Appendix E:
Geotechnical Evaluation

THIS PAGE INTENTIONALLY LEFT BLANK

August 19, 2022 Project No. 22057-01

Ms. Johanna Crooker
Meritage Homes
5 Peters Canyon, Suite 310
Irvine, CA 92606

Subject: ***Geotechnical Subsurface Evaluation and Preliminary Design Recommendations, Proposed Approximately 58-Acre "Salt Creek" Residential Development, Southwest Corner of Simpson Road and Briggs Road, APN 333-200-062 in the City of Menifee, Riverside County, California***

In accordance with your request, LGC Geotechnical, Inc. has performed a subsurface geotechnical evaluation and provided the following preliminary design recommendations for the proposed approximately 58-acre "Salt Creek" residential development, located in the City of Menifee, Riverside County, California. The purpose of our study was to evaluate the existing onsite geotechnical conditions and to provide preliminary geotechnical recommendations relative to the proposed development.

Should you have any questions regarding this report, please do not hesitate to contact our office. We appreciate this opportunity to be of service.

Respectfully,

LGC Geotechnical, Inc.

Dennis Boratynec, GE 2770
Vice President

REGISTERED PROFESSIONAL ENGINEER
DENNIS BORATYNEC
No. 2770
GEOTECHNICAL
STATE OF CALIFORNIA

Colby Matthews, CEG 2460
Project Geologist

CERTIFIED ENGINEERING GEOLOGIST
COLBY MATTHEWS
No. 2460
STATE OF CALIFORNIA

DJB/CPM/RLD/amm

Distribution: (1) Addressee (electronic copy)

TABLE OF CONTENTS

Section ***Page***

TABLE OF CONTENTS cont'd

LIST OF TABLES, ILLUSTRATIONS, & APPENDICES

Tables

Figures

Sheets

Appendices

1.0 INTRODUCTION

LGC Geotechnical has performed a geotechnical evaluation for the proposed "Salt Creek" residential development, located in the City of Menifee, Riverside County, California (Figure 1). This report summarizes our findings, conclusions, and preliminary geotechnical design recommendations relative to the proposed development of the site.

1.1 Site and Project Description

The subject site consists of a vacant parcel of land in the City of Menifee, Riverside County, California. The evaluation of the subject site was initially part of a larger evaluation of approximately 312-acres that included the site as well as the adjacent parcels to the east and southeast in the unincorporated Winchester area of Riverside County.

The subject site is identified as APN 333-200-062 which consists of approximately 58 acres of farmland that is located within the City of Menifee, on the north side of the Salt Creek channel. The subject site is bound on the north by Simpson Road, on the south by the Salt Creek channel, on the west by an existing residential development, and on the east by vacant farmland that was part of a larger evaluation by LGC Geotechnical.

Topography: The subject site is relatively flat with about 10 feet of topographic relief. Surface drainage is via sheet flow to the south toward the Salt Creek channel.

Historical Land Use: Based on a review of historical aerial photographs the subject site has historically been used for dry farming of crops. Based on a review of historical aerial photographs it appears that sometime after the mid-1980's grading in order to straighten and channelize the naturally sinuous Salt Creek began in the Winchester area, and completion of the channelization in the vicinity of the site had occurred by December of 2005. Also, in December of 2005 it appears that construction of Domenigoni Parkway had begun, which was completed by January of 2007.

Site Conditions: At the time of our recent field work the site had been recently planted with a crop of wheat and the wheat plants were about 12 inches tall.

A north-south dirt road that appears to be a southern extension of Briggs Road was observed along the eastern side of the subject site, and a drainage ditch was observed along the dirt road. What appears to be a large diameter water pipe was observed extending up from the ground surface on the east side of the site, adjacent to the north-south dirt road, about 1,200 feet south of Simpson Road. The large diameter water pipe appears to be the irrigation supply for the wheat fields at the site and adjacent farmland; however, it is unclear if this pipe is connected to an on-site water well or if it is connected to underground municipal water pipes. Tall steel transmission poles were observed along the north-south dirt road. The steel transmission poles allow the power lines which they support to cross over the Salt Creek channel, where they transition away from the site further to the south. A set of shorter wooden power poles were observed to trend east-west along the northern side of the Salt Creek channel, from the southeast corner of the subject site, crossing through the adjacent eastern parcels where they are located along a dirt road with an adjacent ditch. The wooden power poles extend toward an Eastern Municipal Water

District sewer lift station on the east side of the gravel La Ventana Road, approximately 0.5 miles east of the site.

The Salt Creek has been channelized. The channel trends roughly southeast-northwest, with flow toward the northwest. The total width at the top of the channel is approximately 450 feet, with dirt access roads running along each side of the channel at the tops of the banks. The banks slope at about 5 to 10 percent to a flat channel bottom which is approximately 350 feet wide and an estimated 7 to 10 feet below the adjacent land surface. Vegetation within the channel consisted of a moderate to dense growth of grasses and weeds, and ponded water was observed at scattered locations along the channel bottom.

Project Description: Based on the preliminary plans by K&A Engineering, Inc., (K&A, 2021) the site will be developed with residences. Typical street, other hardscape, utility, and open space improvements are proposed in conjunction with the construction of the residences. Minor cuts and fills on the order of approximately 2 to 3 feet (not including remedial grading) are proposed. We anticipate that the residences will consist of typical one- or two-story wood-framed homes with slab on grade foundations. Preliminary building (dead plus live) loads were not provided at the time of this report. However, we have estimated the maximum wall and column (dead plus live) structural loads for the single-family residences at 2 kips per lineal foot and 25 kips, respectively.

The recommendations given in this report are based on the layout and estimated structural loads and grading information as indicated above. LGC Geotechnical should be provided with any updated project information, plans and/or any structural loads when they become available, in order to either confirm or modify the recommendations provided herein.

1.2 Previous Reports

No previous reports were available for review. If previous reports that address the site exist, they should be made available for our review so that the data from those reports can be incorporated into the characterization of the site.

1.3 Subsurface Exploration

Our recent subsurface evaluation was conducted over a large area consisting of 8 parcels of vacant land comprising approximately 312-acres, of which the subject site, consisting of 1 parcel comprising approximately 58-acres, is a part. The data obtained from the subsurface exploration of the larger area are incorporated into the evaluation of the subject site, and therefore the data from the borings, cone penetration tests, and test pits from the larger evaluation are presented herein.

Our subsurface exploration for the large area consisted of advancing 14 hollow stem auger borings (HS-1 through HS-11 and I-1 through I-3), 9 Cone Penetration Test (CPT) soundings (CPT-1 through CPT-8 and one adjacent to the location of test pit TP-5), and the excavation of 11 test pits (TP-1 through TP-11) in April and May of 2022, in order to evaluate geotechnical conditions. Personnel from LGC Geotechnical observed the trenching and drilling operations, logged the trenches and borings, and collected soil samples for laboratory testing.

The portion of the subsurface evaluation of the larger area that was performed within the limits of the subject site include Borings HS-1, HS-2 and I-1, Cone Penetration Test sounding CPT-1, and test pits TP-1 and TP-2.

Test pits TP-1 through TP-11 were excavated on April 10 and 15, 2022, utilizing a John Deere 410 wheel-mounted backhoe equipped with 18-inch and 36-inch buckets to depths ranging from approximately 9 to 13.5 feet below the ground surface. The trenches were logged, and bulk samples of the near-surface soils were collected for laboratory testing. The bulk samples represent a mixture of soils within a given depth range, as indicated. At completion of the excavation the test pits were backfilled, some settlement of the backfill soils may occur over time.

Cone Penetration Test soundings were advanced by Kehoe Testing & Engineering on April 11, 2022, to depths ranging from approximately 27 to 50 feet below the ground surface. The CPT soundings were advanced using an electronic cone penetrometer in general accordance with the current ASTM standards (ASTM D5778 and ASTM D3441). The CPT equipment consisted of a cone penetrometer assembly mounted at the end of a series of hollow sounding rods. The interior of the cone penetrometer is instrumented with strain gauges that allow the simultaneous measurement of cone tip and friction sleeve resistance during penetration. The cone penetration assembly is continuously pushed into the soil by a set of hydraulic rams at a standard rate of 0.8 inches per second while the cone tip resistance and sleeve friction resistance are recorded at approximately every 2 inches and stored in digital form. All CPTs were performed by Kehoe Testing and Engineering using a 30-ton truck mounted CPT rig.

Borings HS-1 through HS-5 and I-1 through I-3 were excavated by Cal-Pac Drilling on April 11 and 12, 2022, using a truck-mounted drill rig, borings HS-1 through HS-5 were excavated to depths of approximately 26.5 to 45 feet and borings I-1 through I-3 were excavated to depths of approximately 5 to 10 feet below the ground surface. Borings HS-6 through HS-11 were excavated by Martini Drilling on May 5, 2022, using a truck-mounted drill rig to depths of approximately 7.5 to 51 feet below the ground surface. The drill rigs were equipped with 8-inch diameter hollow-stem augers. Driven soil samples were collected by means of the Standard Penetration Test (SPT) and Modified California Drive (MCD) sampler generally obtained at 2.5 to 5-foot vertical increments. The MCD is a split-barrel sampler with a tapered cutting tip and lined with a series of 1-inch-tall brass rings. The SPT sampler (1.4-inch ID) and MCD sampler (2.4-inch ID, 3.0-inch OD) were driven using a 140-pound automatic hammer falling 30 inches to advance the sampler a total depth of 18 inches. The raw blow counts for each 6-inch increment of penetration were recorded on the boring logs. Bulk samples of the near-surface soils were also collected and logged at select borings for laboratory testing. At the completion of drilling and testing, the borings were backfilled and tamped. Some settlement of the backfill soils may occur over time.

Infiltration testing was performed on April 13, 2022, at I-1 through I-3. PVC pipe was installed in the infiltration borings for the testing, and after infiltration testing was completed the PVC pipe was removed. At the completion of drilling and testing, the borings were backfilled and tamped. Some settlement of the backfill soils may occur over time.

The approximate locations of our subsurface explorations are provided on Sheet 1. The boring, CPT, and trench logs are provided in Appendix B.

1.4 Laboratory Testing

Representative bulk, and driven, relatively undisturbed, samples were obtained for laboratory testing during our field evaluation. Laboratory testing included in-situ moisture content and in-situ dry density, organic content, expansion index, collapse/swell, consolidation, Atterberg limits, laboratory maximum compaction, R-value, and corrosion (sulfate, chloride, pH, and minimum resistivity). A summary of the laboratory test results is presented below.

- Field moisture content ranged from approximately 2 percent to 54 percent, with an average of 16 percent. Dry density values ranged from approximately 72 pounds per cubic foot (pcf) to 127 pcf, with an average of 109 pcf.
- Thirty organic content tests indicate that the organic content of the upper approximately 2 to 3 feet of soil ranged from approximately 1 to 5 percent with an average of approximately 2 percent.
- Six Expansion Index (EI) tests indicated EI values ranging from 0 to 26, corresponding to "Very Low" to "Low" expansion potential.
- Four collapse tests were performed on select samples. The collapse versus vertical stress plots are provided in Appendix C.
- Three consolidation tests were performed on select samples. The deformation versus vertical stress plots are provided in Appendix C.
- Two Atterberg limit tests indicated soils with Plasticity Indices of 10 and 12.
- Four laboratory maximum compaction tests indicated maximum dry densities of 97.0 to 133.5 pcf and optimum moisture contents ranging from 7.5 to 22.0 percent.
- R-value testing of near surface soils indicated an R-value of 21.
- Six Corrosion tests indicated soluble sulfate content ranging from approximately 0.01 to 0.94 percent, chloride contents ranging from 100 to 540 parts per million (ppm), a pH value of 8.16, and a resistivity value of 246 ohm-centimeters.

A summary of the results is presented in Appendix C. The moisture and dry density results are presented on the boring and test pit logs in Appendix B.

1.5 Field Infiltration Testing

Three falling head field percolation tests (I-1 through I-3) were performed in the approximate locations indicated on our Geotechnical Map (Sheet 1). Estimation of infiltration rates for the site was accomplished in general accordance with the guidelines set forth by the set forth by the County of Riverside (2011). A 3-inch diameter perforated PVC pipe with filter sock was placed in the borehole, and the annulus was backfilled with gravel. The percolation wells were pre-soaked prior to testing. The test interval was determined to be 10 minutes at I-1 and I-2, and 30 minutes at I-3. Successive percolation tests were performed starting at approximately the initial testing water level. The observed infiltration rates are considered representative of the site soils where tested. Observed infiltration rates have been normalized to correct the 3-Dimensional flow that occurs within the field test to 1-Dimensional flow out of the bottom of the boring. These measured infiltration rates include an estimated factor of safety of 3. The

approximate infiltration test locations are shown on the Geotechnical Map (Sheet 1) and the results of the field infiltration tests are summarized in Table 1 on the following page. Infiltration test results are provided in Appendix D.

TABLE 1

Summary of Field Infiltration Testing

Infiltration Test No.	Approx. Depth Below Existing Grade (ft)	Observed Infiltration Rate* (in./hr.)	Measured Infiltration Rate** (in./hr.)
I-1	5	1.9	0.6
I-2	5	2.7	0.9
I-3	10	0.0	0.0

*Observed Infiltration Rates Do Not Include Factor of Safety.
**Measured Infiltration Rates Based on Factor of Safety of 3.

The measured infiltration rates provided in this report are considered a general representation of the infiltration rate at the test locations. Please note, the testing of infiltration rates is highly dependent upon the materials encountered at the point of testing (i.e., location and depth of testing). Varying subsurface conditions may exist outside of the test location which could alter the measured infiltration rates presented above. Please refer to Section 4.11 for preliminary subsurface water infiltration recommendations.

2.0 GEOTECHNICAL CONDITIONS

2.1 Regional Geology

The site is located in the Northern Peninsular Range on the southern sector of the structural unit known as the Perris Block. The Perris Block is bounded on the northeast by the San Jacinto Fault Zone, on the southwest by the Elsinore Fault Zone, and the north by the Cucamonga Fault Zone. The southern boundary of the Perris Block is not as distinct but is believed to coincide with a complex group of faults trending southeast from the Murrieta, California area (Kennedy, 1977). The Peninsular Range is characterized by large Mesozoic age intrusive rock masses flanked by volcanic, metasedimentary, and sedimentary rocks. Various thicknesses of colluvial and alluvial sediments derived from the erosion of the elevated portions of the region fill the low-lying areas.

2.2 Site-Specific Geology

Based on the Geologic Map of the Romoland Quadrangle (Morton, 2003), and our geologic field mapping, the subject site is underlain by undocumented agricultural fill, young alluvium, and old alluvium. The geologic units are summarized below, and their approximate lateral limits are depicted on the Geotechnical Map (Sheet 1). It should be noted that the relatively thin agricultural fill is not shown on the site plan and therefore there are areas delineated on the site plan that indicate young and old alluvium exposed at the surface that are overlain by approximately 1 foot of undocumented agricultural fill.

It should be noted that the excavated borings and trenches are only representative of the locations where they were excavated at the time in which they were performed, and varying subsurface conditions may exist outside of those location. In addition, subsurface conditions can change over time. The soil descriptions provided should not be construed to indicate that the subsurface profile is uniform, and that soil is homogeneous within the project area.

2.2.1 Undocumented Artificial Fill (not mapped on-site)

Relatively thin undocumented agricultural fill associated with tilling for crop cultivation was found to mantle the site, and it is not shown on the site plan, as described above. Minor undocumented fill is also likely associated with the dirt roads and associated drainage ditches along the eastern and southern perimeters of the site. During our evaluation, the agricultural fill was found to range up to approximately 1 foot thick. The agricultural fill was found to consist of silty fine-grained sand with scattered clayey sand, and fine roots from the crops were commonly encountered. The agricultural fill was found to be dry to moist and loose in place, and excavation was easy.

2.2.3 Quaternary Young Alluvium (Qal)

Young alluvial deposits were exposed across approximately the southeastern 2/3 of the site to depths of up to approximately 20 feet below the ground surface, where it was found to be underlain by old alluvium. The young alluvium was found to consist mostly

of silty fine-grained sand and sandy silt, with scattered discontinuous lenses of poorly graded sand, and clayey sand. The young alluvium was generally found to be dry to wet and loose to dense or medium stiff to very stiff in-place. The near surface portions of the young alluvium were generally found to be porous, with scattered root hairs in the upper approximately 1 to 2 feet. Excavation of the young alluvium is anticipated to be easy.

2.2.4 Quaternary Old Alluvium (Qoa)

Old alluvial deposits were exposed across approximately the northwest 1/3 of the site, and they were encountered beneath the young alluvium across the site. The old alluvium was found to consist of silty fine-grained sand, clayey sand, sandy silt, clay, and scattered discontinuous beds of poorly graded sand. It was found to be moist to wet, and loose to very dense or soft to hard in-place. The upper approximately 3 feet was commonly found to be porous, with a blocky structure and carbonate deposits (caliche). Excavation was easy to moderately difficult with a backhoe, but excavation with heavy earth moving equipment is anticipated to be relatively easy.

2.2.5 Cretaceous Domenigoni Valley Granodiorite (not mapped on-site)

Granitic bedrock consisting of granodiorite was exposed on the rocky hillsides approximately 1 mile northeast, 0.75 mile west, and 0.25 mile southwest of the subject site. The old alluvial deposits at the site are underlain by granitic bedrock at depths beyond the maximum depth explored at the subject site, approximately 26.5 feet below the ground surface, and therefore encountering bedrock at the site is not anticipated.

2.3 Geologic Structure

The bedding within the young and old alluvium is generally horizontal.

2.4 Landslides

Our research and field observations do not indicate the presence of landslides on the subject site or in the immediate vicinity, which is consistent with the low topographic relief at the site. Review of regional geologic maps of the area do not indicate the presence of known or suspected landslides in the vicinity of the site.

2.5 Groundwater

What appears to be groundwater recharge ponds are located approximately 2,800 feet to the northeast of the subject site. The ponds cover an area of approximately 100 acres, and the recharge ponds appear to be affecting the groundwater elevations in the vicinity of the subject site. The groundwater levels on the site are shallowest near the northeastern corner of the site in the area nearest to the ponds, and generally the depth to groundwater increases toward the

south and west. Groundwater was encountered at approximately 12 to 15 feet below the ground surface at the subject site, however, in conjunction with the larger evaluation of which the subject site is a part, groundwater was encountered at approximately 6 to 18 feet below the ground surface in the parcels adjacent to the eastern side of the subject site. Historic high groundwater was conservatively estimated to be approximately 5 feet below existing grades for the purpose of liquefaction analysis.

Groundwater is not expected to be a concern during grading of the subject site; however, it may be a challenge during utility construction if the proposed utilities are deep. Dewatering and/or other special techniques may be necessary. Where utilities are at or below the water table, installing those utilities may require special techniques for shoring, stabilization, and design. The potential impact of groundwater on grading and utility installation is discussed in more detail in Section 4.1, the Earthwork Recommendations section, and associated subsections.

Groundwater and/or groundwater seepage conditions may occur in the future due to changes in land use and/or following periods of heavy rain, or due to irrigation. Seasonal fluctuations of groundwater elevations should be expected over time. In general, groundwater levels fluctuate with the seasons and local zones of perched groundwater may be present within the near-surface deposits due to local landscape irrigation or precipitation, especially during rainy seasons and/or near the Salt Creek channel.

2.6 Faulting and Seismic Hazards

Prompted by damaging earthquakes in Northern and Southern California, State legislation and policies concerning the classification and land-use criteria associated with faults have been developed. Their purpose was to prevent the construction of urban developments across the trace of active faults, resulting in the Alquist-Priolo Earthquake Fault Zoning Act. Earthquake Fault Zones have been delineated along the traces of active faults within California. Where developments for human occupation are proposed within these zones, the State requires detailed fault evaluations be performed so that engineering geologists can mitigate the hazards associated with active faulting by identifying the location of active faults and allowing for a setback from the zone of previous ground rupture.

The subject site is not located within a State of California Earthquake Fault Zone (formerly known as an Alquist-Priolo Special Studies Zone, or simply A-P Zone), nor is it located within a Riverside County Fault Zone, and no faults were identified on the site during our site evaluation. The possibility of damage due to ground rupture is considered low since no active faults are known to cross the site or trend toward the site.

Secondary effects of seismic shaking resulting from large earthquakes on the major faults in the Southern California region, which may affect the site, include ground lurching, shallow ground rupture, soil liquefaction and dynamic settlement. These secondary effects of seismic shaking are a possibility throughout the Southern California region and are dependent on the distance between the site and causative fault and the onsite geology. The closest active faults are the Elsinore Fault and the San Jacinto Fault; active, right-lateral, strike-slip faults, located approximately 9 miles to the southwest and to the northeast of the site, respectively. The trends of the Elsinore Fault and San Jacinto Fault are northwest-southeast, oblique to the site. Therefore, there are no active faults on the site or trending toward the site. Some major active

nearby faults that could produce secondary effects include the Cucamonga, Elsinore, San Jacinto, and San Andreas Fault Zones, among others (CGS, 2018). A discussion of these secondary effects is provided in the following sections.

2.6.1 Lurching and Shallow Ground Rupture

Soil lurching refers to the rolling motion on the ground surface by the passage of seismic surface waves. Effects of this nature are not likely to be significant where the thickness of soft sediments do not vary appreciably under structures. Ground rupture due to active faulting is not likely to occur onsite due to the absence of known active fault traces. Ground cracking due to shaking from distant seismic events is not considered a significant hazard, although it is a possibility at any site.

2.6.2 Liquefaction and Dynamic Settlement

Liquefaction is a seismic phenomenon in which loose, saturated, granular soils behave similarly to a fluid when subject to high-intensity ground shaking. Liquefaction occurs when three general conditions coexist: 1) shallow groundwater; 2) low density non-cohesive (granular) soils; and 3) high-intensity ground motion. Studies indicate that saturated, loose near surface cohesionless soils exhibit the highest liquefaction potential, while dry, dense, cohesionless soils and cohesive soils exhibit low to negligible liquefaction potential. In general, cohesive soils are not considered susceptible to liquefaction, depending on their plasticity and moisture content (Bray & Sancio, 2006). Effects of liquefaction on level ground include settlement, sand boils, and bearing capacity failures below structures. Dynamic settlement of dry loose sands can occur as the sand particles tend to settle and densify as a result of a seismic event.

Based on the Riverside County maps (Riverside County, 2022), the potential for liquefaction varies across the site: the potential for liquefaction at the subject site is High to Very High. It is likely that these determinations were made based on assumed shallow groundwater and thick young alluvial deposits. However, during our site-specific evaluation we have determined that the density and relative shallow depths of the old alluvium, as well as the fine-grained nature of the soils interspersed within the old alluvium indicates that only relatively minor seismic settlements due to liquefaction are anticipated.

Groundwater levels described in Section 2.5, along with the conservatively estimated historic high groundwater levels were used in the liquefaction analysis. Preliminary liquefaction analysis was performed using CPT data along with liquefaction analysis software (GeoLogismiki, 2021). Furthermore, isolated layers may be susceptible to dry sand seismic settlement which was analyzed based on the procedures outlined by Pradel (Pradel, 1998). Preliminary liquefaction potential was evaluated using the procedures outlined by Special Publication 117A (SCEC, 1999 & CGS, 2008) and the applicable seismic criteria (e.g., 2019 CBC). Liquefaction analysis was estimated using the PGA_M per the 2019 CBC and a moment magnitude of 6.93 (USGS, 2014). Liquefaction analysis is presented in Appendix E.

The liquefaction analysis incorporated the preliminary recommended earthwork removal and recompaction depths (see Sheet 1) into estimated seismic settlement. Estimated total and differential seismic settlement due to liquefaction and dry sand settlement is provided in Table 2 below. We anticipate that the recommended earthwork and foundation design will mitigate for the minor seismic settlement due to liquefaction.

TABLE 2

Estimated Seismic Settlement

Approximate Total Seismic Settlement	Approximate Differential Seismic Settlement
1-inch	½-inch over 40 feet

2.6.3 Lateral Spreading

Lateral spreading is a type of liquefaction-induced ground failure associated with the lateral displacement of surficial blocks of sediment resulting from liquefaction in a subsurface layer. Once liquefaction transforms the subsurface layer into a fluid mass, gravity plus the earthquake inertial forces may cause the mass to move downslope towards a free face (such as a river channel or an embankment). Lateral spreading may cause large horizontal displacements and such movement typically damages pipelines, utilities, bridges, and structures.

The sandy soils anticipated to be left in place (below the recommended removal and recompaction depths presented on the Geotechnical Map Sheet 1) generally have a normalized clean sand tip resistance well above 70. A normalized clean sand tip resistance of 70 corresponds to a blow count $(N_1)_{60}$ of at least 15. Soils with a corrected SPT $(N_1)_{60}$ blow count of 15 or greater are generally not considered susceptible to lateral spreading (Youd, Hansen, Bartlett, 2002). Furthermore, isolated sandy layers susceptible to liquefaction were generally found not to be laterally continuous.

Due to the depth of proposed earthwork removals, presence of dense sandy soils interfingered with non-liquefiable fine-grained soils below the recommended earthwork removals, and limited nature of potentially liquefiable soils, the potential for lateral spreading is considered low.

2.7 Seismic Design Parameters

The site seismic characteristics were evaluated per the guidelines set forth in Chapter 16, Section 1613 of the 2019 California Building Code (CBC) and applicable portions of ASCE 7-16 which has been adopted by the CBC. Please note that the following seismic parameters are only applicable for code-based acceleration response spectra and are not applicable for where site-specific ground motion procedures are required by ASCE 7-16. Representative site coordinates of latitude 33.7035 degrees north and longitude -117.1331 degrees west were utilized in our analyses. Please note that these coordinates are considered representative of the site for

preliminary planning purposes, however their applicability must be verified with respect to a desired specific location within the site. The maximum considered earthquake (MCE) spectral response accelerations (S_{MS} and S_{M1}) and adjusted design spectral response acceleration parameters (S_{DS} and S_{D1}) for Site Class D are provided in Table 3 on the following page. The structural designer should contact the geotechnical consultant if structural conditions (e.g., number of stories, seismically isolated structures, etc.) require site-specific ground motions.

Section 1803.5.12 of the 2019 CBC (per Section 11.8.3 of ASCE 7) states that the maximum considered earthquake geometric mean (MCE_G) Peak Ground Acceleration (PGA) should be used for liquefaction potential. The PGA_M for the site is equal to 0.55g (SEAOC, 2022). The design PGA is equal to 0.367g (2/3 of PGA_M).

A deaggregation of the PGA based on a 2,475-year average return period (MCE) indicates that an earthquake magnitude of 6.93 at a distance of approximately 15.62 km from the site would contribute the most to this ground motion. A deaggregation of the PGA based on a 475-year average return period (Design Earthquake) indicates that an earthquake magnitude of 6.83 at a distance of approximately 19.41 km from the site would contribute the most to this ground motion (USGS, 2014).

TABLE 3

Seismic Design Parameters

Selected Parameters from 2019 CBC, Section 1613 - Earthquake Loads	Seismic Design Values	Notes/Exceptions
Distance to applicable faults classifies the site as a "Near-Fault" site.		Section 11.4.1 of ASCE 7
Site Class	D*	Chapter 20 of ASCE 7
Ss (Risk-Targeted Spectral Acceleration for Short Periods)	1.405g	From SEAOC, 2022
S_1 (Risk-Targeted Spectral Accelerations for 1-Second Periods)	0.523g	From SEAOC, 2022
F_a (per Table 1613.2.3(1))	1.000	For Simplified Design Procedure of Section 12.14 of ASCE 7, F_a shall be taken as 1.4 (Section 12.14.8.1)
F_v (per Table 1613.2.3(2))	1.777	Value is only applicable per requirements/exceptions per Section 11.4.8 of ASCE 7
S_{MS} for Site Class D [Note: $S_{MS} = F_aS_S$]	1.405g	-
S_{M1} for Site Class D [Note: $S_{M1} = F_vS_1$]	0.929g	Value is only applicable per requirements/exceptions per Section 11.4.8 of ASCE 7
S_{DS} for Site Class D [Note: $S_{DS} = (^2/_3)$ SMS]	1.937g	-
S_{D1} for Site Class D [Note: $S_{D1} = (^2/_3)$ SM_1]	0.620g	Value is only applicable per requirements/exceptions per Section 11.4.8 of ASCE 7
C_{RS} (Mapped Risk Coefficient at 0.2 sec)	0.931	ASCE 7 Chapter 22
C_{R1} (Mapped Risk Coefficient at 1 sec)	0.914	ASCE 7 Chapter 22
*Since site soils are Site Class D and S_1 is greater than or equal to 0.2, the seismic response coefficient Cs is determined by Eq. 12.8-2 for values of $T \leq 1.5T_s$ and taken equal to 1.5 times the value calculated in accordance with either Eq. 12.8-3 for $T_L \geq T > T_s$, or Eq. 12.8-4 for $T > T_L$. Refer to ASCE 7-16.		

2.8 Rippability

A rippability survey was not within the scope of this report, however, we have provided some preliminary guidance concerning the rippability characteristics of the on-site materials based on our observations and experience in the vicinity of the site. We anticipate that excavation of the undocumented agricultural fill, and young alluvium (shown as Qal on the Geotechnical Site Plan) will be easy. Excavation of the old alluvium (shown as Qoa on the Geotechnical Site Plan)

was easy to moderately difficult using a backhoe, but excavation with heavy earth moving equipment is anticipated to be relatively easy.

2.9 Oversized Material

Based on visual observations, encountering oversized material (material larger than 8 inches in maximum dimension) is not anticipated during the excavation at the subject site.

2.10 Expansive Soil Characteristics

Expansion Index (EI) test results indicated EI values ranging from 0 to 26, corresponding to "Very Low" to "Low" Expansion Indices. Some deep soils have significant amounts of clay which could potentially be expansive. Final expansion potential of site soils should be determined at the completion of grading. Results of expansion testing at finish grades will be utilized to confirm final foundation design.

3.0 FINDINGS AND CONCLUSIONS

Based on the results of our geotechnical evaluation, it is our opinion that the proposed site development is feasible from a geotechnical standpoint, provided the following conclusions and recommendations are incorporated into the site design, grading, and construction.

The following is a summary of the primary geotechnical factors, which may affect future development of the site.

- The site has been utilized for dry farming. The upper approximately 1 foot consists of agricultural fill that has slightly elevated organic content with an average organic content of 2 percent. The surficial organic soils should be blended with underlying soils that are lower in organic content in order to achieve soils that have an overall low organic content. Additionally, the near surface loose, dry, and potentially compressible soils are not suitable for the planned improvements in their present condition.
- During our recent evaluation groundwater was encountered at depths of approximately 12 to 15 feet below the ground surface at the subject site, and approximately 6 to 18 feet below the ground surface in the offsite parcels adjacent to the east side of the site. Historic high groundwater was conservatively estimated to be approximately 5 feet below existing grades for the purpose of liquefaction analysis. Groundwater elevations fluctuate, especially seasonally or near the creek channel, and groundwater could be encountered at shallower elevations.
- Groundwater is not expected to be a concern during grading when achieving the proposed 5- to 6-foot removal bottoms for the remedial grading at the subject site.
- It is possible that deep utilities such as sewer and storm drain may be installed at or below the water table in portions of the site. The depths of the utilities are unknown; however, a sewer lift station is located approximately 0.5 miles east of the site which may indicate the sewer is especially deep. Special excavating techniques will likely be necessary, such as dewatering, for the installation of utilities below the groundwater. Utilities at or below groundwater should be designed for buoyancy. Special shoring techniques, such as use of shields, flatter temporary side slopes, etc., may be necessary for utility installation below the groundwater in conjunction with other mitigation.
- The proposed development will likely be subjected to strong seismic ground shaking during its design life from one of the regional faults. The subject site is not located within a State of California Earthquake Fault Zone, nor is it within a Riverside County Fault Zone. No active earthquake faults were identified on the site or trending toward the site during our evaluation.
- Riverside County mapping indicates the site has a High to Very High potential for liquefaction. Based on a site-specific liquefaction evaluation, on the order of 1-inch of seismic settlement was estimated. This minor settlement can be mitigated with the recommended remedial grading and foundation design.
- Soils encountered at the site are anticipated to have “Very Low” to “Low” Expansion Potential. Some deep soils have significant amounts of clay which could potentially be expansive.
- Corrosion tests indicated that the site soils are corrosive.
- Excavation for foundations and underground improvements should be achievable with the appropriate equipment.

- Field percolation testing indicated low infiltration rates; therefore, stormwater infiltration is not feasible.
- The site contains some clayey soils that are not suitable for backfill of retaining walls due to high fines content and Low Expansion potential. Therefore, select grading and stockpiling of suitable select sandy soils, or import of select sandy soils meeting project recommendations will be required.

4.0 RECOMMENDATIONS

The following recommendations are to be considered preliminary and should be confirmed upon completion of earthwork operations. In addition, they should be considered minimal from a geotechnical viewpoint, as there may be more restrictive requirements from the architect, structural engineer, building codes, governing agencies, or the City and County. It is the responsibility of the builder to ensure these recommendations are provided to the appropriate parties.

It should be noted that the following geotechnical recommendations are intended to provide sufficient information to develop the site in general accordance with the 2019 California Building Code (CBC) requirements. With regard to the potential occurrence of potentially catastrophic geotechnical hazards such as fault rupture, earthquake-induced landslides, liquefaction, etc. the following geotechnical recommendations should provide adequate protection for the proposed development to the extent required to reduce seismic risk to an "acceptable level." The "acceptable level" of risk is defined by the California Code of Regulations as "the level that provides reasonable protection of the public safety, though it does not necessarily ensure continued structural integrity and functionality of the project" [Section 3721(a)]. Therefore, repair and remedial work of the proposed improvement may be required after a significant seismic event. With regards to the potential for less significant geologic hazards to the proposed development, the recommendations contained herein are intended as a reasonable protection against the potential damaging effects of geotechnical phenomena such as expansive soils, fill settlement, groundwater seepage, etc. It should be understood, however, that although our recommendations are intended to maintain the structural integrity of the proposed development and structures given the site geotechnical conditions, they cannot preclude the potential for some cosmetic distress or nuisance issues to develop as a result of the site geotechnical conditions.

The geotechnical recommendations contained herein must be confirmed to be suitable or modified based on the actual exposed conditions.

4.1 Site Earthwork

We anticipate that earthwork at the subject site will consist of typical cut and fill grading in order to construct the proposed building pads, slopes, roads, and utility installation. We recommend that earthwork onsite be performed in accordance with the following recommendations and the City of Menifee and County of Riverside Grading Requirements. In case of conflict, the following recommendations shall supersede all previous geotechnical recommendations. The following recommendations should be considered preliminary and may be revised based on the actual as-graded conditions of the site.

4.1.1 Site Preparation

All vegetation, trees, roots, etc., and any man-made materials should be removed from the site and not used as fill material. Any water wells should be properly abandoned in accordance with County and State regulatory guidelines. Holes resulting from the removal of buried obstructions, which extend below proposed finish grades, should be replaced with suitable compacted fill material.

All agricultural/undocumented fill, including any stockpiles and test pit backfill, should be removed, and may be stockpiled for reuse as engineered fill. At the conclusion of the clearing operations, a representative of LGC Geotechnical should observe and accept the site prior to further grading.

4.1.2 Remedial Grading Recommendations

In order to provide a relatively uniform bearing condition for the planned structures remedial grading is required. Agricultural fill, and loose, compressible, dry alluvial soils are considered unsuitable for support of the planned structures and should be temporarily removed and recompacted to suitable young alluvium, or old alluvium per the project recommendations. For preliminary planning purposes, the depth of required remedial grading removals may be estimated as indicated below and shown on the Geotechnical Map (Sheet 1).

The undocumented agricultural fill should be completely removed during remedial grading. The agricultural fill is anticipated to be on the order of 1 foot thick. The agricultural fill has slightly elevated organic content, with an average of approximately 2 percent based on the recent testing. In order to reuse the agricultural fill as engineered fill, it must be properly blended with deeper natural soils that have low organic content. No nesting of organic soils is permitted.

Dry, loose, or compressible alluvium (both young alluvium and old alluvium) should be removed to competent soils. In general, remedial grading depths are estimated to be 5 feet below existing grade where young alluvium (Qal) is located in the southeastern approximately 2/3 of the site, and 6 feet below existing grade where old alluvium (Qoa) is located in the northwestern approximately 1/3 of the site (refer to Sheet 1). Remedial grading should be performed to the minimum depth recommended below existing grades (Sheet 1) or a minimum of 3 feet below finished pad grades, whichever is deeper, so that all pads are underlain by a minimum of 3 feet of compacted fill.

Groundwater is not expected to be a concern during grading when achieving the proposed 5- to 6-foot removal bottoms for the remedial grading. If shallow groundwater is encountered refer to Section 4.1.4 for subgrade stabilization recommendations.

Local conditions may be encountered during excavation that could require additional remedial grading/over-excavation beyond the above-noted minimum in order to obtain an acceptable removal bottom. The actual depths and lateral extents of grading will be determined by the geotechnical consultant, based on subsurface conditions encountered during grading. Removal areas should be accurately staked in the field by the Project Surveyor.

4.1.3 Cut-Fill Transition

Structures must not straddle a cut-fill transition. Where a cut-fill transition occurs, the cut and shallow fill portions of the lot must be over excavated. The overexcavation should be

performed so that the minimum fill thickness beneath the pad is at least one-half of the maximum fill thickness, but not less than 3 feet below finish pad grade or 2 feet below footing bottoms, which ever results in the deeper excavation. The overexcavation should extend laterally beyond the perimeter of the proposed building a distance equal to the minimum overexcavation depth, but not less than 5 feet, so that a 1:1 plane may be projected from the building perimeter to the edge of the overexcavation.

4.1.4 Removal Bottoms and Preparation

In general, removal bottom areas and any areas to receive compacted fill should be scarified to a minimum depth of 6 to 8 inches, brought to a near-optimum moisture condition, and re-compacted per project recommendations. Shallow groundwater is not anticipated within or immediately below the proposed removal bottom depths.

If shallow groundwater is encountered the removal bottoms will likely be saturated. Scarification/processing of removal bottoms is generally not required when the removal bottom is within approximately 3 feet of groundwater. "Pumping" removal bottoms should be anticipated for bottoms excavated at or near groundwater. For these conditions, stabilization will likely be required prior to placing compacted fill. In general, stabilization should be anticipated to consist of a minimum of 12 to 18 inches of clean crushed rock ranging in size from approximately 1 to 3 inches; however, the actual thickness and size of stabilization rock will have to be determined during earthwork based on field conditions. Stabilization rock should be placed in layers and compacted. It should be anticipated that the first lift of crushed rock will be worked into the pumping removal bottom. Subsequent lifts will help bridge the pumping conditions. Thickness of required crushed rock stabilization may be reduced by placing a layer of triaxial geogrid reinforcement (Tensar InterAx or acceptable equivalent) directly on the removal bottom prior to crushed rock placement. The contractor may have to minimize construction traffic on the removal bottom to reduce disturbance. Soft and yielding removal bottom soils should be evaluated on a case-by-case basis during earthwork operations.

Removal bottoms should be observed and accepted by the geotechnical consultant prior to fill placement or construction.

4.1.5 Subdrains

Subdrains are not anticipated in conjunction with the remedial site grading. The need for (and location) of subdrains shall be determined in the field based on exposed conditions. The subdrains must be deeper than or beyond the limits of proposed utilities, retaining wall foundations, and swimming pools.

4.1.6 Temporary Excavations

Temporary excavations should be performed in accordance with project plans, specifications, and all Occupational Safety and Health Administration (OSHA) requirements. Excavations should be laid back or shored in accordance with OSHA

requirements before personnel or equipment are allowed to enter. Based on our field evaluation, site soils upper approximate 10 feet are anticipated to be OSHA Type "B" soils (refer to the attached boring logs). Soil conditions should be regularly evaluated during construction to verify conditions are as anticipated. The contractor shall be responsible for providing the "competent person," required by OSHA standards, to evaluate soil conditions. Sandy soils are present and should be considered susceptible to caving. The contractor shall be responsible for providing the "competent person," required by OSHA standards, to evaluate soil conditions. Close coordination with the geotechnical consultant should be maintained to facilitate construction while providing safe excavations. Excavation safety is the sole responsibility of the contractor.

Vehicular traffic, stockpiles, and equipment storage should be set back from the perimeter of excavations a distance equivalent to a 1:1 projection from the bottom of the excavation, or 5 feet whichever is greater. Once an excavation has been initiated, it should be backfilled as soon as practical. Prolonged exposure of temporary excavations may result in some localized instability. Excavations should be planned so that they are not initiated without sufficient time to shore/fill them prior to weekends, holidays, or forecasted rain.

If shallow groundwater is encountered, special shoring techniques, such as use of shields, flatter temporary side slopes, etc., may be necessary for utility installation below the groundwater in conjunction with other mitigation such as dewatering.

4.1.7 Material for Fill

From a geotechnical perspective, the onsite soils are generally considered suitable for use as general compacted fill (i.e., non-retaining wall backfill), provided they are screened of organic materials, construction debris and any oversized material (8 inches in greatest dimension). Moisture conditioning of site soils should be anticipated as outlined in the section below.

From a geotechnical viewpoint, any required import soils should consist of clean, relatively granular soils of Very Low to Low expansion potential (expansion index 50 or less based on ASTM D4829) and no particles larger than 4 inches in greatest dimension. Source samples of planned importation should be provided to the geotechnical consultant for laboratory testing a minimum of 3 working days prior to any planned importation for required laboratory testing.

Any required retaining wall backfill should consist of sandy soils with a maximum of 35 percent fines (passing the No. 200 sieve) per American Society for Testing and Materials (ASTM) Test Method D1140 (or ASTM D6913/ ASTM D422) and a Very Low expansion potential (EI of 20 or less per ASTM D4829). Soils should also be screened of organic materials, construction debris and any material greater than 3 inches in maximum dimension. The site contains some soils that are not suitable for retaining wall backfill due to their fines content and expansion potential, therefore select grading and stockpiling and/or import of select sandy soils will be required by the contractor for obtaining suitable retaining wall backfill soil.

Aggregate base (crushed aggregate base or crushed miscellaneous base) should conform to the requirements of Section 200-2 of the Standard Specifications for Public Works Construction ("Greenbook") for untreated base materials (except processed miscellaneous base) or Caltrans Class 2 aggregate base.

4.1.8 Fill Placement and Compaction

Material to be placed as fill should be brought to near-optimum moisture content (generally at about 2 percent above optimum moisture content) and recompacted to at least 90 percent relative compaction (per ASTM D1557). Moisture conditioning of site soils should be anticipated in order to achieve the required degree of compaction.

The optimum lift thickness to produce a uniformly compacted fill will depend on the type and size of compaction equipment used. In general, fill should be placed in uniform lifts not exceeding 8 inches in compacted thickness. Each lift should be thoroughly compacted and accepted prior to subsequent lifts. Generally, placement and compaction of fill should be performed in accordance with local grading ordinances and with observation and testing by the geotechnical consultant. Oversized material as previously defined should be removed from site fills.

Fill placed on any slopes greater than 5:1 (horizontal to vertical) should be properly keyed and benched into firm and competent soils as it is placed in lifts. During backfill of excavations, the fill should be properly benched into firm and competent soils of temporary backcut slopes as it is placed in lifts.

Aggregate base material should be compacted to a minimum of 95 percent relative compaction at or slightly above-optimum moisture content per ASTM D1557. Subgrade below aggregate base should be compacted to a minimum of 90 percent relative compaction (or 95 percent relative compaction if dictated by City or County standards) per ASTM D1557 at or slightly above-optimum moisture content.

If gap-graded ¾-inch rock is used for backfill (around storm drain storage chambers, retaining wall backfill, etc.) it will require compaction. Rock shall be placed in thin lifts (typically not exceeding 6 inches) and mechanically compacted with observation by geotechnical consultant. Backfill rock shall meet the requirements of ASTM D2321. Gap-graded rock is required to be wrapped in filter fabric (Mirafi 140N or approved alternative) to prevent the migration of fines into the rock backfill.

4.1.9 Slopes

Design cut and fill slopes at the site are anticipated to be both grossly and surficially stable as designed, as long as they are constructed in accordance with the Standard Earthwork and Grading Specifications included in Appendix F. Slopes should be constructed with a maximum slope ratio of 2:1 (horizontal to vertical). Fill slope faces should also be compacted to minimum project specifications. This may require overbuilding of the slope face and trimming back to design grades. To improve surficial stability, vegetation specified by the landscape architect should be established on the

slope face as soon as it is practical.

Fill slopes should be constructed at least equipment width wide (approximately 10 horizontal feet). In the case of conflict, the recommendations provided herein shall supersede those provided in Appendix F. Keyway widths should be a minimum of one-half of the total height of the slope or no less than 10 feet wide, whichever is greater. Keyways should be a minimum of 2 feet deep, determined from the lowest toe-of-slope elevation, and tilt back to the heel a minimum of 1-foot or 2 percent (whichever is greater). In general, backcuts should be excavated at 2:1 (horizontal to vertical) inclinations. If grading limits do not allow sufficient room for maintaining 10-foot widths at 2:1 backcut inclinations, then portions of the backcut may be cut steeper to accommodate the stability fill slopes at the appropriate widths at the discretion of the geotechnical consultant.

4.1.10 Trench and Retaining Wall Backfill and Compaction

Bedding material used within the pipe zone should conform to the requirements of the current Greenbook and the pipe manufacturer. Where applicable, sand having a sand equivalent (SE) of 20 or greater (per Caltrans Test Method [CTM] 217) may be used to bed and shade the pipes within the bedding zone. Sand backfill should be densified by jetting or flooding and then tamped to ensure adequate compaction. Bedding sand should be from a natural source, manufactured sand from recycled material is not suitable for jetting. The onsite soils may generally be considered suitable as trench backfill (zone defined as 12 inches above the pipe to subgrade), provided the soils are screened of rocks greater than 6 inches in maximum dimension, construction debris and organic material. Trench backfill should be compacted in uniform lifts (as outlined in the "Material for Fill" Section 4.1.7) by mechanical means to at least 90 percent relative compaction (per ASTM D1557). If gap-graded rock is used for trench backfill, refer to Section 4.1.8 above. City and/or County standards may require 95 percent relative compaction of the soils at subgrade elevation.

Deep utilities in areas of relatively shallow groundwater may necessitate special excavation techniques, and saturated soils from the excavation will require drying or mixing with dry soils in order to obtain near-optimum soil moisture content for use as backfill material. Utilities at or below the water table should be designed for buoyancy.

Any required retaining wall backfill should consist of predominately granular, sandy soils outlined in Section 4.1.7. The limits of select sandy backfill should extend at minimum ½ the height of the retaining wall or the width of the heel (if applicable), whichever is greater (Refer to Figure 2). Retaining wall backfill soils should be compacted in relatively uniform thin lifts to a minimum of 90 percent relative compaction (per ASTM D1557). Jetting or flooding of retaining wall backfill materials should not be permitted. If gap-graded rock is used for retaining wall backfill, refer to Section 4.1.8 above.

A representative from LGC Geotechnical should observe, probe, and test the backfill to verify compliance with the project recommendations.

4.1.11 Preliminary Shrinkage and Bulking

Volumetric changes in earth quantities will occur when excavated onsite earth materials are replaced as properly compacted fill. The following is an estimate of shrinkage and bulking factors for the various geologic units found onsite. These estimates are based on in-place densities of the various materials and on the estimated average degree of relative compaction achieved during grading.

Due to the combined variability in topographic surveys, inability to precisely model the removals and variability in on-site near-surface conditions, it is our opinion that the site will not balance at the end of grading. If importing/exporting a large volume of soils is not considered feasible or economical, we recommend a balance area be designated onsite that can fluctuate up or down based on the actual volume of soil. We recommend the site plan include a "balance area" that can accommodate on the order of 5 percent of the total grading volume.

TABLE 4

Estimated Shrinkage & Bulking

Soil Type	Allowance	Estimated Range
Undocumented/Agricultural Fill (Afu)	Shrink	15% to 20%
Young Alluvium (Qal)	Shrink	7.5% to 17.5%
Old Alluvium (Qoa)	Shrink	0% to 10%

Subsidence due to earthwork equipment is expected to be on the order of 0.1 feet. It should be stressed that these values are only estimates and that actual shrinkage factors are extremely difficult to predict. The effective shrinkage of onsite soils will depend primarily on the type of compaction equipment and method of compaction used onsite by the contractor. Additionally, the onsite geology is very complex; the above estimates are generalized groupings of similar lithologies and should be expected to vary across the site and with depth.

The above shrinkage estimates are intended as an aid for others in determining preliminary earthwork quantities. However, these estimates should be used with some caution since they are not absolute values. Shrinkage and bulking are also expected to vary with variations in survey accuracy during rough grading.

4.2 Preliminary Foundation Recommendations

Site soils are anticipated to be "Very Low" to "Low" expansion potential (EI of 50 or less per ASTM D4829) and special design considerations from a geotechnical perspective are required. The site may be considered suitable for the support of the proposed structures using a rigid slab-on-grade conventionally reinforced or post-tensioned slab foundation designed in accordance with Chapter 18 of the 2019 CBC. It should be noted that, as with many structures in Southern California, risk does remain that the proposed structures could suffer some damage as a result of an earthquake. Repair and remedial work may be required after a seismic event. Post-

tensioned foundation recommendations for "Low" expansion potential categories have been provided in the following sections. Please note that the following foundation recommendations are preliminary and must be confirmed by LGC Geotechnical at the completion of grading. If soils with a different expansion potential are encountered at the completion of grading, updated geotechnical foundation recommendations will be provided.

The following recommendations may be superseded by the requirements of the foundation engineer, structural engineer and/or local jurisdictions. Proposed foundations should be designed to accommodate estimated site settlements. Recommendations for seismic settlement are provided in Section 2.6.2. Recommended soil bearing and estimated settlement due to structural loads are provided in Section 4.3.

4.2.1 Provisional Post-Tensioned Foundation Design Parameters

The geotechnical parameters provided in Table 5 may be used for post-tensioned slab foundations. These parameters have been determined in general accordance with the Post-Tensioning Institute (PTI) Standard Requirements for Design of Shallow Post-Tensioned Concrete Foundations on Expansive Soils referenced in Chapter 18 of the 2019 CBC. In utilizing these parameters, the foundation engineer should design the foundation system in accordance with the allowable deflection criteria of applicable codes and the requirements of the structural designer/architect. Other types of stiff slabs may be used in place of the CBC post-tensioned slab design provided that, in the opinion of the foundation structural designer, the alternative type of slab is at least as stiff and strong as that designed by the CBC/PTI method to resist expansive soils.

Our design parameters are based on our experience with similar residential projects and the anticipated nature of the soil (with respect to expansion potential). Please note that implementation of our recommendations will not eliminate foundation movement (and related distress) should the moisture content of the subgrade soils fluctuate. It is the intent of these recommendations to help maintain the integrity of the proposed structures and reduce (not eliminate) movement, based upon the anticipated site soil conditions. Should future owners not properly maintain the areas surrounding the foundation, for example by overwatering, then we anticipate for expansive soils the maximum differential movement of the perimeter of the foundation to the center of the foundation to be on the order of a few inches. Soils of lower expansion potential are anticipated to show less movement.

Based on preliminary corrosion testing, soils corrosive to concrete were encountered at the site, as indicated in Section 4.7. Therefore, per ACI 318, Type V cement should be utilized, with a maximum water/cement ratio of 0.45, and a minimum compressive strength of 4,500 psi.

TABLE 5

Provisional Geotechnical Parameters for Post-Tensioned Foundation Slab Design for "Very Low" to "Low" Expansion Potential Subgrade Soils

Parameter	PT Slab with Perimeter Footing	PT Mat with Thickened Edge
Expansion Index	Low[1]	Low[1]
Thornthwaite Moisture Index	-20	-20
Constant Soil Suction	PF 3.9	PF 3.9
Center Lift Edge moisture variation distance, e_m Center lift, y_m	 9.0 feet 0.25 inch	 9.0 feet 0.30 inch
Edge Lift Edge moisture variation distance, e_m Edge lift, y_m	 5.5 feet 0.55 inch	 5.5 feet 0.66 inch
Modulus of Subgrade Reaction, k (assuming presoaking as indicated below)	200 pci	200 pci
Minimum perimeter footing/thickened edge embedment below finish grade	12 inches	6 inches
Presoak (moisture conditioning)	100% of Optimum 12 inches	100% of Optimum 12 inches

1. Assumed for preliminary design purposes. Further evaluation is needed at the completion of grading.
2. Recommendations for foundation reinforcement and slab thickness are ultimately the purview of the foundation engineer/structural engineer based upon geotechnical criteria and structural engineering considerations.
3. The sand layer requirements are the purview of the foundation engineer/structural engineer and should be provided in accordance with ACI Publication 302 "Guide for Concrete Floor and Slab Construction".
4. Recommendations for vapor retarders below slabs are also the purview of the foundation engineer/structural engineer and should be provided in accordance with applicable code requirements.

4.2.2 Foundation Subgrade Preparation and Maintenance

Moisture conditioning of the subgrade soils is recommended prior to trenching the foundation. The recommendations specific to the anticipated site soil conditions are presented herein. The subgrade moisture condition of the building pad soils should be maintained at the recommended moisture content up to the time of concrete placement. This moisture content should be maintained around the immediate perimeter of the slab during construction and up to occupancy of the homes.

The geotechnical parameters provided herein assume that if the areas adjacent to the

foundation are planted and irrigated, these areas will be designed with proper drainage and adequately maintained so that ponding, which causes significant moisture changes below the foundation, does not occur. Our recommendations do not account for excessive irrigation and/or incorrect landscape design. Plants should only be provided with sufficient irrigation for life and not overwatered to saturate subgrade soils. Sunken planters placed adjacent to the foundation, should either be designed with an efficient drainage system or liners to prevent moisture infiltration below the foundation. Some lifting of the perimeter foundation beam should be expected even with properly constructed planters.

In addition to the factors mentioned above, future homeowners should be made aware of the potential negative influences of trees and/or other large vegetation. Roots that extend near the vicinity of foundations can cause distress to foundations. Future homeowners (and the owner's landscape architect) should not plant trees/large shrubs closer to the foundations than a distance equal to half the mature height of the tree or 20 feet, whichever is more conservative unless specifically provided with root barriers to prevent root growth below the house foundation.

It is the homeowner's responsibility to perform periodic maintenance during hot and dry periods to ensure that adequate watering has been provided to keep soils from separating or pulling back from the foundation. Future homeowners should be informed and educated regarding the importance of maintaining a constant level of soil-moisture. The homeowners should be made aware of the potential negative consequences of both excessive watering, as well as allowing potentially expansive soils to become too dry. Expansive soils can undergo shrinkage during drying and swelling during the rainy winter season or when irrigation is resumed. This can result in distress to building structures and hardscape improvements. The builder should provide these recommendations to future homeowners.

4.2.3 Slab Underlayment Guidelines

The following is for informational purposes only since slab underlayment (e.g., moisture retarder, sand, or gravel layers for concrete curing and/or capillary break) is unrelated to the geotechnical performance of the foundation and thereby not the purview of the geotechnical consultant. Post-construction moisture migration should be expected below the foundation. The foundation engineer/architect should determine whether the use of a capillary break (sand or gravel layer), in conjunction with the vapor retarder, is necessary or required by code. Sand layer thickness and location (above and/or below vapor retarder) should also be determined by the foundation engineer/architect.

4.3 Soil Bearing and Lateral Resistance

Provided our earthwork recommendations are implemented, an allowable soil bearing pressure of 1,500 pounds per square foot (psf) may be used for the design of footings having a minimum width of 12 inches and minimum embedment of 12 inches below lowest adjacent ground surface. This value may be increased by 300 psf for each additional foot of embedment or 150 psf for each additional foot of foundation width to a maximum value of 2,500 psf. A mat

foundation a minimum of 6 inches below lowest adjacent grade may be designed for an allowable soil bearing pressure of 1,200 psf. These allowable bearing pressures are applicable for level (ground slope equal to or flatter than 5H:1V) conditions only. Bearing values indicated are for total dead loads and frequently applied live loads and may be increased by ⅓ for short duration loading (i.e., wind or seismic loads).

In utilizing the above-mentioned allowable bearing capacity and provided our earthwork recommendations are implemented, foundation settlement due to structural loads is anticipated to be 1-inch or less. Differential settlement may be taken as half of the total settlement (i.e., ½-inch over a horizontal span of 40 feet).

Resistance to lateral loads can be provided by friction acting at the base of foundations and by passive earth pressure. For concrete/soil frictional resistance, an allowable coefficient of friction of 0.30 may be assumed with dead-load forces. An allowable passive lateral earth pressure of 250 psf per foot of depth (or pcf) to a maximum of 2,500 psf may be used for lateral resistance. Allowable passive pressure may be increased to 340 pcf to a maximum of 3,400 psf for short duration seismic loading. This passive pressure is applicable for level (ground slope equal to or flatter than 5 horizontal feet to 1-foot vertical) conditions only. Frictional resistance and passive pressure may be used in combination without reduction. We recommend that the upper foot of passive resistance be neglected if finished grade will not be covered with concrete or asphalt concrete. Frictional resistance and passive pressure may be used in combination without reduction. The provided allowable passive pressures are based on a factor of safety of 1.5 and 1.1 for static and seismic loading conditions, respectively. The structural designer should incorporate appropriate factors of safety and/or load factors in their design.

4.4 Foundation Setbacks

Foundations should have adequate setback from top and bottom of slopes in accordance with the 2019 CBC. For footings located above a descending slope, footing setbacks should be at least one-third of the slope height with a maximum required horizontal setback of 40 feet. As an alternative to moving the building footprint, setback requirements may be accomplished by deepened footings or deep foundations. For buildings located below an ascending slope, the edge of the building should be at least of one-half of the slope height with a maximum required setback of 15 feet. Refer to Chapter 18 of the 2019 CBC.

The project civil engineer must review, survey, and confirm that building setbacks are in accordance with governing codes. The precise grading plan should depict required foundation setbacks.

4.5 Lateral Earth Pressures for Retaining Walls

Lateral earth pressures are provided as equivalent fluid unit weights, in psf/ft of depth or pcf. These values do not contain an appreciable factor of safety, so the retaining wall designer should apply the applicable factors of safety and/or load factors during design. A soil unit weight of 120 pcf may be assumed for calculating the actual weight of soil over the wall footing.

The following lateral earth pressures are presented in Table 6 for approved granular soils a

maximum of 35 percent fines (passing the No. 200 sieve per ASTM D1140) and Very Low expansion potential (EI of 20 or less per ASTM D4829). Retaining wall backfill should also be limited to fill material not exceeding 3 inches in greatest dimension. Portions of the site soils are not suitable for retaining wall backfill due to their fines content (i.e., silt and clay content) and expansion potential; therefore, select grading/stockpiling of approved sandy soils or import of select sandy soils meeting the criteria outlined above will be required by the contractor for obtaining suitable retaining wall backfill soil. The retaining wall designer should clearly indicate on the retaining wall plans the required sandy backfill.

TABLE 6

Lateral Earth Pressures – Approved On-Site or Imported Select Sandy Backfill

Conditions	Equivalent Fluid Unit Weight (pcf)	
	Level Backfill	2:1 Backfill Sloping Upwards
	Approved Sandy Soils	Approved Sandy Soils
Active	35	55
At-Rest	55	75

If the wall can yield enough to mobilize the full shear strength of the soil, it can be designed for "active" pressure. If the wall cannot yield under the applied load, the earth pressure will be higher. This would include 90-degree corners of retaining walls. Such walls should be designed for "at-rest." The equivalent fluid pressure values assume free-draining conditions and a drainage system will be installed and maintained to prevent the build-up of hydrostatic pressures. If conditions other than those assumed above are anticipated, the equivalent fluid pressure values should be provided on an individual-case basis by the geotechnical engineer.

Retaining wall structures should be provided with appropriate drainage and appropriately waterproofed. To reduce, but not eliminate, saturation of near surface (upper approximate 1-foot) soils in front of the retaining walls, the perforated subdrain pipe should be located as low as possible behind the retaining wall. The outlet pipe should be sloped to drain to a suitable outlet. In general, we do not recommend retaining wall outlet pipes be connected to area drains. If subdrains are connected to area drains, special care and information should be provided to homeowners to maintain these drains. Typical retaining wall drainage is illustrated in Figure 2. It should be noted that the recommended subdrain does not provide protection against seepage through the face of the wall and/or efflorescence. Efflorescence is generally a white crystalline powder (discoloration) that results when water containing soluble salts migrates over a period of time through the face of a retaining wall and evaporates. If such seepage or efflorescence is undesirable, retaining walls should be waterproofed to reduce this potential.

Surcharge loading effects from any adjacent structures should be evaluated by the retaining wall designer. In general, structural loads within a 1:1 (horizontal to vertical) upward

projection from the bottom of the proposed retaining wall footing will surcharge the proposed retaining wall. In addition to the recommended earth pressure, retaining walls adjacent to streets should be designed to resist vehicular traffic if applicable. For a level backfill, a factor of 0.33 and 0.5 may be used for the active and at-rest conditions, respectively. The vertical traffic surcharge may be determined by the structural designer. The retaining wall designer should contact the geotechnical consultant for any required geotechnical input in estimating any applicable surcharge loads.

If required, the retaining wall designer may use a seismic lateral earth pressure increment of 5 pcf and 10 pcf for level and 2:1 (horizontal to vertical) sloping backfill conditions, respectively. This increment should be applied in addition to the provided static lateral earth pressure using a triangular distribution with the resultant acting at H/3 in relation to the base of the retaining structure (where H is the retained height). Per Section 1803.5.12 of the 2019 CBC, the seismic lateral earth pressure is applicable to structures assigned to Seismic Design Category D through F for retaining wall structures supporting more than 6 feet of backfill height. The provided seismic lateral earth pressure should not be used for retaining walls and/or a sloping backfill condition exceeding 10 feet in height. If a retaining wall and/or sloping backfill condition greater than 10 feet in height is proposed, the retaining wall designer should contact the geotechnical consultant for specific seismic lateral earth pressure increments based on the configuration of the planned retaining wall structures. This seismic lateral earth pressure is estimated using the procedure outlined by the Structural Engineers Association of California (Lew, et al, 2010).

Soil bearing and lateral resistance (friction coefficient and passive resistance) are provided in Section 4.3 (Soil Bearing and Lateral Resistance). Earthwork considerations (temporary back cuts, backfill, compaction, etc.) for retaining walls are provided in Section 4.1 (Site Earthwork) and the subsequent earthwork related sub-sections.

4.6 Preliminary Asphalt Concrete Pavement Sections

The following provisional minimum asphalt concrete (AC) pavement sections are provided in Table 7 based on a preliminary R-value of 21 for Traffic Indices (TI) of 5.5, 6.5 and 7.0. Per the Riverside County Road Improvement Standards & Specifications, TI of 5.5 is assigned to "Local Streets," 6.5 to "Enhanced Local Streets, and 7.0 to "Collector Streets." Pavement sections are based on Caltrans Highway Design Manual (Caltrans, 2020). These recommendations must be confirmed with R-value testing of representative near-surface soils at the completion of grading and after underground utilities have been installed and backfilled. Final pavement sections should be confirmed by the project civil engineer based upon the final design Traffic Index. Determination of the TI is not the purview of the geotechnical consultant If requested, LGC Geotechnical will provide sections for alternate TI values.

TABLE 7

Preliminary Asphalt Concrete Pavement Section Options

Assumed Traffic Index	5.5	6.5	7.0
R -Value Subgrade	21	21	21
AC Thickness	4.0 inches	4.0 inches	5.0 inches
Aggregate Base Thickness	7.0 inches	10.0 inches	10.0 inches

The pavement section thicknesses provided above are considered minimum thicknesses. Increasing the thickness of any or all of the above layers will reduce the likelihood of the pavement experiencing distress during its service life. The above recommendations are based on the assumption that proper maintenance and irrigation of the areas adjacent to the roadway will occur throughout the design life of the pavement. Failure to maintain a proper maintenance and/or irrigation program may jeopardize the integrity of the pavement.

Earthwork recommendations regarding underlying aggregate base and subgrade are provided in Section 4.1 ("Site Earthwork") and the related sub-sections of this report.

4.7 Soil Corrosivity

LGC Geotechnical is not a corrosion consultant; however, several governing agencies in Southern California require the geotechnical consultant to determine the corrosion potential of soils to buried concrete and metal facilities. We therefore present the results of our testing with regard to corrosion for the use of the client and other consultants, as they determine necessary.

Corrosion testing indicated a soluble sulfate content ranging from approximately 0.01 to 0.94 percent, chloride contents ranging from 100 to 540 parts per million (ppm), a pH value of 8.16, and a resistivity value of 246-ohm-centimeters. Based on Caltrans Corrosion Guidelines (2021), soils are considered corrosive if the pH is 5.5 or less, or the chloride concentration is 500 ppm or greater, or the sulfate concentration is 1,500 ppm (0.15 percent) or greater. Based on the test results, soils are considered corrosive using Caltrans criteria.

Based on laboratory sulfate test results, the near surface soils are designated to a class "S2" per ACI 318, Table 19.3.1.1 with respect to sulfates. Concrete in direct contact with the onsite soils can be designed according to ACI 318, Table 19.3.2.1 using the "S2" sulfate classification.

Laboratory testing may need to be performed at the completion of grading by the Project Corrosion Engineer to further evaluate the as-graded soil corrosivity characteristics. Accordingly, revision of the corrosion potential may be needed, should future test results differ substantially from the conditions reported herein. The client and/or other members of the development team should consider this during the design and planning phase of the project and formulate an appropriate course of action.

4.8 Slope Maintenance Guidelines

Slopes must not be overwatered. Irrigation levels should be kept to the minimum level necessary to establish a healthy plant growth. If automatic sprinklers are used, they must be adjusted during periods of rainfall. Continuous erosion control, rodent control, and maintenance are essential to the long-term stability of slopes. A program for the elimination of burrowing animals in slope areas must be established to protect slope stability by reducing the potential for surface water to penetrate into the slope face. Trenches excavated on a slope face for utility or irrigation lines and/or for any purpose must be properly backfilled and compacted (as outlined in Section 4.1.10) to the slope face. Observation/testing and acceptance by the

geotechnical consultant during trench backfill are recommended. V-ditches should be inspected and cleared of loose soil and/or debris on a routine basis, especially prior to and during the rainy season.

4.9 Nonstructural Concrete Flatwork

Nonstructural concrete (such as flatwork, sidewalks, patios, bicycle trails, etc.) has a potential for cracking due to changes in soil volume related to soil-moisture fluctuations. To reduce the potential for excessive cracking and lifting, concrete should be designed in accordance with the minimum guidelines outlined in Table 8. These guidelines will reduce the potential for irregular cracking and promote cracking along control joints but will not eliminate all cracking or lifting. Thickening the concrete and/or adding additional reinforcement will further reduce cosmetic distress. Please note that these are preliminary recommendations that will need to be confirmed and/or modified based on as-graded conditions at the completion of grading. The concrete flatwork will move over time, the architect and builder must make provisions for this movement in both design and construction.

TABLE 8

Preliminary Geotechnical Guidelines for Nonstructural Concrete Flatwork Placed on Very Low to Low Expansion Potential Subgrade

	Homeowner Sidewalks	**Private Drives**	**Flatwork/Patios /Entryways**	**City Sidewalk Curb and Gutters**
Minimum Thickness (in.)	4 (nominal)	4 (full)	4 (full)	City/Agency Standard
Presoaking	Wet down prior to placing	Wet down prior to placing	Wet down prior to placing	City/Agency Standard
Reinforcement	—	No. 3 at 36 inches on centers	No. 3 at 36 inches on centers	City/Agency Standard
Thickened Edge	—	8" wide x 8" total thickness	—	City/Agency Standard
Crack Control Joints	Saw cut or deep open tool joint to a minimum of $^1/_3$ the concrete thickness	Saw cut or deep open tool joint to a minimum of $^1/_3$ the concrete thickness	Saw cut or deep open tool joint to a minimum of $^1/_3$ the concrete thickness	City/Agency Standard
Maximum Joint Spacing	5 feet	10 feet or quarter cut whichever is closer	6 feet	City/Agency Standard
Aggregate Base Thickness (in.)	—	—	—	City/Agency Standard

To reduce the potential for driveways to separate from the garage slab, the builder may elect to install dowels to tie these two elements together. Similarly, future homeowners should consider the use of dowels to connect flatwork to the foundation.

4.10 Surface Drainage and Landscaping

4.10.1 Precise Grading

From a geotechnical perspective, we recommend that compacted finished grade soils adjacent to proposed residences be sloped away from the proposed building structures and towards an approved drainage device or unobstructed swale. Drainage swales, wherever feasible, should not be constructed within 5 feet of buildings. Where lot and

building geometry necessitates that drainage swales be routed closer than 5 feet to structural foundations, we recommend the use of area drains together with drainage swales. Drainage swales used in conjunction with area drains should be designed by the project civil engineer so that a properly constructed and maintained system will prevent ponding within 5 feet of the foundation. Code compliance of grades is not the purview of the geotechnical consultant.

Planters with open bottoms adjacent to buildings should be avoided. Planters should not be designed adjacent to buildings unless provisions for drainage, such as catch basins, liners, and/or area drains, are made. Overwatering must be avoided.

4.10.2 Landscaping

Planters adjacent to a building or structure should be avoided wherever possible or be properly designed (e.g., lined with a membrane), to reduce the penetration of water into the adjacent footing subgrades and thereby reduce moisture-related damage to the foundation. Planting areas at grade should be provided with appropriate positive drainage. Wherever possible, exposed soil areas should be above adjacent paved grades to facilitate drainage. Planters should not be depressed below adjacent paved grades unless provisions for drainage, such as multiple depressed area drains, are constructed. Adequate drainage gradients, devices, and curbing should be provided to prevent runoff from adjacent pavement or walks into the planting areas. Irrigation methods should promote uniformity of moisture in planters and beneath adjacent concrete flatwork. Overwatering and underwatering of landscape areas must be avoided. Irrigation levels should be kept to the absolute minimum level necessary to maintain healthy plant life.

Area drain inlets should be maintained and kept clear of debris in order to properly function. Owners and property management personnel should also be made aware that excessive irrigation of neighboring properties can cause seepage and moisture conditions. Owners and property management personnel should be furnished with these recommendations communicating the importance of maintaining positive drainage away from structures, towards streets, when they design their improvements.

The impact of heavy irrigation or inadequate runoff gradients can create perched water conditions. This may result in seepage or shallow groundwater conditions where previously none existed. Maintaining adequate surface drainage and controlled irrigation will significantly reduce the potential for nuisance-type moisture problems. To reduce differential earth movements such as heaving and shrinkage due to the change in moisture content of foundation soils, which may cause distress to a structure and associated improvements, moisture content of the soils surrounding the structure should be kept as relatively constant as possible.

4.11 Subsurface Water Infiltration

Recent regulatory changes have occurred that mandate that storm water be infiltrated below grade rather than collected in a conventional storm drain system. Typically, a combination of methods is implemented to reduce surface water runoff and increase infiltration including;

permeable pavements/pavers for roadways and walkways, directing surface water runoff to grass-lined swales, retention areas, and/or drywells, etc.
It should be noted that collecting and concentrating surface water for the purpose of intentional infiltration below grade conflicts with the geotechnical engineering objectives of directing surface water away from slopes, structures, and other improvements. The geotechnical stability and integrity of a site is reliant upon appropriately handling surface water. In general, the vast majority of geotechnical distress issues are directly related to improper drainage. In general, distress in the form of movement of improvements could occur as a result of soil saturation and loss of soil support, expansion, internal soil erosion, collapse and/or settlement. Infiltrated water may enter underground utility pipe zones and migrate along the pipe backfill, potentially impacting other improvements located far away from the point of infiltration.

Geotechnical stability and integrity of the project site is reliant upon appropriate handling of surface water. Due to the low measured infiltration rates, low permeability fine-grained soil layers encountered, and shallow groundwater encountered across the site, we strongly recommend against the intentional infiltration of storm water into subsurface soils.

4.12 Geotechnical Plan Review

When available, the project plans (e.g., rough grading, precise grading, retaining wall, foundation, etc.) should be reviewed by LGC Geotechnical in order to verify our geotechnical recommendations are implemented. Updated recommendations and/or additional field work may be necessary.

4.13 Geotechnical Observation and Testing During Construction

The recommendations provided in this report are based on limited subsurface observations and geotechnical analysis. The interpolated subsurface conditions should be checked in the field during construction by a representative of LGC Geotechnical. Geotechnical observation and testing are required per Section 1705 of the 2019 California Building Code (CBC).

Geotechnical observation and/or testing should be performed by LGC Geotechnical at the following stages:

- During rough grading (removal/over-excavation bottoms, fill placement, etc.);
- Geologic mapping of temporary backcuts;
- During utility trench backfill and compaction;
- During precise grading;
- After presoaking building pads and other concrete-flatwork subgrades, and prior to placement of aggregate base or concrete;
- Preparation of pavement subgrade and placement of aggregate base;
- After building and wall footing excavation and prior to placement of steel reinforcement and/or concrete; and
- When any unusual soil conditions are encountered during any construction operation subsequent to issuance of this report.

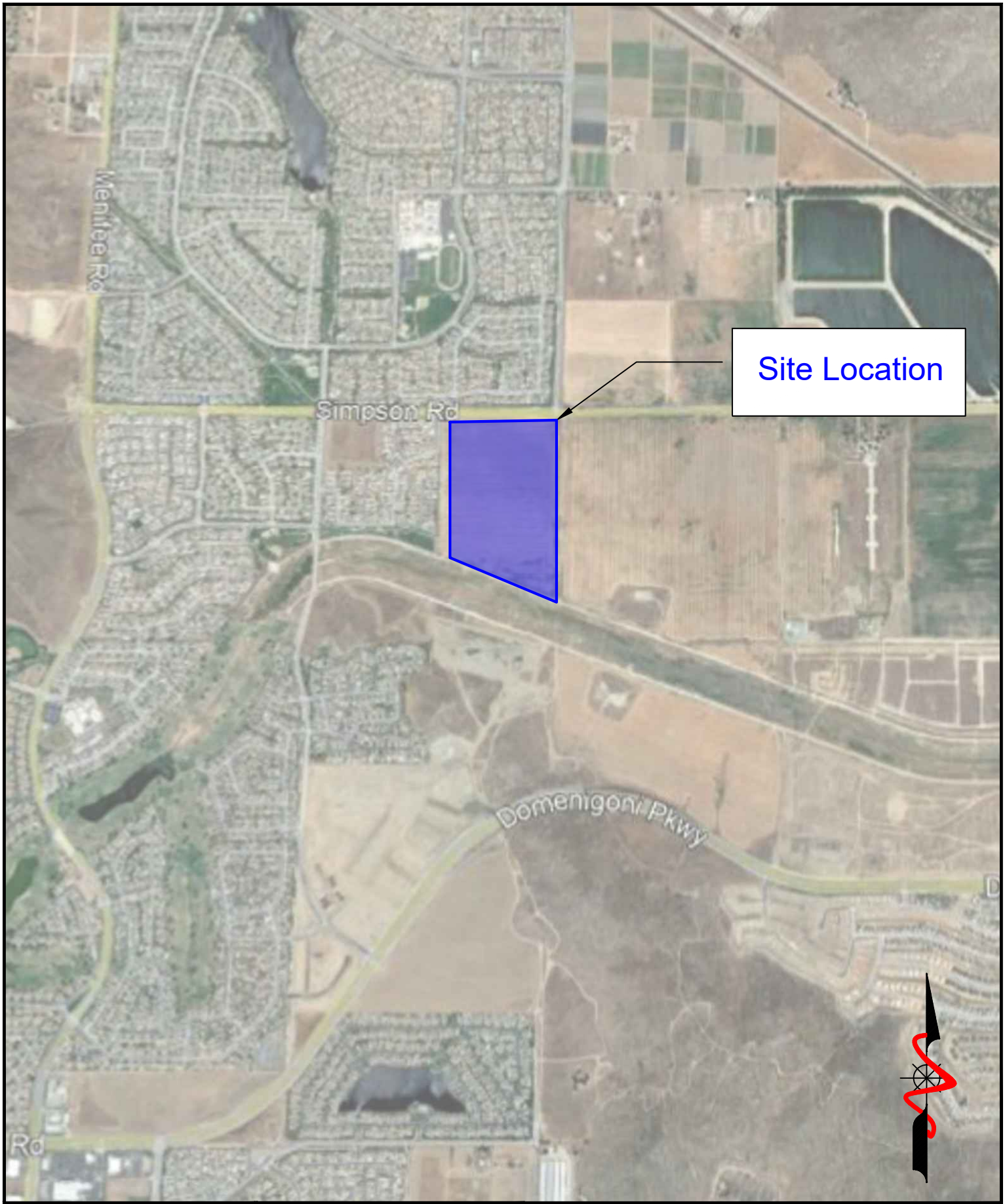
5.0 LIMITATIONS

Our services were performed using the degree of care and skill ordinarily exercised, under similar circumstances, by reputable engineers and geologists practicing in this or similar localities. No other warranty, expressed or implied, is made as to the conclusions and professional advice included in this report. The samples taken and submitted for laboratory testing, the observations made, and the in-situ field testing performed are believed representative of the entire project; however, soil and geologic conditions revealed by excavation may be different than our preliminary findings. If this occurs, the changed conditions must be evaluated by the project soils engineer and geologist and design(s) adjusted as required or alternate design(s) recommended.

This report is issued with the understanding that it is the responsibility of the owner, or of his/her representative, to ensure that the information and recommendations contained herein are brought to the attention of the architect and/or project engineer and incorporated into the plans, and the necessary steps are taken to see that the contractor and/or subcontractor properly implements the recommendations in the field. The contractor and/or subcontractor should notify the owner if they consider any of the recommendations presented herein to be unsafe.

The findings of this report are valid as of the present date. However, changes in the conditions of a property can and do occur with the passage of time, whether they be due to natural processes or the works of man on this or adjacent properties. Therefore, the findings, conclusions, and recommendations presented in this report can be re lied upon only if LGC Geotechnical has the opportunity to observe the subsurface conditions during grading and construction of the project, in order to confirm that our preliminary findings are representative for the site.

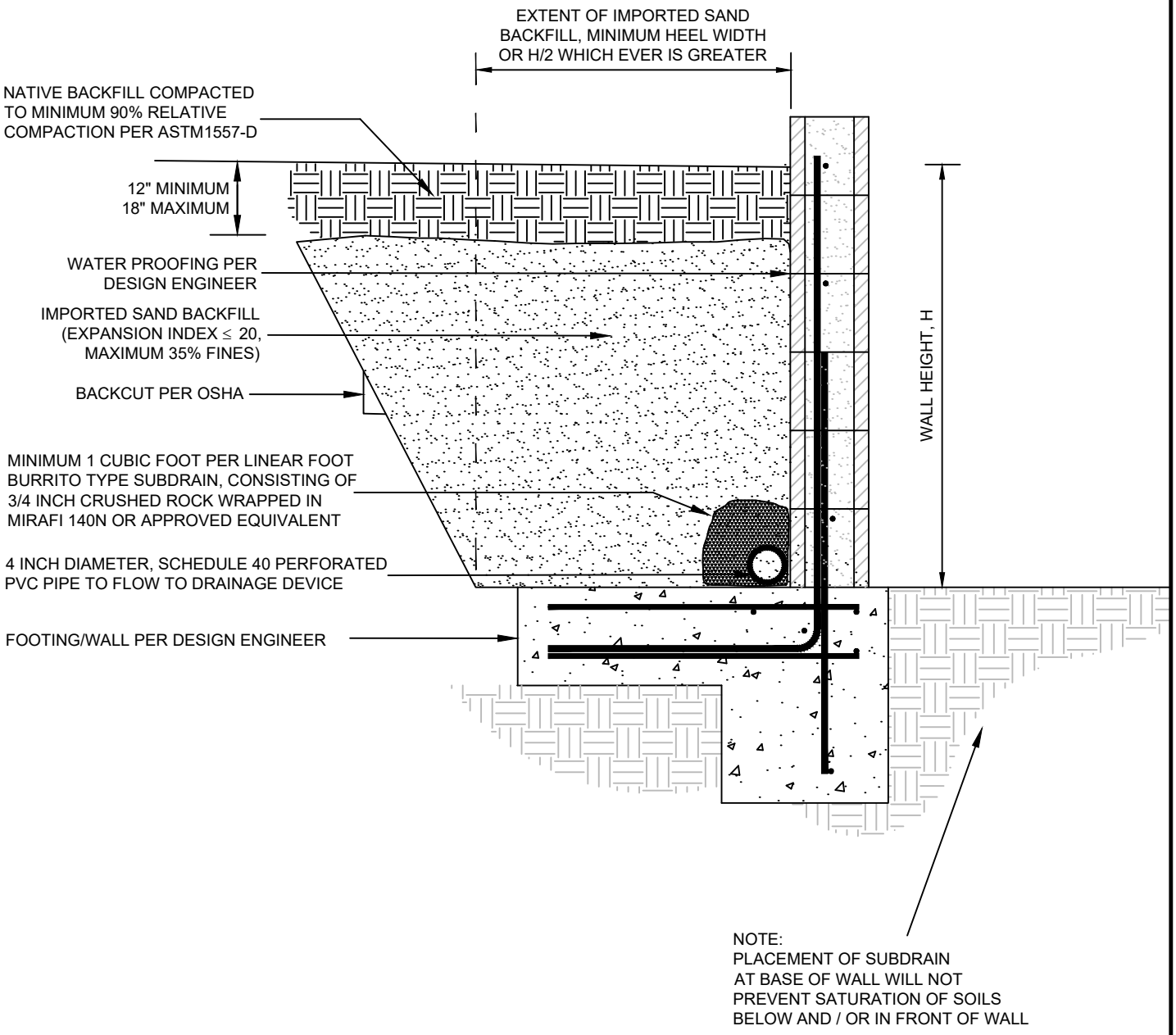
In addition, changes in applicable or appropriate standards may occur, whether they result from legislation or the broadening of knowledge. Accordingly, the findings of this report may be invalidated wholly or partially by changes outside our control. Therefore, this report is subject to review and modification, and should not be relied upon after a period of 3 years.



LGC Geotechnical, Inc.

FIGURE 1
Site Location Map

PROJECT NAME	Meritage - Salt Creek, Riverside
PROJECT NO.	22057-01
ENG. / GEOL.	DJB/CPM
SCALE	Not to Scale
DATE	August 2022



LGC Geotechnical, Inc.

FIGURE 2

Retaining Wall Backfill and Subdrain Detail

PROJECT NAME	Meritage - Salt Creek, Riverside
PROJECT NO.	22057-01
ENG. / GEOL.	DJB/CPM
SCALE	Not to Scale
DATE	August 2022

Appendix A
References

APPENDIX A

References

American Concrete Institute, 2014, Building Code Requirements for Structural Concrete (ACI 318-14) and Commentary (ACI 318R-14).

American Society of Civil Engineers (ASCE), 2017, Minimum Design Loads for Buildings and Other Structures, ASCE/SEI 7-16, 2017.

_____, 2018, Standard 7-16, Minimum Design Loads for Buildings and Associated Criteria for Buildings and Other Structures, Supplement 1, effective: December 12, 2018

ASTM International, Annual Book of ASTM Standards, Volume 04.08.

Bray, J.D., & Sancio, R. B., 2006, Assessment of liquefaction susceptibility of fine-grained soils, Journal of Geotechnical and Geoenvironmental Engineering, ASCE, pp. 1165-1177, dated September 2006.

California Building Standards Commission, 2019, California Building Code, California Code of Regulations Title 24, Volumes 1 and 2, dated July 2019.

California Geological Survey (CGS), (Previously California Division of Mines and Geology [CDMG]), 2008, California Geological Survey Special Publication 117A: Guidelines for Evaluating and Mitigating Seismic Hazards in California.

_____, 2010, California Geological Survey website, Interactive Fault Map: http://www.quake.ca.gov/gmaps/FAM/faultactivitymap.html

_____, 2018, Earthquake Fault Zones, Special Publication 42, revised 2018.

California Department of Transportation (Caltrans), 2020, Highway Design Manual, Seventh Edition, dated July 1, 2020.

_____, 2021, Corrosion Guidelines, Version 3.2, dated May 2021.

County of Riverside, 2011, Low Impact Development BMP Design Handbook, Appendix A, Infiltration Testing, dated September 2011.

Doehring, D., Morton, R., Woodford, A., 1971, Pliocene-Pleistocene History of the Perris Block, Southern California, Geologic Society of America Bulletin, v. 82, p. 3421-3448.

GeoLogismiki, 2021, CLiq, v.3.3.1.14, Software for Liquefaction Potential Evaluation using Cone Penetration Tests and Standard Penetration Tests.

K&A Engineering, Inc., 2021, Conceptual Grading Study, plan undated, last plotted July 22, 2021, scale 1" =200'.

Kennedy, M.P, 1977, Recency and Character of Faulting Along the Elsinore Fault Zone in Southern Riverside County, California: California Division of Mines and Geology, Special Report 131, 12 p. 1 plate, scale 1:24,000.

Lew, et al, 2010, Seismic Earth Pressures on Deep Basements, Structural Engineers Association of California (SEAOC) Convention Proceedings.

Morton, D.M., 2003, Geologic Map of the Romoland 7.5-Minute Quadrangle, Riverside County, California, Open-File Report 03-102, scale 1:24,000

NCEER, 1997, "Proceeding of the NCEER Workshop on Evaluation of Liquefaction Resistance of Soils", T. L. Youd and I. M. Idriss Editors, Technical Report NCEER-97-0022, NCEER, Buffalo, NY.

Pradel, Daniel, 1998, Procedure to evaluate earthquake-induced settlement in dry sandy soils, Journal of Geotechnical and Geoenvironmental Engineering, Volume 124(4), pp. 364-368, dated April and October 1998.

Riverside County, 2022, Map My County, web application, viewed at https://gis1countyofriverside.us

Robertson, P.K., 2010, Evaluation of flow liquefaction and liquefied strength using the cone penetration test, Journal of Geotechnical and Geoenvironmental Engineering, ASCE, pp. 842-853, dated June 2010.

Southern California Earthquake Center (SCEC), 1999, "Recommended Procedure for Implementation of DMG Special Publication 117, Guidelines for Analyzing and Mitigation Liquefaction Hazards in California", Edited by Martin, G.R., and Lew, M., dated March 1999.

Structural Engineers Association of California (SEAOC), 2022, Seismic Design Maps, Retrieved from https://seismicmaps.org/

Tokimatsu, K., and Seed, H. B., 1987, "Evaluation of Settlements in Sands Due to Earthquake Shaking", Journal of Geotechnical Engineering, ASCE, Vol. 113, No. 8, pp. 861-878.

United States Geological Survey (USGS), 2014, Unified Hazard Tool, Dynamic: Conterminous U.S. 2014 (update) (v4.2.0), Retrieved from: https://earthquake.usgs.gov/hazards/interactive/

Youd, L.T., Hansen, C.B., Bartlett, S.F., 2002, Revised multilinear regression equations for prediction of lateral spread displacement, Journal of Geotechnical and Geoenvironmental Engineering, December 2002, pp. 1007-1017.

Appendix B
Exploratory Boring and Trench Logs

Geotechnical Boring Log Borehole HS-1

Date: 4/11/2022	**Drilling Company:** Cal Pac Drilling
Project Name: Meritage - Salt Creek	**Type of Rig:** Mobile B61
Project Number: 22057-01	**Drop:** 30" **Hole Diameter:** 8"
Elevation of Top of Hole: ~1446' MSL	**Drive Weight:** 140 pounds
Hole Location: See Geotechnical Map	Page 1 of 1

Logged By JMN
Sampled By JMN
Checked By CPM

Elevation (ft)	Depth (ft)	Graphic Log	Sample Number	Blow Count	Dry Density (pcf)	Moisture (%)	USCS Symbol	DESCRIPTION	Type of Test
1445	0	B-1	R-1	12 12 11	121.6	8.6	SM	**@0' to T.D. - <u>Old Alluvium (Qoa):</u>** @1' - Silty SAND: reddish to yellowish brown, moist, medium dense	
			R-2	4 7 8	115.5	12.0	ML	@2.5' - Sandy SILT: reddish brown, moist, stiff	
1440	5		R-3	5 5 7	113.8	11.3	SM	@5' - Silty SAND: dark brown, moist, loose, scattered pebbles	
			R-4	5 8 11	118.3	10.3		@7.5' - Silty SAND: light brown to reddish brown, moist, medium dense	
1435	10		R-5	7 8 7				@10' - No Recovery	
1430	15	▽	R-6	2 2 3	94.6	18.0	ML	@15' - Sandy SILT: brown, wet soft	
1425	20		SPT-1	8 11 15		17.3	SC	@20' - Clayey SAND: orange to olive brown, wet, dense	
1420	25		R-7	8 12 13	120.2	15.0		@25' - Clayey SAND: reddish brown, wet, dense	
	30							Total Depth = 26.5' Groundwater Encountered at Approximately 15' Backfilled with Cuttings on 4/11/2022	

LGC Geotechnical, Inc.

THIS SUMMARY APPLIES ONLY AT THE LOCATION OF THIS BORING AND AT THE TIME OF DRILLING. SUBSURFACE CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH THE PASSAGE OF TIME. THE DATA PRESENTED IS A SIMPLIFICATION OF THE ACTUAL CONDITIONS ENCOUNTERED. THE DESCRIPTIONS PROVIDED ARE QUALITATIVE FIELD DESCRIPTIONS AND ARE NOT BASED ON QUANTITATIVE ENGINEERING ANALYSIS.

SAMPLE TYPES:

B	BULK SAMPLE
R	RING SAMPLE (CA Modified Sampler)
G	GRAB SAMPLE
SPT	STANDARD PENETRATION TEST SAMPLE
▽	GROUNDWATER TABLE

TEST TYPES:

DS	DIRECT SHEAR
MD	MAXIMUM DENSITY
SA	SIEVE ANALYSIS
S&H	SIEVE AND HYDROMETER
EI	EXPANSION INDEX
CN	CONSOLIDATION
CR	CORROSION
AL	ATTERBERG LIMITS
CO	COLLAPSE/SWELL
RV	R-VALUE
-#200	% PASSING # 200 SIEVE

Last Edited: 5/23/2022

Geotechnical Boring Log Borehole HS-2

Date: 4/11/2022 | **Drilling Company:** Cal Pac Drilling

Project Name: Meritage - Salt Creek | **Type of Rig:** Mobile B61

Project Number: 22057-01 | **Drop:** 30" | **Hole Diameter:** 8"

Elevation of Top of Hole: ~1444' MSL | **Drive Weight:** 140 pounds

Hole Location: See Geotechnical Map |

Logged By JMN
Sampled By JMN
Checked By CPM

Elevation (ft)	Depth (ft)	Graphic Log	Sample Number	Blow Count	Dry Density (pcf)	Moisture (%)	USCS Symbol	DESCRIPTION	Type of Test
	0	B-1	R-1	13 13 13				**@0' to 20' - Young Alluvium (Qal):** @1' - No Recovery	EI CR
			R-2	6 10 12	98.4	12.3	SM	@2.5' - Silty SAND: pale brown, moist, medium dense	
1440	5		R-3	6 11 16	95.2	12.6		@5' - Silty SAND: reddish brown, moist, medium dense	
			R-4	2 6 10	86.5	32.3	ML	@7.5' - Sandy SILT: yellowish brown, very moist, stiff	CD
1435	10		R-5	2 5 8	110.2	17.9	SM	@10' - Silty SAND: yellowish brown, very moist, medium dense	CN
1430	15	▽	SPT-1	3 6 6		22.2		@15' - Silty SAND: pale grayish brown, wet, medium dense	
1425								**@20' to T.D. - Old Alluvium (Qoa):**	
	20		R-6	1 2 3	74.9	42.7	CL	@20' - CLAY: light brown, wet, soft	CN
1420	25		SPT-2	2 2 3		25.4	ML	@25' - Sandy SILT: olive brown, very moist, medium stiff	
1415	30							Total Depth = 26.5' Groundwater Encountered at Approximately 14' Backfilled with Cuttings on 4/11/2022	

LGC Geotechnical, Inc.

THIS SUMMARY APPLIES ONLY AT THE LOCATION OF THIS BORING AND AT THE TIME OF DRILLING. SUBSURFACE CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH THE PASSAGE OF TIME. THE DATA PRESENTED IS A SIMPLIFICATION OF THE ACTUAL CONDITIONS ENCOUNTERED. THE DESCRIPTIONS PROVIDED ARE QUALITATIVE FIELD DESCRIPTIONS AND ARE NOT BASED ON QUANTITATIVE ENGINEERING ANALYSIS.

SAMPLE TYPES:

B	BULK SAMPLE
R	RING SAMPLE (CA Modified Sampler)
G	GRAB SAMPLE
SPT	STANDARD PENETRATION TEST SAMPLE
▽	GROUNDWATER TABLE

TEST TYPES:

DS	DIRECT SHEAR
MD	MAXIMUM DENSITY
SA	SIEVE ANALYSIS
S&H	SIEVE AND HYDROMETER
EI	EXPANSION INDEX
CN	CONSOLIDATION
CR	CORROSION
AL	ATTERBERG LIMITS
CO	COLLAPSE/SWELL
RV	R-VALUE
-#200	% PASSING # 200 SIEVE

Last Edited: 5/23/2022

Geotechnical Boring Log Borehole HS-3

Date: 4/11/2022	**Drilling Company:** Cal Pac Drilling
Project Name: Meritage - Salt Creek	**Type of Rig:** Mobile B61
Project Number: 22057-01	**Drop:** 30" **Hole Diameter:** 8"
Elevation of Top of Hole: ~1444' MSL	**Drive Weight:** 140 pounds
Hole Location: See Geotechnical Map	Page 1 of 2

Logged By JMN
Sampled By JMN
Checked By CPM

Elevation (ft)	Depth (ft)	Graphic Log	Sample Number	Blow Count	Dry Density (pcf)	Moisture (%)	USCS Symbol	DESCRIPTION	Type of Test
	0	B-1						**@0' to 20' - Young Alluvium (Qal):**	
			R-1	7 7 8	97.5	17.0	ML	@1' - Sandy SILT: dark brown, moist, stiff	RV
			R-2	4 14 19	97.8	15.5	SM	@2.5' - Silty SAND: reddish brown, very moist, medium dense	
1440	5		R-3	9 11 10	105.1	13.3	SM-ML	@5' - Silty SAND to Sandy SILT: yellowish brown to olive brown, moist, medium dense to very stiff, scattered pebbles	
			R-4	8 16 24	112.9	13.3	SM	@7.5' - Silty SAND: yellowish brown to pale olive brown, moist, dense, scattered pebbles	
1435	10	▽	R-5	7 12 14	101.7	23.5	ML	@10' - Sandy SILT: pale brown to olive brown, very moist, very stiff, rock fragments in sampler	
1430	15		SPT-1	2 3 5		24.7	SM	@15' - Silty SAND with Gravel: light brown to olive brown, wet, loose	
1425	20		R-6	3 5 6	101.6	23.2	ML	**@20' to T.D. - Old Alluvium (Qoa):** @20' - Sandy SILT: olive brown, wet, stiff	
1420	25		SPT-2	3 5 5		24.2	CL	@25' - Sandy CLAY: olive brown, wet, stiff	
1415	30								

LGC Geotechnical, Inc.

THIS SUMMARY APPLIES ONLY AT THE LOCATION OF THIS BORING AND AT THE TIME OF DRILLING. SUBSURFACE CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH THE PASSAGE OF TIME. THE DATA PRESENTED IS A SIMPLIFICATION OF THE ACTUAL CONDITIONS ENCOUNTERED. THE DESCRIPTIONS PROVIDED ARE QUALITATIVE FIELD DESCRIPTIONS AND ARE NOT BASED ON QUANTITATIVE ENGINEERING ANALYSIS.

SAMPLE TYPES:

B	BULK SAMPLE
R	RING SAMPLE (CA Modified Sampler)
G	GRAB SAMPLE
SPT	STANDARD PENETRATION TEST SAMPLE
▽	GROUNDWATER TABLE

TEST TYPES:

DS	DIRECT SHEAR
MD	MAXIMUM DENSITY
SA	SIEVE ANALYSIS
S&H	SIEVE AND HYDROMETER
EI	EXPANSION INDEX
CN	CONSOLIDATION
CR	CORROSION
AL	ATTERBERG LIMITS
CO	COLLAPSE/SWELL
RV	R-VALUE
-#200	% PASSING # 200 SIEVE

Last Edited: 5/23/2022

Geotechnical Boring Log Borehole HS-3

Date: 4/11/2022 | **Drilling Company:** Cal Pac Drilling

Project Name: Meritage - Salt Creek | **Type of Rig:** Mobile B61

Project Number: 22057-01 | **Drop:** 30" | **Hole Diameter:** 8"

Elevation of Top of Hole: ~1444' MSL | **Drive Weight:** 140 pounds

Hole Location: See Geotechnical Map

Logged By JMN
Sampled By JMN
Checked By CPM

Elevation (ft)	Depth (ft)	Graphic Log	Sample Number	Blow Count	Dry Density (pcf)	Moisture (%)	USCS Symbol	DESCRIPTION	Type of Test
1410	30		R-7	4 9 15	115.2	14.7	SM	@30' - Silty SAND: light brown to reddish brown, wet, medium dense	
	35		SPT-3	2 4 5		24.1		@35' - Silty SAND: light brown to olive brown, wet, medium dense	
1405									
1400	40		R-8	6 12 20	106.0	21.5		@40' - Silty SAND: pale brown to olive brown, wet, medium dense	
1395	45							Total Depth = 45' (Due to heaving sand) Groundwater Encountered at Approximately 11' Backfilled with Cuttings on 4/11/2022	
1390	50								
1385	55								
	60								

LGC Geotechnical, Inc.

THIS SUMMARY APPLIES ONLY AT THE LOCATION OF THIS BORING AND AT THE TIME OF DRILLING. SUBSURFACE CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH THE PASSAGE OF TIME. THE DATA PRESENTED IS A SIMPLIFICATION OF THE ACTUAL CONDITIONS ENCOUNTERED. THE DESCRIPTIONS PROVIDED ARE QUALITATIVE FIELD DESCRIPTIONS AND ARE NOT BASED ON QUANTITATIVE ENGINEERING ANALYSIS.

SAMPLE TYPES:

B	BULK SAMPLE
R	RING SAMPLE (CA Modified Sampler)
G	GRAB SAMPLE
SPT	STANDARD PENETRATION TEST SAMPLE
▽	GROUNDWATER TABLE

TEST TYPES:

DS	DIRECT SHEAR
MD	MAXIMUM DENSITY
SA	SIEVE ANALYSIS
S&H	SIEVE AND HYDROMETER
EI	EXPANSION INDEX
CN	CONSOLIDATION
CR	CORROSION
AL	ATTERBERG LIMITS
CO	COLLAPSE/SWELL
RV	R-VALUE
-#200	% PASSING # 200 SIEVE

Geotechnical Boring Log Borehole HS-4

Date: 4/12/2022	**Drilling Company:** Cal Pac Drilling
Project Name: Meritage - Salt Creek	**Type of Rig:** Mobile B61
Project Number: 22057-01	**Drop:** 30" **Hole Diameter:** 8"
Elevation of Top of Hole: ~1445' MSL	**Drive Weight:** 140 pounds
Hole Location: See Geotechnical Map	Page 1 of 1

Logged By JMN
Sampled By JMN
Checked By CPM

Elevation (ft)	Depth (ft)	Graphic Log	Sample Number	Blow Count	Dry Density (pcf)	Moisture (%)	USCS Symbol	DESCRIPTION	Type of Test
	0	B-1	R-1	19 29 34	117.4	9.0	SM	**@0' to 5' - Young Alluvium (Qal):** @1' - Silty SAND: light brown to orange brown, moist, dense	CR
			R-2	14 17 18	109.1	16.8	SC	@2.5' - Clayey SAND: orange brown, moist, medium dense	
1440	5		R-3	6 9 11	104.6	22.6	CL	**@5' to T.D. - Old Alluvium (Qoa):** @5' - Sandy CLAY: light brown to orange brown, very moist, very stiff	
			R-4	4 5 7	110.7	20.2	SC	@7.5' - Clayey SAND: brown, wet, loose	CO
1435	10		R-5	5 8 18	106.0	26.5	CL	@10' - Sandy CLAY: pale brown to olive brown, wet, very stiff	
1430	15		SPT-1	2 3 5		26.3	ML	@15' - Sandy SILT: brown to dark brown, wet, stiff	
1425	20		R-6	11 13 14	126.6	11.6	SC	@20' - Clayey SAND: reddish brown, moist, medium dense	
1420	25		SPT-2	5 10 11		15.9	SM	@25' - Silty SAND: brown, wet, medium dense	
	30							Total Depth = 26.5' Groundwater Encountered at Approximately 6' Backfilled with Cuttings on 4/12/2022	

LGC Geotechnical, Inc.

THIS SUMMARY APPLIES ONLY AT THE LOCATION OF THIS BORING AND AT THE TIME OF DRILLING. SUBSURFACE CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH THE PASSAGE OF TIME. THE DATA PRESENTED IS A SIMPLIFICATION OF THE ACTUAL CONDITIONS ENCOUNTERED. THE DESCRIPTIONS PROVIDED ARE QUALITATIVE FIELD DESCRIPTIONS AND ARE NOT BASED ON QUANTITATIVE ENGINEERING ANALYSIS.

SAMPLE TYPES:

B	BULK SAMPLE
R	RING SAMPLE (CA Modified Sampler)
G	GRAB SAMPLE
SPT	STANDARD PENETRATION TEST SAMPLE
▽	GROUNDWATER TABLE

TEST TYPES:

DS	DIRECT SHEAR
MD	MAXIMUM DENSITY
SA	SIEVE ANALYSIS
S&H	SIEVE AND HYDROMETER
EI	EXPANSION INDEX
CN	CONSOLIDATION
CR	CORROSION
AL	ATTERBERG LIMITS
CO	COLLAPSE/SWELL
RV	R-VALUE
-#200	% PASSING # 200 SIEVE

Last Edited: 5/23/2022

Geotechnical Boring Log Borehole HS-5

Date: 4/12/2022 | **Drilling Company:** Cal Pac Drilling

Project Name: Meritage - Salt Creek | **Type of Rig:** Mobile B61

Project Number: 22057-01 | **Drop:** 30" | **Hole Diameter:** 8"

Elevation of Top of Hole: ~1445' MSL | **Drive Weight:** 140 pounds

Hole Location: See Geotechnical Map |

Logged By JMN
Sampled By JMN
Checked By CPM

Elevation (ft)	Depth (ft)	Graphic Log	Sample Number	Blow Count	Dry Density (pcf)	Moisture (%)	USCS Symbol	DESCRIPTION	Type of Test
	0	B-1	R-1	5 4 4	98.7	18.4	SC-CL	**@0' to 15' - Young Alluvium (Qal):** @1' - Clayey SAND to Sandy CLAY: brown, moist, loose to medium stiff, rootlets	MD EI CR AL
			R-2	10 12 7	93.8	21.3	SM	@2.5' - Silty SAND: yellowish to reddish brown, very moist, medium dense	
1440	5		R-3	4 5 9	114.7	10.0		@5' - Silty SAND: yellowish to reddish brown, moist, medium dense	
		▽	R-4	6 11 17	115.3	7.4	SP	@7.5' - SAND: gray to yellowish brown, moist, medium dense, scattered gravel	
1435	10		R-5	12 18 25	118.8	9.8		@10' - SAND: gray to pale brown, wet, dense, scattered gravel	
1430	15		SPT-1	3 8 10		14.1	SP	**@15' to T.D. - Old Alluvium (Qoa):** @15' - SAND: reddish to grayish brown, wet, medium dense	
1425	20		R-6	4 5 6	75.4	45.5	CL-ML	@20' - Silty CLAY: light yellow brown to olive brown, wet, stiff	CN
1420	25		SPT-2	1 2 2		26.2	CL	@25' - Sandy CLAY: yellowish orange brown to light brown, wet, medium stiff	
	30							Total Depth = 26.5' Groundwater Encountered at Approximately 8.5' Backfilled with Cuttings on 4/12/2022	

LGC Geotechnical, Inc.

THIS SUMMARY APPLIES ONLY AT THE LOCATION OF THIS BORING AND AT THE TIME OF DRILLING. SUBSURFACE CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH THE PASSAGE OF TIME. THE DATA PRESENTED IS A SIMPLIFICATION OF THE ACTUAL CONDITIONS ENCOUNTERED. THE DESCRIPTIONS PROVIDED ARE QUALITATIVE FIELD DESCRIPTIONS AND ARE NOT BASED ON QUANTITATIVE ENGINEERING ANALYSIS.

SAMPLE TYPES:

B	BULK SAMPLE
R	RING SAMPLE (CA Modified Sampler)
G	GRAB SAMPLE
SPT	STANDARD PENETRATION TEST SAMPLE
▽	GROUNDWATER TABLE

TEST TYPES:

DS	DIRECT SHEAR
MD	MAXIMUM DENSITY
SA	SIEVE ANALYSIS
S&H	SIEVE AND HYDROMETER
EI	EXPANSION INDEX
CN	CONSOLIDATION
CR	CORROSION
AL	ATTERBERG LIMITS
CO	COLLAPSE/SWELL
RV	R-VALUE
-#200	% PASSING # 200 SIEVE

Last Edited: 5/23/2022

Geotechnical Boring Log Borehole HS-6

Date: 5/5/2022	**Drilling Company:** Martini Drilling
Project Name: Meritage - Salt Creek	**Type of Rig:** CME 75
Project Number: 22057-01	**Drop:** 30" **Hole Diameter:** 8"
Elevation of Top of Hole: ~1447' MSL	**Drive Weight:** 140 pounds
Hole Location: See Geotechnical Map	Page 1 of 2

Logged By JMN
Sampled By JMN
Checked By CPM

Elevation (ft)	Depth (ft)	Sample Number	Blow Count	Dry Density (pcf)	Moisture (%)	USCS Symbol	DESCRIPTION	Type of Test
	0	R-1	11 12 19	105.4	5.9	ML	**@0' to 7.5' - <u>Young Alluvium (Qal):</u>** @1' - Sandy SILT: brown to olive brown, dry, very stiff	
1445		SPT-1	5 5 3		8.6		@2.5' - Sandy SILT: light yellowish brown, slightly moist, stiff	
	5	R-2	19 21 26	99.0	14.1	SM	@5' - Silty SAND: brown, moist, medium dense	
1440		SPT-2	6 8 11		15.6	SM	**@7.5' to T.D. - <u>Old Alluvium (Qoa):</u>** @7.5' - Silty SAND: brown to reddish brown, moist, medium dense	
	10	R-3	14 19 28	120.3	14.0	SC	@10' - Clayey SAND: brown, moist, dense	
1435								
	15	SPT-3	4 11 20		14.7	CL	@15' - Sandy CLAY: light brown to reddish brown, moist, hard	
1430								
	20	R-4	14 41 50/4"	122.0	12.4	SC	@20' - Clayey SAND, brown to reddish brown, moist, very dense	
1425								
	25	SPT-4	4 6 10		15.1		@25' - Clayey SAND: dark brown to reddish brown, moist, medium dense	
1420								
	30							

LGC Geotechnical, Inc.

THIS SUMMARY APPLIES ONLY AT THE LOCATION OF THIS BORING AND AT THE TIME OF DRILLING. SUBSURFACE CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH THE PASSAGE OF TIME. THE DATA PRESENTED IS A SIMPLIFICATION OF THE ACTUAL CONDITIONS ENCOUNTERED. THE DESCRIPTIONS PROVIDED ARE QUALITATIVE FIELD DESCRIPTIONS AND ARE NOT BASED ON QUANTITATIVE ENGINEERING ANALYSIS.

SAMPLE TYPES:

B	BULK SAMPLE
R	RING SAMPLE (CA Modified Sampler)
G	GRAB SAMPLE
SPT	STANDARD PENETRATION TEST SAMPLE
	GROUNDWATER TABLE

TEST TYPES:

DS	DIRECT SHEAR
MD	MAXIMUM DENSITY
SA	SIEVE ANALYSIS
S&H	SIEVE AND HYDROMETER
EI	EXPANSION INDEX
CN	CONSOLIDATION
CR	CORROSION
AL	ATTERBERG LIMITS
CO	COLLAPSE/SWELL
RV	R-VALUE
-#200	% PASSING # 200 SIEVE

Last Edited: 5/23/2022

Geotechnical Boring Log Borehole HS-6

Date: 5/5/2022	**Drilling Company:** Martini Drilling
Project Name: Meritage - Salt Creek	**Type of Rig:** CME 75
Project Number: 22057-01	**Drop:** 30" **Hole Diameter:** 8"
Elevation of Top of Hole: ~1447' MSL	**Drive Weight:** 140 pounds
Hole Location: See Geotechnical Map	Page 2 of 2

Logged By JMN
Sampled By JMN
Checked By CPM

Elevation (ft)	Depth (ft)	Graphic Log	Sample Number	Blow Count	Dry Density (pcf)	Moisture (%)	USCS Symbol	DESCRIPTION	Type of Test
1415	30		R-5	20 37 47	126.9	11.9	SM	@30' - Silty SAND: brown to dark brown, moist, very dense	
1410	35		SPT-5	16 18 27		17.0	SP-SM	@35' - SAND with Silt: brown to dark brown, wet, very dense	
1405	40		R-6	18 35 50/4"	123.6	13.3	SC	@40' - Clayey SAND: dark brown, to reddish brown, very moist, very dense	
1400	45		SPT-6	5 19 22		15.1	CL	@45' - Sandy CLAY: brown to dark brown, very moist, hard	
1395	50		R-7	42 50/4"	122.2	8.8	SP	@50' - SAND: gray to brown, very moist, very dense	
1390	55							Total Depth = 51' Groundwater Encountered at Approximately 28' Backfilled with Cuttings on 5/5/2022	
	60								

LGC Geotechnical, Inc.

THIS SUMMARY APPLIES ONLY AT THE LOCATION OF THIS BORING AND AT THE TIME OF DRILLING. SUBSURFACE CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH THE PASSAGE OF TIME. THE DATA PRESENTED IS A SIMPLIFICATION OF THE ACTUAL CONDITIONS ENCOUNTERED. THE DESCRIPTIONS PROVIDED ARE QUALITATIVE FIELD DESCRIPTIONS AND ARE NOT BASED ON QUANTITATIVE ENGINEERING ANALYSIS.

SAMPLE TYPES:

B	BULK SAMPLE
R	RING SAMPLE (CA Modified Sampler)
G	GRAB SAMPLE
SPT	STANDARD PENETRATION TEST SAMPLE
▽	GROUNDWATER TABLE

TEST TYPES:

DS	DIRECT SHEAR
MD	MAXIMUM DENSITY
SA	SIEVE ANALYSIS
S&H	SIEVE AND HYDROMETER
EI	EXPANSION INDEX
CN	CONSOLIDATION
CR	CORROSION
AL	ATTERBERG LIMITS
CO	COLLAPSE/SWELL
RV	R-VALUE
-#200	% PASSING # 200 SIEVE

Geotechnical Boring Log Borehole HS-7

Date: 5/5/2022 | **Drilling Company:** Martini Drilling

Project Name: Meritage - Salt Creek | **Type of Rig:** CME 75

Project Number: 22057-01 | **Drop:** 30" | **Hole Diameter:** 8"

Elevation of Top of Hole: ~1462' MSL | **Drive Weight:** 140 pounds

Hole Location: See Geotechnical Map

Logged By JMN
Sampled By JMN
Checked By CPM

Elevation (ft)	Depth (ft)	Graphic Log	Sample Number	Blow Count	Dry Density (pcf)	Moisture (%)	USCS Symbol	DESCRIPTION	Type of Test
	0							**@0' to 20' - Old Alluvium (Qoa):**	
1460			R-1	8 15 26	119.1	5.5	SM	@2.5' - Silty SAND: light reddish brown to light gray, slightly moist, dense	
	5		R-2	22 50/3"	116.6	5.9		@5' - Silty SAND: yellowish brown to light brown, slightly moist, very dense	
1455			R-3	38 50/3"	118.5	8.0		@7.5' - Silty SAND: light brown to orange brown, moist, very dense	
	10		R-4	30 48 50/5"	121.5	7.6		@10' - Silty SAND: yellowish brown to brown, moist, very dense	
1450									
	15		SPT-1	4 4 4		10.0		@15' - Silty SAND: brown to orange brown, moist, loose	
1445									
	20		R-5	33 50/5"	118.9	7.9	SP-SM	**@20' to T.D. - Bedrock - Domenigoni Valley Granodiorite (Kdvg):** @20' - SAND with Silt: brown to orange brown, moist, very dense, highly weathered	
1440									
	25		SPT-2	50/5"		5.6		@25' - SAND with Silt: light brown to orange brown, slightly moist, very dense	
1435								Total Depth = 25.5' Groundwater Not Encountered Backfilled with Cuttings on 5/5/2022	
	30								

LGC Geotechnical, Inc.

THIS SUMMARY APPLIES ONLY AT THE LOCATION OF THIS BORING AND AT THE TIME OF DRILLING. SUBSURFACE CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH THE PASSAGE OF TIME. THE DATA PRESENTED IS A SIMPLIFICATION OF THE ACTUAL CONDITIONS ENCOUNTERED. THE DESCRIPTIONS PROVIDED ARE QUALITATIVE FIELD DESCRIPTIONS AND ARE NOT BASED ON QUANTITATIVE ENGINEERING ANALYSIS.

SAMPLE TYPES:

B	BULK SAMPLE
R	RING SAMPLE (CA Modified Sampler)
G	GRAB SAMPLE
SPT	STANDARD PENETRATION TEST SAMPLE
▽	GROUNDWATER TABLE

TEST TYPES:

DS	DIRECT SHEAR
MD	MAXIMUM DENSITY
SA	SIEVE ANALYSIS
S&H	SIEVE AND HYDROMETER
EI	EXPANSION INDEX
CN	CONSOLIDATION
CR	CORROSION
AL	ATTERBERG LIMITS
CO	COLLAPSE/SWELL
RV	R-VALUE
-#200	% PASSING # 200 SIEVE

Last Edited: 5/23/2022

Geotechnical Boring Log Borehole HS-8

Date: 5/5/2022	**Drilling Company:** Martini Drilling
Project Name: Meritage - Salt Creek	**Type of Rig:** CME 75
Project Number: 22057-01	**Drop:** 30" **Hole Diameter:** 8"
Elevation of Top of Hole: ~1466' MSL	**Drive Weight:** 140 pounds
Hole Location: See Geotechnical Map	Page 1 of 1

Logged By JMN
Sampled By JMN
Checked By CPM

Elevation (ft)	Depth (ft)	Graphic Log	Sample Number	Blow Count	Dry Density (pcf)	Moisture (%)	USCS Symbol	DESCRIPTION	Type of Test
1465	0		R-1	3 4 11	114.7	6.1	SM	**@0' to 5' - <u>Young Alluvium (Qal):</u>** @2.5' - Silty SAND: light reddish brown to light gray, slightly moist, medium dense	
1460	5		R-2	50/3"	108.0	2.4	SM	**@5' to T.D. - <u>Old Alluvium (Qoa):</u>** @5' - Silty SAND: yellowish brown to light brown, slightly moist, very dense	
1455	10							Total Depth = 7.5' Refusal on Bedrock Groundwater Not Encountered Backfilled with Cuttings on 5/5/2022	
1450	15								
1445	20								
1440	25								
	30								

LGC Geotechnical, Inc.

THIS SUMMARY APPLIES ONLY AT THE LOCATION OF THIS BORING AND AT THE TIME OF DRILLING. SUBSURFACE CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH THE PASSAGE OF TIME. THE DATA PRESENTED IS A SIMPLIFICATION OF THE ACTUAL CONDITIONS ENCOUNTERED. THE DESCRIPTIONS PROVIDED ARE QUALITATIVE FIELD DESCRIPTIONS AND ARE NOT BASED ON QUANTITATIVE ENGINEERING ANALYSIS.

SAMPLE TYPES:

B	BULK SAMPLE
R	RING SAMPLE (CA Modified Sampler)
G	GRAB SAMPLE
SPT	STANDARD PENETRATION TEST SAMPLE
⏚	GROUNDWATER TABLE

TEST TYPES:

DS	DIRECT SHEAR
MD	MAXIMUM DENSITY
SA	SIEVE ANALYSIS
S&H	SIEVE AND HYDROMETER
EI	EXPANSION INDEX
CN	CONSOLIDATION
CR	CORROSION
AL	ATTERBERG LIMITS
CO	COLLAPSE/SWELL
RV	R-VALUE
-#200	% PASSING # 200 SIEVE

Last Edited: 5/23/2022

Geotechnical Boring Log Borehole HS-9

Date: 5/5/2022 | **Drilling Company:** Martini Drilling

Project Name: Meritage - Salt Creek | **Type of Rig:** CME 75

Project Number: 22057-01 | **Drop:** 30" | **Hole Diameter:** 8"

Elevation of Top of Hole: ~1448' MSL | **Drive Weight:** 140 pounds

Hole Location: See Geotechnical Map

Logged By JMN
Sampled By JMN
Checked By CPM

Elevation (ft)	Depth (ft)	Sample Number	Blow Count	Dry Density (pcf)	Moisture (%)	USCS Symbol	DESCRIPTION	Type of Test
	0	R-1	14 18 40	121.3	4.1	SM	**@0' to 7.5' - <u>Young Alluvium (Qal):</u>** @1' - Silty SAND: yellowish brown to light brown, slightly moist, dense	
1445		R-2	12 35 50/3"	118.0	3.5		@2.5' - Silty SAND: yellowish brown to brown, dry, very dense	
	5	R-3	36 50/4"	120.1	8.8		@5' - Silty SAND: brown to dark brown, moist, very dense	
1440		R-4	20 33 49	127.0	10.1	SM	**@7.5' to T.D. - <u>Old Alluvium (Qoa):</u>** @7.5' - Silty SAND: light brown to orange brown, moist, very dense	CO
	10	R-5	14 24 28	125.2	12.6		@10' - Silty SAND: brown to dark brown, moist, dense	
1435								
	15	R-6	5 7 12	121.5	14.9		@15' - Silty SAND: brown to dark brown, very moist, medium dense	CO
1430								
	20	SPT-1	5 13 20		13.6	SC	@20' - Clayey SAND: brown to reddish brown, moist, dense	
1425		R-7	50/3"	105.0	16.4		@23' - Clayey SAND: pale brown, very moist, very dense	
	25						Total Depth = 23.5' Refusal on Bedrock Groundwater Not Encountered Backfilled with Cuttings on 5/5/2022	
1420								
	30							

LGC Geotechnical, Inc.

THIS SUMMARY APPLIES ONLY AT THE LOCATION OF THIS BORING AND AT THE TIME OF DRILLING. SUBSURFACE CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH THE PASSAGE OF TIME. THE DATA PRESENTED IS A SIMPLIFICATION OF THE ACTUAL CONDITIONS ENCOUNTERED. THE DESCRIPTIONS PROVIDED ARE QUALITATIVE FIELD DESCRIPTIONS AND ARE NOT BASED ON QUANTITATIVE ENGINEERING ANALYSIS.

SAMPLE TYPES:

B	BULK SAMPLE
R	RING SAMPLE (CA Modified Sampler)
G	GRAB SAMPLE
SPT	STANDARD PENETRATION TEST SAMPLE
⏚	GROUNDWATER TABLE

TEST TYPES:

DS	DIRECT SHEAR
MD	MAXIMUM DENSITY
SA	SIEVE ANALYSIS
S&H	SIEVE AND HYDROMETER
EI	EXPANSION INDEX
CN	CONSOLIDATION
CR	CORROSION
AL	ATTERBERG LIMITS
CO	COLLAPSE/SWELL
RV	R-VALUE
-#200	% PASSING # 200 SIEVE

Last Edited: 5/23/2022

Geotechnical Boring Log Borehole HS-10

Date: 5/5/2022	**Drilling Company:** Martini Drilling
Project Name: Meritage - Salt Creek	**Type of Rig:** CME 75
Project Number: 22057-01	**Drop:** 30" **Hole Diameter:** 8"
Elevation of Top of Hole: ~1445' MSL	**Drive Weight:** 140 pounds
Hole Location: See Geotechnical Map	Page 1 of 1

Logged By JMN
Sampled By JMN
Checked By CPM

Elevation (ft)	Depth (ft)	Sample Number	Blow Count	Dry Density (pcf)	Moisture (%)	USCS Symbol	DESCRIPTION	Type of Test
	0	R-1	4 5 5	98.2	9.4	ML	**@0' to 15' - Young Alluvium (Qal):** @1' - Sandy SILT: brown to dark brown, moist, medium stiff	
		R-2	4 5 8	108.4	13.7		@2.5' - Sandy SILT: brown to dark brown, moist, stiff, rootlets	
1440	5	R-3	14 25 32	109.3	16.4		@5' - Sandy SILT: yellowish brown to brown, very moist, hard	
		R-4	15 27 47	100.4	6.0	SP	@7.5' - SAND: light gray to brown, moist, very dense, sample disturbed	
1435	10	R-5	20 38 34	121.0	9.0		@10' - SAND: reddish brown, moist, very dense	
1430	15	SPT-1	6 7 11		18.8	ML	**@15' to T.D. Old Alluvium (Qoa):** @15' - Sandy SILT: brown to reddish brown, very moist, very stiff	
1425	20	R-6	4 5 7	93.9	27.4		@20' - Clayey SILT: brown to gray, wet, stiff	
1420	25	SPT-2	2 3 4		29.3	CL	@25' - Sandy CLAY: light brown to dark gray, wet, stiff	
	30						Total Depth = 26.5' Groundwater Encountered at Approximately 18' Backfilled with Cuttings on 5/5/2022	

LGC Geotechnical, Inc.

THIS SUMMARY APPLIES ONLY AT THE LOCATION OF THIS BORING AND AT THE TIME OF DRILLING. SUBSURFACE CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH THE PASSAGE OF TIME. THE DATA PRESENTED IS A SIMPLIFICATION OF THE ACTUAL CONDITIONS ENCOUNTERED. THE DESCRIPTIONS PROVIDED ARE QUALITATIVE FIELD DESCRIPTIONS AND ARE NOT BASED ON QUANTITATIVE ENGINEERING ANALYSIS.

SAMPLE TYPES:

B	BULK SAMPLE
R	RING SAMPLE (CA Modified Sampler)
G	GRAB SAMPLE
SPT	STANDARD PENETRATION TEST SAMPLE
▽	GROUNDWATER TABLE

TEST TYPES:

DS	DIRECT SHEAR
MD	MAXIMUM DENSITY
SA	SIEVE ANALYSIS
S&H	SIEVE AND HYDROMETER
EI	EXPANSION INDEX
CN	CONSOLIDATION
CR	CORROSION
AL	ATTERBERG LIMITS
CO	COLLAPSE/SWELL
RV	R-VALUE
-#200	% PASSING # 200 SIEVE

Last Edited: 5/23/2022

Geotechnical Boring Log Borehole HS-11

Date: 5/5/2022 | **Drilling Company:** Martini Drilling

Project Name: Meritage - Salt Creek | **Type of Rig:** CME 75

Project Number: 22057-01 | **Drop:** 30" | **Hole Diameter:** 8"

Elevation of Top of Hole: ~1445' MSL | **Drive Weight:** 140 pounds

Hole Location: See Geotechnical Map

Logged By JMN
Sampled By JMN
Checked By CPM

Elevation (ft)	Depth (ft)	Graphic Log	Sample Number	Blow Count	Dry Density (pcf)	Moisture (%)	USCS Symbol	DESCRIPTION	Type of Test
	0	B-1						**@0' to 10' - Young Alluvium (Qal):**	
			R-1	10 10 14	97.2	23.1	ML	@2.5' - Sandy SILT: brown to yellowish brown, very moist, very stiff	
1440	5		R-2	8 19 27	88.8	31.4		@5' - Sandy SILT: yellowish brown to light brown, wet, hard	
			R-3	4 6 8	71.7	48.7		@7.5' - SILT: light brown to reddish brown, wet, stiff	
								@10' to T.D. - Old Alluvium (Qoa):	
1435	10		R-4	5 8 10	94.9	26.0	ML	@10' Sandy SILT: brown to orange brown, wet, stiff	
1430	15		SPT-1	8 22 28		54.2		@15' - Clayey SILT: light brown to yellowish brown, wet, hard	
1425	20		R-5	2 2 2	103.9	22.5	ML-SM	@20' - Sandy SILT to Silty SAND: light brown to brown, wet, soft to loose	
1420	25		R-6	17 34 50/5"	121.6	12.6	SM	@25' - Silty SAND: brown to orange brown, very moist, very dense	
	30							Total Depth = 26.5' Groundwater Encountered at Approximately 7' Backfilled with Cuttings on 5/5/2022	

LGC Geotechnical, Inc.

THIS SUMMARY APPLIES ONLY AT THE LOCATION OF THIS BORING AND AT THE TIME OF DRILLING. SUBSURFACE CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH THE PASSAGE OF TIME. THE DATA PRESENTED IS A SIMPLIFICATION OF THE ACTUAL CONDITIONS ENCOUNTERED. THE DESCRIPTIONS PROVIDED ARE QUALITATIVE FIELD DESCRIPTIONS AND ARE NOT BASED ON QUANTITATIVE ENGINEERING ANALYSIS.

SAMPLE TYPES:

B	BULK SAMPLE
R	RING SAMPLE (CA Modified Sampler)
G	GRAB SAMPLE
SPT	STANDARD PENETRATION TEST SAMPLE
▽	GROUNDWATER TABLE

TEST TYPES:

DS	DIRECT SHEAR
MD	MAXIMUM DENSITY
SA	SIEVE ANALYSIS
S&H	SIEVE AND HYDROMETER
EI	EXPANSION INDEX
CN	CONSOLIDATION
CR	CORROSION
AL	ATTERBERG LIMITS
CO	COLLAPSE/SWELL
RV	R-VALUE
-#200	% PASSING # 200 SIEVE

Last Edited: 5/23/2022

Geotechnical Boring Log Borehole I-1

Date: 4/11/2022	**Drilling Company:** Cal Pac Drilling
Project Name: Meritage - Salt Creek	**Type of Rig:** Mobile B61
Project Number: 22057-01	**Drop:** 30" **Hole Diameter:** 8"
Elevation of Top of Hole: ~1444' MSL	**Drive Weight:** 140 pounds
Hole Location: See Geotechnical Map	Page 1 of 1

Logged By JMN
Sampled By JMN
Checked By CPM

Elevation (ft)	Depth (ft)	Graphic Log	Sample Number	Blow Count	Dry Density (pcf)	Moisture (%)	USCS Symbol	DESCRIPTION	Type of Test
1440	0		SPT-1	2 2 4		22.3	ML	**@0' to T.D. - <u>Young Alluvium (Qal):</u>** @2.5' - Sandy SILT: yellowish brown to orange brown, very moist, medium stiff	
1435	5							Total Depth = 5' Installed 3" pipe and gravel No Groundwater Encountered Backfilled with Cuttings on 4/13/2022	
1430	10								
1425	15								
1420	20								
1415	25								
	30								

LGC Geotechnical, Inc.

THIS SUMMARY APPLIES ONLY AT THE LOCATION OF THIS BORING AND AT THE TIME OF DRILLING. SUBSURFACE CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH THE PASSAGE OF TIME. THE DATA PRESENTED IS A SIMPLIFICATION OF THE ACTUAL CONDITIONS ENCOUNTERED. THE DESCRIPTIONS PROVIDED ARE QUALITATIVE FIELD DESCRIPTIONS AND ARE NOT BASED ON QUANTITATIVE ENGINEERING ANALYSIS.

SAMPLE TYPES:

B	BULK SAMPLE
R	RING SAMPLE (CA Modified Sampler)
G	GRAB SAMPLE
SPT	STANDARD PENETRATION TEST SAMPLE
▽	GROUNDWATER TABLE

TEST TYPES:

DS	DIRECT SHEAR
MD	MAXIMUM DENSITY
SA	SIEVE ANALYSIS
S&H	SIEVE AND HYDROMETER
EI	EXPANSION INDEX
CN	CONSOLIDATION
CR	CORROSION
AL	ATTERBERG LIMITS
CO	COLLAPSE/SWELL
RV	R-VALUE
-#200	% PASSING # 200 SIEVE

Last Edited: 5/23/2022

Geotechnical Boring Log Borehole I-2

Date: 4/12/2022	**Drilling Company:** Cal Pac Drilling
Project Name: Meritage - Salt Creek	**Type of Rig:** Mobile B61
Project Number: 22057-01	**Drop:** 30" **Hole Diameter:** 8"
Elevation of Top of Hole: ~1447' MSL	**Drive Weight:** 140 pounds
Hole Location: See Geotechnical Map	Page 1 of 1

Elevation (ft)	Depth (ft)	Graphic Log	Sample Number	Blow Count	Dry Density (pcf)	Moisture (%)	USCS Symbol	Logged By JMN Sampled By JMN Checked By CPM DESCRIPTION	Type of Test
1445	0		SPT-1	2 2 4		22.3	ML	**@0' to T.D. - <u>Young Alluvium (Qal):</u>** @2.5' - Sandy SILT: yellowish brown to orange brown, very moist, medium stiff	
1440	5							Total Depth = 5' Installed 3" pipe and gravel No Groundwater Encountered Backfilled with Cuttings on 4/13/2022	
1435	10								
1430	15								
1425	20								
1420	25								
	30								

LGC Geotechnical, Inc.

THIS SUMMARY APPLIES ONLY AT THE LOCATION OF THIS BORING AND AT THE TIME OF DRILLING. SUBSURFACE CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH THE PASSAGE OF TIME. THE DATA PRESENTED IS A SIMPLIFICATION OF THE ACTUAL CONDITIONS ENCOUNTERED. THE DESCRIPTIONS PROVIDED ARE QUALITATIVE FIELD DESCRIPTIONS AND ARE NOT BASED ON QUANTITATIVE ENGINEERING ANALYSIS.

SAMPLE TYPES:

B	BULK SAMPLE
R	RING SAMPLE (CA Modified Sampler)
G	GRAB SAMPLE
SPT	STANDARD PENETRATION TEST SAMPLE
▽	GROUNDWATER TABLE

TEST TYPES:

DS	DIRECT SHEAR
MD	MAXIMUM DENSITY
SA	SIEVE ANALYSIS
S&H	SIEVE AND HYDROMETER
EI	EXPANSION INDEX
CN	CONSOLIDATION
CR	CORROSION
AL	ATTERBERG LIMITS
CO	COLLAPSE/SWELL
RV	R-VALUE
-#200	% PASSING # 200 SIEVE

Last Edited: 5/23/2022

Geotechnical Boring Log Borehole I-3

Date: 4/12/2022	**Drilling Company:** Cal Pac Drilling
Project Name: Meritage - Salt Creek	**Type of Rig:** Mobile B61
Project Number: 22057-01	**Drop:** 30" **Hole Diameter:** 8"
Elevation of Top of Hole: ~1450' MSL	**Drive Weight:** 140 pounds
Hole Location: See Geotechnical Map	Page 1 of 1

Elevation (ft)	Depth (ft)	Graphic Log	Sample Number	Blow Count	Dry Density (pcf)	Moisture (%)	USCS Symbol	Logged By JMN Sampled By JMN Checked By CPM DESCRIPTION	Type of Test
	0							**@0' to T.D. - <u>Old Alluvium (Qoa):</u>**	
			SPT-1	7 16 22		6.3	SM	@2.5' - Silty SAND: orange brown to reddish brown, slightly moist, dense	
1445	5								
			SPT-2	5 7 13		11.4		@7.5' - Silty SAND: orange brown to reddish brown, moist, medium dense	
1440	10								
								Total Depth = 10' Installed 3" pipe and gravel No Groundwater Encountered Backfilled with Cuttings on 4/13/2022	
1435	15								
1430	20								
1425	25								
1430	30								

LGC Geotechnical, Inc.

THIS SUMMARY APPLIES ONLY AT THE LOCATION OF THIS BORING AND AT THE TIME OF DRILLING. SUBSURFACE CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH THE PASSAGE OF TIME. THE DATA PRESENTED IS A SIMPLIFICATION OF THE ACTUAL CONDITIONS ENCOUNTERED. THE DESCRIPTIONS PROVIDED ARE QUALITATIVE FIELD DESCRIPTIONS AND ARE NOT BASED ON QUANTITATIVE ENGINEERING ANALYSIS.

SAMPLE TYPES:

B	BULK SAMPLE
R	RING SAMPLE (CA Modified Sampler)
G	GRAB SAMPLE
SPT	STANDARD PENETRATION TEST SAMPLE
	GROUNDWATER TABLE

TEST TYPES:

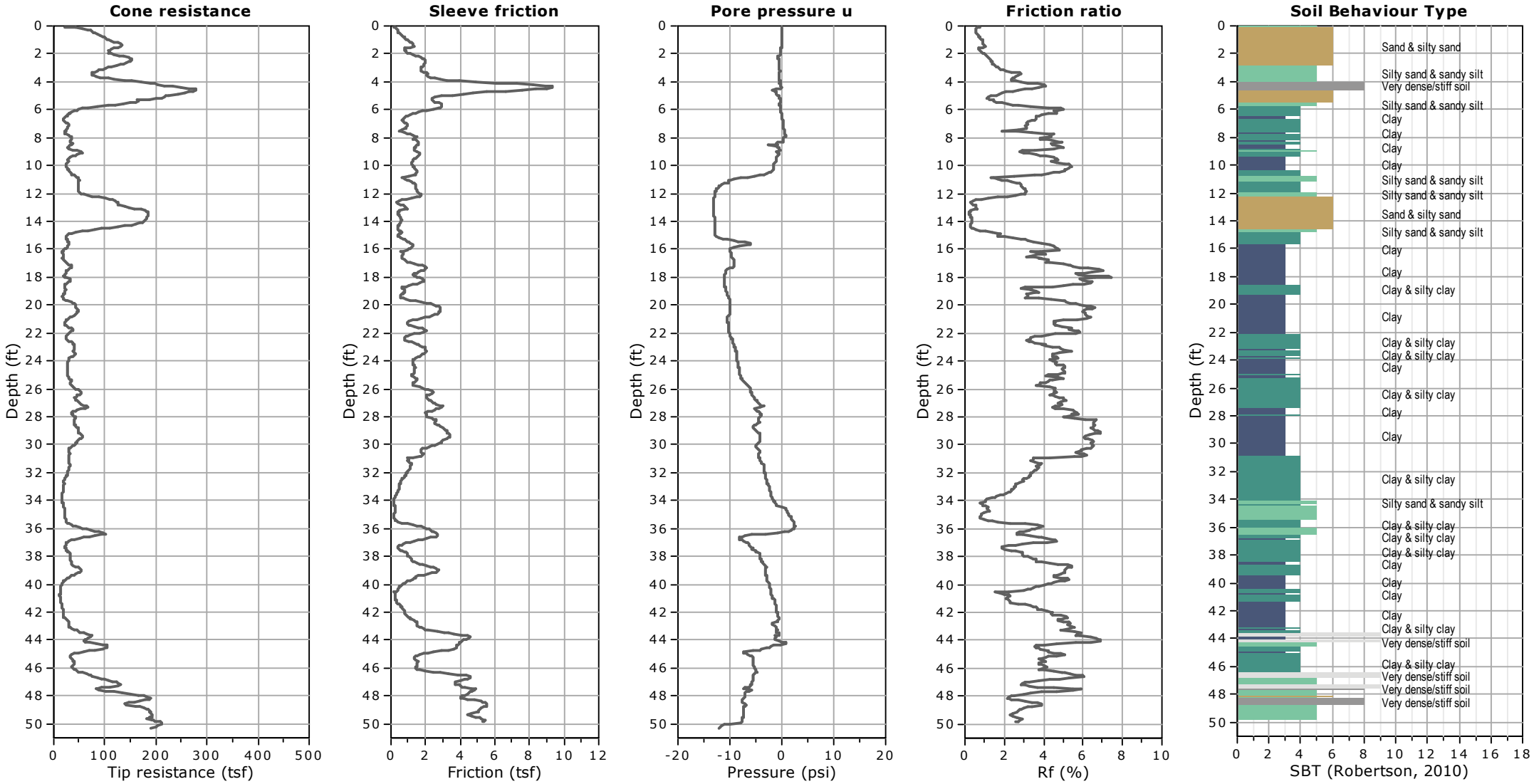
DS	DIRECT SHEAR
MD	MAXIMUM DENSITY
SA	SIEVE ANALYSIS
S&H	SIEVE AND HYDROMETER
EI	EXPANSION INDEX
CN	CONSOLIDATION
CR	CORROSION
AL	ATTERBERG LIMITS
CO	COLLAPSE/SWELL
RV	R-VALUE
-#200	% PASSING # 200 SIEVE

Last Edited: 5/23/2022

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

Project: **LGC Geotechnical / Salt Creek**
Location: **Menifee, CA**

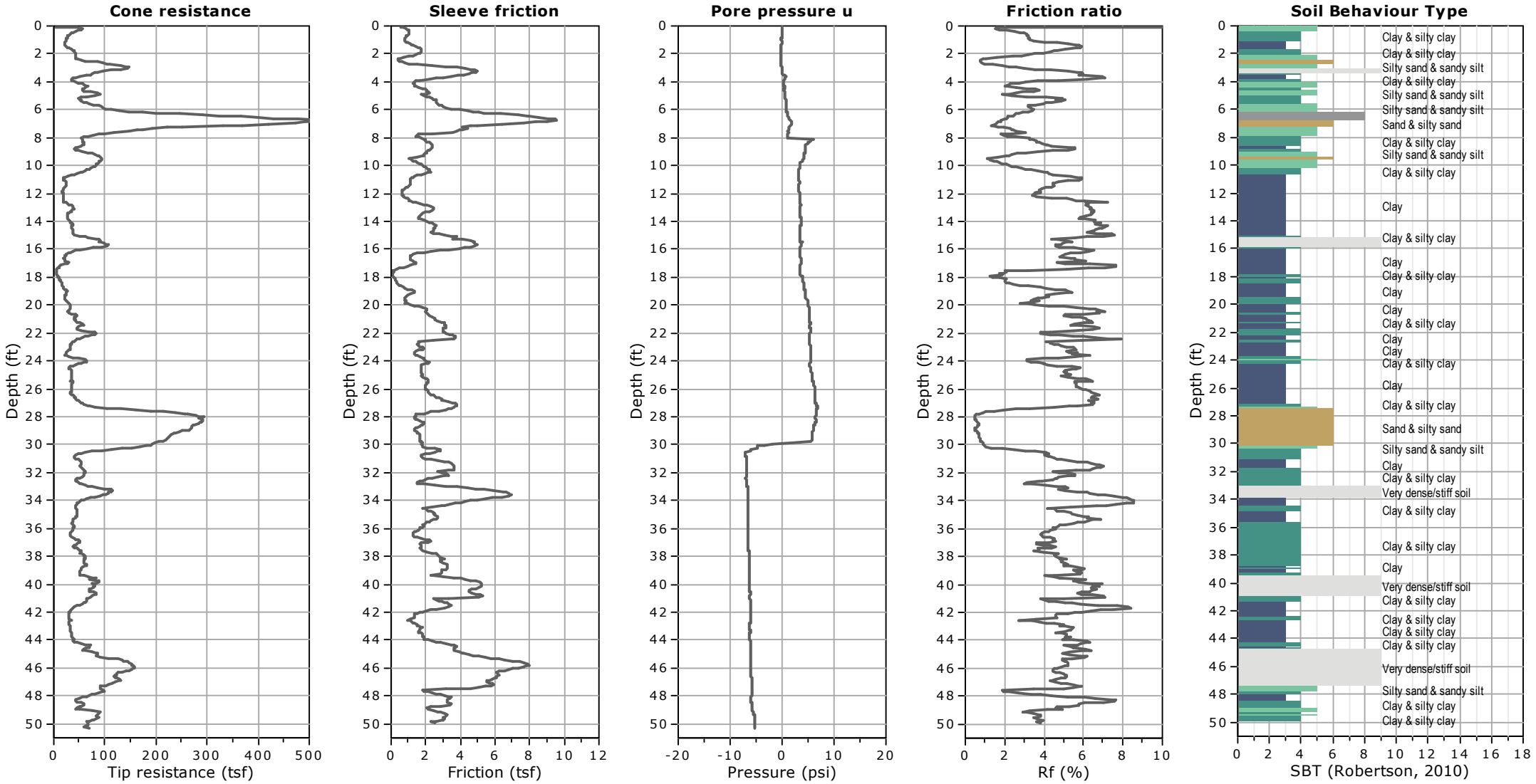
CPT-1
Total depth: 50.28 ft, Date: 4/11/2022



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

Project: **LGC Geotechnical / Salt Creek**
Location: **Menifee, CA**

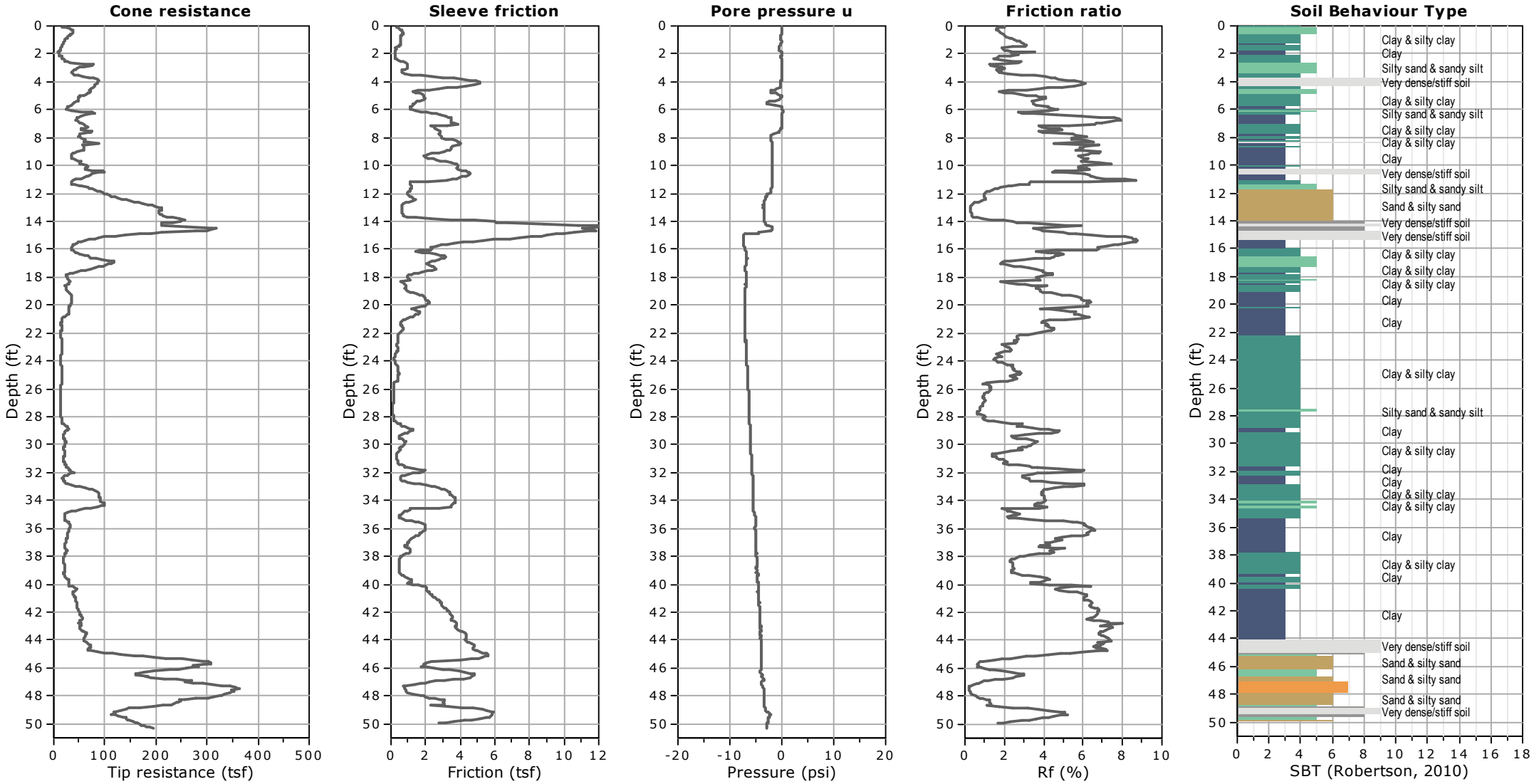
CPT-2
Total depth: 50.33 ft, Date: 4/11/2022



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

Project: **LGC Geotechnical / Salt Creek**
Location: **Menifee, CA**

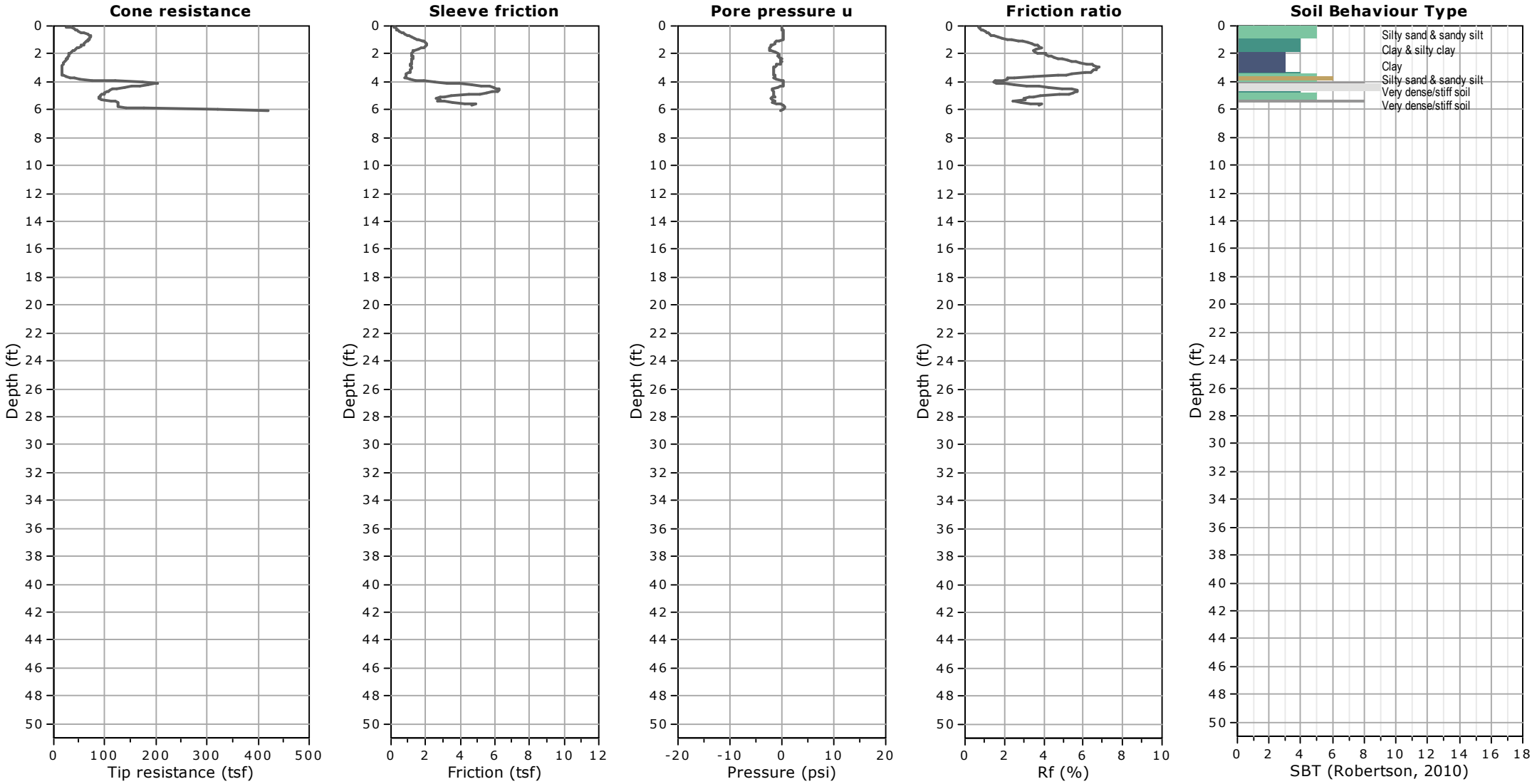
CPT-3
Total depth: 50.34 ft, Date: 4/11/2022



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

Project: **LGC Geotechnical / Salt Creek**
Location: **Menifee, CA**

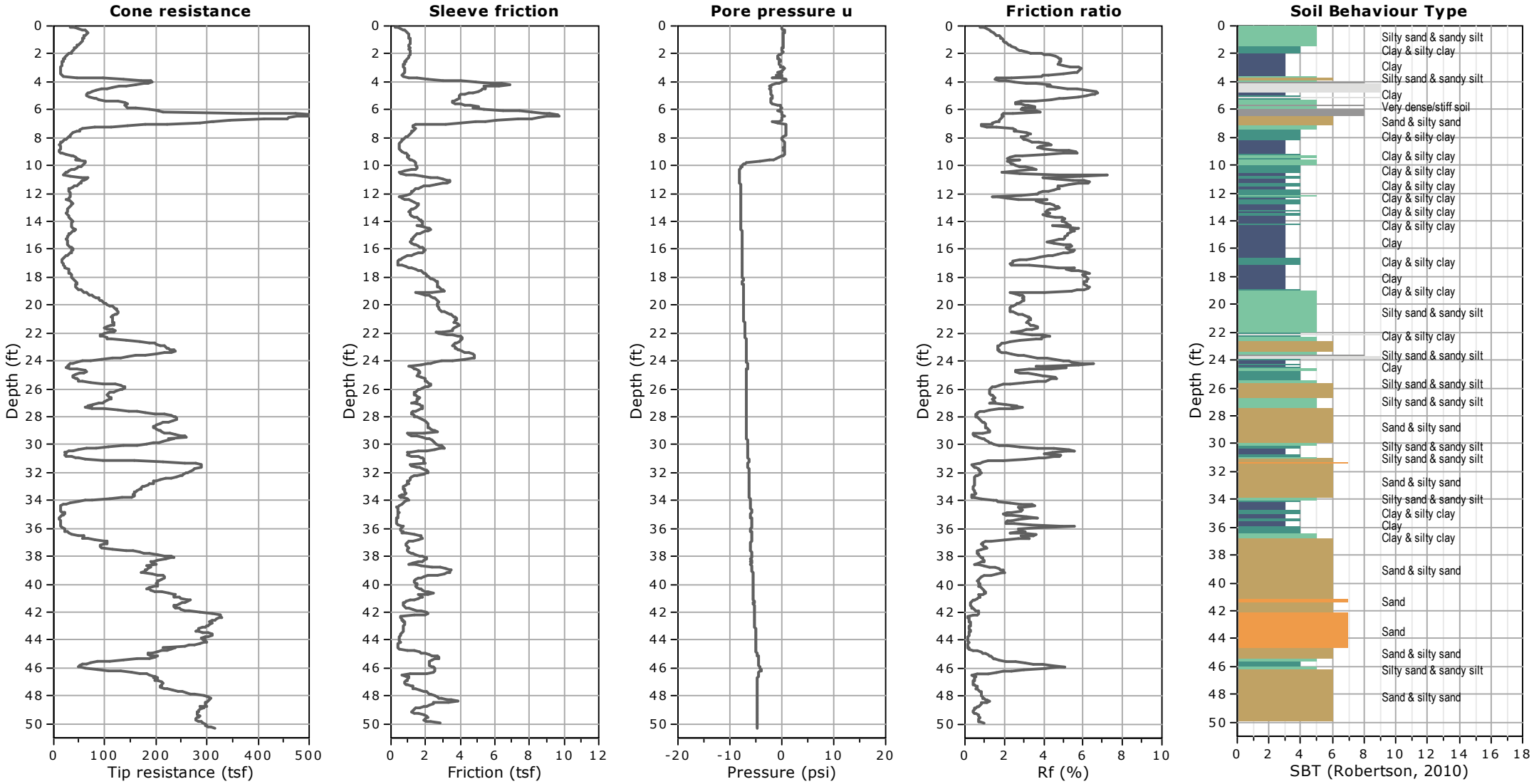
CPT-4
Total depth: 6.04 ft, Date: 4/11/2022



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

Project: **LGC Geotechnical / Salt Creek**
Location: **Menifee, CA**

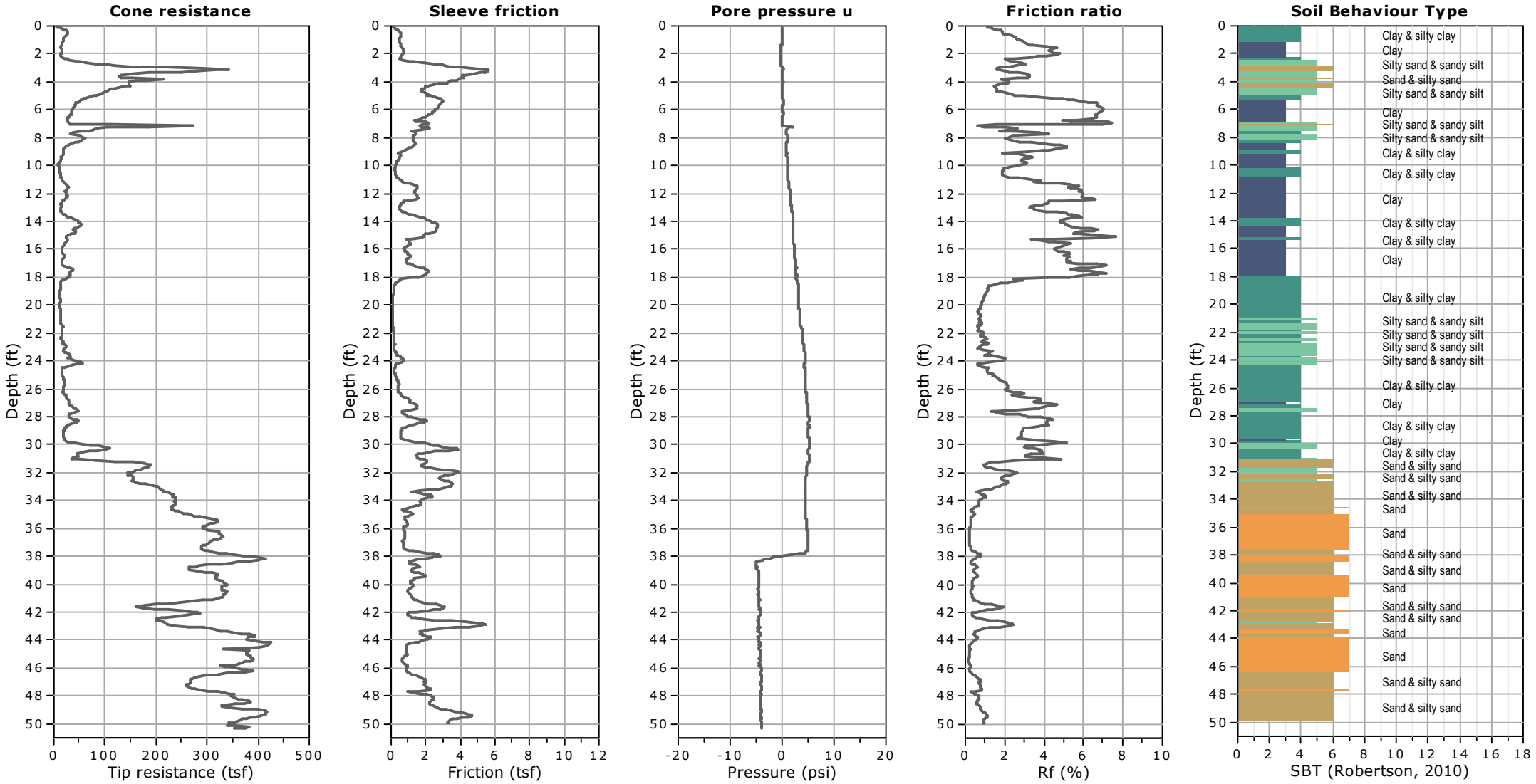
CPT-4A
Total depth: 50.34 ft, Date: 4/11/2022



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

Project: **LGC Geotechnical / Salt Creek**
Location: **Menifee, CA**

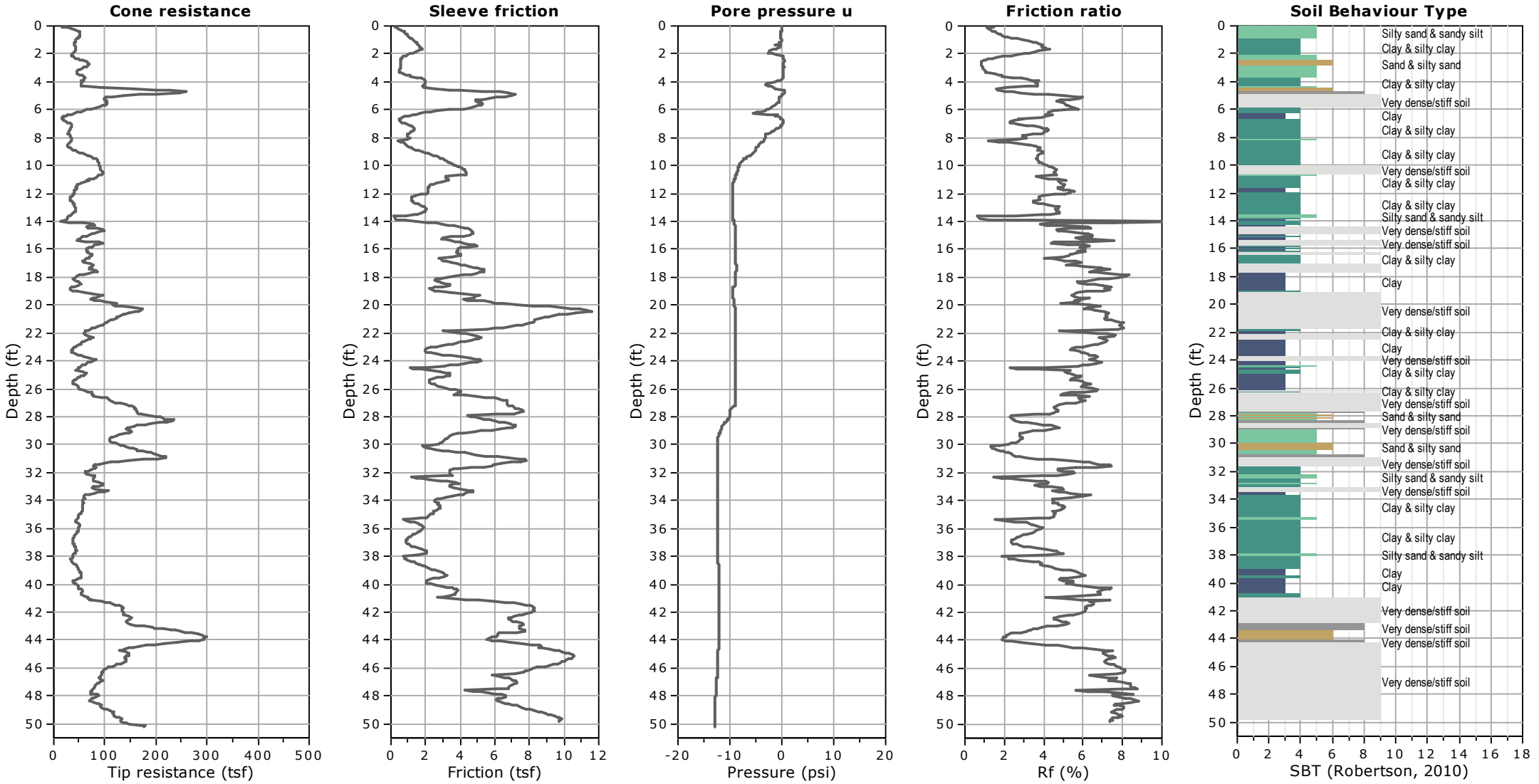
CPT-5
Total depth: 50.34 ft, Date: 4/11/2022



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

Project: **LGC Geotechnical / Salt Creek**
Location: **Menifee, CA**

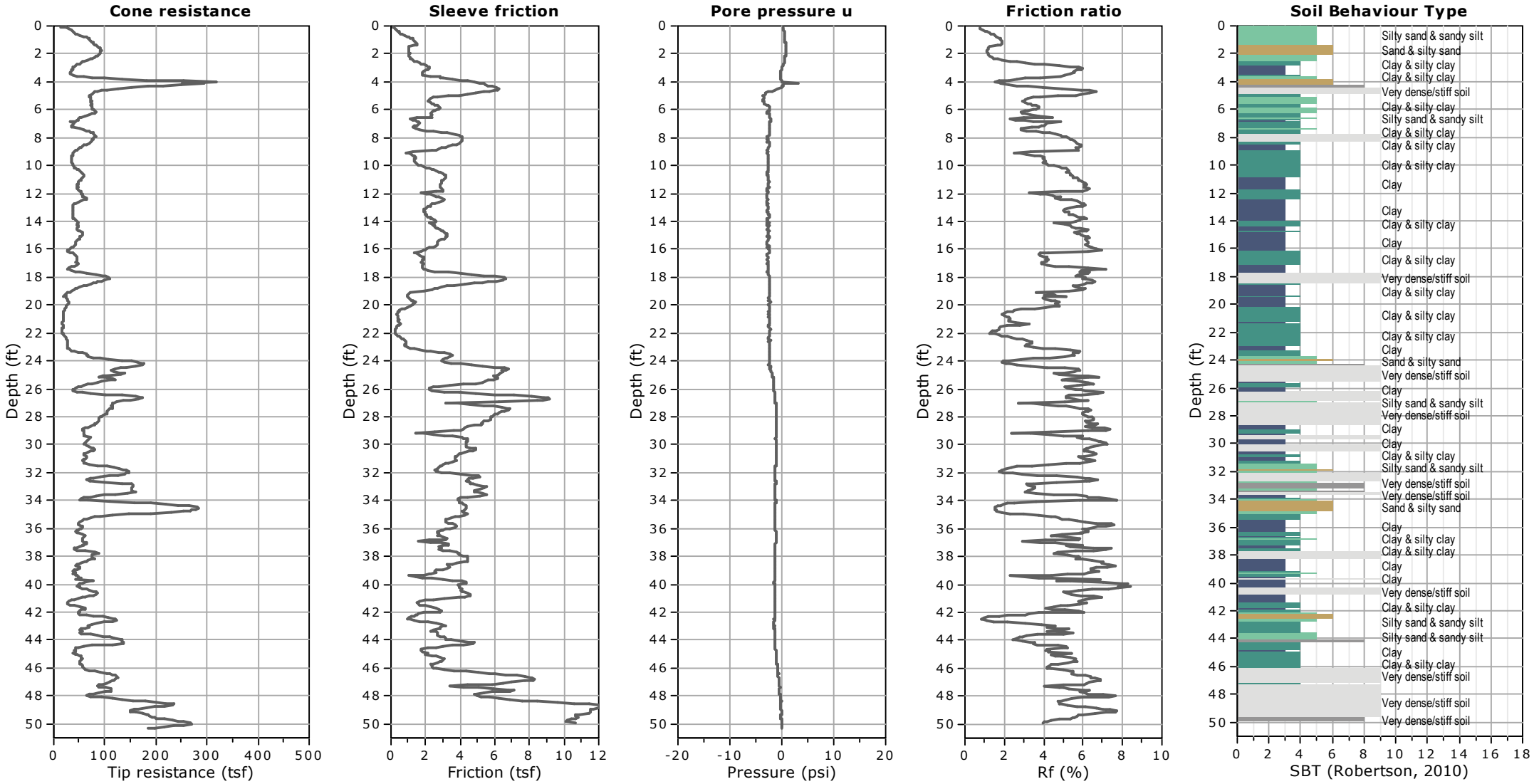
CPT-6
Total depth: 50.22 ft, Date: 4/11/2022



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

Project: **LGC Geotechnical / Salt Creek**
Location: **Menifee, CA**

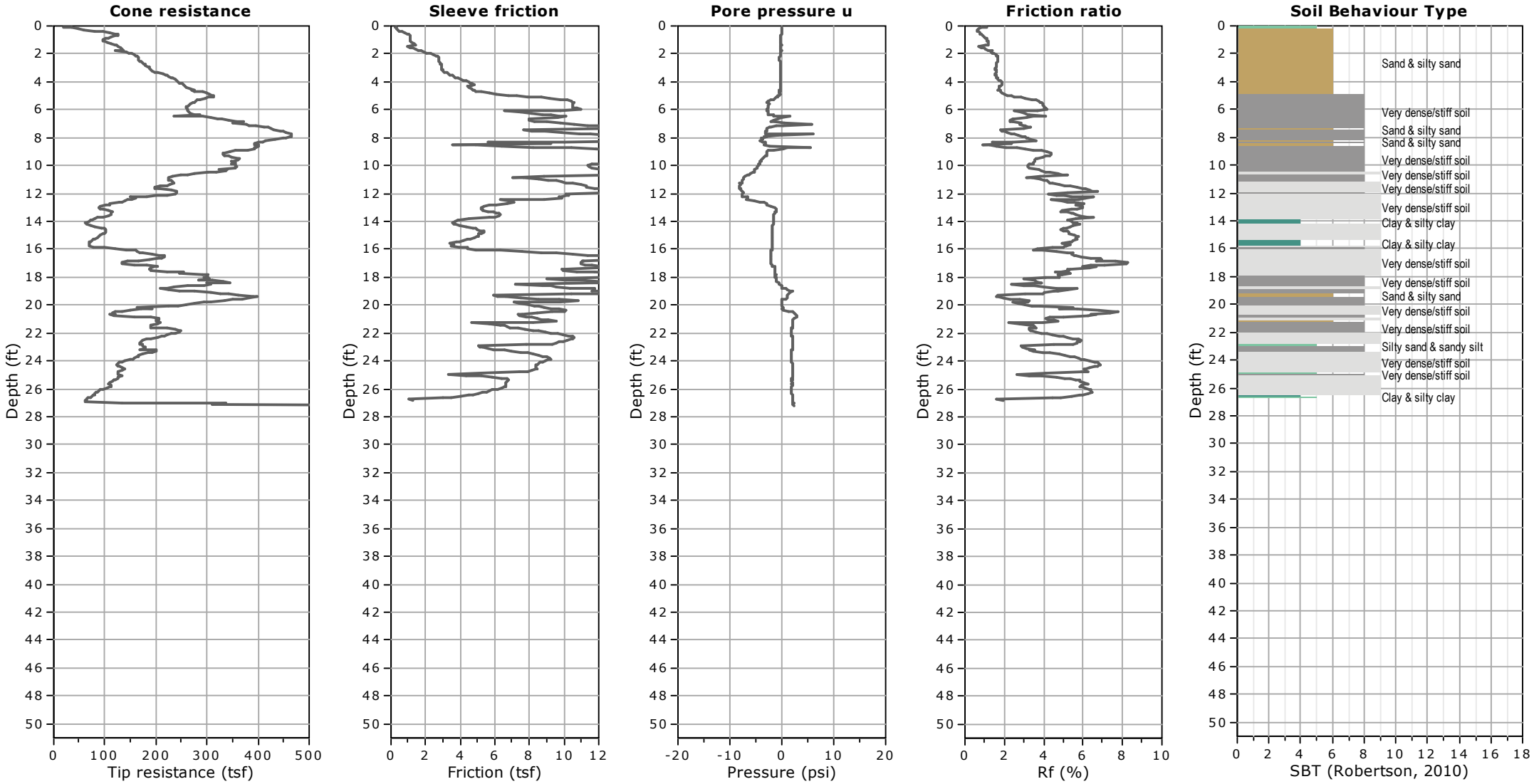
CPT-7
Total depth: 50.33 ft, Date: 4/11/2022



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

Project: **LGC Geotechnical / Salt Creek**
Location: **Menifee, CA**

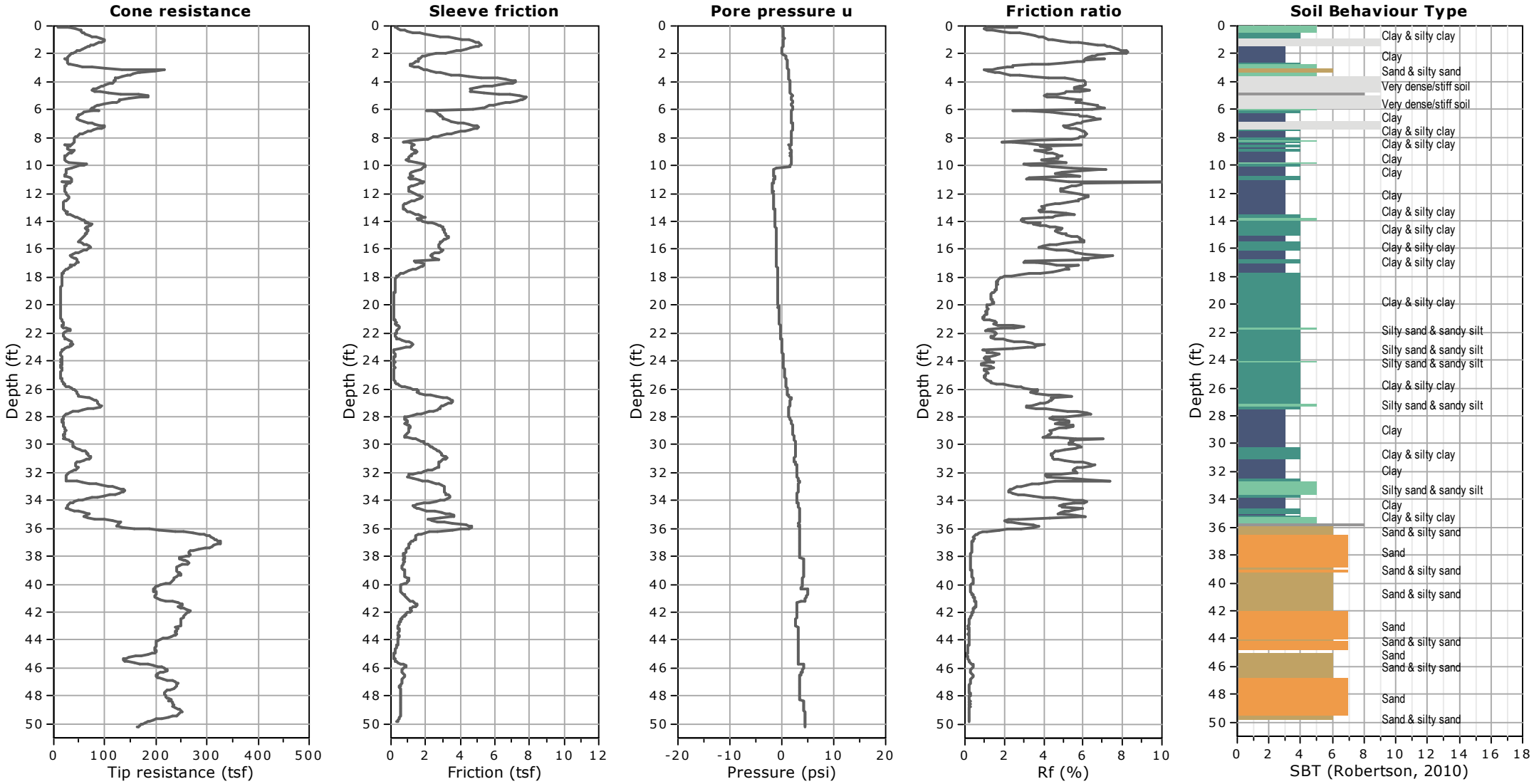
CPT-8
Total depth: 27.17 ft, Date: 4/11/2022



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

Project: **LGC Geotechnical / Salt Creek**
Location: **Menifee, CA**

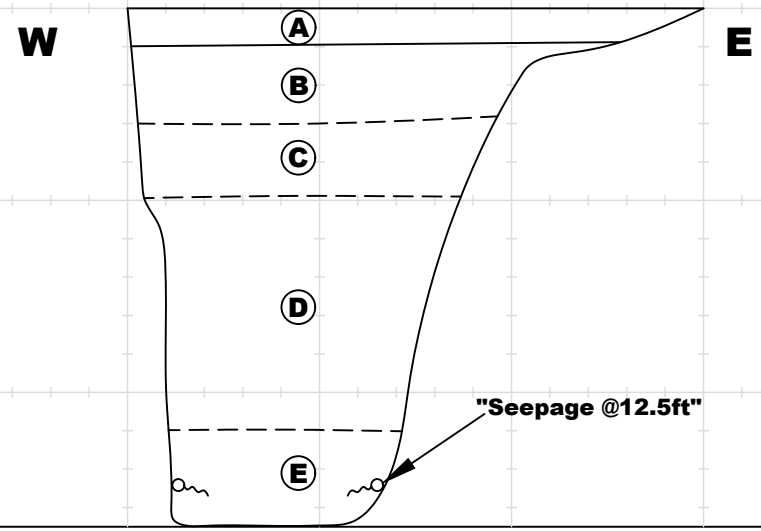
TP-5
Total depth: 50.26 ft, Date: 4/11/2022



Project Name: Meritage - Salt Creek	Logged By: CPM	Trench No: TP-1	
Project Number : 22057-01	Date : 4/12/2022	Engineering Properties:	
Equipment: John Deer Backhoe 410 (18"/36")	Location: See Geotechnical Map		

Geologic Attitudes	Unit	SOIL DESCRIPTION:	GEOLOGIC UNIT	USCS	SAMPLE No	MOISTURE (%)	Organic Content (%)
	A	***Agricultural Fill*** @ 0' to 1' - Silty Fine SAND: pale yellowish brown (10YR 6/2), slightly moist, loose, rootlets	afu	SM	TP1@1'	8.8	1.4
	B	***Young Alluvium*** @ 1' to 3' - Silty Fine SAND: medium yellowish brown (10YR 5/4), moist, loose, porous	Qal	SM	TP1@2'	38.3	1.8
	C	@ 3' to 5' - Sandy SILT: pale yellowish brown (10YR 6/2), moist, medium stiff, porous, carbonate deposits @3'	Qal	ML	TP1@3'		
	D	@ 5' to 11' - Sandy SILT: pale yellowish brown (18YR 6/2), moist, stiff	Qal	ML			
	E	@ 11' to 13.5' - Silty SAND to Sandy SILT: pale yellowish brown (10YR 6/2), very moist to wet, medium stiff to soft, seepage @12.5'	Qal	ML			

GRAPHICAL REPRESENTATION BELOW: **Elevation : 1444 ' MSL** **Surface Slope: 1 deg.** **Trend: E-W**



Total Depth: 13.5'
Groundwater: 12.5'
Backfilled: 4/12/22

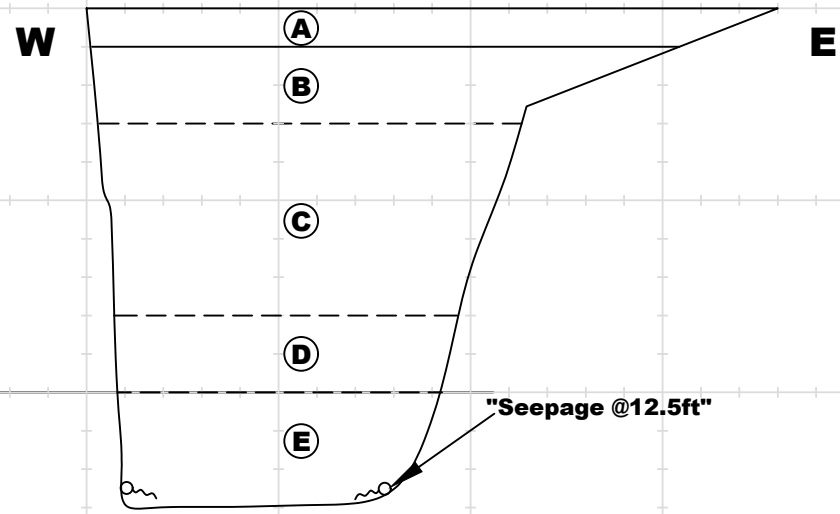
scale : 1 in = 5 ft

Last Edited: 4/20/2021

Project Name: Meritage - Salt Creek	Logged By: CPM	Trench No: TP-2	
Project Number : 22057-01	Date : 4/12/2022	Engineering Properties:	
Equipment: John Deer Backhoe 410 (18"/36")	Location: See Geotechnical Map		

Geologic Attitudes	Unit	SOIL DESCRIPTION:	GEOLOGIC UNIT	USCS	SAMPLE No	MOISTURE (%)	Organic Content (%)
	A	***Agricultural Fill*** @ 0' to 1' - Silty Fine SAND: pale yellowish brown (10YR 6/2), slightly moist, loose	Afu	SM	Grab@1'	4.2	0.7
	B	***Old Alluvium*** @ 1' to 3' - Silty Fine SAND: medium brown (5YR 4/4), slightly moist, medium dense to dense, porous, indurated	Qoa	SM	Grab@2'	8.7	1.1
	C	@ 3' to 8' - Silty Fine SAND: medium yellowish brown (10YR 5/4), moist, medium dense	Qoa	SM	Grab@3'		
	D	@ 8' to 10' - Silty Fine SAND to Sandy SILT: medium yellowish brown (10YR 5/4), moist, medium dense	Qoa	SM-ML			
	E	@ 10' to 13' - Very moist to wet, seepage at 12.5'	Qoa	SM-ML			

GRAPHICAL REPRESENTATION BELOW: **Elevation : 1445 ' MSL** **Surface Slope: 1 deg.** **Trend: E-W**



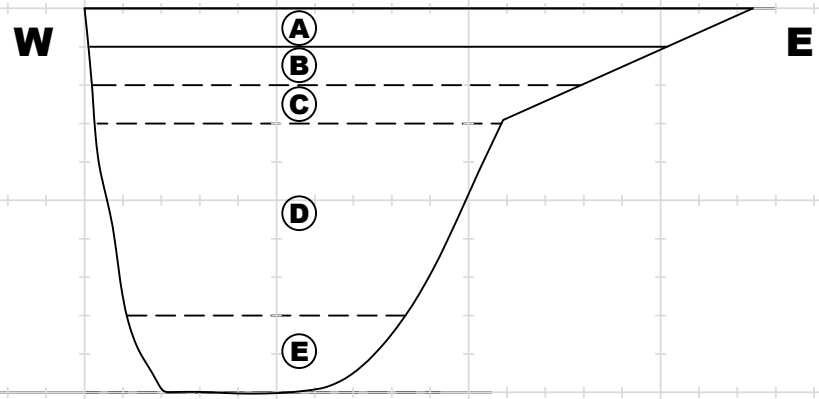
Total Depth: 13'
Groundwater: 12.5'
Backfilled: 4/12/22

scale : 1 in = 5 ft

Project Name: Meritage - Salt Creek	Logged By: CPM	Trench No: TP-3	
Project Number : 22057-01	Date : 4/12/2022	Engineering Properties:	
Equipment: John Deer Backhoe 410 (18"/36")	Location: See Geotechnical Map		

Geologic Attitudes	Unit	SOIL DESCRIPTION:	GEOLOGIC UNIT	USCS	SAMPLE No	MOISTURE (%)	Organic Content (%)
	A	***Agricultural Fill*** @ 0' to 1' - Silty Fine SAND: pale yellowish brown (10YR 6/2), moist, loose, roots	Afu	SM	Grab@1'	10.1	2.8
	B	***Young Alluvium*** @ 1' to 2' - Sandy SILT: medium yellowish brown (10YR 5/4), moist, soft, porous	Qal	ML	Grab@2'	18.6	2.3
	C	@ 2' to 3' - Silty SAND: dark yellowish brown (10YR 4/2) to white, slightly moist, medium dense, cemented, with abundant carbonates	Qal	SM	Grab@3'	23.0	2.0
	D	@ 3' to 8' - Silty Fine SAND to Sandy SILT: medium yellowish brown (10YR 5/4), moist, medium dense, porous	Qal	SM-ML			
	E	@ 8' to 10' - medium dense to dense	Qal	SM-ML			

GRAPHICAL REPRESENTATION BELOW: **Elevation : 1443 ' MSL** **Surface Slope: 1 deg.** **Trend: E-W**



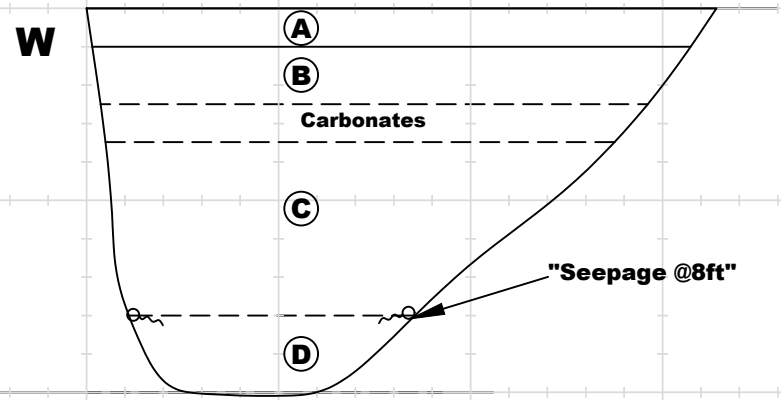
Total Depth: 10'
Groundwater: None
Backfilled: 4/12/22

scale : 1 in = 5 ft

Project Name: Meritage - Salt Creek	Logged By: CPM	Trench No: TP-4	
Project Number : 22057-01	Date : 4/12/2022	Engineering Properties:	
Equipment: John Deer Backhoe 410 (18"/36")	Location: See Geotechnical Map		

Geologic Attitudes	Unit	SOIL DESCRIPTION:	GEOLOGIC UNIT	USCS	SAMPLE No	MOISTURE (%)	Organic Content (%)
	A	***Agricultural Fill*** @0' to 1' - Silty Fine SAND: dark yellowish brown (10YR 4/2), moist, loose, roots	Afu	SM	Grab@1'	14.8	4.6
	B	***Young Alluvium*** @ 1' to 3.5' - Sandy SILT: dark yellowish brown (10YR 4/2), moist, soft, slightly blocky, porous, roots	Qal	ML	Grab@2' Grab@3'	23.2 22.8	3.3 4.2
	C	@ 3.5' to 8' - 8-12" thick layer of poorly cemented carbonates overlying Sandy SILT: medium yellowish brown (10YR 5/4), moist, medium stiff	Qal	ML	Grab@4'	30.1	2.4
	D	@ 8' to 10' - Sandy SILT: medium yellowish brown (10YR 5/4), wet, soft, seepage @8'	Qal	ML			

GRAPHICAL REPRESENTATION BELOW: **Elevation : 1444 ' MSL** **Surface Slope: 1 deg.** **Trend: E-W**



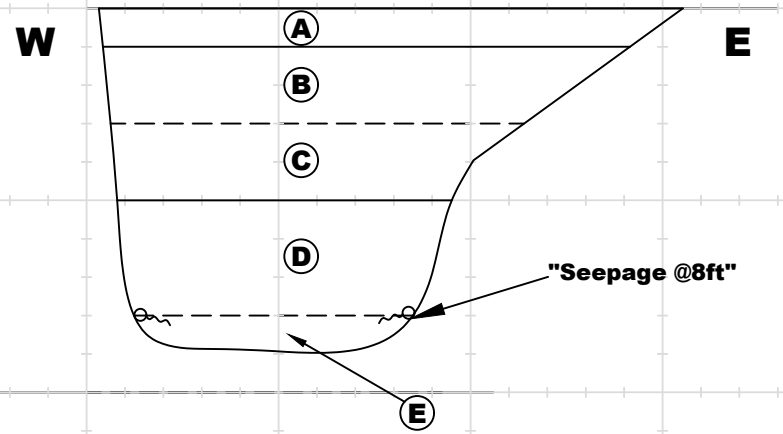
Total Depth: 10'
Groundwater: 8'
Backfilled: 4/12/22

scale : 1 in = 5 ft

Project Name: Meritage - Salt Creek	Logged By: CMP	Trench No: TP-5	LGC Geotechnical, Inc.
Project Number : 22057-01	Date : 4/12/2022	Engineering Properties:	
Equipment: John Deer Backhoe 410 (18"/36")	Location: See Geotechnical Map		

Geologic Attitudes	Unit	SOIL DESCRIPTION:	GEOLOGIC UNIT	USCS	SAMPLE No	MOISTURE (%)	Organic Content (%)
	A	***Agricultural Fill*** @0' to 1' - Silty Fine SAND: dark yellowish brown (10YR 6/2), slightly moist, loose, roots	Afu	SM	Grab@1'	2.5	1.0
	B	***Young Alluvium*** @ 1' to 3' - Fine SAND: medium yellowish brown (10YR 5/4), slightly moist, medium dense to dense, indurated, porous	Qal	SP	Grab@2'	8.6	1.2
	C	@ 3' to 5' - Silty Fine SAND: medium yellowish brown (10YR 5/4), moist, medium dense, porous	Qal	SM	Grab@3'		
	D	***Old Alluvium*** @ 5' to 8' - Clayey SILT: very pale orange (10YR 8/2), very moist, medium stiff	Qoa	ML-CL			
	E	@ 8' to 9' - Clayey SILT: very pale orange (10YR 8/2), very moist, medium stiff, seepage @8'	Qoa	ML-CL			

GRAPHICAL REPRESENTATION BELOW: **Elevation : 1446 ' MSL** **Surface Slope: 1 deg.** **Trend: E-W**



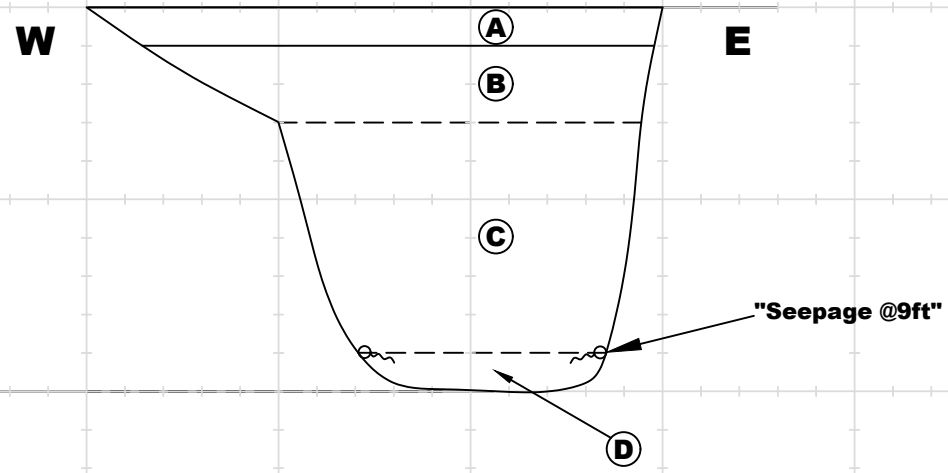
Total Depth: 9'
Groundwater: 8'
Backfilled: 4/12/22

scale : 1 in = 5 ft

Project Name: Meritage - Salt Creek	Logged By: CPM	Trench No: TP-6	LGC Geotechnical, Inc.
Project Number : 22057-01	Date : 4/12/2022	Engineering Properties:	
Equipment: John Deer Backhoe 410 (18"/36")	Location: See Geotechnical Map		

Geologic Attitudes	Unit	SOIL DESCRIPTION:	GEOLOGIC UNIT	USCS	SAMPLE No	MOISTURE (%)	Organic Content (%)
	A	***Agricultural Fill*** @0' to 1' - Silty Fine SAND: very pale orange (10YR 6/2), dry to slightly moist, loose, roots	Afu	SM	Grab@1'	3.1	0.8
	B	***Young Alluvium*** @ 1' to 3' - Silty Fine SAND: dark yellowish brown (10YR 4/2), slightly moist, medium dense, indurated, porous, trace roots	Qal	SM	Grab@2'	8.0	1.2
	C	@ 3' to 9' - Sandy SILT: medium yellowish brown (10YR 5/4), moist, medium stiff	Qal	ML	Grab@3'	31.3	2.5
	D	@ 9' to 10' - Sandy SILT: medium yellowish brown (10YR 5/4), moist, medium stiff, seepage @9'	Qal	ML			

GRAPHICAL REPRESENTATION BELOW: **Elevation : 1446 ' MSL** **Surface Slope: 1 deg.** **Trend: E-W**



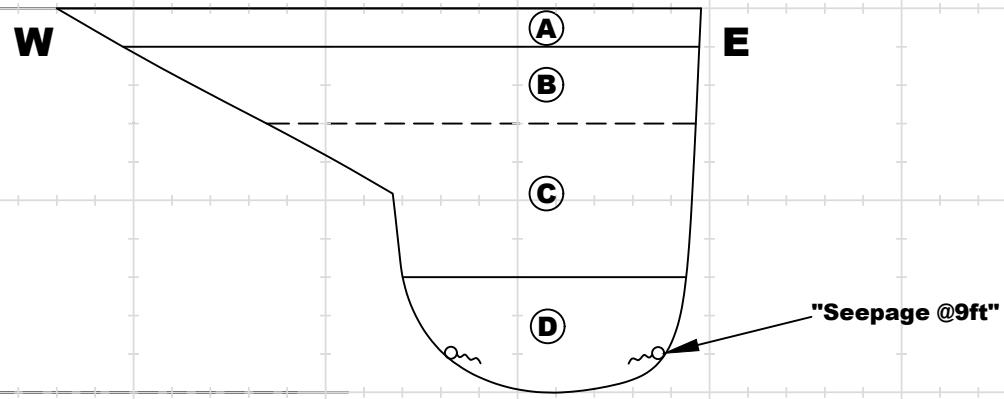
Total Depth: 10'
Groundwater: 9'
Backfilled: 4/12/22

scale : 1 in = 5 ft

Project Name: Meritage - Salt Creek	Logged By: CPM	Trench No: TP-7	LGC Geotechnical, Inc.
Project Number : 22057-01	Date : 4/12/2022	Engineering Properties:	
Equipment: John Deer Backhoe 410 (18"/36")	Location: See Geotechnical Map		

Geologic Attitudes	Unit	SOIL DESCRIPTION:	GEOLOGIC UNIT	USCS	SAMPLE No	MOISTURE (%)	Organic Content (%)
	A	***Agricultural Fill*** @0' to 1' - Sandy CLAY: dark yellowish brown (10YR 4/2), slightly moist, soft, roots	Afu	CL	Grab@1'	12.5	2.9
	B	***Young Alluvium*** @ 1' to 3' - Sandy CLAY to Sandy SILT: dark yellowish brown (10YR 4/2), moist, soft porous, scattered rootlets	Qal	CL-ML	Grab@2'	21.5	2.3
	C	@ 3' to 7' - Fine SAND: medium yellowish brown (10YR 5/4), moist, medium dense, indurated, trace carbonates	Qal	SP	Grab@3'	14.7	1.2
	D	***Old Alluvium*** @ 7' to 10' - Medium SAND: dark yellowish orange (10YR 6/6), moist to wet, medium dense, seepage @9'	Qoa	SP			

GRAPHICAL REPRESENTATION BELOW: **Elevation : 1446 ' MSL** **Surface Slope: 1 deg.** **Trend: E-W**



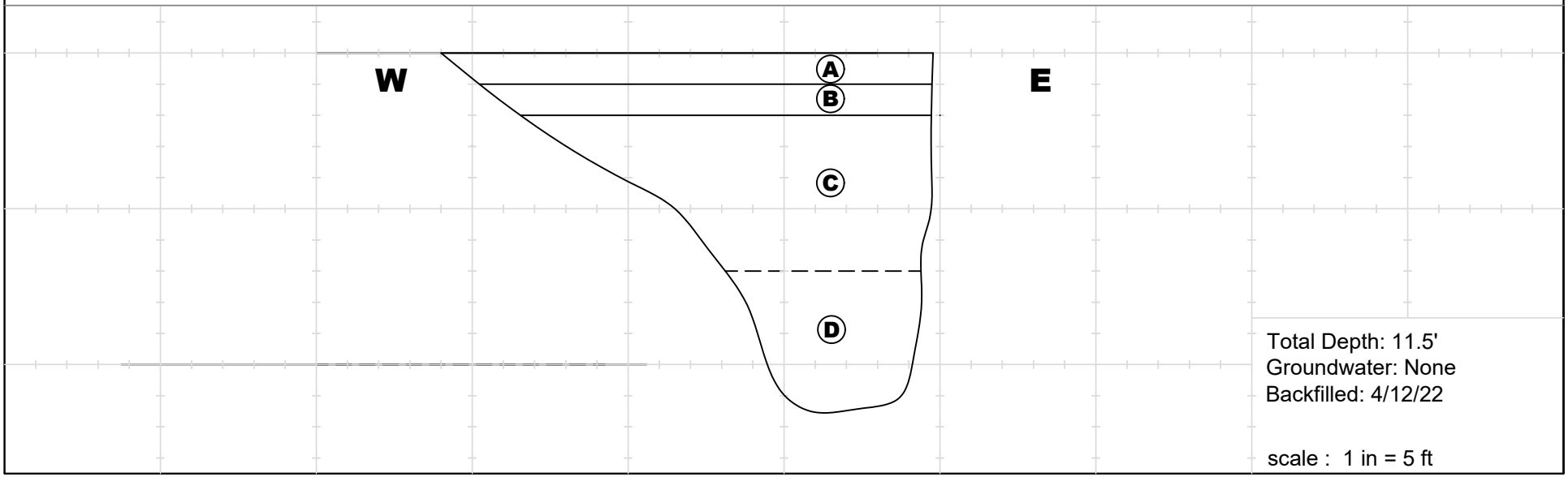
Total Depth: 10'
Groundwater: 9'
Backfilled: 4/12/22

scale : 1 in = 5 ft

Project Name: Meritage - Salt Creek	Logged By: CPM	Trench No: TP-8	LGC Geotechnical, Inc.
Project Number : 22057-01	Date : 4/12/2022	Engineering Properties:	
Equipment: John Deer Backhoe 410 (18"/36")	Location: See Geotechnical Map		

Geologic Attitudes	Unit	SOIL DESCRIPTION:	GEOLOGIC UNIT	USCS	SAMPLE No	MOISTURE (%)	Organic Content (%)
	A	***Agricultural Fill*** @0' to 1' - Silty Fine SAND: grayish orange (10YR 7/4), dry to slightly moist, loose, roots	Afu	SM	Grab@1'	2.3	1.4
	B	***Young Alluvium*** @ 1' to 2' - Silty Fine SAND: grayish orange (10YR 7/4), slightly moist, loose, porous, scattered rootlets	Qal	SM	Grab@2'	6.0	1.2
	C	***Old Alluvium*** @ 2' to 7' - Clayey Fine SAND: dark yellowish orange (10YR 6/6), moist, medium dense to dense, indurated	Qoa	SC	Grab@3'	6.5	1.1
	D	@ 7' to 11' - dense, low production	Qoa	SC			

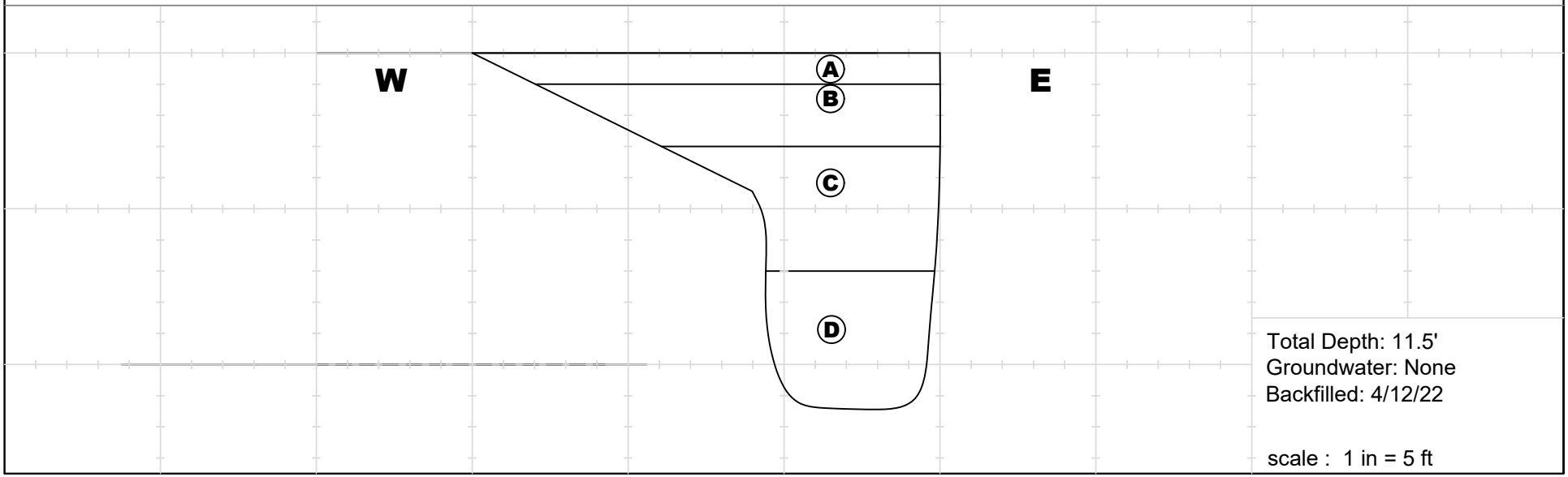
GRAPHICAL REPRESENTATION BELOW: **Elevation : 1460 ' MSL** **Surface Slope: 2 deg.** **Trend: E-W**



Project Name: Meritage - Salt Creek	Logged By: CPM	Trench No: TP-9	LGC Geotechnical, Inc.
Project Number : 22057-01	Date : 4/12/2022	Engineering Properties:	
Equipment: John Deer Backhoe 410 (18"/36")	Location: See Geotechnical Map		

Geologic Attitudes	Unit	SOIL DESCRIPTION:	GEOLOGIC UNIT	USCS	SAMPLE No	MOISTURE (%)	Organic Content (%)
	A	***Agricultural Fill*** @0' to 1' - Silty Fine SAND: pale yellowish brown (10YR 6/2), slightly moist, loose, roots	Afu	SM	Grab@1'	13.6	2.7
	B	***Young Alluvium*** @ 1' to 3' - Silty Fine SAND: medium yellowish brown (10YR 5/4), moist, medium dense	Qal	SM	Grab@2'	7.4	1.1
	C	***Old Alluvium*** @ 3' to 7' - Sandy CLAY: dark yellowish brown (10YR 4/2), moist, medium stiff to stiff, indurated	Qoa	CL	Grab@3'	9.6	1.6
	D	@ 7' to 11.5' - Silty Medium SAND: medium brown (5YR 4/4), moist to very moist, medium dense	Qoa	SM			

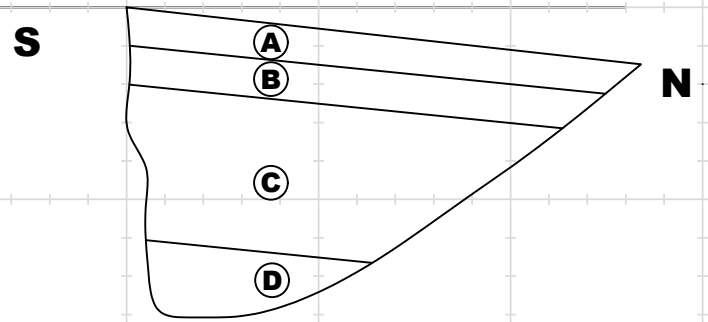
GRAPHICAL REPRESENTATION BELOW: **Elevation : 1449 ' MSL** **Surface Slope: 2 deg.** **Trend: E-W**



Project Name: Meritage - Salt Creek	Logged By: CPM	Trench No: TP-10	LGC Geotechnical, Inc.
Project Number : 22057-01	Date : 4/15/2022	Engineering Properties:	
Equipment: John Deer Backhoe 410 (18"/36")	Location: See Geotechnical Map		

Geologic Attitudes	Unit	SOIL DESCRIPTION:	GEOLOGIC UNIT	USCS	SAMPLE No	MOISTURE (%)	Organic Content (%)
	A	***Agricultural Fill*** @0' to 1' - Silty Fine SAND: pale yellowish brown (10YR 6/2), dry, loose, roots	Afu	SM	Grab@1'	2.1	1.3
	B	***Young Alluvium*** @ 1' to 2' - Silty Fine SAND: pale yellowish brown (10YR 6/2), slightly moist, loose, porous, trace roots	Qal	SM	Grab@2'	4.8	1.4
	C	***Old Alluvium*** @ 2' to 6' - Silty Fine to Medium SAND: dark yellowish brown (10YR 6/6), moist, medium dense, porous, trace roots	Qoa	SM	Grab@3'	7.3	1.3
	D	***Bedrock - Domenigoni Valley Granodiorite*** @ 6' to 8' - highly weathered, recovered as Silty Medium SAND: light gray (7N), dry to slightly moist, dense, decreased weathering with depth, slow production, abandoned @8' (practical refusal)	Kdvg	SM			

GRAPHICAL REPRESENTATION BELOW: **Elevation : 1494 ' MSL** **Surface Slope: 12 deg.** **Trend: N-S**



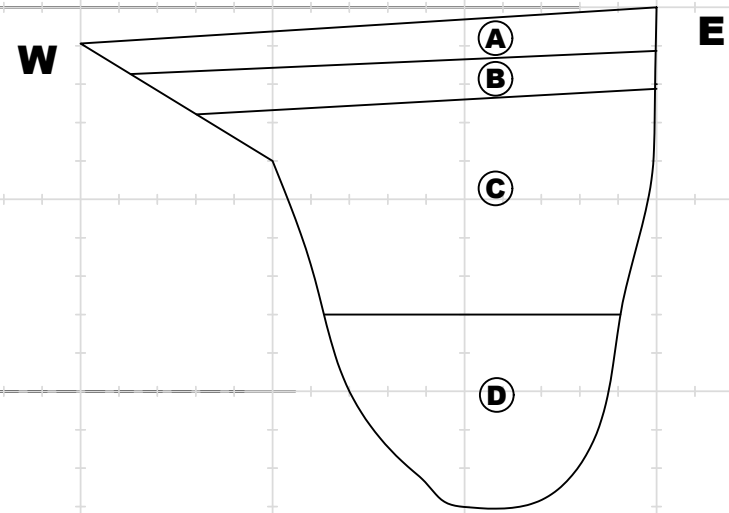
Total Depth: 8'
Groundwater: None
Backfilled: 4/15/22

scale : 1 in = 5 ft

Project Name: Meritage - Salt Creek	Logged By: CPM	Trench No: TP-11	LGC Geotechnical, Inc.
Project Number : 22057-01	Date : 4/15/2022	Engineering Properties:	
Equipment: John Deer Backhoe 410 (18"/36")	Location: See Geotechnical Map		

Geologic Attitudes	Unit	SOIL DESCRIPTION:	GEOLOGIC UNIT	USCS	SAMPLE No	MOISTURE (%)	Organic Content (%)
	A	***Agricultural Fill*** @0' to 1' - Silty Fine SAND: pale yellowish brown (10YR 6/2), dry, loose, roots	Afu	SM	Grab@1'	3.0	3.4
	B	***Young Alluvium*** @ 1' to 2' -Clayey to Silty Fine SAND: medium yellowish brown (10YR 5/4), slightly moist, loose, porous, trace roots	Qal	SC-SM	Grab@2'	5.4	1.0
	C	***Old Alluvium*** @ 2' to 8' - Silty Fine to Medium SAND: light brown (5YR 6/4), moist, medium dense	Qoa	SM	Grab@3'		
	D	***Bedrock - Domenigoni Valley Granodiorite*** @ 8' to 13' - Highly weathered, recovered as Fine to Medium SAND with Silt: medium yellowish brown (10YR 5/4), moist, dense, slow production, abandoned @13' (practical refusal)	Kdvg	SP-SM			

GRAPHICAL REPRESENTATION BELOW: **Elevation : 1501' MSL** **Surface Slope: 7 deg.** **Trend: E-W**



Total Depth: 13'
Groundwater: None
Backfilled: 4/15/22

scale : 1 in = 5 ft

Appendix C
Laboratory Test Results

APPENDIX C

Laboratory Test Results

The laboratory testing program was directed towards providing quantitative data relating to the relevant engineering properties of the soils. Samples considered representative of site conditions were tested in general accordance with American Society for Testing and Materials (ASTM) procedure and/or California Test Methods (CTM), where applicable. The following summary is a brief outline of the test type and a table summarizing the test results.

Moisture and Density Determination Tests: Moisture content (ASTM D2216) and dry density determinations (ASTM D2937) were performed on driven samples obtained from the test borings. The results of these tests are presented in the boring logs. Where applicable, only moisture content was determined.

Atterberg Limits: The liquid and plastic limits ("Atterberg Limits") were determined per ASTM D4318 for engineering classification of fine-grained material and presented in the table below. The USCS soil classification indicated in the table below is based on the portion of sample passing the No. 40 sieve and may not necessarily be representative of the entire sample. The plots are provided in this Appendix.

Sample Location	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	USCS Soil Classification
HS-5 @ 0-5 ft	32	22	10	CL
TP-4 @ 0-5 ft	41	29	12	ML

Expansion Index: The expansion potential of selected representative samples was evaluated by the Expansion Index Test per ASTM D4829. The results are presented in the table below.

Sample Location	Expansion Index	Expansion Potential*
HS-2 @ 0-5 ft	26	Low
HS-5 @ 0-5 ft	24	Low
TP-3 @ 0-5 ft	15	Very Low
TP-4 @ 0-5 ft	0	Very Low
TP-5 @ 0-5 ft	2	Very Low
TP-10 @ 0-5 ft	4	Very Low

* Per ASTM D4829

Laboratory Test Results

Laboratory Compaction: The maximum dry density and optimum moisture content of typical materials were determined in accordance with ASTM D1557. The results are presented in the table below.

Sample Location	Sample Description	Maximum Dry Density (pcf)	Optimum Moisture Content (%)
HS-5 @ 0-5 ft	Brown Silty SAND/Sandy SILT	117.0	13.0
TP-4 @ 0-5 ft	Light Yellowish-Brown Sandy SILT	97.0	22.0
TP-8 @ 0-5 ft	Light Brown Silty SAND	133.5	7.5
TP-11 @ 0-5 ft	Pale Brown Silty SAND	131.0	8.5

*Includes rock correction

Consolidation: Consolidation tests were performed per ASTM D2435. Samples (2.4 inches in diameter and 1 inch in height) were placed in a consolidometer and increasing loads were applied. The samples were allowed to consolidate under "double drainage" and total deformation for each loading step was recorded. The percent consolidation for each load step was recorded as the ratio of the amount of vertical compression to the original sample height. The consolidation pressure curves are provided in this Appendix.

Collapse/Swell Potential: Collapse tests were performed per ASTM D4546. Samples (2.4 inches in diameter and 1 inch in height) were placed in a consolidometer and loaded to their approximate in-situ effective stress. The collapse/swell plots are presented in this Appendix.

R-value Test: R-value test was performed in general accordance with California Test Method 301. The plot is included in the Appendix.

Sample Location	R-value
HS-3 @ 0-5 feet	21

Laboratory Test Results

Soluble Sulfates: The soluble sulfate contents of selected samples were determined by standard geochemical methods (CTM 417). The test results are presented in the table below.

Sample Location	Sulfate Content (%)
HS-2 @ 0-5 ft	0.154
HS-4 @ 0-5 ft	0.016
HS-5 @ 0-5 ft	0.334
TP-7 @ 0-5 ft	0.942
TP-9 @ 0-5 ft	0.030
TP-11 @ 0-5 ft	0.013

Chloride Content: Chloride content was tested per CTM 422. The results are presented below.

Sample Location	Chloride Content (ppm)
HS-2 @ 0-5 ft	420
HS-4 @ 0-5 ft	200
HS-5 @ 0-5 ft	360
TP-7 @ 0-5 ft	540
TP-9 @ 0-5 ft	227
TP-11 @ 0-5 ft	100

Minimum Resistivity and pH Tests: Minimum resistivity and pH tests were performed in general accordance with CTM 643 and standard geochemical methods. The results are presented in the table below.

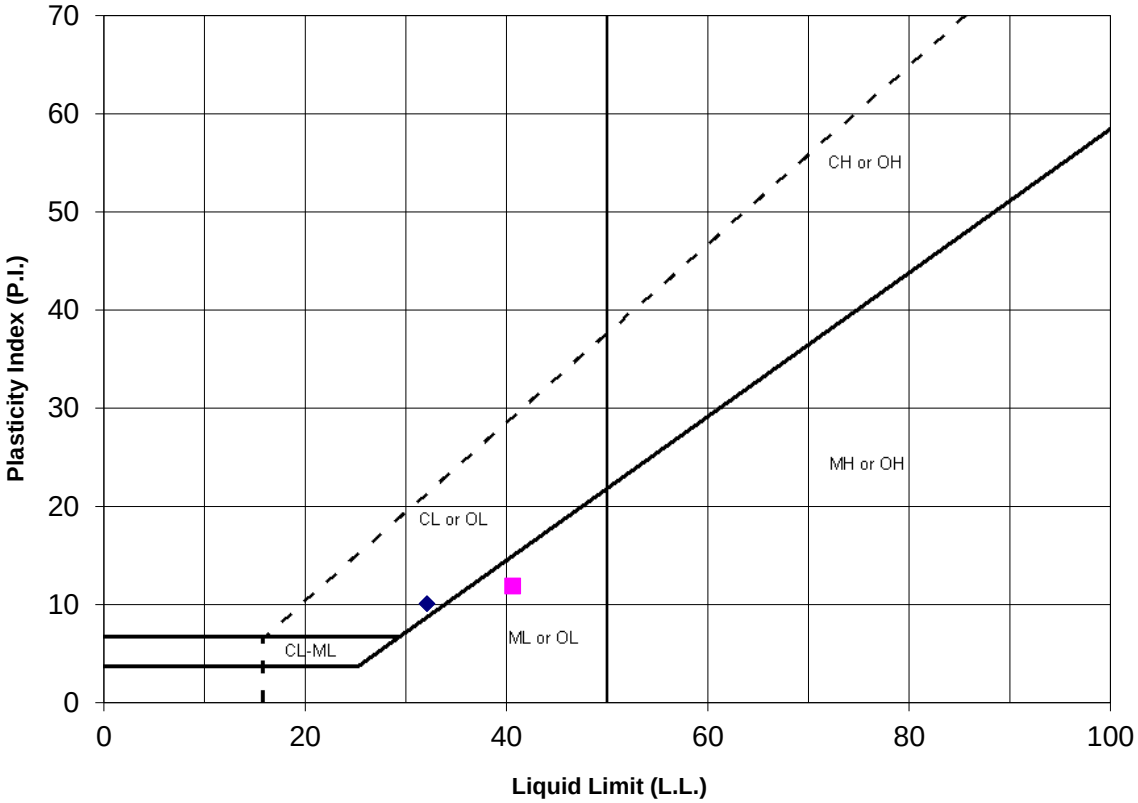
Sample Location	pH	Minimum Resistivity (ohm-cm)
TP-7 @ 0-5 ft	8.16	246

Laboratory Test Results

Organic Matter Content of Soils: Organic matter content tests were performed in general accordance with ASTM D 2974 (Test Methods A & C). The results are presented in the table below.

Sample Location	Organics Content (%)
TP-1 @ 1 ft	1.4
TP-1 @ 2 ft	1.8
TP-2 @ 1 ft	0.7
TP-2 @ 2 ft	1.1
TP-3 @ 1 ft	2.8
TP-3 @ 2 ft	2.3
TP-3 @ 3 ft	2.0
TP-4 @ 1 ft	4.6
TP-4 @ 2 ft	3.3
TP-4 @ 3 ft	4.2
TP-4 @ 4 ft	2.4
TP-5 @ 1 ft	1.0
TP-5 @ 2 ft	1.2
TP-6 @ 1 ft	0.8
TP-6 @ 2 ft	1.2
TP-6 @ 3 ft	2.5
TP-7 @ 1 ft	2.9
TP-7 @ 2 ft	2.3
TP-7 @ 3 ft	1.2
TP-8 @ 1 ft	1.4
TP-8 @ 2 ft	1.2
TP-8 @ 3 ft	1.1
TP-9 @ 1 ft	2.7
TP-9 @ 2 ft	1.1
TP-9 @ 3 ft	1.6
TP-10 @ 1 ft	1.3
TP-10 @ 2 ft	1.4
TP-10 @ 3 ft	1.3
TP-11 @ 1 ft	3.4
TP-11 @ 2 ft	1.0

PLASTICITY CHART - CLASSIFICATION OF FINE-GRAINED SOILS



Symbol	Location.:	Sample No.:	Depth (ft)	Passing No. 200 Sieve (%)	Liquid Limit (%) LL	Plastic Limit (%) PL	Plasticity Index (%) PI	USCS
◆	HS-5	B-1	0-5'	-	32	22	10	CL
■	TP4	Bulk1	0-5'	-	41	29	12	ML

LGC Geotechnical, Inc.

ATTERBERG LIMITS
(ASTM D 4318)

Project Number: 22057-01
Date: May-22

Salt Creek

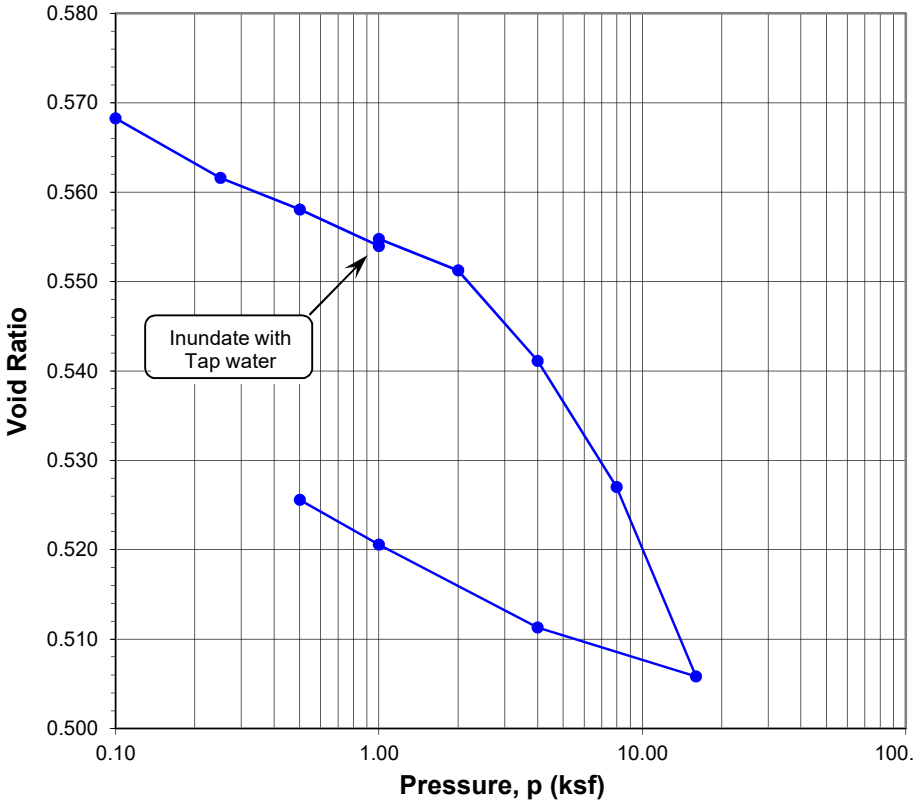
ONE-DIMENSIONAL CONSOLIDATION PROPERTIES of SOILS

ASTM D 2435

Project Name: Salt Creek
Project No.: 22057-01
Boring No.: HS-2
Sample No.: R-5
Soil Identification: Light olive brown silty clay with sand (CL-ML)s

Tested By: G. Bathala Date: 05/05/22
Checked By: J. Ward Date: 05/25/22
Depth (ft.): 10.0
Sample Type: Ring

Sample Diameter (in.):	2.415
Sample Thickness (in.):	1.000
Weight of Sample + ring (g):	201.85
Weight of Ring (g):	44.80
Height after consol. (in.):	0.9726
Before Test	
Wt. of Wet Sample+Cont. (g):	201.60
Wt. of Dry Sample+Cont. (g):	179.50
Weight of Container (g):	65.19
Initial Moisture Content (%)	19.3
Initial Dry Density (pcf)	109.5
Initial Saturation (%):	94
Initial Vertical Reading (in.)	0.0996
After Test	
Wt. of Wet Sample+Cont. (g):	267.02
Wt. of Dry Sample+Cont. (g):	240.92
Weight of Container (g):	67.14
Final Moisture Content (%)	20.24
Final Dry Density (pcf):	110.3
Final Saturation (%):	100
Final Vertical Reading (in.)	0.1321
Specific Gravity (assumed):	2.75
Water Density (pcf):	62.43

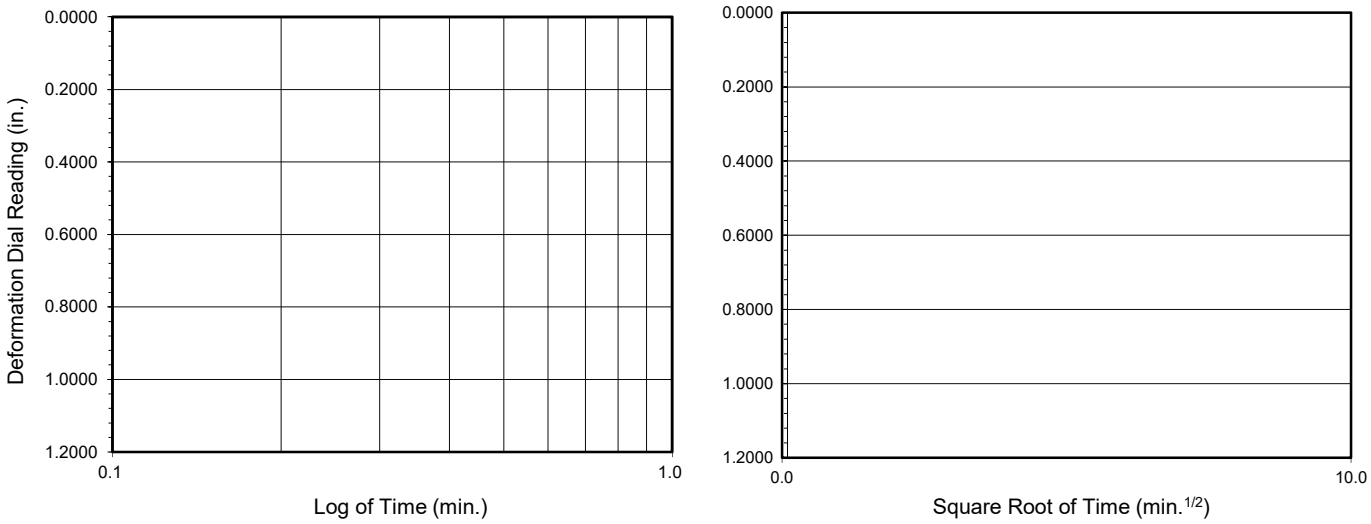


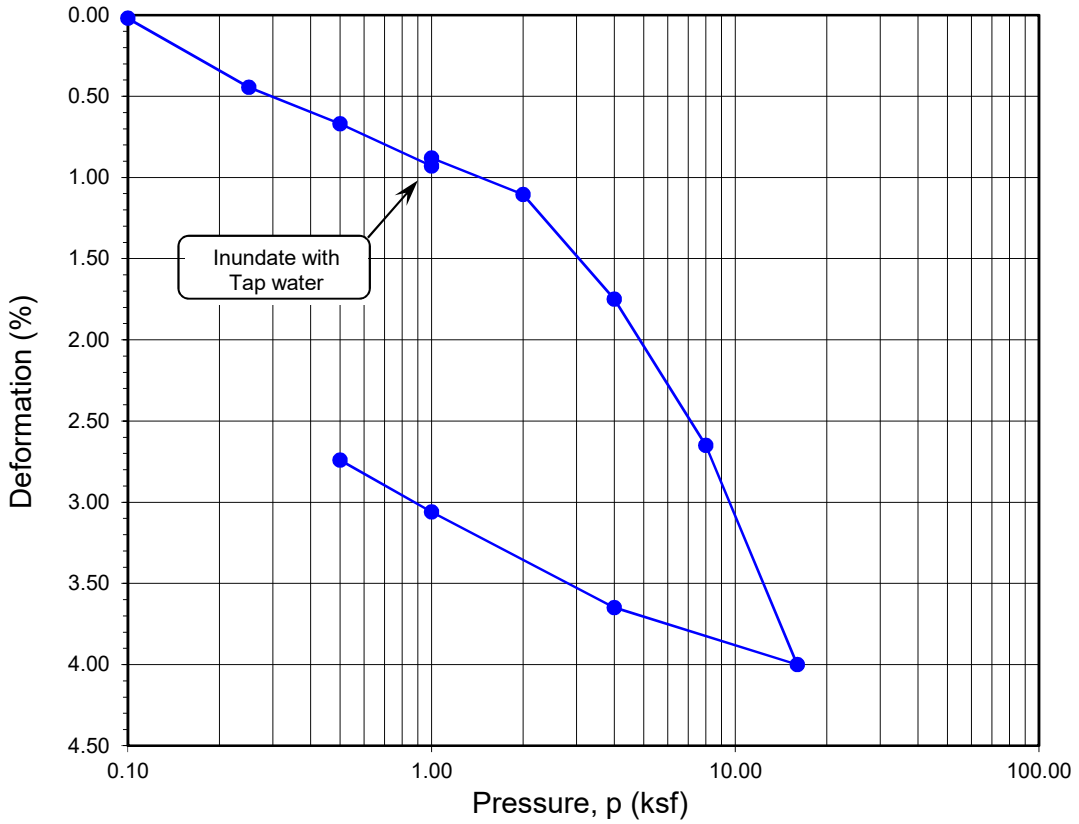
Pressure (p) (ksf)	Final Reading (in.)	Apparent Thickness (in.)	Load Compliance (%)	Deformation % of Sample Thickness	Void Ratio	Corrected Deforma-tion (%)
0.10	0.0998	0.9998	0.00	0.02	0.568	0.02
0.25	0.1043	0.9954	0.02	0.47	0.562	0.45
0.50	0.1072	0.9924	0.09	0.76	0.558	0.67
1.00	0.1113	0.9883	0.24	1.17	0.554	0.93
1.00	0.1108	0.9888	0.24	1.12	0.555	0.88
2.00	0.1146	0.9851	0.39	1.50	0.551	1.11
4.00	0.1224	0.9772	0.53	2.28	0.541	1.75
8.00	0.1327	0.9669	0.66	3.31	0.527	2.65
16.00	0.1477	0.9519	0.81	4.81	0.506	4.00
4.00	0.1427	0.9569	0.66	4.31	0.511	3.65
1.00	0.1357	0.9639	0.55	3.61	0.521	3.06
0.50	0.1321	0.9675	0.51	3.25	0.526	2.74

Time Readings

Date	Time	Elapsed Time (min)	Square Root of Time	Dial Rdgs. (in.)

Time Readings





Boring No.	Sample No.	Depth (ft.)	Moisture Content (%)		Dry Density (pcf)		Void Ratio		Degree of Saturation (%)	
			Initial	Final	Initial	Final	Initial	Final	Initial	Final
HS-2	**R-5**	**10**	**19.3**	**20.2**	**109.5**	**110.3**	**0.569**	**0.526**	**94**	**100**

Soil Identification: Light olive brown silty clay with sand (CL-ML)s

ONE-DIMENSIONAL CONSOLIDATION PROPERTIES of SOILS
ASTM D 2435

Project No.: 22057-01

Salt Creek

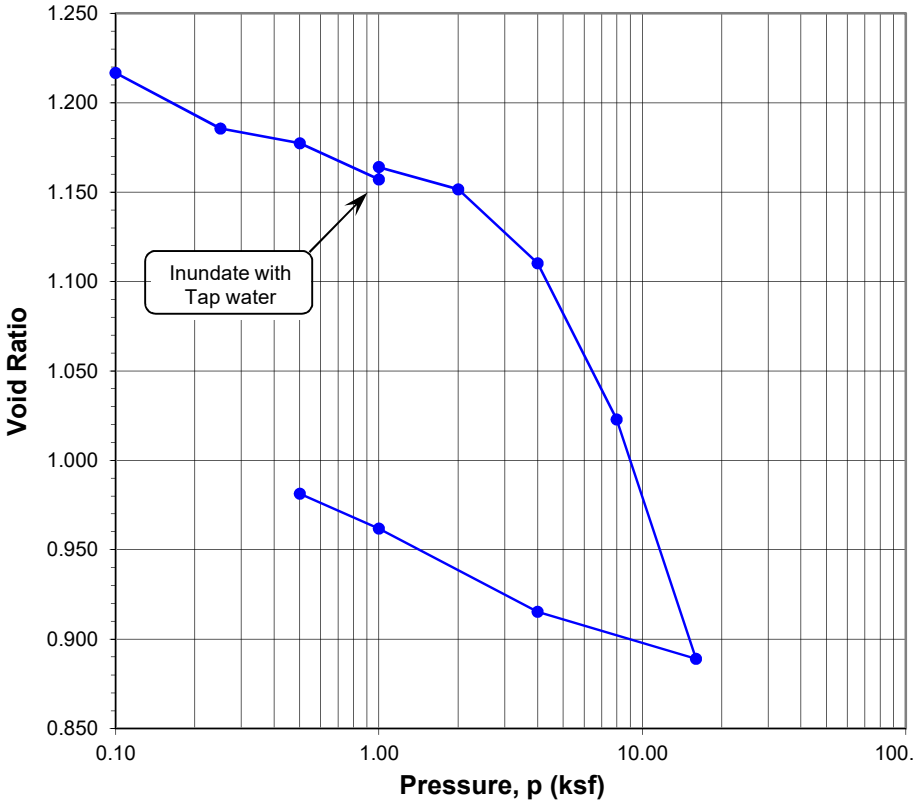
05-22

ONE-DIMENSIONAL CONSOLIDATION PROPERTIES of SOILS

ASTM D 2435

Project Name:	Salt Creek	Tested By: G. Bathala	Date: 05/05/22
Project No.:	22057-01	Checked By: J. Ward	Date: 05/25/22
Boring No.:	HS-2	Depth (ft.): 20.0	
Sample No.:	R-6	Sample Type: Ring	
Soil Identification:	Light olive brown lean clay (CL)		

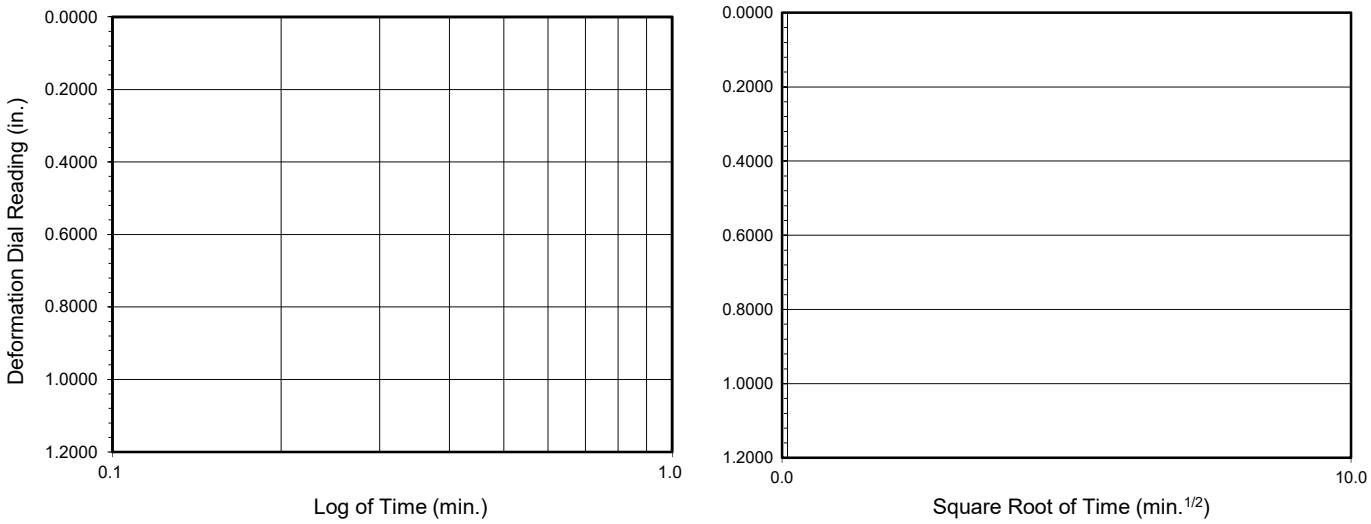
Sample Diameter (in.):	2.415
Sample Thickness (in.):	1.000
Weight of Sample + ring (g):	178.91
Weight of Ring (g):	44.47
Height after consol. (in.):	0.8921
Before Test	
Wt. of Wet Sample+Cont. (g):	168.01
Wt. of Dry Sample+Cont. (g):	135.04
Weight of Container (g):	56.66
Initial Moisture Content (%)	42.1
Initial Dry Density (pcf)	78.7
Initial Saturation (%):	96
Initial Vertical Reading (in.)	0.0516
After Test	
Wt. of Wet Sample+Cont. (g):	224.52
Wt. of Dry Sample+Cont. (g):	190.42
Weight of Container (g):	53.70
Final Moisture Content (%)	36.96
Final Dry Density (pcf):	86.0
Final Saturation (%):	100
Final Vertical Reading (in.)	0.1627
Specific Gravity (assumed):	2.80
Water Density (pcf):	62.43

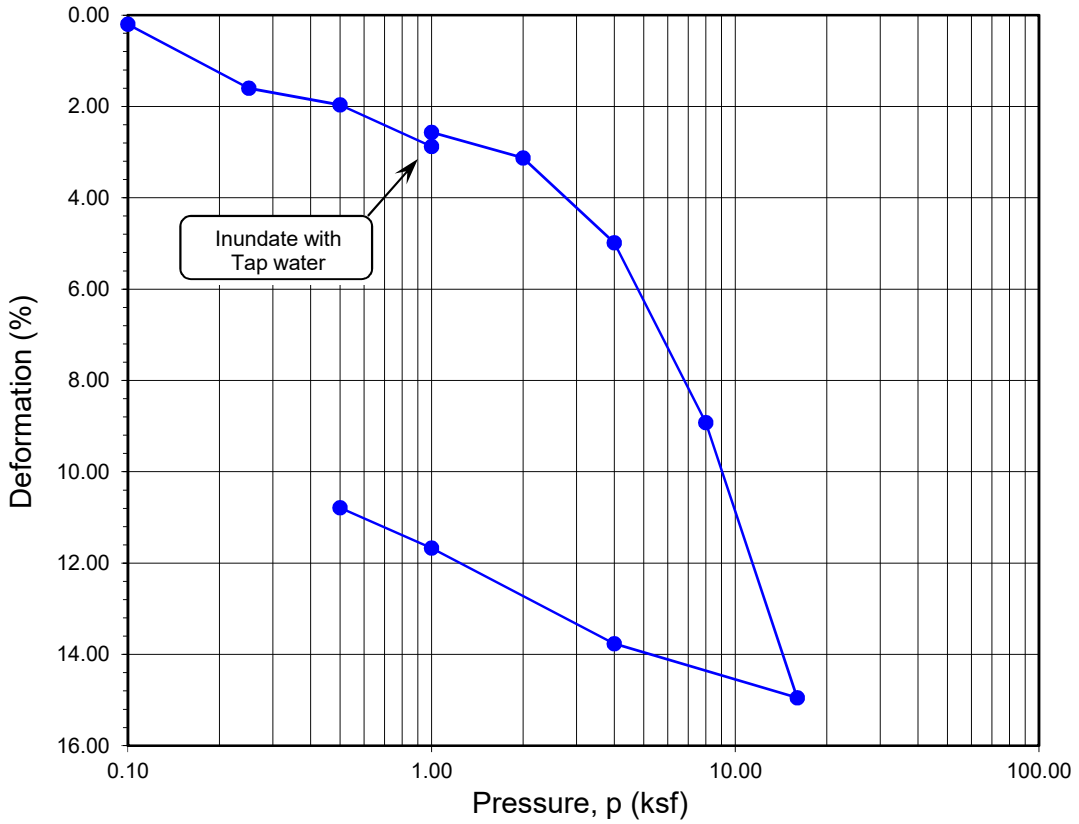


Pressure (p) (ksf)	Final Reading (in.)	Apparent Thickness (in.)	Load Compliance (%)	Deformation % of Sample Thickness	Void Ratio	Corrected Deforma-tion (%)
0.10	0.0536	0.9980	0.00	0.20	1.217	0.20
0.25	0.0680	0.9836	0.04	1.64	1.186	1.60
0.50	0.0723	0.9793	0.10	2.07	1.177	1.97
1.00	0.0821	0.9695	0.17	3.05	1.157	2.88
1.00	0.0790	0.9726	0.17	2.74	1.164	2.57
2.00	0.0854	0.9662	0.25	3.38	1.152	3.13
4.00	0.1050	0.9466	0.35	5.34	1.110	4.99
8.00	0.1456	0.9061	0.47	9.40	1.023	8.93
16.00	0.2074	0.8442	0.63	15.58	0.889	14.95
4.00	0.1940	0.8576	0.47	14.24	0.915	13.77
1.00	0.1720	0.8797	0.36	12.04	0.962	11.68
0.50	0.1627	0.8889	0.32	11.11	0.981	10.79

Time Readings				
Date	Time	Elapsed Time (min)	Square Root of Time	Dial Rdgs. (in.)

Time Readings





Boring No.	Sample No.	Depth (ft.)	Moisture Content (%)		Dry Density (pcf)		Void Ratio		Degree of Saturation (%)	
			Initial	Final	Initial	Final	Initial	Final	Initial	Final
HS-2	**R-6**	**20**	**42.1**	**37.0**	**78.7**	**86.0**	**1.221**	**0.981**	**96**	**100**

Soil Identification: Light olive brown lean clay (CL)

ONE-DIMENSIONAL CONSOLIDATION PROPERTIES of SOILS
ASTM D 2435

Project No.: 22057-01

Salt Creek

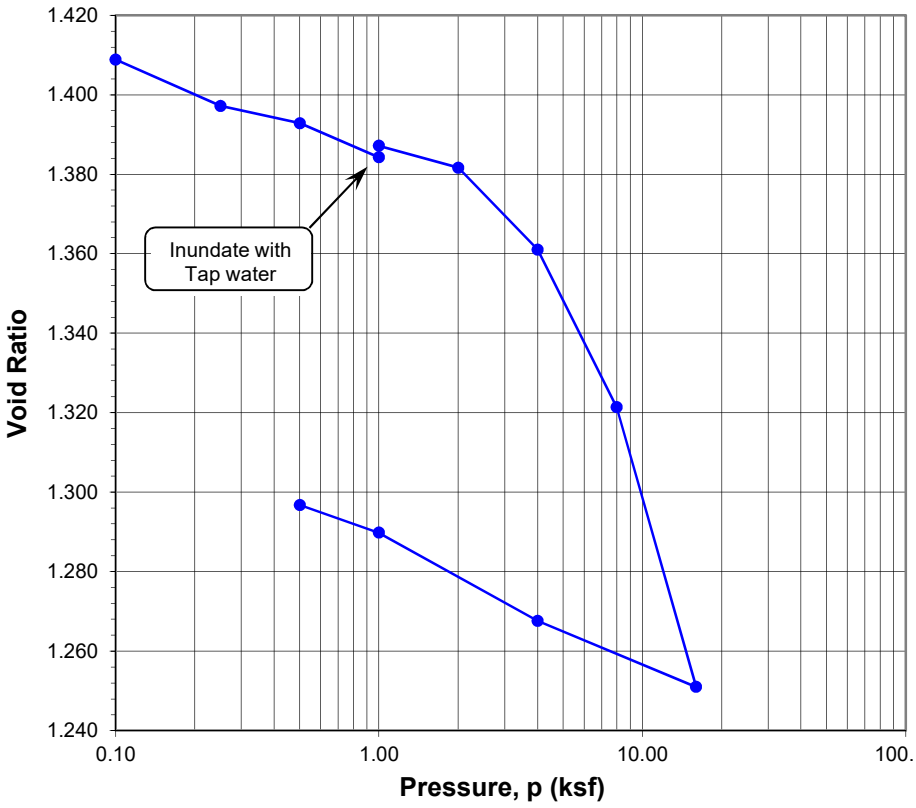
05-22

ONE-DIMENSIONAL CONSOLIDATION PROPERTIES of SOILS

ASTM D 2435

Project Name:	Salt Creek	Tested By: G. Bathala	Date: 05/05/22
Project No.:	22057-01	Checked By: J. Ward	Date: 05/25/22
Boring No.:	HS-5	Depth (ft.): 20.0	
Sample No.:	R-6	Sample Type: Ring	
Soil Identification:	Light olive brown lean clay (CL), caliche noted		

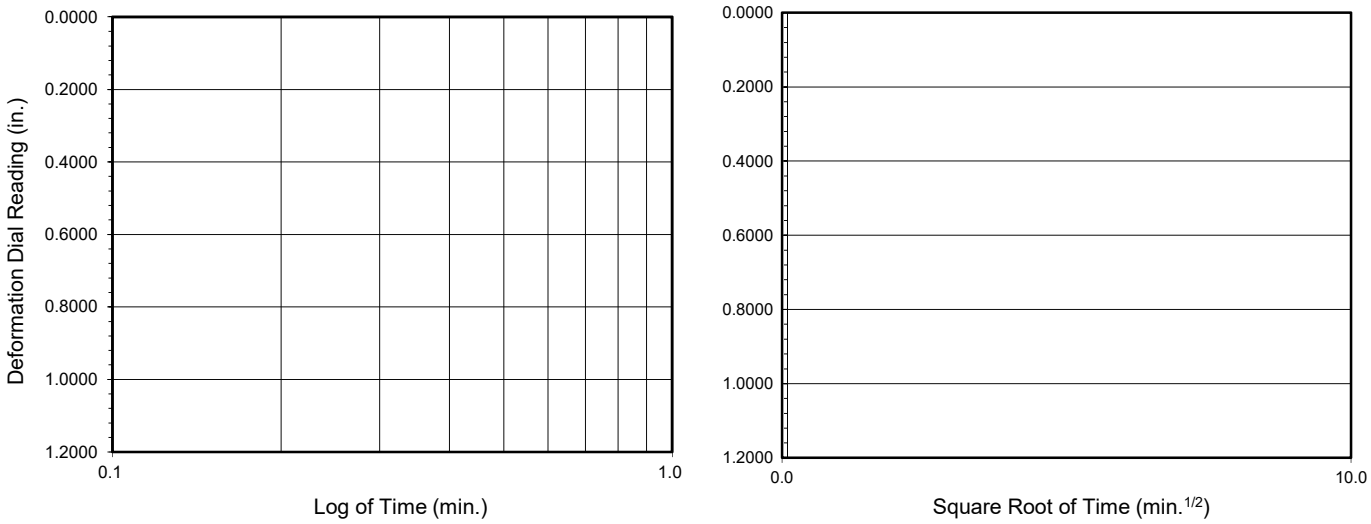
Sample Diameter (in.):	2.415
Sample Thickness (in.):	1.000
Weight of Sample + ring (g):	182.56
Weight of Ring (g):	45.97
Height after consol. (in.):	0.9529
Before Test	
Wt. of Wet Sample+Cont. (g):	174.95
Wt. of Dry Sample+Cont. (g):	139.06
Weight of Container (g):	63.77
Initial Moisture Content (%)	47.7
Initial Dry Density (pcf)	76.9
Initial Saturation (%):	100
Initial Vertical Reading (in.)	0.0693
After Test	
Wt. of Wet Sample+Cont. (g):	238.50
Wt. of Dry Sample+Cont. (g):	202.68
Weight of Container (g):	59.51
Final Moisture Content (%)	36.85
Final Dry Density (pcf):	84.8
Final Saturation (%):	92
Final Vertical Reading (in.)	0.1194
Specific Gravity (assumed):	2.97
Water Density (pcf):	62.43

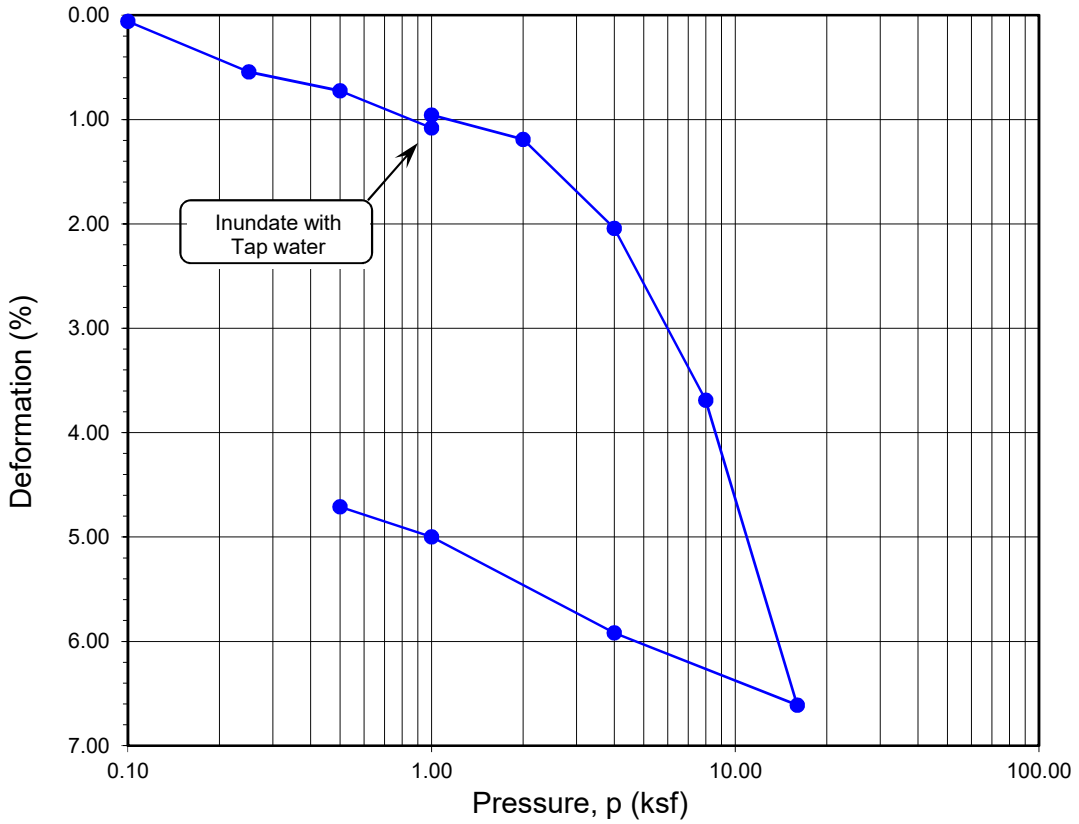


Pressure (p) (ksf)	Final Reading (in.)	Apparent Thickness (in.)	Load Compliance (%)	Deformation % of Sample Thickness	Void Ratio	Corrected Deforma-tion (%)
0.10	0.0699	0.9994	0.00	0.06	1.409	0.06
0.25	0.0753	0.9941	0.05	0.60	1.397	0.55
0.50	0.0777	0.9917	0.11	0.83	1.393	0.72
1.00	0.0820	0.9873	0.19	1.27	1.384	1.08
1.00	0.0808	0.9885	0.19	1.15	1.387	0.96
2.00	0.0841	0.9852	0.29	1.48	1.382	1.19
4.00	0.0939	0.9755	0.41	2.46	1.361	2.05
8.00	0.1116	0.9577	0.54	4.23	1.321	3.69
16.00	0.1423	0.9270	0.69	7.30	1.251	6.61
4.00	0.1336	0.9357	0.51	6.43	1.268	5.92
1.00	0.1229	0.9464	0.36	5.36	1.290	5.00
0.50	0.1194	0.9499	0.30	5.01	1.297	4.71

Time Readings				
Date	Time	Elapsed Time (min)	Square Root of Time	Dial Rdgs. (in.)

Time Readings





Boring No.	Sample No.	Depth (ft.)	Moisture Content (%)		Dry Density (pcf)		Void Ratio		Degree of Saturation (%)	
			Initial	Final	Initial	Final	Initial	Final	Initial	Final
HS-5	**R-6**	**20**	**47.7**	**36.9**	**76.9**	**84.8**	**1.410**	**1.297**	**100**	**92**

Soil Identification: Light olive brown lean clay (CL), caliche noted

ONE-DIMENSIONAL CONSOLIDATION PROPERTIES of SOILS
ASTM D 2435

Project No.: 22057-01

Salt Creek

05-22

ONE-DIMENSIONAL SWELL OR SETTLEMENT POTENTIAL OF COHESIVE SOILS

ASTM D 4546

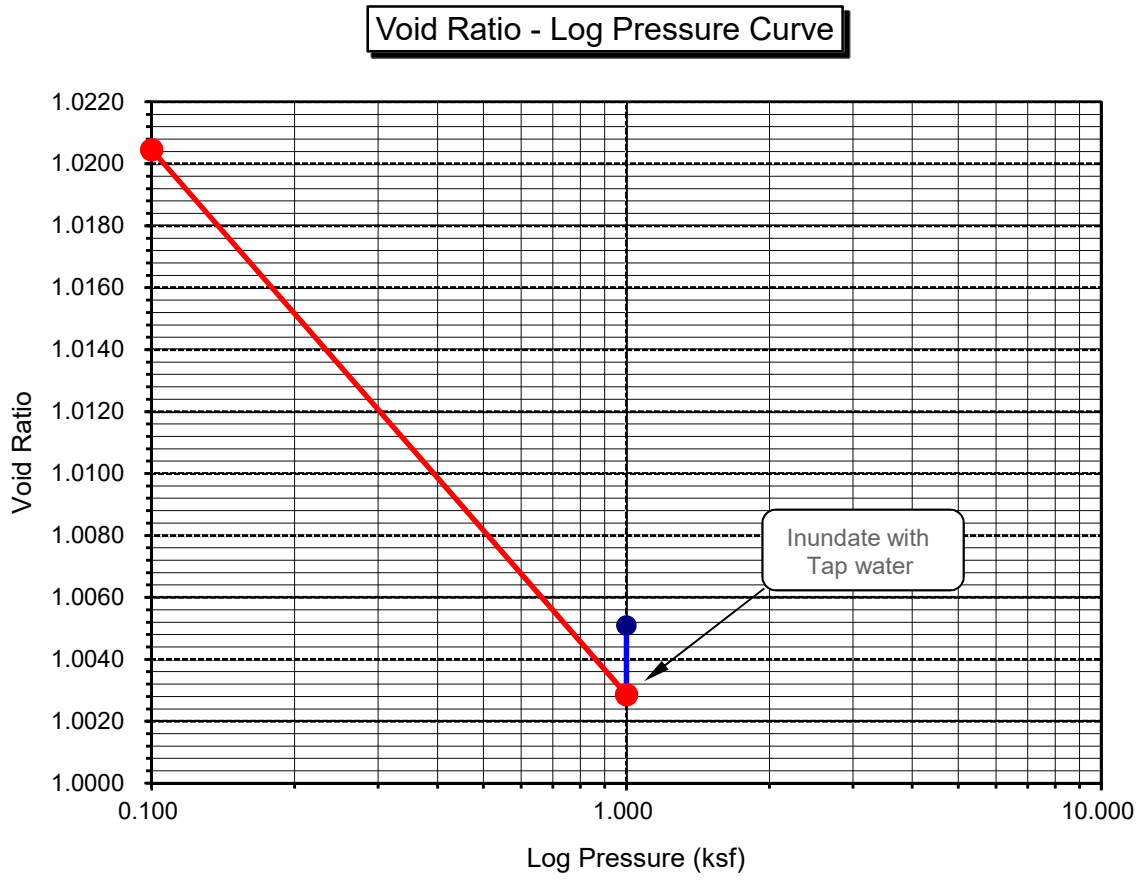
Project Name:	Salt Creek	Tested By:	G. Bathala	Date:	05/09/22
Project No.:	22057-01	Checked By:	J. Ward	Date:	05/25/22
Boring No.:	HS-2	Sample Type:	Ring		
Sample No.:	R-4	Depth (ft.)	7.5		
Sample Description:	Olive yellow lean clay (CL)				

Initial Dry Density (pcf):	83.4
Initial Moisture (%):	36.06
Initial Length (in.):	1.0000
Initial Dial Reading:	0.1364
Diameter(in):	2.415

Final Dry Density (pcf):	84.5
Final Moisture (%) :	35.4
Initial Void ratio:	1.0223
Specific Gravity(assumed):	2.70
Initial Saturation (%)	95.2

Pressure (p) (ksf)	Final Reading (in)	Apparent Thickness (in)	Load Compliance (%)	Swell (+) Settlement (-) % of Sample Thickness	Void Ratio	Corrected Deformation (%)
0.100	0.1373	0.9991	0.00	-0.09	1.0205	-0.09
1.000	0.1484	0.9880	0.24	-1.20	1.0029	-0.96
H2O	0.1473	0.9891	0.24	-1.09	1.0051	-0.85

Percent Swell (+) / Settlement (-) After Inundation = 0.11



ONE-DIMENSIONAL SWELL OR SETTLEMENT POTENTIAL OF COHESIVE SOILS

ASTM D 4546

Project Name:	Salt Creek	Tested By:	G. Bathala	Date:	05/10/22
Project No.:	22057-01	Checked By:	J. Ward	Date:	05/25/22
Boring No.:	HS-4	Sample Type:	Ring		
Sample No.:	R-4	Depth (ft.)	7.5		

Sample Description: Olive brown silty clay with sand (CL-ML)s, mica noted

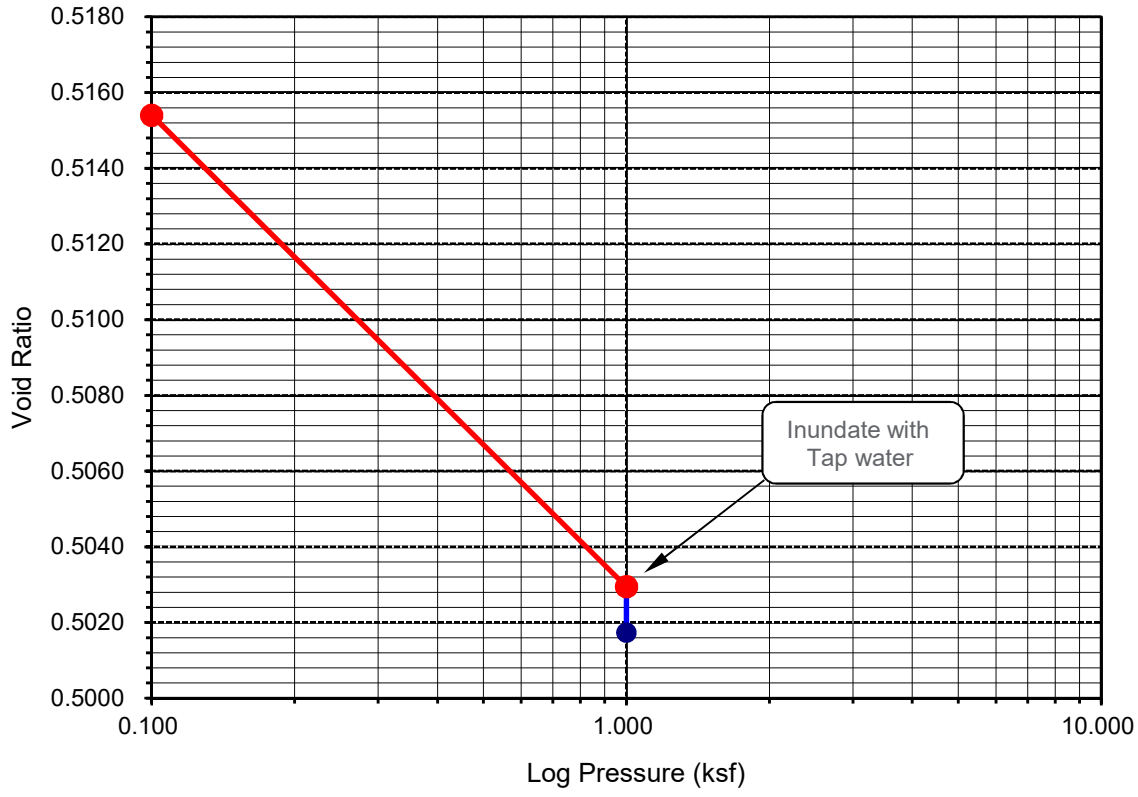
Initial Dry Density (pcf):	111.0
Initial Moisture (%):	20.65
Initial Length (in.):	1.0000
Initial Dial Reading:	0.1295
Diameter(in):	2.415

Final Dry Density (pcf):	112.8
Final Moisture (%) :	19.6
Initial Void ratio:	0.5192
Specific Gravity(assumed):	2.70
Initial Saturation (%)	107.4

Pressure (p) (ksf)	Final Reading (in)	Apparent Thickness (in)	Load Compliance (%)	Swell (+) Settlement (-) % of Sample Thickness	Void Ratio	Corrected Deformation (%)
0.100	0.1320	0.9975	0.00	-0.25	0.5154	-0.25
1.000	0.1426	0.9869	0.24	-1.31	0.5029	-1.07
H2O	0.1434	0.9861	0.24	-1.39	0.5017	-1.15

Percent Swell (+) / Settlement (-) After Inundation = -0.08

Void Ratio - Log Pressure Curve



ONE-DIMENSIONAL SWELL OR SETTLEMENT POTENTIAL OF COHESIVE SOILS

ASTM D 4546

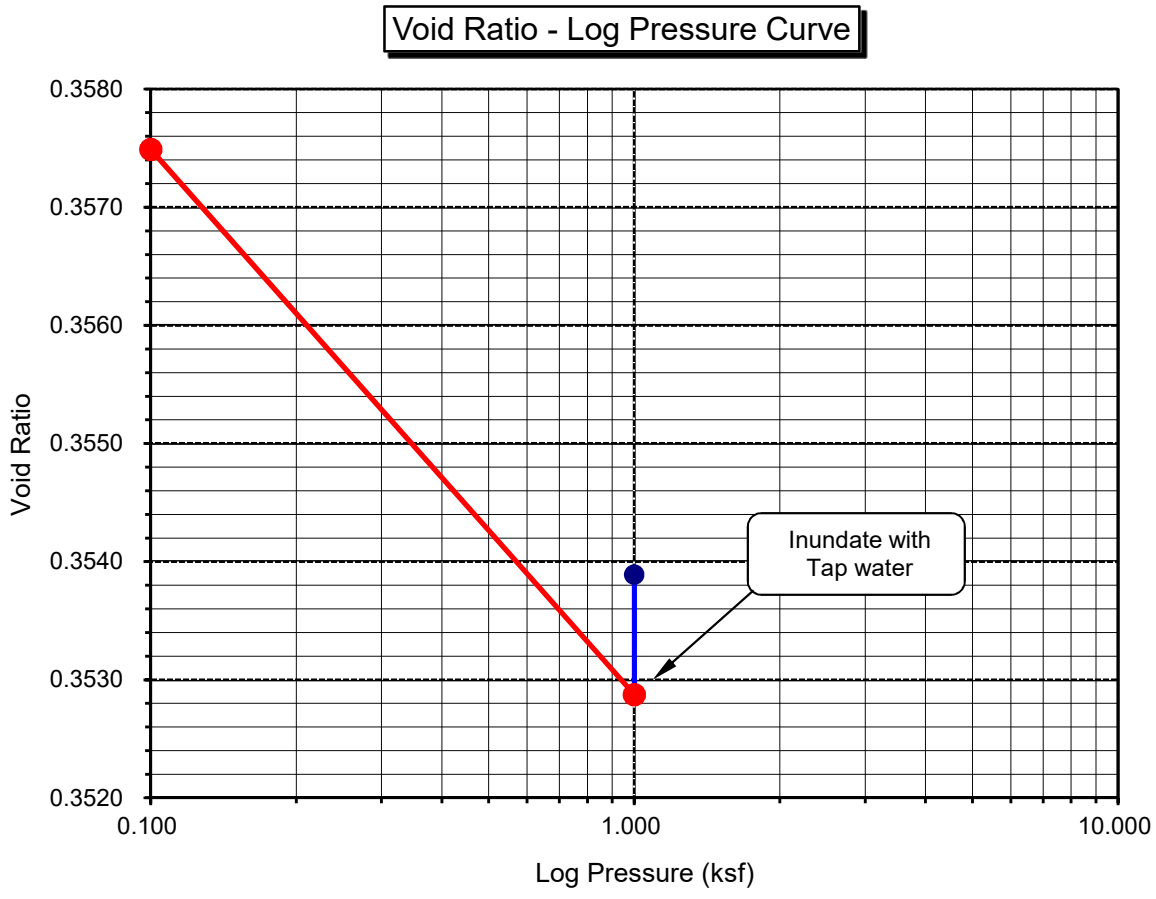
Project Name:	Salt Creek	Tested By:	G. Bathala	Date:	05/16/22
Project No.:	22057-01	Checked By:	J. Ward	Date:	05/25/22
Boring No.:	HS-9	Sample Type:	Ring		
Sample No.:	R-4	Depth (ft.)	7.5		
Sample Description:	Light olive brown sandy lean clay s(CL)				

Initial Dry Density (pcf):	124.1
Initial Moisture (%):	12.19
Initial Length (in.):	1.0000
Initial Dial Reading:	0.2938
Diameter(in):	2.415

Final Dry Density (pcf):	124.5
Final Moisture (%) :	12.6
Initial Void Ratio:	0.3579
Specific Gravity(assumed):	2.70
Initial Saturation (%)	92.0

Pressure (p) (ksf)	Final Reading (in)	Apparent Thickness (in)	Load Compliance (%)	Swell (+) Settlement (-) % of Sample Thickness	Void Ratio	Corrected Deformation (%)
0.100	0.2935	0.9997	0.00	-0.03	0.3575	-0.03
1.000	0.2880	0.9942	0.21	-0.58	0.3529	-0.37
H2O	0.2888	0.9950	0.21	-0.51	0.3539	-0.30

Percent Swell (+) / Settlement (-) After Inundation = 0.08



ONE-DIMENSIONAL SWELL OR SETTLEMENT POTENTIAL OF COHESIVE SOILS

ASTM D 4546

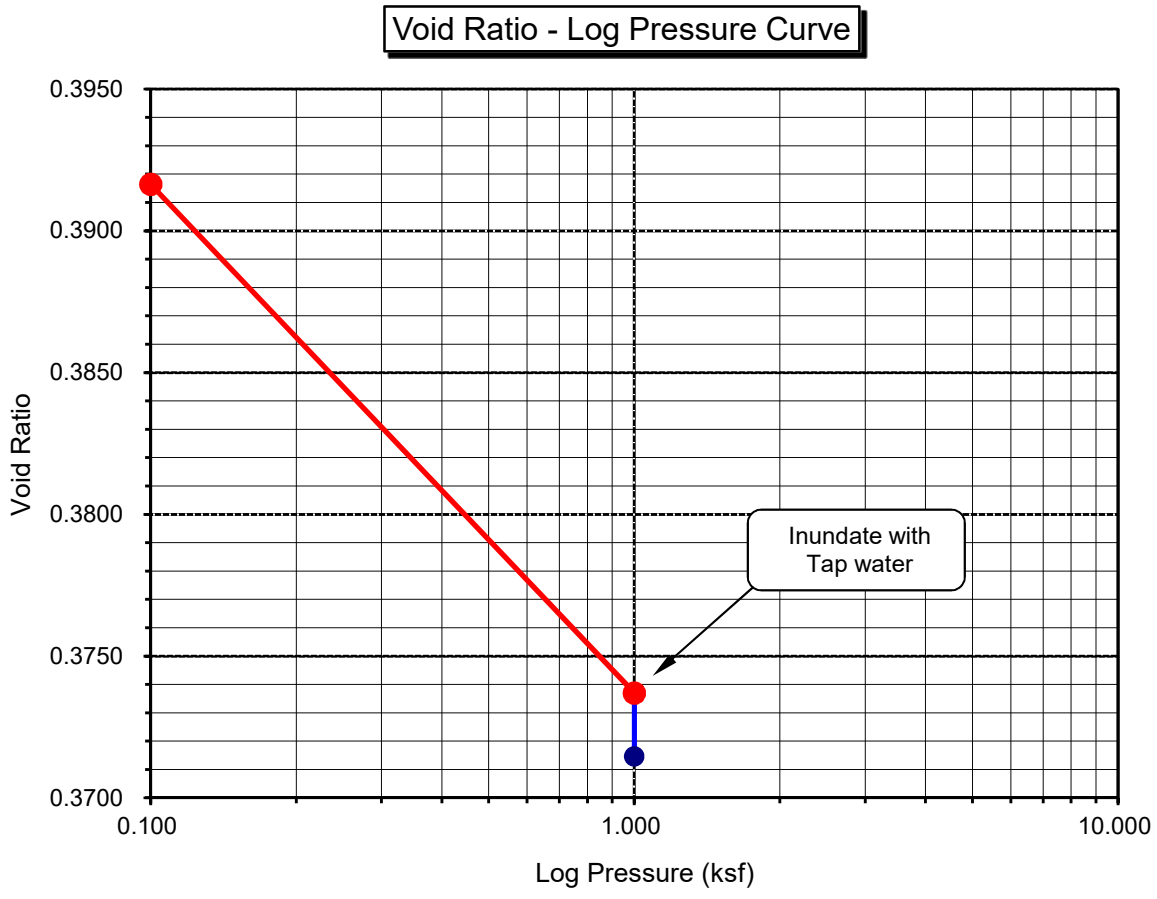
Project Name:	Salt Creek	Tested By:	G. Bathala	Date:	05/16/22
Project No.:	22057-01	Checked By:	J. Ward	Date:	05/25/22
Boring No.:	HS-9	Sample Type:	Ring		
Sample No.:	R-6	Depth (ft.)	15.0		
Sample Description:	Dark yellowish brown clayey sand (SC)				

Initial Dry Density (pcf):	120.3
Initial Moisture (%):	14.53
Initial Length (in.):	1.0000
Initial Dial Reading:	0.2740
Diameter(in):	2.415

Final Dry Density (pcf):	122.9
Final Moisture (%) :	14.3
Initial Void Ratio:	0.4016
Specific Gravity(assumed):	2.70
Initial Saturation (%)	97.7

Pressure (p) (ksf)	Final Reading (in)	Apparent Thickness (in)	Load Compliance (%)	Swell (+) Settlement (-) % of Sample Thickness	Void Ratio	Corrected Deformation (%)
0.100	0.2669	0.9929	0.00	-0.71	0.3916	-0.71
1.000	0.2514	0.9774	0.27	-2.26	0.3737	-1.99
H2O	0.2498	0.9758	0.27	-2.42	0.3715	-2.15

Percent Swell (+) / Settlement (-) After Inundation = -0.16



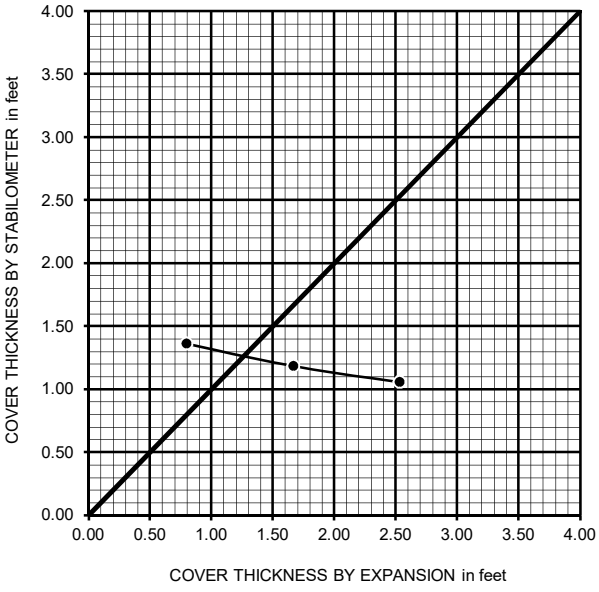
R-VALUE TEST RESULTS
DOT CA Test 301

PROJECT NAME:	Salt Creek	PROJECT NUMBER:	22057-01
BORING NUMBER:	HS-3	DEPTH (FT.):	0-5
SAMPLE NUMBER:	B-1	TECHNICIAN:	O. Figueroa
SAMPLE DESCRIPTION:	Olive brown silty clay (CL-ML)	DATE COMPLETED:	5/6/2022

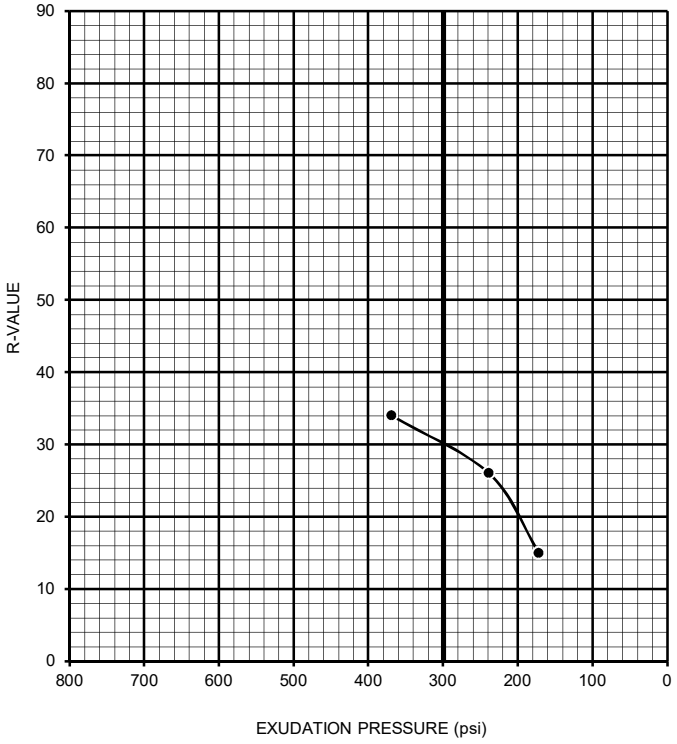
TEST SPECIMEN	a	b	c
MOISTURE AT COMPACTION %	18.8	20.0	20.9
HEIGHT OF SAMPLE, Inches	2.42	2.45	2.50
DRY DENSITY, pcf	109.5	107.2	106.6
COMPACTOR PRESSURE, psi	150	90	60
EXUDATION PRESSURE, psi	369	239	172
EXPANSION, Inches x 10exp-4	76	50	24
STABILITY Ph 2,000 lbs (160 psi)	81	99	122
TURNS DISPLACEMENT	4.34	4.40	4.45
R-VALUE UNCORRECTED	36	26	15
R-VALUE CORRECTED	34	26	15

DESIGN CALCULATION DATA	a	b	c
GRAVEL EQUIVALENT FACTOR	1.0	1.0	1.0
TRAFFIC INDEX	5.0	5.0	5.0
STABILOMETER THICKNESS, ft.	1.06	1.18	1.36
EXPANSION PRESSURE THICKNESS, ft.	2.53	1.67	0.80

EXPANSION PRESSURE CHART



EXUDATION PRESSURE CHART



R-VALUE BY EXPANSION:	21
R-VALUE BY EXUDATION:	30
EQUILIBRIUM R-VALUE:	21

Appendix D
Infiltration Test Results

Infiltration Test Data Sheet

LGC Geotechnical, Inc
131 Calle Iglesia Suite 200, San Clemente, CA 92672 tel. (949) 369-6141

Project Name: Meritage - Salt Creek
Project Number: 22057-01
Date: 4/13/2022
Boring Number: I-1

Test hole dimensions (if circular)	
Boring Depth (feet)*:	5
Boring Diameter (inches):	8
Pipe Diameter (inches):	3

*measured at time of test

Test pit dimensions (if rectangular)	
Pit Depth (feet):	
Pit Length (feet):	
Pit Breadth (feet):	

*Pre-Test (Sandy Soil Criteria)**

Trial No.	Start Time (24:HR)	Stop Time (24:HR)	Time Interval (min)	Initial Depth to Water (feet)	Final Depth to Water (feet)	Total Change in Water Level (feet)	Greater Than or Equal to 0.5 feet (yes/no)
1	8:15	8:40	25.0	2.70	3.27	0.57	Yes
2	8:50	9:15	25.0	1.9	2.66	0.76	Yes

*If two consecutive measurements show that six inches of water seeps away in less than 25 minutes, the test shall be run for an additional hour with measurements taken every 10 minutes. Otherwise, pre-soak (fill) overnight, and then obtain at least twelve measurements per hole over at least six hours (approximately 30 minute intervals) with a precision of at least 0.25 inches

Main Test Data

Trial No.	Start Time (24:HR)	Stop Time (24:HR)	Time Interval, t (min)	Initial Depth to Water, D_o (feet)	Final Depth to Water, D_f (feet)	Change in Water Level, D (feet)	Observed Infiltration Rate(in/hr)
1	16:08	16:18	10.0	2.15	2.51	0.36	1.5
2	16:20	16:30	10.0	2.17	2.51	0.34	1.4
3	16:35	16:45	10.0	2.07	2.42	0.35	1.4
4	16:47	16:57	10.0	2.10	2.5	0.4	1.7
5	17:02	17:12	10.0	2.15	2.55	0.4	1.7
6	17:15	17:25	10.0	2.17	2.6	0.43	1.9
7							
8							
9							
10							
11							
12							

Observed Infiltration Rate (No Factor of Safety)	**1.9**
MinimumFactor of Safety	**3.0**
Measured Infiltration Rate (With Factor of Safety)	**0.6**

Sketch:

Notes:

Based on Guidelines from: Riverside County 09/2012
Spreadsheet Revised on: 10/30/2019

LGC Geotechnical, Inc.

Infiltration Test Data Sheet

LGC Geotechnical, Inc
131 Calle Iglesia Suite 200, San Clemente, CA 92672 tel. (949) 369-6141

Project Name: Meritage - Salt Creek
Project Number: 22057-01
Date: 4/13/2022
Boring Number: I-2

Test hole dimensions (if circular)	
Boring Depth (feet)*:	5
Boring Diameter (inches):	8
Pipe Diameter (inches):	3

*measured at time of test

Test pit dimensions (if rectangular)	
Pit Depth (feet):	
Pit Length (feet):	
Pit Breadth (feet):	

*Pre-Test (Sandy Soil Criteria)**

Trial No.	Start Time (24:HR)	Stop Time (24:HR)	Time Interval (min)	Initial Depth to Water (feet)	Final Depth to Water (feet)	Total Change in Water Level (feet)	Greater Than or Equal to 0.5 feet (yes/no)
1	8:25	8:50	25.0	2.00	2.65	0.65	Yes
2	9:00	9:25	25.0	2.1	2.69	0.59	Yes

*If two consecutive measurements show that six inches of water seeps away in less than 25 minutes, the test shall be run for an additional hour with measurements taken every 10 minutes. Otherwise, pre-soak (fill) overnight, and then obtain at least twelve measurements per hole over at least six hours (approximately 30 minute intervals) with a precision of at least 0.25 inches

Main Test Data

Trial No.	Start Time (24:HR)	Stop Time (24:HR)	Time Interval, t (min)	Initial Depth to Water, D_o (feet)	Final Depth to Water, D_f (feet)	Change in Water Level, D (feet)	Observed Infiltration Rate(in/hr)
1	16:14	16:24	10.0	2.1	2.45	0.35	1.5
2	16:27	16:37	10.0	2	2.32	0.32	1.3
3	16:40	16:50	10.0	2.2	2.43	0.23	1.0
4	16:55	17:05	10.0	2	2.39	0.39	1.6
5	17:07	17:17	10.0	2	2.55	0.55	2.3
6	17:24	17:34	10.0	2	2.65	0.65	2.7
7							
8							
9							
10							
11							
12							

Observed Infiltration Rate (No Factor of Safety)	**2.7**
MinimumFactor of Safety	**3.0**
Measured Infiltration Rate (With Factor of Safety)	**0.9**

Sketch:

Notes:

Based on Guidelines from: Riverside County 09/2012
Spreadsheet Revised on: 10/30/2019

LGC Geotechnical, Inc.

Infiltration Test Data Sheet

LGC Geotechnical, Inc
131 Calle Iglesia Suite 200, San Clemente, CA 92672 tel. (949) 369-6141

Project Name: Meritage - Salt Creek
Project Number: 22057-01
Date: 4/13/2022
Boring Number: I-3

Test hole dimensions (if circular)	
Boring Depth (feet)*:	10
Boring Diameter (inches):	8
Pipe Diameter (inches):	3

*measured at time of test

Test pit dimensions (if rectangular)	
Pit Depth (feet):	
Pit Length (feet):	
Pit Breadth (feet):	

*Pre-Test (Sandy Soil Criteria)**

Trial No.	Start Time (24:HR)	Stop Time (24:HR)	Time Interval (min)	Initial Depth to Water (feet)	Final Depth to Water (feet)	Total Change in Water Level (feet)	Greater Than or Equal to 0.5 feet (yes/no)
1	8:40	9:05	25.0	5.15	5.21	0.06	No
2	9:15	9:40	25.0	5.21	5.27	0.06	No

*If two consecutive measurements show that six inches of water seeps away in less than 25 minutes, the test shall be run for an additional hour with measurements taken every 10 minutes. Otherwise, pre-soak (fill) overnight, and then obtain at least twelve measurements per hole over at least six hours (approximately 30 minute intervals) with a precision of at least 0.25 inches

Main Test Data

Trial No.	Start Time (24:HR)	Stop Time (24:HR)	Time Interval, t (min)	Initial Depth to Water, D_o (feet)	Final Depth to Water, D_f (feet)	Change in Water Level, D (feet)	Observed Infiltration Rate(in/hr)
1	9:50	10:20	30.0	5.27	5.32	0.05	0.0
2	10:20	10:50	30.0	5.32	5.37	0.05	0.0
3	10:50	11:20	30.0	5.37	5.42	0.05	0.0
4	11:20	11:50	30.0	5.42	5.46	0.04	0.0
5	11:50	12:20	30.0	5.46	5.52	0.06	0.1
6	12:20	12:50	30.0	5.52	5.58	0.06	0.1
7	12:50	13:20	30.0	5.58	5.61	0.03	0.0
8	13:20	13:50	30.0	5.61	5.67	0.06	0.1
9	13:50	14:20	30.0	5.67	5.71	0.04	0.0
10	14:20	14:50	30.0	5.71	5.74	0.03	0.0
11	14:50	15:20	30.0	5.74	5.78	0.04	0.0
12	15:20	15:50	30.0	5.78	5.81	0.03	0.0

Observed Infiltration Rate (No Factor of Safety)	**0.0**
MinimumFactor of Safety	**3.0**
Measured Infiltration Rate (With Factor of Safety)	**0.0**

Sketch:

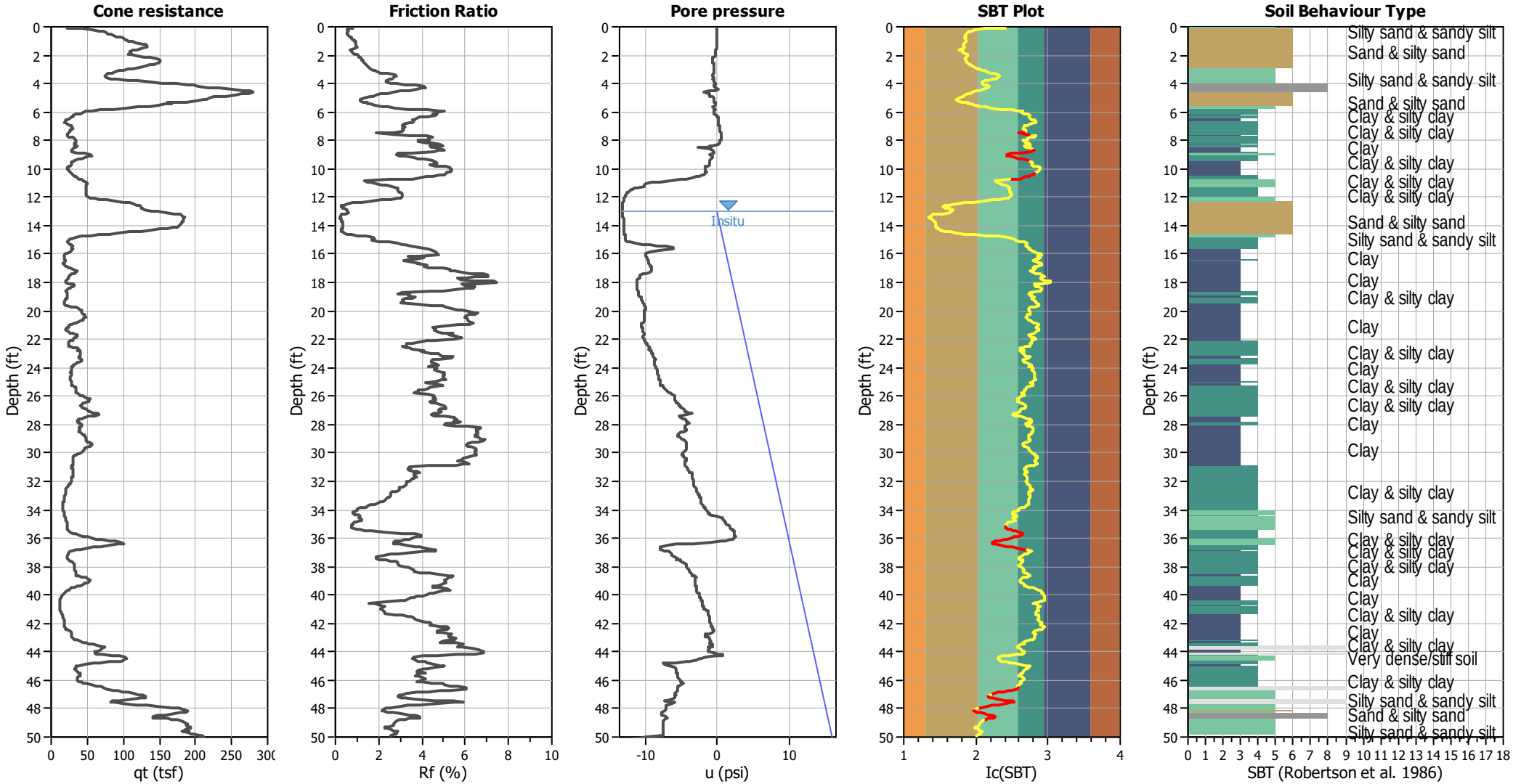
Notes:

Based on Guidelines from: Riverside County 09/2012
Spreadsheet Revised on: 10/30/2019

LGC Geotechnical, Inc.

Appendix E
Liquefaction Calculations

CPT basic interpretation plots



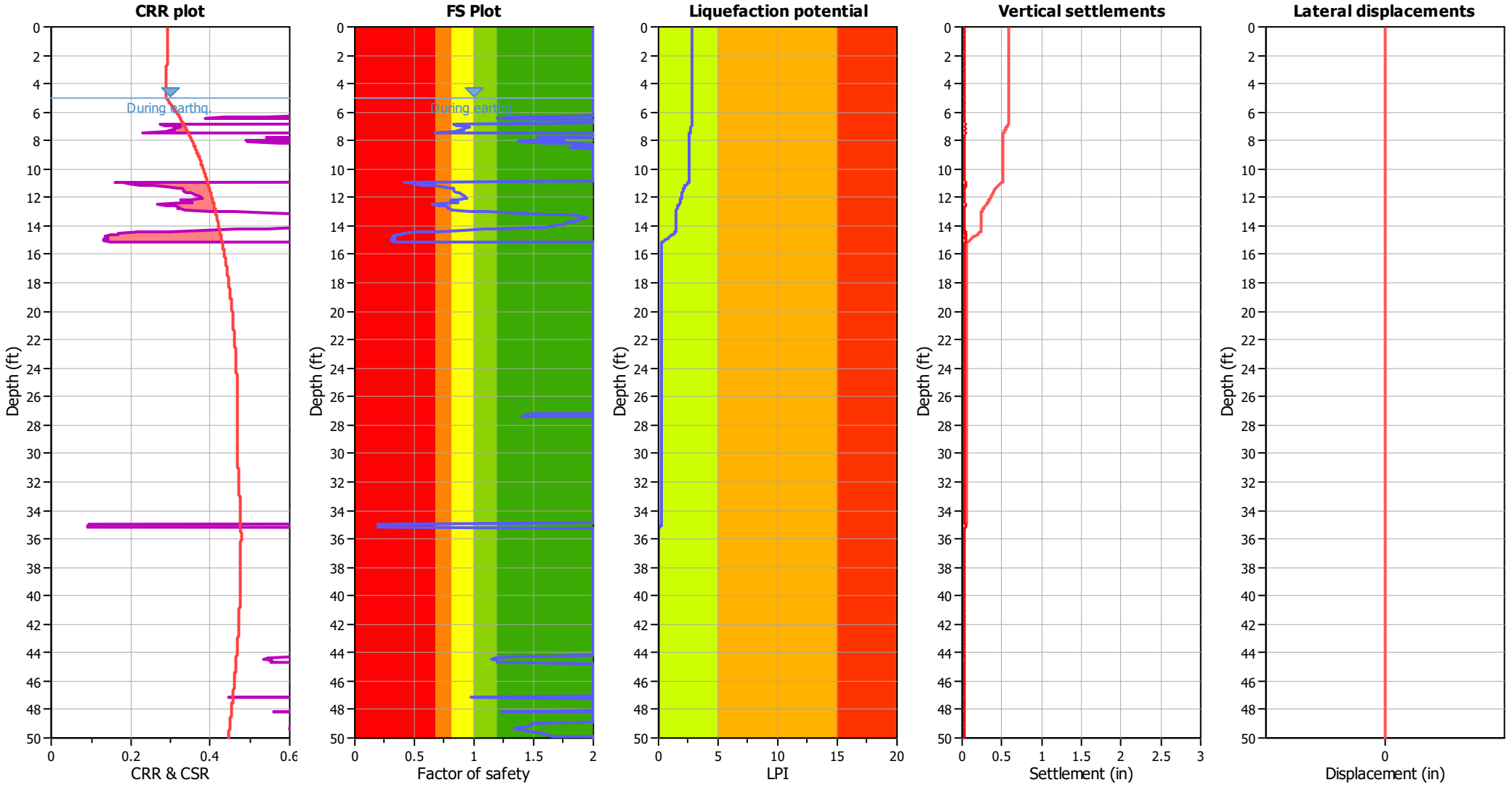
Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	5.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	1	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:	6.93	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):	13.00 ft	Fill height:	N/A	Limit depth:	50.00 ft

SBT 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:	1	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:	6.93	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):	13.00 ft	Fill height:	N/A	Limit depth:	50.00 ft

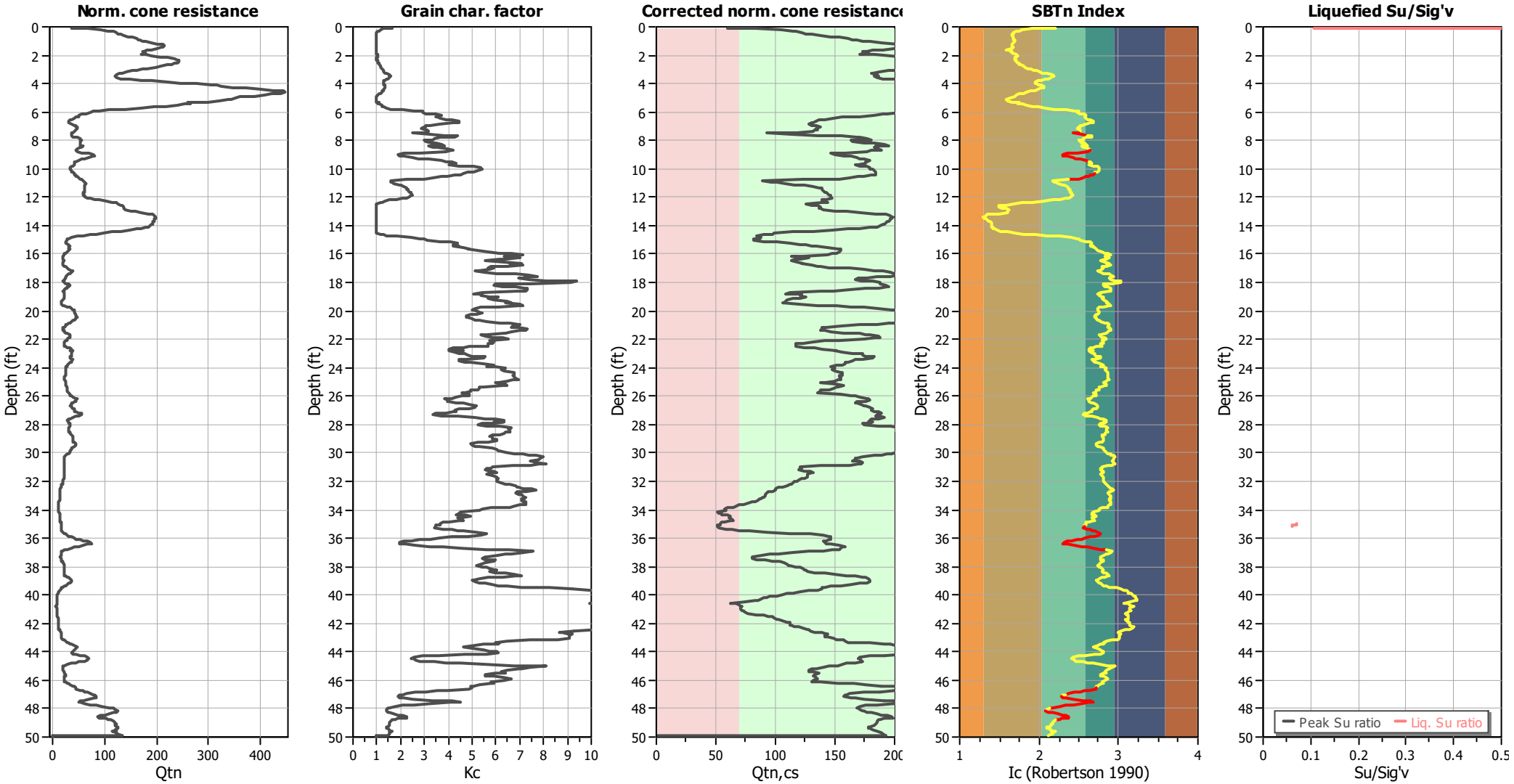
F.S. color scheme

- 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

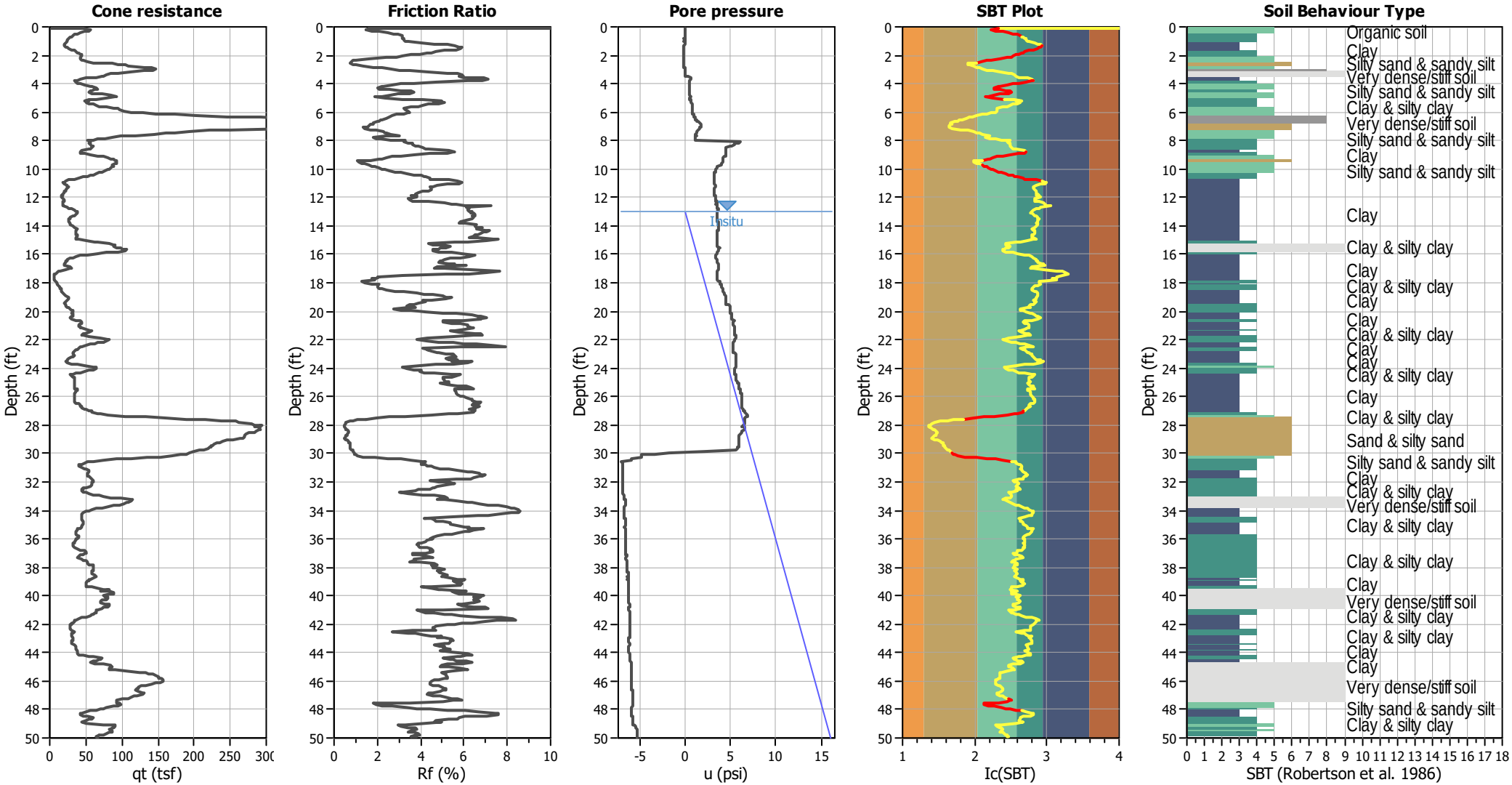
Check for strength loss plots (Robertson (2010))



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:	1	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:	6.93	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):	13.00 ft	Fill height:	N/A	Limit depth:	50.00 ft

CPT basic interpretation plots



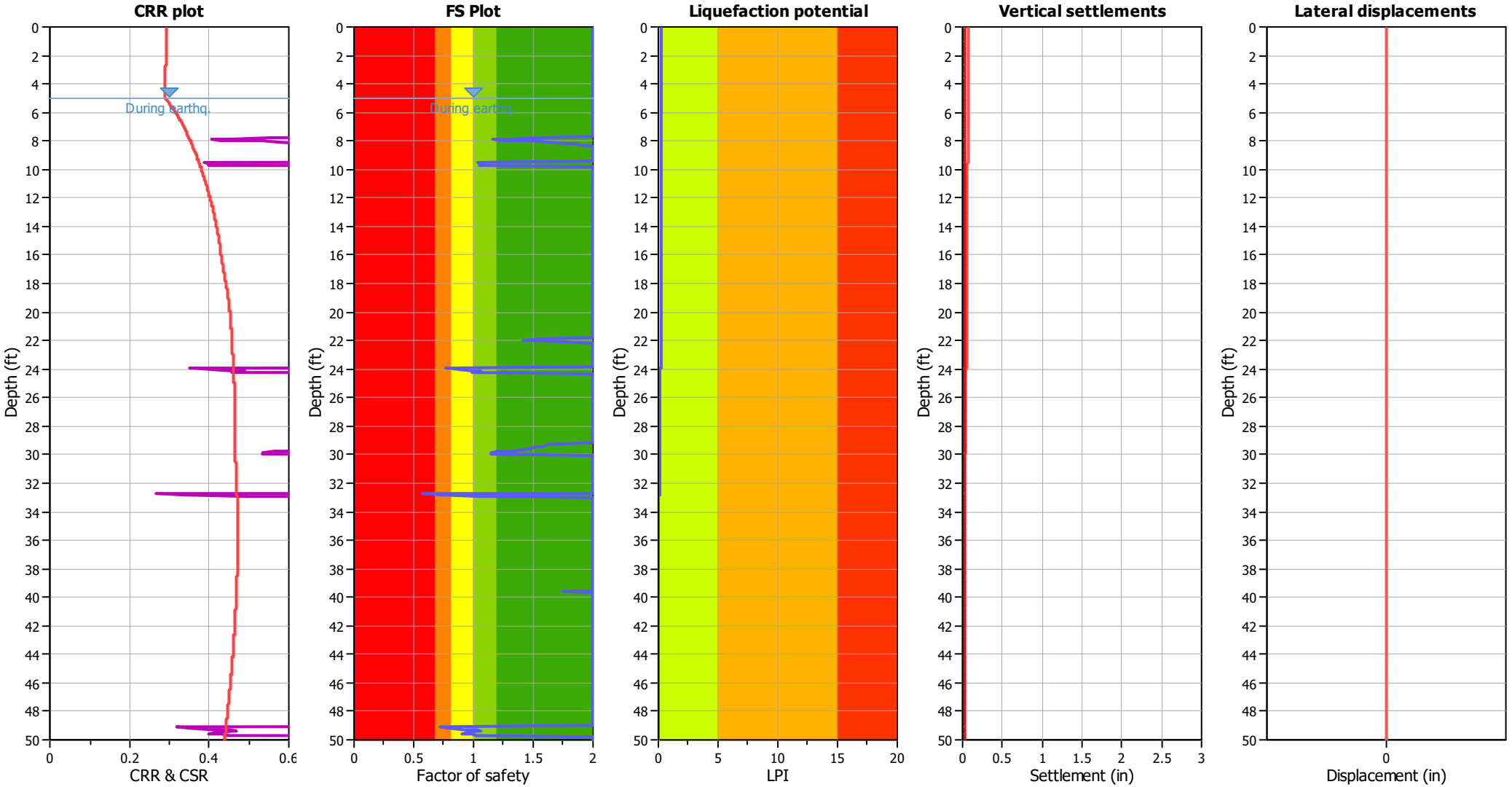
Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	5.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	1	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:	6.93	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):	13.00 ft	Fill height:	N/A	Limit depth:	50.00 ft

SBT 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:	1	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:	6.93	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):	13.00 ft	Fill height:	N/A	Limit depth:	50.00 ft

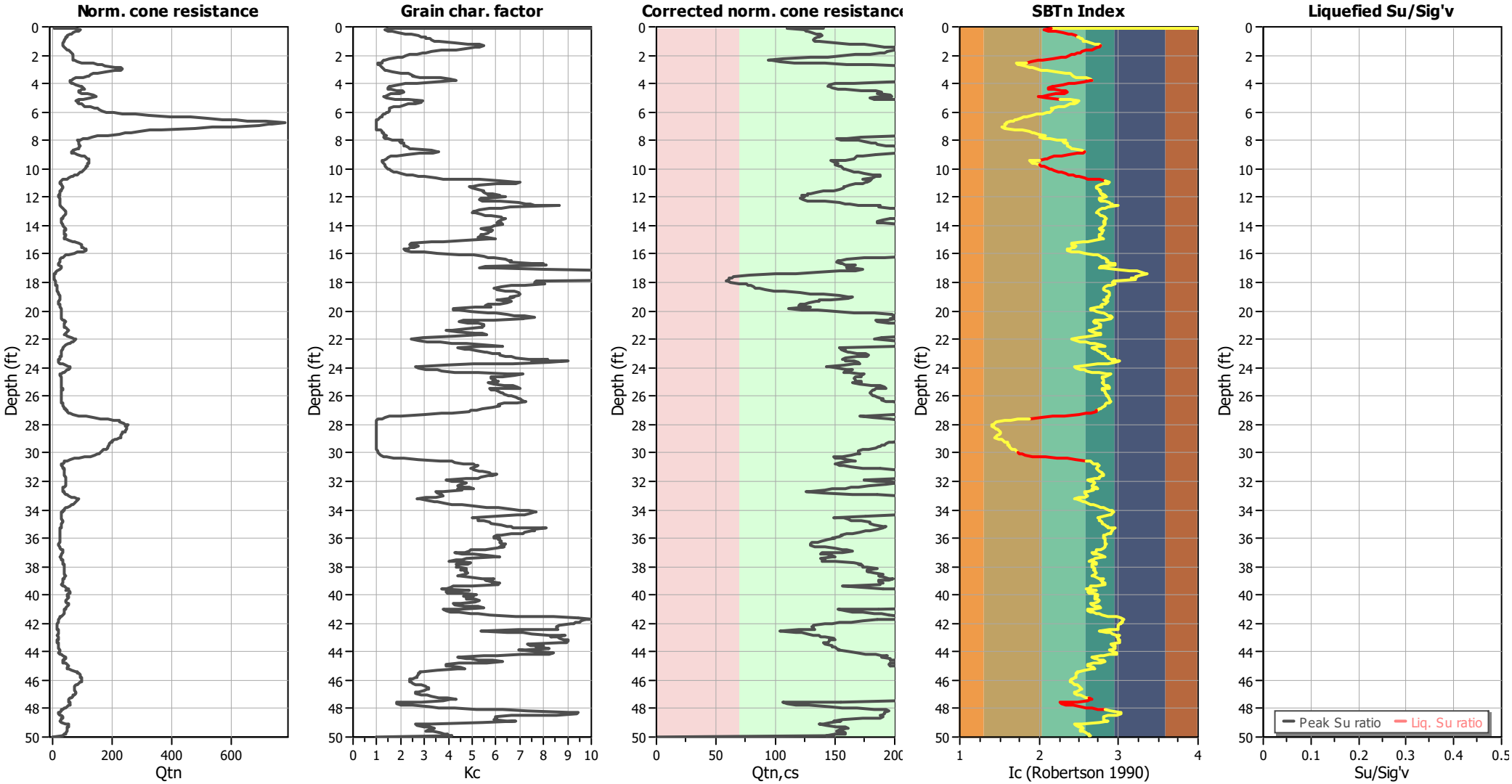
F.S. color scheme

- 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

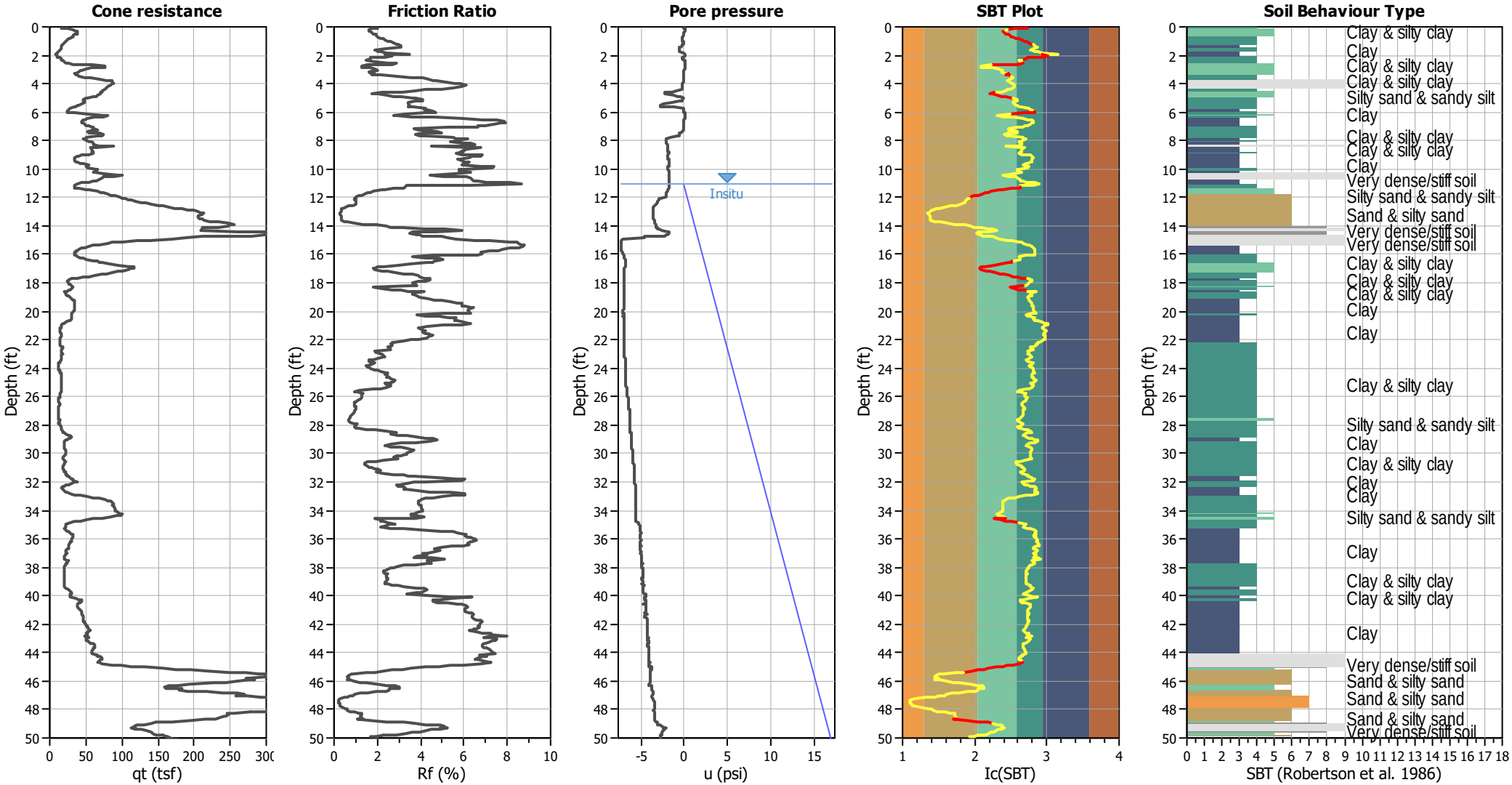
Check for strength loss plots (Robertson (2010))



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:	1	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:	6.93	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):	13.00 ft	Fill height:	N/A	Limit depth:	50.00 ft

CPT basic interpretation plots



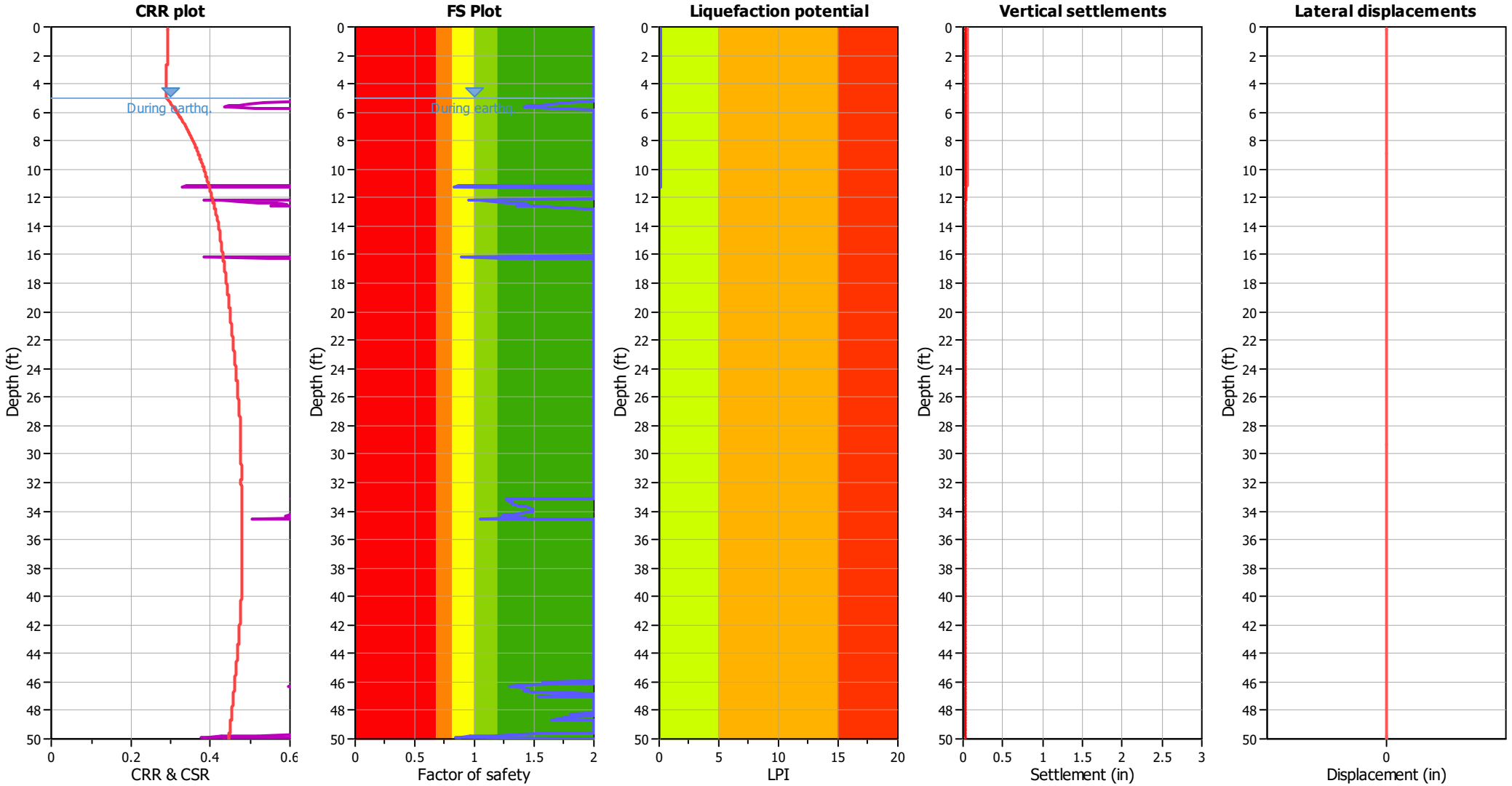
Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	5.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	1	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:	6.93	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):	11.00 ft	Fill height:	N/A	Limit depth:	50.00 ft

SBT 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:	1	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:	6.93	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):	11.00 ft	Fill height:	N/A	Limit depth:	50.00 ft

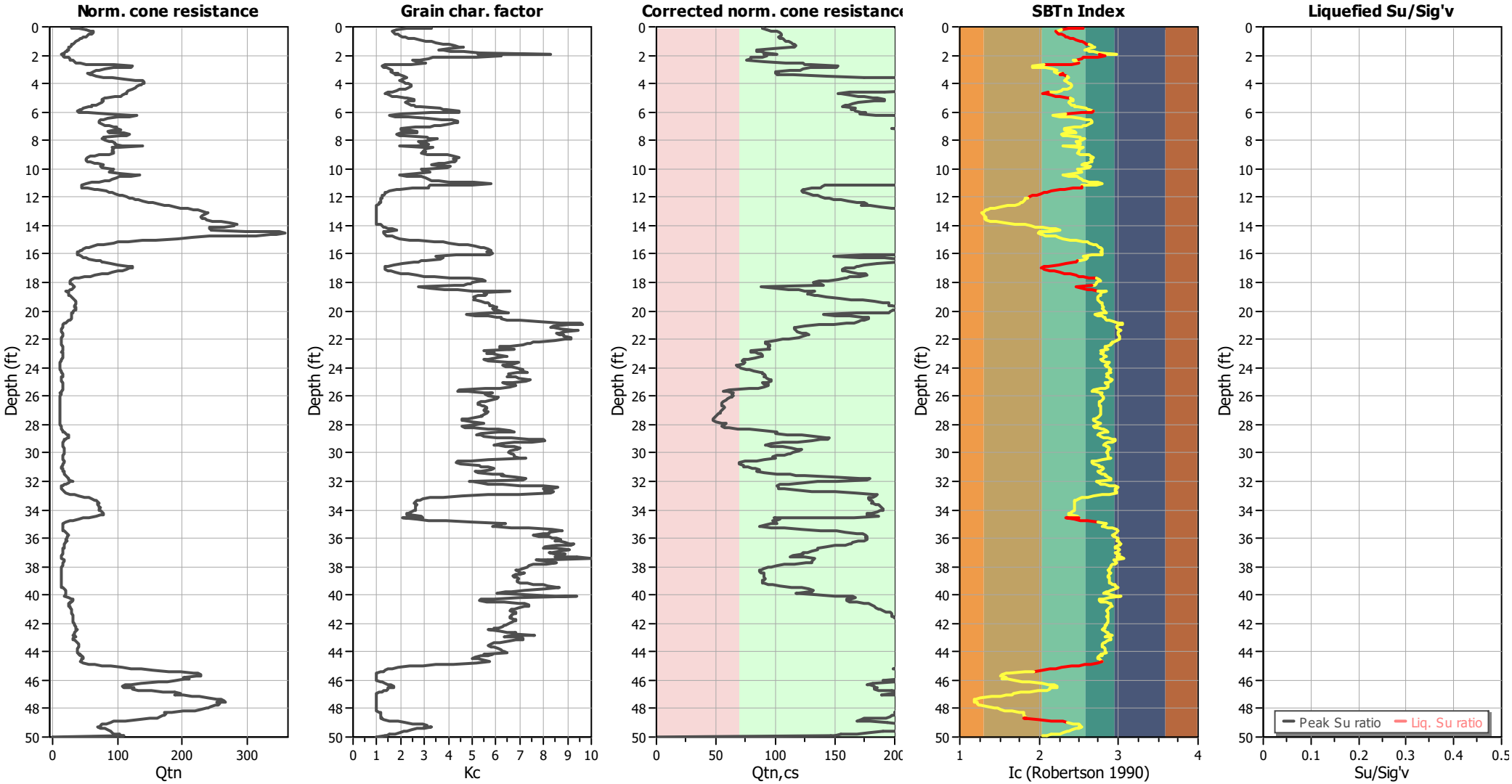
F.S. color scheme

- 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

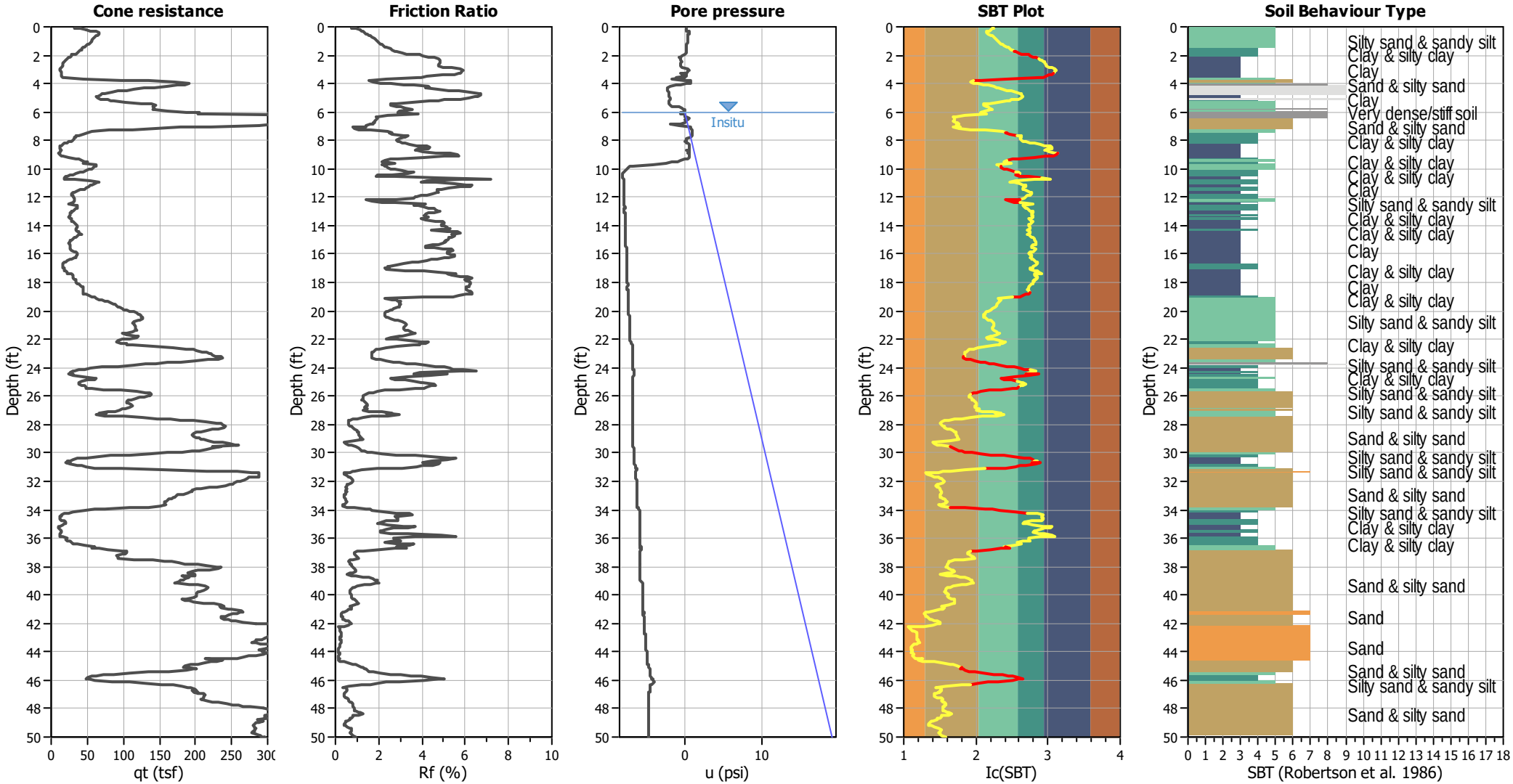
Check for strength loss plots (Robertson (2010))



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:	1	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:	6.93	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):	11.00 ft	Fill height:	N/A	Limit depth:	50.00 ft

CPT basic interpretation plots



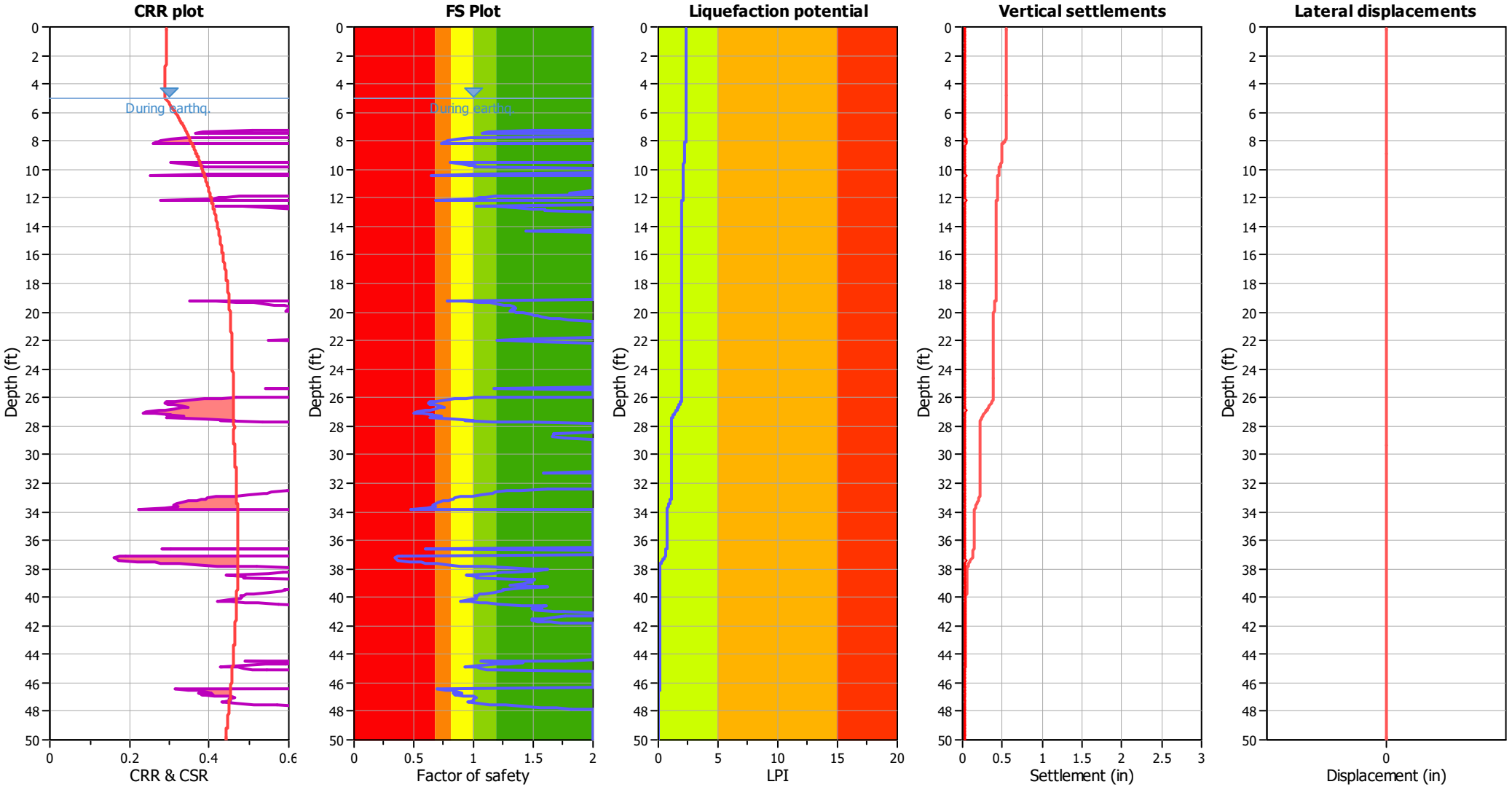
Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	5.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	1	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:	6.93	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):	6.00 ft	Fill height:	N/A	Limit depth:	50.00 ft

SBT 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:	1	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:	6.93	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):	6.00 ft	Fill height:	N/A	Limit depth:	50.00 ft

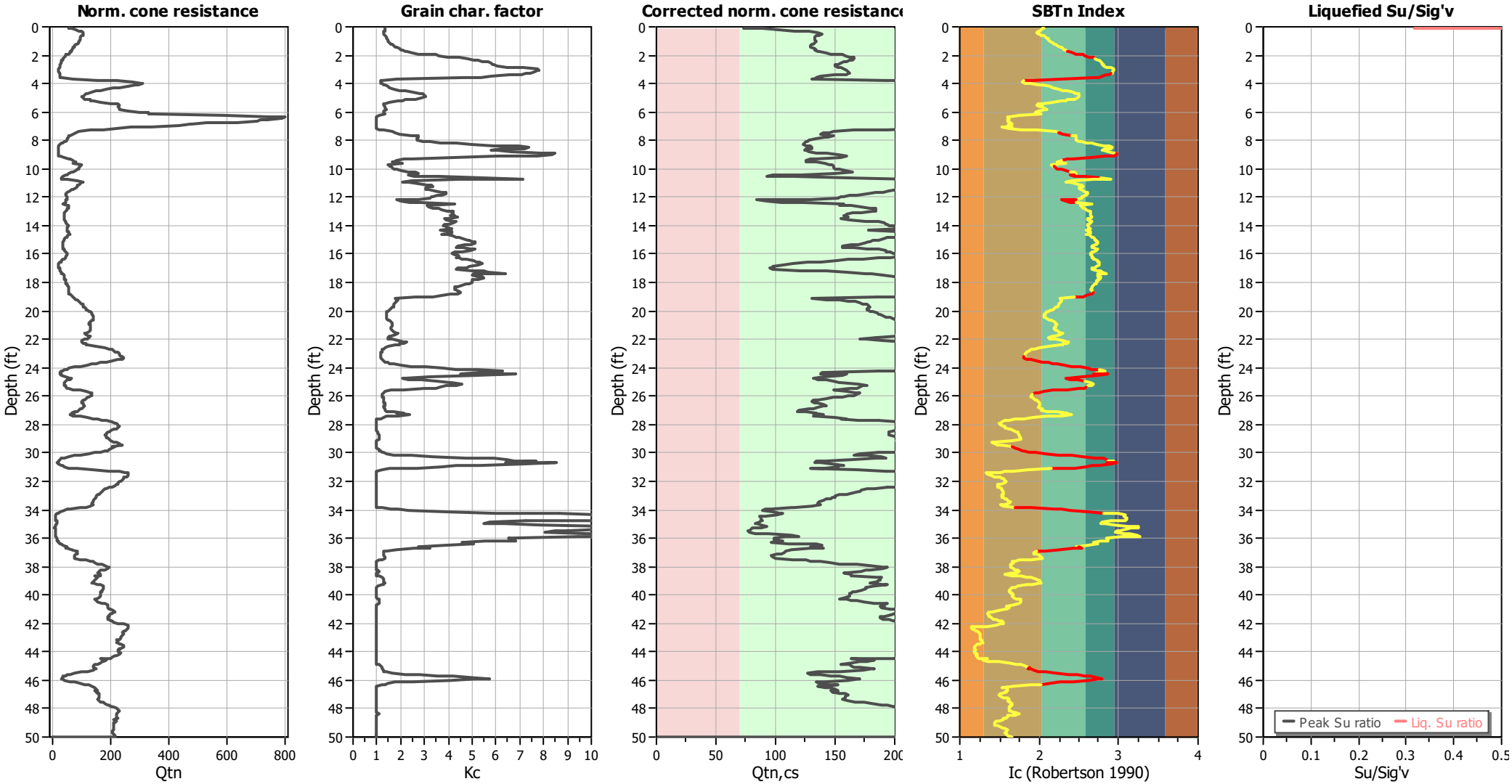
F.S. color scheme

- 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

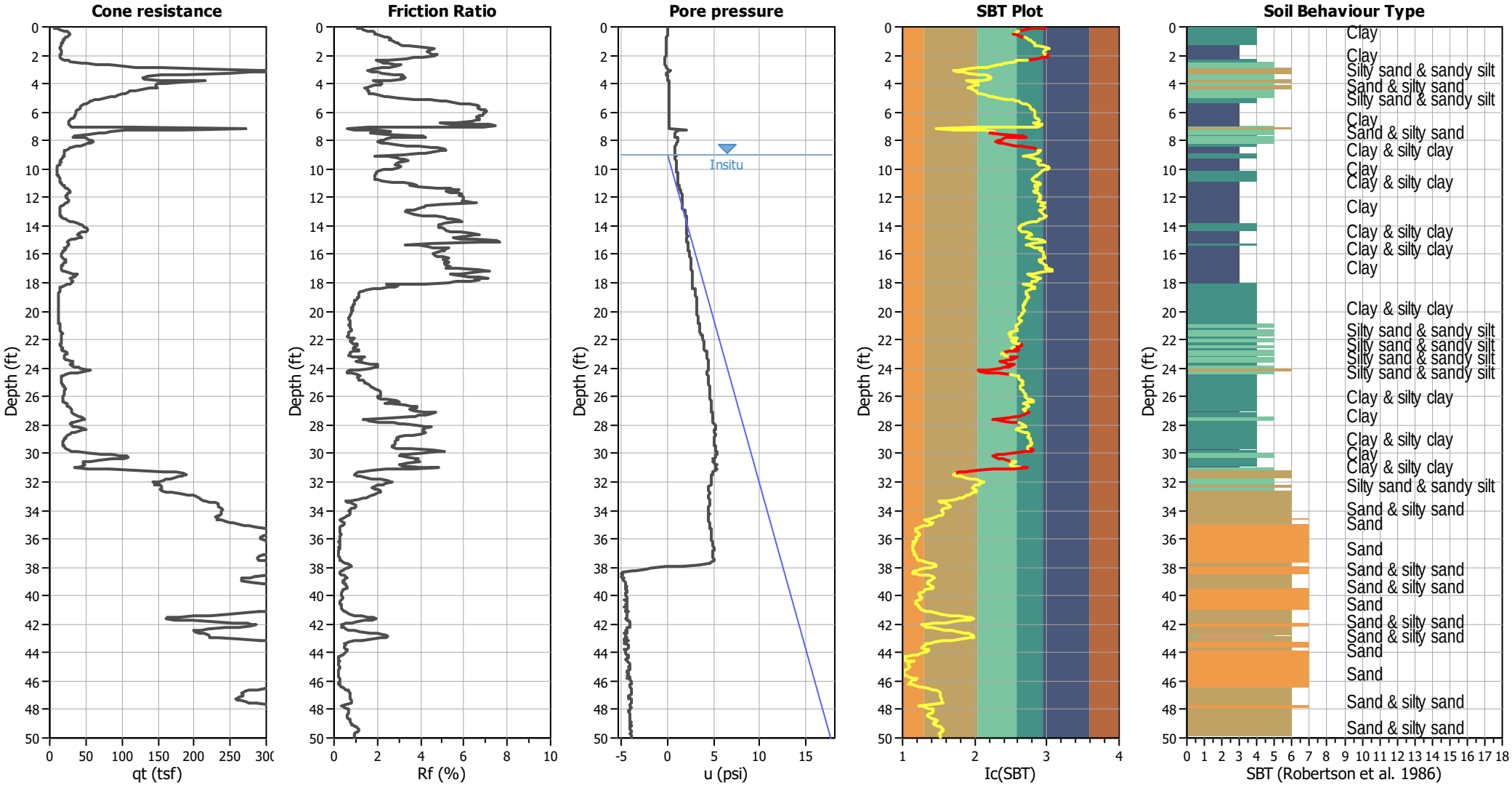
Check for strength loss plots (Robertson (2010))



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:	1	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:	6.93	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):	6.00 ft	Fill height:	N/A	Limit depth:	50.00 ft

CPT basic interpretation plots



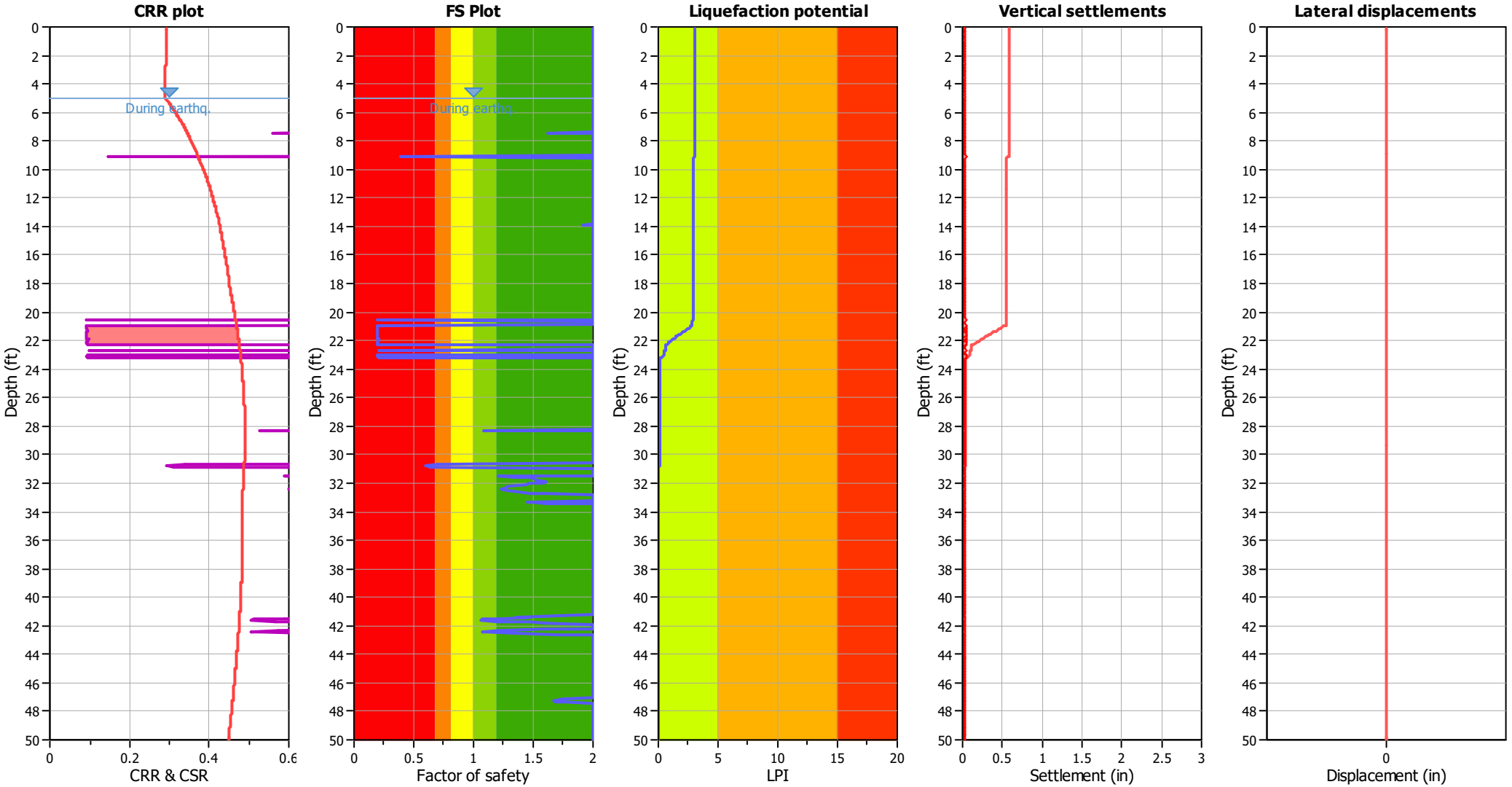
Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	5.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	1	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:	6.93	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):	9.00 ft	Fill height:	N/A	Limit depth:	50.00 ft

SBT 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:	1	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:	6.93	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):	9.00 ft	Fill height:	N/A	Limit depth:	50.00 ft

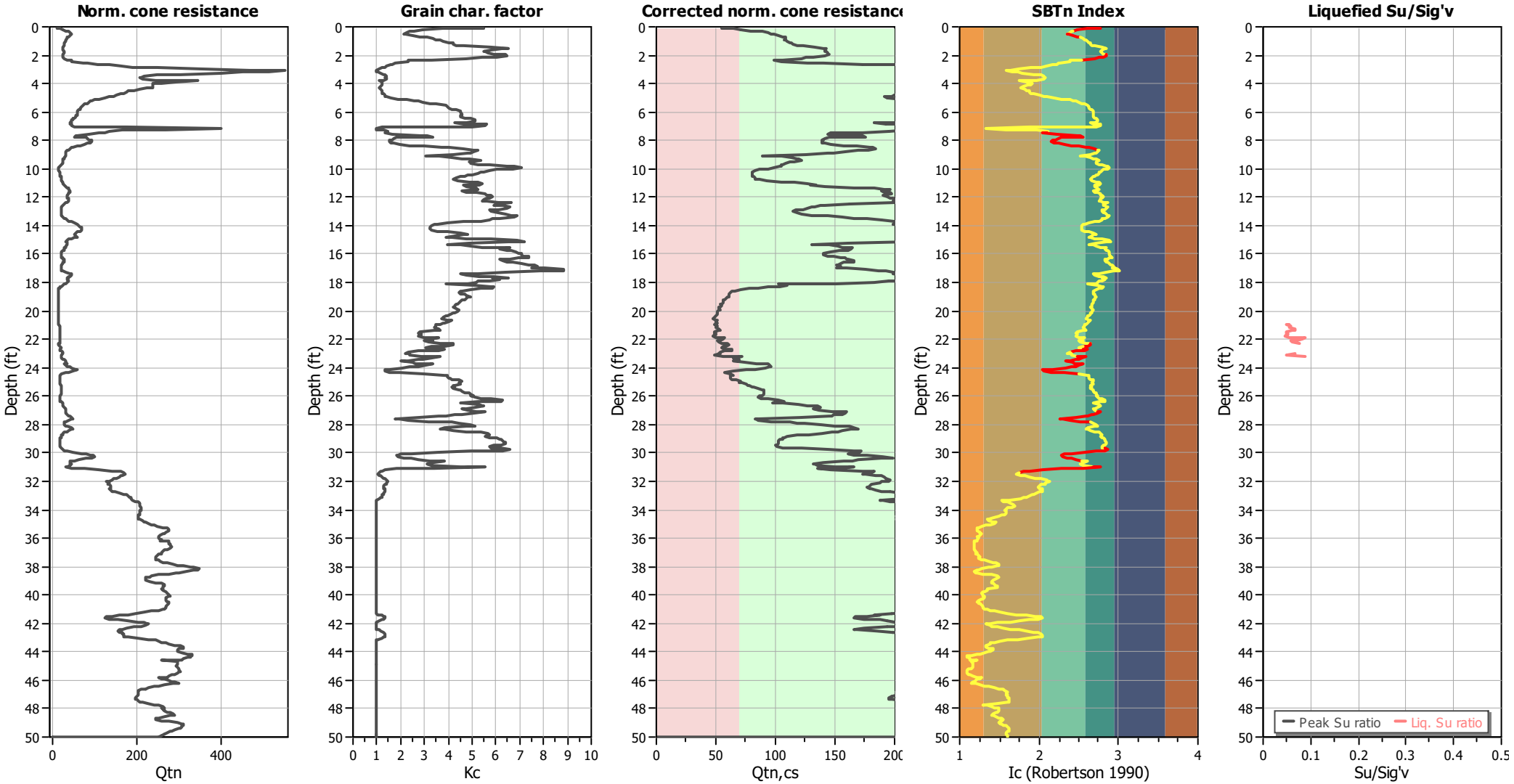
F.S. color scheme

- 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

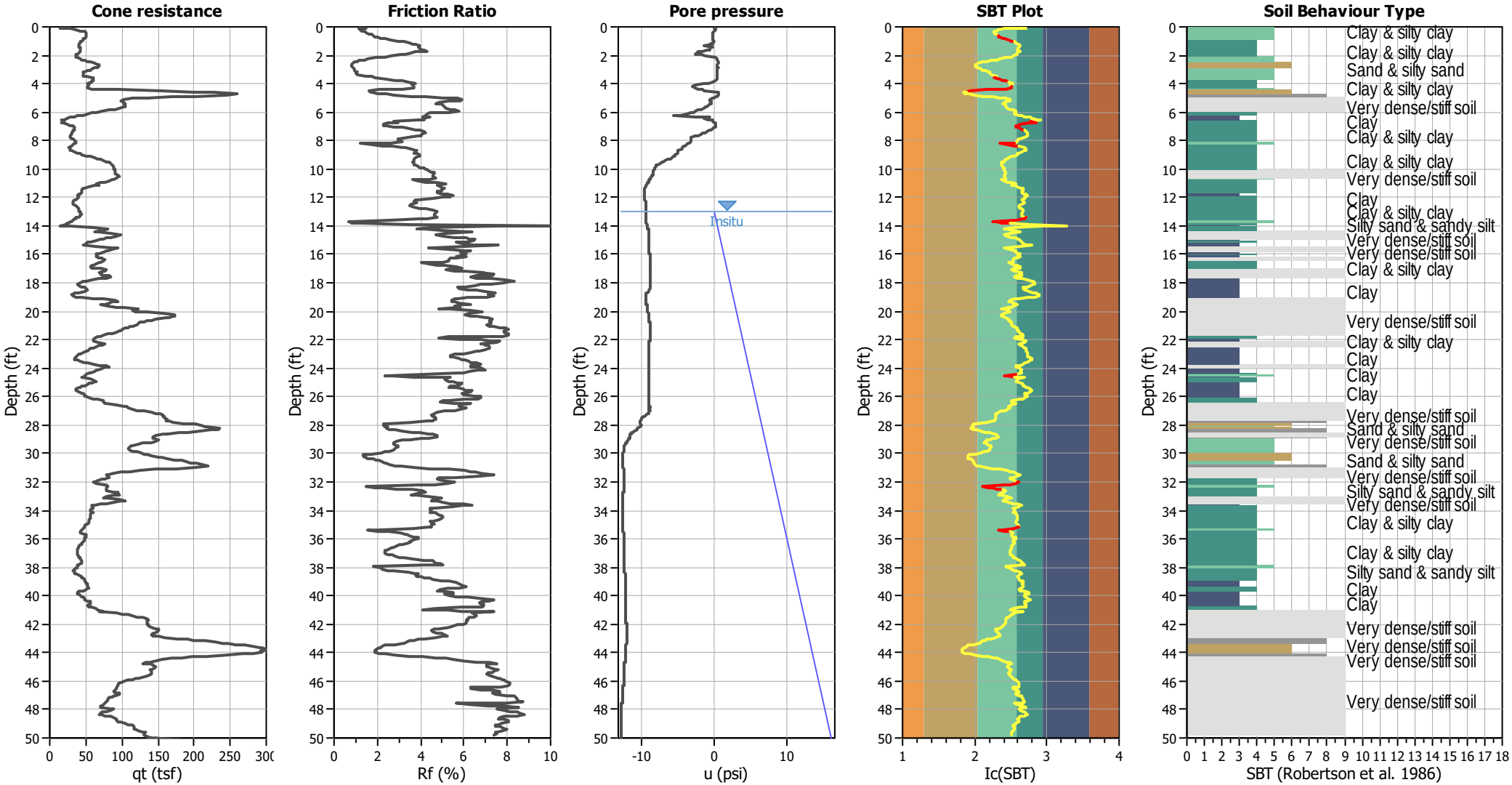
Check for strength loss plots (Robertson (2010))



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:	1	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:	6.93	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):	9.00 ft	Fill height:	N/A	Limit depth:	50.00 ft

CPT basic interpretation plots



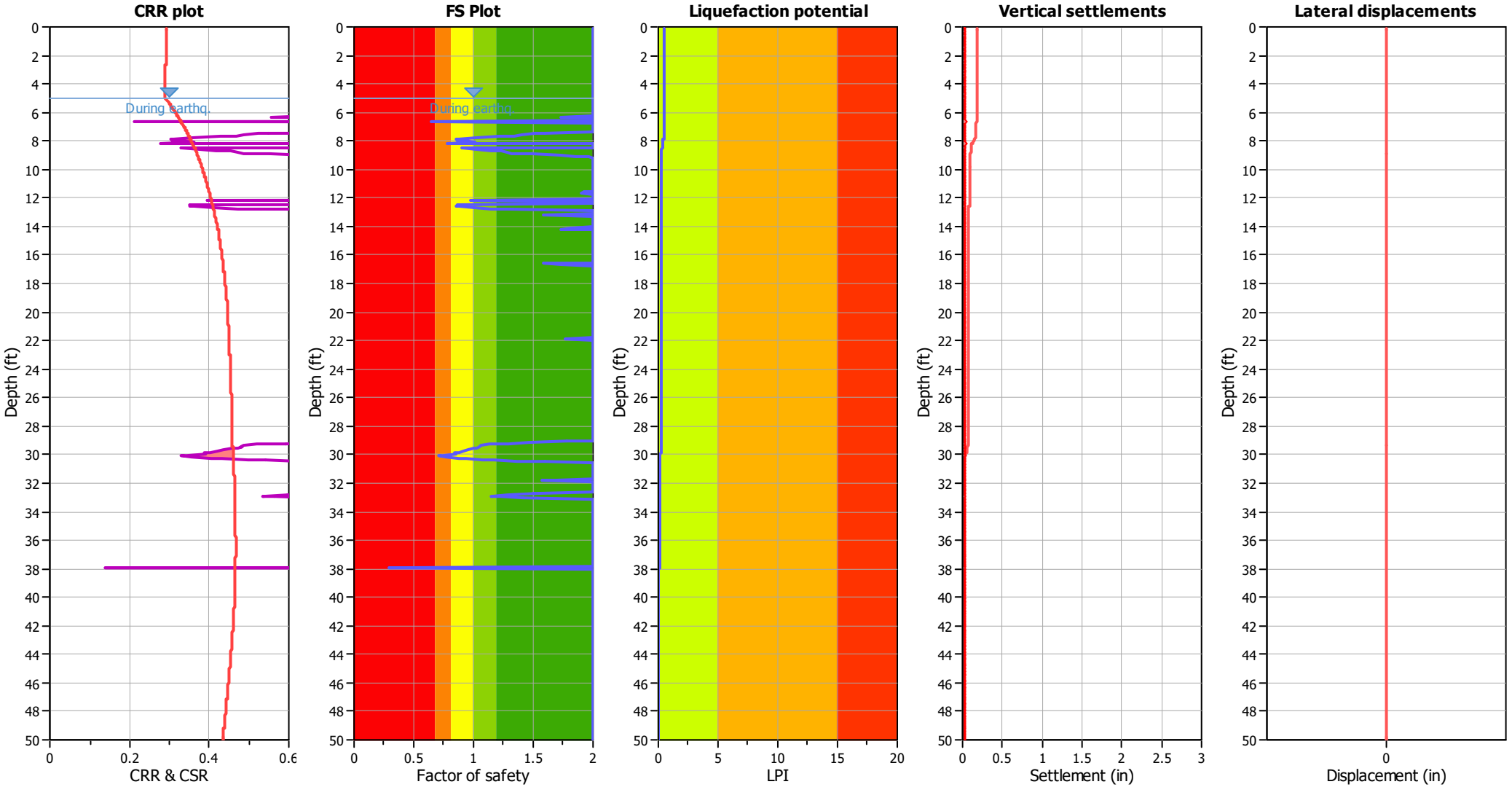
Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	5.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	1	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:	6.93	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):	13.00 ft	Fill height:	N/A	Limit depth:	50.00 ft

SBT 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:	1	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:	6.93	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):	13.00 ft	Fill height:	N/A	Limit depth:	50.00 ft

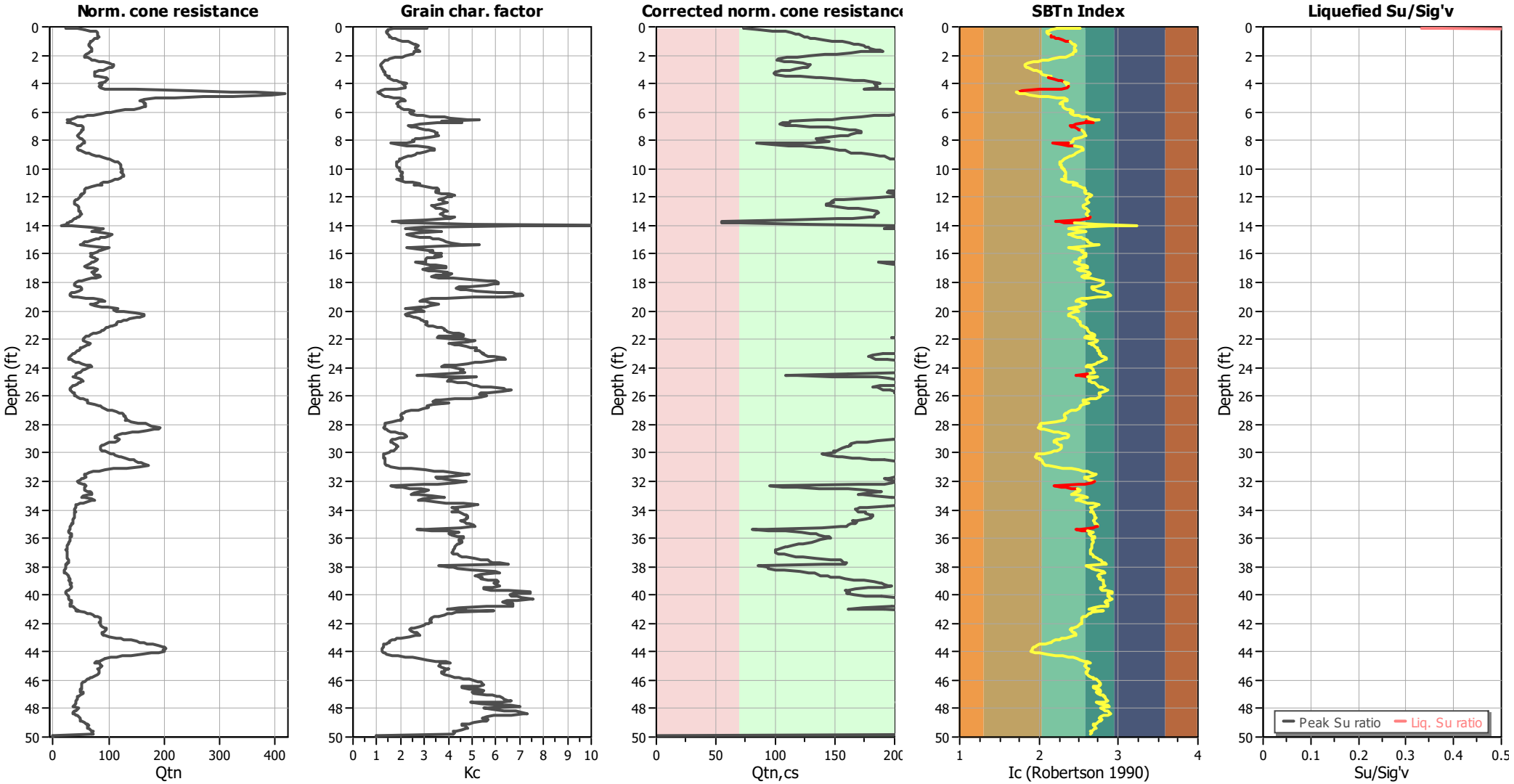
F.S. color scheme

- 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

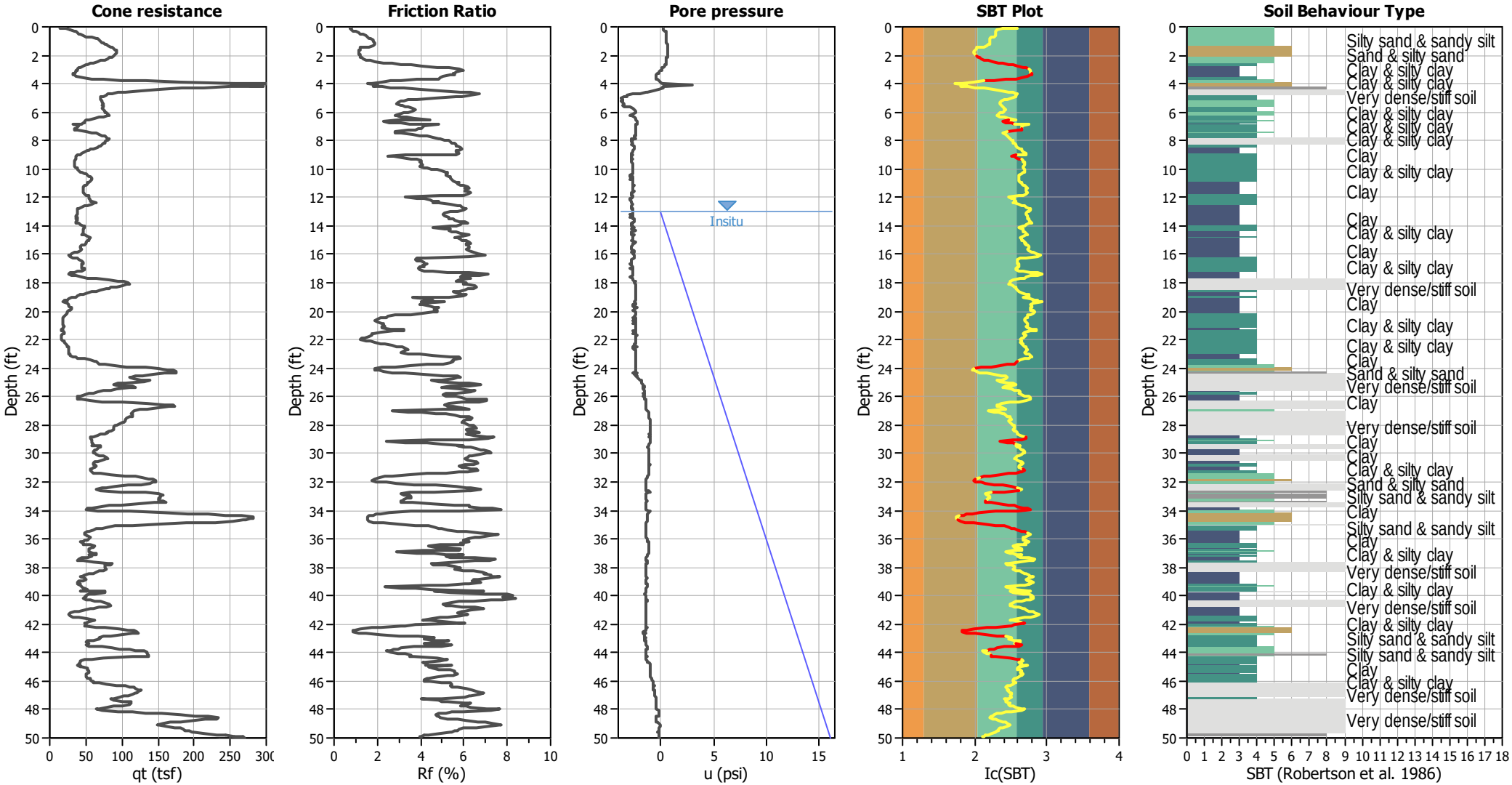
Check for strength loss plots (Robertson (2010))



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:	1	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:	6.93	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):	13.00 ft	Fill height:	N/A	Limit depth:	50.00 ft

CPT basic interpretation plots



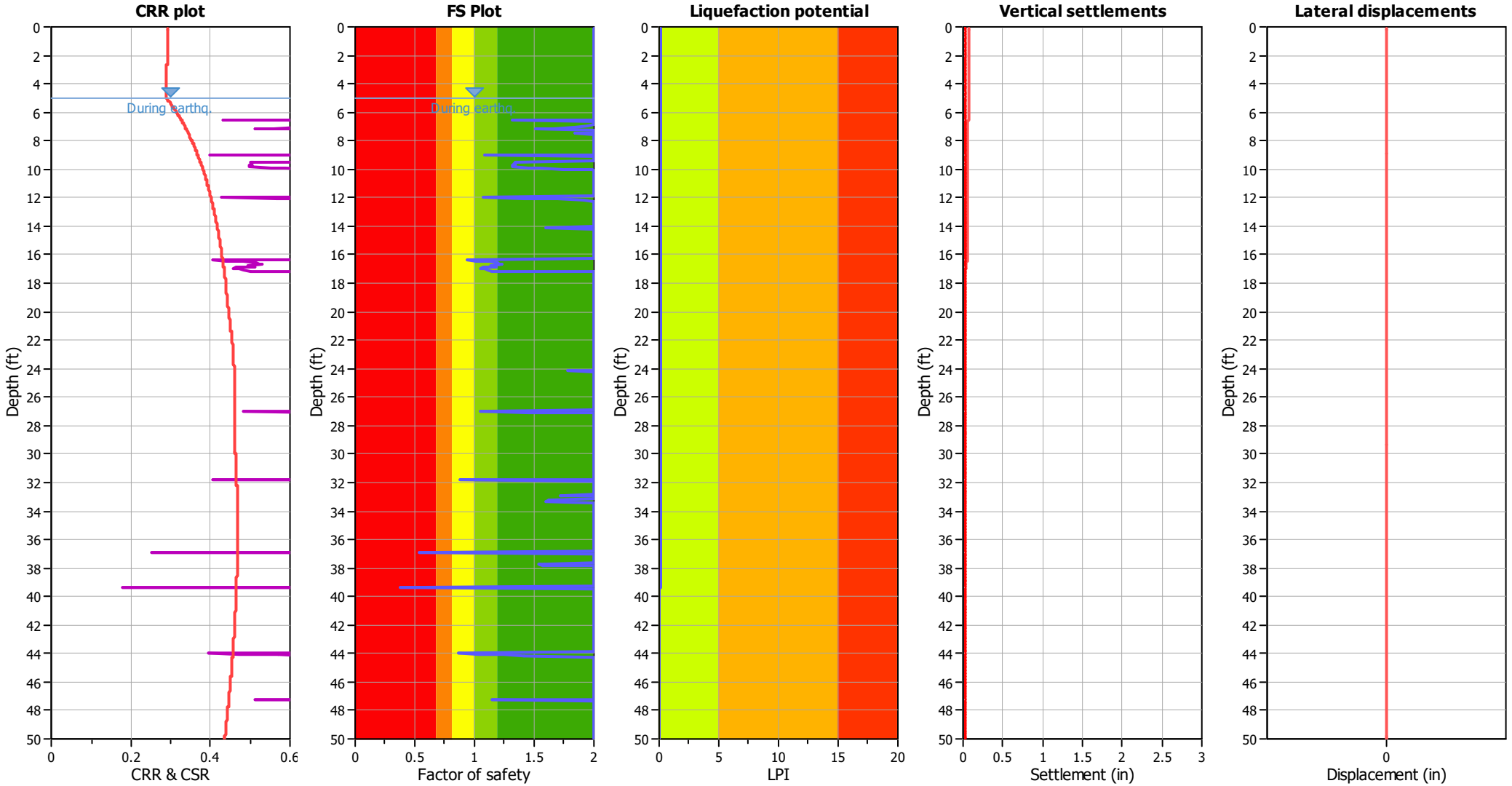
Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	5.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	1	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:	6.93	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):	13.00 ft	Fill height:	N/A	Limit depth:	50.00 ft

SBT 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:	1	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:	6.93	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):	13.00 ft	Fill height:	N/A	Limit depth:	50.00 ft

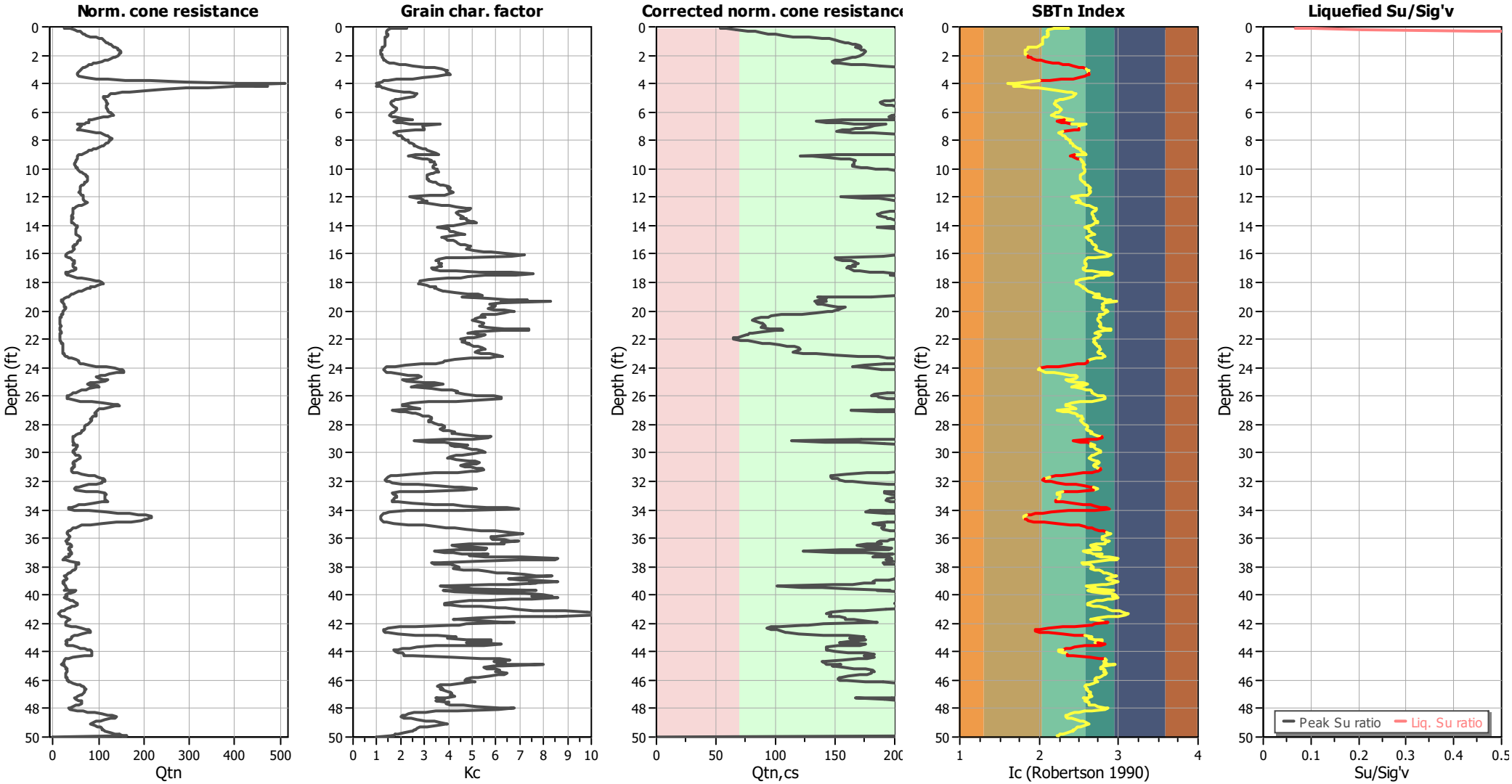
F.S. color scheme

- 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

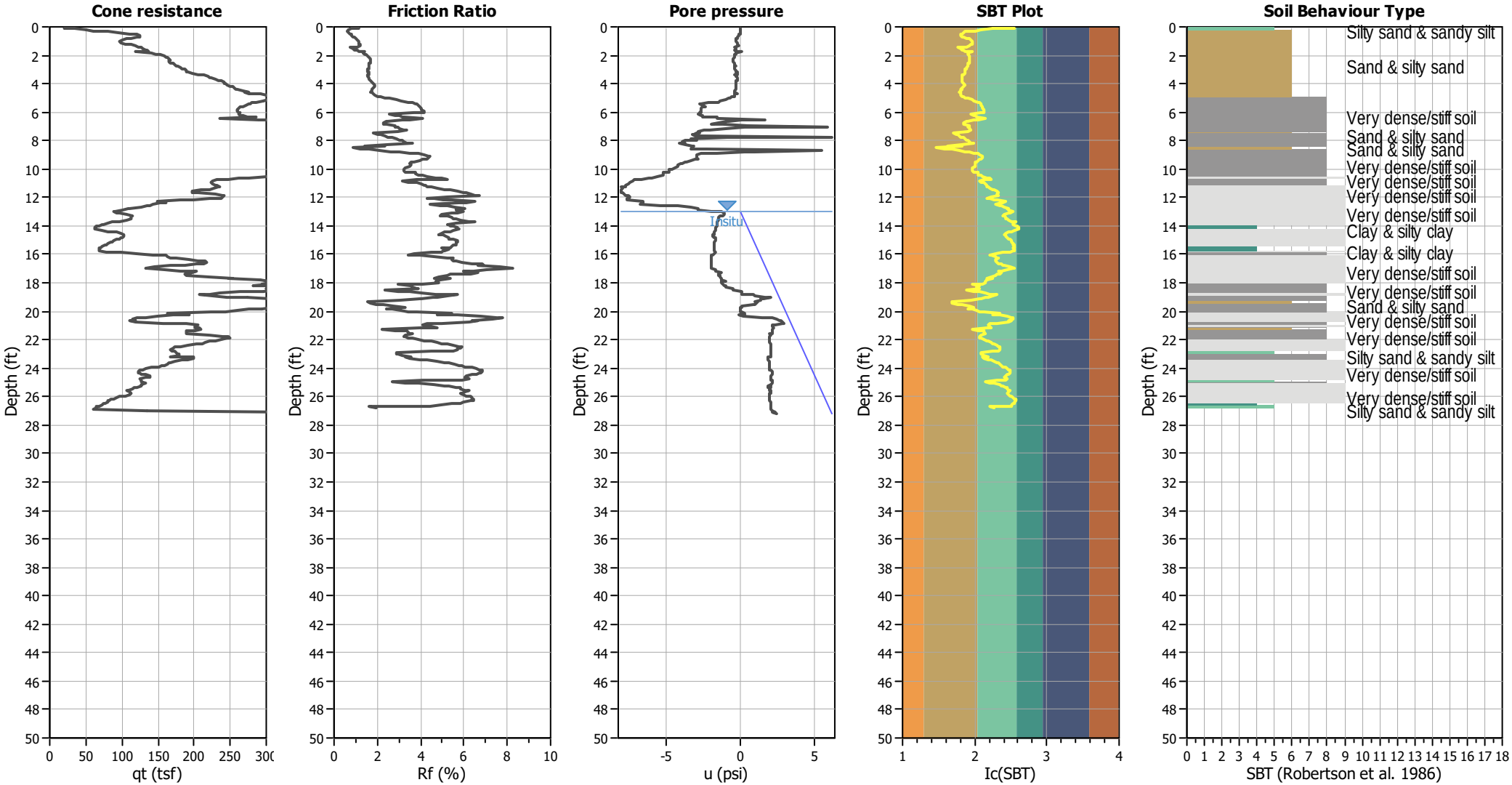
Check for strength loss plots (Robertson (2010))



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:	1	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:	6.93	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):	13.00 ft	Fill height:	N/A	Limit depth:	50.00 ft

CPT basic interpretation plots



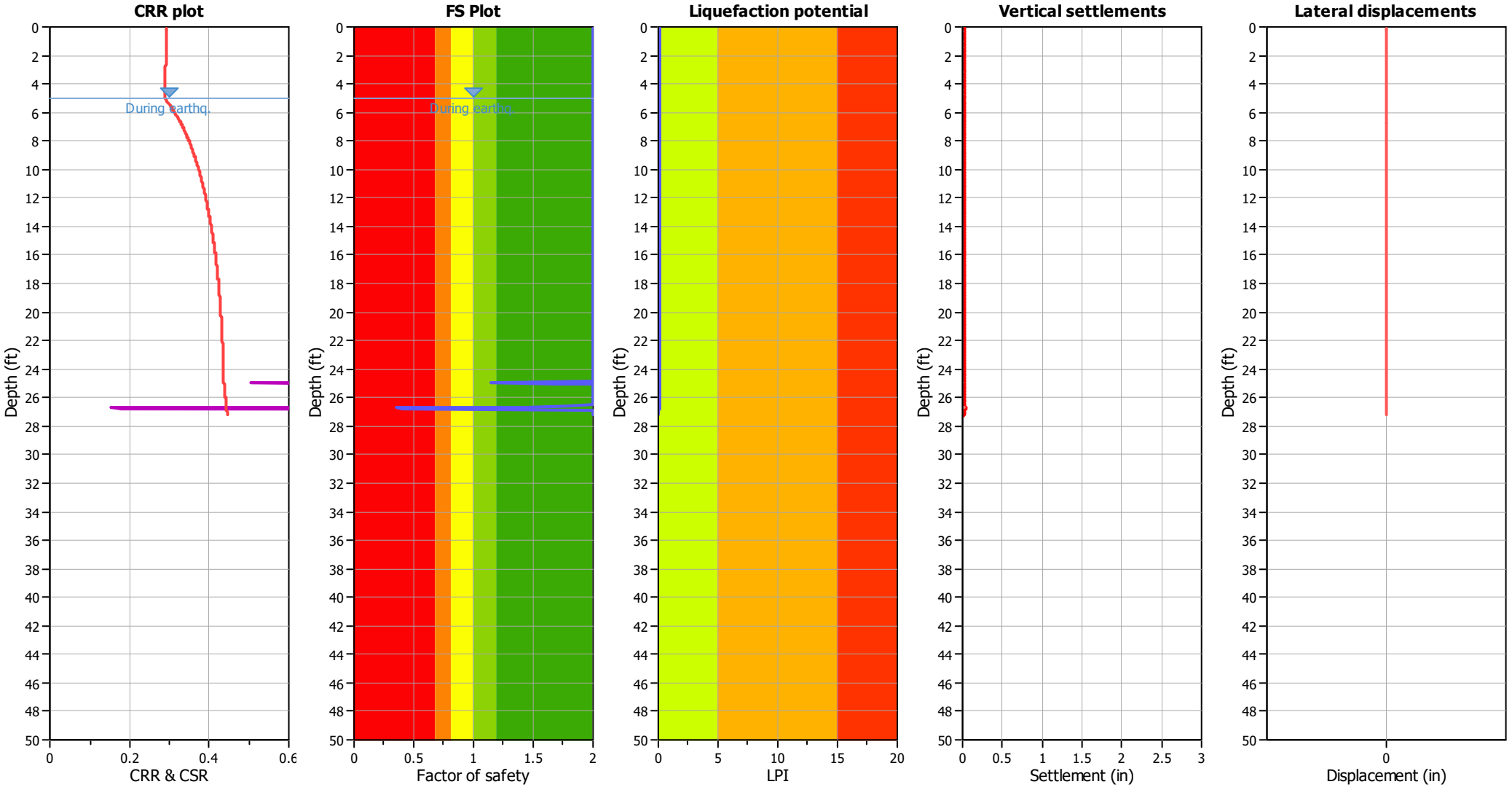
Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	5.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	1	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:	6.93	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):	13.00 ft	Fill height:	N/A	Limit depth:	50.00 ft

SBT 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:	1	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:	6.93	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):	13.00 ft	Fill height:	N/A	Limit depth:	50.00 ft

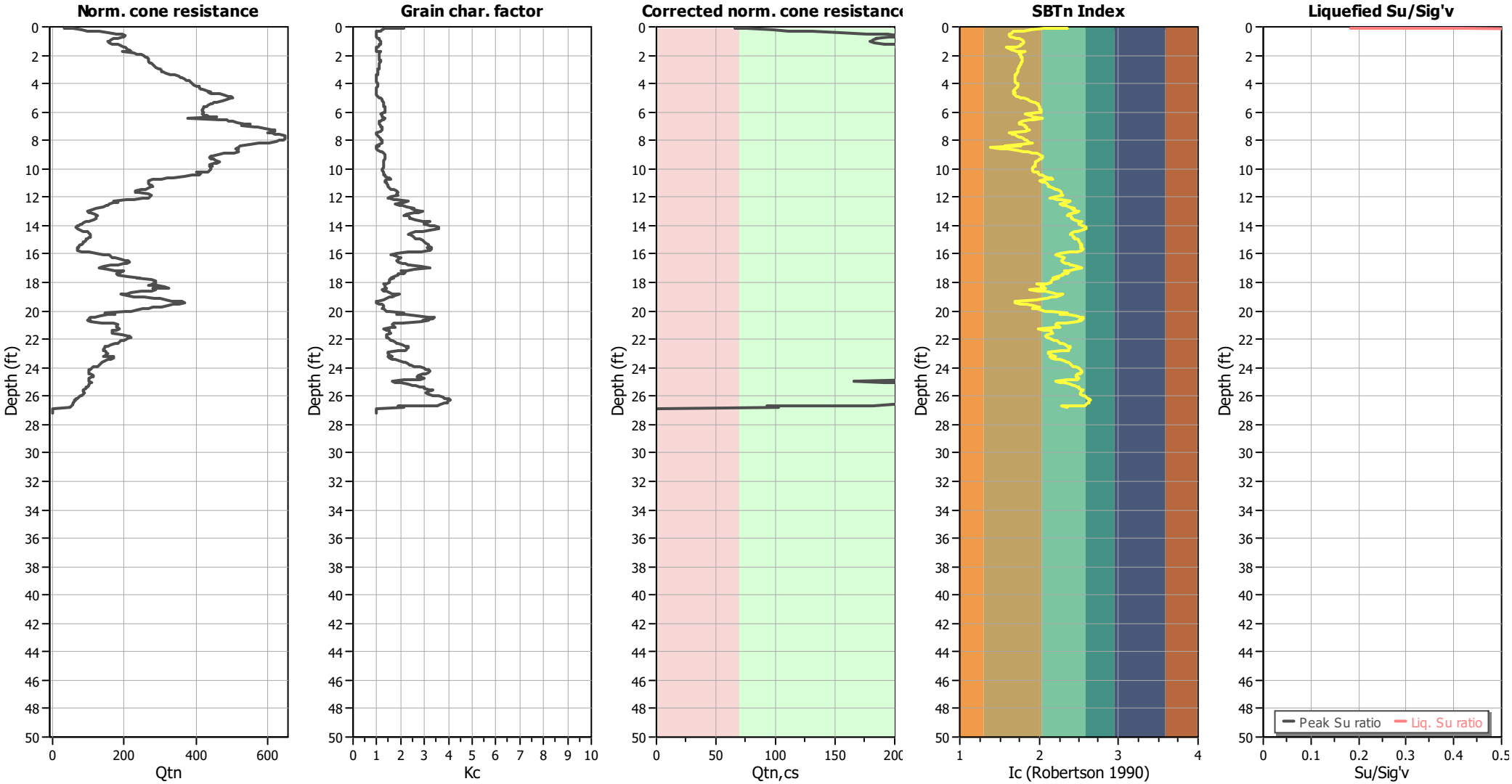
F.S. color scheme

- 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

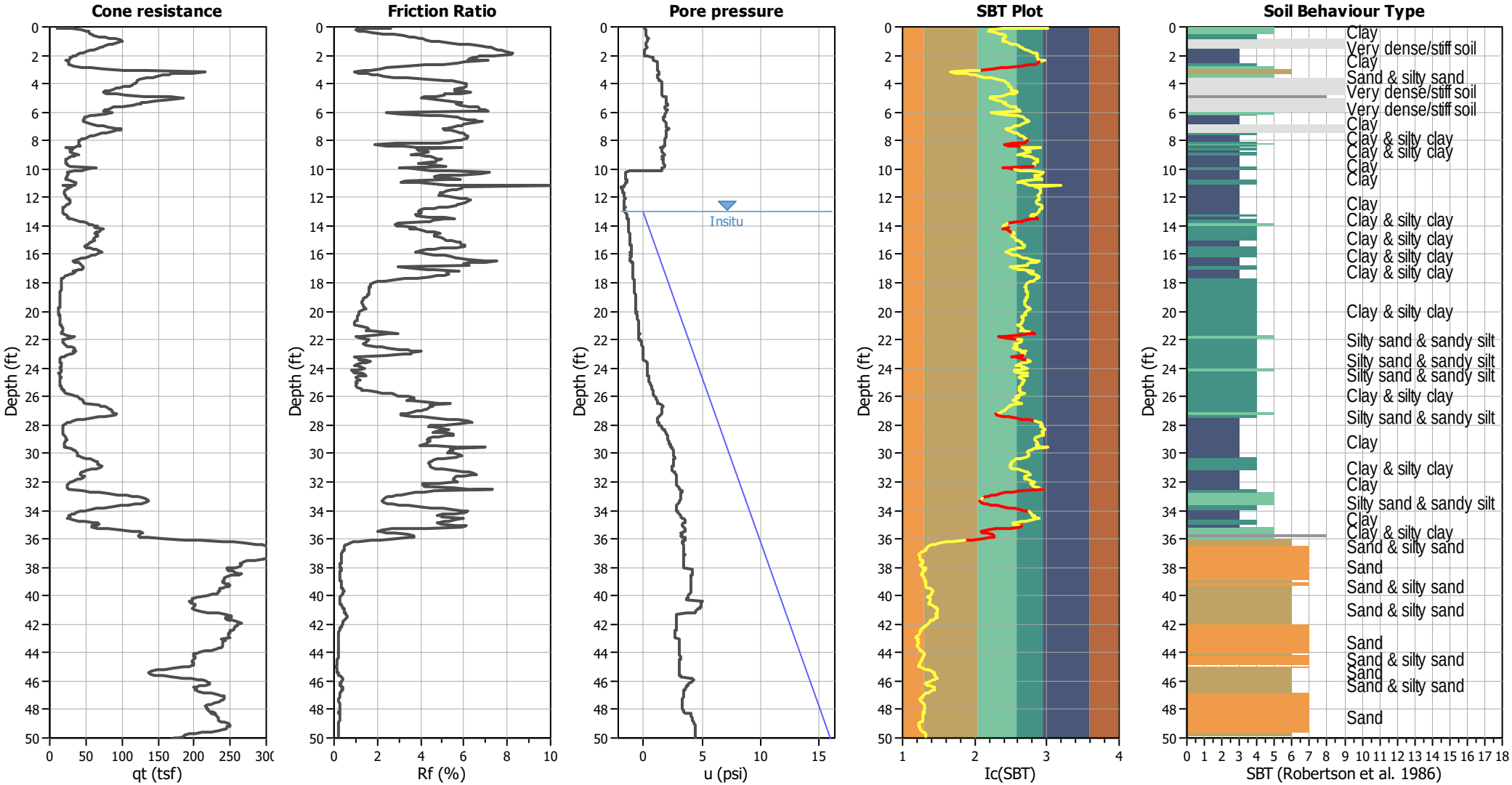
Check for strength loss plots (Robertson (2010))



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:	1	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:	6.93	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):	13.00 ft	Fill height:	N/A	Limit depth:	50.00 ft

CPT basic interpretation plots



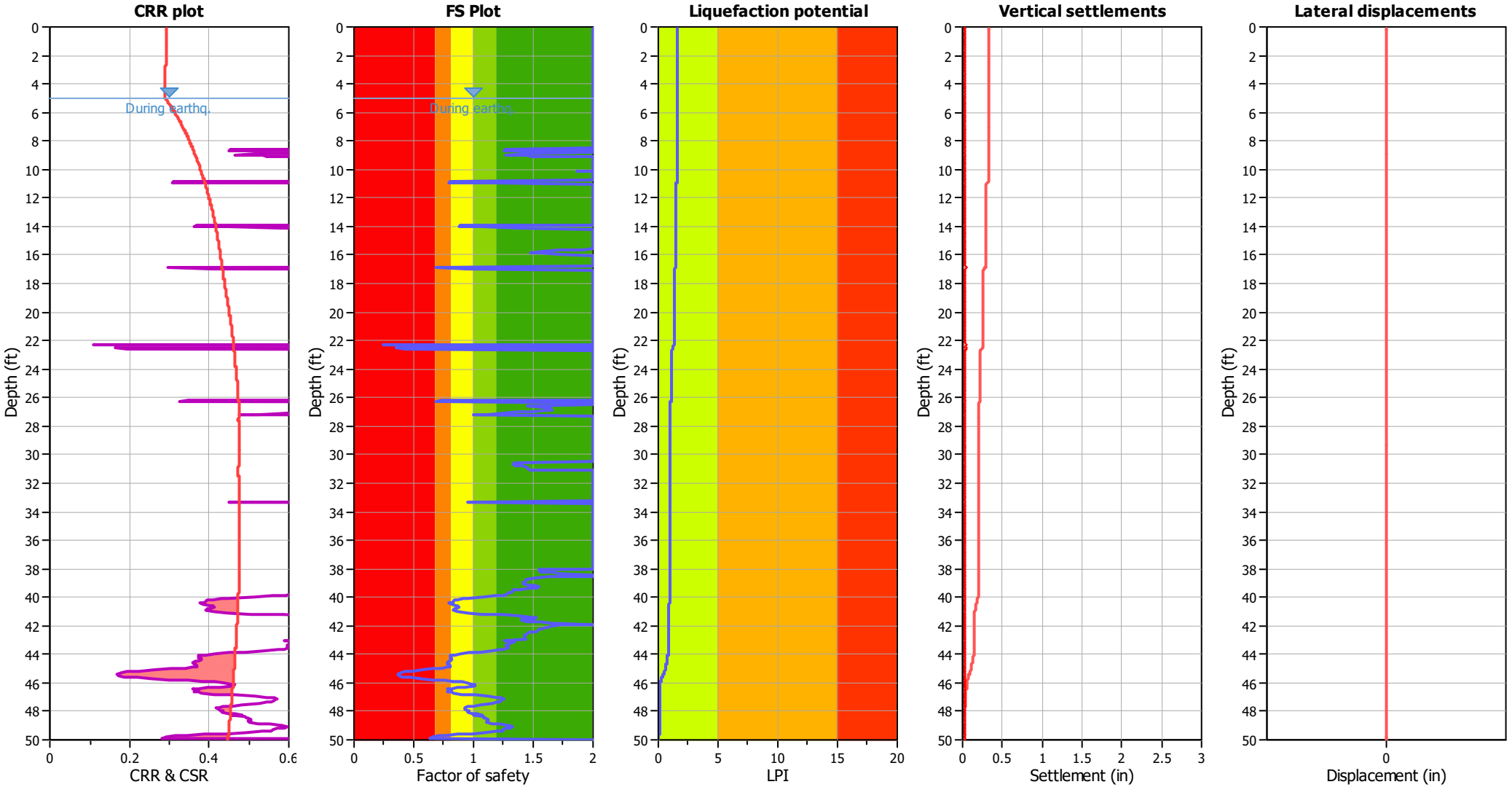
Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	5.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	1	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:	6.93	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):	13.00 ft	Fill height:	N/A	Limit depth:	50.00 ft

SBT 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:	1	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:	6.93	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):	13.00 ft	Fill height:	N/A	Limit depth:	50.00 ft

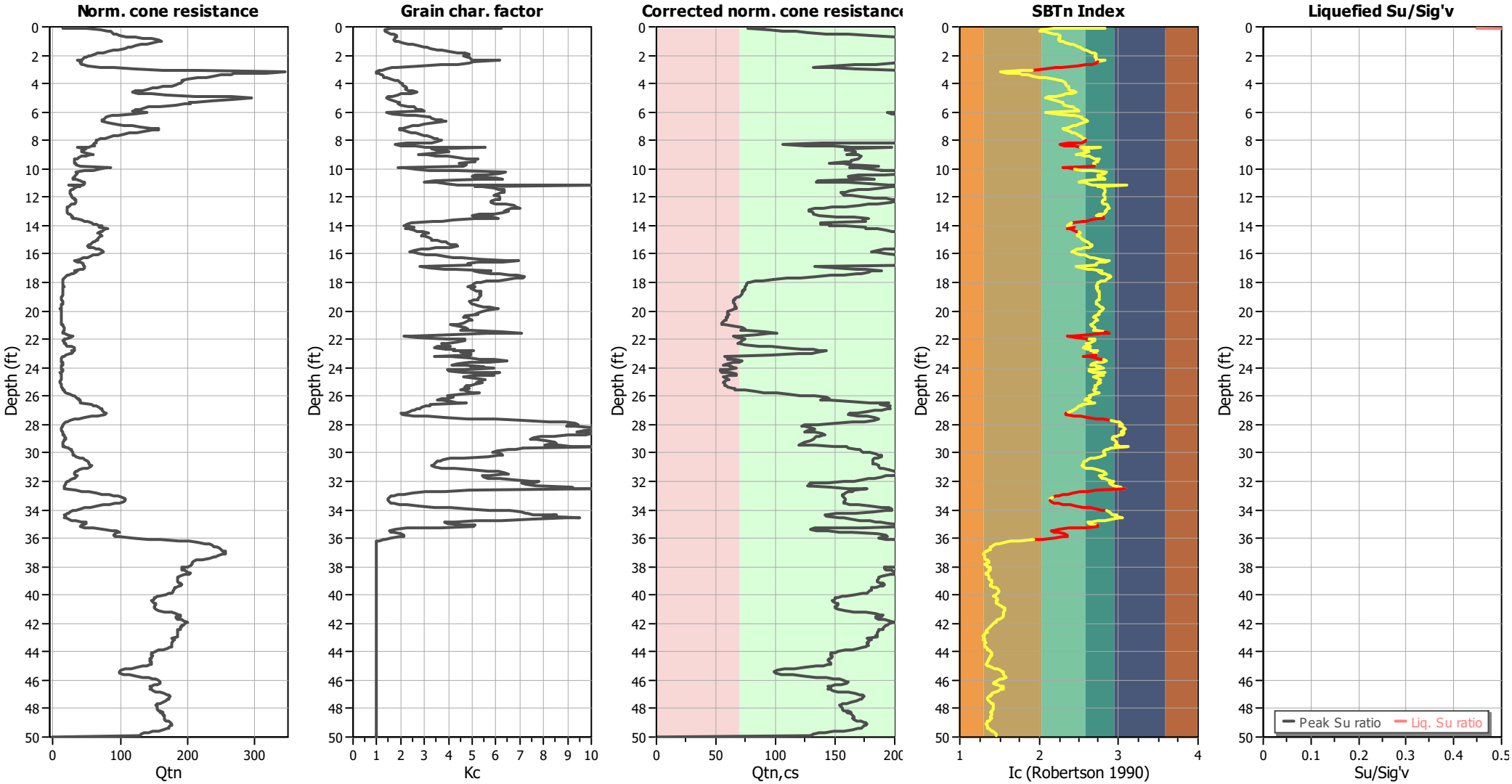
F.S. color scheme

- 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

Check for strength loss plots (Robertson (2010))



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:	1	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:	6.93	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):	13.00 ft	Fill height:	N/A	Limit depth:	50.00 ft

Appendix F
General Earthwork and Grading Specifications

General Earthwork and Grading Specifications for Rough Grading

1.0 General

1.1 Intent

These General Earthwork and Grading Specifications are for the grading and earthwork shown on the approved grading plan(s) and/or indicated in the geotechnical report(s). These Specifications are a part of the recommendations contained in the geotechnical report(s). In case of conflict, the specific recommendations in the geotechnical report shall supersede these more general Specifications. Observations of the earthwork by the project Geotechnical Consultant during the course of grading may result in new or revised recommendations that could supersede these specifications or the recommendations in the geotechnical report(s).

1.2 The Geotechnical Consultant of Record

Prior to commencement of work, the owner shall employ a qualified Geotechnical Consultant of Record (Geotechnical Consultant). The Geotechnical Consultant shall be responsible for reviewing the approved geotechnical report(s) and accepting the adequacy of the preliminary geotechnical findings, conclusions, and recommendations prior to the commencement of the grading.

Prior to commencement of grading, the Geotechnical Consultant shall review the "work plan" prepared by the Earthwork Contractor (Contractor) and schedule sufficient personnel to perform the appropriate level of observation, mapping, and compaction testing.

During the grading and earthwork operations, the Geotechnical Consultant shall observe, map, and document the subsurface exposures to verify the geotechnical design assumptions. If the observed conditions are found to be significantly different than the interpreted assumptions during the design phase, the Geotechnical Consultant shall inform the owner, recommend appropriate changes in design to accommodate the observed conditions, and notify the review agency where required.

The Geotechnical Consultant shall observe the moisture-conditioning and processing of the subgrade and fill materials and perform relative compaction testing of fill to confirm that the attained level of compaction is being accomplished as specified. The Geotechnical Consultant shall provide the test results to the owner and the Contractor on a routine and frequent basis.

1.3 The Earthwork Contractor

The Earthwork Contractor (Contractor) shall be qualified, experienced, and knowledgeable in earthwork logistics, preparation and processing of ground to receive fill, moisture-conditioning and processing of fill, and compacting fill. The Contractor shall review and accept the plans, geotechnical report(s), and these Specifications prior to commencement of grading. The Contractor shall be solely responsible for performing the grading in accordance with the project plans and specifications. The Contractor shall prepare and submit to the owner and the Geotechnical Consultant a work plan that indicates the sequence of earthwork grading, the number of “equipment” of work and the estimated quantities of daily earthwork

contemplated for the site prior to commencement of grading. The Contractor shall inform the owner and the
Geotechnical Consultant of changes in work schedules and updates to the work plan at least 24 hours in advance of such changes so that appropriate personnel will be available for observation and testing. The Contractor shall not assume that the Geotechnical Consultant is aware of all grading operations.

The Contractor shall have the sole responsibility to provide adequate equipment and methods to accomplish the earthwork in accordance with the applicable grading codes and agency ordinances, these Specifications, and the recommendations in the approved geotechnical report(s) and grading plan(s). If, in the opinion of the Geotechnical Consultant, unsatisfactory conditions, such as unsuitable soil, improper moisture condition, inadequate compaction, insufficient buttress key size, adverse weather, etc., are resulting in a quality of work less than required in these specifications, the Geotechnical Consultant shall reject the work and may recommend to the owner that construction be stopped until the conditions are rectified. It is the contractor's sole responsibility to provide proper fill compaction.

2.0 Preparation of Areas to be Filled

2.1 Clearing and Grubbing

Vegetation, such as brush, grass, roots, and other deleterious material shall be sufficiently removed and properly disposed of in a method acceptable to the owner, governing agencies, and the Geotechnical Consultant.

The Geotechnical Consultant shall evaluate the extent of these removals depending on specific site conditions. Earth fill material shall not contain more than 1 percent of organic materials (by volume). Nesting of the organic materials shall not be allowed.

If potentially hazardous materials are encountered, the Contractor shall stop work in the affected area, and a hazardous material specialist shall be informed immediately for proper evaluation and handling of these materials prior to continuing to work in that area.

As presently defined by the State of California, most refined petroleum products (gasoline, diesel fuel, motor oil, grease, coolant, etc.) have chemical constituents that are considered to be hazardous waste. As such, the indiscriminate dumping or spillage of these fluids onto the ground may constitute a misdemeanor, punishable by fines and/or imprisonment, and shall not be allowed. The contractor is responsible for all hazardous waste relating to his work. The Geotechnical Consultant does not have expertise in this area. If hazardous waste is a concern, then the Client should acquire the services of a qualified environmental assessor.

2.2 Processing

Existing ground that has been declared satisfactory for support of fill by the Geotechnical Consultant shall be scarified to a minimum depth of 6 inches. Existing ground that is not satisfactory shall be over-excavated as specified in the following section. Scarification shall continue until soils are broken down and free of oversize material and the working surface is reasonably uniform, flat, and free of uneven features that would inhibit uniform compaction.

2.3 Over-excavation

In addition to removals and over-excavations recommended in the approved geotechnical report(s) and the grading plan, soft, loose, dry, saturated, spongy, organic-rich, highly fractured or otherwise unsuitable ground shall be over-excavated to competent ground as evaluated by the Geotechnical Consultant during grading.

2.4 Benching

Where fills are to be placed on ground with slopes steeper than 5:1 (horizontal to vertical units), the ground shall be stepped or benched. Please see the Standard Details for a graphic illustration. The lowest bench or key shall be a minimum of 15 feet wide and at least 2 feet deep, into competent material as evaluated by the Geotechnical Consultant. Other benches shall be excavated a minimum height of 4 feet into competent material or as otherwise recommended by the Geotechnical Consultant. Fill placed on ground sloping flatter than 5:1 shall also be benched or otherwise over-excavated to provide a flat subgrade for the fill.

2.5 Evaluation/Acceptance of Fill Areas

All areas to receive fill, including removal and processed areas, key bottoms, and benches, shall be observed, mapped, elevations recorded, and/or tested prior to being accepted by the Geotechnical Consultant as suitable to receive fill. The Contractor shall obtain a written acceptance from the Geotechnical Consultant prior to fill placement. A licensed surveyor shall provide the survey control for determining elevations of processed areas, keys, and benches.

3.0 Fill Material

3.1 General

Material to be used as fill shall be essentially free of organic matter and other deleterious substances evaluated and accepted by the Geotechnical Consultant prior to placement. Soils of poor quality, such as those with unacceptable gradation, high expansion potential, or low strength shall be placed in areas acceptable to the Geotechnical Consultant or mixed with other soils to achieve satisfactory fill material.

3.2 Oversize

Oversize material defined as rock, or other irreducible material with a maximum dimension greater than 8 inches, shall not be buried or placed in fill unless location, materials, and placement methods are specifically accepted by the Geotechnical Consultant. Placement operations shall be such that nesting of oversized material does not occur and such that oversize material is completely surrounded by compacted or densified fill. Oversize material shall not be placed within 10 vertical feet of finish grade or within 2 feet of future utilities or underground construction.

3.3 Import

If importing of fill material is required for grading, proposed import material shall meet the requirements of the geotechnical consultant. The potential import source shall be given to the Geotechnical Consultant at least 48 hours (2 working days) before importing begins so that its suitability can be determined and appropriate tests performed.

4.0 Fill Placement and Compaction

4.1 Fill Layers

Approved fill material shall be placed in areas prepared to receive fill (per Section 3.0) in near-horizontal layers not exceeding 8 inches in loose thickness. The Geotechnical Consultant may accept thicker layers if testing indicates the grading procedures can adequately compact the thicker layers. Each layer shall be spread evenly and mixed thoroughly to attain relative uniformity of material and moisture throughout.

4.2 Fill Moisture Conditioning

Fill soils shall be watered, dried back, blended, and/or mixed, as necessary to attain a relatively uniform moisture content at or slightly over optimum. Maximum density and optimum soil moisture content tests shall be performed in accordance with the American Society of Testing and Materials (ASTM Test Method D1557).

4.3 Compaction of Fill

After each layer has been moisture-conditioned, mixed, and evenly spread, it shall be uniformly compacted to not less than 90 percent of maximum dry density (ASTM Test Method D1557). Compaction equipment shall be adequately sized and be either specifically designed for soil compaction or of proven reliability to efficiently achieve the specified level of compaction with uniformity.

4.4 Compaction of Fill Slopes

In addition to normal compaction procedures specified above, compaction of slopes shall be accomplished by backrolling of slopes with sheepsfoot rollers at increments of 3 to 4 feet in fill elevation, or by other methods producing satisfactory results acceptable to the Geotechnical Consultant. Upon completion of grading, relative compaction of the fill, out to the slope face, shall be at least 90 percent of maximum density per ASTM Test Method D1557.

4.5 Compaction Testing

Field tests for moisture content and relative compaction of the fill soils shall be performed by the Geotechnical Consultant. Location and frequency of tests shall be at the Consultant's discretion based on field conditions encountered. Compaction test locations will not necessarily be selected on a random basis. Test locations shall be selected to verify adequacy of compaction levels in areas that are judged to be prone to inadequate compaction (such as close to slope faces and at the fill/bedrock benches).

4.6 Frequency of Compaction Testing

Tests shall be taken at intervals not exceeding 2 feet in vertical rise and/or 1,000 cubic yards of compacted fill soils embankment. In addition, as a guideline, at least one test shall be taken on slope faces for each 5,000 square feet of slope face and/or each 10 feet of vertical height of slope. The Contractor shall assure that fill construction is such that the testing schedule can be accomplished by the Geotechnical Consultant. The Contractor shall stop or slow down the earthwork construction if these minimum standards are not met.

4.7 Compaction Test Locations

The Geotechnical Consultant shall document the approximate elevation and horizontal coordinates of each test location. The Contractor shall coordinate with the project surveyor to assure that sufficient grade stakes are established so that the Geotechnical Consultant can determine the test locations with sufficient accuracy. At a minimum, two grade stakes within a horizontal distance of 100 feet and vertically less than
5 feet apart from potential test locations shall be provided.

5.0 Subdrain Installation

Subdrain systems shall be installed in accordance with the approved geotechnical report(s), the grading plan, and the Standard Details. The Geotechnical Consultant may recommend additional subdrains and/or changes in subdrain extent, location, grade, or material depending on conditions encountered during grading. All subdrains shall be surveyed by a land surveyor/civil engineer for line and grade after installation and prior to burial. Sufficient time should be allowed by the Contractor for these surveys.

6.0 Excavation

Excavations, as well as over-excavation for remedial purposes, shall be evaluated by the Geotechnical Consultant during grading. Remedial removal depths shown on geotechnical plans are estimates only. The actual extent of removal shall be determined by the Geotechnical Consultant based on the field evaluation of exposed conditions during grading. Where fill-over-cut slopes are to be graded, the cut portion of the slope shall be made, evaluated, and accepted by the Geotechnical Consultant prior to placement of materials for construction of the fill portion of the slope, unless otherwise recommended by the Geotechnical Consultant.

7.0 Trench Backfills

7.1 The Contractor shall follow all OHSA and Cal/OSHA requirements for safety of trench excavations.

7.2 All bedding and backfill of utility trenches shall be done in accordance with the applicable provisions of Standard Specifications of Public Works Construction. Bedding material shall have a Sand Equivalent greater than 30 (SE>30). The bedding shall be placed to 1 foot over

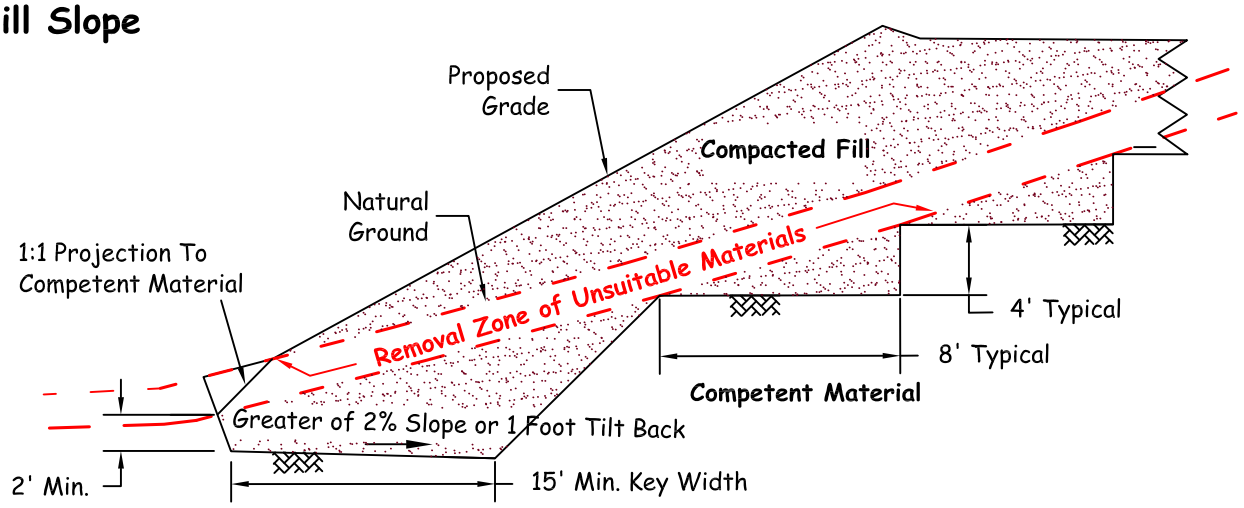
the top of the conduit and densified by jetting. Backfill shall be placed and densified to a minimum of 90 percent of maximum from 1 foot above the top of the conduit to the surface.

7.3 The jetting of the bedding around the conduits shall be observed by the Geotechnical Consultant.

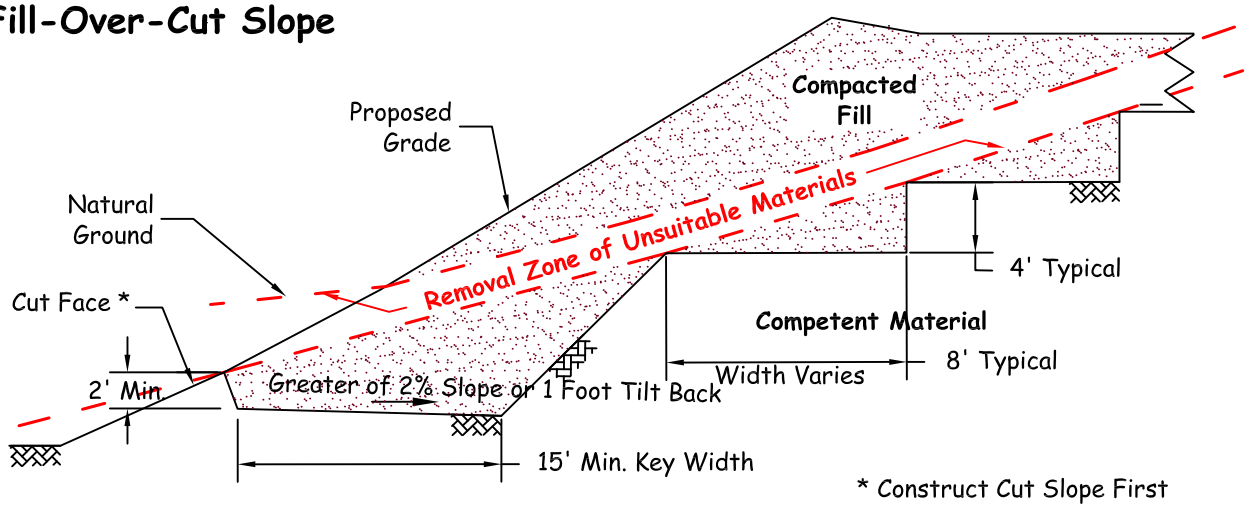
7.4 The Geotechnical Consultant shall test the trench backfill for relative compaction. At least one test should be made for every 300 feet of trench and 2 feet of fill.

7.5 Lift thickness of trench backfill shall not exceed those allowed in the Standard Specifications of Public Works Construction unless the Contractor can demonstrate to the Geotechnical Consultant that the fill lift can be compacted to the minimum relative compaction by his alternative equipment and method.

Fill Slope

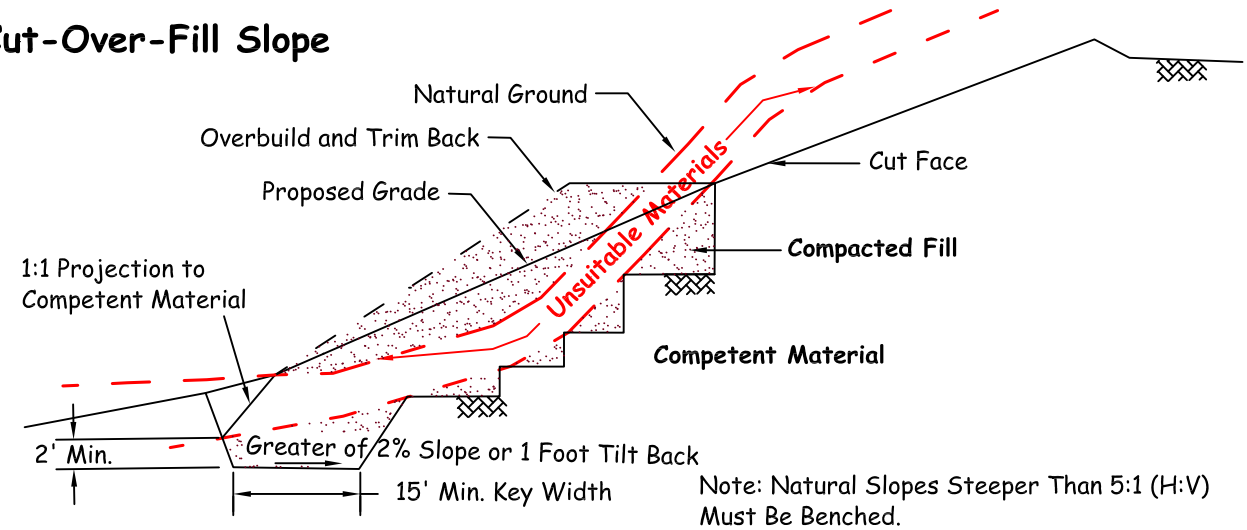


Fill-Over-Cut Slope



* Construct Cut Slope First

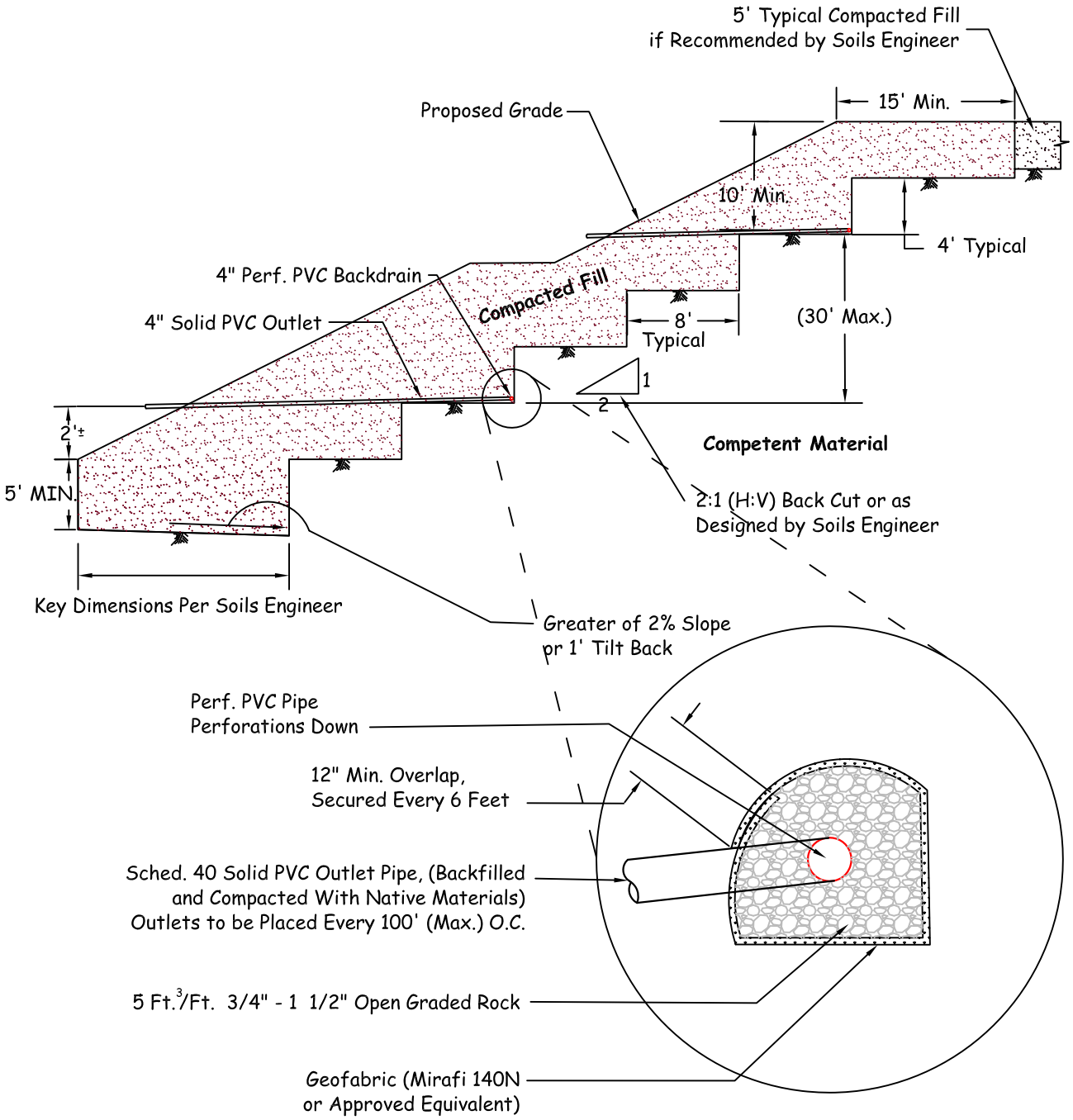
Cut-Over-Fill Slope



Note: Natural Slopes Steeper Than 5:1 (H:V) Must Be Benched.

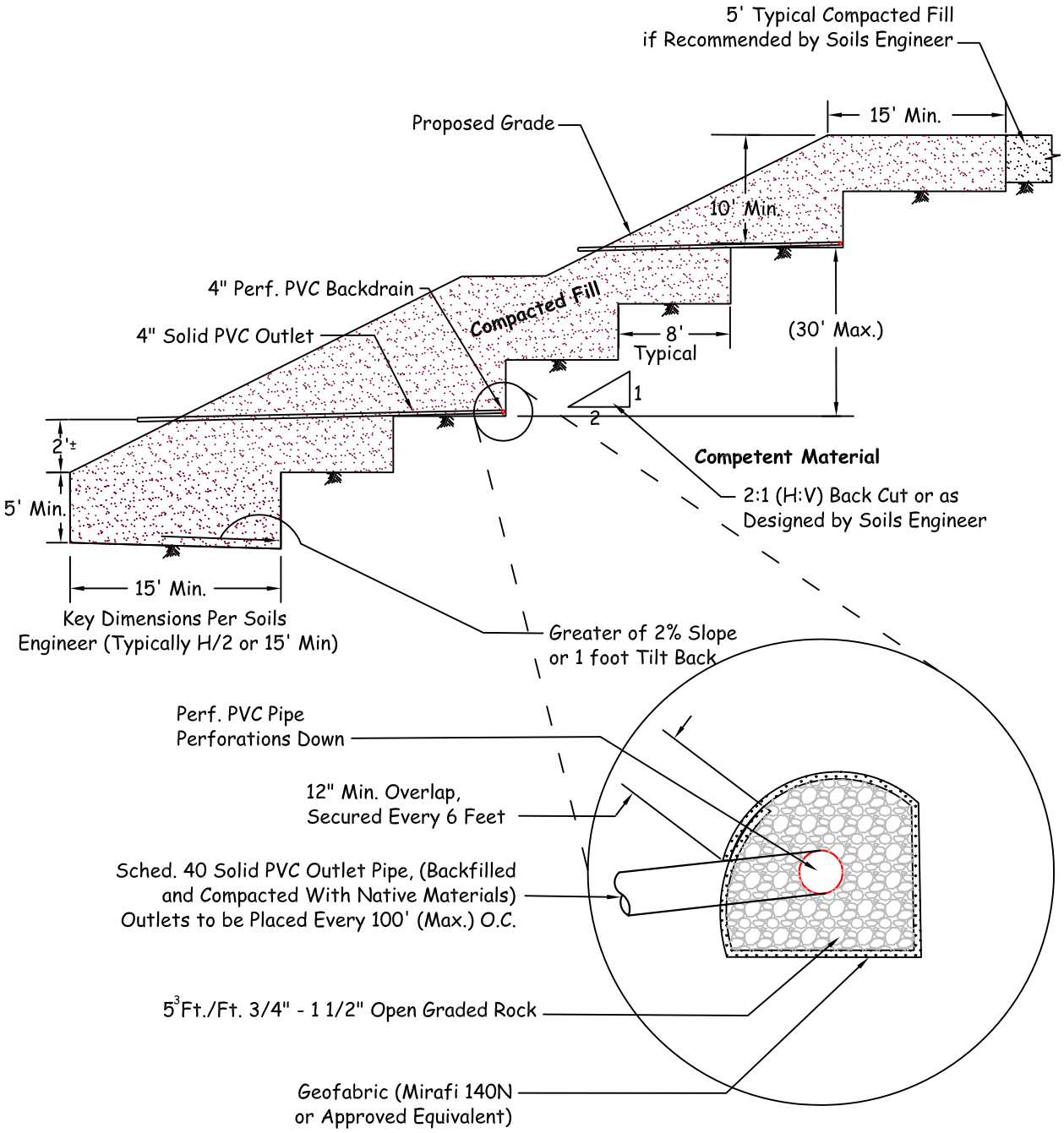
LGC Geotechnical, Inc.

KEYING AND BENCHING



LGC Geotechnical, Inc.

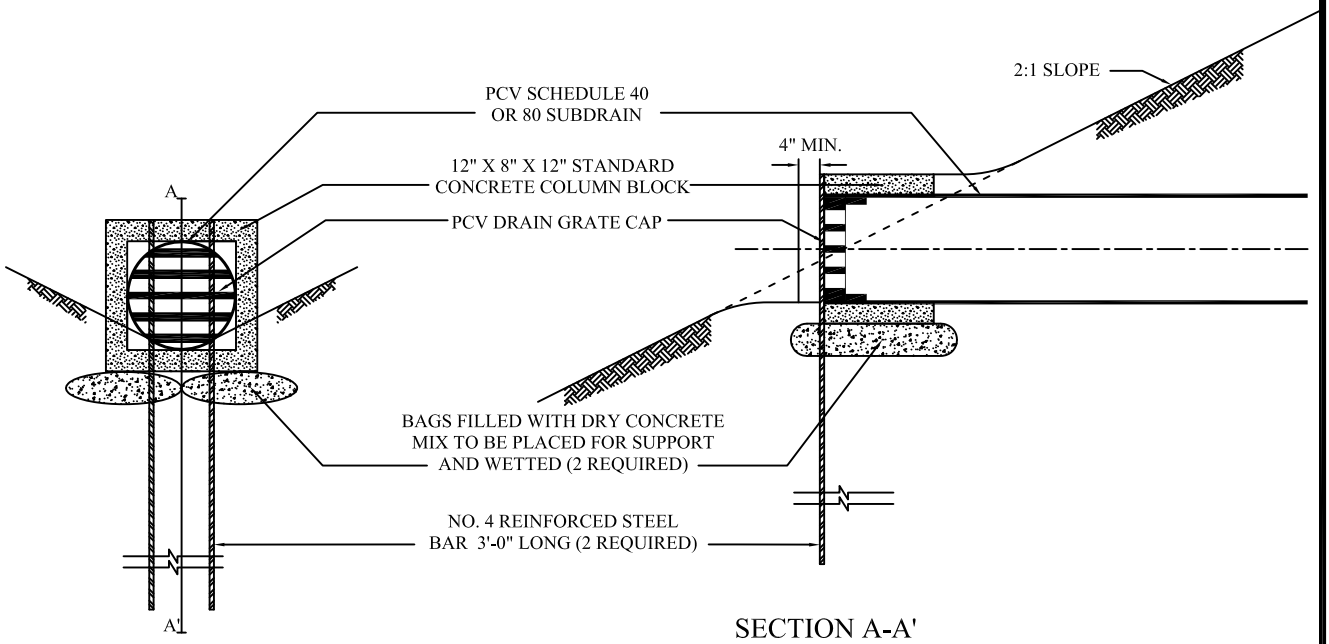
TYPICAL BUTTRESS DETAIL



LGC Geotechnical, Inc.

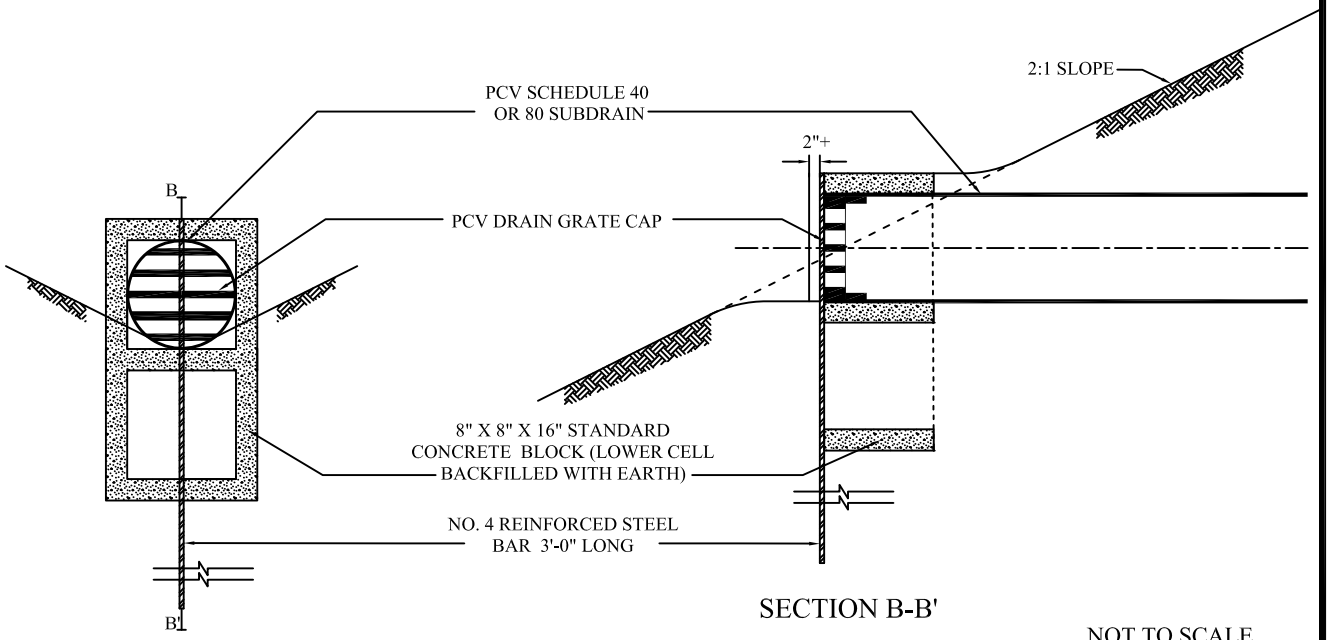
TYPICAL STABILIZATION FILL DETAIL

SUBDRAIN OUTLET MARKER -6" & 8" PIPE



SECTION A-A'

SUBDRAIN OUTLET MARKER -4" PIPE



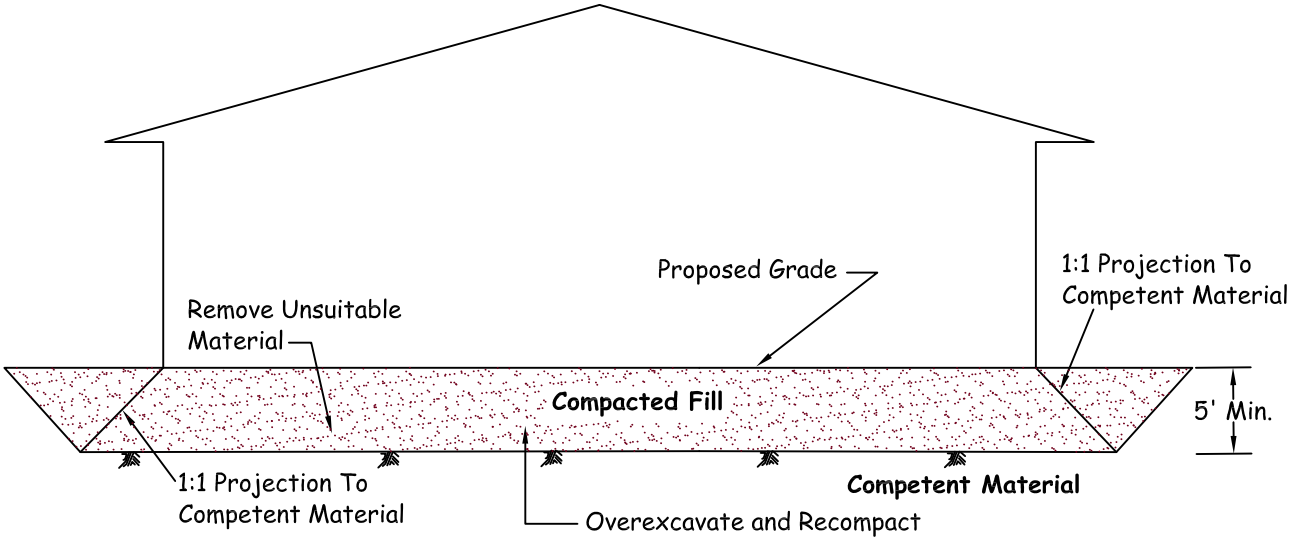
SECTION B-B'

NOT TO SCALE

LGC Geotechnical, Inc.

SUBDRAIN OUTLET MARKER DETAIL

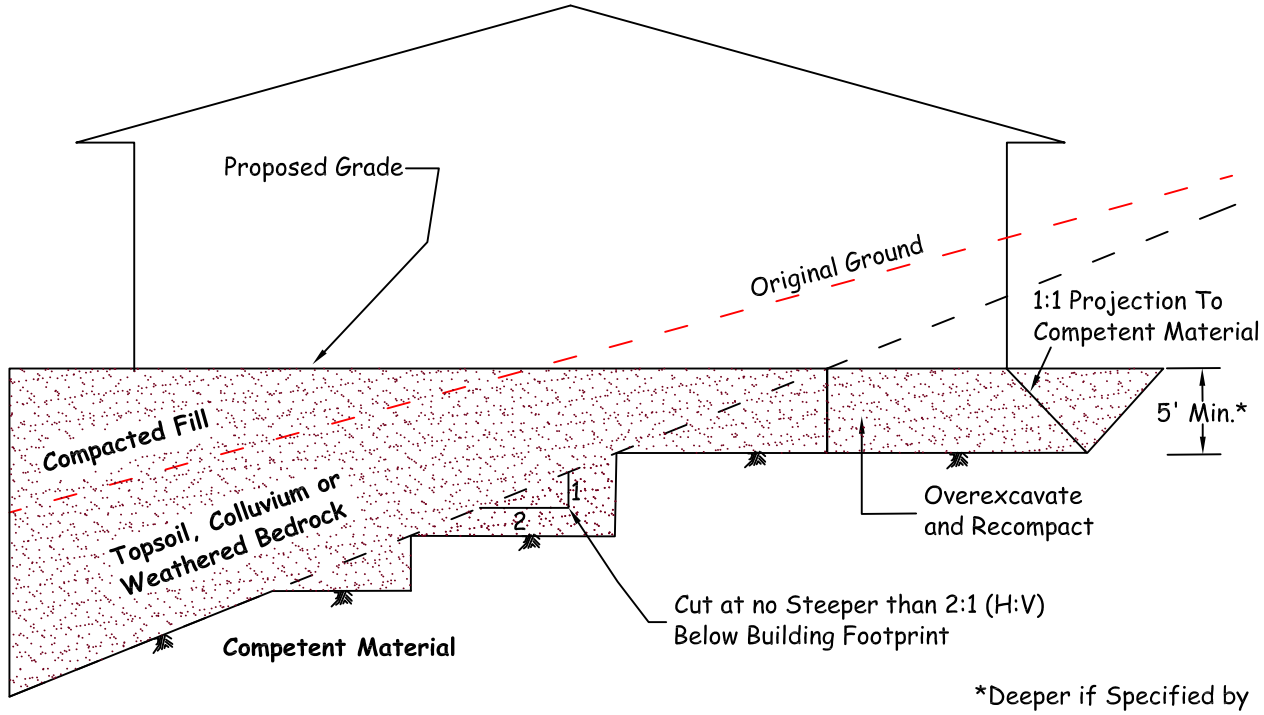
Cut Lot
(Exposing Unsuitable Soils at Design Grade)



Note 1: Removal Bottom Should be Graded With Minimum 2% Fall Towards Street or Other Suitable Area (as Determined by Soils Engineer) to Avoid Ponding Below Building

Note 2: Where Design Cut Lots are Excavated Entirely Into Competent Material, Overexcavation May Still be Required for Hard-Rock Conditions or for Materials With Variable Expansion Characteristics.

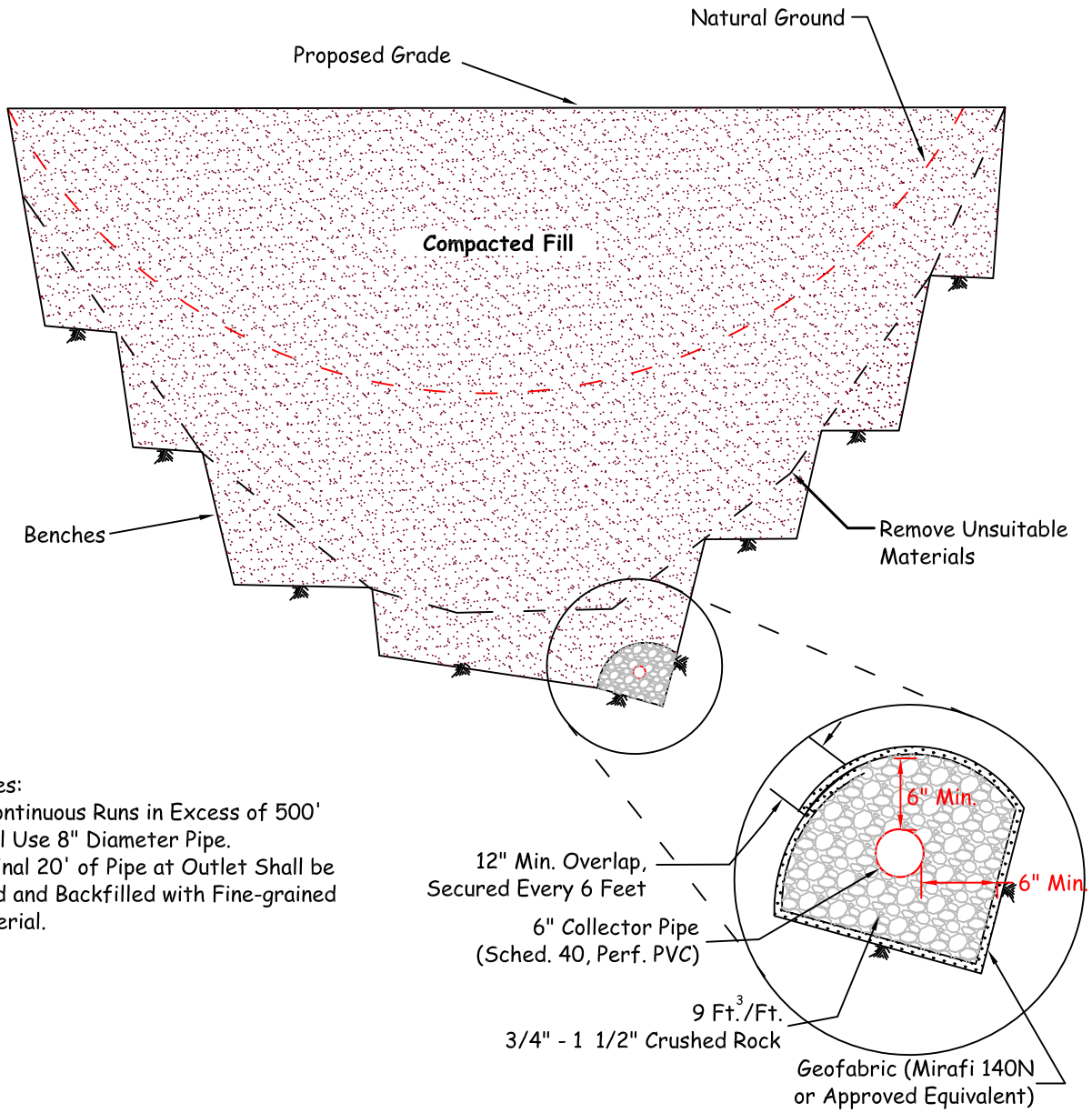
Cut/Fill Transition Lot



*Deeper if Specified by Soils Engineer

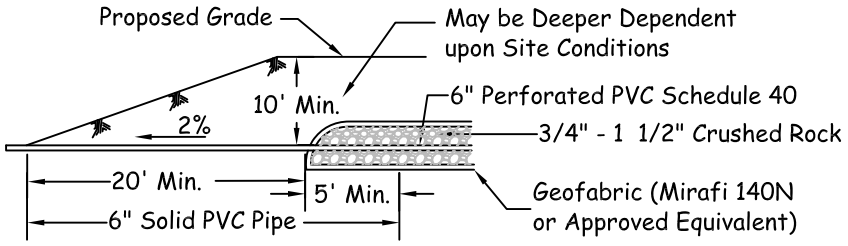
LGC Geotechnical, Inc.

CUT AND TRANSITION LOT OVEREXCAVATION DETAIL



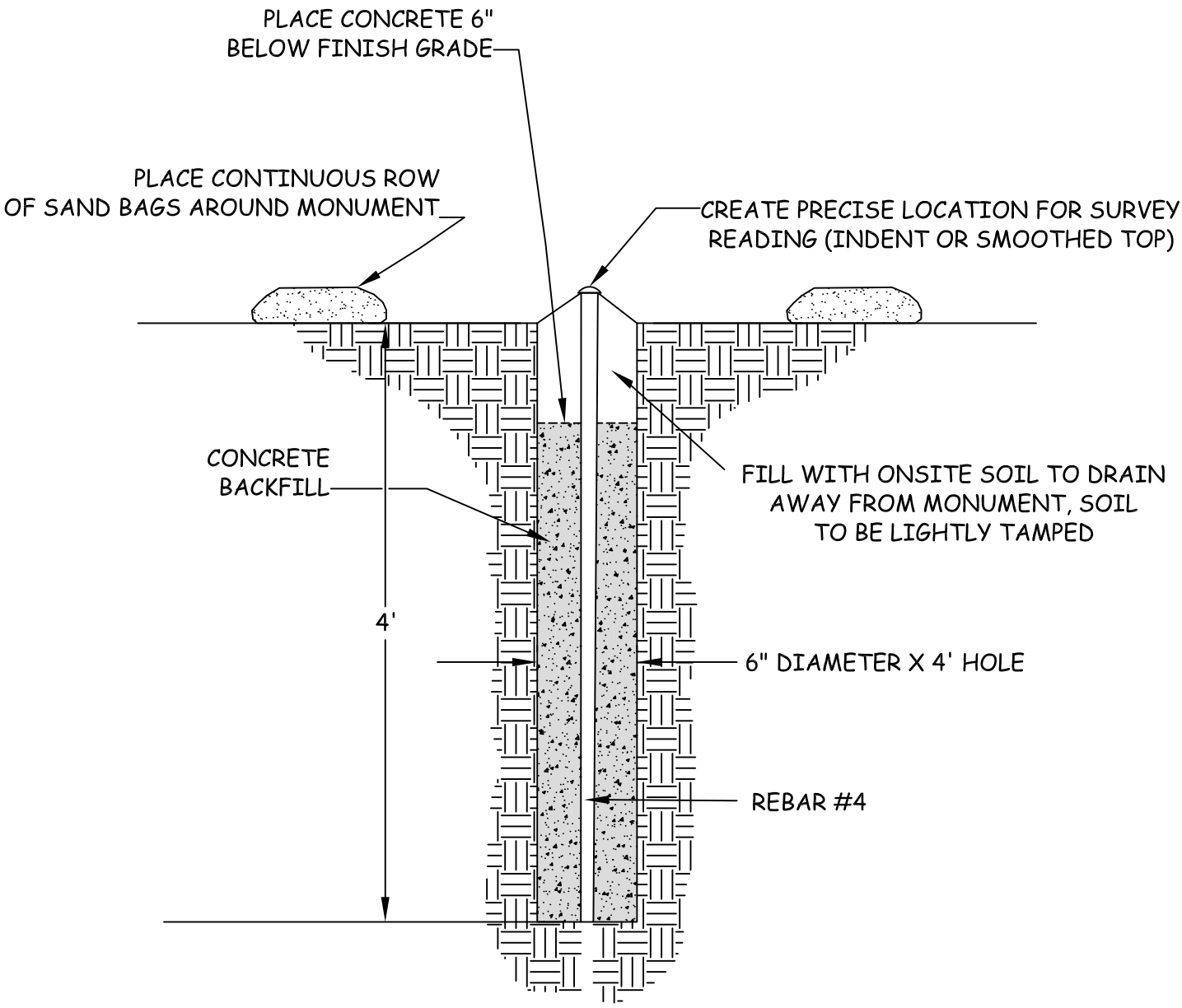
Notes:
1) Continuous Runs in Excess of 500' Shall Use 8" Diameter Pipe.
2) Final 20' of Pipe at Outlet Shall be Solid and Backfilled with Fine-grained Material.

Proposed Outlet Detail



LGC Geotechnical, Inc.

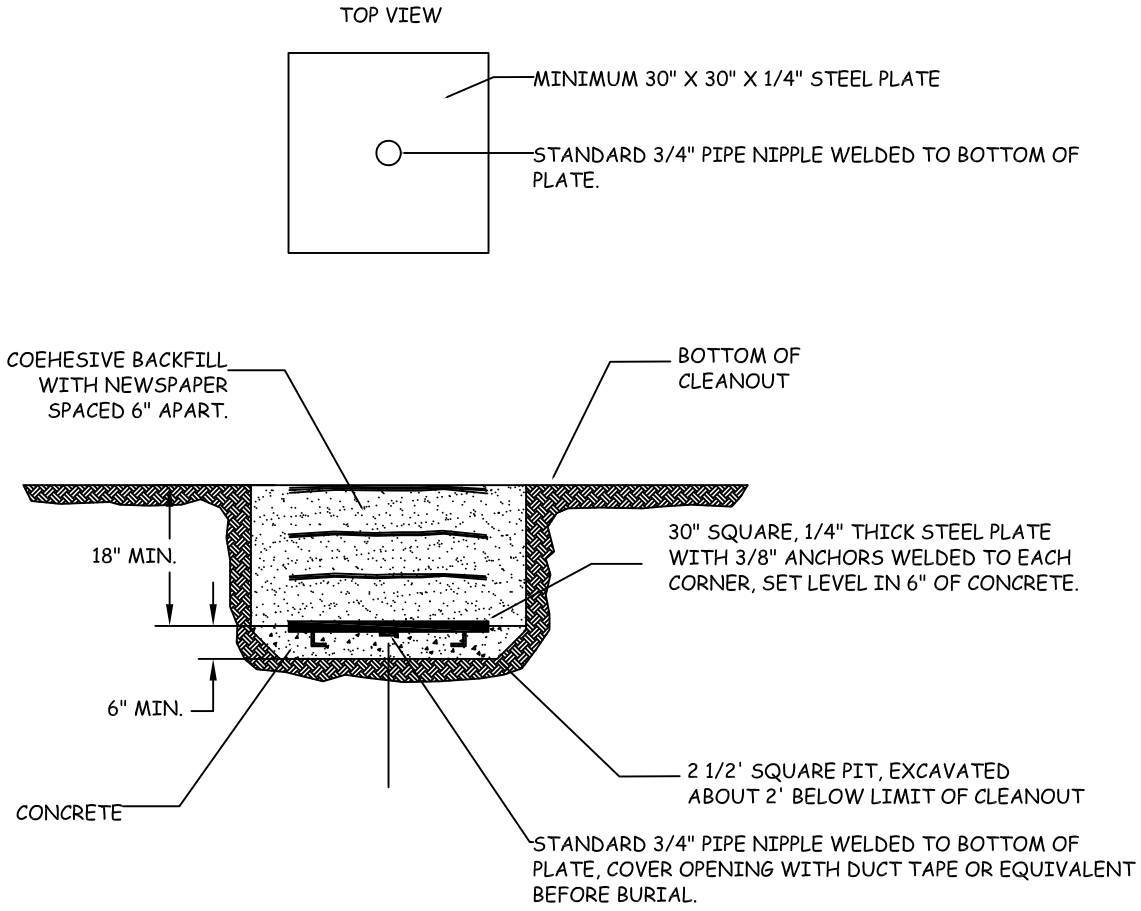
CANYON SUBDRAINS



NO CONSTRUCTION EQUIPMENT WITHIN 25 FEET
OF ANY INSTALLED SETTLEMENT MONUMENTS

LGC Geotechnical, Inc.

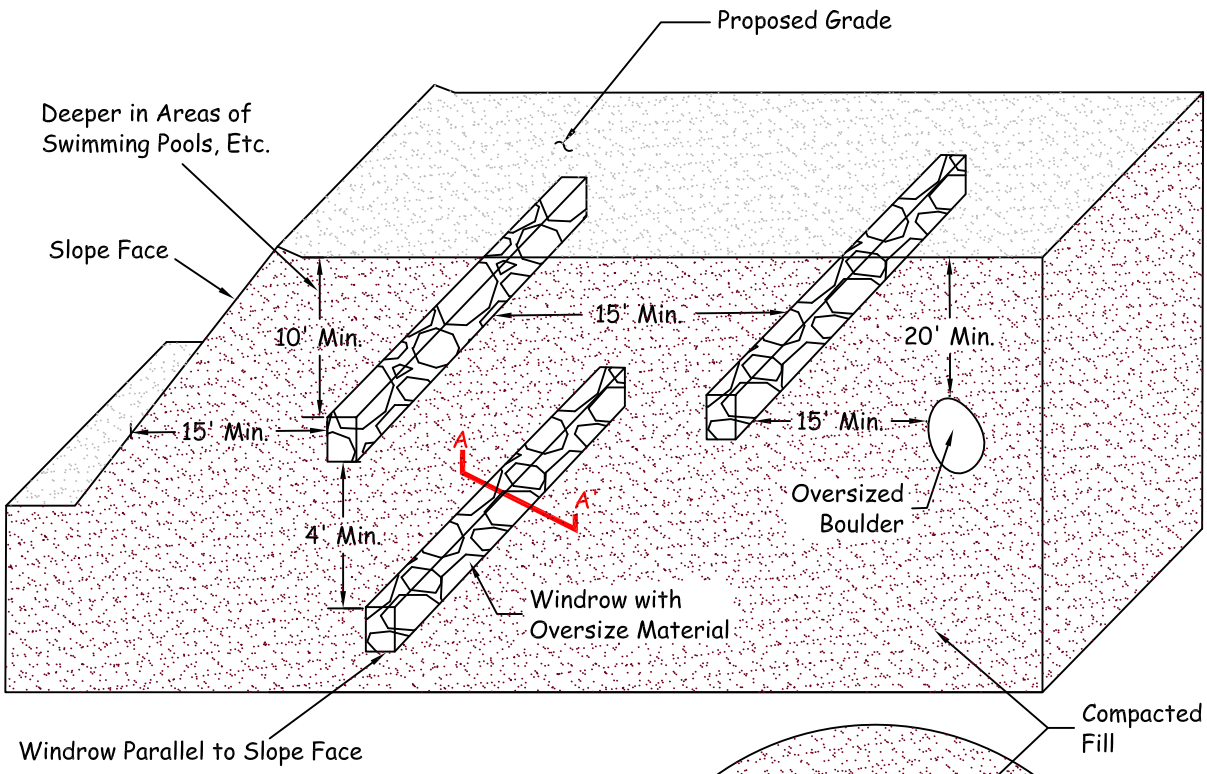
TYPICAL SURFACE SETTLEMENT MONUMENT

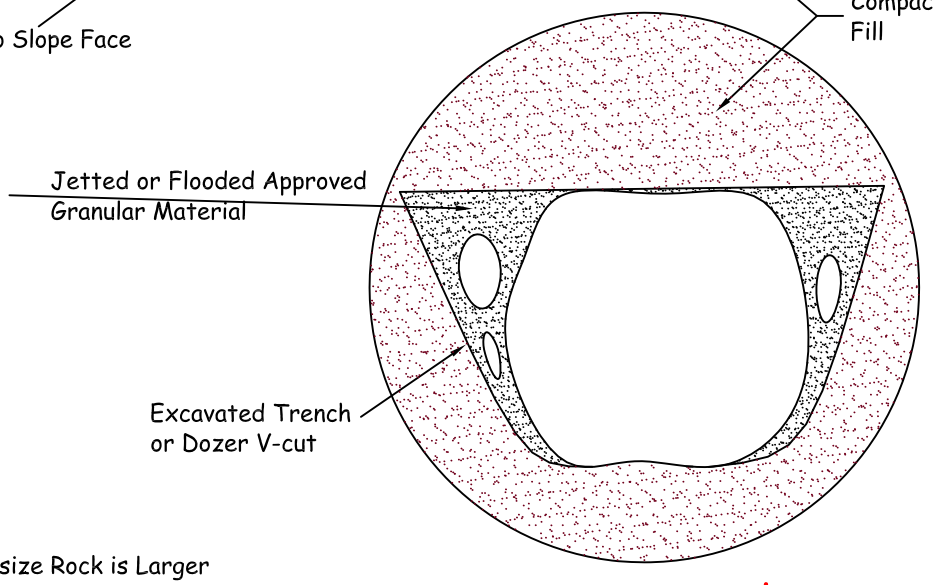


1. SURVEY FOR HORIZONTAL AND VERTICAL LOCATION TO NEAREST .01 INCH PRIOR TO BACKFILL USING KNOW LOCATIONS THAT WILL REMAIN INTACT DURING THE DURATION OF THE MONITORING PROGRAM. KNOW POINTS EXPLICITELY NOT ALLOWED ARE THOSE LOCATED ON FILL OR THAT WILL BE DESTROYED DURING GRADING.
2. IN THE EVENT OF DAMAGE TO SETTLEMENT PLATE DURING GRADING, CONTRACTOR SHALL IMMEDIATELY NOTIFY THE GEOTECHNICAL ENGINEER AND SHALL BE RESPONSIBLE FOR RESTORING THE SETTLEMENT PLATES TO WORKING ORDER.
3. DRILL TO RECOVER AND ATTACH RISER PIPE.

LGC Geotechnical, Inc.

TYPICAL SETTLEMENT PLATE AND RISER





Note: Oversize Rock is Larger
than 8" in Maximum Dimension.

Section A-A'

LGC Geotechnical, Inc.

OVERSIZE ROCK DISPOSAL DETAIL

LEGEND

Qal	Young Alluvium
Qoa	Old Alluvium
~ - ~	Approximate Location of Geologic Contact
Afu	Undocumented Fill (Not a Part)
Afe	Engineered Fill (Not a Part)
Kdvg	Domenigoni Valley Granodiorite (Not a Part)

HS-2 T.D. = 26'	Approximate Location of Hollow Stem Auger Boring by LGC Geotechnical, With Total Depth in Feet
I-1 T.D. = 5'	Approximate Location of Hollow Stem Auger Infiltration Boring by LGC Geotechnical, With Total Depth in Feet
CPT-1 T.D. = 50'	Approximate Location of Cone Penetration Test (CPT) Boring by LGC Geotechnical, With Total Depth in Feet
TP-2	Approximate Location of Exploratory Test Pit by LGC Geotechnical, With Total Depth in Feet
6	Estimated Depth of Remedial Grading in Feet

Simpson Rd

HS-1 T.D. = 26'
TP-2
6
Qoa
Qoa
CPT-1 T.D. = 50'
TP-1
I-1 T.D. = 5'
HS-2 T.D. = 26'
5
Qal

TP-4
CPT-2 T.D. = 50'
HS-4 T.D. = 26'
TP-5 T.D. = 50'
HS-11 T.D. = 26'
Qal
TP-6
N.A.P.
TP-3
CPT-3 T.D. = 50'
Qal
Qal
HS-5 T.D. = 26'
I-2 T.D. = 5'
HS-3 T.D. = 51'
CPT-4 T.D. = 50'
TP-7
Afu
approx. 8-12ft stockpile
HS-10 T.D. = 51'
CPT-5 T.D. = 50'

La Ventana Road

Sewer Lift Station

Approximate Site Limits

Salt Creek Channel

HS-9 T.D. = 23'
I-3 T.D. = 10'
CPT-7 T.D. = 50'
Afu
approx. 10-20ft stockpile
HS-6 T.D. = 51'
Qoa
Kdvg
Qal
TP-9
CPT-6 T.D. = 50'
HS-8 T.D. = 7'
CPT-8 T.D. = 27'
Kdvg
N.A.P.
Qal
TP-8
HS-7 T.D. = 26'
Afe
Domenigoni Pkwy
TP-11
Kdvg
Qoa
Qoa
N.A.P.
TP-10
Kdvg
Kdvg

SCALE: 1"=200'
200' 0 200' 400'

LGC Geotechnical, Inc.	LGC Geotechnical, Inc. 131 Calle Iglesia, Ste. 200 San Clemente, CA 92672 TEL (949) 369-6141 FAX (949) 369-6142
Sheet 1 Geotechnical Map	

PROJECT NAME	Meritage - Salt Creek, Riverside
PROJECT NO.	22057-01
ENG. / GEOL.	DJB/CPM
SCALE	1"=200'
DATE	August 2022

SHEET 1 of 1

May 16, 2023 Project No. 22057-01

Ms. Johanna Crooker
Meritage Homes
5 Peters Canyon Road, Suite 310
Irvine, CA 92606

Subject: ***Response to Geotechnical Review Comments for Proposed Approximately 58-Acre "Salt Creek" Residential Development, Southwest Corner of Simpson Road and Briggs Road, APN 333-200-062 in the City of Menifee, Riverside County, California***

Introduction

In accordance with your request, LGC Geotechnical, Inc. (LGC Geotechnical) has prepared this response to geotechnical review comments regarding the proposed approximately 58-Acre "Salt Creek" residential development located at the southwest corner of Simpson Road and Briggs Road, APN 333-200-062, in the City of Menifee, Riverside County, California. The provided review comments are based on review of the referenced geotechnical report (LGC Geotechnical, 2022).

This response-report should be considered as part of the project design documents in conjunction with our previous geotechnical reports (references). In the case of conflict, the recommendations contained herein should supersede those provided in our previous reports. The remaining recommendations provided in our previous geotechnical reports (references) remain valid and applicable.

Geotechnical Review Comments

For your convenience, the applicable geotechnical review comments have been repeated below along with our responses.

Comment No. 1

"Report calls out an R-value of 21. Where did this number come from, and where were the locations of the testing?"

Response to Comment No. 1

The R-value of 21 comes from laboratory testing, see attached R-value test results. The location of the tested sample was from HS-3, which can be seen in the attached Geotechnical Map. HS-3 is now outside the limits of the project since the project has been reduced since our original evaluation. But based on our initial evaluation it is our opinion that these soils are relatively homogenous and will have similar characteristics to the soils on the currently proposed site. Therefore, an R-value of 21 is still considered appropriate.

Comment No. 2

"Update TI information. Collector Road has a TI of 8 per city standard. Project also consists of a Secondary Road and Major Road along Simpson and Briggs, both which have a TI of 10."

Response to Comment No. 2

Acknowledged, see recommendations below.

Preliminary Asphalt Concrete Pavement Section Options

Assumed Traffic Index	8.0	10.0
R -Value Subgrade	21	21
AC Thickness	6.0 inches	8.0 inches
Aggregate Base Thickness	11.5 inches	15.0 inches

Closure

Should you have any questions regarding this report, please do not hesitate to contact our office. We appreciate this opportunity to be of service.

Respectfully,

LGC Geotechnical, Inc.

Dennis Boratynec, GE 2770
Vice President

DJB/BPP/amm

Attachments: Appendix A – References
R-Value Test Results
Sheet 1 – Geotechnical Map

Distribution: (1) Addressee (electronic copy)

Appendix A
References

APPENDIX A

References

LGC Geotechnical, Inc. (LGC Geotechnical), 2022, Geotechnical Subsurface Evaluation and Preliminary Design Recommendations, Proposed Approximately 58-Acre "Salt Creek" Residential Development, Southwest Corner of Simpson Road and Briggs Road, APN 333-200-062 in the City of Menifee, Riverside County, California, Project No. 22057-01, dated August 19, 2022.

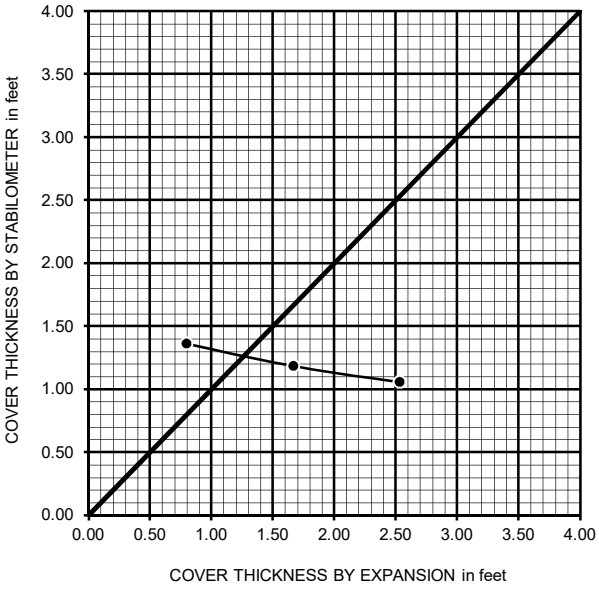
R-VALUE TEST RESULTS
DOT CA Test 301

PROJECT NAME:	Salt Creek	PROJECT NUMBER:	22057-01
BORING NUMBER:	HS-3	DEPTH (FT.):	0-5
SAMPLE NUMBER:	B-1	TECHNICIAN:	O. Figueroa
SAMPLE DESCRIPTION:	Olive brown silty clay (CL-ML)	DATE COMPLETED:	5/6/2022

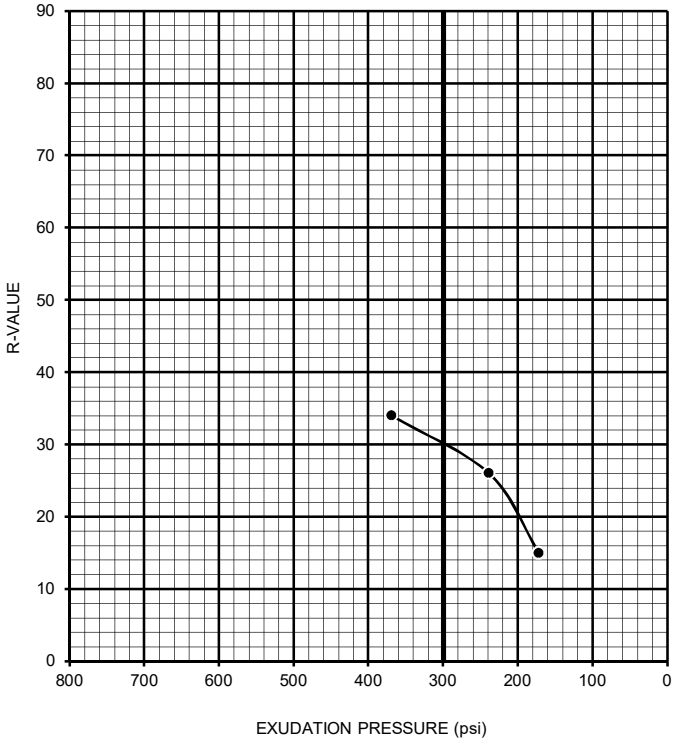
TEST SPECIMEN	a	b	c
MOISTURE AT COMPACTION %	18.8	20.0	20.9
HEIGHT OF SAMPLE, Inches	2.42	2.45	2.50
DRY DENSITY, pcf	109.5	107.2	106.6
COMPACTOR PRESSURE, psi	150	90	60
EXUDATION PRESSURE, psi	369	239	172
EXPANSION, Inches x 10exp-4	76	50	24
STABILITY Ph 2,000 lbs (160 psi)	81	99	122
TURNS DISPLACEMENT	4.34	4.40	4.45
R-VALUE UNCORRECTED	36	26	15
R-VALUE CORRECTED	34	26	15

DESIGN CALCULATION DATA	a	b	c
GRAVEL EQUIVALENT FACTOR	1.0	1.0	1.0
TRAFFIC INDEX	5.0	5.0	5.0
STABILOMETER THICKNESS, ft.	1.06	1.18	1.36
EXPANSION PRESSURE THICKNESS, ft.	2.53	1.67	0.80

EXPANSION PRESSURE CHART



EXUDATION PRESSURE CHART



R-VALUE BY EXPANSION:	21
R-VALUE BY EXUDATION:	30
EQUILIBRIUM R-VALUE:	21

LEGEND

Qal	Young Alluvium
Qoa	Old Alluvium
~ - ~	Approximate Location of Geologic Contact
Afu	Undocumented Fill (Not a Part)
Afe	Engineered Fill (Not a Part)
Kdvg	Domenigoni Valley Granodiorite (Not a Part)

HS-2 T.D. = 26'	Approximate Location of Hollow Stem Auger Boring by LGC Geotechnical, With Total Depth in Feet
I-1 T.D. = 5'	Approximate Location of Hollow Stem Auger Infiltration Boring by LGC Geotechnical, With Total Depth in Feet
CPT-1 T.D. = 50'	Approximate Location of Cone Penetration Test (CPT) Boring by LGC Geotechnical, With Total Depth in Feet
TP-2	Approximate Location of Exploratory Test Pit by LGC Geotechnical, With Total Depth in Feet
6	Estimated Depth of Remedial Grading in Feet

Simpson Rd

HS-1 T.D. = 26'
TP-2
6
Qoa
Qoa
CPT-1 T.D. = 50'
TP-1
I-1 T.D. = 5'
HS-2 T.D. = 26'
5
Qal

TP-4
CPT-2 T.D. = 50'
HS-4 T.D. = 26'
TP-5 T.D. = 50'
HS-11 T.D. = 26'
Qal
TP-6
N.A.P.
TP-3
CPT-3 T.D. = 50'
Qal
Qal
HS-5 T.D. = 26'
I-2 T.D. = 5'
HS-3 T.D. = 51'
CPT-4 T.D. = 50'
TP-7
Afu
approx. 8-12ft stockpile
HS-10 T.D. = 51'
CPT-5 T.D. = 50'

La Ventana Road

Sewer Lift Station

Approximate Site Limits

Salt Creek Channel

HS-9 T.D. = 23'
I-3 T.D. = 10'
CPT-7 T.D. = 50'
Afu
approx. 10-20ft stockpile
HS-6 T.D. = 51'
Qoa
Kdvg
Qal
TP-9
CPT-6 T.D. = 50'
HS-8 T.D. = 7'
CPT-8 T.D. = 27'
Kdvg
N.A.P.
Qal
TP-8
HS-7 T.D. = 26'
Afe
Domenigoni Pkwy
TP-11
Kdvg
Qoa
Qoa
N.A.P.
TP-10
Kdvg
Kdvg

SCALE: 1"=200'
200' 0 200' 400'

LGC Geotechnical, Inc.	LGC Geotechnical, Inc. 131 Calle Iglesia, Ste. 200 San Clemente, CA 92672 TEL (949) 369-6141 FAX (949) 369-6142
Sheet 1 Geotechnical Map	

PROJECT NAME	Meritage - Salt Creek, Riverside
PROJECT NO.	22057-01
ENG. / GEOL.	DJB/CPM
SCALE	1"=200'
DATE	August 2022

SHEET 1 of 1