.66	0.00	19.96	92.53	2.00	0.00	0.66	0.00
20.05	91.43	2.00	0.00	0.66	0.00	20.10	90.51	2.00	0.00	0.66	0.00
20.14	90.10	2.00	0.00	0.66	0.00	20.24	89.59	2.00	0.00	0.66	0.00
20.28	88.91	2.00	0.00	0.66	0.00	20.38	88.30	2.00	0.00	0.65	0.00
20.41	87.74	2.00	0.00	0.65	0.00	20.52	87.46	2.00	0.00	0.65	0.00
20.57	87.35	2.00	0.00	0.65	0.00	20.61	87.56	2.00	0.00	0.65	0.00
20.71	87.71	2.00	0.00	0.65	0.00	20.74	87.92	2.00	0.00	0.65	0.00
20.84	87.99	2.00	0.00	0.65	0.00	20.89	87.99	2.00	0.00	0.65	0.00
20.93	87.54	2.00	0.00	0.65	0.00	21.03	86.82	2.00	0.00	0.64	0.00
21.07	86.30	2.00	0.00	0.64	0.00	21.16	86.09	2.00	0.00	0.64	0.00
21.21	85.99	2.00	0.00	0.64	0.00	21.26	86.02	2.00	0.00	0.64	0.00
21.35	86.65	2.00	0.00	0.64	0.00	21.40	88.72	2.00	0.00	0.64	0.00
21.49	91.88	2.00	0.00	0.64	0.00	21.54	93.47	2.00	0.00	0.63	0.00
21.59	94.86	2.00	0.00	0.63	0.00	21.68	93.66	2.00	0.00	0.63	0.00
21.73	91.40	2.00	0.00	0.63	0.00	21.81	88.48	0.23	1.63	0.63	0.02
21.86	87.19	0.23	1.65	0.63	0.01	21.95	88.56	0.23	1.62	0.63	0.02
22.00	90.96	0.24	1.58	0.63	0.01	22.05	95.42	2.00	0.00	0.63	0.00
22.13	96.20	2.00	0.00	0.62	0.00	22.22	96.09	0.26	1.51	0.62	0.02
22.25	94.62	0.25	1.52	0.62	0.00	22.31	96.57	0.26	1.50	0.62	0.01
22.41	98.72	2.00	0.00	0.62	0.00	22.45	101.19	2.00	0.00	0.62	0.00
22.55	102.02	2.00	0.00	0.62	0.00	22.59	101.75	2.00	0.00	0.62	0.00
22.69	100.70	2.00	0.00	0.62	0.00	22.71	98.38	2.00	0.00	0.62	0.00
22.78	94.52	2.00	0.00	0.61	0.00	22.87	88.31	2.00	0.00	0.61	0.00
22.92	82.07	2.00	0.00	0.61	0.00	23.01	77.60	2.00	0.00	0.61	0.00
23.05	73.79	2.00	0.00	0.61	0.00	23.10	71.30	2.00	0.00	0.61	0.00
23.20	69.32	2.00	0.00	0.61	0.00	23.24	67.93	2.00	0.00	0.61	0.00
23.33	67.72	2.00	0.00	0.60	0.00	23.39	67.67	2.00	0.00	0.60	0.00
23.43	67.50	2.00	0.00	0.60	0.00	23.52	67.95	2.00	0.00	0.60	0.00
23.56	69.92	2.00	0.00	0.60	0.00	23.66	71.45	2.00	0.00	0.60	0.00
23.71	71.86	2.00	0.00	0.60	0.00	23.79	70.64	2.00	0.00	0.60	0.00
23.84	69.78	2.00	0.00	0.60	0.00	23.89	70.01	2.00	0.00	0.60	0.00
23.98	70.24	2.00	0.00	0.59	0.00	24.02	69.97	2.00	0.00	0.59	0.00
24.12	68.93	2.00	0.00	0.59	0.00	24.17	68.08	2.00	0.00	0.59	0.00
24.22	67.88	2.00	0.00	0.59	0.00	24.31	67.91	2.00	0.00	0.59	0.00
24.35	67.64	2.00	0.00	0.59	0.00	24.45	67.37	2.00	0.00	0.59	0.00
24.50	67.32	2.00	0.00	0.58	0.00	24.59	67.68	2.00	0.00	0.58	0.00
24.63	68.12	2.00	0.00	0.58	0.00	24.68	68.47	2.00	0.00	0.58	0.00
24.77	68.74	2.00	0.00	0.58	0.00	24.82	68.88	2.00	0.00	0.58	0.00
24.87	69.17	2.00	0.00	0.58	0.00	24.96	69.63	2.00	0.00	0.58	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)
25.01	70.89	2.00	0.00	0.58	0.00	25.10	72.29	2.00	0.00	0.57	0.00
25.14	73.91	2.00	0.00	0.57	0.00	25.20	77.26	2.00	0.00	0.57	0.00
25.29	82.32	2.00	0.00	0.57	0.00	25.33	91.82	2.00	0.00	0.57	0.00
25.43	100.13	2.00	0.00	0.57	0.00	25.47	107.37	2.00	0.00	0.57	0.00
25.53	110.91	2.00	0.00	0.57	0.00	25.61	112.23	2.00	0.00	0.57	0.00
25.70	112.57	2.00	0.00	0.56	0.00	25.73	113.23	2.00	0.00	0.56	0.00
25.80	108.59	2.00	0.00	0.56	0.00	25.89	103.76	2.00	0.00	0.56	0.00
25.93	101.83	2.00	0.00	0.56	0.00	26.03	108.93	2.00	0.00	0.56	0.00
26.07	122.29	2.00	0.00	0.56	0.00	26.12	128.76	2.00	0.00	0.56	0.00
26.18	129.03	0.44	1.05	0.56	0.01	26.26	128.20	0.43	1.06	0.55	0.01
26.35	133.56	0.47	1.02	0.55	0.01	26.40	136.19	0.49	1.00	0.55	0.01
26.45	135.96	0.49	1.00	0.55	0.01	26.54	134.51	0.48	1.01	0.55	0.01
26.59	131.68	0.46	1.02	0.55	0.01	26.68	129.15	0.44	1.04	0.55	0.01
26.72	125.76	0.41	1.06	0.55	0.01	26.79	123.54	0.40	1.07	0.55	0.01
26.86	121.55	0.39	1.08	0.54	0.01	26.91	119.98	0.38	1.09	0.54	0.01
27.00	118.40	0.37	1.10	0.54	0.01	27.05	116.59	0.36	1.12	0.54	0.01
27.13	114.99	0.35	1.13	0.54	0.01	27.18	113.21	0.34	1.14	0.54	0.01
27.23	110.30	0.32	1.16	0.54	0.01	27.33	103.50	0.29	1.22	0.54	0.01
27.39	98.54	0.26	1.27	0.54	0.01	27.43	93.24	0.24	1.32	0.54	0.01
27.52	91.40	0.24	1.34	0.53	0.02	27.57	85.49	0.22	1.42	0.53	0.01
27.66	80.13	0.20	1.49	0.53	0.02	27.71	74.08	2.00	0.00	0.53	0.00
27.80	68.75	2.00	0.00	0.53	0.00	27.85	64.01	2.00	0.00	0.53	0.00
27.89	74.28	2.00	0.00	0.53	0.00	27.99	70.89	2.00	0.00	0.53	0.00
28.02	69.63	2.00	0.00	0.53	0.00	28.12	72.18	2.00	0.00	0.52	0.00
28.17	78.02	2.00	0.00	0.52	0.00	28.22	82.94	2.00	0.00	0.52	0.00
28.31	86.09	2.00	0.00	0.52	0.00	28.36	87.51	2.00	0.00	0.52	0.00
28.45	86.63	2.00	0.00	0.52	0.00	28.49	86.54	2.00	0.00	0.52	0.00
28.58	88.89	2.00	0.00	0.52	0.00	28.63	90.59	2.00	0.00	0.51	0.00
28.68	90.21	2.00	0.00	0.51	0.00	28.77	88.78	2.00	0.00	0.51	0.00
28.82	86.18	2.00	0.00	0.51	0.00	28.91	83.98	2.00	0.00	0.51	0.00
28.96	81.92	2.00	0.00	0.51	0.00	29.01	79.72	2.00	0.00	0.51	0.00
29.10	77.69	2.00	0.00	0.51	0.00	29.14	75.77	2.00	0.00	0.51	0.00
29.24	75.04	2.00	0.00	0.50	0.00	29.27	72.39	2.00	0.00	0.50	0.00
29.38	69.23	2.00	0.00	0.50	0.00	29.43	65.94	2.00	0.00	0.50	0.00
29.47	64.61	2.00	0.00	0.50	0.00	29.56	64.02	2.00	0.00	0.50	0.00
29.61	63.47	2.00	0.00	0.50	0.00	29.70	63.04	2.00	0.00	0.50	0.00
29.75	62.69	2.00	0.00	0.50	0.00	29.79	62.82	2.00	0.00	0.50	0.00
29.89	63.28	2.00	0.00	0.49	0.00	29.93	64.24	2.00	0.00	0.49	0.00
30.03	65.30	2.00	0.00	0.49	0.00	30.07	66.78	2.00	0.00	0.49	0.00
30.16	67.62	2.00	0.00	0.49	0.00	30.22	68.04	2.00	0.00	0.49	0.00
30.26	67.73	2.00	0.00	0.49	0.00	30.35	67.50	2.00	0.00	0.49	0.00
30.40	67.24	2.00	0.00	0.48	0.00	30.49	66.91	2.00	0.00	0.48	0.00
30.52	66.24	2.00	0.00	0.48	0.00	30.59	65.42	2.00	0.00	0.48	0.00
30.68	64.76	2.00	0.00	0.48	0.00	30.72	64.23	2.00	0.00	0.48	0.00
30.82	64.27	2.00	0.00	0.48	0.00	30.86	64.79	2.00	0.00	0.48	0.00
30.91	65.81	2.00	0.00	0.48	0.00	31.00	66.31	2.00	0.00	0.47	0.00
31.05	65.82	2.00	0.00	0.47	0.00	31.14	64.82	2.00	0.00	0.47	0.00
31.18	63.85	2.00	0.00	0.47	0.00	31.23	63.19	2.00	0.00	0.47	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)
31.30	62.44	2.00	0.00	0.47	0.00	31.37	61.70	2.00	0.00	0.47	0.00
31.46	61.32	2.00	0.00	0.47	0.00	31.51	61.76	2.00	0.00	0.47	0.00
31.60	62.73	2.00	0.00	0.46	0.00	31.64	63.71	2.00	0.00	0.46	0.00
31.73	63.36	2.00	0.00	0.46	0.00	31.79	62.21	2.00	0.00	0.46	0.00
31.83	60.41	2.00	0.00	0.46	0.00	31.93	59.13	2.00	0.00	0.46	0.00
31.97	58.61	2.00	0.00	0.46	0.00	32.07	58.76	2.00	0.00	0.46	0.00
32.12	59.33	2.00	0.00	0.46	0.00	32.16	60.35	2.00	0.00	0.45	0.00
32.25	61.91	2.00	0.00	0.45	0.00	32.29	64.72	2.00	0.00	0.45	0.00
32.39	66.97	2.00	0.00	0.45	0.00	32.44	68.36	2.00	0.00	0.45	0.00
32.48	66.03	2.00	0.00	0.45	0.00	32.58	62.46	2.00	0.00	0.45	0.00
32.62	59.02	2.00	0.00	0.45	0.00	32.70	58.39	2.00	0.00	0.45	0.00
32.76	59.05	2.00	0.00	0.44	0.00	32.81	60.62	2.00	0.00	0.44	0.00
32.90	62.78	2.00	0.00	0.44	0.00	32.95	65.71	2.00	0.00	0.44	0.00
33.01	69.59	2.00	0.00	0.44	0.00	33.09	73.70	2.00	0.00	0.44	0.00
33.14	76.98	2.00	0.00	0.44	0.00	33.23	78.47	2.00	0.00	0.44	0.00
33.27	78.98	2.00	0.00	0.44	0.00	33.35	78.92	2.00	0.00	0.43	0.00
33.42	78.58	2.00	0.00	0.43	0.00	33.49	77.88	2.00	0.00	0.43	0.00
33.56	77.02	2.00	0.00	0.43	0.00	33.60	76.05	2.00	0.00	0.43	0.00
33.69	75.36	2.00	0.00	0.43	0.00	33.73	74.86	2.00	0.00	0.43	0.00
33.84	74.77	2.00	0.00	0.43	0.00	33.88	75.24	2.00	0.00	0.43	0.00
33.93	77.29	2.00	0.00	0.42	0.00	34.02	79.15	2.00	0.00	0.42	0.00
34.07	80.67	2.00	0.00	0.42	0.00	34.16	81.21	2.00	0.00	0.42	0.00
34.20	81.64	2.00	0.00	0.42	0.00	34.25	81.79	2.00	0.00	0.42	0.00
34.35	81.10	2.00	0.00	0.42	0.00	34.39	79.48	2.00	0.00	0.42	0.00
34.48	77.50	2.00	0.00	0.42	0.00	34.53	76.87	2.00	0.00	0.41	0.00
34.61	76.95	2.00	0.00	0.41	0.00	34.66	76.88	2.00	0.00	0.41	0.00
34.72	75.83	2.00	0.00	0.41	0.00	34.80	74.87	2.00	0.00	0.41	0.00
34.86	74.25	2.00	0.00	0.41	0.00	34.91	74.21	2.00	0.00	0.41	0.00
34.99	74.41	2.00	0.00	0.41	0.00	35.04	74.79	2.00	0.00	0.41	0.00
35.13	75.11	2.00	0.00	0.40	0.00	35.18	75.32	2.00	0.00	0.40	0.00
35.26	75.26	2.00	0.00	0.40	0.00	35.32	75.38	2.00	0.00	0.40	0.00
35.38	75.82	2.00	0.00	0.40	0.00	35.45	76.64	2.00	0.00	0.40	0.00
35.50	77.71	2.00	0.00	0.40	0.00	35.60	78.47	2.00	0.00	0.40	0.00
35.64	79.02	2.00	0.00	0.40	0.00	35.73	79.63	2.00	0.00	0.39	0.00
35.78	81.19	2.00	0.00	0.39	0.00	35.84	82.57	2.00	0.00	0.39	0.00
35.92	83.69	2.00	0.00	0.39	0.00	35.97	83.31	2.00	0.00	0.39	0.00
36.06	81.69	2.00	0.00	0.39	0.00	36.11	77.38	2.00	0.00	0.39	0.00
36.17	73.09	2.00	0.00	0.39	0.00	36.24	70.68	2.00	0.00	0.39	0.00
36.29	71.59	2.00	0.00	0.38	0.00	36.35	75.16	2.00	0.00	0.38	0.00
36.43	80.23	2.00	0.00	0.38	0.00	36.52	85.16	2.00	0.00	0.38	0.00
36.56	87.07	2.00	0.00	0.38	0.00	36.62	88.10	2.00	0.00	0.38	0.00
36.71	88.80	2.00	0.00	0.38	0.00	36.75	92.10	2.00	0.00	0.38	0.00
36.84	93.87	2.00	0.00	0.38	0.00	36.90	93.17	2.00	0.00	0.37	0.00
36.98	89.67	2.00	0.00	0.37	0.00	37.03	87.31	2.00	0.00	0.37	0.00
37.08	87.07	2.00	0.00	0.37	0.00	37.17	88.88	2.00	0.00	0.37	0.00
37.22	90.86	2.00	0.00	0.37	0.00	37.31	95.05	2.00	0.00	0.37	0.00
37.36	100.97	2.00	0.00	0.37	0.00	37.40	103.13	2.00	0.00	0.37	0.00
37.50	100.87	2.00	0.00	0.36	0.00	37.54	92.94	2.00	0.00	0.36	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)
37.63	86.30	2.00	0.00	0.36	0.00	37.68	80.90	2.00	0.00	0.36	0.00
37.76	79.48	2.00	0.00	0.36	0.00	37.82	79.02	2.00	0.00	0.36	0.00
37.86	80.58	2.00	0.00	0.36	0.00	37.96	83.09	2.00	0.00	0.36	0.00
38.00	86.41	2.00	0.00	0.36	0.00	38.10	88.19	2.00	0.00	0.35	0.00
38.15	89.09	2.00	0.00	0.35	0.00	38.20	89.25	2.00	0.00	0.35	0.00
38.28	88.11	2.00	0.00	0.35	0.00	38.34	86.00	2.00	0.00	0.35	0.00
38.42	84.19	2.00	0.00	0.35	0.00	38.47	83.82	2.00	0.00	0.35	0.00
38.56	83.67	2.00	0.00	0.35	0.00	38.61	81.96	2.00	0.00	0.35	0.00
38.66	80.94	2.00	0.00	0.34	0.00	38.74	80.66	2.00	0.00	0.34	0.00
38.80	81.57	2.00	0.00	0.34	0.00	38.85	82.20	2.00	0.00	0.34	0.00
38.94	83.59	2.00	0.00	0.34	0.00	38.98	84.43	2.00	0.00	0.34	0.00
39.07	82.75	2.00	0.00	0.34	0.00	39.12	78.68	2.00	0.00	0.34	0.00
39.21	74.54	2.00	0.00	0.34	0.00	39.26	72.33	2.00	0.00	0.33	0.00
39.35	71.56	2.00	0.00	0.33	0.00	39.40	70.78	2.00	0.00	0.33	0.00
39.45	71.14	2.00	0.00	0.33	0.00	39.51	72.11	2.00	0.00	0.33	0.00
39.58	72.59	2.00	0.00	0.33	0.00	39.64	72.39	2.00	0.00	0.33	0.00
39.73	71.83	2.00	0.00	0.33	0.00	39.77	71.82	2.00	0.00	0.33	0.00
39.83	73.45	2.00	0.00	0.32	0.00	39.91	75.51	2.00	0.00	0.32	0.00
40.00	78.30	2.00	0.00	0.32	0.00	40.05	80.67	2.00	0.00	0.32	0.00
40.10	82.29	2.00	0.00	0.32	0.00	40.19	81.60	2.00	0.00	0.32	0.00
40.23	78.29	2.00	0.00	0.32	0.00	40.31	77.60	2.00	0.00	0.32	0.00
40.36	76.96	2.00	0.00	0.32	0.00	40.47	77.74	2.00	0.00	0.31	0.00
40.51	76.41	2.00	0.00	0.31	0.00	40.56	73.87	2.00	0.00	0.31	0.00
40.65	72.04	2.00	0.00	0.31	0.00	40.69	71.59	2.00	0.00	0.31	0.00
40.78	73.38	2.00	0.00	0.31	0.00	40.84	76.46	2.00	0.00	0.31	0.00
40.88	79.94	2.00	0.00	0.31	0.00	40.95	82.33	2.00	0.00	0.31	0.00
41.02	85.66	2.00	0.00	0.30	0.00	41.12	89.33	2.00	0.00	0.30	0.00
41.16	93.40	2.00	0.00	0.30	0.00	41.22	95.21	2.00	0.00	0.30	0.00
41.30	95.05	2.00	0.00	0.30	0.00	41.34	99.37	2.00	0.00	0.30	0.00
41.44	101.07	2.00	0.00	0.30	0.00	41.49	100.34	2.00	0.00	0.30	0.00
41.57	90.47	2.00	0.00	0.30	0.00	41.62	88.36	2.00	0.00	0.29	0.00
41.67	92.80	2.00	0.00	0.29	0.00	41.76	92.90	2.00	0.00	0.29	0.00
41.81	88.92	2.00	0.00	0.29	0.00	41.90	83.77	2.00	0.00	0.29	0.00
41.95	80.90	2.00	0.00	0.29	0.00	42.00	80.59	2.00	0.00	0.29	0.00
42.09	79.96	2.00	0.00	0.29	0.00	42.14	80.07	2.00	0.00	0.29	0.00
42.21	80.35	2.00	0.00	0.28	0.00	42.28	80.86	2.00	0.00	0.28	0.00
42.32	83.22	2.00	0.00	0.28	0.00	42.42	85.71	2.00	0.00	0.28	0.00
42.46	87.04	2.00	0.00	0.28	0.00	42.55	85.62	2.00	0.00	0.28	0.00
42.60	84.55	2.00	0.00	0.28	0.00	42.70	84.84	2.00	0.00	0.28	0.00
42.73	85.47	2.00	0.00	0.28	0.00	42.79	84.38	2.00	0.00	0.27	0.00
42.88	82.85	2.00	0.00	0.27	0.00	42.92	83.14	2.00	0.00	0.27	0.00
43.02	85.11	2.00	0.00	0.27	0.00	43.06	87.91	2.00	0.00	0.27	0.00
43.11	90.93	2.00	0.00	0.27	0.00	43.20	93.37	2.00	0.00	0.27	0.00
43.25	95.73	2.00	0.00	0.27	0.00	43.34	97.27	2.00	0.00	0.27	0.00
43.39	99.66	2.00	0.00	0.26	0.00	43.48	101.76	2.00	0.00	0.26	0.00
43.53	103.52	2.00	0.00	0.26	0.00	43.57	104.17	2.00	0.00	0.26	0.00
43.67	104.47	2.00	0.00	0.26	0.00	43.71	105.12	2.00	0.00	0.26	0.00
43.80	106.18	2.00	0.00	0.26	0.00	43.85	108.14	2.00	0.00	0.26	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)
43.95	109.84	2.00	0.00	0.26	0.00	43.99	111.37	2.00	0.00	0.25	0.00
44.04	112.57	2.00	0.00	0.25	0.00	44.14	113.71	2.00	0.00	0.25	0.00
44.18	115.22	2.00	0.00	0.25	0.00	44.27	116.13	2.00	0.00	0.25	0.00
44.30	116.91	2.00	0.00	0.25	0.00	44.37	117.28	2.00	0.00	0.25	0.00
44.46	117.66	2.00	0.00	0.25	0.00	44.50	118.06	2.00	0.00	0.25	0.00
44.59	117.78	2.00	0.00	0.24	0.00	44.63	116.01	2.00	0.00	0.24	0.00
44.69	112.62	2.00	0.00	0.24	0.00	44.78	108.86	2.00	0.00	0.24	0.00
44.83	105.51	2.00	0.00	0.24	0.00	44.92	103.06	2.00	0.00	0.24	0.00
44.97	100.73	2.00	0.00	0.24	0.00	45.02	98.81	2.00	0.00	0.24	0.00
45.10	96.82	2.00	0.00	0.24	0.00	45.15	94.11	2.00	0.00	0.23	0.00
45.24	93.03	2.00	0.00	0.23	0.00	45.29	92.23	2.00	0.00	0.23	0.00
45.38	92.61	2.00	0.00	0.23	0.00	45.43	91.98	2.00	0.00	0.23	0.00
45.48	91.83	2.00	0.00	0.23	0.00	45.58	92.97	2.00	0.00	0.23	0.00
45.63	94.90	2.00	0.00	0.23	0.00	45.67	97.45	2.00	0.00	0.23	0.00
45.76	98.73	2.00	0.00	0.22	0.00	45.81	100.18	2.00	0.00	0.22	0.00
45.90	102.38	2.00	0.00	0.22	0.00	45.95	105.02	2.00	0.00	0.22	0.00
46.00	107.27	2.00	0.00	0.22	0.00	46.09	109.06	2.00	0.00	0.22	0.00
46.13	110.00	2.00	0.00	0.22	0.00	46.23	110.26	2.00	0.00	0.22	0.00
46.27	110.56	2.00	0.00	0.22	0.00	46.34	111.12	2.00	0.00	0.21	0.00
46.41	111.42	2.00	0.00	0.21	0.00	46.47	110.95	2.00	0.00	0.21	0.00
46.55	110.20	2.00	0.00	0.21	0.00	46.60	109.89	2.00	0.00	0.21	0.00
46.69	110.41	2.00	0.00	0.21	0.00	46.74	110.96	2.00	0.00	0.21	0.00
46.79	111.56	2.00	0.00	0.21	0.00	46.88	115.28	2.00	0.00	0.21	0.00
46.92	117.00	2.00	0.00	0.20	0.00	47.01	118.35	2.00	0.00	0.20	0.00
47.06	118.49	2.00	0.00	0.20	0.00	47.15	117.39	2.00	0.00	0.20	0.00
47.19	116.66	2.00	0.00	0.20	0.00	47.24	117.36	2.00	0.00	0.20	0.00
47.34	115.35	2.00	0.00	0.20	0.00	47.39	116.47	2.00	0.00	0.20	0.00
47.48	116.94	2.00	0.00	0.20	0.00	47.52	117.43	2.00	0.00	0.19	0.00
47.62	118.39	2.00	0.00	0.19	0.00	47.66	119.55	2.00	0.00	0.19	0.00
47.71	122.98	2.00	0.00	0.19	0.00	47.80	122.55	2.00	0.00	0.19	0.00
47.85	122.08	2.00	0.00	0.19	0.00	47.94	122.35	2.00	0.00	0.19	0.00
47.98	122.98	2.00	0.00	0.19	0.00	48.03	125.32	2.00	0.00	0.19	0.00
48.13	126.68	2.00	0.00	0.18	0.00	48.17	124.39	2.00	0.00	0.18	0.00
48.27	119.41	2.00	0.00	0.18	0.00	48.30	114.27	2.00	0.00	0.18	0.00
48.38	111.75	2.00	0.00	0.18	0.00	48.44	109.12	2.00	0.00	0.18	0.00
48.49	107.76	2.00	0.00	0.18	0.00	48.59	108.05	2.00	0.00	0.18	0.00
48.63	110.00	2.00	0.00	0.18	0.00	48.70	111.75	2.00	0.00	0.17	0.00
48.77	112.86	2.00	0.00	0.17	0.00	48.82	115.41	2.00	0.00	0.17	0.00
48.91	118.67	2.00	0.00	0.17	0.00	48.95	123.38	2.00	0.00	0.17	0.00
49.05	126.38	2.00	0.00	0.17	0.00	49.10	129.45	2.00	0.00	0.17	0.00
49.19	131.34	2.00	0.00	0.17	0.00	49.23	132.15	2.00	0.00	0.17	0.00
49.28	130.06	2.00	0.00	0.16	0.00	49.34	125.43	2.00	0.00	0.16	0.00
49.42	120.25	2.00	0.00	0.16	0.00	49.51	116.74	2.00	0.00	0.16	0.00
49.56	115.14	2.00	0.00	0.16	0.00	49.61	114.45	2.00	0.00	0.16	0.00
49.70	114.01	2.00	0.00	0.16	0.00	49.75	113.39	2.00	0.00	0.16	0.00
49.84	112.85	2.00	0.00	0.16	0.00	49.89	111.97	2.00	0.00	0.15	0.00
49.94	111.83	2.00	0.00	0.15	0.00	50.03	112.55	2.00	0.00	0.15	0.00
50.07	115.01	2.00	0.00	0.15	0.00	50.16	117.47	2.00	0.00	0.15	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)
50.26	119.03	2.00	0.00	0.15	0.00	50.29	119.66	2.00	0.00	0.15	0.00
50.35	120.55	2.00	0.00	0.15	0.00	50.40	122.73	2.00	0.00	0.15	0.00
50.49	124.81	2.00	0.00	0.14	0.00	50.54	125.86	2.00	0.00	0.14	0.00
50.60	125.48	2.00	0.00	0.14	0.00	50.68	124.28	2.00	0.00	0.14	0.00
50.73	122.78	2.00	0.00	0.14	0.00	50.82	121.33	2.00	0.00	0.14	0.00
50.87	119.79	2.00	0.00	0.14	0.00	50.96	118.91	2.00	0.00	0.14	0.00
50.99	118.52	2.00	0.00	0.14	0.00	51.05	118.54	2.00	0.00	0.13	0.00
51.15	118.26	2.00	0.00	0.13	0.00	51.20	117.03	2.00	0.00	0.13	0.00
51.28	116.21	2.00	0.00	0.13	0.00	51.32	116.12	2.00	0.00	0.13	0.00
51.38	117.61	2.00	0.00	0.13	0.00	51.47	119.18	2.00	0.00	0.13	0.00
51.52	120.82	2.00	0.00	0.13	0.00	51.61	121.75	2.00	0.00	0.13	0.00
51.66	122.51	2.00	0.00	0.12	0.00	51.72	122.07	2.00	0.00	0.12	0.00
51.80	120.94	2.00	0.00	0.12	0.00	51.84	118.16	2.00	0.00	0.12	0.00
51.94	115.29	2.00	0.00	0.12	0.00	51.98	111.94	2.00	0.00	0.12	0.00
52.06	109.64	2.00	0.00	0.12	0.00	52.12	107.86	2.00	0.00	0.12	0.00
52.17	106.70	2.00	0.00	0.12	0.00	52.26	106.39	2.00	0.00	0.11	0.00
52.30	106.98	2.00	0.00	0.11	0.00	52.37	108.89	2.00	0.00	0.11	0.00
52.45	112.76	2.00	0.00	0.11	0.00	52.54	116.62	2.00	0.00	0.11	0.00
52.57	120.39	2.00	0.00	0.11	0.00	52.63	123.08	2.00	0.00	0.11	0.00
52.73	125.66	2.00	0.00	0.11	0.00	52.77	128.08	2.00	0.00	0.11	0.00
52.86	128.95	2.00	0.00	0.10	0.00	52.90	128.09	2.00	0.00	0.10	0.00
52.95	125.10	2.00	0.00	0.10	0.00	53.05	122.47	2.00	0.00	0.10	0.00
53.09	120.92	2.00	0.00	0.10	0.00	53.19	120.39	2.00	0.00	0.10	0.00
53.24	119.59	2.00	0.00	0.10	0.00	53.33	118.68	2.00	0.00	0.10	0.00
53.37	118.33	2.00	0.00	0.10	0.00	53.42	120.13	2.00	0.00	0.09	0.00
53.51	121.79	2.00	0.00	0.09	0.00	53.56	121.70	2.00	0.00	0.09	0.00
53.65	118.35	2.00	0.00	0.09	0.00	53.70	114.50	2.00	0.00	0.09	0.00
53.74	111.50	2.00	0.00	0.09	0.00	53.84	109.73	2.00	0.00	0.09	0.00
53.88	108.62	2.00	0.00	0.09	0.00	53.97	108.35	2.00	0.00	0.09	0.00
54.02	108.75	2.00	0.00	0.08	0.00	54.09	109.46	2.00	0.00	0.08	0.00
54.16	110.28	2.00	0.00	0.08	0.00	54.21	110.38	2.00	0.00	0.08	0.00
54.30	111.25	2.00	0.00	0.08	0.00	54.34	112.24	2.00	0.00	0.08	0.00
54.44	113.16	2.00	0.00	0.08	0.00	54.46	112.95	2.00	0.00	0.08	0.00
54.53	112.84	2.00	0.00	0.08	0.00	54.62	112.39	2.00	0.00	0.07	0.00
54.67	110.76	2.00	0.00	0.07	0.00	54.76	108.91	2.00	0.00	0.07	0.00
54.79	108.16	2.00	0.00	0.07	0.00	54.86	108.20	2.00	0.00	0.07	0.00
54.95	107.09	2.00	0.00	0.07	0.00	54.99	105.26	2.00	0.00	0.07	0.00
55.09	105.47	2.00	0.00	0.07	0.00	55.12	108.91	2.00	0.00	0.07	0.00
55.23	111.90	2.00	0.00	0.06	0.00	55.27	111.85	2.00	0.00	0.06	0.00
55.32	112.49	2.00	0.00	0.06	0.00	55.42	113.26	2.00	0.00	0.06	0.00
55.47	115.83	2.00	0.00	0.06	0.00	55.52	118.93	2.00	0.00	0.06	0.00
55.60	122.85	2.00	0.00	0.06	0.00	55.65	127.11	2.00	0.00	0.06	0.00
55.74	129.66	2.00	0.00	0.06	0.00	55.79	132.75	2.00	0.00	0.05	0.00
55.88	135.00	2.00	0.00	0.05	0.00	55.92	137.61	2.00	0.00	0.05	0.00
55.98	140.03	2.00	0.00	0.05	0.00	56.06	142.71	2.00	0.00	0.05	0.00
56.11	144.99	2.00	0.00	0.05	0.00	56.20	145.87	2.00	0.00	0.05	0.00
56.25	145.42	2.00	0.00	0.05	0.00	56.31	143.27	2.00	0.00	0.05	0.00
56.37	139.80	2.00	0.00	0.04	0.00	56.44	136.33	2.00	0.00	0.04	0.00

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

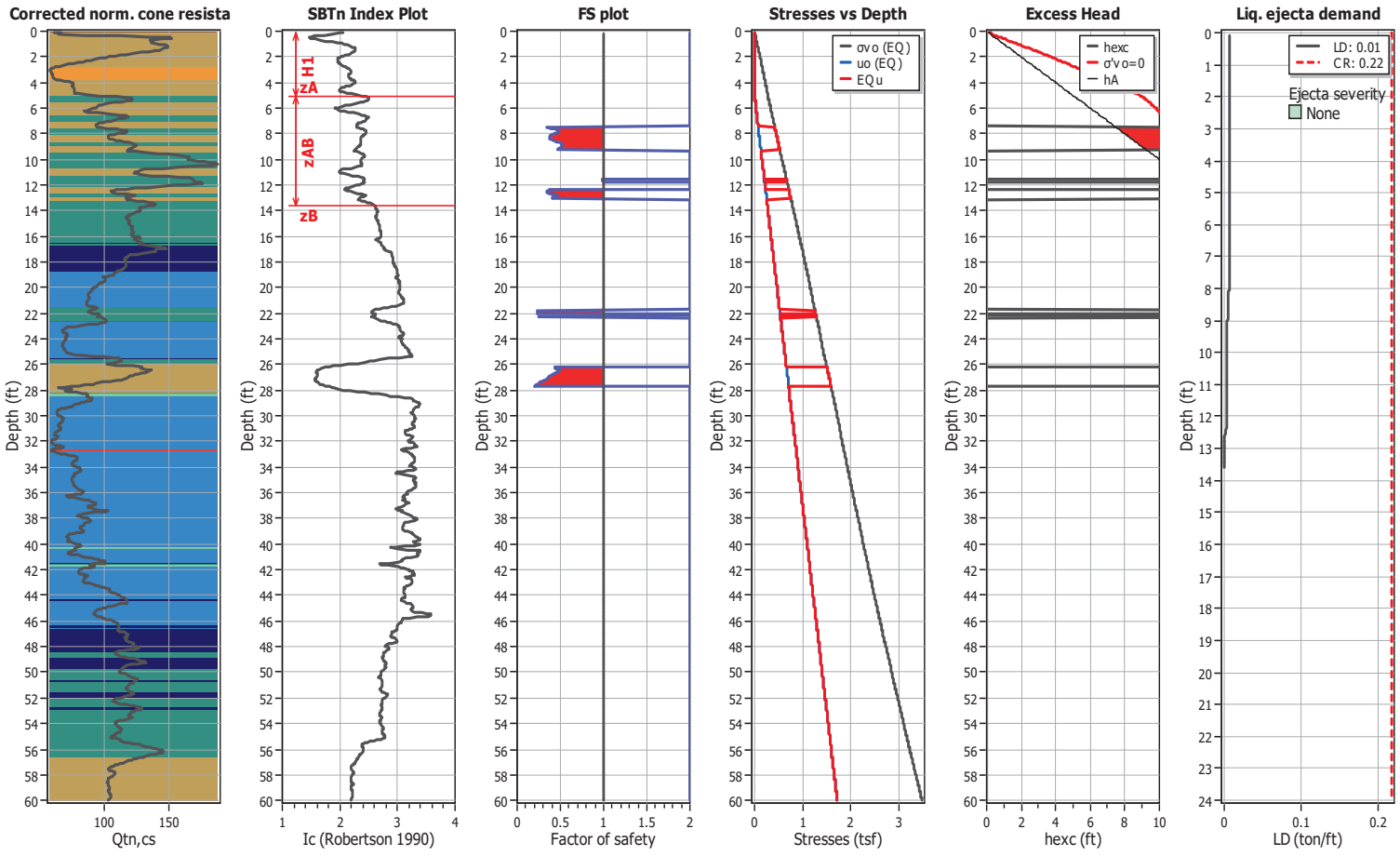
Depth (ft)	$Q_{tn,cs}$	FS	e_v (%)	DF	Settlement (in)	Depth (ft)	$Q_{tn,cs}$	FS	e_v (%)	DF	Settlement (in)
56.50	132.63	2.00	0.00	0.04	0.00	56.58	130.01	2.00	0.00	0.04	0.00
56.63	126.97	2.00	0.00	0.04	0.00	56.73	124.93	2.00	0.00	0.04	0.00
56.77	122.49	2.00	0.00	0.04	0.00	56.86	120.71	2.00	0.00	0.04	0.00
56.91	118.32	2.00	0.00	0.04	0.00	57.01	116.45	2.00	0.00	0.03	0.00
57.05	114.68	2.00	0.00	0.03	0.00	57.09	112.62	2.00	0.00	0.03	0.00
57.18	110.44	2.00	0.00	0.03	0.00	57.24	108.35	2.00	0.00	0.03	0.00
57.33	106.90	2.00	0.00	0.03	0.00	57.38	105.61	2.00	0.00	0.03	0.00
57.42	104.29	2.00	0.00	0.03	0.00	57.51	103.20	2.00	0.00	0.03	0.00
57.56	103.14	2.00	0.00	0.02	0.00	57.65	104.03	2.00	0.00	0.02	0.00
57.69	105.89	2.00	0.00	0.02	0.00	57.75	107.26	2.00	0.00	0.02	0.00
57.84	108.19	2.00	0.00	0.02	0.00	57.88	108.36	2.00	0.00	0.02	0.00
57.96	107.85	2.00	0.00	0.02	0.00	58.05	107.02	2.00	0.00	0.02	0.00
58.10	105.96	2.00	0.00	0.02	0.00	58.14	104.68	2.00	0.00	0.01	0.00
58.23	103.55	2.00	0.00	0.01	0.00	58.28	102.75	2.00	0.00	0.01	0.00
58.37	102.60	2.00	0.00	0.01	0.00	58.42	102.54	2.00	0.00	0.01	0.00
58.47	102.44	2.00	0.00	0.01	0.00	58.56	102.37	2.00	0.00	0.01	0.00
58.60	102.43	2.00	0.00	0.01	0.00	58.68	102.58	2.00	0.00	0.01	0.00
58.74	102.81	2.00	0.00	0.00	0.00	58.81	102.90	2.00	0.00	0.00	0.00
58.88	103.21	2.00	0.00	0.00	0.00	58.93	103.64	2.00	0.00	0.00	0.00
59.02	103.90	2.00	0.00	0.00	0.00	59.07	103.98	2.00	0.00	0.00	0.00
59.14	103.57	2.00	0.00	0.00	0.00	59.19	103.04	2.00	0.00	0.00	0.00
59.25	102.70	2.00	0.00	0.00	0.00	59.34	102.89	2.00	0.00	0.00	0.00
59.39	103.74	2.00	0.00	0.00	0.00	59.49	104.46	2.00	0.00	0.00	0.00
59.53	105.11	2.00	0.00	0.00	0.00	59.60	105.25	2.00	0.00	0.00	0.00
59.66	105.21	2.00	0.00	0.00	0.00	59.72	104.95	2.00	0.00	0.00	0.00
59.78	104.59	2.00	0.00	0.00	0.00	59.85	104.11	2.00	0.00	0.00	0.00
59.94	103.33	2.00	0.00	0.00	0.00	59.98	102.71	2.00	0.00	0.00	0.00

Total estimated settlement: 0.85

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

Ejecta Severity Estimation



APPENDIX F

STATIC SETTLEMENT ANALYSIS

Updated Geotechnical and Infiltration Evaluation
San Juan Capistrano, California
Project No. 3653-CR

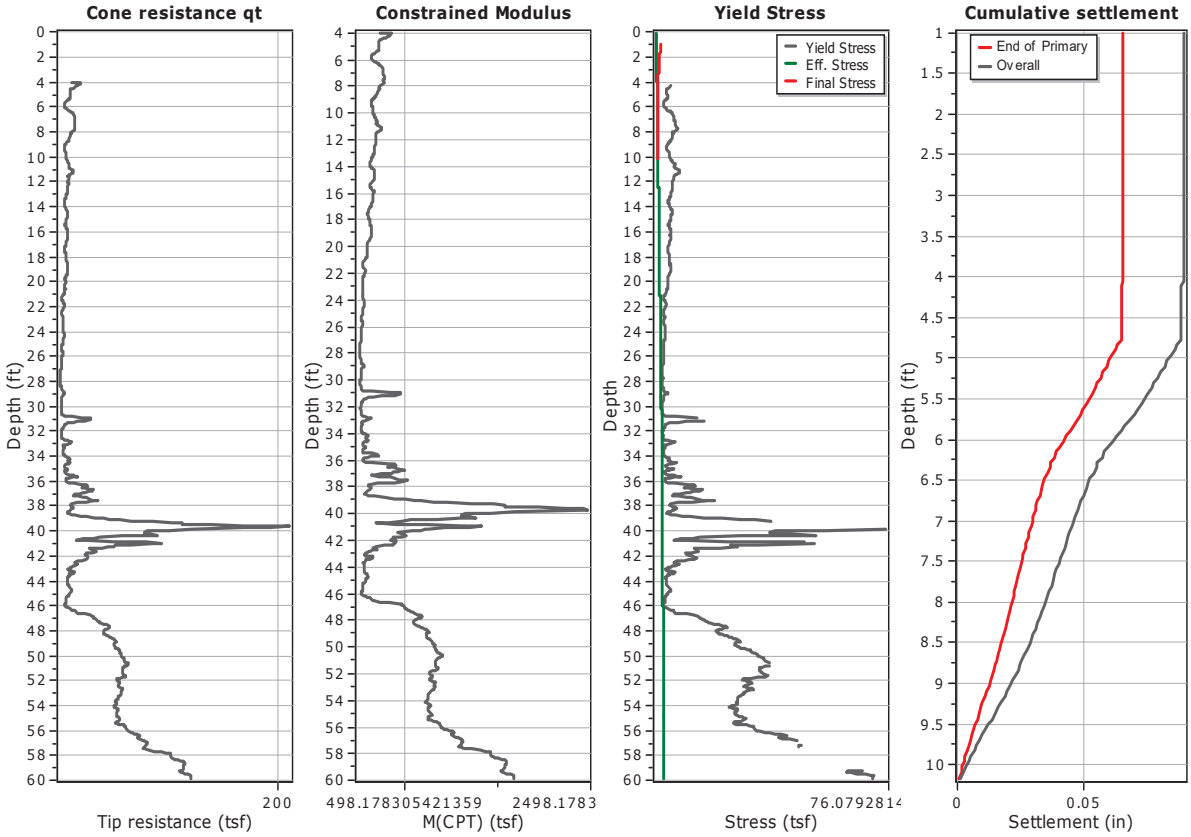
GEOTEK

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

CPT: CPT-1
Total depth: 59.86 ft, Date: 9/27/2023
Surface Elevation: 0.00 ft
Coords: X:0.00, Y:0.00
Cone Type:
Cone Operator:

Project: **Mixed-Use Development - Forster & El Camino**
Location: **San Juan Capistrano, CA**

Settlements calculation according to theory of elasticity*



Calculation properties

Footing type: Rectangular
Footing width: 1.60 (ft)
L/B: 10.0
Footing pressure: 1.25 (tsf)
Embedment depth: 1.00 (ft)
Footing is rigid: No
Remove excavation load: No
Apply 20% rule: Yes
Calculate secondary settlements: Yes
Time period for primary consolidation: 6 months
Time period for second. settlements: 240 months

* Primary settlement calculation is performed according to the following formula:

$$S = \sum \frac{\Delta\sigma_v}{M_{CPT}} \Delta z$$

* Secondary (creep) settlement calculation is performed according to the following formula:

$$S = C_\alpha \cdot \Delta z \cdot \log(t/t_p)$$

where t_p is the duration of primary consolidation

:: Tabular results ::

Point No	Start depth (ft)	End depth (ft)	Thickness (ft)	Relative depth (ft)	Delta P (tsf)	$M_{(CPT)}$ (tsf)	Iz	Settlement (in)	Second. settlement (in)	Overall settlement (in)
1	0.93	1.01	0.08	0.01	1.25	0.00	1.00	0.000	0.000	0.000
2	1.01	1.06	0.05	0.04	1.25	0.00	1.00	0.000	0.000	0.000
3	1.06	1.13	0.08	0.10	1.25	0.00	1.00	0.000	0.000	0.000
4	1.13	1.22	0.08	0.17	1.24	0.00	1.00	0.000	0.000	0.000
5	1.22	1.26	0.04	0.24	1.24	0.00	0.99	0.000	0.000	0.000
6	1.26	1.32	0.06	0.29	1.23	0.00	0.98	0.000	0.000	0.000
7	1.32	1.41	0.09	0.36	1.21	0.00	0.97	0.000	0.000	0.000
8	1.41	1.46	0.05	0.43	1.19	0.00	0.95	0.000	0.000	0.000
9	1.46	1.55	0.09	0.51	1.16	0.00	0.93	0.000	0.000	0.000
10	1.55	1.60	0.05	0.57	1.13	0.00	0.90	0.000	0.000	0.000
11	1.60	1.65	0.05	0.62	1.11	0.00	0.89	0.000	0.000	0.000
12	1.65	1.74	0.09	0.69	1.07	0.00	0.86	0.000	0.000	0.000
13	1.74	1.79	0.04	0.76	1.04	0.00	0.83	0.000	0.000	0.000
14	1.79	1.84	0.05	0.81	1.02	0.00	0.81	0.000	0.000	0.000
15	1.84	1.93	0.09	0.88	0.98	0.00	0.79	0.000	0.000	0.000
16	1.93	1.97	0.04	0.95	0.95	0.00	0.76	0.000	0.000	0.000
17	1.97	2.06	0.09	1.02	0.92	0.00	0.73	0.000	0.000	0.000
18	2.06	2.11	0.05	1.09	0.88	0.00	0.71	0.000	0.000	0.000
19	2.11	2.20	0.09	1.16	0.85	0.00	0.68	0.000	0.000	0.000
20	2.20	2.24	0.04	1.22	0.83	0.00	0.66	0.000	0.000	0.000
21	2.24	2.30	0.06	1.27	0.80	0.00	0.64	0.000	0.000	0.000
22	2.30	2.39	0.09	1.35	0.78	0.00	0.62	0.000	0.000	0.000
23	2.39	2.44	0.05	1.42	0.75	0.00	0.60	0.000	0.000	0.000
24	2.44	2.50	0.05	1.47	0.73	0.00	0.58	0.000	0.000	0.000
25	2.50	2.58	0.08	1.54	0.71	0.00	0.57	0.000	0.000	0.000
26	2.58	2.63	0.05	1.60	0.69	0.00	0.55	0.000	0.000	0.000
27	2.63	2.72	0.09	1.67	0.66	0.00	0.53	0.000	0.000	0.000
28	2.72	2.77	0.05	1.74	0.64	0.00	0.51	0.000	0.000	0.000
29	2.77	2.85	0.09	1.81	0.62	0.00	0.50	0.000	0.000	0.000
30	2.85	2.90	0.05	1.88	0.61	0.00	0.49	0.000	0.000	0.000
31	2.90	2.96	0.06	1.93	0.59	0.00	0.47	0.000	0.000	0.000
32	2.96	3.03	0.07	2.00	0.58	0.00	0.46	0.000	0.000	0.000
33	3.03	3.09	0.06	2.06	0.56	0.00	0.45	0.000	0.000	0.000
34	3.09	3.19	0.09	2.14	0.54	0.00	0.44	0.000	0.000	0.000
35	3.19	3.22	0.04	2.20	0.53	0.00	0.43	0.000	0.000	0.000
36	3.22	3.31	0.09	2.27	0.52	0.00	0.41	0.000	0.000	0.000
37	3.31	3.38	0.06	2.34	0.50	0.00	0.40	0.000	0.000	0.000
38	3.38	3.42	0.05	2.40	0.49	0.00	0.39	0.000	0.000	0.000
39	3.42	3.49	0.07	2.46	0.48	0.00	0.39	0.000	0.000	0.000
40	3.49	3.56	0.07	2.53	0.47	0.00	0.38	0.000	0.000	0.000
41	3.56	3.65	0.09	2.61	0.46	0.00	0.37	0.000	0.000	0.000
42	3.65	3.71	0.05	2.68	0.45	0.00	0.36	0.000	0.000	0.000
43	3.71	3.74	0.04	2.72	0.44	0.00	0.35	0.000	0.000	0.000
44	3.74	3.83	0.09	2.79	0.43	0.00	0.35	0.000	0.000	0.000
45	3.83	3.89	0.06	2.86	0.42	0.00	0.34	0.000	0.000	0.000
46	3.89	3.98	0.09	2.94	0.41	0.00	0.33	0.000	0.000	0.000

:: Tabular results ::

Point No	Start depth (ft)	End depth (ft)	Thickness (ft)	Relative depth (ft)	Delta P (tsf)	$M_{(CPT)}$ (tsf)	Iz	Settlement (in)	Second. settlement (in)	Overall settlement (in)
47	3.98	4.03	0.04	3.00	0.40	0.00	0.32	0.000	0.000	0.000
48	4.03	4.08	0.05	3.05	0.40	233.76	0.32	0.001	0.000	0.001
49	4.08	4.17	0.09	3.12	0.39	351.91	0.31	0.000	0.000	0.000
50	4.17	4.22	0.05	3.19	0.38	349.42	0.30	0.000	0.000	0.000
51	4.22	4.30	0.08	3.26	0.37	335.61	0.30	0.000	0.000	0.000
52	4.30	4.35	0.05	3.33	0.37	313.67	0.29	0.000	0.000	0.000
53	4.35	4.41	0.05	3.38	0.36	289.36	0.29	0.000	0.000	0.000
54	4.41	4.49	0.09	3.45	0.35	265.85	0.28	0.000	0.000	0.000
55	4.49	4.54	0.05	3.52	0.35	248.00	0.28	0.000	0.000	0.000
56	4.54	4.61	0.06	3.58	0.34	231.33	0.27	0.000	0.000	0.000
57	4.61	4.68	0.08	3.65	0.33	221.91	0.27	0.000	0.000	0.000
58	4.68	4.73	0.05	3.71	0.33	215.74	0.26	0.000	0.000	0.000
59	4.73	4.82	0.09	3.78	0.32	214.43	0.26	0.002	0.000	0.002
60	4.82	4.86	0.03	3.84	0.32	214.71	0.25	0.001	0.000	0.001
61	4.86	4.93	0.07	3.89	0.31	215.82	0.25	0.001	0.000	0.001
62	4.93	5.01	0.08	3.97	0.31	215.70	0.25	0.001	0.000	0.002
63	5.01	5.06	0.05	4.03	0.30	215.14	0.24	0.001	0.000	0.001
64	5.06	5.15	0.09	4.10	0.30	216.26	0.24	0.001	0.000	0.002
65	5.15	5.19	0.05	4.17	0.29	218.57	0.23	0.001	0.000	0.001
66	5.19	5.29	0.10	4.24	0.29	220.90	0.23	0.002	0.000	0.002
67	5.29	5.32	0.03	4.30	0.28	214.72	0.23	0.000	0.000	0.000
68	5.32	5.41	0.09	4.36	0.28	206.97	0.22	0.001	0.000	0.002
69	5.41	5.48	0.07	4.44	0.27	193.08	0.22	0.001	0.000	0.001
70	5.48	5.52	0.05	4.50	0.27	182.43	0.22	0.001	0.000	0.001
71	5.52	5.62	0.09	4.57	0.27	167.01	0.21	0.002	0.000	0.002
72	5.62	5.66	0.04	4.63	0.26	156.48	0.21	0.001	0.000	0.001
73	5.66	5.73	0.08	4.69	0.26	147.98	0.21	0.002	0.000	0.002
74	5.73	5.80	0.07	4.77	0.25	144.30	0.20	0.001	0.000	0.002
75	5.80	5.85	0.05	4.82	0.25	142.63	0.20	0.001	0.000	0.001
76	5.85	5.93	0.08	4.89	0.25	142.18	0.20	0.002	0.000	0.002
77	5.93	5.99	0.06	4.96	0.24	142.51	0.20	0.001	0.000	0.002
78	5.99	6.08	0.10	5.04	0.24	146.95	0.19	0.002	0.000	0.002
79	6.08	6.13	0.04	5.11	0.24	154.17	0.19	0.001	0.000	0.001
80	6.13	6.17	0.05	5.15	0.23	167.12	0.19	0.001	0.000	0.001
81	6.17	6.27	0.10	5.22	0.23	182.45	0.18	0.001	0.000	0.002
82	6.27	6.30	0.03	5.29	0.23	197.78	0.18	0.000	0.000	0.001
83	6.30	6.37	0.07	5.33	0.23	212.74	0.18	0.001	0.000	0.001
84	6.37	6.46	0.09	5.41	0.22	225.25	0.18	0.001	0.000	0.001
85	6.46	6.50	0.04	5.48	0.22	236.94	0.18	0.000	0.000	0.001
86	6.50	6.56	0.06	5.53	0.22	246.19	0.17	0.001	0.000	0.001
87	6.56	6.64	0.08	5.60	0.21	252.61	0.17	0.001	0.000	0.001
88	6.64	6.73	0.09	5.69	0.21	260.19	0.17	0.001	0.000	0.001
89	6.73	6.78	0.05	5.76	0.21	265.39	0.17	0.000	0.000	0.001
90	6.78	6.83	0.05	5.81	0.21	268.56	0.16	0.000	0.000	0.001
91	6.83	6.92	0.09	5.88	0.20	266.52	0.16	0.001	0.000	0.001
92	6.92	6.97	0.05	5.95	0.20	264.44	0.16	0.000	0.000	0.001

:: Tabular results ::

Point No	Start depth (ft)	End depth (ft)	Thickness (ft)	Relative depth (ft)	Delta P (tsf)	$M_{(CPT)}$ (tsf)	Iz	Settlement (in)	Second. settlement (in)	Overall settlement (in)
93	6.97	7.03	0.06	6.00	0.20	263.61	0.16	0.000	0.000	0.001
94	7.03	7.11	0.09	6.07	0.20	266.80	0.16	0.001	0.000	0.001
95	7.11	7.16	0.04	6.13	0.19	269.53	0.15	0.000	0.000	0.001
96	7.16	7.24	0.09	6.20	0.19	272.72	0.15	0.001	0.000	0.001
97	7.24	7.30	0.05	6.27	0.19	273.86	0.15	0.000	0.000	0.001
98	7.30	7.39	0.09	6.34	0.19	274.66	0.15	0.001	0.000	0.001
99	7.39	7.44	0.05	6.41	0.18	274.21	0.15	0.000	0.000	0.001
100	7.44	7.48	0.05	6.46	0.18	273.80	0.15	0.000	0.000	0.001
101	7.48	7.58	0.09	6.53	0.18	272.56	0.14	0.001	0.000	0.001
102	7.58	7.62	0.05	6.60	0.18	271.28	0.14	0.000	0.000	0.001
103	7.62	7.69	0.07	6.66	0.18	272.03	0.14	0.001	0.000	0.001
104	7.69	7.77	0.08	6.73	0.17	273.56	0.14	0.001	0.000	0.001
105	7.77	7.86	0.09	6.81	0.17	274.72	0.14	0.001	0.000	0.001
106	7.86	7.88	0.03	6.87	0.17	271.80	0.14	0.000	0.000	0.000
107	7.88	7.95	0.07	6.92	0.17	267.34	0.13	0.001	0.000	0.001
108	7.95	8.01	0.05	6.98	0.17	240.17	0.13	0.000	0.000	0.001
109	8.01	8.09	0.08	7.05	0.16	230.42	0.13	0.001	0.000	0.001
110	8.09	8.14	0.05	7.11	0.16	220.64	0.13	0.000	0.000	0.001
111	8.14	8.23	0.10	7.18	0.16	229.89	0.13	0.001	0.000	0.001
112	8.23	8.28	0.05	7.26	0.16	221.74	0.13	0.000	0.000	0.001
113	8.28	8.37	0.09	7.33	0.16	214.01	0.12	0.001	0.000	0.001
114	8.37	8.42	0.05	7.40	0.15	210.72	0.12	0.000	0.000	0.001
115	8.42	8.47	0.05	7.44	0.15	209.48	0.12	0.000	0.000	0.001
116	8.47	8.56	0.09	7.51	0.15	207.45	0.12	0.001	0.000	0.001
117	8.56	8.61	0.05	7.58	0.15	204.53	0.12	0.000	0.000	0.001
118	8.61	8.70	0.09	7.65	0.15	197.58	0.12	0.001	0.000	0.001
119	8.70	8.74	0.04	7.72	0.15	191.81	0.12	0.000	0.000	0.001
120	8.74	8.80	0.05	7.77	0.15	183.65	0.12	0.001	0.000	0.001
121	8.80	8.88	0.09	7.84	0.14	177.12	0.11	0.001	0.000	0.001
122	8.88	8.93	0.05	7.91	0.14	169.36	0.11	0.001	0.000	0.001
123	8.93	9.00	0.06	7.96	0.14	162.04	0.11	0.001	0.000	0.001
124	9.00	9.07	0.07	8.03	0.14	154.71	0.11	0.001	0.000	0.001
125	9.07	9.12	0.05	8.10	0.14	148.22	0.11	0.001	0.000	0.001
126	9.12	9.21	0.09	8.16	0.14	142.12	0.11	0.001	0.001	0.002
127	9.21	9.26	0.06	8.23	0.13	138.41	0.11	0.001	0.000	0.001
128	9.26	9.33	0.07	8.30	0.13	137.16	0.11	0.001	0.000	0.001
129	9.33	9.39	0.07	8.36	0.13	138.32	0.11	0.001	0.000	0.001
130	9.39	9.49	0.09	8.44	0.13	140.70	0.10	0.001	0.001	0.002
131	9.49	9.54	0.05	8.51	0.13	145.07	0.10	0.001	0.000	0.001
132	9.54	9.59	0.05	8.56	0.13	149.88	0.10	0.000	0.000	0.001
133	9.59	9.68	0.09	8.63	0.13	153.49	0.10	0.001	0.001	0.002
134	9.68	9.73	0.05	8.70	0.13	154.64	0.10	0.000	0.000	0.001
135	9.73	9.78	0.05	8.75	0.12	155.02	0.10	0.000	0.000	0.001
136	9.78	9.87	0.09	8.82	0.12	155.41	0.10	0.001	0.001	0.002
137	9.87	9.91	0.04	8.89	0.12	155.35	0.10	0.000	0.000	0.001
138	9.91	10.00	0.09	8.95	0.12	156.11	0.10	0.001	0.001	0.001

:: Tabular results ::

Point No	Start depth (ft)	End depth (ft)	Thickness (ft)	Relative depth (ft)	Delta P (tsf)	$M_{(CPT)}$ (tsf)	Iz	Settlement (in)	Second. settlement (in)	Overall settlement (in)
139	10.00	10.05	0.05	9.02	0.12	157.68	0.10	0.000	0.000	0.001
140	10.05	10.15	0.10	9.10	0.12	161.28	0.09	0.001	0.001	0.002
141	10.15	10.20	0.05	9.17	0.12	165.69	0.09	0.000	0.000	0.001

Total primary settlement: 0.07
Total secondary settlement: 0.02

Total calculated settlement: 0.09

Abbreviations

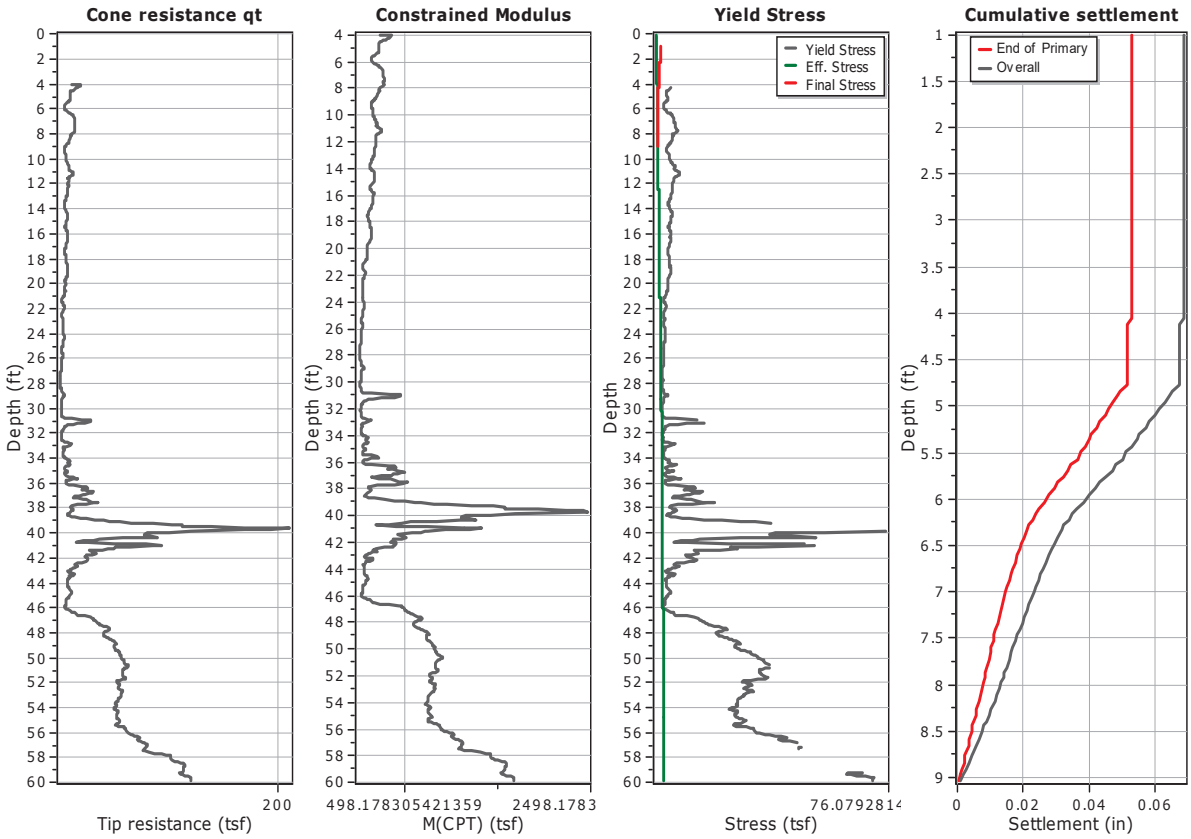
Start depth:	Start depth of soil layer (penetration depth measured from ground free surface)
End depth:	End depth of soil layer (penetration depth measured from ground free surface)
Thickness:	Thickness of soil layer
Relative depth:	Depth of calculation relative to footing
Iz:	Stress influence factor
Delta P:	Footing impossed stress:
Eff. stress:	Effective stress
$M_{(CPT)}$:	Constrained modulus from CPT
Settlement:	Primary settlement
Second. settlement:	Secondary settlemends due to creep

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

CPT: CPT-1
Total depth: 59.86 ft, Date: 9/27/2023
Surface Elevation: 0.00 ft
Coords: X:0.00, Y:0.00
Cone Type:
Cone Operator:

Project: **Mixed-Use Development - Forster & El Camino**
Location: **San Juan Capistrano, CA**

Settlements calculation according to theory of elasticity*



Calculation properties

Footing type: Rectangular
Footing width: 3.50 (ft)
L/B: 1.0
Footing pressure: 1.25 (tsf)
Embedment depth: 1.00 (ft)
Footing is rigid: No
Remove excavation load: No
Apply 20% rule: Yes
Calculate secondary settlements: Yes
Time period for primary consolidation: 6 months
Time period for second. settlements: 240 months

* Primary settlement calculation is performed according to the following formula:

$$S = \sum \frac{\Delta\sigma_v}{M_{CPT}} \Delta z$$

* Secondary (creep) settlement calculation is performed according to the following formula:

$$S = C_\alpha \cdot \Delta z \cdot \log(t/t_p)$$

where t_p is the duration of primary consolidation

:: Tabular results ::

Point No	Start depth (ft)	End depth (ft)	Thickness (ft)	Relative depth (ft)	Delta P (tsf)	$M_{(CPT)}$ (tsf)	Iz	Settlement (in)	Second. settlement (in)	Overall settlement (in)
1	0.93	1.01	0.08	0.01	1.25	0.00	1.00	0.000	0.000	0.000
2	1.01	1.06	0.05	0.04	1.25	0.00	1.00	0.000	0.000	0.000
3	1.06	1.13	0.08	0.10	1.25	0.00	1.00	0.000	0.000	0.000
4	1.13	1.22	0.08	0.17	1.25	0.00	1.00	0.000	0.000	0.000
5	1.22	1.26	0.04	0.24	1.25	0.00	1.00	0.000	0.000	0.000
6	1.26	1.32	0.06	0.29	1.25	0.00	1.00	0.000	0.000	0.000
7	1.32	1.41	0.09	0.36	1.24	0.00	0.99	0.000	0.000	0.000
8	1.41	1.46	0.05	0.43	1.24	0.00	0.99	0.000	0.000	0.000
9	1.46	1.55	0.09	0.51	1.23	0.00	0.98	0.000	0.000	0.000
10	1.55	1.60	0.05	0.57	1.22	0.00	0.98	0.000	0.000	0.000
11	1.60	1.65	0.05	0.62	1.21	0.00	0.97	0.000	0.000	0.000
12	1.65	1.74	0.09	0.69	1.20	0.00	0.96	0.000	0.000	0.000
13	1.74	1.79	0.04	0.76	1.19	0.00	0.95	0.000	0.000	0.000
14	1.79	1.84	0.05	0.81	1.18	0.00	0.94	0.000	0.000	0.000
15	1.84	1.93	0.09	0.88	1.16	0.00	0.93	0.000	0.000	0.000
16	1.93	1.97	0.04	0.95	1.14	0.00	0.91	0.000	0.000	0.000
17	1.97	2.06	0.09	1.02	1.12	0.00	0.90	0.000	0.000	0.000
18	2.06	2.11	0.05	1.09	1.10	0.00	0.88	0.000	0.000	0.000
19	2.11	2.20	0.09	1.16	1.08	0.00	0.86	0.000	0.000	0.000
20	2.20	2.24	0.04	1.22	1.06	0.00	0.85	0.000	0.000	0.000
21	2.24	2.30	0.06	1.27	1.04	0.00	0.83	0.000	0.000	0.000
22	2.30	2.39	0.09	1.35	1.02	0.00	0.81	0.000	0.000	0.000
23	2.39	2.44	0.05	1.42	0.99	0.00	0.79	0.000	0.000	0.000
24	2.44	2.50	0.05	1.47	0.98	0.00	0.78	0.000	0.000	0.000
25	2.50	2.58	0.08	1.54	0.95	0.00	0.76	0.000	0.000	0.000
26	2.58	2.63	0.05	1.60	0.93	0.00	0.74	0.000	0.000	0.000
27	2.63	2.72	0.09	1.67	0.90	0.00	0.72	0.000	0.000	0.000
28	2.72	2.77	0.05	1.74	0.88	0.00	0.70	0.000	0.000	0.000
29	2.77	2.85	0.09	1.81	0.86	0.00	0.68	0.000	0.000	0.000
30	2.85	2.90	0.05	1.88	0.83	0.00	0.67	0.000	0.000	0.000
31	2.90	2.96	0.06	1.93	0.81	0.00	0.65	0.000	0.000	0.000
32	2.96	3.03	0.07	2.00	0.79	0.00	0.63	0.000	0.000	0.000
33	3.03	3.09	0.06	2.06	0.77	0.00	0.62	0.000	0.000	0.000
34	3.09	3.19	0.09	2.14	0.75	0.00	0.60	0.000	0.000	0.000
35	3.19	3.22	0.04	2.20	0.73	0.00	0.58	0.000	0.000	0.000
36	3.22	3.31	0.09	2.27	0.71	0.00	0.56	0.000	0.000	0.000
37	3.31	3.38	0.06	2.34	0.68	0.00	0.55	0.000	0.000	0.000
38	3.38	3.42	0.05	2.40	0.67	0.00	0.53	0.000	0.000	0.000
39	3.42	3.49	0.07	2.46	0.65	0.00	0.52	0.000	0.000	0.000
40	3.49	3.56	0.07	2.53	0.63	0.00	0.51	0.000	0.000	0.000
41	3.56	3.65	0.09	2.61	0.61	0.00	0.49	0.000	0.000	0.000
42	3.65	3.71	0.05	2.68	0.59	0.00	0.47	0.000	0.000	0.000
43	3.71	3.74	0.04	2.72	0.58	0.00	0.46	0.000	0.000	0.000
44	3.74	3.83	0.09	2.79	0.56	0.00	0.45	0.000	0.000	0.000
45	3.83	3.89	0.06	2.86	0.55	0.00	0.44	0.000	0.000	0.000
46	3.89	3.98	0.09	2.94	0.53	0.00	0.42	0.000	0.000	0.000

:: Tabular results ::

Point No	Start depth (ft)	End depth (ft)	Thickness (ft)	Relative depth (ft)	Delta P (tsf)	$M_{(CPT)}$ (tsf)	Iz	Settlement (in)	Second. settlement (in)	Overall settlement (in)
47	3.98	4.03	0.04	3.00	0.52	0.00	0.41	0.000	0.000	0.000
48	4.03	4.08	0.05	3.05	0.50	233.76	0.40	0.001	0.000	0.001
49	4.08	4.17	0.09	3.12	0.49	351.91	0.39	0.000	0.000	0.000
50	4.17	4.22	0.05	3.19	0.48	349.42	0.38	0.000	0.000	0.000
51	4.22	4.30	0.08	3.26	0.46	335.61	0.37	0.000	0.000	0.000
52	4.30	4.35	0.05	3.33	0.45	313.67	0.36	0.000	0.000	0.000
53	4.35	4.41	0.05	3.38	0.44	289.36	0.35	0.000	0.000	0.000
54	4.41	4.49	0.09	3.45	0.43	265.85	0.34	0.000	0.000	0.000
55	4.49	4.54	0.05	3.52	0.42	248.00	0.33	0.000	0.000	0.000
56	4.54	4.61	0.06	3.58	0.41	231.33	0.33	0.000	0.000	0.000
57	4.61	4.68	0.08	3.65	0.40	221.91	0.32	0.000	0.000	0.000
58	4.68	4.73	0.05	3.71	0.39	215.74	0.31	0.000	0.000	0.000
59	4.73	4.82	0.09	3.78	0.38	214.43	0.30	0.002	0.000	0.002
60	4.82	4.86	0.03	3.84	0.37	214.71	0.29	0.001	0.000	0.001
61	4.86	4.93	0.07	3.89	0.36	215.82	0.29	0.001	0.000	0.002
62	4.93	5.01	0.08	3.97	0.35	215.70	0.28	0.002	0.000	0.002
63	5.01	5.06	0.05	4.03	0.34	215.14	0.27	0.001	0.000	0.001
64	5.06	5.15	0.09	4.10	0.33	216.26	0.27	0.002	0.000	0.002
65	5.15	5.19	0.05	4.17	0.32	218.57	0.26	0.001	0.000	0.001
66	5.19	5.29	0.10	4.24	0.32	220.90	0.25	0.002	0.000	0.002
67	5.29	5.32	0.03	4.30	0.31	214.72	0.25	0.000	0.000	0.001
68	5.32	5.41	0.09	4.36	0.30	206.97	0.24	0.002	0.000	0.002
69	5.41	5.48	0.07	4.44	0.29	193.08	0.24	0.001	0.000	0.002
70	5.48	5.52	0.05	4.50	0.29	182.43	0.23	0.001	0.000	0.001
71	5.52	5.62	0.09	4.57	0.28	167.01	0.22	0.002	0.000	0.002
72	5.62	5.66	0.04	4.63	0.27	156.48	0.22	0.001	0.000	0.001
73	5.66	5.73	0.08	4.69	0.27	147.98	0.22	0.002	0.000	0.002
74	5.73	5.80	0.07	4.77	0.26	144.30	0.21	0.002	0.000	0.002
75	5.80	5.85	0.05	4.82	0.26	142.63	0.21	0.001	0.000	0.001
76	5.85	5.93	0.08	4.89	0.25	142.18	0.20	0.002	0.000	0.002
77	5.93	5.99	0.06	4.96	0.25	142.51	0.20	0.001	0.000	0.002
78	5.99	6.08	0.10	5.04	0.24	146.95	0.19	0.002	0.000	0.002
79	6.08	6.13	0.04	5.11	0.23	154.17	0.19	0.001	0.000	0.001
80	6.13	6.17	0.05	5.15	0.23	167.12	0.18	0.001	0.000	0.001
81	6.17	6.27	0.10	5.22	0.23	182.45	0.18	0.001	0.000	0.002
82	6.27	6.30	0.03	5.29	0.22	197.78	0.18	0.000	0.000	0.000
83	6.30	6.37	0.07	5.33	0.22	212.74	0.17	0.001	0.000	0.001
84	6.37	6.46	0.09	5.41	0.21	225.25	0.17	0.001	0.000	0.001
85	6.46	6.50	0.04	5.48	0.21	236.94	0.17	0.000	0.000	0.001
86	6.50	6.56	0.06	5.53	0.20	246.19	0.16	0.001	0.000	0.001
87	6.56	6.64	0.08	5.60	0.20	252.61	0.16	0.001	0.000	0.001
88	6.64	6.73	0.09	5.69	0.20	260.19	0.16	0.001	0.000	0.001
89	6.73	6.78	0.05	5.76	0.19	265.39	0.15	0.000	0.000	0.001
90	6.78	6.83	0.05	5.81	0.19	268.56	0.15	0.000	0.000	0.001
91	6.83	6.92	0.09	5.88	0.18	266.52	0.15	0.001	0.000	0.001
92	6.92	6.97	0.05	5.95	0.18	264.44	0.14	0.000	0.000	0.001

:: Tabular results ::

Point No	Start depth (ft)	End depth (ft)	Thickness (ft)	Relative depth (ft)	Delta P (tsf)	$M_{(CPT)}$ (tsf)	Iz	Settlement (in)	Second. settlement (in)	Overall settlement (in)
93	6.97	7.03	0.06	6.00	0.18	263.61	0.14	0.000	0.000	0.001
94	7.03	7.11	0.09	6.07	0.17	266.80	0.14	0.001	0.000	0.001
95	7.11	7.16	0.04	6.13	0.17	269.53	0.14	0.000	0.000	0.000
96	7.16	7.24	0.09	6.20	0.17	272.72	0.13	0.001	0.000	0.001
97	7.24	7.30	0.05	6.27	0.16	273.86	0.13	0.000	0.000	0.001
98	7.30	7.39	0.09	6.34	0.16	274.66	0.13	0.001	0.000	0.001
99	7.39	7.44	0.05	6.41	0.16	274.21	0.13	0.000	0.000	0.000
100	7.44	7.48	0.05	6.46	0.16	273.80	0.12	0.000	0.000	0.000
101	7.48	7.58	0.09	6.53	0.15	272.56	0.12	0.001	0.000	0.001
102	7.58	7.62	0.05	6.60	0.15	271.28	0.12	0.000	0.000	0.000
103	7.62	7.69	0.07	6.66	0.15	272.03	0.12	0.000	0.000	0.001
104	7.69	7.77	0.08	6.73	0.15	273.56	0.12	0.000	0.000	0.001
105	7.77	7.86	0.09	6.81	0.14	274.72	0.11	0.001	0.000	0.001
106	7.86	7.88	0.03	6.87	0.14	271.80	0.11	0.000	0.000	0.000
107	7.88	7.95	0.07	6.92	0.14	267.34	0.11	0.000	0.000	0.001
108	7.95	8.01	0.05	6.98	0.14	240.17	0.11	0.000	0.000	0.001
109	8.01	8.09	0.08	7.05	0.13	230.42	0.11	0.001	0.000	0.001
110	8.09	8.14	0.05	7.11	0.13	220.64	0.10	0.000	0.000	0.001
111	8.14	8.23	0.10	7.18	0.13	229.89	0.10	0.001	0.000	0.001
112	8.23	8.28	0.05	7.26	0.13	221.74	0.10	0.000	0.000	0.001
113	8.28	8.37	0.09	7.33	0.12	214.01	0.10	0.001	0.000	0.001
114	8.37	8.42	0.05	7.40	0.12	210.72	0.10	0.000	0.000	0.001
115	8.42	8.47	0.05	7.44	0.12	209.48	0.10	0.000	0.000	0.001
116	8.47	8.56	0.09	7.51	0.12	207.45	0.10	0.001	0.000	0.001
117	8.56	8.61	0.05	7.58	0.12	204.53	0.09	0.000	0.000	0.001
118	8.61	8.70	0.09	7.65	0.11	197.58	0.09	0.001	0.000	0.001
119	8.70	8.74	0.04	7.72	0.11	191.81	0.09	0.000	0.000	0.001
120	8.74	8.80	0.05	7.77	0.11	183.65	0.09	0.000	0.000	0.001
121	8.80	8.88	0.09	7.84	0.11	177.12	0.09	0.001	0.000	0.001
122	8.88	8.93	0.05	7.91	0.11	169.36	0.09	0.000	0.000	0.001
123	8.93	9.00	0.06	7.96	0.11	162.04	0.09	0.001	0.000	0.001
124	9.00	9.07	0.07	8.03	0.10	154.71	0.08	0.001	0.000	0.001

Total primary settlement: 0.05
Total secondary settlement: 0.02

Total calculated settlement: 0.07

Abbreviations

Start depth:	Start depth of soil layer (penetration depth measured from ground free surface)
End depth:	End depth of soil layer (penetration depth measured from ground free surface)
Thickness:	Thickness of soil layer
Relative depth:	Depth of calculation relative to footing
Iz:	Stress influence factor
Delta P:	Footing impossed stress:
Eff. stress:	Effective stress
$M_{(CPT)}$:	Constrained modulus from CPT
Settlement:	Primary settlement
Second. settlement:	Secondary settlemends due to creep

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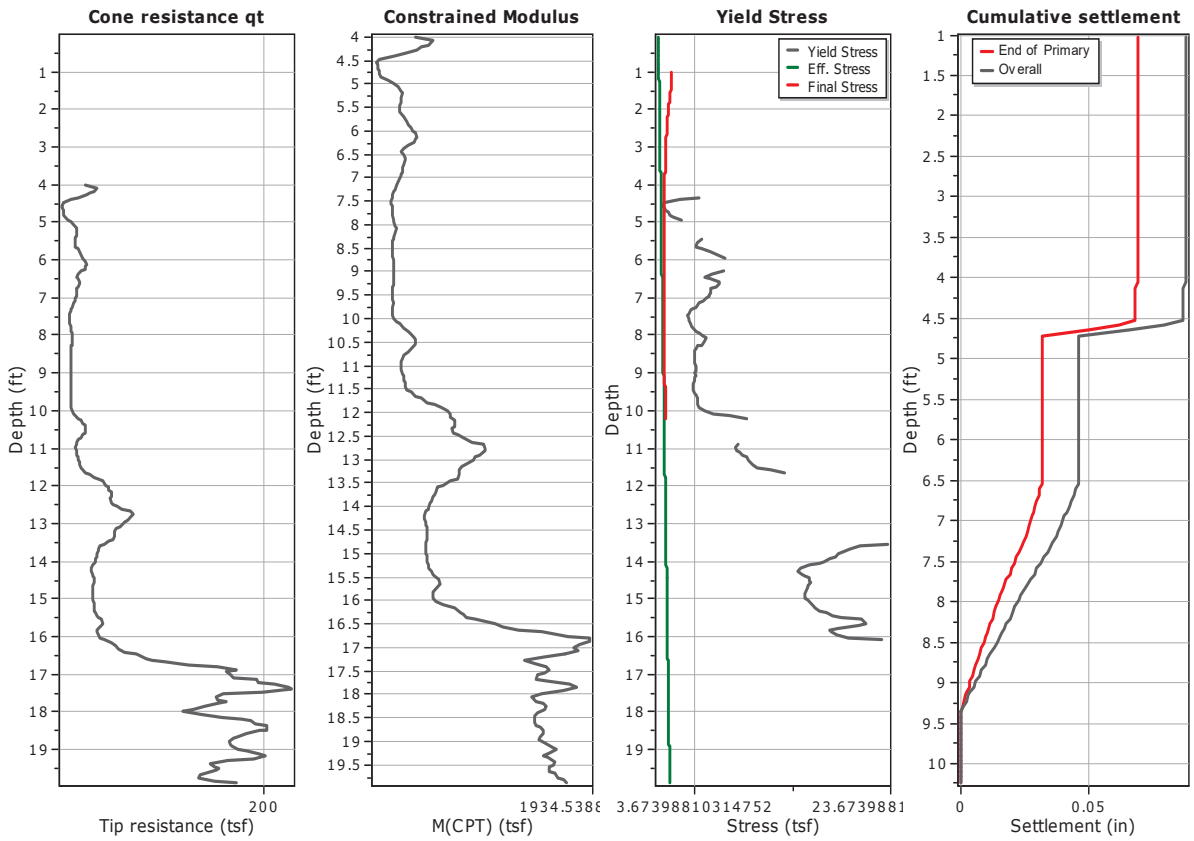
CPT: CPT-2A
Total depth: 19.88 ft, Date: 10/5/2023
Surface Elevation: 0.00 ft
Coords: X:0.00, Y:0.00
Cone Type:
Cone Operator:

Project: **Mixed-Use Development - Forster & El Camino**
Location: **San Juan Capistrano, CA**

Settlements calculation according to theory of elasticity*



Calculation properties

Footing type: Rectangular
Footing width: 1.60 (ft)
L/B: 10.0
Footing pressure: 1.25 (tsf)
Embedment depth: 1.00 (ft)
Footing is rigid: No
Remove excavation load: No
Apply 20% rule: Yes
Calculate secondary settlements: Yes
Time period for primary consolidation: 6 months
Time period for second. settlements: 240 months

* Primary settlement calculation is performed according to the following formula:

$$S = \sum \frac{\Delta\sigma_v}{M_{CPT}} \Delta z$$

* Secondary (creep) settlement calculation is performed according to the following formula:

$$S = C_\alpha \cdot \Delta z \cdot \log(t/t_p)$$

where t_p is the duration of primary consolidation

:: Tabular results ::

Point No	Start depth (ft)	End depth (ft)	Thickness (ft)	Relative depth (ft)	Delta P (tsf)	$M_{(CPT)}$ (tsf)	Iz	Settlement (in)	Second. settlement (in)	Overall settlement (in)
1	0.99	1.06	0.07	0.03	1.25	0.00	1.00	0.000	0.000	0.000
2	1.06	1.15	0.09	0.10	1.25	0.00	1.00	0.000	0.000	0.000
3	1.15	1.20	0.05	0.17	1.24	0.00	1.00	0.000	0.000	0.000
4	1.20	1.25	0.05	0.22	1.24	0.00	0.99	0.000	0.000	0.000
5	1.25	1.33	0.08	0.29	1.23	0.00	0.98	0.000	0.000	0.000
6	1.33	1.38	0.04	0.36	1.21	0.00	0.97	0.000	0.000	0.000
7	1.38	1.45	0.07	0.41	1.20	0.00	0.96	0.000	0.000	0.000
8	1.45	1.52	0.08	0.49	1.17	0.00	0.94	0.000	0.000	0.000
9	1.52	1.62	0.10	0.57	1.13	0.00	0.91	0.000	0.000	0.000
10	1.62	1.66	0.04	0.64	1.10	0.00	0.88	0.000	0.000	0.000
11	1.66	1.71	0.04	0.69	1.08	0.00	0.86	0.000	0.000	0.000
12	1.71	1.78	0.07	0.74	1.05	0.00	0.84	0.000	0.000	0.000
13	1.78	1.85	0.07	0.81	1.02	0.00	0.81	0.000	0.000	0.000
14	1.85	1.91	0.06	0.88	0.98	0.00	0.79	0.000	0.000	0.000
15	1.91	1.97	0.06	0.94	0.95	0.00	0.76	0.000	0.000	0.000
16	1.97	2.08	0.11	1.03	0.91	0.00	0.73	0.000	0.000	0.000
17	2.08	2.13	0.05	1.11	0.88	0.00	0.70	0.000	0.000	0.000
18	2.13	2.17	0.04	1.15	0.86	0.00	0.68	0.000	0.000	0.000
19	2.17	2.26	0.09	1.22	0.83	0.00	0.66	0.000	0.000	0.000
20	2.26	2.31	0.05	1.29	0.80	0.00	0.64	0.000	0.000	0.000
21	2.31	2.40	0.09	1.36	0.77	0.00	0.62	0.000	0.000	0.000
22	2.40	2.45	0.05	1.43	0.75	0.00	0.60	0.000	0.000	0.000
23	2.45	2.50	0.04	1.48	0.73	0.00	0.58	0.000	0.000	0.000
24	2.50	2.58	0.08	1.54	0.71	0.00	0.57	0.000	0.000	0.000
25	2.58	2.65	0.07	1.61	0.68	0.00	0.55	0.000	0.000	0.000
26	2.65	2.70	0.05	1.67	0.66	0.00	0.53	0.000	0.000	0.000
27	2.70	2.77	0.07	1.73	0.65	0.00	0.52	0.000	0.000	0.000
28	2.77	2.83	0.06	1.80	0.63	0.00	0.50	0.000	0.000	0.000
29	2.83	2.90	0.07	1.86	0.61	0.00	0.49	0.000	0.000	0.000
30	2.90	2.97	0.07	1.94	0.59	0.00	0.47	0.000	0.000	0.000
31	2.97	3.02	0.05	2.00	0.58	0.00	0.46	0.000	0.000	0.000
32	3.02	3.09	0.07	2.06	0.56	0.00	0.45	0.000	0.000	0.000
33	3.09	3.16	0.07	2.13	0.55	0.00	0.44	0.000	0.000	0.000
34	3.16	3.25	0.09	2.20	0.53	0.00	0.43	0.000	0.000	0.000
35	3.25	3.30	0.05	2.27	0.52	0.00	0.41	0.000	0.000	0.000
36	3.30	3.36	0.06	2.33	0.51	0.00	0.41	0.000	0.000	0.000
37	3.36	3.42	0.06	2.39	0.49	0.00	0.40	0.000	0.000	0.000
38	3.42	3.48	0.06	2.45	0.48	0.00	0.39	0.000	0.000	0.000
39	3.48	3.58	0.09	2.53	0.47	0.00	0.38	0.000	0.000	0.000
40	3.58	3.62	0.05	2.60	0.46	0.00	0.37	0.000	0.000	0.000
41	3.62	3.69	0.07	2.66	0.45	0.00	0.36	0.000	0.000	0.000
42	3.69	3.76	0.07	2.73	0.44	0.00	0.35	0.000	0.000	0.000
43	3.76	3.81	0.05	2.79	0.43	0.00	0.35	0.000	0.000	0.000
44	3.81	3.88	0.07	2.84	0.42	0.00	0.34	0.000	0.000	0.000
45	3.88	3.95	0.07	2.91	0.41	0.00	0.33	0.000	0.000	0.000
46	3.95	4.01	0.06	2.98	0.41	0.00	0.32	0.000	0.000	0.000

:: Tabular results ::

Point No	Start depth (ft)	End depth (ft)	Thickness (ft)	Relative depth (ft)	Delta P (tsf)	$M_{(CPT)}$ (tsf)	Iz	Settlement (in)	Second. settlement (in)	Overall settlement (in)
47	4.01	4.09	0.08	3.05	0.40	354.67	0.32	0.001	0.000	0.001
48	4.09	4.17	0.08	3.13	0.39	513.40	0.31	0.000	0.000	0.000
49	4.17	4.23	0.06	3.20	0.38	480.53	0.30	0.000	0.000	0.000
50	4.23	4.27	0.04	3.25	0.37	414.07	0.30	0.000	0.000	0.000
51	4.27	4.33	0.06	3.30	0.37	371.10	0.29	0.000	0.000	0.000
52	4.33	4.41	0.08	3.37	0.36	268.56	0.29	0.000	0.000	0.000
53	4.41	4.50	0.08	3.46	0.35	165.20	0.28	0.000	0.000	0.000
54	4.50	4.55	0.05	3.52	0.35	34.69	0.28	0.006	0.001	0.007
55	4.55	4.60	0.05	3.57	0.34	15.82	0.27	0.012	0.001	0.013
56	4.60	4.69	0.09	3.64	0.33	20.14	0.27	0.019	0.002	0.021
57	4.69	4.73	0.04	3.71	0.33	26.49	0.26	0.000	0.000	0.000
58	4.73	4.80	0.07	3.77	0.32	35.44	0.26	0.000	0.000	0.000
59	4.80	4.86	0.06	3.83	0.32	40.39	0.25	0.000	0.000	0.000
60	4.86	4.92	0.06	3.89	0.31	57.16	0.25	0.000	0.000	0.000
61	4.92	4.99	0.07	3.96	0.31	113.14	0.25	0.000	0.000	0.000
62	4.99	5.06	0.07	4.03	0.30	164.38	0.24	0.000	0.000	0.000
63	5.06	5.14	0.08	4.10	0.30	210.12	0.24	0.000	0.000	0.000
64	5.14	5.21	0.06	4.18	0.29	233.53	0.23	0.000	0.000	0.000
65	5.21	5.28	0.07	4.24	0.29	241.61	0.23	0.000	0.000	0.000
66	5.28	5.35	0.07	4.31	0.28	238.29	0.23	0.000	0.000	0.000
67	5.35	5.39	0.05	4.37	0.28	232.97	0.22	0.000	0.000	0.000
68	5.39	5.46	0.06	4.42	0.28	227.24	0.22	0.000	0.000	0.000
69	5.46	5.54	0.08	4.50	0.27	223.13	0.22	0.000	0.000	0.000
70	5.54	5.61	0.08	4.57	0.27	220.22	0.21	0.000	0.000	0.000
71	5.61	5.64	0.03	4.63	0.26	222.63	0.21	0.000	0.000	0.000
72	5.64	5.72	0.07	4.68	0.26	228.73	0.21	0.000	0.000	0.000
73	5.72	5.81	0.09	4.76	0.25	252.20	0.20	0.000	0.000	0.000
74	5.81	5.86	0.05	4.83	0.25	283.31	0.20	0.000	0.000	0.000
75	5.86	5.95	0.09	4.90	0.25	300.68	0.20	0.000	0.000	0.000
76	5.95	5.99	0.05	4.97	0.24	319.65	0.19	0.000	0.000	0.000
77	5.99	6.04	0.05	5.02	0.24	337.44	0.19	0.000	0.000	0.000
78	6.04	6.13	0.09	5.09	0.24	359.24	0.19	0.000	0.000	0.000
79	6.13	6.18	0.05	5.16	0.23	371.30	0.19	0.000	0.000	0.000
80	6.18	6.25	0.07	5.22	0.23	361.50	0.19	0.000	0.000	0.000
81	6.25	6.31	0.06	5.28	0.23	350.95	0.18	0.000	0.000	0.000
82	6.31	6.37	0.06	5.34	0.23	297.83	0.18	0.000	0.000	0.000
83	6.37	6.45	0.09	5.41	0.22	259.75	0.18	0.000	0.000	0.000
84	6.45	6.50	0.04	5.48	0.22	236.18	0.18	0.000	0.000	0.000
85	6.50	6.59	0.10	5.55	0.22	254.00	0.17	0.001	0.000	0.001
86	6.59	6.63	0.04	5.61	0.21	273.35	0.17	0.000	0.000	0.000
87	6.63	6.73	0.09	5.68	0.21	273.74	0.17	0.001	0.000	0.001
88	6.73	6.78	0.05	5.75	0.21	261.13	0.17	0.000	0.000	0.001
89	6.78	6.87	0.09	5.82	0.20	245.33	0.16	0.001	0.000	0.001
90	6.87	6.92	0.04	5.89	0.20	239.63	0.16	0.000	0.000	0.001
91	6.92	6.97	0.05	5.94	0.20	237.59	0.16	0.001	0.000	0.001
92	6.97	7.02	0.06	5.99	0.20	231.49	0.16	0.001	0.000	0.001

:: Tabular results ::

Point No	Start depth (ft)	End depth (ft)	Thickness (ft)	Relative depth (ft)	Delta P (tsf)	$M_{(CPT)}$ (tsf)	Iz	Settlement (in)	Second. settlement (in)	Overall settlement (in)
93	7.02	7.10	0.08	6.06	0.20	222.90	0.16	0.001	0.000	0.001
94	7.10	7.15	0.05	6.13	0.19	210.64	0.15	0.001	0.000	0.001
95	7.15	7.25	0.09	6.20	0.19	197.19	0.15	0.001	0.000	0.001
96	7.25	7.29	0.04	6.27	0.19	182.51	0.15	0.001	0.000	0.001
97	7.29	7.35	0.06	6.32	0.19	168.63	0.15	0.001	0.000	0.001
98	7.35	7.43	0.08	6.39	0.18	157.17	0.15	0.001	0.000	0.002
99	7.43	7.48	0.05	6.46	0.18	150.59	0.15	0.001	0.000	0.001
100	7.48	7.57	0.09	6.52	0.18	148.13	0.14	0.001	0.000	0.002
101	7.57	7.61	0.05	6.59	0.18	148.03	0.14	0.001	0.000	0.001
102	7.61	7.71	0.09	6.66	0.18	148.73	0.14	0.001	0.001	0.002
103	7.71	7.75	0.05	6.73	0.17	150.22	0.14	0.001	0.000	0.001
104	7.75	7.81	0.06	6.78	0.17	152.94	0.14	0.001	0.000	0.001
105	7.81	7.89	0.08	6.85	0.17	156.11	0.14	0.001	0.000	0.002
106	7.89	7.94	0.05	6.92	0.17	162.88	0.13	0.001	0.000	0.001
107	7.94	8.03	0.09	6.99	0.17	172.15	0.13	0.001	0.000	0.001
108	8.03	8.08	0.05	7.06	0.16	183.16	0.13	0.001	0.000	0.001
109	8.08	8.16	0.07	7.12	0.16	187.74	0.13	0.001	0.000	0.001
110	8.16	8.26	0.10	7.21	0.16	182.59	0.13	0.001	0.001	0.002
111	8.26	8.29	0.03	7.28	0.16	172.40	0.13	0.000	0.000	0.001
112	8.29	8.36	0.06	7.33	0.16	161.87	0.12	0.001	0.000	0.001
113	8.36	8.41	0.05	7.38	0.15	156.58	0.12	0.001	0.000	0.001
114	8.41	8.47	0.06	7.44	0.15	154.42	0.12	0.001	0.000	0.001
115	8.47	8.54	0.07	7.50	0.15	155.58	0.12	0.001	0.000	0.001
116	8.54	8.61	0.07	7.57	0.15	158.31	0.12	0.001	0.000	0.001
117	8.61	8.68	0.07	7.64	0.15	159.10	0.12	0.001	0.000	0.001
118	8.68	8.74	0.06	7.71	0.15	160.92	0.12	0.001	0.000	0.001
119	8.74	8.82	0.08	7.78	0.14	163.34	0.12	0.001	0.001	0.001
120	8.82	8.87	0.05	7.84	0.14	166.34	0.11	0.000	0.000	0.001
121	8.87	8.96	0.09	7.91	0.14	167.62	0.11	0.001	0.001	0.001
122	8.96	9.01	0.05	7.98	0.14	167.11	0.11	0.001	0.000	0.001
123	9.01	9.10	0.09	8.05	0.14	167.26	0.11	0.001	0.001	0.001
124	9.10	9.14	0.04	8.12	0.14	167.18	0.11	0.000	0.000	0.001
125	9.14	9.19	0.05	8.17	0.14	166.73	0.11	0.000	0.000	0.001
126	9.19	9.28	0.09	8.23	0.13	164.69	0.11	0.001	0.001	0.001
127	9.28	9.33	0.05	8.30	0.13	161.40	0.11	0.001	0.000	0.001
128	9.33	9.39	0.06	8.36	0.13	158.53	0.11	0.000	0.000	0.000
129	9.39	9.47	0.08	8.43	0.13	156.86	0.10	0.000	0.000	0.000
130	9.47	9.52	0.06	8.49	0.13	157.24	0.10	0.000	0.000	0.000
131	9.52	9.61	0.08	8.56	0.13	158.86	0.10	0.000	0.000	0.000
132	9.61	9.66	0.05	8.63	0.13	160.45	0.10	0.000	0.000	0.000
133	9.66	9.75	0.09	8.70	0.13	161.22	0.10	0.000	0.000	0.000
134	9.75	9.79	0.05	8.77	0.12	159.97	0.10	0.000	0.000	0.000
135	9.79	9.86	0.06	8.83	0.12	157.98	0.10	0.000	0.000	0.000
136	9.86	9.93	0.07	8.89	0.12	156.33	0.10	0.000	0.000	0.000
137	9.93	10.00	0.07	8.96	0.12	159.13	0.10	0.000	0.000	0.000
138	10.00	10.07	0.08	9.03	0.12	171.21	0.10	0.000	0.000	0.000

:: Tabular results ::

Point No	Start depth (ft)	End depth (ft)	Thickness (ft)	Relative depth (ft)	Delta P (tsf)	$M_{(CPT)}$ (tsf)	Iz	Settlement (in)	Second. settlement (in)	Overall settlement (in)
139	10.07	10.12	0.04	9.09	0.12	188.98	0.09	0.000	0.000	0.000
140	10.12	10.21	0.10	9.16	0.12	222.66	0.09	0.000	0.000	0.000
141	10.21	10.26	0.04	9.24	0.12	258.11	0.09	0.000	0.000	0.000

Total primary settlement: 0.07
Total secondary settlement: 0.02

Total calculated settlement: 0.09

Abbreviations

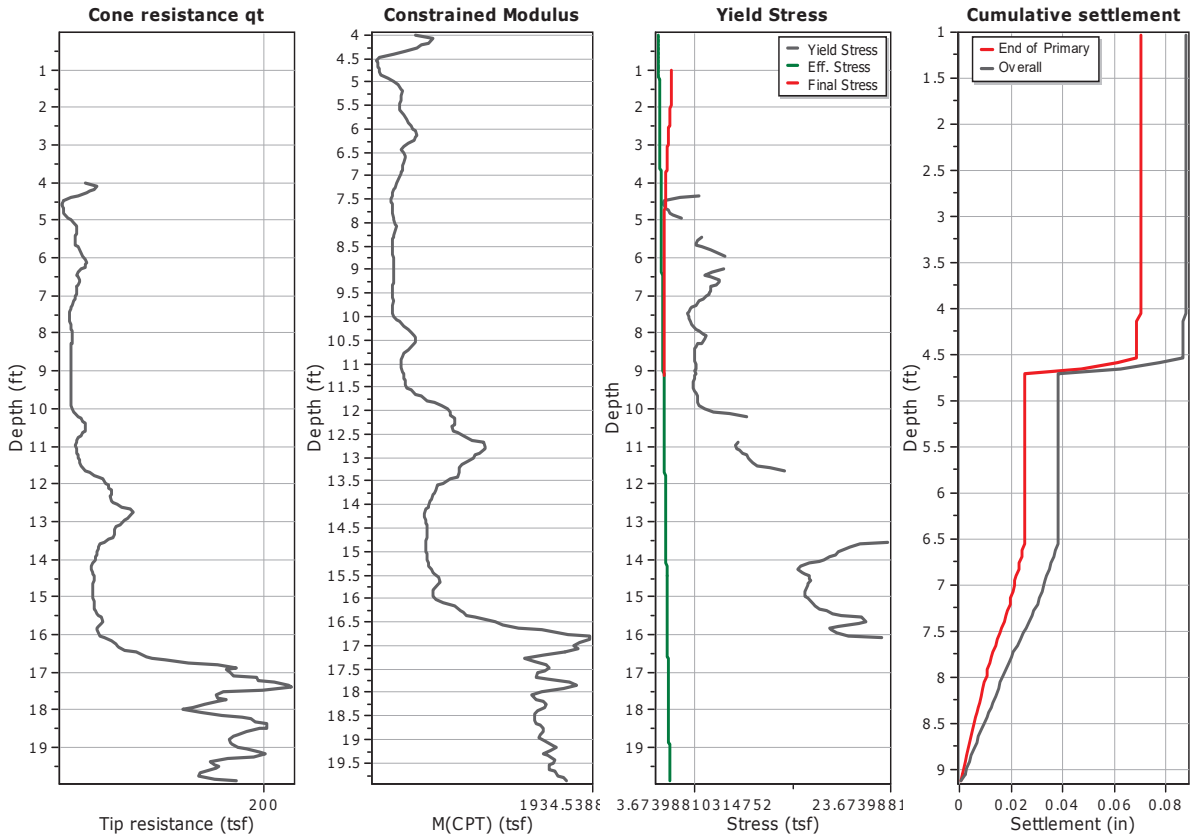
Start depth:	Start depth of soil layer (penetration depth measured from ground free surface)
End depth:	End depth of soil layer (penetration depth measured from ground free surface)
Thickness:	Thickness of soil layer
Relative depth:	Depth of calculation relative to footing
Iz:	Stress influence factor
Delta P:	Footing impossed stress:
Eff. stress:	Effective stress
$M_{(CPT)}$:	Constrained modulus from CPT
Settlement:	Primary settlement
Second. settlement:	Secondary settlemends due to creep

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

CPT: CPT-2A
Total depth: 19.88 ft, Date: 10/5/2023
Surface Elevation: 0.00 ft
Coords: X:0.00, Y:0.00
Cone Type:
Cone Operator:

Project: **Mixed-Use Development - Forster & El Camino**
Location: **San Juan Capistrano, CA**

Settlements calculation according to theory of elasticity*



Calculation properties

Footing type: Rectangular
Footing width: 3.50 (ft)
L/B: 1.0
Footing pressure: 1.25 (tsf)
Embedment depth: 1.00 (ft)
Footing is rigid: No
Remove excavation load: No
Apply 20% rule: Yes
Calculate secondary settlements: Yes
Time period for primary consolidation: 6 months
Time period for second. settlements: 240 months

* Primary settlement calculation is performed according to the following formula:

$$S = \sum \frac{\Delta \sigma_v}{M_{CPT}} \Delta z$$

* Secondary (creep) settlement calculation is performed according to the following formula:

$$S = C_\alpha \cdot \Delta z \cdot \log(t/t_p)$$

where t_p is the duration of primary consolidation

:: Tabular results ::

Point No	Start depth (ft)	End depth (ft)	Thickness (ft)	Relative depth (ft)	Delta P (tsf)	$M_{(CPT)}$ (tsf)	Iz	Settlement (in)	Second. settlement (in)	Overall settlement (in)
1	0.99	1.06	0.07	0.03	1.25	0.00	1.00	0.000	0.000	0.000
2	1.06	1.15	0.09	0.10	1.25	0.00	1.00	0.000	0.000	0.000
3	1.15	1.20	0.05	0.17	1.25	0.00	1.00	0.000	0.000	0.000
4	1.20	1.25	0.05	0.22	1.25	0.00	1.00	0.000	0.000	0.000
5	1.25	1.33	0.08	0.29	1.25	0.00	1.00	0.000	0.000	0.000
6	1.33	1.38	0.04	0.36	1.24	0.00	0.99	0.000	0.000	0.000
7	1.38	1.45	0.07	0.41	1.24	0.00	0.99	0.000	0.000	0.000
8	1.45	1.52	0.08	0.49	1.23	0.00	0.99	0.000	0.000	0.000
9	1.52	1.62	0.10	0.57	1.22	0.00	0.98	0.000	0.000	0.000
10	1.62	1.66	0.04	0.64	1.21	0.00	0.97	0.000	0.000	0.000
11	1.66	1.71	0.04	0.69	1.20	0.00	0.96	0.000	0.000	0.000
12	1.71	1.78	0.07	0.74	1.19	0.00	0.95	0.000	0.000	0.000
13	1.78	1.85	0.07	0.81	1.18	0.00	0.94	0.000	0.000	0.000
14	1.85	1.91	0.06	0.88	1.16	0.00	0.93	0.000	0.000	0.000
15	1.91	1.97	0.06	0.94	1.15	0.00	0.92	0.000	0.000	0.000
16	1.97	2.08	0.11	1.03	1.12	0.00	0.90	0.000	0.000	0.000
17	2.08	2.13	0.05	1.11	1.10	0.00	0.88	0.000	0.000	0.000
18	2.13	2.17	0.04	1.15	1.08	0.00	0.87	0.000	0.000	0.000
19	2.17	2.26	0.09	1.22	1.06	0.00	0.85	0.000	0.000	0.000
20	2.26	2.31	0.05	1.29	1.04	0.00	0.83	0.000	0.000	0.000
21	2.31	2.40	0.09	1.36	1.01	0.00	0.81	0.000	0.000	0.000
22	2.40	2.45	0.05	1.43	0.99	0.00	0.79	0.000	0.000	0.000
23	2.45	2.50	0.04	1.48	0.97	0.00	0.78	0.000	0.000	0.000
24	2.50	2.58	0.08	1.54	0.95	0.00	0.76	0.000	0.000	0.000
25	2.58	2.65	0.07	1.61	0.92	0.00	0.74	0.000	0.000	0.000
26	2.65	2.70	0.05	1.67	0.90	0.00	0.72	0.000	0.000	0.000
27	2.70	2.77	0.07	1.73	0.88	0.00	0.71	0.000	0.000	0.000
28	2.77	2.83	0.06	1.80	0.86	0.00	0.69	0.000	0.000	0.000
29	2.83	2.90	0.07	1.86	0.84	0.00	0.67	0.000	0.000	0.000
30	2.90	2.97	0.07	1.94	0.81	0.00	0.65	0.000	0.000	0.000
31	2.97	3.02	0.05	2.00	0.79	0.00	0.63	0.000	0.000	0.000
32	3.02	3.09	0.07	2.06	0.77	0.00	0.62	0.000	0.000	0.000
33	3.09	3.16	0.07	2.13	0.75	0.00	0.60	0.000	0.000	0.000
34	3.16	3.25	0.09	2.20	0.73	0.00	0.58	0.000	0.000	0.000
35	3.25	3.30	0.05	2.27	0.70	0.00	0.56	0.000	0.000	0.000
36	3.30	3.36	0.06	2.33	0.69	0.00	0.55	0.000	0.000	0.000
37	3.36	3.42	0.06	2.39	0.67	0.00	0.54	0.000	0.000	0.000
38	3.42	3.48	0.06	2.45	0.65	0.00	0.52	0.000	0.000	0.000
39	3.48	3.58	0.09	2.53	0.63	0.00	0.50	0.000	0.000	0.000
40	3.58	3.62	0.05	2.60	0.61	0.00	0.49	0.000	0.000	0.000
41	3.62	3.69	0.07	2.66	0.60	0.00	0.48	0.000	0.000	0.000
42	3.69	3.76	0.07	2.73	0.58	0.00	0.46	0.000	0.000	0.000
43	3.76	3.81	0.05	2.79	0.57	0.00	0.45	0.000	0.000	0.000
44	3.81	3.88	0.07	2.84	0.55	0.00	0.44	0.000	0.000	0.000
45	3.88	3.95	0.07	2.91	0.53	0.00	0.43	0.000	0.000	0.000
46	3.95	4.01	0.06	2.98	0.52	0.00	0.42	0.000	0.000	0.000

:: Tabular results ::

Point No	Start depth (ft)	End depth (ft)	Thickness (ft)	Relative depth (ft)	Delta P (tsf)	$M_{(CPT)}$ (tsf)	Iz	Settlement (in)	Second. settlement (in)	Overall settlement (in)
47	4.01	4.09	0.08	3.05	0.51	354.67	0.40	0.001	0.000	0.001
48	4.09	4.17	0.08	3.13	0.49	513.40	0.39	0.000	0.000	0.000
49	4.17	4.23	0.06	3.20	0.47	480.53	0.38	0.000	0.000	0.000
50	4.23	4.27	0.04	3.25	0.47	414.07	0.37	0.000	0.000	0.000
51	4.27	4.33	0.06	3.30	0.46	371.10	0.36	0.000	0.000	0.000
52	4.33	4.41	0.08	3.37	0.44	268.56	0.35	0.000	0.000	0.000
53	4.41	4.50	0.08	3.46	0.43	165.20	0.34	0.000	0.000	0.000
54	4.50	4.55	0.05	3.52	0.42	34.69	0.33	0.008	0.001	0.009
55	4.55	4.60	0.05	3.57	0.41	15.82	0.33	0.014	0.001	0.015
56	4.60	4.69	0.09	3.64	0.40	20.14	0.32	0.022	0.002	0.024
57	4.69	4.73	0.04	3.71	0.39	26.49	0.31	0.000	0.000	0.000
58	4.73	4.80	0.07	3.77	0.38	35.44	0.30	0.000	0.000	0.000
59	4.80	4.86	0.06	3.83	0.37	40.39	0.29	0.000	0.000	0.000
60	4.86	4.92	0.06	3.89	0.36	57.16	0.29	0.000	0.000	0.000
61	4.92	4.99	0.07	3.96	0.35	113.14	0.28	0.000	0.000	0.000
62	4.99	5.06	0.07	4.03	0.34	164.38	0.27	0.000	0.000	0.000
63	5.06	5.14	0.08	4.10	0.33	210.12	0.27	0.000	0.000	0.000
64	5.14	5.21	0.06	4.18	0.32	233.53	0.26	0.000	0.000	0.000
65	5.21	5.28	0.07	4.24	0.32	241.61	0.25	0.000	0.000	0.000
66	5.28	5.35	0.07	4.31	0.31	238.29	0.25	0.000	0.000	0.000
67	5.35	5.39	0.05	4.37	0.30	232.97	0.24	0.000	0.000	0.000
68	5.39	5.46	0.06	4.42	0.30	227.24	0.24	0.000	0.000	0.000
69	5.46	5.54	0.08	4.50	0.29	223.13	0.23	0.000	0.000	0.000
70	5.54	5.61	0.08	4.57	0.28	220.22	0.22	0.000	0.000	0.000
71	5.61	5.64	0.03	4.63	0.28	222.63	0.22	0.000	0.000	0.000
72	5.64	5.72	0.07	4.68	0.27	228.73	0.22	0.000	0.000	0.000
73	5.72	5.81	0.09	4.76	0.26	252.20	0.21	0.000	0.000	0.000
74	5.81	5.86	0.05	4.83	0.26	283.31	0.21	0.000	0.000	0.000
75	5.86	5.95	0.09	4.90	0.25	300.68	0.20	0.000	0.000	0.000
76	5.95	5.99	0.05	4.97	0.25	319.65	0.20	0.000	0.000	0.000
77	5.99	6.04	0.05	5.02	0.24	337.44	0.19	0.000	0.000	0.000
78	6.04	6.13	0.09	5.09	0.24	359.24	0.19	0.000	0.000	0.000
79	6.13	6.18	0.05	5.16	0.23	371.30	0.18	0.000	0.000	0.000
80	6.18	6.25	0.07	5.22	0.23	361.50	0.18	0.000	0.000	0.000
81	6.25	6.31	0.06	5.28	0.22	350.95	0.18	0.000	0.000	0.000
82	6.31	6.37	0.06	5.34	0.22	297.83	0.17	0.000	0.000	0.000
83	6.37	6.45	0.09	5.41	0.21	259.75	0.17	0.000	0.000	0.000
84	6.45	6.50	0.04	5.48	0.21	236.18	0.17	0.000	0.000	0.000
85	6.50	6.59	0.10	5.55	0.20	254.00	0.16	0.001	0.000	0.001
86	6.59	6.63	0.04	5.61	0.20	273.35	0.16	0.000	0.000	0.000
87	6.63	6.73	0.09	5.68	0.20	273.74	0.16	0.001	0.000	0.001
88	6.73	6.78	0.05	5.75	0.19	261.13	0.15	0.000	0.000	0.001
89	6.78	6.87	0.09	5.82	0.19	245.33	0.15	0.001	0.000	0.001
90	6.87	6.92	0.04	5.89	0.18	239.63	0.15	0.000	0.000	0.001
91	6.92	6.97	0.05	5.94	0.18	237.59	0.14	0.000	0.000	0.001
92	6.97	7.02	0.06	5.99	0.18	231.49	0.14	0.001	0.000	0.001

:: Tabular results ::

Point No	Start depth (ft)	End depth (ft)	Thickness (ft)	Relative depth (ft)	Delta P (tsf)	$M_{(CPT)}$ (tsf)	Iz	Settlement (in)	Second. settlement (in)	Overall settlement (in)
93	7.02	7.10	0.08	6.06	0.17	222.90	0.14	0.001	0.000	0.001
94	7.10	7.15	0.05	6.13	0.17	210.64	0.14	0.000	0.000	0.001
95	7.15	7.25	0.09	6.20	0.17	197.19	0.13	0.001	0.000	0.001
96	7.25	7.29	0.04	6.27	0.16	182.51	0.13	0.000	0.000	0.001
97	7.29	7.35	0.06	6.32	0.16	168.63	0.13	0.001	0.000	0.001
98	7.35	7.43	0.08	6.39	0.16	157.17	0.13	0.001	0.000	0.001
99	7.43	7.48	0.05	6.46	0.16	150.59	0.13	0.001	0.000	0.001
100	7.48	7.57	0.09	6.52	0.15	148.13	0.12	0.001	0.000	0.002
101	7.57	7.61	0.05	6.59	0.15	148.03	0.12	0.001	0.000	0.001
102	7.61	7.71	0.09	6.66	0.15	148.73	0.12	0.001	0.001	0.002
103	7.71	7.75	0.05	6.73	0.15	150.22	0.12	0.001	0.000	0.001
104	7.75	7.81	0.06	6.78	0.14	152.94	0.11	0.001	0.000	0.001
105	7.81	7.89	0.08	6.85	0.14	156.11	0.11	0.001	0.000	0.001
106	7.89	7.94	0.05	6.92	0.14	162.88	0.11	0.001	0.000	0.001
107	7.94	8.03	0.09	6.99	0.14	172.15	0.11	0.001	0.000	0.001
108	8.03	8.08	0.05	7.06	0.13	183.16	0.11	0.000	0.000	0.001
109	8.08	8.16	0.07	7.12	0.13	187.74	0.10	0.001	0.000	0.001
110	8.16	8.26	0.10	7.21	0.13	182.59	0.10	0.001	0.001	0.001
111	8.26	8.29	0.03	7.28	0.13	172.40	0.10	0.000	0.000	0.000
112	8.29	8.36	0.06	7.33	0.12	161.87	0.10	0.001	0.000	0.001
113	8.36	8.41	0.05	7.38	0.12	156.58	0.10	0.000	0.000	0.001
114	8.41	8.47	0.06	7.44	0.12	154.42	0.10	0.001	0.000	0.001
115	8.47	8.54	0.07	7.50	0.12	155.58	0.10	0.001	0.000	0.001
116	8.54	8.61	0.07	7.57	0.12	158.31	0.09	0.001	0.000	0.001
117	8.61	8.68	0.07	7.64	0.12	159.10	0.09	0.001	0.000	0.001
118	8.68	8.74	0.06	7.71	0.11	160.92	0.09	0.000	0.000	0.001
119	8.74	8.82	0.08	7.78	0.11	163.34	0.09	0.001	0.001	0.001
120	8.82	8.87	0.05	7.84	0.11	166.34	0.09	0.000	0.000	0.001
121	8.87	8.96	0.09	7.91	0.11	167.62	0.09	0.001	0.001	0.001
122	8.96	9.01	0.05	7.98	0.11	167.11	0.08	0.000	0.000	0.001
123	9.01	9.10	0.09	8.05	0.10	167.26	0.08	0.001	0.001	0.001
124	9.10	9.14	0.04	8.12	0.10	167.18	0.08	0.000	0.000	0.001

Total primary settlement: 0.07
Total secondary settlement: 0.02

Total calculated settlement: 0.09

Abbreviations

Start depth:	Start depth of soil layer (penetration depth measured from ground free surface)
End depth:	End depth of soil layer (penetration depth measured from ground free surface)
Thickness:	Thickness of soil layer
Relative depth:	Depth of calculation relative to footing
Iz:	Stress influence factor
Delta P:	Footing impossed stress:
Eff. stress:	Effective stress
$M_{(CPT)}$:	Constrained modulus from CPT
Settlement:	Primary settlement
Second. settlement:	Secondary settlemends due to creep

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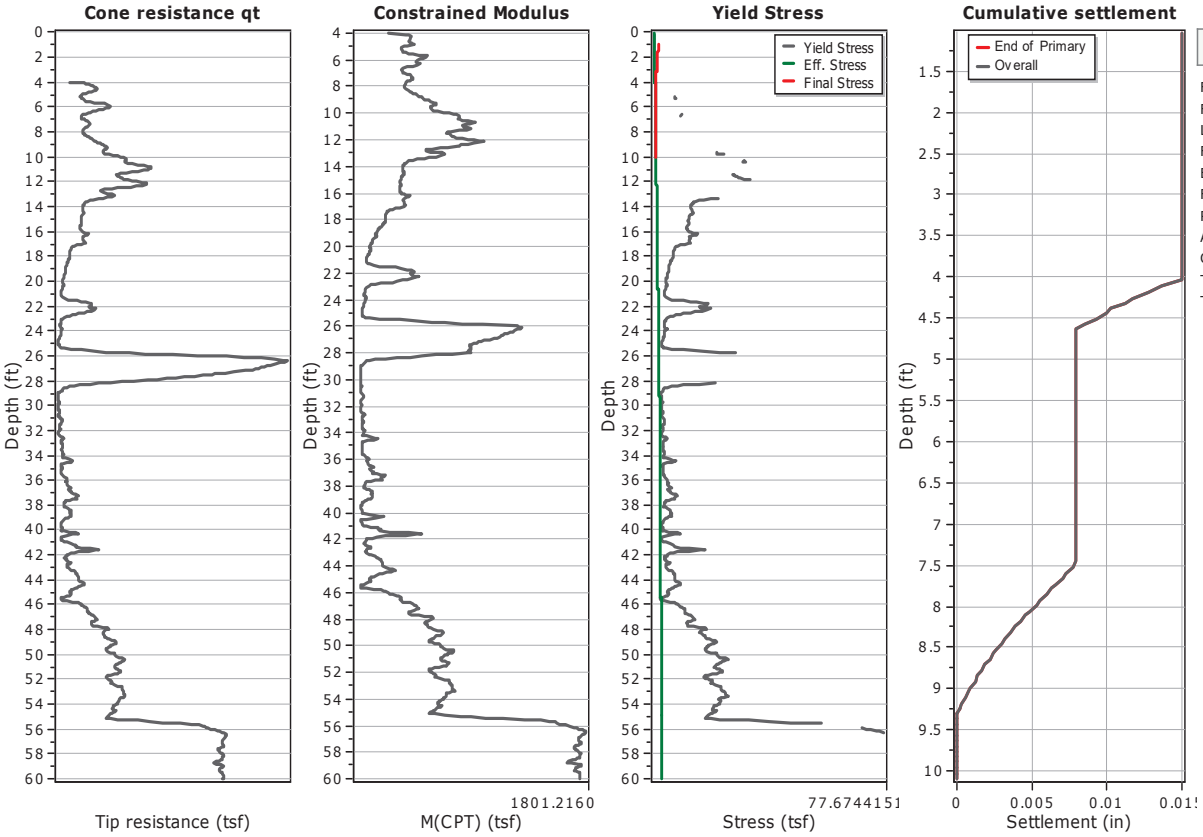
CPT: CPT-4
Total depth: 59.98 ft, Date: 9/27/2023
Surface Elevation: 0.00 ft
Coords: X:0.00, Y:0.00
Cone Type:
Cone Operator:

Project: **Mixed-Use Development - Forster & El Camino**
Location: **San Juan Capistrano, CA**

Settlements calculation according to theory of elasticity*



Calculation properties

Footing type: Rectangular
Footing width: 1.60 (ft)
L/B: 10.0
Footing pressure: 1.25 (tsf)
Embedment depth: 1.00 (ft)
Footing is rigid: No
Remove excavation load: No
Apply 20% rule: Yes
Calculate secondary settlements: Yes
Time period for primary consolidation: 6 months
Time period for second. settlements: 240 months

* Primary settlement calculation is performed according to the following formula:

$$S = \sum \frac{\Delta \sigma_v}{M_{CPT}} \Delta z$$

* Secondary (creep) settlement calculation is performed according to the following formula:

$$S = C_\alpha \cdot \Delta z \cdot \log(t/t_p)$$

where t_p is the duration of primary consolidation

:: Tabular results ::

Point No	Start depth (ft)	End depth (ft)	Thickness (ft)	Relative depth (ft)	Delta P (tsf)	$M_{(CPT)}$ (tsf)	Iz	Settlement (in)	Second. settlement (in)	Overall settlement (in)
1	0.99	1.08	0.09	0.04	1.25	0.00	1.00	0.000	0.000	0.000
2	1.08	1.13	0.04	0.10	1.25	0.00	1.00	0.000	0.000	0.000
3	1.13	1.22	0.10	0.17	1.24	0.00	1.00	0.000	0.000	0.000
4	1.22	1.27	0.05	0.24	1.24	0.00	0.99	0.000	0.000	0.000
5	1.27	1.31	0.05	0.29	1.23	0.00	0.98	0.000	0.000	0.000
6	1.31	1.40	0.09	0.36	1.21	0.00	0.97	0.000	0.000	0.000
7	1.40	1.45	0.05	0.43	1.19	0.00	0.95	0.000	0.000	0.000
8	1.45	1.54	0.09	0.50	1.16	0.00	0.93	0.000	0.000	0.000
9	1.54	1.60	0.05	0.57	1.13	0.00	0.91	0.000	0.000	0.000
10	1.60	1.64	0.05	0.62	1.11	0.00	0.89	0.000	0.000	0.000
11	1.64	1.73	0.09	0.69	1.08	0.00	0.86	0.000	0.000	0.000
12	1.73	1.78	0.05	0.76	1.04	0.00	0.84	0.000	0.000	0.000
13	1.78	1.87	0.09	0.83	1.01	0.00	0.81	0.000	0.000	0.000
14	1.87	1.92	0.05	0.89	0.98	0.00	0.78	0.000	0.000	0.000
15	1.92	1.97	0.05	0.94	0.95	0.00	0.76	0.000	0.000	0.000
16	1.97	2.06	0.09	1.01	0.92	0.00	0.73	0.000	0.000	0.000
17	2.06	2.11	0.05	1.08	0.89	0.00	0.71	0.000	0.000	0.000
18	2.11	2.18	0.07	1.15	0.86	0.00	0.69	0.000	0.000	0.000
19	2.18	2.25	0.06	1.21	0.83	0.00	0.66	0.000	0.000	0.000
20	2.25	2.30	0.05	1.27	0.81	0.00	0.64	0.000	0.000	0.000
21	2.30	2.38	0.08	1.34	0.78	0.00	0.62	0.000	0.000	0.000
22	2.38	2.43	0.05	1.41	0.75	0.00	0.60	0.000	0.000	0.000
23	2.43	2.52	0.09	1.48	0.73	0.00	0.58	0.000	0.000	0.000
24	2.52	2.57	0.04	1.54	0.70	0.00	0.56	0.000	0.000	0.000
25	2.57	2.64	0.07	1.60	0.69	0.00	0.55	0.000	0.000	0.000
26	2.64	2.71	0.07	1.67	0.66	0.00	0.53	0.000	0.000	0.000
27	2.71	2.80	0.09	1.75	0.64	0.00	0.51	0.000	0.000	0.000
28	2.80	2.85	0.04	1.82	0.62	0.00	0.50	0.000	0.000	0.000
29	2.85	2.90	0.05	1.87	0.61	0.00	0.49	0.000	0.000	0.000
30	2.90	2.98	0.09	1.94	0.59	0.00	0.47	0.000	0.000	0.000
31	2.98	3.03	0.05	2.01	0.57	0.00	0.46	0.000	0.000	0.000
32	3.03	3.10	0.07	2.07	0.56	0.00	0.45	0.000	0.000	0.000
33	3.10	3.17	0.07	2.14	0.55	0.00	0.44	0.000	0.000	0.000
34	3.17	3.22	0.04	2.20	0.53	0.00	0.43	0.000	0.000	0.000
35	3.22	3.31	0.10	2.27	0.52	0.00	0.41	0.000	0.000	0.000
36	3.31	3.36	0.05	2.34	0.51	0.00	0.40	0.000	0.000	0.000
37	3.36	3.42	0.06	2.39	0.50	0.00	0.40	0.000	0.000	0.000
38	3.42	3.50	0.08	2.46	0.48	0.00	0.39	0.000	0.000	0.000
39	3.50	3.59	0.09	2.54	0.47	0.00	0.37	0.000	0.000	0.000
40	3.59	3.63	0.04	2.61	0.46	0.00	0.37	0.000	0.000	0.000
41	3.63	3.68	0.04	2.66	0.45	0.00	0.36	0.000	0.000	0.000
42	3.68	3.78	0.10	2.73	0.44	0.00	0.35	0.000	0.000	0.000
43	3.78	3.82	0.05	2.80	0.43	0.00	0.34	0.000	0.000	0.000
44	3.82	3.88	0.06	2.85	0.42	0.00	0.34	0.000	0.000	0.000
45	3.88	3.96	0.08	2.92	0.41	0.00	0.33	0.000	0.000	0.000
46	3.96	4.00	0.04	2.98	0.41	0.00	0.32	0.000	0.000	0.000

:: Tabular results ::

Point No	Start depth (ft)	End depth (ft)	Thickness (ft)	Relative depth (ft)	Delta P (tsf)	$M_{(CPT)}$ (tsf)	Iz	Settlement (in)	Second. settlement (in)	Overall settlement (in)
47	4.00	4.07	0.07	3.04	0.40	243.25	0.32	0.001	0.000	0.001
48	4.07	4.14	0.07	3.11	0.39	378.06	0.31	0.001	0.000	0.001
49	4.14	4.23	0.09	3.19	0.38	403.16	0.30	0.001	0.000	0.001
50	4.23	4.28	0.05	3.26	0.37	427.62	0.30	0.000	0.000	0.000
51	4.28	4.37	0.09	3.33	0.37	424.56	0.29	0.001	0.000	0.001
52	4.37	4.40	0.03	3.39	0.36	420.30	0.29	0.000	0.000	0.000
53	4.40	4.47	0.06	3.44	0.35	415.62	0.28	0.001	0.000	0.001
54	4.47	4.55	0.09	3.51	0.35	411.93	0.28	0.001	0.000	0.001
55	4.55	4.60	0.05	3.58	0.34	408.80	0.27	0.001	0.000	0.001
56	4.60	4.67	0.07	3.64	0.34	408.55	0.27	0.000	0.000	0.000
57	4.67	4.74	0.07	3.71	0.33	414.94	0.26	0.000	0.000	0.000
58	4.74	4.79	0.05	3.77	0.32	423.86	0.26	0.000	0.000	0.000
59	4.79	4.87	0.08	3.83	0.32	435.97	0.25	0.000	0.000	0.000
60	4.87	4.93	0.06	3.90	0.31	447.37	0.25	0.000	0.000	0.000
61	4.93	5.01	0.08	3.97	0.31	397.30	0.25	0.000	0.000	0.000
62	5.01	5.06	0.05	4.03	0.30	367.65	0.24	0.000	0.000	0.000
63	5.06	5.16	0.10	4.11	0.30	348.56	0.24	0.000	0.000	0.000
64	5.16	5.21	0.04	4.18	0.29	344.79	0.23	0.000	0.000	0.000
65	5.21	5.25	0.05	4.23	0.29	348.02	0.23	0.000	0.000	0.000
66	5.25	5.34	0.09	4.30	0.28	351.63	0.23	0.000	0.000	0.000
67	5.34	5.39	0.05	4.37	0.28	356.03	0.22	0.000	0.000	0.000
68	5.39	5.46	0.07	4.42	0.28	364.89	0.22	0.000	0.000	0.000
69	5.46	5.53	0.08	4.50	0.27	379.43	0.22	0.000	0.000	0.000
70	5.53	5.58	0.05	4.56	0.27	400.83	0.21	0.000	0.000	0.000
71	5.58	5.67	0.09	4.62	0.26	435.60	0.21	0.000	0.000	0.000
72	5.67	5.72	0.05	4.69	0.26	485.75	0.21	0.000	0.000	0.000
73	5.72	5.78	0.06	4.75	0.26	551.91	0.20	0.000	0.000	0.000
74	5.78	5.86	0.08	4.82	0.25	540.11	0.20	0.000	0.000	0.000
75	5.86	5.95	0.09	4.91	0.25	517.39	0.20	0.000	0.000	0.000
76	5.95	6.00	0.05	4.97	0.24	489.72	0.19	0.000	0.000	0.000
77	6.00	6.04	0.05	5.02	0.24	471.84	0.19	0.000	0.000	0.000
78	6.04	6.12	0.07	5.08	0.24	467.69	0.19	0.000	0.000	0.000
79	6.12	6.18	0.07	5.15	0.23	464.68	0.19	0.000	0.000	0.000
80	6.18	6.24	0.05	5.21	0.23	464.46	0.19	0.000	0.000	0.000
81	6.24	6.32	0.08	5.28	0.23	472.48	0.18	0.000	0.000	0.000
82	6.32	6.38	0.05	5.35	0.23	492.47	0.18	0.000	0.000	0.000
83	6.38	6.46	0.08	5.42	0.22	469.83	0.18	0.000	0.000	0.000
84	6.46	6.51	0.06	5.49	0.22	443.02	0.18	0.000	0.000	0.000
85	6.51	6.57	0.05	5.54	0.22	419.49	0.17	0.000	0.000	0.000
86	6.57	6.65	0.08	5.61	0.21	391.54	0.17	0.000	0.000	0.000
87	6.65	6.70	0.05	5.68	0.21	363.94	0.17	0.000	0.000	0.000
88	6.70	6.79	0.09	5.75	0.21	352.32	0.17	0.000	0.000	0.000
89	6.79	6.84	0.05	5.81	0.21	350.62	0.16	0.000	0.000	0.000
90	6.84	6.92	0.09	5.88	0.20	356.65	0.16	0.000	0.000	0.000
91	6.92	6.97	0.05	5.95	0.20	355.16	0.16	0.000	0.000	0.000
92	6.97	7.03	0.06	6.00	0.20	359.98	0.16	0.000	0.000	0.000

:: Tabular results ::

Point No	Start depth (ft)	End depth (ft)	Thickness (ft)	Relative depth (ft)	Delta P (tsf)	$M_{(CPT)}$ (tsf)	Iz	Settlement (in)	Second. settlement (in)	Overall settlement (in)
93	7.03	7.12	0.09	6.07	0.20	375.34	0.16	0.000	0.000	0.000
94	7.12	7.16	0.04	6.14	0.19	395.54	0.15	0.000	0.000	0.000
95	7.16	7.25	0.09	6.21	0.19	415.75	0.15	0.000	0.000	0.000
96	7.25	7.30	0.05	6.28	0.19	424.96	0.15	0.000	0.000	0.000
97	7.30	7.36	0.06	6.33	0.19	431.77	0.15	0.000	0.000	0.000
98	7.36	7.43	0.08	6.40	0.18	436.16	0.15	0.000	0.000	0.000
99	7.43	7.48	0.05	6.46	0.18	438.94	0.15	0.000	0.000	0.000
100	7.48	7.58	0.09	6.53	0.18	429.62	0.14	0.000	0.000	0.000
101	7.58	7.62	0.05	6.60	0.18	412.56	0.14	0.000	0.000	0.000
102	7.62	7.71	0.09	6.67	0.17	395.49	0.14	0.000	0.000	0.000
103	7.71	7.76	0.05	6.74	0.17	387.71	0.14	0.000	0.000	0.000
104	7.76	7.81	0.05	6.79	0.17	384.03	0.14	0.000	0.000	0.000
105	7.81	7.90	0.09	6.86	0.17	377.93	0.14	0.000	0.000	0.000
106	7.90	7.95	0.05	6.92	0.17	373.01	0.13	0.000	0.000	0.000
107	7.95	8.04	0.09	6.99	0.17	369.33	0.13	0.000	0.000	0.000
108	8.04	8.09	0.04	7.06	0.16	370.44	0.13	0.000	0.000	0.000
109	8.09	8.14	0.05	7.11	0.16	372.80	0.13	0.000	0.000	0.000
110	8.14	8.23	0.09	7.18	0.16	378.82	0.13	0.000	0.000	0.000
111	8.23	8.27	0.04	7.25	0.16	386.48	0.13	0.000	0.000	0.000
112	8.27	8.37	0.09	7.32	0.16	401.43	0.13	0.000	0.000	0.000
113	8.37	8.41	0.04	7.39	0.15	414.69	0.12	0.000	0.000	0.000
114	8.41	8.50	0.09	7.46	0.15	431.22	0.12	0.000	0.000	0.000
115	8.50	8.55	0.05	7.53	0.15	442.81	0.12	0.000	0.000	0.000
116	8.55	8.60	0.05	7.58	0.15	454.07	0.12	0.000	0.000	0.000
117	8.60	8.69	0.09	7.64	0.15	464.13	0.12	0.000	0.000	0.000
118	8.69	8.73	0.04	7.71	0.15	472.58	0.12	0.000	0.000	0.000
119	8.73	8.83	0.10	7.78	0.14	488.72	0.12	0.000	0.000	0.000
120	8.83	8.86	0.03	7.84	0.14	501.99	0.11	0.000	0.000	0.000
121	8.86	8.97	0.11	7.92	0.14	519.36	0.11	0.000	0.000	0.000
122	8.97	9.02	0.05	8.00	0.14	534.66	0.11	0.000	0.000	0.000
123	9.02	9.06	0.04	8.04	0.14	549.63	0.11	0.000	0.000	0.000
124	9.06	9.16	0.09	8.11	0.14	566.15	0.11	0.000	0.000	0.000
125	9.16	9.20	0.04	8.18	0.14	578.65	0.11	0.000	0.000	0.000
126	9.20	9.28	0.08	8.24	0.13	605.00	0.11	0.000	0.000	0.000
127	9.28	9.33	0.05	8.31	0.13	614.34	0.11	0.000	0.000	0.000
128	9.33	9.39	0.05	8.36	0.13	616.76	0.11	0.000	0.000	0.000
129	9.39	9.47	0.08	8.43	0.13	596.83	0.10	0.000	0.000	0.000
130	9.47	9.52	0.05	8.50	0.13	581.01	0.10	0.000	0.000	0.000
131	9.52	9.61	0.09	8.56	0.13	574.75	0.10	0.000	0.000	0.000
132	9.61	9.66	0.05	8.63	0.13	570.70	0.10	0.000	0.000	0.000
133	9.66	9.75	0.09	8.70	0.13	576.76	0.10	0.000	0.000	0.000
134	9.75	9.80	0.05	8.77	0.12	583.36	0.10	0.000	0.000	0.000
135	9.80	9.85	0.05	8.82	0.12	599.52	0.10	0.000	0.000	0.000
136	9.85	9.94	0.09	8.89	0.12	633.48	0.10	0.000	0.000	0.000
137	9.94	9.99	0.05	8.96	0.12	673.87	0.10	0.000	0.000	0.000
138	9.99	10.07	0.08	9.03	0.12	718.73	0.10	0.000	0.000	0.000

:: Tabular results ::

Point No	Start depth (ft)	End depth (ft)	Thickness (ft)	Relative depth (ft)	Delta P (tsf)	$M_{(CPT)}$ (tsf)	Iz	Settlement (in)	Second. settlement (in)	Overall settlement (in)
139	10.07	10.12	0.05	9.09	0.12	751.41	0.09	0.000	0.000	0.000

Total primary settlement: 0.02
Total secondary settlement: 0.00

Total calculated settlement: 0.02

Abbreviations

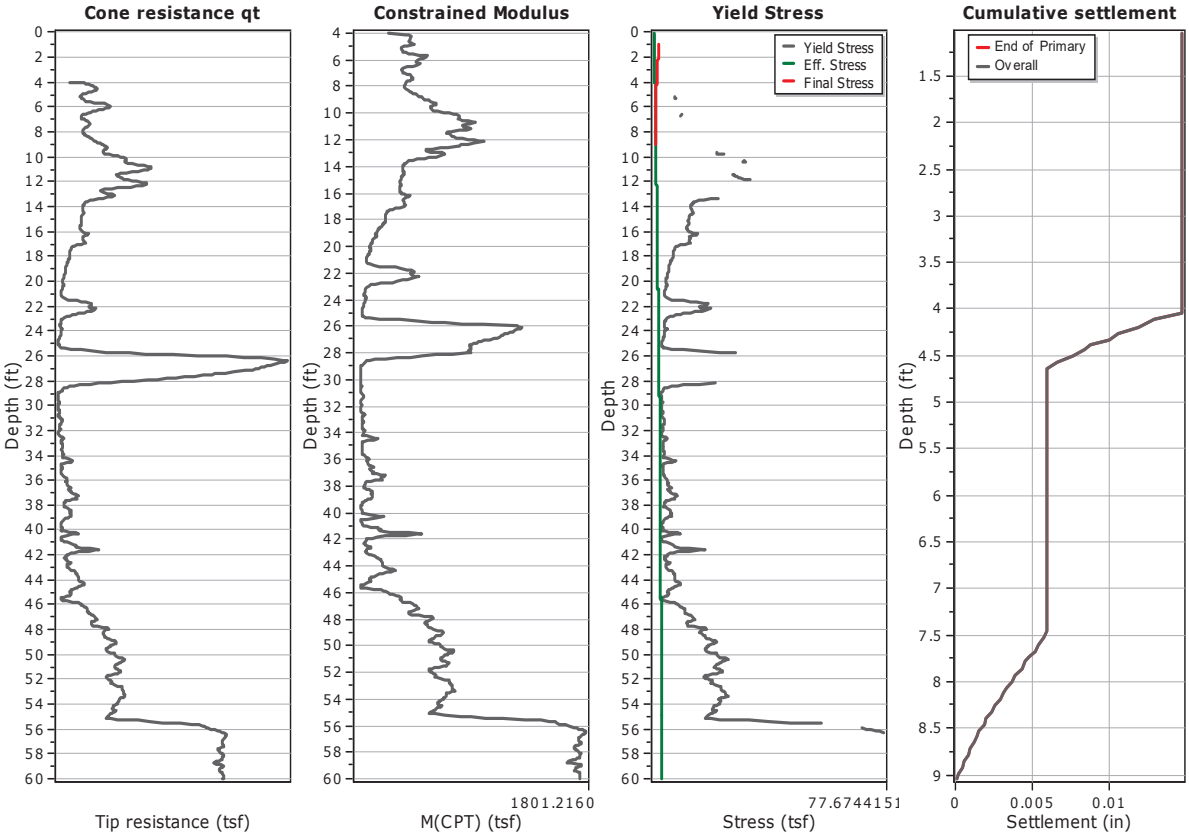
Start depth:	Start depth of soil layer (penetration depth measured from ground free surface)
End depth:	End depth of soil layer (penetration depth measured from ground free surface)
Thickness:	Thickness of soil layer
Relative depth:	Depth of calculation relative to footing
Iz:	Stress influence factor
Delta P:	Footing impossed stress:
Eff. stress:	Effective stress
$M_{(CPT)}$:	Constrained modulus from CPT
Settlement:	Primary settlement
Second. settlement:	Secondary settlemends due to creep

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

CPT: CPT-4
Total depth: 59.98 ft, Date: 9/27/2023
Surface Elevation: 0.00 ft
Coords: X:0.00, Y:0.00
Cone Type:
Cone Operator:

Project: **Mixed-Use Development - Forster & El Camino**
Location: **San Juan Capistrano, CA**

Settlements calculation according to theory of elasticity*



Calculation properties

Footing type: Rectangular
Footing width: 3.50 (ft)
L/B: 1.0
Footing pressure: 1.25 (tsf)
Embedment depth: 1.00 (ft)
Footing is rigid: No
Remove excavation load: No
Apply 20% rule: Yes
Calculate secondary settlements: Yes
Time period for primary consolidation: 6 months
Time period for second. settlements: 240 months

* Primary settlement calculation is performed according to the following formula:

$$S = \sum \frac{\Delta\sigma_v}{M_{CPT}} \Delta z$$

* Secondary (creep) settlement calculation is performed according to the following formula:

$$S = C_\alpha \cdot \Delta z \cdot \log(t/t_p)$$

where t_p is the duration of primary consolidation

:: Tabular results ::

Point No	Start depth (ft)	End depth (ft)	Thickness (ft)	Relative depth (ft)	Delta P (tsf)	$M_{(CPT)}$ (tsf)	Iz	Settlement (in)	Second. settlement (in)	Overall settlement (in)
1	0.99	1.08	0.09	0.04	1.25	0.00	1.00	0.000	0.000	0.000
2	1.08	1.13	0.04	0.10	1.25	0.00	1.00	0.000	0.000	0.000
3	1.13	1.22	0.10	0.17	1.25	0.00	1.00	0.000	0.000	0.000
4	1.22	1.27	0.05	0.24	1.25	0.00	1.00	0.000	0.000	0.000
5	1.27	1.31	0.05	0.29	1.25	0.00	1.00	0.000	0.000	0.000
6	1.31	1.40	0.09	0.36	1.24	0.00	0.99	0.000	0.000	0.000
7	1.40	1.45	0.05	0.43	1.24	0.00	0.99	0.000	0.000	0.000
8	1.45	1.54	0.09	0.50	1.23	0.00	0.98	0.000	0.000	0.000
9	1.54	1.60	0.05	0.57	1.22	0.00	0.98	0.000	0.000	0.000
10	1.60	1.64	0.05	0.62	1.21	0.00	0.97	0.000	0.000	0.000
11	1.64	1.73	0.09	0.69	1.20	0.00	0.96	0.000	0.000	0.000
12	1.73	1.78	0.05	0.76	1.19	0.00	0.95	0.000	0.000	0.000
13	1.78	1.87	0.09	0.83	1.17	0.00	0.94	0.000	0.000	0.000
14	1.87	1.92	0.05	0.89	1.16	0.00	0.93	0.000	0.000	0.000
15	1.92	1.97	0.05	0.94	1.14	0.00	0.92	0.000	0.000	0.000
16	1.97	2.06	0.09	1.01	1.12	0.00	0.90	0.000	0.000	0.000
17	2.06	2.11	0.05	1.08	1.10	0.00	0.88	0.000	0.000	0.000
18	2.11	2.18	0.07	1.15	1.09	0.00	0.87	0.000	0.000	0.000
19	2.18	2.25	0.06	1.21	1.06	0.00	0.85	0.000	0.000	0.000
20	2.25	2.30	0.05	1.27	1.04	0.00	0.84	0.000	0.000	0.000
21	2.30	2.38	0.08	1.34	1.02	0.00	0.82	0.000	0.000	0.000
22	2.38	2.43	0.05	1.41	1.00	0.00	0.80	0.000	0.000	0.000
23	2.43	2.52	0.09	1.48	0.97	0.00	0.78	0.000	0.000	0.000
24	2.52	2.57	0.04	1.54	0.95	0.00	0.76	0.000	0.000	0.000
25	2.57	2.64	0.07	1.60	0.93	0.00	0.74	0.000	0.000	0.000
26	2.64	2.71	0.07	1.67	0.90	0.00	0.72	0.000	0.000	0.000
27	2.71	2.80	0.09	1.75	0.87	0.00	0.70	0.000	0.000	0.000
28	2.80	2.85	0.04	1.82	0.85	0.00	0.68	0.000	0.000	0.000
29	2.85	2.90	0.05	1.87	0.83	0.00	0.67	0.000	0.000	0.000
30	2.90	2.98	0.09	1.94	0.81	0.00	0.65	0.000	0.000	0.000
31	2.98	3.03	0.05	2.01	0.79	0.00	0.63	0.000	0.000	0.000
32	3.03	3.10	0.07	2.07	0.77	0.00	0.62	0.000	0.000	0.000
33	3.10	3.17	0.07	2.14	0.75	0.00	0.60	0.000	0.000	0.000
34	3.17	3.22	0.04	2.20	0.73	0.00	0.58	0.000	0.000	0.000
35	3.22	3.31	0.10	2.27	0.71	0.00	0.56	0.000	0.000	0.000
36	3.31	3.36	0.05	2.34	0.69	0.00	0.55	0.000	0.000	0.000
37	3.36	3.42	0.06	2.39	0.67	0.00	0.54	0.000	0.000	0.000
38	3.42	3.50	0.08	2.46	0.65	0.00	0.52	0.000	0.000	0.000
39	3.50	3.59	0.09	2.54	0.63	0.00	0.50	0.000	0.000	0.000
40	3.59	3.63	0.04	2.61	0.61	0.00	0.49	0.000	0.000	0.000
41	3.63	3.68	0.04	2.66	0.60	0.00	0.48	0.000	0.000	0.000
42	3.68	3.78	0.10	2.73	0.58	0.00	0.46	0.000	0.000	0.000
43	3.78	3.82	0.05	2.80	0.56	0.00	0.45	0.000	0.000	0.000
44	3.82	3.88	0.06	2.85	0.55	0.00	0.44	0.000	0.000	0.000
45	3.88	3.96	0.08	2.92	0.53	0.00	0.43	0.000	0.000	0.000
46	3.96	4.00	0.04	2.98	0.52	0.00	0.42	0.000	0.000	0.000

:: Tabular results ::

Point No	Start depth (ft)	End depth (ft)	Thickness (ft)	Relative depth (ft)	Delta P (tsf)	$M_{(CPT)}$ (tsf)	Iz	Settlement (in)	Second. settlement (in)	Overall settlement (in)
47	4.00	4.07	0.07	3.04	0.51	243.25	0.41	0.002	0.000	0.002
48	4.07	4.14	0.07	3.11	0.49	378.06	0.39	0.001	0.000	0.001
49	4.14	4.23	0.09	3.19	0.48	403.16	0.38	0.001	0.000	0.001
50	4.23	4.28	0.05	3.26	0.46	427.62	0.37	0.001	0.000	0.001
51	4.28	4.37	0.09	3.33	0.45	424.56	0.36	0.001	0.000	0.001
52	4.37	4.40	0.03	3.39	0.44	420.30	0.35	0.000	0.000	0.000
53	4.40	4.47	0.06	3.44	0.43	415.62	0.35	0.001	0.000	0.001
54	4.47	4.55	0.09	3.51	0.42	411.93	0.33	0.001	0.000	0.001
55	4.55	4.60	0.05	3.58	0.41	408.80	0.33	0.001	0.000	0.001
56	4.60	4.67	0.07	3.64	0.40	408.55	0.32	0.000	0.000	0.000
57	4.67	4.74	0.07	3.71	0.39	414.94	0.31	0.000	0.000	0.000
58	4.74	4.79	0.05	3.77	0.38	423.86	0.30	0.000	0.000	0.000
59	4.79	4.87	0.08	3.83	0.37	435.97	0.29	0.000	0.000	0.000
60	4.87	4.93	0.06	3.90	0.36	447.37	0.29	0.000	0.000	0.000
61	4.93	5.01	0.08	3.97	0.35	397.30	0.28	0.000	0.000	0.000
62	5.01	5.06	0.05	4.03	0.34	367.65	0.27	0.000	0.000	0.000
63	5.06	5.16	0.10	4.11	0.33	348.56	0.27	0.000	0.000	0.000
64	5.16	5.21	0.04	4.18	0.32	344.79	0.26	0.000	0.000	0.000
65	5.21	5.25	0.05	4.23	0.32	348.02	0.25	0.000	0.000	0.000
66	5.25	5.34	0.09	4.30	0.31	351.63	0.25	0.000	0.000	0.000
67	5.34	5.39	0.05	4.37	0.30	356.03	0.24	0.000	0.000	0.000
68	5.39	5.46	0.07	4.42	0.30	364.89	0.24	0.000	0.000	0.000
69	5.46	5.53	0.08	4.50	0.29	379.43	0.23	0.000	0.000	0.000
70	5.53	5.58	0.05	4.56	0.28	400.83	0.23	0.000	0.000	0.000
71	5.58	5.67	0.09	4.62	0.28	435.60	0.22	0.000	0.000	0.000
72	5.67	5.72	0.05	4.69	0.27	485.75	0.22	0.000	0.000	0.000
73	5.72	5.78	0.06	4.75	0.26	551.91	0.21	0.000	0.000	0.000
74	5.78	5.86	0.08	4.82	0.26	540.11	0.21	0.000	0.000	0.000
75	5.86	5.95	0.09	4.91	0.25	517.39	0.20	0.000	0.000	0.000
76	5.95	6.00	0.05	4.97	0.24	489.72	0.20	0.000	0.000	0.000
77	6.00	6.04	0.05	5.02	0.24	471.84	0.19	0.000	0.000	0.000
78	6.04	6.12	0.07	5.08	0.24	467.69	0.19	0.000	0.000	0.000
79	6.12	6.18	0.07	5.15	0.23	464.68	0.18	0.000	0.000	0.000
80	6.18	6.24	0.05	5.21	0.23	464.46	0.18	0.000	0.000	0.000
81	6.24	6.32	0.08	5.28	0.22	472.48	0.18	0.000	0.000	0.000
82	6.32	6.38	0.05	5.35	0.22	492.47	0.17	0.000	0.000	0.000
83	6.38	6.46	0.08	5.42	0.21	469.83	0.17	0.000	0.000	0.000
84	6.46	6.51	0.06	5.49	0.21	443.02	0.17	0.000	0.000	0.000
85	6.51	6.57	0.05	5.54	0.20	419.49	0.16	0.000	0.000	0.000
86	6.57	6.65	0.08	5.61	0.20	391.54	0.16	0.000	0.000	0.000
87	6.65	6.70	0.05	5.68	0.20	363.94	0.16	0.000	0.000	0.000
88	6.70	6.79	0.09	5.75	0.19	352.32	0.15	0.000	0.000	0.000
89	6.79	6.84	0.05	5.81	0.19	350.62	0.15	0.000	0.000	0.000
90	6.84	6.92	0.09	5.88	0.18	356.65	0.15	0.000	0.000	0.000
91	6.92	6.97	0.05	5.95	0.18	355.16	0.14	0.000	0.000	0.000
92	6.97	7.03	0.06	6.00	0.18	359.98	0.14	0.000	0.000	0.000

:: Tabular results ::

Point No	Start depth (ft)	End depth (ft)	Thickness (ft)	Relative depth (ft)	Delta P (tsf)	$M_{(CPT)}$ (tsf)	Iz	Settlement (in)	Second. settlement (in)	Overall settlement (in)
93	7.03	7.12	0.09	6.07	0.17	375.34	0.14	0.000	0.000	0.000
94	7.12	7.16	0.04	6.14	0.17	395.54	0.14	0.000	0.000	0.000
95	7.16	7.25	0.09	6.21	0.17	415.75	0.13	0.000	0.000	0.000
96	7.25	7.30	0.05	6.28	0.16	424.96	0.13	0.000	0.000	0.000
97	7.30	7.36	0.06	6.33	0.16	431.77	0.13	0.000	0.000	0.000
98	7.36	7.43	0.08	6.40	0.16	436.16	0.13	0.000	0.000	0.000
99	7.43	7.48	0.05	6.46	0.16	438.94	0.12	0.000	0.000	0.000
100	7.48	7.58	0.09	6.53	0.15	429.62	0.12	0.000	0.000	0.000
101	7.58	7.62	0.05	6.60	0.15	412.56	0.12	0.000	0.000	0.000
102	7.62	7.71	0.09	6.67	0.15	395.49	0.12	0.000	0.000	0.000
103	7.71	7.76	0.05	6.74	0.14	387.71	0.12	0.000	0.000	0.000
104	7.76	7.81	0.05	6.79	0.14	384.03	0.11	0.000	0.000	0.000
105	7.81	7.90	0.09	6.86	0.14	377.93	0.11	0.000	0.000	0.000
106	7.90	7.95	0.05	6.92	0.14	373.01	0.11	0.000	0.000	0.000
107	7.95	8.04	0.09	6.99	0.14	369.33	0.11	0.000	0.000	0.000
108	8.04	8.09	0.04	7.06	0.13	370.44	0.11	0.000	0.000	0.000
109	8.09	8.14	0.05	7.11	0.13	372.80	0.11	0.000	0.000	0.000
110	8.14	8.23	0.09	7.18	0.13	378.82	0.10	0.000	0.000	0.000
111	8.23	8.27	0.04	7.25	0.13	386.48	0.10	0.000	0.000	0.000
112	8.27	8.37	0.09	7.32	0.12	401.43	0.10	0.000	0.000	0.000
113	8.37	8.41	0.04	7.39	0.12	414.69	0.10	0.000	0.000	0.000
114	8.41	8.50	0.09	7.46	0.12	431.22	0.10	0.000	0.000	0.000
115	8.50	8.55	0.05	7.53	0.12	442.81	0.09	0.000	0.000	0.000
116	8.55	8.60	0.05	7.58	0.12	454.07	0.09	0.000	0.000	0.000
117	8.60	8.69	0.09	7.64	0.12	464.13	0.09	0.000	0.000	0.000
118	8.69	8.73	0.04	7.71	0.11	472.58	0.09	0.000	0.000	0.000
119	8.73	8.83	0.10	7.78	0.11	488.72	0.09	0.000	0.000	0.000
120	8.83	8.86	0.03	7.84	0.11	501.99	0.09	0.000	0.000	0.000
121	8.86	8.97	0.11	7.92	0.11	519.36	0.09	0.000	0.000	0.000
122	8.97	9.02	0.05	8.00	0.11	534.66	0.08	0.000	0.000	0.000
123	9.02	9.06	0.04	8.04	0.10	549.63	0.08	0.000	0.000	0.000

Total primary settlement: 0.01
Total secondary settlement: 0.00

Total calculated settlement: 0.01

Abbreviations

Start depth:	Start depth of soil layer (penetration depth measured from ground free surface)
End depth:	End depth of soil layer (penetration depth measured from ground free surface)
Thickness:	Thickness of soil layer
Relative depth:	Depth of calculation relative to footing
Iz:	Stress influence factor
Delta P:	Footing impossed stress:
Eff. stress:	Effective stress
$M_{(CPT)}$:	Constrained modulus from CPT
Settlement:	Primary settlement
Second. settlement:	Secondary settlemends due to creep

APPENDIX G

GENERAL EARTHWORK GRADING GUIDELINES

Updated Geotechnical and Infiltration Evaluation
San Juan Capistrano, California
Project No. 3653-CR

GEOTEK

GENERAL GRADING GUIDELINES

Guidelines presented herein are intended to address general construction procedures for earthwork construction. Specific situations and conditions often arise which cannot reasonably be discussed in general guidelines, when anticipated these are discussed in the text of the report. Often unanticipated conditions are encountered which may necessitate modification or changes to these guidelines. It is our hope that these will assist the contractor to more efficiently complete the project by providing a reasonable understanding of the procedures that would be expected during earthwork and the testing and observation used to evaluate those procedures.

General

Grading should be performed to at least the minimum requirements of governing agencies, Chapters 18 and 33 of the California Building Code, CBC (2022) and the guidelines presented below.

Preconstruction Meeting

A preconstruction meeting should be held prior to site earthwork. Any questions the contractor has regarding our recommendations, general site conditions, apparent discrepancies between reported and actual conditions and/or differences in procedures the contractor intends to use should be brought up at that meeting. The contractor (including the main onsite representative) should review our report and these guidelines in advance of the meeting. Any comments the contractor may have regarding these guidelines should be brought up at that meeting.

Grading Observation and Testing

1. Observation of the fill placement should be provided by our representative during grading. Verbal communication during the course of each day will be used to inform the contractor of test results. The contractor should receive a copy of the "Daily Field Report" indicating results of field density tests that day. If our representative does not provide the contractor with these reports, our office should be notified.
2. Testing and observation procedures are, by their nature, specific to the work or area observed and location of the tests taken, variability may occur in other locations. The contractor is responsible for the uniformity of the grading operations; our observations and test results are intended to evaluate the contractor's overall level of efforts during grading. The contractor's personnel are the only individuals participating in all aspect of site work. Compaction testing and observation should not be considered as relieving the contractor's responsibility to properly compact the fill.
3. Cleanouts, processed ground to receive fill, key excavations, and subdrains should be observed by our representative prior to placing any fill. It will be the contractor's responsibility to notify our representative or office when such areas are ready for observation.
4. Density tests may be made on the surface material to receive fill, as considered warranted by this firm.
5. In general, density tests would be made at maximum intervals of two feet of fill height or every 1,000 cubic yards of fill placed. Criteria will vary depending on soil conditions and size of the fill. More frequent testing may be performed. In any case, an adequate number of field density tests should be made to evaluate the required compaction and moisture content is generally being obtained.

6. Laboratory testing to support field test procedures will be performed, as considered warranted, based on conditions encountered (e.g. change of material sources, types, etc.) Every effort will be made to process samples in the laboratory as quickly as possible and in progress construction projects are our first priority. However, laboratory workloads may cause in delays and some soils may require a **minimum of 48 to 72 hours to complete test procedures**. Whenever possible, our representative(s) should be informed in advance of operational changes that might result in different source areas for materials.
7. Procedures for testing of fill slopes are as follows:
   a) Density tests should be taken periodically during grading on the flat surface of the fill, three to five feet horizontally from the face of the slope.
   b) If a method other than over building and cutting back to the compacted core is to be employed, slope compaction testing during construction should include testing the outer six inches to three feet in the slope face to determine if the required compaction is being achieved.
8. Finish grade testing of slopes and pad surfaces should be performed after construction is complete.

Site Clearing

1. All vegetation, and other deleterious materials, should be removed from the site. If material is not immediately removed from the site it should be stockpiled in a designated area(s) well outside of all current work areas and delineated with flagging or other means. Site clearing should be performed in advance of any grading in a specific area.
2. Efforts should be made by the contractor to remove all organic or other deleterious material from the fill, as even the most diligent efforts may result in the incorporation of some materials. This is especially important when grading is occurring near the natural grade. All equipment operators should be aware of these efforts. Laborers may be required as root pickers.
3. Nonorganic debris or concrete may be placed in deeper fill areas provided the procedures used are observed and found acceptable by our representative.

Treatment of Existing Ground

1. Following site clearing, all surficial deposits of alluvium and colluvium as well as weathered or creep effected bedrock, should be removed unless otherwise specifically indicated in the text of this report.
2. In some cases, removal may be recommended to a specified depth (e.g. flat sites where partial alluvial removals may be sufficient). The contractor should not exceed these depths unless directed otherwise by our representative.
3. Groundwater existing in alluvial areas may make excavation difficult. Deeper removals than indicated in the text of the report may be necessary due to saturation during winter months.
4. Subsequent to removals, the natural ground should be processed to a depth of six inches, moistened to near optimum moisture conditions and compacted to fill standards.
5. Exploratory back hoe or dozer trenches still remaining after site removal should be excavated and filled with compacted fill if they can be located.

Fill Placement

1. Unless otherwise indicated, all site soil and bedrock may be reused for compacted fill; however, some special processing or handling may be required (see text of report).

2. Material used in the compacting process should be evenly spread, moisture conditioned, processed, and compacted in thin lifts six (6) to eight (8) inches in compacted thickness to obtain a uniformly dense layer. The fill should be placed and compacted on a nearly horizontal plane, unless otherwise found acceptable by our representative.
3. If the moisture content or relative density varies from that recommended by this firm, the contractor should rework the fill until it is in accordance with the following:
   a) Moisture content of the fill should be at or above optimum moisture. Moisture should be evenly distributed without wet and dry pockets. Pre-watering of cut or removal areas should be considered in addition to watering during fill placement, particularly in clay or dry surficial soils. The ability of the contractor to obtain the proper moisture content will control production rates.
   b) Each six-inch layer should be compacted to at least 90 percent of the maximum dry density in compliance with the testing method specified by the controlling governmental agency. In most cases, the testing method is ASTM Test Designation D 1557.
4. Rock fragments less than eight inches in diameter may be utilized in the fill, provided:
   a) They are not placed in concentrated pockets;
   b) There is a sufficient percentage of fine-grained material to surround the rocks;
   c) The distribution of the rocks is observed by, and acceptable to, our representative.
5. Rocks exceeding eight (8) inches in diameter should be taken off site, broken into smaller fragments, or placed in accordance with recommendations of this firm in areas designated suitable for rock disposal. On projects where significant large quantities of oversized materials are anticipated, alternate guidelines for placement may be included. If significant oversize materials are encountered during construction, these guidelines should be requested.
6. In clay soil, dry or large chunks or blocks are common. If in excess of eight (8) inches minimum dimension, then they are considered as oversized. Sheepsfoot compactors or other suitable methods should be used to break up blocks. When dry, they should be moisture conditioned to provide a uniform condition with the surrounding fill.

Slope Construction

1. The contractor should obtain a minimum relative compaction of 90 percent out to the finished slope face of fill slopes. This may be achieved by either overbuilding the slope and cutting back to the compacted core, or by direct compaction of the slope face with suitable equipment.
2. Slopes trimmed to the compacted core should be overbuilt by at least three (3) feet with compaction efforts out to the edge of the false slope. Failure to properly compact the outer edge results in trimming not exposing the compacted core and additional compaction after trimming may be necessary.
3. If fill slopes are built "at grade" using direct compaction methods, then the slope construction should be performed so that a constant gradient is maintained throughout construction. Soil should not be "spilled" over the slope face nor should slopes be "pushed out" to obtain grades. Compaction equipment should compact each lift along the immediate top of slope. Slopes should be back rolled or otherwise compacted at approximately every 4 feet vertically as the slope is built.
4. Corners and bends in slopes should have special attention during construction as these are the most difficult areas to obtain proper compaction.
5. Cut slopes should be cut to the finished surface. Excessive undercutting and smoothing of the face with fill may necessitate stabilization.

UTILITY TRENCH CONSTRUCTION AND BACKFILL

Utility trench excavation and backfill is the contractors responsibility. The geotechnical consultant typically provides periodic observation and testing of these operations. While efforts are made to make sufficient observations and tests to verify that the contractors' methods and procedures are adequate to achieve proper compaction, it is typically impractical to observe all backfill procedures. As such, it is critical that the contractor use consistent backfill procedures.

Compaction methods vary for trench compaction and experience indicates many methods can be successful. However, procedures that "worked" on previous projects may or may not prove effective on a given site. The contractor(s) should outline the procedures proposed, so that we may discuss them **prior** to construction. We will offer comments based on our knowledge of site conditions and experience.

1. Utility trench backfill in slopes, structural areas, in streets and beneath flat work or hardscape should be brought to at least optimum moisture and compacted to at least 90 percent of the laboratory standard. Soil should be moisture conditioned prior to placing in the trench.
2. Flooding and jetting are not typically recommended or acceptable for native soils. Flooding or jetting may be used with select sand having a Sand Equivalent (SE) of 30 or higher. This is typically limited to the following uses:
   a) shallow (12 + inches) under slab interior trenches and,
   b) as bedding in pipe zone.

   The water should be allowed to dissipate prior to pouring slabs or completing trench compaction.
3. Care should be taken not to place soils at high moisture content within the upper three feet of the trench backfill in street areas, as overly wet soils may impact subgrade preparation. Moisture may be reduced to 2% below optimum moisture in areas to be paved within the upper three feet below sub grade.
4. Sand backfill should not be allowed in exterior trenches adjacent to and within an area extending below a 1:1 projection from the outside bottom edge of a footing, unless it is similar to the surrounding soil.
5. Trench compaction testing is generally at the discretion of the geotechnical consultant. Testing frequency will be based on trench depth and the contractors procedures. A probing rod would be used to assess the consistency of compaction between tested areas and untested areas. If zones are found that are considered less compact than other areas, this would be brought to the contractors attention.

JOB SAFETY

General

Personnel safety is a primary concern on all job sites. The following summaries are safety considerations for use by all our employees on multi-employer construction sites. On ground personnel are at highest risk of injury and possible fatality on grading construction projects. The company recognizes that construction activities will vary on each site and that job site safety is the contractor's responsibility. However, it is, imperative that all personnel be safety conscious to avoid accidents and potential injury.

In an effort to minimize risks associated with geotechnical testing and observation, the following precautions are to be implemented for the safety of our field personnel on grading and construction projects.

1. Safety Meetings: Our field personnel are directed to attend the contractor's regularly scheduled safety meetings.
2. Safety Vests: Safety vests are provided for and are to be worn by our personnel while on the job site.
3. Safety Flags: Safety flags are provided to our field technicians; one is to be affixed to the vehicle when on site, the other is to be placed atop the spoil pile on all test pits.

In the event that the contractor's representative observes any of our personnel not following the above, we request that it be brought to the attention of our office.

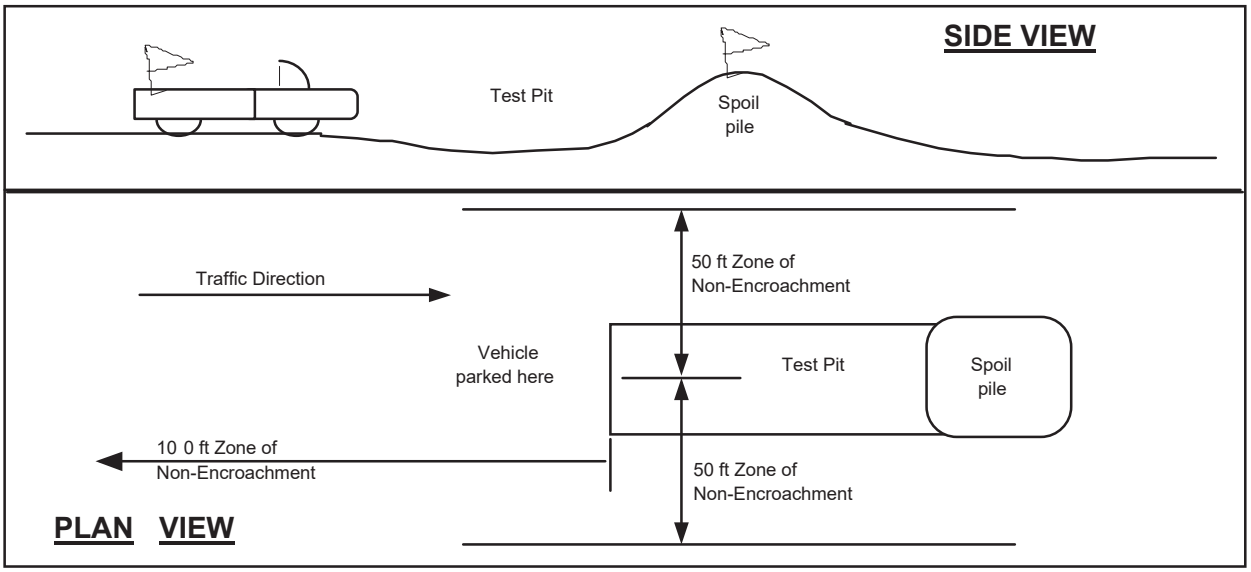
Test Pits Location, Orientation and Clearance

The technician is responsible for selecting test pit locations. The primary concern is the technician's safety. However, it is necessary to take sufficient tests at various locations to obtain a representative sampling of the fill. As such, efforts will be made to coordinate locations with the grading contractors authorized representatives (e.g. dump man, operator, supervisor, grade checker, etc.), and to select locations following or behind the established traffic pattern, preferably outside of current traffic. The contractors authorized representative should direct excavation of the pit and safety during the test period. Again, safety is the paramount concern.

Test pits should be excavated so that the spoil pile is placed away from oncoming traffic. The technician's vehicle is to be placed next to the test pit, opposite the spoil pile. This necessitates that the fill be maintained in a drivable condition. Alternatively, the contractor may opt to park a piece of equipment in front of test pits, particularly in small fill areas or those with limited access.

A zone of non-encroachment should be established for all test pits (see diagram below). No grading equipment should enter this zone during the test procedure. The zone should extend outward to the sides approximately 50 feet from the center of the test pit and 100 feet in the direction of traffic flow. This zone is established both for safety and to avoid excessive ground vibration, which typically decreases test results.

TEST PIT SAFETY PLAN



Slope Tests

When taking slope tests, the technician should park their vehicle directly above or below the test location on the slope. The contractor's representative should effectively keep all equipment at a safe operation distance (e.g. 50 feet) away from the slope during testing.

The technician is directed to withdraw from the active portion of the fill as soon as possible following testing. The technician's vehicle should be parked at the perimeter of the fill in a highly visible location.

Trench Safety

It is the contractor's responsibility to provide safe access into trenches where compaction testing is needed. Trenches for all utilities should be excavated in accordance with CAL-OSHA and any other applicable safety standards. Safe conditions will be required to enable compaction testing of the trench backfill.

All utility trench excavations in excess of 5 feet deep, which a person enters, are to be shored or laid back. Trench access should be provided in accordance with OSHA standards. Our personnel are directed not to enter any trench by being lowered or "riding down" on the equipment.

Our personnel are directed not to enter any excavation which;

1. is 5 feet or deeper unless shored or laid back,
2. exit points or ladders are not provided,
3. displays any evidence of instability, has any loose rock or other debris which could fall into the trench, or
4. displays any other evidence of any unsafe conditions regardless of depth.

If the contractor fails to provide safe access to trenches for compaction testing, our company policy requires that the soil technician withdraws and notifies their supervisor. The contractors representative will then be contacted in an effort to effect a solution. All backfill not tested due to safety concerns or other reasons is subject to reprocessing and/or removal.

Procedures

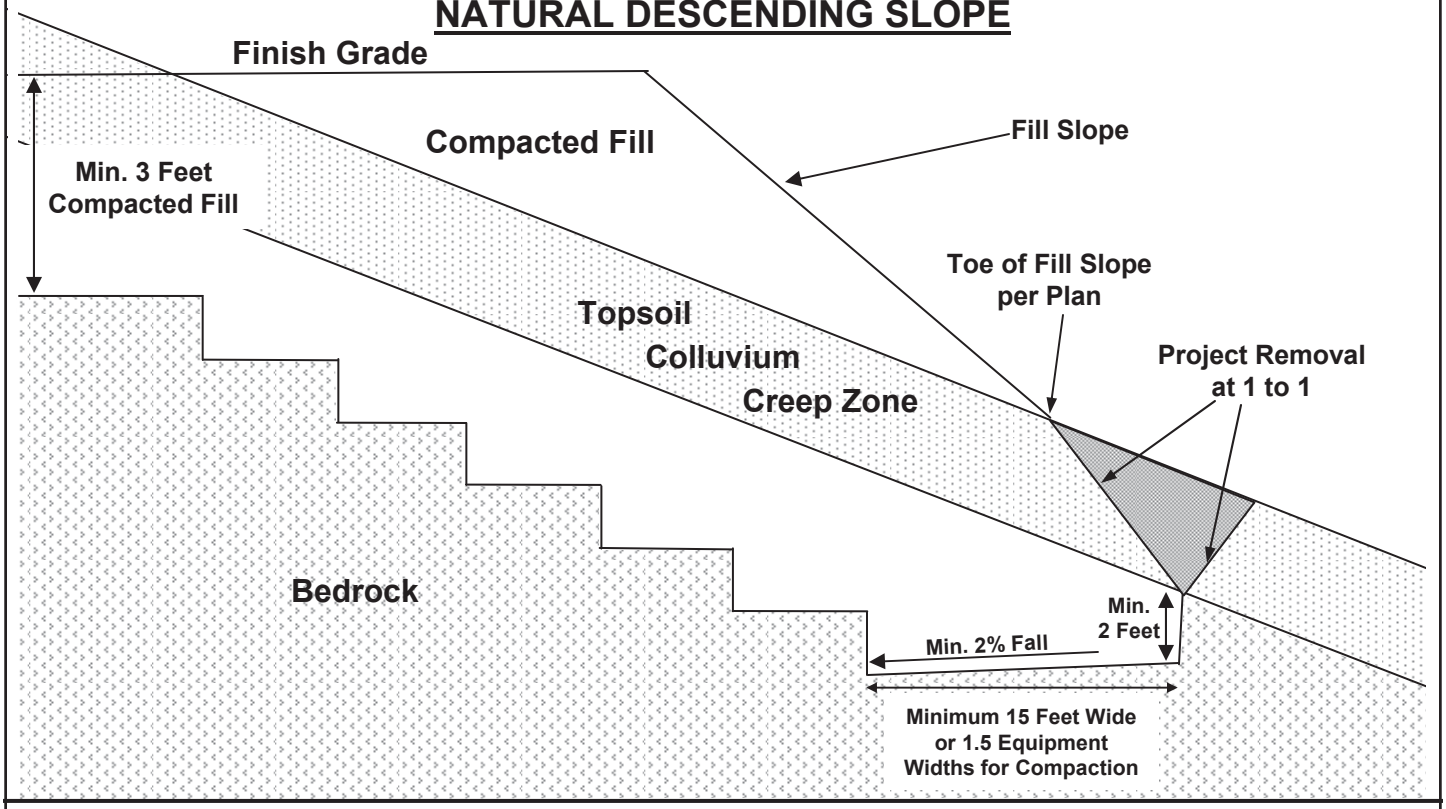
In the event that the technician's safety is jeopardized or compromised as a result of the contractor's failure to comply with any of the above, the technician is directed to inform both the developer's and contractor's representatives. If the condition is not rectified, the technician is required, by company policy, to immediately withdraw and notify their supervisor. The contractor's representative will then be contacted in an effort to effect a solution. No further testing will be performed until the situation is rectified. Any fill placed in the interim can be considered unacceptable and subject to reprocessing, recompaction or removal.

In the event that the soil technician does not comply with the above or other established safety guidelines, we request that the contractor bring this to technicians attention and notify our project manager or office. Effective communication and coordination between the contractors' representative and the field technician(s) is strongly encouraged in order to implement the above safety program and safety in general.

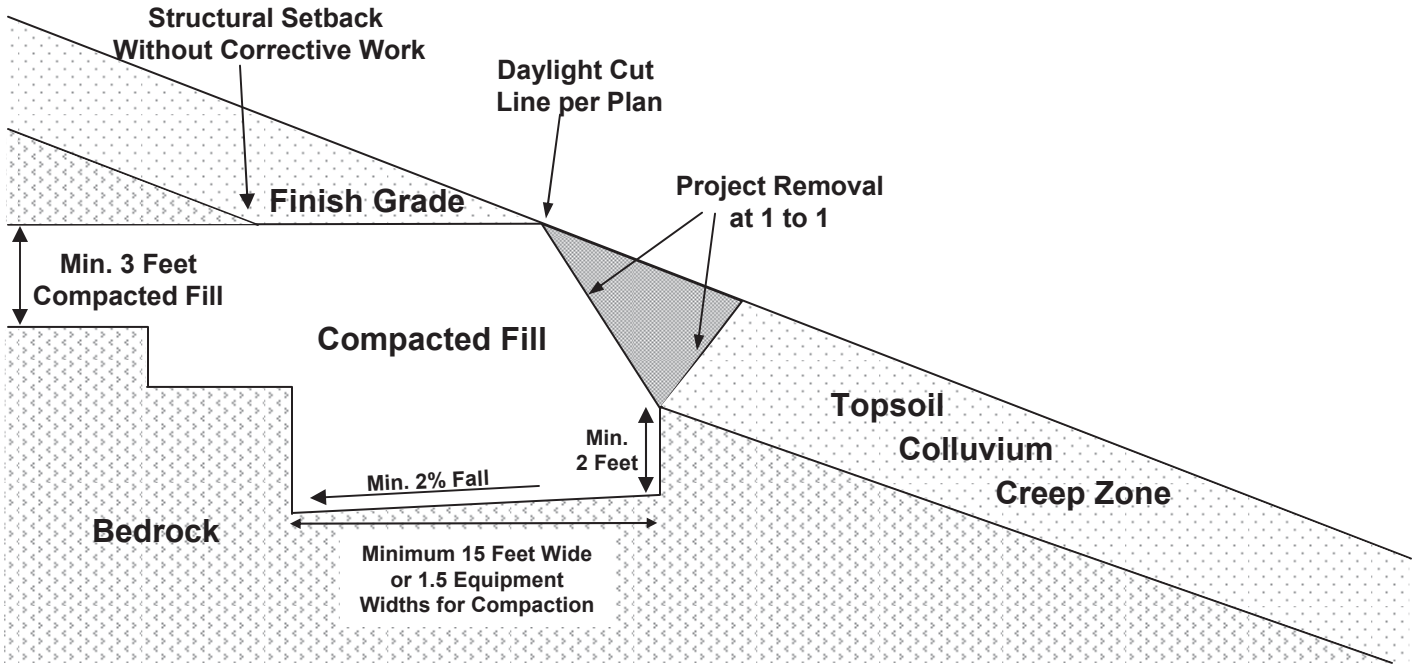
The safety procedures outlined above should be discussed at the contractor's safety meetings. This will serve to inform and remind equipment operators of these safety procedures particularly the zone of non-encroachment.

The safety procedures outlined above should be discussed at the contractor's safety meetings. This will serve to inform and remind equipment operators of these safety procedures particularly the zone of non-encroachment.

TYPICAL FILL SLOPE OVER NATURAL DESCENDING SLOPE



DAYLIGHT CUT AREA OVER NATURAL DESCENDING SLOPE



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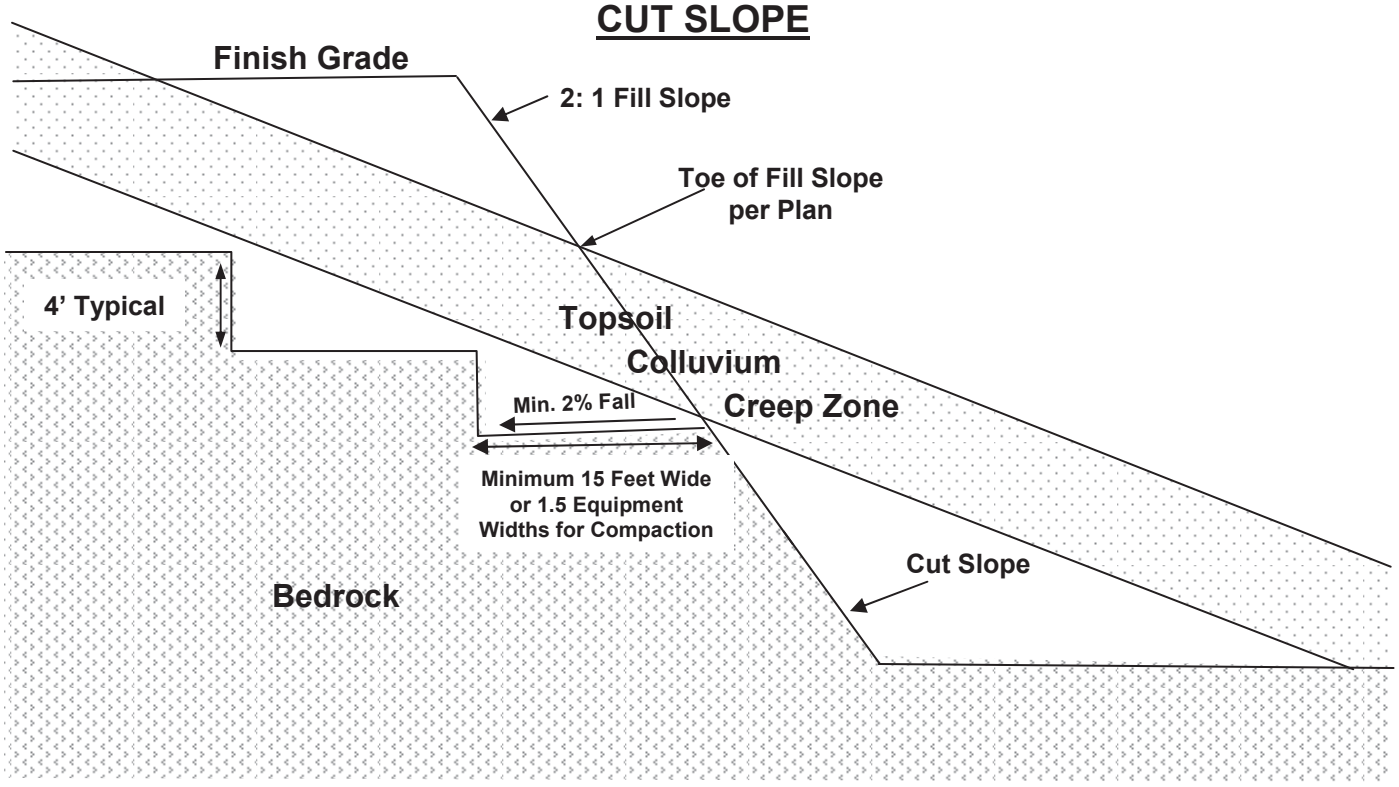
TREATMENT ABOVE NATURAL SLOPES

STANDARD GRADING GUIDELINES

PLATE G-1

TYPICAL FILL SLOPE OVER CUT SLOPE



TYPICAL FILL SLOPE

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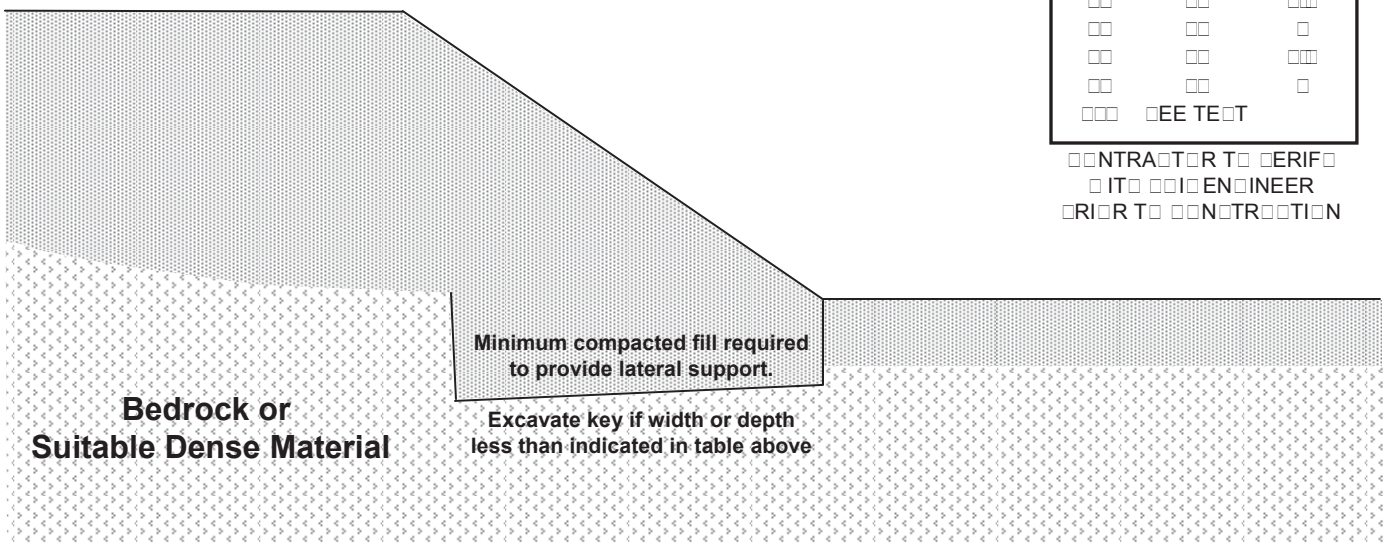

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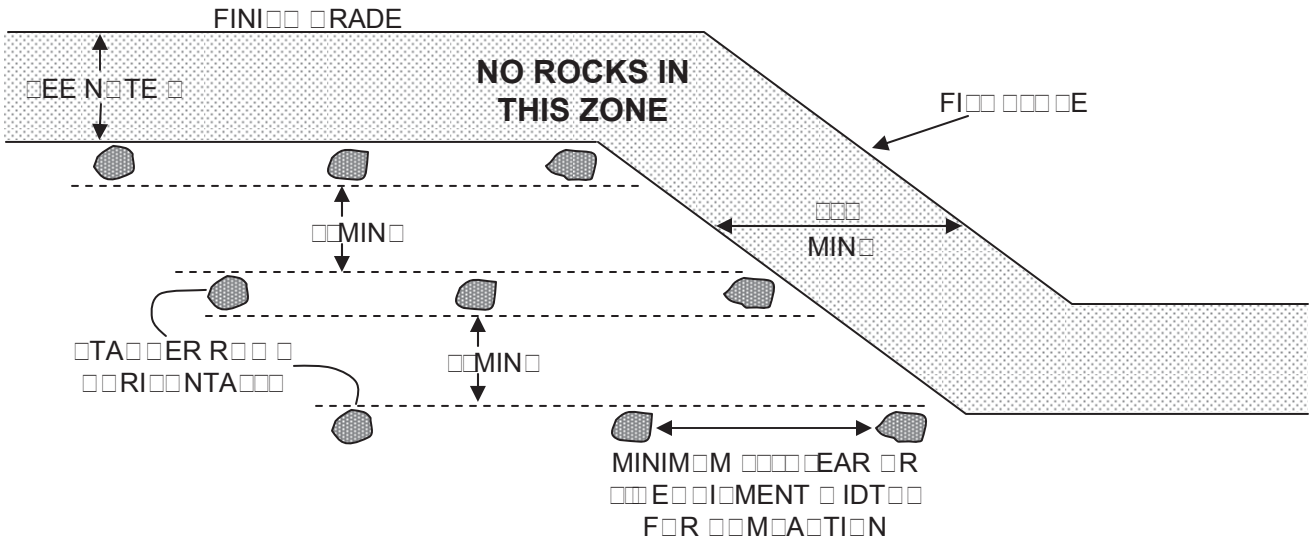
COMMON FILL SLOPE KEYS

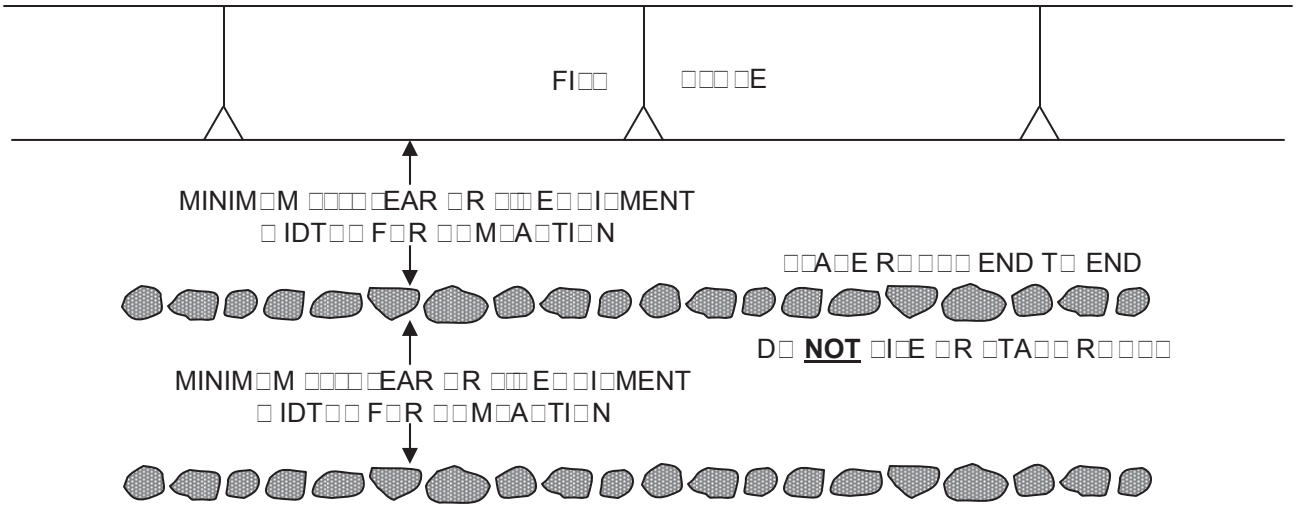
STANDARD GRADING GUIDELINES

PLATE G-2

CROSS SECTIONAL VIEW



PLAN VIEW



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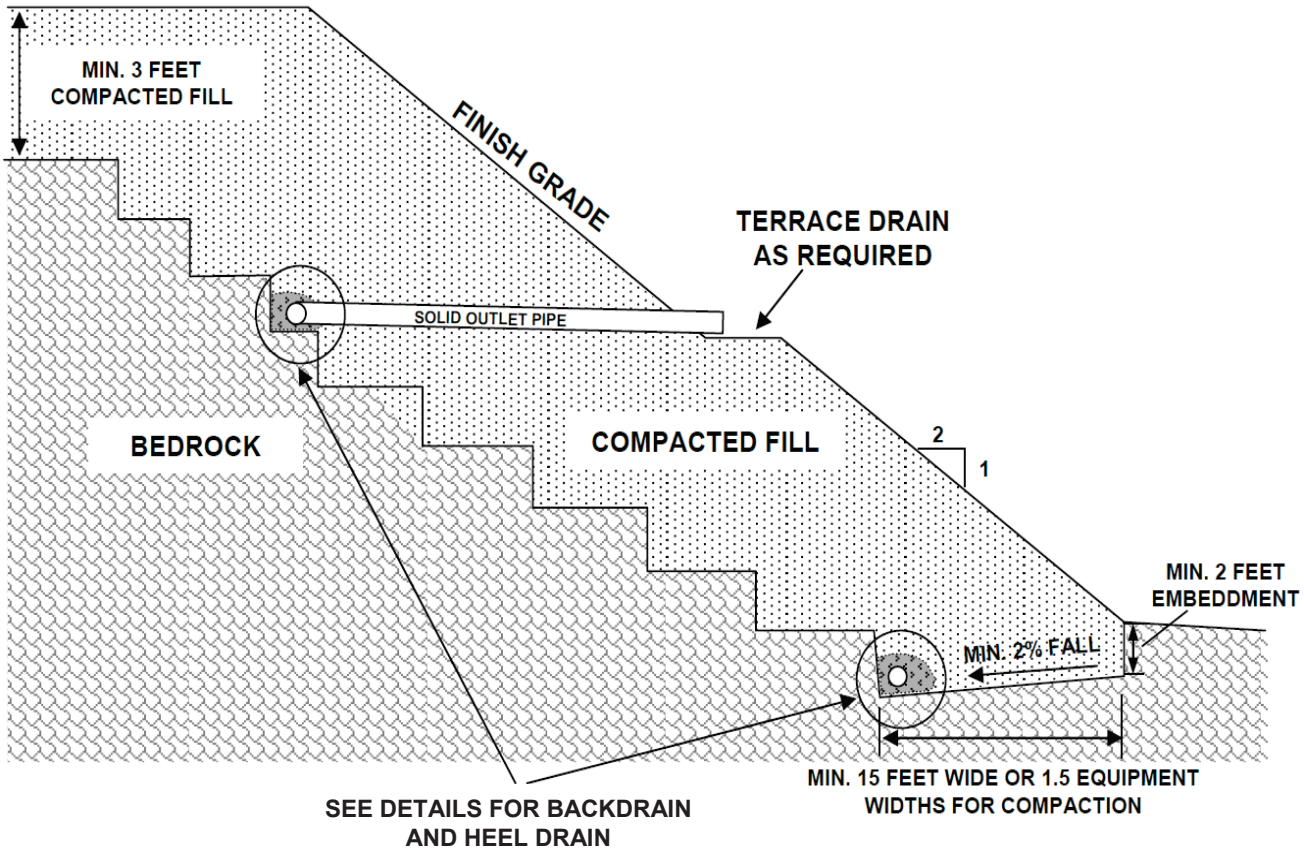

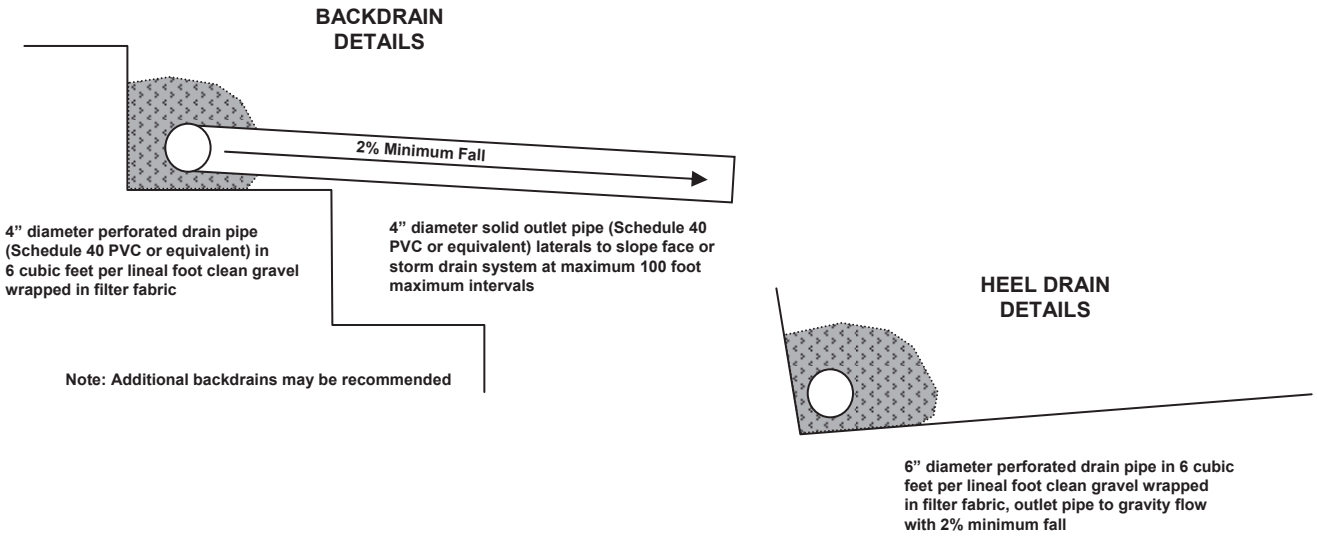

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TYPICAL BUTTRESS AND STABILIZATION FILL

STANDARD GRADING GUIDELINES

PLATE G-4