APPENDIX H

GEOTECHNICAL REPORT

ENGINEERS & GEOLOGISTS

Geotechnical Investigation and
Preliminary Design Recommendations Report
San Juan Capistrano Legacy Ranch Northwest Open Space
San Juan Capistrano, California

Prepared For
ALMQUIST DEVELOPEMNT

October 9, 2025

GMU Project No. 25-126-00

ENGINEERS & GEOLOGISTS

TRANSMITTAL

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DATE: October 9, 2025

PROJECT: 25-126-00

ATTENTION: Mr. Dan Almquist

SUBJECT: Geotechnical Investigation and Preliminary Design Recommendations Report, Legacy Ranch, San Juan Capistrano Northwest Open Space

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INTRODUCTION

PURPOSE

This report summarizes the results of our geotechnical investigation for the proposed Legacy Ranch at the Northwest Open Space in the City of San Juan Capistrano, CA. The purpose of our investigation was to determine the nature of the on-site subsurface soils, evaluate their in-place characteristics, and provide preliminary geotechnical recommendations with respect to design and construction of the proposed facilities shown in the conceptual Master Plan Core Amenities exhibit.

SCOPE

To date, GMU's studies have included the following:

1. Compiled and reviewed available documents, maps, historic aerial photographs and previously prepared reports for the subject site.

2. Performed a preliminary Geotechnical field investigation program consisting of CPT borings, hollow stem auger borings and backhoe test pits. Test pits and borings were utilized for shallow and deep infiltration testing.

3. Conducted geotechnical laboratory testing on samples obtained from the borings and test pits. Agronomic Testing was also performed on four (4) samples in order to provide preliminary agronomic soils conditions.

4. Utilized field and laboratory data in conjunction with the proposed conceptual plan to conduct the preliminary geotechnical analyses in general accordance with the 2025 CBC and ASCE 7-22. Our analyses focused on:

- Characterization of site geologic conditions and hazards
- Preliminary evaluation of liquefaction, seismic settlement lateral spreading potential, impacts, and remediation
- Preliminary evaluation of static settlement and expansion impacts and grading and foundation remediation options.
- Site infiltration characteristics
- Site corrosivity

5. Prepared this report that includes the results of our investigation, infiltration testing, laboratory testing, geotechnical analyses, and preliminary recommendations for the conceptual land use plan shown on the Geotechnical Map (Plate 2) suitable for the Environmental Impact Report (EIR) submittal. This report contains our drill hole and test pit logs, lab data, infiltration data, agronomic test results, Geotechnical Map, and cross sections.

SITE DESCRIPTION

SITE LOCATION

The subject site is located at and adjacent to 30291 Camino Capistrano, San Juan Capistrano, California. This site is generally bound by Camino Capistrano to the northeast, the Southern California Regional Rail Authority (SCRRA) railroad tracks to the west, single-family residential development to the north, and an apartment complex to the south. Trabuco Creek runs along the eastern and southeastern portion of the site. The general location of the site is shown on the attached Plate 1 – Location Map.

SITE HISTORY AND DESCRIPTION

Based on a review of aerial photographs, the site was already established as a citrus grove in 1938 and continued to be active until about 1994. After 1994 the citrus trees become scattered with large portions becoming covered with native grasses. The majority of the land is currently used for outdoor recreation. The northerly portion of the site has been developed as a park site with a dog park and a re-creation of a Native American Putuidem village. A disused pump house is located on the north central portion of the site immediately south of the Putuidem village. The Swaner House events center is located on the northern end of the site and a water district facility is located east of the park entry drive. A storage yard with steel storage building is located on the eastern portion of the site and is separated from the rest of the property by Trabuco Creek. Portions of the site have been surfaced with gravel for use as parking areas, and some clearing has been done to create trails.

The Trabuco Creek channel creates a prominent geographic feature onsite. Westerly of the creek, relatively flat uniform terrace (Qt) and alluvial (Qal) deposits are present. The creek bed itself is a relatively steeply incised canyon that geographically separates the western portion of the site from the eastern side, with relatively flat terrain to the east of the creek.

In addition to separating the site geographically, the creek and the associated alluvial (Qal) soil deposits form a geologic contact that separates the two geologic units onsite. Westerly of the creek, within the proposed development area, are terrace deposits (Qt) with alluvial (Qal) deposits below the existing dog park and proposed open space area. Easterly of the creek are alluvial deposits (Qal). These geologic units have differing engineering characteristics with different remedial grading and foundation requirements. In addition, the alluvial deposits on the west side of the creek have differing engineering characteristics from those on the east side. Further discussion of the site geology is presented in the Geologic Conditions section of the report, and remedial recommendations are presented in the "Static Settlement/Compressibility" and "Preliminary Foundation Design Considerations and Parameters" sections of the report. The Geologic Map (Plate 2) shows Trabuco Creek and the contact between the alluvium (Qal) and the terrace deposits (Qt).

Trabuco Creek flows through a concrete box structure below the nearby Interstate 5 freeway and Camino Capistrano. Velocity reducers and wing walls are located at the end of the concrete section, and the channel banks have been armored with rock for approximately 400 feet on the downstream side of the channel.

The overall site is relatively flat except for the banks leading down to Trabuco Creek which are very steep. Elevations onsite range from 154 feet MSL in Trabuco Creek on the south side of the site to 208 feet MSL on the north side of the site. Surface drainage is by sheet flow to the creek. The majority of the site is covered with native grasses, bushes and scattered trees. Remnant citrus trees from the old grove are scattered onsite. Larger trees and heavier vegetation are located in the Trabuco Creek channel.

PROPOSED DEVELOPMENT

Based on the conceptual land use plan provided to GMU by Almquist development, the project will consist of mixed use of new buildings, equestrian facilities, agricultural areas and park amenities as shown on Plate 2 and as described below:

- New light to moderately loaded structures (as shown on the provided plan).
- New upgrades to landscape and hardscaping.
- New roadways, parking areas, and traffic/pedestrian/equestrian walkways and trails.
- New pedestrian bridge spanning Trabuco Creek.
- Landscape and agricultural areas.

A final development plan along with grading plans and structural foundation loads were not available at the time of this report. Therefore, foundation loads for our settlement analysis were assumed based on our prior experience with similar projects. Once the development plan has been finalized and more definitive information is provided regarding structure type and location, as well as planned grading and foundation loading, additional exploration and analyses may be required.

GEOTECHNICAL INVESTIGATION

GENERAL

GMU conducted a field investigation program to characterize the subsurface soils for the proposed improvements. A total of thirteen (13) hollow stem auger drill holes were performed within the existing area to a maximum depth of 51.5 feet below ground surface. Six (6) cone penetration tests were performed in the central and central eastern portion of the site near Trabuco Creek. Shear wave velocity tests were performed at three (3) of these locations. Eleven (11) test pits were

excavated with a rubber-tired backhoe to depths of 4 to 9 feet. Percolation testing was performed at six locations. The methods used to collect soil samples are described in Appendix B. Groundwater was encountered during our investigation, as described in a subsequent section of this report.

Previous exploratory efforts were performed by three geotechnical firms. The extent of their investigations is summarized below:

- Petra Geotechnical, Inc. August 21, 2009 (reference 2). This exploration was conducted within the existing Putuidem Village and the northern end of the site and consisted of five (5) hollow-stem auger borings drilled to a maximum depth of 43.5 feet below ground surface.

- LGC Geotechnical, Inc. February 3, 2012 (reference 3). This exploration consisted of shallow hand-auger borings drilled to a depth of 2 feet below ground surface and was performed to evaluate slope conditions at the existing dog park.

- Diaz Yourman and Associates June 6, 2017 (reference 1). This exploration was performed within the existing Putuidem Villages and consisted of five (5) hand-auger borings, three (3) percolation tests, and two (2) CPT tests. These borings were drilled to a maximum depth of 22 feet below ground surface.

The locations of our drill holes and those from the previous investigations are shown on the attached Plate 2 – Geotechnical Map. The logs of our drill holes and previous drill holes by others are included in Appendix A and A-1, respectively.

LABORATORY TESTING PROGRAM

Laboratory testing was performed on samples collected from the exploratory drill holes during our subsurface investigation. The testing on soil samples included the following:

- In-situ moisture and density;
- Expansion index;
- Maximum density and optimum moisture;
- Particle Size Distribution;
- Atterberg Limits;
- Consolidation;
- R-value;
- Direct shear tests; and
- Corrosion (pH, resistivity, chlorides, soluble sulfates)

Laboratory procedures and the results of our laboratory testing are summarized on Table B-1 and included within Appendix B. Laboratory testing results from others are included in appendix B-1.

Agronomic testing was also performed on four (4) samples in order to meet the requirements for the Agronomic Soils Report. GMU staff collected these samples, which were tested at Wallace Laboratories, LLC. The Agronomic testing report is attached in Appendix G.

GEOTECHNICAL CONDITIONS

REGIONAL GEOLOGY

The subject site is located near the southeastern portion of the San Joaquin Hills within the Peninsular Ranges Geomorphic Province. While the San Joaquin Hills represent the local topographic high, the site itself is situated within an adjacent valley. The site geology was created by the Capistrano Embayment, a broad synclinal basin that is centered around San Juan Capistrano and is responsible for the deposition of the sediments that form the bedrock of the Capistrano formation. The Geologic map for the San Juan Capistrano 7.5 Minute (Morton, Edgington, and Fife, 1974) indicates that the regional geology is characterized by surficial deposits overlying the Capistrano Formation.

LOCAL GEOLOGY

The underlying geologic units encountered during the subsurface exploration include undocumented artificial fills, topsoil, Quaternary-aged alluvium and terrace deposits, as well as Tertiary-aged claystone of the Capistrano Formation. The depth to each of these materials is shown in the Geotechnical Map, Plate 2.

The relatively young alluvial soils are located on the eastern portion of the site and are associated with deposition from Trabuco Creek fluvial activity. The alluvial soils are located along the banks of Trabuco Creek with more recent deposits within the creek bed. The alluvial soils are generally fine grained (i.e. silts and clays) in the development area east of the creek thalweg and relatively granular in the large development area west of the creek thalweg. The older terrace deposits associated with ancient fluvial activity of the proto Trabuco and Oso Creek water sheds are located on the western side of the project and form an elevated terrace on the site. The majority of the proposed site development is underlain by the terrace deposits. A detailed description of the subsurface materials observed in the borings and test pits is provided below.

Undocumented Artificial Fill (Qafu)

West Side of Trabuco Creek

As described previously, based on our review or historic aerial photographs, the site was likely partially graded for development of the citrus grove. As a result of this grading, the site is underlain locally by 2 to 2.5 feet of undocumented artificial fill materials. The fill predominantly consisted of brown silty sands with some occurrences of clayey sands. The fills were dry to damp to moist and loose to medium dense. It should be noted that local areas of shallower or deeper fills may be encountered during site grading.

East Side of Trabuco Creek

Based on DH-9 the alluvial soils on the east side of the creek may also be capped with up to approximately 2.5 feet of artificial fill comprised of loose to medium dense sandy clay.

Topsoil

West Side of Trabuco Creek

Topsoil was encountered in the test pits throughout the site and was 2 to 2.6 feet thick. The soil in these areas consists of silty sand that is light brown to brown and dry. These soils appear to be derived from the underlying terrace deposits and alluvium.

East Side of Trabuco Creek

Topsoil was not observed in Boring DH-9, however 2 to 2.5 feet of topsoil is likely present locally in the proposed development area.

Alluvial Deposits (Qal)

West Side of Trabuco Creek

Alluvial deposits were encountered adjacent to Trabuco Creek in borings DH-2 and DH-3. Where encountered, the alluvial materials generally consist of silty sand and sand, with lesser amounts of sandy clay and sandy silt. These materials were observed to range from loose to dense in consistency and exhibit variable moisture contents. In situ moisture contents are typically below the optimum but increase with proximity to the groundwater table.

East Side of Trabuco Creek

East of the creek alluvial soils were logged in borings DH-9, CPT-5, and CPT-6. The upper soils generally consisted of clays, fat clays, and silty clays. Poorly graded sands were encountered from

35 to 42 feet. The soils were moist to very moist and stiff and medium dense to very stiff and dense.

Terrace Deposits (Qt)

Terrace deposits were encountered through the majority of the proposed development area west of Trabuco Creek. These materials are ancient fluvial deposits that were deposited on the Trabuco and Oso Creek floodplains and subsequently uplifted to their current elevation. The terrace deposits are anticipated to be approximately 50-60 feet thick and composed of light to dark brown silty sand and clayey sand. The terrace deposits also had lesser amounts of poorly to well graded sands and sandy clays. Finally, trace amounts of gravel were encountered at greater depths. These soils were generally slightly moist to very moist and stiff to medium dense. The moisture content of these soils increased with depth.

Capistrano Formation (Tc)

The Capistrano Formation underlies the site at depth and consists of siltstone, sandy siltstone, and claystone, with minor sandstone interbeds. Claystone bedrock was encountered in DH-9 at a depth of 42 feet and was observed to consist of predominantly moist, hard, greenish gray to black claystone.

GROUNDWATER

Local Groundwater

Groundwater was encountered within our recent drill holes at a depth of 48.4 feet in boring DH-1, 39.8 feet in boring DH-9, 48.0 feet in boring CPT-1, 42.6 feet in boring CPT-3, and 53.6 feet in boring CPT-4. This is not in general agreement with the depth of historically high groundwater provided in the reference Seismic Hazard Zone Report for the San Juan Capistrano Quadrangle (CDMG, 2001), which indicates that historic high groundwater is 5 feet below the ground surface.

It should be noted that seasonal fluctuations in the groundwater level may occur. However, given that the shallowest groundwater was encountered at a depth of 39.8 feet below existing ground surface, it is likely that present and/or future groundwater is not expected to have an impact on the proposed construction.

As mentioned above, Trabuco Creek runs through the southern portion of the site and will exert influence on groundwater levels near the creek. Another source of groundwater is Oso Creek, which is located between approximately 150 to 300 yards west of the site. Although more distant, Oso Creek may also exert a localized influence on groundwater conditions. To evaluate the potential influence of these creeks on groundwater conditions, monitoring well data from multiple

locations was reviewed (reference 5). The measurements from these wells indicated deeper groundwater at elevations of 141-143 feet or 49 to 67 feet BGS.

Groundwater Depth for Engineering Analyses

California Geologic Survey (CGS) Special Publication 117 recommends that the historic high groundwater level presented in the Seismic Hazard Zone Report be used in engineering analyses. However, it is our opinion that groundwater at depths of 5-ft is very unlikely to occur on site. Alternatively, a more likely condition is that the high groundwater condition is a groundwater table drawn at a 2% slope that rises from the Trabuco Creek thalweg. This results in a design groundwater depth of approximately 35 feet bgs (roughly 10-15 feet higher than in-situ conditions).

SEISMIC CONDITIONS

Faulting and Seismicity

The site is not located within an official Alquist-Priolo Earthquake Fault Zone (Jennings, 1994; Hart and Bryant, 2007), and no known active faults are shown on the reviewed geologic maps crossing the site. The site is however located within close proximity to several surface faults that are presently zoned as active or potentially active by the CGS. The nearest known active fault is the San Joaquin Hills blind thrust fault, which is located approximately 5.1 miles from the site and capable of generating a maximum earthquake magnitude (Mw) of 7.1. The site is also located within 6.3 miles of the Newport Inglewood fault, which is capable of generating a maximum earthquake magnitude (Mw) of 7.5.

Most of Southern California is subject to some level of ground shaking (ground motion) because of movement along active and potentially active fault zones in the region. Several sizeable, historic earthquakes have occurred in Southern California. Given the proximity of the site to several active and potentially active faults, the site will likely be subject to earthquake ground motions in the future. The level of ground motion at a given site resulting from an earthquake is a function of several factors including earthquake magnitude, type of faulting, rupture propagation path, distance from the epicenter, earthquake depth, duration of shaking, site topography, and site geology.

Seismic Hazard Zones

According to the reference Seismic Hazard Zone map for the San Juan Capistrano 7.5-Minute Quadrangle (CGS, 2001), the subject site does not lie within an area that is susceptible to earthquake-induced landsliding. However, the site has been identified as potentially susceptible to liquefaction. Consequently, an earthquake-induced liquefaction analysis is included in the following section of this report.

GEOTECHNICAL ENGINEERING FINDINGS

SYNTHESIS OF LABORATORY INFORMATION

As described above, previous geotechnical investigations have been performed at this site. We reviewed and consolidated relevant laboratory results contained in Appendix B and field test data, such as SPT blow counts, from these reports for reference. While this information was considered in our analysis, it was not relied upon in formulating our recommendations. Rather, it served as a comparison point to verify the consistency and reliability of our own test data.

LIQUEFACTION AND LATERAL SPREADING

Analysis Input Data and Methods

As stated above, the subject site is located within a liquefaction hazard zone mapped by California Geologic Survey (CGS, 2001), and several areas which contain saturated alluvium are located within the vicinity of Trabuco Creek. The saturated alluvium is potentially liquefiable based on soil type, groundwater levels, and regional seismicity. Site specific liquefaction analyses were performed to evaluate the liquefaction potential and its effects on the proposed developments.

CLiq, v. 3.5.2.22, software and Robertson (2009) methodology were used for the liquefaction evaluation of CPT data. In addition, the drill hole blowcounts and CPT's along the cross sections were analyzed to further determine the layers of the potentially liquefiable soils and their assigned liquefied shear strengths. Youd et al. (2001) methodology was used to evaluate liquefaction resistance of soils using the blowcounts. The following CPTs and drill holes were analyzed:

Table 1: Drill Holes and CPTs for Liquefaction Analysis

Geologic Unit	Analyzed Drill Holes and CPTs
Qt	DH-1, CPT-1, SCPT-2, CPT-3, and CPT-4
Qal	DH-2, DH-9, SCPT-5, and SCPT-6

The liquefaction analyses were performed using the estimated high groundwater level discussed previously in the Groundwater section of this report. The analyses confirmed liquefaction potential for the terrace and alluvium in the vicinity of Trabuco Creek.

Results of our liquefaction analysis are provided in Appendix C. The residual shear strength of liquefiable soils and strain softening of the alluvial deposits to be left in-place below the high groundwater table, that were determined from our liquefaction analysis, are utilized further in our stability analyses (see "Slope Stability" section below).

The results of the liquefaction analyses indicate that portions of the alluvial deposits remaining in place below the design groundwater table are susceptible to liquefaction during seismic events. These liquefiable layers vary in thickness, ranging from a few inches up to approximately 3 feet. Under seismic loading, these layers are expected to experience a reduction in cyclic shear strength, which may lead to post-liquefaction ground deformations and seismic settlement.

Earthquake-Induced Vertical Settlement

Some potentially liquefiable layers within the terrace and alluvial deposits will be left-in-place below the proposed development after remedial grading. Therefore, vertical seismic settlement related to liquefaction was calculated for the proposed development. Expected seismic settlements are summarized in the table below and shown in Appendix C.

Table 2: Earthquake-Induced Vertical Settlements

Development Location	Cross Section	Analyzed CPTs & Drill Holes	Earthquake-Induced Vertical Settlement (in)
1. East Side of Trabuco Creek at Pedestrian Bride (Qal deposits)	A-A'	SCPT-5 (25-126-00)	1.1
		SCPT-6 (25-126-00)	0.6
		DH-9 (25-126-00)	2.1
		Range:	**0.6 –2.1**
		Average:	**1.3**
2. West Side of Trabuco Creek at Pedestrian Bridge (Qal deposits)	A-A''	CPT-3 (25-126-00)	0.4
		CPT-4 (25-126-00)	1
		DH-1 (25-126-00)	2.9
		Range:	**0.4-2.9**
		Average:	**1.4**
3. West Side of Trabuco Creek (within Qt deposits)	N.A	CPT-1 (25-126-00)	1
		SCPT-2 (25-126-00)	0.3
		Range:	**0.3-1**
		Average:	**0.7**

In the development location 1 (East side Trabuco Creek near pedestrian bridge), the total and differential EQ-induced settlements are 2.1-inch and 1.5-inch, respectively. In development location 2 (west side of Trabuco Creek near the pedestrian bridge), the total and differential EQ-induced settlements are 2.9-inch and 2.5-inch respectively. In development location 3 (west side of Trabuco creek within the Qt deposits), the total and differential EQ-induced settlements are 1-inch and 0.7-inch, respectively. The results from development location 3 should be representative of the currently planned development area west of Trabuco Creek.

Lateral Spreading

Lateral spreading typically occurs as a form of horizontal displacement of relatively flat-lying alluvial material toward an open or "free" face such as an open body of water, channel, or excavation. In soils, this movement is generally due to slippage along a weak plane and may often be associated with liquefaction. As cracks develop within the weakened material, blocks of soil displace laterally towards the open face. Cracking and lateral movement may gradually propagate away from the face as blocks continue to break free. Generally, failure in this mode is analytically unpredictable, because it is difficult to determine where the first tension crack will occur.

Lateral spreading was analyzed for the banks of Trabuco Creek near the proposed bridge and the general eastern development area utilizing Cross Section A-A'. The lateral spreading was initially analyzed in terms of accumulation of horizontal seismic shear deformations, as determined using CLiq software. The resulting horizontal deformations are summarized in the table below:

Table 3: Earthquake-Induced Horizontal Deformations

Location	Analyzed CPTs	Earthquake-Induced Horizontal Deformation (in)
East of Trabuco Creek Development Area Area	SCPT-5 (25-126-00)	15
	SCPT-6 (25-126-00)	78
	Range:	**15-78**
West Bridge Abutment Area (Qt deposits)	CPT-1 (25-126-00)	13.3
	SCPT-2 (25-126-00)	5.8
	CPT-3 (25-126-00)	3.9
	CPT-4 (25-126-00)	18.5
	Range:	**4-19**

Our analysis indicates that if not remediated, lateral spread would likely impact the proposed bridge and proposed structures in the eastern development area. Due to the variability in EQ-induced lateral spreading values shown in the table above, additional deformation analyses were conducted (see slope stability section below)

SLOPE STABILITY

Overview

Preliminary quantitative slope stability analyses are presented for static and earthquake conditions for the natural slopes descending into the Trabuco Creek canyon. These natural slopes are represented on Cross sections A-A' and B-B'. The results are discussed in detail below and provided in Appendix D.

Cross Sections and Analytical Methods

Slope stability analyses were conducted on cross sections A-A' and B-B' to analyze various conditions of the existing slopes. The intent of each analysis was to check for lateral spreading and slope failures occurring as a result of soil liquefaction within the alluvial deposits. The general approach for evaluating the stability of slopes was to:

1. Estimate appropriate design material strengths for static and earthquake conditions.
2. Calculate the factors of safety for static conditions;
3. Assess the potential extent of lateral spread if liquefaction strength loss were to occur during the initial cycles of seismic loading.
4. Evaluate the stability of slopes under post-earthquake liquefied soil conditions.

Slope stability calculations were performed using the computer software Slope/W 2020 by Geo-Slope International Ltd. This formulation assumes that plane strain conditions exist in the direction perpendicular to the cross-section.

Generalized (entry and exit) and translational (block) potential slip surfaces along soft material were considered in the analyses. The Morgenstern-Price method, which satisfies all conditions of equilibrium, was used to find the factor of safety against sliding (FS_{sl}).

Shear Strength Model

Shear strengths used for our stability analysis are based on the available lab data from our laboratory testing and our experience with similar geologic materials. The results from the laboratory shear strength tests are included in Appendix B. The table below shows the design shear strengths used in GMU's analyses, presented in Appendix D of this report.

Table 4: Design Shear Strength Parameters

Material	Design Shear Strength Parameters		
	Phi (degrees)	Cohesion (psf)	Unit Weight (pcf)
Undocumented Artificial Fill (Qafu)	32	80	120
Terrace (Qt)	32	80	120
Alluvium (Qal)	32	80	120
Capistrano Formation (Tc)	25	250	125
Material	**Design Liquefaction Shear-Strength Parameter**		
	Sr/σ'v		**Unit Weight (pcf)**
Allvium (Qal Liq 0.17)	0.17		120
Allvium (Qal Liq 0.18)	0.18		120

Undocumented Artificial Fill (Qafu) and Alluvial Deposits (Qal) The design strength for these units is based on Direct Shear test results on undisturbed samples. Peak strengths were selected based on the predominance of granular soil material in the main western area of the site and lesser amounts of low plasticity fine-grained soil (CDMG, 2008). These values were also used for areas east of Trabuco creek. Given that the alluvial and fill materials are relatively more fine-grained east of the creek, additional testing will be required for final analyses. However, revised values are anticipated to significantly change the stability results and conclusions.

Terrace Deposits (Qt) The design strength for these units is based on Direct Shear test results on undisturbed samples. Peak strengths were selected based on the predominance of granular soil material and lesser amounts of low plasticity fine-grained soil (CDMG, 2008).

Capistrano Formation (Tc) The design strength for this unit is based on Direct Shear test results on undisturbed samples. Ultimate strengths were selected based on the presence of moderate plasticity fine-grained soil (CDMG, 2008).

Liquefied Alluvial Deposits (Qal Liq 0.17) The design strength of this zone was estimated based on the results of our liquefaction analysis on SCPT-5 and SCPT-6, presented in appendix C. The residual strengths of alluvial deposits in section A-A' range from $Sr/\sigma'v = 0.05$ to 0.30. For design purposes, the average value of this range was used to represent the post-liquefaction residual strength of the liquefied layer in A-A'.

Liquefied Alluvial Deposits (Qal Liq 0.18) The design strength of this zone was estimated based on the results of our liquefaction analysis on DH-2, presented in appendix C. The residual strength of alluvial deposits in section B-B' is interpreted to be $Sr/\sigma'v = 0.18$.

Liquified terrace deposits were not considered in the liquefaction analysis because they consist of dense, well-cemented material with a low susceptibility to liquefaction under the expected seismic loading conditions.

Pre-Earthquake Static Analysis

All slopes in the project area have a factor of safety above 1.5 under static conditions.

Post-earthquake Static Analysis – Liquefied Conditions

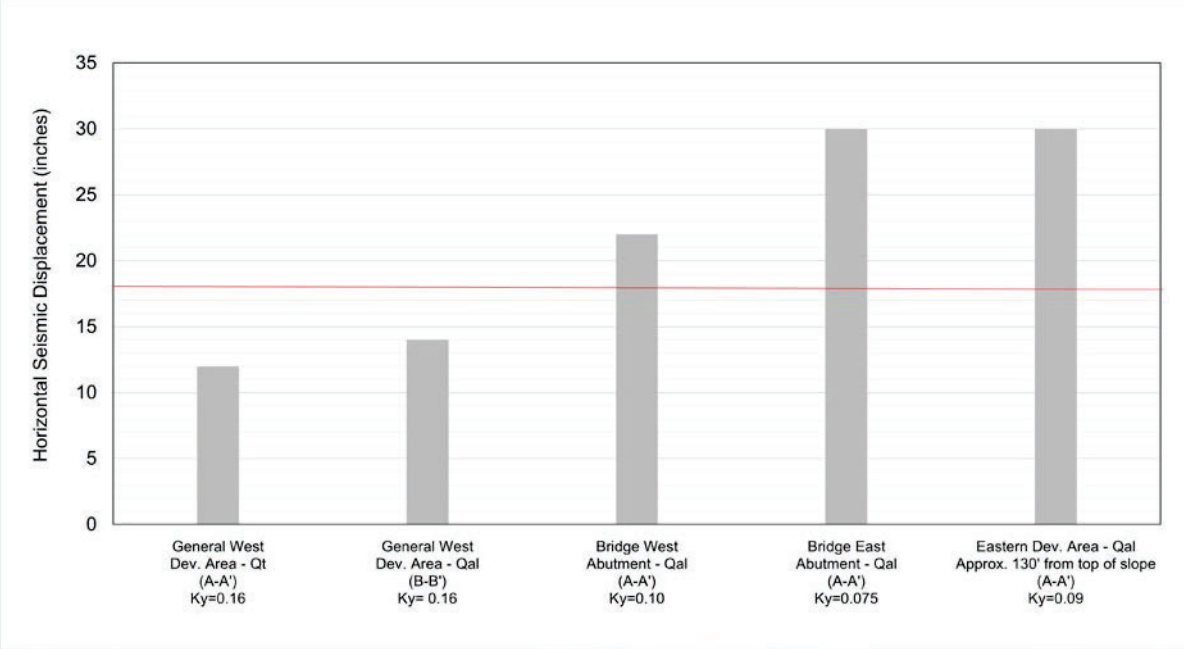
After a seismic event and resulting strength loss of liquefied deposits, the static safety factors are reduced to below 1.0, indicating unstable conditions and a high potential for alluvial flow failures near the banks of the Trabuco Creek (i.e. within the Qal deposits). However, the post-earthquake FS increases to more than 1.3 away from the creek as summarized below:

- Section A-A'
    - West Side of Creek
        - Within the terrace deposits as shown on Plate 2 (Only the alluvial deposit areas west of the creek will have safety factors less than 1.3)
    - East Side of Creek
        - Approximately 50' away from the top of slope
- Section B-B'
    - (West Side of Creek Only)
        - Within terrace deposits as shown on Plate 2 (Only the alluvial deposit areas west of the creek will have safety factors less than 1.3)

Lateral Spread & Mobilized Cyclic Deformations

If liquefaction-induced strength loss occurs during the initial cycles of seismic loading, progressive deformations may develop leading to lateral spreading/mobilization of cyclic deformations, tension cracks, and additional vertical settlements. Procedures recommended by Bray and Macedo (2019) and Rathja and Antonakos (2011) were utilized to obtain these deformations assuming the liquefied condition. Figure 1, below, presents a summary of the estimated deformations for the critical building locations.

Figure 1: Lateral Spread Analysis Summary



LATERAL SPREAD AND SEISMIC SLOPE STABILITY ANALYSIS CONCLUSIONS

The potential for post-earthquake lateral deformations/lateral spreading to significantly impact proposed development areas adjacent the creek is considered high. However, based on the current Master Exhibit, this would appear to mainly impact the proposed bridge and proposed buildings within the development area east of Trabuco Creek (i.e. the development area west of Trabuco Creek are within the Terrace deposits). Planning and mitigation considerations are shown below:

- For planning purposes, all structures planned in the recent alluvial deposits (Qal) on both sides of the creek will be subject to significant lateral spreading deformations (see Plates 2 and 3).

- Proposed structures located within the terrace deposits west of Trabuco Creek will likely not require significant lateral spreading related mitigation. However, some lateral spreading mitigation may be required pending the final location and type of planned

structures as well as final analyses of lateral spreading deformations. Based on our current understanding of structures adjacent Trabuco Creek, the following may need to be required:

- Potential Remediation options for the bridge foundations area include:
  - Piles extending to bedrock (i.e. roughly 40-50') that have sufficient lateral load capacity and stiffness to resist lateral spreading forces. It should be noted that this will likely result in pile diameters greater than would normally be required.
  - Moving the western abutment westward away from the creek face.
  - Remedial grading of the slope face in the form of stability keyways.

- Potential remediation options for proposed buildings in the development area east of Trabuco Creek may include mat foundations and/or piles. Remedial grading of the slope face in the form of stability keyways could also be considered.

Once the location and design of all the structures near the creek are finalized, additional analyses will be required to develop final foundation design recommendations. Additional CPT soundings would likely enable a more efficient design and likely result in cost savings.

STATIC SETTLEMENT/COMPRESSIBILITY

The proposed amenities will involve the placement of new design fills and foundation loads over alluvial and terrace deposits, resulting in these structures being subject to settlement. A detailed assessment was performed on the existing soils to determine adequacy for the proposed improvements. This assessment consisted of the following:

Consolidation:

- West Side of Trabuco Creek – Terrace Deposits (Qt)
  - Consolidation testing was generally performed on samples showing relatively low blow counts. The result of this testing indicates low to moderate compressibility of the existing Qt soils.
- East Side of Trabuco Creek – Alluvial Soils (Qal)
  - Compressibility of the existing alluvial deposits is anticipated to be moderate. Additional evaluation will be required when the final building type and configuration are determined.

Hydro-Collapse Testing and Percent Saturation Levels:

- West Side of Trabuco Creek – Terrace Deposits (Qt)
    - A total of ten (10) hydro-collapse tests were conducted on relatively low-density samples. The majority of the results indicate low hydro-collapse potential, generally ranging from 0 to 1 percent. The most significant concern was identified in a sample obtained from boring DH-4 at a depth of approximately 7.5 feet, which exhibited a hydro-collapse potential of about 2 percent. In addition, very low saturation levels can be found in samples obtained from the upper 10 feet indicating the potential for hydro-collapse. Recommendations for addressing this condition include over-excavation and recompaction, moisture conditioning, or other appropriate ground improvement measures, as warranted by the proposed grading and structural loading conditions.

- East Side of Trabuco Creek – Alluvial Soils (Qal)
    - Hydro-collapse does not appear to be a geotechnical design constraint in the development area east of the creek.

SPT Blow Counts:

- West of Trabuco Creek – Terrace Deposits (Qt)
    - SPT blow counts were also evaluated with regard to consolidation and hydro-consolidation testing. These analyses indicate loose granular soils down to depths of approximately 8-feet bgs.
    - East of Trabuco Creek – Alluvial Deposits (Qal)
        - SPT blow counts indicate stiff soils with low compressibility.

Static Settlement Calculations:

- West Side of Trabuco Creek – Terrace Deposits (Qt)
    - To evaluate potential settlement due to grading, a hypothesized fill of 10 feet was used for preliminary settlement estimate purposes. This likely represents a worst-case fill surcharge condition.
    - Total static settlements were calculated by modeling the pressure associated with 10-feet of fill (1,250 psf) and the anticipated foundation load (250 psf). Given the anticipated lightly loaded structures, this settlement will be within industry standards– i.e. on the order of 1 inch total and ½ inch differential over a distance of 40 feet. Additional discussion is contained in the "Foundations" section of this report. The settlement calculations and results are presented in Appendix E, static settlement.

- East Side of Trabuco Creek – Alluvial Soils (Qal)
    - Limited grading is anticipated east of Trabuco creek. Hence settlement will be controlled by foundation loading.

Settlement Summary

- West Side of Trabuco Creek – Terrace Deposits (Qt)
    - Settlement due to Pressure from hypothetical design fill loading:
        - Primary
            - Without Corrective Grading
                - Average: 1-2” (without consideration of hydro-collapse)
                - Range: 0.1 to 3.0” (without consideration of hydro-collapse)
                - Substantially complete at the conclusion of grading.
            - With corrective grading applied:
                - 1” total and ½” over 40’ - complete following grading
        - Long-term – secondary and hydro-collapse.
            - Not anticipated to be significant.
    - Settlement due to Hydro-collapse
        - 1.2” to 2.4”
    - Settlement Due to Building Loads (assumes corrective grading performed):
        - On the order of 1 inch total and ½ inch over 40 feet.

- East Side of Trabuco Creek – Alluvial Soils (Qal)
    - To be determined once building types and loading are determined.

INFILTRATION

West Side of Trabuco Creek – Terrace Deposits (Qt) and Alluvial Soils (Qal)

Six (6) preliminary infiltration tests were performed within the general conformance with the South Orange County Technical Guidance Document (TGD) within drill holes identified as DH-2, and DH-3 (in alluvial soils); and within test pits TP-2, TP-4, TP-7 and TP-8 (in Terrace Deposits). The infiltration locations are shown on the attached Plate 2.1 – Geotechnical Map. The drill holes were excavated to depths of approximately 15 and 30 feet below the existing grade, and the test pits were excavated from 4 to 6 feet below grade. The borings and test pits were prepared in general accordance with the TGD manual. Following testing, we determined the unfactored observed infiltration rates, as shown on Table 5 below. The results of our infiltration testing are also included in Appendix F.

Table 5: Unfactored Observed Infiltration Rates Results Summary

Drill Hole	Depth Below Existing Grade (feet)	Unfactored Observed Infiltration Rates (inches/hour) *
DH-2	30	2.10
DH-3	15	2.05
TP-2	5.5	7.68
TP-4	6.0	9.60
TP-7	4.4	8.40
TP-8	4.0	11.88

**Rates do not incorporate a factor of safety.*
Final factor of safety should be applied by the project civil engineer.

Infiltration is deemed feasible when the design infiltration rates meet and exceed the minimum infiltration rate of 0.3 inches per hour in accordance with the TGD Manual.

Based on the above, infiltration rates appear higher at shallower depths. It should also be noted that the results are based on in situ soil conditions (i.e. without corrective grading). Consequently, corrective grading in shallow infiltration areas should not extend below the bottom of infiltration basins/devices.

Additional infiltration testing may need to be performed once the proposed location and depth of the infiltration system is determined to confirm feasibility at the design location and depth (i.e., if the design depth and location is different than that above).

East Side of Trabuco Creek

It is our understanding that infiltration is not planned in the development area east of the creek. In addition, all of the soils in this area are very low permeability fine grained soils, which would have very low infiltration characteristics. Consequently, infiltration testing was not performed in this area. Preliminarily, infiltration should be assumed to be infeasible. However, the reviewing agency may require additional testing to make a final determination.

SUBSIDENCE

Subsidence is considered negligible in both development areas (i.e. West and East of Trabuco Creek).

SOIL EXPANSION

West of Trabuco Creek – Terrace Deposits (Qt)

The Terrace Deposits (Qt) west of Trabuco Creek are anticipated to be granular with a very low to low expansion potential.

East of Trabuco Creek – Alluvial Soils (Qal)

Based on expansion index testing of subsurface soils, the on-site soil materials have a medium to high (EI 80-90) expansion potential. Test results are provided in Appendix B.

SOIL CORROSION

Geotechnical Characterization Testing

Soil corrosion testing was performed to evaluate the potential for soil corrosion to impact proposed foundations and subsurface improvements. Based on the test results for pH, soluble chlorides, sulfate, and minimum resistivity obtained during this investigation (presented in Appendix B), the on-site soils on both sides of the creek should be considered to have:

- pH values that are generally considered non-corrosive to mildly corrosive (pH of 6.1 to 7.5)
- A negligible sulfate exposure to concrete per the ACI 318 Table 19.3.1.1 Exposure Class S_0 (Sulfate concentrations range from ND to 207 ppm)
- Minimum resistivities indicating that onsite soils are corrosive to moderately corrosive to ferrous metals – (Minimum resistivity values of 1186 to 4392 ohm-cm)
- A low to moderate chloride content (i.e., less than 500 ppm).

Further corrosivity testing is recommended below proposed structures and improvements upon completion of precise grading and prior to construction to confirm the preliminary results provided herein. Corrosion testing must be performed on all import soil prior to importation.

Agronomic Testing

Four (4) surface samples were taken for agronomic testing. The samples were taken from 3 locations west of Trabuco Creek and 1 sample east of Trabuco Creek. The results are contained in Appendix G. These results have been passed on to the Landscape Architect for his consideration. Recommendations with regard to this testing are outside our purview.

EXCAVATION CHARACTERISTICS

Rippability

The soil materials to be encountered for the project can be excavated with conventional grading and excavation equipment.

Excavation and Trenching

We expect that the proposed corrective grading and utility trenches can be accomplished utilizing conventional excavating and trenching machines and backhoes. Significant quantities of gravels or oversize materials were not observed during our field investigation; however, some gravels and small cobbles were encountered during our field investigation and should be expected (primarily west of Trabuco Creek). Trench support requirements will be limited to those required by safety laws or other locations where trench slopes will need to be flattened or supported by shoring designed to suit the specific conditions exposed.

VOLUME CHANGE

West of Trabuco Creek – Terrace Deposits (Qt)

In order to aid in the planning for the anticipated grading, we estimate that the change in volume of the on-site engineered fill excavated and placed as compacted fill at an average relative compaction of 90%, will result in about 5% to 9% decrease of volume or shrink. Laboratory testing of shallow soil samples (from 0 to 10 feet) indicates relatively low in-situ dry densities, with an average of approximately 103 pcf. For reference, achieving 90% relative compaction would require dry densities in the range of 108 to 113 pcf.

East of Trabuco Creek – Alluvial Soils (Qal)

Based on limited data from DH-9, the in-situ soils in the upper 5 feet are anticipated to have a volume change on the order of 1-2%

IN-SITU SOIL MOISTURE CHARACTERISTICS

West of Trabuco Creek – Terrace Deposits (Qt)

The surficial soils within the Qt are generally dry to moist. It should be noted, however, that the moisture content within the upper several feet may vary depending on rainfall and the time of year in which grading occurs. Laboratory testing of shallow soil samples (from 0 to 10 feet) indicates relatively low in-situ moisture content, with an average of approximately 6.8%. For reference, optimum moisture content is in the range of 10.5-11%. During site grading one or more of the following measures may be required: 1) moisture conditioning, 2) locally drying back of the soils, and/or 3) mixing of the soils.

East of Trabuco Creek – Alluvial Soils (Qal)

Based on limited data from DH-9, the moisture content of soils in the upper five feet are anticipated to range from near optimum to dry of optimum. During site grading one or more of the following measures may be required: 1) moisture conditioning, and 2) mixing of the soils.

EXISTING UNDERGROUND UTILITIES

Existing underground utilities, pipelines, and drains likely run throughout the site. If existing subsurface lines are present onsite, then depending on their depths and locations in relation to the proposed development, they may need to be excavated and removed, abandoned in-place, or the foundations of the proposed structures deepened so that they do not surcharge the existing pipelines. Therefore, specific recommendations pertaining to pipeline protection can be provided as necessary once plans and information pertaining to the existing utilities (i.e., type, location, depth, etc.) are available.

CONCLUSIONS

Based on the preliminary scope of the project, we conclude that the proposed development is feasible from a geotechnical standpoint if accomplished in accordance with the California Building Code (CBC), City requirements, and the preliminary recommendations presented in this report. A summary of conclusions is as follows:

1. It is our opinion that the proposed project is feasible assuming all applicable preliminary recommendations contained herein are implemented. The recommendations contained within this report will need to be revised once final development and grading plans as well as building types and foundation loading estimates are developed.

2. In the development area east of Trabuco Creek the site is underlain by shallow undocumented fill soils and dry clayey/expansive alluvial soils (Qal). To provide uniform soils characteristics, foundation slab, pavement and flatwork, the artificial fills and alluvial soils present in the upper several feet will need to be removed and recompacted.

3. In the development area west of Trabuco Creek the site is underlain by artificial fill, recent alluvial deposits – Qal (adjacent Trabuco Creek) and terrace deposits - Qt. Most of the development area will be in areas underlain by terrace deposits which are subject to consolidation and hydro-collapse. To provide a uniform foundation slab, pavement and flatwork support, the artificial fills, alluvial soils and terrace deposits present in the upper several feet will need to be removed and

recompacted.

4. We expect that the proposed corrective grading and utility trenches can be accomplished utilizing conventional excavating and trenching machines and backhoes.

5. Groundwater exists on the site in the way of accumulated "perched" pockets that lie just above bedrock. Groundwater is not anticipated to be a design constraint during the planned grading, during the construction of shallow foundations, or during the installation of shallow underground utilities.

6. There are no known active faults crossing the subject site. The site seismicity is typical for the San Juan Capistrano area. Structure design should be in accordance with the current CBC.

7. Corrective grading will be required below all building and surface improvement areas (i.e. concrete flatwork, roadways, parking lots, etc.).

8. Lateral Spreading poses a hazard for planned buildings and structures adjacent Trabuco Creek. Specifically, the bridge abutments and building development in the development area east of Trabuco Creek will likely need remediation.

9. East of Trabuco Creek site soils within the foundation influence zone are anticipated to have a medium to medium/high potential for expansion based on our laboratory test results and local experience. Soils west of Trabuco Creek are anticipated to have very low to low expansion potential.

10. Buildings in the development area east of Trabuco Creek will require foundations to mitigate the effect of expansive soils and lateral spreading deformations. Buildings in the development area west of Trabuco Creek may be constructed using conventional foundation systems following corrective grading.

11. Laboratory testing indicates the on-site soils are generally corrosive. More specifically, the sulfate testing indicates a negligible concrete exposure while the pH, resistivity, and chlorides indicate moderate corrosivity to ferrous metals. Soil agronomic testing also indicates potential issues with regard to plant growth that need to be addressed by the Project Landscape Architect.

PRELIMINARY RECOMMENDATIONS

DEVELOPMENT FEASIBILITY

Based on the geologic and geotechnical findings, it is our opinion that the proposed project is feasible and practical from a geotechnical standpoint if accomplished in accordance with City of San Juan Capistrano grading and building requirements and the recommendations presented in this report. Preliminary geotechnical recommendations provided in this report include the following:

- Recommendations for corrective grading for the proposed improvements (i.e., foundations, building slabs, and pavement/flatwork areas);
- Preliminary design recommendations for spread and continuous footings, slab-on-grade systems, retaining wall foundations, to support the proposed structures and site improvements;
- Utility trench and structure excavations, and backfill recommendations;
- Site and retaining wall recommendations; and
- Asphalt pavement and concrete flatwork recommendations.

The preliminary recommendations contained within this report may need to be revised once final structural loads and grading plans are available for our review.

FUTURE CONCEPT PLAN GUIDANCE

The following is a summary of general guidance for use in the development of the final plans.

- **Eastern Development Area**
  - Buildings subject to expansive soils and significant lateral spreading deformations
- **Western Development Area**
  - Alluvial Areas - Qal (see Plate 2) adjacent Creek will be subject to significant lateral spreading deformations. Habitable buildings in these areas should be avoided if possible.
  - Terrace deposit areas – QT (See Plate 2)
    - Are generally not subject to expansive soil movements
    - Are subject to significant hydro-collapse requiring deeper over-excavation and re-compaction for habitable structures
- **Pedestrian Bridge (linking east and west development areas)**
  - Bridge foundations will be subject to significant lateral spreading deformation requiring remediation.

GENERAL SITE PREPARATION AND GRADING

General

The following recommendations pertain to any required grading associated with the proposed improvements. All site preparation and grading should be performed in accordance with the City of San Juan Capistrano grading requirements and the recommendations presented in this report.

Clearing/Demolition

All significant organic material such as weeds, brush, tree branches, or roots and other decomposable material should be removed from the area to be graded for improvements. Organic materials are acceptable in park sites and agricultural areas if approved by the landscape architect and agronomist. No rock or broken concrete greater than 6 inches in diameter should be utilized in the fills.

Due to past agricultural land use, it should be expected that buried irrigation pipes (concrete, steel, and PVC) will be encountered. Concrete irrigation pipes can be reduced mechanically to less than 6-inches and utilized in fill areas. Steel and PVC pipes should be removed from the site. There is an old pump house and there may have been old farm structures onsite that could have had septic systems, buried fuel tanks, etc. Care should be taken during remedial grading to identify if any of these types of old infrastructures are encountered. All buried structures should be removed and taken offsite. If evidence of buried fuel tanks is observed, then they should be removed offsite and an Environmental Engineer should evaluate the site conditions. Cavities and excavations created during clearing/demolition should be cleared of loose soil, shaped to provide access for backfilling and compaction equipment, and then backfilled with properly compacted fill.

GMU should provide periodic observation and testing services during demolition operations to document compliance with the above recommendations. In addition, should unusual or adverse soil conditions or buried structures be encountered during grading that are not described herein, these conditions should be brought to the immediate attention of the project geotechnical consultant for corrective recommendations.

Corrective Grading

It should be noted that the recommendations provided herein are based on our subsurface exploration. Actual removals may vary in configuration and volume based on observations of geologic materials and conditions encountered during grading. The bottom of all remedial grading removals should be observed by a GMU representative to verify the suitability of in-place soil prior to performing scarification and re-compaction.

If the existing native soils are found to be inadequate for support of the planned improvements to depths greater than noted below (i.e., very soft or loose soil materials exposed that were not

encountered in the borings), then the depth of over-excavation and re-compaction should be increased accordingly in local areas as recommended by GMU during construction.

Corrective grading recommendations are outlined below.

Development Areas West of Trabuco Creek – Terrace Deposits (Qt)

New Building Pads: Grading recommendations for support of the proposed new buildings (including additions) should consist of the following:

- The existing ground surface should be over-excavated a minimum depth of at least eight (8) feet below existing grade or six (6) feet below bottom of proposed footings, whichever is deeper. Following removal, if loose, dry or otherwise incompetent soils are present that are more than 6" in depth, locally deeper removals may be required. The lateral extent of the over-excavation should extend a minimum of eight (8) feet beyond the perimeter edges of the footings or slabs.
- The bottoms of the over-excavations should then be scarified to a depth of at least 6 inches, flooded to induce local hydro-collapse and then recompacted to at least 90% relative compaction per ASTM D 1557.
- Following the approval and processing of the over-excavation bottom by a representative of GMU, the onsite material may be used as fill material to achieve the planned subgrade elevation.
- The fill material should then be placed in 6- to 8-inch-thick lifts, moisture conditioned to 2% above optimum moisture content, blended to achieve uniform moisture content, and compacted to achieve 90% relative compaction per ASTM D 1557.
- All building foundations shall bear on a minimum six (6) feet thick layer of new engineered fill.

Flatwork/Pavement Areas: Grading recommendations for the support of asphalt and concrete pavement and flatwork areas should consist of the following:

- All flatwork/pavement areas should be removed to at least four (4) feet below existing grade.
- The removals should provide for at least four (4) feet of new fill below the bottom of the structural asphalt and flatwork sections (i.e., below subgrade).
- The bottom of the removal should be scarified to a depth of 6 inches, flooded to induce local hydro-collapse, and recompacted to at least 90% relative compaction per ASTM D 1557.

Foundations for Miscellaneous Site Improvements (Site Walls, Retaining Walls, Monuments, Shade Structures, Light Poles, etc.): Corrective grading to support foundations for miscellaneous site improvements are provided below:

- All areas supporting miscellaneous foundations should be removed to at least five (5) feet below existing grade.

- Isolated pad or continuous foundations should be supported by at least four (4) feet of new engineering fill placed on in-situ soils.

Parks/Landscape/Agriculture Areas: It is our understanding that park, landscape, and agricultural areas will be left in their current state with no corrective grading planned. Consequently, corrective grading for the park sites, large landscape, and agricultural areas should be determined by the landscape architect and agronomist.

However, if grading is required to achieve site drainage or other reasons, the following should be noted/considered:

Depending on the depths of cuts to achieve design grades, large root structures from the existing citrus trees could be present after grading and could hinder the ground preparation and soil amendment efforts. In addition, sensitivity to settlement for the park site amenities such as playground improvements should be considered when determining the removal requirements. If no corrective grading is performed, then uneven surfaces could manifest over time creating issues with drainage and uneven play surfaces. Consequently, if desired, the following removals should be considered:

- Fill Areas
  Remove and recompact upper 1-2 foot.
- At-grade areas
  Remove and recompact upper 1-2 foot
- Shallow Cut areas
  Remove and recompact to provide a minimum of 1-2 foot of compacted fill.

Development Area East of Trabuco Creek – Alluvial Soils (Qal)

New Building Pads: Grading recommendations for support of the proposed new buildings (including additions) should consist of the following:

- The existing ground surface should be over-excavated a minimum depth of at least five (5) feet below existing grade or four (4) feet below bottom of proposed footings, whichever is deeper. Following removal, if loose, dry or otherwise incompetent soils are present that are more than 6" in depth, locally deeper removals may be required. The lateral extent of the over-excavation should extend a minimum of five (5) feet beyond the perimeter edges of the footings or slabs.
- The bottoms of the over-excavations should then be scarified to a depth of at least 6 inches, moisture conditioned to 3% above optimum moisture content, and recompacted to at least 90% relative compaction per ASTM D 1557.
- Following the approval and processing of the over-excavation bottom by a representative of GMU, the onsite material may be used as fill material to achieve the planned subgrade elevation.

- The fill material should then be placed in 6- to 8-inch-thick lifts, moisture conditioned to 3% above optimum moisture content, blended to achieve uniform moisture content, and compacted to achieve 90% relative compaction per ASTM D 1557.
- All building foundations shall bear on a minimum five (5) feet thick layer of new engineered fill.

Flatwork/Pavement Areas: Grading recommendations for the support of asphalt and concrete pavement and flatwork areas should consist of the following:

- All flatwork/pavement areas should be removed to at least two (2) feet below existing grade or one (1) foot below the bottom of the subgrade section.
- The removals should provide for at least one (1) foot of new fill below the bottom of the structural asphalt and flatwork sections (i.e., below subgrade).
- The bottom of the removal should be scarified to a depth of 6 inches, moisture conditioned to 3% above optimum moisture content, and recompacted to at least 90% relative compaction per ASTM D 1557.

Foundations for Miscellaneous Site Improvements (Site Walls, Retaining Walls, Monuments, Shade Structures, Light Poles, etc.): Corrective grading to support foundations for miscellaneous site improvements are provided below:

- All areas supporting miscellaneous foundations should be removed to at least three (3) feet below existing grade.
- Isolated pad or continuous foundations should be supported by at least two (2) feet of new engineering fill placed on in-situ soils.

Parks/Landscape/Agriculture Areas: It is our understanding that park, landscape and agricultural areas will be left in their current state with no corrective grading planned. Consequently, corrective grading for the park sites, large landscape and agricultural areas should be determined by the landscape architect and agronomist.

However, if grading is required to achieve site drainage or other reasons, the following should be noted/considered:

Depending on the depths of cuts to achieve design grades, large root structures from the existing citrus trees could be present after grading and could hinder the ground preparation and soil amendments efforts. In addition, sensitivity to settlement for the park site amenities such as playground improvements should be considered when determining the removal requirements. If no corrective grading is performed, then uneven surfaces could manifest over time creating issues with drainage and uneven play surfaces. Consequently, if desired the following removals should be considered:

- Fill Areas
  Remove and recompact upper 1-2 foot.
- At-grade areas
  Remove and recompact upper 1-2 foot
- Shallow Cut areas
  Remove and recompact to provide a minimum of 1-2 foot of compacted fill.

Excavations

Excavations should conform to the following OSHA requirements. Anticipated soil classifications are follows:

- East of Trabuco Creek: Type B soils.
- West of Trabuco Creek: Type C soils

Where removals are adjacent to roadways, other improvements etc., they should be set back 5 feet from the property line unless evaluated by GMU.

The above verbiage regarding excavation stability is presented for general guidance only. All aspects of construction stability are the responsibility of the contractor. All governing regulations in regards to excavation stability (i.e., OSHA, City, etc.) should be followed.

FILL MATERIAL AND PLACEMENT

Suitability and Selective Grading

All on-site soil materials within the limits of grading are suitable for use as compacted fill if care is taken to remove all significant organic and other decomposable debris and to separate and selectively place and/or stockpile rock materials larger than 6 inches in diameter.

Compaction Standard and Moisture Requirements

Structural Areas
Within structural areas (i.e., buildings, paved areas, roadways, etc.) all on-site soil material used as compacted fill, material processed in place, or used to backfill trenches should be moistened, dried, or blended as necessary to achieve a minimum of 2% -3% over optimum moisture content; 2% over for development areas west of Trabuco Creek and 3% over for soils east of Trabuco Creek. For example, if the optimum moisture content is 12%, the compacted fill's moisture content shall be at least 14%. After moisture conditioning, the fills should be densified to at least 90% relative compaction as determined by ASTM Test Method D 1557. Final surface subgrade soils should be frequently watered in order to keep the soil moist until building slabs, flatwork, or any other final improvements are installed. If the soil is allowed to dry out and deep shrinkage cracks appear, at least the upper 6 inches should be re-processed, moisture conditioned to 2% -3% over

optimum, and re-compacted.

Non-structural Areas
Within non-structural passive use areas (i.e., park sites, landscape areas, and agricultural areas, etc.) all on-site soil material used as compacted fill, material processed in place, or used to backfill trenches should be moistened, dried, or blended as necessary to achieve a minimum of 2% - 3% over optimum moisture content (i.e., if the optimum moisture content is 12%, the compacted fill's moisture content shall be at least 14%), and densified to at least 85% relative compaction as determined by ASTM Test Method D 1557.

Use of Rock or Broken Concrete

Based on the materials encountered during our investigation, large quantities of rock and broken concrete are not expected to be encountered in the fill. If encountered, no rock or broken concrete greater than 6 inches in diameter should be utilized in the fills. Consequently, existing fill soils may need to be screened prior to placement as approved engineered fills. Rock should not be nested and should be distributed throughout the fill at a distance that compaction can be achieved within the soil matrix.

Temporary Excavations and Construction Slopes

During site grading and construction, the contractor should conform to all applicable occupational and health standards, rules, regulations, and orders established by the State of California and the Federal Government, including shoring bracing, sloping, or other provisions as necessary. The contractor should also install shoring, sheet piling, cribbing, or whatever means are necessary to support existing structures adjacent to the grading limits. Final project design should include detailed analyses and recommendations for temporary excavations based on site-specific exploration.

PRELIMINARY FOUNDATION DESIGN CONSIDERATIONS AND PARAMETERS

SEISMIC DESIGN PARAMETERS

Site-specific seismic design parameters were determined using the USGS computer program title ASCE 7 Hazard Tool. Based on our field exploration and USGS V_{S30} data, Table 20.3-1 of ASCE 7-22 indicates that the sites be designated as Site Class D which corresponds to a "stiff soil" profile. The seismic design coefficients based on ASCE 7-22 are listed below in Table 6.

Table 6. 2022 CBC and ASCE 7-22 Seismic Design Parameters
(To be utilized as per the requirements of Section 11.4.8 of ASCE 7-22)

Seismic Item	Design Value	2022 ASCE 7-22 or 2022 CBC Reference
Site Class based on soil profile	D	ASCE 7-22 Chapter 20
Importance Factor $\mathbf{I_e}$	1.00	ASCE 7-22 Figure 22-1
Short Period Spectral Acceleration $\mathbf{S_s}$	1.36	USGS Seismic Design Maps
1-sec. Period Spectral Acceleration $\mathbf{S_1}$	0.43	USGS Seismic Design Maps
Short Period Design Spectral Acceleration $\mathbf{S_{DS}}$	1.07	ASCE 7-22 Equation 11.4-1
1-sec. Period Design Spectral Acceleration $\mathbf{S_{D1}}$	0.71	ASCE 7-22 Equation 11.4-2
Short Period MCE* Spectral Acceleration $\mathbf{S_{MS}}$	1.605	ASCE 7-22 Figure 22-1
1-sec. Period MCE Spectral Acceleration $\mathbf{S_{M1}}$	1.065	ASCE 7-22 Figure 22-2
Seismic Design Category	D	ASCE 7-22 Tables 11.6-1 and 11.6-2
Mapped MCE(c) Peak Ground Acceleration $\mathbf{PGA_M}$	0.60	ASCE 7-22 Figure 22-9
Short Period Transition Period $\mathbf{T_s}$ (sec)	0.663	
Long Period Transition Period $\mathbf{T_L}$ (sec)	8	ASCE 7-22 Figure 22-14

(a) Design Values Obtained from USGS Earthquake Hazards Program website that are based on the ASCE-7-22 and 2022 CBC and site coordinates of N 33.5237° and W 117.6697°.
(b) Design Values Determined per CBC Equations 16-20 through 16-23 and ASCE Tables 11.4-2 and 11.6.1-2.
(c) MCE: Maximum Considered Earthquake.

The Maximum Considered Earthquake (MCE) Peak Horizontal Ground Acceleration (PGA_M) is 0.60g as determined in accordance with ASCE 7-22. This PGA_M is primarily dominated by earthquakes with a mean magnitude of 6.6 at a mean distance of 7.7 miles from the site using the USGS 2014 Interactive Deaggregation website.

Per the 2022 CBC and ASCE 7-16, the Design Earthquake peak ground acceleration (PGA_D) may be assumed to be equivalent to $S_{DS}/2.5$; therefore, for the subject site, a PGA_D value of 0.428g (1.07g/2.5) should be used.

It should be recognized that much of Southern California is subject to some level of damaging ground shaking as a result of movement along the major active (and potentially active) fault zones that characterize this region. Design utilizing the 2022 CBC is not meant to completely protect against damage or loss of function. Therefore, the preceding parameters should be considered as minimum design criteria.

PRELIMINARY FOUNDATION CONSIDERATIONS AND RECOMMENDATIONS

General Discussion

The following summarizes the key geotechnical design constraints as well as our approach to the foundation design of proposed structures.

- Proposed Habitable/Occupied Structures in Development Area West of Trabuco Creek
  - Geotechnical Design Constraints
    - Static and Seismic Settlement
  - Design Approach
    - Stiffened Foundation Systems to accommodate settlement soils (i.e. Mat slabs, Ribbed slabs, etc.)
- Proposed Buildings in Development Area East of Trabuco Creek
  - Geotechnical Design Constraints
    - Static and Seismic Settlement
    - Expansive soils
    - Lateral Spreading Deformation
  - Design Approach
    - Mat slab to accommodate settlement, lateral spreading deformation, and expansion soil movements
- Bridge Foundations
  - Geotechnical Design Constraints
    - Lateral spreading deformation
  - Design approach
    - Piles to bedrock that withstand lateral spreading forces
    - Potential buttress grading to reduce required lateral pile capacity

General Foundation Design Discussion

The methods used in the design and construction of the slab foundation system should conform to all applicable and current codes, ordinances, and standards. The allowable limits selected for foundation deflection due to any differential soil expansion should be coordinated with the architect and structural engineer responsible for the design of the structure framing and roof systems. They should confirm that such deflection will not cause excessive distress to those systems or to interior and exterior walls and ceilings of the planned structures.

Design Settlement and Expansivity

- West of Trabuco Creek – Terrace Deposits (Qt)
  - Settlement (Assuming Corrective Grading)
    - Total Settlement:

        - Static Settlement: 1" over 40'
        - Seismic settlement: 0.75
      - Differential Settlement
        - ½ total over width of structure
    - Expansivity
      - Very low to low

- East of Trabuco Creek – Alluvial Soils (Qal)
  - Settlement (Assuming Corrective Grading Performed)
    - Total Settlement:
      - Static Settlement: 1" over 40'
      - Seismic Settlement: 1.3"
    - Differential Settlement
      - ½ total over width of structure
  - Expansivity
    - Medium /high – EI= 84/PI=30

General Foundation Design Parameters

West of Trabuco Creek – Terrace Deposits (Qt)

Bearing Material:	Engineered Fill
Allowable Bearing Value:	3000 psf, based on 12-inch-wide by 12-inch-deep footing (see subsequent sections for minimum recommended footing embedments) o May be increased 10% for each additional foot of width and by 20% for each additional foot of depth to a maximum of 5000 psf. o One-third increase for wind or seismic loading.
Allow. Coefficient of Friction:	0.4 for foundations directly in contact with onsite soils. o One-third increase for wind or seismic loading.
Allowable Passive Resistance:	350 psf/ft to a max of 3000 psf. o Disregard upper 6 inches o One-third increase for wind or seismic loading.
Modulus of Subgrade Reaction:	150 pci

East of Trabuco Creek – Alluvial Soils (Qal)

Bearing Material:	Engineered Fill
Allowable Bearing Value:	2000 psf, based on 12-inch-wide by 12-inch-deep footing (see subsequent sections for minimum recommended footing embedments) o May be increased 10% for each additional foot of width and by 20% for each additional foot of depth to a maximum of 4000 psf. o One-third increase for wind or seismic loading.
Allow. Coefficient of Friction:	0.30 for foundations directly in contact with onsite soils. o One-third increase for wind or seismic loading.
Allowable Passive Resistance:	275 psf/ft to a max of 2750 psf. o Disregard upper 6 inches o One-third increase for wind or seismic loading.
Modulus of Subgrade Reaction:	75 pci

Preliminary Conventional Foundation Design Recommendations (Ribbed Slabs)

Development Area East of Trabuco Creek – Alluvial Soils (Qal)

The following design parameters are considered applicable if conventional slabs-on-grade are used for the proposed structure. Per Section 1808.6 2 of the 2022 CBC, the slabs should be designed as ribbed slabs in accordance with the WRI/CRSI publication "Design of Slab-on-Ground Foundations". The following minimum design recommendations are preliminarily provided:

- Expansive Soils
    - Effective PI: 30
- Settlement
    - As per settlement section of this report
- Slab Thickness:
    - Minimum 5-inch-thick slab.
- Slab Reinforcement:
    - No. 4 bars at 18 inches on center, both ways.

- Slab Subgrade Moisture Content:
    - 3 percentage points over optimum to minimum depth of 18 inches.

- Footing Depths:
    - Perimeter Footings Constructed On-Grade: Minimum 24-inch embedment from lowest adjacent final grade.
    - Interior Footings: Minimum 18 inches below top of slabs.

- Footing Reinforcement:
    - Minimum (four) No. 4 bars, two top and two bottom, but final reinforcement to be determined by structural engineer.

<u>Development Area West of Trabuco Creek – Terrace Deposits (Qt)</u>

It is anticipated that conventional foundation/slabs may be used for structures in the western development area following corrective grading. The following preliminary design recommendations assume that proposed structures are not immediately adjacent the alluvial (Qal) - Terrace Deposits (Qt) contact (see Plate 2). Structures immediately adjacent to this contact may be subject to some lateral spreading deformations which could impact foundation design.

- Settlement
    - As per settlement section of this report
- Slab Thickness:
    - Minimum 5-inch-thick slab.
- Slab Reinforcement:
    - To be determined by structural engineer
- Slab Subgrade Moisture Content:
    - 2 percentage points over optimum to minimum depth of 18 inches.

- Footing Depths:
    - Perimeter Footings Constructed On-Grade: Minimum 24-inch embedment from lowest adjacent final grade
    - Interior Footings: Minimum 18 inches below top of slabs.

- Footing Reinforcement:
    - Minimum four No. 4 bars, two top and two bottom, but final reinforcement to be determined by structural engineer.

Preliminary Mat Slab Foundation Design Recommendations – Buildings in Development Area East of Trabuco Creek

Mat slabs may be required for buildings in the development area east of Trabuco Creek. These slabs will likely need to mitigate expansive soil movements as well as potential deformations from lateral spreading. Preliminary design recommendations are contained below.

Mat Slab Thickness:	Minimum 10-inch-thick slab.
Slab Reinforcement:	No. 4 bars at 18 inches on center, both ways.
Slab Subgrade Moisture Content:	3 percentage points over optimum to minimum depth of 18 inches.
Perimeter Thickened Edge:	Minimum 12-inch embedment from lowest adjacent final grade.

Post Tensioned Slabs

Recommendations for post-tensioned slabs can be developed if desired.

Special Foundation Design Comments

Lateral spreading deformation will significantly impact the proposed pedestrian bridge and buildings within the eastern development area. However, additional details (i.e. final locations, building type, bridge type, etc.) are required to develop final design recommendations. In addition, preliminary analyses indicate that additional exploration, testing and analyses would likely result in a more efficient design.

Vapor Retarder/Barrier System

- 10 Mil Stego® Wrap, Husky Yellow Guard®, or equivalent (15 mil Steg or equivalent may be considered for any structure with highly sensitive flooring, etc.)
    - Constructed below the entire slab area of the foundation system, including non-living areas.
    - Installed per manufacture's specifications as well as with all applicable recognized installation procedures such as ASTM E 1643-18A.
    - Joints between the sheets and the openings for utility piping should be lapped and taped.
    - If the barrier is not continuously placed across footings/ribs, the barrier should, as a minimum, be lapped into the sides of the footing/rib trenches down to the bottom of the trench.
    - Punctures in the vapor barrier should be repaired prior to concrete placement.

- The moisture vapor retarder may be placed directly on-grade. Prior to placing the retarder, the subgrade should be smooth and free of any protrusions that may damage the retarder.
- The need for sand above the moisture vapor retarder/barrier is not required from a geotechnical perspective. If sand is used, it should consist of at least 2 inches of clean dry sand (see *Note* below).
- To achieve full Green Code compliance, if required, the 15 mil vapor barrier should be underlain by a capillary break as described in the Green Code (i.e., 4-inch-thick layer of ½ inch or larger clean gravel or crushed rock containing no more than 10 percent of material that passes through the No. 4 sieve).

Note: Some structural engineers, geotechnical professionals, and concrete experts consider the clean sand above the moisture vapor barrier as a layer that can entrap excess water during concrete placement which later migrates up through the slab and adversely impacts moisture-sensitive floor coverings. This potential for future upward moisture intrusion into the concrete slab can be reduced by eliminating the sand layer and placing the concrete directly on the moisture vapor barrier. However, if this sand layer is eliminated, appropriate concrete curing methods must be implemented to ensure that the concrete slab cures uniformly. A qualified materials engineer with experience in slab design and construction should provide recommendations for alternative methods of curing and supervise the construction process to ensure uniform slab curing. Steps will also need to be taken to prevent puncturing of the vapor barrier during concrete placement.

Water Vapor Transmission

As discussed above, placement of a moisture vapor retarder/barrier below all slab areas is recommended. This moisture vapor retarder/barrier recommendation is intended only to reduce moisture vapor transmissions from the soil beneath the concrete and is consistent with the current standard of the industry for residential construction in Southern California. It is not intended to provide a "waterproof" or "vapor proof" barrier or reduce vapor transmission from sources above the retarder. Sources above the retarder include any sand placed on top of the retarder (i.e., to be determined by the project structural designer) and from the concrete itself (i.e., vapor emitted during the curing process). The evaluation of water vapor from any source and its effect on any aspect of the proposed living space above the slab (i.e., floor covering applicability, mold growth, etc.) is outside our purview and the scope of this report.

Floor Coverings

Prior to the placement of flooring, the floor slabs should be properly cured and tested to verify that the water vapor transmission rate (WVTR) is compatible with the flooring requirements.

CONCRETE

Based on the results of our laboratory testing, the onsite soils have moderate sulfate exposure per the 2022 CBC and elevated levels of chlorides. Therefore, we recommend using the following:

Structural Elements (i.e., foundations, walls, etc.)

- Cement Type: II/V
- Maximum Water Cement Ratio: 0.5
- Minimum Strength: 4,000 psi (geotechnical perspective only)
- Reinforcement steel should be covered by at least 3 inches of concrete

These recommendations will serve to minimize the potential of water and/or vapor transmission through the concrete, minimize the potential for physical attack to concrete from non-sulfate-based salts, and add additional protection to embedded steel reinforcement. In addition, wet curing of the concrete as described in ACI Publication 308 should be considered.

Non-structural Elements (i.e., flatwork, pavement, etc.)

Non-structural onsite concrete (i.e., walkways, patios, driveways, etc.) may be designed with concrete strengths that are determined by the engineer or designer responsible for that particular site improvement. The concrete design should account for the moderate sulfate content of the onsite soils.

The aforementioned recommendations regarding concrete are made from a soils perspective only. Final concrete mix design as well as any concrete testing is outside our purview. All applicable codes, ordinances, regulations, and guidelines should be followed regarding designing a durable concrete with respect to the potential for detrimental exposure from the on-site soils (i.e., severe sulfate exposure and high levels of chlorides) and/or changes in the environment.

CORROSION PROTECTION OF METAL STRUCTURES

The results of the laboratory chemical tests performed on a sample of soil collected within the site indicates that the on-site soils are moderately corrosive to metals. Consequently, metal structures in direct contact with the soil (i.e., underground metal conduits, pipelines, metal signposts, metal door frames, etc.) and/or in close proximity to the soil (wrought iron fencing, post-tension cable end caps, weep screeds, etc.) may be subject to corrosion.

Special protection measures should be implemented to adequately protect the improvements noted above. Use of special coatings or cathodic protection around buried metal structures has been shown to be beneficial in reducing corrosion potential. It should also be noted that a significant potential for copper piping corrosion has been detected in various areas of south Orange County

where similar soils are present. The potential for corrosion of ferrous metal reinforcing elements embedded in structural concrete will be minimized by the use of the recommended maximum water/cement ratio for concrete.

The above discussion is provided for general guidance regarding the anticipated corrosiveness of the on-site soils to typical metal structures used for construction. Detailed corrosion testing and recommendations for protecting buried ferrous metal and/or copper elements is beyond our purview.

If detailed testing is required, a corrosion engineer should be consulted to perform the testing and develop appropriate mitigation measures.

SITE WALL AND RETAINING WALL DESIGN CRITERIA

General

The following criterion is considered applicable to the design and construction of free-standing site walls and retaining walls within the subject project. Conventional retaining wall footings will be founded in engineered fill.

Foundation Design Parameters

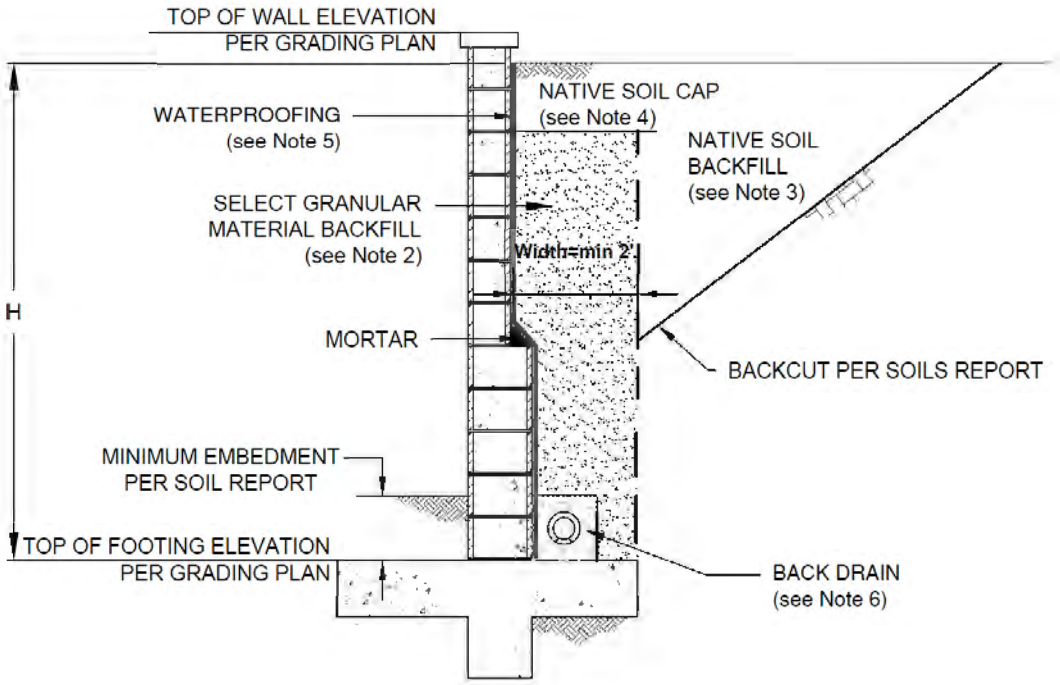
Development Area West of Trabuco Creek – Terrace Deposits (Qt)

Minimum Foundation Width:	24 inches (spread footing)
Minimum Foundation Depth:	Depth below lowest adjacent grade to bottom of footing: o 18 inches (spread footing)
Minimum Embedment:	Depth from outside grade to top of footing: o 12 inches (spread footing)
Bearing Materials:	Engineered fill
Allowable Bearing Capacity:	3,000 psf for footing on level ground o 10% increase for each additional foot of width and 20% increase for each additional foot of embedment to a maximum 4,500 psf (static) o 1/3 increase for seismic and wind loading
Coefficient of Friction:	0.4 (static) o 1/3 increase for seismic loading

Unit Weight of Backfill:	125 pcf
Allowable Passive Earth Pressure:	350 psf/ft of depth to maximum 3500 psf/ft(static) o 1/3 increase for seismic conditions o Ignore upper 6 inches o Reduce passive by 1/3 when combined with friction in sliding resistance
Wall Backfill:	See Retaining Wall Detail diagram and Notes (next page) for backfill requirements.

<u>Development Area East of Trabuco Creek – Alluvial Soils (Qal)</u>

Minimum Foundation Width:	24 inches (spread footing)
Minimum Foundation Depth:	Depth below lowest adjacent grade to bottom of footing: o 18 inches (spread footing)
Minimum Embedment:	Depth from outside grade to top of footing: o 12 inches (spread footing)
Bearing Materials:	Engineered fill
Allowable Bearing Capacity:	2,500 psf for footing on level ground o 10% increase for each additional foot of width and 20% increase for each additional foot of embedment to a maximum 4,500 psf (static) o 1/3 increase for seismic and wind loading
Coefficient of Friction:	0.35 (static) o 1/3 increase for seismic loading
Unit Weight of Backfill:	125 pcf
Allowable Passive Earth Pressure:	275 psf/ft of depth to maximum 2750 psf/ft(static) o 1/3 increase for seismic conditions o Ignore upper 6 inches o Reduce passive by 1/3 when combined with friction in sliding resistance
Wall Backfill:	See Retaining Wall Detail diagram and Notes (next page) for backfill requirements.



RETAINING WALL DETAIL
NOT TO SCALE

Retaining Wall Notes:

1. Final determination of the material to be used for backfill shall be made by our office.

2 All select retaining wall backfill to within 1 to 2 feet of final grade should consist of granular material possessing a very low (i.e., EI <20) expansion potential and a sand equivalent (SE)>20. Gravel, such as open, poorly graded rock (i.e., ¾-inch rock) will require filter fabric (Mirafi 180N or equivalent) to minimize the potential for migration of fines into the gravel.

3. All native wall backfill should be moisture conditioned as necessary to at least 3% over the optimum moisture content and compacted to a minimum of 90% relative compaction as determined by ASTM Test Method D 1557.

4. Fine-grained native soils should be used to cap the upper 2 feet of the select backfill zone where walls are greater than 3 feet in height. Where walls are less than 3 feet in height but greater than 2 feet, the fine-grained cap should not be greater than 1.5 feet, and where walls are less than 2 feet in height, the fine-grained cap should be limited to 1 foot.

5. The back side of the walls should be waterproofed down to the footing. The design and selection of the waterproofing system is outside the scope of this report.

6. A backdrain system should be installed per the requirements outlined in the "Wall Waterproofing and Drainage" section of this report.

7. Backdrain gradient should not be less than 1% when possible. The drains to outlet into area drains.

8. If the retaining wall backdrains cannot be outletted to an area drain system, a sump pump system(s) will need to be designed and constructed. Redundant back-up pumps or components are recommended. Design of this system is outside our purview and the scope of this report.

Wall Design Parameters

West of Trabuco Creek – Terrace Deposits (Qt)

Static Lateral Earth Pressures (EFP): 35 pcf (Active/Unrestrained – Level Backfill)
55 pcf (Active/Unrestrained – 2:1 Backfill)
50 pcf (At-Rest/Restrained – Level Backfill)
65 pcf (At-Rest/Restrained – 2:1 Backfill)

Unrestrained values are applicable only when the walls are designed and constructed as cantilevered walls allowing sufficient wall movement to mobilize active pressure conditions. Wall movement should not be less than 0.01 H (H = height of wall) for the unrestrained values to be applicable.

Seismic Lateral Earth Coefficient: K_H = (0.5) PGA* = (0.5)0.36g = 0.10g (Active)
(For Walls > 6' in Height) K_H = (0.75) PGA* = (0.75)0.36g = 0.18g (At-Rest)
*PGA=S_{DS}/2.5=0.36g

Seismic Pressures (EFP): 12.5 pcf (Unrestrained, def. ≤ 4"– Level Backfill)
(For Walls > 6' in Height) 22.5 pcf (Restrained, def. ≤ 1" – Level Backfill)

Weight of Backfill: 125 pcf

Control/Construction Joints: Maximum spacing of 20 feet and at angle points

East of Trabuco Creek – Alluvial Soils (Qal)

Static Lateral Earth Pressures (EFP): 45 pcf (Active/Unrestrained – Level Backfill)
65 pcf (Active/Unrestrained – 2:1 Backfill)

60 pcf (At-Rest/Restrained – Level Backfill)
80 pcf (At-Rest/Restrained – 2:1 Backfill)

Unrestrained values are applicable only when the walls are designed and constructed as cantilevered walls allowing sufficient wall movement to mobilize active pressure conditions. Wall movement should not be less than 0.01 H (H = height of wall) for the unrestrained values to be applicable.

Seismic Lateral Earth Coefficient: K_H = (0.5) PGA* = (0.5)0.36g = 0.10g (Active)
(For Walls > 6' in Height) K_H = (0.75) PGA* = (0.75)0.36g = 0.18g (At-Rest)
*PGA=S_{DS}/2.5=0.36g

Seismic Pressures (EFP): 12.5 pcf (Unrestrained, def. ≤ 4"– Level Backfill)
(For Walls > 6' in Height) 22.5 pcf (Restrained, def. ≤ 1" – Level Backfill)

Weight of Backfill: 125 pcf

Control/Construction Joints: Maximum spacing of 20 feet and at angle points

Wall Waterproofing and Drainage

The back side of all conventional retaining walls should be waterproofed per the project wall plans prior to placing subdrains or backfill. The design and selection of the waterproofing system is beyond GMU's scope of work.

To prevent the accumulation of water behind retaining walls, proper drainage should be provided. A conventional pipe and gravel subdrain system should be installed. A minimum 24-inch-wide column of ¾-inch, open-graded gravel should be placed directly behind the wall. A layer of filter fabric consisting of Mirafi 140N, or equivalent, should be placed between the column of gravel and the wall backfill materials. In addition, a backdrain should be constructed at the bottom of the wall backcut. The backdrain should consist of 4-inch-diameter perforated Schedule PVC pipe. The pipe should be installed with the perforations facing down and embedded in ¾-inch open-graded gravel. Approximately 1 cubic foot of gravel should be provided for each linear foot of perforated backdrain pipe. The entire pipe and gravel subdrain assembly should be completely wrapped in filter fabric consisting of Mirafi 140N or equivalent. The backdrains should outlet through 4-inch-diameter solid Schedule 40 PVC pipes. A minimum flow gradient of 2 percent should be maintained throughout the subdrain system.

If a limited area exists between the backcut and the back of the wall, a geotextile drain mat such as Mirafi Miradrain 6200, or equivalent, may be used in lieu of the gravel column. The drain mat should extend the full height and length of the wall, and the filter fabric side of the drain mat should be placed against the backcut.

ROADWAYS, PARKING LOTS, AND TRAILS – PRELIMINARY DESIGN RECOMENDATIONS

General

Background

It is our understanding that the development will consist of roadways, parking lots, and trails as described below.

- Roadways
    - Roadways may be either paved or be constructed from structural rock (i.e. CMB or equivalent)
    - Small concrete pads for trash truck receptacle areas, etc. may also be required.

- Parking Lots
    - Parking lots will be either paved or composed of structural rock (i.e., CMB or equivalent)
    - Small concrete pads for trash trucks, etc. may also be required.
- Trails
    - It is our understanding that the trails will consist of loose or compacted soil pending the desired use (i.e., horse trials vs. walking trails, etc.)

Geotechnical Conditions and Design R-values

The site conditions can be broken up into two general areas as described below.

- East side of Trabuco Creek (adjacent to Interstate 5)
    - Geotechnical Conditions
        - The surficial soils in this area consist of moderate to highly expansive clayey soils.
    - Preliminary Design R-value:
        - 5
- West side of Trabuco Creek
    - Geotechnical Conditions
        - The surficial soils in this area consist of clayey, silty and clayey sands
    - Preliminary Design R-value
        - 50

Roadway and Parking Lot Pavement Design

Pavement structural analysis was conducted in accordance with the Caltrans Highway Design Manual methodology, which incorporates the design traffic index (TI), subgrade soil strength determined through R-value testing, and the typical gravel factors for the various pavement layers. Various pavement layer types and thicknesses were analyzed to achieve structural adequacy.
For this evaluation, composite pavement consists of an asphalt concrete (AC) layer constructed over a properly placed aggregate base (AB) layer on a prepared subgrade.

Full-depth aggregate base refers to an AB layer constructed directly on a prepared subgrade without an AC layer. Because an aggregate base surface is a granular, cohesionless material, it is inherently more susceptible to particle displacement under repeated traffic loading and environmental conditions. As a result, periodic maintenance should be expected to preserve long-term performance. This typically includes annual inspections and, when necessary, regrading or localized repairs to correct rutting, surface irregularities, or deformation that may develop over time. While proper drainage design and surface protection can reduce these maintenance needs, some level of ongoing management will still be required.

Based on our analysis, we have developed pavement thickness recommendations designed to achieve a 20-year design life using assumed traffic indices (TI). Subgrade soil types and R-value testing identified two predominant conditions, separated by Trabuco Creek. The tables below summarize the recommended minimum pavement thicknesses for the various pavement areas and uses.

Table 7: East of Trabuco Creek – Pavement Section Recommendations

Area	TI	R-value	Pavement Section		
			Composite Pavement (AC over AB)	AB over Subgrade	PCC Pavement
Parking Stalls	4.5	5	4.0" AC / 6.0" AB	17.0"	8" PCC(1) over 6" AB
General Roadway	5.0		5.0" AC / 8.0" AB	19.0"	
Emergency Access	5.5		5.0" AC / 8.0" AB	21.0"	

Note 1: No. 3 rebar, 18" on-center, both directions, extended into thickened edge. Thickened edge: one No. 3 bar placed in long direction, doweled into adjacent curbs or structures and across cold joints/expansion joints with No.3 bars at 18" on-center. If dowels are placed in cored holes, the cored holes shall be placed at alternating in-plane angles (i.e., not cored straight into the slab).

Table 8: West of Trabuco Creek – Pavement Section Recommendations

Area	TI	R-value	Pavement Section		
			Composite Pavement (AC over AB)	AB over Subgrade	PCC Pavement
Parking Stalls	4.5	50	4.0" AC / 6.0" AB	10.0"	6" PCC(1) over 3" AB
General Roadway	5.0		4.0" AC / 6.0" AB	11.0"	
Emergency Access	5.5		4.0" AC / 6.0" AB	9.0"	

Note 1: No. 3 rebar, 18" on-center, both directions, extended into thickened edge. Thickened edge: one No. 3 bar placed in long direction, doweled into adjacent curbs or structures and across cold joints/expansion joints with No.3 bars at 18" on-center. If dowels are placed in cored holes, the cored holes shall be placed at alternating in-plane angles (i.e., not cored straight into the slab).

Implementing any of these pavement structural sections involves:

- Performing the corrective grading described in the "Corrective Grading" section; and

- Installing the AB layer to at least 95% relative compaction and moisture conditioning to at least optimum moisture content, placed in lifts no greater than 4 inches thick. The maximum density and optimum moisture content of the AB should be determined by ASTM D 1557.

The aggregate base (AB) material recommended is Crushed Miscellaneous Base (CMB) or Crushed Aggregate Base (CAB), meeting "Greenbook" Section 200-2.

The recommended asphalt concrete (AC) mix is Type IIIC3 PG 64-10 R0 for both the AC surface and AC base course layers, meeting Greenbook Section 203-6.

The recommended Portland cement concrete (PCC) mix is 560-C-3250, meeting Greenbook Section 201-1.

Unstable Subgrade Materials

Based on the soil types encountered and the moisture contents measured from samples collected, it is our opinion that there is some potential for unstable materials to be exposed during construction. If unstable materials are exposed, the following recommendations can be implemented.

- Replacing unstable subgrade with a "sacrificial AC bridging" layer (if AC section will be implemented): An additional AC layer referred to as a "sacrificial AC bridging" layer can be installed to help bridge over the unstable subgrade prior to installation of the overlaying structural pavement layer(s). The project's geotechnical consultant will determine the depth to the bottom of the sacrificial AC bridging layer (i.e., thickness of the sacrificial AC bridging layer).

- Replacing unstable subgrade with aggregate base: Replace the unstable soil to a maximum depth of 18 inches with aggregate base. The actual depth of wet soil removal should be determined in the field by the project's geotechnical consultant. The initial lift of the aggregate base should consist of a maximum 3- to 4-inch loose lift that is then mechanically worked into the removal of bottom soils with equipment approved by the geotechnical consultant (i.e., sheepsfoot compactor, track dozer, etc.).

- Replacing unstable subgrade with aggregate base and subgrade stabilization geotextile: If the depth of the subgrade stabilization process needs to be limited or field conditions necessitate additional stabilization measures, as determined by the geotechnical consultant, use a subgrade stabilization geotextile. The subgrade stabilization geotextile (Mirafi RS580i or approved equivalent) should be installed at the bottom of the excavation. The project's geotechnical consultant will determine the depth to the bottom of excavation (i.e., thickness of AB).

- "Drying back" of wet unstable subgrade material, if time allows: Procedures to dry back the wet unstable soil consist of thoroughly scarifying, ripping, aerating, and mixing the wet material to a depth as determined in the field by the project's geotechnical consultant, until it dries back to near optimum moisture content. The amount of time and repetitions of this process will depend on how wet the subgrade soils are, weather conditions, and how thoroughly and frequently the procedures are performed.

Trails

If certain trails require a hard surface for pedestrian walking trails, etc., then the following recommendations may be followed.

- The upper 1 foot shall be removed and recompacted to 90% relative compaction per ASTM D 1557 at a minimum of 2% over optimum moisture content.

It should be noted that given that this will not remove all unsuitable soils, regular trail maintenance and re-compaction efforts may be required.

PEDESTRIAN CONCRETE FLATWORK DESIGN RECOMMENDATIONS

Pedestrian flatwork areas, such as concrete walkways and patios, and pre-cast concrete pavers should be designed in minimum accordance with the recommendations contained in Table 7 below. Aggregate base may consist of either CAB or CMB as per current Greenbook standards and should be compacted to at least 95% relative compaction. The underlying subgrade soils should be compacted to at least 90% relative compaction.

For concrete flatwork, it should be noted that the recommendations contained in the table are largely to improve "post-cure" performance relative to expansive soils. All other aspects of concrete design (i.e., concrete mix design, curing, type, and location of joints, etc.) as well as concrete inspection of any kind is outside our purview. It is recommended that the final flatwork design be reviewed by our office prior to bidding.

Even with extensive crack control and expansive soil mitigation, all concrete flatwork will crack and move (i.e., lift) to some degree due to a variety of mechanisms. Consequently, concrete cracking and movement and hence concrete repair/replacement should be anticipated.

TABLE 9A: PRELIMIANRY CONCRETE FLATWORK RECOMMENDATIONS – DEVELOPMENT AREA EAST OF TRABUCO CREEK

Description	Subgrade Preparation	Minimum Concrete Thickness (Full)	Edge Thickness	Reinforcement[2]	Control Joint Spacing (Maximum)	Cement Type	Sulfate Resistance
Isolated Concrete Sidewalks and Walkways (≤5 feet in width) [4]	1) 3% over optimum to 12" [1], 2) 2" of sand or well graded rock (i.e., Class II base or equiv.) above moisture conditioned subgrade.	4 inches	Not Required	1) No. 3 bars at 18" o.c. [2], 2) where adjacent to curbs or structures and at cold joints/expansion joints use dowels: No. 3 bars at 18" o.c. [5]	5 feet	V	(3)
Concrete Patios, Courtyards and Walkways (>5 feet in width) [4]	1) 3% over optimum to 18"[1], 2) 1 2" of sand or well graded rock (i.e., Class II base or equiv.) above moisture conditioned subgrade.	5 inches	Where adjacent to landscape areas – 8" from adjacent finish grade. Min. 8" width	1) No. 3 bars at 18" o.c. [2] extend into thickened edge, 2) where adjacent to structures and at cold joints/expansion joints use dowels: No 3 bars @ 18" o.c. [5]	8 feet	V	(3)
Concrete Driveways[4]	1) 3% over optimum to 18" [1], 2) 1 2" of sand or well graded rock (i.e., Class II base or equiv.) above moisture conditioned subgrade.	6 inches	Where adjacent to landscape areas - 8" from adjacent finish grade. Min. 8" width	1) No. 3 bars @ 18" o.c. [2] extend into thickened edge; 2) dowel into garage slab and where adjacent to sidewalks, curbs and at cold joints/expansion joints - use dowels: No. 3 bars @ 18" o.c. [5]	10 feet	V	(3)
Concrete Interlocking Pavers (non-vehicular) [4,6]	1) 3% over optimum to 18"[1], 2) 5 inches of CAB or CMB compacted to a minimum of 95% relative compaction or concrete sub-slab may be used in lieu of base section (see adjacent columns).	4- inch concrete sub-slab if base section not used	Where adjacent to landscape areas - 8" from adjacent finish grade. Min. 8" width	1) Slab – No. 3 bars @ 18" o.c. [2] extend into thickened edge, 2) where adjacent to structures, curbs, etc. use dowels: No. 3 @ 18" o.c. [5]	10 feet	V	(3)

(1) The moisture content of the subgrade must be verified by the geotechnical consultant prior to sand/rock placement.
(2) Reinforcement to be placed at or above the mid-point of the slab (i.e., a minimum of 2.0 to 2.5 inches above the prepared subgrade).
(3) Soils having severe levels of sulfates as defined by CBC are expected. Concrete mix design shall be selected by the concrete designer. Concrete mix design is outside the geotechnical engineer's purview.
(4) Where flatwork is adjacent a stucco surface, a ¼" to ½" foam separation/expansion joint should be used.
(5) If dowels are placed in cored holes, the cored holes shall be placed at alternating in-plane angles (i.e., not cored straight into slab).
(6) Pavers to be installed per minimum manufacturer's recommendations.

TABLE 9B: PRELIMINARY CONCRETE FLATWORK RECOMMENDATIONS – WEST OF TRABUCO CREEK

Description	Subgrade Preparation	Minimum Concrete Thickness (Full)	Edge Thickness	Reinforcement[2]	Control Joint Spacing (Maximum)	Cement Type	Sulfate Resistance
Isolated Concrete Sidewalks and Walkways (≤5 feet in width) [4]	1) 2% over optimum to 12" [1], 2) optional 2" of sand or well graded rock (i.e., Class II base or equiv.) above moisture conditioned subgrade.	4 inches	Not Required	1) No. 3 bars at 24" o.c. [2], 2) where adjacent to curbs or structures and at cold joints/expansion joints use dowels: No. 3 bars at 24" o.c. [5]	5 feet	V	(3)
Concrete Patios, Courtyards and Walkways (>5 feet in width) [4]	1) 2% over optimum to 12"[1], 2) optional 2" of sand or well graded rock (i.e., Class II base or equiv.) above moisture conditioned subgrade.	4 inches	Where adjacent to landscape areas – 8" from adjacent finish grade. Min. 8" width	1) No. 3 bars at 24" o.c. [2] extend into thickened edge, 2) where adjacent to structures and at cold joints/expansion joints use dowels: No 3 bars @ 18" o.c. [5]	8 feet	V	(3)
Concrete Driveways[4]	1) 2% over optimum to 12" [1], 2) optional 2" of sand or well graded rock (i.e., Class II base or equiv.) above moisture conditioned subgrade.	5 inches	Where adjacent to landscape areas - 8" from adjacent finish grade. Min. 8" width	1) No. 3 bars @ 24" o.c. [2] extend into thickened edge; 2) dowel into garage slab and where adjacent to sidewalks, curbs and at cold joints/expansion joints - use dowels: No. 3 bars @ 18" o.c. [5]	10 feet	V	(3)
Concrete Interlocking Pavers (non-vehicular) [4,6]	1) 2% over optimum to 18"[1], 2) 4 inches of CAB or CMB compacted to a minimum of 95% relative compaction or concrete sub-slab may be used in lieu of base section (see adjacent columns).	4- inch concrete sub-slab if base section not used	Where adjacent to landscape areas - 8" from adjacent finish grade. Min. 8" width	1) Slab – No. 3 bars @ 24" o.c. [2] extend into thickened edge, 2) where adjacent to structures, curbs, etc. use dowels: No. 3 @ 18" o.c. [5]	10 feet	V	(3)

UTILITY TRENCH BACKFILL CONSIDERATIONS

General

New utility line pipeline trenches should be backfilled with select bedding materials beneath and around the pipes (pipe zone) and compacted soil above the pipe bedding. Recommendations for the types of the materials to be used and the proper placement of these materials are provided in the following sections.

Pipe Zone (Bedding and Shading)

The pipe bedding and shading materials should extend from at least 6 inches below the pipes to at least 12 inches above the crown of the pipes. Pipe bedding and shading should consist of either clean sand with a sand equivalent (SE) of at least 30, or crushed rock. If crushed rock is used, it should consist of ¾-inch crushed rock that conforms to Table 200-1.2.1 (A) of the current "Greenbook." Pipe bedding and shading should also meet the minimum requirements of the City of San Juan Capistrano. If the requirements of the City are more stringent, they should take precedence over the geotechnical recommendations. Sufficient laboratory testing should be performed to verify the bedding and shading meets the minimum requirements of the "Greenbook" and City of San Juan Capistrano grading code.

Based on our subsurface exploration and knowledge of the onsite materials, the soils that will be excavated from the pipeline trenches will not meet the recommendations for pipe bedding and shading materials; therefore, imported materials will be required for pipe bedding and shading.

Granular pipe bedding and shading material having a sand equivalent of 30 or greater should be properly placed in thicknesses not exceeding 3 feet, and then sufficiently flooded or jetted in place. Crushed rock, if used, should be capped with filter fabric (Mirafi 180N, or equivalent) to prevent the migration of fines into the rock.

Trench Backfill

All existing soil material within the limits of the site are considered suitable for use as trench backfill above the pipe bedding and shading zone if care is taken to remove all significant organic and other decomposable debris, moisture condition the soil materials as necessary, and separate and selectively place and/or stockpile any inert materials larger than 6 inches in maximum diameter.

Imported soils are not anticipated for backfill since the on-site soils are suitable. However, if imported soils are used, the soils should consist of clean, granular materials with physical and chemical characteristics similar to or better than those described herein for on-site soils. Any imported soils to be used as backfill should be evaluated and approved by GMU prior to placement.

Soils to be used as trench backfill should be moistened, dried, or blended as necessary to achieve a minimum of 3% over optimum moisture content (i.e., if the optimum moisture content is 11%, the compacted fill's moisture content shall be at least 14%), placed in lifts, which prior to compaction, shall not exceed the thickness specified in section 306-12.3 of the current "Greenbook" for various types of equipment, and mechanically compacted/densified to at least 90% relative compaction as determined by ASTM Test Method D 1557. Jetting is not permitted in this trench zone.

No rock or broken concrete greater than 6 inches in maximum diameter should be utilized in the trench backfills.

FUTURE EVALUATION/REPORTS, PLAN REVIEW AND GEOTECHCNIAL OBERVATION AND TESTING

Future Investigations and Reports

This report is based on the conceptual design shown on the "Master Plan Core Amenities" exhibit. As the project progresses through the design phases this plan may change and those changes could necessitate additional subsurface investigations. The future anticipated design level reports include:

- Supplemental investigation and design for:
  - Lateral spreading
  - Bridge Foundation design
  - Eastern development area foundation design
- Geotechnical Review of the Final Development Plan
- Additional foundation evaluation and/or for proposed structures pending type and location.

Plan Review

The following plans should be reviewed by our office for conformance to our geotechnical recommendations:

- **Grading Plans**
- **Foundation Plans**
- **Landscaping Plans**

Geotechnical Observation and Testing

As geotechnical observation and testing is an extension of our design recommendations herein, geotechnical observation and testing will need to be performed by GMU during the following stages of grading and construction if GMU is to remain as the geotechnical engineer of record:

- During site clearing and grubbing.
- During removal of any buried irrigation lines or other subsurface structures.
- During all phases of grading including over-excavation, temporary excavations, removals, scarification, ground preparation, moisture conditioning, proof-rolling, over-excavation, and placement and compaction of all fill materials.
- During installation of all foundation elements.
- During backfill of the underground utilities.
- When any unusual conditions are encountered.

LIMITATIONS

All parties reviewing or utilizing this report should recognize that the findings, conclusions, and recommendations presented represent the results of our professional geological and geotechnical engineering efforts and judgements. Due to the inexact nature of the state of the art of these professions and the possible occurrence of undetected variables in subsurface conditions, we cannot guarantee that the conditions actually encountered during grading and foundation installation will be identical to those observed and sampled during our study or that there are no unknown subsurface conditions which could have an adverse effect on the use of the property. We have exercised a degree of care comparable to the standard of practice presently maintained by other professionals in the fields of geotechnical engineering and engineering geology and believe that our findings present a reasonably representative description of geotechnical conditions and their probable influence on the grading and use of the property.

Because our conclusions and recommendations are based on a limited amount of current and previous geotechnical exploration and analysis, all parties should recognize the need for possible revisions to our conclusions and recommendations during grading of the project.

Additionally, our conclusions and recommendations are based on the assumption that our firm will act as the geotechnical engineer of record during grading of the project to observe the actual conditions exposed, to verify our design concepts and the grading contractor's general compliance with the project geotechnical specifications, and to provide our revised conclusions and recommendations should subsurface conditions differ significantly from those used as the basis for our conclusions and recommendations presented in this report.

Detailed corrosion testing and recommendations for protecting buried ferrous metal and/or copper elements are beyond our purview.

No screening or testing for hazardous material was performed and is beyond our purview.

This report has not been prepared for use by other parties or projects other than those named or described herein. This report may not contain sufficient information for other parties or other purposes.

CLOSURE

We are pleased to present the results of our geotechnical investigation and to provide preliminary design recommendations for this project. The Plates and Appendices that complete this report are listed in the Table of Contents.

If you have any questions concerning our findings or recommendations, please do not hesitate to contact us and we will be happy to discuss them with you.



John Pettross, PG, CEG 2043
Associate Geologist



Gregory Silver, M.Sc., PE, GE 2336
Principal Geotechnical Engineer

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(3) LGC Geotechnical, 2012b, "Laboratory Testing of Potential Import Stockpile Soils, Proposed Dog Park, Northwest Open Space, San Juan Capistrano, Project Number 12023-01, dated October 4, 2012.

(4) Petra, 2009, *"Geotechnical Investigation, Proposed Park, Northwest Open Space, Phase 1A Master Plan Improvements, City of San Juan Capistrano, California"* J.N. 250-09, dated September 14, 2009.

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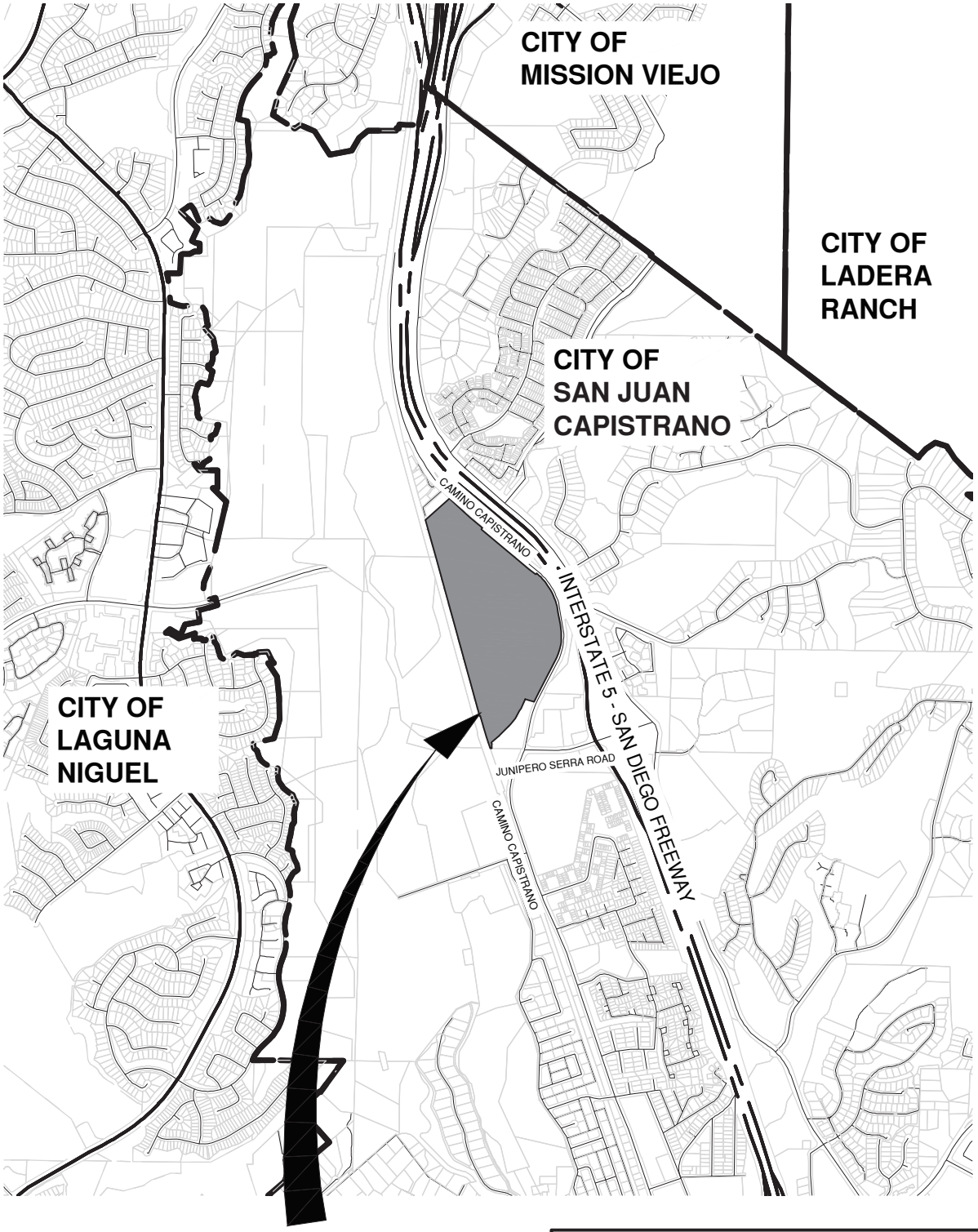
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Rathje and Antonakos, 2011, Prediction of Dynamic Response and Sliding Displacement of a Sliding Mass During Earthquake Shaking.



PROJECT LOCATION
LEGACY RANCH, SAN JUAN CAPISTRANO NORTHWEST OPEN SPACE, CA

0 2000'

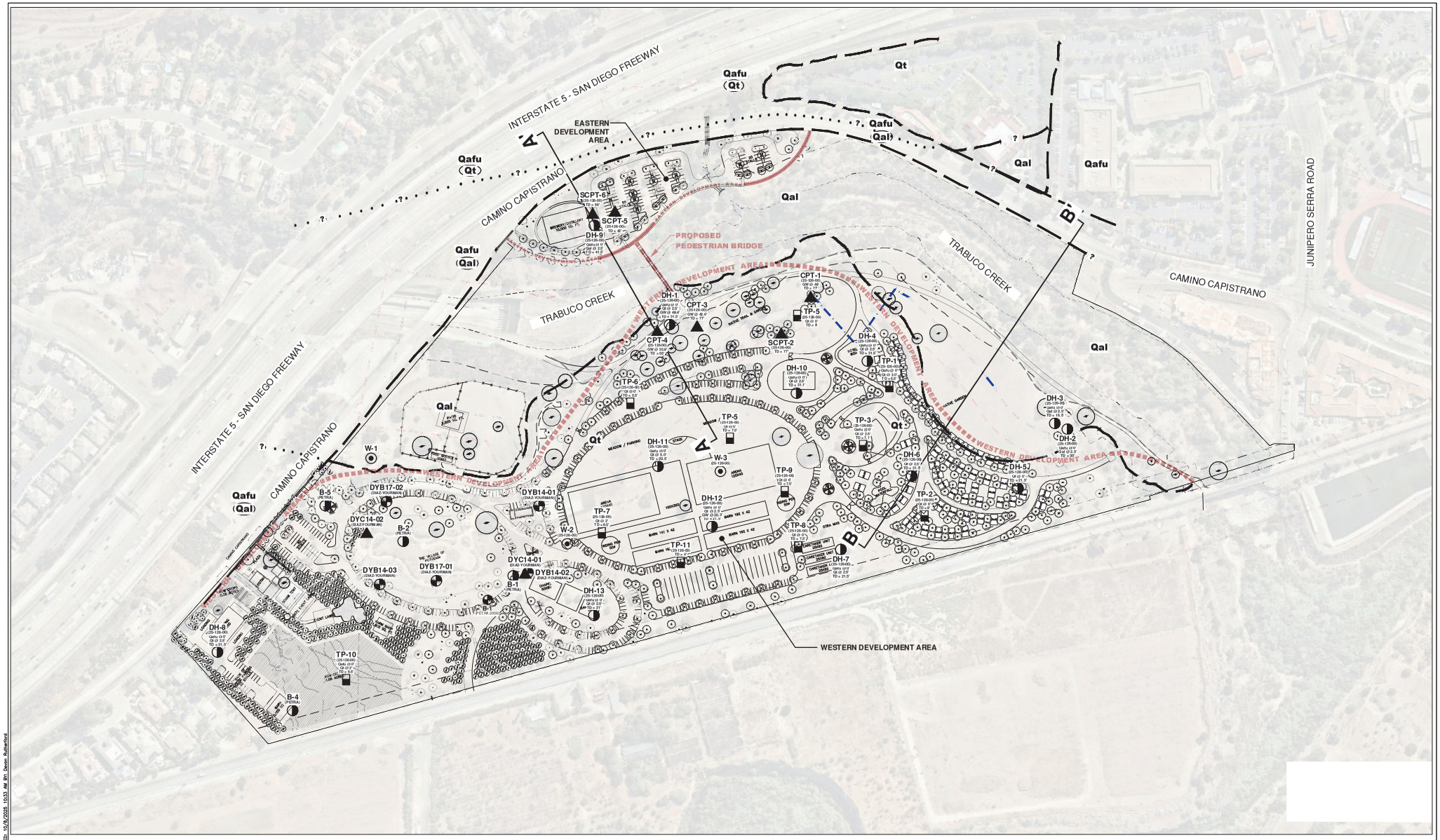
LOCATION MAP

GMU ENGINEERS & GEOLOGISTS

Date:	OCTOBER 2025
Project No.:	25.126.00

Plate 1

DRAWING: q:\2025\25-126-00\dwg\2512600_plate 1_location map.dwg PLOTTED: 10/8/2025 10:51 AM BY: Devon Rutherford



GEOTECHNICAL LEGEND

Qafu	UNDOCUMENTED ARTIFICIAL FILL
Qal	ALLUVIUM (CIRCLED WHERE BURIED)
Qt	TERRACE DEPOSITS (CIRCLED WHERE BURIED)
——— ———	GEOLOGIC CONTACT - ? WHERE UNCERTAIN
. . . . .	UNDERLYING GEOLOGIC CONTACT
DH-13 (35-126-00)	APPROXIMATE LOCATION OF HOLLOW STEM AUGER BORING BY GMU ENGINEERS & GEOLOGISTS
B-2 (PETRA)	APPROXIMATE LOCATION OF HOLLOW STEM AUGER BORING BY PETRA GEOTECHNICAL 2009
DYB17-02 (DIAZ-YOURMAN AH)	APPROXIMATE LOCATION OF HAND AUGER BORING BY DIAZ-YOURMAN 2017
W-1 (35-126-00)	APPROXIMATE LOCATION OF WELL
CPT-4 (35-126-00)	APPROXIMATE LOCATION OF CONE PENETRATION TEST BY GMU ENGINEERS & GEOLOGISTS
SCPT-6 (35-126-00)	APPROXIMATE LOCATION OF SEISMIC CONE PENETRATION TEST BY GMU ENGINEERS & GEOLOGISTS
DYC14-02 (DIAZ-YOURMAN)	APPROXIMATE LOCATION OF PERCOLATION TEST BY DIAZ-YOURMAN 2017
TP-11 (35-126-00)	APPROXIMATE LOCATION OF TEST PIT BY GMU ENGINEERS & GEOLOGISTS
B B'	GEOTECHNICAL SECTION LINE

0 100' 200'

GEOTECHNICAL MAP

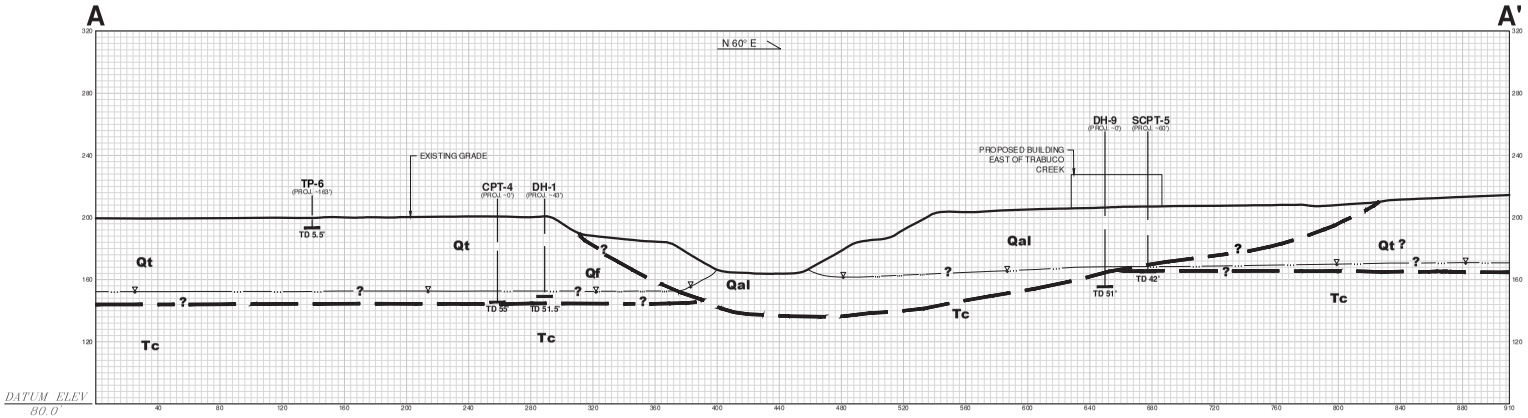
GMU

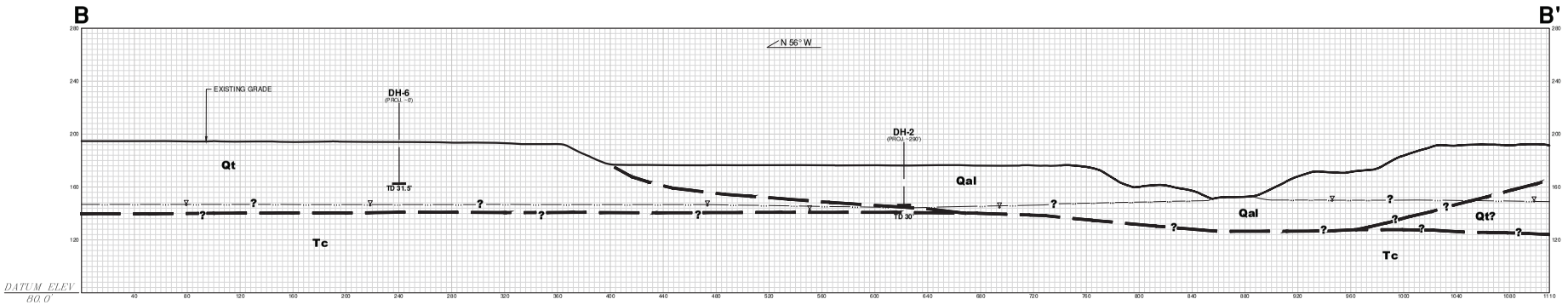
Date: OCTOBER 2025

Project No.: 25126.00

Plate 2

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0 40' 80'

SECTION A-A' & B-B'

GMU ENGINEERS & GEOLOGISTS

Date:	OCTOBER 2025
Project No.:	25.126.00

Plate 3

APPENDIX A

Geotechnical Exploration Procedures and Logs

APPENDIX A

GMU GEOTECHNICAL EXPLORATION PROCEDURES AND LOGS

Our exploration at the subject site consisted of thirteen (13) hollow stem auger drill holes, eleven (11) backhoe test pits, and six (6) cone penetration tests (CPT). The estimated locations of the explorations are shown on Plate 2 – Geotechnical Map. Our drill holes were logged by a Certified Engineering Geologist or a Staff Geologist and Cal Mod, SPT, and bulk samples of the excavated soils were collected. During hollow stem auger drilling, Cal Mod relatively undisturbed samples were taken using a 3.0-inch outside-diameter drive sampler which contains a 2.416-inch-diameter brass sample sleeve 6 inches in length. Standard penetration testing (SPT) with a 2.0-inch outside diameter split spoon sampler without liners was performed in the borings during advancement. Blow counts recorded during sampling from the Cal Mod and SPT are shown on the drill hole logs. The logs of each drill hole and test pit are contained in this Appendix A-1, and the Legend to Logs is presented as Plate A-1 and A-2. Furthermore, additional exploration logs performed by GMU are contained in the following Appendix A-2.

The geologic and engineering field descriptions and classifications that appear on these logs are prepared according to Corps of Engineers and Bureau of Reclamation standards. Major soil classifications are prepared according to the Unified Soil Classification System as modified by ASTM Standard No. 2487. Since the descriptions and classifications that appear on the Log of Boring and Test Pits are intended to be that which most accurately describe a given interval of a boring and test pit (frequently an interval of several feet), discrepancies do occur in the Unified Soil Classification System nomenclature between that interval and a particular sample in that interval. For example, an 8-foot-thick interval in a log may be identified as silty sand (SM) while one sample taken within the interval may have individually been identified as sandy silt (ML). This discrepancy is frequently allowed to remain to emphasize the occurrence of local textural variations in the interval.

MAJOR DIVISIONS			Group Letter	Symbol	TYPICAL NAMES
COARSE-GRAINED SOILS More Than 50% Retained On No.200 Sieve Based on The Material Passing The 3-Inch (75mm) Sieve. Reference: ASTM Standard D2487	GRAVELS 50% or More of Coarse Fraction Retained on No.4 Sieve	Clean Gravels	GW		Well Graded Gravels and Gravel-Sand Mixtures, Little or No Fines.
			GP		Poorly Graded Gravels and Gravel-Sand Mixtures Little or No Fines.
		Gravels With Fines	GM		Silty Gravels, Gravel-Sand-Silt Mixtures.
			GC		Clayey Gravels, Gravel-Sand-Clay Mixtures.
	SANDS More Than 50% of Coarse Fraction Passes No.4 Sieve	Clean Sands	SW		Well Graded Sands and Gravelly Sands, Little or No Fines.
			SP		Poorly Graded Sands and Gravelly Sands, Little or No Fines.
		Sands With Fines	SM		Silty Sands, Sand-Silt Mixtures.
			SC		Clayey Sands, Sand-Clay Mixtures.
FINE-GRAINED SOILS 50% or More Passe The No.200 Sieve Based on The Material Passing The 3-Inch (75mm) Sieve. Reference: ASTM Standard D2487	SILTS AND CLAYS Liquid Limit Less Than 50%		ML		Inorganic Silts, Very Fine Sands, Rock Flour, Silty or Clayey Fine Sands or Clayey Silts With Slight Plasticity.
			CL		Inorganic Clays of Low To Medium Plasticity, Gravelly Clays, Sandy Clays, Silty Clays, Lean Clays.
			OL		Organic Silts and Organic Silty Clays of Low Plasticity
	SILTS AND CLAYS Liquid Limit 50% or Greater		MH		Inorganic Silts, Micaceous or Diatomaceous Fine Sandy or Silty Soils, Elastic Silts.
			CH		Inorganic Clays of High Plasticity, Fat Clays.
			OH		Organic Clays of Medium To High Plasticity, Organic Silts.
HIGHLY ORGANIC SOILS			PT		Peat and Other Highly Organic Soils.

The descriptive terminology of the logs is modified from current ASTM Standards to suit the purposes of this study

ADDITIONAL TESTS

DS = Direct Shear
HY = Hydrometer Test
TC = Triaxial Compression Test
UC = Unconfined Compression
CN = Consolidation Test
(T) = Time Rate
EX = Expansion Test
CP = Compaction Test
PS = Particle Size Distribution
EI = Expansion Index
SE = Sand Equivalent Test
AL = Atterberg Limits
FC = Chemical Tests
RV = Resistance Value
SG = Specific Gravity
SU = Sulfates
CH = Chlorides
MR = Minimum Resistivity
pH
(N) = Natural Undisturbed Sample
(R) = Remolded Sample
CS = Collapse Test/Swell-Settlement

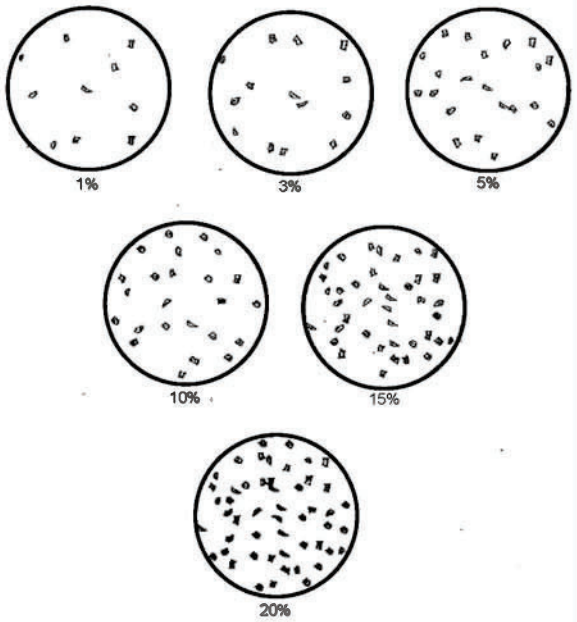
GEOLOGIC NOMENCLATURE

B = Bedding C = Contact J = Joint
F = Fracture Flt = Fault S = Shear
RS = Rupture Surface = Seepage
= Groundwater

SAMPLE SYMBOLS

Undisturbed Sample (California Sample)
Undisturbed Sample (Shelby Tube)
Bulk Sample
Unsuccessful Sampling Attempt
SPT Sample

5
10 Blows per 6-Inches Penetration
15
10: 10 Blows for 12-Inches Penetration
6/4": 6 Blows for 4-Inches Penetration
P: Push
(13): Uncorrected Blow Counts ("N" Values) for 12-Inches Penetration- Standard Penetration Test (SPT)



GMU

LEGEND TO LOGS

ASTM Designation: D 2487
(Based on Unified Soil Classification System)

Plate
A-1

P8-11/16/2012

SOIL DENSITY/CONSISTENCY

FINE GRAINED

Consistency	Field Test	SPT (#blows/foot)	Mod (#blows/foot)
Very Soft	Easily penetrated by thumb, exudes between fingers	<2	<3
Soft	Easily penetrated one inch by thumb, molded by fingers	2-4	3-6
Firm	Penetrated over 1/2 inch by thumb with moderate effort	4-8	6-12
Stiff	Penetrated about 1/2 inch by thumb with great effort	8-15	12-25
Very Stiff	Readily indented by thumbnail	15-30	25-50
Hard	Indented with difficulty by thumbnail	>30	>50

COARSE GRAINED

Density	Field Test	SPT (#blows/foot)	Mod (#blows/foot)
Very Loose	Easily penetrated with 0.5" rod pushed by hand	<4	<5
Loose	Easily penetrated with 0.5" rod pushed by hand	4-10	5-12
Medium Dense	Easily penetrated 1' with 0.5" rod driven by 5lb hammer	10-30	12-35
Dense	Dificult to penetrat 1' with 0.5" rod driven by 5lb hammer	31-50	35-60
Very Dense	Penetrated few inches with 0.5" rod driven by 5lb hammer	>50	>60

BEDROCK HARDNESS

Density	Field Test	SPT (#blows/foot)
Soft	Can be crushed by hand, soil like and structureless	1-30
Moderately Hard	Can be grooved with fingernails, crumbles with hammer	30-50
Hard	Can't break by hand, can be grooved with knife	50-100
Very Hard	Scratches with knife, chips with hammer blows	>100

MODIFIERS

Trace	1%
Few	1-5%
Some	5-12%
Numerous	12-20%
Abundant	>20%

GRAIN SIZE

Description		Sieve Size	Grain Size	Approximate Size
Boulders		>12"	>12"	Larger than a basketball
Cobbles		3-12"	3-12"	Fist-sized to basketball-sized
Gravel	Coarse	3/4-3"	3/4-3"	Thumb-sized to fist-sized
	Fine	#4-3/4"	0.19-0.75"	Pea-sized to thumb-sized
Sand	Coarse	#10-#4	0.079-0.19"	Rock-salt-sized to pea-sized
	Medium	#40-#10	0.017-0.079"	Sugar-sized to rock salt-sized
	Fine	#200-#40	0.0029-0.017"	Flour-sized to sugar-sized
Fines		passing #200	<0.0029"	Flour-sized and smaller

MOISTURE CONTENT

Dry- Very little or no moisture
Damp- Some moisture but less than optimum
Moist- Near optimum
Very Moist- Above optimum
Wet/Saturated- Contains free moisture

GMU

LEGEND TO LOGS

ASTM Designation: D 2487
(Based on Unified Soil Classification System)

Plate

A-2

APPENDIX A-1

Previous Investigations by Others

Project: Northwest Open Space
Project Location: 30291 Camino Capistrano, SJC, CA 92675
Project Number: 25-126-00

Log of Drill Hole DH- 1

Date(s) Drilled	**6/25/25**	Logged By	**ER/JB**	Checked By	**SS**
Drilling Method	**Hollow Stem Auger**	Drilling Contractor	**2R Drilling, Inc.**	Total Depth of Drill Hole	**51.5 feet**
Drill Rig Type	**CME 75**	Diameter(s) of Hole, inches	**8**	Approx. Surface Elevation, ft MSL	**200.0**
Groundwater Depth [Elevation], feet	**48.4 [151.6]**	Sampling Method(s)	**California Modified, SPT, Bulk**	Drill Hole Backfill	**Native**
Remarks				Driving Method and Drop	**140 lb Auto Hammer**

ELEVATION, feet	DEPTH, feet	GRAPHIC LOG	GEOLOGICAL CLASSIFICATION AND DESCRIPTION	ORIENTATION DATA	ENGINEERING CLASSIFICATION AND DESCRIPTION	SAMPLE DATA: SAMPLE	NUMBER OF BLOWS / 6"	DRIVING WEIGHT, lbs	TEST DATA: MOISTURE CONTENT, %	DRY UNIT WEIGHT, pcf	ADDITIONAL TESTS
			UNDOCUMENTED FILL (Qafu)		SILTY SAND (SM); gray, dry, medium dense, fine- to medium- grained sand						
			TERRACE (Qt) Some white precipitate, some pinhole porosity Some rig chatter		SILTY SAND (SM); gray, damp, medium dense, fine- to medium- grained sand		4 5 8	140	5	104	
195	5		Faint laminae, some orange oxidation				4 4 3	140			
			Some charcoal fragments, rare rootlets, very faint laminae Some rig chatter and slower drilling		CLAYEY SAND TO SANDY CLAY (SC-CL); gray, damp, medium dense, fine- to medium- grained sand		4 8 11	140	4	102	CN
190	10		Homogeneous, no bedding observed, friable		SILTY SAND (SM); brown, damp, medium dense, fine- to medium- grained sand POORLY GRADED SAND (SP); light brown, damp, medium dense, fine- to coarse- grained sand		5 6 7	140			
185	15		Some pinhole porosity, some subrounded gravel up to # 4 sieve size		SILTY SAND (SM); gray, damp, medium dense, fine- to medium- grained sand, some gravel SANDY SILT (ML); pale brown, damp, stiff, fine- to medium- grained sand		10 13 13	140	4	112	DS

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Project: Northwest Open Space
Project Location: 30291 Camino Capistrano, SJC, CA 92675
Project Number: 25-126-00

Log of Drill Hole DH- 1

ELEVATION, feet	DEPTH, feet	GRAPHIC LOG	GEOLOGICAL CLASSIFICATION AND DESCRIPTION	ORIENTATION DATA	ENGINEERING CLASSIFICATION AND DESCRIPTION	SAMPLE DATA: SAMPLE	SAMPLE DATA: NUMBER OF BLOWS / 6"	SAMPLE DATA: DRIVING WEIGHT, lbs	TEST DATA: MOISTURE CONTENT, %	TEST DATA: DRY UNIT WEIGHT, pcf	TEST DATA: ADDITIONAL TESTS
			cont. to be TERRACE (Qt) Some clay interbeds within a silty sand, some charcoal fragments near clay interbeds, homogeneous, friable		SILTY SAND (SM); gray, damp, medium dense, fine- to medium- grained sand		6 7 7	140			FC
175	25						13 22 35	140	13	118	DS
			Homogeneous with some orange oxidation, some rootlets and pinhole porosity		SANDY CLAY (CL); gray, moist, hard, fine- to medium- grained sand						
170	30		Mostly homogeneous with rare faint laminae, some clasts are weathered in place, some orange oxidation Slower drilling, harder drilling				6 6 6	140			AL, PS
165	35		Homogeneous with rare silt interbeds, beds are subhorizontal and ~ 0.5" thick, subangular to subrounded gravel up to 3/4" (~8% abundance)		POORLY GRADED SAND (SP-SM); light gray, damp, dense, fine- to coarse-grained sand, some fine- to coarse-grained gravel		16 24 35	140	5	122	
160	40		Some free moisture within sampler, variable bed thicknesses 0.5" to 3" Sampler returns wet, begin waiting period, gradational contact, homogeneous, friable sand		INTERBEDDED SILTY SAND (SM) AND SILTY CLAY (CL); gray to brown, moist, loose/soft, fine- to medium- grained sand		4 5 5	140			PS

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Project: Northwest Open Space
Project Location: 30291 Camino Capistrano, SJC, CA 92675
Project Number: 25-126-00

Log of Drill Hole DH- 1

ELEVATION, feet	DEPTH, feet	GRAPHIC LOG	GEOLOGICAL CLASSIFICATION AND DESCRIPTION	ORIENTATION DATA	ENGINEERING CLASSIFICATION AND DESCRIPTION	SAMPLE DATA: SAMPLE	SAMPLE DATA: NUMBER OF BLOWS / 6"	SAMPLE DATA: DRIVING WEIGHT, lbs	TEST DATA: MOISTURE CONTENT, %	TEST DATA: DRY UNIT WEIGHT, pcf	TEST DATA: ADDITIONAL TESTS
			cont. to be TERRACE (Qt)		SANDY CLAY (CL); grayish brown, very moist, firm, fine- to medium- grained sand		3 9 15	140	21	99	AL, PS
			Some rig chatter and slow drilling		SILTY SAND (SM); brown, moist, medium dense, fine- to medium- grained sand						
			9:15 am; groundwater measured at 40'5"								
			9:15 am; groundwater measured at 40'5"								
150	50		Some oxidation in clay and silty sand layers, ~6" thick subhorizontal bedding		CLAY (CL); grayish brown, very moist, medium dense, fine- to medium- grained sand		6 7 8	140			
					POORLY GRADED SAND (SP); brownish gray, moist, stiff to medium dense, fine- to coarse- grained sand						
					SILTY SAND (SM); brownish gray, moist, medium dense, fine- to medium- grained sand						
					Total Depth: 51.5' Groundwater at 48.4'						

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Project: Northwest Open Space
Project Location: 30291 Camino Capistrano, SJC, CA 92675
Project Number: 25-126-00

Log of Drill Hole DH- 2

Date(s) Drilled	**6/25/25**	Logged By	**ER/JB**	Checked By	**SS**
Drilling Method	**Hollow Stem Auger**	Drilling Contractor	**2R Drilling, Inc.**	Total Depth of Drill Hole	**30.0 feet**
Drill Rig Type	**CME 75**	Diameter(s) of Hole, inches	**8**	Approx. Surface Elevation, ft MSL	**174.0**
Groundwater Depth [Elevation], feet	**NA []**	Sampling Method(s)	**California Modified, SPT, Bulk**	Drill Hole Backfill	**Native**
Remarks				Driving Method and Drop	**140 lb Auto Hammer**

ELEVATION, feet	DEPTH, feet	GRAPHIC LOG	GEOLOGICAL CLASSIFICATION AND DESCRIPTION	ORIENTATION DATA	ENGINEERING CLASSIFICATION AND DESCRIPTION	SAMPLE DATA: SAMPLE	NUMBER OF BLOWS / 6"	DRIVING WEIGHT, lbs	TEST DATA: MOISTURE CONTENT, %	DRY UNIT WEIGHT, pcf	ADDITIONAL TESTS
			UNDOCUMENTED FILL (Qafu)		SILTY SAND (SM); pale brown, dry, medium dense, fine- to coarse- grained sand			140			
			ALLUVIUM (Qal) No recovery, homogeneous, friable, subangular to subrounded gravel up to 3/5" ~5% abundance Rig chatter		POORLY GRADED SAND (SP); brown, dry to damp, medium dense, fine- to coarse- grained sand, fine- to coarse-grained gravel		9 13 10	140			
170											
	5		Gravel up to 3/5" ~5% abundance		Becomes light gray, dry		9 10 12	140			
			Light rig chatter Gravel abundance becomes ~ 15%				9 11 21	140	9	111	CN
165			Some rootlets and pinhole porosity		SILTY SAND W/ CLAY (SM); pale brown, damp, medium dense, fine- to medium-grained sand						
	10		Homogeneous, friable, some orange oxidation		SILTY SAND (SM); yellowish brown, damp, medium dense, fine- to medium-grained sand		7 9 9	140			
			Decrease in fines, some pockets/zones of interbedded silt Some rig chatter		SILTY SAND TO POORLY GRADED SAND (SM-SP); yellowish brown, damp, medium dense, fine- to medium- grained sand		11 12 28	140	6	115	
160	15		Beds are ~1-3" thick, subhorizontal, gradational contact		INTERBEDDED SILTY SAND (SM); POORLY GRADED SAND (SP); AND CLAYEY SAND (SC); brown to gray, damp to moist, medium dense, fine- to medium- grained sand		8 15 21	140			
			Subangular to subrounded gravel up to 1" (~10%) Some heavy rig chatter		POORLY GRADED SAND (SP); pale brown, damp, dense, fine- to coarse-grained sand, fine- to coarse- grained gravel		28 30/5"	140	2		
155											

Project: Northwest Open Space
Project Location: 30291 Camino Capistrano, SJC, CA 92675
Project Number: 25-126-00

Log of Drill Hole DH- 2

ELEVATION, feet	DEPTH, feet	GRAPHIC LOG	GEOLOGICAL CLASSIFICATION AND DESCRIPTION	ORIENTATION DATA	ENGINEERING CLASSIFICATION AND DESCRIPTION	SAMPLE DATA: SAMPLE	SAMPLE DATA: NUMBER OF BLOWS / 6"	SAMPLE DATA: DRIVING WEIGHT, lbs	TEST DATA: MOISTURE CONTENT, %	TEST DATA: DRY UNIT WEIGHT, pcf	TEST DATA: ADDITIONAL TESTS
			cont. to be AULLUVIUM (Qal) Slight increase in moisture, homogeneous, friable, gravels as above				14 18 16	140			
			Rig chatter								
			Homogeneous, some faint orange oxidation, laminae		SILTY CLAY (CL); olive brown, moist, firm, fine grained sand		7 6	140	22	98	
150			Gradational contact, friable, homogeneous		SILTY SAND (SM); olive brown, moist, medium dense, fine- to medium- grained sand		10				
	25		Interbedded, 1-4" thick beds		INTERBEDDED SILT (ML) for 4", 2" of SILT (ML) and POORLY GRADED SAND (SP) beds, 4" SILTY SAND (SM) at tip; olive brown, moist to damp, medium dense to firm, fine- to medium- grained sand		7 6 5	140			
145			~2" thick beds		INTERBEDDED CLAY (CL) and POORLY GRADED SAND (SP)		9 20 35	140	4	110	
	30		Homogeneous, friable		SILTY SAND (SM); pale brown to light brown, damp, medium dense to dense						
					Total Depth: 30' No groundwater Performed Falling Head Borehole Infiltration Test at Depths of 27-30 feet B.G.S.						

Project: Northwest Open Space
Project Location: 30291 Camino Capistrano, SJC, CA 92675
Project Number: 25-126-00

Log of Drill Hole DH- 3

Date(s) Drilled	6/25/25	Logged By	ER/JB	Checked By	SS
Drilling Method	Hollow Stem Auger	Drilling Contractor	2R Drilling, Inc.	Total Depth of Drill Hole	16.5 feet
Drill Rig Type	CME 75	Diameter(s) of Hole, inches	8	Approx. Surface Elevation, ft MSL	174.0
Groundwater Depth [Elevation], feet	NA []	Sampling Method(s)	California Modified, SPT, Bulk	Drill Hole Backfill	Native
Remarks				Driving Method and Drop	140 lb Auto Hammer

ELEVATION, feet	DEPTH, feet	GRAPHIC LOG	GEOLOGICAL CLASSIFICATION AND DESCRIPTION	ORIENTATION DATA	ENGINEERING CLASSIFICATION AND DESCRIPTION	SAMPLE DATA: SAMPLE	NUMBER OF BLOWS / 6"	DRIVING WEIGHT, lbs	TEST DATA: MOISTURE CONTENT, %	DRY UNIT WEIGHT, pcf	ADDITIONAL TESTS
			UNDOCUMENTED FILL (Qafu)		SILTY SAND (SM) w/ gravel; pale brown, dry, fine- to medium- grained sand						
			ALLUVIUM (Qal) Homogeneous, slight blocky soil structure		SANDY CLAY (CL); dark brown, moist, stiff, trace fine sand		4 4 9	140			
170											
	5		Some rootlets, faint white precipitate, faint structure		Increase of fine- to medium- grained sand		9 13 17	140	8	121	
			~2-4" beds, alternating (SM) and (CL)		Interbedded SILTY SAND (SM) and SANDY CLAY (CL); brown to light brown, moist to damp, medium dense/ firm, fine- to medium- grained sand		4 5 4	140			
165											
	10				SANDY CLAY (CL); as above		11 18 27	140	6	126	
			Homogeneous, friable		SILTY SAND (SM); brown, moist, dense, fine- to medium- grained sand						
			Gradational contacts				10 25	140			
			Homogeneous, friable, subangular to subrounded gravel up to 1" (~12%)		SANDY CLAY (CL); dark brown, moist, hard, fine- to medium- grained sand		40				
160					POORLY GRADED SAND (SP); white, damp, dense, fine- to coarse- grained sand, fine- to coarse- grained gravel						
	15				Increase in gravel content		24 30 34	140	2		
					Total Depth: 16.5' No groundwater Performed Falling Head Borehole Infiltration Test at Depths of 12-15 feet B.G.S.						

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Drill Hole DH- 3

Project: Northwest Open Space
Project Location: 30291 Camino Capistrano, SJC, CA 92675
Project Number: 25-126-00

Log of Drill Hole DH- 4

Sheet 1 of 2

Date(s) Drilled	**6/25/25**	Logged By	**ER/JB**	Checked By	**SS**
Drilling Method	**Hollow Stem Auger**	Drilling Contractor	**2R Drilling, Inc.**	Total Depth of Drill Hole	**31.5 feet**
Drill Rig Type	**CME 75**	Diameter(s) of Hole, inches	**8**	Approx. Surface Elevation, ft MSL	**195.0**
Groundwater Depth [Elevation], feet	**NA []**	Sampling Method(s)	**California Modified, SPT, Bulk**	Drill Hole Backfill	**Native**
Remarks				Driving Method and Drop	**140 lb Auto Hammer**

ELEVATION, feet	DEPTH, feet	GRAPHIC LOG	GEOLOGICAL CLASSIFICATION AND DESCRIPTION	ORIENTATION DATA	ENGINEERING CLASSIFICATION AND DESCRIPTION	SAMPLE DATA: SAMPLE	NUMBER OF BLOWS / 6"	DRIVING WEIGHT, lbs	TEST DATA: MOISTURE CONTENT, %	DRY UNIT WEIGHT, pcf	ADDITIONAL TESTS
			UNDOCUMENTED FILL (Qafu)		SILTY SAND (SM); brown, damp, medium dense, fine- to medium- grained sand						
			TERRACE (Qt) Some rootlets, homogeneous, friable, becomes finer grained at tip		SILTY SAND (SM); brown, damp, loose to medium dense, fine- to medium-grained sand		4 5 5	140	13	87	CN
190	5		Fines decrease, ~1" thick subhorizontal clay bed at 6.5'				2 2 4	140			
			~2% fines, homogeneous, friable Rig chatter		POORLY GRADED SAND (SP); light brownish gray, damp, medium dense, fine- to medium- grained sand		6 10 21	140	2	91	CN
			Angular to subrounded gravel up to 1" (~15), trace clay		SILTY SAND (SM) w/ gravel; brown, damp to moist, medium dense, fine- to coarse- grained sand, fine- to coarse-grained gravel						
185	10		Homogeneous, friable, gravel as above				10 11 9	140			
			Increase in moisture and fines, some orange oxidation, 50% sand/silt Heavy rig chatter		SILTY SAND to SANDY SILT (SM-ML); olive brown, moist, medium dense, fine- to medium- grained sand		3 3 12	140	11	114	
			Homogeneous, friable, ~10% gravel up to 1", subangular to subrounded, ~20% fines		SILTY SAND (SM) w/ gravel; brown, moist, medium dense, fine- to coarse-grained sand						
180	15		Gradational contact, decrease in moisture with depth, ~4% fines, homogeneous, friable		POORLY GRADED SAND (SP); light brownish gray, damp, medium dense, fine- to medium- grained sand		7 10 12	140			
					WELL GRADED SAND (SW) w/ fine gravel; pale brown, damp, medium dense, fine- to coarse- grained sand, fine gravel						

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Drill Hole DH- 4

Project: Northwest Open Space
Project Location: 30291 Camino Capistrano, SJC, CA 92675
Project Number: 25-126-00

Log of Drill Hole DH- 4

ELEVATION, feet	DEPTH, feet	GRAPHIC LOG	GEOLOGICAL CLASSIFICATION AND DESCRIPTION	ORIENTATION DATA	ENGINEERING CLASSIFICATION AND DESCRIPTION	SAMPLE DATA: SAMPLE	SAMPLE DATA: NUMBER OF BLOWS / 6"	SAMPLE DATA: DRIVING WEIGHT, lbs	TEST DATA: MOISTURE CONTENT, %	TEST DATA: DRY UNIT WEIGHT, pcf	TEST DATA: ADDITIONAL TESTS
			cont. to be TERRACE (Qt) ~18% gravel up to 1.5", increase in moisture		NO RECOVERY; cuttings (SM) w/ gravel		10 50/6"	140			
170	25		Decrease in moisture, homogeneous, friable, angular to subrounded gravel up to 1" (~30% gravel)		POORLY GRADED SAND (SP) to POORLY GRADED GRAVEL (GP); pale brown to gray, damp, dense, fine- to coarse- grained sand, fine- to coarse-grained gravel		10 14 16	140			
165	30		Gradational contact, decrease in fines at 31.5', homogeneous, friable		SILTY SAND to SANDY SILTY (SM-ML); olive brown, moist, medium dense, fine- to medium- grained sand		7 8 17	140	7	117	
					SILTY SAND (SM); brown, moist, medium dense, fine to medium grained sand, fine- to coarse- grained gravel Total Depth: 32.0' No groundwater						

Project: Northwest Open Space
Project Location: 30291 Camino Capistrano, SJC, CA 92675
Project Number: 25-126-00

Log of Drill Hole DH- 5

Date(s) Drilled	**6/25/25**	Logged By	**ER/JB**	Checked By	**SS**
Drilling Method	**Hollow Stem Auger**	Drilling Contractor	**2R Drilling, Inc.**	Total Depth of Drill Hole	**21.5 feet**
Drill Rig Type	**CME 75**	Diameter(s) of Hole, inches	**8**	Approx. Surface Elevation, ft MSL	**190.0**
Groundwater Depth [Elevation], feet	**NA []**	Sampling Method(s)	**California Modified, SPT, Bulk**	Drill Hole Backfill	**Native**
Remarks				Driving Method and Drop	**140 lb Auto Hammer**

ELEVATION, feet	DEPTH, feet	GRAPHIC LOG	GEOLOGICAL CLASSIFICATION AND DESCRIPTION	ORIENTATION DATA	ENGINEERING CLASSIFICATION AND DESCRIPTION	SAMPLE DATA: SAMPLE	SAMPLE DATA: NUMBER OF BLOWS / 6"	SAMPLE DATA: DRIVING WEIGHT, lbs	TEST DATA: MOISTURE CONTENT, %	TEST DATA: DRY UNIT WEIGHT, pcf	TEST DATA: ADDITIONAL TESTS
			TERRACE (Qt)		SILTY SAND (SM); pale brown to gray, dry to damp, loose, fine- to medium-grained sand						
			Disturbed in upper 2'								
			Layer of clayey sand ~1" bed, rare roots and rootlets, homogeneous, friable		SILTY SAND (SM); brown, damp, loose, fine- to medium- grained sand		2 3 3				
185	5		Homogeneous, friable, low plasticity, micaceous		Interbedded SANDY CLAY (CL); brown, damp to moist, soft, fine grained sand POORLY GRADED SAND (SP); light brown to gray, loose, fine- to medium-grained sand CLAY (CL); brown, damp to moist, soft, fine grained sand		7 5 4		9	100	CN
			Interbedded; sandy silt, clay, poorly graded sand, beds are 4-3"and subhorizontal, gradational contacts				2 3 2				
180	10		Homogeneous, gravel ~ 15%, friable		Sand becomes medium dense		7 9 9		3	102	CN
175	15		~2" thick clay interbeds, ~20% fines, homogeneous, friable		Interbedded SILTY SAND (SM) and CLAY (CL); brown, damp to moist, medium dense/stiff, fine- to medium- grained sand		6 6 20				
			Rig chatter								

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Log of Drill Hole DH- 5

ELEVATION, feet	DEPTH, feet	GRAPHIC LOG	GEOLOGICAL CLASSIFICATION AND DESCRIPTION	ORIENTATION DATA	ENGINEERING CLASSIFICATION AND DESCRIPTION	SAMPLE DATA			TEST DATA		
						SAMPLE	NUMBER OF BLOWS / 6"	DRIVING WEIGHT, lbs	MOISTURE CONTENT, %	DRY UNIT WEIGHT, pcf	ADDITIONAL TESTS
			cont. to be TERRACE (Qt) Homogeneous, friable, ~15% gravel up to 1", subangular		POORLY GRADED SAND (SP) w/ gravel; light brown, damp, dense, fine- to coarse-grained sand, fine- to coarse- grained gravel		14 15 27		3		
					Total Depth 21.5' No groundwater No caving						

Project: Northwest Open Space
Project Location: 30291 Camino Capistrano, SJC, CA 92675
Project Number: 25-126-00

Log of Drill Hole DH- 6

Date(s) Drilled	6/25/25	Logged By	ER/JB	Checked By	SS
Drilling Method	Hollow Stem Auger	Drilling Contractor	2R Drilling, Inc.	Total Depth of Drill Hole	31.5 feet
Drill Rig Type	CME 75	Diameter(s) of Hole, inches	8	Approx. Surface Elevation, ft MSL	194.0
Groundwater Depth [Elevation], feet	NA []	Sampling Method(s)	California Modified, SPT, Bulk	Drill Hole Backfill	Native
Remarks				Driving Method and Drop	140 lb Auto Hammer

ELEVATION, feet	DEPTH, feet	GRAPHIC LOG	GEOLOGICAL CLASSIFICATION AND DESCRIPTION	ORIENTATION DATA	ENGINEERING CLASSIFICATION AND DESCRIPTION	SAMPLE DATA: SAMPLE	NUMBER OF BLOWS / 6"	DRIVING WEIGHT, lbs	TEST DATA: MOISTURE CONTENT, %	DRY UNIT WEIGHT, pcf	ADDITIONAL TESTS
			ARTIFICIAL FILL, UNDOCUMENTED (Qafu)		SILTY SAND (SM); brown, damp, medium dense, fine- to medium- grained sand				6		PS, CP, FC
			TERRACE (Qt)		SILTY SAND (SM); dark brown, damp to moist, medium dense, fine- to medium-grained sand		5 5 8	140	6	108	
190			Slight increase in moisture, homogeneous, friable								
	5		Homogeneous, friable				4 5 4	140			
			Some pinhole porosity and rootlets, homogeneous, rare charcoal fragments				5 7 11	140	8	100	
185			Some rig chatter, ~50% sand/silt		SANDY SILT (ML); pale brown, damp, medium dense, fine- to medium- grained sand						
	10		Decrease in fines (~10%), homogeneous, friable		SILTY SAND (SM); light brown, damp, medium dense, fine- to medium- grained sand		4 6 7	140			
			Gradational contact, homogeneous		SANDY SILT (ML); light brown, damp, medium dense, fine- to medium- grained sand						
			Some orange oxidation, homogeneous, friable, increase in fines		SILTY SAND (SM); light brown, damp, medium dense, fine- to medium- grained sand		6 9 15	140	6	104	
180	15		~1" thick clay interbed, otherwise homogeneous		Clay interbeds		6 7 5	140			
			Gradational contact, homogeneous, friable		Grades to (SP-SM)						
175											

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Log of Drill Hole DH- 6

ELEVATION, feet	DEPTH, feet	GRAPHIC LOG	GEOLOGICAL CLASSIFICATION AND DESCRIPTION	ORIENTATION DATA	ENGINEERING CLASSIFICATION AND DESCRIPTION	SAMPLE DATA: SAMPLE	SAMPLE DATA: NUMBER OF BLOWS / 6"	SAMPLE DATA: DRIVING WEIGHT, lbs	TEST DATA: MOISTURE CONTENT, %	TEST DATA: DRY UNIT WEIGHT, pcf	TEST DATA: ADDITIONAL TESTS
			cont. to be TERRACE (Qt) ~4% fines, homogeneous, angular to subrounded gravel up to 1" (~20% abundance)		POORLY GRADED SAND (SP-SM) w/ gravel; light brown, damp, dense, fine- to coarse- grained sand, fine- to coarse-grained gravel		20 22 25	140	3		
170											
	25		Becomes finer grained at tip of sampler, gravel abundance decrease (~12%) Rig Chatter		Becomes light brown to white		13 15 14	140			
165											
	30		Grades to , homogeneous, friable, ~10% gravel up to 3/4"		WELL GRADED SAND to POORLY GRADED SAND (SW-SP); pale brown, damp, dense, fine- to coarse- grained sand, fine- to coarse- grained gravel		29 21 32	140	2	110	
					Total Depth: 31.5' No groundwater						

Project: Northwest Open Space
Project Location: 30291 Camino Capistrano, SJC, CA 92675
Project Number: 25-126-00

Log of Drill Hole DH- 7

Date(s) Drilled	**6/25/25**	Logged By	**ER/JB**	Checked By	**SS**
Drilling Method	**Hollow Stem Auger**	Drilling Contractor	**2R Drilling, Inc.**	Total Depth of Drill Hole	**21.5 feet**
Drill Rig Type	**CME 75**	Diameter(s) of Hole, inches	**8**	Approx. Surface Elevation, ft MSL	**195.0**
Groundwater Depth [Elevation], feet	**NA []**	Sampling Method(s)	**California Modified, SPT, Bulk**	Drill Hole Backfill	**Native**
Remarks				Driving Method and Drop	**140 lb Auto Hammer**

ELEVATION, feet	DEPTH, feet	GRAPHIC LOG	GEOLOGICAL CLASSIFICATION AND DESCRIPTION	ORIENTATION DATA	ENGINEERING CLASSIFICATION AND DESCRIPTION	SAMPLE DATA: SAMPLE	NUMBER OF BLOWS / 6"	DRIVING WEIGHT, lbs	TEST DATA: MOISTURE CONTENT, %	DRY UNIT WEIGHT, pcf	ADDITIONAL TESTS
			ARTIFICIAL FILL, UNDOCUMENTED (Qafu)		SILTY SAND (SM); pale brown, damp, loose, fine- to medium- grained sand						
			TERRACE (Qt) ~55% sand, ~45% silt, homogeneous, friable		SILTY SAND (SM); dark brown, damp, medium dense, fine- to medium- grained sand		2 3 6	140			
190	5		Slight moisture increase, some orange oxidation				4 6 8	140	5	99	CN
			Some rootlets, homogeneous, ~50% silt/sand		SANDY SILT (ML); strong brown, damp, stiff, fine grained sand		3 4 6	40			
			Gradational contact, some faint laminae		SILTY CLAY (CL); gray, damp, stiff, fine grained sand						
185	10		~18% gravel abundance, subangular to subrounded gravel up to 1.5"		SILTY SAND to POORLY GRADED SAND (SM-SP) w/ gravel; brown, damp, medium dense, fine- to coarse- grained sand, fine- to coarse- grained gravel		8 10 16	140	3	90	
180	15		~8% gravel, fining upward sequence observed in (SP), ~4% fines		POORLY GRADED SAND (SP) w/ one (CL) interbed; brown, damp, medium dense, fine- to coarse- grained sand, fine- to coarse- grained gravel		4 9 7	140			

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Log of Drill Hole DH- 7

ELEVATION, feet	DEPTH, feet	GRAPHIC LOG	GEOLOGICAL CLASSIFICATION AND DESCRIPTION	ORIENTATION DATA	ENGINEERING CLASSIFICATION AND DESCRIPTION	SAMPLE DATA			TEST DATA		
						SAMPLE	NUMBER OF BLOWS / 6"	DRIVING WEIGHT, lbs	MOISTURE CONTENT, %	DRY UNIT WEIGHT, pcf	ADDITIONAL TESTS
			cont. to be TERRACE (Qt) NO RECOVERY, cuttings observed as above		NO RECOVERY		10 25 50/4"	140			
					Total Depth: 21.5' No groundwater						

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Project: Northwest Open Space
Project Location: 30291 Camino Capistrano, SJC, CA 92675
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Log of Drill Hole DH- 8

Date(s) Drilled	**6/26/25**	Logged By	**ER/JB**	Checked By	**SS**
Drilling Method	**Hollow Stem Auger**	Drilling Contractor	**2R Drilling, Inc.**	Total Depth of Drill Hole	**31.5 feet**
Drill Rig Type	**CME 75**	Diameter(s) of Hole, inches	**8**	Approx. Surface Elevation, ft MSL	**206.0**
Groundwater Depth [Elevation], feet	**NA []**	Sampling Method(s)	**California Modified, SPT, Bulk**	Drill Hole Backfill	**Native**
Remarks				Driving Method and Drop	**140 lb Auto Hammer**

ELEVATION, feet	DEPTH, feet	GRAPHIC LOG	GEOLOGICAL CLASSIFICATION AND DESCRIPTION	ORIENTATION DATA	ENGINEERING CLASSIFICATION AND DESCRIPTION	SAMPLE DATA: SAMPLE	SAMPLE DATA: NUMBER OF BLOWS / 6"	SAMPLE DATA: DRIVING WEIGHT, lbs	TEST DATA: MOISTURE CONTENT, %	TEST DATA: DRY UNIT WEIGHT, pcf	TEST DATA: ADDITIONAL TESTS
205			**ARTIFICIAL FILL, UNDOCUMENTED (Qafu)** Wood chips		SILTY SAND (SM); dark brown, dry, medium dense						PS, RV, FC
			TERRACE (Qt) Soil structure, homogeneous, friable, some faint laminae		SILTY SAND (SM); brown, moist, medium dense, fine- to medium- grained sand		2 4 5		4	95	CN
	5		~10% gravel up to 3/4", homogeneous, friable, dominantly fine to medium grained sand		POORLY GRADED SAND (SP) w/ gravel; pale brown, damp, loose, fine- to coarse-grained sand, fine- to coarse- grained gravel		2 3 4				
200			Moisture increase, slightly harder drilling		NO RECOVERY; waste barrel as above, becomes moist, medium dense		10 12 16				
	10		~18% gravel up to 3/4", homogeneous, friable		POORLY GRADED SAND (SP); brown, moist, medium dense, fine- to coarse-grained sand, fine- to coarse- grained gravel		13 12 12				
195											
	15		No recovery, dominantly coarser gravel (~3/4"-1"), ~15%		NO RECOVERY; cuttings as above		13 10 11				
190			Rig chatter, slower drilling								

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GMU

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Log of Drill Hole DH- 8

ELEVATION, feet	DEPTH, feet	GRAPHIC LOG	GEOLOGICAL CLASSIFICATION AND DESCRIPTION	ORIENTATION DATA	ENGINEERING CLASSIFICATION AND DESCRIPTION	SAMPLE DATA: SAMPLE	SAMPLE DATA: NUMBER OF BLOWS / 6"	SAMPLE DATA: DRIVING WEIGHT, lbs	TEST DATA: MOISTURE CONTENT, %	TEST DATA: DRY UNIT WEIGHT, pcf	TEST DATA: ADDITIONAL TESTS
185			**cont. to be TERRACE (Qt)** Partial recovery, sampled on a coarse gravel		PARTIAL RECOVERY; (SP) w/ gravel; pale brown, damp, medium dense, fine- to coarse- grained sand, fine- to coarse-grained gravel		12 11 10				
	25		~55% gravel/~45% sand, homogeneous, friable, subangular to subrounded gravel up to 1"		POORLY GRADED GRAVEL (GP); brown, damp, dense, fine- to coarse-grained sand, fine- to coarse- grained gravel		20 23 30		1		
180											
	30		~2' thick beds, ~15% gravel within (SP), abundant orange oxidation in (SC) beds		Interbedded POORLY GRADED SAND (SP) and CLAYEY SAND (SC); brown, moist, medium dense, fine- to coarse-grained sand, fine- to coarse- grained gravel		8 8 11				
175					Total Depth: 31.5' No groundwater						

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Log of Drill Hole DH- 9

Date(s) Drilled	**6/26/25**	Logged By	**ER/JB**	Checked By	**SS**
Drilling Method	**Hollow Stem Auger**	Drilling Contractor	**2R Drilling, Inc.**	Total Depth of Drill Hole	**51.5 feet**
Drill Rig Type	**CME 75**	Diameter(s) of Hole, inches	**8**	Approx. Surface Elevation, ft MSL	**205.0**
Groundwater Depth [Elevation], feet	**39.8 [165.2]**	Sampling Method(s)	**California Modified, SPT, Bulk**	Drill Hole Backfill	**Native**
Remarks				Driving Method and Drop	**140 lb Auto Hammer**

ELEVATION, feet	DEPTH, feet	GRAPHIC LOG	GEOLOGICAL CLASSIFICATION AND DESCRIPTION	ORIENTATION DATA	ENGINEERING CLASSIFICATION AND DESCRIPTION	SAMPLE DATA: SAMPLE	SAMPLE DATA: NUMBER OF BLOWS / 6"	SAMPLE DATA: DRIVING WEIGHT, lbs	TEST DATA: MOISTURE CONTENT, %	TEST DATA: DRY UNIT WEIGHT, pcf	TEST DATA: ADDITIONAL TESTS
			ARTIFICIAL FILL, UNDOCUMENTED (Qafu)		SANDY CLAY (CL); dark brown, moist, firm/stiff, fine- to medium- grained sand				13		AL, PS, CP, EI, RV, FC
			ALLUVIUM (Qal) Rare faint stringers, homogeneous, micaceous		FAT CLAY (CH); dark brown, moist, firm/stiff, fine- to medium- grained sand		3 5 5	140			
200	5		Micaceous, faint caliche stringers, homogeneous		CLAY (CL); dark brown, moist, stiff, fine- to medium- grained sand		7 12 15	140	2	123	CN
							3 5 7	140			
195	10		Micaceous, homogeneous, faint caliche stringers		FAT CLAY (CH); dark brown, moist, stiff, fine- to medium- grained sand		5 15 21	140	17	110	
190	15		Micaceous, homogeneous, faint caliche stringers (medium to high plasticity)		CLAY (CL-CH); dark brown, moist, stiff, fine- to medium- grained sand		4 5 8	140			

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Log of Drill Hole DH- 9

ELEVATION, feet	DEPTH, feet	GRAPHIC LOG	GEOLOGICAL CLASSIFICATION AND DESCRIPTION	ORIENTATION DATA	ENGINEERING CLASSIFICATION AND DESCRIPTION	SAMPLE DATA: SAMPLE	SAMPLE DATA: NUMBER OF BLOWS / 6"	SAMPLE DATA: DRIVING WEIGHT, lbs	TEST DATA: MOISTURE CONTENT, %	TEST DATA: DRY UNIT WEIGHT, pcf	TEST DATA: ADDITIONAL TESTS
			cont. to be ALLUVIUM (Qal) Rare faint stringers, homogeneous, micaceous				5 10 13	140	18	108	
180	25		Tiny lenses of fine sand (light brown), homogeneous, micaceous		SILTY CLAY (CL); brown, moist to very moist, stiff, fine- to medium- grained sand		3 4 5	140			
175	30		Rare laminae of fine sand, homogeneous, micaceous		Slight increase in moisture		5 7 8	140	24	97	AL, PS
170	35		~2" thick (SM) interbeds, ~12% gravel up to 1/2", dominantly fine to medium grained sand, homogeneous		POORLY GRADED SAND (SP) w/ SILTY SAND (SM) interbeds; brown, damp, medium dense, fine- to coarse- grained sand, fine- to coarse- grained gravel		6 9 13	140			
165	40		Sampler returns wet, saturated, homogeneous, subrounded gravel up to 3/4" ~10% 10:34 am groundwater at 40'6" 10:50 am groundwater at 39'10"		POORLY GRADED SAND (SP) w/ gravel; brown, saturated, dense, fine- to coarse-grained sand, fine- to coarse- grained gravel		14 20 18	140	18	112	
			CAPISTRANO FORMATION (Tc) faint laminae, orange oxidation along small joints/laminae, micaceous		CLAYSTONE (Tc); greenish gray, moist, hard, fine grained sand						

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Log of Drill Hole DH- 9

ELEVATION, feet	DEPTH, feet	GRAPHIC LOG	GEOLOGICAL CLASSIFICATION AND DESCRIPTION	ORIENTATION DATA	ENGINEERING CLASSIFICATION AND DESCRIPTION	SAMPLE DATA: SAMPLE	SAMPLE DATA: NUMBER OF BLOWS / 6"	SAMPLE DATA: DRIVING WEIGHT, lbs	TEST DATA: MOISTURE CONTENT, %	TEST DATA: DRY UNIT WEIGHT, pcf	TEST DATA: ADDITIONAL TESTS
			cont. to be CAPISTRANO FORMATION (Tc) Massive, micaceous		CLAYSTONE (Tc); black, moist, hard, fine grained sand		9 10 13	140			
155	50		Massive, micaceous				25 50/6"	140	31	88	
					Total Depth 51.5' Groundwater at 39.8'						

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Log of Drill Hole DH-10

Date(s) Drilled	**6/26/25**	Logged By	**ER/JB**	Checked By	**SS**
Drilling Method	**Hollow Stem Auger**	Drilling Contractor	**2R Drilling, Inc.**	Total Depth of Drill Hole	**31.5 feet**
Drill Rig Type	**CME 75**	Diameter(s) of Hole, inches	**8**	Approx. Surface Elevation, ft MSL	**197.0**
Groundwater Depth [Elevation], feet	**NA []**	Sampling Method(s)	**California Modified, SPT, Bulk**	Drill Hole Backfill	**Native**
Remarks				Driving Method and Drop	**140 lb Auto Hammer**

ELEVATION, feet	DEPTH, feet	GRAPHIC LOG	GEOLOGICAL CLASSIFICATION AND DESCRIPTION	ORIENTATION DATA	ENGINEERING CLASSIFICATION AND DESCRIPTION	SAMPLE DATA: SAMPLE	SAMPLE DATA: NUMBER OF BLOWS / 6"	SAMPLE DATA: DRIVING WEIGHT, lbs	TEST DATA: MOISTURE CONTENT, %	TEST DATA: DRY UNIT WEIGHT, pcf	TEST DATA: ADDITIONAL TESTS
195			**ARTIFICIAL FILL, UNDOCUMENTED (Qafu)**		SILTY SAND (SM); light brown, dry, medium dense, fine- to medium- grained sand						
			TERRACE (Qt) Some rootlets, rare pinhole porosity, ~4% gravel up to 1/2" (subangular)		SILTY SAND (SM); pale brown, damp, medium dense, fine- to medium- grained sand, few gravel		6 18 25		5		
	5		Partial recovery due to rock in sampler, ~15% gravel Rig chatter, gravel abundance and size increase		SILTY SAND (SM) w/ gravel; brown, damp, medium dense, fine- to medium-grained sand, fine- to coarse- grained sand		8 10 11				
190			~18% gravel up to 1", subangular to subrounded, homogeneous, some pockets of silt Heavy rig chatter		POORLY GRADED SAND (SP) w/ gravel; brown, damp, medium dense, fine- to coarse- grained sand, fine- to coarse-grained gravel		7 18 26		1	97	
	10		Gravel as above, ~4% fine				6 6 7				
185			Rig chatter								
	15		Fines increase, ~10% fines, homogeneous, friable, ~18% gravel up to 1"		POORLY GRADED SAND to SILTY SAND w/ gravel (SP-SM); brown, moist, dense, fine- to coarse- grained sand, fine- to coarse- grained gravel		15 20 20		3	112	
180											

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Log of Drill Hole DH-10

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ELEVATION, feet	DEPTH, feet	GRAPHIC LOG	GEOLOGICAL CLASSIFICATION AND DESCRIPTION	ORIENTATION DATA	ENGINEERING CLASSIFICATION AND DESCRIPTION	SAMPLE DATA: SAMPLE	SAMPLE DATA: NUMBER OF BLOWS / 6"	SAMPLE DATA: DRIVING WEIGHT, lbs	TEST DATA: MOISTURE CONTENT, %	TEST DATA: DRY UNIT WEIGHT, pcf	TEST DATA: ADDITIONAL TESTS
			cont. to be TERRACE (Qt) ~55% gravel up to 1.5", subangular to subrounded, homogeneous, friable		POORLY GRADED GRAVEL (GP); brown, damp to moist, dense, fine- to coarse- grained sand, fine- to coarse-grained gravel		17 24 28				
175			Abundant rig chatter								
	25		Subrounded to rounded gravel up to 3/4" (~25%), clayey silty		SILTY SAND (SM) w/ gravel; brown, moist, medium dense, fine- to coarse-grained sand, fine- to coarse- grained gravel		11 5 7		16	108	
170			High plasticity Rig chatter/ slow drilling		SANDY CLAY (CL); brown, moist, stiff, fine- to medium- grained sand						
	30		Some gray mottling, homogeneous, mostly fine grained sand				6 7 11				
					Total Depth: 31.5' No groundwater						

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Log of Drill Hole DH-11

Date(s) Drilled	**6/26/25**	Logged By	**ER/JB**	Checked By	**SS**
Drilling Method	**Hollow Stem Auger**	Drilling Contractor	**2R Drilling, Inc.**	Total Depth of Drill Hole	**20.5 feet**
Drill Rig Type	**CME 75**	Diameter(s) of Hole, inches	**8**	Approx. Surface Elevation, ft MSL	**200.0**
Groundwater Depth [Elevation], feet	**NA []**	Sampling Method(s)	**California Modified, SPT, Bulk**	Drill Hole Backfill	**Native**
Remarks				Driving Method and Drop	**140 lb Auto Hammer**

ELEVATION, feet	DEPTH, feet	GRAPHIC LOG	GEOLOGICAL CLASSIFICATION AND DESCRIPTION	ORIENTATION DATA	ENGINEERING CLASSIFICATION AND DESCRIPTION	SAMPLE DATA: SAMPLE	SAMPLE DATA: NUMBER OF BLOWS / 6"	SAMPLE DATA: DRIVING WEIGHT, lbs	TEST DATA: MOISTURE CONTENT, %	TEST DATA: DRY UNIT WEIGHT, pcf	TEST DATA: ADDITIONAL TESTS
			ARTIFICIAL FILL, UNDOCUMENTED (Qafu)		SILTY SAND (SM); pale brown, dry, loose, fine- to coarse- grained sand						
			~5% gravel up to 3/4", homogeneous, friable		SILTY SAND (SM); brown, moist, medium dense, fine- to medium- grained sand		3 5 6				
195	5		**TERRACE (Qt)** Decrease in gravel (~3%), homogeneous, friable		SILTY SAND (SM) w/ gravel; brown, damp, medium dense, fine- to medium-grained sand, fine- to coarse- grained gravel		4 5 5		5	98	CN
			Low plasticity, homogeneous with gradational change between soil, precipitate stringgers (rare)		SILT (ML) to SANDY SILT (SM-ML); brown, moist, firm, fine- to medium-grained sand		2 2 2				
190	10		At ~11' SANDY CLAY (CL) bed, gradational changes, some zones of less fines and some with clay		SILTY SAND (SM) w/ some CLAY (CL); brown, moist, medium dense, fine- to medium- grained sand		4 4 6		16	108	
185	15		6' saturated bed of SANDY SILT (ML) with free moisture, coarsening upward sequence in (SP), orange oxidation at contact		SANDY SILT (ML); olive brown, saturated, stiff to very stiff, fine- to medium- grained sand		7 16 25				
			Some rig chatter, abundant gravel		POORLY GRADED SAND (SP); brown, damp, dense, fine- to coarse- grained sand, few fine gravel						

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Log of Drill Hole DH-11

ELEVATION, feet	DEPTH, feet	GRAPHIC LOG	GEOLOGICAL CLASSIFICATION AND DESCRIPTION	ORIENTATION DATA	ENGINEERING CLASSIFICATION AND DESCRIPTION	SAMPLE DATA: SAMPLE	SAMPLE DATA: NUMBER OF BLOWS / 6"	SAMPLE DATA: DRIVING WEIGHT, lbs	TEST DATA: MOISTURE CONTENT, %	TEST DATA: DRY UNIT WEIGHT, pcf	TEST DATA: ADDITIONAL TESTS
			TERRACE (Qt) ~18% gravel up to 1", subangular to subrounded, homogeneous, friable		Becomes moist and contains some gravels		35 50/5"		2		
					Total Depth: 20'5" No groundwater						

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Log of Drill Hole DH-12

Date(s) Drilled	6/26/25	Logged By	ER/JB	Checked By	SS
Drilling Method	Hollow Stem Auger	Drilling Contractor	2R Drilling, Inc.	Total Depth of Drill Hole	21.5 feet
Drill Rig Type	CME 75	Diameter(s) of Hole, inches	8	Approx. Surface Elevation, ft MSL	198.0
Groundwater Depth [Elevation], feet	NA []	Sampling Method(s)	California Modified, SPT, Bulk	Drill Hole Backfill	Native
Remarks				Driving Method and Drop	140 lb Auto Hammer

ELEVATION, feet	DEPTH, feet	GRAPHIC LOG	GEOLOGICAL CLASSIFICATION AND DESCRIPTION	ORIENTATION DATA	ENGINEERING CLASSIFICATION AND DESCRIPTION	SAMPLE DATA: SAMPLE	SAMPLE DATA: NUMBER OF BLOWS / 6"	SAMPLE DATA: DRIVING WEIGHT, lbs	TEST DATA: MOISTURE CONTENT, %	TEST DATA: DRY UNIT WEIGHT, pcf	TEST DATA: ADDITIONAL TESTS
			ARTIFICIAL FILL, UNDOCUMENTED (Qafu)		SILTY SAND (SM); brown, dry, medium dense, fine- to medium- grained sand						PS, FC
195			**TERRACE (Qt)** Tiny caliche stringers, homogeneous, light brown to brown		SILTY SAND (SM); brown, moist, medium dense, fine- to medium- grained sand		3 4 6		6	106	
	5		6" bed of clay, gradational contact				2 3 4				
			Slight decrease in fines from (SM) above, homogeneous, friable		SANDY CLAY (CL); dark brown, moist, firm, fine- to medium- grained sand SILTY SAND (SM); brown, moist, medium dense, fine- to medium- grained sand						
190			As above Increase in fines, dominantly fine grained sand				5 6 8		11	96	
			1" gray bed then (SP), gradational contact		SANDY SILT (ML); strong brown, moist, stiff, fine grained sand						
	10		Homogeneous, friable, subangular to subrounded gravel up to 3/4" (~8), ~4% fines		POORLY GRADED SAND (SP) w/ gravel; gray to brown, damp, medium dense, fine- to coarse- grained sand, fine- to coarse- grained gravel		6 12 14				
185											
	15		As above, gravel ~15%				15 8 15		3	121	
			Increase in fines (~15%), gravel (~5%) up to 1/2"		SILTY SAND (SM); brown, damp, medium dense, fine- to medium- grained sand, some fine gravel						
180											

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Log of Drill Hole DH-12

ELEVATION, feet	DEPTH, feet	GRAPHIC LOG	GEOLOGICAL CLASSIFICATION AND DESCRIPTION	ORIENTATION DATA	ENGINEERING CLASSIFICATION AND DESCRIPTION	SAMPLE DATA			TEST DATA		
						SAMPLE	NUMBER OF BLOWS / 6"	DRIVING WEIGHT, lbs	MOISTURE CONTENT, %	DRY UNIT WEIGHT, pcf	ADDITIONAL TESTS
	-		**TERRACE (Qt)** ~15% subangular to subrounded gravel up to 3/4", homogeneous, friable		POORLY GRADED SAND to SILTY SAND (SP-SM); brown, moist, medium dense, fine- to coarse- grained sand, fine- to coarse- grained gravel		8 10 10				
					Total Depth: 21.5' No groundwater						

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Log of Drill Hole DH-13

Date(s) Drilled	**6/26/25**	Logged By	**ER/JB**	Checked By	**SS**
Drilling Method	**Hollow Stem Auger**	Drilling Contractor	**2R Drilling, Inc.**	Total Depth of Drill Hole	**21.0 feet**
Drill Rig Type	**CME 75**	Diameter(s) of Hole, inches	**8**	Approx. Surface Elevation, ft MSL	**198.0**
Groundwater Depth [Elevation], feet	**NA []**	Sampling Method(s)	**California Modified, SPT, Bulk**	Drill Hole Backfill	**Native**
Remarks				Driving Method and Drop	**140 lb Auto Hammer**

ELEVATION, feet	DEPTH, feet	GRAPHIC LOG	GEOLOGICAL CLASSIFICATION AND DESCRIPTION	ORIENTATION DATA	ENGINEERING CLASSIFICATION AND DESCRIPTION	SAMPLE DATA: SAMPLE	SAMPLE DATA: NUMBER OF BLOWS / 6"	SAMPLE DATA: DRIVING WEIGHT, lbs	TEST DATA: MOISTURE CONTENT, %	TEST DATA: DRY UNIT WEIGHT, pcf	TEST DATA: ADDITIONAL TESTS
			ARTIFICIAL FILL, UNDOCUMENTED (Qafu)		SILTY SAND (SM); brown, dry, loose, fine- to medium- grained sand						
195			**TERRACE (Qt)** Rootlets, faint caliche, gradational contact with (SP), homogeneous, friable, gravel up to 3/4", rig chatter		SILTY SAND (SM) to POORLY GRADED SAND (SP); brown, dry, loose, fine- to medium- grained sand, fine- to coarse-grained gravel		2 4 2				
	5		~18% gravel, subangular to subrounded, homogeneous, friable		SILTY SAND (SM); brown, damp, medium dense, fine- to coarse- grained sand, fine- to coarse- grained gravel		8 8 10		2		
190			~8-10% gravel up to 3/4", homogeneous, friable		POORLY GRADED SAND (SP); light brown, damp, loose, fine- to coarse-grained sand, fine- to coarse- grained gravel		3 4 5				
	10		Moisture increase, homogeneous, ~50% sand/silt, slightly plastic, more fines at tip of sampler		SILTY SAND (SM) to SANDY SILT (ML); brown, moist, very dense, fine- to medium- grained sand		5 25 50/5"		14	98	
185											
	15		~8% gravel, subangular to subrounded, up to 3/4"		POORLY GRADED SAND (SP); light brown, moist, medium dense, fine- to coarse- grained sand, fine- to coarse-grained gravel		9 10 15				
180											

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Log of Drill Hole DH-13

ELEVATION, feet	DEPTH, feet	GRAPHIC LOG	GEOLOGICAL CLASSIFICATION AND DESCRIPTION	ORIENTATION DATA	ENGINEERING CLASSIFICATION AND DESCRIPTION	SAMPLE DATA			TEST DATA		
						SAMPLE	NUMBER OF BLOWS / 6"	DRIVING WEIGHT, lbs	MOISTURE CONTENT, %	DRY UNIT WEIGHT, pcf	ADDITIONAL TESTS
			No recovery, bagged sample from waste barrel				35 50/6"				
					Total Depth: 21' No groundwater						

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Log of Test Pit TP-1

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Date(s) Excavated	**6/30/25**	Logged By	**ER**	Checked By	**SS**
Excavation Equipment	**Backhoe**	Excavation Contractor	**JES Engineering Contractors, Inc.**	Total Depth of Test Pit	**6.5 feet**
Sampling Method(s)	**NA**			Approx. Surface Elevation, ft MSL	**194.0**
Groundwater Depth [Elevation], feet	**NA []**	Test Pit Dimensions	**Width: 2 ft; Length: 7 ft; Depth: 6.5 ft**		
Remarks					

DEPTH, feet	GEOLOGICAL CLASSIFICATION AND DESCRIPTION	ENGINEERING CLASSIFICATION AND DESCRIPTION	ELEVATION, feet	DEPTH, feet	SOIL SYMBOL	SAMPLE	TEST DATA: MOISTURE CONTENT, %	TEST DATA: DRY UNIT WEIGHT, pcf	TEST DATA: MAXIMUM DENSITY, pcf	TEST DATA: ADDITIONAL TESTS
	ARTIFICIAL FILL (Qafu) randomly oriented gravel clasts in upper 2', some pinhole porosity, rootlets	SILTY SAND (SM); light brown, dry, loose, fine- to medium- grained sand								
		Becomes damp, medium dense								
2	**TERRACE (Qt)** undulating subhorizontal contact, granular soil structure, white precipitate throughout rootlets continues	SILTY SAND (SM); light brown, damp to moist, fine- to medium- grained sand	192	2						
	Gradational contact, rare charcoal fragments	SILT (ML); light brown, moist, stiff, trace fine sand								
	Large root									
4			190	4						
	Orange oxidation, ~20% fines, caving from 5' to total depth	SILTY SAND (SM); light brown, damp to moist, medium dense, fine- to medium-grained sand								
6	Fines increase	POORLY GRADED SAND (SP); brown, damp, medium dense, fine- to medium-grained sand	188	6						
		Total Depth: 6.5' No groundwater Minor caving from 5-6.5'								

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Log of Test Pit TP-2

Sheet 1 of 1

Date(s) Excavated	**6/30/25**	Logged By	**ER**	Checked By	**SS**
Excavation Equipment	**Backhoe**	Excavation Contractor	**JES Engineering Contractors, Inc.**	Total Depth of Test Pit	**8.0 feet**
Sampling Method(s)	**NA**			Approx. Surface Elevation, ft MSL	**193.0**
Groundwater Depth [Elevation], feet	**NA []**	Test Pit Dimensions	**Width: 2 ft; Length: 6 ft; Depth: 8 ft**		
Remarks					

DEPTH, feet	GEOLOGICAL CLASSIFICATION AND DESCRIPTION	ENGINEERING CLASSIFICATION AND DESCRIPTION	ELEVATION, feet	DEPTH, feet	SOIL SYMBOL	SAMPLE	TEST DATA: MOISTURE CONTENT, %	TEST DATA: DRY UNIT WEIGHT, pcf	TEST DATA: MAXIMUM DENSITY, pcf	TEST DATA: ADDITIONAL TESTS
	TOP SOIL loose, and disturbed in upper foot, abundant pinhole porosity, granular soil structure, abundant organics	SILTY SAND (SM); light brown, dry, loose, fine- to medium- grained sand								
		Becomes damp, medium dense	192							
2				2						
	TERRACE (Qt) subhorizontal gradational contact, picks harder, sparse charcoal fragments, white precipitate stringers, sparse rootlets, rare pinhole porosity	SILTY SAND (SM); light brown, moist, medium dense, fine- to medium- grained sand	190							
4				4						
	~5% gravel up to 6", subrounded	POORLY GRADED SAND (SP) w/ gravel; gray, moist, medium dense to loose, fine- to coarse- grained sand, fine- to coarse- grained gravel	188							
6		SILTY SAND (SM-ML); brown, moist, medium dense, fine- to medium- grained sand		6						
			186							
8				8						
		Total Depth: 8' No groundwater No caving Performed Open Pit Falling Head Infiltration Test at Depths of 4-6 Feet B.G.S.								

TP_REV1 25-126-00.GPJ GM&U.GDT 8/2/25

Project: Northwest Open Space
Project Location: 30291 Camino Capistrano, SJC, CA 92675
Project Number: 25-126-00

Log of Test Pit TP-3

Sheet 1 of 1

Date(s) Excavated	**6/30/25**	Logged By	**ER/JB**	Checked By	**SS**
Excavation Equipment	**Backhoe**	Excavation Contractor	**JES Engineering Contractors, Inc.**	Total Depth of Test Pit	**7.1 feet**
Sampling Method(s)	**NA**			Approx. Surface Elevation, ft MSL	**196.0**
Groundwater Depth [Elevation], feet	**NA []**	Test Pit Dimensions	**Width: 2 ft; Length: 9 ft; Depth: 7.1 ft**		
Remarks					

DEPTH, feet	GEOLOGICAL CLASSIFICATION AND DESCRIPTION	ENGINEERING CLASSIFICATION AND DESCRIPTION	ELEVATION, feet	DEPTH, feet	SOIL SYMBOL	SAMPLE	TEST DATA: MOISTURE CONTENT, %	TEST DATA: DRY UNIT WEIGHT, pcf	TEST DATA: MAXIMUM DENSITY, pcf	TEST DATA: ADDITIONAL TESTS
	<<U>UNDOCUMENTED ARTIFICIAL FILL (Qafu) some rootlets, appears granular, rare gravel clasts ~2%, some pinhole porosity	SILTY SAND (SM); brown, dry, loose, fine- to medium- grained sand								
		Becomes damp, medium dense, fine- to coarse- grained gravel								
2	Asphalt fragment		194	2						
	TERRACE (Qt) few rootlets, few gravel clasts, fines increase toward pit bottom, rare pinhole porosity, picks harder	SILTY SAND (SM); brown, damp to moist, medium dense, fine- to medium- grained sand								
	Very few rootlets									
		Fines increase								
4			192	4						
6		Fines decrease	190	6						
		Total Depth: 7.1' No groundwater No caving								

TP_REV1 25-126-00.GPJ GM&U.GDT 8/2/25

Project: Northwest Open Space
Project Location: 30291 Camino Capistrano, SJC, CA 92675
Project Number: 25-126-00

Log of Test Pit TP-4

Sheet 1 of 1

Date(s) Excavated	**6/30/25**	Logged By	**ER/JB**	Checked By	**SS**
Excavation Equipment	**Backhoe**	Excavation Contractor	**JES Engineering Contractors, Inc.**	Total Depth of Test Pit	**9.0 feet**
Sampling Method(s)	**NA**			Approx. Surface Elevation, ft MSL	**196.0**
Groundwater Depth [Elevation], feet	**NA []**	Test Pit Dimensions	**Width: 2 ft; Length: 9 ft; Depth: 9 ft**		
Remarks					

DEPTH, feet	GEOLOGICAL CLASSIFICATION AND DESCRIPTION	ENGINEERING CLASSIFICATION AND DESCRIPTION	ELEVATION, feet	DEPTH, feet	SOIL SYMBOL	SAMPLE	TEST DATA: MOISTURE CONTENT, %	TEST DATA: DRY UNIT WEIGHT, pcf	TEST DATA: MAXIMUM DENSITY, pcf	TEST DATA: ADDITIONAL TESTS
	TOP SOIL large cobble ~12" at surface, surface is dry but becomes damp at ~1', some rootlets	SILTY SAND (SM); brown, dry, loose, fine- to medium- grained sand								
	Heavy caving from 1-5'	Becomes damp, medium dense								
2	**TERRACE (Qt)** gradational contact with top soil, coarsening upward sequence, moderate caving, faint lamination, gravel ~8% up to 1/2"	WELL GRADED SAND (SW); gray to light gray, damp, loose, fine- to coarse- grained sand, fine gravel	194	2						
4		POORLY GRADED SAND (SP) w/ gravel; gray to light gray, damp, loose to medium dense, fine- to coarse- grained sand, fine- to coarse- grained gravel	192	4						
6	Harder digging on trench bottom, larger gravel clasts up to 6" ~15%, subrounded		190	6						
8			188	8						
		Total Depth: 9' No Groundwater, Caving From 1-5 Feet Performed Open Pit Falling Head Infiltration Test at Depths of 4-6 Feet B.G.S.								

TP_REV1 25-126-00.GPJ GM&U.GDT 8/2/25

Project: Northwest Open Space
Project Location: 30291 Camino Capistrano, SJC, CA 92675
Project Number: 25-126-00

Log of Test Pit TP-5

Sheet 1 of 1

Date(s) Excavated	**6/30/25**	Logged By	**ER/JB**	Checked By	**SS**
Excavation Equipment	**Backhoe**	Excavation Contractor	**JES Engineering Contractors, Inc.**	Total Depth of Test Pit	**7.5 feet**
Sampling Method(s)	**NA**			Approx. Surface Elevation, ft MSL	**198.0**
Groundwater Depth [Elevation], feet	**NA []**	Test Pit Dimensions	**Width: 2 ft; Length: 8 ft; Depth: 7.5 ft**		
Remarks					

DEPTH, feet	GEOLOGICAL CLASSIFICATION AND DESCRIPTION	ENGINEERING CLASSIFICATION AND DESCRIPTION	ELEVATION, feet	DEPTH, feet	SOIL SYMBOL	SAMPLE	TEST DATA: MOISTURE CONTENT, %	TEST DATA: DRY UNIT WEIGHT, pcf	TEST DATA: MAXIMUM DENSITY, pcf	TEST DATA: ADDITIONAL TESTS
	TOP SOIL granular soil structure, some rootlets	SILTY SAND (SM); brown, dry, loose, fine- to medium- grained sand								
	Some pinhole porosity	Becomes damp, medium dense								
	Lens of poorly graded sand									
2	**TERRACE (Qt)** orange oxidation, gray mottling, few rootlets, fines increase with depth, rare gravel clasts up to 1/2", lens of silt ~1' long, sparse pinhole porosity, some plasticity in silt	SILTY SAND (SM) to SANDY SILT (ML); brown, moist, medium dense, fine- to medium- grained sand	196	2						
	Picks harder									
4	Some white precipitate along rootlets, light caving from 4-7.5'		194	4						
6	Hard digging		192	6						
	Boulders and cobbles up to 1', subangular to subrounded, gravel ~12%, fines ~20%	SILTY SAND (SM) w/ gravel; light brown, moist, dense, fine- to coarse- grained sand, fine- to coarse- grained gravel								
		Total Depth: 7.5' No groundwater Minor caving from 4-7.5'								

TP_REV1 25-126-00.GPJ GM&U.GDT 8/2/25

Project: Northwest Open Space
Project Location: 30291 Camino Capistrano, SJC, CA 92675
Project Number: 25-126-00

Log of Test Pit TP-6

Sheet 1 of 1

Date(s) Excavated	**6/30/25**	Logged By	**ER/JB**	Checked By	**SS**
Excavation Equipment	**Backhoe**	Excavation Contractor	**JES Engineering Contractors, Inc.**	Total Depth of Test Pit	**5.5 feet**
Sampling Method(s)	**NA**			Approx. Surface Elevation, ft MSL	**200.0**
Groundwater Depth [Elevation], feet	**NA []**	Test Pit Dimensions	**Width: 2 ft; Length: 6 ft; Depth: 5.5 ft**		
Remarks					

DEPTH, feet	GEOLOGICAL CLASSIFICATION AND DESCRIPTION	ENGINEERING CLASSIFICATION AND DESCRIPTION	ELEVATION, feet	DEPTH, feet	SOIL SYMBOL	SAMPLE	TEST DATA: MOISTURE CONTENT, %	TEST DATA: DRY UNIT WEIGHT, pcf	TEST DATA: MAXIMUM DENSITY, pcf	TEST DATA: ADDITIONAL TESTS
	TOP SOIL rootlets, some pinhole porosity, granular soil structure, white precipitate	SILTY SAND (SM); brown, dry, loose, fine- to medium- grained sand								
		SILTY SAND (SM) TO SANDY SILT (ML); brown, damp, medium dense, fine- to medium- grained sand								
2			198	2						
	TERRACE (Qt) gradational contact, few rootlets, orange oxidized sand grains, white precipitate along rootlets, gravel abundance increases towards trench bottom (~1-3%), subangular to subrounded up to 1/2"	SILTY SAND (SM); brown, damp, medium dense, fine- to medium- grained sand, few gravel								
4	Thick root transects test pit		196	4						
		Total Depth: 5.5' No groundwater No caving								

TP_REV1 25-126-00.GPJ GM&U.GDT 8/2/25

Project: Northwest Open Space
Project Location: 30291 Camino Capistrano, SJC, CA 92675
Project Number: 25-126-00

Log of Test Pit TP-7

Sheet 1 of 1

Date(s) Excavated	**6/30/25**	Logged By	**ER/JB**	Checked By	**SS**
Excavation Equipment	**Backhoe**	Excavation Contractor	**JES Engineering Contractors, Inc.**	Total Depth of Test Pit	**8.5 feet**
Sampling Method(s)	**NA**			Approx. Surface Elevation, ft MSL	**200.0**
Groundwater Depth [Elevation], feet	**NA []**	Test Pit Dimensions	**Width: 2 ft; Length: ft; Depth: 8.5 ft**		
Remarks					

DEPTH, feet	GEOLOGICAL CLASSIFICATION AND DESCRIPTION	ENGINEERING CLASSIFICATION AND DESCRIPTION	ELEVATION, feet	DEPTH, feet	SOIL SYMBOL	SAMPLE	TEST DATA: MOISTURE CONTENT, %	TEST DATA: DRY UNIT WEIGHT, pcf	TEST DATA: MAXIMUM DENSITY, pcf	TEST DATA: ADDITIONAL TESTS
	TOP SOIL some pinhole porosity, some rootlets, rare gravel clasts (subrounded), granular soil structure, white precipitate, some plasticity	SILTY SAND (SM); brown, dry, loose, fine- to medium- grained sand								
	Charcoal fragment	SILTY SAND (SM) to SANDY SILT (ML); dark brown, damp, medium dense, fine- to medium- grained sand								
2	Charcoal fragment		198	2						
	TERRACE (Qt) gradational contact, sparse rootlets, gravel ~3% up to 1/2", fines increase towards bottom of trench, orange oxidized sand grains, white precipitate stringers, gray mottling on cuttings	SILTY SAND (SM); brown to dark brown, moist, medium dense, fine- to medium-grained sand, fine- to coarse- grained gravel								
4	Large root		196	4						
6	Rootlet molds, precipitate along rootlets, color change to dominantly brown with orange oxidation, lens silt Decrease in fines		194	6						
8	Lens of silt, low plasticity, micaceous	SILT (ML); olive brown, moist, stiff, fine grained sand	192	8						
		Total Depth: 8.5' No groundwater No caving Performed Open Pit Falling Head Infiltration Test at Depths of 2-5 Feet B.G.S.								

TP_REV1 25-126-00.GPJ GM&U.GDT 8/2/25

Project: Northwest Open Space
Project Location: 30291 Camino Capistrano, SJC, CA 92675
Project Number: 25-126-00

Log of Test Pit TP-8

Sheet 1 of 1

Date(s) Excavated	**7/1/25**	Logged By	**ER**	Checked By	**SS**
Excavation Equipment	**Backhoe**	Excavation Contractor	**JES Engineering Contractors, Inc.**	Total Depth of Test Pit	**7.5 feet**
Sampling Method(s)	**NA**			Approx. Surface Elevation, ft MSL	**196.0**
Groundwater Depth [Elevation], feet	**NA []**	Test Pit Dimensions	**Width: 2 ft; Length: ft; Depth: 7.5 ft**		
Remarks					

DEPTH, feet	GEOLOGICAL CLASSIFICATION AND DESCRIPTION	ENGINEERING CLASSIFICATION AND DESCRIPTION	ELEVATION, feet	DEPTH, feet	SOIL SYMBOL	SAMPLE	TEST DATA: MOISTURE CONTENT, %	TEST DATA: DRY UNIT WEIGHT, pcf	TEST DATA: MAXIMUM DENSITY, pcf	TEST DATA: ADDITIONAL TESTS
	TOP SOIL disturbed in upper foot	SILTY SAND (SM); brown, dry, loose, fine- to medium- grained sand								
	Granular soil structure, sparse rootlets	Becomes damp, medium dense								
2	**WEATHERED TERRACE (Qt)** gradational contact, pinhole porosity	SILTY SAND (SM); light brown, moist, medium dense, fine- to medium- grained sand	194	2						
	Some roots, sparse rootlets									
4	Some orange oxidation, gray mottling, slightly harder digging	Becomes dense	192	4						
6	~10% gravel up to 6", no porosity observed, soil structure	Some gravel	190	6						
		Total Depth: 7.5' No groundwater No caving Performed Open Pit Falling Head Infiltration Test at Depths of 2-4 Feet B.G.S.								

Project: Northwest Open Space
Project Location: 30291 Camino Capistrano, SJC, CA 92675
Project Number: 25-126-00

Log of Test Pit TP-9

Sheet 1 of 1

Date(s) Excavated	**7/1/25**	Logged By	**ER**	Checked By	**SS**
Excavation Equipment	**Backhoe**	Excavation Contractor	**JES Engineering Contractors, Inc.**	Total Depth of Test Pit	**7.5 feet**
Sampling Method(s)	**NA**			Approx. Surface Elevation, ft MSL	**197.0**
Groundwater Depth [Elevation], feet	**NA []**	Test Pit Dimensions	**Width: 2 ft; Length: 8 ft; Depth: 7.5 ft**		
Remarks					

DEPTH, feet	GEOLOGICAL CLASSIFICATION AND DESCRIPTION	ENGINEERING CLASSIFICATION AND DESCRIPTION	ELEVATION, feet	DEPTH, feet	SOIL SYMBOL	SAMPLE	TEST DATA: MOISTURE CONTENT, %	TEST DATA: DRY UNIT WEIGHT, pcf	TEST DATA: MAXIMUM DENSITY, pcf	TEST DATA: ADDITIONAL TESTS
	TOP SOIL abundant rootlets, granular soil structure, abundant pinhole porosity	SILTY SAND (SM); light brown, dry, medium dense, fine- to medium- grained sand								
		Becomes damp	196							
	6" thick bed of white precipitate and weathered rootlets									
2	**TERRACE (Qt)** gradational contact	SILTY SAND (SM); light brown, moist, medium dense, fine- to medium- grained sand, some clay		2						
	Homogeneous, sparse rootlets and pinhole porosity		194							
	Picks harder									
4	Some orange oxidation and gray mottling, sparse pinhole porosity, precipitate along rootlets	Becomes gray w/ orange oxidation		4						
			192							
6	~10% gravel up to 3/4"	Becomes light brown w/ gravel		6						
			190							
		Total Depth: 7.5' No groundwater No caving								

TP_REV1 25-126-00.GPJ GM&U.GDT 8/2/25

Project: Northwest Open Space
Project Location: 30291 Camino Capistrano, SJC, CA 92675
Project Number: 25-126-00

Log of Test Pit TP-10

Sheet 1 of 1

Date(s) Excavated	**7/1/25**	Logged By	**ER**	Checked By	**SS**
Excavation Equipment	**Backhoe**	Excavation Contractor	**JES Engineering Contractors, Inc.**	Total Depth of Test Pit	**6.5 feet**
Sampling Method(s)	**NA**			Approx. Surface Elevation, ft MSL	**205.0**
Groundwater Depth [Elevation], feet	**NA []**	Test Pit Dimensions	**Width: 2 ft; Length: ft; Depth: 6.5 ft**		
Remarks					

DEPTH, feet	GEOLOGICAL CLASSIFICATION AND DESCRIPTION	ENGINEERING CLASSIFICATION AND DESCRIPTION	ELEVATION, feet	DEPTH, feet	SOIL SYMBOL	SAMPLE	TEST DATA: MOISTURE CONTENT, %	TEST DATA: DRY UNIT WEIGHT, pcf	TEST DATA: MAXIMUM DENSITY, pcf	TEST DATA: ADDITIONAL TESTS
	UNDOCUMENTED ARTIFICIAL FILL (Qafu) ~5% gravel up to 4" (subrounded) in random orientations, some loose pockets	SILTY SAND (SM); pale brown, dry, loose, fine- to medium- grained sand Becomes moist, medium dense	204							
2	**TERRACE (Qt)** irregular contact, few white precipitate along rootlets, few pinhole porosity, soil structure	SILTY SAND (SM); light brown, moist, medium dense, fine- to medium- grained sand	202	2						
4	Some orange oxidation and gray mottling	Becomes strong brown	200	4						
6	No porosity observed			6						
		Total Depth: 6.5' No groundwater No caving								

TP_REV1 25-126-00.GPJ GM&U.GDT 8/2/25

Project: Northwest Open Space
Project Location: 30291 Camino Capistrano, SJC, CA 92675
Project Number: 25-126-00

Log of Test Pit TP-11

Sheet 1 of 1

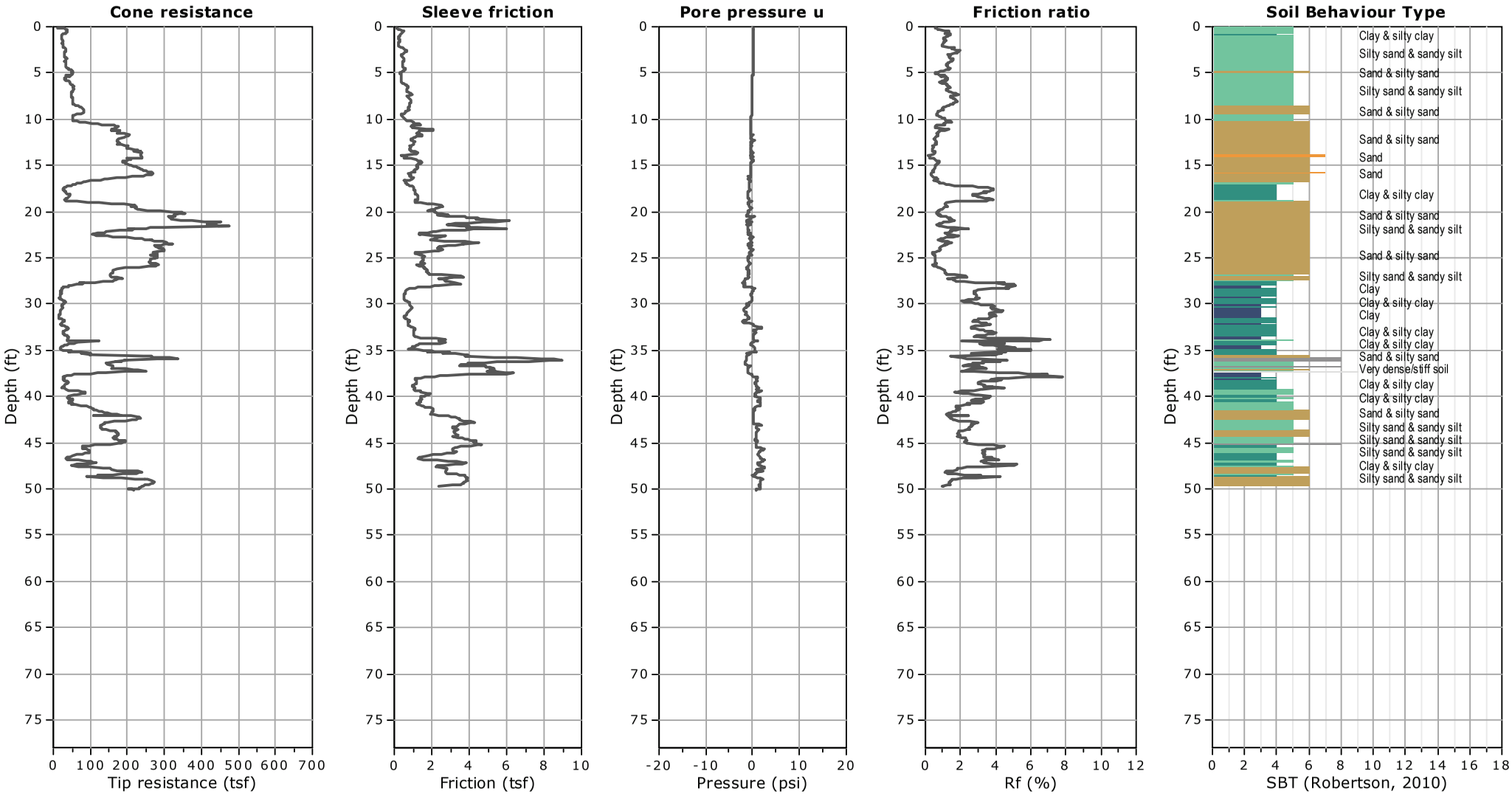
Date(s) Excavated	**7/1/25**	Logged By	**ER**	Checked By	**SS**
Excavation Equipment	**Backhoe**	Excavation Contractor	**JES Engineering Contractors, Inc.**	Total Depth of Test Pit	**4.0 feet**
Sampling Method(s)	**NA**			Approx. Surface Elevation, ft MSL	**198.0**
Groundwater Depth [Elevation], feet	**NA []**	Test Pit Dimensions	**Width: 2 ft; Length: ft; Depth: 4 ft**		
Remarks					

DEPTH, feet	GEOLOGICAL CLASSIFICATION AND DESCRIPTION	ENGINEERING CLASSIFICATION AND DESCRIPTION	ELEVATION, feet	DEPTH, feet	SOIL SYMBOL	SAMPLE	TEST DATA: MOISTURE CONTENT, %	TEST DATA: DRY UNIT WEIGHT, pcf	TEST DATA: MAXIMUM DENSITY, pcf	TEST DATA: ADDITIONAL TESTS
	TOP SOIL granular soil structure, some rootlets, pinhole porosity	SILTY SAND (SM); light brown, dry, loose, fine- to medium- grained sand								
		Becomes damp, medium dense								
	Some silt lenses									
2			196	2						
	TERRACE (Qt) some precipitate along rootlets, sparse pinhole porosity and rootlets	SILTY SAND (SM); light brown to strong brown, moist, medium dense, fine- to medium- grained sand								
4	Backhoe broke down		194	4						
		Total Depth: 4' No groundwater No caving								

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

Project: GMU Geotechnical / Northwest Open Space - Legacy Ranch
Location: 29943 Camino Capistrano, San Juan Capistrano, CA

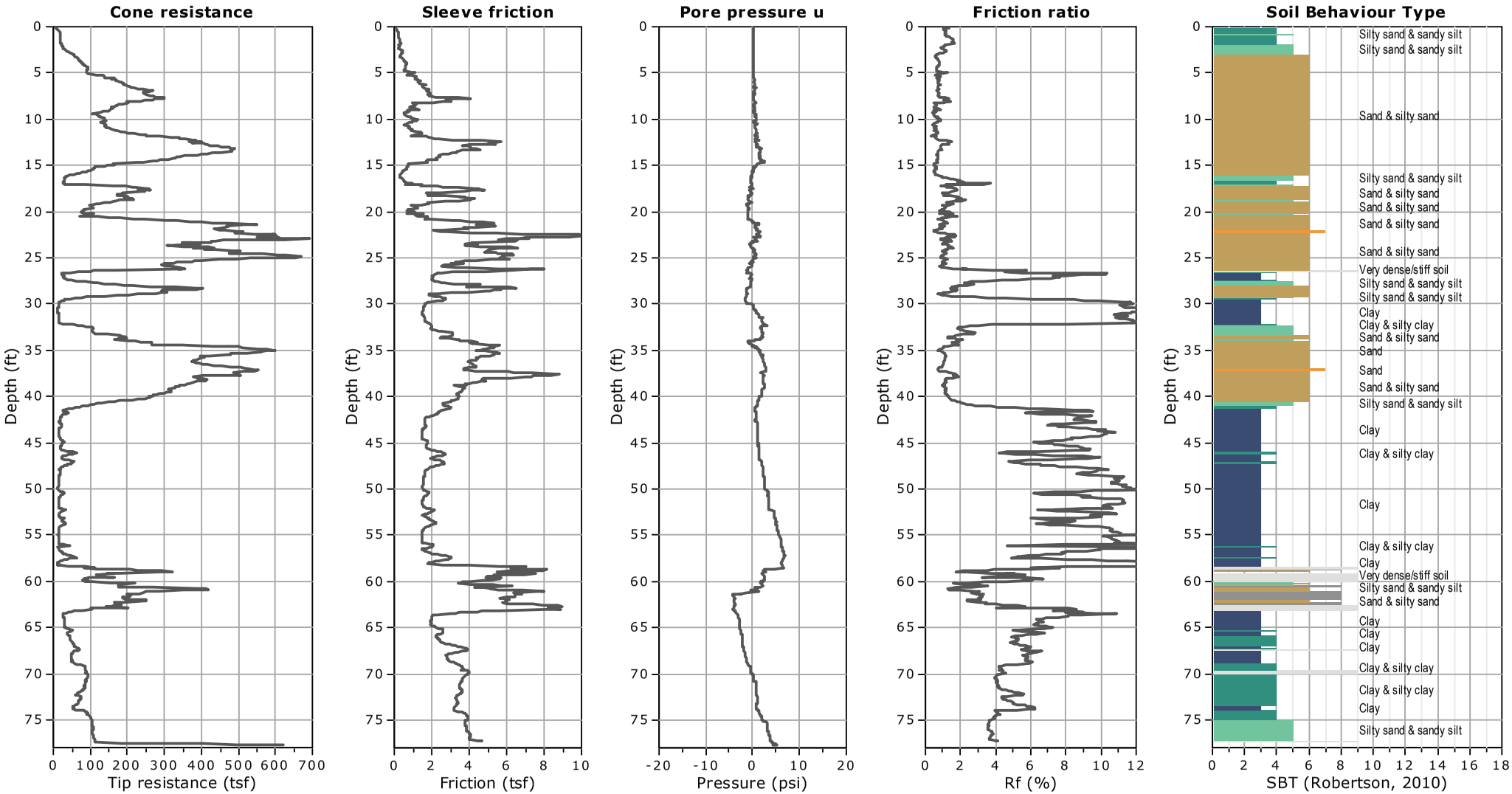
CPT-01
Total depth: 50.15 ft, Date: 6/24/2025



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Project: GMU Geotechnical / Northwest Open Space - Legacy Ranch
Location: 29943 Camino Capistrano, San Juan Capistrano, CA

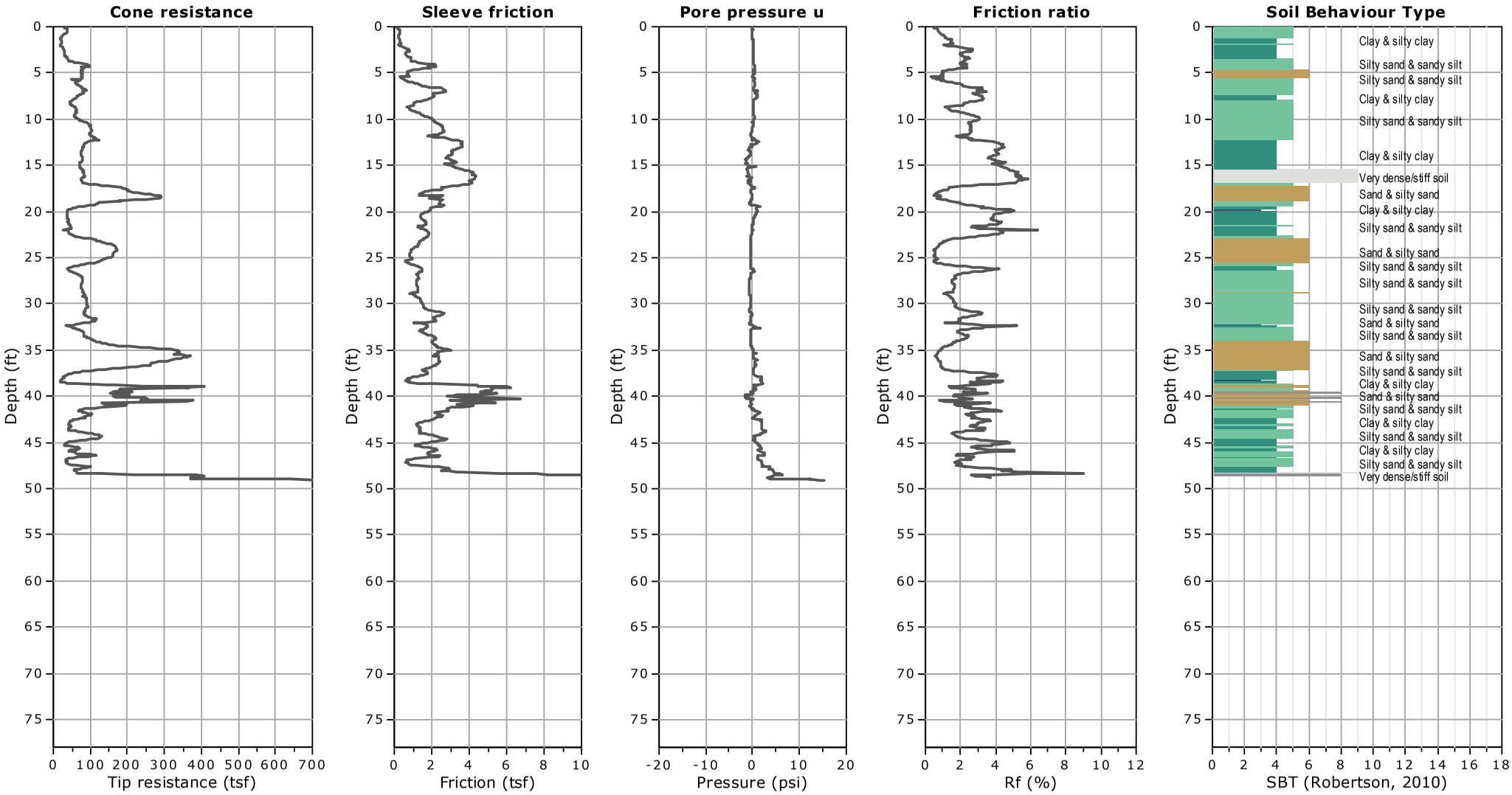
CPT-02
Total depth: 77.69 ft, Date: 6/24/2025



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Project: GMU Geotechnical / Northwest Open Space - Legacy Ranch
Location: 29943 Camino Capistrano, San Juan Capistrano, CA

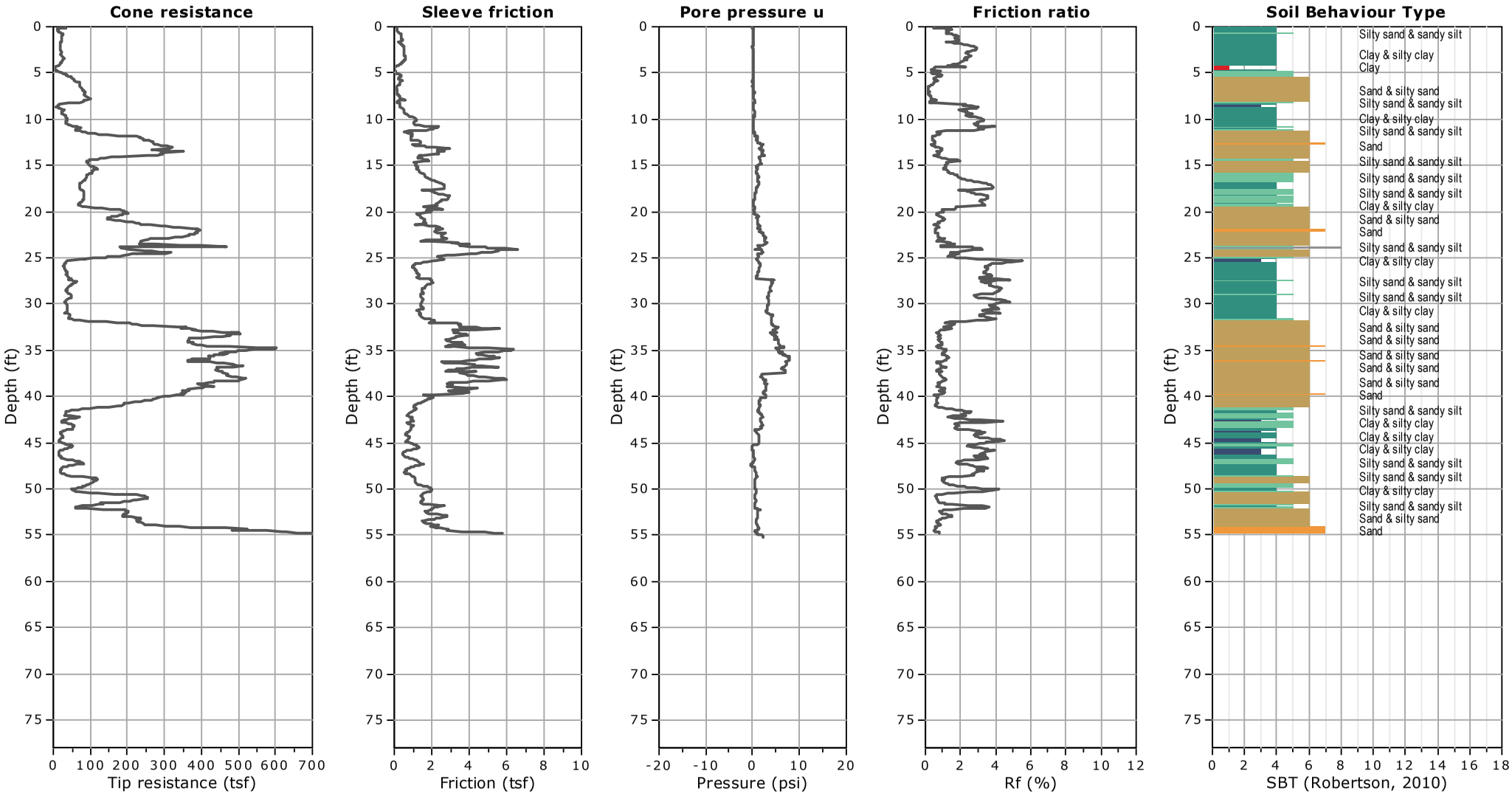
CPT-03
Total depth: 49.15 ft, Date: 6/24/2025



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Project: GMU Geotechnical / Northwest Open Space - Legacy Ranch
Location: 29943 Camino Capistrano, San Juan Capistrano, CA

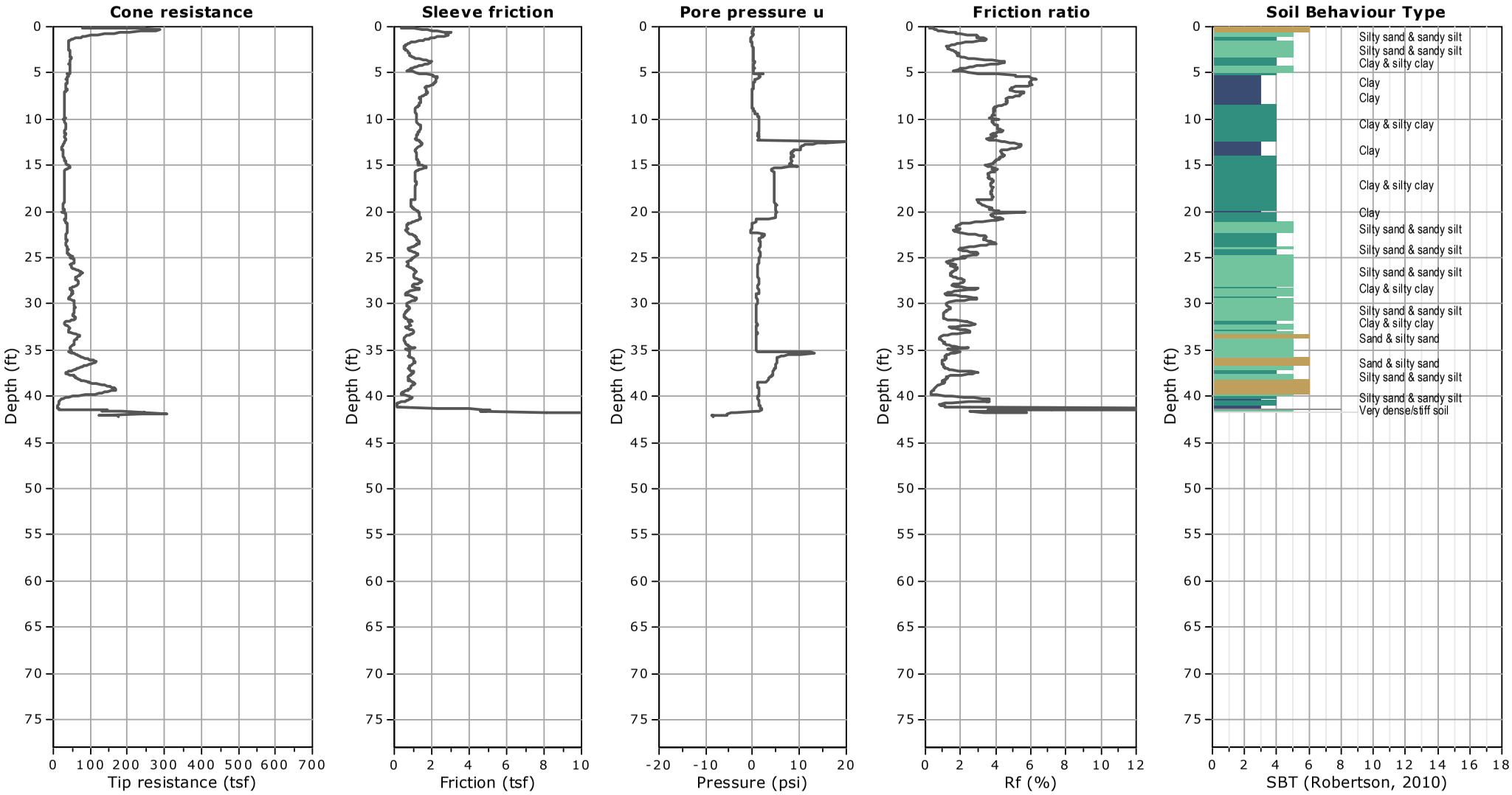
CPT-04
Total depth: 55.26 ft, Date: 6/24/2025



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Project: GMU Geotechnical / Northwest Open Space - Legacy Ranch
Location: 29943 Camino Capistrano, San Juan Capistrano, CA

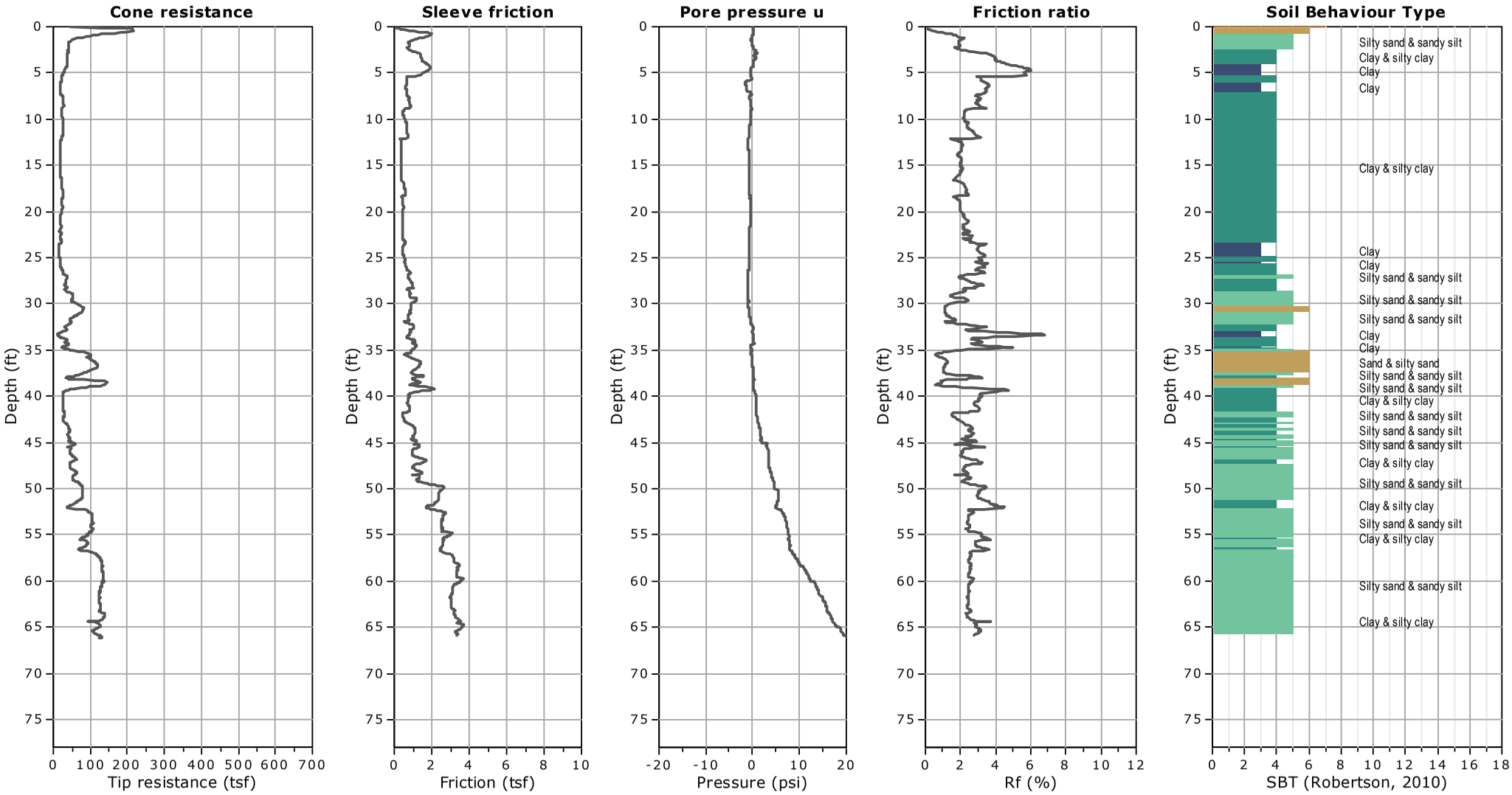
CPT-05
Total depth: 42.20 ft, Date: 6/24/2025



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Project: **GMU Geotechnical / Northwest Open Space - Legacy Ranch**
Location: **29943 Camino Capistrano, San Juan Capistrano, CA**

CPT-06
Total depth: 66.22 ft, Date: 6/24/2025



APPENDIX A-1

Previous Investigations by Others

SOIL CLASSIFICATION SYSTEM-ASTM D2487

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

NOTE: DUAL SYMBOLS ARE USED TO INDICATE BORDERLINE SOIL CLASSIFICATIONS

"Push" Sampler

Split Barrel "Drive" Sampler With Liner

Standard Penetration Test (SPT) Sampler

Bag Sample

Concrete/Rock Core

Groundwater Surface

NP = Nonplastic
EI = Expansion Index Test
SG = Specific Gravity
SE = Sand Equivalent
UU = Unconfined Comp.
CD = Consol. Drained Triaxial.
CU = Consol. Undrained Triaxial.
UU = Undrained, Unconsol. Triaxial.
R = R-Value
CA = Corrosivity
DS = Direct Shear
CN = Consolidation
CL = Collapse Potential
SA = Particle size; HD = Hydrometer
CP = Compaction Test
P = Permeability Test
[PID] Reading in ppm above background

San Juan Capistrano - Community Park
Project No. 2014-029

PLATE
A1

Template: DYLG HAND AUGER; Prj ID: 2014-029.GPJ

BORING LOCATION:	See Figure No. 2	**ELEVATION (feet):**	203
LATITUDE:	33.52583	**LONGITUDE:**	-117.6717
DRILLING EQUIPMENT:	Hand Auger	**DRILLING METHOD:**	Hand Auger
BORING DIAMETER (inches):	4	**BORING DEPTH (feet):**	3
DATE STARTED:	8/20/14	**DATE COMPLETED:**	8/20/14
LOGGED BY:	EMV	**CHECKED BY:**	KMV

Elevation (feet)	Depth (feet)	Sampler	Symbol			Field Unc. Comp. Str. (tsf)	DESCRIPTION	Dry Density (pcf)	Moisture Content (%)	Liquid Limit (%)	Plasticity Index (%)	Percent Passing #200 Sieve	Other Tests [PID]
							SILTY SAND (SM): grayish brown; dry; coarse to fine SAND; trace coarse to fine GRAVEL		4			44	CA CN MD DS
							no coarse GRAVEL		4				
200							Refusal encountered at 3 feet due to gravel. Groundwater not encountered during drilling. Boring backfilled with cuttings.						
	5												
195													
	10												

LOG OF BORING DYB14-01

Page 1 of 1

San Juan Capistrano - Community Park

Project No. 2014-029

PLATE

A2

Template: DYLG HAND AUGER; Prj ID: 2014-029.GPJ

BORING LOCATION:	See Figure No. 2	**ELEVATION (feet):**	202
LATITUDE:	33.52592	**LONGITUDE:**	-117.6723
DRILLING EQUIPMENT:	Hand Auger	**DRILLING METHOD:**	Hand Auger
BORING DIAMETER (inches):	4	**BORING DEPTH (feet):**	1
DATE STARTED:	8/20/14	**DATE COMPLETED:**	8/20/14
LOGGED BY:	EMV	**CHECKED BY:**	KMV

Elevation (feet)	Depth (feet)	Sampler	Symbol			Field Unc. Comp. Str. (tsf)	DESCRIPTION	Dry Density (pcf)	Moisture Content (%)	Liquid Limit (%)	Plasticity Index (%)	Percent Passing #200 Sieve	Other Tests [PID]
							SILTY SAND (SM): grayish brown; coarse to fine SAND; few coarse to fine GRAVEL; trace roots					29	CA
							Refusal encountered at 1 foot due to gravel. Groundwater not encountered during drilling. Boring backfilled with cuttings.						SA
200													
	5												
195													
	10												

LOG OF BORING DYB14-02

Page 1 of 1

San Juan Capistrano - Community Park

Project No. 2014-029

PLATE

A3

Template: DYLG HAND AUGER; Prj ID: 2014-029.GPJ

BORING LOCATION:	See Figure No. 2	**ELEVATION (feet):**	205
LATITUDE:	33.52706	**LONGITUDE:**	-117.67242
DRILLING EQUIPMENT:	Hand Auger	**DRILLING METHOD:**	Hand Auger
BORING DIAMETER (inches):	4	**BORING DEPTH (feet):**	6
DATE STARTED:	8/20/14	**DATE COMPLETED:**	8/20/14
LOGGED BY:	EMV	**CHECKED BY:**	KMV

Elevation (feet)	Depth (feet)	Sampler	Symbol	Field Unc. Comp. Str. (tsf)	DESCRIPTION	Dry Density (pcf)	Moisture Content (%)	Liquid Limit (%)	Plasticity Index (%)	Percent Passing #200 Sieve	Other Tests [PID]
					SILTY SAND (SM): dark grayish brown; dry; coarse to fine SAND; trace fine GRAVEL; trace rootlets					39	SA
							3				
					light olive brown						
					moist; decreased fines content; no rootlets						
					olive brown; medium to fine SAND; few fine GRAVEL		3			18	SA
200	5				POORLY GRADED SAND (SP): brown; moist; coarse to fine SAND						
					Bottom of boring at 6 feet. Percolation test run at this location. Groundwater not encountered during drilling. Boring backfilled with GRAVEL to 5 feet bgs and cuttings to surface.						
195	10										

LOG OF BORING DYB14-03

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San Juan Capistrano - Community Park

Project No. 2014-029

PLATE

A4

Template: DYLG HAND AUGER; Prj ID: 2014-029.01.GPJ

BORING LOCATION:	See Figure No. 2	**ELEVATION (feet):**	204
LATITUDE:	33.52662	**LONGITUDE:**	-117.67238
DRILLING EQUIPMENT:	Hand Auger	**DRILLING METHOD:**	Hand Auger
BORING DIAMETER (inches):	4	**BORING DEPTH (feet):**	5
DATE STARTED:	6/6/17	**DATE COMPLETED:**	6/6/17
LOGGED BY:	EMV	**CHECKED BY:**	SC

Elevation (feet)	Depth (feet)	Sampler	Symbol			Field Unc. Comp. Str. (tsf)	DESCRIPTION	Dry Density (pcf)	Moisture Content (%)	Liquid Limit (%)	Plasticity Index (%)	Percent Passing #200 Sieve	Other Tests [PID]
							SILTY SAND (SM): pale brown; moist; medium dense; coarse to fine SAND; few organic debris (vegetation, rootlets)						
							trace fine GRAVEL						
							SILTY SAND with GRAVEL (SM): pale brown; moist; medium dense; coarse to fine SAND; coarse to fine GRAVEL; trace COBBLES		1				
200													
	5						POORLY GRADED SAND with SILT (SP-SM): yellowish brown; moist; medium dense; medium to fine SAND; micaceous		4			10	
							Bottom of boring at 5 feet. Groundwater not encountered during drilling. Boring backfilled with cuttings. Percolation test performed at this location.						
195													
	10												

LOG OF BORING DYP17-01

Page 1 of 1

San Juan Capistrano - Community Park

Project No. 2014-029.01

PLATE

A5

Template: DYLG HAND AUGER; Prj ID: 2014-029.01.GPJ

BORING LOCATION:	See Figure No. 2	**ELEVATION (feet):**	206
LATITUDE:	33.52702	**LONGITUDE:**	-117.67165
DRILLING EQUIPMENT:	Hand Auger	**DRILLING METHOD:**	Hand Auger
BORING DIAMETER (inches):	4	**BORING DEPTH (feet):**	5
DATE STARTED:	6/6/17	**DATE COMPLETED:**	6/6/17
LOGGED BY:	EMV	**CHECKED BY:**	SC

Elevation (feet)	Depth (feet)	Sampler	Symbol	Field Unc. Comp. Str. (tsf)	DESCRIPTION	Dry Density (pcf)	Moisture Content (%)	Liquid Limit (%)	Plasticity Index (%)	Percent Passing #200 Sieve	Other Tests [PID]
205					CLAYEY SAND (SC): pale brown; moist; loose; medium to fine SAND; trace fine GRAVEL; trace organic debris (vegetation)		2				
					SILTY SAND (SM): dark brown; moist; medium dense; medium to fine SAND						
					dark yellowish brown		10			38	
	5				Bottom of boring at 5 feet. Groundwater not encountered during drilling. Boring backfilled with cuttings. Percolation test performed at this location.						
200											
	10										
195											

LOG OF BORING DYP17-02

Page 1 of 1

San Juan Capistrano - Community Park

Project No. 2014-029.01

PLATE

A6

Template: DYLG HAND AUGER; Prj ID: 2014-029.01.GPJ

BORING LOCATION:	Borrow Stockpile	**ELEVATION (feet):**	NA
LATITUDE:	33.52051	**LONGITUDE:**	-117.66996
DRILLING EQUIPMENT:	Shovel	**DRILLING METHOD:**	Grab Sample
BORING DIAMETER (inches):	NA	**BORING DEPTH (feet):**	1
DATE STARTED:	6/6/17	**DATE COMPLETED:**	6/6/17
LOGGED BY:	EMV	**CHECKED BY:**	SC

Elevation (feet)	Depth (feet)	Sampler	Symbol			Field Unc. Comp. Str. (tsf)	DESCRIPTION	Dry Density (pcf)	Moisture Content (%)	Liquid Limit (%)	Plasticity Index (%)	Percent Passing #200 Sieve	Other Tests [PID]
	5						SANDY LEAN CLAY with GRAVEL (CL): light yellowish brown; moist; medium stiff; low plasticity; coarse to fine SAND; coarse to fine GRAVEL; trace COBBLES; few organic debris (vegetation, rootlets) Borrow stockpile located at the northwest of the intersection of Junipero Serra Road and Camino Capistrano. Location identified by NUVIS.					53	
	10												

LOG OF BORING DYB17-03

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San Juan Capistrano - Community Park

Project No. 2014-029.01

PLATE

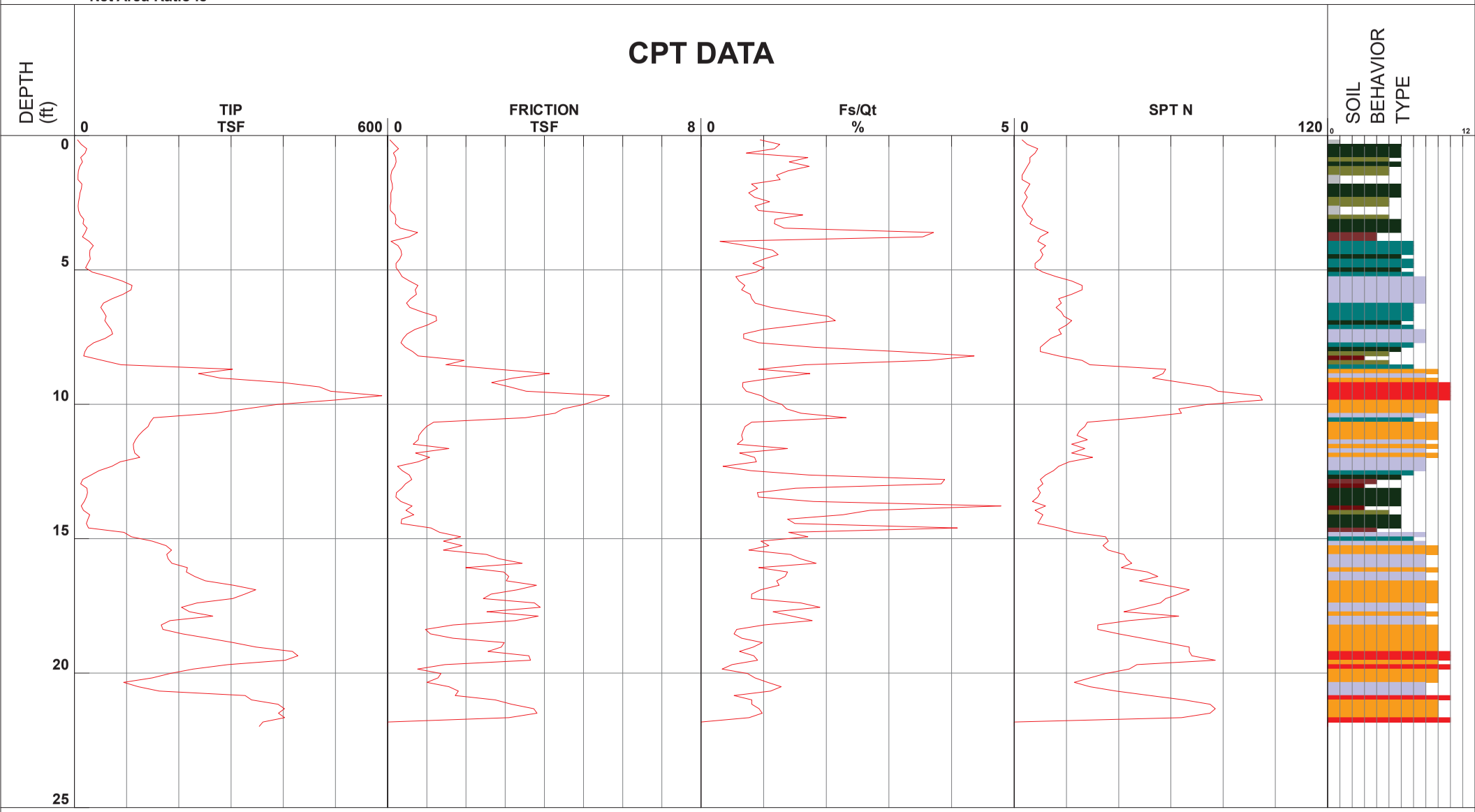
A7

Daiz Yourman & Associates

Project	San Juan Capistrano Community Park	Operator	BH-DG	Filename	SDF(146).cpt
Job Number	TBD	Cone Number	DDG1268	GPS	
Hole Number	DYC14-01	Date and Time	8/20/2014 2:51:31 PM	Maximum Depth	21.98 ft
EST GW Depth During Test		18.00 ft			

Net Area Ratio .8

CPT DATA



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

PLATE
A8

Cone Size 10cm squared

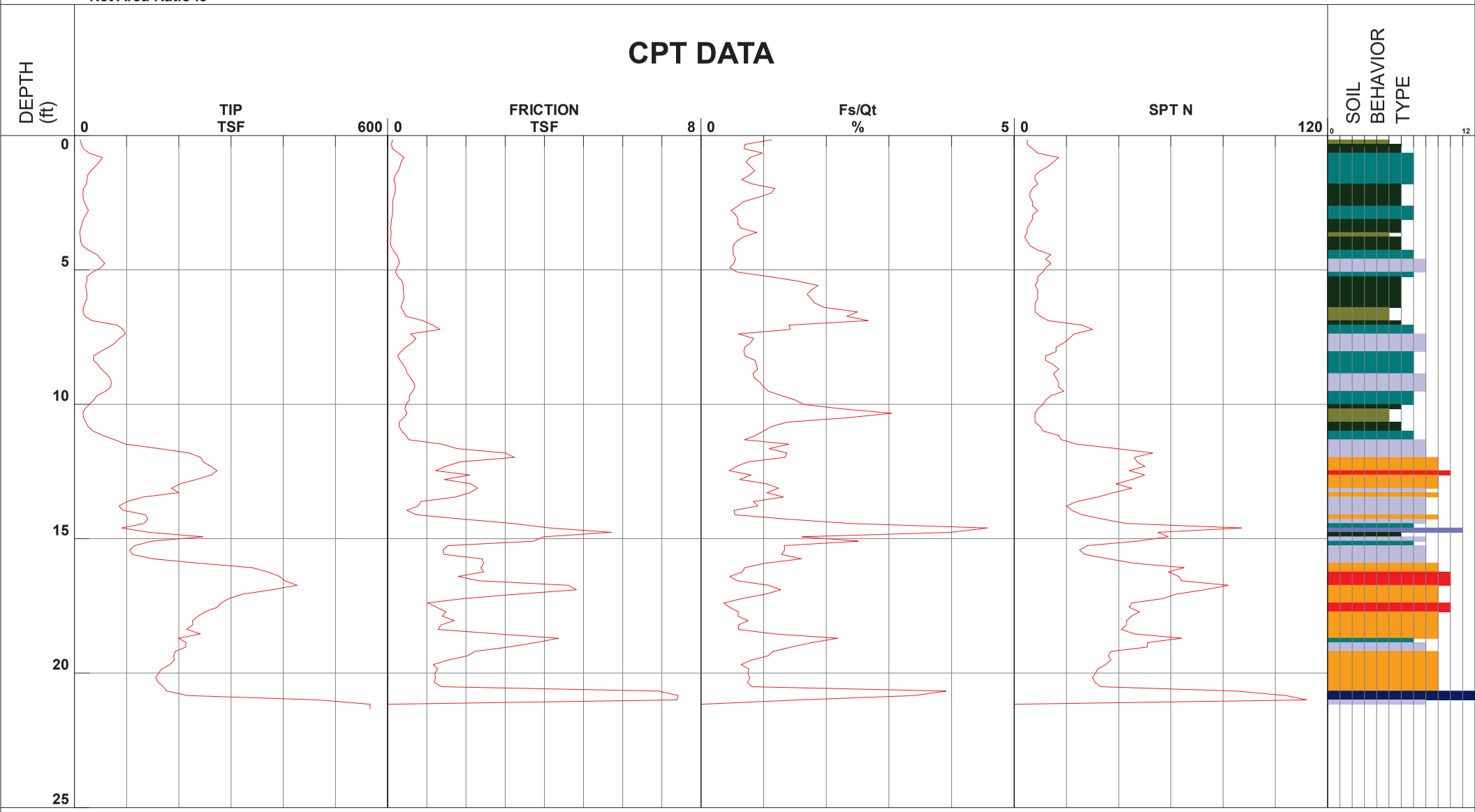
S*Soil behavior type and SPT based on data from UBC-1983

Daiz Yourman & Associates

Project	San Juan Capistrano Community Park	Operator	BH-DG	Filename	SDF(145).cpt
Job Number	TBD	Cone Number	DDG1268	GPS	
Hole Number	DYC14-02	Date and Time	8/20/2014 1:10:44 PM	Maximum Depth	21.33 ft
EST GW Depth During Test		18.00 ft			

Net Area Ratio .8

CPT DATA



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

PLATE
A9

Cone Size 10cm squared

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

Key to Soil and Bedrock Symbols and Terms

PETRA

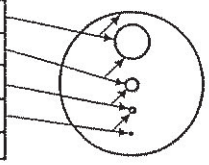
Unified Soil Classification System

Coarse-grained Soils > 1/2 of materials is larger than #200 sieve	GRAVELS more than half of coarse fraction is larger than #4 sieve	Clean Gravels (less than 5% fines)	GW	Well-graded gravels, gravel-sand mixtures, little or no fines
			GP	Poorly-graded gravels, gravel-sand mixtures, little or no fines
		Gravels with fines	GM	Silty Gravels, poorly-graded gravel-sand-silt mixtures
			GC	Clayey Gravels, poorly-graded gravel-sand-clay mixtures
	SANDS more than half of coarse fraction is smaller than #4 sieve	Clean Sands (less than 5% fines)	SW	Well-graded sands, gravelly sands, little or no fines
			SP	Poorly-graded sands, gravelly sands, little or no fines
		Sands with fines	SM	Silty Sands, poorly-graded sand-gravel-silt mixtures
			SC	Clayey Sands, poorly-graded sand-gravel-clay mixtures
Fine-grained Soils > 1/2 of materials is smaller than #200 sieve	SILTS & CLAYS Liquid Limit Less Than 50		ML	Inorganic silts & very fine sands, silty or clayey fine sands, clayey silts with slight plasticity
			CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays
			OL	Organic silts & clays of low plasticity
	SILTS & CLAYS Liquid Limit Greater Than 50		MH	Inorganic silts, micaceous or diatomaceous fine sand or silt
			CH	Inorganic clays of high plasticity, fat clays
			OH	Organic silts and clays of medium-to-high plasticity
Highly Organic Soils			PT	Peat, humus swamp soils with high organic content

The No. 200 U.S. Standard Sieve is about the smallest particle visible to the naked eye

Grain Size

Description		Sieve Size	Grain Size	Approximate Size
Boulders		>12"	>12"	Larger than basketball-sized
Cobbles		3 - 12"	3 - 12"	Fist-sized to basketball-sized
Gravel	coarse	3/4 - 3"	3/4 - 3"	Thumb-sized to fist-sized
	fine	#4 - 3/4"	0.19 - 0.75"	Pea-sized to thumb-sized
Sand	coarse	#10 - #4	0.079 - 0.19"	Rock salt-sized to pea-sized
	medium	#40 - #10	0.017 - 0.079"	Sugar-sized to rock salt-sized
	fine	#200 - #40	0.0029 - 0.017"	Flour-sized to sugar-sized to
Fines		Passing #200	<0.0029"	Flour-sized and smaller



Laboratory Test Abbreviations

MAX	Maximum Dry Density	MA	Mechanical (Particle Size) Analysis
EXP	Expansion Potential	AT	Atterberg Limits
SO4	Soluble Sulfate Content	#200	#200 Screen Wash
RES	Resistivity	DSU	Direct Shear (Undisturbed Sample)
pH	Acidity	DSR	Direct Shear (Remolded Sample)
CON	Consolidation	HYD	Hydrometer Analysis
SW	Swell	SE	Sand Equivalent
CL	Chloride Content	OC	Organic Content
RV	R-Value	COMP	Mortar Cylinder Compression

Modifiers

Trace	< 1 %
Few	1 - 5%
Some	5 - 12 %
Numerous	12 - 20 %

Sampler and Symbol Descriptions

- Approximate Depth of Seepage
- Approximate Depth of Standing Groundwater
- Modified California Split Spoon Sample
- Standard Penetration Test
- Bulk Sample
- Shelby Tube
- No Recovery in Sampler

Bedrock Hardness

Soft	Can be crushed and granulated by hand; "soil like" and structureless
Moderately Hard	Can be grooved with fingernails; gouged easily with butter knife; crumbles under light hammer blows
Hard	Cannot break by hand; can be grooved with a sharp knife; breaks with a moderate hammer blow
Very Hard	Sharp knife leaves scratch; chips with repeated hammer blows

Notes:

Blows Per Foot: Number of blows required to advance sampler 1 foot (unless a lesser distance is specified). Samplers in general were driven into the soil or bedrock at the bottom of the hole with a standard (140 lb.) hammer dropping a standard 30 inches unless noted otherwise in Log Notes. Drive samples collected in bucket auger borings may be obtained by dropping non-standard weight from variable heights. When a SPT sampler is used the blow count conforms to ASTM D-1586

EXPLORATION LOG

Project: **Northwest Open Space Park Site**		Boring No.: **B-1**	
Location: **Camino Capistrano**		Elevation:	
Job No.: **250-09**	Client: **City of San Juan Capistrano**	Date:	**8/21/09**
Drill Method: **Hollow-Stem Auger**	Driving Weight: **140 lbs / 30 in**	Logged By:	**D. Roberts**

Depth (Feet)	Lith-ology	Material Description	Water	Samples: Blows Per 6 Inches	Samples: Core	Samples: Bulk	Laboratory Tests: Moisture Content (%)	Laboratory Tests: Dry Density (pcf)	Laboratory Tests: Other Lab Tests
		ALLUVIUM (Qal)							
		Silty Sand (SM): Brown; dry to slighlty moist, porous and desiccated upper 2 to 3 feet, slightly moist to moist and medium dense to dense (firm to stiff) below; scattered rounded gravel and cobbles up to 3.5 inches in diameter.		11					
		@ 2 Feet: Sample not recovered.		11					
				12					
5		Gravelly Sand (SW): Brown to light gray; slightly moist; dense; fine to medium grained; scattered gravel.		8			3.2	107.6	
				10					
				13					
10				13			2.1	106.8	
				17					
				18					
15		Sandy Gravel to Gavelly Sand (SW-GW): Brown to gray; moist; dense; medium to coarse grained; gravel from 1/4 to 1 inch in diameter.		10			5.4	87.9	
				23					
				25					
		Total Depth 16.5 feet. Slight caving after withdrawal of augers No seepage or groundwater Boring backfilled with cuttings.							

EXPLORATION LOG - V3 250-09.GPJ PETRA.GDT 9/14/09

PLATE A-1

Petra Geotechnical, Inc.

EXPLORATION LOG

Project: **Northwest Open Space Park Site**		Boring No.: **B-2**	
Location: **Camino Capistrano**		Elevation:	
Job No.: **250-09**	Client: **City of San Juan Capistrano**	Date: **8/21/09**	
Drill Method: **Hollow-Stem Auger**	Driving Weight: **140 lbs / 30 in**	Logged By: **D. Roberts**	

Depth (Feet)	Lith-ology	Material Description	Water	Samples: Blows Per 6 Inches	Samples: Core	Samples: Bulk	Laboratory Tests: Moisture Content (%)	Laboratory Tests: Dry Density (pcf)	Laboratory Tests: Other Lab Tests
		ALLUVIUM (Qal)							
		Silty Sand (SM): Brown; dry and loose upper 6 to 8 inches, dry to slightly moist and desiccated and porous upper 3 feet, slightly moist to moist and medium dense to dense (firm to stiff) below; scattered rounded gravel and cobbles up to 3.5 inches in diameter.		4 3 4	■		7.7	96.0	
5		Sand with Gravel (SW): Brown to light gray; moist; dense; fine to medium grained; scattered gravel.		4 7 14	■		7.8	100.1	
10		Gravelly Sand (SW-GW): Light gray; slightly moist; dense; medium to coarse grained; gravel from 1/4 to 1 inch in diameter.		13 14 14	■		2.8	115.6	
15		@ 15 feet: Increase in gravel content.		17 30 22	■		3.1	110.5	
		Total Depth 16.5 feet. Slight caving after withdrawal of augers No seepage or groundwater Boring backfilled with cuttings.							

EXPLORATION LOG - V3 250-09.GPJ PETRA.GDT 9/14/09

PLATE A-2

Petra Geotechnical, Inc.

EXPLORATION LOG

Project: **Northwest Open Space Park Site**		Boring No.: **B-3**	
Location: **Camino Capistrano**		Elevation:	
Job No.: **250-09**	Client: **City of San Juan Capistrano**	Date: **8/21/09**	
Drill Method: **Hollow-Stem Auger**	Driving Weight: **140 lbs / 30 in**	Logged By: **D. Roberts**	

Depth (Feet)	Lith-ology	Material Description	Water	Samples: Blows Per 6 Inches	Samples: Core	Samples: Bulk	Laboratory Tests: Moisture Content (%)	Laboratory Tests: Dry Density (pcf)	Laboratory Tests: Other Lab Tests
		ALLUVIUM (Qal)							
		Silty Sand (SM): Brown; dry to slightly moist and desiccated and porous upper 2 feet, slightly moist to moist and medium dense to dense (firm to stiff below; fine grained.		4 4 4			9.8	105.4	
5		@ 5 feet: moist, very fine to medium grained, scattered gravel.		3 3 9			13.4	101.6	
10		Gravelly Sand to Sandy Gravel (SW-GW): Light brown to gray; moist; dense; medium to coarse grained; 2- to 3-inch diameter gravel in sampler tip.		15 50/ 6 inches			3.2	105.0	
15		Gravelly Sand (SW): Light gray; moist; dense; medium to coarse grained sand; gravel up to 1 inch in diameter.		11 32 33			2.8	120.4	
20				10 10 9					

EXPLORATION LOG - V3 250-09.GPJ PETRA.GDT 9/14/09

PLATE A-3

Petra Geotechnical, Inc.

EXPLORATION LOG

Project: **Northwest Open Space Park Site**		Boring No.: **B-3**	
Location: **Camino Capistrano**		Elevation:	
Job No.: **250-09**	Client: **City of San Juan Capistrano**	Date: **8/21/09**	
Drill Method: **Hollow-Stem Auger**	Driving Weight: **140 lbs / 30 in**	Logged By: **D. Roberts**	

Depth (Feet)	Lith-ology	Material Description	Water	Samples: Blows Per 6 Inches	Samples: Core	Samples: Bulk	Laboratory Tests: Moisture Content (%)	Laboratory Tests: Dry Density (pcf)	Laboratory Tests: Other Lab Tests
		Sand with Gravel (SP): Light brown to gray; moist; dense; medium to coarse grained.		5					
				7					
				12					
30				3					
				9					
				17					
35				7					
				13					
				18					
40		Clay (CL): Brown; moist to very moist; stiff; plastic.		3					
				6					
				5					
		Total Depth 43.5 feet. Slight caving after withdrawal of augers No seepage or groundwater Boring backfilled with cuttings.							

EXPLORATION LOG - V3 250-09.GPJ PETRA.GDT 9/14/09

PLATE A-4

Petra Geotechnical, Inc.

EXPLORATION LOG

Project: **Northwest Open Space Park Site**		Boring No.: **B-4**	
Location: **Camino Capistrano**		Elevation:	
Job No.: **250-09**	Client: **City of San Juan Capistrano**	Date: **8/21/09**	
Drill Method: **Hollow-Stem Auger**	Driving Weight: **140 lbs / 30 in**	Logged By: **D. Roberts**	

Depth (Feet)	Lith-ology	Material Description	Water	Samples: Blows Per 6 Inches	Samples: Core	Samples: Bulk	Laboratory Tests: Moisture Content (%)	Laboratory Tests: Dry Density (pcf)	Laboratory Tests: Other Lab Tests
		ALLUVIUM (Qal)							
		Silty Sand (SM): Brown; dry and loose upper 6 to 8 inches, dry to slightly moist and desiccated and porous upper 3 feet, slightly moist to moist and medium dense to dense (firm to stiff) below; scattered rounded gravel and cobbles up to 3.5 inches in diameter.		2 4 5	■		8.3	96.8	
5				2 4 5	■		9.7	96.1	
10		Gravelly Sand (SW-GW): Light gray; moist; dense; medium to coarse grained; gravel from 1/4 to 1 inch in diameter.		7 16 21	■		2.8	112.5	
15		Silty Sand (SM): Brown; moist; dense; fine to medium grained; scattered gravel.		6 5 9	■		16.0	105.4	
		Silty Clay (CL): Brown; moist; stiff; moderately plastic.							
		Total Depth 16.5 feet. Slight caving after withdrawal of augers No seepage or groundwater Boring backfilled with cuttings.							

EXPLORATION LOG - V3 250-09.GPJ PETRA.GDT 9/14/09

PLATE A-5

Petra Geotechnical, Inc.

EXPLORATION LOG

Project: **Northwest Open Space Park Site**			Boring No.: **B-5**
Location: **Camino Capistrano**			Elevation:
Job No.: **250-09**	Client: **City of San Juan Capistrano**		Date: **8/21/09**
Drill Method: **Hollow-Stem Auger**	Driving Weight: **140 lbs / 30 in**		Logged By: **D. Roberts**

Depth (Feet)	Lithology	Material Description	Water	Samples: Blows Per 6 Inches	Samples: Core	Samples: Bulk	Laboratory Tests: Moisture Content (%)	Laboratory Tests: Dry Density (pcf)	Laboratory Tests: Other Lab Tests
		ALLUVIUM (Qal)							MAX EXP SO4 pH RES CL
		Silty Sand (SM): Brown; dry to slighlty moist, porous and desiccated upper 2 to 3 feet, slightly moist to moist and medium dense to dense (firm to stiff) below.		4 4 4			21.2	90.6	
				2 4 3			5.5	115.9	
5		Sand to Silty Sand (SP-SM): Brown; moist; dense; fine to medium grained; scattered gravel to 1/4 inch in diameter.		5 6 8			13.9	96.2	
10		@ 10 Feet: Sample not recovered.		7 14 16					
15		Sand with Gravel (SW): Light gray; moist; dense; medium to coarse grained; scattered gravel 1.5 inch in diameter.		11 16 18			2.2	116.5	
		Total Depth 16.5 feet. Slight caving after withdrawal of augers No seepage or groundwater Boring backfilled with cuttings.							

EXPLORATION LOG - W3 250-09.GPJ PETRA.GDT 9/14/09

PLATE A-6

Petra Geotechnical, Inc.

APPENDIX B

Geotechnical Laboratory Procedures and Test Results

APPENDIX B

GMU GEOTECHNICAL LABORATORY PROCEDURES AND TEST RESULTS

MOISTURE AND DENSITY

Field moisture content and in-place density were determined for each 6-inch sample sleeve of undisturbed soil material obtained from the drill holes. The field moisture content was determined in general accordance with ASTM Test Method D 2216 by obtaining one-half the moisture sample from each end of the 6-inch sleeve. The in-place dry density of the sample was determined by using the wet weight of the entire sample.

At the same time the field moisture content and in-place density were determined, the soil material at each end of the sleeve was classified according to the Unified Soil Classification System. The results of the field moisture content and in-place density determinations are presented on the right-hand column of the Log of Drill Hole and are summarized on Table B-1. The results of the visual classifications were used for general reference.

PARTICLE SIZE DISTRIBUTION

As part of the engineering classification of the materials underlying the site, select samples were tested to determine the distribution of particle sizes. The distribution was determined in general accordance with ASTM Test Method D 422 using U.S. Standard Sieve Openings 3", 1.5", 3/4, 3/8, and U.S. Standard Sieve Nos. 4, 10, 20, 40, 60, 100, and 200. In addition, on some samples a standard hydrometer test was performed to determine the distribution of particle sizes passing the No. 200 sieve (i.e., silt and clay-size particles). The results of the tests are contained in Appendix B. Key distribution categories (% gravel; % sand, etc.) are contained on Table B-1.

ATTERBERG LIMITS

As part of the engineering classification of the soil material, samples of the on-site soil material were tested to determine relative plasticity. This relative plasticity is based on the Atterberg limits determined in general accordance with ASTM Test Method D 4318. The results of these tests are contained in this Appendix B and also Table B-1.

EXPANSION TESTS

To provide a standard definition of one-dimensional expansion, a test was performed on typical on-site materials in general accordance with ASTM Test Method D 4829. The result from this test procedure is reported as an “expansion index”. The results of this test are contained in Appendix B and also Table B-1.

CHEMICAL TESTS

The corrosion potential of typical on-site materials under long-term contact with both metal and concrete was determined by chemical and electrical resistance tests. The soluble sulfate test for potential concrete corrosion was performed in general accordance with California Test Method 417, the minimum resistivity test for potential metal corrosion was performed in general accordance with California Test Method 643, and the concentration of soluble chlorides was determined in general accordance with California Test Method 422. The results of these tests are contained in Appendix B and also Table B-1.

COMPACTION TESTS

Bulk sample representatives of the on-site materials were tested to determine the maximum dry density and optimum moisture content of the soil. These compactive characteristics were determined in general accordance with ASTM Test Method D 1557. The results of this test are contained in Appendix B and also Table B-1.

DIRECT SHEAR STRENGTH TESTS

Direct shear tests were performed on typical on-site materials. The general philosophy and procedure of the tests were in accord with ASTM Test Method D 3080 - "Direct Shear Tests for Soils Under Consolidated Drained Conditions".

The tests are single shear tests and are performed using a sample diameter of 2.416 inches and a height of 1.00 inch. The normal load is applied by a vertical dead load system. A constant rate of strain is applied to the upper one-half of the sample until failure occurs. Shear stress is monitored by a strain gauge-type precision load cell and deflection is measured with a digital dial indicator. This data is transferred electronically to data acquisition software which plots shear strength vs. deflection. The shear strength plots are then interpreted to determine either peak or ultimate shear strengths. Residual strengths were obtained through multiple shear box reversals. A strain rate compatible with the grain size distribution of the soils was utilized. The interpreted results of these tests are shown in Appendix B.

CONSOLIDATION TESTS

The one-dimensional consolidation properties of "undisturbed" samples were evaluated in general accordance with the provisions of ASTM Test Method D 2435. Sample diameter was 2.416 inches and sample height was 1.00 inch. Water was added during the test at various normal loads to evaluate the potential for hydro-collapse and to produce saturation during the remainder of the testing. Consolidation readings were taken regularly during each load increment until the change in sample height was less than approximately 0.0001 inch over a two-hour period. The graphic presentation of consolidation data is a representation of volume change in change in axial load. In addition, time rate tests were performed for select samples. The results of these tests are contained in this Appendix B.

R-VALUE TESTS

Bulk samples representative of the underlying on-site materials were tested to measure the response of a compacted sample to a vertically applied pressure under specific conditions. The R-value of a material is determined when the material is in a state of saturation such that water will be exuded from the compacted test specimen when a 16.8 kN load (2.07 MPa) is applied. The results from these test procedures are reported in this Appendix B-1.

TABLE B-1
SUMMARY OF SOIL LABORATORY DATA

Sample Information			Geologic Unit	USCS Group Symbol	In Situ Water Content, %	In Situ Dry Unit Weight, pcf	In Situ Saturation, %	Sieve/Hydrometer				Atterberg Limits			Compaction		Expansion Index	R-Value	Chemical Test Results			
Boring Number	Depth, feet	Elevation, feet						Gravel, %	Sand, %	<#200, %	<2μ, %	LL	PL	PI	Maximum Dry Unit Weight, pcf	Optimum Water Content, %			pH	Sulfate (ppm)	Chloride (ppm)	Min. Resistivity (ohm/cm)
DH- 1	2.5	197.5	Qt	SM	4.8	104	22															
DH- 1	7.5	192.5	Qt	SC-CL	4.4	102	19															
DH- 1	15	185.0	Qt	SM	3.6	112	21															
DH- 1	20	180.0	Qt	SM															6.8	122	246	2084
DH- 1	25	175.0	Qt	CL	12.5	118	82															
DH- 1	30	170.0	Qt	CL				0	34	65		39	15	24								
DH- 1	35	165.0	Qt	SP-SM	5.3	122	39															
DH- 1	40	160.0	Qt	SC				0	66	33												
DH- 1	45	155.0	Qt	CL	21.1	99	83	8	33	58	22	41	17	24								
DH- 2	7.5	166.5	Qal	SP	8.5	111	46															
DH- 2	12.5	161.5	Qal	SM-SP	6.0	115	36															
DH- 2	17.5	156.5	Qal	SP	2.0																	
DH- 2	22.5	151.5	Qal	CL	22.0	98	85															
DH- 2	28.5	145.5	Qal	SM	4.4	110	23															
DH- 3	5	169.0	Qal	CL	8.2	121	60															
DH- 3	10	164.0	Qal	CL	6.3	126	54															
DH- 3	15	159.0	Qal	SP	1.8																	
DH- 4	2.5	192.5	Qt	SM	12.6	87	37															
DH- 4	7.5	187.5	Qt	SP	2.5	91	8															
DH- 4	12.5	182.5	Qt	ML-SM	10.6	114	63															
DH- 4	30	165.0	Qt	SC-SP	7.2	117	46															
DH- 5	5	185.0	Qt	SP	9.3	100	38															
DH- 5	10	180.0	Qt	SP	2.9	102	12															
DH- 5	20	170.0	Qt	SP	3.2																	
DH- 6	0	194.0	Qt	SM	6.2			1	60	39					125.0	10.5			7.2	ND	420	4392

GMU_TABLE_SOIL_LAB_DATA 25-126-00.GPJ FNC AB GWGN01.GDT 8/2/25

Project: Northwest Open Space

Project No. 25-126-00

TABLE B-1
SUMMARY OF SOIL LABORATORY DATA

Sample Information			Geologic Unit	USCS Group Symbol	In Situ Water Content, %	In Situ Dry Unit Weight, pcf	In Situ Saturation, %	Sieve/Hydrometer				Atterberg Limits			Compaction		Expansion Index	R-Value	Chemical Test Results			
Boring Number	Depth, feet	Elevation, feet						Gravel, %	Sand, %	<#200, %	<2μ, %	LL	PL	PI	Maximum Dry Unit Weight, pcf	Optimum Water Content, %			pH	Sulfate (ppm)	Chloride (ppm)	Min. Resistivity (ohm/cm)
DH- 6	2.5	191.5	Qt	SM	6.4	108	32															
DH- 6	7.5	186.5	Qt	SM	7.8	100	32															
DH- 6	12.5	181.5	Qt	SM	5.8	104	26															
DH- 6	20	174.0	Qt	SM-SP	3.2																	
DH- 6	30	164.0	Qt	SW-SP	1.9	110	10															
DH- 7	5	190.0	Qt	SM	4.7	99	19															
DH- 7	10	185.0	Qt	SM-SP	2.6	90	8															
DH- 8	0	206.0	Qt	SM				2	58	40								76	7.45	138	438	2435
DH- 8	2.5	203.5	Qt	SM-SP	4.4	95	16															
DH- 8	25	181.0	Qt	SP	1.3																	
DH- 9	0	205.0	Qafu	CL	13.2			3	24	73	26	42	16	26	120.0	11.0	83	5	6.1	207	390	1186
DH- 9	5	200.0	Qal	CL	2.3	123	18															
DH- 9	10	195.0	Qal	CH	17.0	110	89															
DH- 9	20	185.0	Qal	CL	18.0	108	90															
DH- 9	30	175.0	Qal	CL	23.7	97	90	0	8	92		43	19	24								
DH- 9	40	165.0	Qal	SP/CL	18.1	112	100															
DH- 9	50	155.0	Tc	CL	30.6	88	92															
DH-10	2.5	194.5	Qt	SM	4.7																	
DH-10	7.5	189.5	Qt	SP	1.3	97	5															
DH-10	15	182.0	Qt	SP	2.8	112	16															
DH-10	25	172.0	Qt	SM	16.1	108	81															
DH-11	5	195.0	Qt	SM	4.6	98	18															
DH-11	10	190.0	Qt	SM	15.7	108	78															
DH-11	20	180.0	Qt	SM-SP	2.3																	
DH-12	0	198.0	Qafu	SM				2	49	49									7	ND	444	3617

Project: Northwest Open Space
Project No. 25-126-00

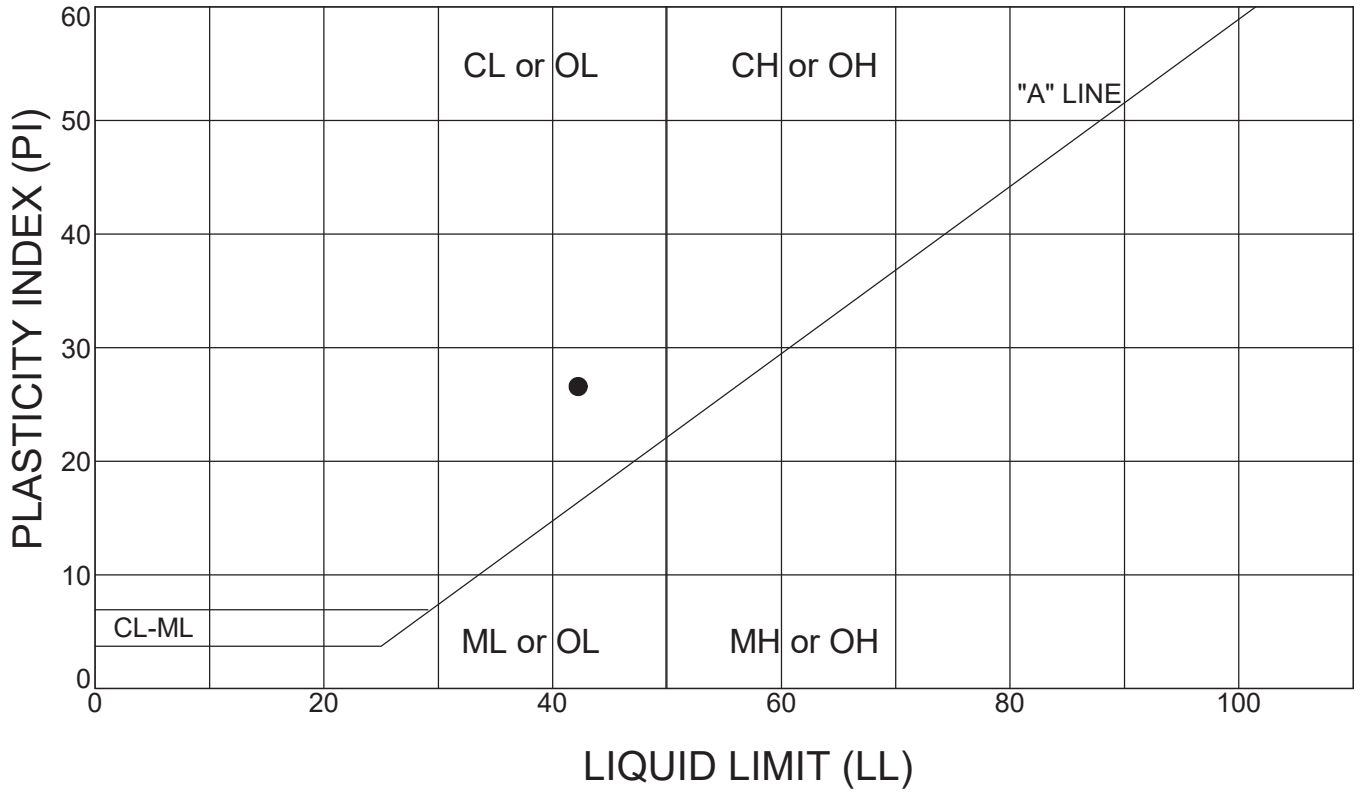
GMU

GMU_TABLE_SOIL_LAB_DATA 25-126-00.GPJ FNC AB GWGN01.GDT 8/2/25

TABLE B-1
SUMMARY OF SOIL LABORATORY DATA

Sample Information			Geologic Unit	USCS Group Symbol	In Situ Water Content, %	In Situ Dry Unit Weight, pcf	In Situ Saturation, %	Sieve/Hydrometer				Atterberg Limits			Compaction		Expansion Index	R-Value	Chemical Test Results			
Boring Number	Depth, feet	Elevation, feet						Gravel, %	Sand, %	<#200, %	<2μ, %	LL	PL	PI	Maximum Dry Unit Weight, pcf	Optimum Water Content, %			pH	Sulfate (ppm)	Chloride (ppm)	Min. Resistivity (ohm/cm)
DH-12	2.5	195.5	Qt	SM	5.5	106	26															
DH-12	7.5	190.5	Qt	SM	10.7	96	39															
DH-12	15	183.0	Qt	SP	2.8	121	20															
DH-13	5	193.0	Qt	SM	1.7																	
DH-13	10	188.0	Qt	SP	13.6	98	53															

GMU_TABLE_SOIL_LAB_DATA 25-126-00.GPJ FNC AB GWGN01.GDT 8/2/25



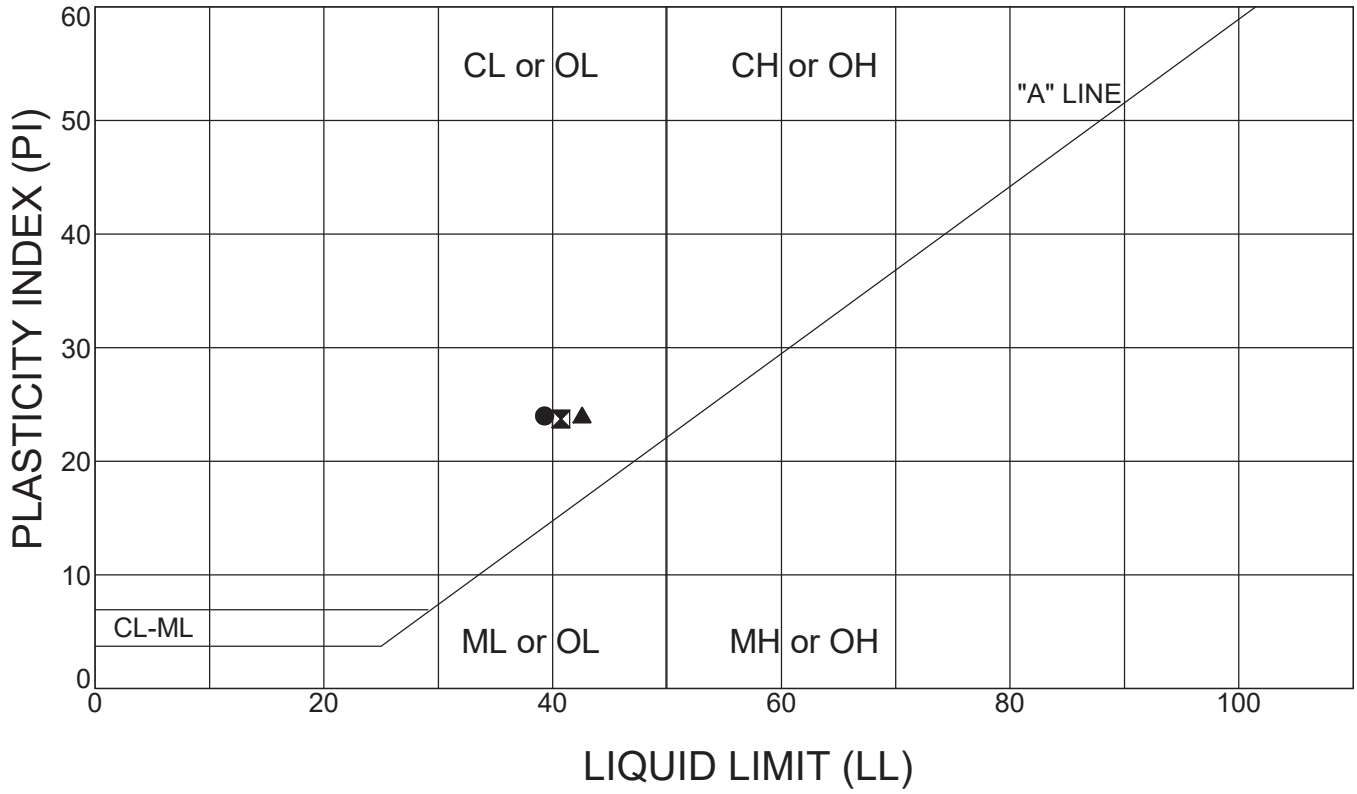
Boring Number	Depth (feet)	Geologic Unit	Test Symbol	Insitu Water Content (%)	LL	PL	PI	Classification
DH- 9	0.0	Qafu	●	13	42	16	26	LEAN CLAY with SAND (CL)

LIMITS 25-126-00.GPJ 7/24/25

ATTERBERG LIMITS

Project: Northwest Open Space
Project No. 25-126-00

GMU



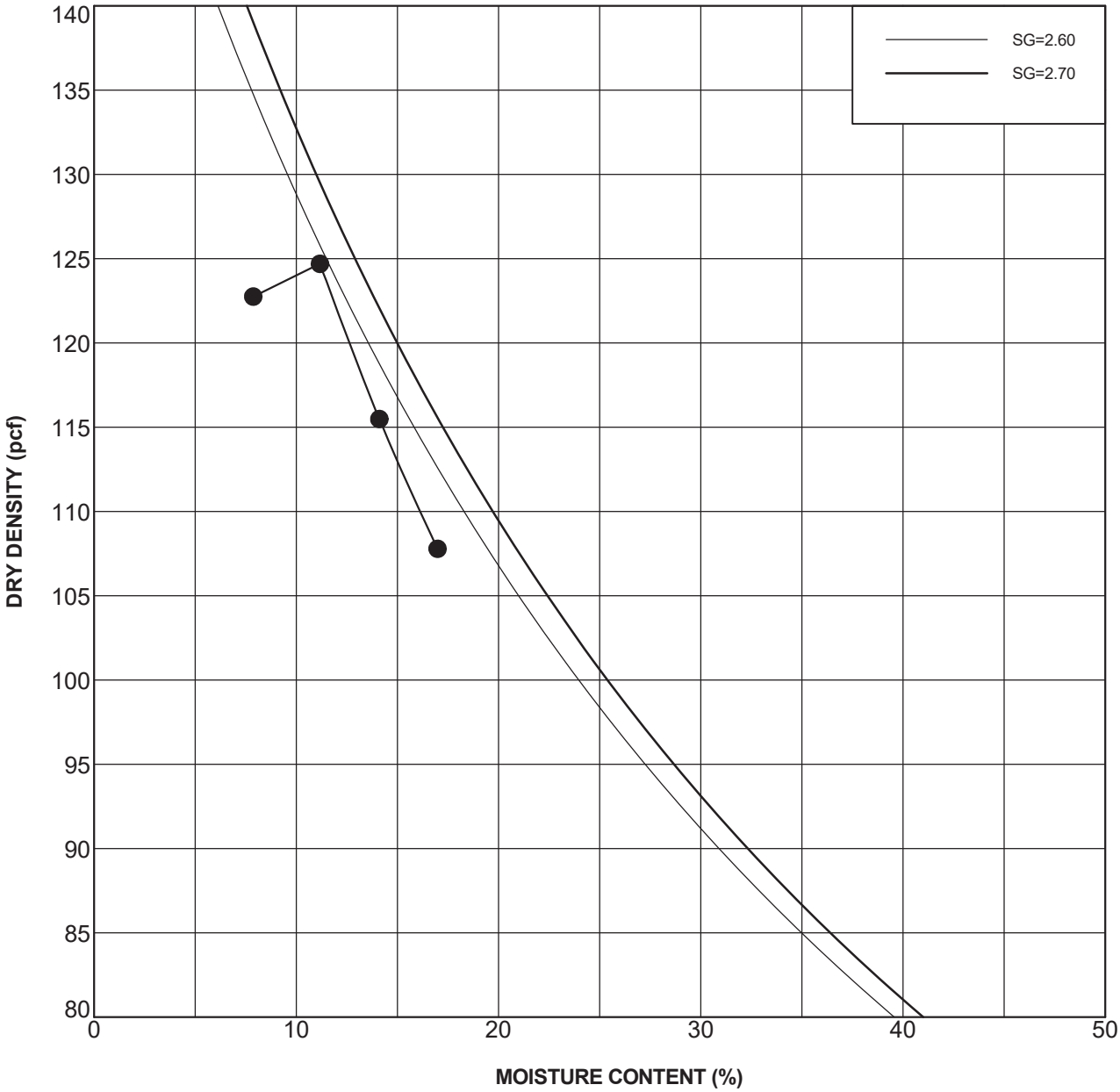
Boring Number	Depth (feet)	Geologic Unit	Test Symbol	Insitu Water Content (%)	LL	PL	PI	Classification
DH- 1	30.0	Qt	●		39	15	24	SANDY LEAN CLAY (CL)
DH- 1	45.0	Qt	⊠	21	41	17	24	SANDY LEAN CLAY (CL)
DH- 9	30.0	Qal	▲	24	43	19	24	LEAN CLAY (CL)

LIMITS 25-126-00.GPJ 8/1/25

ATTERBERG LIMITS

Project: Northwest Open Space
Project No. 25-126-00

GMU



Boring Number	Depth (feet)	Geologic Unit	Symbol	Maximum Dry Density, pcf	Optimum Moisture Content, %	Classification
DH- 6	0.0	Qt	●	125	10.5	SILTY SAND (SM)

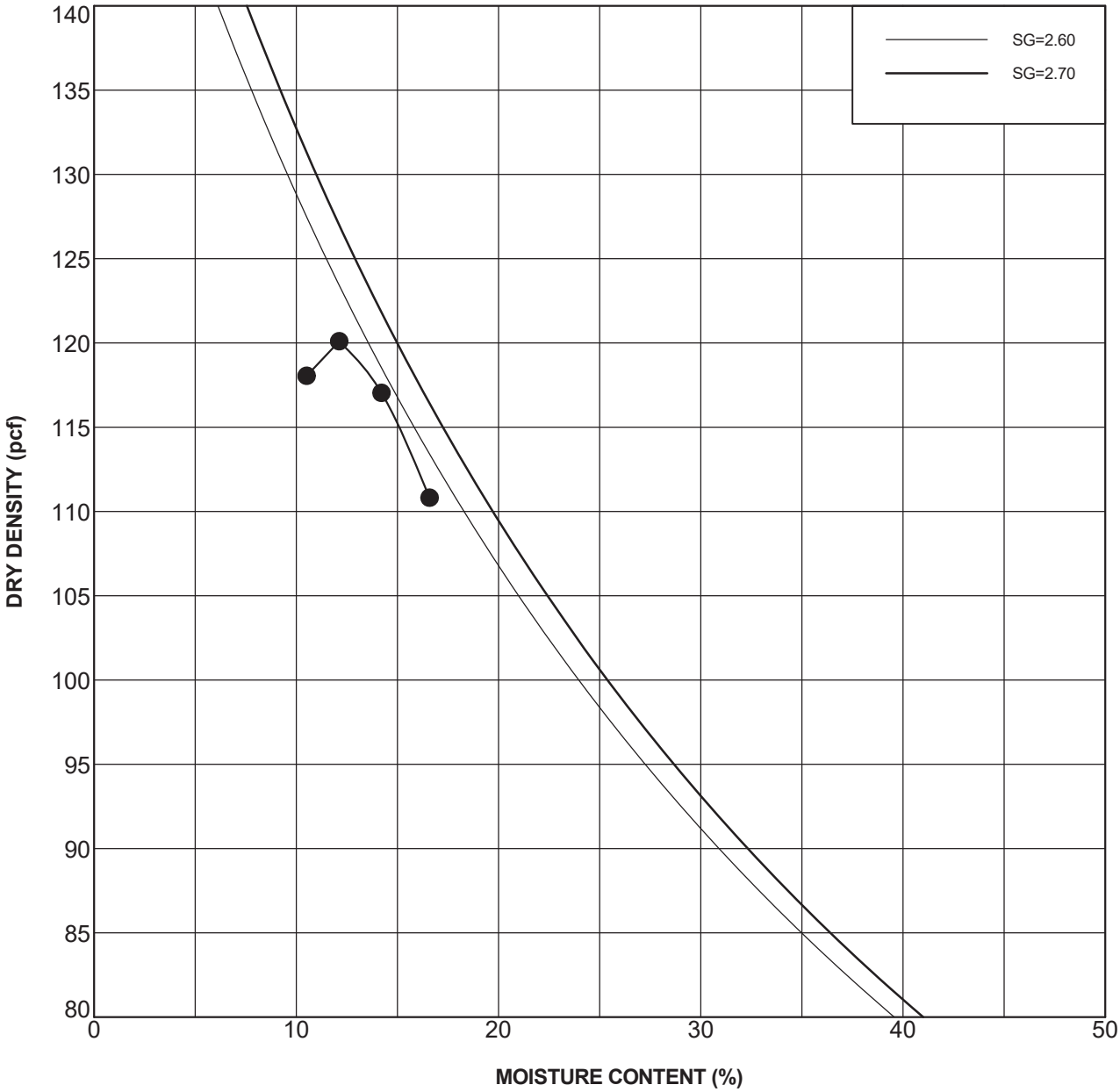
DV/TCOMP 25-126-00.GPJ 8/1/25

COMPACTION TEST DATA

Project: Northwest Open Space

Project No. 25-126-00

GMU



Boring Number	Depth (feet)	Geologic Unit	Symbol	Maximum Dry Density, pcf	Optimum Moisture Content, %	Classification
DH- 9	0.0	Qafu	●	120	11	LEAN CLAY with SAND (CL)

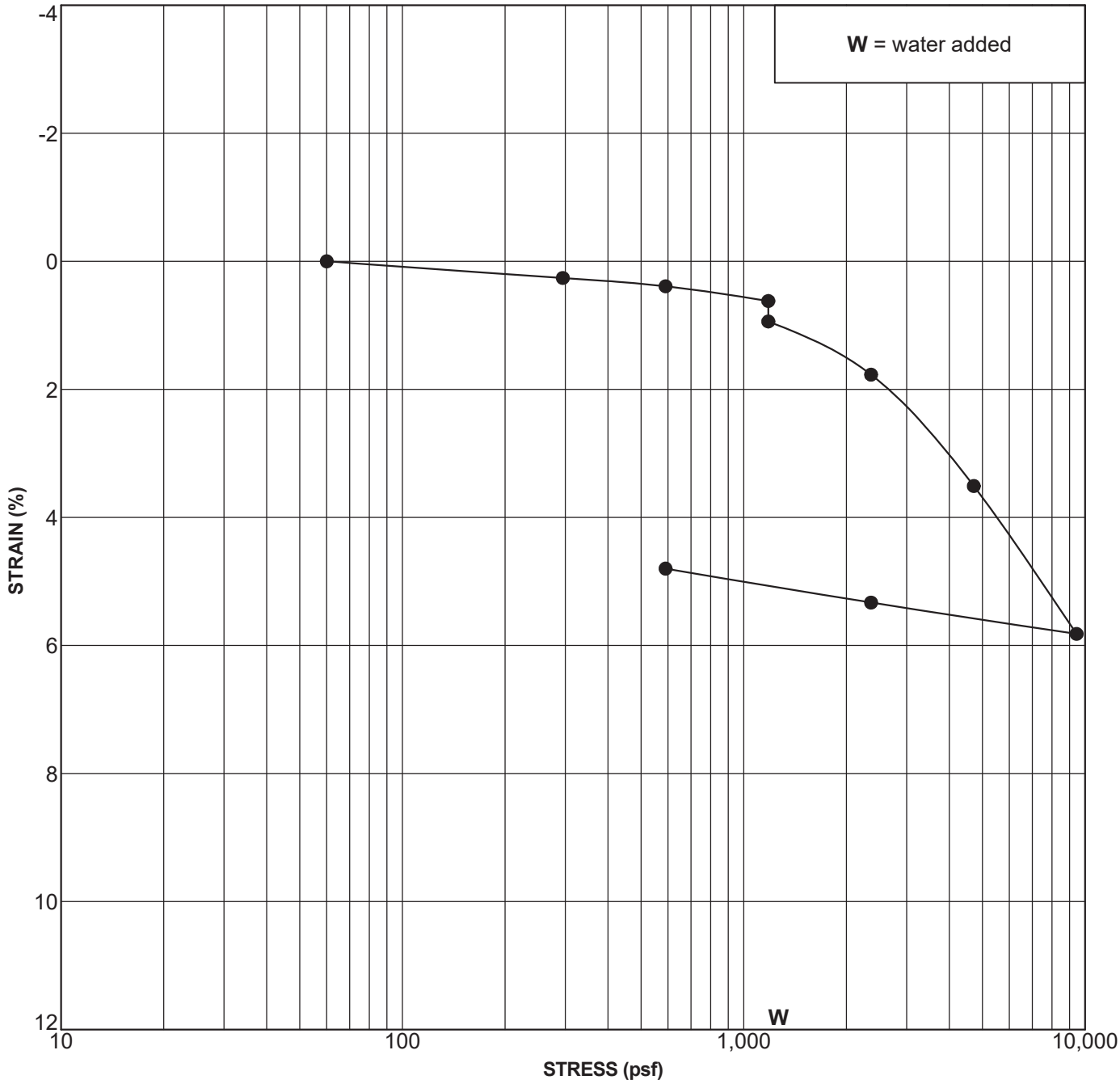
DVTCOMP 25-126-00.GPJ 8/1/25

COMPACTION TEST DATA

Project: Northwest Open Space

Project No. 25-126-00

GMU



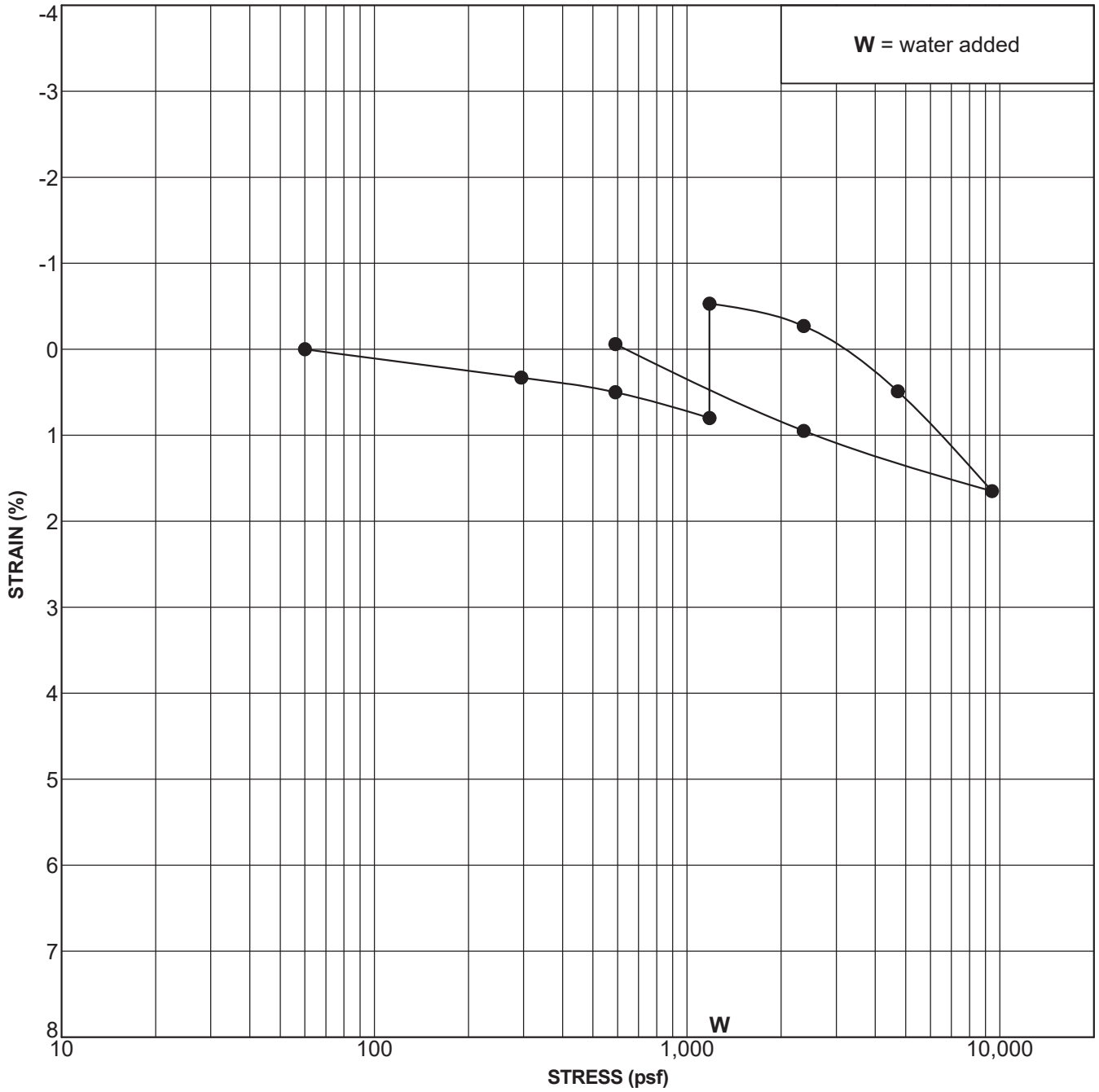
Boring Number	Depth (feet)	Geologic Unit	Symbol	In Situ or Remolded Sample	% Hydro-Collapse	Classification
DH- 1	7.5	Qt	●	In Situ	0.32	CLAYEY SAND (SC-CL)

GMU_CONSOL 25-126-00.GPJ GM&U.GDT 8/1/25

CONSOLIDATION TEST DATA

Project: Northwest Open Space

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Boring Number	Depth (feet)	Geologic Unit	Symbol	In Situ or Remolded Sample	% Hydro-Collapse	Classification
DH- 2	7.5	Qal	●	In Situ	-1.33	POORLY-GRADED SAND (SP)

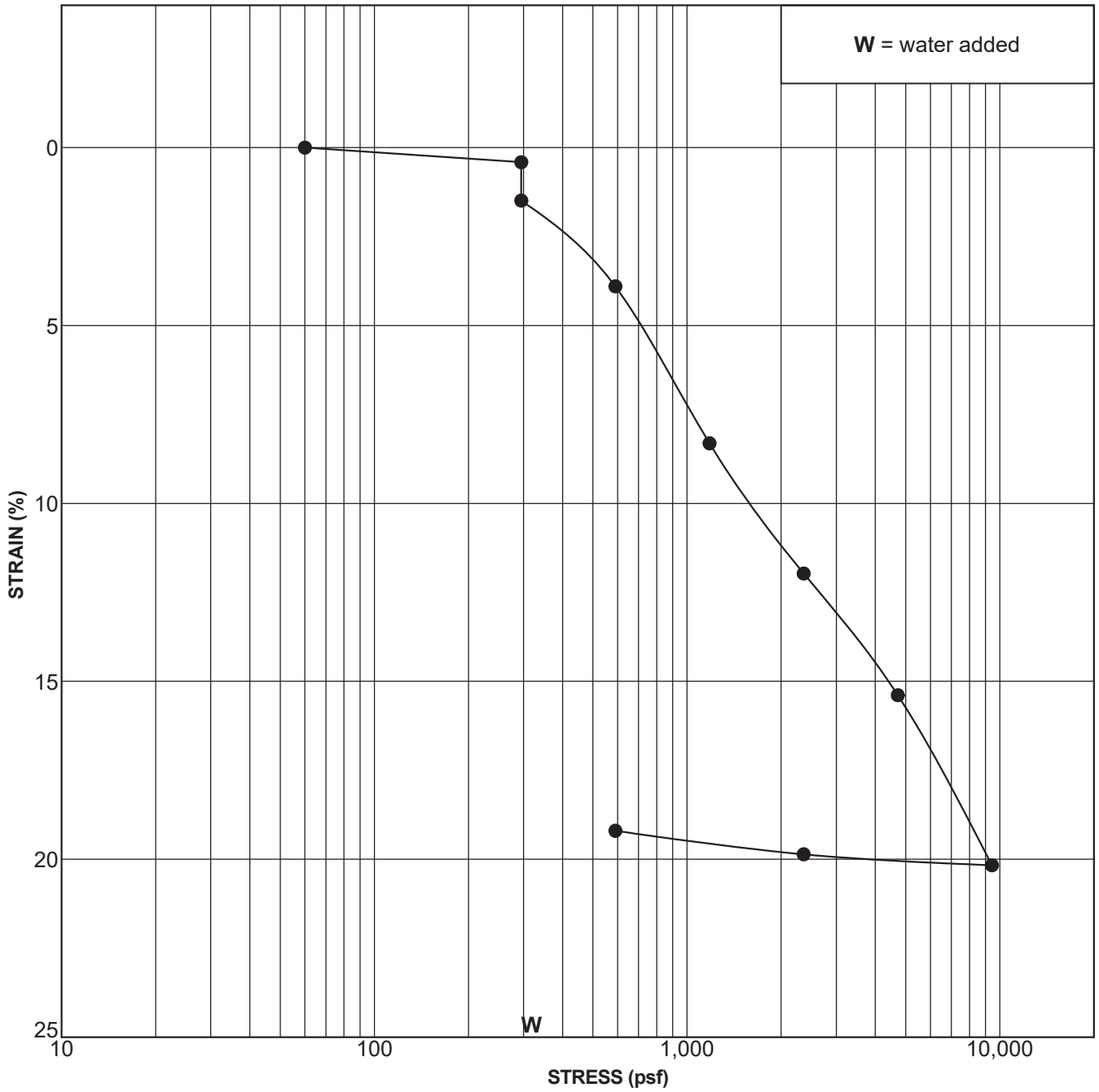
CONSOLIDATION TEST DATA

Project: Northwest Open Space

Project No. 25-126-00

GMU

GMU_CONSOL 25-126-00.GPJ GM&U.GDT 8/1/25



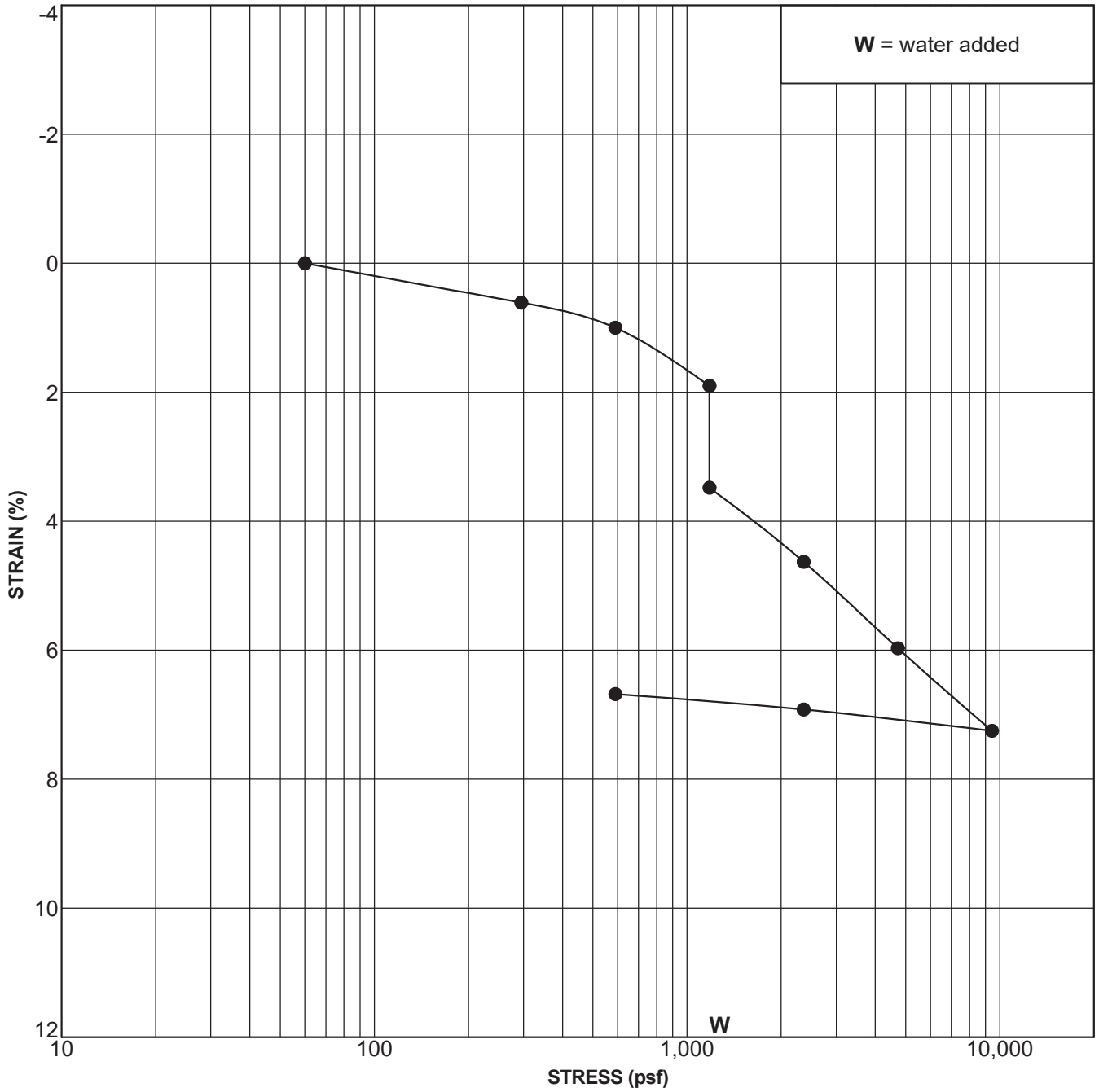
Boring Number	Depth (feet)	Geologic Unit	Symbol	In Situ or Remolded Sample	% Hydro-Collapse	Classification
DH- 4	2.5	Qt	●	In Situ	1.08	SILTY SAND (SM)

GMU_CONSOL 25-126-00.GPJ GM&U.GDT 8/1/25

CONSOLIDATION TEST DATA

Project: Northwest Open Space

Project No. 25-126-00



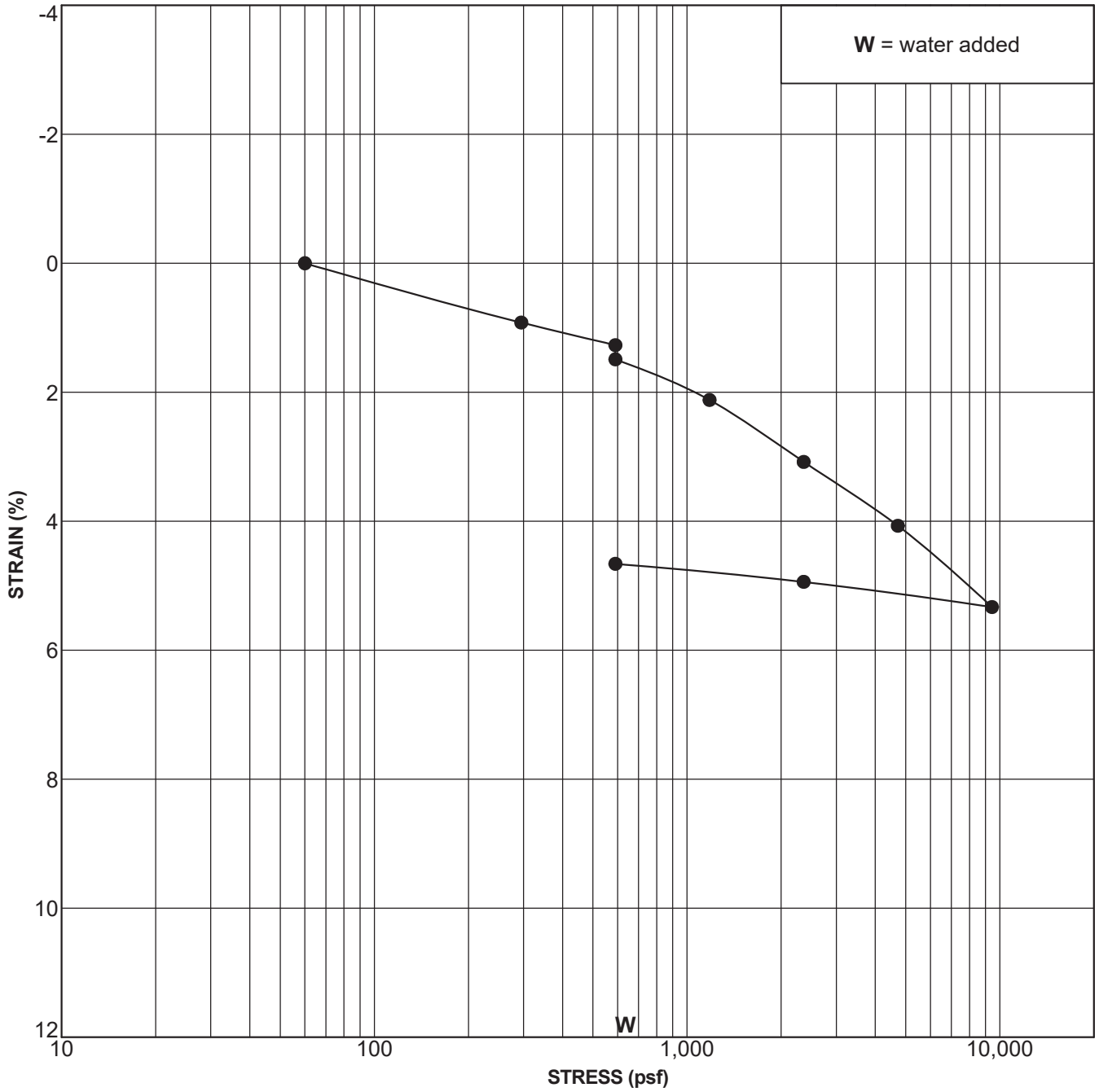
Boring Number	Depth (feet)	Geologic Unit	Symbol	In Situ or Remolded Sample	% Hydro-Collapse	Classification
DH- 4	7.5	Qt	●	In Situ		POORLY GRADED SAND (SP)

GMU_CONSOL 25-126-00.GPJ GM&U.GDT 8/1/25

CONSOLIDATION TEST DATA

Project: Northwest Open Space

Project No. 25-126-00



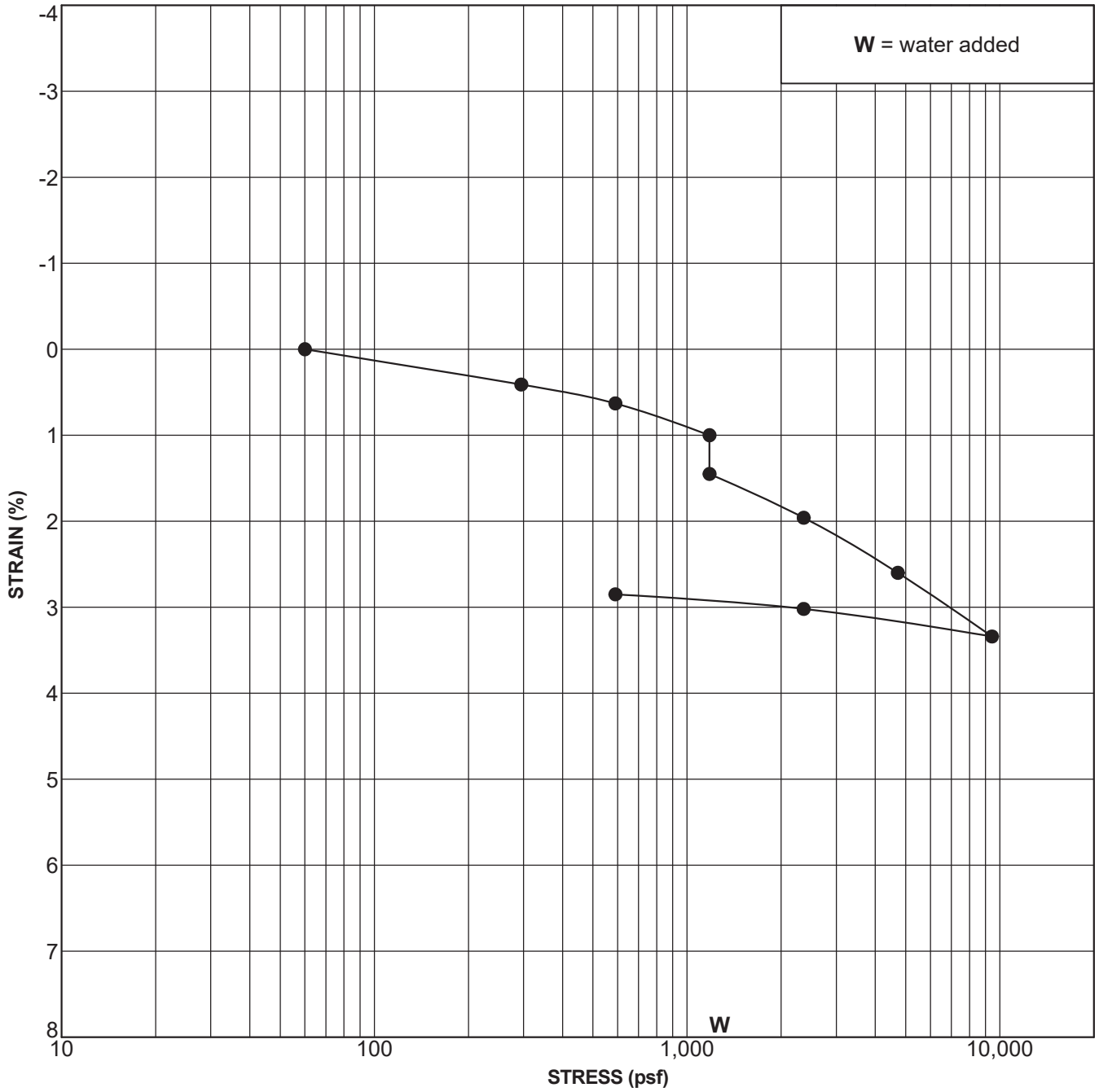
Boring Number	Depth (feet)	Geologic Unit	Symbol	In Situ or Remolded Sample	% Hydro-Collapse	Classification
DH- 5	5.0	Qt	●	In Situ	0.22	POORLY GRADED SAND (SP)

GMU_CONSOL 25-126-00.GPJ GM&U.GDT 8/1/25

CONSOLIDATION TEST DATA

Project: Northwest Open Space

Project No. 25-126-00



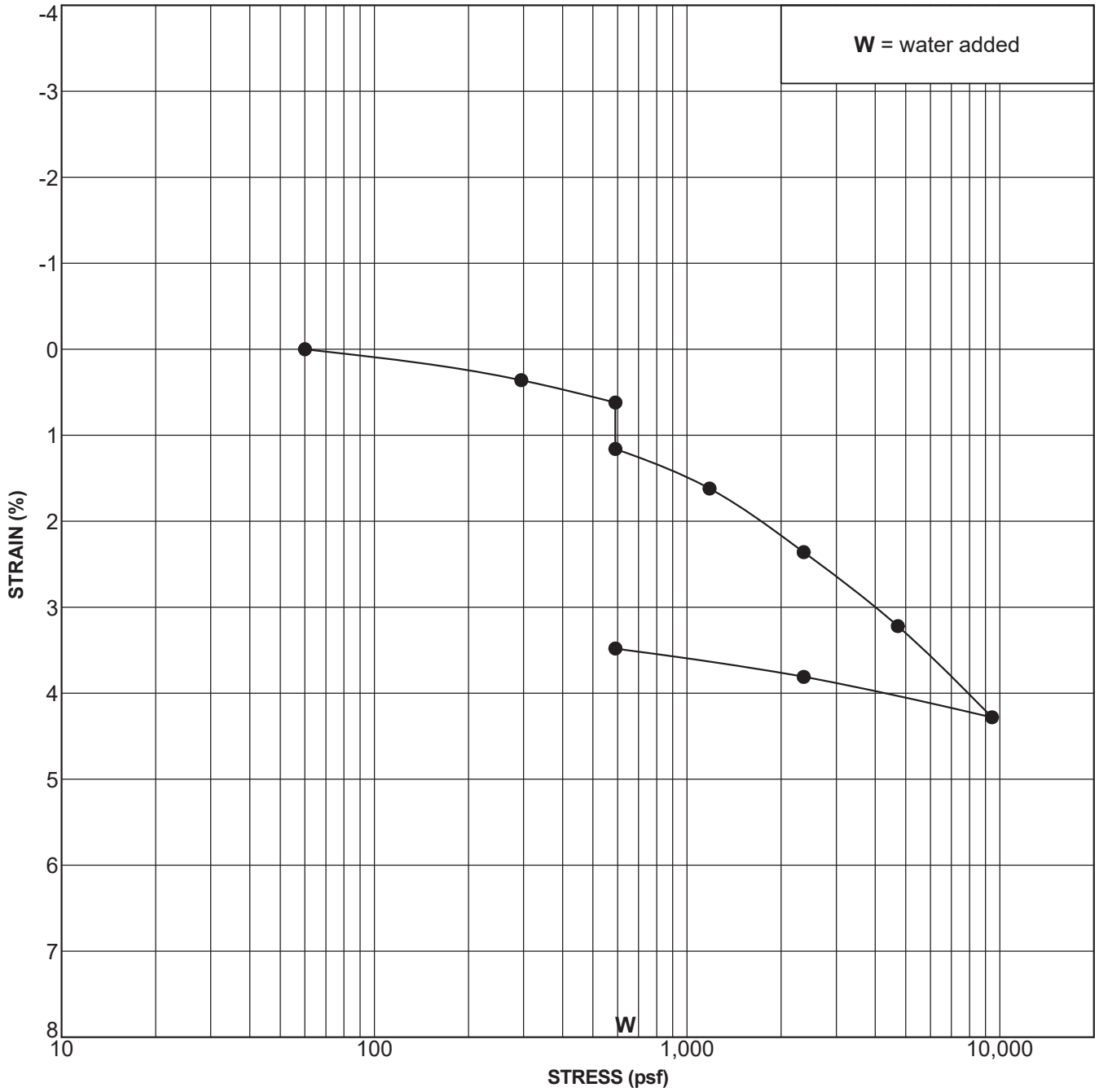
Boring Number	Depth (feet)	Geologic Unit	Symbol	In Situ or Remolded Sample	% Hydro-Collapse	Classification
DH- 5	10.0	Qt	●	In Situ	0.45	

GMU_CONSOL 25-126-00.GPJ GM&U.GDT 8/1/25

CONSOLIDATION TEST DATA

Project: Northwest Open Space

Project No. 25-126-00



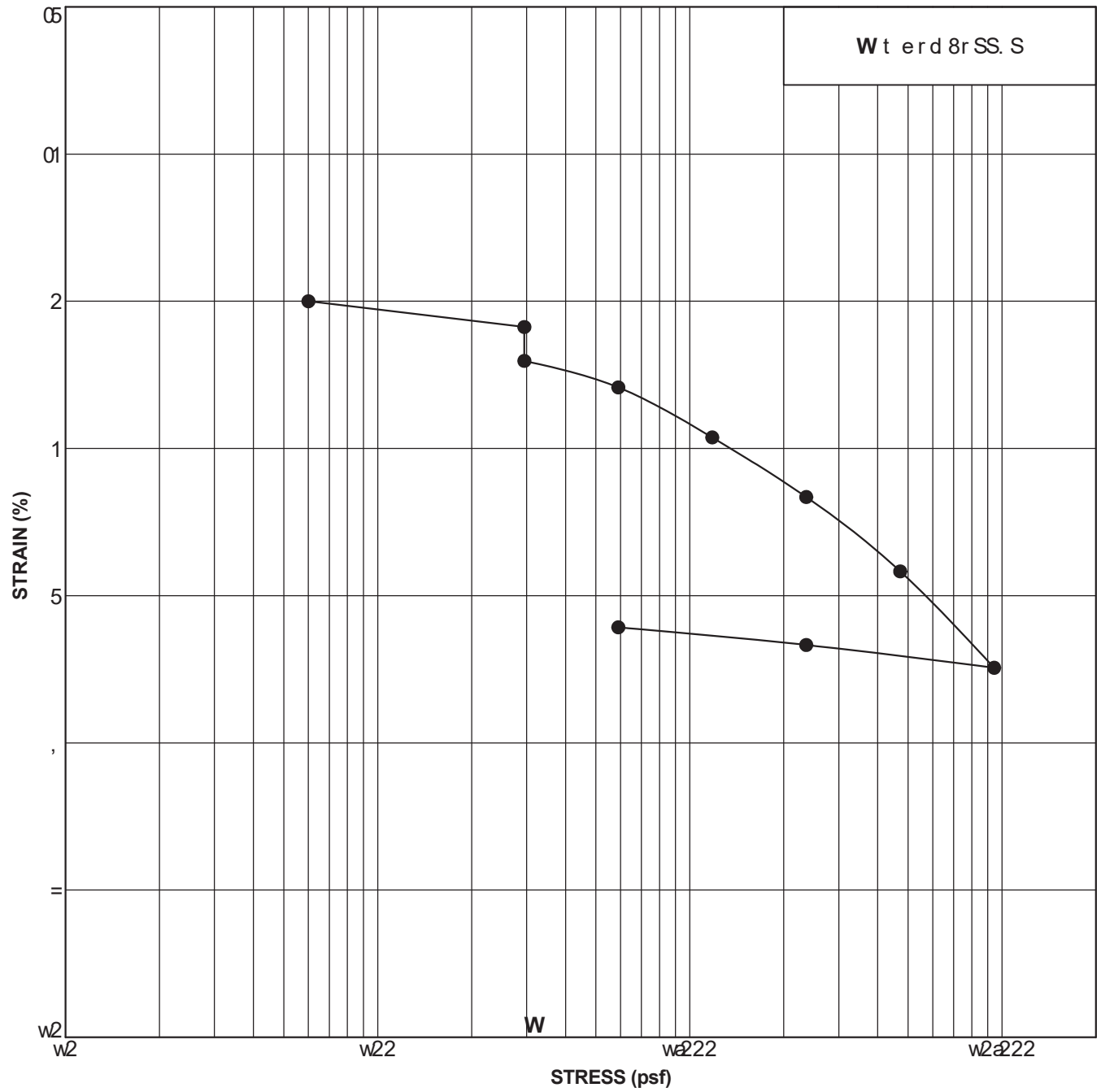
Boring Number	Depth (feet)	Geologic Unit	Symbol	In Situ or Remolded Sample	% Hydro-Collapse	Classification
DH- 7	5.0	Qt	●	In Situ	0.54	SILTY SAND (SM)

CONSOLIDATION TEST DATA

Project: Northwest Open Space

Project No. 25-126-00

GMU_CONSOL 25-126-00.GPJ GM&U.GDT 8/1/25

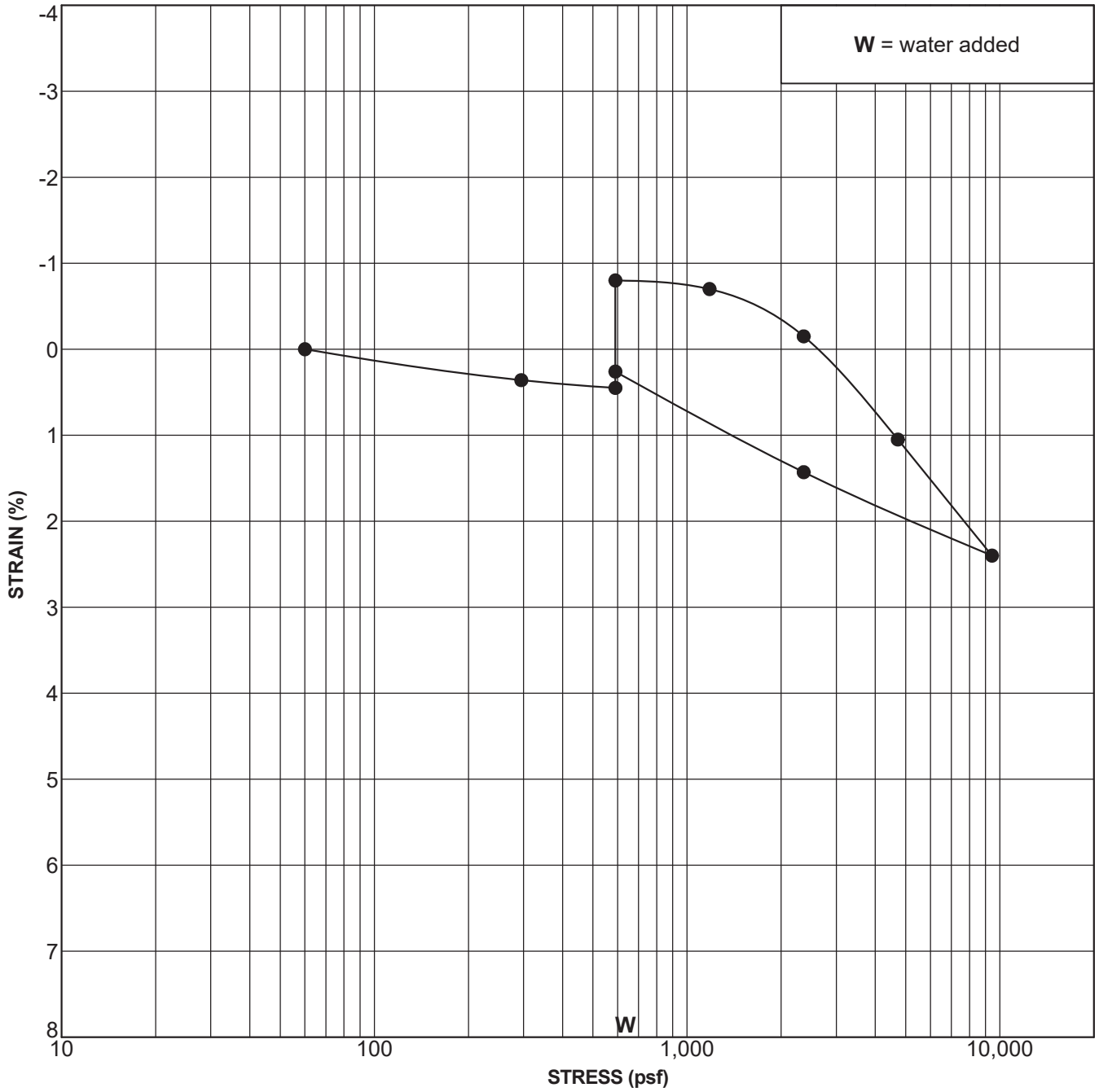


Boring Number	Depth (feet)	Geologic Unit	Symbol	In Situ or Remolded Sample	% Hydro-Collapse	Classification
Mn0=	1IP	o d	●	T LudQ	2I5,	LTYAN LD(M)LH0L- 4

GHU_Cp(Lp Y 1P0w1, 022IG- J GH&UIGMA =/w1P

CONSOLIDATION TEST DATA

- 8j c : dh (j 8dse . Odp 6. i L 6r : .
- 8j c : d(j l 1P0w1, 022



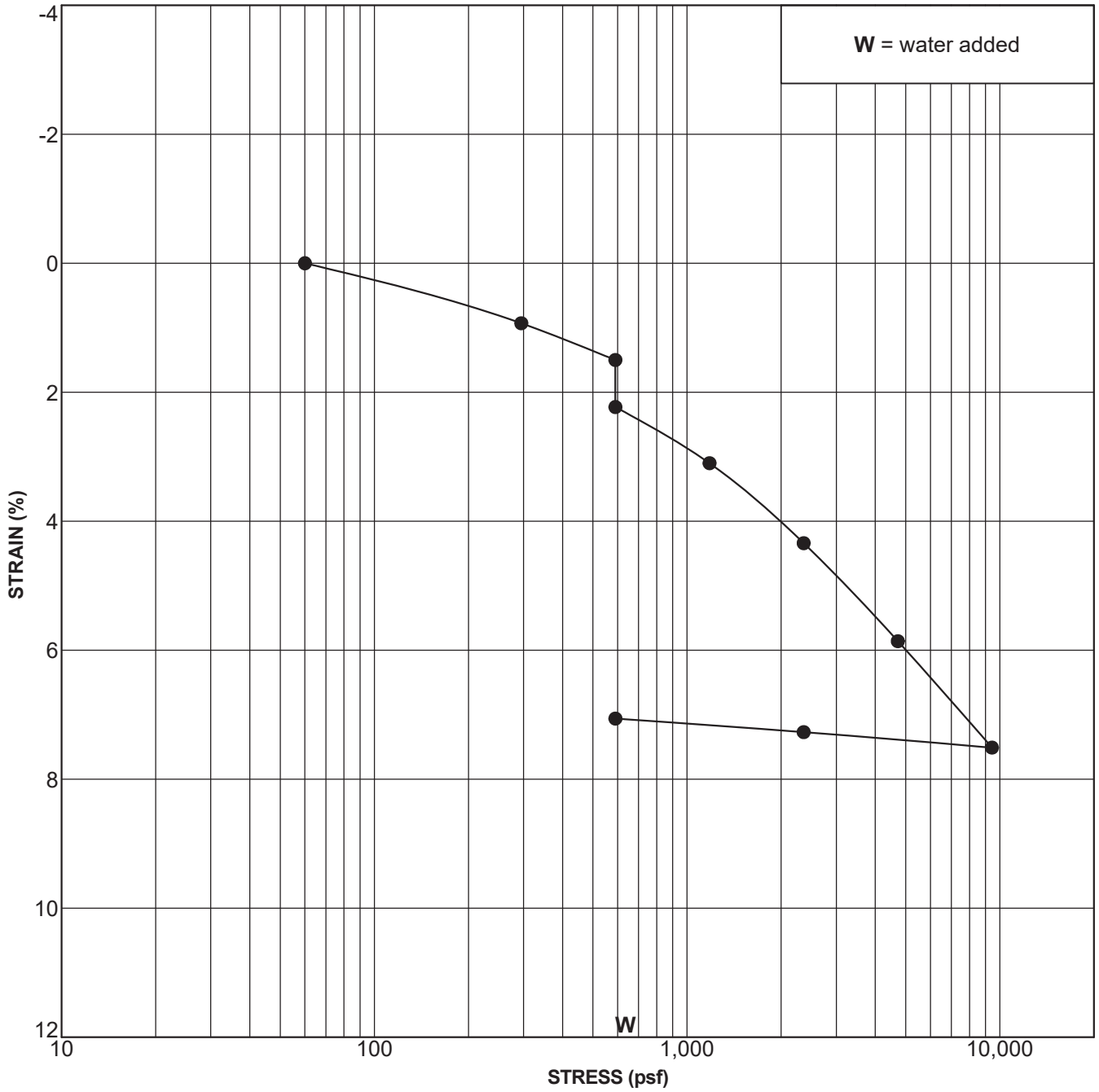
Boring Number	Depth (feet)	Geologic Unit	Symbol	In Situ or Remolded Sample	% Hydro-Collapse	Classification
DH- 9	5.0	Qal	●	In Situ	-1.25	LEAN CLAY with SAND (CL)

GMU_CONSOL 25-126-00.GPJ GM&U.GDT 8/1/25

CONSOLIDATION TEST DATA

Project: Northwest Open Space

Project No. 25-126-00



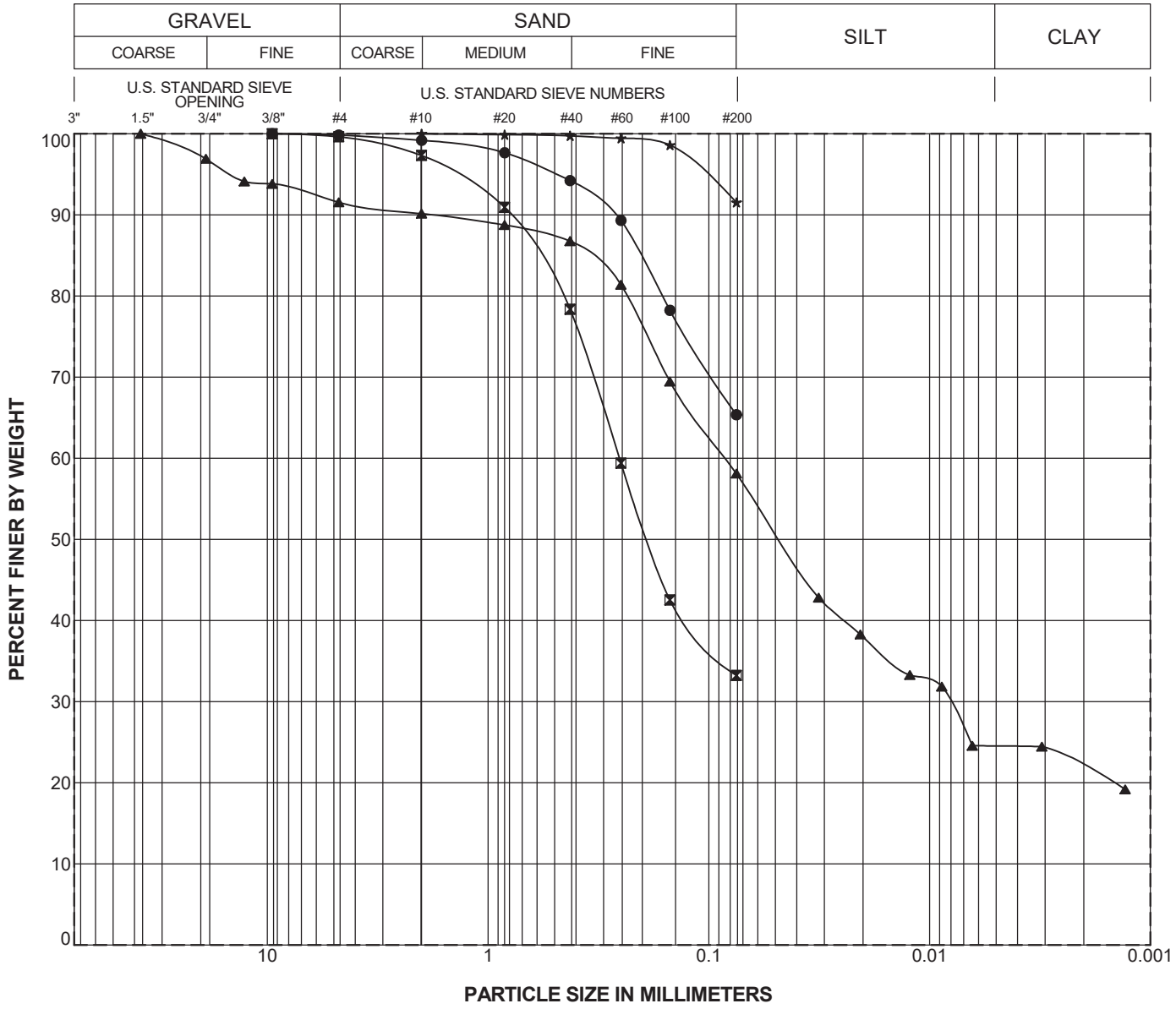
Boring Number	Depth (feet)	Geologic Unit	Symbol	In Situ or Remolded Sample	% Hydro-Collapse	Classification
DH-11	5.0	Qt	●	In Situ	0.73	SILTY SAND (SM)

CONSOLIDATION TEST DATA

Project: Northwest Open Space

Project No. 25-126-00

GMU_CONSOL 25-126-00.GPJ GM&U.GDT 8/1/25



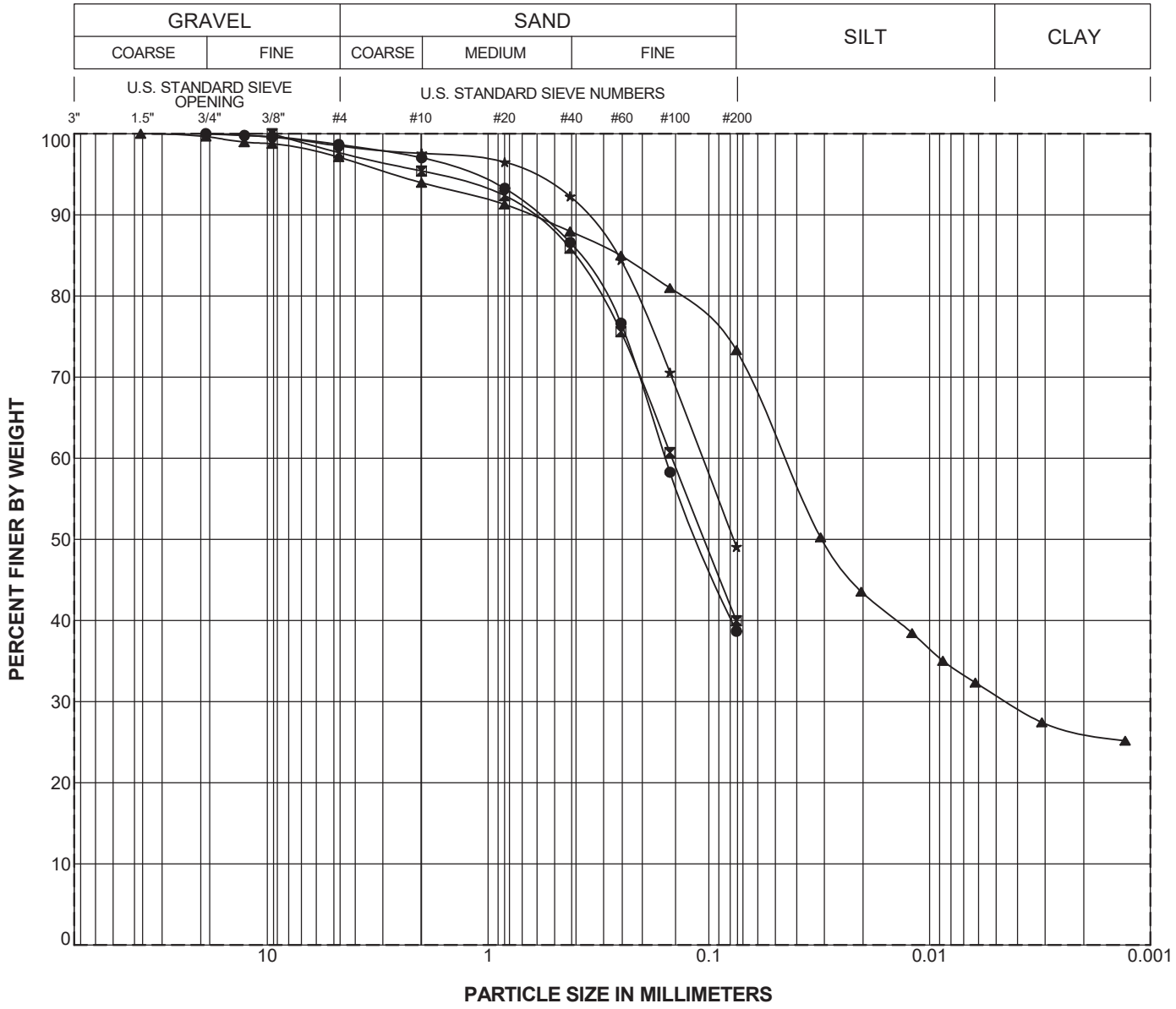
Boring Number	Depth (feet)	Geologic Unit	Symbol	LL	PI	Classification
DH- 1	30.0	Qt	●	39	24	SANDY LEAN CLAY (CL)
DH- 1	40.0	Qt	⊠			CLAYEY SAND (SC)
DH- 1	45.0	Qt	▲	41	24	SANDY LEAN CLAY (CL)
DH- 9	30.0	Qal	★	43	24	LEAN CLAY (CL)

GMU_GRAIN_SIZE 25-126-00.GPJ 8/1/25

PARTICLE SIZE DISTRIBUTION

Project: Northwest Open Space

Project No. 25-126-00



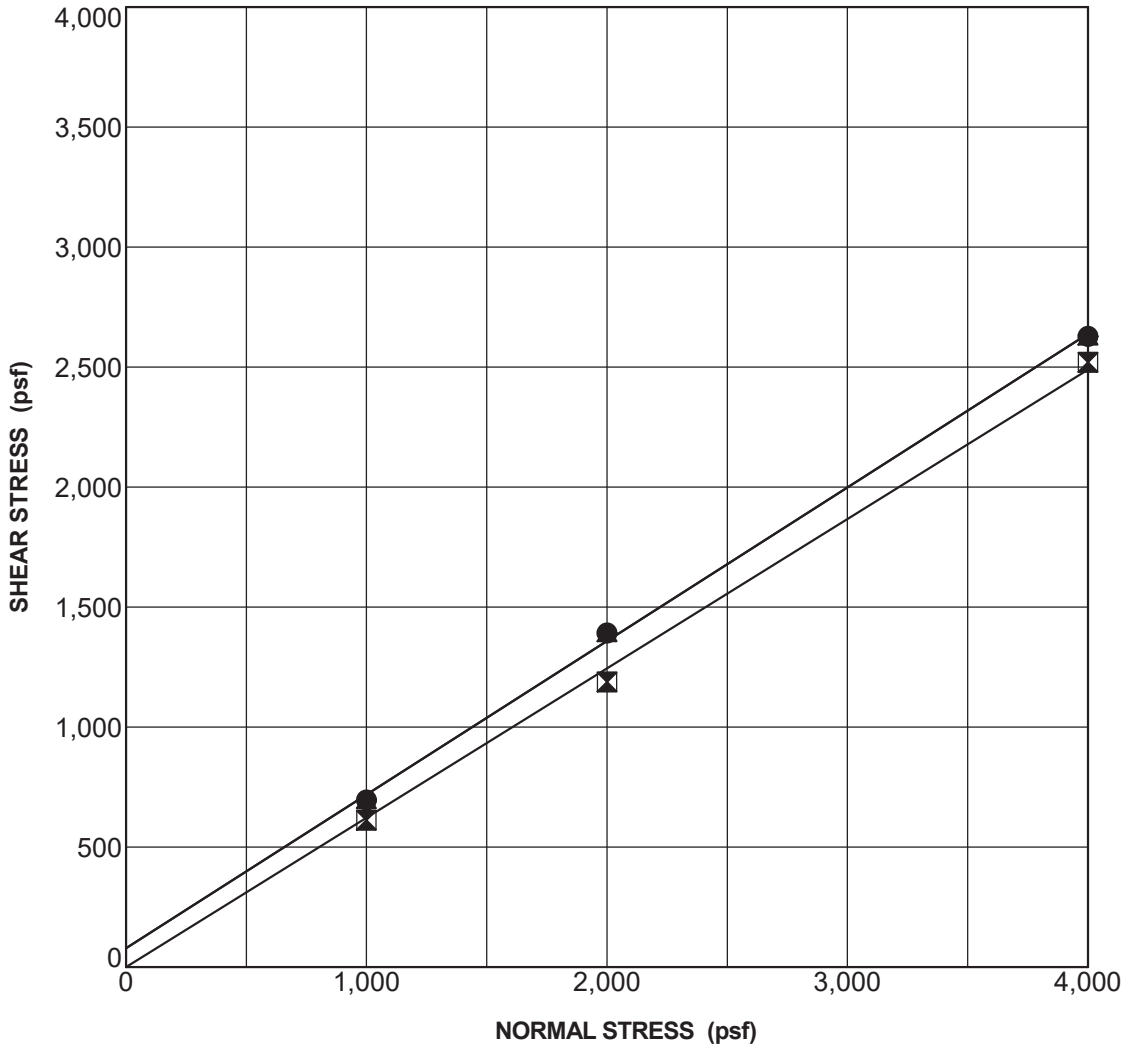
Boring Number	Depth (feet)	Geologic Unit	Symbol	LL	PI	Classification
DH- 6	0.0	Qt	●			SILTY SAND (SM)
DH- 8	0.0	Qt	⊠			SILTY SAND (SM)
DH- 9	0.0	Qafu	▲	42	26	LEAN CLAY with SAND (CL)
DH-12	0.0	Qafu	★			SILTY SAND (SM)

GMU_GRAIN_SIZE 25-126-00.GPJ 7/24/25

PARTICLE SIZE DISTRIBUTION

Project: Northwest Open Space

Project No. 25-126-00



SAMPLE AND TEST DESCRIPTION
Sample Location: DH- 1 @ 15.0 ft **Geologic Unit:** Qt **Classification:** SILTY SAND (SM) **Strain Rate (in/min):** 0.005 **Sample Preparation:** Undisturbed **Notes:** Sample inundated prior and during shearing

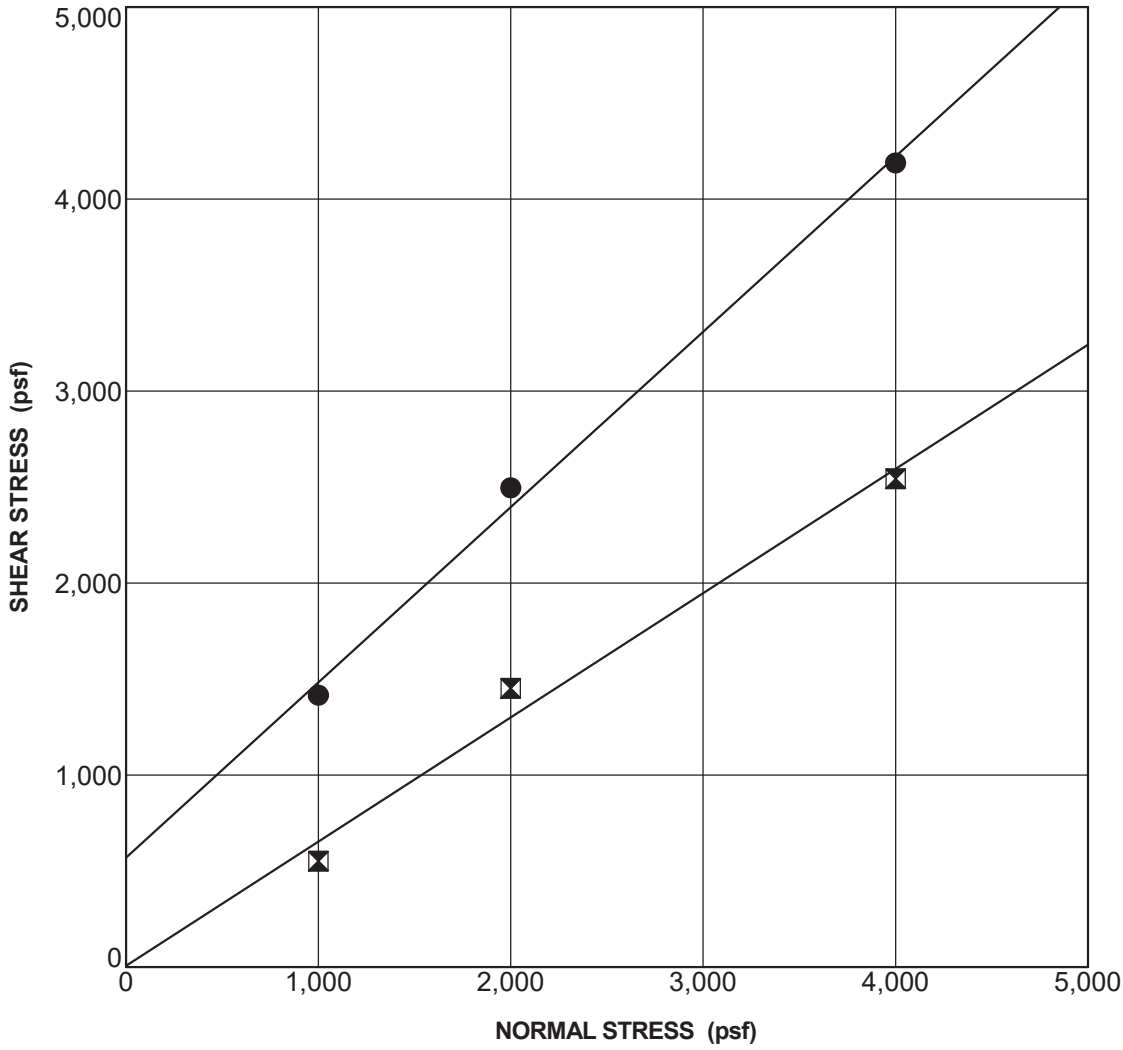
STRENGTH PARAMETERS		
STRENGTH TYPE	**COHESION (psf)**	**FRICTION ANGLE (degrees)**
● Peak Strength	78	32.6
⊠ Ultimate Strength	0	31.9

SHEAR TEST DATA

Project: Northwest Open Space

Project No. 25-126-00

GMU_DIRECT_SHEAR 25-126-00.GPJ GM&U.GDT 7/24/25



SAMPLE AND TEST DESCRIPTION
Sample Location: DH- 1 @ 25.0 ft **Geologic Unit:** Qt **Classification:** SANDY CLAY (CL) **Strain Rate (in/min):** 0.005 **Sample Preparation:** Undisturbed **Notes:** Sample inundated prior and during shearing

STRENGTH PARAMETERS		
STRENGTH TYPE	**COHESION (psf)**	**FRICTION ANGLE (degrees)**
● Peak Strength	570	42.4
⊠ Ultimate Strength	6	32.9

SHEAR TEST DATA

Project: Northwest Open Space
Project No. 25-126-00

GMU

GMU_DIRECT_SHEAR 25-126-00.GPJ GM&U.GDT 7/24/25

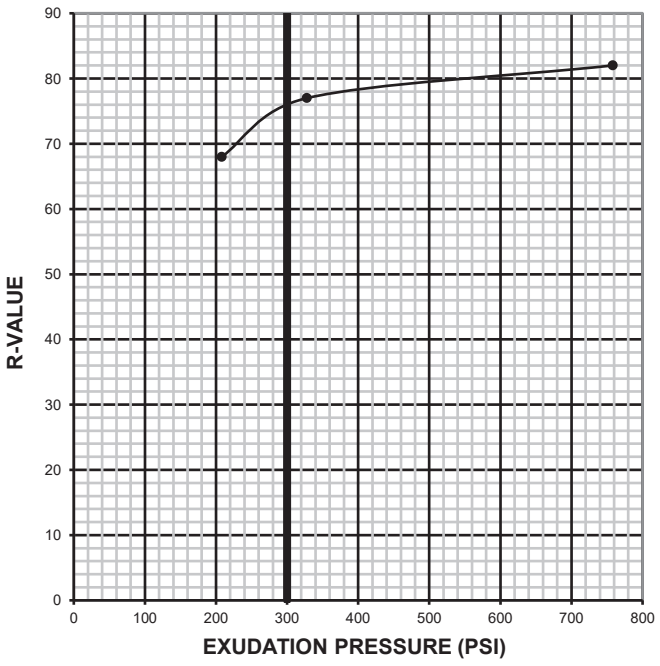
R-VALUE TEST REPORT

☑ CT-301 ☐ ASTM-D2844

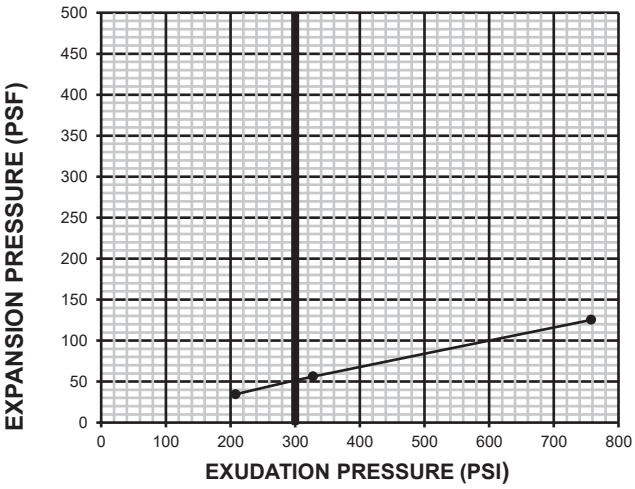
PROJECT NAME:	Almquist Development	PROJECT NUMBER:	25-126-00
SAMPLE LOCATION:		SAMPLE NUMBER:	DH-8
SAMPLE DESCRIPTION:	SILTY SAND (SM), brown	SAMPLE DEPTH:	
SAMPLED BY:		TESTED BY:	JPG
		DATE TESTED:	7/14/2025

TEST SPECIMEN	A	B	C
MOISTURE AT COMPACTION %	10.3	11.4	12.5
WEIGHT OF SAMPLE, grams	1070	1015	1008
HEIGHT OF SAMPLE, Inches	2.48	2.34	2.32
DRY DENSITY, pcf	118.5	118.0	117.0
COMPACTOR AIR PRESSURE, psi	350	350	250
EXUDATION PRESSURE, psi	758	328	208
EXPANSION, Inches x 10exp-4	29	13	8
STABILITY Ph 2,000 lbs (160 psi)	15	17	26
TURNS DISPLACEMENT	5.26	5.35	5.33
R-VALUE UNCORRECTED	82	80	71
R-VALUE CORRECTED	82	77	68
EXPANSION PRESSURE (psf)	125.3	56.2	34.6

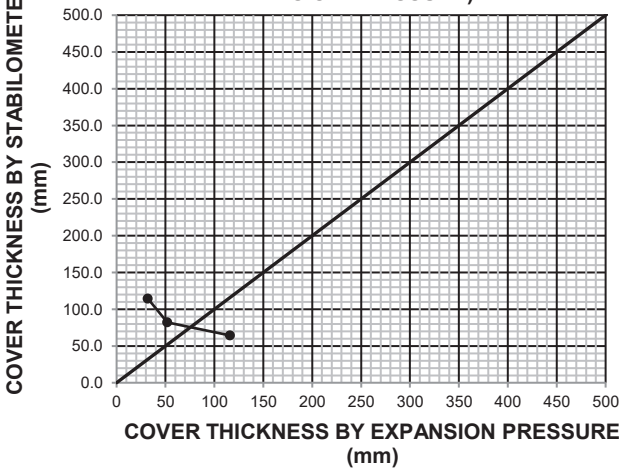
R-VALUE VS. EXUDATION PRESSURE



EXPANSION PRESSURE VS. EXUDATION PRESSURE



COVER THICKNESS (STABILOMETER BY EXPANSION PRESSURE)



R-VALUE AT EQUILIBRIUM:	76

R-VALUE BY EXUDATION PRESSURE:	76
R-VALUE BY EXPANSION PRESSURE:	79
EXPANSION PRESSURE AT 300 PSI EXUDATION:	55
TRAFFIC INDEX (Assumed):	5.5
GRAVEL FACTOR (Assumed):	1.5
UNIT MASS OF COVER MATERIAL, kg/m^3 (Assumed):	2100.0

R-VALUE TEST REPORT

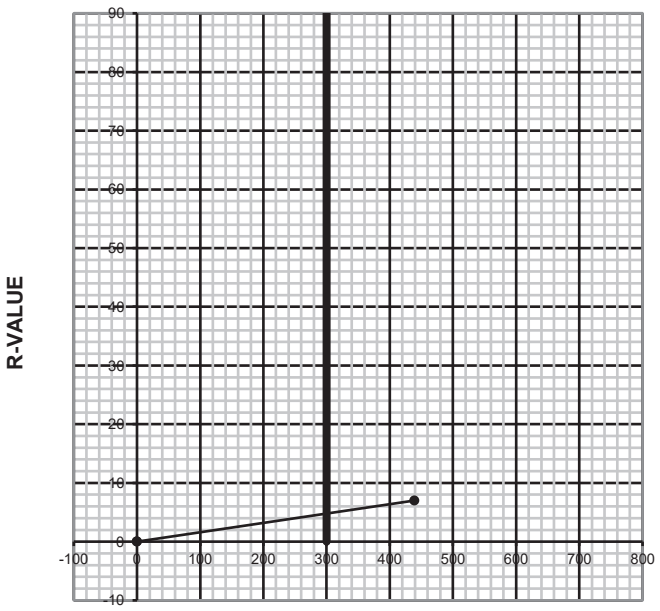
☑ CT-301 ☐ ASTM-D2844

PROJECT NAME:	Almquist Development	PROJECT NUMBER:	25-126-00
SAMPLE LOCATION:		SAMPLE NUMBER:	DH-9
SAMPLE DESCRIPTION:	SILTY CLAY (CL), dark brown	SAMPLE DEPTH:	0 - 5
SAMPLED BY:	Eddie Reyes 6/26/25	TESTED BY:	JPG
		DATE TESTED:	7/14/2025

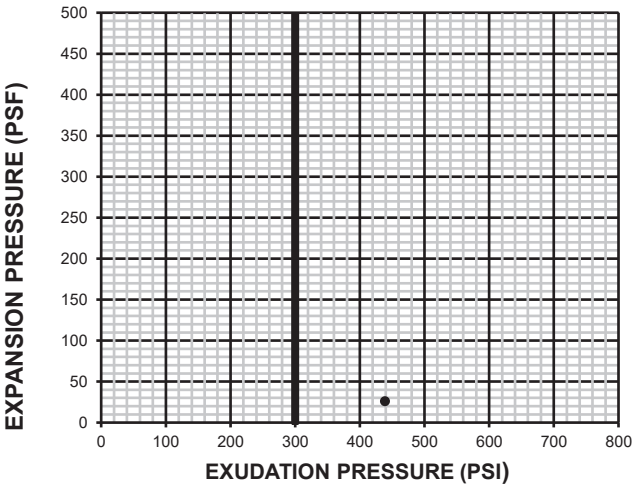
TEST SPECIMEN	A	B	C
MOISTURE AT COMPACTION %	23.3		
WEIGHT OF SAMPLE, grams	978		
HEIGHT OF SAMPLE, Inches	2.47		
DRY DENSITY, pcf	97.4		
COMPACTOR AIR PRESSURE, psi	80		
EXUDATION PRESSURE, psi	439		
EXPANSION, Inches x 10exp-4	6		
STABILITY Ph 2,000 lbs (160 psi)	140		
TURNS DISPLACEMENT	4.85		
R-VALUE UNCORRECTED	7		
R-VALUE CORRECTED	7		
EXPANSION PRESSURE (psf)	25.9		

Sample extruded from under the mold during the loading. Soil reported as 5 R-Value.

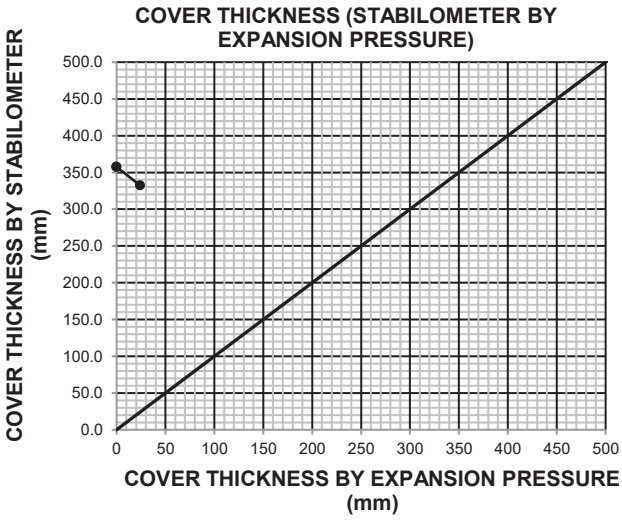
R-VALUE VS. EXUDATION PRESSURE



EXPANSION PRESSURE VS. EXUDATION PRESSURE



COVER THICKNESS (STABILOMETER BY EXPANSION PRESSURE)



R-VALUE AT EQUILIBRIUM:	5

R-VALUE BY EXUDATION PRESSURE:	5
R-VALUE BY EXPANSION PRESSURE:	N.A.
EXPANSION PRESSURE AT 300 PSI EXUDATION:	0
TRAFFIC INDEX (Assumed):	5.5
GRAVEL FACTOR (Assumed):	1.5
UNIT MASS OF COVER MATERIAL, kg/m^3 (Assumed):	2100.0

APPENDIX B-1

Laboratory Testing by Others

APPENDIX B - LABORATORY TESTING

Diaz•Yourman & Associates (DYA) selected soil samples to be tested and the tests to be performed on the selected samples. The initial laboratory testing program was performed by AP Engineering & Testing, Inc. in August 2014. Supplemental laboratory testing was performed by Hushmand Associates, Inc. in June 2017. Laboratory data are summarized on the boring logs in Appendix A and presented on Plates B1 through B7. A summary of the geotechnical laboratory testing is presented in Table B1. A summary of the corrosion test results is presented in Table B2.

The samples collected for the direct shear and consolidation tests were disturbed; therefore, the samples were remolded to 90 percent compaction before testing.

Table B1 - LABORATORY TESTING SUMMARY

TEST NAME	PROCEDURE	PURPOSE	LOCATION
Percent Passing the No. 200 Sieve	ASTM D1140	Classification, index properties	Boring Logs
Moisture Content	ASTM D2216	Classification, index properties	Boring Logs
Grain-Size Distribution	ASTM D422	Classification, index properties	Plates B1 and B2
Consolidation	ASTM D2435	Settlement	Plate B3
Direct Shear	ASTM D3080	Shear strength	Plate B4
Compaction	ASTM D1557	Earthwork	Plates B4 and B6
pH	CTM 532	Corrosion potential	Table B2, Plate B7
Resistivity	CTM 532	Corrosion potential	Table B2, Plate B7
Soluble Sulfates	CTM 417-B	Corrosion potential	Table B2, Plate B7
Soluble Chlorides	CTM 422	Corrosion potential	Table B2, Plate B7

Notes:
- ASTM = ASTM International
- CTM = Caltrans Test Method

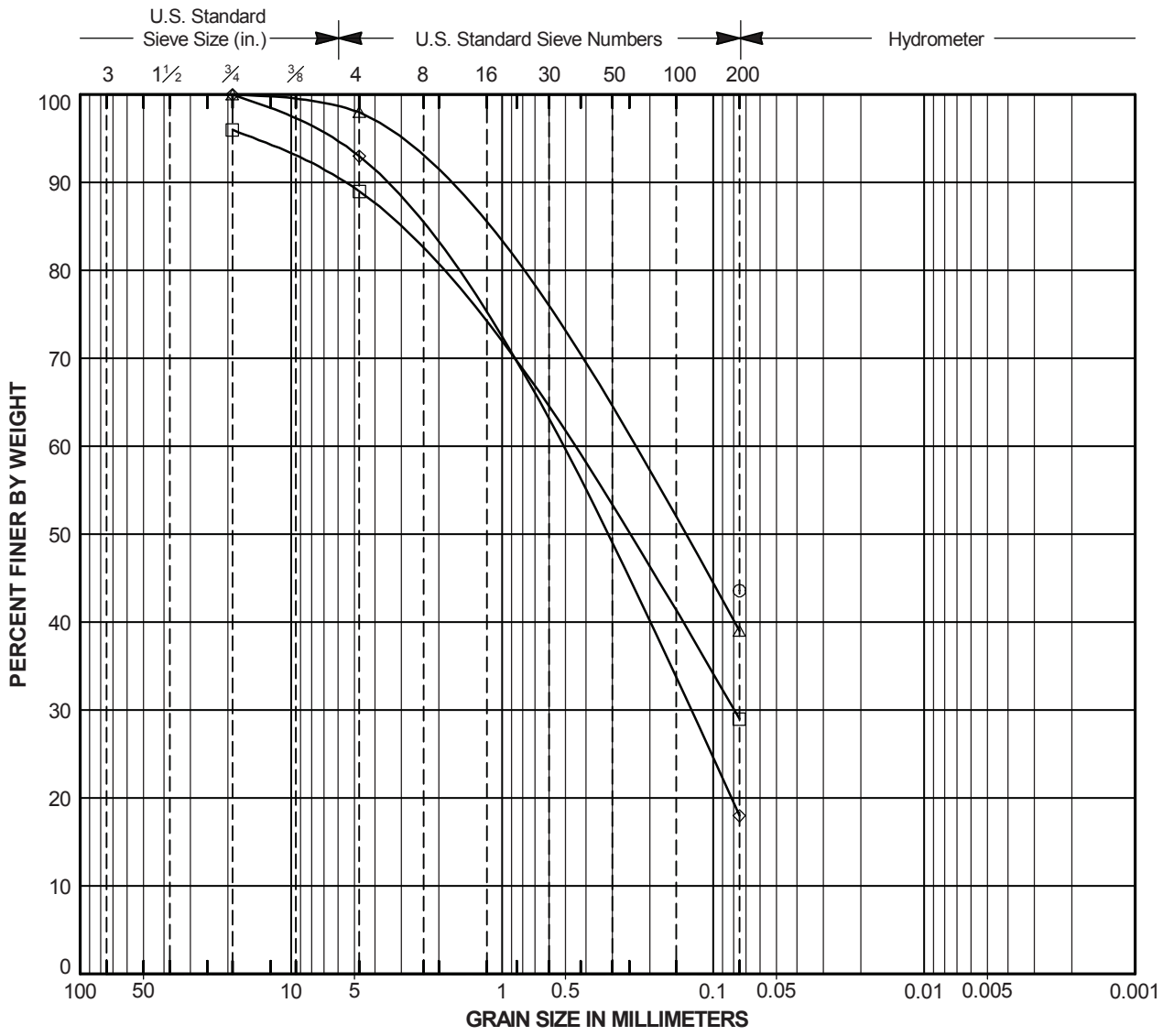
Table B2 - CORROSION POTENTIAL TEST RESULTS

Boring No.	DYB14-01	DYB14-02
Depth (feet)	0	0-1
pH	8	7.9
Water Soluble Sulfate Content (ppm)	111	58
Water Soluble Chloride Content (ppm)	111	58
Minimum Resistivity (ohms-cm)	2,898	3,922

Note:
- ppm = parts per million



Template: DY_SIEVE_WIN



COBBLES	GRAVEL		SAND			SILT or CLAY
	Coarse	Fine	Coarse	Medium	Fine	

Laboratory Testing by: AP Engineering and Testing, Inc.

Symbol	Source	Depth (feet)	Classification	Natural M. C. (%)	Liquid Limit (%)	Plasticity Index (%)	% Passing #200 Sieve
⊙	DYB14-01	1.0	SILTY SAND (SM)				44
□	DYB14-02	0.8	SILTY SAND (SM)				29
△	DYB14-03	0.0	SILTY SAND (SM)				39
◇	DYB14-03	4.0	SILTY SAND (SM)	3			18

PARTICLE SIZE ANALYSIS

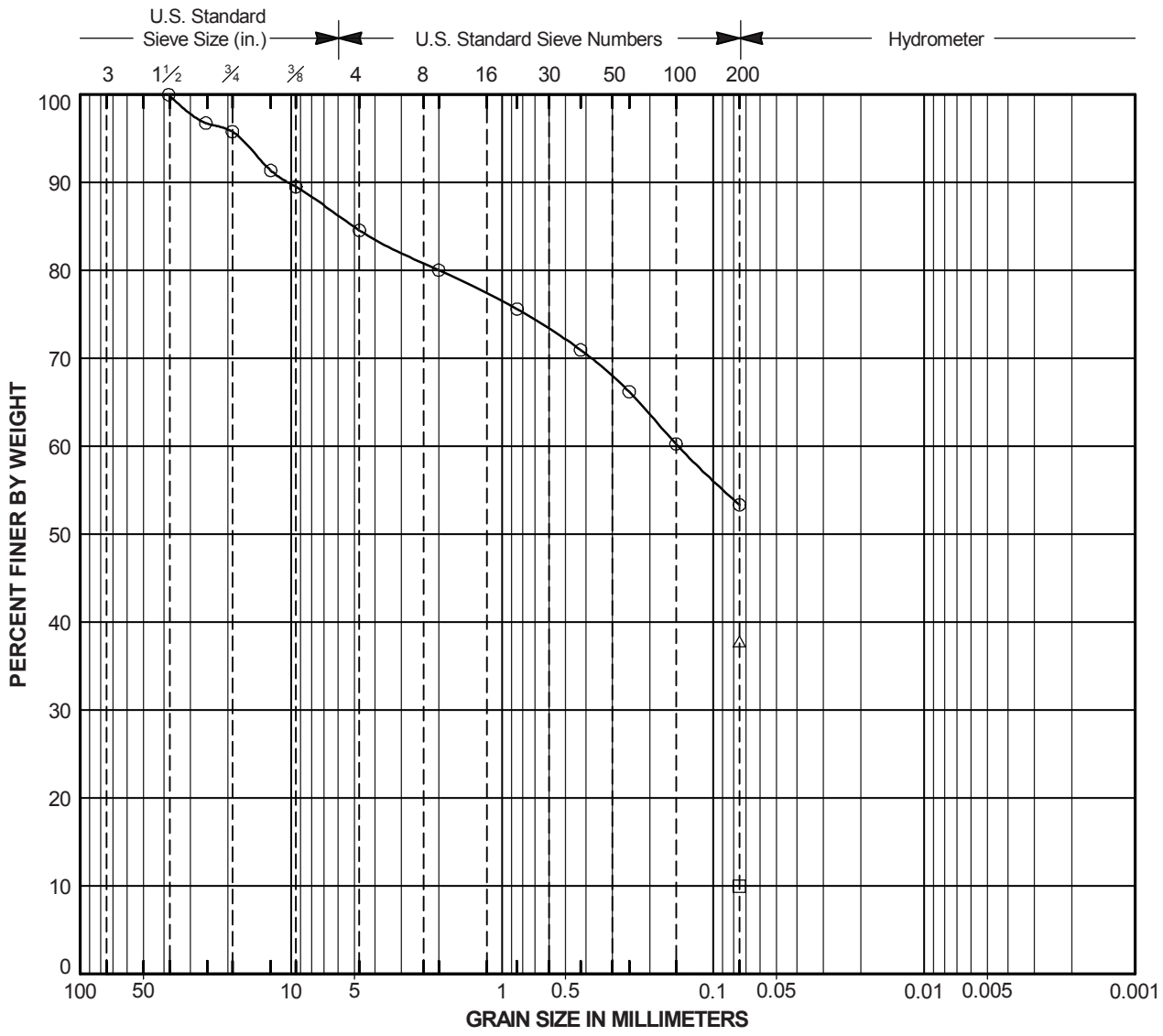
San Juan Capistrano - Community Park

Project No. 2014-029

PLATE

B1

Template: DY_SIEVE_WIN



COBBLES	GRAVEL		SAND			SILT or CLAY
	Coarse	Fine	Coarse	Medium	Fine	

Laboratory Testing by: Hushmand Associates, Incorporated

Symbol	Source	Depth (feet)	Classification	Natural M. C. (%)	Liquid Limit (%)	Plasticity Index (%)	% Passing #200 Sieve
⊙	DYB17-03	0.0	SANDY LEAN CLAY WITH GRAVEL (CL)				53
□	DYP17-01	4.5	POORLY GRADED SAND WITH SILT (SP-SM)	4			10
△	DYP17-02	4.5	SILTY SAND (SM)	10			38

PARTICLE SIZE ANALYSIS

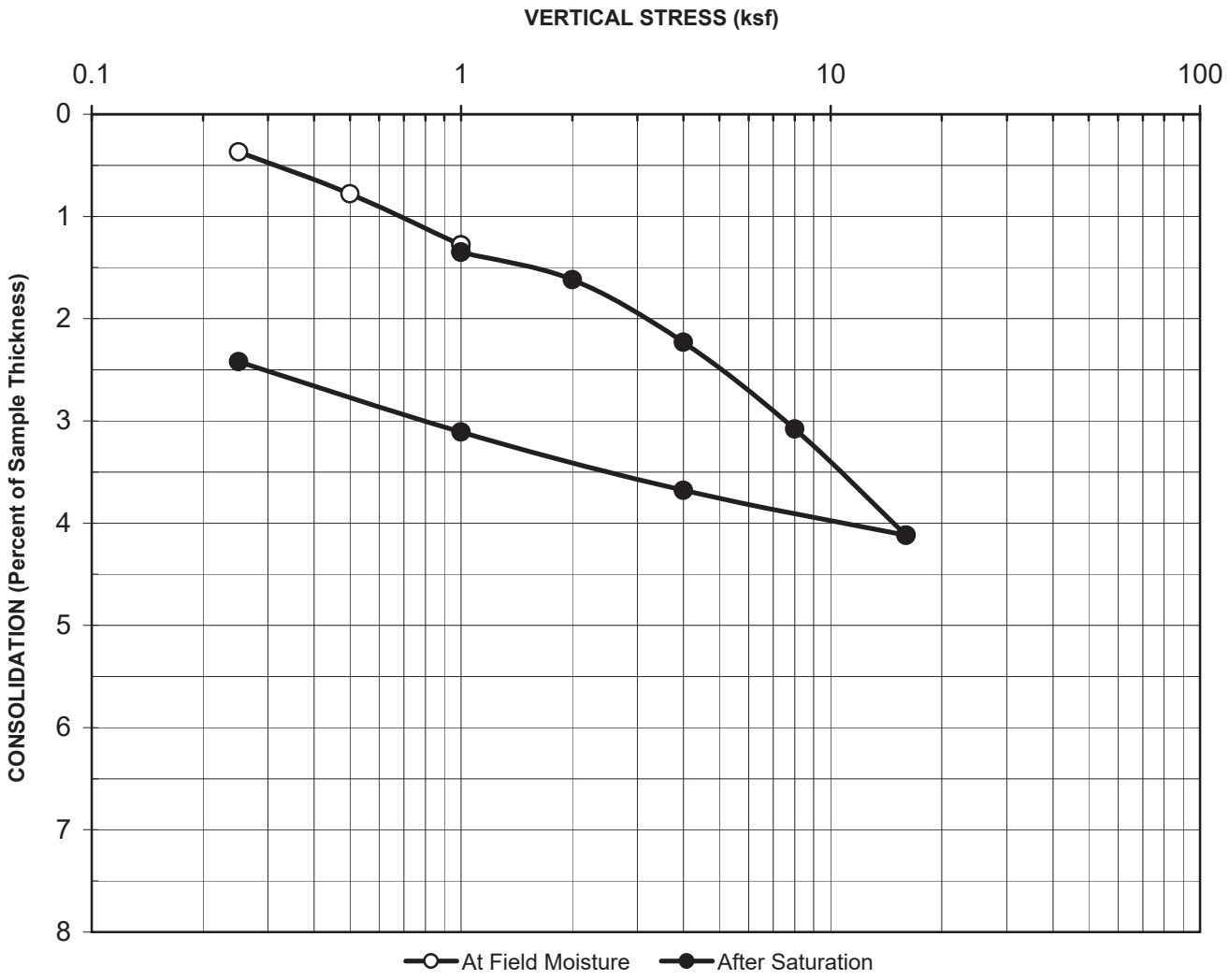
San Juan Capistrano - Community Park

Project No. 2014-029.01

PLATE

B2

AP Engineering & Testing, Inc.



Boring No. :	DYB14-01	Initial Dry Unit Weight (pcf):	112.9
Sample No.:	B	Initial Moisture Content (%):	9.8
Depth (feet):	0-3	Final Moisture Content (%):	14.6
Sample Type:	Remolded to 90% RC at opt. MC	Assumed Specific Gravity:	2.7
Soil Description:	Silty Sand	Initial Void Ratio:	0.49
Remarks:	Collapse= 0.07%		

CONSOLIDATION CURVE
ASTM D 2435

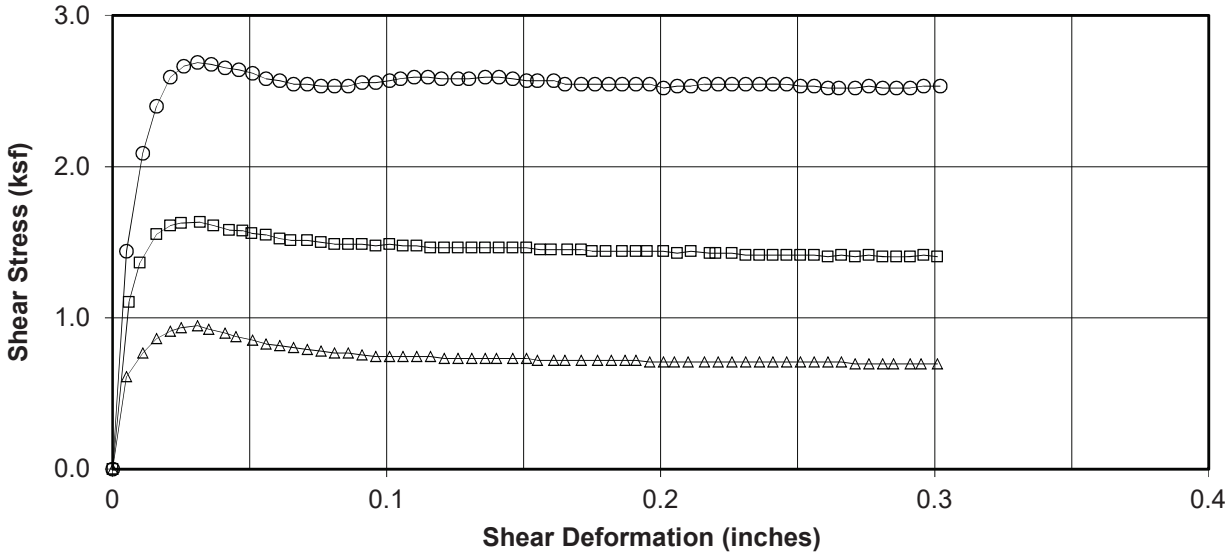
Project Name: San Juan Capistrano
Project No.: 2014-029
Date: 9/2/2014
AP No: 14-0851

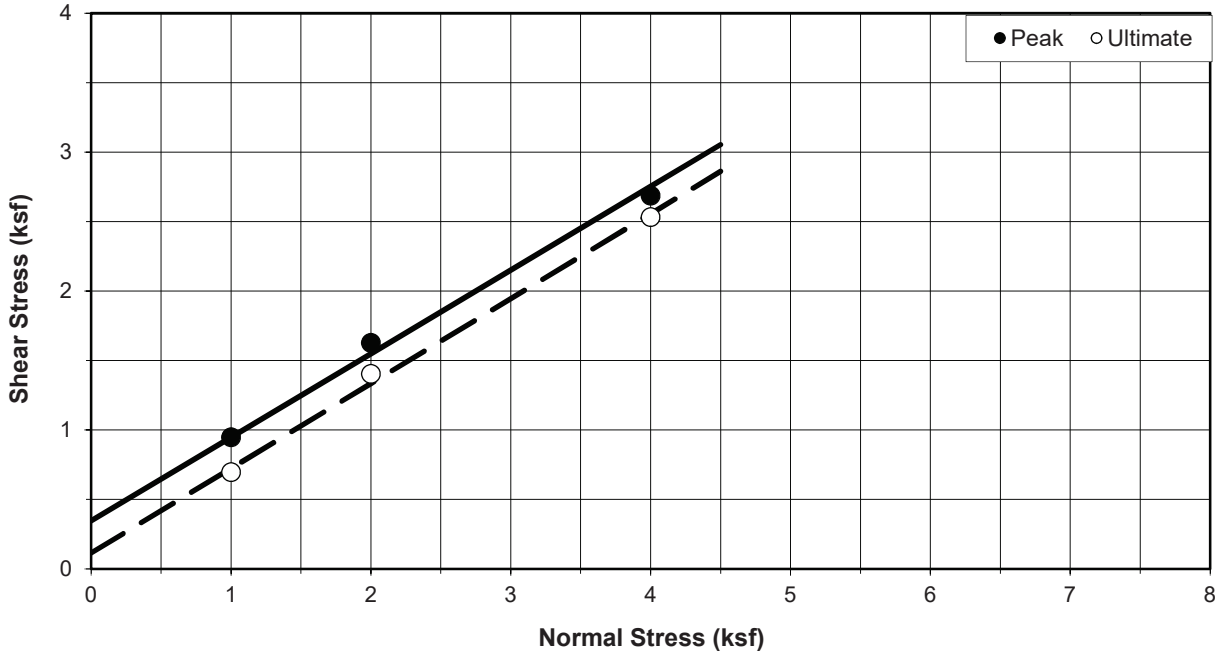
PLATE
B3

AP Engineering & Testing, Inc.

DIRECT SHEAR TEST RESULTS
ASTM D 3080

Project Name:	San Juan Capistrano	Initial Dry Density:	113.0	pcf
Boring No.:	DYB14-01	Moisture Content (before):	9.8	%
Sample No.:	B	Moisture Content (after):	16.0	%
Depth (ft):	0-3			
Sample Type:	Remolded to 90% RC at opt. MC			
Soil Description:	Silty Sand			
Test Condition:	Inundated			





Strength Parameters	Peak	Ultimate
Cohesion (psf):	350	100
Friction Angle:	31 °	31 °

PLATE
B4

AP Engineering & Testing, Inc.

COMPACTION TEST

Client:	Diaz Yourman			AP Number:	14-0851
Project Name:	San Juan Capistrano	Tested By:	AP	Date:	08/28/14
Project No. :	2014-029	Calculated By:	JP	Date:	09/02/14
Boring No.:	DYB14-01	Checked By:	AP	Date:	09/02/14
Sample No.:	B	Depth(ft.):	0-3		
Visual Sample Description:	Silty Sand				

Compaction Method	X	ASTM D1557	
		ASTM D698	
Preparation Method		Moist	
	X	Dry	

METHOD	A
MOLD VOLUME (CU.FT)	0.0333

Trial No.	1	2	3	4	5	6
Wt. Comp. Soil + Mold (gm.)	3794	3874	3915	3864		
Wt. of Mold (gm.)	1816	1816	1816	1816		
Net Wt. of Soil (gm.)	1978	2058	2099	2048		
Container No.						
Wt. of Container (gm.)	150.04	149.68	150.04	149.69		
Wet Wt. of Soil + Cont. (gm.)	455.25	441.75	500.36	464.47		
Dry Wt. of Soil + Cont. (gm.)	434.47	417.16	465.16	427.53		
Moisture Content (%)	7.31	9.19	11.17	13.30		
Wet Density (pcf)	130.79	136.11	138.82	135.42		
Dry Density (pcf)	121.88	124.65	124.87	119.53		

Maximum Dry Density (pcf)	125.7	Optimum Moisture Content (%)	10.2
Maximum Dry Density w/ Rock Correction (pcf)	N/A	Optimum Moisture Content w/ Rock Correction (%)	N/A

PROCEDURE USED

[X] *METHOD A: Percent of Oversize:* 3.2%
Soil Passing No. 4 (4.75 mm) Sieve
Mold : 4 in. (101.6 mm) diameter
Layers : 5 (Five)
Blows per layer : 25 (twenty-five)

[ ] *METHOD B: Percent of Oversize:* N/A
Soil Passing 3/8 in. (9.5 mm) Sieve
Mold : 4 in. (101.6 mm) diameter
Layers : 5 (Five)
Blows per layer : 25 (twenty-five)

[ ] *METHOD C: Percent of Oversize:* N/A
Soil Passing 3/4 in. (19.0 mm) Sieve
Mold : 6 in. (152.4 mm) diameter
Layers : 5 (Five)
Blows per layer : 56 (fifty-six)

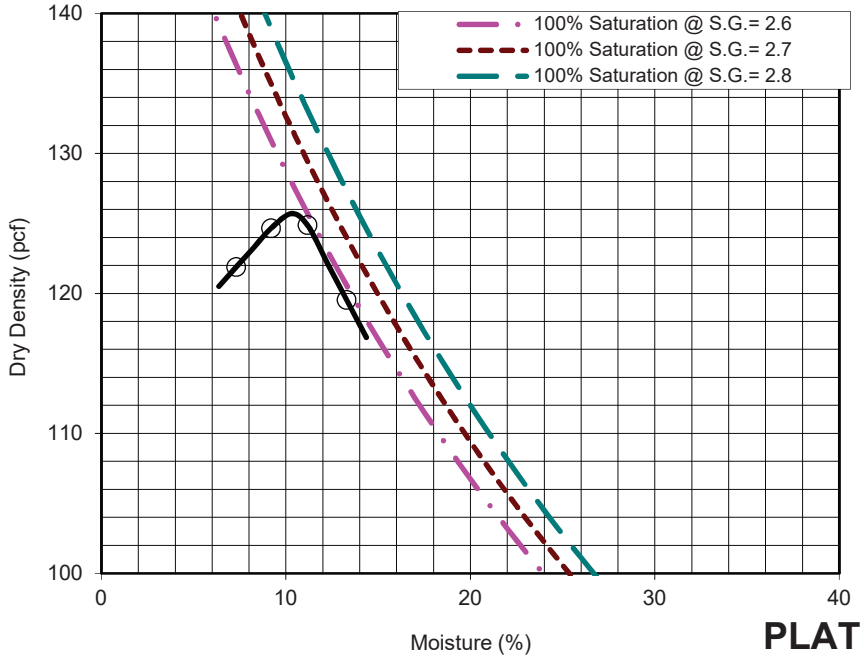


PLATE
B5

HUSHMAND ASSOCIATES, INC.
Geotechnical and Earthquake Engineers

COMPACTION CURVE (ASTM D1557)

Client :	Diaz Yourman & Associates, Inc.	***HAI Project No.:***	DYAL-17-011
Project Name:	San Juan Capistrano Community Park	***Tested by:***	MB/KL
Project No.:	2014-029.01	***Checked by:***	MZ
Boring No:	DYB17-03	***Date:***	6/12/2017
Sample No.:	Bulk @ 0-5'	***Mold size:***	4"
Soil Description:	Brown, Sandy Lean Clay with Gravel (CL)	***Procedure:***	B
		% Ret. On 3/8 "	10.5

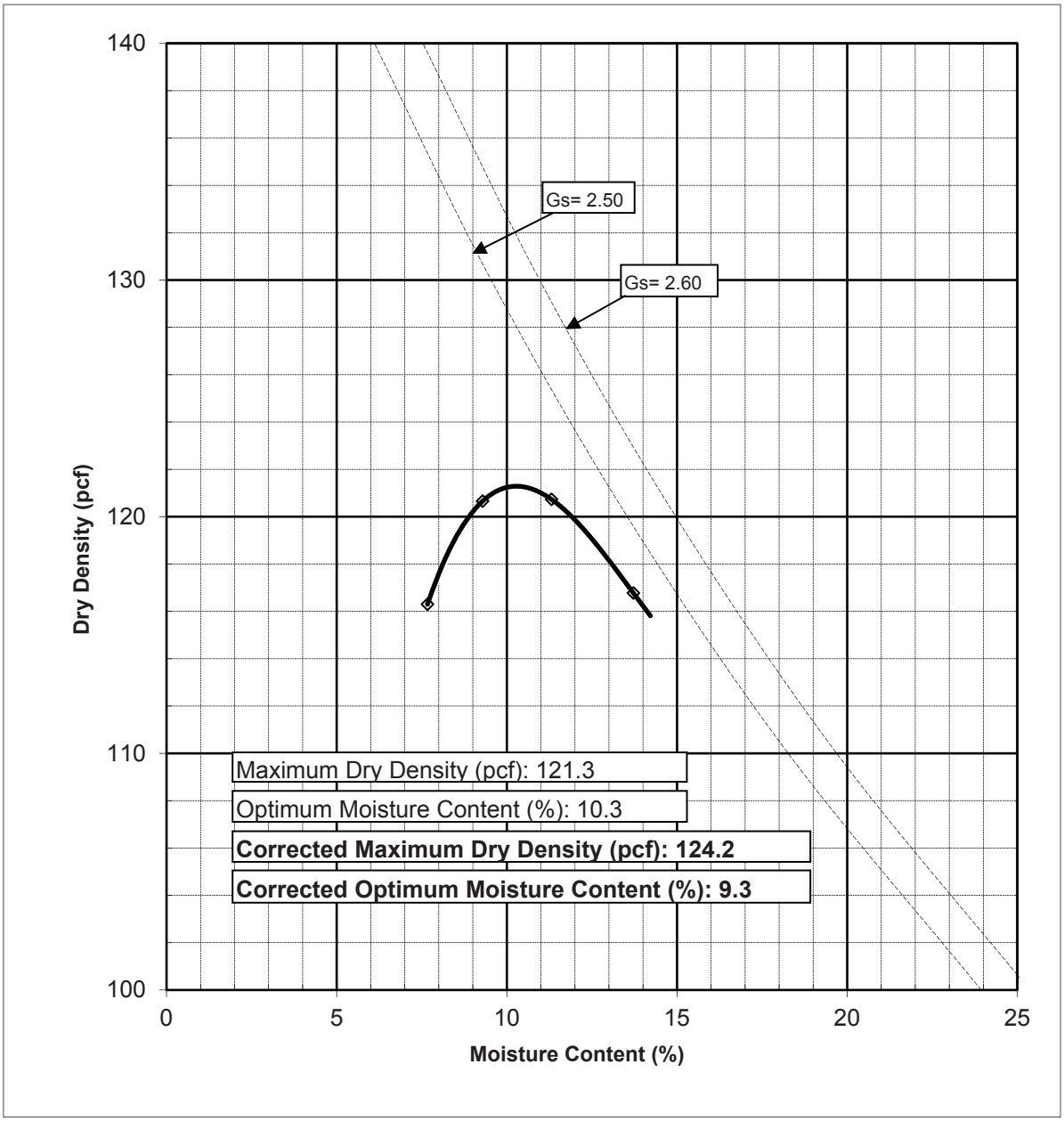


PLATE
B6

AP Engineering & Testing, Inc.

CORROSION TEST RESULTS

Client Name: Diaz Yourman
Project Name: San Juan Capistrano
Project No.: 2014-029

AP Job No.: 14-0851
Date 08/28/14

Boring No.	Sample No.	Depth (feet)	Soil Type	Minimum Resistivity (ohm-cm)	pH	Sulfate Content (ppm)	Chloride Content (ppm)
DYB14-01	1	0	SM	2898	8.0	111	111
DYB14-02	B	0-1	SM	3922	7.9	58	58

NOTES: Resistivity Test and pH: California Test Method 643
Sulfate Content : California Test Method 417
Chloride Content : California Test Method 422
ND = Not Detectable
NA = Not Sufficient Sample
NR = Not Requested

2607 Pomona Boulevard, Pomona, CA 91768
Tel. (909) 869-6316 Fax. (909)869-6318

PLATE
B7

LABORATORY DATA SUMMARY														
Boring/ Test Pit Number	Sample Depth (ft)	Soil/Bedrock Description	Max. Dry Density[1] (pcf)	Optimum Moisture[1] (%)	Expansion Index[2]	Expansion Potential[3]	Atterberg Limits[4]			Sulfate Content[5] (%)	Chloride Content[6] (ppm)	pH[7]	Minimum Resistivity[8] (Ohm-cm)	
							LL	PL	PI					
B-5	0-2	Silty Sand (SM)	124.5	11.0	14	Very Low				.00405	140	7.7	1,600	

Test Procedures:

[1] Per ASTM Test Method D 1557-02
[2] Per ASTM Test Method D 4829-03
[3] Per California Building Code Table 18-I-B
[4] Per ASTM Test Method D 4318-00
[5] Per CalTrans Test Method 417
[6] Per CalTrans Test Method 422
[7] Per CalTrans Test Method 532
[8] Per ASTM Test method 2974-00

J.N. 250-09
September 2009

Plate B-1

PETRA

APPENDIX C

Liquefaction and Seismic Settlement Analysis

GMU
Engineers and Geologists

LIQUEFACTION ANALYSIS REPORT

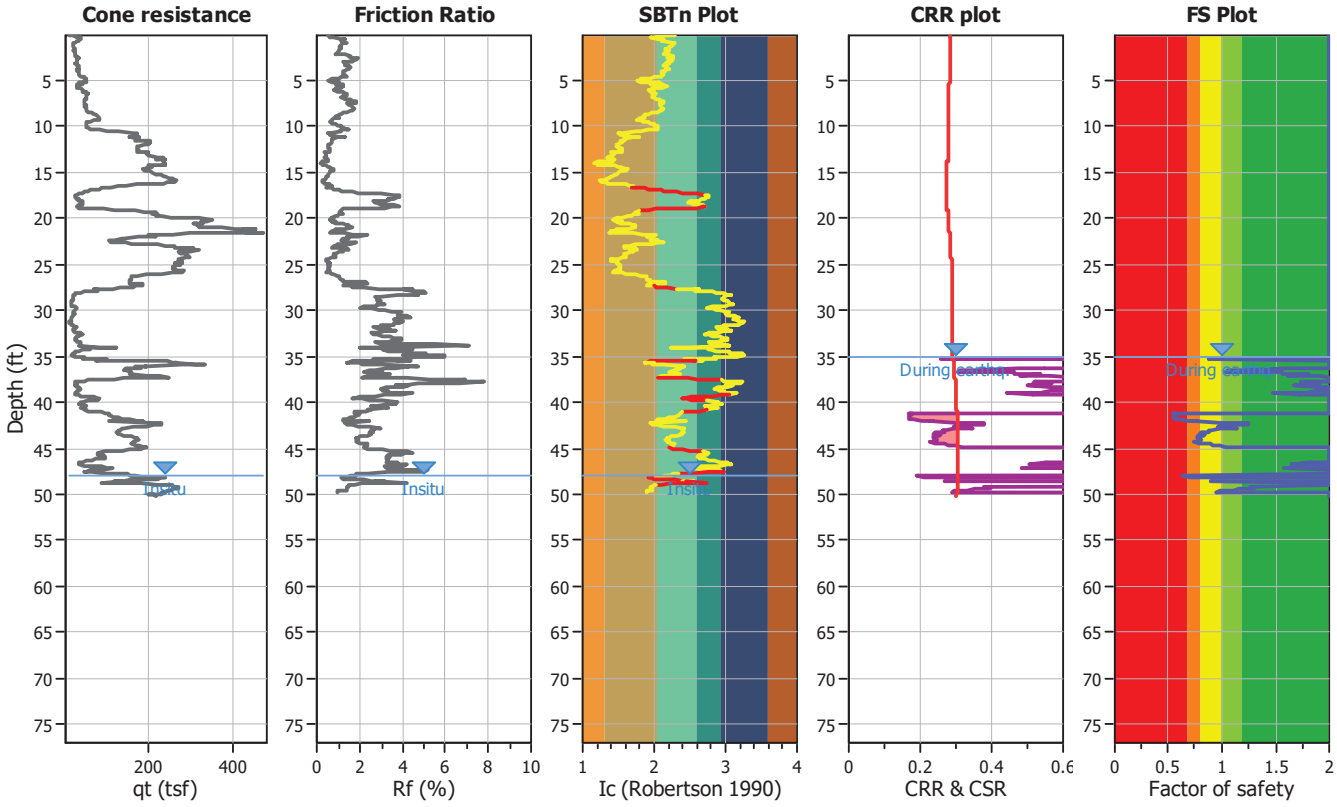
Project title : 25-126-00 NW Open Space

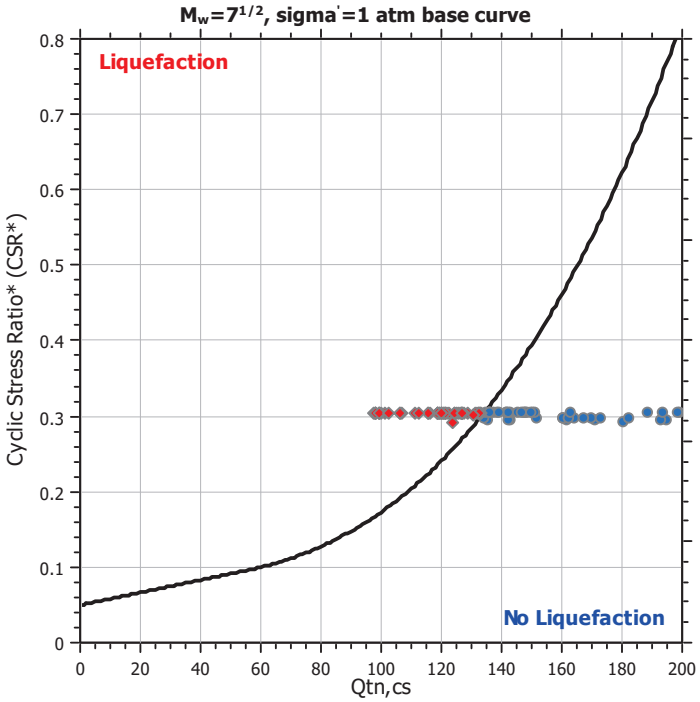
Location : 30291 Camino Capistrano, SJC, CA 92675

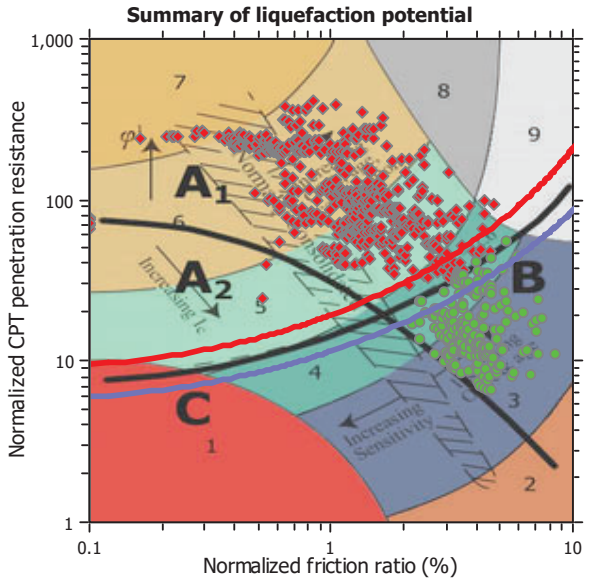
CPT file : 25-126-00 CPT-01

Input parameters and analysis data

Analysis method:	Robertson (2009)	G.W.T. (in-situ):	48.00 ft	Use fill:	No	Clay like behavior applied:	All soils
Fines correction method:	Robertson (2009)	G.W.T. (earthq.):	35.00 ft	Fill height:	N/A	Limit depth applied:	No
Points to test:	Based on Ic value	Average results interval:	1	Fill weight:	N/A	Limit depth:	N/A
Earthquake magnitude M_w:	6.63	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method based
Peak ground acceleration:	0.60	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

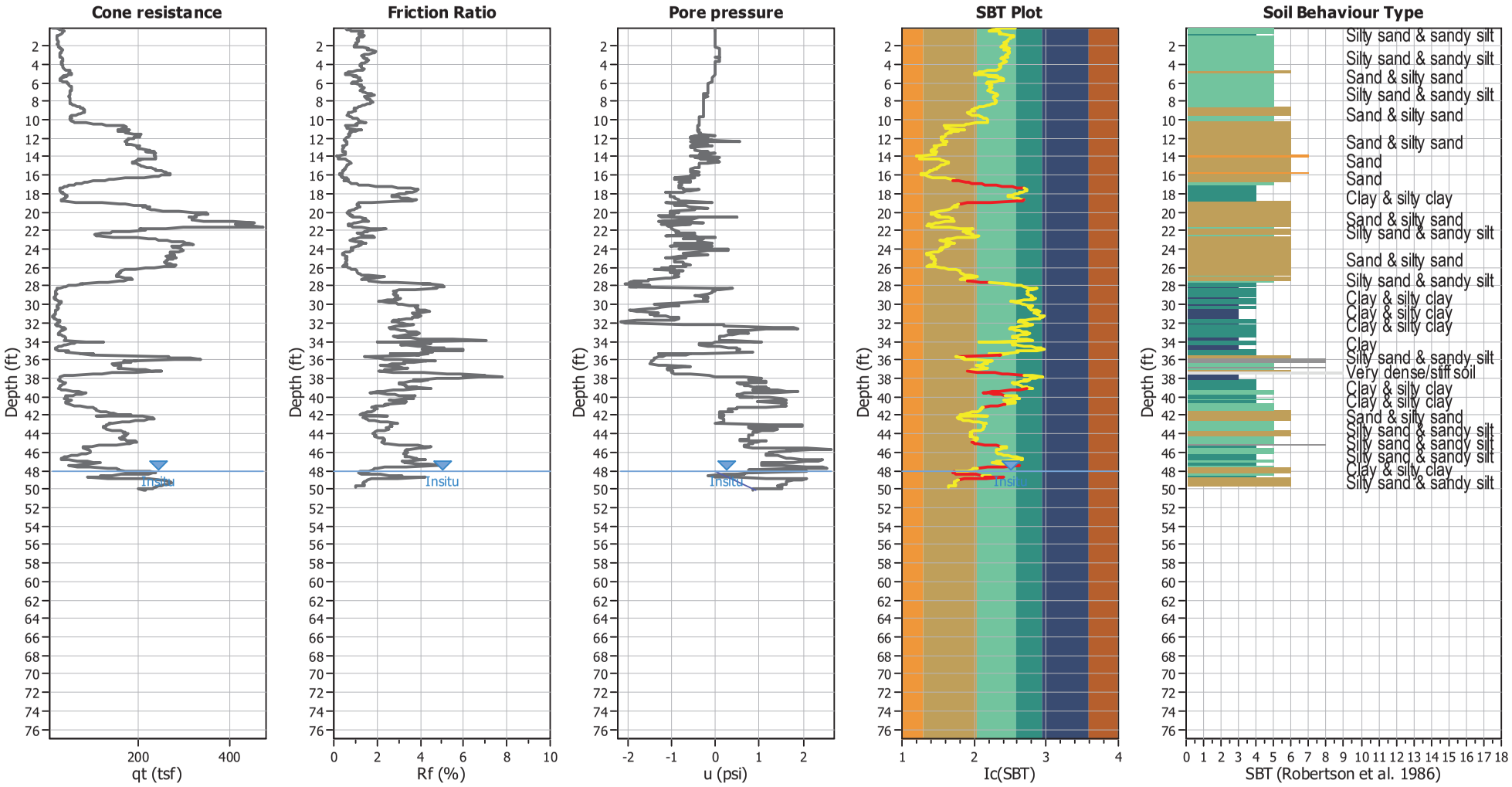






Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and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

CPT basic interpretation plots



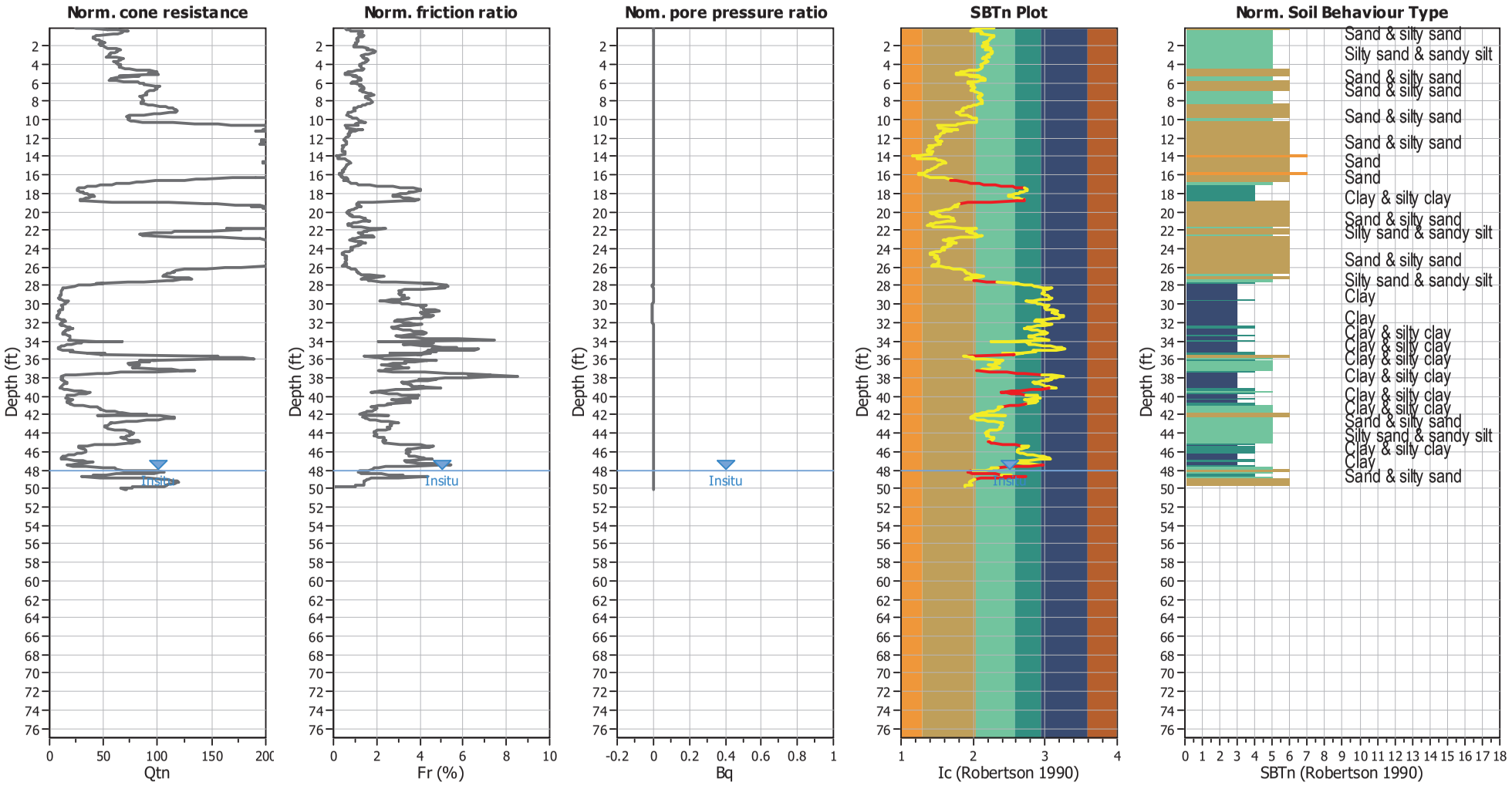
Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	35.00 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	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:	6.63	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	0.60	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	48.00 ft	Fill height:	N/A	Limit depth:	N/A

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

CPT basic interpretation plots (normalized)



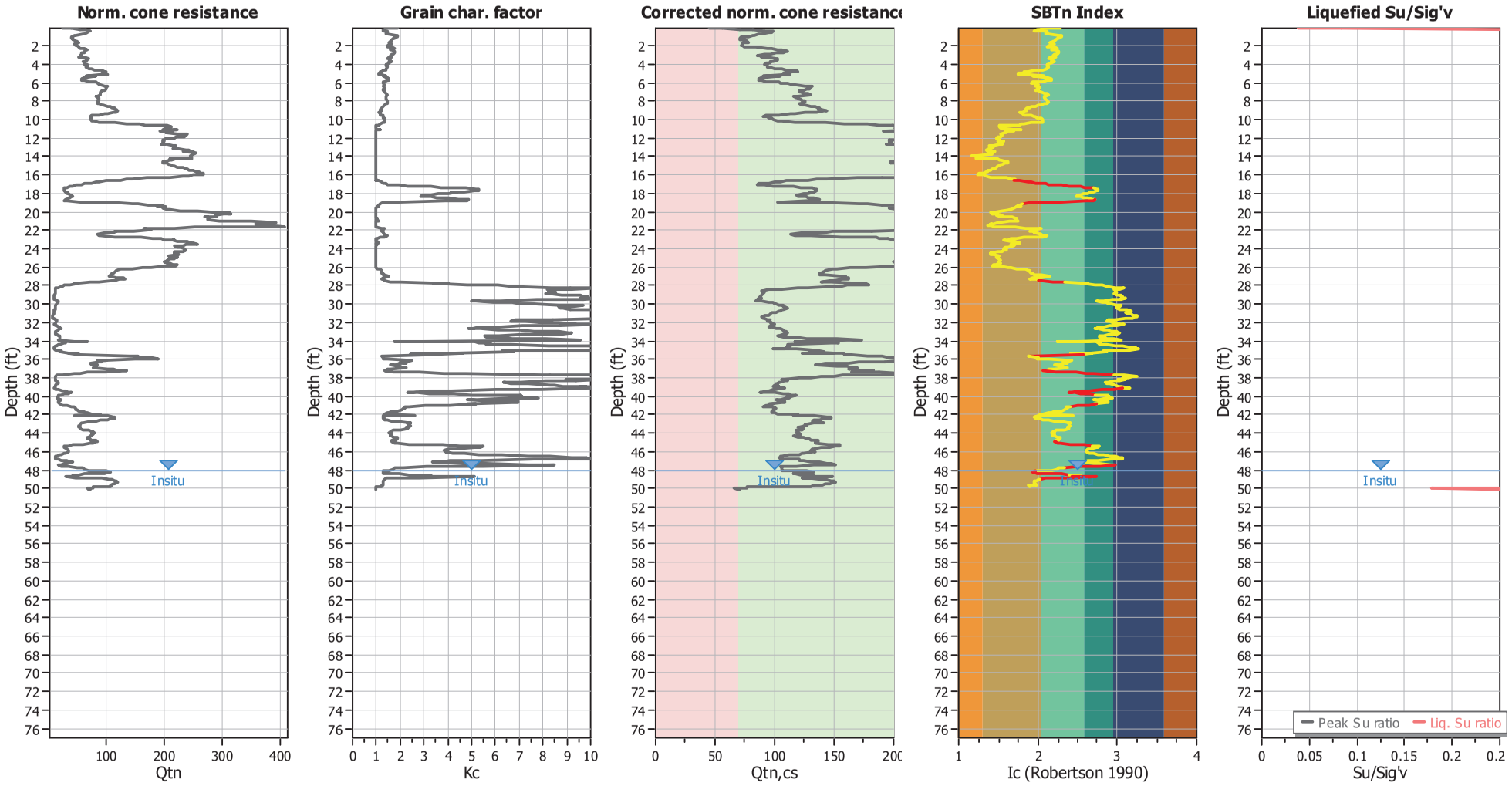
Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	35.00 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	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:	6.63	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	0.60	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	48.00 ft	Fill height:	N/A	Limit depth:	N/A

SBTn legend

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

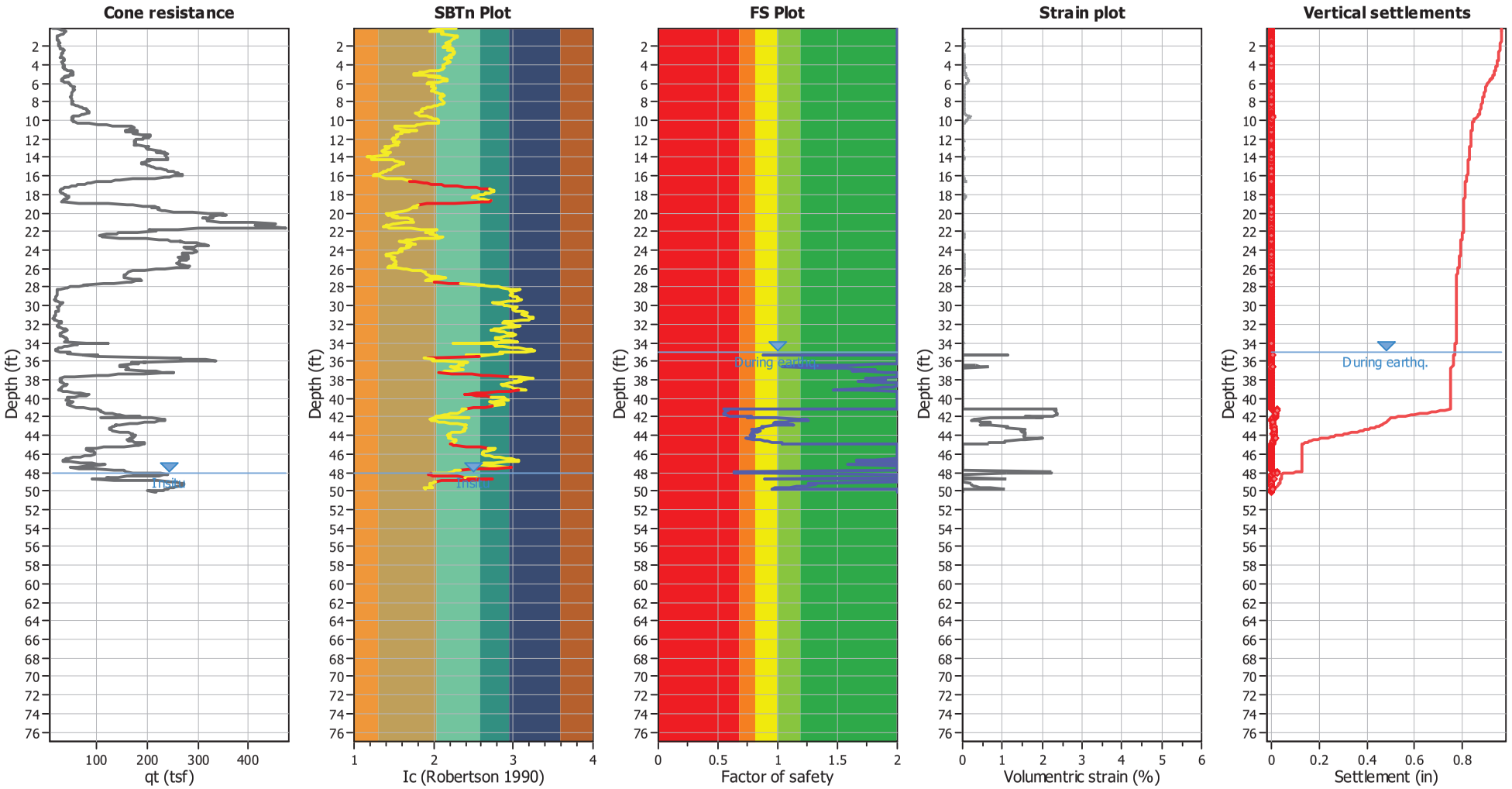
Check for strength loss plots (Robertson (2010))



Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	35.00 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	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:	6.63	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	0.60	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	48.00 ft	Fill height:	N/A	Limit depth:	N/A

Estimation of post-earthquake settlements

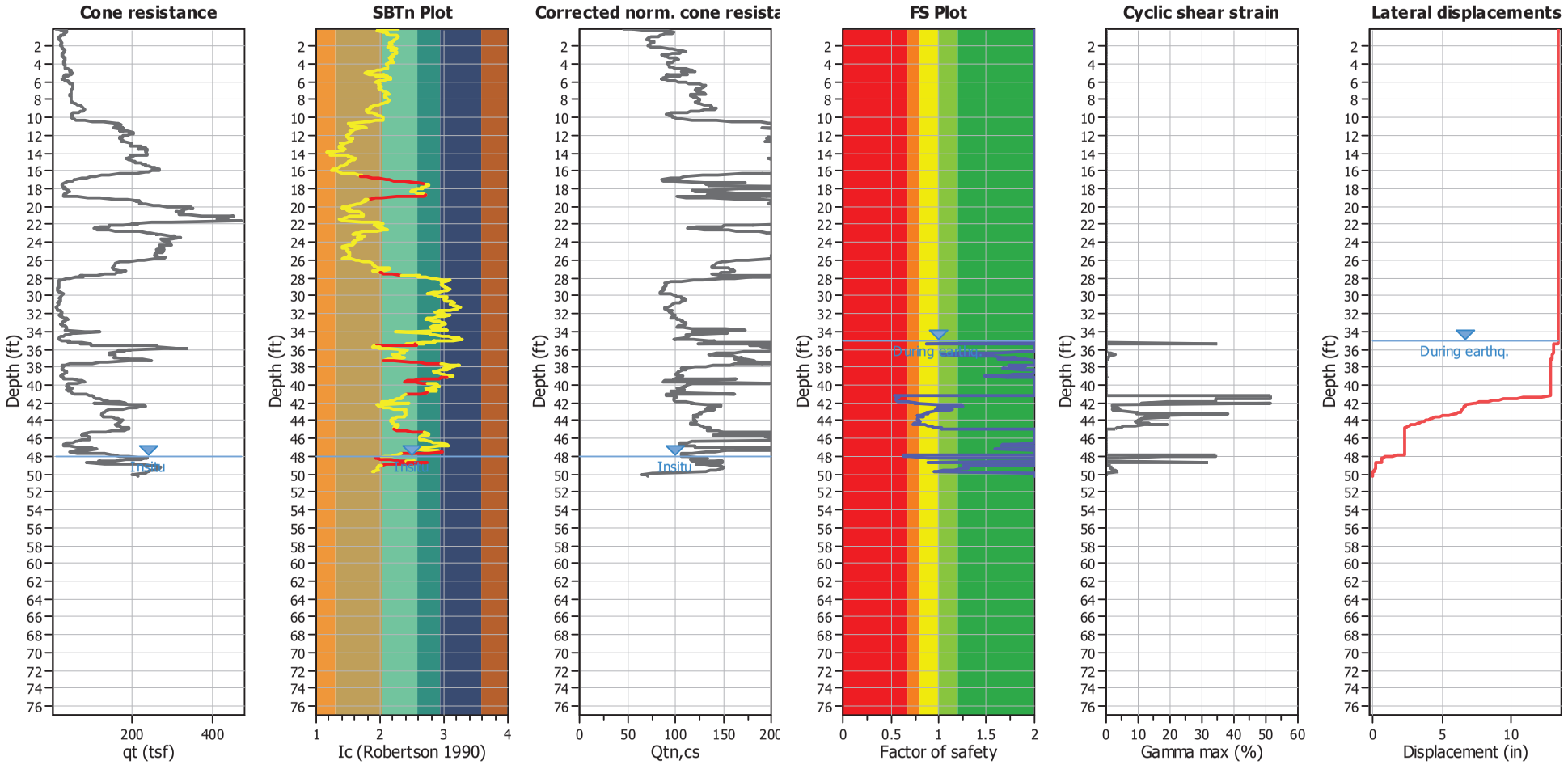


Abbreviations

q_t:	Total cone resistance (cone resistance q_c corrected for pore water effects)
I_c:	Soil Behaviour Type Index
FS:	Calculated Factor of Safety against liquefaction
Volumentric strain:	Post-liquefaction volumentric strain

Estimation of post-earthquake lateral Displacements

Geometric parameters: Level ground (or gently sloping) with free face (L: 220.00 ft - H: 37.00 ft)



Abbreviations

q_t: Total cone resistance (cone resistance q_c corrected for pore water effects)
I_c: Soil Behaviour Type Index
$Q_{tn,cs}$: Equivalent clean sand normalized CPT total cone resistance
F.S.: Factor of safety
γ_{max}: Maximum cyclic shear strain
LDI: Lateral displacement index

Surface condition



LIQUEFACTION ANALYSIS REPORT

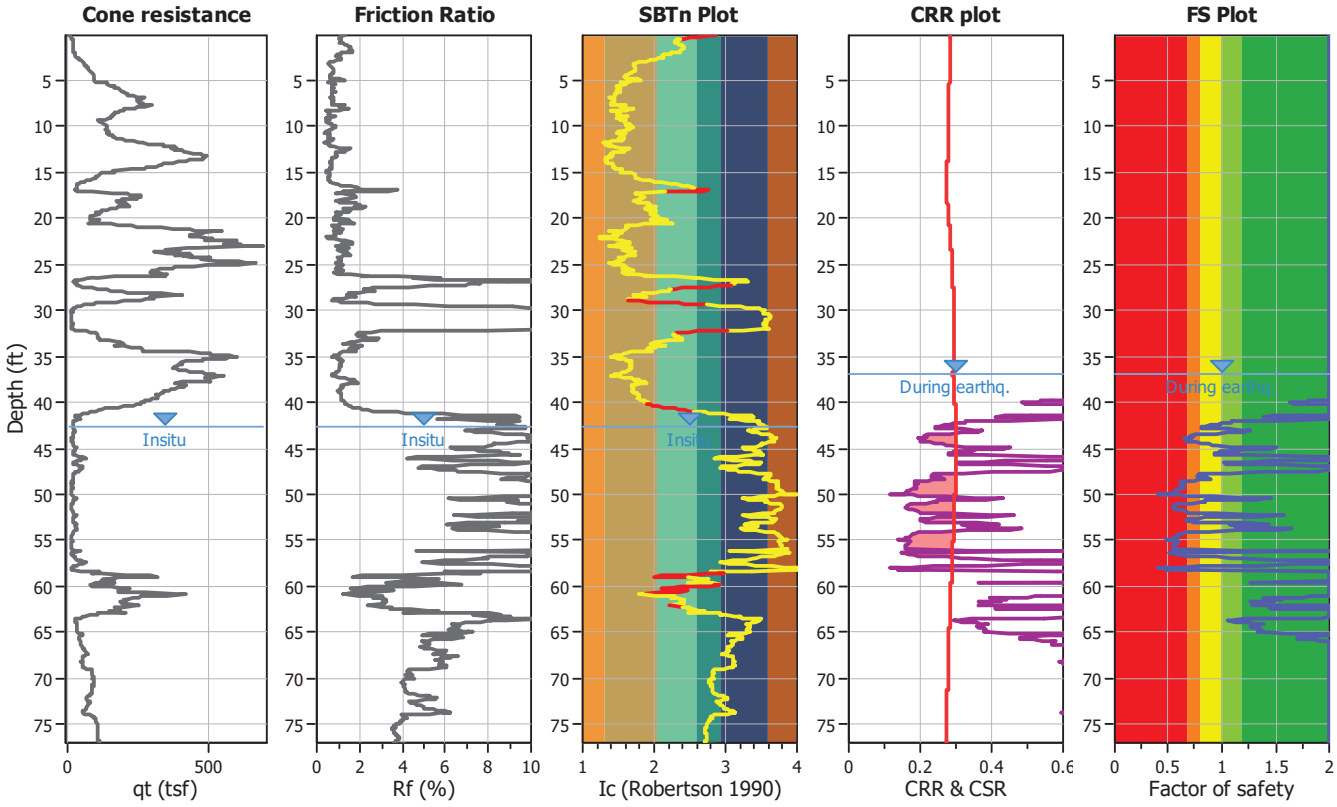
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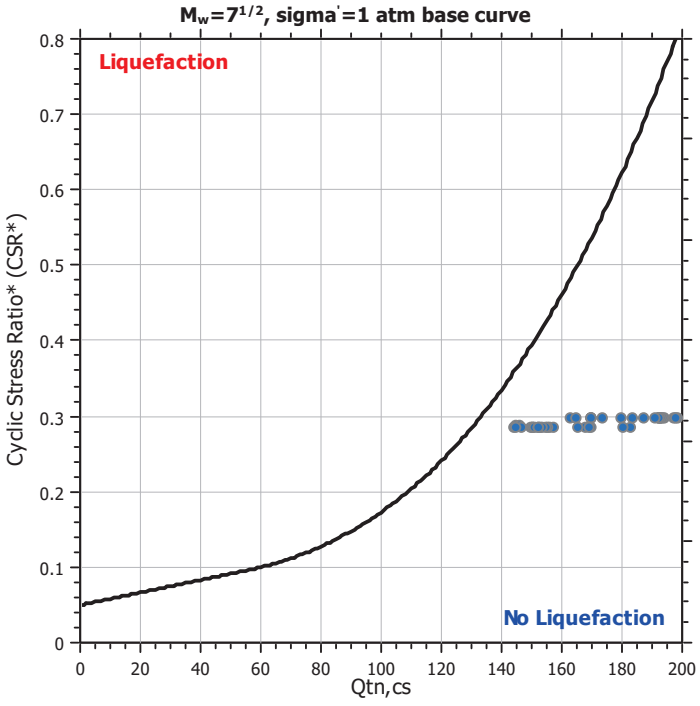
Location : 30291 Camino Capistrano, SJC, CA 92675

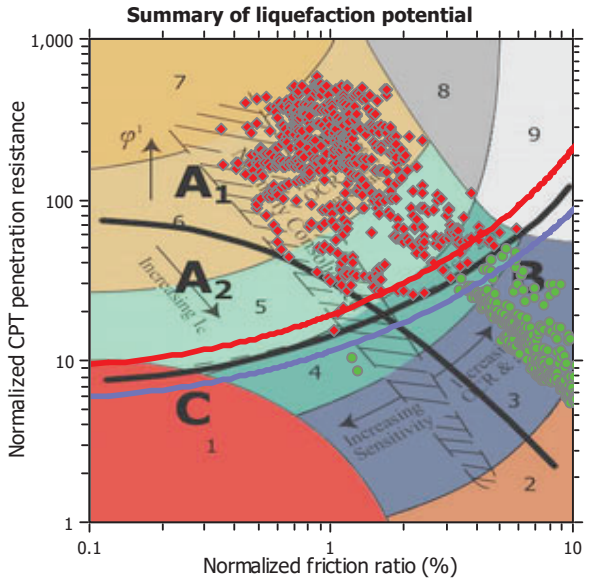
CPT file : 25-126-00 CPT-02

Input parameters and analysis data

Analysis method:	Robertson (2009)	G.W.T. (in-situ):	42.60 ft	Use fill:	No	Clay like behavior applied:	All soils
Fines correction method:	Robertson (2009)	G.W.T. (earthq.):	37.00 ft	Fill height:	N/A	Limit depth applied:	No
Points to test:	Based on Ic value	Average results interval:	1	Fill weight:	N/A	Limit depth:	N/A
Earthquake magnitude M_w:	6.63	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method based
Peak ground acceleration:	0.60	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

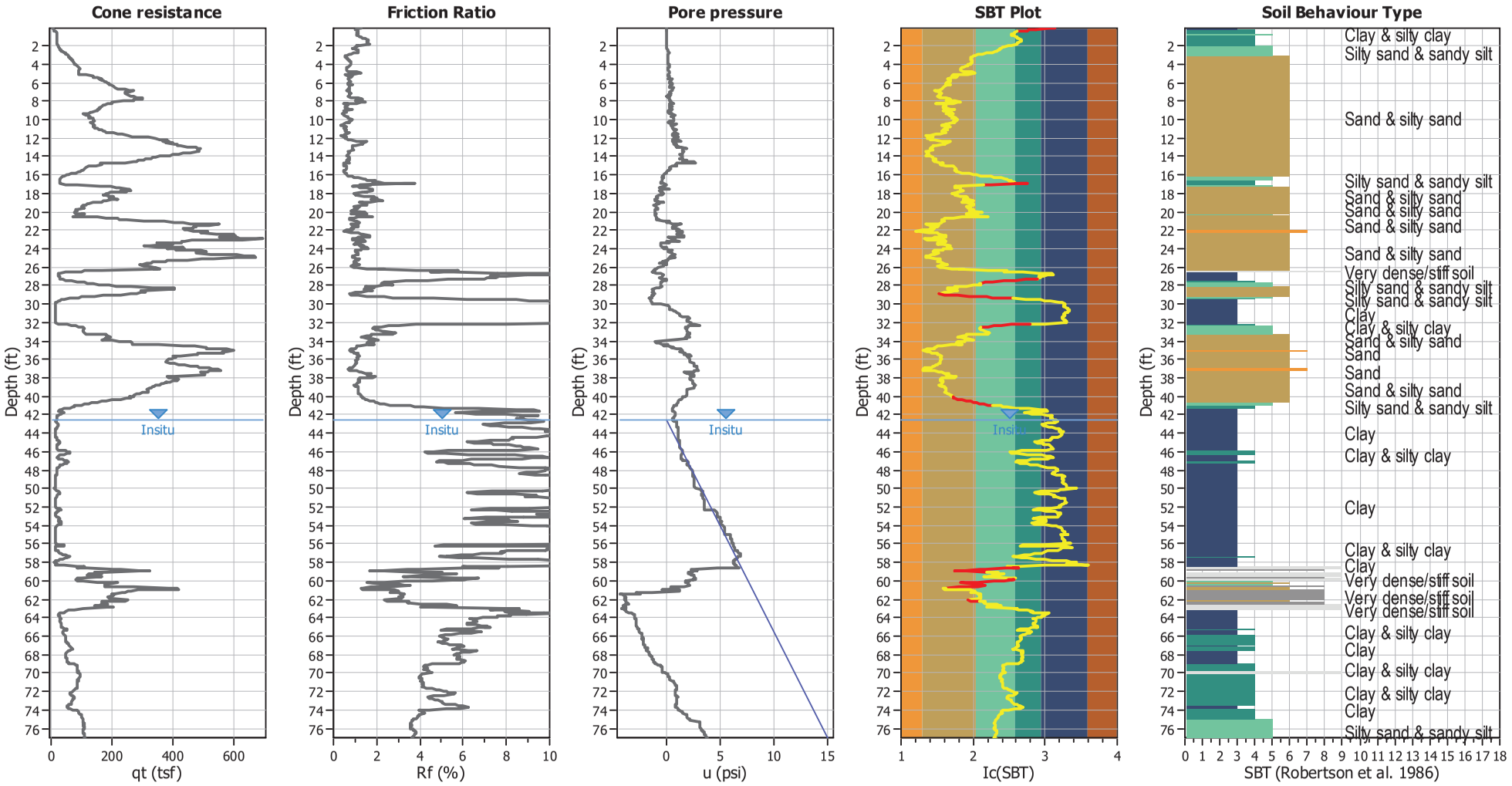






Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and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

CPT basic interpretation plots



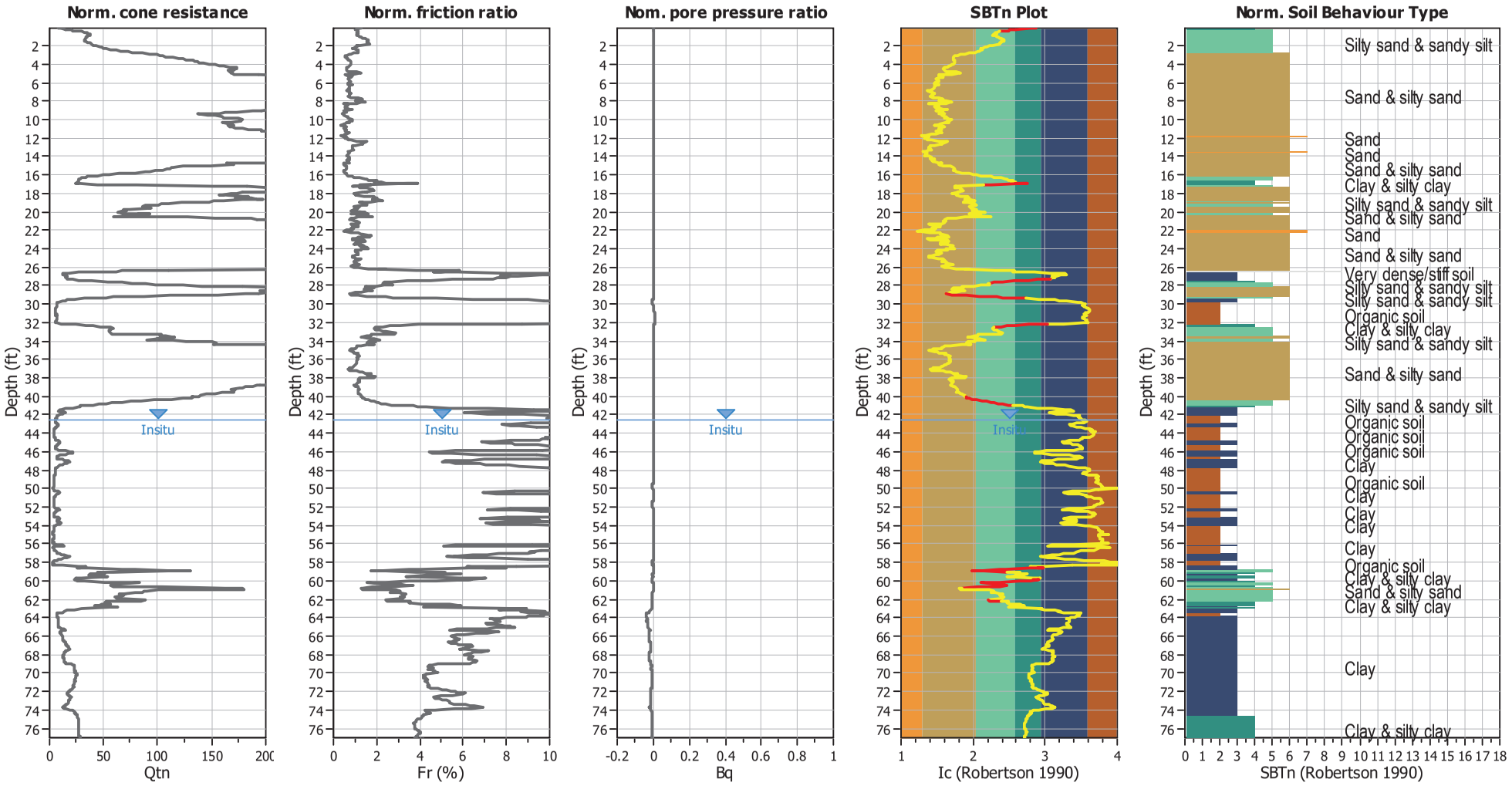
Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	37.00 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	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:	6.63	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	0.60	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	42.60 ft	Fill height:	N/A	Limit depth:	N/A

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

CPT basic interpretation plots (normalized)



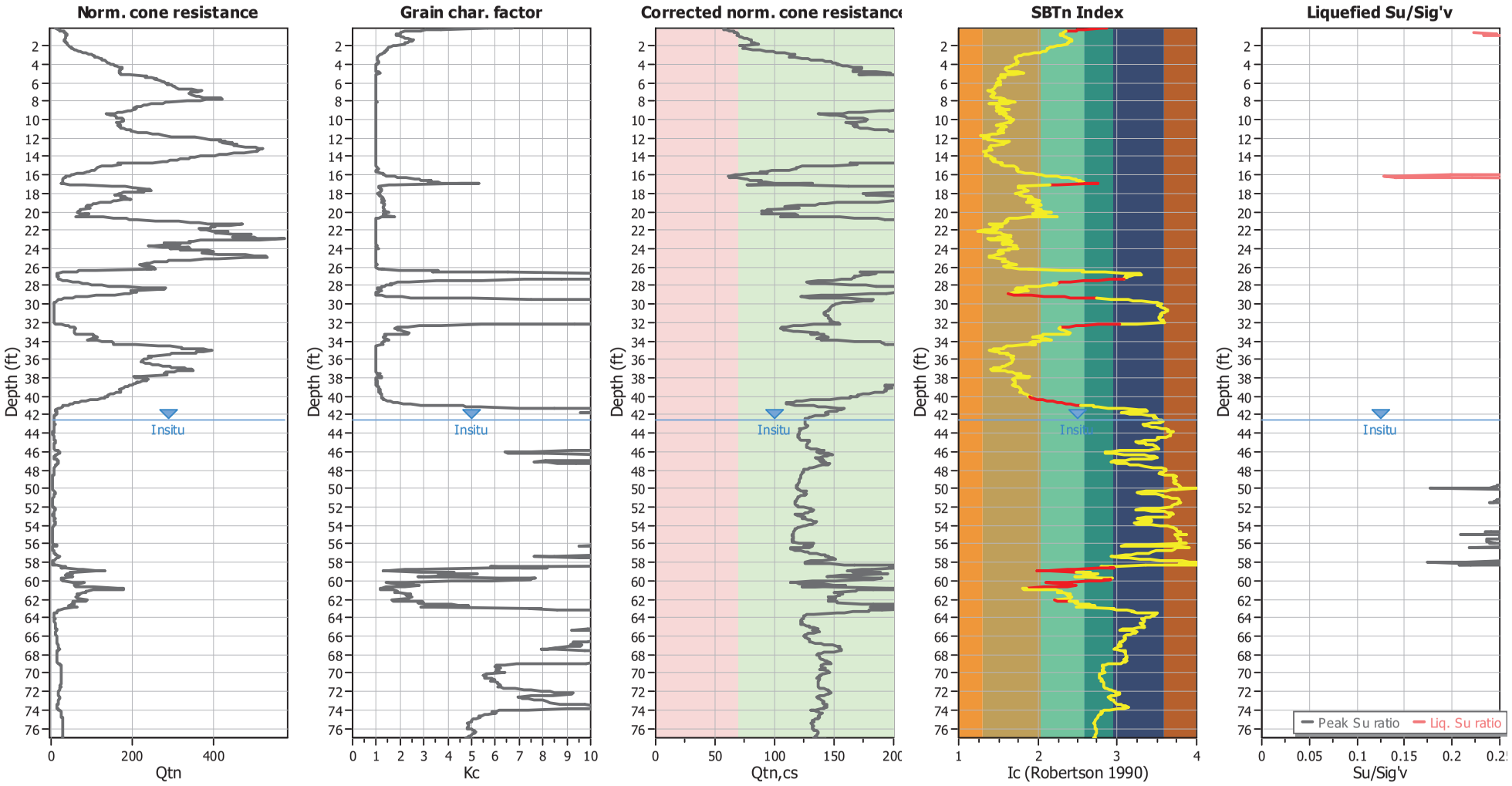
Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	37.00 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	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:	6.63	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	0.60	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	42.60 ft	Fill height:	N/A	Limit depth:	N/A

SBTn legend

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

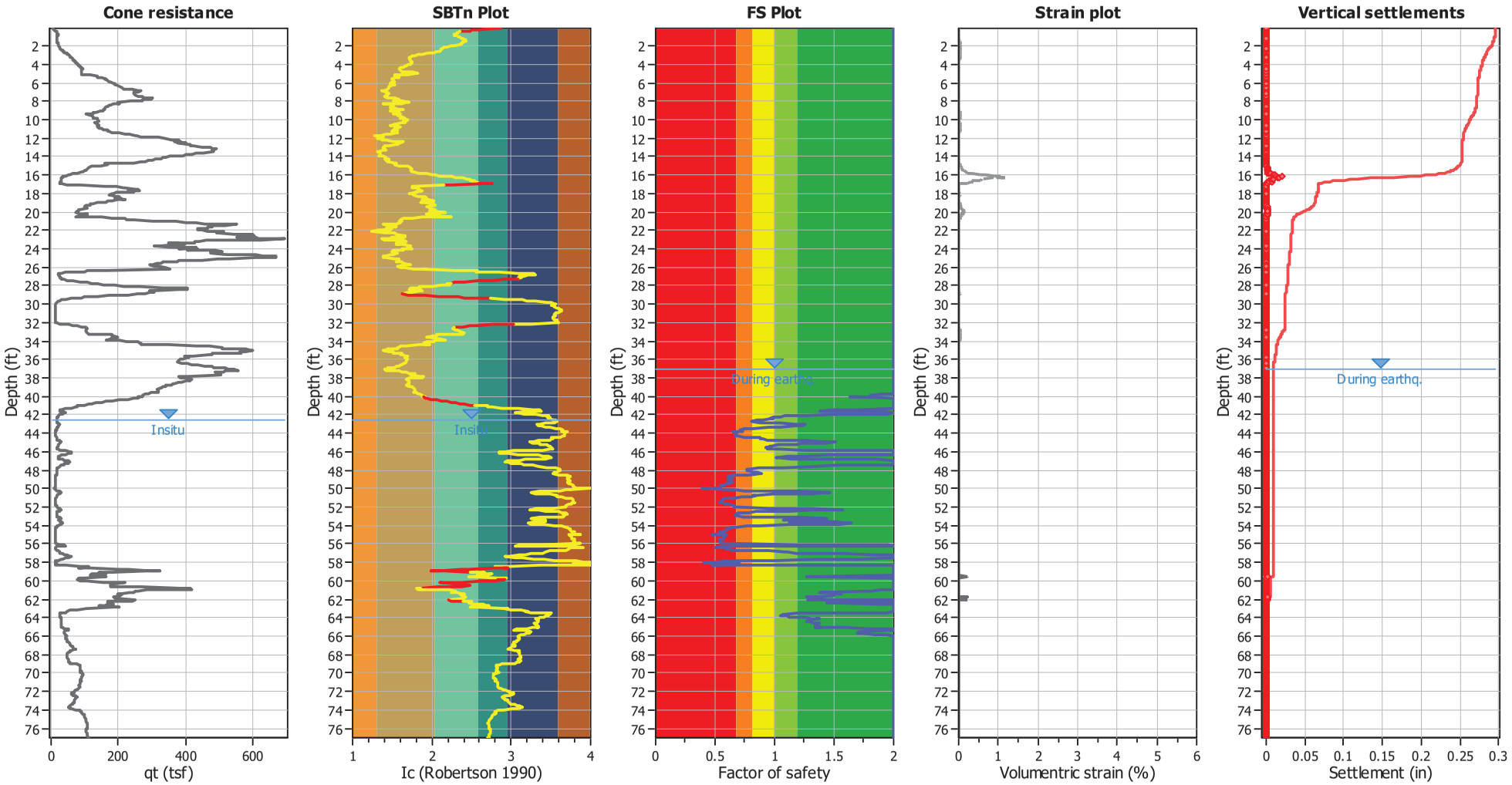
Check for strength loss plots (Robertson (2010))



Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	37.00 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	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:	6.63	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	0.60	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	42.60 ft	Fill height:	N/A	Limit depth:	N/A

Estimation of post-earthquake settlements

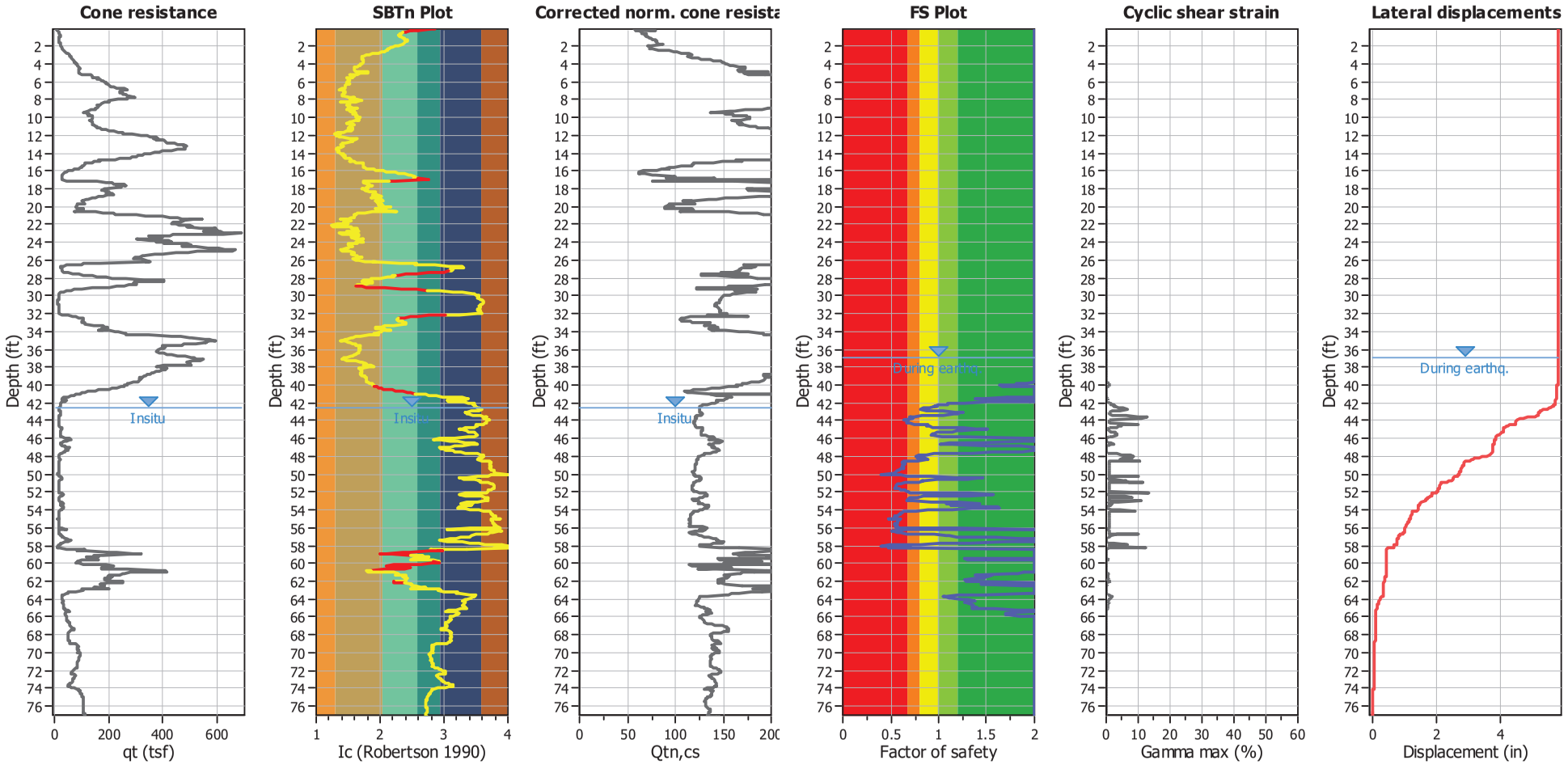


Abbreviations

q_t:	Total cone resistance (cone resistance q_c corrected for pore water effects)
I_c:	Soil Behaviour Type Index
FS:	Calculated Factor of Safety against liquefaction
Volumentric strain:	Post-liquefaction volumentric strain

Estimation of post-earthquake lateral Displacements

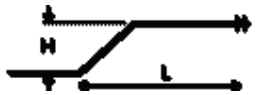
Geometric parameters: Level ground (or gently sloping) with free face (L: 295.00 ft - H: 41.00 ft)



Abbreviations

q_t: Total cone resistance (cone resistance q_c corrected for pore water effects)
I_c: Soil Behaviour Type Index
$Q_{tn,cs}$: Equivalent clean sand normalized CPT total cone resistance
F.S.: Factor of safety
γ_{max}: Maximum cyclic shear strain
LDI: Lateral displacement index

Surface condition



LIQUEFACTION ANALYSIS REPORT

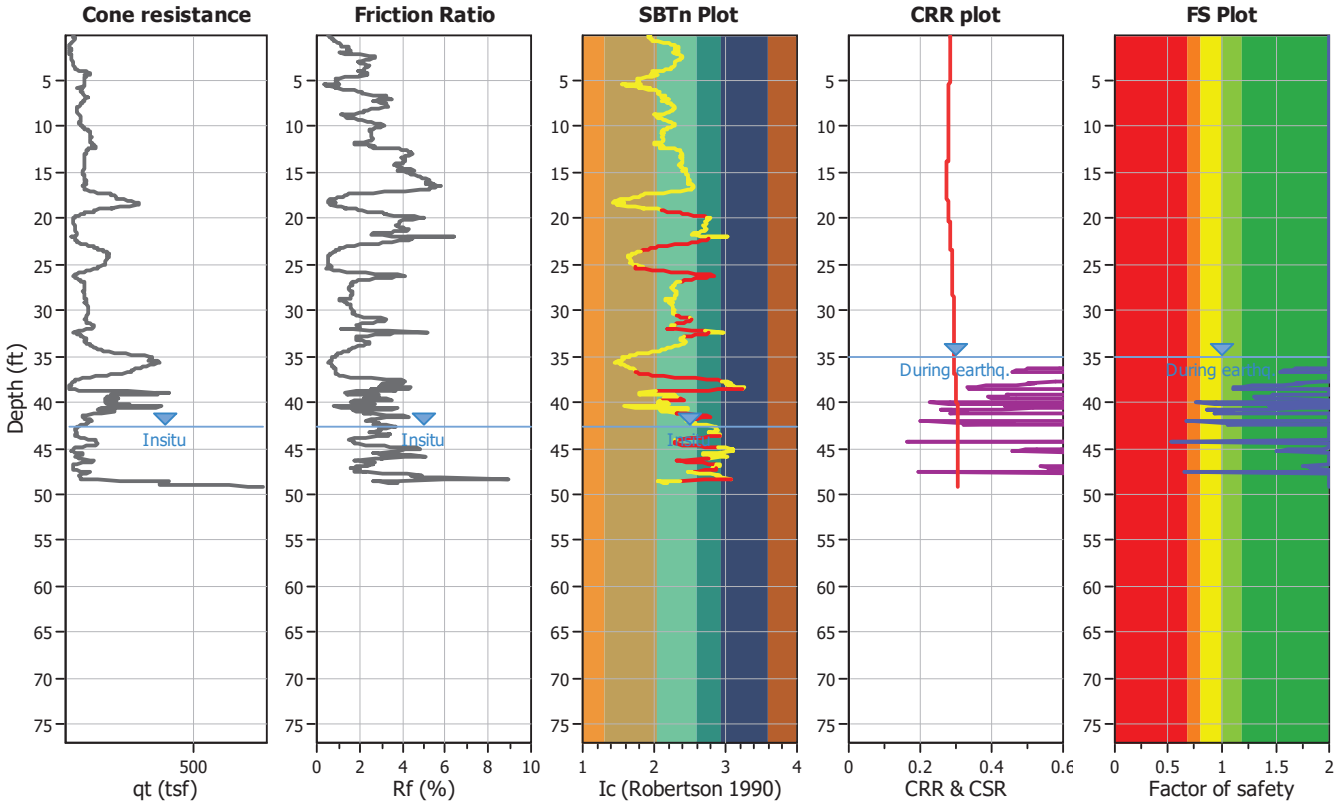
Project title : 25-126-00 NW Open Space

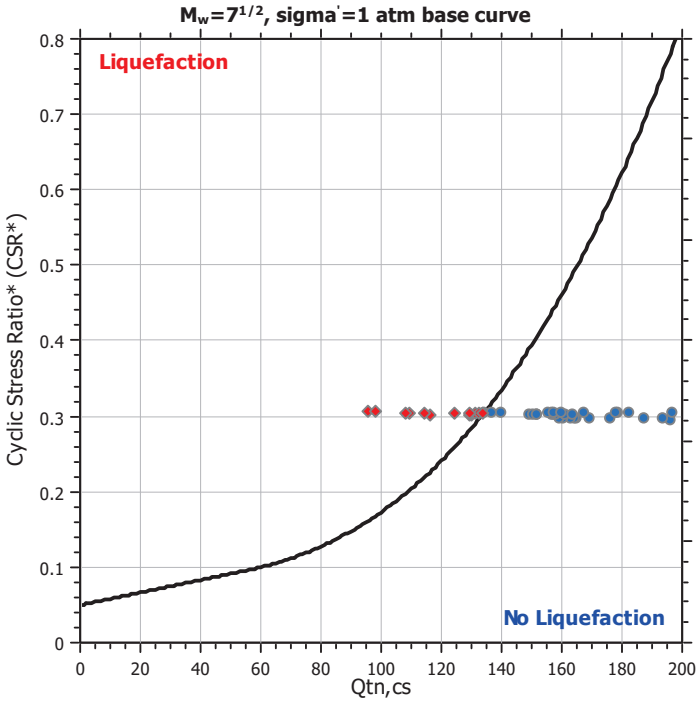
Location : 30291 Camino Capistrano, SJC, CA 92675

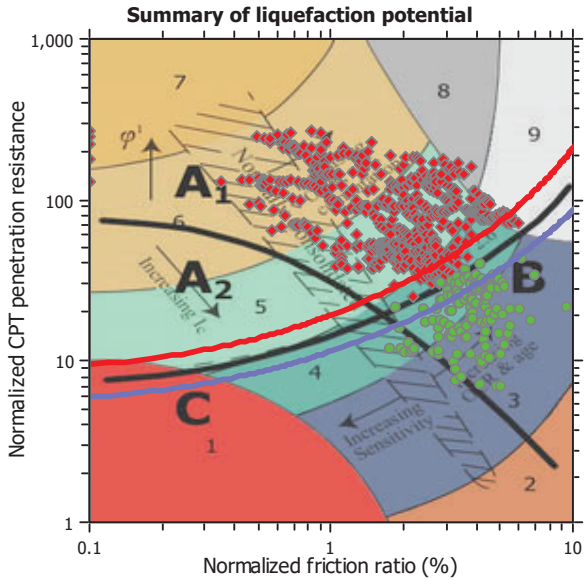
CPT file : 25-126-00 CPT-03

Input parameters and analysis data

Analysis method:	Robertson (2009)	G.W.T. (in-situ):	42.60 ft	Use fill:	No	Clay like behavior applied:	All soils
Fines correction method:	Robertson (2009)	G.W.T. (earthq.):	35.00 ft	Fill height:	N/A	Limit depth applied:	No
Points to test:	Based on Ic value	Average results interval:	1	Fill weight:	N/A	Limit depth:	N/A
Earthquake magnitude M_w:	6.63	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method based
Peak ground acceleration:	0.60	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

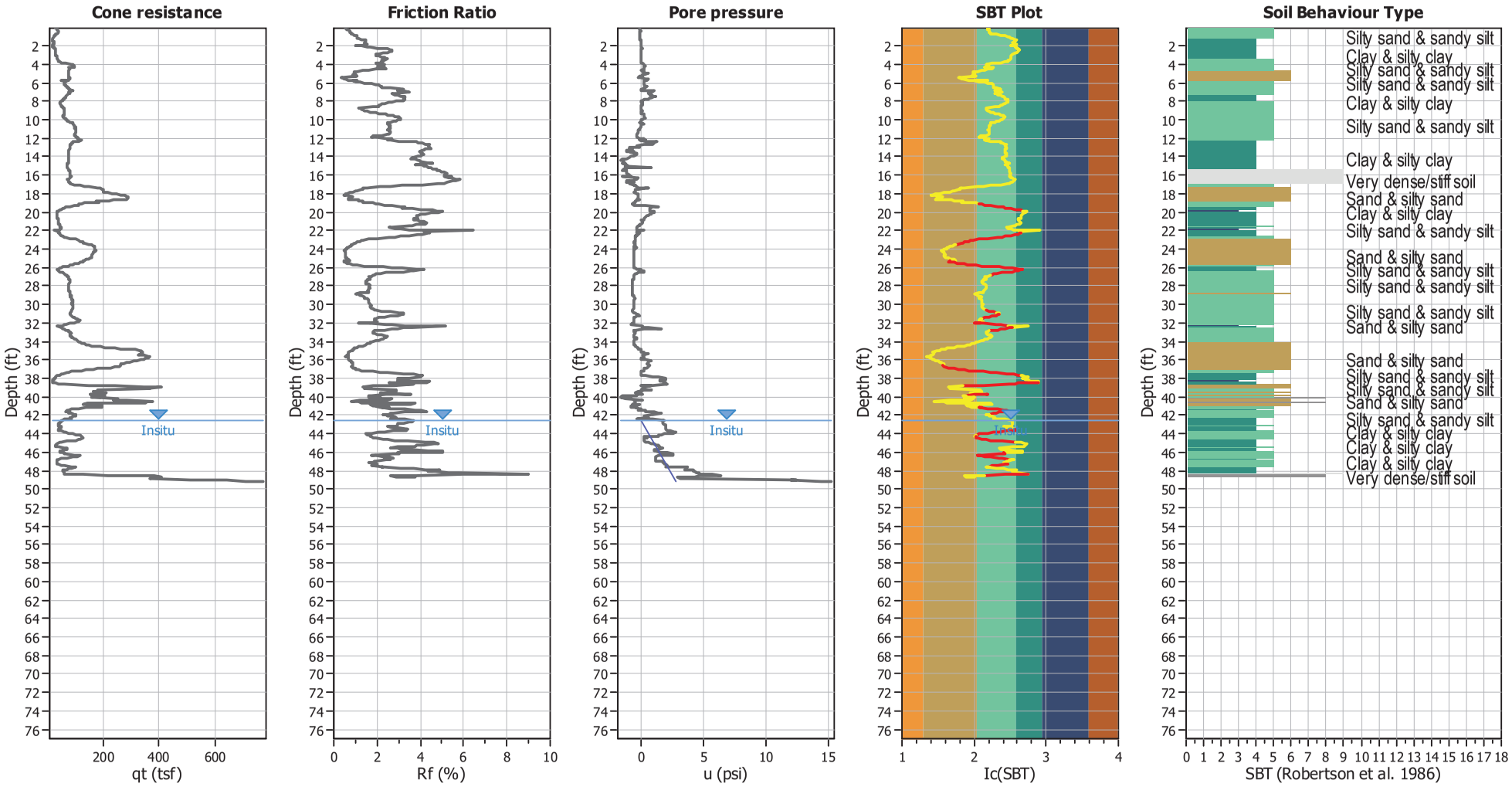






Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and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

CPT basic interpretation plots



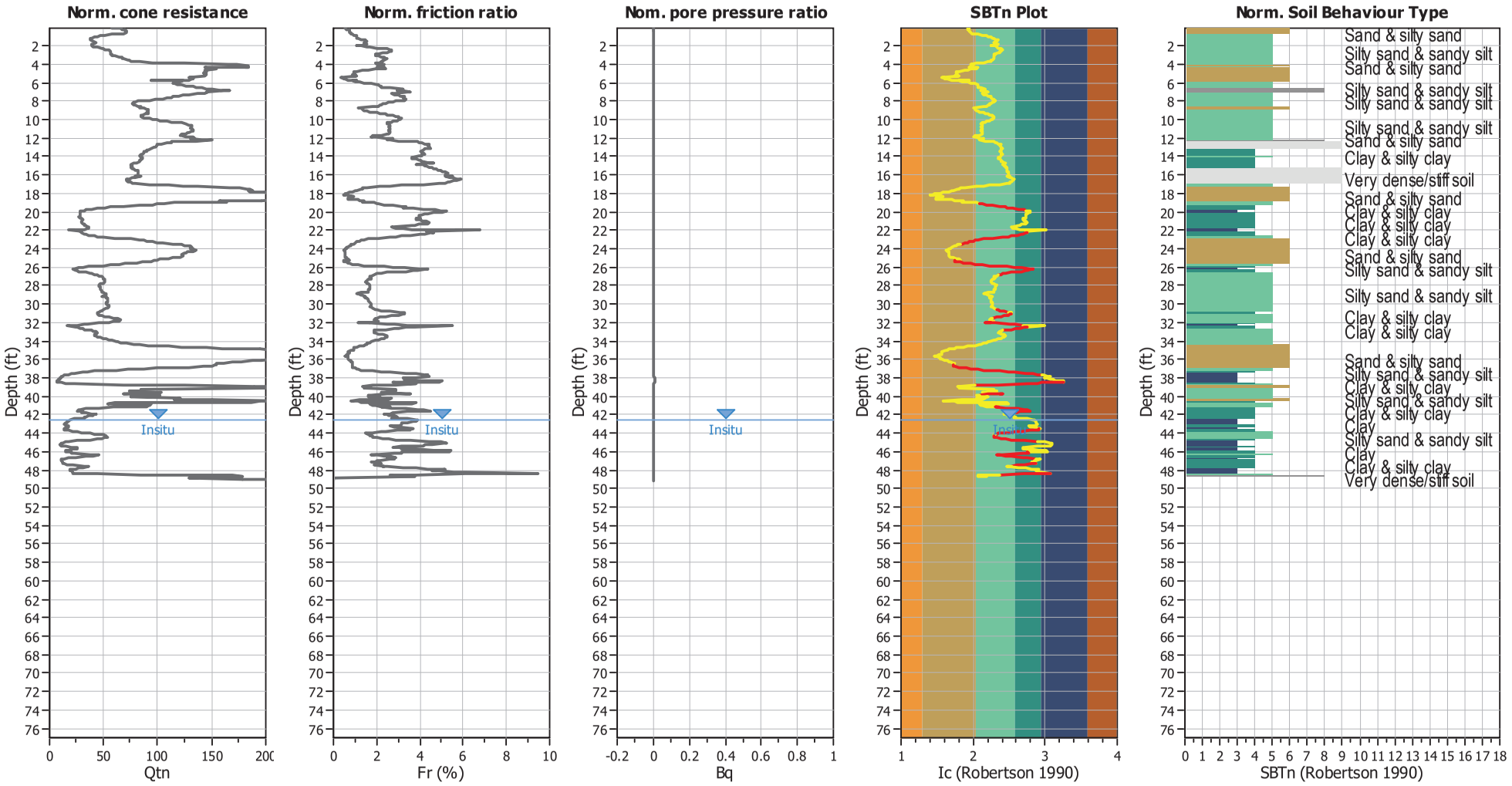
Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	35.00 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	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:	6.63	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	0.60	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	42.60 ft	Fill height:	N/A	Limit depth:	N/A

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

CPT basic interpretation plots (normalized)



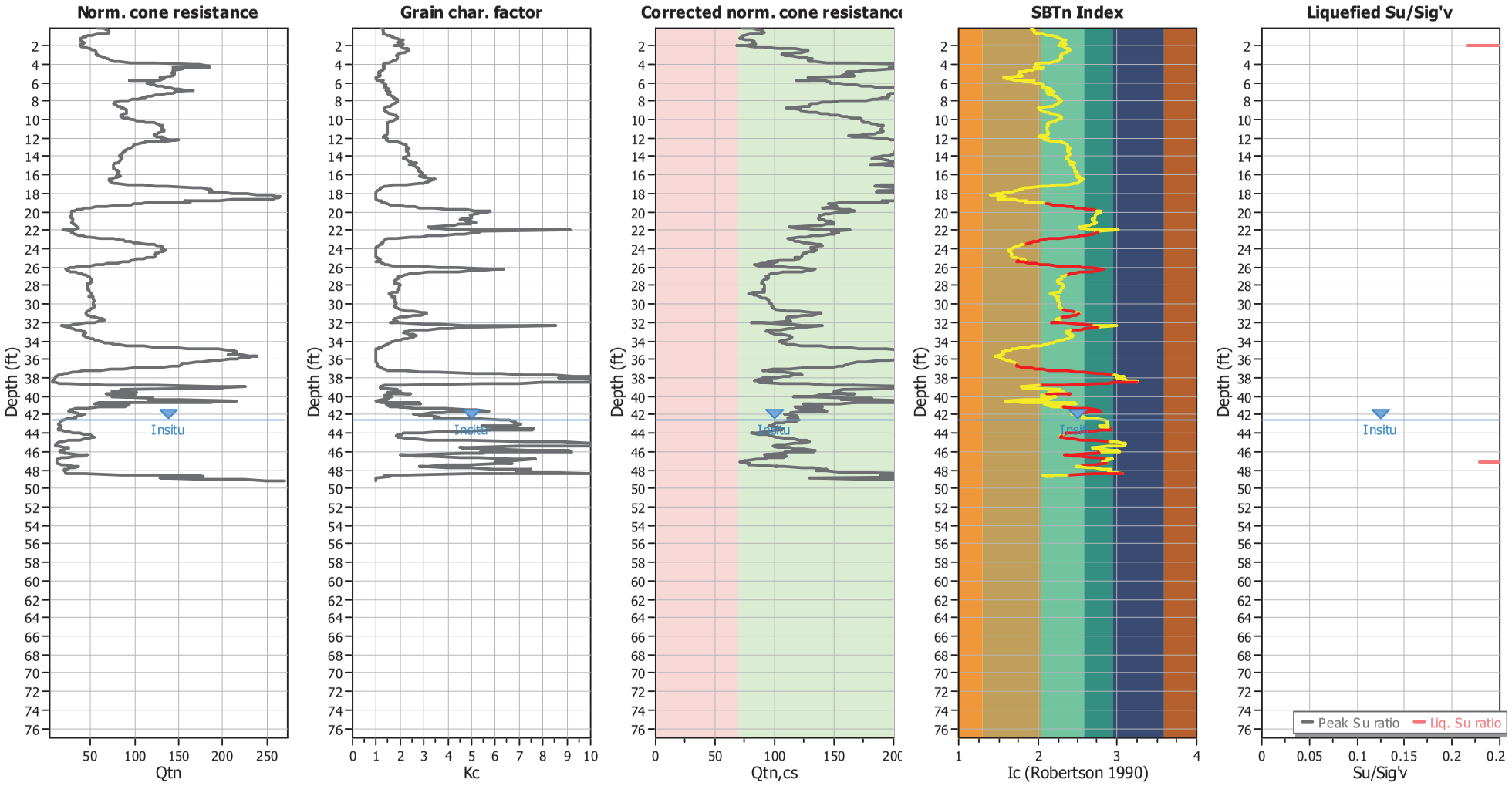
Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	35.00 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	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:	6.63	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	0.60	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	42.60 ft	Fill height:	N/A	Limit depth:	N/A

SBTn legend

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

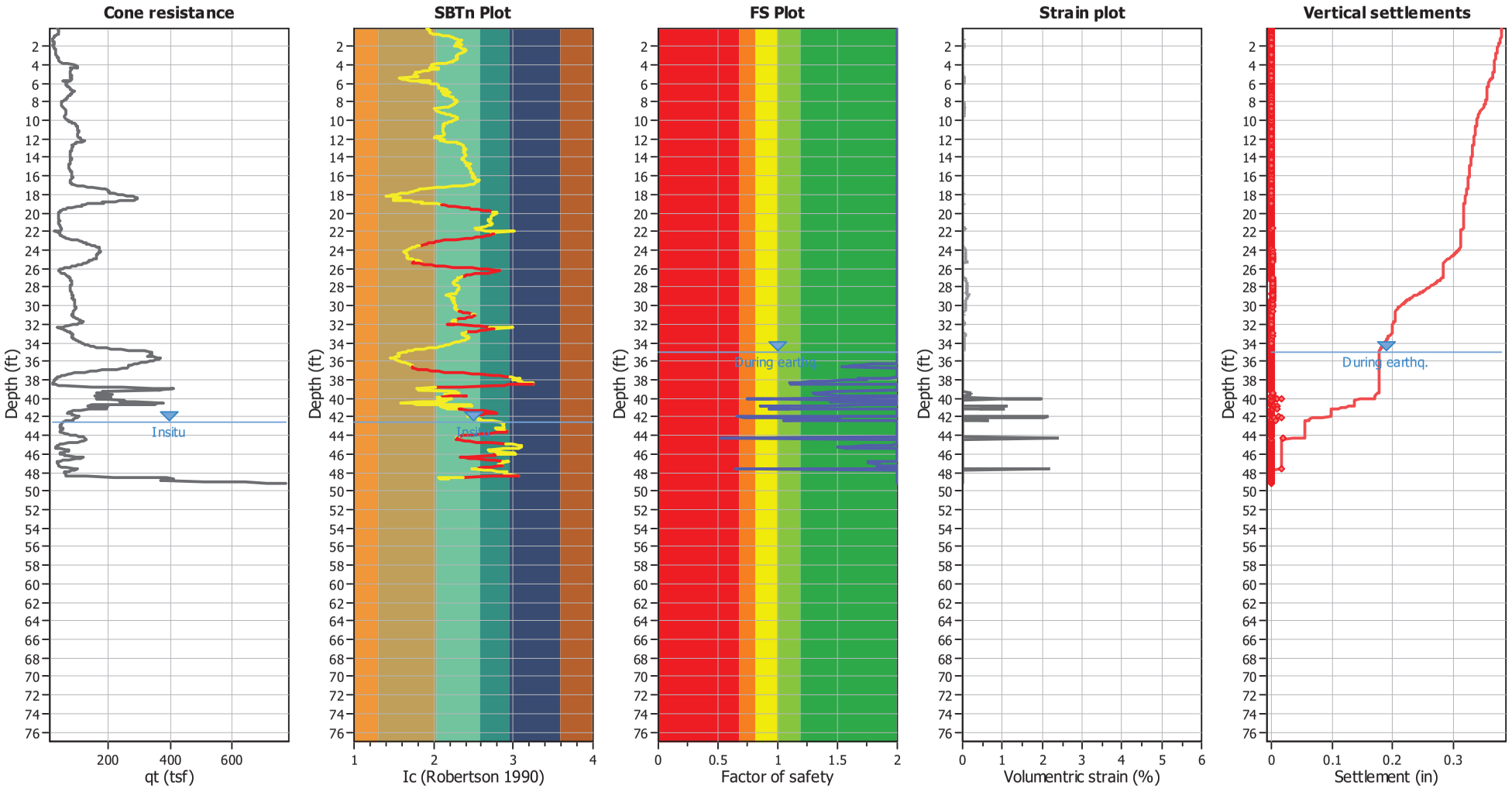
Check for strength loss plots (Robertson (2010))



Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	35.00 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	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:	6.63	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	0.60	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	42.60 ft	Fill height:	N/A	Limit depth:	N/A

Estimation of post-earthquake settlements

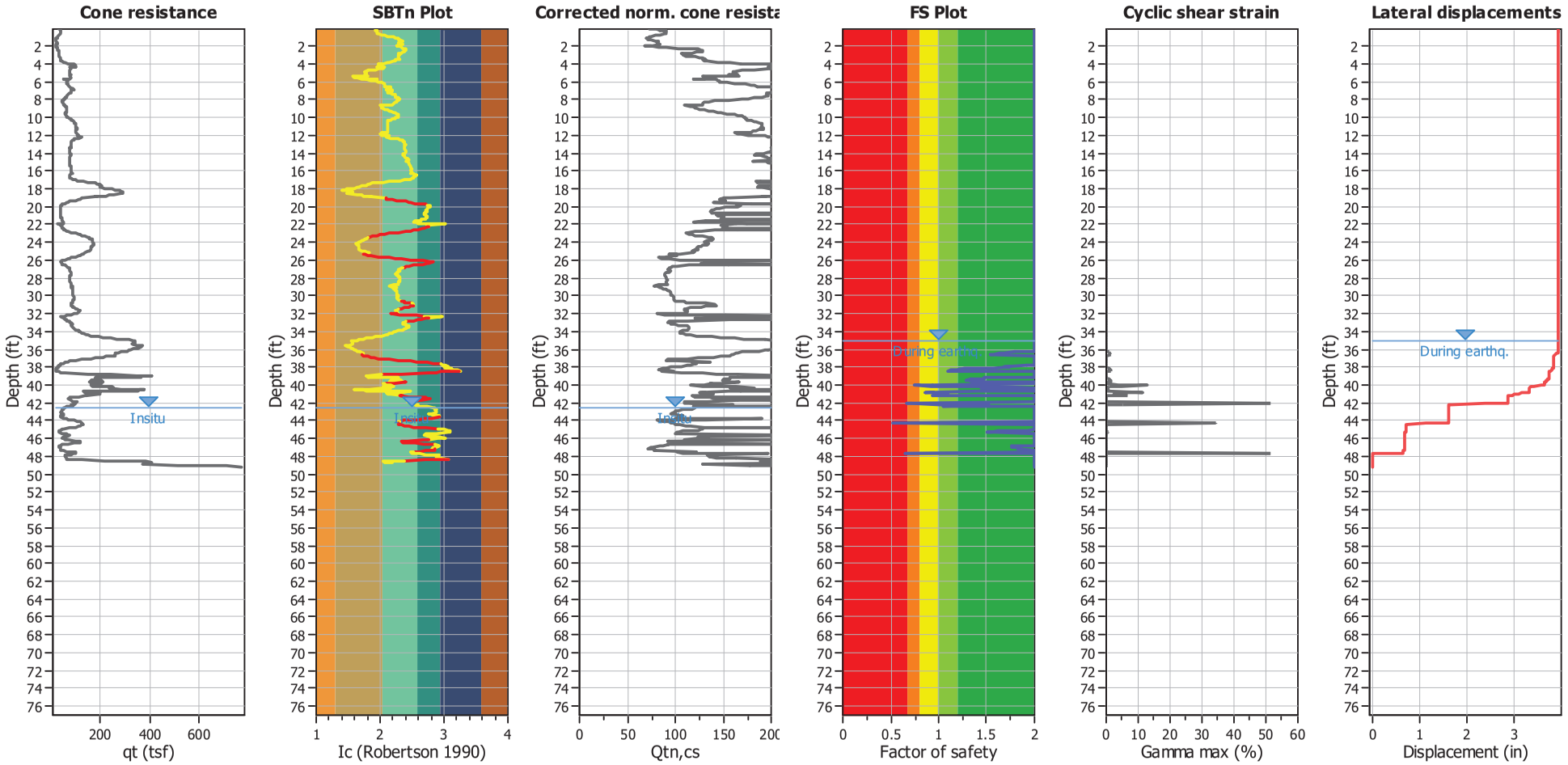


Abbreviations

q_t:	Total cone resistance (cone resistance q_c corrected for pore water effects)
I_c:	Soil Behaviour Type Index
FS:	Calculated Factor of Safety against liquefaction
Volumentric strain:	Post-liquefaction volumentric strain

Estimation of post-earthquake lateral Displacements

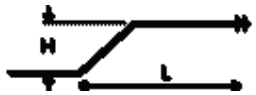
Geometric parameters: Level ground (or gently sloping) with free face (L: 179.00 ft - H: 35.00 ft)



Abbreviations

q_t: Total cone resistance (cone resistance q_c corrected for pore water effects)
I_c: Soil Behaviour Type Index
$Q_{tn,cs}$: Equivalent clean sand normalized CPT total cone resistance
F.S.: Factor of safety
γ_{max}: Maximum cyclic shear strain
LDI: Lateral displacement index

Surface condition



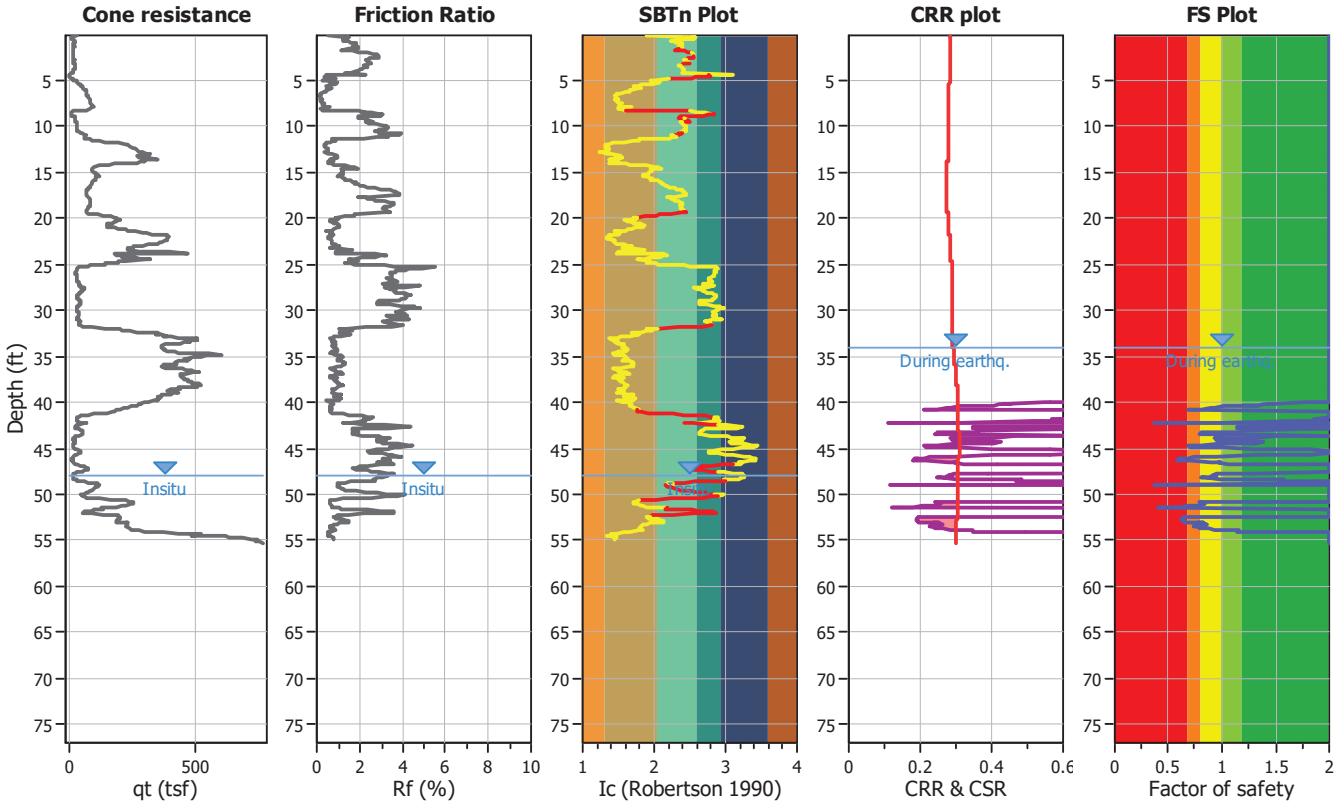
LIQUEFACTION ANALYSIS REPORT

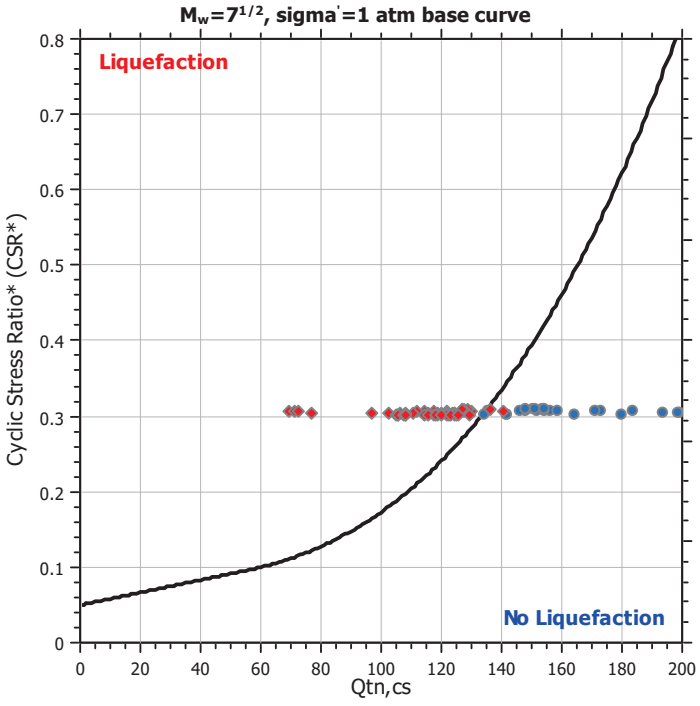
Project title : 25-126-00 NW Open Space **Location : 30291 Camino Capistrano, SJC, CA 92675**

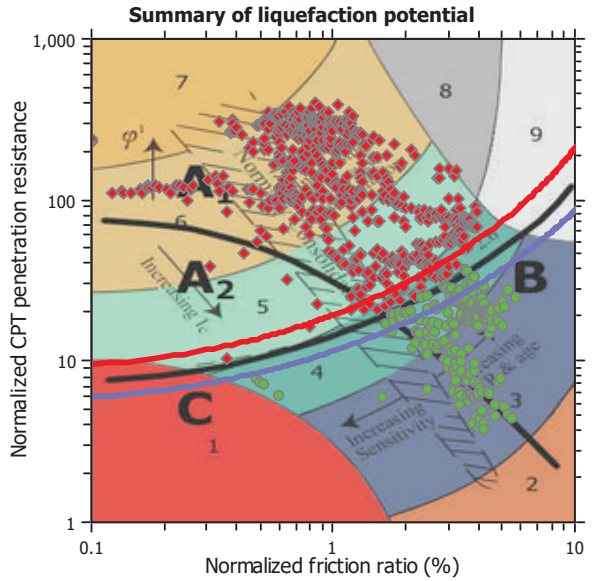
CPT file : 25-126-00 CPT-04

Input parameters and analysis data

Analysis method:	Robertson (2009)	G.W.T. (in-situ):	48.00 ft	Use fill:	No	Clay like behavior applied:	All soils
Fines correction method:	Robertson (2009)	G.W.T. (earthq.):	34.00 ft	Fill height:	N/A	Limit depth applied:	No
Points to test:	Based on Ic value	Average results interval:	1	Fill weight:	N/A	Limit depth:	N/A
Earthquake magnitude M_w:	6.63	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method based
Peak ground acceleration:	0.60	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

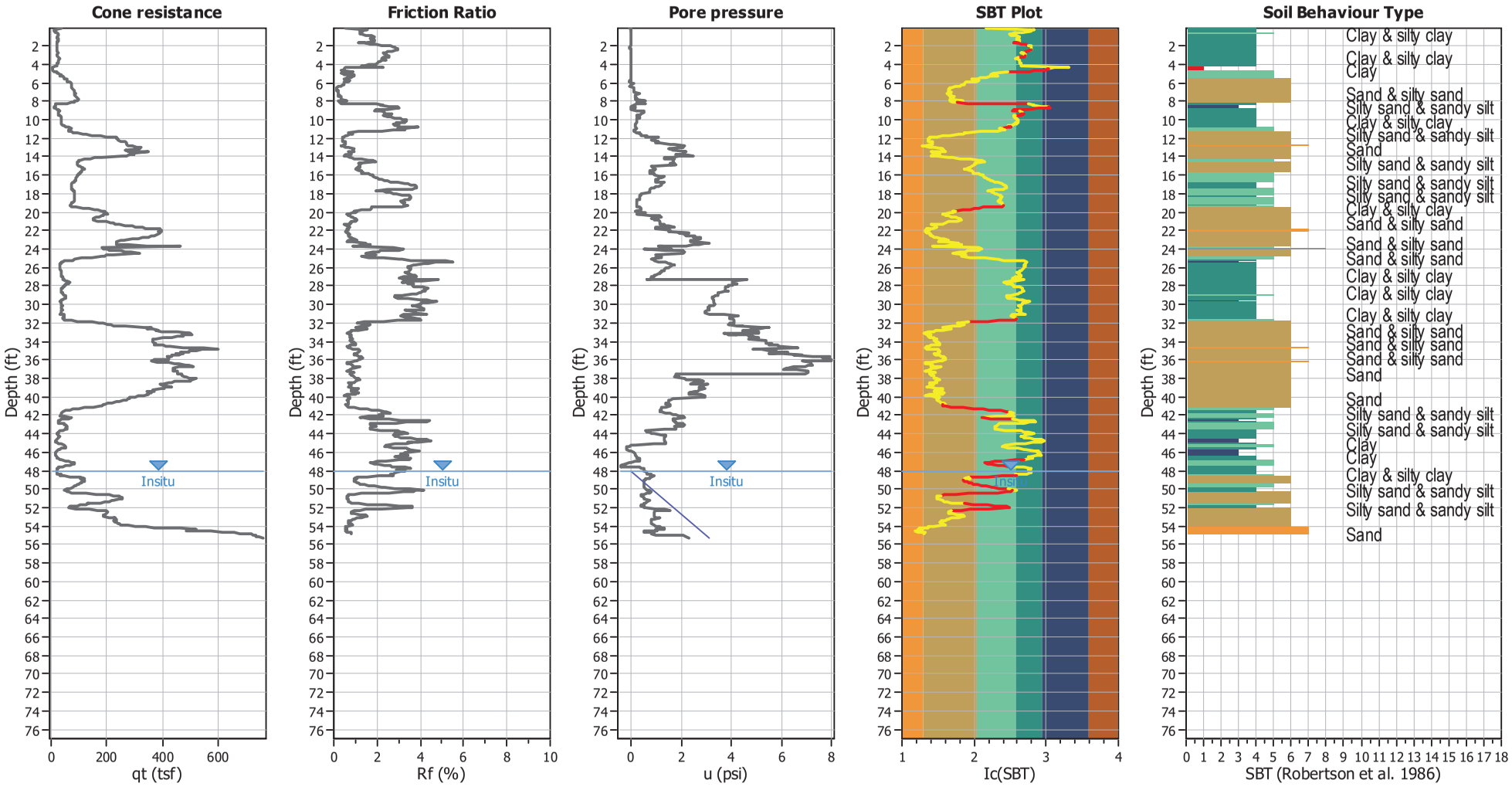






Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and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

CPT basic interpretation plots



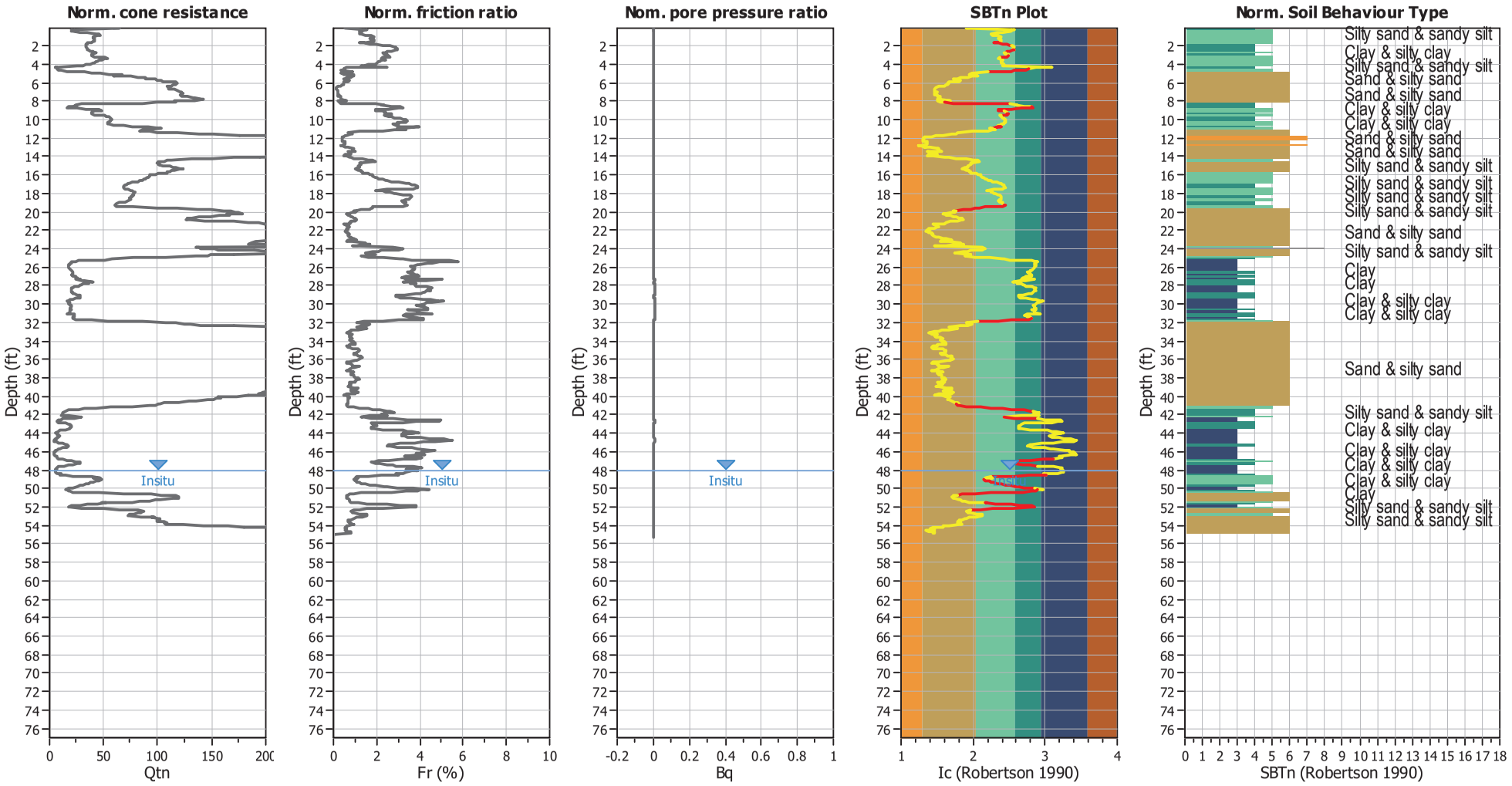
Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	34.00 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	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:	6.63	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	0.60	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	48.00 ft	Fill height:	N/A	Limit depth:	N/A

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

CPT basic interpretation plots (normalized)



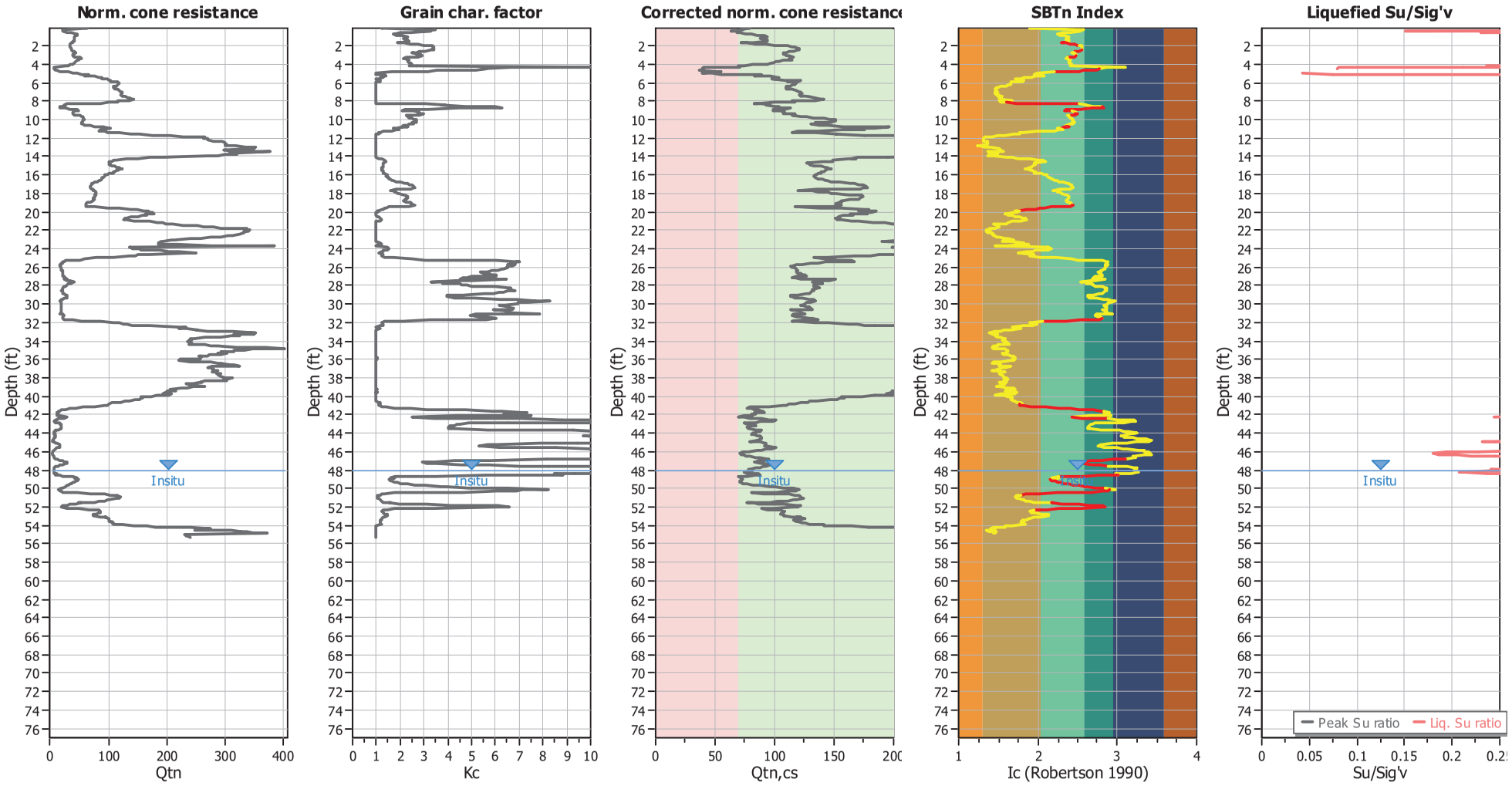
Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	34.00 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	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:	6.63	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	0.60	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	48.00 ft	Fill height:	N/A	Limit depth:	N/A

SBTn legend

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

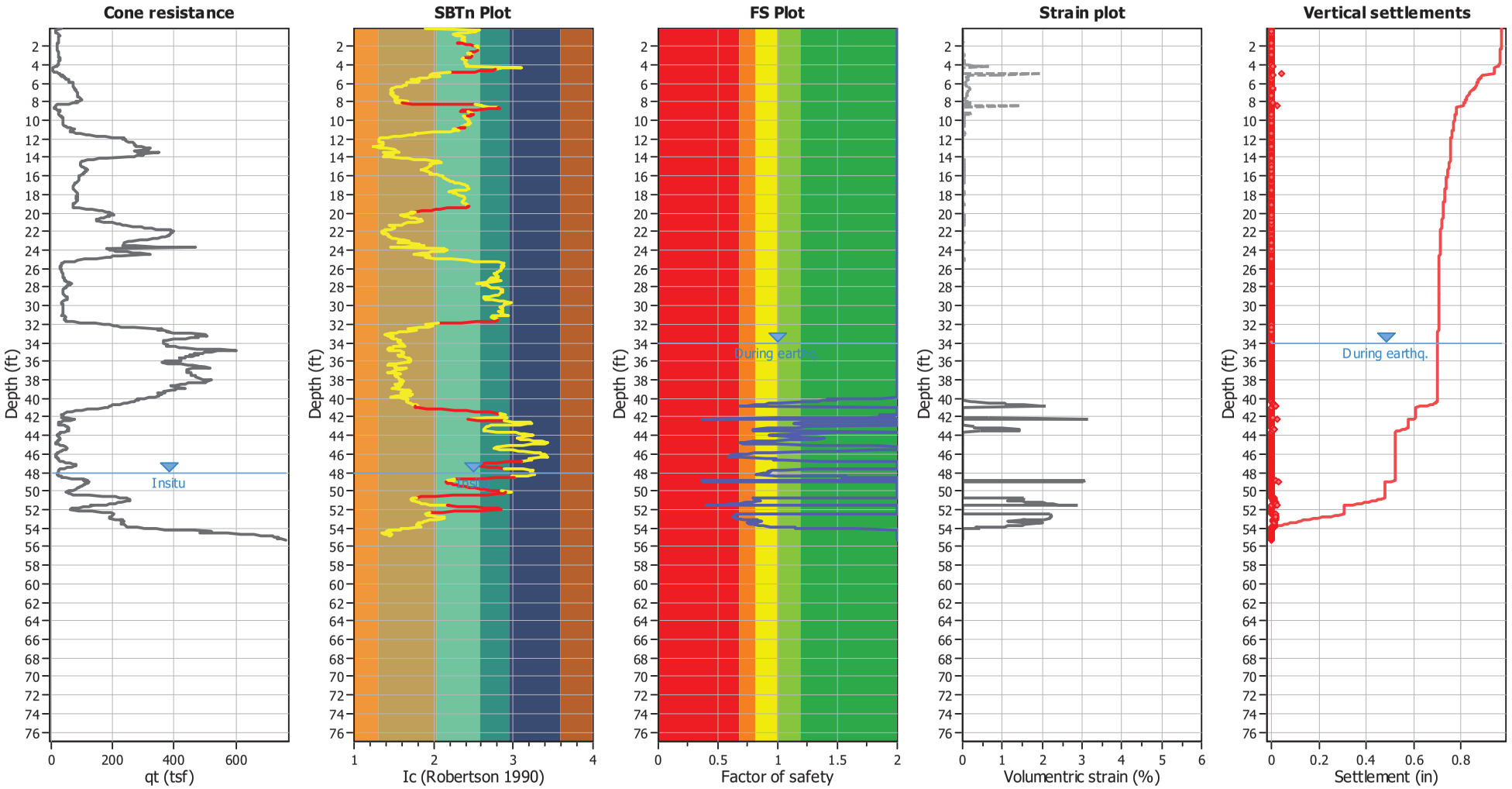
Check for strength loss plots (Robertson (2010))



Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	34.00 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	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:	6.63	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	0.60	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	48.00 ft	Fill height:	N/A	Limit depth:	N/A

Estimation of post-earthquake settlements

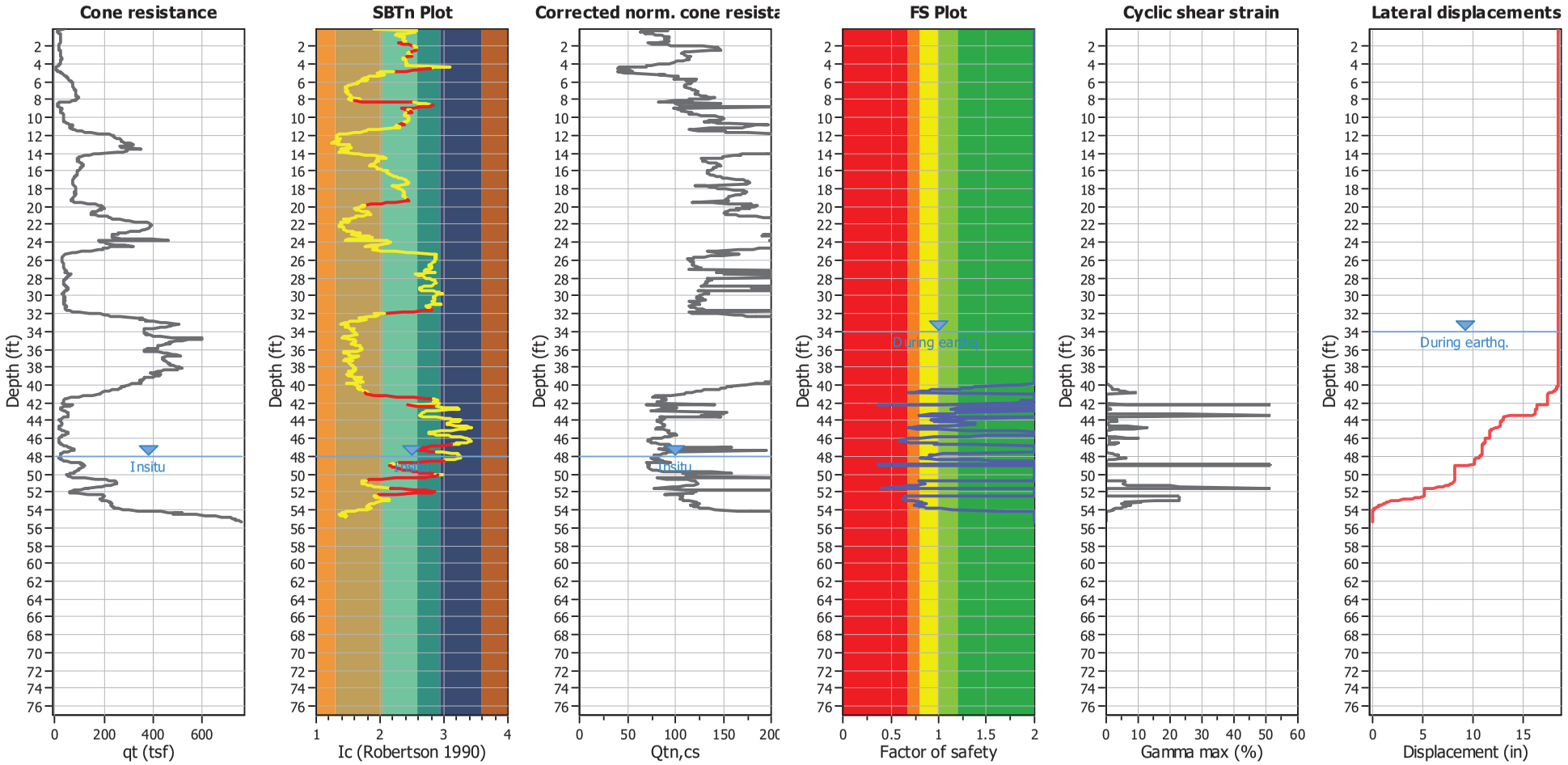


Abbreviations

q_t:	Total cone resistance (cone resistance q_c corrected for pore water effects)
I_c:	Soil Behaviour Type Index
FS:	Calculated Factor of Safety against liquefaction
Volumentric strain:	Post-liquefaction volumentric strain

Estimation of post-earthquake lateral Displacements

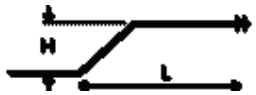
Geometric parameters: Level ground (or gently sloping) with free face (L: 115.00 ft - H: 36.00 ft)



Abbreviations

q_t: Total cone resistance (cone resistance q_c corrected for pore water effects)
I_c: Soil Behaviour Type Index
$Q_{tn,cs}$: Equivalent clean sand normalized CPT total cone resistance
F.S.: Factor of safety
γ_{max}: Maximum cyclic shear strain
LDI: Lateral displacement index

Surface condition



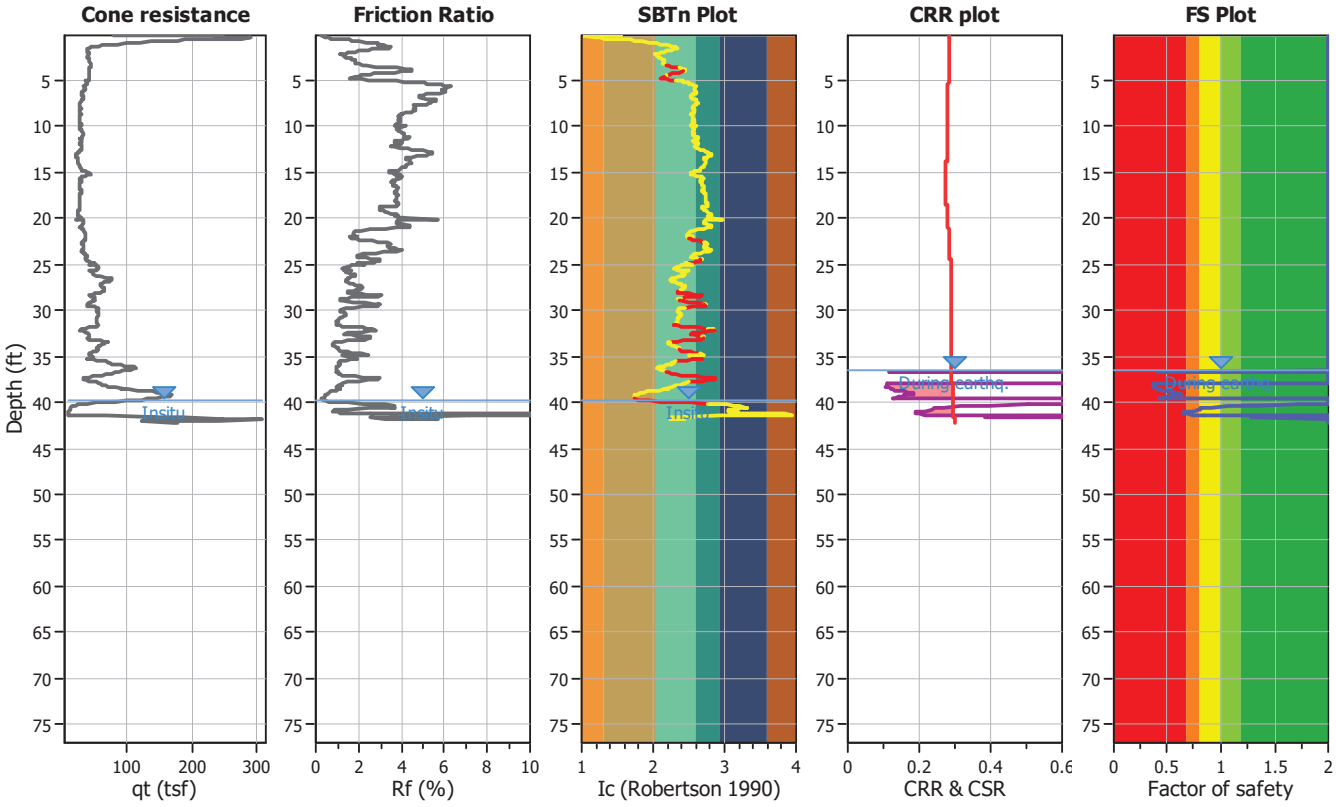
LIQUEFACTION ANALYSIS REPORT

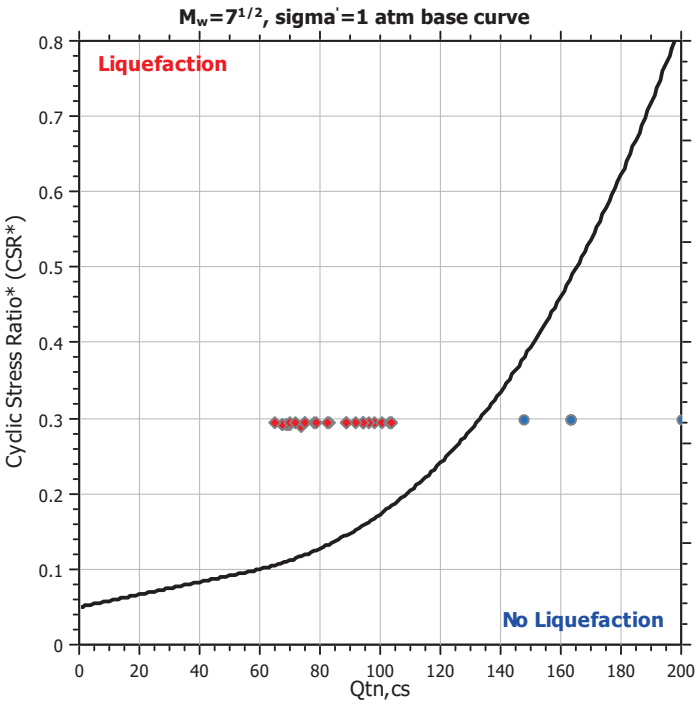
Project title : 25-126-00 NW Open Space **Location : 30291 Camino Capistrano, SJC, CA 92675**

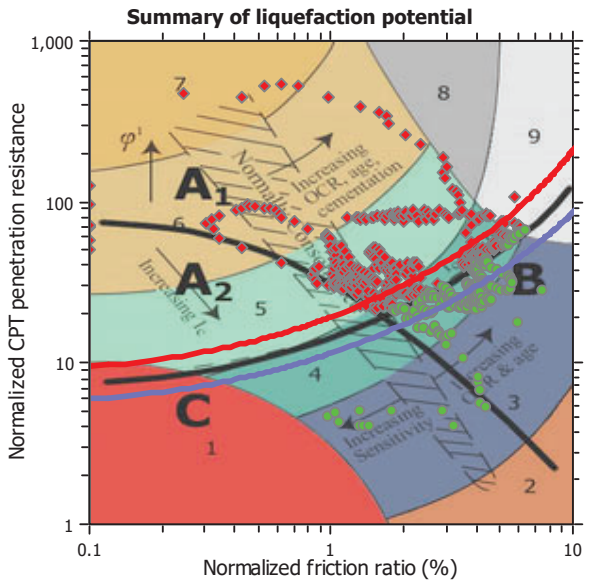
CPT file : 25-126-00 CPT-05

Input parameters and analysis data

Analysis method:	Robertson (2009)	G.W.T. (in-situ):	39.80 ft	Use fill:	No	Clay like behavior applied:	All soils
Fines correction method:	Robertson (2009)	G.W.T. (earthq.):	36.60 ft	Fill height:	N/A	Limit depth applied:	No
Points to test:	Based on Ic value	Average results interval:	1	Fill weight:	N/A	Limit depth:	N/A
Earthquake magnitude M_w:	6.63	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method based
Peak ground acceleration:	0.60	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

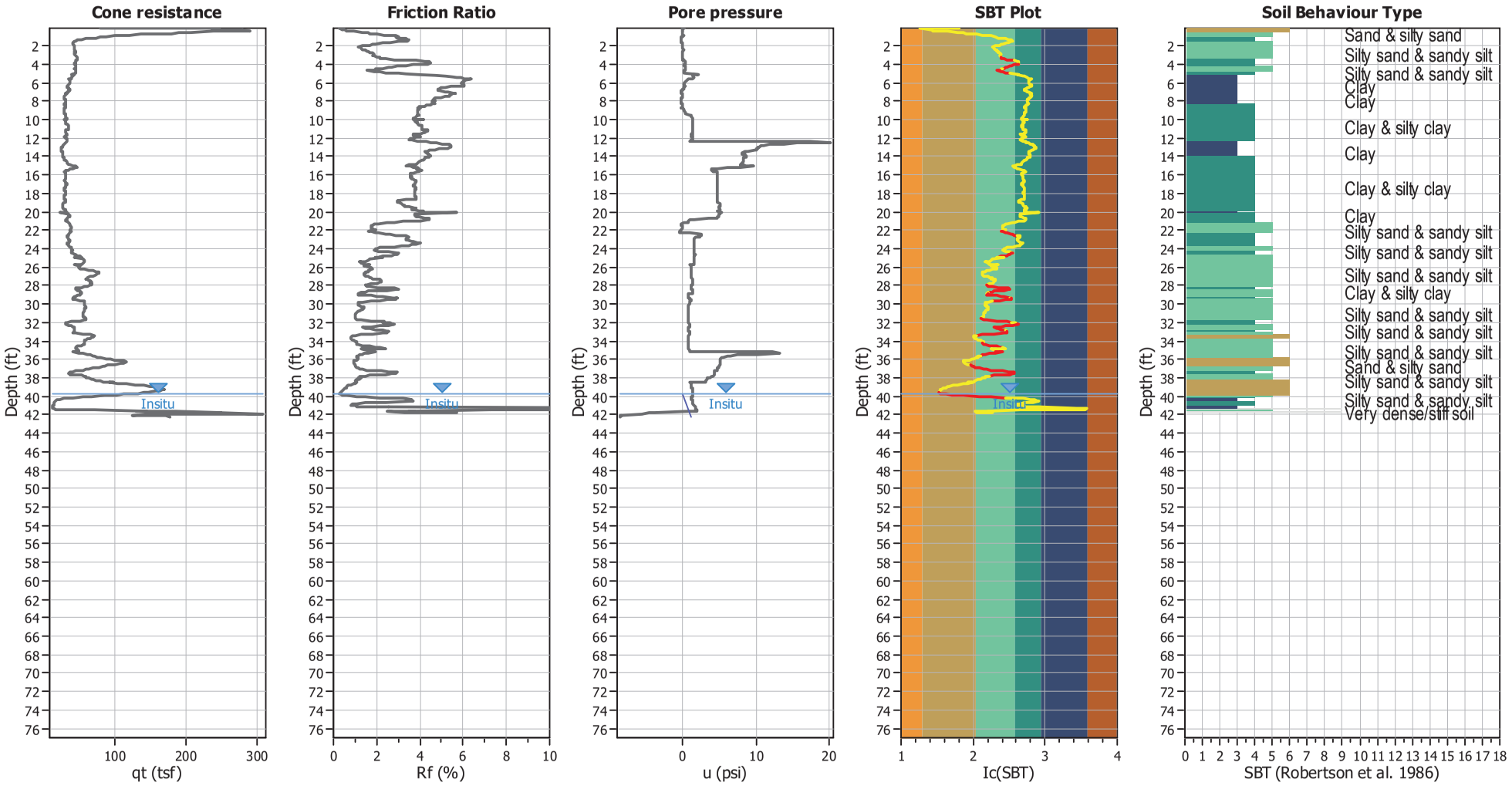






Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and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

CPT basic interpretation plots



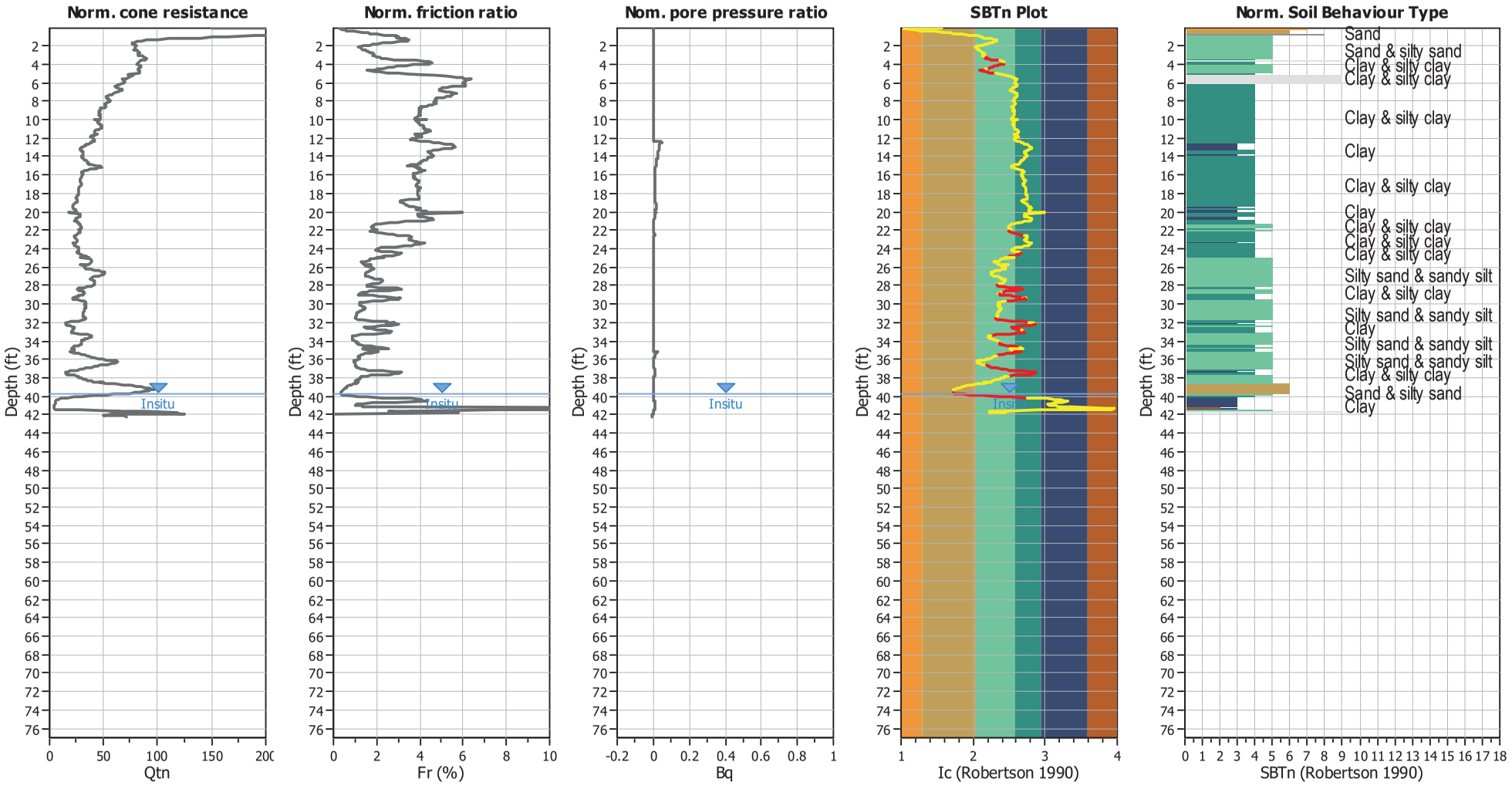
Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	36.60 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	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:	6.63	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	0.60	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	39.80 ft	Fill height:	N/A	Limit depth:	N/A

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

CPT basic interpretation plots (normalized)



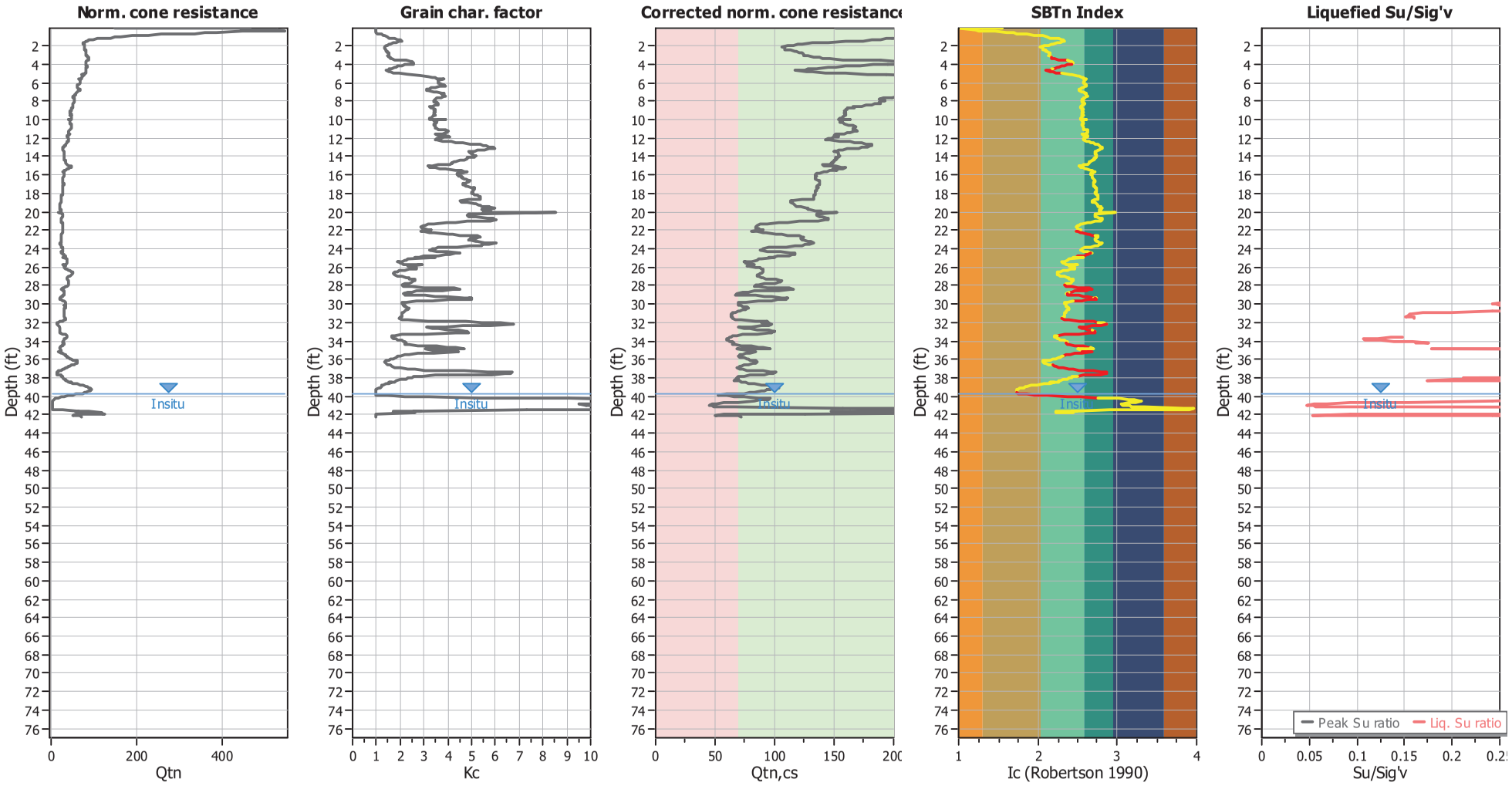
Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	36.60 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	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:	6.63	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	0.60	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	39.80 ft	Fill height:	N/A	Limit depth:	N/A

SBTn legend

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

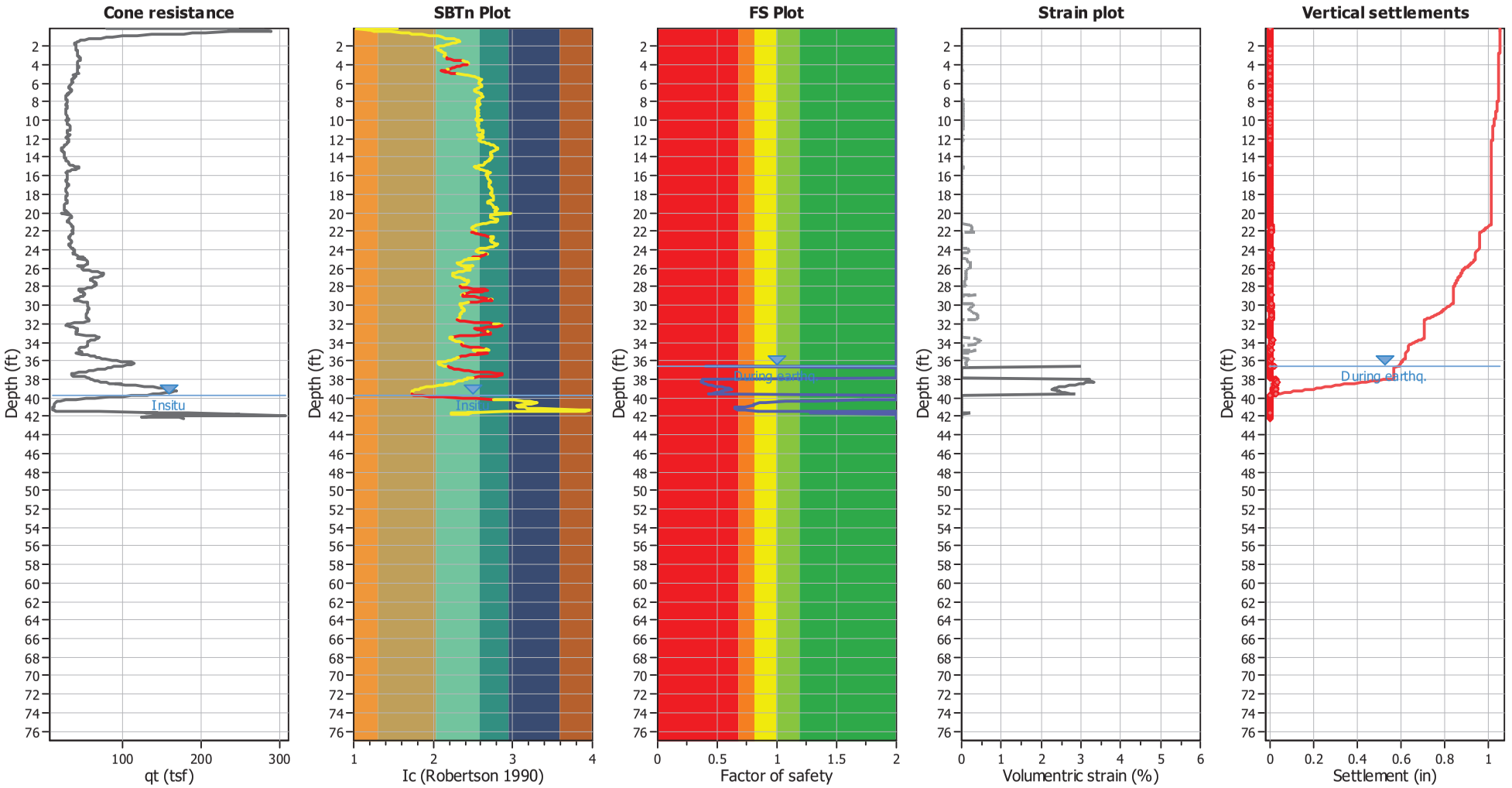
Check for strength loss plots (Robertson (2010))



Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	36.60 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	1	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_0 applied:	Yes
Earthquake magnitude M_w:	6.63	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	0.60	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	39.80 ft	Fill height:	N/A	Limit depth:	N/A

Estimation of post-earthquake settlements

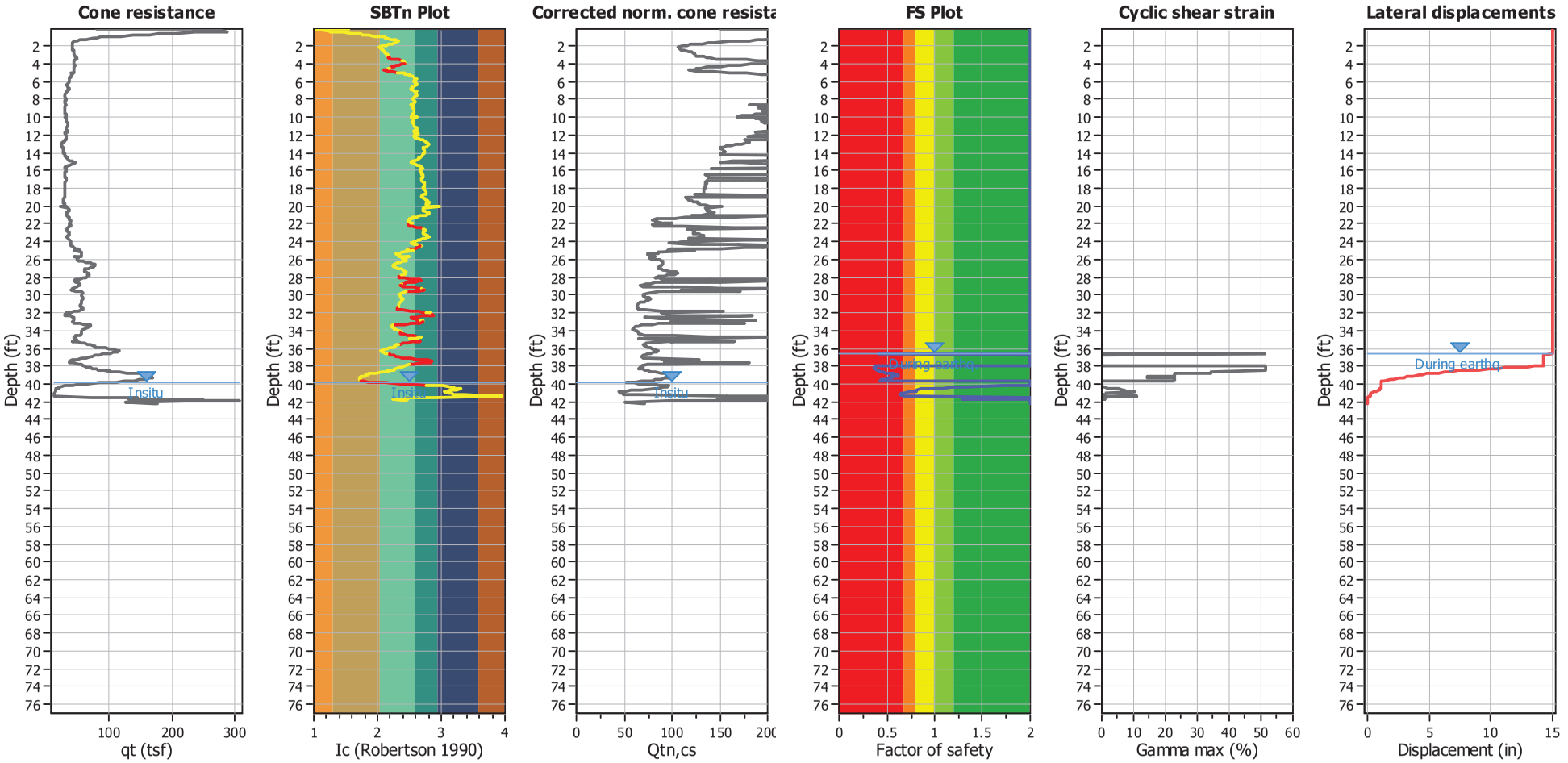


Abbreviations

q_t:	Total cone resistance (cone resistance q_c corrected for pore water effects)
I_c:	Soil Behaviour Type Index
FS:	Calculated Factor of Safety against liquefaction
Volumentric strain:	Post-liquefaction volumentric strain

Estimation of post-earthquake lateral Displacements

Geometric parameters: Level ground (or gently sloping) with free face (L: 178.00 ft - H: 42.00 ft)



Abbreviations

q_t: Total cone resistance (cone resistance q_c corrected for pore water effects)
I_c: Soil Behaviour Type Index
$Q_{tn,cs}$: Equivalent clean sand normalized CPT total cone resistance
F.S.: Factor of safety
γ_{max}: Maximum cyclic shear strain
LDI: Lateral displacement index

Surface condition



LIQUEFACTION ANALYSIS REPORT

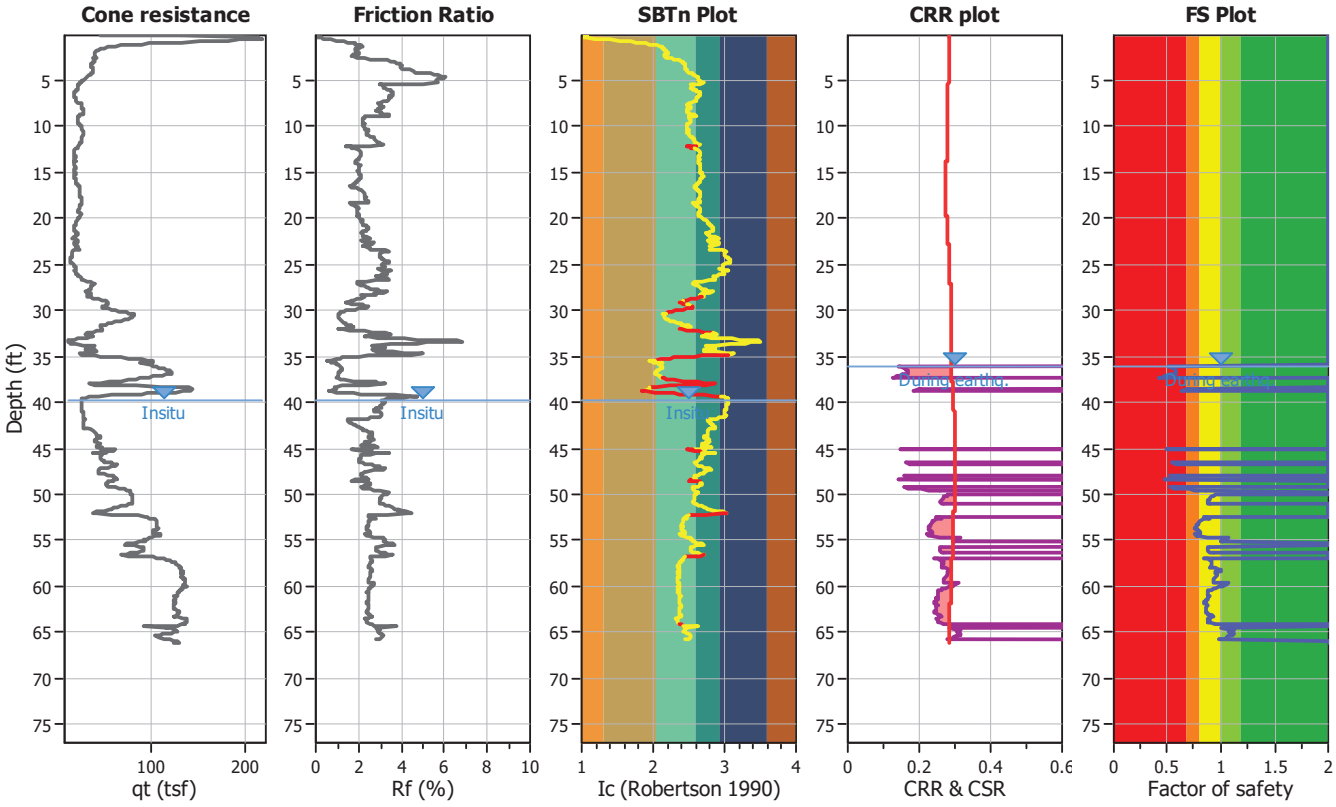
Project title : 25-126-00 NW Open Space

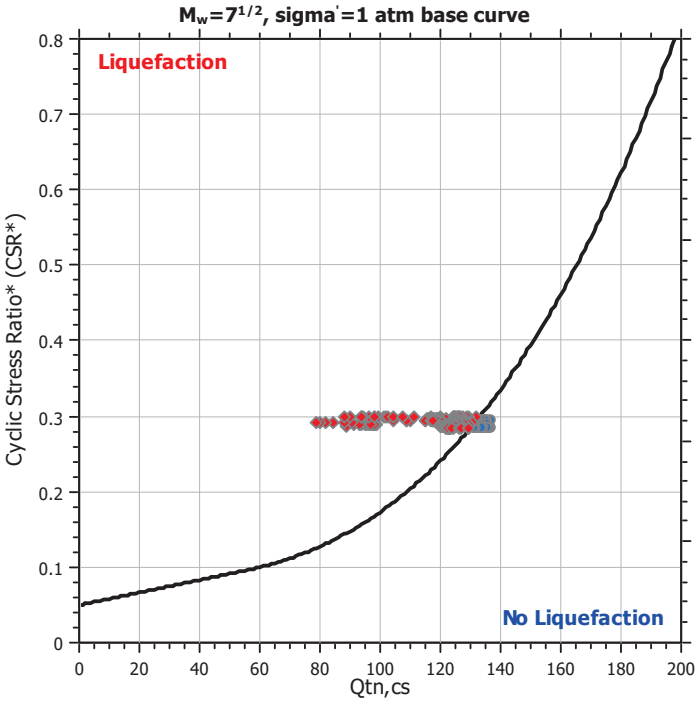
Location : 30291 Camino Capistrano, SJC, CA 92675

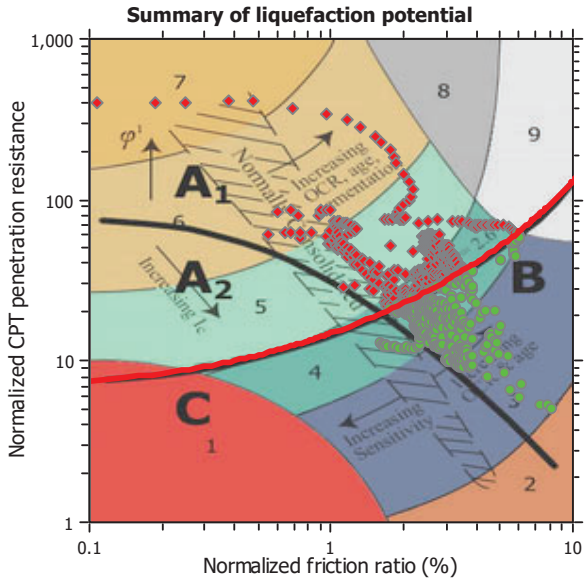
CPT file : 25-126-00 CPT-06

Input parameters and analysis data

Analysis method:	NCEER (1998)	G.W.T. (in-situ):	39.80 ft	Use fill:	No	Clay like behavior applied:	Sands only
Fines correction method:	NCEER (1998)	G.W.T. (earthq.):	36.00 ft	Fill height:	N/A	Limit depth applied:	No
Points to test:	Based on Ic value	Average results interval:	1	Fill weight:	N/A	Limit depth:	N/A
Earthquake magnitude M_w:	6.63	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method based
Peak ground acceleration:	0.60	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

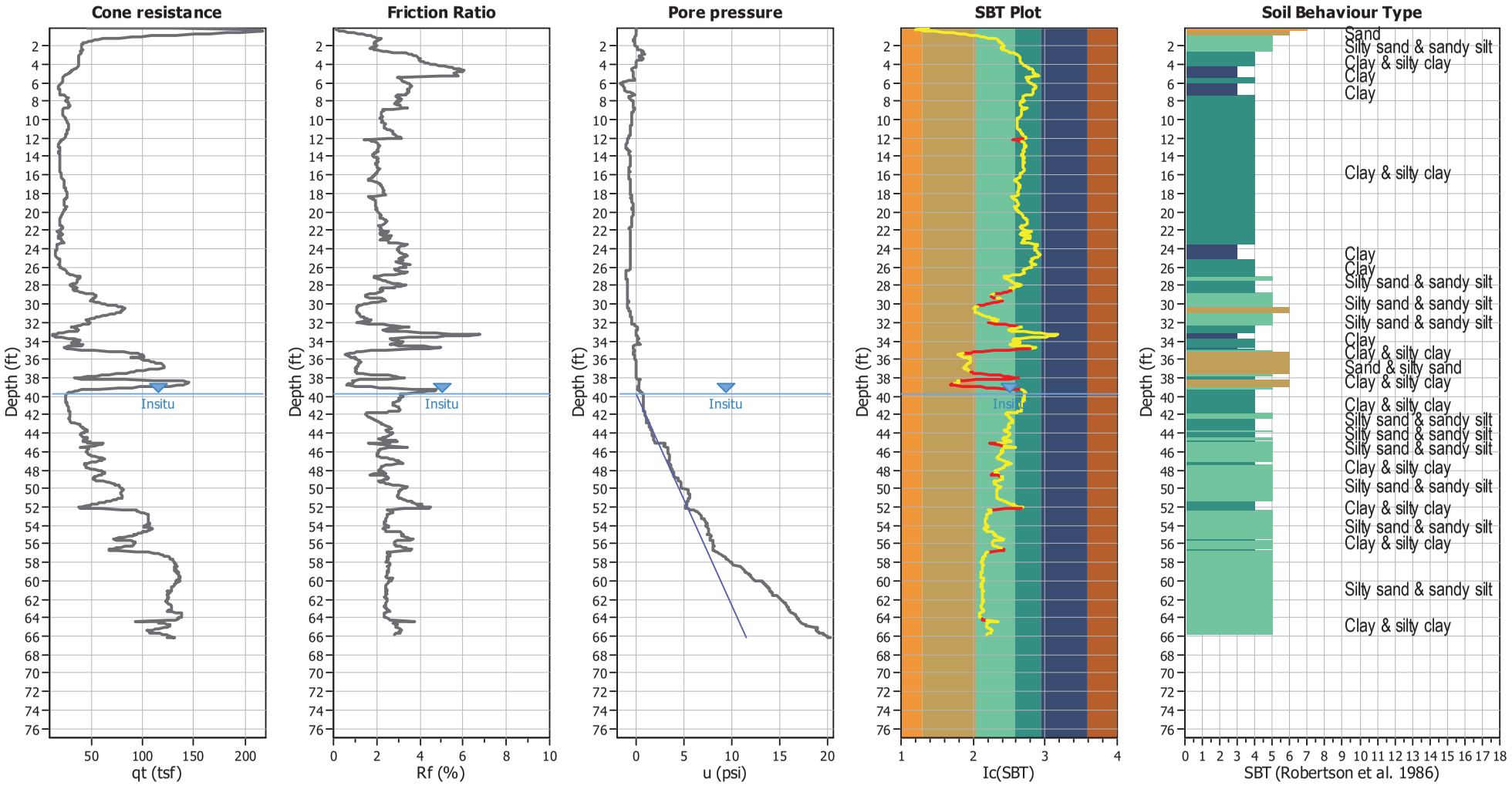






Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and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

CPT basic interpretation plots



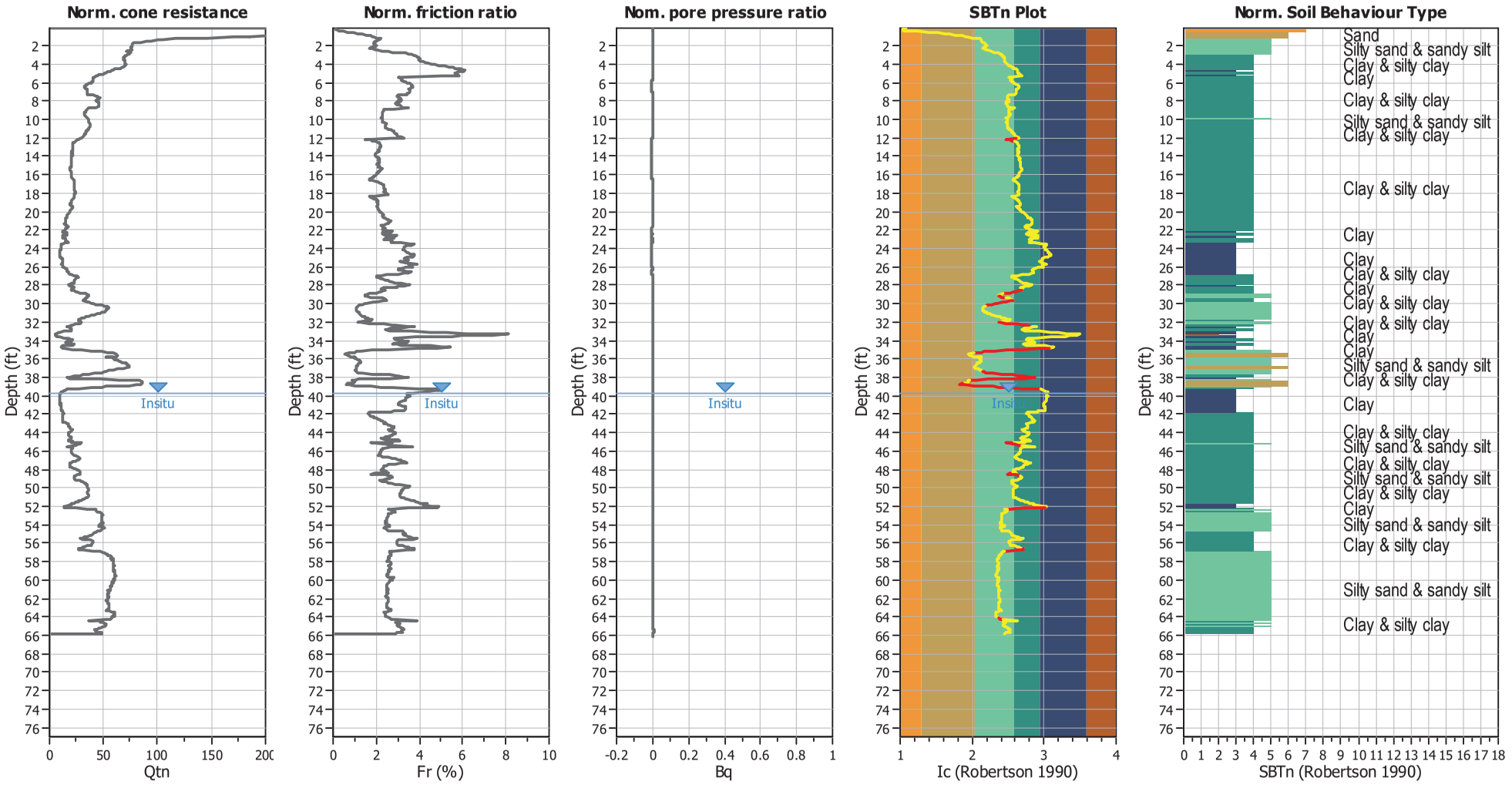
Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	36.00 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:	6.63	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.60	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	39.80 ft	Fill height:	N/A	Limit depth:	N/A

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

CPT basic interpretation plots (normalized)



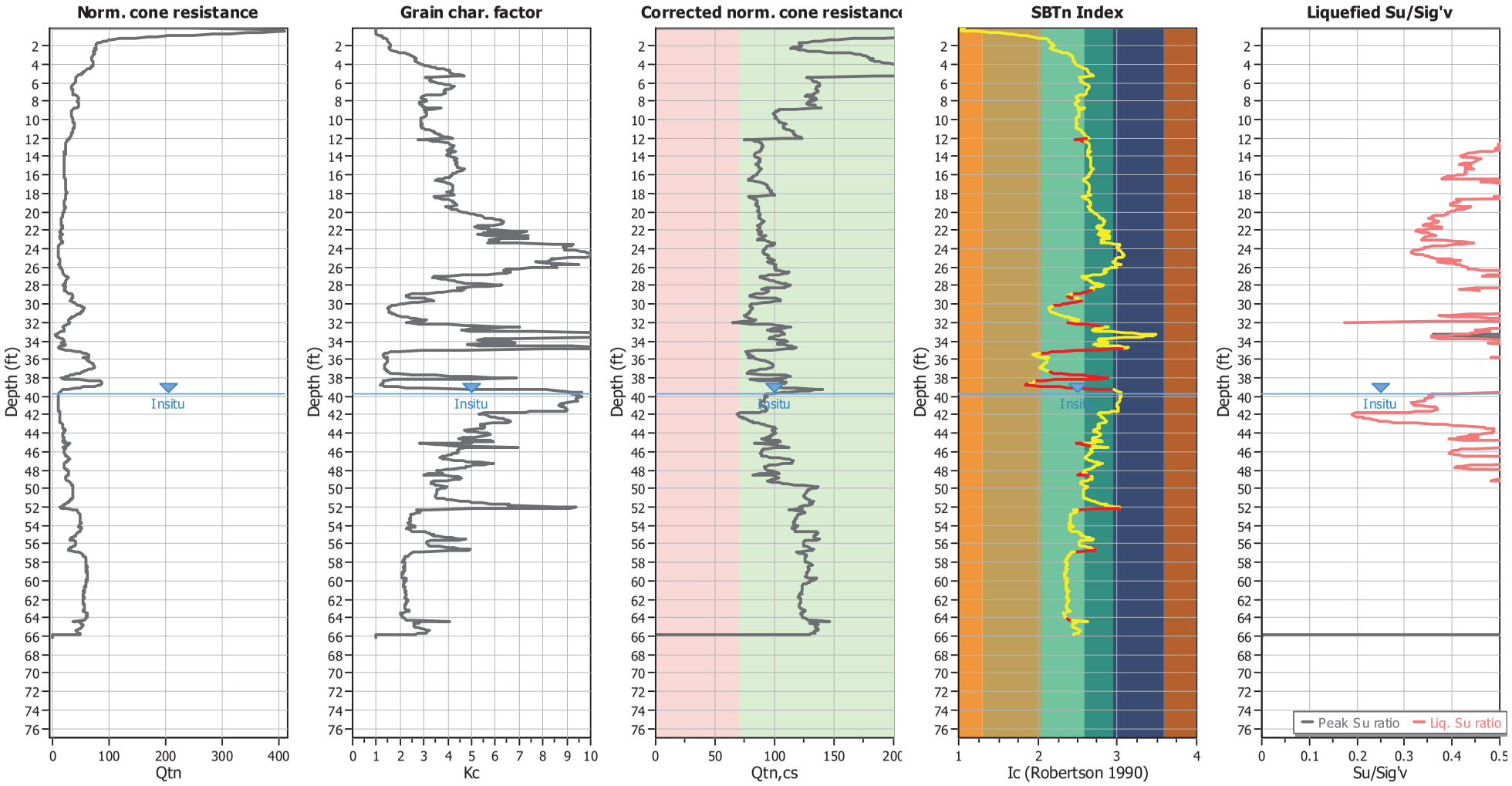
Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	36.00 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:	6.63	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.60	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	39.80 ft	Fill height:	N/A	Limit depth:	N/A

SBTn legend

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

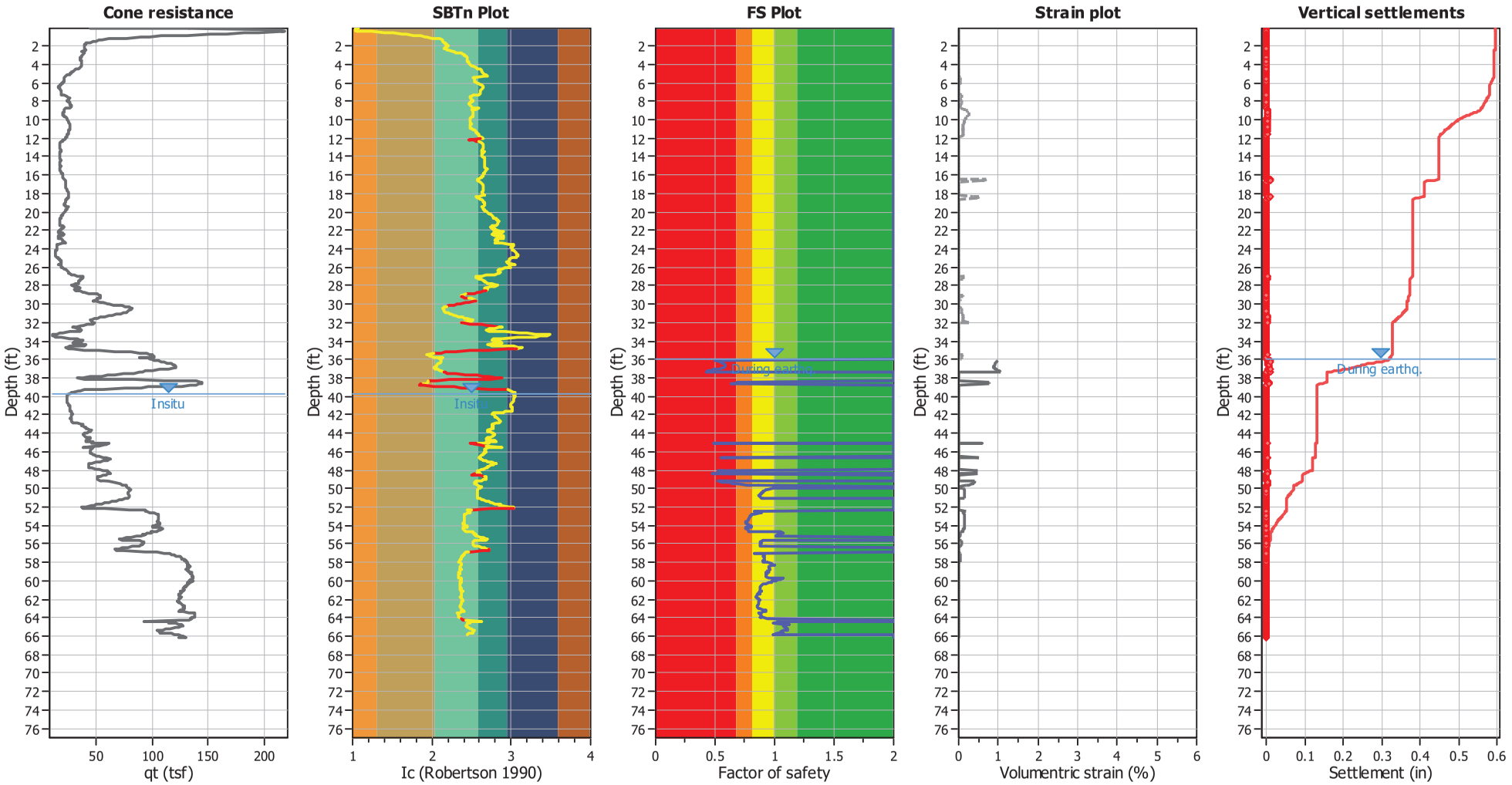
Check for strength loss plots (Robertson (2010))



Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	36.00 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:	6.63	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.60	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	39.80 ft	Fill height:	N/A	Limit depth:	N/A

Estimation of post-earthquake settlements

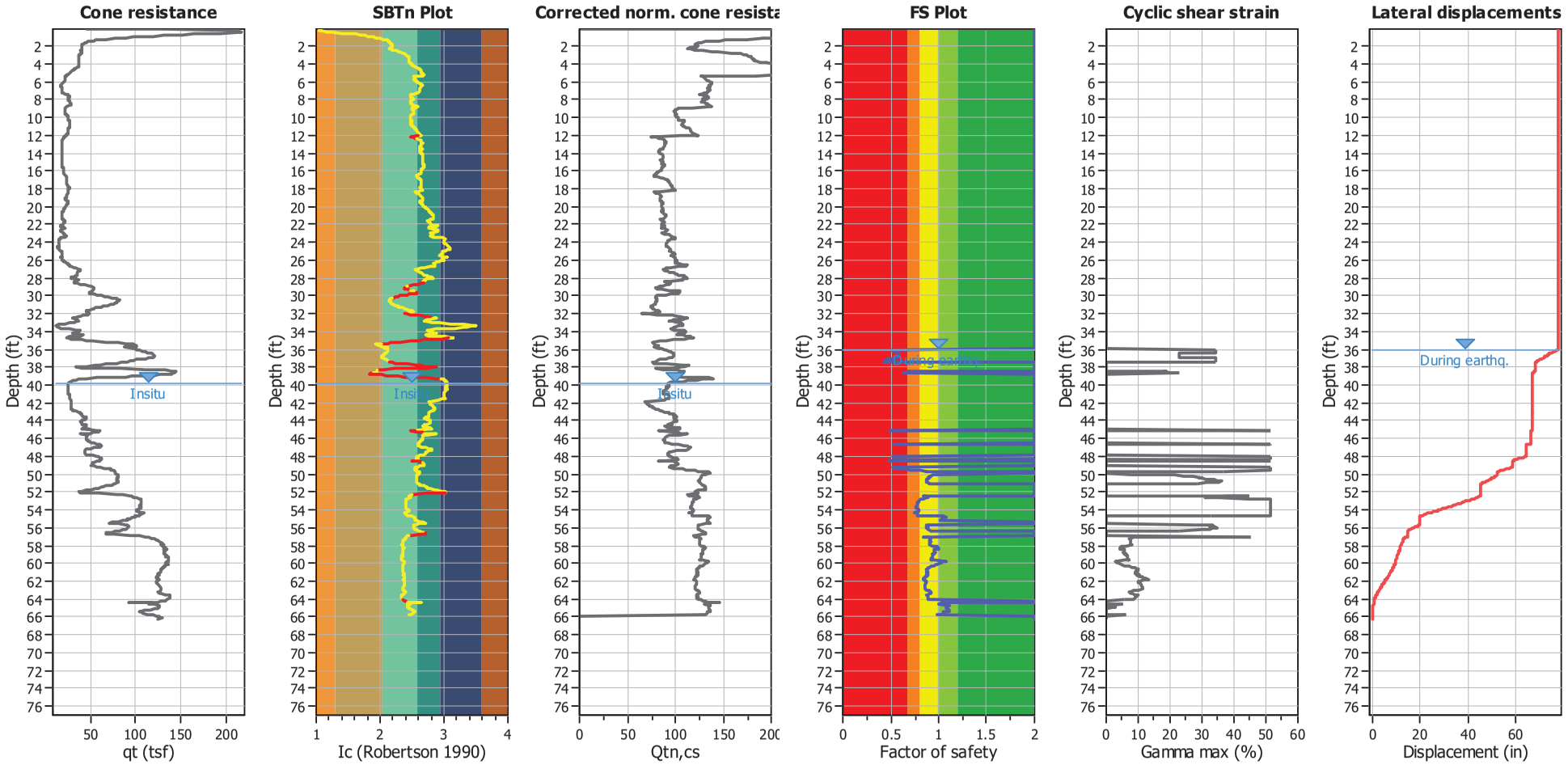


Abbreviations

q_t:	Total cone resistance (cone resistance q_c corrected for pore water effects)
I_c:	Soil Behaviour Type Index
FS:	Calculated Factor of Safety against liquefaction
Volumentric strain:	Post-liquefaction volumentric strain

Estimation of post-earthquake lateral Displacements

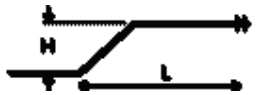
Geometric parameters: Level ground (or gently sloping) with free face (L: 178.00 ft - H: 42.00 ft)



Abbreviations

q_t: Total cone resistance (cone resistance q_c corrected for pore water effects)
I_c: Soil Behaviour Type Index
$Q_{tn,cs}$: Equivalent clean sand normalized CPT total cone resistance
F.S.: Factor of safety
γ_{max}: Maximum cyclic shear strain
LDI: Lateral displacement index

Surface condition



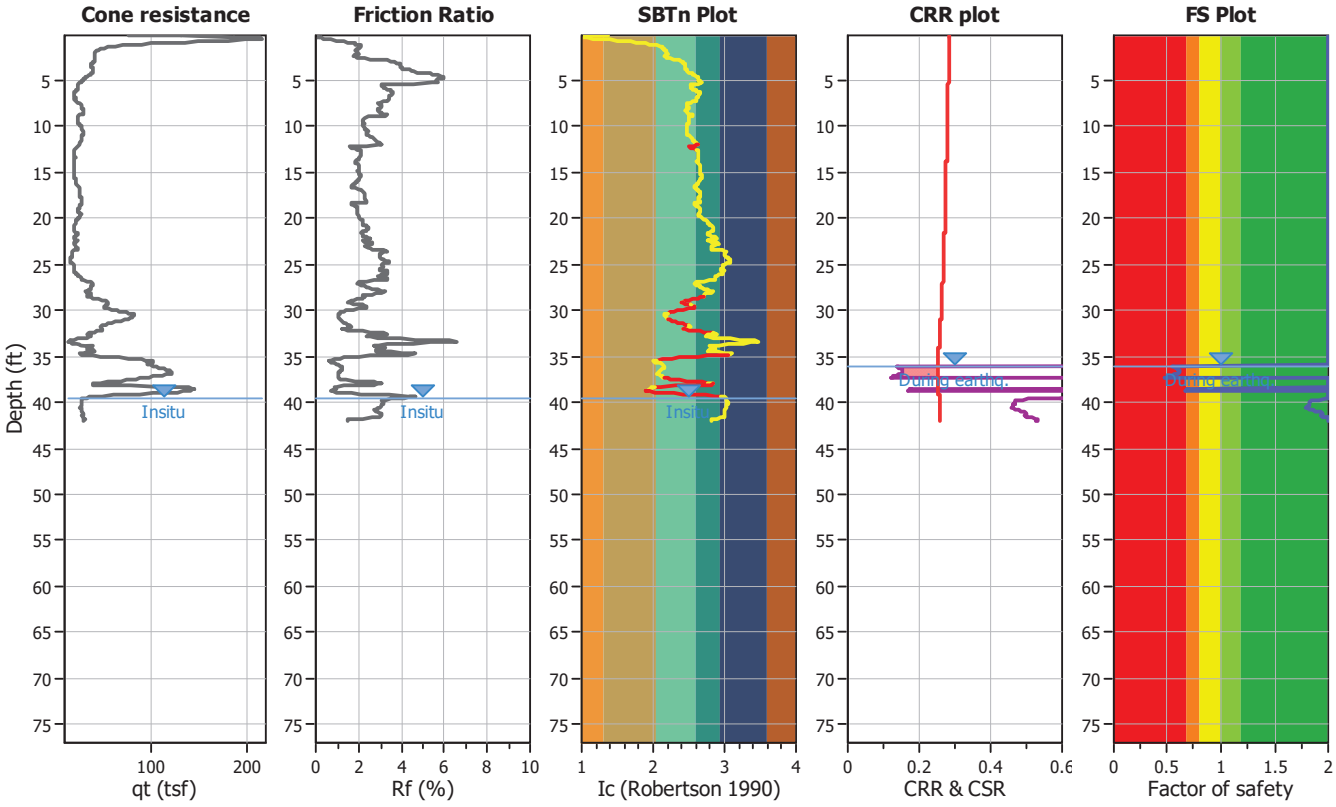
LIQUEFACTION ANALYSIS REPORT

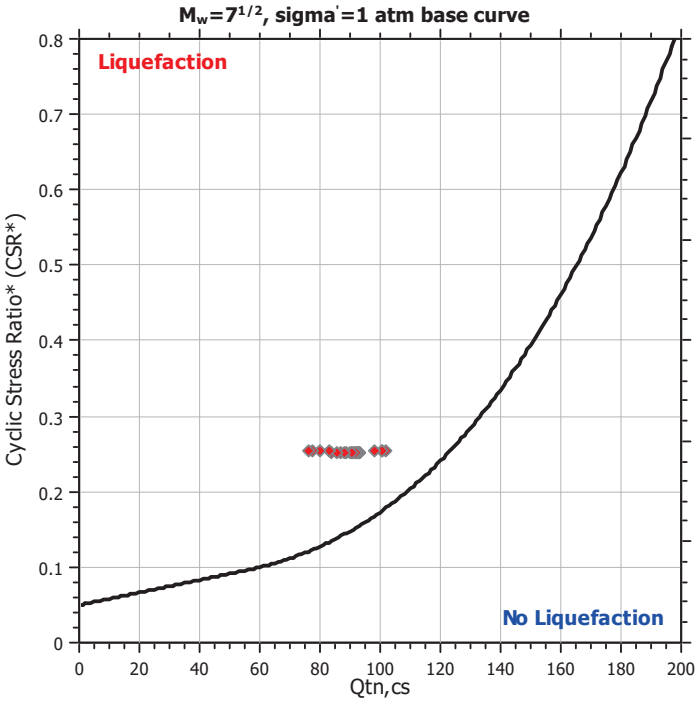
Project title : 25-126-00 NW Open Space **Location : 30291 Camino Capistrano, SJC, CA 92675**

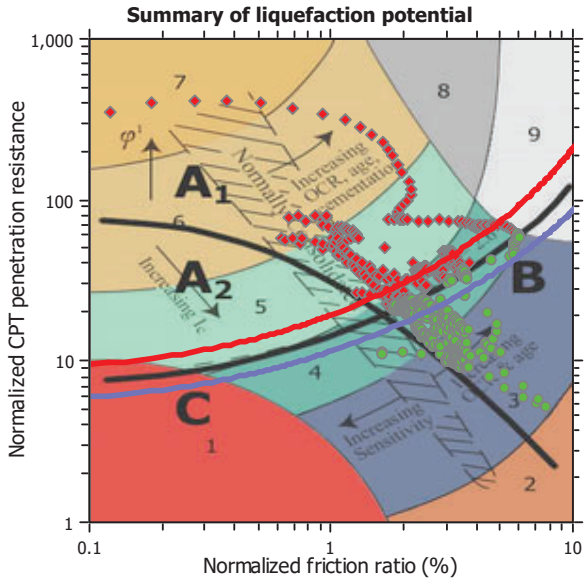
CPT file : CPT-06Remove Bedrock

Input parameters and analysis data

Analysis method:	Robertson (2009)	G.W.T. (in-situ):	39.60 ft	Use fill:	No	Clay like behavior applied:	All soils
Fines correction method:	Robertson (2009)	G.W.T. (earthq.):	36.00 ft	Fill height:	N/A	Limit depth applied:	No
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	N/A
Earthquake magnitude M_w:	6.63	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method based
Peak ground acceleration:	0.60	Unit weight calculation:	Based on SBT	K_σ applied:	No		

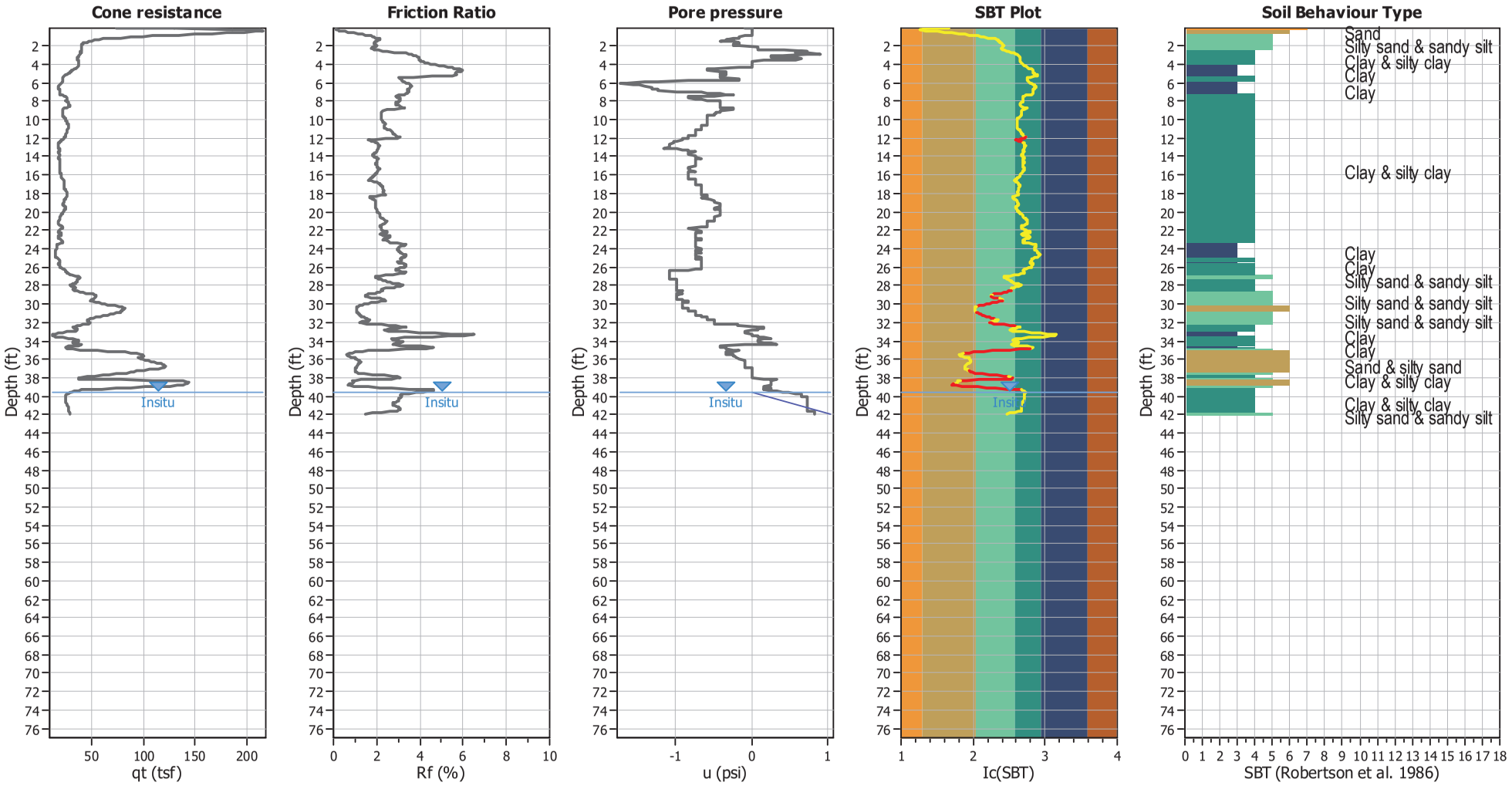






Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and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

CPT basic interpretation plots



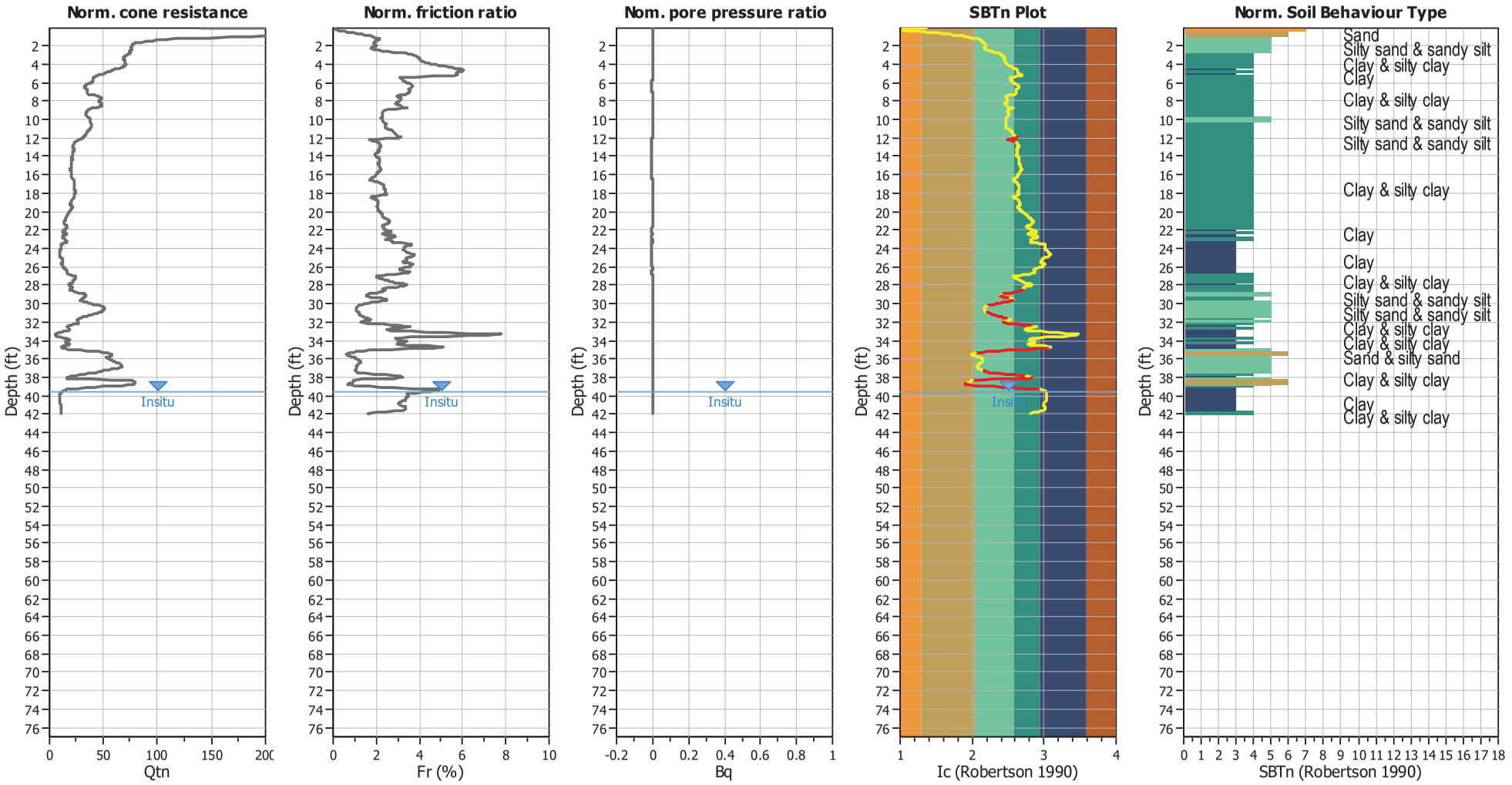
Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	36.00 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	No
Earthquake magnitude M_w:	6.63	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	0.60	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	39.60 ft	Fill height:	N/A	Limit depth:	N/A

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

CPT basic interpretation plots (normalized)



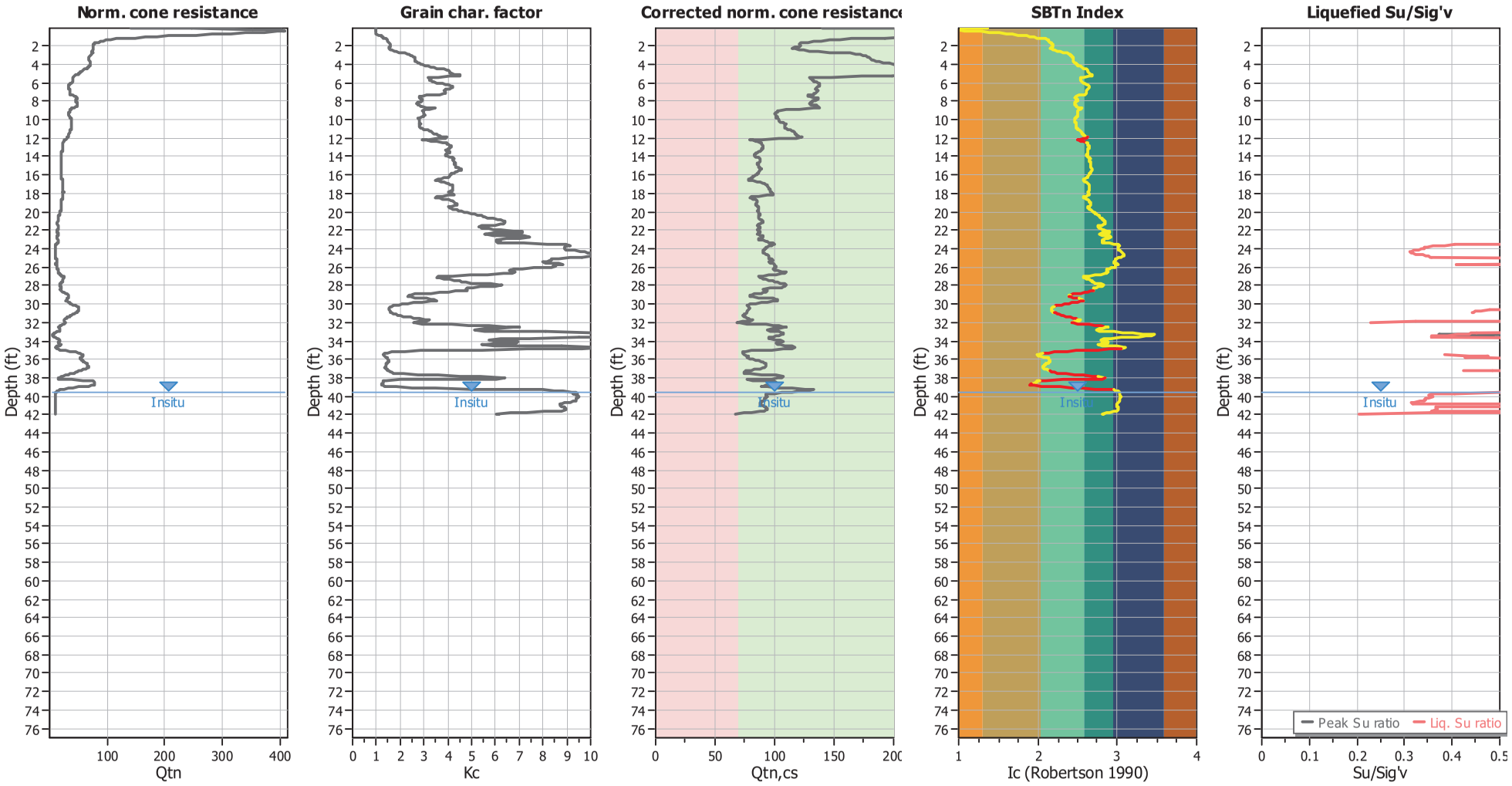
Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	36.00 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	No
Earthquake magnitude M_w:	6.63	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	0.60	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	39.60 ft	Fill height:	N/A	Limit depth:	N/A

SBTn legend

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

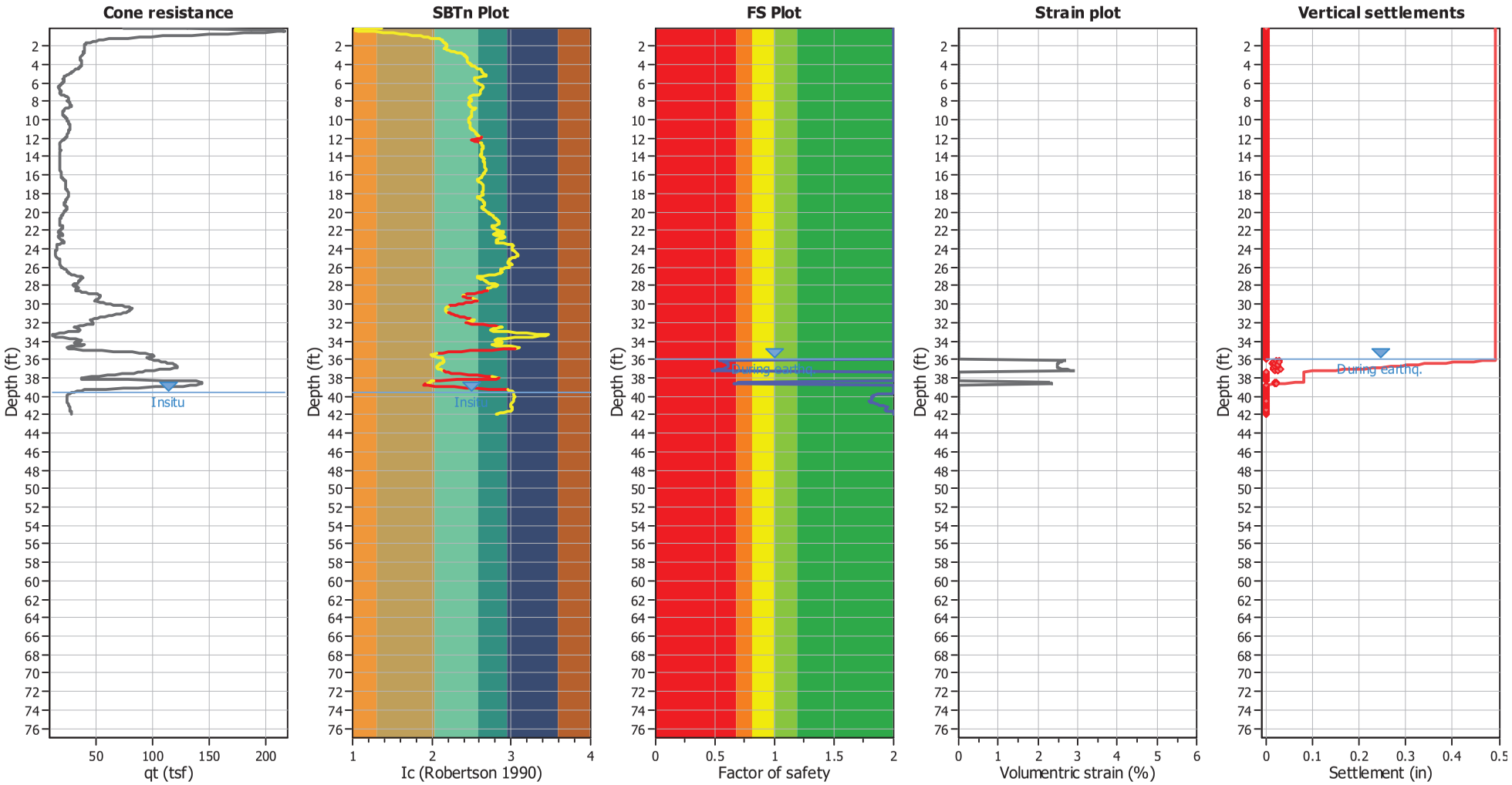
Check for strength loss plots (Robertson (2010))



Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	36.00 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_0 applied:	No
Earthquake magnitude M_w:	6.63	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	0.60	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	39.60 ft	Fill height:	N/A	Limit depth:	N/A

Estimation of post-earthquake settlements

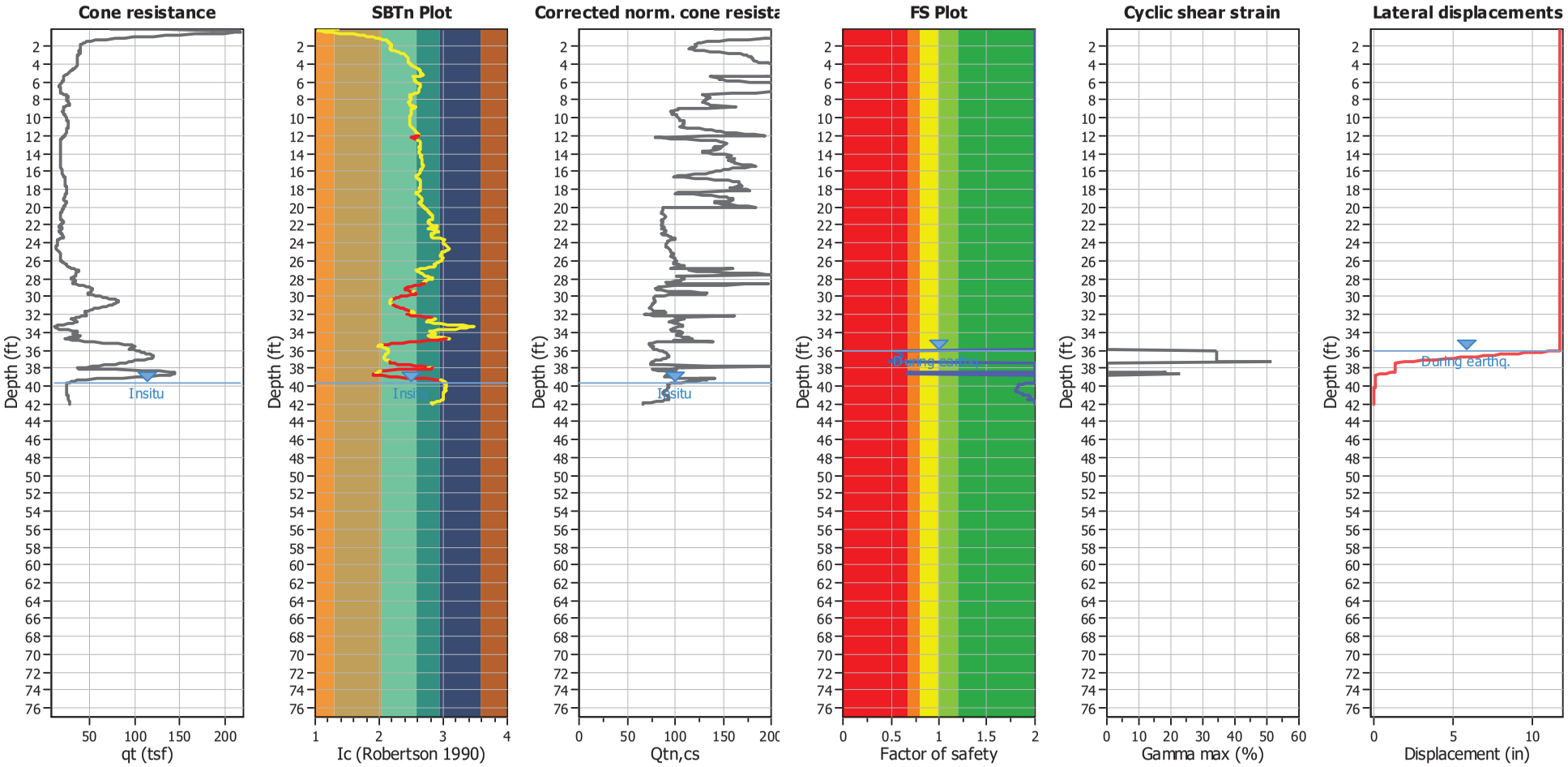


Abbreviations

q_t:	Total cone resistance (cone resistance q_c corrected for pore water effects)
I_c:	Soil Behaviour Type Index
FS:	Calculated Factor of Safety against liquefaction
Volumentric strain:	Post-liquefaction volumentric strain

Estimation of post-earthquake lateral Displacements

Geometric parameters: Level ground (or gently sloping) with free face (L: 178.00 ft - H: 42.00 ft)



Abbreviations

q_t: Total cone resistance (cone resistance q_c corrected for pore water effects)
I_c: Soil Behaviour Type Index
$Q_{tn,cs}$: Equivalent clean sand normalized CPT total cone resistance
F.S.: Factor of safety
γ_{max}: Maximum cyclic shear strain
LDI: Lateral displacement index

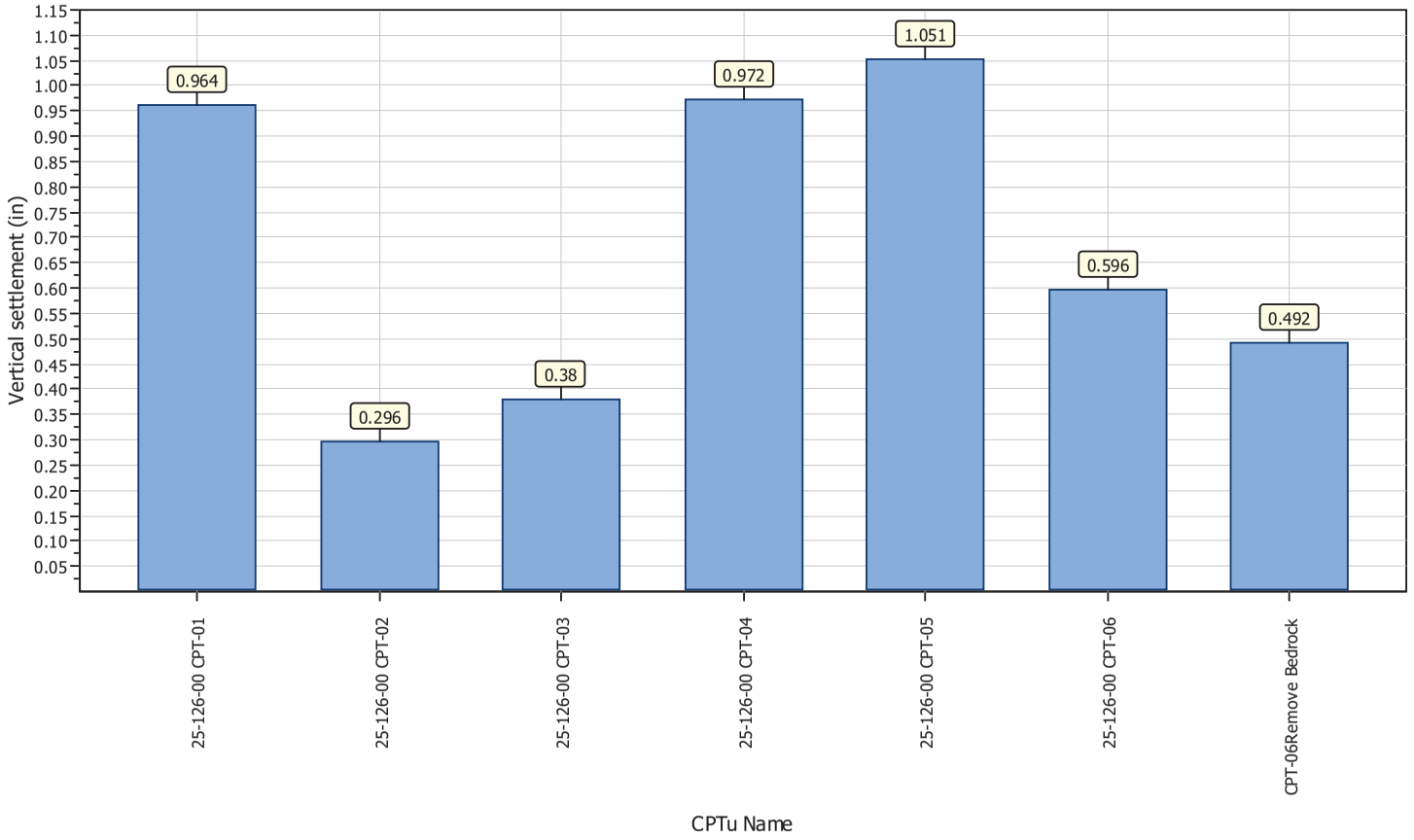
Surface condition



Project title : 25-126-00 NW Open Space

Location : 30291 Camino Capistrano, SJC, CA 92675

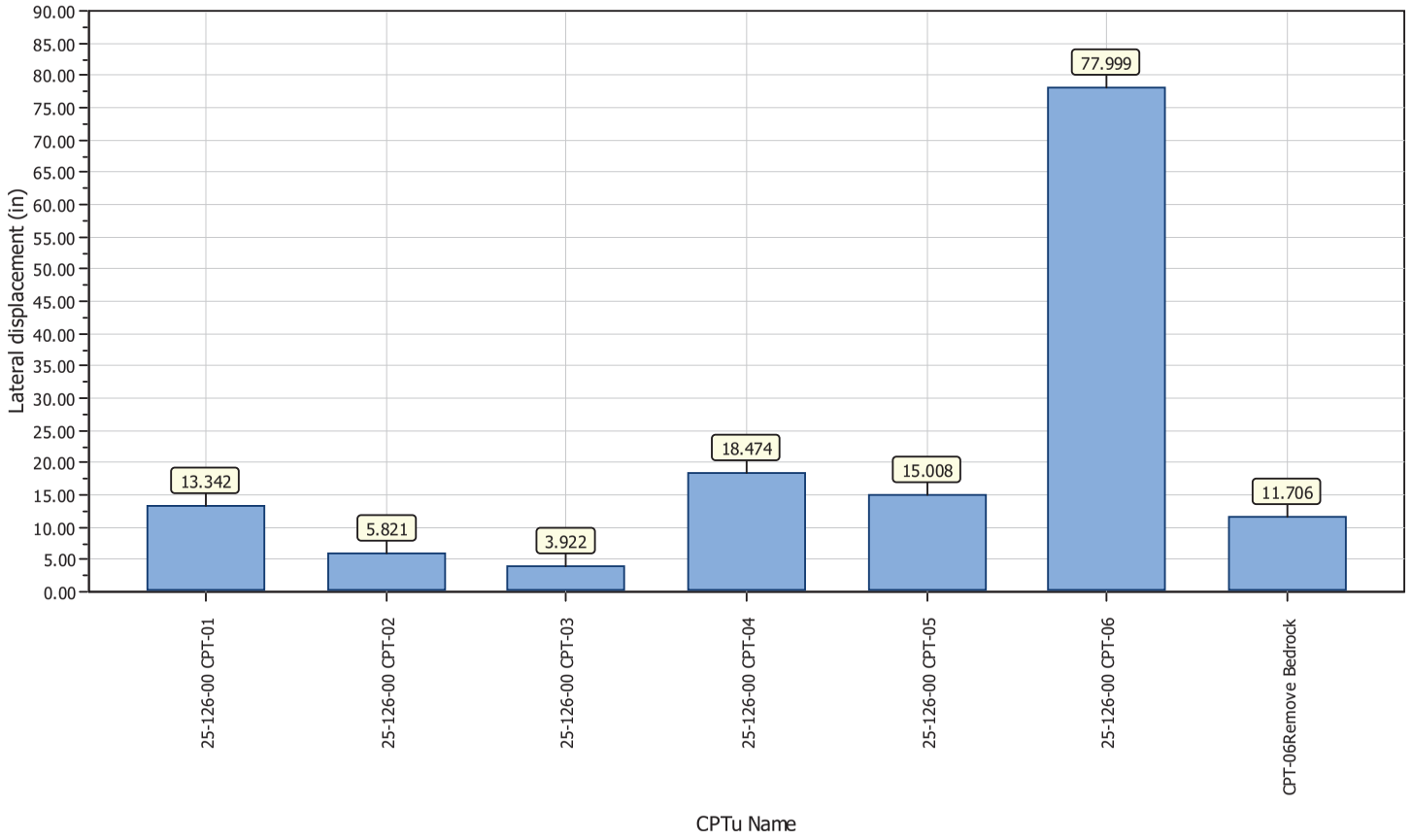
Overall vertical settlements report

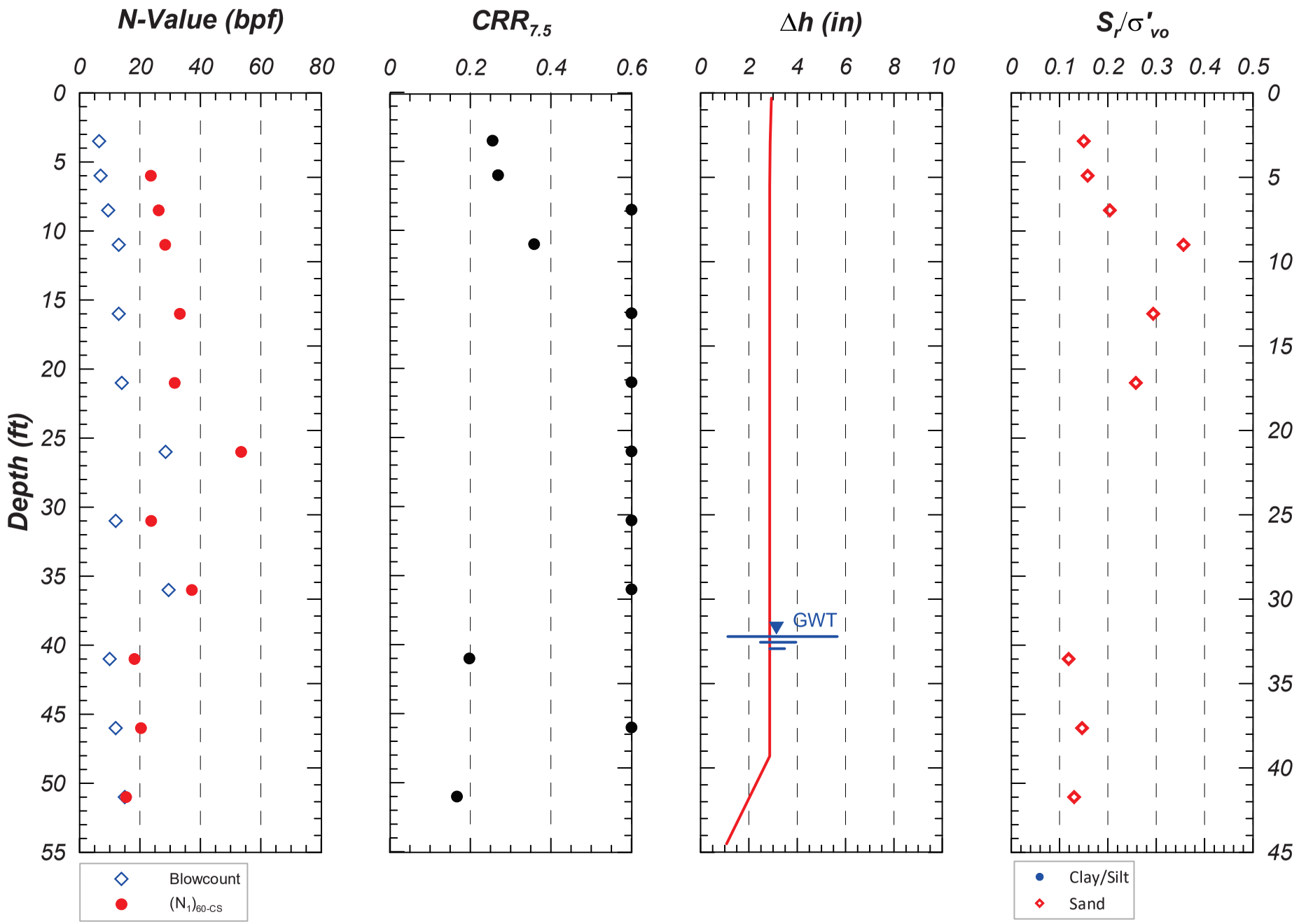


Project title : 25-126-00 NW Open Space

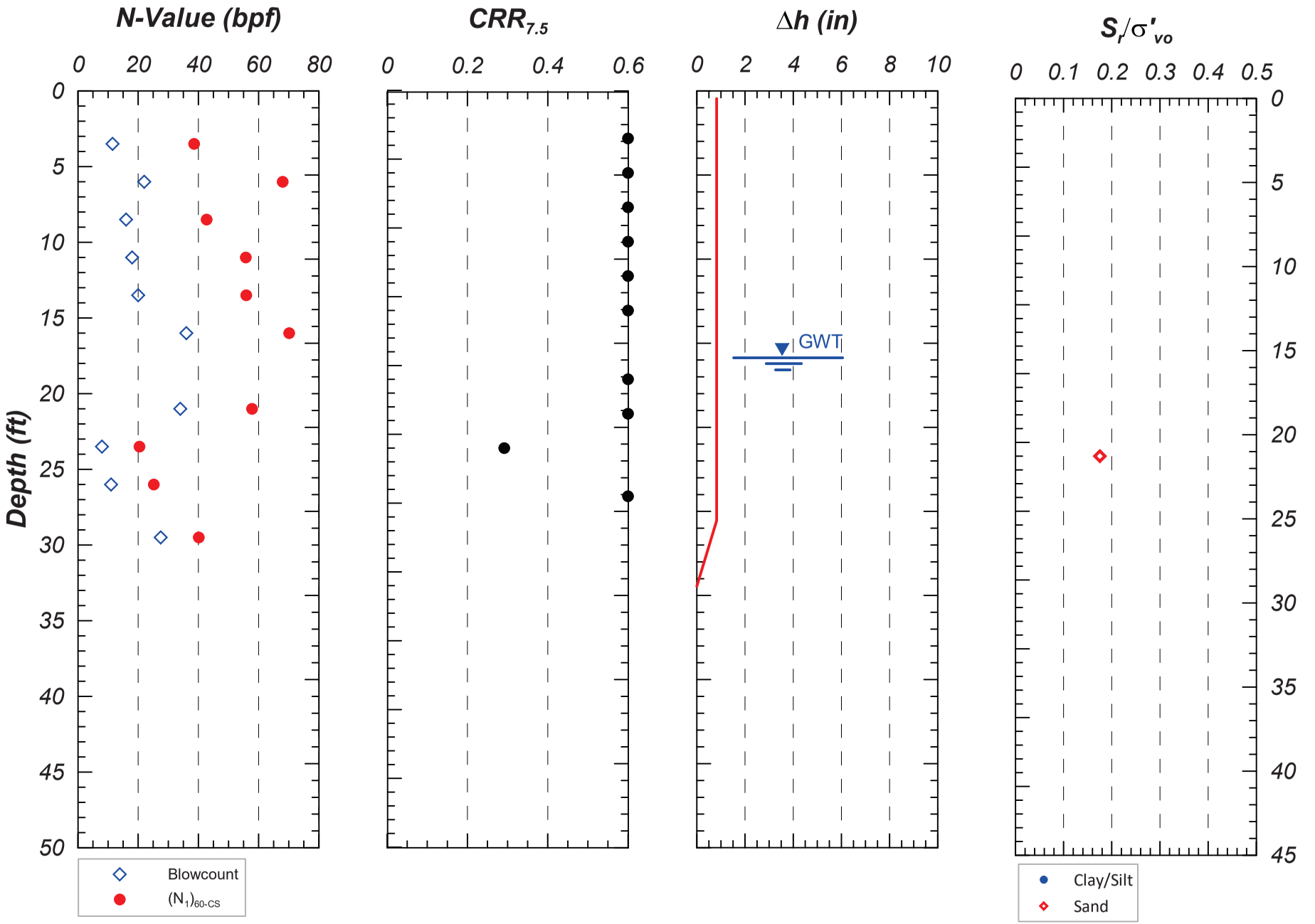
Location : 30291 Camino Capistrano, SJC, CA 92675

Overall lateral displacements report

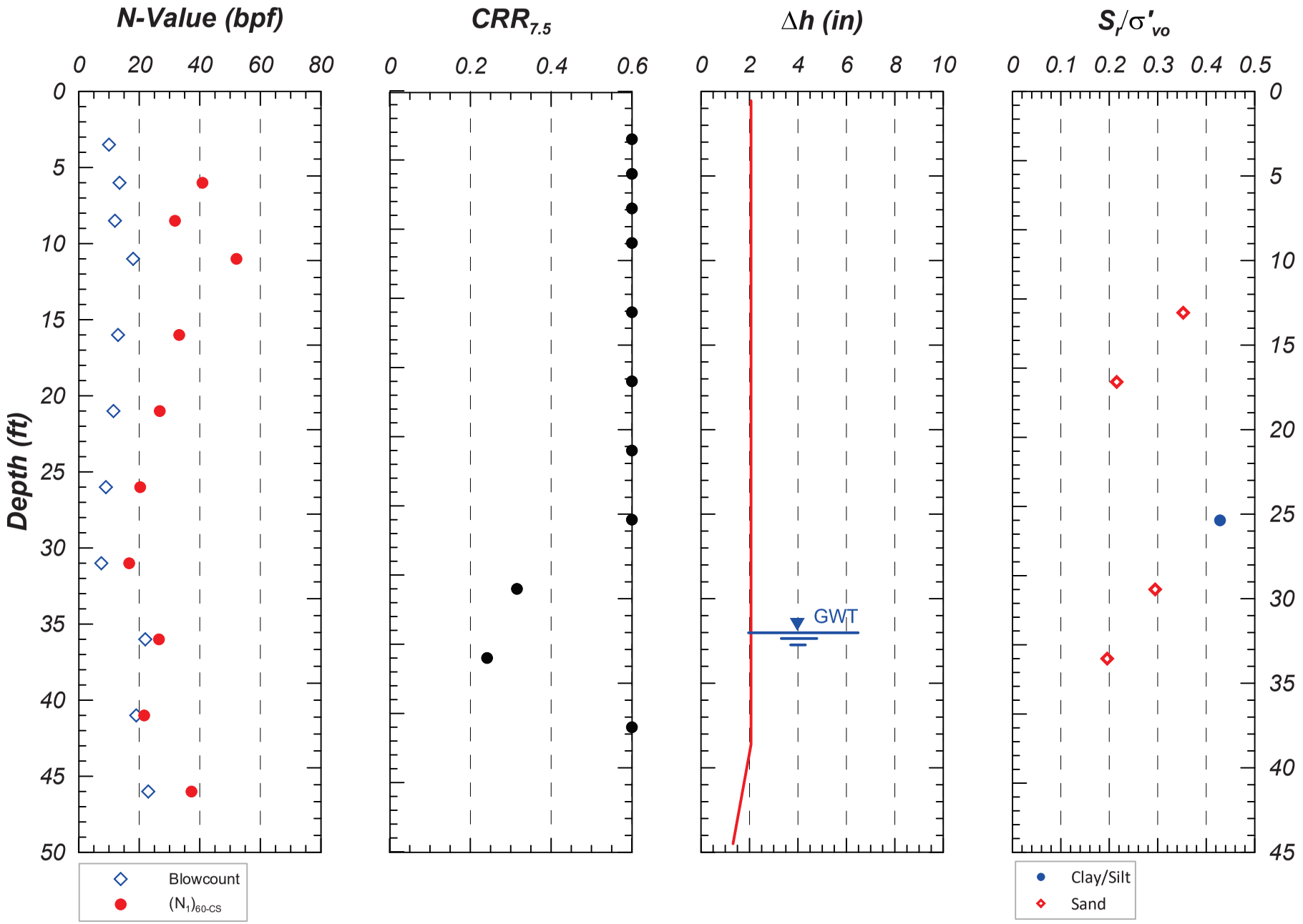




GMU	Project Name NW OPENSPACE Project No. 25-126-00	**Integrated SPT Method for Estimating Subsurface Stratification & Liquefaction** **Drill Hole DH-1 (GMU Project No. 25-126-00)**



GMU	Project Name NW OPENSPACE Project No. 25-126-00	**Integrated SPT Method for Estimating Subsurface Stratification & Liquefaction** **Drill Hole DH-2 (GMU Project No. 25-126-00)**



GMU	Project Name NW OPENSPACE Project No. 25-126-00	**Integrated SPT Method for Estimating Subsurface Stratification & Liquefaction** **Drill Hole DH-9 (GMU Project No. 25-126-00)**

APPENDIX C-1

Previous Analyses by Others

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

LIQUEFACTION ANALYSIS REPORT

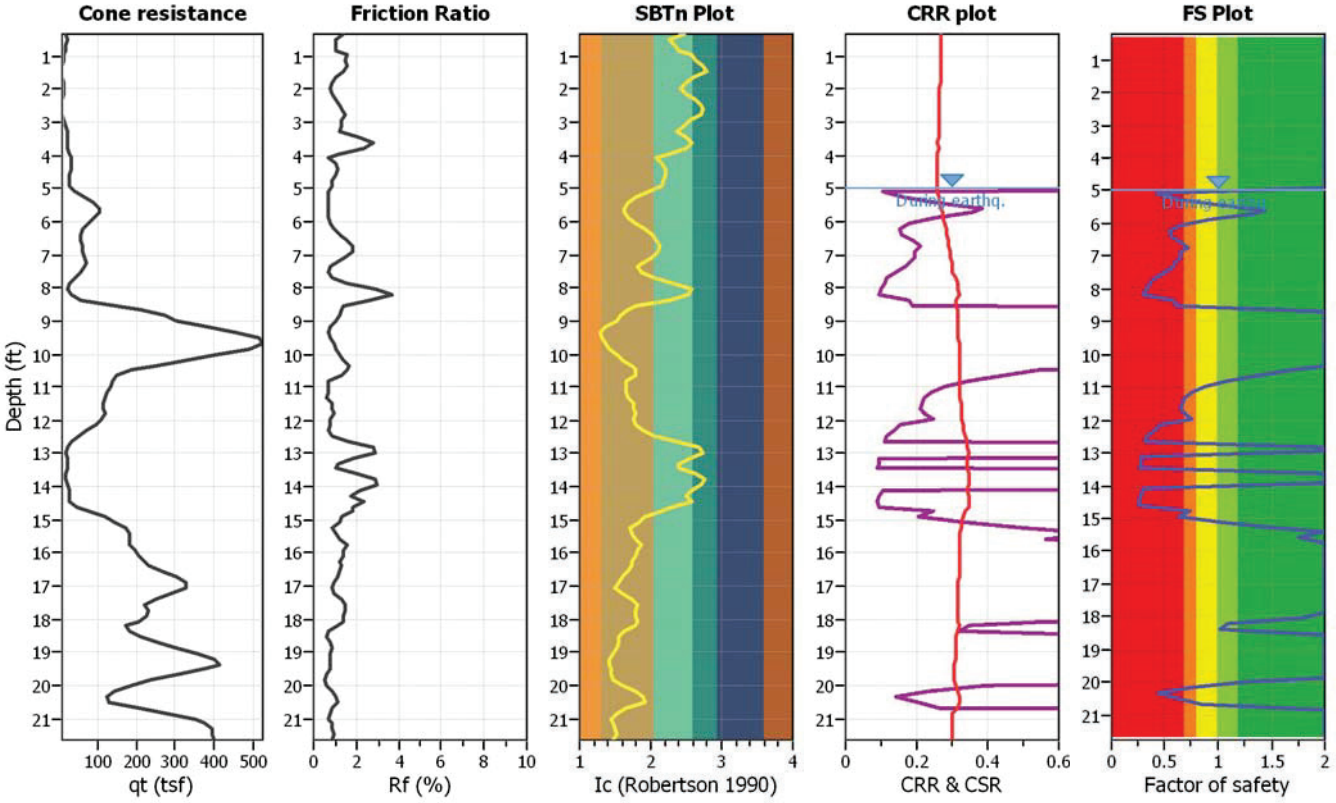
Project title : 2014-029 - San Juan Capistrano Community Park

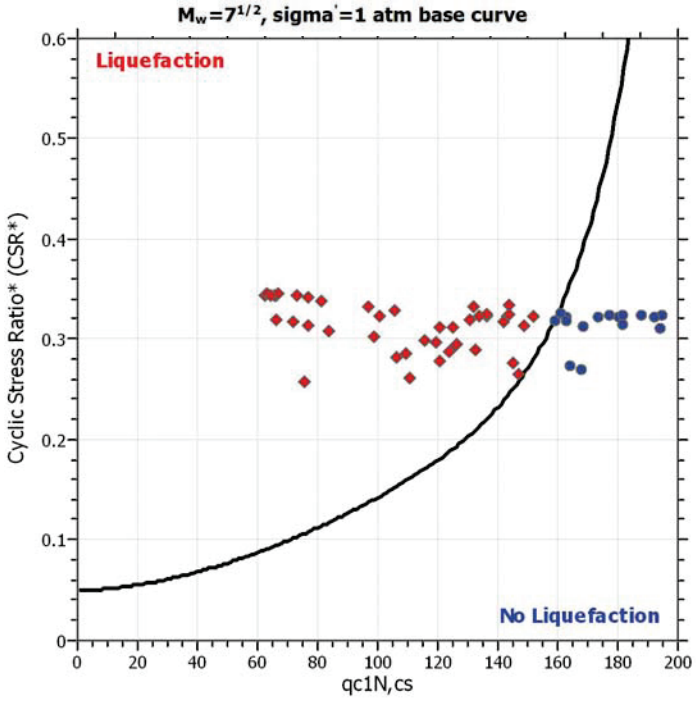
Location : San Juan Capistrano, California

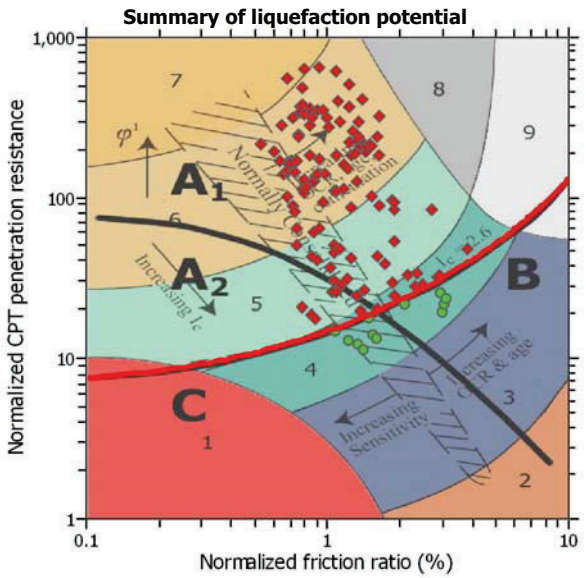
CPT file : DYC14-2

Input parameters and analysis data

Analysis method:	I&B (2008)	G.W.T. (in-situ):	18.00 ft	Use fill:	No	Clay like behavior applied:	Sands only
Fines correction method:	R&W (1998)	G.W.T. (earthq.):	5.00 ft	Fill height:	N/A	Limit depth applied:	No
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	N/A
Earthquake magnitude M_w:	7.00	Ic cut-off value:	2.60	Trans. detect. applied:	No	MSF method:	Method based
Peak ground acceleration:	0.52	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		



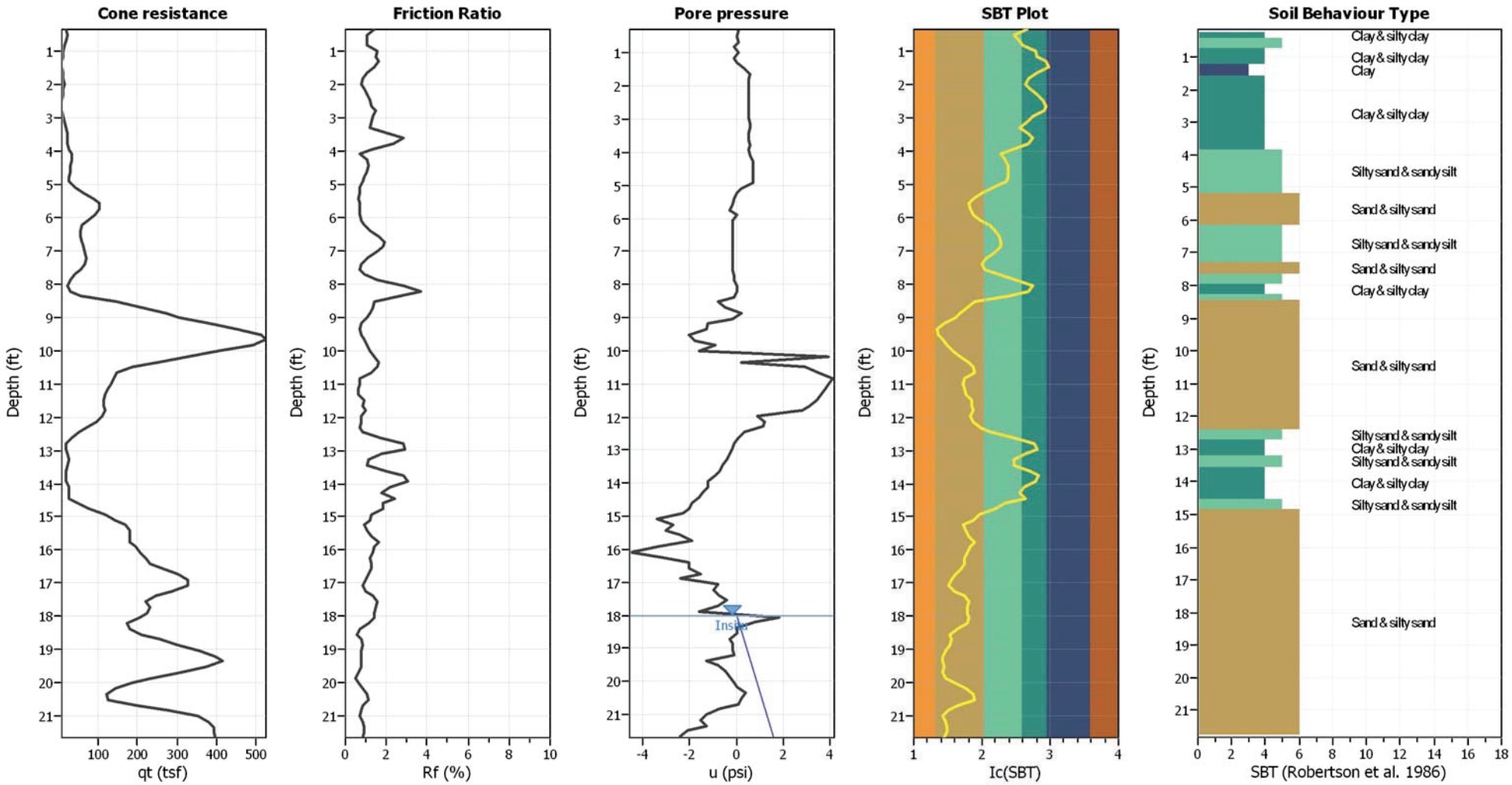




Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and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

PLATE C1

CPT basic interpretation plots



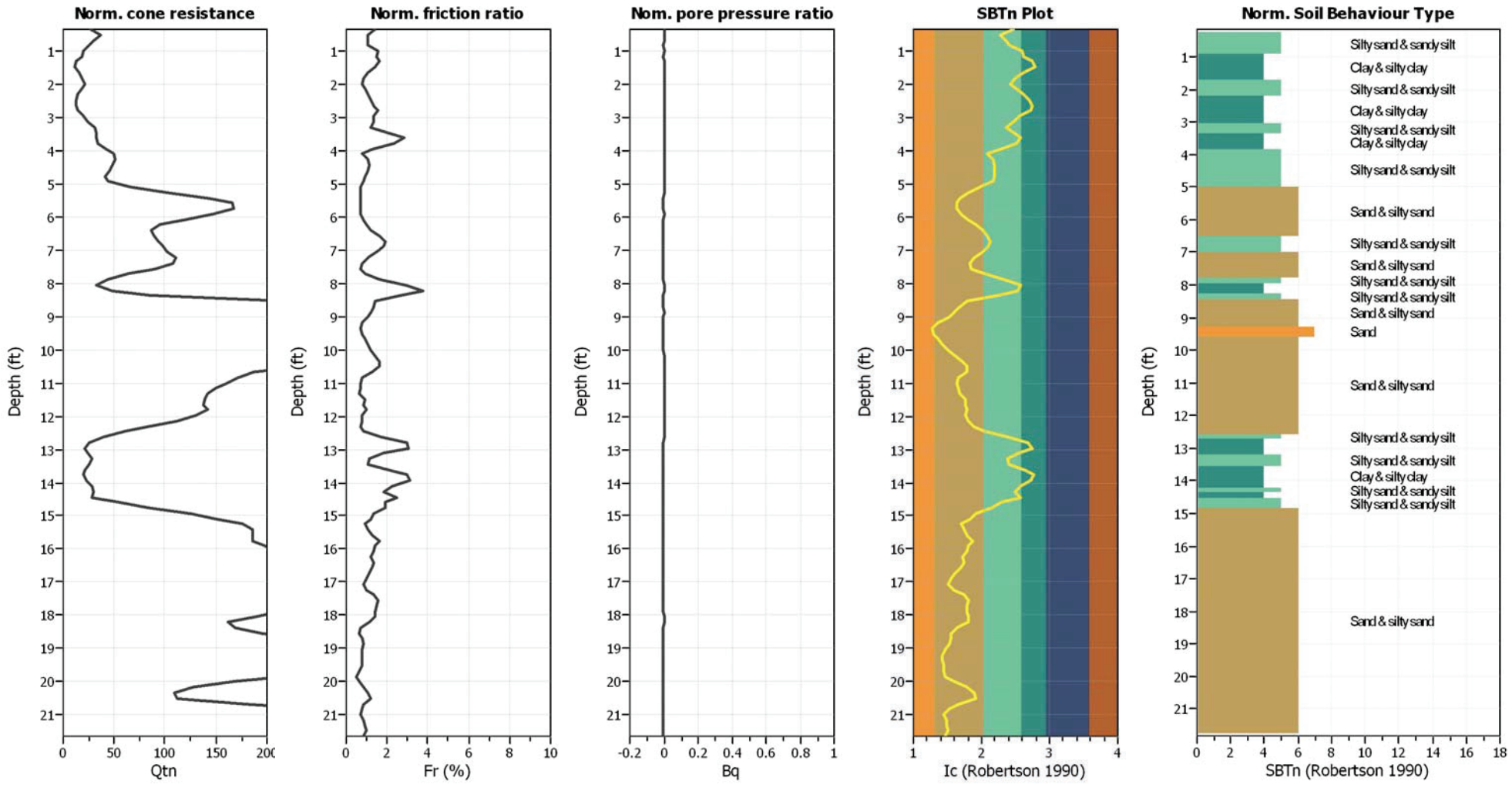
Input parameters and analysis data

Analysis method:	I&B (2008)	Depth to GWT (erthq.):	5.00 ft	Fill weight:	N/A
Fines correction method:	R&W (1998)	Average results interval:	3	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_o applied:	Yes
Earthquake magnitude M_w:	7.00	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.52	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	18.00 ft	Fill height:	N/A	Limit depth:	N/A

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

CPT basic interpretation plots (normalized)



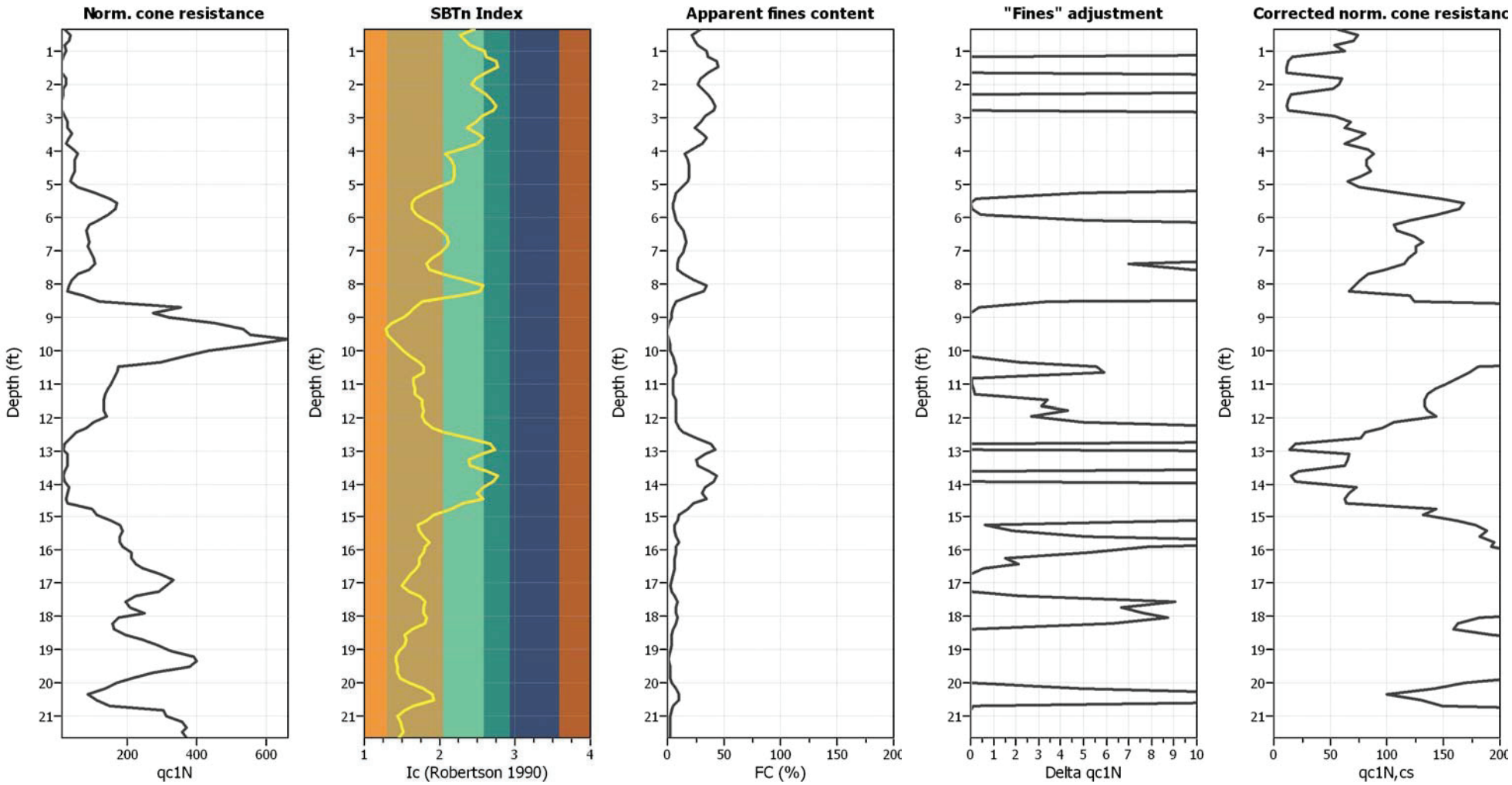
Input parameters and analysis data

Analysis method:	I&B (2008)	Depth to GWT (erthq.):	5.00 ft	Fill weight:	N/A
Fines correction method:	R&W (1998)	Average results interval:	3	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_o applied:	Yes
Earthquake magnitude M_w:	7.00	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.52	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	18.00 ft	Fill height:	N/A	Limit depth:	N/A

SBTn legend

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

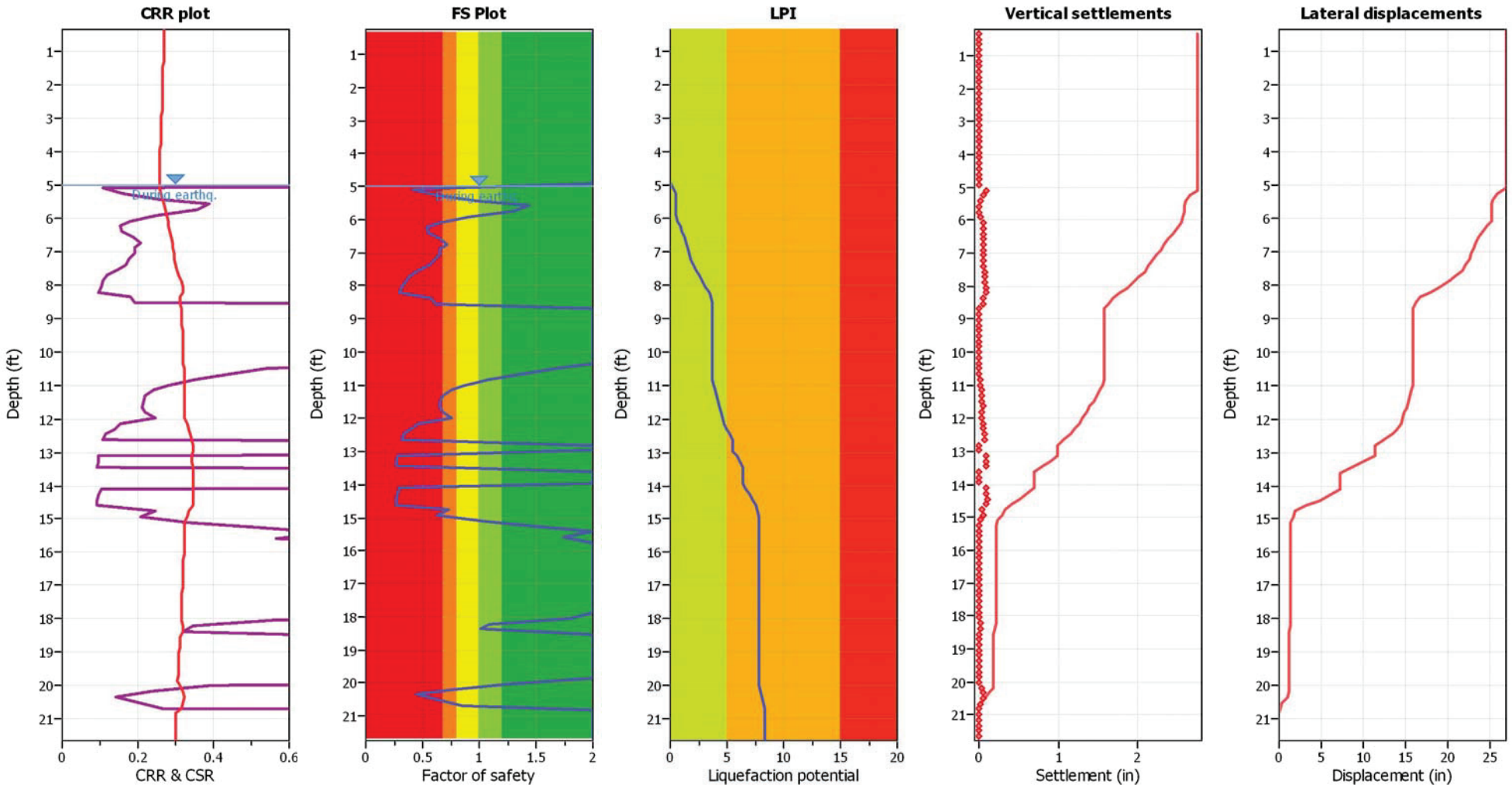
Liquefaction analysis overall plots (intermediate results)



Input parameters and analysis data

Analysis method:	I&B (2008)	Depth to GWT (erthq.):	5.00 ft	Fill weight:	N/A
Fines correction method:	R&W (1998)	Average results interval:	3	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.00	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.52	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	18.00 ft	Fill height:	N/A	Limit depth:	N/A

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	I&B (2008)	Depth to GWT (erthq.):	5.00 ft	Fill weight:	N/A
Fines correction method:	R&W (1998)	Average results interval:	3	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.00	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.52	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	18.00 ft	Fill height:	N/A	Limit depth:	N/A

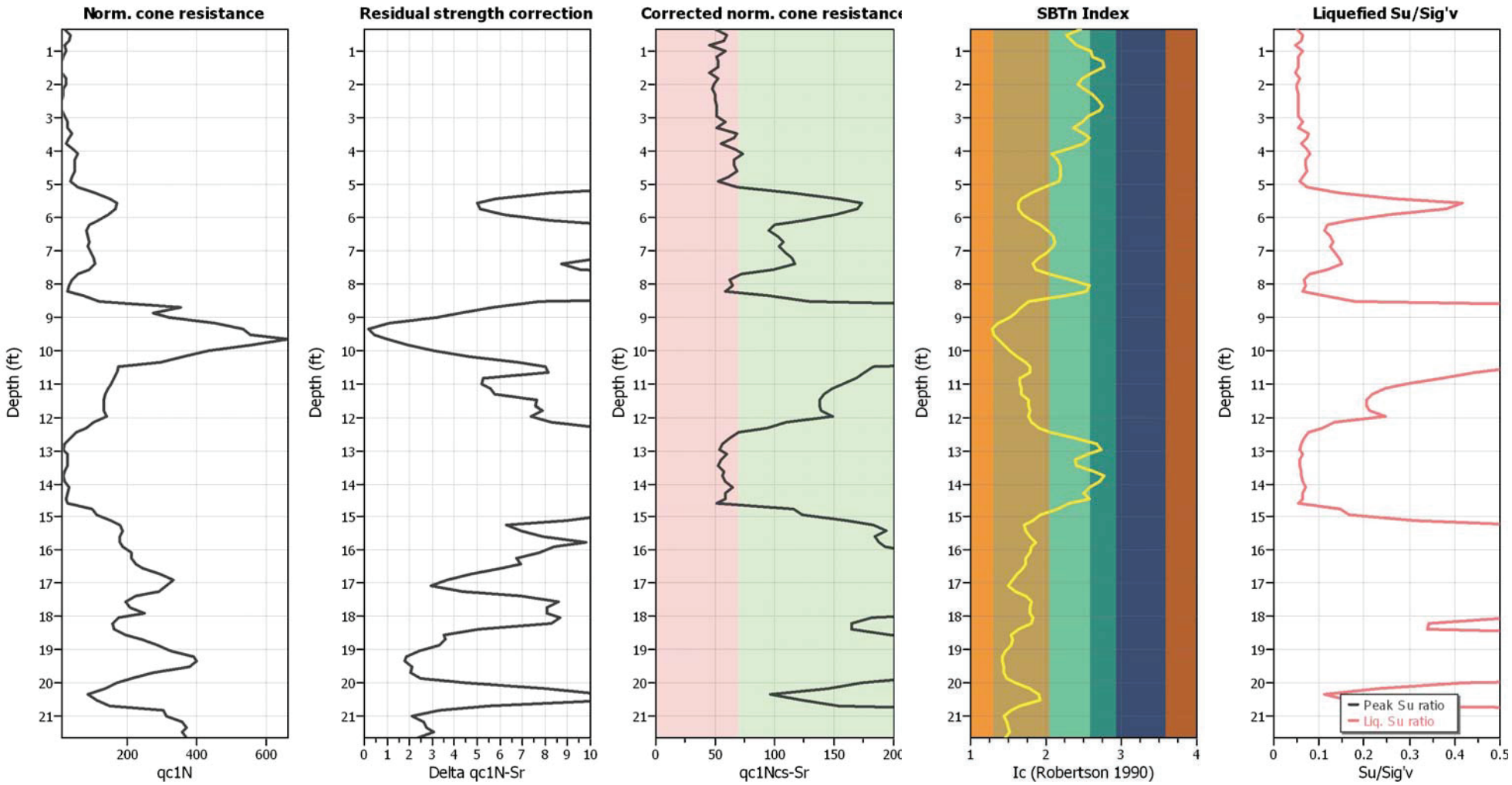
F.S. color scheme

- 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

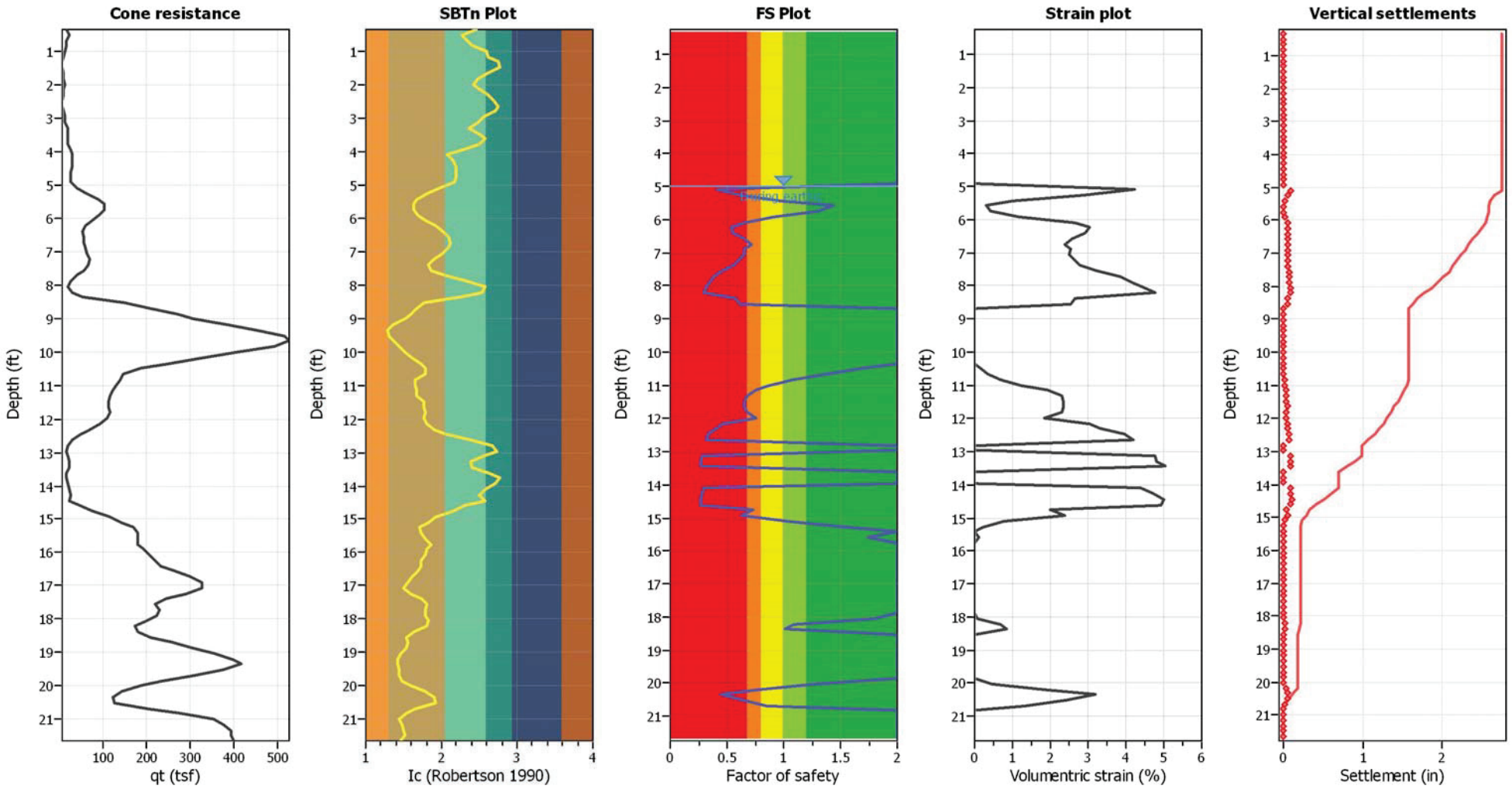
Check for strength loss plots (Idriss & Boulanger (2008))



Input parameters and analysis data

Analysis method:	I&B (2008)	Depth to GWT (erthq.):	5.00 ft	Fill weight:	N/A
Fines correction method:	R&W (1998)	Average results interval:	3	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.00	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.52	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	18.00 ft	Fill height:	N/A	Limit depth:	N/A

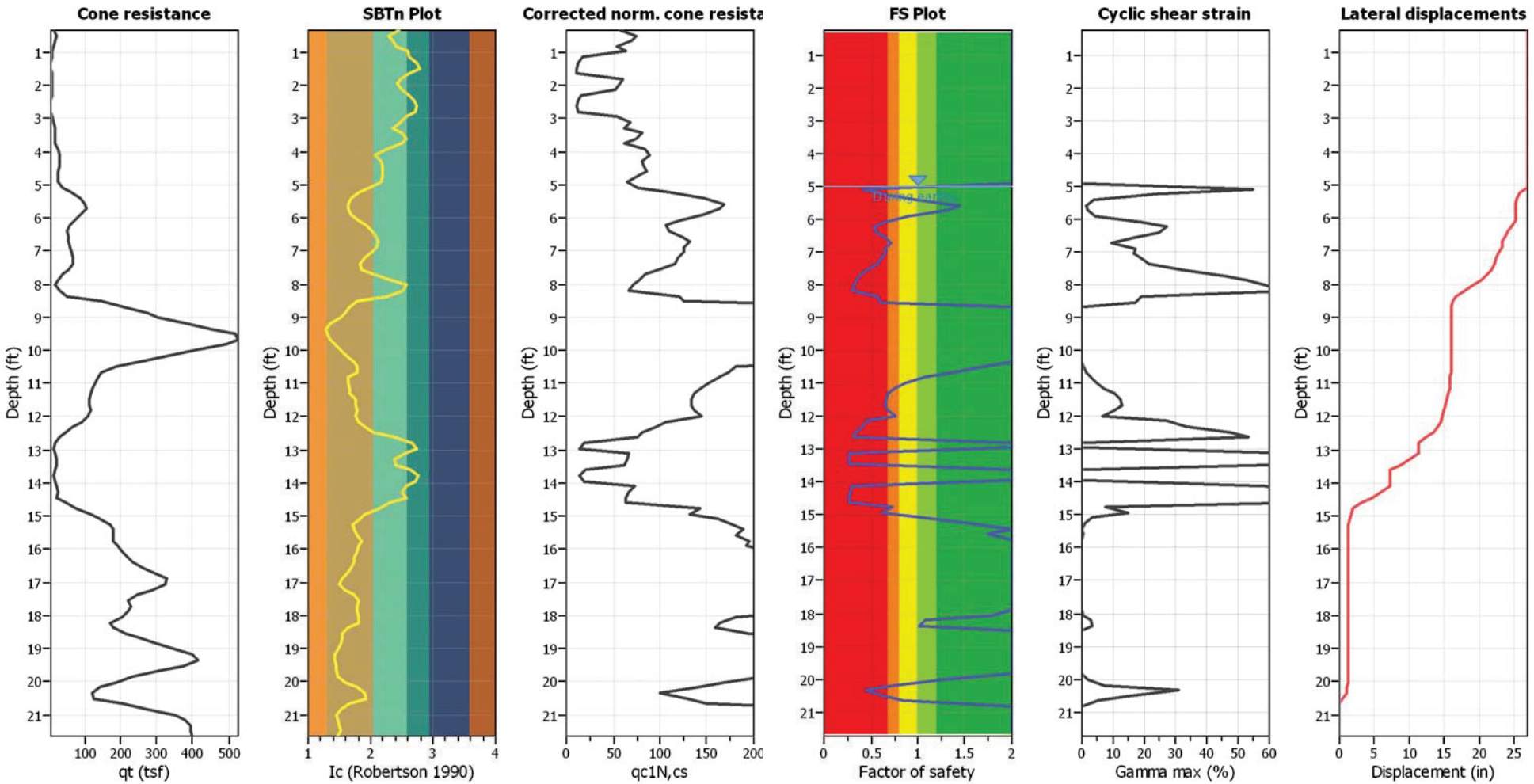
Estimation of post-earthquake settlements



Abbreviations

q_t:	Total cone resistance (cone resistance q_c corrected for pore water effects)
I_c:	Soil Behaviour Type Index
FS:	Calculated Factor of Safety against liquefaction
Volumentric strain:	Post-liquefaction volumentric strain

Estimation of post-earthquake lateral Displacements



Abbreviations

q_t: Total cone resistance (cone resistance q_c corrected for pore water effects)
I_c: Soil Behaviour Type Index
$q_{c1N,cs}$: Equivalent clean sand normalized CPT total cone resistance
F.S.: Factor of safety
γ_{max}: Maximum cyclic shear strain
LDI: Lateral displacement index

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http://www.geologismiki.gr

LIQUEFACTION ANALYSIS REPORT

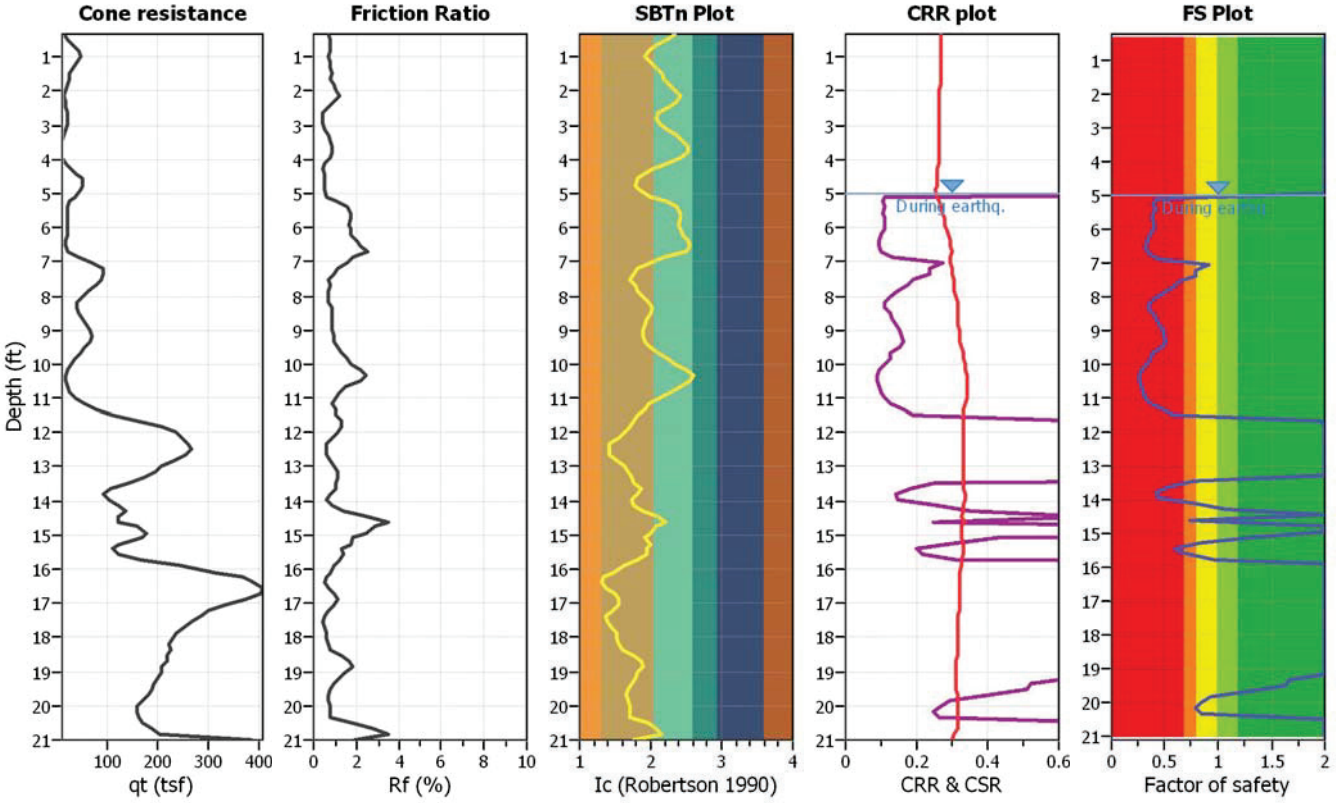
Project title : 2014-029 - San Juan Capistrano Community Park

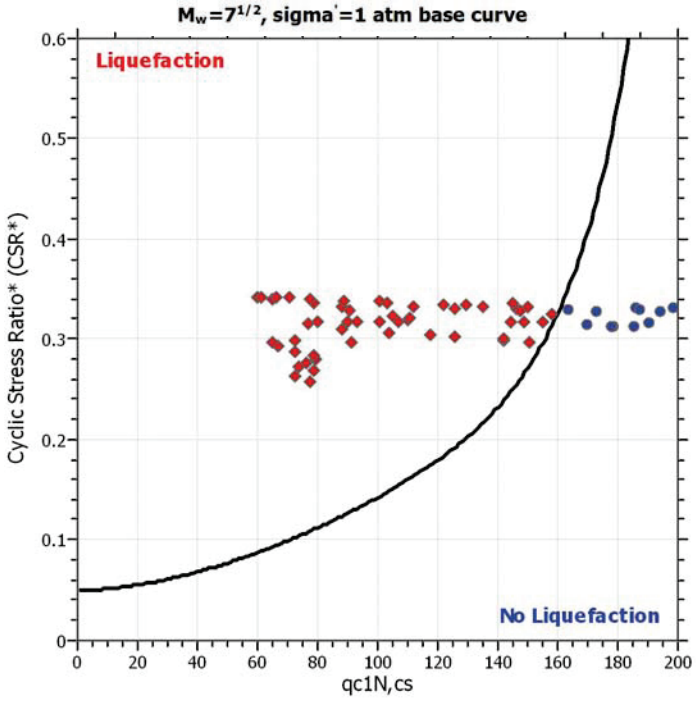
Location : San Juan Capistrano, California

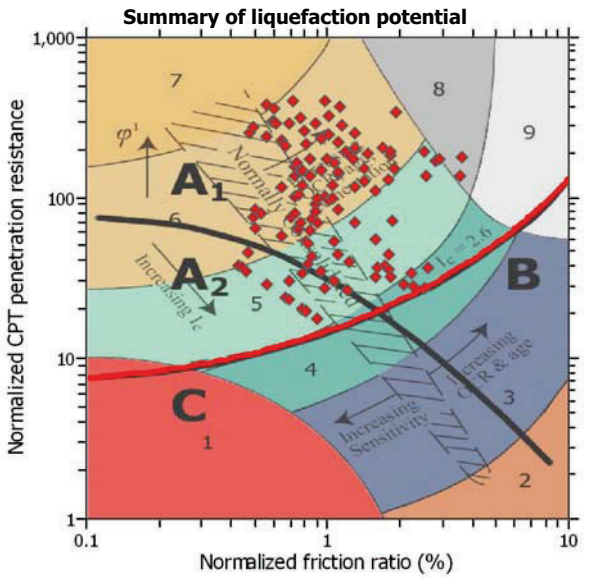
CPT file : DYC14-1

Input parameters and analysis data

Analysis method:	I&B (2008)	G.W.T. (in-situ):	18.00 ft	Use fill:	No	Clay like behavior applied:	Sands only
Fines correction method:	R&W (1998)	G.W.T. (earthq.):	5.00 ft	Fill height:	N/A	Limit depth applied:	No
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	N/A
Earthquake magnitude M_w:	7.00	Ic cut-off value:	2.60	Trans. detect. applied:	No	MSF method:	Method based
Peak ground acceleration:	0.52	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		



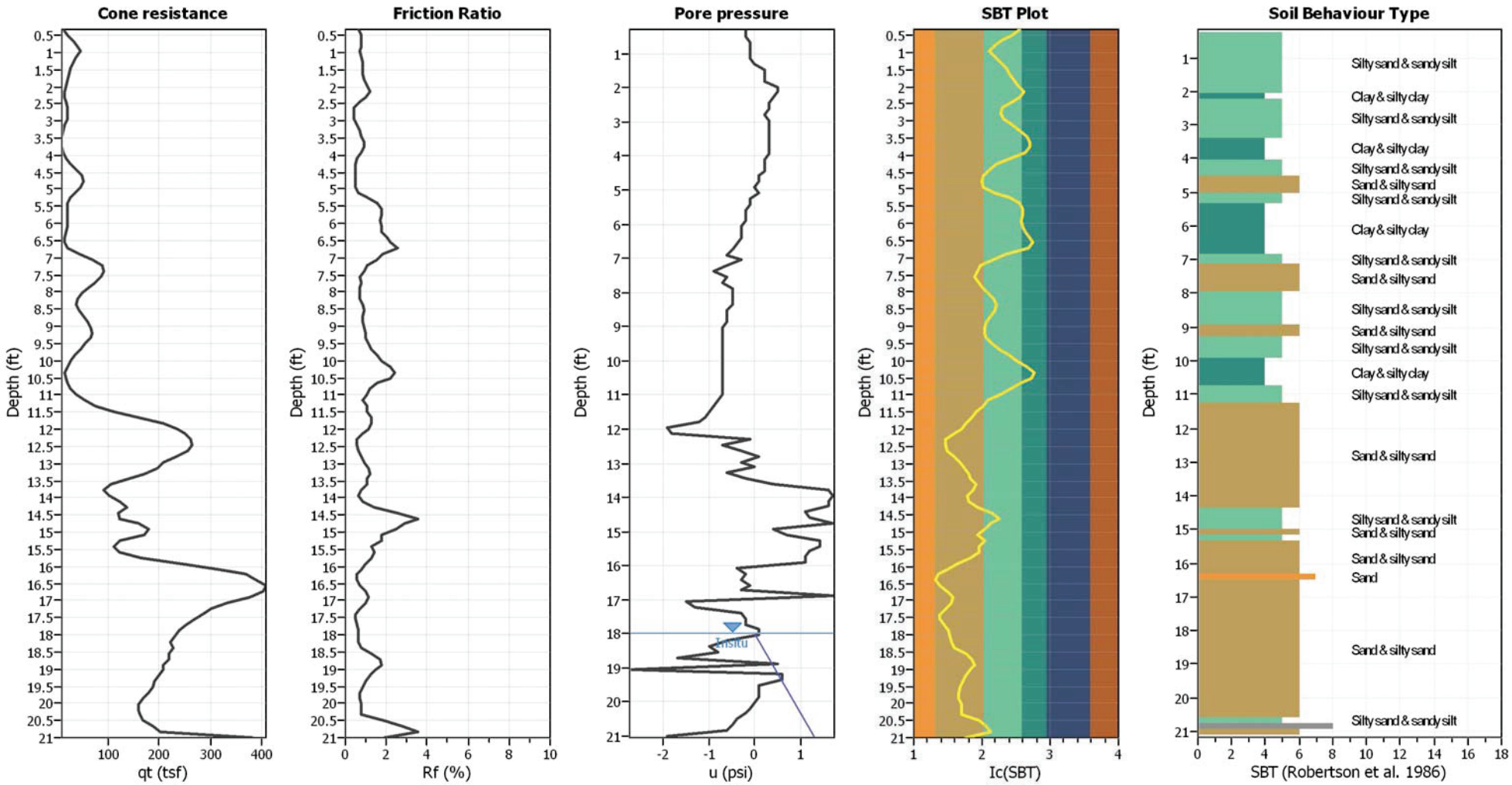




Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and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

PLATE C9

CPT basic interpretation plots



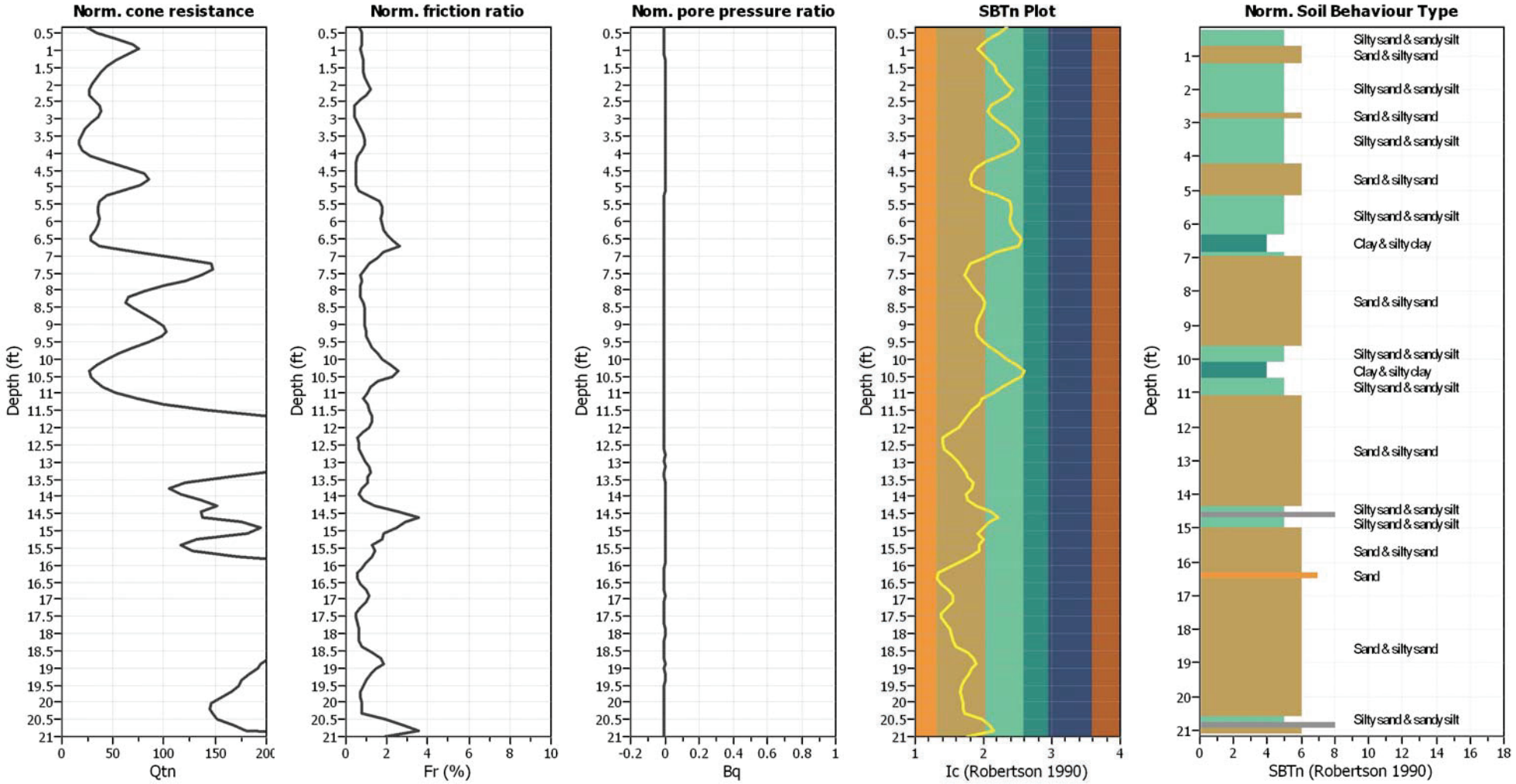
Input parameters and analysis data

Analysis method:	I&B (2008)	Depth to GWT (erthq.):	5.00 ft	Fill weight:	N/A
Fines correction method:	R&W (1998)	Average results interval:	3	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_o applied:	Yes
Earthquake magnitude M_w:	7.00	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.52	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	18.00 ft	Fill height:	N/A	Limit depth:	N/A

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

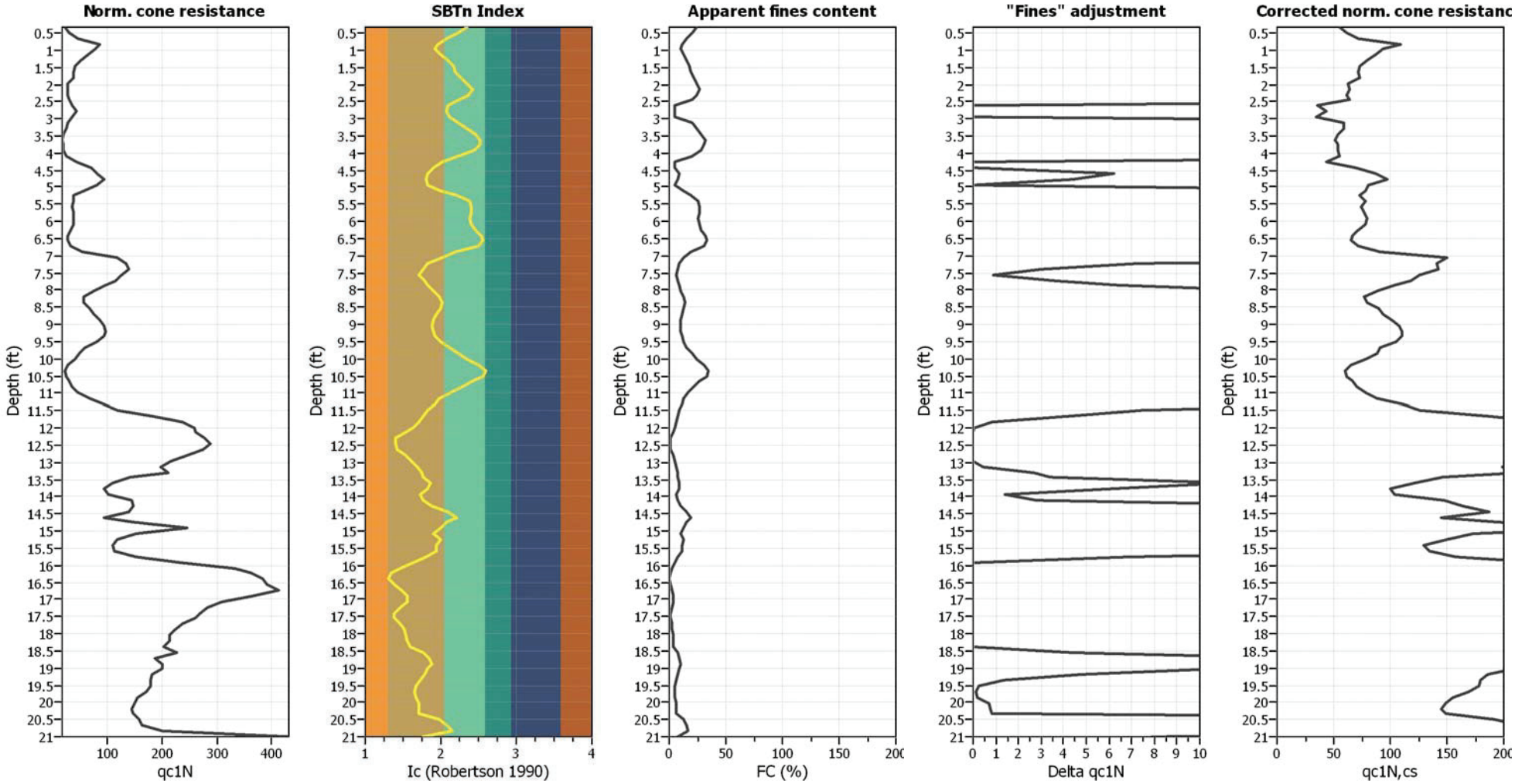
CPT basic interpretation plots (normalized)



Input parameters and analysis data

Analysis method:	I&B (2008)	Depth to GWT (erthq.):	5.00 ft	Fill weight:	N/A
Fines correction method:	R&W (1998)	Average results interval:	3	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.00	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.52	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	18.00 ft	Fill height:	N/A	Limit depth:	N/A

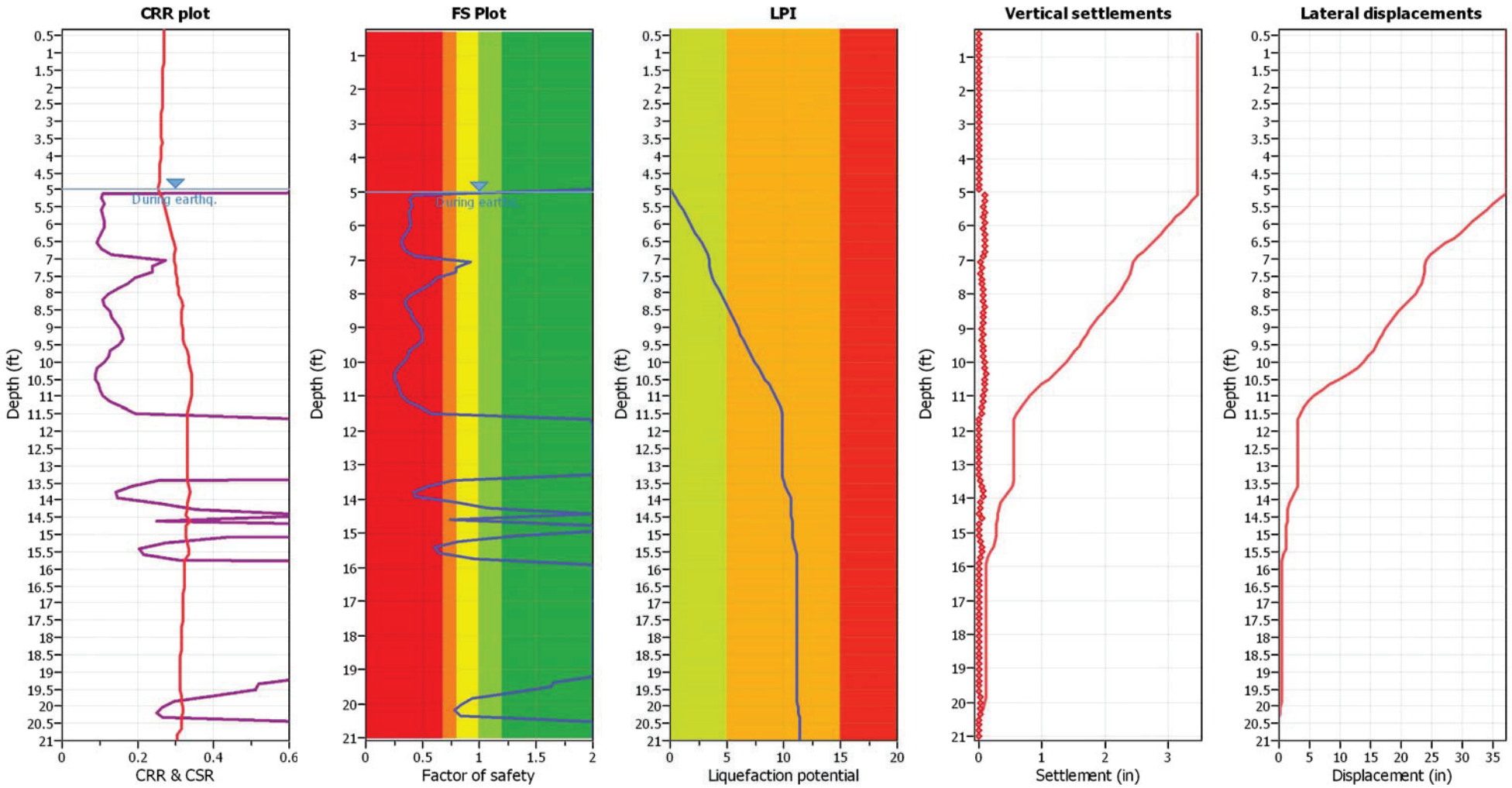
Liquefaction analysis overall plots (intermediate results)



Input parameters and analysis data

Analysis method:	I&B (2008)	Depth to GWT (erthq.):	5.00 ft	Fill weight:	N/A
Fines correction method:	R&W (1998)	Average results interval:	3	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.00	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.52	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	18.00 ft	Fill height:	N/A	Limit depth:	N/A

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	I&B (2008)	Depth to GWT (erthq.):	5.00 ft	Fill weight:	N/A
Fines correction method:	R&W (1998)	Average results interval:	3	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.00	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.52	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	18.00 ft	Fill height:	N/A	Limit depth:	N/A

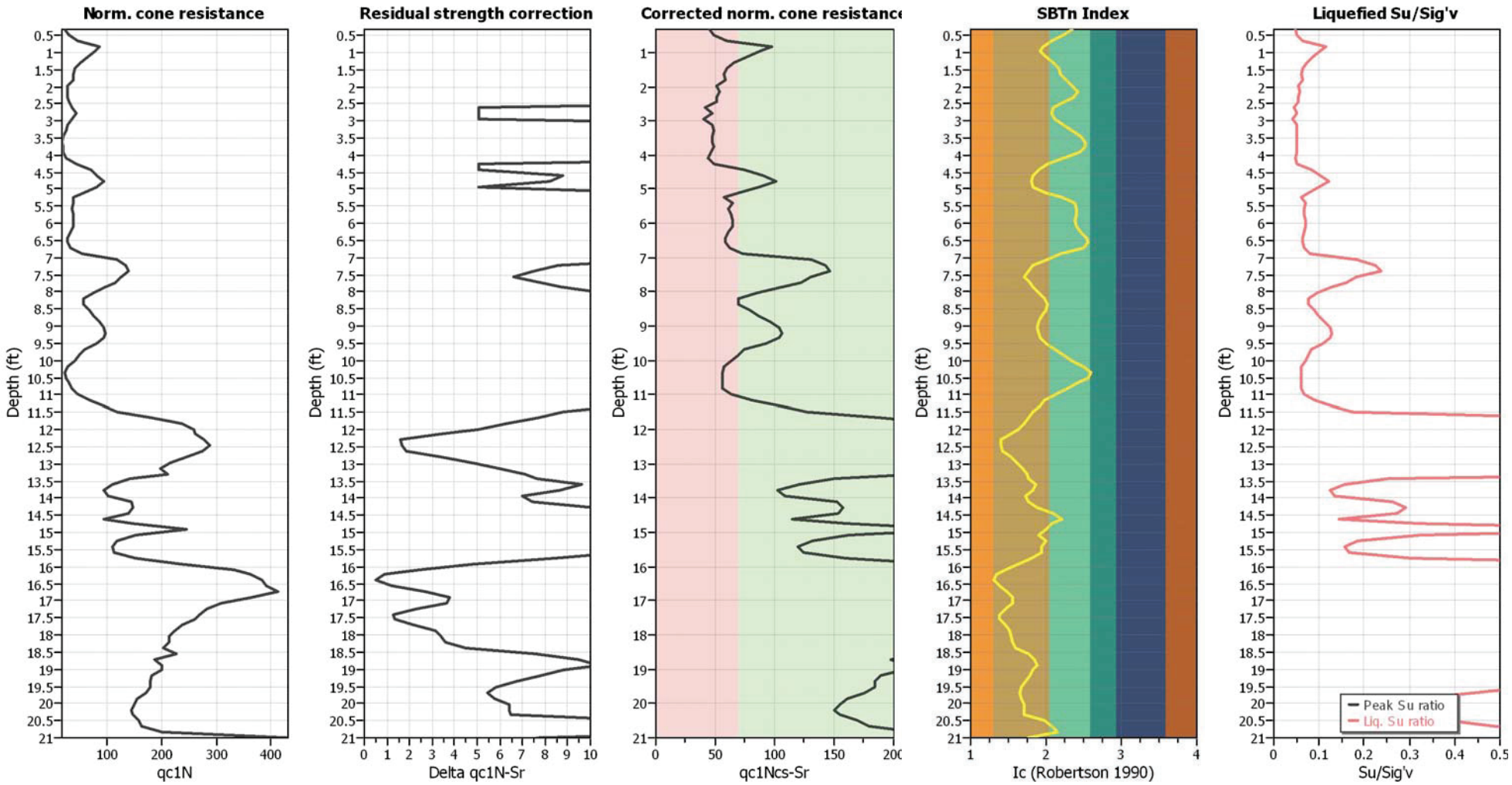
F.S. color scheme

- 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

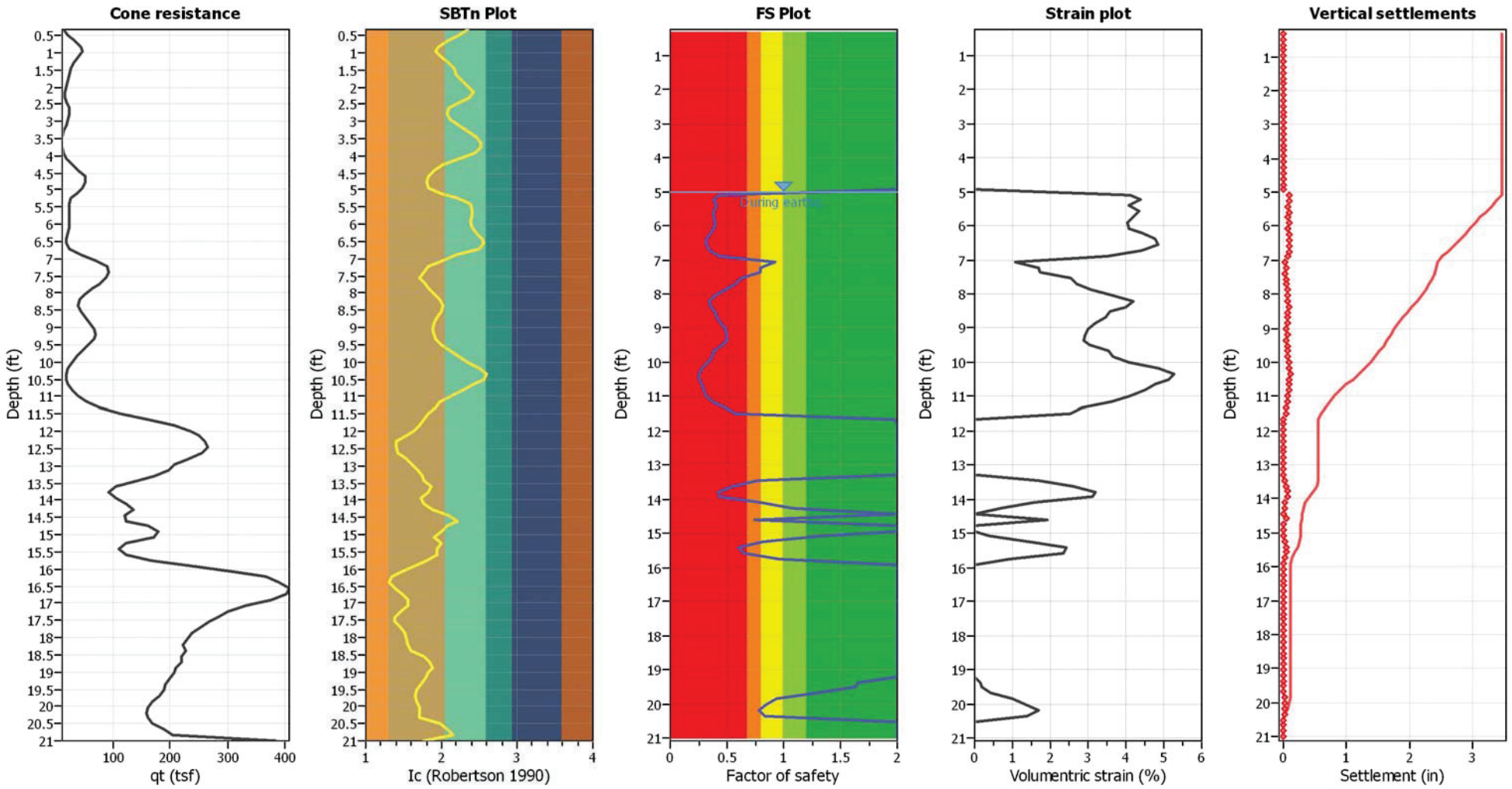
Check for strength loss plots (Idriss & Boulanger (2008))



Input parameters and analysis data

Analysis method:	I&B (2008)	Depth to GWT (erthq.):	5.00 ft	Fill weight:	N/A
Fines correction method:	R&W (1998)	Average results interval:	3	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.00	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.52	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	18.00 ft	Fill height:	N/A	Limit depth:	N/A

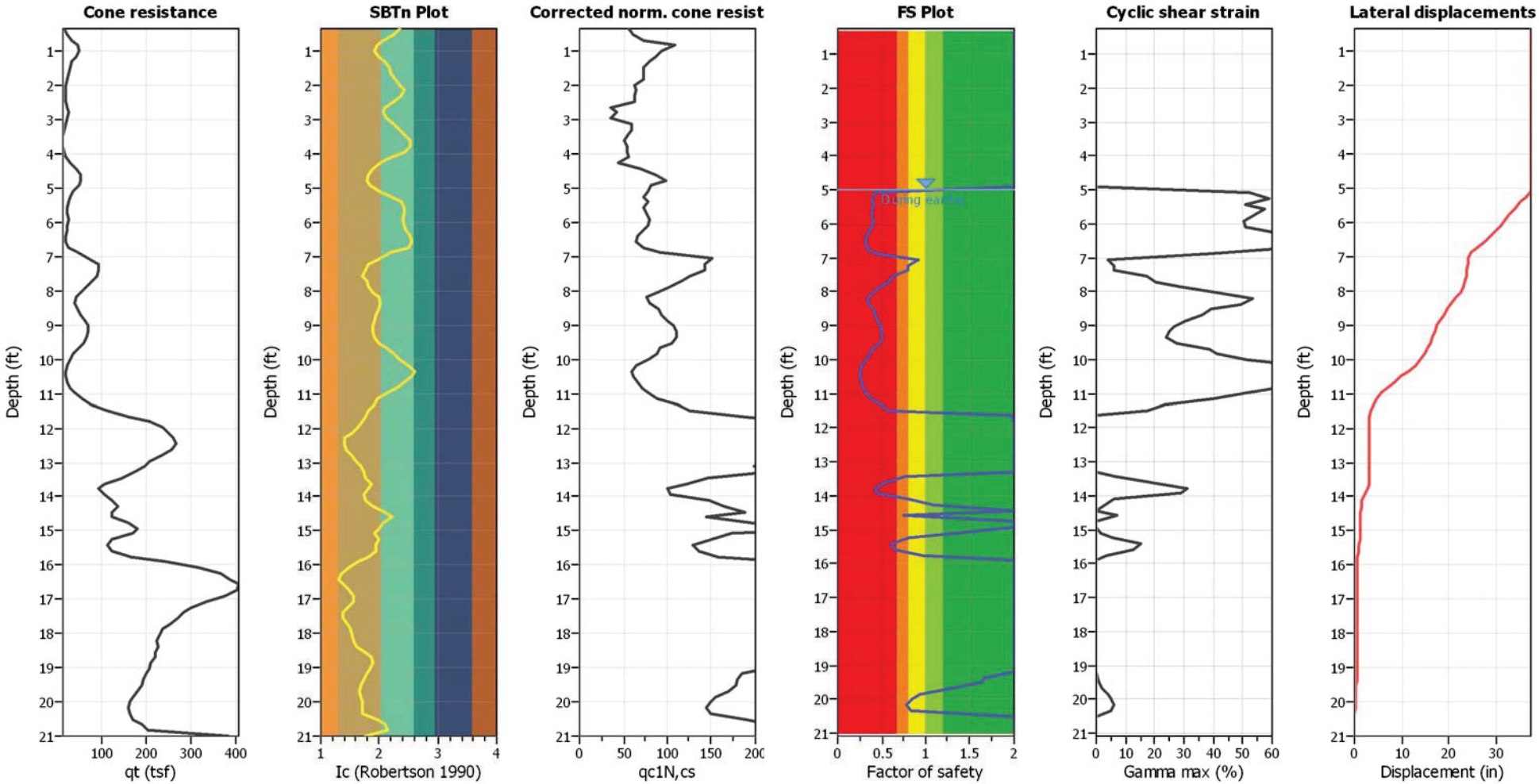
Estimation of post-earthquake settlements



Abbreviations

q_t:	Total cone resistance (cone resistance q_c corrected for pore water effects)
I_c:	Soil Behaviour Type Index
FS:	Calculated Factor of Safety against liquefaction
Volumentric strain:	Post-liquefaction volumentric strain

Estimation of post-earthquake lateral Displacements



Abbreviations

q_t: Total cone resistance (cone resistance q_c corrected for pore water effects)
I_c: Soil Behaviour Type Index
$q_{c1N,cs}$: Equivalent clean sand normalized CPT total cone resistance
F.S.: Factor of safety
γ_{max}: Maximum cyclic shear strain
LDI: Lateral displacement index

APPENDIX D

Slope Stability And Deformation Analyses

Static Slope Stability

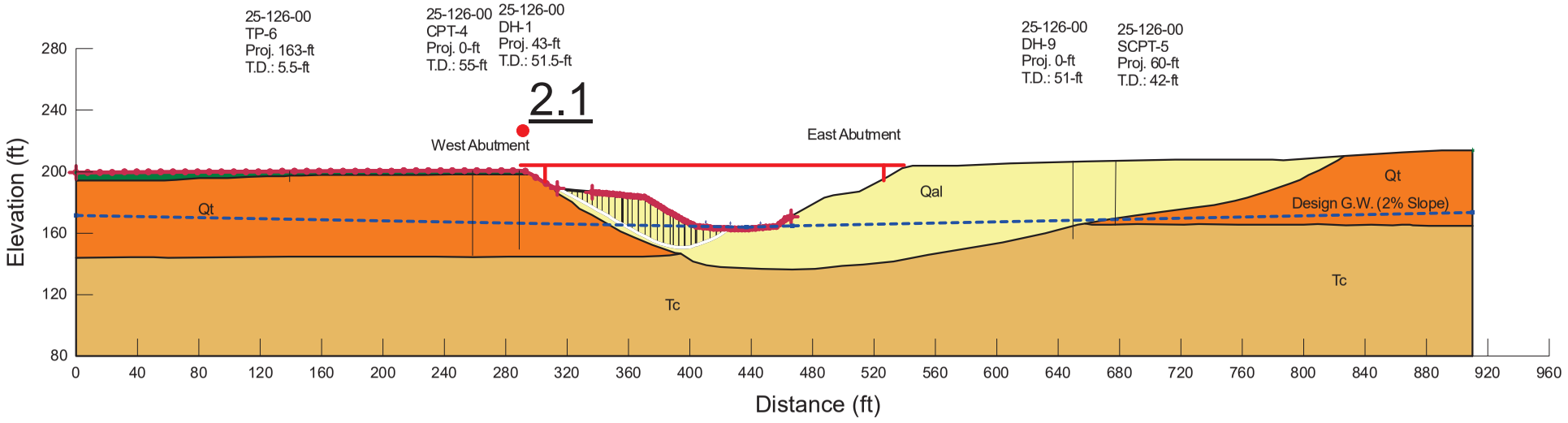
Cross Sections A-A’ and B-B’

Project No. 25-126-00
Section A-A'
August 2025

Analysis Type: Morgenstern-Price
Slip Surface Option: Entry and Exit
Horz Seismic Coef.: 0

Static, Western Slope, Entry Exit

Color	Name	Slope Stability Material Model	Unit Weight (pcf)	Effective Cohesion (psf)	Effective Friction Angle (°)	Piezometric Line
	Alluvium (Qal)	Mohr-Coulomb	120	80	32	1
	Capistrano Formation (Tc)	Mohr-Coulomb	125	250	25	1
	Terrace Deposits (Qt)	Mohr-Coulomb	120	80	32	1
	Undocumented Artificial Fill (Qafu)	Mohr-Coulomb	120	80	32	



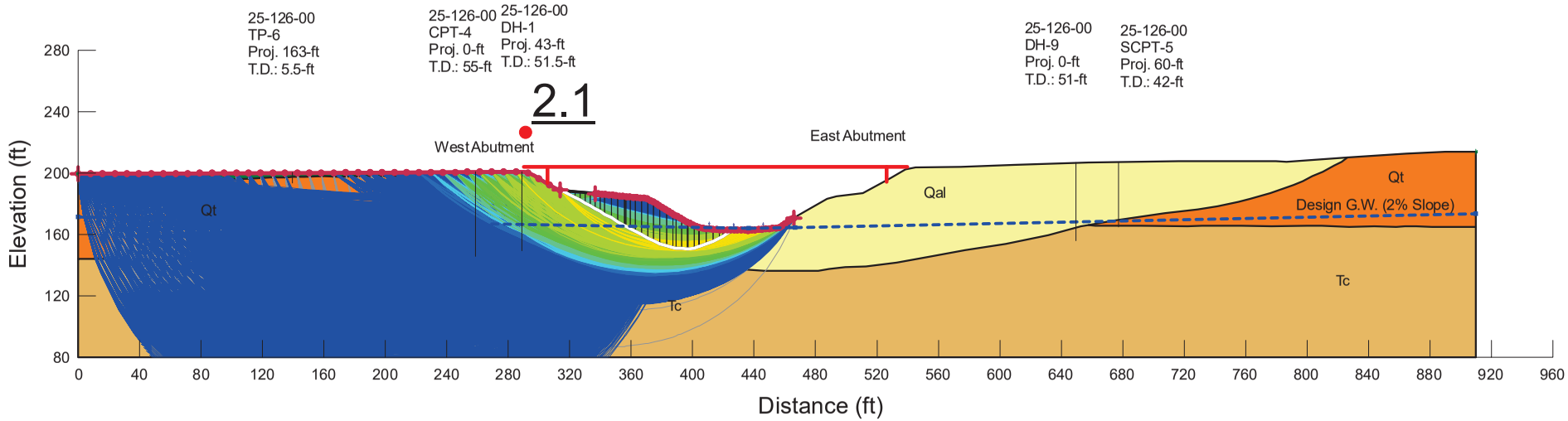
Project No. 25-126-00
Section A-A'
August 2025

Analysis Type: Morgenstern-Price
Slip Surface Option: Entry and Exit
Horz Seismic Coef.: 0

Static, Western Slope, Entry Exit

Factor of Safety
- 2.1 - 2.2
- 2.2 - 2.3
- 2.3 - 2.4
- 2.4 - 2.5
- 2.5 - 2.6
- 2.6 - 2.7
- 2.7 - 2.8
- 2.8 - 2.9
- 2.9 - 3.0
- ≥ 3.0

Color	Name	Slope Stability Material Model	Unit Weight (pcf)	Effective Cohesion (psf)	Effective Friction Angle (°)	Piezometric Line
	Alluvium (Qal) (32,80)	Mohr-Coulomb	120	80	32	1
	Capistrano Formation (Tc)	Mohr-Coulomb	125	250	25	1
	Terrace Deposits (Qt)	Mohr-Coulomb	120	80	32	1
	Undocumented Artificial Fill (Qafu)	Mohr-Coulomb	120	80	32	

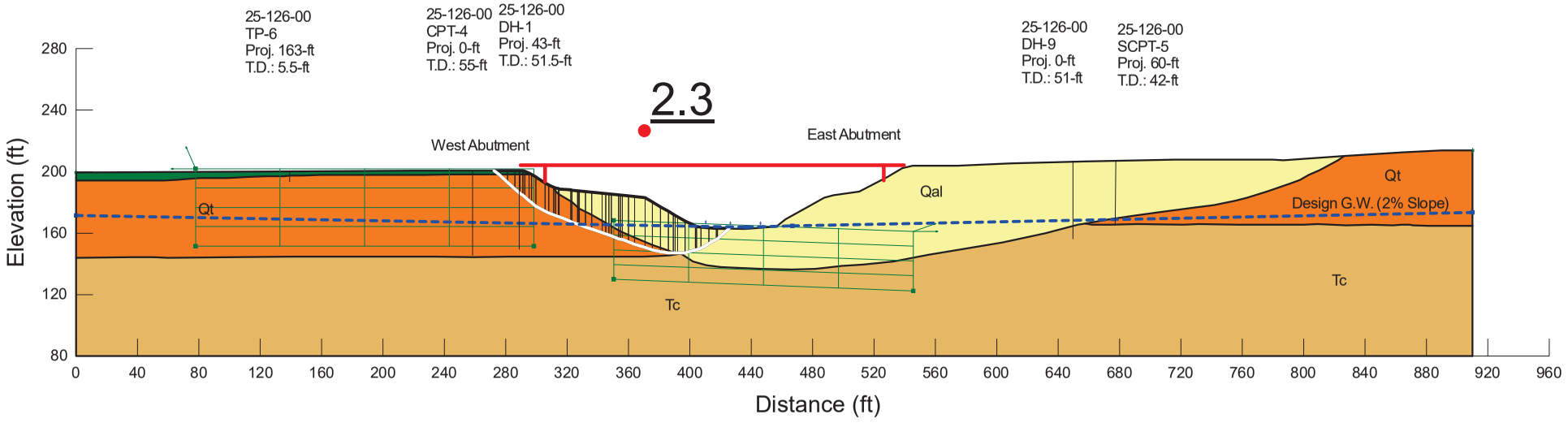


Project No. 25-126-00
Section A-A'
August 2025

Analysis Type: Morgenstern-Price Slip
Surface Option: Block
Horz Seismic Coef.: 0

Static, Western Slope, Box Within Qt

Color	Name	Slope Stability Material Model	Unit Weight (pcf)	Effective Cohesion (psf)	Effective Friction Angle (°)	Piezometric Line
	Alluvium (Qal)	Mohr-Coulomb	120	80	32	1
	Capistrano Formation (Tc)	Mohr-Coulomb	125	250	25	1
	Terrace Deposits (Qt)	Mohr-Coulomb	120	80	32	1
	Undocumented Artificial Fill (Qafu)	Mohr-Coulomb	120	80	32	



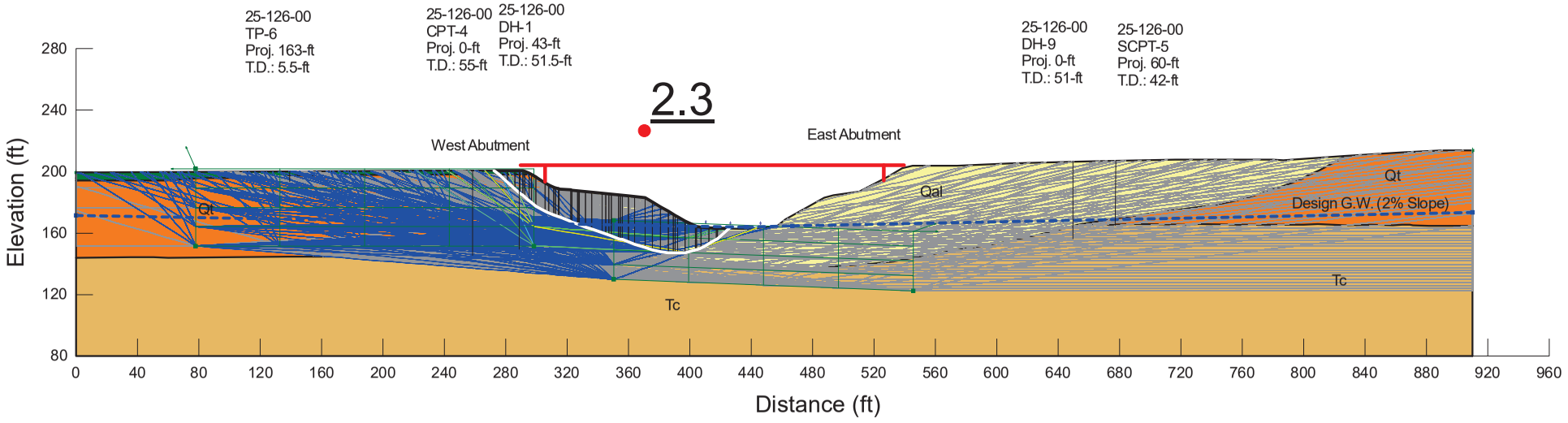
Project No. 25-126-00
Section A-A'
August 2025

Analysis Type: Morgenstern-Price
Slip Surface Option: Block
Horz Seismic Coef.: 0

Static, Western Slope, Box, Within Qt

Factor of Safety
- 2.3 - 2.4
- 2.4 - 2.5
- 2.5 - 2.6
- 2.6 - 2.7
- 2.7 - 2.8
- 2.8 - 2.9
- 2.9 - 3.0
- 3.0 - 3.1
- 3.1 - 3.2
- ≥ 3.2

Color	Name	Slope Stability Material Model	Unit Weight (pcf)	Effective Cohesion (psf)	Effective Friction Angle (°)	Piezometric Line
	Alluvium (Qal) (32,80)	Mohr-Coulomb	120	80	32	1
	Capistrano Formation (Tc)	Mohr-Coulomb	125	250	25	1
	Terrace Deposits (Qt)	Mohr-Coulomb	120	80	32	1
	Undocumented Artificial Fill (Qafu)	Mohr-Coulomb	120	80	32	

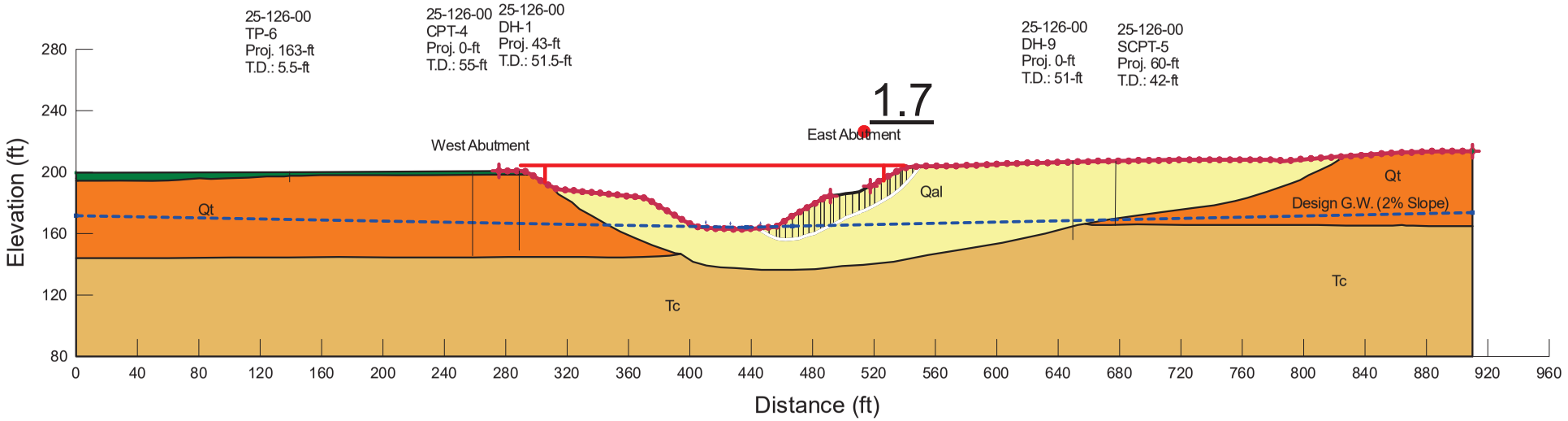


Project No. 25-126-00
Section A-A'
August 2025

Analysis Type: Morgenstern-Price
Slip Surface Option: Entry and Exit
Horz Seismic Coef.: 0

Color	Name	Slope Stability Material Model	Unit Weight (pcf)	Effective Cohesion (psf)	Effective Friction Angle (°)	Piezometric Line
	Alluvium (Qal)	Mohr-Coulomb	120	80	32	1
	Capistrano Formation (Tc)	Mohr-Coulomb	125	250	25	
	Terrace Deposits (Qt)	Mohr-Coulomb	120	80	32	1
	Undocumented Artificial Fill (Qafu)	Mohr-Coulomb	120	80	32	1

Static, Eastern Slope, Entry Exit



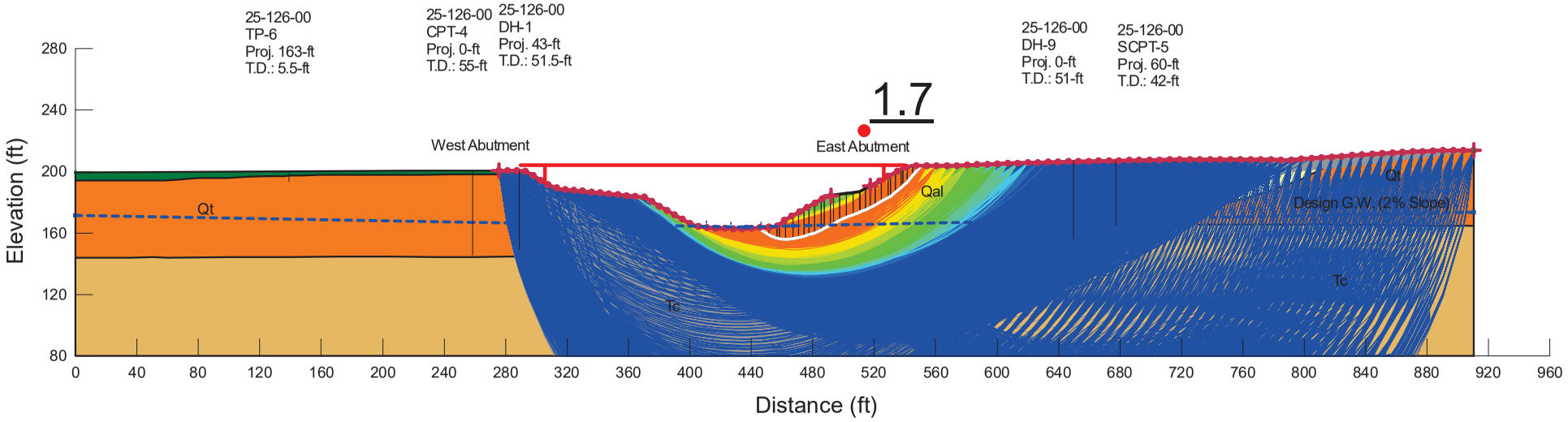
Project No. 25-126-00
Section A-A'
August 2025

Analysis Type: Morgenstern-Price
Slip Surface Option: Entry and Exit
Horz Seismic Coef.: 0

Static, Eastern Slope, Entry Exit

Factor of Safety
- 1.7 - 1.8
- 1.8 - 1.9
- 1.9 - 2.0
- 2.0 - 2.1
- 2.1 - 2.2
- 2.2 - 2.3
- 2.3 - 2.4
- 2.4 - 2.5
- 2.5 - 2.6
- ≥ 2.6

Color	Name	Slope Stability Material Model	Unit Weight (pcf)	Effective Cohesion (psf)	Effective Friction Angle (°)	Piezometric Line
	Alluvium (Qal)	Mohr-Coulomb	120	80	32	1
	Capistrano Formation (Tc)	Mohr-Coulomb	125	250	25	
	Terrace Deposits (Qt)	Mohr-Coulomb	120	80	32	1
	Undocumented Artificial Fill (Qafu)	Mohr-Coulomb	120	80	32	1

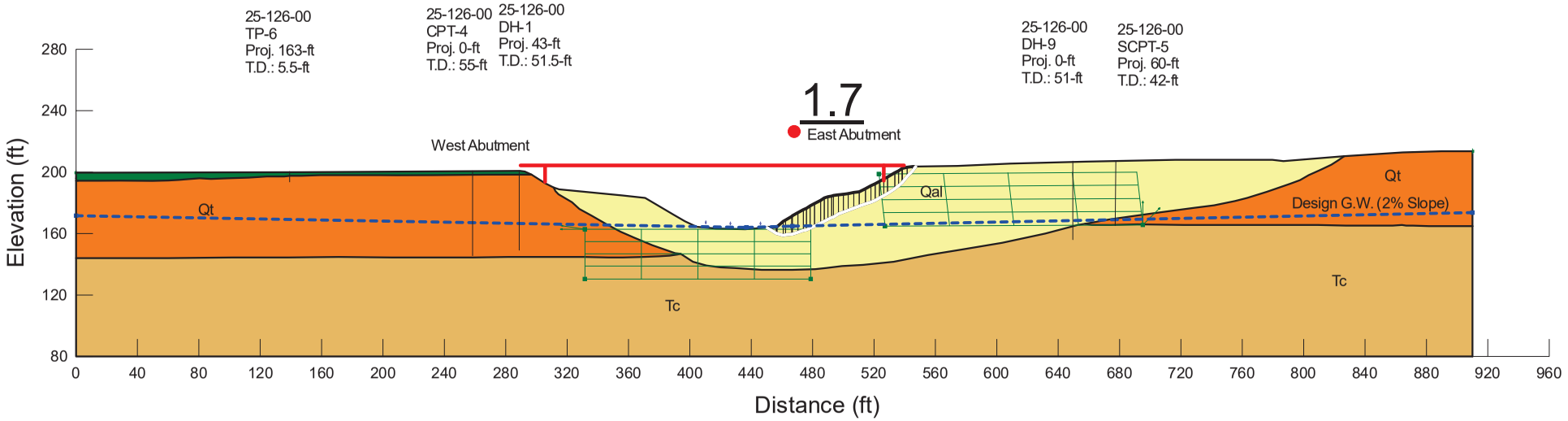


Project No. 25-126-00
Section A-A'
August 2025

Analysis Type: Morgenstern-Price
Slip Surface Option: Block
Horz Seismic Coef.: 0

Static, Eastern Slope, Box

Color	Name	Slope Stability Material Model	Unit Weight (pcf)	Effective Cohesion (psf)	Effective Friction Angle (°)	Piezometric Line
	Alluvium (Qal)	Mohr-Coulomb	120	80	32	1
	Capistrano Formation (Tc)	Mohr-Coulomb	125	250	25	
	Terrace Deposits (Qt)	Mohr-Coulomb	120	80	32	1
	Undocumented Artificial Fill (Qafu)	Mohr-Coulomb	120	80	32	1



Project No. 25-126-00
Section A-A'
August 2025

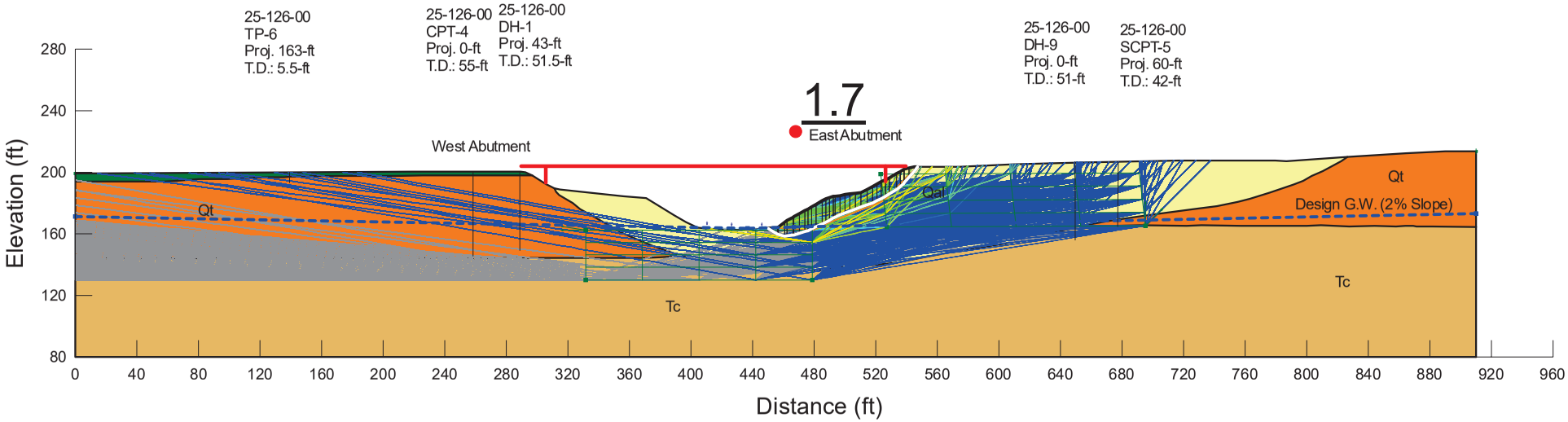
Analysis Type: Morgenstern-Price
Slip Surface Option: Block
Horz Seismic Coef.: 0

Static, Eastern Slope, Box

Factor of Safety

- 1.7 - 1.8
- 1.8 - 1.9
- 1.9 - 2.0
- 2.0 - 2.1
- 2.1 - 2.2
- 2.2 - 2.3
- 2.3 - 2.4
- 2.4 - 2.5
- 2.5 - 2.6
- ≥ 2.6

Color	Name	Slope Stability Material Model	Unit Weight (pcf)	Effective Cohesion (psf)	Effective Friction Angle (°)	Piezometric Line
	Alluvium (Qal)	Mohr-Coulomb	120	80	32	1
	Capistrano Formation (Tc)	Mohr-Coulomb	125	250	25	
	Terrace Deposits (Qt)	Mohr-Coulomb	120	80	32	1
	Undocumented Artificial Fill (Qafu)	Mohr-Coulomb	120	80	32	1

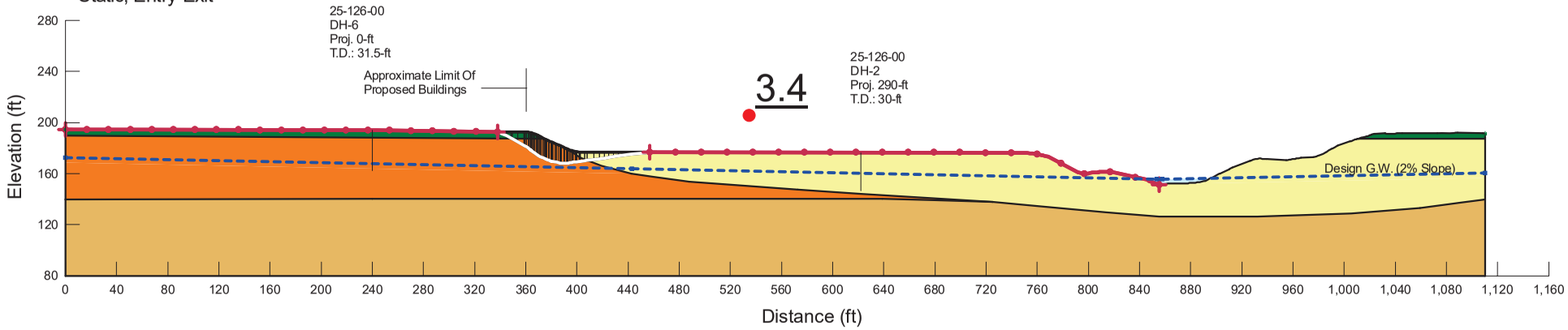


Project No. 25-126-00
Section B-B'
August 2025

Analysis Type: Morgenstern-Price
Slip Surface Option: Entry and Exit
Horz Seismic Coef.: 0

Color	Name	Slope Stability Material Model	Unit Weight (pcf)	Effective Cohesion (psf)	Effective Friction Angle (°)	Piezometric Line
	Alluvium (Qal)	Mohr-Coulomb	120	80	32	1
	Capistrano Formation (Tc)	Mohr-Coulomb	125	250	25	1
	Terrace Deposits (Qt)	Mohr-Coulomb	120	80	32	1
	Undocumented Artificial Fill (Qafu)	Mohr-Coulomb	120	80	32	

Static, Entry-Exit



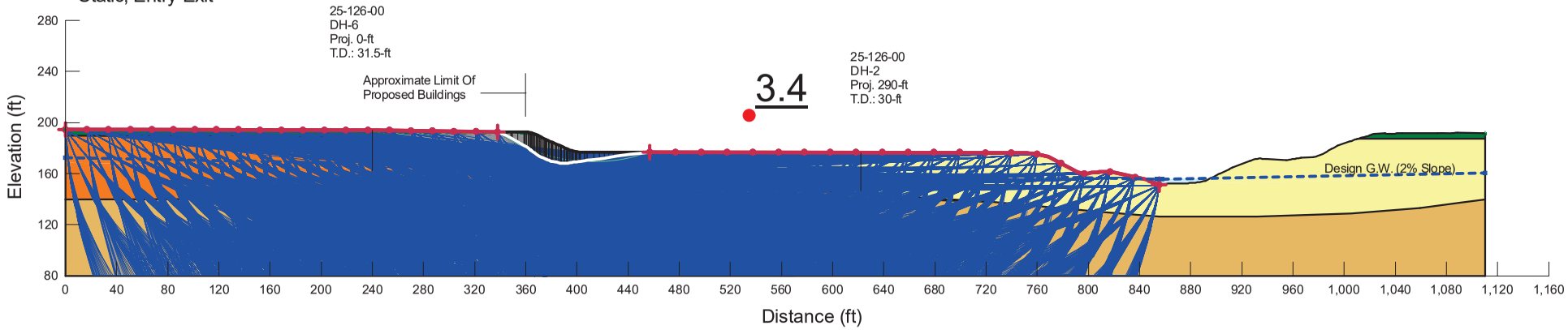
Project No. 25-126-00
Section B-B'
August 2025

Analysis Type: Morgenstern-Price
Slip Surface Option: Entry and Exit
Horz Seismic Coef.: 0

Static, Entry-Exit

Factor of Safety
- 3.4 - 3.5
- 3.5 - 3.6
- 3.6 - 3.7
- 3.7 - 3.8
- 3.8 - 3.9
- 3.9 - 4.0
- 4.0 - 4.1
- 4.1 - 4.2
- 4.2 - 4.3
- ≥ 4.3

Color	Name	Slope Stability Material Model	Unit Weight (pcf)	Effective Cohesion (psf)	Effective Friction Angle (°)	Piezometric Line
	Alluvium (Qal)	Mohr-Coulomb	120	80	32	1
	Capistrano Formation (Tc)	Mohr-Coulomb	125	250	25	1
	Terrace Deposits (Qt)	Mohr-Coulomb	120	80	32	1
	Undocumented Artificial Fill (Qafu)	Mohr-Coulomb	120	80	32	

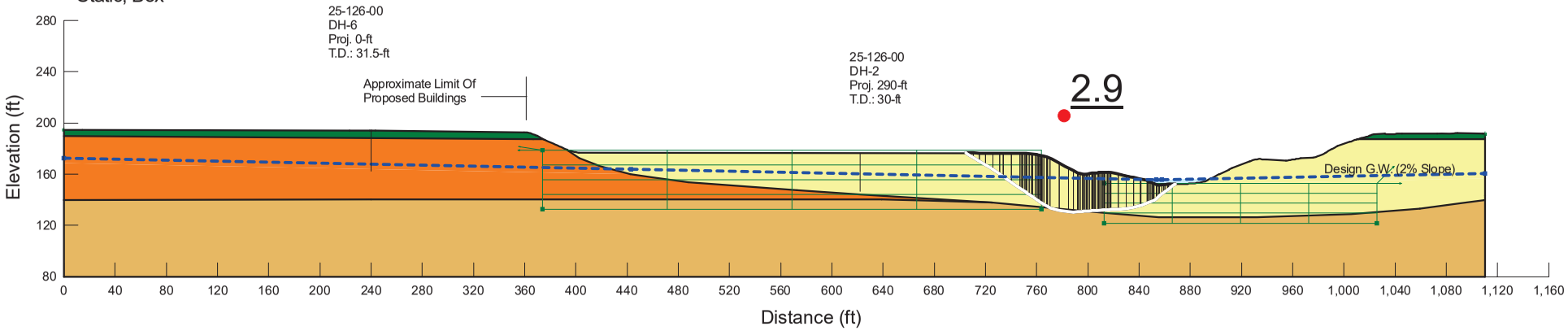


Project No. 25-126-00
Section B-B'
August 2025

Analysis Type: Morgenstern-Price
Slip Surface Option: Block
Horz Seismic Coef.: 0

Color	Name	Slope Stability Material Model	Unit Weight (pcf)	Effective Cohesion (psf)	Effective Friction Angle (°)	Piezometric Line
	Alluvium (Qal)	Mohr-Coulomb	120	80	32	1
	Capistrano Formation (Tc)	Mohr-Coulomb	125	250	25	1
	Terrace Deposits (Qt)	Mohr-Coulomb	120	80	32	1
	Undocumented Artificial Fill (Qafu)	Mohr-Coulomb	120	80	32	

Static, Box



Project No. 25-126-00
Section A-A'
August 2025

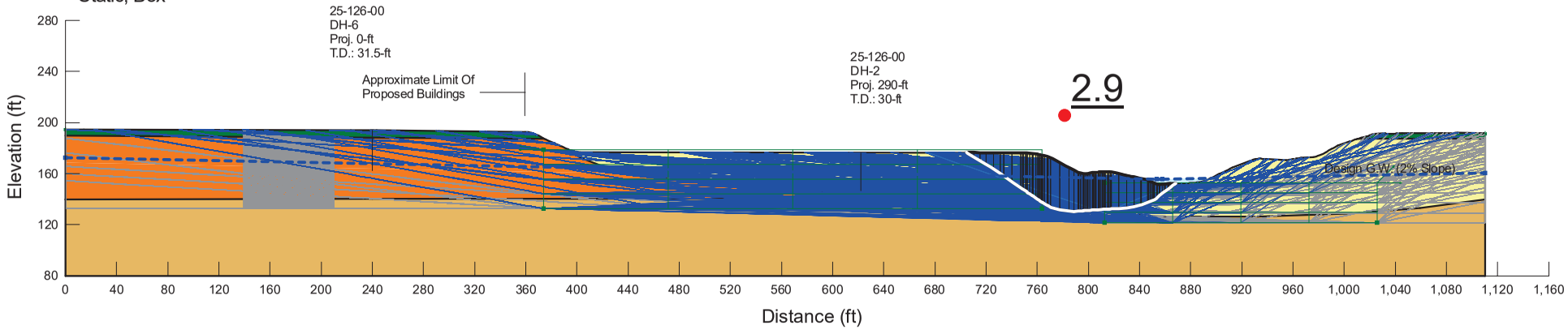
Analysis Type: Morgenstern-Price
Slip Surface Option: Block
Horz Seismic Coef.: 0

Static, Box

Factor of Safety

- 2.9 - 3.0
- 3.0 - 3.1
- 3.1 - 3.2
- 3.2 - 3.3
- 3.3 - 3.4
- 3.4 - 3.5
- 3.5 - 3.6
- 3.6 - 3.7
- 3.7 - 3.8
- ≥ 3.8

Color	Name	Slope Stability Material Model	Unit Weight (pcf)	Effective Cohesion (psf)	Effective Friction Angle (°)	Piezometric Line
	Alluvium (Qal)	Mohr-Coulomb	120	80	32	1
	Capistrano Formation (Tc)	Mohr-Coulomb	125	250	25	1
	Terrace Deposits (Qt)	Mohr-Coulomb	120	80	32	1
	Undocumented Artificial Fill (Qafu)	Mohr-Coulomb	120	80	32	



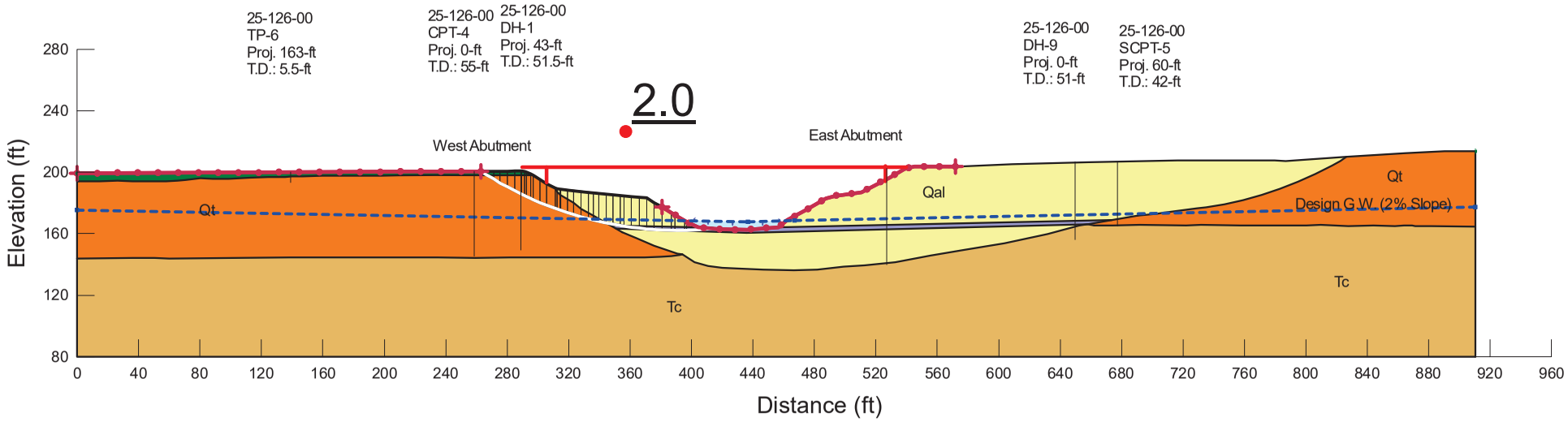
Post-Earthquake Analyses - Liquified Conditions

Project No. 25-126-00
Section A-A'
August 2025

Analysis Type: Morgenstern-Price
Slip Surface Option: Entry and Exit
Horz Seismic Coef.:

Color	Name	Slope Stability Material Model	Unit Weight (pcf)	Minimum Strength (psf)	Tau/Sigma Ratio	Effective Cohesion (psf)	Effective Friction Angle (°)	Piezometric Line
	Alluvium (Qal) (32,80)	Mohr-Coulomb	120			80	32	1
	Capistrano Formation (Tc)	Mohr-Coulomb	125			250	25	1
	Qal Liq (0.17)	SHANSEP	120	0	0.17			1
	Terrace Deposits (Qt)	Mohr-Coulomb	120			80	32	1
	Undocumented Artificial Fill (Qafu)	Mohr-Coulomb	120			80	32	

Post-Earthquake, Western Slope Entry Exit



Project No. 25-126-00
Section A-A'
August 2025

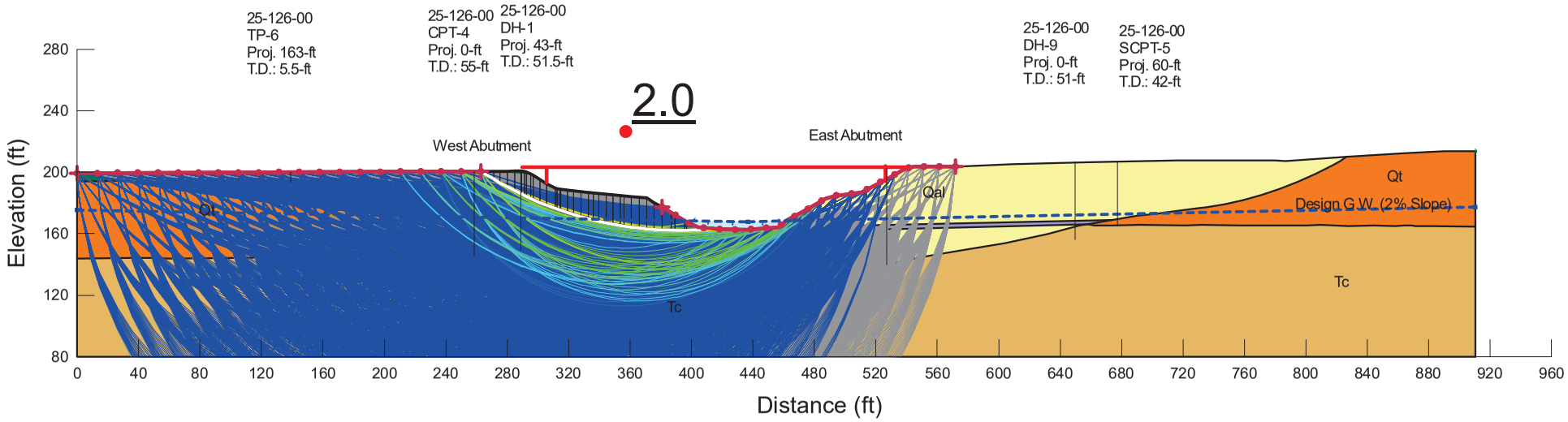
Analysis Type: Morgenstern-Price
Slip Surface Option: Entry and Exit
Horz Seismic Coef.:

Post-Earthquake, Western Slope Entry Exit

Factor of Safety

- 2.0 - 2.1
- 2.1 - 2.2
- 2.2 - 2.3
- 2.3 - 2.4
- 2.4 - 2.5
- 2.5 - 2.6
- 2.6 - 2.7
- 2.7 - 2.8
- 2.8 - 2.9
- ≥ 2.9

Color	Name	Slope Stability Material Model	Unit Weight (pcf)	Minimum Strength (psf)	Tau/Sigma Ratio	Effective Cohesion (psf)	Effective Friction Angle (°)	Piezometric Line
	Alluvium (Qal) (32,80)	Mohr-Coulomb	120			80	32	1
	Capistrano Formation (Tc)	Mohr-Coulomb	125			250	25	1
	Qal Liq (0.17)	SHANSEP	120	0	0.17			1
	Terrace Deposits (Qt)	Mohr-Coulomb	120			80	32	1
	Undocumented Artificial Fill (Qafu)	Mohr-Coulomb	120			80	32	

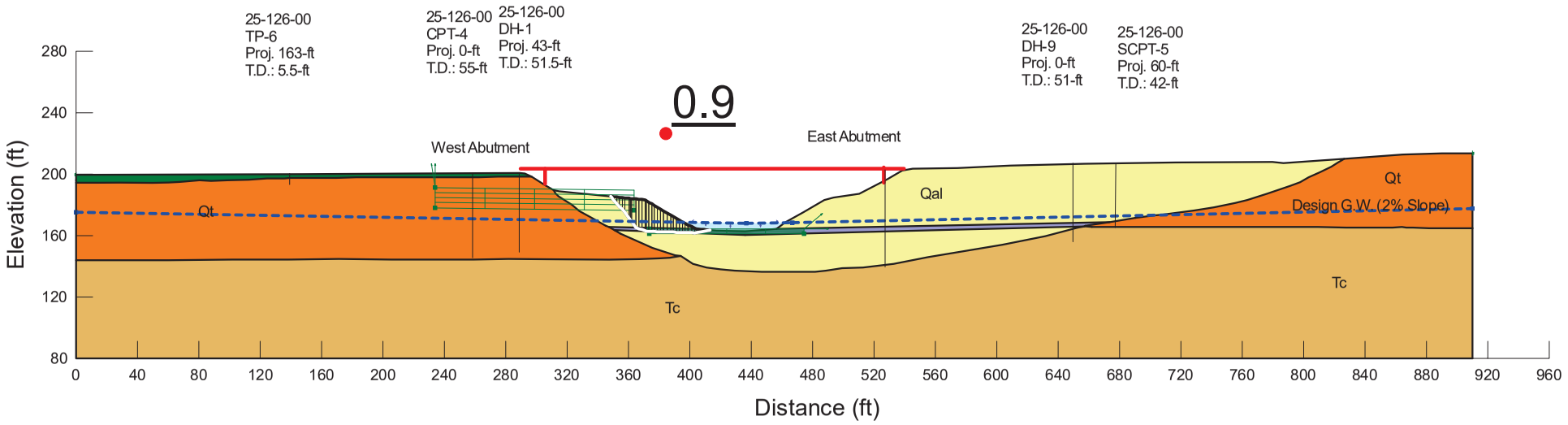


Project No. 25-126-00
Section A-A'
August 2025

Analysis Type: Morgenstern-Price
Slip Surface Option: Block
Horz Seismic Coef.:

Color	Name	Slope Stability Material Model	Unit Weight (pcf)	Minimum Strength (psf)	Tau/Sigma Ratio	Effective Cohesion (psf)	Effective Friction Angle (°)	Piezometric Line
	Alluvium (Qal)	Mohr-Coulomb	120			80	32	1
	Capistrano Formation (Tc)	Mohr-Coulomb	125			250	25	1
	Qal Liq (0.17)	SHANSEP	120	0	0.17			1
	Terrace Deposits (Qt)	Mohr-Coulomb	120			80	32	1
	Undocumented Artificial Fill (Qafu)	Mohr-Coulomb	120			80	32	

Post-Earthquake, Western Slope, Box



Project No. 25-126-00
Section A-A'
August 2025

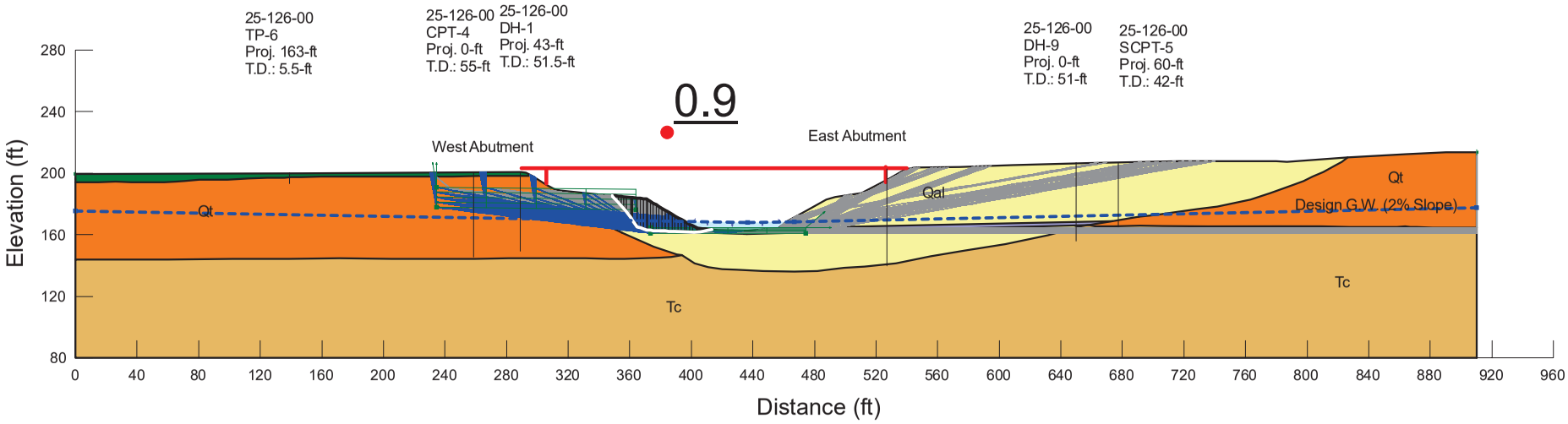
Analysis Type: Morgenstern-Price
Slip Surface Option: Block
Horz Seismic Coef.:

Post-Earthquake, Western Slope, Box

Factor of Safety

- 0.9 - 1.0
- 1.0 - 1.1
- 1.1 - 1.2
- 1.2 - 1.3
- 1.3 - 1.4
- 1.4 - 1.5
- 1.5 - 1.6
- 1.6 - 1.7
- 1.7 - 1.8
- ≥ 1.8

Color	Name	Slope Stability Material Model	Unit Weight (pcf)	Minimum Strength (psf)	Tau/Sigma Ratio	Effective Cohesion (psf)	Effective Friction Angle (°)	Piezometric Line
	Alluvium (Qal) (32,80)	Mohr-Coulomb	120			80	32	1
	Capistrano Formation (Tc)	Mohr-Coulomb	125			250	25	1
	Qal Liq (0.17)	SHANSEP	120	0	0.17			1
	Terrace Deposits (Qt)	Mohr-Coulomb	120			80	32	1
	Undocumented Artificial Fill (Qafu)	Mohr-Coulomb	120			80	32	

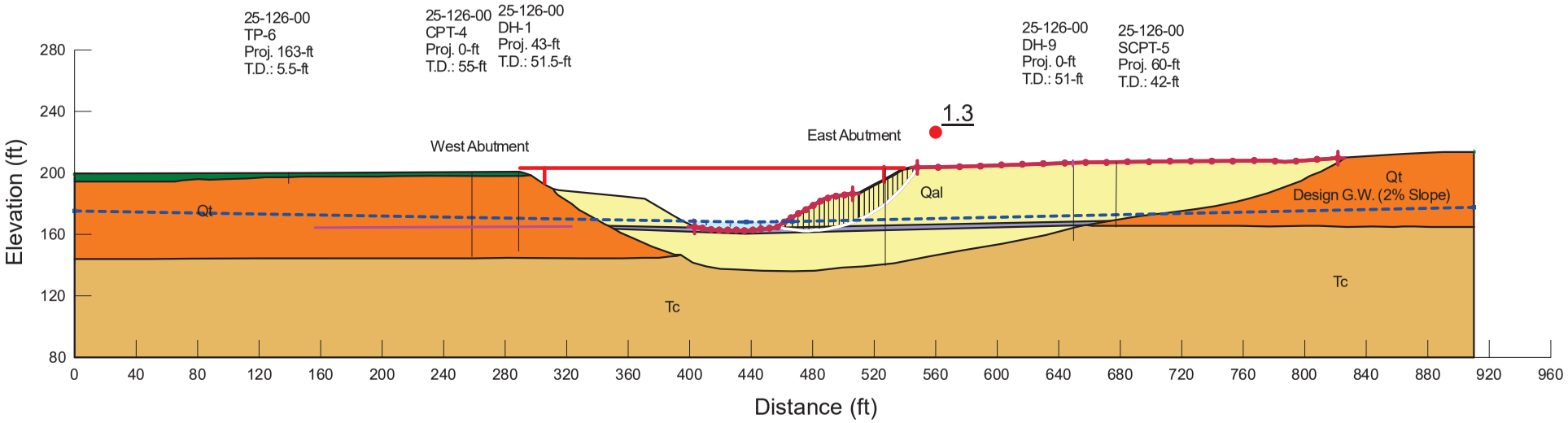


Color	Name	Slope Stability Material Model	Unit Weight (pcf)	Minimum Strength (psf)	Tau/Sigma Ratio	Effective Cohesion (psf)	Effective Friction Angle (°)	Piezometric Line
	Alluvium (Qal)	Mohr-Coulomb	120			80	32	1
	Capistrano Formation (Tc)	Mohr-Coulomb	125			250	25	1
	Qal Liq (0.17)	SHANSEP	120	0	0.17			1
	Terrace Deposits (Qt)	Mohr-Coulomb	120			80	32	1
	Undocumented Artificial Fill (Qafu)	Mohr-Coulomb	120			80	32	

Project No. 25-126-00
Section A-A'
August 2025

Analysis Type: Morgenstern-Price
Slip Surface Option: Entry and Exit
Horz Seismic Coef.:

Post-Earthquake, Eastern Slope, Entry Exit



Project No. 25-126-00
Section A-A'
August 2025

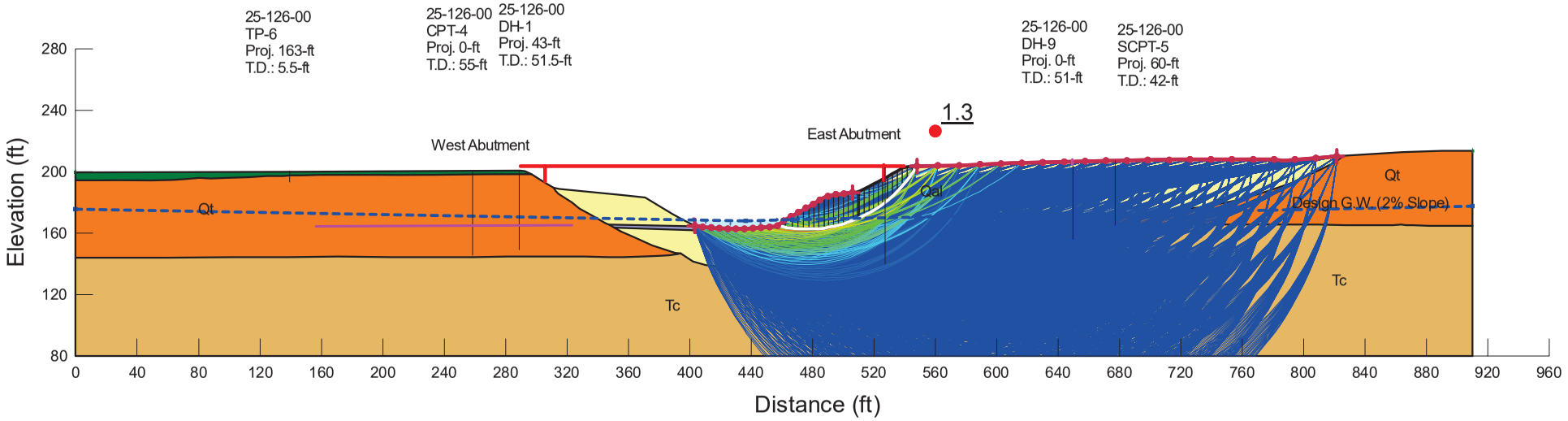
Analysis Type: Morgenstern-Price
Slip Surface Option: Entry and Exit
Horz Seismic Coef.:

Post-Earthquake, Eastern Slope, Entry Exit

Factor of Safety

- 1.3 - 1.4
- 1.4 - 1.5
- 1.5 - 1.6
- 1.6 - 1.7
- 1.7 - 1.8
- 1.8 - 1.9
- 1.9 - 2.0
- 2.0 - 2.1
- 2.1 - 2.2
- ≥ 2.2

Color	Name	Slope Stability Material Model	Unit Weight (pcf)	Minimum Strength (psf)	Tau/Sigma Ratio	Effective Cohesion (psf)	Effective Friction Angle (°)	Piezometric Line
	Alluvium (Qal)	Mohr-Coulomb	120			80	32	1
	Capistrano Formation (Tc)	Mohr-Coulomb	125			250	25	1
	Qal Liq (0.17)	SHANSEP	120	0	0.17			1
	Terrace Deposits (Qt)	Mohr-Coulomb	120			80	32	1
	Undocumented Artificial Fill (Qafu)	Mohr-Coulomb	120			80	32	

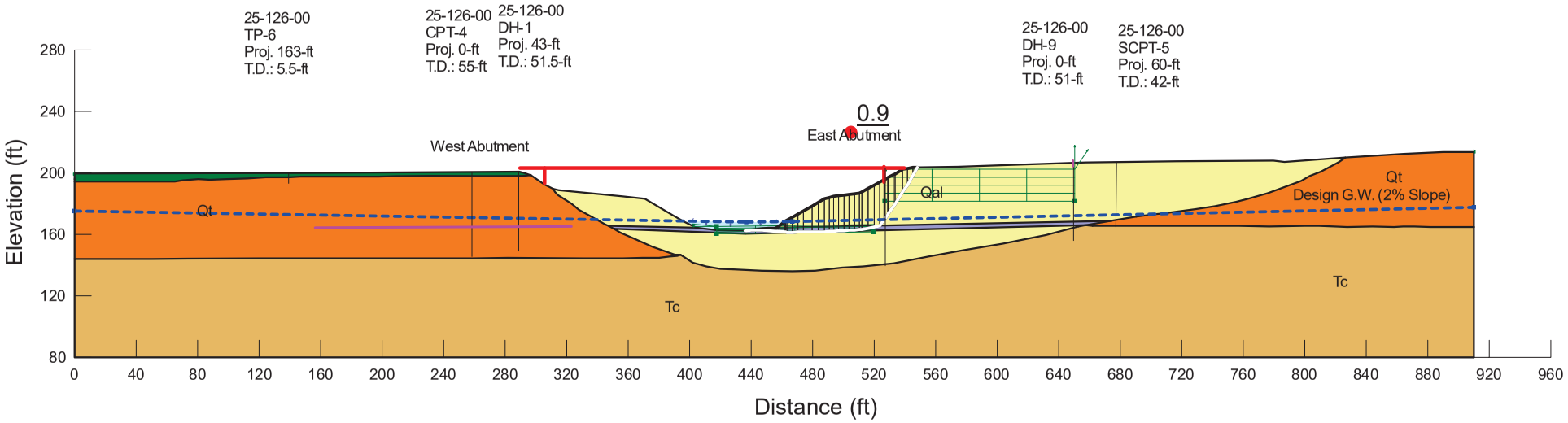


Color	Name	Slope Stability Material Model	Unit Weight (pcf)	Minimum Strength (psf)	Tau/Sigma Ratio	Effective Cohesion (psf)	Effective Friction Angle (°)	Piezometric Line
	Alluvium (Qal)	Mohr-Coulomb	120			80	32	1
	Capistrano Formation (Tc)	Mohr-Coulomb	125			250	25	1
	Qal Liq (0.17)	SHANSEP	120	0	0.17			1
	Terrace Deposits (Qt)	Mohr-Coulomb	120			80	32	1
	Undocumented Artificial Fill (Qafu)	Mohr-Coulomb	120			80	32	

Project No. 25-126-00
Section A-A'
August 2025

Analysis Type: Morgenstern-Price
Slip Surface Option: Block
Horz Seismic Coef.:

Post-Earthquake, Eastern Slope, Box

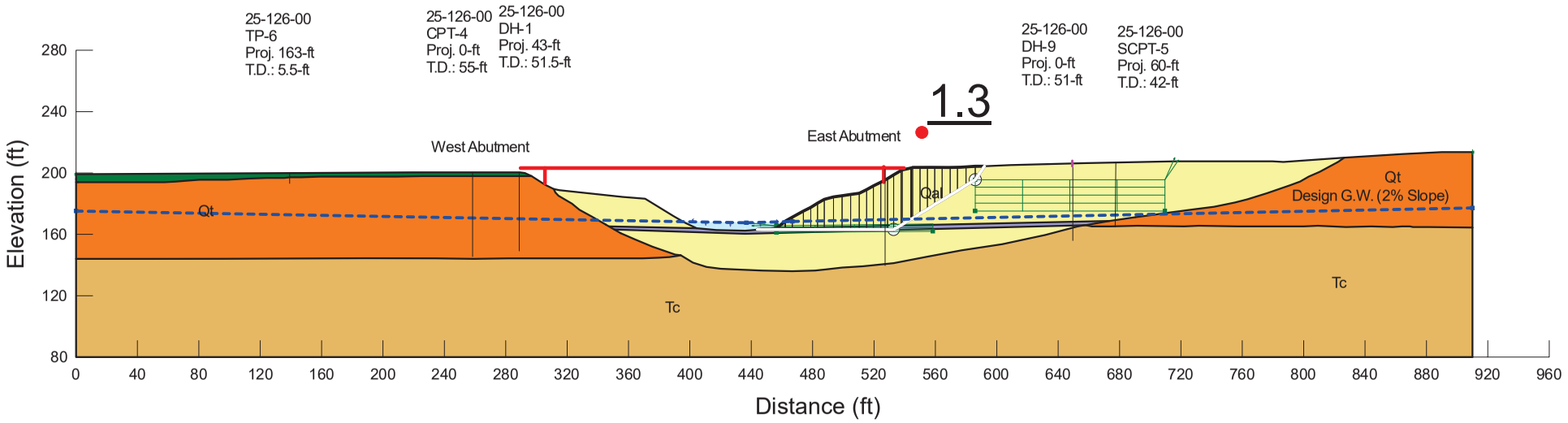


Project No. 25-126-00
Section A-A'
August 2025

Analysis Type: Morgenstern-Price
Slip Surface Option: Block
Horz Seismic Coef.:

Post-Earthquake, Eastern Slope, Box S.F.=1.3

Color	Name	Slope Stability Material Model	Unit Weight (pcf)	Minimum Strength (psf)	Tau/Sigma Ratio	Effective Cohesion (psf)	Effective Friction Angle (°)	Piezometric Line
	Alluvium (Qal)	Mohr-Coulomb	120			80	32	1
	Capistrano Formation (Tc)	Mohr-Coulomb	125			250	25	1
	Qal Liq (0.17)	SHANSEP	120	0	0.17			1
	Terrace Deposits (Qt)	Mohr-Coulomb	120			80	32	1
	Undocumented Artificial Fill (Qafu)	Mohr-Coulomb	120			80	32	



Project No. 25-126-00
Section A-A'
August 2025

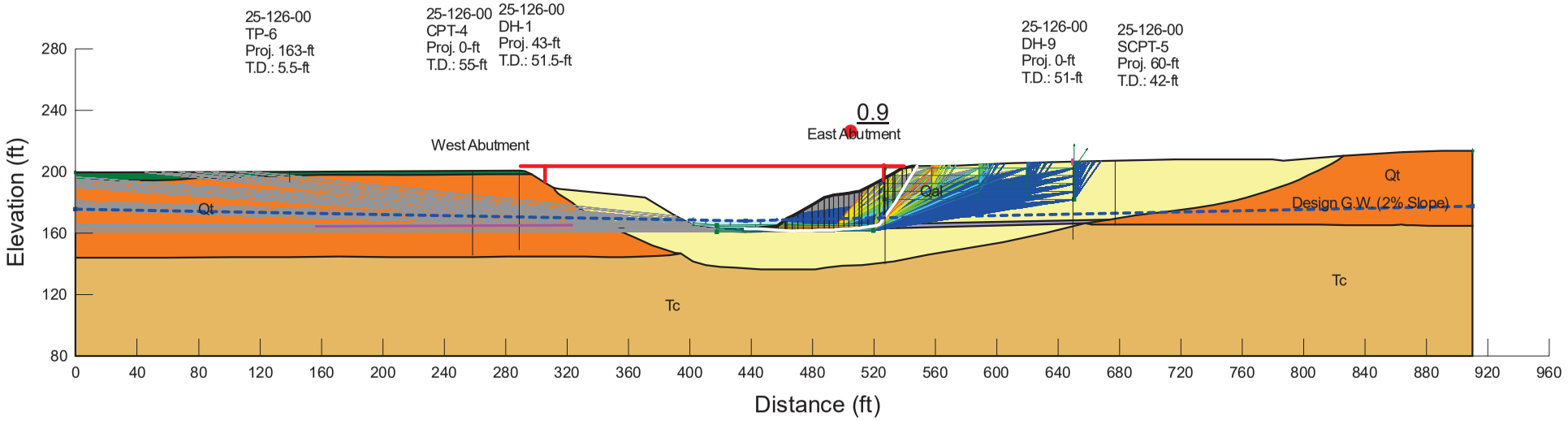
Analysis Type: Morgenstern-Price
Slip Surface Option: Block
Horz Seismic Coef.:

Post-Earthquake, Eastern Slope, Box

Factor of Safety

- 0.9 - 1.0
- 1.0 - 1.1
- 1.1 - 1.2
- 1.2 - 1.3
- 1.3 - 1.4
- 1.4 - 1.5
- 1.5 - 1.6
- 1.6 - 1.7
- 1.7 - 1.8
- ≥ 1.8

Color	Name	Slope Stability Material Model	Unit Weight (pcf)	Minimum Strength (psf)	Tau/Sigma Ratio	Effective Cohesion (psf)	Effective Friction Angle (°)	Piezometric Line
	Alluvium (Qal)	Mohr-Coulomb	120			80	32	1
	Capistrano Formation (Tc)	Mohr-Coulomb	125			250	25	1
	Qal Liq (0.17)	SHANSEP	120	0	0.17			1
	Terrace Deposits (Qt)	Mohr-Coulomb	120			80	32	1
	Undocumented Artificial Fill (Qafu)	Mohr-Coulomb	120			80	32	

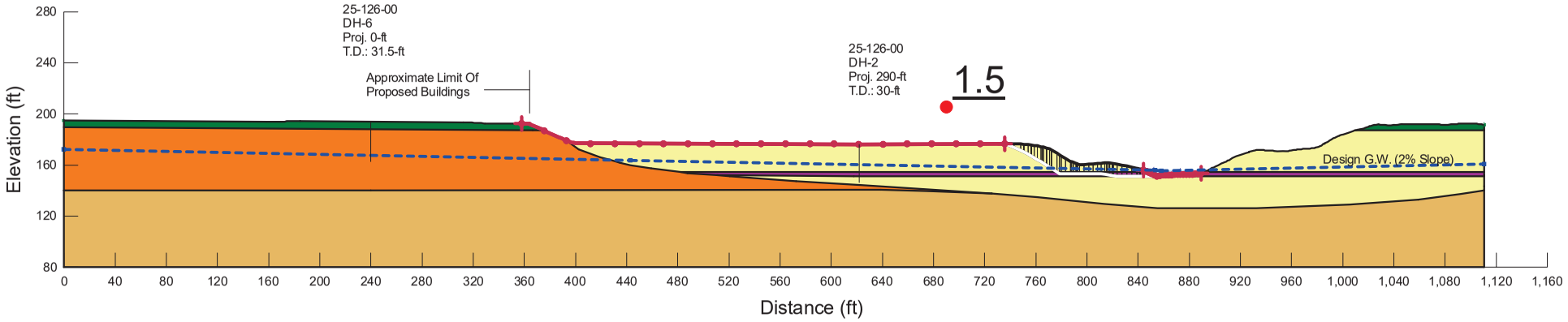


Project No. 25-126-00
Section B-B'
August 2025

Analysis Type: Morgenstern-Price
Slip Surface Option: Entry and Exit
Horz Seismic Coef.: 0

Post-Earthquake, Entry Exit

Color	Name	Slope Stability Material Model	Unit Weight (pcf)	Minimum Strength (psf)	Tau/Sigma Ratio	Effective Cohesion (psf)	Effective Friction Angle (°)	Piezometric Line
	Alluvium (Qal)	Mohr-Coulomb	120			80	32	1
	Capistrano Formation (Tc)	Mohr-Coulomb	125			250	25	1
	Qal Liq (0.18)	SHANSEP	120	0	0.18			1
	Terrace Deposits (Qt)	Mohr-Coulomb	120			80	32	1
	Undocumented Artificial Fill (Qafu)	Mohr-Coulomb	120			80	32	



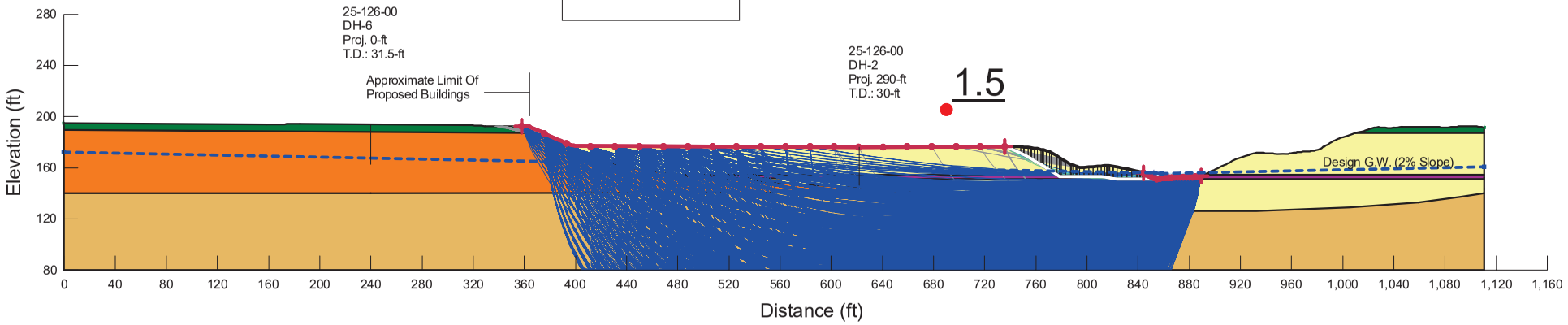
Project No. 25-126-00
Section B-B'
August 2025

Analysis Type: Morgenstern-Price
Slip Surface Option: Entry and Exit
Horz Seismic Coef.: 0

Post-Earthquake, Entry Exit

Factor of Safety
- 1.5 - 1.6
- 1.6 - 1.7
- 1.7 - 1.8
- 1.8 - 1.9
- 1.9 - 2.0
- 2.0 - 2.1
- 2.1 - 2.2
- 2.2 - 2.3
- 2.3 - 2.4
- ≥ 2.4

Color	Name	Slope Stability Material Model	Unit Weight (pcf)	Minimum Strength (psf)	Tau/Sigma Ratio	Effective Cohesion (psf)	Effective Friction Angle (°)	Piezometric Line
	Alluvium (Qal)	Mohr-Coulomb	120			80	32	1
	Capistrano Formation (Tc)	Mohr-Coulomb	125			250	25	1
	Qal Liq (0.18)	SHANSEP	120	0	0.18			1
	Terrace Deposits (Qt)	Mohr-Coulomb	120			80	32	1
	Undocumented Artificial Fill (Qafu)	Mohr-Coulomb	120			80	32	

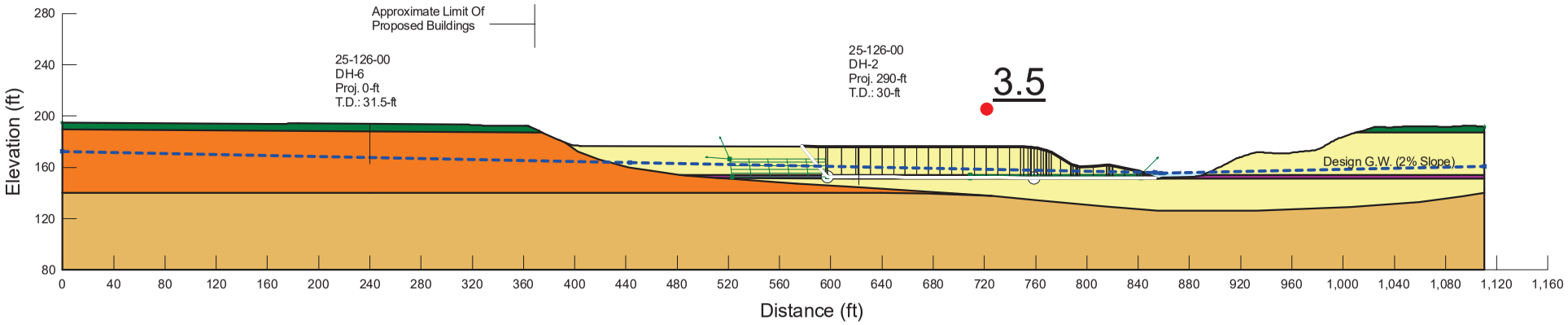


Project No. 25-126-00
Section B-B'
August 2025

Analysis Type: Morgenstern-Price
Slip Surface Option: Block
Horz Seismic Coef.: 0

Post Earthquake, box

Color	Name	Slope Stability Material Model	Unit Weight (pcf)	Minimum Strength (psf)	Tau/Sigma Ratio	Effective Cohesion (psf)	Effective Friction Angle (°)	Piezometric Line
	Alluvium (Qal)	Mohr-Coulomb	120			80	32	1
	Capistrano Formation (Tc)	Mohr-Coulomb	125			250	25	1
	Qal Liq (0.18)	SHANSEP	120	0	0.18			1
	Terrace Deposits (Qt)	Mohr-Coulomb	120			80	32	1
	Undocumented Artificial Fill (Qafu)	Mohr-Coulomb	120			80	32	



Project No. 25-126-00
Section B-B'
August 2025

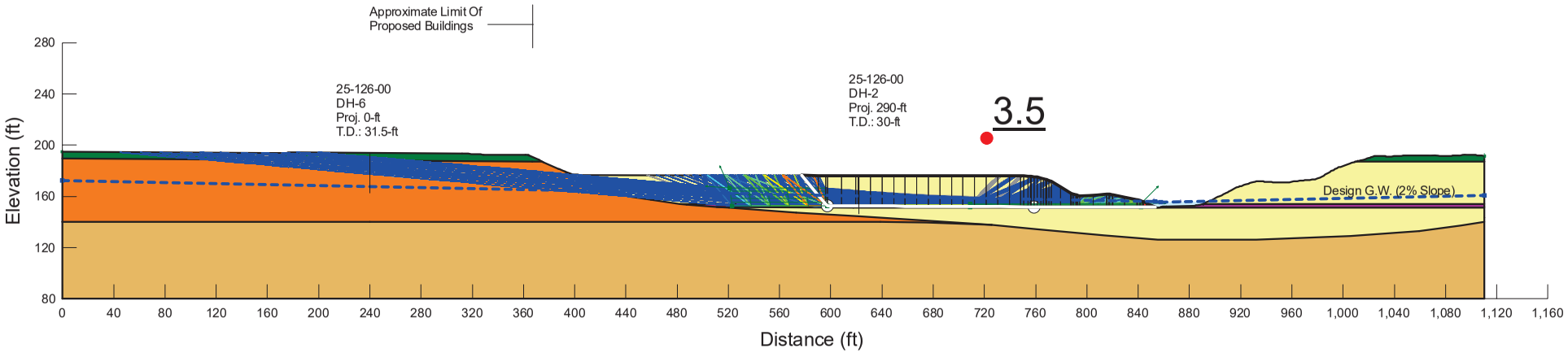
Analysis Type: Morgenstern-Price
Slip Surface Option: Block
Horz Seismic Coef.: 0

Post Earthquake, box

Factor of Safety

- 3.5 - 3.6
- 3.6 - 3.7
- 3.7 - 3.8
- 3.8 - 3.9
- 3.9 - 4.0
- 4.0 - 4.1
- 4.1 - 4.2
- 4.2 - 4.3
- 4.3 - 4.4
- ≥ 4.4

Color	Name	Slope Stability Material Model	Unit Weight (pcf)	Minimum Strength (psf)	Tau/Sigma Ratio	Effective Cohesion (psf)	Effective Friction Angle (°)	Piezometric Line
	Alluvium (Qal)	Mohr-Coulomb	120			80	32	1
	Capistrano Formation (Tc)	Mohr-Coulomb	125			250	25	1
	Qal Liq (0.18)	SHANSEP	120	0	0.18			1
	Terrace Deposits (Qt)	Mohr-Coulomb	120			80	32	1
	Undocumented Artificial Fill (Qafu)	Mohr-Coulomb	120			80	32	



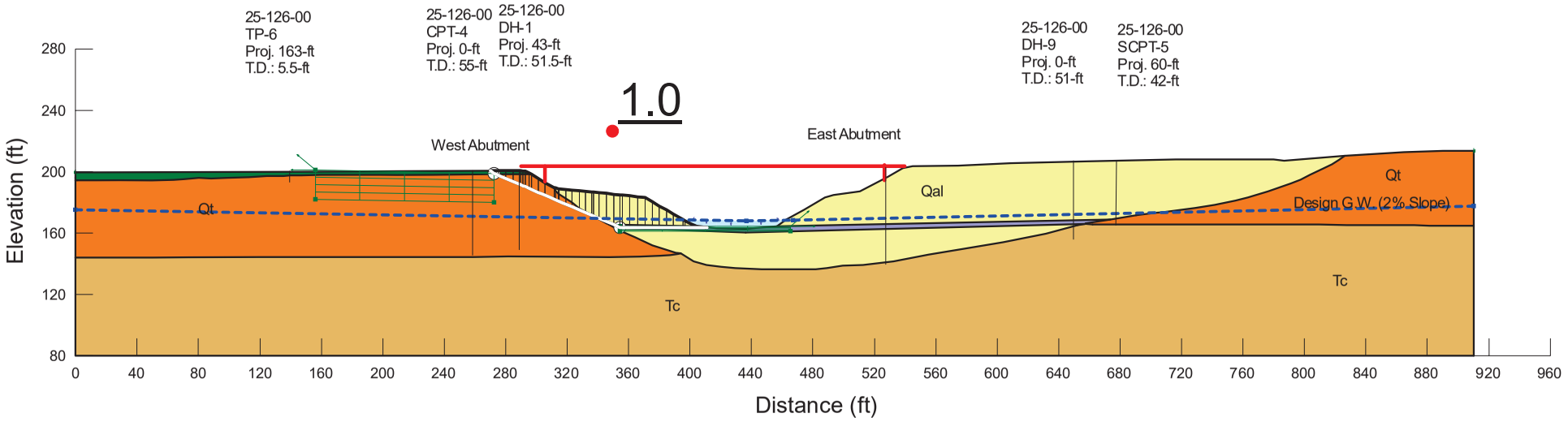
Yield Acceleration and Lateral Spread Deformations

Project No. 25-126-00
Section A-A'
August 2025

Analysis Type: Morgenstern-Price
Slip Surface Option: Block
Horz Seismic Coef.: 0.16

Color	Name	Slope Stability Material Model	Unit Weight (pcf)	Minimum Strength (psf)	Tau/Sigma Ratio	Effective Cohesion (psf)	Effective Friction Angle (°)	Piezometric Line
	Alluvium (Qal) (32,80)	Mohr-Coulomb	120			80	32	1
	Capistrano Formation (Tc)	Mohr-Coulomb	125			250	25	1
	Qal Liq (0.17)	SHANSEP	120	0	0.17			1
	Terrace Deposits (Qt)	Mohr-Coulomb	120			80	32	1
	Undocumented Artificial Fill (Qafu)	Mohr-Coulomb	120			80	32	

Psuedostatic Yield Acc., General Western Development Area - Qt



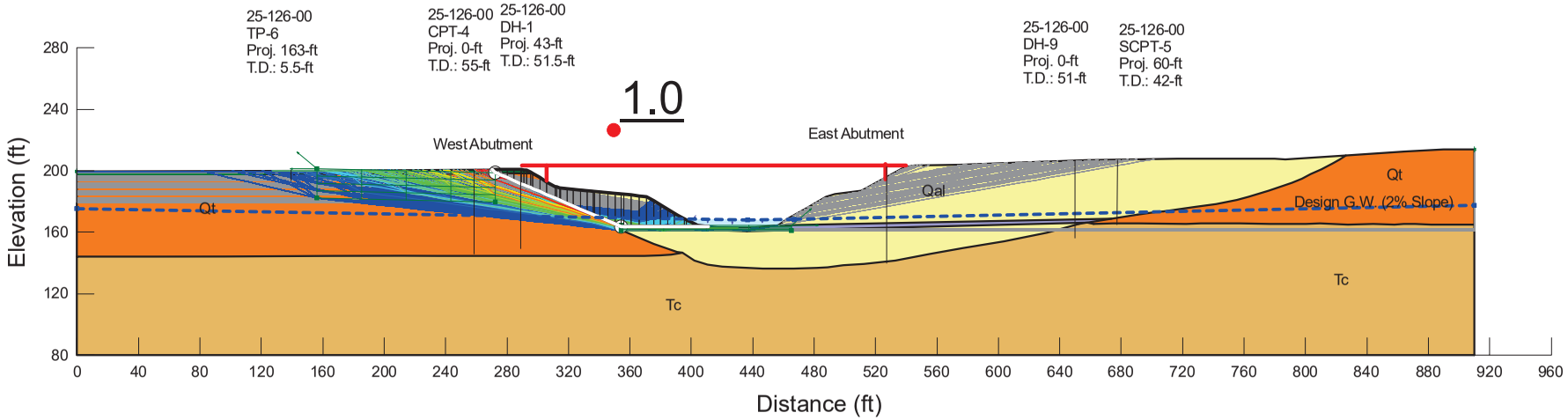
Project No. 25-126-00
Section A-A'
August 2025

Analysis Type: Morgenstern-Price
Slip Surface Option: Block
Horz Seismic Coef.: 0.16

Factor of Safety
- 1.0 - 1.1
- 1.1 - 1.2
- 1.2 - 1.3
- 1.3 - 1.4
- 1.4 - 1.5
- 1.5 - 1.6
- 1.6 - 1.7
- 1.7 - 1.8
- 1.8 - 1.9
- ≥ 1.9

Color	Name	Slope Stability Material Model	Unit Weight (pcf)	Minimum Strength (psf)	Tau/Sigma Ratio	Effective Cohesion (psf)	Effective Friction Angle (°)	Piezometric Line
	Alluvium (Qal) (32,80)	Mohr-Coulomb	120			80	32	1
	Capistrano Formation (Tc)	Mohr-Coulomb	125			250	25	1
	Qal Liq (0.17)	SHANSEP	120	0	0.17			1
	Terrace Deposits (Qt)	Mohr-Coulomb	120			80	32	1
	Undocumented Artificial Fill (Qafu)	Mohr-Coulomb	120			80	32	

Psuedostatic Yield Acc., General Western Development Area - Qt



General Western Development Area - Qt

DATA FOR SEISMIC SLOPE DISPLACEMENT ANALYSES

Project: 25-126-00

INPUT:

Slide h (ft):	8.00
Slide Vs (ft/sec):	931.0
Depth to Rx (km):	0.01
Ave. Vs(30) (m/s):	285
Ave. Site Class:	D
Modal Magnitude:	6.63
Modal Dist. (km):	12.4
ky:	0.160

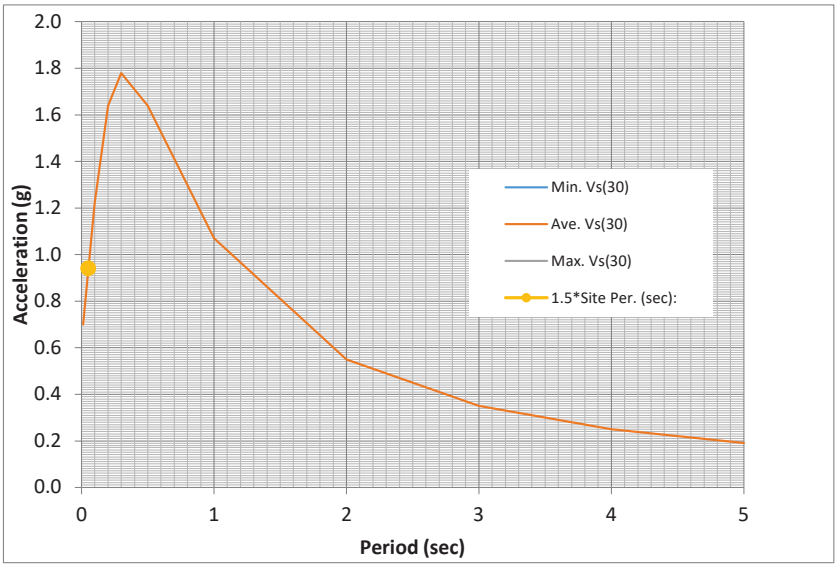
RESULTS:

Site Period, Ts (sec):	0.0344
1.5*Site Per. (sec):	0.0516
EQ Mean Period, Tm (sec):	0.566
Ts/Tm:	0.06
Estimated PGV (cm/sec):	119.06
Duration (D_5-D_{95}) (sec):	14.9
Sa(1.5Ts) Min $Vs_{(30)}$	0.0000
Sa(1.5Ts) Ave $Vs_{(30)}$	0.9401
Sa(1.5Ts) Max $Vs_{(30)}$	0.0000

5-Percent Damped Spectra

Period	Min. $Vs_{(30)}$	Ave. $Vs_{(30)}$	Max. $Vs_{(30)}$
0.01		0.7000	
0.1		1.2200	
0.2		1.6400	
0.3		1.7800	
0.5		1.6400	
1.0		1.0700	
2.0		0.5500	
3.0		0.3500	
4.0		0.2500	
5.0		0.1900	

Ts: 4h/Vs
Tm: Rathje et al. (2004)
PGV: Watson-Lamprey and Abrahamson (2006)
Duration: Bommer et al. (2009)



Slide Mass Area =	1124.0
Lengh of Slide Mass =	140.0
Average Slide H (ft) =	8.0

RESULT

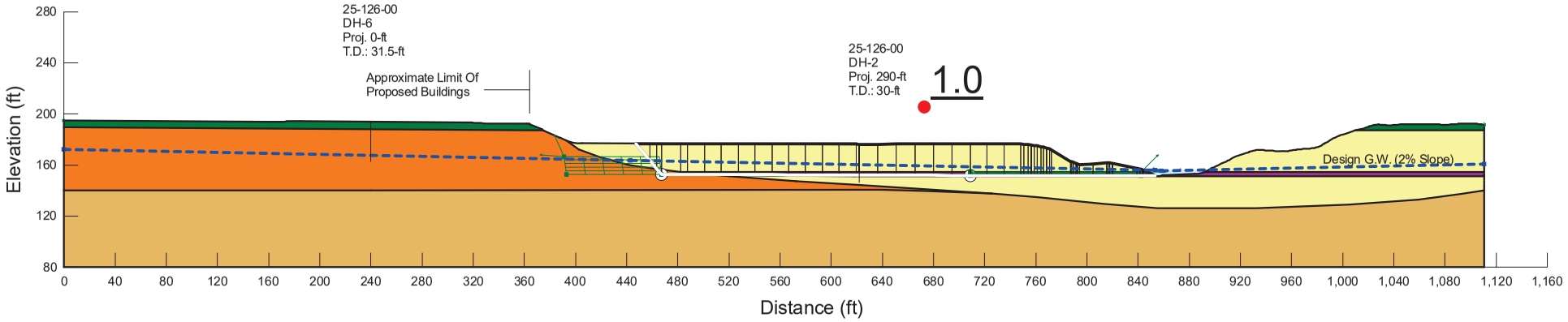
Average Displacement (in)	11.76

Project No. 25-126-00
Section B-B'
August 2025

Analysis Type: Morgenstern-Price
Slip Surface Option: Block
Horz Seismic Coef.: 0.16

Psuedo-static Yield Acc., General Western Development Area - Qal

Color	Name	Slope Stability Material Model	Unit Weight (pcf)	Minimum Strength (psf)	Tau/Sigma Ratio	Effective Cohesion (psf)	Effective Friction Angle (°)	Piezometric Line
	Alluvium (Qal)	Mohr-Coulomb	120			80	32	1
	Capistrano Formation (Tc)	Mohr-Coulomb	125			250	25	1
	Qal Liq (0.18)	SHANSEP	120	0	0.18			1
	Terrace Deposits (Qt)	Mohr-Coulomb	120			80	32	1
	Undocumented Artificial Fill (Qafu)	Mohr-Coulomb	120			80	32	



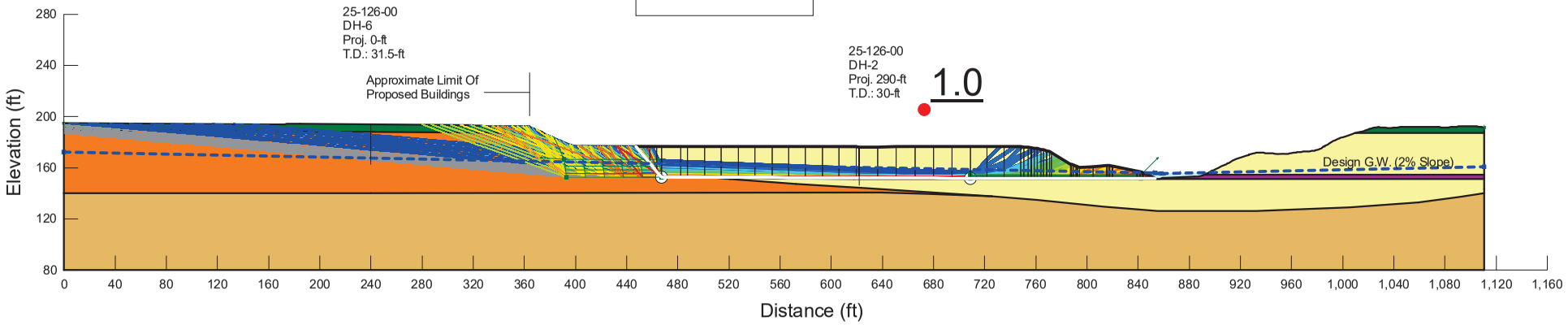
Project No. 25-126-00
Section B-B'
August 2025

Analysis Type: Morgenstern-Price
Slip Surface Option: Block
Horz Seismic Coef.: 0.16

Psuedo-static Yield Acc., General Western Development Area - Qal

Factor of Safety
- 1.0 - 1.1
- 1.1 - 1.2
- 1.2 - 1.3
- 1.3 - 1.4
- 1.4 - 1.5
- 1.5 - 1.6
- 1.6 - 1.7
- 1.7 - 1.8
- 1.8 - 1.9
- ≥ 1.9

Color	Name	Slope Stability Material Model	Unit Weight (pcf)	Minimum Strength (psf)	Tau/Sigma Ratio	Effective Cohesion (psf)	Effective Friction Angle (°)	Piezometric Line
	Alluvium (Qal)	Mohr-Coulomb	120			80	32	1
	Capistrano Formation (Tc)	Mohr-Coulomb	125			250	25	1
	Qal Liq (0.18)	SHANSEP	120	0	0.18			1
	Terrace Deposits (Qt)	Mohr-Coulomb	120			80	32	1
	Undocumented Artificial Fill (Qafu)	Mohr-Coulomb	120			80	32	



General Western Development Area - Qal

DATA FOR SEISMIC SLOPE DISPLACEMENT ANALYSES

Project: 25-126-00

INPUT:

Slide h (ft):	23.00
Slide Vs (ft/sec):	931.0
Depth to Rx (km):	0.01
Ave. Vs(30) (m/s):	285
Ave. Site Class:	D
Modal Magnitude:	6.63
Modal Dist. (km):	12.4
ky:	0.160

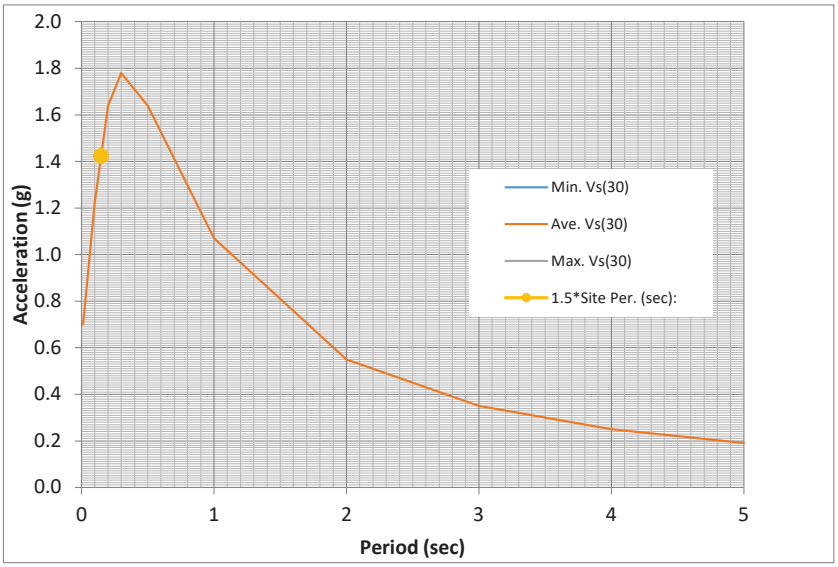
RESULTS:

Site Period, Ts (sec):	0.0988
1.5*Site Per. (sec):	0.1482
EQ Mean Period, Tm (sec):	0.566
Ts/Tm:	0.17
Estimated PGV (cm/sec):	119.06
Duration (D_5-D_{95}) (sec):	14.9
Sa(1.5Ts) Min $Vs_{(30)}$	0.0000
Sa(1.5Ts) Ave $Vs_{(30)}$	1.4226
Sa(1.5Ts) Max $Vs_{(30)}$	0.0000

5-Percent Damped Spectra

Period	Min. $Vs_{(30)}$	Ave. $Vs_{(30)}$	Max. $Vs_{(30)}$
0.01		0.7000	
0.1		1.2200	
0.2		1.6400	
0.3		1.7800	
0.5		1.6400	
1.0		1.0700	
2.0		0.5500	
3.0		0.3500	
4.0		0.2500	
5.0		0.1900	

Ts: 4h/Vs
Tm: Rathje et al. (2004)
PGV: Watson-Lamprey and Abrahamson (2006)
Duration: Bommer et al. (2009)



Slide Mass Area =	1124.0
Lengh of Slide Mass =	140.0
Average Slide H (ft) =	8.0

RESULT

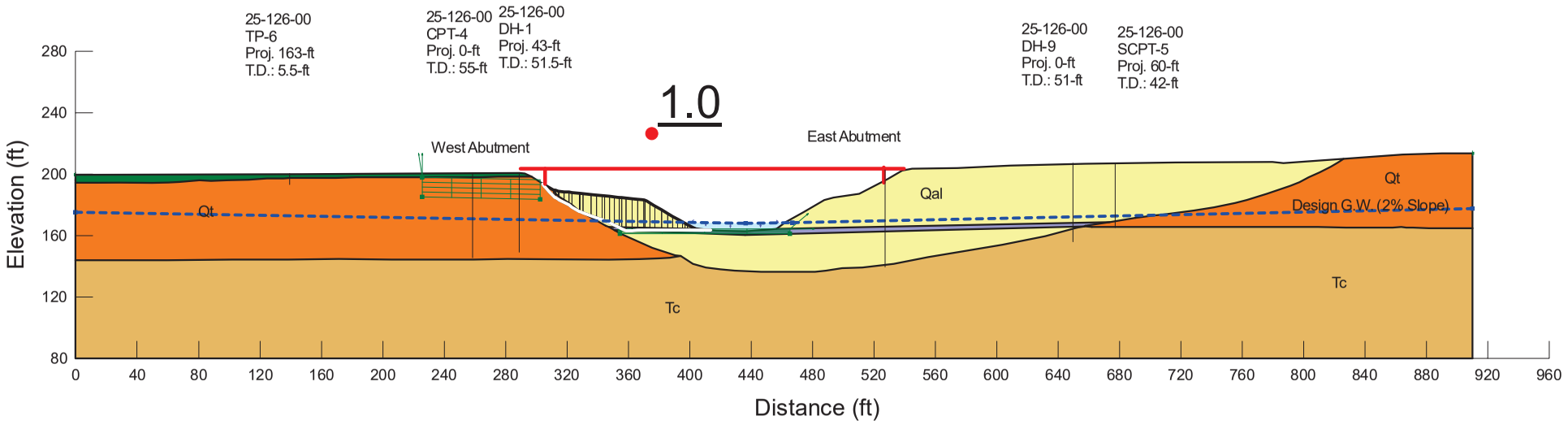
Average Displacement (in)	14.31

Project No. 25-126-00
Section A-A'
August 2025

Analysis Type: Morgenstern-Price
Slip Surface Option: Block
Horz Seismic Coef.: 0.1

Color	Name	Slope Stability Material Model	Unit Weight (pcf)	Minimum Strength (psf)	Tau/Sigma Ratio	Effective Cohesion (psf)	Effective Friction Angle (°)	Piezometric Line
	Alluvium (Qal)	Mohr-Coulomb	120			80	32	1
	Capistrano Formation (Tc)	Mohr-Coulomb	125			250	25	1
	Qal Liq (0.17)	SHANSEP	120	0	0.17			1
	Terrace Deposits (Qt)	Mohr-Coulomb	120			80	32	1
	Undocumented Artificial Fill (Qafu)	Mohr-Coulomb	120			80	32	

Psuedostatic, West Abutment, Yield Acceleration



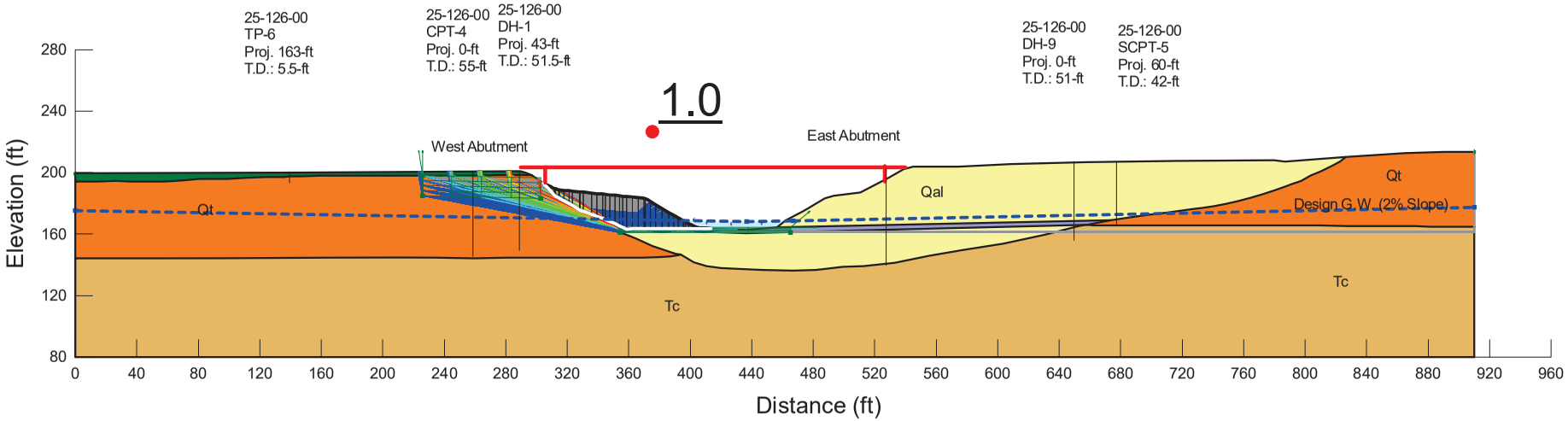
Project No. 25-126-00
Section A-A'
August 2025

Analysis Type: Morgenstern-Price
Slip Surface Option: Block
Horz Seismic Coef.: 0.1

Factor of Safety
- 0.9 - 1.0
- 1.0 - 1.1
- 1.1 - 1.2
- 1.2 - 1.3
- 1.3 - 1.4
- 1.4 - 1.5
- 1.5 - 1.6
- 1.6 - 1.7
- 1.7 - 1.8
- ≥ 1.8

Color	Name	Slope Stability Material Model	Unit Weight (pcf)	Minimum Strength (psf)	Tau/Sigma Ratio	Effective Cohesion (psf)	Effective Friction Angle (°)	Piezometric Line
	Alluvium (Qal) (32,80)	Mohr-Coulomb	120			80	32	1
	Capistrano Formation (Tc)	Mohr-Coulomb	125			250	25	1
	Qal Liq (0.17)	SHANSEP	120	0	0.17			1
	Terrace Deposits (Qt)	Mohr-Coulomb	120			80	32	1
	Undocumented Artificial Fill (Qafu)	Mohr-Coulomb	120			80	32	

Psuedostatic, West Abutment, Yield Acceleration



Western Bridge Abutment

DATA FOR SEISMIC SLOPE DISPLACEMENT ANALYSES

Project: 25-126-00

INPUT:

Slide h (ft):	8.00
Slide Vs (ft/sec):	931.0
Depth to Rx (km):	0.01
Ave. Vs(30) (m/s):	285
Ave. Site Class:	D
Modal Magnitude:	6.63
Modal Dist. (km):	12.4
ky:	0.100

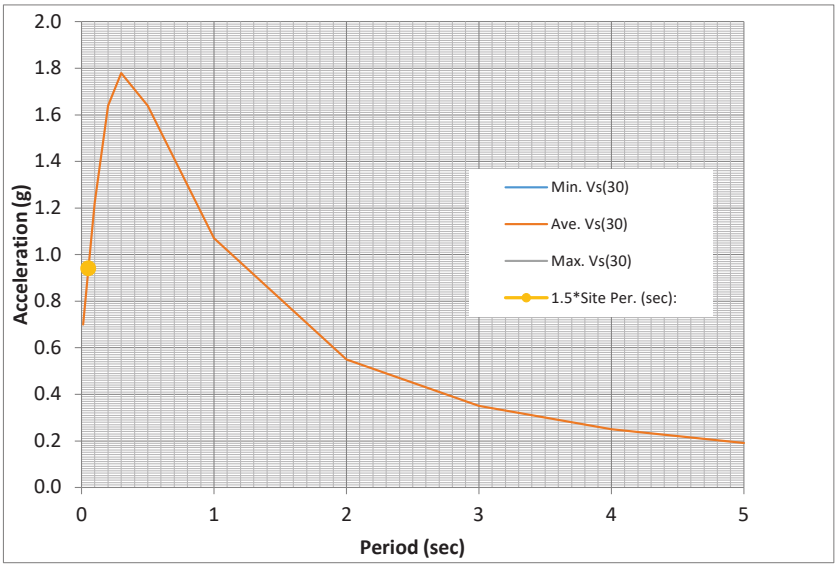
RESULTS:

Site Period, Ts (sec):	0.0344
1.5*Site Per. (sec):	0.0516
EQ Mean Period, Tm (sec):	0.566
Ts/Tm:	0.06
Estimated PGV (cm/sec):	119.06
Duration (D_5-D_{95}) (sec):	14.9
Sa(1.5Ts) Min $Vs_{(30)}$	0.0000
Sa(1.5Ts) Ave $Vs_{(30)}$	0.9401
Sa(1.5Ts) Max $Vs_{(30)}$	0.0000

5-Percent Damped Spectra

Period	Min. $Vs_{(30)}$	Ave. $Vs_{(30)}$	Max. $Vs_{(30)}$
0.01		0.7000	
0.1		1.2200	
0.2		1.6400	
0.3		1.7800	
0.5		1.6400	
1.0		1.0700	
2.0		0.5500	
3.0		0.3500	
4.0		0.2500	
5.0		0.1900	

Ts: 4h/Vs
Tm: Rathje et al. (2004)
PGV: Watson-Lamprey and Abrahamson (2006)
Duration: Bommer et al. (2009)



Slide Mass Area =	1124.0
Lengh of Slide Mass =	140.0
Average Slide H (ft) =	8.0

RESULT

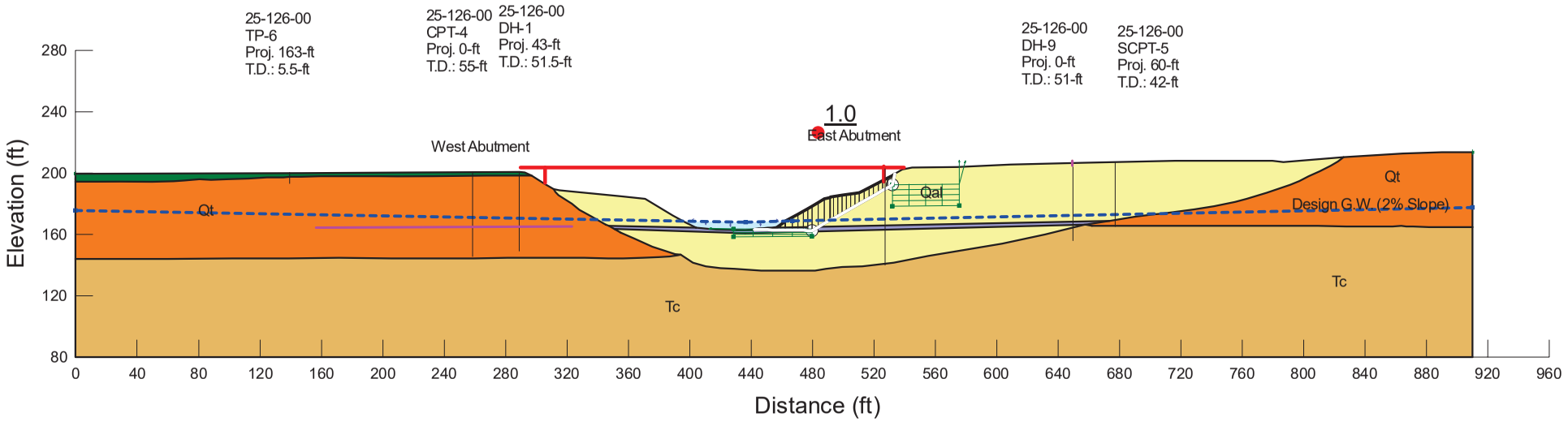
Average Displacement (in)	21.92

Project No. 25-126-00
Section A-A'
August 2025

Analysis Type: Morgenstern-Price
Slip Surface Option: Block
Horz Seismic Coef.: 0.075

Psuedo-static, East Abutment, Yield Acceleration

Color	Name	Slope Stability Material Model	Unit Weight (pcf)	Minimum Strength (psf)	Tau/Sigma Ratio	Effective Cohesion (psf)	Effective Friction Angle (°)	Piezometric Line
	Alluvium (Qal)	Mohr-Coulomb	120			80	32	1
	Capistrano Formation (Tc)	Mohr-Coulomb	125			250	25	1
	Qal Liq (0.17)	SHANSEP	120	0	0.17			1
	Terrace Deposits (Qt)	Mohr-Coulomb	120			80	32	1
	Undocumented Artificial Fill (Qafu)	Mohr-Coulomb	120			80	32	



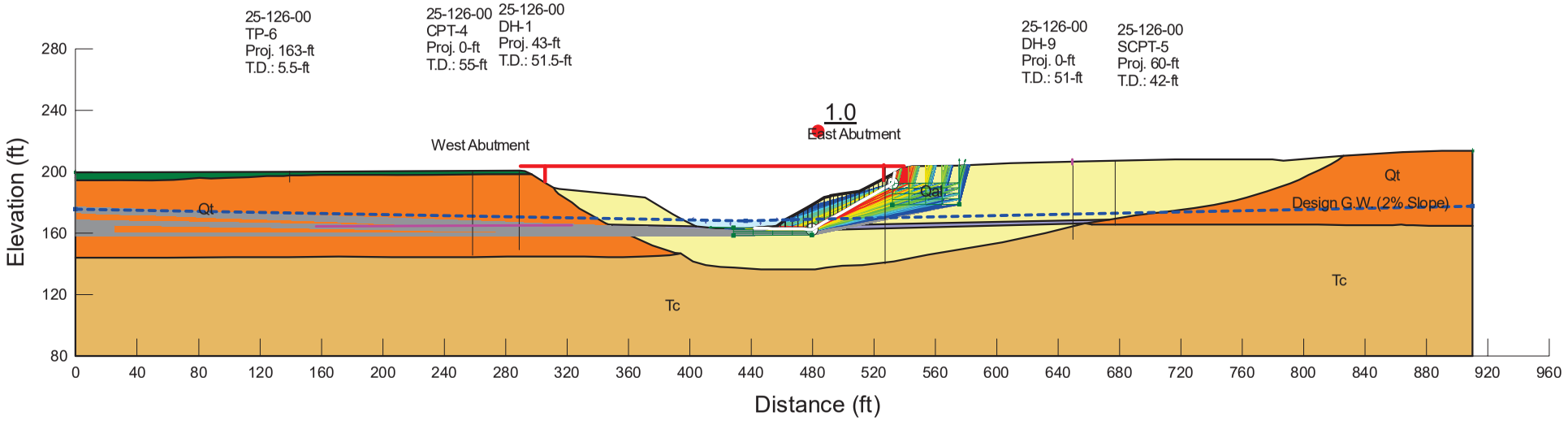
Project No. 25-126-00
Section A-A'
August 2025

Analysis Type: Morgenstern-Price
Slip Surface Option: Block
Horz Seismic Coef.: 0.075

Factor of Safety
- 1.0 - 1.1
- 1.1 - 1.2
- 1.2 - 1.3
- 1.3 - 1.4
- 1.4 - 1.5
- 1.5 - 1.6
- 1.6 - 1.7
- 1.7 - 1.8
- 1.8 - 1.9
- ≥ 1.9

Color	Name	Slope Stability Material Model	Unit Weight (pcf)	Minimum Strength (psf)	Tau/Sigma Ratio	Effective Cohesion (psf)	Effective Friction Angle (°)	Piezometric Line
	Alluvium (Qal)	Mohr-Coulomb	120			80	32	1
	Capistrano Formation (Tc)	Mohr-Coulomb	125			250	25	1
	Qal Liq (0.17)	SHANSEP	120	0	0.17			1
	Terrace Deposits (Qt)	Mohr-Coulomb	120			80	32	1
	Undocumented Artificial Fill (Qafu)	Mohr-Coulomb	120			80	32	

Psuedo-static, East Abutment, Yield Acceleration



Eastern Bridge Abutment

DATA FOR SEISMIC SLOPE DISPLACEMENT ANALYSES

Project: 25-126-00

INPUT:

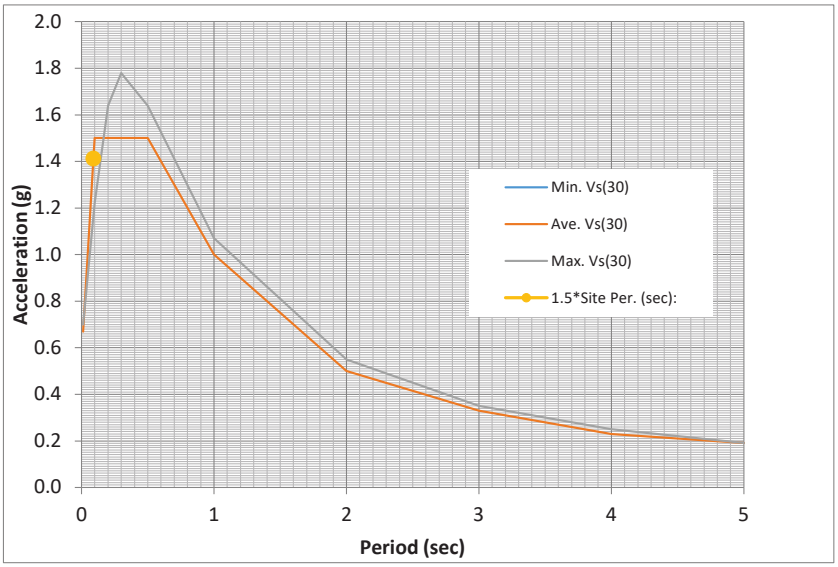
Slide h (ft):	11.00
Slide Vs (ft/sec):	730.0
Depth to Rx (km):	0.01
Ave. Vs(30) (m/s):	285
Ave. Site Class:	D
Modal Magnitude:	6.63
Modal Dist. (km):	12.4
ky:	0.075

RESULTS:

Site Period, Ts (sec):	0.0603
1.5*Site Per. (sec):	0.0904
EQ Mean Period, Tm (sec):	0.566
Ts/Tm:	0.11
Estimated PGV (cm/sec):	112.55
Duration (D_5-D_{95}) (sec):	14.9
Sa(1.5Ts) Min $Vs_{(30)}$	0.0000
Sa(1.5Ts) Ave $Vs_{(30)}$	1.4116
Sa(1.5Ts) Max $Vs_{(30)}$	1.1646

5-Percent Damped Spectra

Period	Min. $Vs_{(30)}$	Ave. $Vs_{(30)}$	Max. $Vs_{(30)}$
0.01		0.6700	0.7000
0.1		1.5000	1.2200
0.2		1.5000	1.6400
0.3		1.5000	1.7800
0.5		1.5000	1.6400
1.0		1.0000	1.0700
2.0		0.5000	0.55000
3.0		0.3300	0.35000
4.0		0.2300	0.25000
5.0		0.1900	0.19000



Ts: 4h/Vs
Tm: Rathje et al. (2004)
PGV: Watson-Lamprey and Abrahamson (2006)
Duration: Bommer et al. (2009)

Slide Mass Area =	1123.9
Lengh of Slide Mass =	110.0
Average Slide H (ft) =	10.2

RESULT

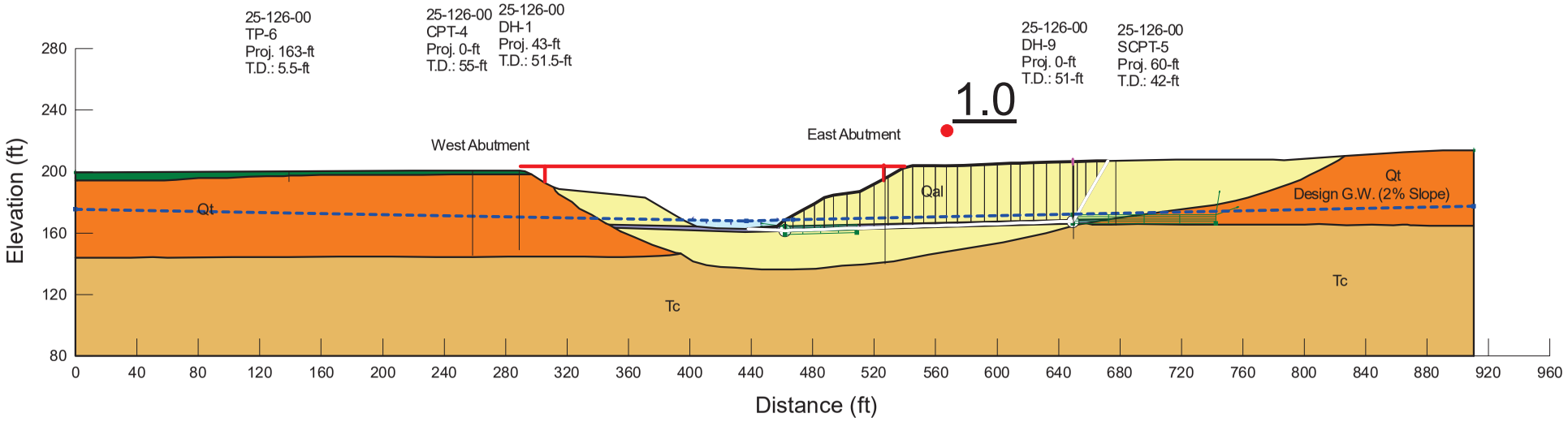
Average Displacement (in)	30.19

Project No. 25-126-00
Section A-A'
August 2025

Analysis Type: Morgenstern-Price
Slip Surface Option: Block
Horz Seismic Coef.: 0.09

Psuedo-static, Eastern Development Area, Yield Acceleration

Color	Name	Slope Stability Material Model	Unit Weight (pcf)	Minimum Strength (psf)	Tau/Sigma Ratio	Effective Cohesion (psf)	Effective Friction Angle (°)	Piezometric Line
	Alluvium (Qal)	Mohr-Coulomb	120			80	32	1
	Capistrano Formation (Tc)	Mohr-Coulomb	125			250	25	1
	Qal Liq (0.17)	SHANSEP	120	0	0.17			1
	Terrace Deposits (Qt)	Mohr-Coulomb	120			80	32	1
	Undocumented Artificial Fill (Qafu)	Mohr-Coulomb	120			80	32	



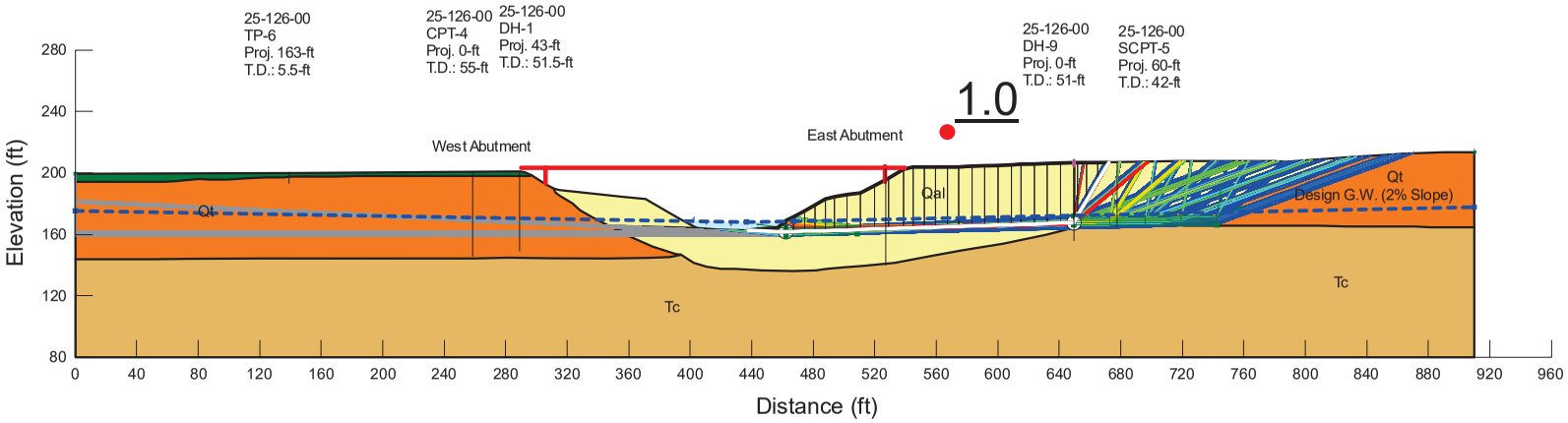
Project No. 25-126-00
Section A-A'
August 2025

Analysis Type: Morgenstern-Price
Slip Surface Option: Block
Horz Seismic Coef.: 0.09

Factor of Safety
- 1.0 - 1.1
- 1.1 - 1.2
- 1.2 - 1.3
- 1.3 - 1.4
- 1.4 - 1.5
- 1.5 - 1.6
- 1.6 - 1.7
- 1.7 - 1.8
- 1.8 - 1.9
- ≥ 1.9

Color	Name	Slope Stability Material Model	Unit Weight (pcf)	Minimum Strength (psf)	Tau/Sigma Ratio	Effective Cohesion (psf)	Effective Friction Angle (°)	Piezometric Line
	Alluvium (Qal)	Mohr-Coulomb	120			80	32	1
	Capistrano Formation (Tc)	Mohr-Coulomb	125			250	25	1
	Qal Liq (0.17)	SHANSEP	120	0	0.17			1
	Terrace Deposits (Qt)	Mohr-Coulomb	120			80	32	1
	Undocumented Artificial Fill (Qafu)	Mohr-Coulomb	120			80	32	

Psuedo-static, Eastern Development Area, Yield Acceleration



Eastern Development Area

DATA FOR SEISMIC SLOPE DISPLACEMENT ANALYSES

Project: 25-126-00

INPUT:

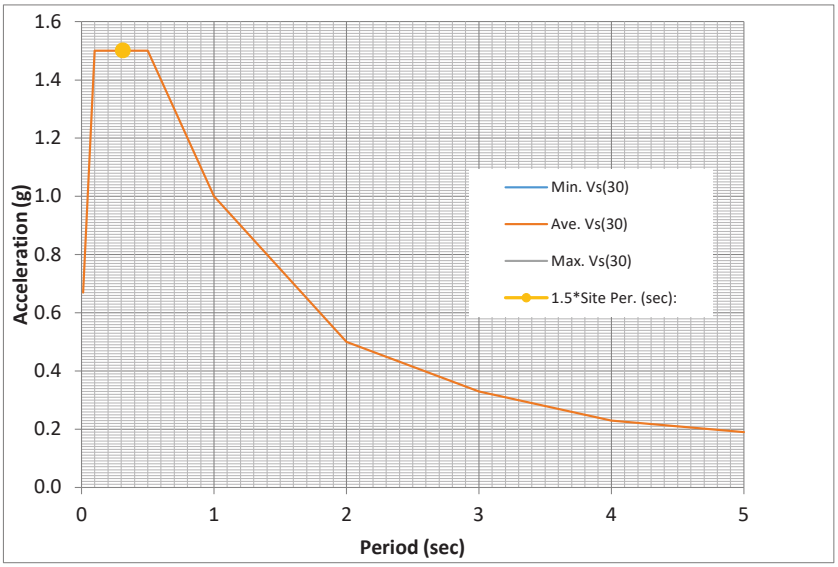
Slide h (ft):	38.00
Slide Vs (ft/sec):	730.0
Depth to Rx (km):	0.01
Ave. Vs(30) (m/s):	285
Ave. Site Class:	D
Modal Magnitude:	6.63
Modal Dist. (km):	12.4
ky:	0.090

RESULTS:

Site Period, Ts (sec):	0.2082
1.5*Site Per. (sec):	0.3123
EQ Mean Period, Tm (sec):	0.566
Ts/Tm:	0.37
Estimated PGV (cm/sec):	112.55
Duration (D_5-D_{95}) (sec):	14.9
Sa(1.5Ts) Min $Vs_{(30)}$	0.0000
Sa(1.5Ts) Ave $Vs_{(30)}$	1.5000
Sa(1.5Ts) Max $Vs_{(30)}$	0.0000

5-Percent Damped Spectra

Period	Min. $Vs_{(30)}$	Ave. $Vs_{(30)}$	Max. $Vs_{(30)}$
0.01		0.6700	
0.1		1.5000	
0.2		1.5000	
0.3		1.5000	
0.5		1.5000	
1.0		1.0000	
2.0		0.5000	
3.0		0.3300	
4.0		0.2300	
5.0		0.1900	



Ts: 4h/Vs
Tm: Rathje et al. (2004)
PGV: Watson-Lamprey and Abrahamson (2006)
Duration: Bommer et al. (2009)

Slide Mass Area =	1123.9
Lengh of Slide Mass =	110.0
Average Slide H (ft) =	10.2

RESULT

Average Displacement (in)	30.07

APPENDIX E

Static Settlement Analyses

SETTLEMENT CALCULATION SUMMARY

Applied Overburden Pressure	Pressure (psf)
Load 1:10-ft of 125 pcf fill (to achieve design grade)	1250
Load 2: building load (assumed)	250
Total increase in bearing pressure	1500

Test Location/Depth	Geologic Unit	Settlement (in)
DH-1 @ 7.5 ft	Qt	3.0
DH-2 @ 7.5 ft	Qal	0.1
DH-4 @ 2.5 ft, 7.5 ft	Qt	2.7
DH-5 @ 5 ft, 10 ft	Qt	0.7
DH-7 @ 5 ft	Qt	1.0
DH-8 @ 2.5 ft	Qt	1.6
DH-9 @ 5 ft	Qal	1.2
DH-11 @ 5 ft	Qt	1.0

Summary	Settlement (in)
All Samples	1.4
Alluvium (Qal) Samples	0.7
Terrace (Qt) Samples	1.7

SETTLEMENT CALCULATIONS

Project:	**NW Open space**
Project Number:	**25-126-00**
Date:	**July 25, 2025**

Sample:	**DH-1 @ 7.5 ft**

Raise in Grade (ft):	10	
Building Loading (psf):	250	
Unit Weight of Fill (pcf):	125	Size/2
Width (ft)=	50	25
Length (ft)=	50	25
Depth (ft)=	0	
Bearing Press (psf)=	1500	
Poisson's Ratio=	0.35	
Groundwater Depth (ft)=	37.7	

Layer Thickness (ft):	0.4

Material:	Layer 1	Layer 2	Layer 3	Layer 4	Layer 5	BR
σ_p (psf)=	3000					10000
C_{cc} (%)=	7.7					0.05
C_{cs} (%)=	0.9					0.05
γ_{wet} (pcf) =	106.5					125
C_v -Sq(t) (in^2/min)						
Layer Bottom Depth (ft)	51.5					1000
Soil Type	Qt					Bedrock

Consolidation (in)
2.962

TOTAL SETTLEMENT 3.0 INCHES

Final Settlement Calculations

Depth (ft)	Ver. Stress (psf)	M	N	V	V1	Stress Due to Fill Pressure (Westergaard) (psf)	Final Stress With Fill (psf)	σ_p (psf)	C_{ac} (%)	C_{as} (%)	Layer Settlement (in)
0.2	21.3	125.00	125.00	31251.00	##########	1494.81	1516.11	3000.00	7.67	0.85	0.08
0.6	63.9	41.67	41.67	3473.22	3014081.79	1484.43	1548.33	3000.00	7.67	0.85	0.06
1	106.5	25.00	25.00	1251.00	390625.00	1474.05	1580.55	3000.00	7.67	0.85	0.05
1.4	149.1	17.86	17.86	638.76	101682.89	1463.68	1612.78	3000.00	7.67	0.85	0.04
1.8	191.7	13.89	13.89	386.80	37210.89	1453.31	1645.01	3000.00	7.67	0.85	0.04
2.2	234.3	11.36	11.36	259.26	16675.13	1442.95	1677.25	3000.00	7.67	0.85	0.03
2.6	276.9	9.62	9.62	185.91	8548.04	1432.60	1709.50	3000.00	7.67	0.85	0.03
3	319.5	8.33	8.33	139.89	4822.53	1422.26	1741.76	3000.00	7.67	0.85	0.03
3.4	362.1	7.35	7.35	109.13	2923.10	1411.93	1774.03	3000.00	7.67	0.85	0.03
3.8	404.7	6.58	6.58	87.57	1873.38	1401.61	1806.31	3000.00	7.67	0.85	0.03
4.2	447.3	5.95	5.95	71.86	1255.34	1391.31	1838.61	3000.00	7.67	0.85	0.03
4.6	489.9	5.43	5.43	60.07	872.43	1381.02	1870.92	3000.00	7.67	0.85	0.02
5	532.5	5.00	5.00	51.00	625.00	1370.75	1903.25	3000.00	7.67	0.85	0.02
5.4	575.1	4.63	4.63	43.87	459.39	1360.49	1935.59	3000.00	7.67	0.85	0.02
5.8	617.7	4.31	4.31	38.16	345.18	1350.26	1967.96	3000.00	7.67	0.85	0.02
6.2	660.3	4.03	4.03	33.52	264.36	1340.05	2000.35	3000.00	7.67	0.85	0.02
6.6	702.9	3.79	3.79	29.70	205.87	1329.87	2032.77	3000.00	7.67	0.85	0.02
7	745.5	3.57	3.57	26.51	162.69	1319.70	2065.20	3000.00	7.67	0.85	0.02
7.4	788.1	3.38	3.38	23.83	130.27	1309.57	2097.67	3000.00	7.67	0.85	0.02
7.8	830.7	3.21	3.21	21.55	105.53	1299.46	2130.16	3000.00	7.67	0.85	0.02
8.2	873.3	3.05	3.05	19.59	86.40	1289.38	2162.68	3000.00	7.67	0.85	0.02
8.6	915.9	2.91	2.91	17.90	71.41	1279.33	2195.23	3000.00	7.67	0.85	0.02
9	958.5	2.78	2.78	16.43	59.54	1269.31	2227.81	3000.00	7.67	0.85	0.01
9.4	1001.1	2.66	2.66	15.15	50.03	1259.32	2260.42	3000.00	7.67	0.85	0.01
9.8	1043.7	2.55	2.55	14.02	42.35	1249.36	2293.06	3000.00	7.67	0.85	0.01
10.2	1086.3	2.45	2.45	13.01	36.09	1239.45	2325.75	3000.00	7.67	0.85	0.01
10.6	1128.9	2.36	2.36	12.12	30.94	1229.56	2358.46	3000.00	7.67	0.85	0.01
11	1171.5	2.27	2.27	11.33	26.68	1219.72	2391.22	3000.00	7.67	0.85	0.01
11.4	1214.1	2.19	2.19	10.62	23.13	1209.91	2424.01	3000.00	7.67	0.85	0.01
11.8	1256.7	2.12	2.12	9.98	20.15	1200.14	2456.84	3000.00	7.67	0.85	0.01
12.2	1299.3	2.05	2.05	9.40	17.63	1190.41	2489.71	3000.00	7.67	0.85	0.01
12.6	1341.9	1.98	1.98	8.87	15.50	1180.73	2522.63	3000.00	7.67	0.85	0.01
13	1384.5	1.92	1.92	8.40	13.68	1171.09	2555.59	3000.00	7.67	0.85	0.01
13.4	1427.1	1.87	1.87	7.96	12.12	1161.49	2588.59	3000.00	7.67	0.85	0.01
13.8	1469.7	1.81	1.81	7.56	10.77	1151.93	2621.63	3000.00	7.67	0.85	0.01
14.2	1512.3	1.76	1.76	7.20	9.61	1142.42	2654.72	3000.00	7.67	0.85	0.01
14.6	1554.9	1.71	1.71	6.86	8.60	1132.96	2687.86	3000.00	7.67	0.85	0.01
15	1597.5	1.67	1.67	6.56	7.72	1123.55	2721.05	3000.00	7.67	0.85	0.01
15.4	1640.1	1.62	1.62	6.27	6.95	1114.18	2754.28	3000.00	7.67	0.85	0.01
15.8	1682.7	1.58	1.58	6.01	6.27	1104.86	2787.56	3000.00	7.67	0.85	0.01
16.2	1725.3	1.54	1.54	5.76	5.67	1095.59	2820.89	3000.00	7.67	0.85	0.01
16.6	1767.9	1.51	1.51	5.54	5.14	1086.38	2854.28	3000.00	7.67	0.85	0.01
17	1810.5	1.47	1.47	5.33	4.68	1077.21	2887.71	3000.00	7.67	0.85	0.01
17.4	1853.1	1.44	1.44	5.13	4.26	1068.10	2921.20	3000.00	7.67	0.85	0.01
17.8	1895.7	1.40	1.40	4.95	3.89	1059.04	2954.74	3000.00	7.67	0.85	0.01
18.2	1938.3	1.37	1.37	4.77	3.56	1050.04	2988.34	3000.00	7.67	0.85	0.01
18.6	1980.9	1.34	1.34	4.61	3.26	1041.09	3021.99	3000.00	7.67	0.85	0.01
19	2023.5	1.32	1.32	4.46	3.00	1032.19	3055.69	3000.00	7.67	0.85	0.01
19.4	2066.1	1.29	1.29	4.32	2.76	1023.35	3089.45	3000.00	7.67	0.85	0.01
19.8	2108.7	1.26	1.26	4.19	2.54	1014.57	3123.27	3000.00	7.67	0.85	0.01
20.2	2151.3	1.24	1.24	4.06	2.35	1005.84	3157.14	3000.00	7.67	0.85	0.01
20.6	2193.9	1.21	1.21	3.95	2.17	997.17	3191.07	3000.00	7.67	0.85	0.02
21	2236.5	1.19	1.19	3.83	2.01	988.55	3225.05	3000.00	7.67	0.85	0.02
21.4	2279.1	1.17	1.17	3.73	1.86	980.00	3259.10	3000.00	7.67	0.85	0.02
21.8	2321.7	1.15	1.15	3.63	1.73	971.50	3293.20	3000.00	7.67	0.85	0.02
22.2	2364.3	1.13	1.13	3.54	1.61	963.07	3327.37	3000.00	7.67	0.85	0.02
22.6	2406.9	1.11	1.11	3.45	1.50	954.69	3361.59	3000.00	7.67	0.85	0.02
23	2449.5	1.09	1.09	3.36	1.40	946.37	3395.87	3000.00	7.67	0.85	0.02
23.4	2492.1	1.07	1.07	3.28	1.30	938.11	3430.21	3000.00	7.67	0.85	0.02
23.8	2534.7	1.05	1.05	3.21	1.22	929.91	3464.61	3000.00	7.67	0.85	0.03
24.2	2577.3	1.03	1.03	3.13	1.14	921.78	3499.08	3000.00	7.67	0.85	0.03

24.6	2619.9	1.02	1.02	3.07	1.07	913.70	3533.60	3000.00	7.67	0.85	0.03
25	2662.5	1.00	1.00	3.00	1.00	905.68	3568.18	3000.00	7.67	0.85	0.03
25.4	2705.1	0.98	0.98	2.94	0.94	897.73	3602.83	3000.00	7.67	0.85	0.03
25.8	2747.7	0.97	0.97	2.88	0.88	889.83	3637.53	3000.00	7.67	0.85	0.03
26.2	2790.3	0.95	0.95	2.82	0.83	882.00	3672.30	3000.00	7.67	0.85	0.03
26.6	2832.9	0.94	0.94	2.77	0.78	874.23	3707.13	3000.00	7.67	0.85	0.03
27	2875.5	0.93	0.93	2.71	0.74	866.52	3742.02	3000.00	7.67	0.85	0.04
27.4	2918.1	0.91	0.91	2.66	0.69	858.87	3776.97	3000.00	7.67	0.85	0.04
27.8	2960.7	0.90	0.90	2.62	0.65	851.29	3811.99	3000.00	7.67	0.85	0.04
28.2	3003.3	0.89	0.89	2.57	0.62	843.76	3847.06	3000.00	7.67	0.85	0.04
28.6	3045.9	0.87	0.87	2.53	0.58	836.30	3882.20	3000.00	7.67	0.85	0.04
29	3088.5	0.86	0.86	2.49	0.55	828.90	3917.40	3000.00	7.67	0.85	0.04
29.4	3131.1	0.85	0.85	2.45	0.52	821.56	3952.66	3000.00	7.67	0.85	0.04
29.8	3173.7	0.84	0.84	2.41	0.50	814.29	3987.99	3000.00	7.67	0.85	0.04
30.2	3216.3	0.83	0.83	2.37	0.47	807.07	4023.37	3000.00	7.67	0.85	0.04
30.6	3258.9	0.82	0.82	2.33	0.45	799.92	4058.82	3000.00	7.67	0.85	0.04
31	3301.5	0.81	0.81	2.30	0.42	792.83	4094.33	3000.00	7.67	0.85	0.03
31.4	3344.1	0.80	0.80	2.27	0.40	785.80	4129.90	3000.00	7.67	0.85	0.03
31.8	3386.7	0.79	0.79	2.24	0.38	778.83	4165.53	3000.00	7.67	0.85	0.03
32.2	3429.3	0.78	0.78	2.21	0.36	771.92	4201.22	3000.00	7.67	0.85	0.03
32.6	3471.9	0.77	0.77	2.18	0.35	765.08	4236.98	3000.00	7.67	0.85	0.03
33	3514.5	0.76	0.76	2.15	0.33	758.29	4272.79	3000.00	7.67	0.85	0.03
33.4	3557.1	0.75	0.75	2.12	0.31	751.57	4308.67	3000.00	7.67	0.85	0.03
33.8	3599.7	0.74	0.74	2.09	0.30	744.90	4344.60	3000.00	7.67	0.85	0.03
34.2	3642.3	0.73	0.73	2.07	0.29	738.30	4380.60	3000.00	7.67	0.85	0.03
34.6	3684.9	0.72	0.72	2.04	0.27	731.75	4416.65	3000.00	7.67	0.85	0.03
35	3727.5	0.71	0.71	2.02	0.26	725.27	4452.77	3000.00	7.67	0.85	0.03
35.4	3770.1	0.71	0.71	2.00	0.25	718.84	4488.94	3000.00	7.67	0.85	0.03
35.8	3812.7	0.70	0.70	1.98	0.24	712.48	4525.18	3000.00	7.67	0.85	0.03
36.2	3855.3	0.69	0.69	1.95	0.23	706.17	4561.47	3000.00	7.67	0.85	0.03
36.6	3897.9	0.68	0.68	1.93	0.22	699.93	4597.83	3000.00	7.67	0.85	0.03
37	3940.5	0.68	0.68	1.91	0.21	693.74	4634.24	3000.00	7.67	0.85	0.03
37.4	3983.1	0.67	0.67	1.89	0.20	687.60	4670.70	3000.00	7.67	0.85	0.03
37.8	4019.46	0.66	0.66	1.87	0.19	681.53	4700.99	3000.00	7.67	0.85	0.03
38.2	4037.1	0.65	0.65	1.86	0.18	675.52	4712.62	3000.00	7.67	0.85	0.02
38.6	4054.74	0.65	0.65	1.84	0.18	669.56	4724.30	3000.00	7.67	0.85	0.02
39	4072.38	0.64	0.64	1.82	0.17	663.66	4736.04	3000.00	7.67	0.85	0.02
39.4	4090.02	0.63	0.63	1.81	0.16	657.81	4747.83	3000.00	7.67	0.85	0.02
39.8	4107.66	0.63	0.63	1.79	0.16	652.02	4759.68	3000.00	7.67	0.85	0.02
40.2	4125.3	0.62	0.62	1.77	0.15	646.29	4771.59	3000.00	7.67	0.85	0.02
40.6	4142.94	0.62	0.62	1.76	0.14	640.61	4783.55	3000.00	7.67	0.85	0.02
41	4160.58	0.61	0.61	1.74	0.14	634.99	4795.57	3000.00	7.67	0.85	0.02
41.4	4178.22	0.60	0.60	1.73	0.13	629.42	4807.64	3000.00	7.67	0.85	0.02
41.8	4195.86	0.60	0.60	1.72	0.13	623.91	4819.77	3000.00	7.67	0.85	0.02
42.2	4213.5	0.59	0.59	1.70	0.12	618.45	4831.95	3000.00	7.67	0.85	0.02
42.6	4231.14	0.59	0.59	1.69	0.12	613.04	4844.18	3000.00	7.67	0.85	0.02
43	4248.78	0.58	0.58	1.68	0.11	607.69	4856.47	3000.00	7.67	0.85	0.02
43.4	4266.42	0.58	0.58	1.66	0.11	602.39	4868.81	3000.00	7.67	0.85	0.02
43.8	4284.06	0.57	0.57	1.65	0.11	597.14	4881.20	3000.00	7.67	0.85	0.02
44.2	4301.7	0.57	0.57	1.64	0.10	591.95	4893.65	3000.00	7.67	0.85	0.02
44.6	4319.34	0.56	0.56	1.63	0.10	586.80	4906.14	3000.00	7.67	0.85	0.02
45	4336.98	0.56	0.56	1.62	0.10	581.71	4918.69	3000.00	7.67	0.85	0.02
45.4	4354.62	0.55	0.55	1.61	0.09	576.67	4931.29	3000.00	7.67	0.85	0.02
45.8	4372.26	0.55	0.55	1.60	0.09	571.68	4943.94	3000.00	7.67	0.85	0.02
46.2	4389.9	0.54	0.54	1.59	0.09	566.74	4956.64	3000.00	7.67	0.85	0.02
46.6	4407.54	0.54	0.54	1.58	0.08	561.84	4969.38	3000.00	7.67	0.85	0.02
47	4425.18	0.53	0.53	1.57	0.08	557.00	4982.18	3000.00	7.67	0.85	0.02
47.4	4442.82	0.53	0.53	1.56	0.08	552.21	4995.03	3000.00	7.67	0.85	0.02
47.8	4460.46	0.52	0.52	1.55	0.07	547.46	5007.92	3000.00	7.67	0.85	0.02
48.2	4478.1	0.52	0.52	1.54	0.07	542.76	5020.86	3000.00	7.67	0.85	0.02
48.6	4495.74	0.51	0.51	1.53	0.07	538.11	5033.85	3000.00	7.67	0.85	0.02
49	4513.38	0.51	0.51	1.52	0.07	533.51	5046.89	3000.00	7.67	0.85	0.02
49.4	4531.02	0.51	0.51	1.51	0.07	528.95	5059.97	3000.00	7.67	0.85	0.02
49.8	4548.66	0.50	0.50	1.50	0.06	524.44	5073.10	3000.00	7.67	0.85	0.02
50.2	4566.3	0.50	0.50	1.50	0.06	519.98	5086.28	3000.00	7.67	0.85	0.02
50.6	4583.94	0.49	0.49	1.49	0.06	515.56	5099.50	3000.00	7.67	0.85	0.02
51	4601.58	0.49	0.49	1.48	0.06	511.18	5112.76	3000.00	7.67	0.85	0.02
51.4	4619.22	0.49	0.49	1.47	0.06	506.85	5126.07	3000.00	7.67	0.85	0.02
51.8	11079.91	0.48	0.48	1.47	0.05	502.57	11582.48	10000.00	0.05	0.05	0.00
52.2	11104.95	0.48	0.48	1.46	0.05	498.33	11603.28	10000.00	0.05	0.05	0.00
52.6	11129.99	0.48	0.48	1.45	0.05	494.13	11624.12	10000.00	0.05	0.05	0.00
53	11155.03	0.47	0.47	1.44	0.05	489.97	11645.00	10000.00	0.05	0.05	0.00
53.4	11180.07	0.47	0.47	1.44	0.05	485.86	11665.93	10000.00	0.05	0.05	0.00
53.8	11205.11	0.46	0.46	1.43	0.05	481.79	11686.90	10000.00	0.05	0.05	0.00
54.2	11230.15	0.46	0.46	1.43	0.05	477.76	11707.91	10000.00	0.05	0.05	0.00
54.6	11255.19	0.46	0.46	1.42	0.04	473.77	11728.96	10000.00	0.05	0.05	0.00
55	11280.23	0.45	0.45	1.41	0.04	469.82	11750.05	10000.00	0.05	0.05	0.00
55.4	11305.27	0.45	0.45	1.41	0.04	465.91	11771.18	10000.00	0.05	0.05	0.00
55.8	11330.31	0.45	0.45	1.40	0.04	462.04	11792.35	10000.00	0.05	0.05	0.00
										Total:	2.96

Note: Stress distribution under the center of the footing was calculated by Westergaard equation for a rectangular footing, ref.: Bowels, "Foundation Analysis & Design," 1996.

SETTLEMENT CALCULATIONS

Project:	**NW Open space**
Project Number:	**25-126-00**
Date:	**July 25, 2025**

Sample:	**DH-2 @ 7.5 ft**

Raise in Grade (ft):	10	
Building Loading (psf):	250	
Unit Weight of Fill (pcf):	125	Size/2
Width (ft)=	25	12.5
Length (ft)=	25	12.5
Depth (ft)=	0	
Bearing Press (psf)=	1500	
Poisson's Ratio=	0.35	
Groundwater Depth (ft)=	13	

Layer Thickness (ft):	0.3

Material:	Layer 1	Layer 2	Layer 3	Layer 4	Layer 5	BR
σ_p (psf)=	3300					10000
C_{cc} (%)=	3.9					0.05
C_{cs} (%)=	0.13					0.05
γ_{wet} (pcf) =	120.4					125
C_v -Sq(t) (in^2/min)						
Layer Bottom Depth (ft)	30					1000
Soil Type	Qal					Bedrock

Consolidation (in)
0.139

TOTAL SETTLEMENT 0.1 INCHES

Final Settlement Calculations

Depth (ft)	Ver. Stress (psf)	M	N	V	V1	Stress Due to Fill Pressure (Westergaard) (psf)	Final Stress With Fill (psf)	σ_p (psf)	C_{ec} (%)	C_{es} (%)	Layer Settlement (in)
0.125	15.05	100.00	100.00	20001.00	##########	1493.51	1508.56	3300.00	3.85	0.13	0.01
0.375	45.15	33.33	33.33	2223.22	1234567.90	1480.54	1525.69	3300.00	3.85	0.13	0.01
0.625	75.25	20.00	20.00	801.00	160000.00	1467.57	1542.82	3300.00	3.85	0.13	0.01
0.875	105.35	14.29	14.29	409.16	41649.31	1454.61	1559.96	3300.00	3.85	0.13	0.00
1.125	135.45	11.11	11.11	247.91	15241.58	1441.66	1577.11	3300.00	3.85	0.13	0.00
1.375	165.55	9.09	9.09	166.29	6830.13	1428.72	1594.27	3300.00	3.85	0.13	0.00
1.625	195.65	7.69	7.69	119.34	3501.28	1415.80	1611.45	3300.00	3.85	0.13	0.00
1.875	225.75	6.67	6.67	89.89	1975.31	1402.90	1628.65	3300.00	3.85	0.13	0.00
2.125	255.85	5.88	5.88	70.20	1197.30	1390.02	1645.87	3300.00	3.85	0.13	0.00
2.375	285.95	5.26	5.26	56.40	767.34	1377.16	1663.11	3300.00	3.85	0.13	0.00
2.625	316.05	4.76	4.76	46.35	514.19	1364.34	1680.39	3300.00	3.85	0.13	0.00
2.875	346.15	4.35	4.35	38.81	357.35	1351.54	1697.69	3300.00	3.85	0.13	0.00
3.125	376.25	4.00	4.00	33.00	256.00	1338.78	1715.03	3300.00	3.85	0.13	0.00
3.375	406.35	3.70	3.70	28.43	188.17	1326.05	1732.40	3300.00	3.85	0.13	0.00
3.625	436.45	3.45	3.45	24.78	141.39	1313.37	1749.82	3300.00	3.85	0.13	0.00
3.875	466.55	3.23	3.23	21.81	108.28	1300.72	1767.27	3300.00	3.85	0.13	0.00
4.125	496.65	3.03	3.03	19.37	84.32	1288.12	1784.77	3300.00	3.85	0.13	0.00
4.375	526.75	2.86	2.86	17.33	66.64	1275.57	1802.32	3300.00	3.85	0.13	0.00
4.625	556.85	2.70	2.70	15.61	53.36	1263.06	1819.91	3300.00	3.85	0.13	0.00
4.875	586.95	2.56	2.56	14.15	43.23	1250.61	1837.56	3300.00	3.85	0.13	0.00
5.125	617.05	2.44	2.44	12.90	35.39	1238.21	1855.26	3300.00	3.85	0.13	0.00
5.375	647.15	2.33	2.33	11.82	29.25	1225.87	1873.02	3300.00	3.85	0.13	0.00
5.625	677.25	2.22	2.22	10.88	24.39	1213.58	1890.83	3300.00	3.85	0.13	0.00
5.875	707.35	2.13	2.13	10.05	20.49	1201.36	1908.71	3300.00	3.85	0.13	0.00
6.125	737.45	2.04	2.04	9.33	17.35	1189.20	1926.65	3300.00	3.85	0.13	0.00
6.375	767.55	1.96	1.96	8.69	14.78	1177.11	1944.66	3300.00	3.85	0.13	0.00
6.625	797.65	1.89	1.89	8.12	12.67	1165.08	1962.73	3300.00	3.85	0.13	0.00
6.875	827.75	1.82	1.82	7.61	10.93	1153.12	1980.87	3300.00	3.85	0.13	0.00
7.125	857.85	1.75	1.75	7.16	9.47	1141.24	1999.09	3300.00	3.85	0.13	0.00
7.375	887.95	1.69	1.69	6.75	8.25	1129.42	2017.37	3300.00	3.85	0.13	0.00
7.625	918.05	1.64	1.64	6.37	7.22	1117.69	2035.74	3300.00	3.85	0.13	0.00
7.875	948.15	1.59	1.59	6.04	6.35	1106.02	2054.17	3300.00	3.85	0.13	0.00
8.125	978.25	1.54	1.54	5.73	5.60	1094.44	2072.69	3300.00	3.85	0.13	0.00
8.375	1008.35	1.49	1.49	5.46	4.96	1082.94	2091.29	3300.00	3.85	0.13	0.00
8.625	1038.45	1.45	1.45	5.20	4.41	1071.51	2109.96	3300.00	3.85	0.13	0.00
8.875	1068.55	1.41	1.41	4.97	3.94	1060.17	2128.72	3300.00	3.85	0.13	0.00
9.125	1098.65	1.37	1.37	4.75	3.52	1048.92	2147.57	3300.00	3.85	0.13	0.00
9.375	1128.75	1.33	1.33	4.56	3.16	1037.74	2166.49	3300.00	3.85	0.13	0.00
9.625	1158.85	1.30	1.30	4.37	2.84	1026.66	2185.51	3300.00	3.85	0.13	0.00
9.875	1188.95	1.27	1.27	4.20	2.57	1015.66	2204.61	3300.00	3.85	0.13	0.00
10.125	1219.05	1.23	1.23	4.05	2.32	1004.75	2223.80	3300.00	3.85	0.13	0.00
10.375	1249.15	1.20	1.20	3.90	2.11	993.93	2243.08	3300.00	3.85	0.13	0.00
10.625	1279.25	1.18	1.18	3.77	1.92	983.20	2262.45	3300.00	3.85	0.13	0.00
10.875	1309.35	1.15	1.15	3.64	1.75	972.56	2281.91	3300.00	3.85	0.13	0.00
11.125	1339.45	1.12	1.12	3.52	1.59	962.02	2301.47	3300.00	3.85	0.13	0.00
11.375	1369.55	1.10	1.10	3.42	1.46	951.56	2321.11	3300.00	3.85	0.13	0.00
11.625	1399.65	1.08	1.08	3.31	1.34	941.20	2340.85	3300.00	3.85	0.13	0.00
11.875	1429.75	1.05	1.05	3.22	1.23	930.93	2360.68	3300.00	3.85	0.13	0.00
12.125	1459.85	1.03	1.03	3.13	1.13	920.76	2380.61	3300.00	3.85	0.13	0.00
12.375	1489.95	1.01	1.01	3.04	1.04	910.68	2400.63	3300.00	3.85	0.13	0.00
12.625	1520.05	0.99	0.99	2.96	0.96	900.70	2420.75	3300.00	3.85	0.13	0.00
12.875	1550.15	0.97	0.97	2.89	0.89	890.82	2440.97	3300.00	3.85	0.13	0.00
13.125	1572.45	0.95	0.95	2.81	0.82	881.03	2453.48	3300.00	3.85	0.13	0.00
13.375	1586.95	0.93	0.93	2.75	0.76	871.33	2458.28	3300.00	3.85	0.13	0.00
13.625	1601.45	0.92	0.92	2.68	0.71	861.73	2463.18	3300.00	3.85	0.13	0.00
13.875	1615.95	0.90	0.90	2.62	0.66	852.23	2468.18	3300.00	3.85	0.13	0.00
14.125	1630.45	0.88	0.88	2.57	0.61	842.83	2473.28	3300.00	3.85	0.13	0.00
14.375	1644.95	0.87	0.87	2.51	0.57	833.52	2478.47	3300.00	3.85	0.13	0.00
14.625	1659.45	0.85	0.85	2.46	0.53	824.31	2483.76	3300.00	3.85	0.13	0.00
14.875	1673.95	0.84	0.84	2.41	0.50	815.19	2489.14	3300.00	3.85	0.13	0.00
15.125	1688.45	0.83	0.83	2.37	0.47	806.18	2494.63	3300.00	3.85	0.13	0.00

15.375	1702.95	0.81	0.81	2.32	0.44	797.25	2500.20	3300.00	3.85	0.13	0.00
15.625	1717.45	0.80	0.80	2.28	0.41	788.43	2505.88	3300.00	3.85	0.13	0.00
15.875	1731.95	0.79	0.79	2.24	0.38	779.70	2511.65	3300.00	3.85	0.13	0.00
16.125	1746.45	0.78	0.78	2.20	0.36	771.06	2517.51	3300.00	3.85	0.13	0.00
16.375	1760.95	0.76	0.76	2.17	0.34	762.53	2523.48	3300.00	3.85	0.13	0.00
16.625	1775.45	0.75	0.75	2.13	0.32	754.08	2529.53	3300.00	3.85	0.13	0.00
16.875	1789.95	0.74	0.74	2.10	0.30	745.73	2535.68	3300.00	3.85	0.13	0.00
17.125	1804.45	0.73	0.73	2.07	0.28	737.48	2541.93	3300.00	3.85	0.13	0.00
17.375	1818.95	0.72	0.72	2.04	0.27	729.32	2548.27	3300.00	3.85	0.13	0.00
17.625	1833.45	0.71	0.71	2.01	0.25	721.25	2554.70	3300.00	3.85	0.13	0.00
17.875	1847.95	0.70	0.70	1.98	0.24	713.27	2561.22	3300.00	3.85	0.13	0.00
18.125	1862.45	0.69	0.69	1.95	0.23	705.39	2567.84	3300.00	3.85	0.13	0.00
18.375	1876.95	0.68	0.68	1.93	0.21	697.60	2574.55	3300.00	3.85	0.13	0.00
18.625	1891.45	0.67	0.67	1.90	0.20	689.90	2581.35	3300.00	3.85	0.13	0.00
18.875	1905.95	0.66	0.66	1.88	0.19	682.29	2588.24	3300.00	3.85	0.13	0.00
19.125	1920.45	0.65	0.65	1.85	0.18	674.77	2595.22	3300.00	3.85	0.13	0.00
19.375	1934.95	0.65	0.65	1.83	0.17	667.34	2602.29	3300.00	3.85	0.13	0.00
19.625	1949.45	0.64	0.64	1.81	0.16	660.00	2609.45	3300.00	3.85	0.13	0.00
19.875	1963.95	0.63	0.63	1.79	0.16	652.74	2616.69	3300.00	3.85	0.13	0.00
20.125	1978.45	0.62	0.62	1.77	0.15	645.58	2624.03	3300.00	3.85	0.13	0.00
20.375	1992.95	0.61	0.61	1.75	0.14	638.50	2631.45	3300.00	3.85	0.13	0.00
20.625	2007.45	0.61	0.61	1.73	0.13	631.50	2638.95	3300.00	3.85	0.13	0.00
20.875	2021.95	0.60	0.60	1.72	0.13	624.59	2646.54	3300.00	3.85	0.13	0.00
21.125	2036.45	0.59	0.59	1.70	0.12	617.77	2654.22	3300.00	3.85	0.13	0.00
21.375	2050.95	0.58	0.58	1.68	0.12	611.03	2661.98	3300.00	3.85	0.13	0.00
21.625	2065.45	0.58	0.58	1.67	0.11	604.37	2669.82	3300.00	3.85	0.13	0.00
21.875	2079.95	0.57	0.57	1.65	0.11	597.79	2677.74	3300.00	3.85	0.13	0.00
22.125	2094.45	0.56	0.56	1.64	0.10	591.30	2685.75	3300.00	3.85	0.13	0.00
22.375	2108.95	0.56	0.56	1.62	0.10	584.89	2693.84	3300.00	3.85	0.13	0.00
22.625	2123.45	0.55	0.55	1.61	0.09	578.55	2702.00	3300.00	3.85	0.13	0.00
22.875	2137.95	0.55	0.55	1.60	0.09	572.30	2710.25	3300.00	3.85	0.13	0.00
23.125	2152.45	0.54	0.54	1.58	0.09	566.12	2718.57	3300.00	3.85	0.13	0.00
23.375	2166.95	0.53	0.53	1.57	0.08	560.02	2726.97	3300.00	3.85	0.13	0.00
23.625	2181.45	0.53	0.53	1.56	0.08	554.00	2735.45	3300.00	3.85	0.13	0.00
23.875	2195.95	0.52	0.52	1.55	0.08	548.05	2744.00	3300.00	3.85	0.13	0.00
24.125	2210.45	0.52	0.52	1.54	0.07	542.18	2752.63	3300.00	3.85	0.13	0.00
24.375	2224.95	0.51	0.51	1.53	0.07	536.38	2761.33	3300.00	3.85	0.13	0.00
24.625	2239.45	0.51	0.51	1.52	0.07	530.66	2770.11	3300.00	3.85	0.13	0.00
24.875	2253.95	0.50	0.50	1.51	0.06	525.00	2778.95	3300.00	3.85	0.13	0.00
25.125	2268.45	0.50	0.50	1.50	0.06	519.42	2787.87	3300.00	3.85	0.13	0.00
25.375	2282.95	0.49	0.49	1.49	0.06	513.91	2796.86	3300.00	3.85	0.13	0.00
25.625	2297.45	0.49	0.49	1.48	0.06	508.47	2805.92	3300.00	3.85	0.13	0.00
25.875	2311.95	0.48	0.48	1.47	0.05	503.10	2815.05	3300.00	3.85	0.13	0.00
26.125	2326.45	0.48	0.48	1.46	0.05	497.80	2824.25	3300.00	3.85	0.13	0.00
26.375	2340.95	0.47	0.47	1.45	0.05	492.56	2833.51	3300.00	3.85	0.13	0.00
26.625	2355.45	0.47	0.47	1.44	0.05	487.39	2842.84	3300.00	3.85	0.13	0.00
26.875	2369.95	0.47	0.47	1.43	0.05	482.29	2852.24	3300.00	3.85	0.13	0.00
27.125	2384.45	0.46	0.46	1.42	0.05	477.25	2861.70	3300.00	3.85	0.13	0.00
27.375	2398.95	0.46	0.46	1.42	0.04	472.28	2871.23	3300.00	3.85	0.13	0.00
27.625	2413.45	0.45	0.45	1.41	0.04	467.37	2880.82	3300.00	3.85	0.13	0.00
27.875	2427.95	0.45	0.45	1.40	0.04	462.53	2890.48	3300.00	3.85	0.13	0.00
28.125	2442.45	0.44	0.44	1.40	0.04	457.74	2900.19	3300.00	3.85	0.13	0.00
28.375	2456.95	0.44	0.44	1.39	0.04	453.02	2909.97	3300.00	3.85	0.13	0.00
28.625	2471.45	0.44	0.44	1.38	0.04	448.35	2919.80	3300.00	3.85	0.13	0.00
28.875	2485.95	0.43	0.43	1.37	0.04	443.75	2929.70	3300.00	3.85	0.13	0.00
29.125	2500.45	0.43	0.43	1.37	0.03	439.20	2939.65	3300.00	3.85	0.13	0.00
29.375	2514.95	0.43	0.43	1.36	0.03	434.72	2949.67	3300.00	3.85	0.13	0.00
29.625	2529.45	0.42	0.42	1.36	0.03	430.29	2959.74	3300.00	3.85	0.13	0.00
29.875	2543.95	0.42	0.42	1.35	0.03	425.91	2969.86	3300.00	3.85	0.13	0.00
30.125	6309.025	0.41	0.41	1.34	0.03	421.60	6730.62	10000.00	0.05	0.05	0.00
30.375	6324.675	0.41	0.41	1.34	0.03	417.33	6742.01	10000.00	0.05	0.05	0.00
30.625	6340.325	0.41	0.41	1.33	0.03	413.12	6753.45	10000.00	0.05	0.05	0.00
30.875	6355.975	0.40	0.40	1.33	0.03	408.97	6764.94	10000.00	0.05	0.05	0.00
31.125	6371.625	0.40	0.40	1.32	0.03	404.87	6776.49	10000.00	0.05	0.05	0.00
31.375	6387.275	0.40	0.40	1.32	0.03	400.82	6788.09	10000.00	0.05	0.05	0.00
31.625	6402.925	0.40	0.40	1.31	0.02	396.82	6799.75	10000.00	0.05	0.05	0.00
31.875	6418.575	0.39	0.39	1.31	0.02	392.87	6811.45	10000.00	0.05	0.05	0.00
32.125	6434.225	0.39	0.39	1.30	0.02	388.98	6823.20	10000.00	0.05	0.05	0.00
32.375	6449.875	0.39	0.39	1.30	0.02	385.13	6835.00	10000.00	0.05	0.05	0.00
32.625	6465.525	0.38	0.38	1.29	0.02	381.33	6846.85	10000.00	0.05	0.05	0.00
32.875	6481.175	0.38	0.38	1.29	0.02	377.58	6858.75	10000.00	0.05	0.05	0.00
33.125	6496.825	0.38	0.38	1.28	0.02	373.88	6870.70	10000.00	0.05	0.05	0.00
33.375	6512.475	0.37	0.37	1.28	0.02	370.22	6882.69	10000.00	0.05	0.05	0.00
33.625	6528.125	0.37	0.37	1.28	0.02	366.61	6894.73	10000.00	0.05	0.05	0.00
33.875	6543.775	0.37	0.37	1.27	0.02	363.04	6906.82	10000.00	0.05	0.05	0.00
34.125	6559.425	0.37	0.37	1.27	0.02	359.52	6918.95	10000.00	0.05	0.05	0.00
34.375	6575.075	0.36	0.36	1.26	0.02	356.05	6931.12	10000.00	0.05	0.05	0.00
34.625	6590.725	0.36	0.36	1.26	0.02	352.62	6943.34	10000.00	0.05	0.05	0.00
34.875	6606.375	0.36	0.36	1.26	0.02	349.23	6955.60	10000.00	0.05	0.05	0.00
										Total:	0.14

Note: Stress distribution under the center of the footing was calculated by Westergaard equation for a rectangular footing, ref.: Bowels, "Foundation Analysis & Design," 1996.

SETTLEMENT CALCULATIONS

Project:	**NW Open space**
Project Number:	**25-126-00**
Date:	**July 25, 2025**

Samples:	**DH-4 @ 2.5-ft, 7.5 ft**

Raise in Grade (ft):	10	
Building Loading (psf):	250	
Unit Weight of Fill (pcf):	125	Size/2
Width (ft)=	25	12.5
Length (ft)=	25	12.5
Depth (ft)=	0	
Bearing Press (psf)=	1500	
Poisson's Ratio=	0.35	
Groundwater Depth (ft)=	29.9	

Layer Thickness (ft):	0.2

Worst Case Consol

Material:	Layer 1	Layer 2	Layer 3	Layer 4	Layer 5	BR
σ_p (psf)=	1200	2300				10000
C_{cc} (%)=	15.9	4.25				0.05
C_{cs} (%)=	0.81	0.47				0.05
γ_{wet} (pcf) =	98	93.3				125
C_v -Sq(t) (in^2/min)						
Layer Bottom Depth (ft)	7.5	16.5				1000
Soil Type	Qaf	Qt				Bedrock

Consolidation (in)

2.670

TOTAL SETTLEMENT 2.7 INCHES

Final Settlement Calculations

Depth (ft)	Ver. Stress (psf)	M	N	V	V1	Stress Due to Fill Pressure (Westergaard) (psf)	Final Stress With Fill (psf)	σ_p (psf)	C_{ec} (%)	C_{es} (%)	Layer Settlement (in)
0.075	7.35	166.67	166.67	55556.56	##########	1496.11	1503.46	1200.00	15.88	0.81	0.06
0.225	22.05	55.56	55.56	6173.84	9525986.89	1488.32	1510.37	1200.00	15.88	0.81	0.05
0.375	36.75	33.33	33.33	2223.22	1234567.90	1480.54	1517.29	1200.00	15.88	0.81	0.05
0.525	51.45	23.81	23.81	1134.79	321368.15	1472.76	1524.21	1200.00	15.88	0.81	0.05
0.675	66.15	18.52	18.52	686.87	117604.78	1464.98	1531.13	1200.00	15.88	0.81	0.05
0.825	80.85	15.15	15.15	460.14	52701.66	1457.20	1538.05	1200.00	15.88	0.81	0.05
0.975	95.55	12.82	12.82	329.73	27016.03	1449.43	1544.98	1200.00	15.88	0.81	0.05
1.125	110.25	11.11	11.11	247.91	15241.58	1441.66	1551.91	1200.00	15.88	0.81	0.05
1.275	124.95	9.80	9.80	193.23	9238.45	1433.89	1558.84	1200.00	15.88	0.81	0.05
1.425	139.65	8.77	8.77	154.89	5920.80	1426.14	1565.79	1200.00	15.88	0.81	0.05
1.575	154.35	7.94	7.94	126.98	3967.51	1418.38	1572.73	1200.00	15.88	0.81	0.05
1.725	169.05	7.25	7.25	106.02	2757.30	1410.64	1579.69	1200.00	15.88	0.81	0.05
1.875	183.75	6.67	6.67	89.89	1975.31	1402.90	1586.65	1200.00	15.88	0.81	0.05
2.025	198.45	6.17	6.17	77.21	1451.91	1395.17	1593.62	1200.00	15.88	0.81	0.05
2.175	213.15	5.75	5.75	67.06	1090.95	1387.45	1600.60	1200.00	15.88	0.81	0.05
2.325	227.85	5.38	5.38	58.81	835.50	1379.73	1607.58	1200.00	15.88	0.81	0.05
2.475	242.55	5.05	5.05	52.02	650.64	1372.03	1614.58	1200.00	15.88	0.81	0.05
2.625	257.25	4.76	4.76	46.35	514.19	1364.34	1621.59	1200.00	15.88	0.81	0.05
2.775	271.95	4.50	4.50	41.58	411.71	1356.66	1628.61	1200.00	15.88	0.81	0.05
2.925	286.65	4.27	4.27	37.53	333.53	1348.99	1635.64	1200.00	15.88	0.81	0.05
3.075	301.35	4.07	4.07	34.05	273.06	1341.33	1642.68	1200.00	15.88	0.81	0.05
3.225	316.05	3.88	3.88	31.05	225.69	1333.68	1649.73	1200.00	15.88	0.81	0.05
3.375	330.75	3.70	3.70	28.43	188.17	1326.05	1656.80	1200.00	15.88	0.81	0.05
3.525	345.45	3.55	3.55	26.15	158.13	1318.44	1663.89	1200.00	15.88	0.81	0.05
3.675	360.15	3.40	3.40	24.14	133.85	1310.83	1670.98	1200.00	15.88	0.81	0.05
3.825	374.85	3.27	3.27	22.36	114.05	1303.25	1678.10	1200.00	15.88	0.81	0.05
3.975	389.55	3.14	3.14	20.78	97.79	1295.67	1685.22	1200.00	15.88	0.81	0.05
4.125	404.25	3.03	3.03	19.37	84.32	1288.12	1692.37	1200.00	15.88	0.81	0.05
4.275	418.95	2.92	2.92	18.10	73.10	1280.58	1699.53	1200.00	15.88	0.81	0.05
4.425	433.65	2.82	2.82	16.96	63.68	1273.06	1706.71	1200.00	15.88	0.81	0.05
4.575	448.35	2.73	2.73	15.93	55.73	1265.56	1713.91	1200.00	15.88	0.81	0.05
4.725	463.05	2.65	2.65	15.00	48.98	1258.07	1721.12	1200.00	15.88	0.81	0.05
4.875	477.75	2.56	2.56	14.15	43.23	1250.61	1728.36	1200.00	15.88	0.81	0.05
5.025	492.45	2.49	2.49	13.38	38.29	1243.16	1735.61	1200.00	15.88	0.81	0.05
5.175	507.15	2.42	2.42	12.67	34.04	1235.74	1742.89	1200.00	15.88	0.81	0.05
5.325	521.85	2.35	2.35	12.02	30.36	1228.33	1750.18	1200.00	15.88	0.81	0.05
5.475	536.55	2.28	2.28	11.43	27.17	1220.95	1757.50	1200.00	15.88	0.81	0.05
5.625	551.25	2.22	2.22	10.88	24.39	1213.58	1764.83	1200.00	15.88	0.81	0.05
5.775	565.95	2.16	2.16	10.37	21.95	1206.24	1772.19	1200.00	15.88	0.81	0.05
5.925	580.65	2.11	2.11	9.90	19.81	1198.92	1779.57	1200.00	15.88	0.81	0.05
6.075	595.35	2.06	2.06	9.47	17.92	1191.63	1786.98	1200.00	15.88	0.81	0.05
6.225	610.05	2.01	2.01	9.06	16.26	1184.36	1794.41	1200.00	15.88	0.81	0.05
6.375	624.75	1.96	1.96	8.69	14.78	1177.11	1801.86	1200.00	15.88	0.81	0.05
6.525	639.45	1.92	1.92	8.34	13.47	1169.88	1809.33	1200.00	15.88	0.81	0.05
6.675	654.15	1.87	1.87	8.01	12.30	1162.68	1816.83	1200.00	15.88	0.81	0.06
6.825	668.85	1.83	1.83	7.71	11.25	1155.51	1824.36	1200.00	15.88	0.81	0.06
6.975	683.55	1.79	1.79	7.42	10.31	1148.36	1831.91	1200.00	15.88	0.81	0.06
7.125	698.25	1.75	1.75	7.16	9.47	1141.24	1839.49	1200.00	15.88	0.81	0.06
7.275	712.95	1.72	1.72	6.90	8.72	1134.14	1847.09	1200.00	15.88	0.81	0.06
7.425	727.65	1.68	1.68	6.67	8.03	1127.07	1854.72	1200.00	15.88	0.81	0.06
7.575	741.9975	1.65	1.65	6.45	7.41	1120.03	1862.02	2300.00	4.25	0.47	0.00
7.725	755.9925	1.62	1.62	6.24	6.86	1113.01	1869.00	2300.00	4.25	0.47	0.00
7.875	769.9875	1.59	1.59	6.04	6.35	1106.02	1876.01	2300.00	4.25	0.47	0.00
8.025	783.9825	1.56	1.56	5.85	5.89	1099.06	1883.05	2300.00	4.25	0.47	0.00
8.175	797.9775	1.53	1.53	5.68	5.47	1092.13	1890.11	2300.00	4.25	0.47	0.00
8.325	811.9725	1.50	1.50	5.51	5.08	1085.23	1897.20	2300.00	4.25	0.47	0.00
8.475	825.9675	1.47	1.47	5.35	4.73	1078.36	1904.32	2300.00	4.25	0.47	0.00
8.625	839.9625	1.45	1.45	5.20	4.41	1071.51	1911.48	2300.00	4.25	0.47	0.00
8.775	853.9575	1.42	1.42	5.06	4.12	1064.70	1918.66	2300.00	4.25	0.47	0.00
8.925	867.9525	1.40	1.40	4.92	3.85	1057.91	1925.87	2300.00	4.25	0.47	0.00
9.075	881.9475	1.38	1.38	4.79	3.60	1051.16	1933.11	2300.00	4.25	0.47	0.00

9.225	895.9425	1.36	1.36	4.67	3.37	1044.44	1940.38	2300.00	4.25	0.47	0.00
9.375	909.9375	1.33	1.33	4.56	3.16	1037.74	1947.68	2300.00	4.25	0.47	0.00
9.525	923.9325	1.31	1.31	4.44	2.97	1031.08	1955.01	2300.00	4.25	0.47	0.00
9.675	937.9275	1.29	1.29	4.34	2.79	1024.45	1962.38	2300.00	4.25	0.47	0.00
9.825	951.9225	1.27	1.27	4.24	2.62	1017.85	1969.78	2300.00	4.25	0.47	0.00
9.975	965.9175	1.25	1.25	4.14	2.47	1011.29	1977.20	2300.00	4.25	0.47	0.00
10.125	979.9125	1.23	1.23	4.05	2.32	1004.75	1984.66	2300.00	4.25	0.47	0.00
10.275	993.9075	1.22	1.22	3.96	2.19	998.25	1992.16	2300.00	4.25	0.47	0.00
10.425	1007.9025	1.20	1.20	3.88	2.07	991.78	1999.68	2300.00	4.25	0.47	0.00
10.575	1021.8975	1.18	1.18	3.79	1.95	985.34	2007.24	2300.00	4.25	0.47	0.00
10.725	1035.8925	1.17	1.17	3.72	1.85	978.93	2014.83	2300.00	4.25	0.47	0.00
10.875	1049.8875	1.15	1.15	3.64	1.75	972.56	2022.45	2300.00	4.25	0.47	0.00
11.025	1063.8825	1.13	1.13	3.57	1.65	966.22	2030.11	2300.00	4.25	0.47	0.00
11.175	1077.8775	1.12	1.12	3.50	1.57	959.92	2037.79	2300.00	4.25	0.47	0.00
11.325	1091.8725	1.10	1.10	3.44	1.48	953.64	2045.52	2300.00	4.25	0.47	0.00
11.475	1105.8675	1.09	1.09	3.37	1.41	947.41	2053.27	2300.00	4.25	0.47	0.00
11.625	1119.8625	1.08	1.08	3.31	1.34	941.20	2061.06	2300.00	4.25	0.47	0.00
11.775	1133.8575	1.06	1.06	3.25	1.27	935.03	2068.89	2300.00	4.25	0.47	0.00
11.925	1147.8525	1.05	1.05	3.20	1.21	928.89	2076.74	2300.00	4.25	0.47	0.00
12.075	1161.8475	1.04	1.04	3.14	1.15	922.79	2084.64	2300.00	4.25	0.47	0.00
12.225	1175.8425	1.02	1.02	3.09	1.09	916.72	2092.56	2300.00	4.25	0.47	0.00
12.375	1189.8375	1.01	1.01	3.04	1.04	910.68	2100.52	2300.00	4.25	0.47	0.00
12.525	1203.8325	1.00	1.00	2.99	0.99	904.68	2108.52	2300.00	4.25	0.47	0.00
12.675	1217.8275	0.99	0.99	2.95	0.95	898.72	2116.55	2300.00	4.25	0.47	0.00
12.825	1231.8225	0.97	0.97	2.90	0.90	892.79	2124.61	2300.00	4.25	0.47	0.00
12.975	1245.8175	0.96	0.96	2.86	0.86	886.89	2132.71	2300.00	4.25	0.47	0.00
13.125	1259.8125	0.95	0.95	2.81	0.82	881.03	2140.84	2300.00	4.25	0.47	0.00
13.275	1273.8075	0.94	0.94	2.77	0.79	875.20	2149.01	2300.00	4.25	0.47	0.00
13.425	1287.8025	0.93	0.93	2.73	0.75	869.40	2157.21	2300.00	4.25	0.47	0.00
13.575	1301.7975	0.92	0.92	2.70	0.72	863.65	2165.44	2300.00	4.25	0.47	0.00
13.725	1315.7925	0.91	0.91	2.66	0.69	857.92	2173.71	2300.00	4.25	0.47	0.00
13.875	1329.7875	0.90	0.90	2.62	0.66	852.23	2182.02	2300.00	4.25	0.47	0.00
14.025	1343.7825	0.89	0.89	2.59	0.63	846.58	2190.36	2300.00	4.25	0.47	0.00
14.175	1357.7775	0.88	0.88	2.56	0.60	840.96	2198.74	2300.00	4.25	0.47	0.00
14.325	1371.7725	0.87	0.87	2.52	0.58	835.37	2207.15	2300.00	4.25	0.47	0.00
14.475	1385.7675	0.86	0.86	2.49	0.56	829.82	2215.59	2300.00	4.25	0.47	0.00
14.625	1399.7625	0.85	0.85	2.46	0.53	824.31	2224.07	2300.00	4.25	0.47	0.00
14.775	1413.7575	0.85	0.85	2.43	0.51	818.83	2232.59	2300.00	4.25	0.47	0.00
14.925	1427.7525	0.84	0.84	2.40	0.49	813.38	2241.14	2300.00	4.25	0.47	0.00
15.075	1441.7475	0.83	0.83	2.38	0.47	807.97	2249.72	2300.00	4.25	0.47	0.00
15.225	1455.7425	0.82	0.82	2.35	0.45	802.60	2258.34	2300.00	4.25	0.47	0.00
15.375	1469.7375	0.81	0.81	2.32	0.44	797.25	2266.99	2300.00	4.25	0.47	0.00
15.525	1483.7325	0.81	0.81	2.30	0.42	791.95	2275.68	2300.00	4.25	0.47	0.00
15.675	1497.7275	0.80	0.80	2.27	0.40	786.68	2284.40	2300.00	4.25	0.47	0.00
15.825	1511.7225	0.79	0.79	2.25	0.39	781.44	2293.16	2300.00	4.25	0.47	0.00
15.975	1525.7175	0.78	0.78	2.22	0.37	776.23	2301.95	2300.00	4.25	0.47	0.00
16.125	1539.7125	0.78	0.78	2.20	0.36	771.06	2310.78	2300.00	4.25	0.47	0.00
16.275	1553.7075	0.77	0.77	2.18	0.35	765.93	2319.64	2300.00	4.25	0.47	0.00
16.425	1567.7025	0.76	0.76	2.16	0.34	760.83	2328.53	2300.00	4.25	0.47	0.00
16.575	3646.575	0.75	0.75	2.14	0.32	755.76	4402.34	10000.00	0.05	0.05	0.00
16.725	3665.325	0.75	0.75	2.12	0.31	750.73	4416.06	10000.00	0.05	0.05	0.00
16.875	3684.075	0.74	0.74	2.10	0.30	745.73	4429.81	10000.00	0.05	0.05	0.00
17.025	3702.825	0.73	0.73	2.08	0.29	740.77	4443.59	10000.00	0.05	0.05	0.00
17.175	3721.575	0.73	0.73	2.06	0.28	735.84	4457.41	10000.00	0.05	0.05	0.00
17.325	3740.325	0.72	0.72	2.04	0.27	730.94	4471.27	10000.00	0.05	0.05	0.00
17.475	3759.075	0.72	0.72	2.02	0.26	726.08	4485.15	10000.00	0.05	0.05	0.00
17.625	3777.825	0.71	0.71	2.01	0.25	721.25	4499.07	10000.00	0.05	0.05	0.00
17.775	3796.575	0.70	0.70	1.99	0.24	716.45	4513.03	10000.00	0.05	0.05	0.00
17.925	3815.325	0.70	0.70	1.97	0.24	711.69	4527.01	10000.00	0.05	0.05	0.00
18.075	3834.075	0.69	0.69	1.96	0.23	706.96	4541.03	10000.00	0.05	0.05	0.00
18.225	3852.825	0.69	0.69	1.94	0.22	702.26	4555.09	10000.00	0.05	0.05	0.00
18.375	3871.575	0.68	0.68	1.93	0.21	697.60	4569.17	10000.00	0.05	0.05	0.00
18.525	3890.325	0.67	0.67	1.91	0.21	692.97	4583.29	10000.00	0.05	0.05	0.00
18.675	3909.075	0.67	0.67	1.90	0.20	688.37	4597.44	10000.00	0.05	0.05	0.00
18.825	3927.825	0.66	0.66	1.88	0.19	683.80	4611.63	10000.00	0.05	0.05	0.00
18.975	3946.575	0.66	0.66	1.87	0.19	679.27	4625.84	10000.00	0.05	0.05	0.00
19.125	3965.325	0.65	0.65	1.85	0.18	674.77	4640.09	10000.00	0.05	0.05	0.00
19.275	3984.075	0.65	0.65	1.84	0.18	670.30	4654.37	10000.00	0.05	0.05	0.00
19.425	4002.825	0.64	0.64	1.83	0.17	665.86	4668.69	10000.00	0.05	0.05	0.00
19.575	4021.575	0.64	0.64	1.82	0.17	661.46	4683.03	10000.00	0.05	0.05	0.00
19.725	4040.325	0.63	0.63	1.80	0.16	657.08	4697.41	10000.00	0.05	0.05	0.00
19.875	4059.075	0.63	0.63	1.79	0.16	652.74	4711.82	10000.00	0.05	0.05	0.00
20.025	4077.825	0.62	0.62	1.78	0.15	648.43	4726.26	10000.00	0.05	0.05	0.00
20.175	4096.575	0.62	0.62	1.77	0.15	644.15	4740.73	10000.00	0.05	0.05	0.00
20.325	4115.325	0.62	0.62	1.76	0.14	639.90	4755.23	10000.00	0.05	0.05	0.00
20.475	4134.075	0.61	0.61	1.75	0.14	635.69	4769.76	10000.00	0.05	0.05	0.00
20.625	4152.825	0.61	0.61	1.73	0.13	631.50	4784.33	10000.00	0.05	0.05	0.00
20.775	4171.575	0.60	0.60	1.72	0.13	627.35	4798.92	10000.00	0.05	0.05	0.00
20.925	4190.325	0.60	0.60	1.71	0.13	623.22	4813.55	10000.00	0.05	0.05	0.00
										Total:	2.67

Note: Stress distribution under the center of the footing was calculated by Westergaard equation for a rectangular footing, ref.: Bowels, "Foundation Analysis & Design," 1996.

SETTLEMENT CALCULATIONS

Project:	**NW Open space**
Project Number:	**25-126-00**
Date:	**July 25, 2025**

Samples:	**DH-5 @ 5-ft, 10 ft**

Raise in Grade (ft):	10	
Building Loading (psf):	250	
Unit Weight of Fill (pcf):	125	Size/2
Width (ft)=	25	12.5
Length (ft)=	25	12.5
Depth (ft)=	0	
Bearing Press (psf)=	1500	
Poisson's Ratio=	0.35	
Groundwater Depth (ft)=	24.6	

Layer Thickness (ft):	0.6

Material:	**Layer 1**	**Layer 2**	**Layer 3**	**Layer 4**	**Layer 5**	**BR**
σ_p (psf)=	2000	2300				10000
C_{cc} (%)=	4.2	2.46				0.05
C_{cs} (%)=	0.56	0.41				0.05
γ_{wet} (pcf) =	109.3	105				125
C_v -Sq(t) (in^2/min)						
Layer Bottom Depth (ft)	10	21.5				1000
Soil Type	Qt	Qt				Bedrock

Consolidation (in)

0.654

TOTAL SETTLEMENT 0.7 INCHES

Final Settlement Calculations

Depth (ft)	Ver. Stress (psf)	M	N	V	V1	Stress Due to Fill Pressure (Westergaard) (psf)	Final Stress With Fill (psf)	σ_p (psf)	C_{ec} (%)	C_{es} (%)	Layer Settlement (in)
0.3	32.79	41.67	41.67	3473.22	3014081.79	1484.43	1517.22	2000.00	4.19	0.56	0.07
0.9	98.37	13.89	13.89	386.80	37210.89	1453.31	1551.68	2000.00	4.19	0.56	0.05
1.5	163.95	8.33	8.33	139.89	4822.53	1422.26	1586.21	2000.00	4.19	0.56	0.04
2.1	229.53	5.95	5.95	71.86	1255.34	1391.31	1620.84	2000.00	4.19	0.56	0.03
2.7	295.11	4.63	4.63	43.87	459.39	1360.49	1655.60	2000.00	4.19	0.56	0.03
3.3	360.69	3.79	3.79	29.70	205.87	1329.87	1690.56	2000.00	4.19	0.56	0.03
3.9	426.27	3.21	3.21	21.55	105.53	1299.46	1725.73	2000.00	4.19	0.56	0.02
4.5	491.85	2.78	2.78	16.43	59.54	1269.31	1761.16	2000.00	4.19	0.56	0.02
5.1	557.43	2.45	2.45	13.01	36.09	1239.45	1796.88	2000.00	4.19	0.56	0.02
5.7	623.01	2.19	2.19	10.62	23.13	1209.91	1832.92	2000.00	4.19	0.56	0.02
6.3	688.59	1.98	1.98	8.87	15.50	1180.73	1869.32	2000.00	4.19	0.56	0.02
6.9	754.17	1.81	1.81	7.56	10.77	1151.93	1906.10	2000.00	4.19	0.56	0.02
7.5	819.75	1.67	1.67	6.56	7.72	1123.55	1943.30	2000.00	4.19	0.56	0.02
8.1	885.33	1.54	1.54	5.76	5.67	1095.59	1980.92	2000.00	4.19	0.56	0.01
8.7	950.91	1.44	1.44	5.13	4.26	1068.10	2019.01	2000.00	4.19	0.56	0.01
9.3	1016.49	1.34	1.34	4.61	3.26	1041.09	2057.58	2000.00	4.19	0.56	0.02
9.9	1082.07	1.26	1.26	4.19	2.54	1014.57	2096.64	2000.00	4.19	0.56	0.02
10.5	1145.5	1.19	1.19	3.83	2.01	988.55	2134.05	2300.00	2.46	0.41	0.01
11.1	1208.5	1.13	1.13	3.54	1.61	963.07	2171.57	2300.00	2.46	0.41	0.01
11.7	1271.5	1.07	1.07	3.28	1.30	938.11	2209.61	2300.00	2.46	0.41	0.01
12.3	1334.5	1.02	1.02	3.07	1.07	913.70	2248.20	2300.00	2.46	0.41	0.01
12.9	1397.5	0.97	0.97	2.88	0.88	889.83	2287.33	2300.00	2.46	0.41	0.01
13.5	1460.5	0.93	0.93	2.71	0.74	866.52	2327.02	2300.00	2.46	0.41	0.01
14.1	1523.5	0.89	0.89	2.57	0.62	843.76	2367.26	2300.00	2.46	0.41	0.01
14.7	1586.5	0.85	0.85	2.45	0.52	821.56	2408.06	2300.00	2.46	0.41	0.01
15.3	1649.5	0.82	0.82	2.33	0.45	799.92	2449.42	2300.00	2.46	0.41	0.01
15.9	1712.5	0.79	0.79	2.24	0.38	778.83	2491.33	2300.00	2.46	0.41	0.01
16.5	1775.5	0.76	0.76	2.15	0.33	758.29	2533.79	2300.00	2.46	0.41	0.01
17.1	1838.5	0.73	0.73	2.07	0.29	738.30	2576.80	2300.00	2.46	0.41	0.01
17.7	1901.5	0.71	0.71	2.00	0.25	718.84	2620.34	2300.00	2.46	0.41	0.01
18.3	1964.5	0.68	0.68	1.93	0.22	699.93	2664.43	2300.00	2.46	0.41	0.01
18.9	2027.5	0.66	0.66	1.87	0.19	681.53	2709.03	2300.00	2.46	0.41	0.01
19.5	2090.5	0.64	0.64	1.82	0.17	663.66	2754.16	2300.00	2.46	0.41	0.02
20.1	2153.5	0.62	0.62	1.77	0.15	646.29	2799.79	2300.00	2.46	0.41	0.02
20.7	2216.5	0.60	0.60	1.73	0.13	629.42	2845.92	2300.00	2.46	0.41	0.02
21.3	2279.5	0.59	0.59	1.69	0.12	613.04	2892.54	2300.00	2.46	0.41	0.02
21.9	5038	0.57	0.57	1.65	0.11	597.14	5635.14	10000.00	0.05	0.05	0.00
22.5	5113	0.56	0.56	1.62	0.10	581.71	5694.71	10000.00	0.05	0.05	0.00
23.1	5188	0.54	0.54	1.59	0.09	566.74	5754.74	10000.00	0.05	0.05	0.00
23.7	5263	0.53	0.53	1.56	0.08	552.21	5815.21	10000.00	0.05	0.05	0.00
24.3	5338	0.51	0.51	1.53	0.07	538.11	5876.11	10000.00	0.05	0.05	0.00
24.9	5394.28	0.50	0.50	1.50	0.06	524.44	5918.72	10000.00	0.05	0.05	0.00
25.5	5431.84	0.49	0.49	1.48	0.06	511.18	5943.02	10000.00	0.05	0.05	0.00
26.1	5469.4	0.48	0.48	1.46	0.05	498.33	5967.73	10000.00	0.05	0.05	0.00
26.7	5506.96	0.47	0.47	1.44	0.05	485.86	5992.82	10000.00	0.05	0.05	0.00
27.3	5544.52	0.46	0.46	1.42	0.04	473.77	6018.29	10000.00	0.05	0.05	0.00
27.9	5582.08	0.45	0.45	1.40	0.04	462.04	6044.12	10000.00	0.05	0.05	0.00
28.5	5619.64	0.44	0.44	1.38	0.04	450.68	6070.32	10000.00	0.05	0.05	0.00
29.1	5657.2	0.43	0.43	1.37	0.03	439.65	6096.85	10000.00	0.05	0.05	0.00
29.7	5694.76	0.42	0.42	1.35	0.03	428.97	6123.73	10000.00	0.05	0.05	0.00
30.3	5732.32	0.41	0.41	1.34	0.03	418.61	6150.93	10000.00	0.05	0.05	0.00
30.9	5769.88	0.40	0.40	1.33	0.03	408.56	6178.44	10000.00	0.05	0.05	0.00
31.5	5807.44	0.40	0.40	1.31	0.02	398.81	6206.25	10000.00	0.05	0.05	0.00
32.1	5845	0.39	0.39	1.30	0.02	389.36	6234.36	10000.00	0.05	0.05	0.00
32.7	5882.56	0.38	0.38	1.29	0.02	380.20	6262.76	10000.00	0.05	0.05	0.00
33.3	5920.12	0.38	0.38	1.28	0.02	371.31	6291.43	10000.00	0.05	0.05	0.00
33.9	5957.68	0.37	0.37	1.27	0.02	362.69	6320.37	10000.00	0.05	0.05	0.00
34.5	5995.24	0.36	0.36	1.26	0.02	354.33	6349.57	10000.00	0.05	0.05	0.00
35.1	6032.8	0.36	0.36	1.25	0.02	346.21	6379.01	10000.00	0.05	0.05	0.00
35.7	6070.36	0.35	0.35	1.25	0.02	338.34	6408.70	10000.00	0.05	0.05	0.00
36.3	6107.92	0.34	0.34	1.24	0.01	330.70	6438.62	10000.00	0.05	0.05	0.00

36.9	6145.48	0.34	0.34	1.23	0.01	323.29	6468.77	10000.00	0.05	0.05	0.00
37.5	6183.04	0.33	0.33	1.22	0.01	316.09	6499.13	10000.00	0.05	0.05	0.00
38.1	6220.6	0.33	0.33	1.22	0.01	309.11	6529.71	10000.00	0.05	0.05	0.00
38.7	6258.16	0.32	0.32	1.21	0.01	302.33	6560.49	10000.00	0.05	0.05	0.00
39.3	6295.72	0.32	0.32	1.20	0.01	295.75	6591.47	10000.00	0.05	0.05	0.00
39.9	6333.28	0.31	0.31	1.20	0.01	289.35	6622.63	10000.00	0.05	0.05	0.00
40.5	6370.84	0.31	0.31	1.19	0.01	283.14	6653.98	10000.00	0.05	0.05	0.00
41.1	6408.4	0.30	0.30	1.18	0.01	277.11	6685.51	10000.00	0.05	0.05	0.00
41.7	6445.96	0.30	0.30	1.18	0.01	271.25	6717.21	10000.00	0.05	0.05	0.00
42.3	6483.52	0.30	0.30	1.17	0.01	265.56	6749.08	10000.00	0.05	0.05	0.00
42.9	6521.08	0.29	0.29	1.17	0.01	260.03	6781.11	10000.00	0.05	0.05	0.00
43.5	6558.64	0.29	0.29	1.17	0.01	254.66	6813.30	10000.00	0.05	0.05	0.00
44.1	6596.2	0.28	0.28	1.16	0.01	249.43	6845.63	10000.00	0.05	0.05	0.00
44.7	6633.76	0.28	0.28	1.16	0.01	244.35	6878.11	10000.00	0.05	0.05	0.00
45.3	6671.32	0.28	0.28	1.15	0.01	239.41	6910.73	10000.00	0.05	0.05	0.00
45.9	6708.88	0.27	0.27	1.15	0.01	234.61	6943.49	10000.00	0.05	0.05	0.00
46.5	6746.44	0.27	0.27	1.14	0.01	229.93	6976.37	10000.00	0.05	0.05	0.00
47.1	6784	0.27	0.27	1.14	0.00	225.39	7009.39	10000.00	0.05	0.05	0.00
47.7	6821.56	0.26	0.26	1.14	0.00	220.97	7042.53	10000.00	0.05	0.05	0.00
48.3	6859.12	0.26	0.26	1.13	0.00	216.66	7075.78	10000.00	0.05	0.05	0.00
48.9	6896.68	0.26	0.26	1.13	0.00	212.47	7109.15	10000.00	0.05	0.05	0.00
49.5	6934.24	0.25	0.25	1.13	0.00	208.40	7142.64	10000.00	0.05	0.05	0.00
50.1	6971.8	0.25	0.25	1.12	0.00	204.43	7176.23	10000.00	0.05	0.05	0.00
50.7	7009.36	0.25	0.25	1.12	0.00	200.56	7209.92	10000.00	0.05	0.05	0.00
51.3	7046.92	0.24	0.24	1.12	0.00	196.80	7243.72	10000.00	0.05	0.05	0.00
51.9	7084.48	0.24	0.24	1.12	0.00	193.13	7277.61	10000.00	0.05	0.05	0.00
52.5	7122.04	0.24	0.24	1.11	0.00	189.56	7311.60	10000.00	0.05	0.05	0.00
53.1	7159.6	0.24	0.24	1.11	0.00	186.08	7345.68	10000.00	0.05	0.05	0.00
53.7	7197.16	0.23	0.23	1.11	0.00	182.69	7379.85	10000.00	0.05	0.05	0.00
54.3	7234.72	0.23	0.23	1.11	0.00	179.39	7414.11	10000.00	0.05	0.05	0.00
54.9	7272.28	0.23	0.23	1.10	0.00	176.17	7448.45	10000.00	0.05	0.05	0.00
55.5	7309.84	0.23	0.23	1.10	0.00	173.03	7482.87	10000.00	0.05	0.05	0.00
56.1	7347.4	0.22	0.22	1.10	0.00	169.96	7517.36	10000.00	0.05	0.05	0.00
56.7	7384.96	0.22	0.22	1.10	0.00	166.98	7551.94	10000.00	0.05	0.05	0.00
57.3	7422.52	0.22	0.22	1.10	0.00	164.07	7586.59	10000.00	0.05	0.05	0.00
57.9	7460.08	0.22	0.22	1.09	0.00	161.22	7621.30	10000.00	0.05	0.05	0.00
58.5	7497.64	0.21	0.21	1.09	0.00	158.45	7656.09	10000.00	0.05	0.05	0.00
59.1	7535.2	0.21	0.21	1.09	0.00	155.75	7690.95	10000.00	0.05	0.05	0.00
59.7	7572.76	0.21	0.21	1.09	0.00	153.11	7725.87	10000.00	0.05	0.05	0.00
60.3	7610.32	0.21	0.21	1.09	0.00	150.53	7760.85	10000.00	0.05	0.05	0.00
60.9	7647.88	0.21	0.21	1.08	0.00	148.01	7795.89	10000.00	0.05	0.05	0.00
61.5	7685.44	0.20	0.20	1.08	0.00	145.55	7830.99	10000.00	0.05	0.05	0.00
62.1	7723	0.20	0.20	1.08	0.00	143.16	7866.16	10000.00	0.05	0.05	0.00
62.7	7760.56	0.20	0.20	1.08	0.00	140.81	7901.37	10000.00	0.05	0.05	0.00
63.3	7798.12	0.20	0.20	1.08	0.00	138.52	7936.64	10000.00	0.05	0.05	0.00
63.9	7835.68	0.20	0.20	1.08	0.00	136.29	7971.97	10000.00	0.05	0.05	0.00
64.5	7873.24	0.19	0.19	1.08	0.00	134.10	8007.34	10000.00	0.05	0.05	0.00
65.1	7910.8	0.19	0.19	1.07	0.00	131.97	8042.77	10000.00	0.05	0.05	0.00
65.7	7948.36	0.19	0.19	1.07	0.00	129.88	8078.24	10000.00	0.05	0.05	0.00
66.3	7985.92	0.19	0.19	1.07	0.00	127.84	8113.76	10000.00	0.05	0.05	0.00
66.9	8023.48	0.19	0.19	1.07	0.00	125.85	8149.33	10000.00	0.05	0.05	0.00
67.5	8061.04	0.19	0.19	1.07	0.00	123.90	8184.94	10000.00	0.05	0.05	0.00
68.1	8098.6	0.18	0.18	1.07	0.00	121.99	8220.59	10000.00	0.05	0.05	0.00
68.7	8136.16	0.18	0.18	1.07	0.00	120.12	8256.28	10000.00	0.05	0.05	0.00
69.3	8173.72	0.18	0.18	1.07	0.00	118.30	8292.02	10000.00	0.05	0.05	0.00
69.9	8211.28	0.18	0.18	1.06	0.00	116.51	8327.79	10000.00	0.05	0.05	0.00
70.5	8248.84	0.18	0.18	1.06	0.00	114.77	8363.61	10000.00	0.05	0.05	0.00
71.1	8286.4	0.18	0.18	1.06	0.00	113.06	8399.46	10000.00	0.05	0.05	0.00
71.7	8323.96	0.17	0.17	1.06	0.00	111.39	8435.35	10000.00	0.05	0.05	0.00
72.3	8361.52	0.17	0.17	1.06	0.00	109.75	8471.27	10000.00	0.05	0.05	0.00
72.9	8399.08	0.17	0.17	1.06	0.00	108.15	8507.23	10000.00	0.05	0.05	0.00
73.5	8436.64	0.17	0.17	1.06	0.00	106.58	8543.22	10000.00	0.05	0.05	0.00
74.1	8474.2	0.17	0.17	1.06	0.00	105.04	8579.24	10000.00	0.05	0.05	0.00
74.7	8511.76	0.17	0.17	1.06	0.00	103.53	8615.29	10000.00	0.05	0.05	0.00
75.3	8549.32	0.17	0.17	1.06	0.00	102.06	8651.38	10000.00	0.05	0.05	0.00
75.9	8586.88	0.16	0.16	1.05	0.00	100.62	8687.50	10000.00	0.05	0.05	0.00
76.5	8624.44	0.16	0.16	1.05	0.00	99.20	8723.64	10000.00	0.05	0.05	0.00
77.1	8662	0.16	0.16	1.05	0.00	97.82	8759.82	10000.00	0.05	0.05	0.00
77.7	8699.56	0.16	0.16	1.05	0.00	96.46	8796.02	10000.00	0.05	0.05	0.00
78.3	8737.12	0.16	0.16	1.05	0.00	95.13	8832.25	10000.00	0.05	0.05	0.00
78.9	8774.68	0.16	0.16	1.05	0.00	93.83	8868.51	10000.00	0.05	0.05	0.00
79.5	8812.24	0.16	0.16	1.05	0.00	92.55	8904.79	10000.00	0.05	0.05	0.00
80.1	8849.8	0.16	0.16	1.05	0.00	91.29	8941.09	10000.00	0.05	0.05	0.00
80.7	8887.36	0.15	0.15	1.05	0.00	90.06	8977.42	10000.00	0.05	0.05	0.00
81.3	8924.92	0.15	0.15	1.05	0.00	88.86	9013.78	10000.00	0.05	0.05	0.00
81.9	8962.48	0.15	0.15	1.05	0.00	87.68	9050.16	10000.00	0.05	0.05	0.00
82.5	9000.04	0.15	0.15	1.05	0.00	86.52	9086.56	10000.00	0.05	0.05	0.00
83.1	9037.6	0.15	0.15	1.05	0.00	85.38	9122.98	10000.00	0.05	0.05	0.00
83.7	9075.16	0.15	0.15	1.04	0.00	84.27	9159.43	10000.00	0.05	0.05	0.00
										Total:	0.65

Note: Stress distribution under the center of the footing was calculated by Westergaard equation for a rectangular footing, ref.: Bowels, "Foundation Analysis & Design," 1996.

SETTLEMENT CALCULATIONS

Project:	**NW Open space**
Project Number:	**25-126-00**
Date:	**July 25, 2025**

Sample:	**DH-7 @ 5 ft**

Raise in Grade (ft):	10	
Building Loading (psf):	250	
Unit Weight of Fill (pcf):	125	Size/2
Width (ft)=	25	12.5
Length (ft)=	25	12.5
Depth (ft)=	0	
Bearing Press (psf)=	1500	
Poisson's Ratio=	0.35	
Groundwater Depth (ft)=	22.6	

Layer Thickness (ft):	0.2

Material:	Layer 1	Layer 2	Layer 3	Layer 4	Layer 5	BR
σ_p (psf)=	2000					10000
C_{cc} (%)=	3.5					0.05
C_{cs} (%)=	0.66					0.05
γ_{wet} (pcf) =	103.7					125
C_v -Sq(t) (in^2/min)						
Layer Bottom Depth (ft)	21.5					1000
Soil Type	Qt					Bedrock

Consolidation (in)
1.000

TOTAL SETTLEMENT 1.0 INCHES

Final Settlement Calculations

Depth (ft)	Ver. Stress (psf)	M	N	V	V1	Stress Due to Fill Pressure (Westergaard) (psf)	Final Stress With Fill (psf)	σ_p (psf)	C_{ec} (%)	C_{es} (%)	Layer Settlement (in)
0.1	10.37	125.00	125.00	31251.00	##########	1494.81	1505.18	2000.00	3.52	0.66	0.03
0.3	31.11	41.67	41.67	3473.22	3014081.79	1484.43	1515.54	2000.00	3.52	0.66	0.03
0.5	51.85	25.00	25.00	1251.00	390625.00	1474.05	1525.90	2000.00	3.52	0.66	0.02
0.7	72.59	17.86	17.86	638.76	101682.89	1463.68	1536.27	2000.00	3.52	0.66	0.02
0.9	93.33	13.89	13.89	386.80	37210.89	1453.31	1546.64	2000.00	3.52	0.66	0.02
1.1	114.07	11.36	11.36	259.26	16675.13	1442.95	1557.02	2000.00	3.52	0.66	0.02
1.3	134.81	9.62	9.62	185.91	8548.04	1432.60	1567.41	2000.00	3.52	0.66	0.02
1.5	155.55	8.33	8.33	139.89	4822.53	1422.26	1577.81	2000.00	3.52	0.66	0.02
1.7	176.29	7.35	7.35	109.13	2923.10	1411.93	1588.22	2000.00	3.52	0.66	0.02
1.9	197.03	6.58	6.58	87.57	1873.38	1401.61	1598.64	2000.00	3.52	0.66	0.01
2.1	217.77	5.95	5.95	71.86	1255.34	1391.31	1609.08	2000.00	3.52	0.66	0.01
2.3	238.51	5.43	5.43	60.07	872.43	1381.02	1619.53	2000.00	3.52	0.66	0.01
2.5	259.25	5.00	5.00	51.00		1370.75	1630.00	2000.00	3.52	0.66	0.01
2.7	279.99	4.63	4.63	43.87	459.39	1360.49	1640.48	2000.00	3.52	0.66	0.01
2.9	300.73	4.31	4.31	38.16	345.18	1350.26	1650.99	2000.00	3.52	0.66	0.01
3.1	321.47	4.03	4.03	33.52	264.36	1340.05	1661.52	2000.00	3.52	0.66	0.01
3.3	342.21	3.79	3.79	29.70	205.87	1329.87	1672.08	2000.00	3.52	0.66	0.01
3.5	362.95	3.57	3.57	26.51	162.69	1319.70	1682.65	2000.00	3.52	0.66	0.01
3.7	383.69	3.38	3.38	23.83	130.27	1309.57	1693.26	2000.00	3.52	0.66	0.01
3.9	404.43	3.21	3.21	21.55	105.53	1299.46	1703.89	2000.00	3.52	0.66	0.01
4.1	425.17	3.05	3.05	19.59	86.40	1289.38	1714.55	2000.00	3.52	0.66	0.01
4.3	445.91	2.91	2.91	17.90	71.41	1279.33	1725.24	2000.00	3.52	0.66	0.01
4.5	466.65	2.78	2.78	16.43	59.54	1269.31	1735.96	2000.00	3.52	0.66	0.01
4.7	487.39	2.66	2.66	15.15	50.03	1259.32	1746.71	2000.00	3.52	0.66	0.01
4.9	508.13	2.55	2.55	14.02	42.35	1249.36	1757.49	2000.00	3.52	0.66	0.01
5.1	528.87	2.45	2.45	13.01	36.09	1239.45	1768.32	2000.00	3.52	0.66	0.01
5.3	549.61	2.36	2.36	12.12	30.94	1229.56	1779.17	2000.00	3.52	0.66	0.01
5.5	570.35	2.27	2.27	11.33	26.68	1219.72	1790.07	2000.00	3.52	0.66	0.01
5.7	591.09	2.19	2.19	10.62	23.13	1209.91	1801.00	2000.00	3.52	0.66	0.01
5.9	611.83	2.12	2.12	9.98	20.15	1200.14	1811.97	2000.00	3.52	0.66	0.01
6.1	632.57	2.05	2.05	9.40	17.63	1190.41	1822.98	2000.00	3.52	0.66	0.01
6.3	653.31	1.98	1.98	8.87	15.50	1180.73	1834.04	2000.00	3.52	0.66	0.01
6.5	674.05	1.92	1.92	8.40	13.68	1171.09	1845.14	2000.00	3.52	0.66	0.01
6.7	694.79	1.87	1.87	7.96	12.12	1161.49	1856.28	2000.00	3.52	0.66	0.01
6.9	715.53	1.81	1.81	7.56	10.77	1151.93	1867.46	2000.00	3.52	0.66	0.01
7.1	736.27	1.76	1.76	7.20	9.61	1142.42	1878.69	2000.00	3.52	0.66	0.01
7.3	757.01	1.71	1.71	6.86	8.60	1132.96	1889.97	2000.00	3.52	0.66	0.01
7.5	777.75	1.67	1.67	6.56	7.72	1123.55	1901.30	2000.00	3.52	0.66	0.01
7.7	798.49	1.62	1.62	6.27	6.95	1114.18	1912.67	2000.00	3.52	0.66	0.01
7.9	819.23	1.58	1.58	6.01	6.27	1104.86	1924.09	2000.00	3.52	0.66	0.01
8.1	839.97	1.54	1.54	5.76	5.67	1095.59	1935.56	2000.00	3.52	0.66	0.01
8.3	860.71	1.51	1.51	5.54	5.14	1086.38	1947.09	2000.00	3.52	0.66	0.01
8.5	881.45	1.47	1.47	5.33	4.68	1077.21	1958.66	2000.00	3.52	0.66	0.01
8.7	902.19	1.44	1.44	5.13	4.26	1068.10	1970.29	2000.00	3.52	0.66	0.01
8.9	922.93	1.40	1.40	4.95	3.89	1059.04	1981.97	2000.00	3.52	0.66	0.01
9.1	943.67	1.37	1.37	4.77	3.56	1050.04	1993.71	2000.00	3.52	0.66	0.01
9.3	964.41	1.34	1.34	4.61	3.26	1041.09	2005.50	2000.00	3.52	0.66	0.01
9.5	985.15	1.32	1.32	4.46	3.00	1032.19	2017.34	2000.00	3.52	0.66	0.01
9.7	1005.89	1.29	1.29	4.32	2.76	1023.35	2029.24	2000.00	3.52	0.66	0.01
9.9	1026.63	1.26	1.26	4.19	2.54	1014.57	2041.20	2000.00	3.52	0.66	0.01
10.1	1047.37	1.24	1.24	4.06	2.35	1005.84	2053.21	2000.00	3.52	0.66	0.01
10.3	1068.11	1.21	1.21	3.95	2.17	997.17	2065.28	2000.00	3.52	0.66	0.01
10.5	1088.85	1.19	1.19	3.83	2.01	988.55	2077.40	2000.00	3.52	0.66	0.01
10.7	1109.59	1.17	1.17	3.73	1.86	980.00	2089.59	2000.00	3.52	0.66	0.01
10.9	1130.33	1.15	1.15	3.63	1.73	971.50	2101.83	2000.00	3.52	0.66	0.01
11.1	1151.07	1.13	1.13	3.54	1.61	963.07	2114.14	2000.00	3.52	0.66	0.01
11.3	1171.81	1.11	1.11	3.45	1.50	954.69	2126.50	2000.00	3.52	0.66	0.01
11.5	1192.55	1.09	1.09	3.36	1.40	946.37	2138.92	2000.00	3.52	0.66	0.01
11.7	1213.29	1.07	1.07	3.28	1.30	938.11	2151.40	2000.00	3.52	0.66	0.01
11.9	1234.03	1.05	1.05	3.21	1.22	929.91	2163.94	2000.00	3.52	0.66	0.01
12.1	1254.77	1.03	1.03	3.13	1.14	921.78	2176.55	2000.00	3.52	0.66	0.01

12.3	1275.51	1.02	1.02	3.07	1.07	913.70	2189.21	2000.00	3.52	0.66	0.01
12.5	1296.25	1.00	1.00	3.00	1.00	905.68	2201.93	2000.00	3.52	0.66	0.01
12.7	1316.99	0.98	0.98	2.94	0.94	897.73	2214.72	2000.00	3.52	0.66	0.01
12.9	1337.73	0.97	0.97	2.88	0.88	889.83	2227.56	2000.00	3.52	0.66	0.01
13.1	1358.47	0.95	0.95	2.82	0.83	882.00	2240.47	2000.00	3.52	0.66	0.01
13.3	1379.21	0.94	0.94	2.77	0.78	874.23	2253.44	2000.00	3.52	0.66	0.01
13.5	1399.95	0.93	0.93	2.71	0.74	866.52	2266.47	2000.00	3.52	0.66	0.01
13.7	1420.69	0.91	0.91	2.66	0.69	858.87	2279.56	2000.00	3.52	0.66	0.01
13.9	1441.43	0.90	0.90	2.62	0.65	851.29	2292.72	2000.00	3.52	0.66	0.01
14.1	1462.17	0.89	0.89	2.57	0.62	843.76	2305.93	2000.00	3.52	0.66	0.01
14.3	1482.91	0.87	0.87	2.53	0.58	836.30	2319.21	2000.00	3.52	0.66	0.01
14.5	1503.65	0.86	0.86	2.49	0.55	828.90	2332.55	2000.00	3.52	0.66	0.01
14.7	1524.39	0.85	0.85	2.45	0.52	821.56	2345.95	2000.00	3.52	0.66	0.01
14.9	1545.13	0.84	0.84	2.41	0.50	814.29	2359.42	2000.00	3.52	0.66	0.01
15.1	1565.87	0.83	0.83	2.37	0.47	807.07	2372.94	2000.00	3.52	0.66	0.01
15.3	1586.61	0.82	0.82	2.33	0.45	799.92	2386.53	2000.00	3.52	0.66	0.01
15.5	1607.35	0.81	0.81	2.30	0.42	792.83	2400.18	2000.00	3.52	0.66	0.01
15.7	1628.09	0.80	0.80	2.27	0.40	785.80	2413.89	2000.00	3.52	0.66	0.01
15.9	1648.83	0.79	0.79	2.24	0.38	778.83	2427.66	2000.00	3.52	0.66	0.01
16.1	1669.57	0.78	0.78	2.21	0.36	771.92	2441.49	2000.00	3.52	0.66	0.01
16.3	1690.31	0.77	0.77	2.18	0.35	765.08	2455.39	2000.00	3.52	0.66	0.01
16.5	1711.05	0.76	0.76	2.15	0.33	758.29	2469.34	2000.00	3.52	0.66	0.01
16.7	1731.79	0.75	0.75	2.12	0.31	751.57	2483.36	2000.00	3.52	0.66	0.01
16.9	1752.53	0.74	0.74	2.09	0.30	744.90	2497.43	2000.00	3.52	0.66	0.01
17.1	1773.27	0.73	0.73	2.07	0.29	738.30	2511.57	2000.00	3.52	0.66	0.01
17.3	1794.01	0.72	0.72	2.04	0.27	731.75	2525.76	2000.00	3.52	0.66	0.01
17.5	1814.75	0.71	0.71	2.02	0.26	725.27	2540.02	2000.00	3.52	0.66	0.01
17.7	1835.49	0.71	0.71	2.00	0.25	718.84	2554.33	2000.00	3.52	0.66	0.01
17.9	1856.23	0.70	0.70	1.98	0.24	712.48	2568.71	2000.00	3.52	0.66	0.01
18.1	1876.97	0.69	0.69	1.95	0.23	706.17	2583.14	2000.00	3.52	0.66	0.01
18.3	1897.71	0.68	0.68	1.93	0.22	699.93	2597.64	2000.00	3.52	0.66	0.01
18.5	1918.45	0.68	0.68	1.91	0.21	693.74	2612.19	2000.00	3.52	0.66	0.01
18.7	1939.19	0.67	0.67	1.89	0.20	687.60	2626.79	2000.00	3.52	0.66	0.01
18.9	1959.93	0.66	0.66	1.87	0.19	681.53	2641.46	2000.00	3.52	0.66	0.01
19.1	1980.67	0.65	0.65	1.86	0.18	675.52	2656.19	2000.00	3.52	0.66	0.01
19.3	2001.41	0.65	0.65	1.84	0.18	669.56	2670.97	2000.00	3.52	0.66	0.01
19.5	2022.15	0.64	0.64	1.82	0.17	663.66	2685.81	2000.00	3.52	0.66	0.01
19.7	2042.89	0.63	0.63	1.81	0.16	657.81	2700.70	2000.00	3.52	0.66	0.01
19.9	2063.63	0.63	0.63	1.79	0.16	652.02	2715.65	2000.00	3.52	0.66	0.01
20.1	2084.37	0.62	0.62	1.77	0.15	646.29	2730.66	2000.00	3.52	0.66	0.01
20.3	2105.11	0.62	0.62	1.76	0.14	640.61	2745.72	2000.00	3.52	0.66	0.01
20.5	2125.85	0.61	0.61	1.74	0.14	634.99	2760.84	2000.00	3.52	0.66	0.01
20.7	2146.59	0.60	0.60	1.73	0.13	629.42	2776.01	2000.00	3.52	0.66	0.01
20.9	2167.33	0.60	0.60	1.72	0.13	623.91	2791.24	2000.00	3.52	0.66	0.01
21.1	2188.07	0.59	0.59	1.70	0.12	618.45	2806.52	2000.00	3.52	0.66	0.01
21.3	2208.81	0.59	0.59	1.69	0.12	613.04	2821.85	2000.00	3.52	0.66	0.01
21.5	2229.55	0.58	0.58	1.68	0.11	607.69	2837.24	2000.00	3.52	0.66	0.01
21.7	4942.05	0.58	0.58	1.66	0.11	602.39	5544.44	10000.00	0.05	0.05	0.00
21.9	4967.05	0.57	0.57	1.65	0.11	597.14	5564.19	10000.00	0.05	0.05	0.00
22.1	4992.05	0.57	0.57	1.64	0.10	591.95	5584.00	10000.00	0.05	0.05	0.00
22.3	5017.05	0.56	0.56	1.63	0.10	586.80	5603.85	10000.00	0.05	0.05	0.00
22.5	5042.05	0.56	0.56	1.62	0.10	581.71	5623.76	10000.00	0.05	0.05	0.00
22.7	5060.81	0.55	0.55	1.61	0.09	576.67	5637.48	10000.00	0.05	0.05	0.00
22.9	5073.33	0.55	0.55	1.60	0.09	571.68	5645.01	10000.00	0.05	0.05	0.00
23.1	5085.85	0.54	0.54	1.59	0.09	566.74	5652.59	10000.00	0.05	0.05	0.00
23.3	5098.37	0.54	0.54	1.58	0.08	561.84	5660.21	10000.00	0.05	0.05	0.00
23.5	5110.89	0.53	0.53	1.57	0.08	557.00	5667.89	10000.00	0.05	0.05	0.00
23.7	5123.41	0.53	0.53	1.56	0.08	552.21	5675.62	10000.00	0.05	0.05	0.00
23.9	5135.93	0.52	0.52	1.55	0.07	547.46	5683.39	10000.00	0.05	0.05	0.00
24.1	5148.45	0.52	0.52	1.54	0.07	542.76	5691.21	10000.00	0.05	0.05	0.00
24.3	5160.97	0.51	0.51	1.53	0.07	538.11	5699.08	10000.00	0.05	0.05	0.00
24.5	5173.49	0.51	0.51	1.52	0.07	533.51	5707.00	10000.00	0.05	0.05	0.00
24.7	5186.01	0.51	0.51	1.51	0.07	528.95	5714.96	10000.00	0.05	0.05	0.00
24.9	5198.53	0.50	0.50	1.50	0.06	524.44	5722.97	10000.00	0.05	0.05	0.00
25.1	5211.05	0.50	0.50	1.50	0.06	519.98	5731.03	10000.00	0.05	0.05	0.00
25.3	5223.57	0.49	0.49	1.49	0.06	515.56	5739.13	10000.00	0.05	0.05	0.00
25.5	5236.09	0.49	0.49	1.48	0.06	511.18	5747.27	10000.00	0.05	0.05	0.00
25.7	5248.61	0.49	0.49	1.47	0.06	506.85	5755.46	10000.00	0.05	0.05	0.00
25.9	5261.13	0.48	0.48	1.47	0.05	502.57	5763.70	10000.00	0.05	0.05	0.00
26.1	5273.65	0.48	0.48	1.46	0.05	498.33	5771.98	10000.00	0.05	0.05	0.00
26.3	5286.17	0.48	0.48	1.45	0.05	494.13	5780.30	10000.00	0.05	0.05	0.00
26.5	5298.69	0.47	0.47	1.44	0.05	489.97	5788.66	10000.00	0.05	0.05	0.00
26.7	5311.21	0.47	0.47	1.44	0.05	485.86	5797.07	10000.00	0.05	0.05	0.00
26.9	5323.73	0.46	0.46	1.43	0.05	481.79	5805.52	10000.00	0.05	0.05	0.00
27.1	5336.25	0.46	0.46	1.43	0.05	477.76	5814.01	10000.00	0.05	0.05	0.00
27.3	5348.77	0.46	0.46	1.42	0.04	473.77	5822.54	10000.00	0.05	0.05	0.00
27.5	5361.29	0.45	0.45	1.41	0.04	469.82	5831.11	10000.00	0.05	0.05	0.00
27.7	5373.81	0.45	0.45	1.41	0.04	465.91	5839.72	10000.00	0.05	0.05	0.00
27.9	5386.33	0.45	0.45	1.40	0.04	462.04	5848.37	10000.00	0.05	0.05	0.00
										Total:	1.00

Note: Stress distribution under the center of the footing was calculated by Westergaard equation for a rectangular footing, ref.: Bowels, "Foundation Analysis & Design," 1996.

SETTLEMENT CALCULATIONS

Project:	**NW Open space**
Project Number:	**25-126-00**
Date:	**July 25, 2025**

Sample:	**DH-8 @ 2.5 ft**

Raise in Grade (ft):	10	
Building Loading (psf):	250	
Unit Weight of Fill (pcf):	125	Size/2
Width (ft)=	25	12.5
Length (ft)=	25	12.5
Depth (ft)=	0	
Bearing Press (psf)=	1500	
Poisson's Ratio=	0.35	
Groundwater Depth (ft)=	15	

Layer Thickness (ft):	0.3

Material:	Layer 1	Layer 2	Layer 3	Layer 4	Layer 5	BR
σ_p (psf)=	1800					10000
C_{cc} (%)=	4.4					0.05
C_{cs} (%)=	0.46					0.05
γ_{wet} (pcf) =	99.2					125
C_v -Sq(t) (in^2/min)						
Layer Bottom Depth (ft)	31.5					1000
Soil Type	Qafu/Qt					Bedrock

Consolidation (in)

1.562

TOTAL SETTLEMENT 1.6 INCHES

Final Settlement Calculations

Depth (ft)	Ver. Stress (psf)	M	N	V	V1	Stress Due to Fill Pressure (Westergaard) (psf)	Final Stress With Fill (psf)	σ_p (psf)	C_{ec} (%)	C_{es} (%)	Layer Settlement (in)
0.15	14.88	83.33	83.33	13889.89	48225308.64	1492.22	1507.10	1800.00	4.35	0.46	0.03
0.45	44.64	27.78	27.78	1544.21	595374.18	1476.65	1521.29	1800.00	4.35	0.46	0.03
0.75	74.4	16.67	16.67	556.56	77160.49	1461.09	1535.49	1800.00	4.35	0.46	0.02
1.05	104.16	11.90	11.90	284.45	20085.51	1445.54	1549.70	1800.00	4.35	0.46	0.02
1.35	133.92	9.26	9.26	172.47	7350.30	1430.01	1563.93	1800.00	4.35	0.46	0.02
1.65	163.68	7.58	7.58	115.78	3293.85	1414.51	1578.19	1800.00	4.35	0.46	0.02
1.95	193.44	6.41	6.41	83.18	1688.50	1399.03	1592.47	1800.00	4.35	0.46	0.02
2.25	223.2	5.56	5.56	62.73	952.60	1383.59	1606.79	1800.00	4.35	0.46	0.01
2.55	252.96	4.90	4.90	49.06	577.40	1368.18	1621.14	1800.00	4.35	0.46	0.01
2.85	282.72	4.39	4.39	39.47	370.05	1352.82	1635.54	1800.00	4.35	0.46	0.01
3.15	312.48	3.97	3.97	32.49	247.97	1337.50	1649.98	1800.00	4.35	0.46	0.01
3.45	342.24	3.62	3.62	27.25	172.33	1322.24	1664.48	1800.00	4.35	0.46	0.01
3.75	372	3.33	3.33	23.22		1307.04	1679.04	1800.00	4.35	0.46	0.01
4.05	401.76	3.09	3.09	20.05	90.74	1291.90	1693.66	1800.00	4.35	0.46	0.01
4.35	431.52	2.87	2.87	17.51	68.18	1276.82	1708.34	1800.00	4.35	0.46	0.01
4.65	461.28	2.69	2.69	15.45	52.22	1261.81	1723.09	1800.00	4.35	0.46	0.01
4.95	491.04	2.53	2.53	13.75	40.66	1246.88	1737.92	1800.00	4.35	0.46	0.01
5.25	520.8	2.38	2.38	12.34	32.14	1232.03	1752.83	1800.00	4.35	0.46	0.01
5.55	550.56	2.25	2.25	11.15	25.73	1217.26	1767.82	1800.00	4.35	0.46	0.01
5.85	580.32	2.14	2.14	10.13	20.85	1202.58	1782.90	1800.00	4.35	0.46	0.01
6.15	610.08	2.03	2.03	9.26	17.07	1187.99	1798.07	1800.00	4.35	0.46	0.01
6.45	639.84	1.94	1.94	8.51	14.11	1173.49	1813.33	1800.00	4.35	0.46	0.01
6.75	669.6	1.85	1.85	7.86	11.76	1159.09	1828.69	1800.00	4.35	0.46	0.01
7.05	699.36	1.77	1.77	7.29	9.88	1144.80	1844.16	1800.00	4.35	0.46	0.01
7.35	729.12	1.70	1.70	6.78	8.37	1130.60	1859.72	1800.00	4.35	0.46	0.01
7.65	758.88	1.63	1.63	6.34	7.13	1116.52	1875.40	1800.00	4.35	0.46	0.01
7.95	788.64	1.57	1.57	5.94	6.11	1102.54	1891.18	1800.00	4.35	0.46	0.01
8.25	818.4	1.52	1.52	5.59	5.27	1088.68	1907.08	1800.00	4.35	0.46	0.01
8.55	848.16	1.46	1.46	5.27	4.57	1074.93	1923.09	1800.00	4.35	0.46	0.01
8.85	877.92	1.41	1.41	4.99	3.98	1061.30	1939.22	1800.00	4.35	0.46	0.01
9.15	907.68	1.37	1.37	4.73	3.48	1047.79	1955.47	1800.00	4.35	0.46	0.01
9.45	937.44	1.32	1.32	4.50	3.06	1034.41	1971.85	1800.00	4.35	0.46	0.01
9.75	967.2	1.28	1.28	4.29	2.70	1021.15	1988.35	1800.00	4.35	0.46	0.01
10.05	996.96	1.24	1.24	4.09	2.39	1008.01	2004.97	1800.00	4.35	0.46	0.01
10.35	1026.72	1.21	1.21	3.92	2.13	995.01	2021.73	1800.00	4.35	0.46	0.01
10.65	1056.48	1.17	1.17	3.76	1.90	982.13	2038.61	1800.00	4.35	0.46	0.01
10.95	1086.24	1.14	1.14	3.61	1.70	969.39	2055.63	1800.00	4.35	0.46	0.01
11.25	1116	1.11	1.11	3.47	1.52	956.78	2072.78	1800.00	4.35	0.46	0.01
11.55	1145.76	1.08	1.08	3.34	1.37	944.30	2090.06	1800.00	4.35	0.46	0.01
11.85	1175.52	1.05	1.05	3.23	1.24	931.96	2107.48	1800.00	4.35	0.46	0.01
12.15	1205.28	1.03	1.03	3.12	1.12	919.75	2125.03	1800.00	4.35	0.46	0.01
12.45	1235.04	1.00	1.00	3.02	1.02	907.68	2142.72	1800.00	4.35	0.46	0.01
12.75	1264.8	0.98	0.98	2.92	0.92	895.75	2160.55	1800.00	4.35	0.46	0.01
13.05	1294.56	0.96	0.96	2.83	0.84	883.95	2178.51	1800.00	4.35	0.46	0.02
13.35	1324.32	0.94	0.94	2.75	0.77	872.30	2196.62	1800.00	4.35	0.46	0.02
13.65	1354.08	0.92	0.92	2.68	0.70	860.78	2214.86	1800.00	4.35	0.46	0.02
13.95	1383.84	0.90	0.90	2.61	0.64	849.40	2233.24	1800.00	4.35	0.46	0.02
14.25	1413.6	0.88	0.88	2.54	0.59	838.16	2251.76	1800.00	4.35	0.46	0.02
14.55	1443.36	0.86	0.86	2.48	0.54	827.06	2270.42	1800.00	4.35	0.46	0.02
14.85	1473.12	0.84	0.84	2.42	0.50	816.10	2289.22	1800.00	4.35	0.46	0.02
15.15	1493.52	0.83	0.83	2.36	0.46	805.28	2298.80	1800.00	4.35	0.46	0.02
15.45	1504.56	0.81	0.81	2.31	0.43	794.60	2299.16	1800.00	4.35	0.46	0.02
15.75	1515.6	0.79	0.79	2.26	0.40	784.05	2299.65	1800.00	4.35	0.46	0.02
16.05	1526.64	0.78	0.78	2.21	0.37	773.64	2300.28	1800.00	4.35	0.46	0.02
16.35	1537.68	0.76	0.76	2.17	0.34	763.38	2301.06	1800.00	4.35	0.46	0.02
16.65	1548.72	0.75	0.75	2.13	0.32	753.24	2301.96	1800.00	4.35	0.46	0.02
16.95	1559.76	0.74	0.74	2.09	0.30	743.25	2303.01	1800.00	4.35	0.46	0.02
17.25	1570.8	0.72	0.72	2.05	0.28	733.38	2304.18	1800.00	4.35	0.46	0.02
17.55	1581.84	0.71	0.71	2.01	0.26	723.66	2305.50	1800.00	4.35	0.46	0.02
17.85	1592.88	0.70	0.70	1.98	0.24	714.07	2306.95	1800.00	4.35	0.46	0.02
18.15	1603.92	0.69	0.69	1.95	0.22	704.61	2308.53	1800.00	4.35	0.46	0.02

18.45	1614.96	0.68	0.68	1.92	0.21	695.28	2310.24	1800.00	4.35	0.46	0.02
18.75	1626	0.67	0.67	1.89	0.20	686.08	2312.08	1800.00	4.35	0.46	0.02
19.05	1637.04	0.66	0.66	1.86	0.19	677.01	2314.05	1800.00	4.35	0.46	0.02
19.35	1648.08	0.65	0.65	1.83	0.17	668.08	2316.16	1800.00	4.35	0.46	0.02
19.65	1659.12	0.64	0.64	1.81	0.16	659.27	2318.39	1800.00	4.35	0.46	0.02
19.95	1670.16	0.63	0.63	1.79	0.15	650.58	2320.74	1800.00	4.35	0.46	0.02
20.25	1681.2	0.62	0.62	1.76	0.15	642.02	2323.22	1800.00	4.35	0.46	0.02
20.55	1692.24	0.61	0.61	1.74	0.14	633.59	2325.83	1800.00	4.35	0.46	0.02
20.85	1703.28	0.60	0.60	1.72	0.13	625.28	2328.56	1800.00	4.35	0.46	0.02
21.15	1714.32	0.59	0.59	1.70	0.12	617.09	2331.41	1800.00	4.35	0.46	0.02
21.45	1725.36	0.58	0.58	1.68	0.12	609.02	2334.38	1800.00	4.35	0.46	0.02
21.75	1736.4	0.57	0.57	1.66	0.11	601.07	2337.47	1800.00	4.35	0.46	0.02
22.05	1747.44	0.57	0.57	1.64	0.10	593.24	2340.68	1800.00	4.35	0.46	0.02
22.35	1758.48	0.56	0.56	1.63	0.10	585.52	2344.00	1800.00	4.35	0.46	0.02
22.65	1769.52	0.55	0.55	1.61	0.09	577.92	2347.44	1800.00	4.35	0.46	0.02
22.95	1780.56	0.54	0.54	1.59	0.09	570.44	2351.00	1800.00	4.35	0.46	0.02
23.25	1791.6	0.54	0.54	1.58	0.08	563.06	2354.66	1800.00	4.35	0.46	0.02
23.55	1802.64	0.53	0.53	1.56	0.08	555.80	2358.44	1800.00	4.35	0.46	0.02
23.85	1813.68	0.52	0.52	1.55	0.08	548.64	2362.32	1800.00	4.35	0.46	0.02
24.15	1824.72	0.52	0.52	1.54	0.07	541.60	2366.32	1800.00	4.35	0.46	0.02
24.45	1835.76	0.51	0.51	1.52	0.07	534.66	2370.42	1800.00	4.35	0.46	0.02
24.75	1846.8	0.51	0.51	1.51	0.07	527.82	2374.62	1800.00	4.35	0.46	0.02
25.05	1857.84	0.50	0.50	1.50	0.06	521.09	2378.93	1800.00	4.35	0.46	0.02
25.35	1868.88	0.49	0.49	1.49	0.06	514.46	2383.34	1800.00	4.35	0.46	0.02
25.65	1879.92	0.49	0.49	1.47	0.06	507.93	2387.85	1800.00	4.35	0.46	0.02
25.95	1890.96	0.48	0.48	1.46	0.05	501.50	2392.46	1800.00	4.35	0.46	0.02
26.25	1902	0.48	0.48	1.45	0.05	495.17	2397.17	1800.00	4.35	0.46	0.02
26.55	1913.04	0.47	0.47	1.44	0.05	488.94	2401.98	1800.00	4.35	0.46	0.02
26.85	1924.08	0.47	0.47	1.43	0.05	482.80	2406.88	1800.00	4.35	0.46	0.02
27.15	1935.12	0.46	0.46	1.42	0.04	476.75	2411.87	1800.00	4.35	0.46	0.01
27.45	1946.16	0.46	0.46	1.41	0.04	470.80	2416.96	1800.00	4.35	0.46	0.01
27.75	1957.2	0.45	0.45	1.41	0.04	464.94	2422.14	1800.00	4.35	0.46	0.01
28.05	1968.24	0.45	0.45	1.40	0.04	459.17	2427.41	1800.00	4.35	0.46	0.01
28.35	1979.28	0.44	0.44	1.39	0.04	453.49	2432.77	1800.00	4.35	0.46	0.01
28.65	1990.32	0.44	0.44	1.38	0.04	447.89	2438.21	1800.00	4.35	0.46	0.01
28.95	2001.36	0.43	0.43	1.37	0.03	442.38	2443.74	1800.00	4.35	0.46	0.01
29.25	2012.4	0.43	0.43	1.37	0.03	436.95	2449.35	1800.00	4.35	0.46	0.01
29.55	2023.44	0.42	0.42	1.36	0.03	431.61	2455.05	1800.00	4.35	0.46	0.01
29.85	2034.48	0.42	0.42	1.35	0.03	426.35	2460.83	1800.00	4.35	0.46	0.01
30.15	2045.52	0.41	0.41	1.34	0.03	421.17	2466.69	1800.00	4.35	0.46	0.01
30.45	2056.56	0.41	0.41	1.34	0.03	416.06	2472.62	1800.00	4.35	0.46	0.01
30.75	2067.6	0.41	0.41	1.33	0.03	411.04	2478.64	1800.00	4.35	0.46	0.01
31.05	2078.64	0.40	0.40	1.32	0.03	406.09	2484.73	1800.00	4.35	0.46	0.01
31.35	2089.68	0.40	0.40	1.32	0.03	401.22	2490.90	1800.00	4.35	0.46	0.01
31.65	6042.09	0.39	0.39	1.31	0.02	396.42	6438.51	10000.00	0.05	0.05	0.00
31.95	6060.87	0.39	0.39	1.31	0.02	391.70	6452.57	10000.00	0.05	0.05	0.00
32.25	6079.65	0.39	0.39	1.30	0.02	387.05	6466.70	10000.00	0.05	0.05	0.00
32.55	6098.43	0.38	0.38	1.29	0.02	382.46	6480.89	10000.00	0.05	0.05	0.00
32.85	6117.21	0.38	0.38	1.29	0.02	377.95	6495.16	10000.00	0.05	0.05	0.00
33.15	6135.99	0.38	0.38	1.28	0.02	373.51	6509.50	10000.00	0.05	0.05	0.00
33.45	6154.77	0.37	0.37	1.28	0.02	369.13	6523.90	10000.00	0.05	0.05	0.00
33.75	6173.55	0.37	0.37	1.27	0.02	364.82	6538.37	10000.00	0.05	0.05	0.00
34.05	6192.33	0.37	0.37	1.27	0.02	360.57	6552.90	10000.00	0.05	0.05	0.00
34.35	6211.11	0.36	0.36	1.26	0.02	356.39	6567.50	10000.00	0.05	0.05	0.00
34.65	6229.89	0.36	0.36	1.26	0.02	352.27	6582.16	10000.00	0.05	0.05	0.00
34.95	6248.67	0.36	0.36	1.26	0.02	348.22	6596.89	10000.00	0.05	0.05	0.00
35.25	6267.45	0.35	0.35	1.25	0.02	344.22	6611.67	10000.00	0.05	0.05	0.00
35.55	6286.23	0.35	0.35	1.25	0.02	340.29	6626.52	10000.00	0.05	0.05	0.00
35.85	6305.01	0.35	0.35	1.24	0.01	336.41	6641.42	10000.00	0.05	0.05	0.00
36.15	6323.79	0.35	0.35	1.24	0.01	332.59	6656.38	10000.00	0.05	0.05	0.00
36.45	6342.57	0.34	0.34	1.24	0.01	328.83	6671.40	10000.00	0.05	0.05	0.00
36.75	6361.35	0.34	0.34	1.23	0.01	325.12	6686.47	10000.00	0.05	0.05	0.00
37.05	6380.13	0.34	0.34	1.23	0.01	321.47	6701.60	10000.00	0.05	0.05	0.00
37.35	6398.91	0.33	0.33	1.22	0.01	317.87	6716.78	10000.00	0.05	0.05	0.00
37.65	6417.69	0.33	0.33	1.22	0.01	314.33	6732.02	10000.00	0.05	0.05	0.00
37.95	6436.47	0.33	0.33	1.22	0.01	310.84	6747.31	10000.00	0.05	0.05	0.00
38.25	6455.25	0.33	0.33	1.21	0.01	307.39	6762.64	10000.00	0.05	0.05	0.00
38.55	6474.03	0.32	0.32	1.21	0.01	304.00	6778.03	10000.00	0.05	0.05	0.00
38.85	6492.81	0.32	0.32	1.21	0.01	300.66	6793.47	10000.00	0.05	0.05	0.00
39.15	6511.59	0.32	0.32	1.20	0.01	297.37	6808.96	10000.00	0.05	0.05	0.00
39.45	6530.37	0.32	0.32	1.20	0.01	294.13	6824.50	10000.00	0.05	0.05	0.00
39.75	6549.15	0.31	0.31	1.20	0.01	290.93	6840.08	10000.00	0.05	0.05	0.00
40.05	6567.93	0.31	0.31	1.19	0.01	287.78	6855.71	10000.00	0.05	0.05	0.00
40.35	6586.71	0.31	0.31	1.19	0.01	284.68	6871.39	10000.00	0.05	0.05	0.00
40.65	6605.49	0.31	0.31	1.19	0.01	281.62	6887.11	10000.00	0.05	0.05	0.00
40.95	6624.27	0.31	0.31	1.19	0.01	278.60	6902.87	10000.00	0.05	0.05	0.00
41.25	6643.05	0.30	0.30	1.18	0.01	275.63	6918.68	10000.00	0.05	0.05	0.00
41.55	6661.83	0.30	0.30	1.18	0.01	272.70	6934.53	10000.00	0.05	0.05	0.00
41.85	6680.61	0.30	0.30	1.18	0.01	269.82	6950.43	10000.00	0.05	0.05	0.00
										Total:	1.56

Note: Stress distribution under the center of the footing was calculated by Westergaard equation for a rectangular footing, ref.: Bowels, "Foundation Analysis & Design," 1996.

SETTLEMENT CALCULATIONS

Project:	**NW Open space**
Project Number:	**25-126-00**
Date:	**July 25, 2025**

Sample:	**DH-9 @ 5 ft**

Raise in Grade (ft):	10	
Building Loading (psf):	250	
Unit Weight of Fill (pcf):	125	Size/2
Width (ft)=	25	12.5
Length (ft)=	25	12.5
Depth (ft)=	0	
Bearing Press (psf)=	1500	
Poisson's Ratio=	0.35	
Groundwater Depth (ft)=	35.4	

Layer Thickness (ft):	0.4

Material:	Layer 1	Layer 2	Layer 3	Layer 4	Layer 5	BR
σ_p (psf)=	2200					10000
C_{cc} (%)=	4.5					0.05
C_{cs} (%)=	0.15					0.05
γ_{wet} (pcf) =	125.8					125
C_v -Sq(t) (in^2/min)						
Layer Bottom Depth (ft)	51					1000
Soil Type	Qal					Bedrock

Consolidation (in)
1.230

TOTAL SETTLEMENT 1.2 INCHES

Final Settlement Calculations

Depth (ft)	Ver. Stress (psf)	M	N	V	V1	Stress Due to Fill Pressure (Westergaard) (psf)	Final Stress With Fill (psf)	σ_p (psf)	C_{ec} (%)	C_{es} (%)	Layer Settlement (in)
0.2	25.16	62.50	62.50	7813.50	15258789.06	1489.62	1514.78	2200.00	4.48	0.15	0.01
0.6	75.48	20.83	20.83	869.06	188380.11	1468.87	1544.35	2200.00	4.48	0.15	0.01
1	125.8	12.50	12.50	313.50	24414.06	1448.13	1573.93	2200.00	4.48	0.15	0.01
1.4	176.12	8.93	8.93	160.44	6355.18	1427.43	1603.55	2200.00	4.48	0.15	0.01
1.8	226.44	6.94	6.94	97.45	2325.68	1406.77	1633.21	2200.00	4.48	0.15	0.01
2.2	276.76	5.68	5.68	65.57	1042.20	1386.16	1662.92	2200.00	4.48	0.15	0.01
2.6	327.08	4.81	4.81	47.23	534.25	1365.62	1692.70	2200.00	4.48	0.15	0.01
3	377.4	4.17	4.17	35.72	301.41	1345.16	1722.56	2200.00	4.48	0.15	0.00
3.4	427.72	3.68	3.68	28.03	182.69	1324.78	1752.50	2200.00	4.48	0.15	0.00
3.8	478.04	3.29	3.29	22.64	117.09	1304.51	1782.55	2200.00	4.48	0.15	0.00
4.2	528.36	2.98	2.98	18.72	78.46	1284.35	1812.71	2200.00	4.48	0.15	0.00
4.6	578.68	2.72	2.72	15.77	54.53	1264.31	1842.99	2200.00	4.48	0.15	0.00
5	629	2.50	2.50	13.50		1244.40	1873.40	2200.00	4.48	0.15	0.00
5.4	679.32	2.31	2.31	11.72	28.71	1224.64	1903.96	2200.00	4.48	0.15	0.00
5.8	729.64	2.16	2.16	10.29	21.57	1205.02	1934.66	2200.00	4.48	0.15	0.00
6.2	779.96	2.02	2.02	9.13	16.52	1185.57	1965.53	2200.00	4.48	0.15	0.00
6.6	830.28	1.89	1.89	8.17	12.87	1166.28	1996.56	2200.00	4.48	0.15	0.00
7	880.6	1.79	1.79	7.38	10.17	1147.17	2027.77	2200.00	4.48	0.15	0.00
7.4	930.92	1.69	1.69	6.71	8.14	1128.25	2059.17	2200.00	4.48	0.15	0.00
7.8	981.24	1.60	1.60	6.14	6.60	1109.51	2090.75	2200.00	4.48	0.15	0.00
8.2	1031.56	1.52	1.52	5.65	5.40	1090.98	2122.54	2200.00	4.48	0.15	0.00
8.6	1081.88	1.45	1.45	5.23	4.46	1072.65	2154.53	2200.00	4.48	0.15	0.00
9	1132.2	1.39	1.39	4.86	3.72	1054.53	2186.73	2200.00	4.48	0.15	0.00
9.4	1182.52	1.33	1.33	4.54	3.13	1036.63	2219.15	2200.00	4.48	0.15	0.00
9.8	1232.84	1.28	1.28	4.25	2.65	1018.95	2251.79	2200.00	4.48	0.15	0.00
10.2	1283.16	1.23	1.23	4.00	2.26	1001.50	2284.66	2200.00	4.48	0.15	0.01
10.6	1333.48	1.18	1.18	3.78	1.93	984.27	2317.75	2200.00	4.48	0.15	0.01
11	1383.8	1.14	1.14	3.58	1.67	967.28	2351.08	2200.00	4.48	0.15	0.01
11.4	1434.12	1.10	1.10	3.40	1.45	950.52	2384.64	2200.00	4.48	0.15	0.01
11.8	1484.44	1.06	1.06	3.24	1.26	934.00	2418.44	2200.00	4.48	0.15	0.01
12.2	1534.76	1.02	1.02	3.10	1.10	917.73	2452.49	2200.00	4.48	0.15	0.01
12.6	1585.08	0.99	0.99	2.97	0.97	901.70	2486.78	2200.00	4.48	0.15	0.01
13	1635.4	0.96	0.96	2.85	0.85	885.91	2521.31	2200.00	4.48	0.15	0.01
13.4	1685.72	0.93	0.93	2.74	0.76	870.37	2556.09	2200.00	4.48	0.15	0.01
13.8	1736.04	0.91	0.91	2.64	0.67	855.07	2591.11	2200.00	4.48	0.15	0.02
14.2	1786.36	0.88	0.88	2.55	0.60	840.03	2626.39	2200.00	4.48	0.15	0.02
14.6	1836.68	0.86	0.86	2.47	0.54	825.23	2661.91	2200.00	4.48	0.15	0.02
15	1887	0.83	0.83	2.39	0.48	810.67	2697.67	2200.00	4.48	0.15	0.02
15.4	1937.32	0.81	0.81	2.32	0.43	796.37	2733.69	2200.00	4.48	0.15	0.02
15.8	1987.64	0.79	0.79	2.25	0.39	782.31	2769.95	2200.00	4.48	0.15	0.02
16.2	2037.96	0.77	0.77	2.19	0.35	768.49	2806.45	2200.00	4.48	0.15	0.02
16.6	2088.28	0.75	0.75	2.13	0.32	754.92	2843.20	2200.00	4.48	0.15	0.02
17	2138.6	0.74	0.74	2.08	0.29	741.59	2880.19	2200.00	4.48	0.15	0.03
17.4	2188.92	0.72	0.72	2.03	0.27	728.50	2917.42	2200.00	4.48	0.15	0.03
17.8	2239.24	0.70	0.70	1.99	0.24	715.65	2954.89	2200.00	4.48	0.15	0.03
18.2	2289.56	0.69	0.69	1.94	0.22	703.04	2992.60	2200.00	4.48	0.15	0.03
18.6	2339.88	0.67	0.67	1.90	0.20	690.66	3030.54	2200.00	4.48	0.15	0.02
19	2390.2	0.66	0.66	1.87	0.19	678.52	3068.72	2200.00	4.48	0.15	0.02
19.4	2440.52	0.64	0.64	1.83	0.17	666.60	3107.12	2200.00	4.48	0.15	0.02
19.8	2490.84	0.63	0.63	1.80	0.16	654.91	3145.75	2200.00	4.48	0.15	0.02
20.2	2541.16	0.62	0.62	1.77	0.15	643.44	3184.60	2200.00	4.48	0.15	0.02
20.6	2591.48	0.61	0.61	1.74	0.14	632.20	3223.68	2200.00	4.48	0.15	0.02
21	2641.8	0.60	0.60	1.71	0.13	621.17	3262.97	2200.00	4.48	0.15	0.02
21.4	2692.12	0.58	0.58	1.68	0.12	610.36	3302.48	2200.00	4.48	0.15	0.02
21.8	2742.44	0.57	0.57	1.66	0.11	599.76	3342.20	2200.00	4.48	0.15	0.02
22.2	2792.76	0.56	0.56	1.63	0.10	589.37	3382.13	2200.00	4.48	0.15	0.02
22.6	2843.08	0.55	0.55	1.61	0.09	579.18	3422.26	2200.00	4.48	0.15	0.02
23	2893.4	0.54	0.54	1.59	0.09	569.20	3462.60	2200.00	4.48	0.15	0.02
23.4	2943.72	0.53	0.53	1.57	0.08	559.42	3503.14	2200.00	4.48	0.15	0.02
23.8	2994.04	0.53	0.53	1.55	0.08	549.83	3543.87	2200.00	4.48	0.15	0.02
24.2	3044.36	0.52	0.52	1.53	0.07	540.43	3584.79	2200.00	4.48	0.15	0.02

24.6	3094.68	0.51	0.51	1.52	0.07	531.23	3625.91	2200.00	4.48	0.15	0.01
25	3145	0.50	0.50	1.50	0.06	522.20	3667.20	2200.00	4.48	0.15	0.01
25.4	3195.32	0.49	0.49	1.48	0.06	513.37	3708.69	2200.00	4.48	0.15	0.01
25.8	3245.64	0.48	0.48	1.47	0.06	504.71	3750.35	2200.00	4.48	0.15	0.01
26.2	3295.96	0.48	0.48	1.46	0.05	496.22	3792.18	2200.00	4.48	0.15	0.01
26.6	3346.28	0.47	0.47	1.44	0.05	487.91	3834.19	2200.00	4.48	0.15	0.01
27	3396.6	0.46	0.46	1.43	0.05	479.77	3876.37	2200.00	4.48	0.15	0.01
27.4	3446.92	0.46	0.46	1.42	0.04	471.79	3918.71	2200.00	4.48	0.15	0.01
27.8	3497.24	0.45	0.45	1.40	0.04	463.97	3961.21	2200.00	4.48	0.15	0.01
28.2	3547.56	0.44	0.44	1.39	0.04	456.32	4003.88	2200.00	4.48	0.15	0.01
28.6	3597.88	0.44	0.44	1.38	0.04	448.82	4046.70	2200.00	4.48	0.15	0.01
29	3648.2	0.43	0.43	1.37	0.03	441.47	4089.67	2200.00	4.48	0.15	0.01
29.4	3698.52	0.43	0.43	1.36	0.03	434.27	4132.79	2200.00	4.48	0.15	0.01
29.8	3748.84	0.42	0.42	1.35	0.03	427.22	4176.06	2200.00	4.48	0.15	0.01
30.2	3799.16	0.41	0.41	1.34	0.03	420.31	4219.47	2200.00	4.48	0.15	0.01
30.6	3849.48	0.41	0.41	1.33	0.03	413.54	4263.02	2200.00	4.48	0.15	0.01
31	3899.8	0.40	0.40	1.33	0.03	406.91	4306.71	2200.00	4.48	0.15	0.01
31.4	3950.12	0.40	0.40	1.32	0.03	400.42	4350.54	2200.00	4.48	0.15	0.01
31.8	4000.44	0.39	0.39	1.31	0.02	394.05	4394.49	2200.00	4.48	0.15	0.01
32.2	4050.76	0.39	0.39	1.30	0.02	387.82	4438.58	2200.00	4.48	0.15	0.01
32.6	4101.08	0.38	0.38	1.29	0.02	381.71	4482.79	2200.00	4.48	0.15	0.01
33	4151.4	0.38	0.38	1.29	0.02	375.72	4527.12	2200.00	4.48	0.15	0.01
33.4	4201.72	0.37	0.37	1.28	0.02	369.86	4571.58	2200.00	4.48	0.15	0.01
33.8	4252.04	0.37	0.37	1.27	0.02	364.11	4616.15	2200.00	4.48	0.15	0.01
34.2	4302.36	0.37	0.37	1.27	0.02	358.48	4660.84	2200.00	4.48	0.15	0.01
34.6	4352.68	0.36	0.36	1.26	0.02	352.96	4705.64	2200.00	4.48	0.15	0.01
35	4403	0.36	0.36	1.26	0.02	347.55	4750.55	2200.00	4.48	0.15	0.01
35.4	4453.32	0.35	0.35	1.25	0.02	342.25	4795.57	2200.00	4.48	0.15	0.01
35.8	4478.68	0.35	0.35	1.24	0.01	337.05	4815.73	2200.00	4.48	0.15	0.01
36.2	4504.04	0.35	0.35	1.24	0.01	331.96	4836.00	2200.00	4.48	0.15	0.01
36.6	4529.4	0.34	0.34	1.23	0.01	326.97	4856.37	2200.00	4.48	0.15	0.01
37	4554.76	0.34	0.34	1.23	0.01	322.07	4876.83	2200.00	4.48	0.15	0.01
37.4	4580.12	0.33	0.33	1.22	0.01	317.28	4897.40	2200.00	4.48	0.15	0.01
37.8	4605.48	0.33	0.33	1.22	0.01	312.57	4918.05	2200.00	4.48	0.15	0.01
38.2	4630.84	0.33	0.33	1.21	0.01	307.96	4938.80	2200.00	4.48	0.15	0.01
38.6	4656.2	0.32	0.32	1.21	0.01	303.44	4959.64	2200.00	4.48	0.15	0.01
39	4681.56	0.32	0.32	1.21	0.01	299.01	4980.57	2200.00	4.48	0.15	0.01
39.4	4706.92	0.32	0.32	1.20	0.01	294.67	5001.59	2200.00	4.48	0.15	0.01
39.8	4732.28	0.31	0.31	1.20	0.01	290.41	5022.69	2200.00	4.48	0.15	0.01
40.2	4757.64	0.31	0.31	1.19	0.01	286.23	5043.87	2200.00	4.48	0.15	0.01
40.6	4783	0.31	0.31	1.19	0.01	282.13	5065.13	2200.00	4.48	0.15	0.01
41	4808.36	0.30	0.30	1.19	0.01	278.11	5086.47	2200.00	4.48	0.15	0.01
41.4	4833.72	0.30	0.30	1.18	0.01	274.16	5107.88	2200.00	4.48	0.15	0.01
41.8	4859.08	0.30	0.30	1.18	0.01	270.29	5129.37	2200.00	4.48	0.15	0.01
42.2	4884.44	0.30	0.30	1.18	0.01	266.50	5150.94	2200.00	4.48	0.15	0.00
42.6	4909.8	0.29	0.29	1.17	0.01	262.78	5172.58	2200.00	4.48	0.15	0.00
43	4935.16	0.29	0.29	1.17	0.01	259.12	5194.28	2200.00	4.48	0.15	0.00
43.4	4960.52	0.29	0.29	1.17	0.01	255.54	5216.06	2200.00	4.48	0.15	0.00
43.8	4985.88	0.29	0.29	1.16	0.01	252.02	5237.90	2200.00	4.48	0.15	0.00
44.2	5011.24	0.28	0.28	1.16	0.01	248.57	5259.81	2200.00	4.48	0.15	0.00
44.6	5036.6	0.28	0.28	1.16	0.01	245.19	5281.79	2200.00	4.48	0.15	0.00
45	5061.96	0.28	0.28	1.15	0.01	241.86	5303.82	2200.00	4.48	0.15	0.00
45.4	5087.32	0.28	0.28	1.15	0.01	238.60	5325.92	2200.00	4.48	0.15	0.00
45.8	5112.68	0.27	0.27	1.15	0.01	235.40	5348.08	2200.00	4.48	0.15	0.00
46.2	5138.04	0.27	0.27	1.15	0.01	232.25	5370.29	2200.00	4.48	0.15	0.00
46.6	5163.4	0.27	0.27	1.14	0.01	229.17	5392.57	2200.00	4.48	0.15	0.00
47	5188.76	0.27	0.27	1.14	0.01	226.14	5414.90	2200.00	4.48	0.15	0.00
47.4	5214.12	0.26	0.26	1.14	0.00	223.16	5437.28	2200.00	4.48	0.15	0.00
47.8	5239.48	0.26	0.26	1.14	0.00	220.24	5459.72	2200.00	4.48	0.15	0.00
48.2	5264.84	0.26	0.26	1.13	0.00	217.37	5482.21	2200.00	4.48	0.15	0.00
48.6	5290.2	0.26	0.26	1.13	0.00	214.55	5504.75	2200.00	4.48	0.15	0.00
49	5315.56	0.26	0.26	1.13	0.00	211.79	5527.35	2200.00	4.48	0.15	0.00
49.4	5340.92	0.25	0.25	1.13	0.00	209.07	5549.99	2200.00	4.48	0.15	0.00
49.8	5366.28	0.25	0.25	1.13	0.00	206.40	5572.68	2200.00	4.48	0.15	0.00
50.2	5391.64	0.25	0.25	1.12	0.00	203.78	5595.42	2200.00	4.48	0.15	0.00
50.6	5417	0.25	0.25	1.12	0.00	201.20	5618.20	2200.00	4.48	0.15	0.00
51	5442.36	0.25	0.25	1.12	0.00	198.67	5641.03	2200.00	4.48	0.15	0.00
51.4	11842.4	0.24	0.24	1.12	0.00	196.18	12038.58	10000.00	0.05	0.05	0.00
51.8	11867.44	0.24	0.24	1.12	0.00	193.74	12061.18	10000.00	0.05	0.05	0.00
52.2	11892.48	0.24	0.24	1.11	0.00	191.34	12083.82	10000.00	0.05	0.05	0.00
52.6	11917.52	0.24	0.24	1.11	0.00	188.98	12106.50	10000.00	0.05	0.05	0.00
53	11942.56	0.24	0.24	1.11	0.00	186.66	12129.22	10000.00	0.05	0.05	0.00
53.4	11967.6	0.23	0.23	1.11	0.00	184.38	12151.98	10000.00	0.05	0.05	0.00
53.8	11992.64	0.23	0.23	1.11	0.00	182.14	12174.78	10000.00	0.05	0.05	0.00
54.2	12017.68	0.23	0.23	1.11	0.00	179.93	12197.61	10000.00	0.05	0.05	0.00
54.6	12042.72	0.23	0.23	1.10	0.00	177.77	12220.49	10000.00	0.05	0.05	0.00
55	12067.76	0.23	0.23	1.10	0.00	175.64	12243.40	10000.00	0.05	0.05	0.00
55.4	12092.8	0.23	0.23	1.10	0.00	173.54	12266.34	10000.00	0.05	0.05	0.00
55.8	12117.84	0.22	0.22	1.10	0.00	171.49	12289.33	10000.00	0.05	0.05	0.00
										Total:	1.23

Note: Stress distribution under the center of the footing was calculated by Westergaard equation for a rectangular footing, ref.: Bowels, "Foundation Analysis & Design," 1996.

SETTLEMENT CALCULATIONS

Project:	**NW Open space**
Project Number:	**25-126-00**
Date:	**July 25, 2025**

Sample:	**DH-11 @ 5 ft**

Raise in Grade (ft):	10	
Building Loading (psf):	250	
Unit Weight of Fill (pcf):	125	Size/2
Width (ft)=	25	12.5
Length (ft)=	25	12.5
Depth (ft)=	0	
Bearing Press (psf)=	1500	
Poisson's Ratio=	0.35	
Groundwater Depth (ft)=	26.6	

Layer Thickness (ft):	0.4

Material:	Layer 1	Layer 2	Layer 3	Layer 4	Layer 5	BR
σ_p (psf)=	2000					10000
C_{cc} (%)=	5.5					0.05
C_{cs} (%)=	0.37					0.05
γ_{wet} (pcf) =	102.5					125
C_v -Sq(t) (in^2/min)						
Layer Bottom Depth (ft)	22					1000
Soil Type	Qt					Bedrock

Consolidation (in)

0.954

TOTAL SETTLEMENT 1.0 INCHES

Final Settlement Calculations

Depth (ft)	Ver. Stress (psf)	M	N	V	V1	Stress Due to Fill Pressure (Westergaard) (psf)	Final Stress With Fill (psf)	σ_p (psf)	C_{ec} (%)	C_{es} (%)	Layer Settlement (in)
0.2	20.5	62.50	62.50	7813.50	15258789.06	1489.62	1510.12	2000.00	5.48	0.37	0.03
0.6	61.5	20.83	20.83	869.06	188380.11	1468.87	1530.37	2000.00	5.48	0.37	0.02
1	102.5	12.50	12.50	313.50	24414.06	1448.13	1550.63	2000.00	5.48	0.37	0.02
1.4	143.5	8.93	8.93	160.44	6355.18	1427.43	1570.93	2000.00	5.48	0.37	0.02
1.8	184.5	6.94	6.94	97.45	2325.68	1406.77	1591.27	2000.00	5.48	0.37	0.02
2.2	225.5	5.68	5.68	65.57	1042.20	1386.16	1611.66	2000.00	5.48	0.37	0.02
2.6	266.5	4.81	4.81	47.23	534.25	1365.62	1632.12	2000.00	5.48	0.37	0.01
3	307.5	4.17	4.17	35.72	301.41	1345.16	1652.66	2000.00	5.48	0.37	0.01
3.4	348.5	3.68	3.68	28.03	182.69	1324.78	1673.28	2000.00	5.48	0.37	0.01
3.8	389.5	3.29	3.29	22.64	117.09	1304.51	1694.01	2000.00	5.48	0.37	0.01
4.2	430.5	2.98	2.98	18.72	78.46	1284.35	1714.85	2000.00	5.48	0.37	0.01
4.6	471.5	2.72	2.72	15.77	54.53	1264.31	1735.81	2000.00	5.48	0.37	0.01
5	512.5	2.50	2.50	13.50		1244.40	1756.90	2000.00	5.48	0.37	0.01
5.4	553.5	2.31	2.31	11.72	28.71	1224.64	1778.14	2000.00	5.48	0.37	0.01
5.8	594.5	2.16	2.16	10.29	21.57	1205.02	1799.52	2000.00	5.48	0.37	0.01
6.2	635.5	2.02	2.02	9.13	16.52	1185.57	1821.07	2000.00	5.48	0.37	0.01
6.6	676.5	1.89	1.89	8.17	12.87	1166.28	1842.78	2000.00	5.48	0.37	0.01
7	717.5	1.79	1.79	7.38	10.17	1147.17	1864.67	2000.00	5.48	0.37	0.01
7.4	758.5	1.69	1.69	6.71	8.14	1128.25	1886.75	2000.00	5.48	0.37	0.01
7.8	799.5	1.60	1.60	6.14	6.60	1109.51	1909.01	2000.00	5.48	0.37	0.01
8.2	840.5	1.52	1.52	5.65	5.40	1090.98	1931.48	2000.00	5.48	0.37	0.01
8.6	881.5	1.45	1.45	5.23	4.46	1072.65	1954.15	2000.00	5.48	0.37	0.01
9	922.5	1.39	1.39	4.86	3.72	1054.53	1977.03	2000.00	5.48	0.37	0.01
9.4	963.5	1.33	1.33	4.54	3.13	1036.63	2000.13	2000.00	5.48	0.37	0.01
9.8	1004.5	1.28	1.28	4.25	2.65	1018.95	2023.45	2000.00	5.48	0.37	0.01
10.2	1045.5	1.23	1.23	4.00	2.26	1001.50	2047.00	2000.00	5.48	0.37	0.01
10.6	1086.5	1.18	1.18	3.78	1.93	984.27	2070.77	2000.00	5.48	0.37	0.01
11	1127.5	1.14	1.14	3.58	1.67	967.28	2094.78	2000.00	5.48	0.37	0.01
11.4	1168.5	1.10	1.10	3.40	1.45	950.52	2119.02	2000.00	5.48	0.37	0.01
11.8	1209.5	1.06	1.06	3.24	1.26	934.00	2143.50	2000.00	5.48	0.37	0.01
12.2	1250.5	1.02	1.02	3.10	1.10	917.73	2168.23	2000.00	5.48	0.37	0.01
12.6	1291.5	0.99	0.99	2.97	0.97	901.70	2193.20	2000.00	5.48	0.37	0.01
13	1332.5	0.96	0.96	2.85	0.85	885.91	2218.41	2000.00	5.48	0.37	0.01
13.4	1373.5	0.93	0.93	2.74	0.76	870.37	2243.87	2000.00	5.48	0.37	0.02
13.8	1414.5	0.91	0.91	2.64	0.67	855.07	2269.57	2000.00	5.48	0.37	0.02
14.2	1455.5	0.88	0.88	2.55	0.60	840.03	2295.53	2000.00	5.48	0.37	0.02
14.6	1496.5	0.86	0.86	2.47	0.54	825.23	2321.73	2000.00	5.48	0.37	0.02
15	1537.5	0.83	0.83	2.39	0.48	810.67	2348.17	2000.00	5.48	0.37	0.02
15.4	1578.5	0.81	0.81	2.32	0.43	796.37	2374.87	2000.00	5.48	0.37	0.02
15.8	1619.5	0.79	0.79	2.25	0.39	782.31	2401.81	2000.00	5.48	0.37	0.02
16.2	1660.5	0.77	0.77	2.19	0.35	768.49	2428.99	2000.00	5.48	0.37	0.02
16.6	1701.5	0.75	0.75	2.13	0.32	754.92	2456.42	2000.00	5.48	0.37	0.02
17	1742.5	0.74	0.74	2.08	0.29	741.59	2484.09	2000.00	5.48	0.37	0.03
17.4	1783.5	0.72	0.72	2.03	0.27	728.50	2512.00	2000.00	5.48	0.37	0.03
17.8	1824.5	0.70	0.70	1.99	0.24	715.65	2540.15	2000.00	5.48	0.37	0.03
18.2	1865.5	0.69	0.69	1.94	0.22	703.04	2568.54	2000.00	5.48	0.37	0.03
18.6	1906.5	0.67	0.67	1.90	0.20	690.66	2597.16	2000.00	5.48	0.37	0.03
19	1947.5	0.66	0.66	1.87	0.19	678.52	2626.02	2000.00	5.48	0.37	0.03
19.4	1988.5	0.64	0.64	1.83	0.17	666.60	2655.10	2000.00	5.48	0.37	0.03
19.8	2029.5	0.63	0.63	1.80	0.16	654.91	2684.41	2000.00	5.48	0.37	0.03
20.2	2070.5	0.62	0.62	1.77	0.15	643.44	2713.94	2000.00	5.48	0.37	0.03
20.6	2111.5	0.61	0.61	1.74	0.14	632.20	2743.70	2000.00	5.48	0.37	0.03
21	2152.5	0.60	0.60	1.71	0.13	621.17	2773.67	2000.00	5.48	0.37	0.03
21.4	2193.5	0.58	0.58	1.68	0.12	610.36	2803.86	2000.00	5.48	0.37	0.03
21.8	2234.5	0.57	0.57	1.66	0.11	599.76	2834.26	2000.00	5.48	0.37	0.03
22.2	5030	0.56	0.56	1.63	0.10	589.37	5619.37	10000.00	0.05	0.05	0.00
22.6	5080	0.55	0.55	1.61	0.09	579.18	5659.18	10000.00	0.05	0.05	0.00
23	5130	0.54	0.54	1.59	0.09	569.20	5699.20	10000.00	0.05	0.05	0.00
23.4	5180	0.53	0.53	1.57	0.08	559.42	5739.42	10000.00	0.05	0.05	0.00
23.8	5230	0.53	0.53	1.55	0.08	549.83	5779.83	10000.00	0.05	0.05	0.00
24.2	5280	0.52	0.52	1.53	0.07	540.43	5820.43	10000.00	0.05	0.05	0.00

24.6	5330	0.51	0.51	1.52	0.07	531.23	5861.23	10000.00	0.05	0.05	0.00
25	5380	0.50	0.50	1.50	0.06	522.20	5902.20	10000.00	0.05	0.05	0.00
25.4	5430	0.49	0.49	1.48	0.06	513.37	5943.37	10000.00	0.05	0.05	0.00
25.8	5480	0.48	0.48	1.47	0.06	504.71	5984.71	10000.00	0.05	0.05	0.00
26.2	5530	0.48	0.48	1.46	0.05	496.22	6026.22	10000.00	0.05	0.05	0.00
26.6	5580	0.47	0.47	1.44	0.05	487.91	6067.91	10000.00	0.05	0.05	0.00
27	5605.04	0.46	0.46	1.43	0.05	479.77	6084.81	10000.00	0.05	0.05	0.00
27.4	5630.08	0.46	0.46	1.42	0.04	471.79	6101.87	10000.00	0.05	0.05	0.00
27.8	5655.12	0.45	0.45	1.40	0.04	463.97	6119.09	10000.00	0.05	0.05	0.00
28.2	5680.16	0.44	0.44	1.39	0.04	456.32	6136.48	10000.00	0.05	0.05	0.00
28.6	5705.2	0.44	0.44	1.38	0.04	448.82	6154.02	10000.00	0.05	0.05	0.00
29	5730.24	0.43	0.43	1.37	0.03	441.47	6171.71	10000.00	0.05	0.05	0.00
29.4	5755.28	0.43	0.43	1.36	0.03	434.27	6189.55	10000.00	0.05	0.05	0.00
29.8	5780.32	0.42	0.42	1.35	0.03	427.22	6207.54	10000.00	0.05	0.05	0.00
30.2	5805.36	0.41	0.41	1.34	0.03	420.31	6225.67	10000.00	0.05	0.05	0.00
30.6	5830.4	0.41	0.41	1.33	0.03	413.54	6243.94	10000.00	0.05	0.05	0.00
31	5855.44	0.40	0.40	1.33	0.03	406.91	6262.35	10000.00	0.05	0.05	0.00
31.4	5880.48	0.40	0.40	1.32	0.03	400.42	6280.90	10000.00	0.05	0.05	0.00
31.8	5905.52	0.39	0.39	1.31	0.02	394.05	6299.57	10000.00	0.05	0.05	0.00
32.2	5930.56	0.39	0.39	1.30	0.02	387.82	6318.38	10000.00	0.05	0.05	0.00
32.6	5955.6	0.38	0.38	1.29	0.02	381.71	6337.31	10000.00	0.05	0.05	0.00
33	5980.64	0.38	0.38	1.29	0.02	375.72	6356.36	10000.00	0.05	0.05	0.00
33.4	6005.68	0.37	0.37	1.28	0.02	369.86	6375.54	10000.00	0.05	0.05	0.00
33.8	6030.72	0.37	0.37	1.27	0.02	364.11	6394.83	10000.00	0.05	0.05	0.00
34.2	6055.76	0.37	0.37	1.27	0.02	358.48	6414.24	10000.00	0.05	0.05	0.00
34.6	6080.8	0.36	0.36	1.26	0.02	352.96	6433.76	10000.00	0.05	0.05	0.00
35	6105.84	0.36	0.36	1.26	0.02	347.55	6453.39	10000.00	0.05	0.05	0.00
35.4	6130.88	0.35	0.35	1.25	0.02	342.25	6473.13	10000.00	0.05	0.05	0.00
35.8	6155.92	0.35	0.35	1.24	0.01	337.05	6492.97	10000.00	0.05	0.05	0.00
36.2	6180.96	0.35	0.35	1.24	0.01	331.96	6512.92	10000.00	0.05	0.05	0.00
36.6	6206	0.34	0.34	1.23	0.01	326.97	6532.97	10000.00	0.05	0.05	0.00
37	6231.04	0.34	0.34	1.23	0.01	322.07	6553.11	10000.00	0.05	0.05	0.00
37.4	6256.08	0.33	0.33	1.22	0.01	317.28	6573.36	10000.00	0.05	0.05	0.00
37.8	6281.12	0.33	0.33	1.22	0.01	312.57	6593.69	10000.00	0.05	0.05	0.00
38.2	6306.16	0.33	0.33	1.21	0.01	307.96	6614.12	10000.00	0.05	0.05	0.00
38.6	6331.2	0.32	0.32	1.21	0.01	303.44	6634.64	10000.00	0.05	0.05	0.00
39	6356.24	0.32	0.32	1.21	0.01	299.01	6655.25	10000.00	0.05	0.05	0.00
39.4	6381.28	0.32	0.32	1.20	0.01	294.67	6675.95	10000.00	0.05	0.05	0.00
39.8	6406.32	0.31	0.31	1.20	0.01	290.41	6696.73	10000.00	0.05	0.05	0.00
40.2	6431.36	0.31	0.31	1.19	0.01	286.23	6717.59	10000.00	0.05	0.05	0.00
40.6	6456.4	0.31	0.31	1.19	0.01	282.13	6738.53	10000.00	0.05	0.05	0.00
41	6481.44	0.30	0.30	1.19	0.01	278.11	6759.55	10000.00	0.05	0.05	0.00
41.4	6506.48	0.30	0.30	1.18	0.01	274.16	6780.64	10000.00	0.05	0.05	0.00
41.8	6531.52	0.30	0.30	1.18	0.01	270.29	6801.81	10000.00	0.05	0.05	0.00
42.2	6556.56	0.30	0.30	1.18	0.01	266.50	6823.06	10000.00	0.05	0.05	0.00
42.6	6581.6	0.29	0.29	1.17	0.01	262.78	6844.38	10000.00	0.05	0.05	0.00
43	6606.64	0.29	0.29	1.17	0.01	259.12	6865.76	10000.00	0.05	0.05	0.00
43.4	6631.68	0.29	0.29	1.17	0.01	255.54	6887.22	10000.00	0.05	0.05	0.00
43.8	6656.72	0.29	0.29	1.16	0.01	252.02	6908.74	10000.00	0.05	0.05	0.00
44.2	6681.76	0.28	0.28	1.16	0.01	248.57	6930.33	10000.00	0.05	0.05	0.00
44.6	6706.8	0.28	0.28	1.16	0.01	245.19	6951.99	10000.00	0.05	0.05	0.00
45	6731.84	0.28	0.28	1.15	0.01	241.86	6973.70	10000.00	0.05	0.05	0.00
45.4	6756.88	0.28	0.28	1.15	0.01	238.60	6995.48	10000.00	0.05	0.05	0.00
45.8	6781.92	0.27	0.27	1.15	0.01	235.40	7017.32	10000.00	0.05	0.05	0.00
46.2	6806.96	0.27	0.27	1.15	0.01	232.25	7039.21	10000.00	0.05	0.05	0.00
46.6	6832	0.27	0.27	1.14	0.01	229.17	7061.17	10000.00	0.05	0.05	0.00
47	6857.04	0.27	0.27	1.14	0.01	226.14	7083.18	10000.00	0.05	0.05	0.00
47.4	6882.08	0.26	0.26	1.14	0.00	223.16	7105.24	10000.00	0.05	0.05	0.00
47.8	6907.12	0.26	0.26	1.14	0.00	220.24	7127.36	10000.00	0.05	0.05	0.00
48.2	6932.16	0.26	0.26	1.13	0.00	217.37	7149.53	10000.00	0.05	0.05	0.00
48.6	6957.2	0.26	0.26	1.13	0.00	214.55	7171.75	10000.00	0.05	0.05	0.00
49	6982.24	0.26	0.26	1.13	0.00	211.79	7194.03	10000.00	0.05	0.05	0.00
49.4	7007.28	0.25	0.25	1.13	0.00	209.07	7216.35	10000.00	0.05	0.05	0.00
49.8	7032.32	0.25	0.25	1.13	0.00	206.40	7238.72	10000.00	0.05	0.05	0.00
50.2	7057.36	0.25	0.25	1.12	0.00	203.78	7261.14	10000.00	0.05	0.05	0.00
50.6	7082.4	0.25	0.25	1.12	0.00	201.20	7283.60	10000.00	0.05	0.05	0.00
51	7107.44	0.25	0.25	1.12	0.00	198.67	7306.11	10000.00	0.05	0.05	0.00
51.4	7132.48	0.24	0.24	1.12	0.00	196.18	7328.66	10000.00	0.05	0.05	0.00
51.8	7157.52	0.24	0.24	1.12	0.00	193.74	7351.26	10000.00	0.05	0.05	0.00
52.2	7182.56	0.24	0.24	1.11	0.00	191.34	7373.90	10000.00	0.05	0.05	0.00
52.6	7207.6	0.24	0.24	1.11	0.00	188.98	7396.58	10000.00	0.05	0.05	0.00
53	7232.64	0.24	0.24	1.11	0.00	186.66	7419.30	10000.00	0.05	0.05	0.00
53.4	7257.68	0.23	0.23	1.11	0.00	184.38	7442.06	10000.00	0.05	0.05	0.00
53.8	7282.72	0.23	0.23	1.11	0.00	182.14	7464.86	10000.00	0.05	0.05	0.00
54.2	7307.76	0.23	0.23	1.11	0.00	179.93	7487.69	10000.00	0.05	0.05	0.00
54.6	7332.8	0.23	0.23	1.10	0.00	177.77	7510.57	10000.00	0.05	0.05	0.00
55	7357.84	0.23	0.23	1.10	0.00	175.64	7533.48	10000.00	0.05	0.05	0.00
55.4	7382.88	0.23	0.23	1.10	0.00	173.54	7556.42	10000.00	0.05	0.05	0.00
55.8	7407.92	0.22	0.22	1.10	0.00	171.49	7579.41	10000.00	0.05	0.05	0.00
										Total:	0.95

Note: Stress distribution under the center of the footing was calculated by Westergaard equation for a rectangular footing, ref.: Bowels, "Foundation Analysis & Design," 1996.

APPENDIX F

Infiltration Testing

APPENDIX F

GMU GEOTECHNICAL INFILTRATION TESTING PROCEDURES

Two (2) Falling Head Borehole Percolation tests were performed in general conformance with the Orange County Technical Guidance Document (TGD) within two drill holes: DH-2 and DH-3. The drill holes were excavated to depths of approximately 15 and 30 feet below the existing grade and prepared in general accordance with the TGD manual. Sandy soils were prevalent in these boreholes, so the sandy soil method was used for each case.

Additional infiltration testing was conducted in four of these test pits, using the open pit falling head (OPF) procedure. The OPF infiltration tests were performed to establish estimates of infiltration rates in general accordance with the County of Orange Technical Guidance Document (TGD). Infiltration testing conducted at depth was conducted as follows: after pre-saturating the subsurface soils, a minimum of three trials were conducted at each location and the average infiltration rate over the last trial was used to calculate the unadjusted (pre-factor of safety) infiltration rate.

Falling Head Borehole Infiltration Test

Project Name:	Northwest Openspace				**Date:**	6/27/2025	
Project Number:	25-126-00				**Tested By:**	ER and JB	
Test Hole Number:	DH-2				**USCS Soil Classification:**	SM	
Total Depth From Reference:	30.00	feet					
Height of Reference above Existing Grade:	0.00	feet	**Depth of Hole:**	30.00	feet		
Test Hole Diameter:	8.00	inches	radius=	4	inches		

Test No.	Start Time	End Time	ΔT	Total Time	Initial Depth of Water	Final Depth of Water	H_0	H_f	ΔH	H_{avg}	Unfactored Percolation Rate
			(min)	*(min)*	*(ft)*	*(ft)*	*(in)*	*(in)*	*(in)*	*(in)*	*(in/hour)*
1	9:11	9:36	25.0	85.0	27.67	28.45	27.96	18.60	9.36	23.28	1.78
2	9:36	10:01	25.0	110.0	27.71	28.43	27.48	18.84	8.64	23.16	1.65
3	10:03	10:13	10.0	120.0	27.68	28.42	27.84	18.96	8.88	23.40	4.20
4	10:14	10:24	10.0	130.0	27.69	28.43	27.72	18.84	8.88	23.28	4.22
5	10:24	10:34	10.0	140.0	27.70	28.42	27.60	18.96	8.64	23.28	4.10
6	10:38	10:48	10.0	150.0	27.73	28.47	27.24	18.36	8.88	22.80	4.30

WATER TEMPERATURE CORRECTION FACTOR:	1.00
SAFETY FACTOR*:	2
UNFACTORED INFILTRATION RATE (IN/HR):	4.20
FACTORED INFILTRATION RATE (IN/HR):	2.10

Factor Category	Factor Description	Assigned Weight (w)	Factor Value (v)	Product (p) = w x v
Suitability Assessment	Soil assessment methods	0.25		0
	Predominant soil texture	0.25		0
	Site soil variablity	0.25		0
	Depth to groundwater	0.25		0
			Geotechnical Factor of Safety (S_A):	0

Concern Level	Factor Value (v)
Low	1
Medium	2
High	3

Factor Description	High Concern	Medium Concern	Low Concern
Soil assessment methods	Use of borehole methods to estimate vertical infiltration rate (not recommended, but may be necessary at a planning level). Less than 2 tests per BMP	At least 2 tests per BMP. Use of borehole tests for dry wells or infiltration trenches. Use of infiltrometer or small scale PIT methods for vertical infiltration BMPs.	Extensive infiltration testing such as: PIT testing or infiltrometer testing at 3+ locations per BMP, and/or commitment to construction phase testing and design adaption if necessary.
Predominant soil texture	Silty and clayey soils with significant fines	Finer sandy soils with some loam content	Clean, granular soils (sands)
Site soil variablity	Highly variable soils indicated from site assessment or limited soil borings collected during site assessment.	Soil borings/test pits indicate moderately homogeneous soils.	Multiple soil borings/test pits indicate relatively homogeneous soils.
Depth to groundwater	Groundwater conditions or movement not well understood.	Seasonal high GW at least 10 ft below facility bottom.	Seasonal high GW at least 15 ft below facility bottom.

***Factor of safety should not be less than 2. Additional factor of safety in accordance with Table D-7 of the South Orange County Technical Guidance Document should be applied by the project civil engineer.**

Falling Head Borehole Infiltration Test

Project Name:	Northwest Openspace				**Date:**	6/27/2025	
Project Number:	25-126-00				**Tested By:**	ER and JB	
Test Hole Number:	DH-3				**USCS Soil Classification:**	SP	
Total Depth From Reference:	15.00	feet					
Height of Reference above Existing Grade:	0.00	feet	**Depth of Hole:**	15.00	feet		
Test Hole Diameter:	8.00	inches	radius=	4	inches		

Test No.	Start Time	End Time	ΔT	Total Time	Initial Depth of Water	Final Depth of Water	H_0	H_f	ΔH	H_{avg}	Unfactored Percolation Rate
			(min)	*(min)*	*(ft)*	*(ft)*	*(in)*	*(in)*	*(in)*	*(in)*	*(in/hour)*
1	8:14	8:24	10.0	70.0	12.45	13.27	30.60	20.76	9.84	25.68	4.27
2	8:29	8:39	10.0	80.0	12.45	13.19	30.60	21.72	8.88	26.16	3.78
3	8:44	8:54	10.0	90.0	12.45	13.24	30.60	21.12	9.48	25.86	4.08
4	8:56	9:06	10.0	100.0	12.47	13.31	30.36	20.28	10.08	25.32	4.43
5	9:08	9:18	10.0	110.0	12.45	13.22	30.60	21.36	9.24	25.98	3.96
6	9:21	9:31	10.0	120.0	12.45	13.21	30.60	21.48	9.12	26.04	3.90

WATER TEMPERATURE CORRECTION FACTOR:	1.00
SAFETY FACTOR*:	2
UNFACTORED INFILTRATION RATE (IN/HR):	4.10
FACTORED INFILTRATION RATE (IN/HR):	2.05

Factor Category	Factor Description	Assigned Weight (w)	Factor Value (v)	Product (p) = w x v
Suitability Assessment	Soil assessment methods	0.25		0
	Predominant soil texture	0.25		0
	Site soil variablity	0.25		0
	Depth to groundwater	0.25		0
			Geotechnical Factor of Safety (SA):	0

Concern Level	Factor Value (v)
Low	1
Medium	2
High	3

Factor Description	High Concern	Medium Concern	Low Concern
Soil assessment methods	Use of borehole methods to estimate vertical infiltration rate (not recommended, but may be necessary at a planning level). Less than 2 tests per BMP	At least 2 tests per BMP. Use of borehole tests for dry wells or infiltration trenches. Use of infiltrometer or small scale PIT methods for vertical infiltration BMPs.	Extensive infiltration testing such as: PIT testing or infiltrometer testing at 3+ locations per BMP, and/or commitment to construction phase testing and design adaption if necessary.
Predominant soil texture	Silty and clayey soils with significant fines	Finer sandy soils with some loam content	Clean, granular soils (sands)
Site soil variablity	Highly variable soils indicated from site assessment or limited soil borings collected during site assessment.	Soil borings/test pits indicate moderately homogeneous soils.	Multiple soil borings/test pits indicate relatively homogeneous soils.
Depth to groundwater	Groundwater conditions or movement not well understood.	Seasonal high GW at least 10 ft below facility bottom.	Seasonal high GW at least 15 ft below facility bottom.

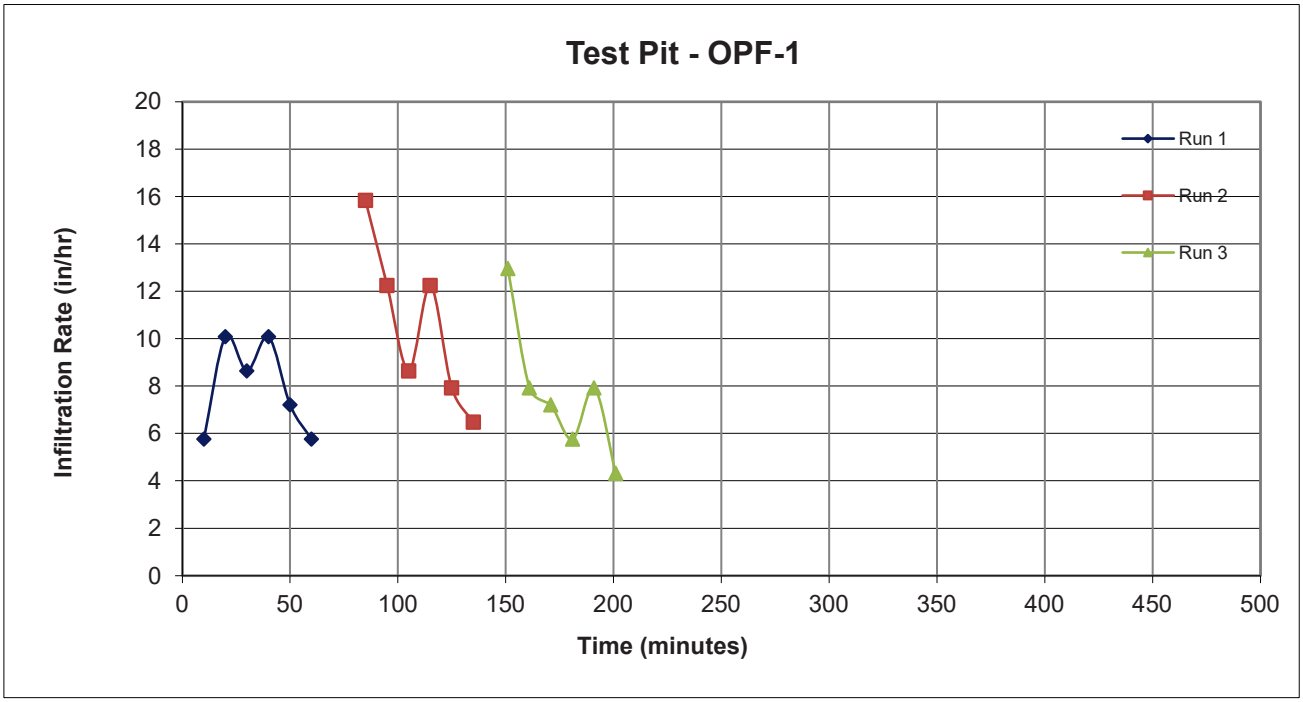
***Factor of safety should not be less than 2. Additional factor of safety in accordance with Table D-7 of the South Orange County Technical Guidance Document should be applied by the project civil engineer.**

INFILTRATION RATE - Open Pit Falling Head Procedure

Job Number 25-126-00
TP- 2
Test Date 7/1/2025

TP- dimensions
Depth (in)= 66
Width (in)= 24
Length (in)= 72

Test No.	Time (hour:min)	ΔT (min)	Cumulative Time (min)	Water Depth from ground surface (in)	Height of Water column (in)	ΔD (in)	Infiltration Rate (in/hr)	Avg Infiltr Rate (in/hr)	10% criteria
RUN # 1	8:35	0	0	48.00	18.00	0			
	8:45	10	10	48.96	17.04	0.96	5.76		
	8:55	10	20	50.64	15.36	1.68	10.08		
	9:05	10	30	52.08	13.92	1.44	8.64		
	9:15	10	40	53.76	12.24	1.68	10.08	**7.92**	**N/A**
	9:25	10	50	54.96	11.04	1.20	7.20		
	9:35	10	60	55.92	10.08	0.96	5.76		
RUN # 2	9:50	0	75	42.60	23.40				
	10:00	10	85	45.24	20.76	2.64	15.84		
	10:10	10	95	47.28	18.72	2.04	12.24		
	10:20	10	105	48.72	17.28	1.44	8.64		
	10:30	10	115	50.76	15.24	2.04	12.24	**10.56**	**-25.00%**
	10:40	10	125	52.08	13.92	1.32	7.92		
	10:50	10	135	53.16	12.84	1.08	6.48		
RUN # 3	10:56	15	141	48.00	18.00				
	11:06	10	151	50.16	15.84	2.16	12.96		
	11:16	10	161	51.48	14.52	1.32	7.92		
	11:26	10	171	52.68	13.32	1.20	7.20		
	11:36	10	181	53.64	12.36	0.96	5.76	**7.68**	**37.50%**
	11:46	10	191	54.96	11.04	1.32	7.92		
	11:56	10	201	55.68	10.32	0.72	4.32		

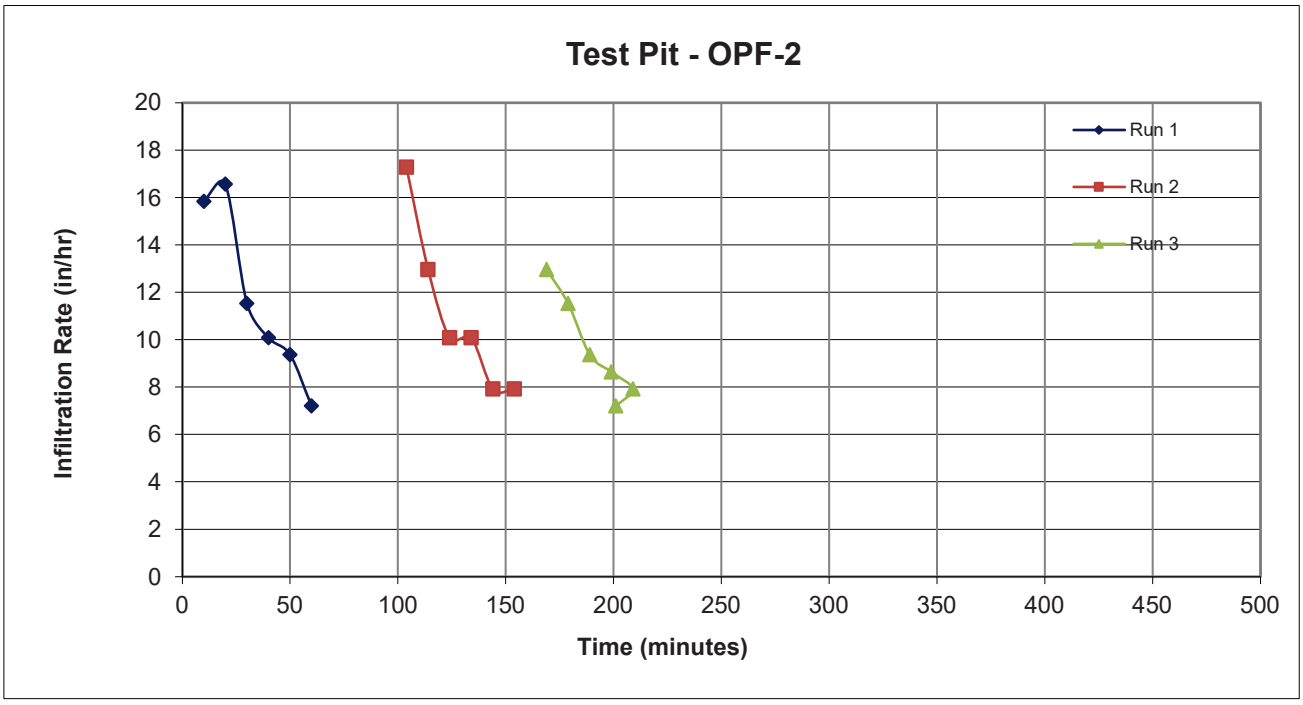


INFILTRATION RATE - Open Pit Falling Head Procedure

Job Number 25-126-00
TP- 4
Test Date 7/1/2025

TP- dimensions
Depth (in)= 72
Width (in)= 24
Length (in)= 81.6

Test No.	Time (hour:min)	ΔT (min)	Cumulative Time (min)	Water Depth from ground surface (in)	Height of Water column (in)	ΔD (in)	Infiltration Rate (in/hr)	Avg Infiltr Rate (in/hr)	10% criteria
RUN # 1	11:58	0	0	50.40	21.60	0			
	12:08	10	10	53.04	18.96	2.64	15.84		
	12:18	10	20	55.80	16.20	2.76	16.56		
	12:28	10	30	57.72	14.28	1.92	11.52		
	12:38	10	40	59.40	12.60	1.68	10.08	**11.76**	**N/A**
	12:48	10	50	60.96	11.04	1.56	9.36		
	12:58	10	60	62.16	9.84	1.20	7.20		
RUN # 2	13:32	0	94	50.40	21.60	0.00			
	13:42	10	104	53.28	18.72	2.88	17.28		
	13:52	10	114	55.44	16.56	2.16	12.96		
	14:02	10	124	57.12	14.88	1.68	10.08		
	14:12	10	134	58.80	13.20	1.68	10.08	**11.04**	**6.52%**
	14:22	10	144	60.12	11.88	1.32	7.92		
	14:32	10	154	61.44	10.56	1.32	7.92		
RUN # 3	14:37	15	159	50.76	21.24	0.00			
	14:47	10	169	52.92	19.08	2.16	12.96		
	14:57	10	179	54.84	17.16	1.92	11.52		
	15:07	10	189	56.40	15.60	1.56	9.36		
	15:17	10	199	57.84	14.16	1.44	8.64	**9.60**	**15.00%**
	15:27	10	209	59.16	12.84	1.32	7.92		
	15:37	10	201	60.36	11.64	1.20	7.20		

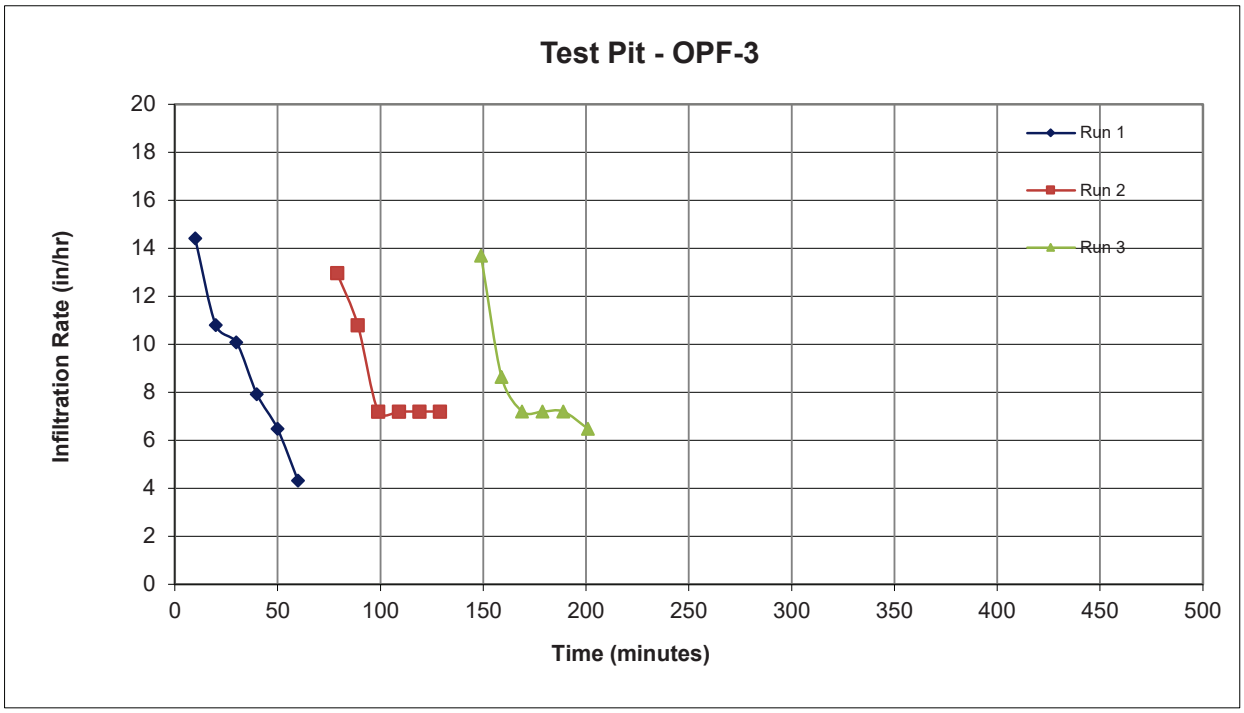


INFILTRATION RATE - Open Pit Falling Head Procedure

Job Number 25-126-00
TP- 7
Test Date 7/1/2025

TP- dimensions Depth (in)= 52.8
Width (in)= 24
Length (in)= 72

Test No.	Time (hour:min)	ΔT (min)	Cumulative Time (min)	Water Depth from ground surface (in)	Height of Water column (in)	ΔD (in)	Infiltration Rate (in/hr)	Avg Infiltr Rate (in/hr)	10% criteria
RUN # 1	12:55	0	0	21.72	31.08	0			
	13:05	10	10	24.12	28.68	2.40	14.40		
	13:15	10	20	25.92	26.88	1.80	10.80		
	13:25	10	30	27.60	25.20	1.68	10.08		
	13:35	10	40	28.92	23.88	1.32	7.92	**9.00**	**N/A**
	13:45	10	50	30.00	22.80	1.08	6.48		
	13:55	10	60	30.72	22.08	0.72	4.32		
RUN # 2	14:04	0	69	21.36	31.44	0.00			
	14:14	10	79	23.52	29.28	2.16	12.96		
	14:24	10	89	25.32	27.48	1.80	10.80		
	14:34	10	99	26.52	26.28	1.20	7.20		
	14:44	10	109	27.72	25.08	1.20	7.20	**8.76**	**2.74%**
	14:54	10	119	28.92	23.88	1.20	7.20		
	15:04	10	129	30.12	22.68	1.20	7.20		
RUN # 3	15:14	15	139	21.48	31.32	0.00			
	15:24	10	149	23.76	29.04	2.28	13.68		
	15:34	10	159	25.20	27.60	1.44	8.64		
	15:44	10	169	26.40	26.40	1.20	7.20		
	15:54	10	179	27.60	25.20	1.20	7.20	**8.40**	**4.29%**
	16:04	10	189	28.80	24.00	1.20	7.20		
	16:14	10	201	29.88	22.92	1.08	6.48		

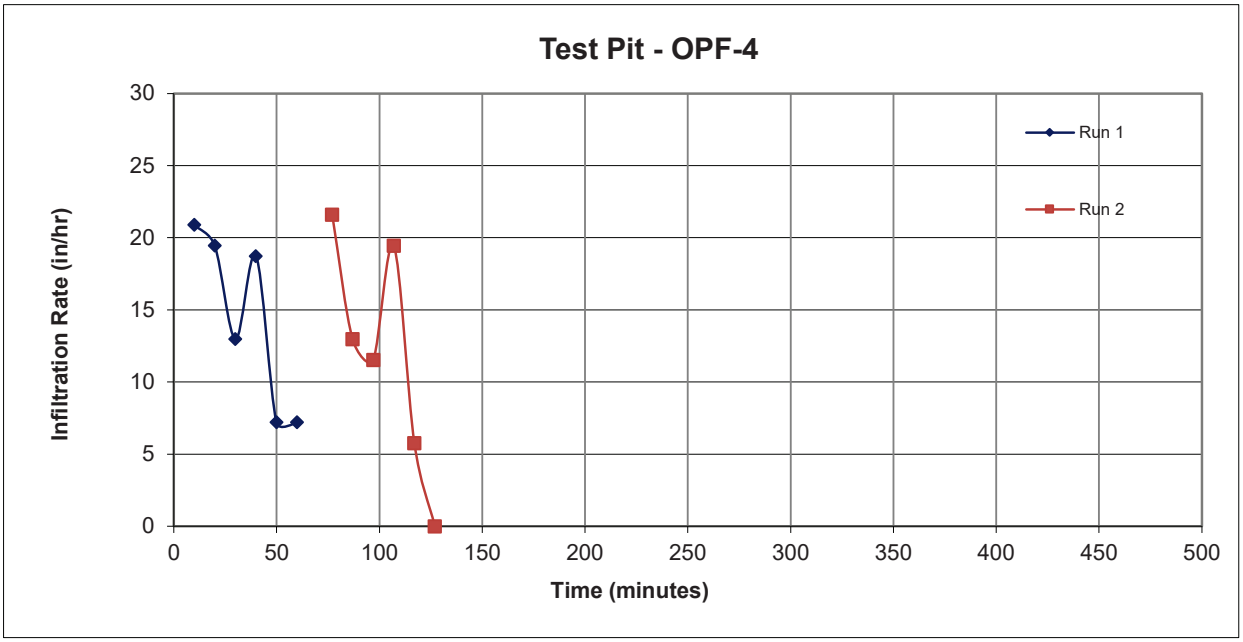


INFILTRATION RATE - Open Pit Falling Head Procedure

Job Number 25-126-00
TP- 8
Test Date 7/1/2025

TP- dimensions Depth (in)= 48
Width (in)= 24
Length (in)= 48

Test No.	Time (hour:min)	ΔT (min)	Cumulative Time (min)	Water Depth from ground surface (in)	Height of Water column (in)	ΔD (in)	Infiltration Rate (in/hr)	Avg Infiltr Rate (in/hr)	10% criteria
RUN # 1	13:46	0	0	30.60	17.40	0			
	13:56	10	10	34.08	13.92	3.48	20.88		
	14:06	10	20	37.32	10.68	3.24	19.44		
	14:16	10	30	39.48	8.52	2.16	12.96		
	14:26	10	40	42.60	5.40	3.12	18.72	**14.40**	**N/A**
	14:36	10	50	43.80	4.20	1.20	7.20		
	14:46	10	60	45.00	3.00	1.20	7.20		
RUN # 2	14:53	0	67	28.56	19.44	0.00			
	15:03	10	77	32.16	15.84	3.60	21.60		
	15:13	10	87	34.32	13.68	2.16	12.96		
	15:23	10	97	36.24	11.76	1.92	11.52		
	15:33	10	107	39.48	8.52	3.24	19.44	**11.88**	**21.21%**
	15:43	10	117	40.44	7.56	0.96	5.76		
	15:53	10	127	40.44	7.56	0.00	0.00		



APPENDIX F-1

Infiltration Testing By Others

DIAZ•YOURMAN & ASSOCIATES
Geotechnical Services

PROJECT NO.	2014-029.01
DATE	6/7/2017
FIELD DATA BY	EMV 6/6/17
COMPUTED BY	EMV 6/7/17
CHECKED BY	SC 6/9/17

PROJECT: 2014-029.01 SJC Community Park

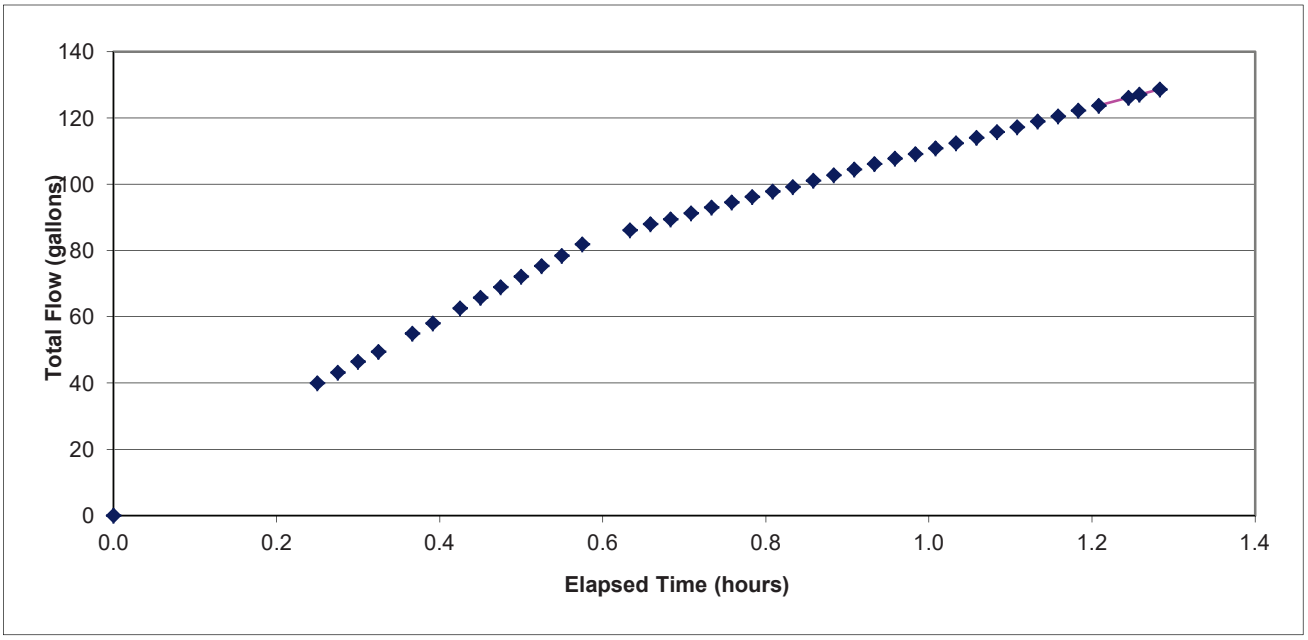
SUBJECT: Hydraulic Conductivity

LOCATION: DYP17-01 DATE OF TEST: 6/6/2017

Purpose: Calculate coefficient of permeability in accordance with USBR methods.

Reference: US Bureau of Reclamation, Procedure 7300-89 for Performing Field Permeability Testing by the Well Permeater Method

Height of water in well, h	60	inches
Depth to bottom of well	5	feet
Radius of well, r	2	inches
Discharge rate of water from the well for steady-state condition, q	65.44	gallons per hour
Water temperature, T	70	deg. F



Note: Line shows data considered to have achieved 'steady state' flow.

Kinematic viscosity ratio of water, V	0.97	
Coefficient of permeability at 20 C, k20	2.03	inches per hour

DIAZ•YOURMAN & ASSOCIATES
Geotechnical Services

PROJECT NO.	2014-029.01
DATE	6/7/2017
FIELD DATA BY	EMV 6/6/17
COMPUTED BY	EMV 6/7/17
CHECKED BY	SC 6/9/17
PAGE	2/2

PROJECT: 2014-029.01 SJC Community Park
SUBJECT: Hydraulic Conductivity
OCATION: DYP17-01 DATE OF TEST: 6/6/2017

Raw Data

Time	Reading (gal)
0.00	402
15.00	442
16.50	445.2
18.00	448.5
19.50	451.5
22.00	457
23.50	460.1
25.50	464.6
27.00	467.8
28.50	471
30.00	474.2
31.50	477.4
33.00	480.5
34.50	483.9
38.00	488.2
39.50	490
41.00	491.5
42.50	493.3
44.00	495
45.50	496.6
47.00	498.2
48.50	499.9
50.00	501.2
51.50	503.2
53.00	504.8
54.50	506.5
56.00	508.2
57.50	509.8
59.00	511.2
60.50	512.9
62.00	514.5
63.50	516.1
65.00	517.8
66.50	519.3
68.00	521
69.50	522.6
71.00	524.3
72.50	525.8
74.70	528.2
75.50	529.1
77.00	530.7

PLATE
A11

DIAZ•YOURMAN & ASSOCIATES
Geotechnical Services

PROJECT NO.	2014-029.01
DATE	6/7/2017
FIELD DATA BY	EMV 6/6/17
COMPUTED BY	EMV 6/7/17
CHECKED BY	SC 6/9/17

PROJECT: 2014-029.01

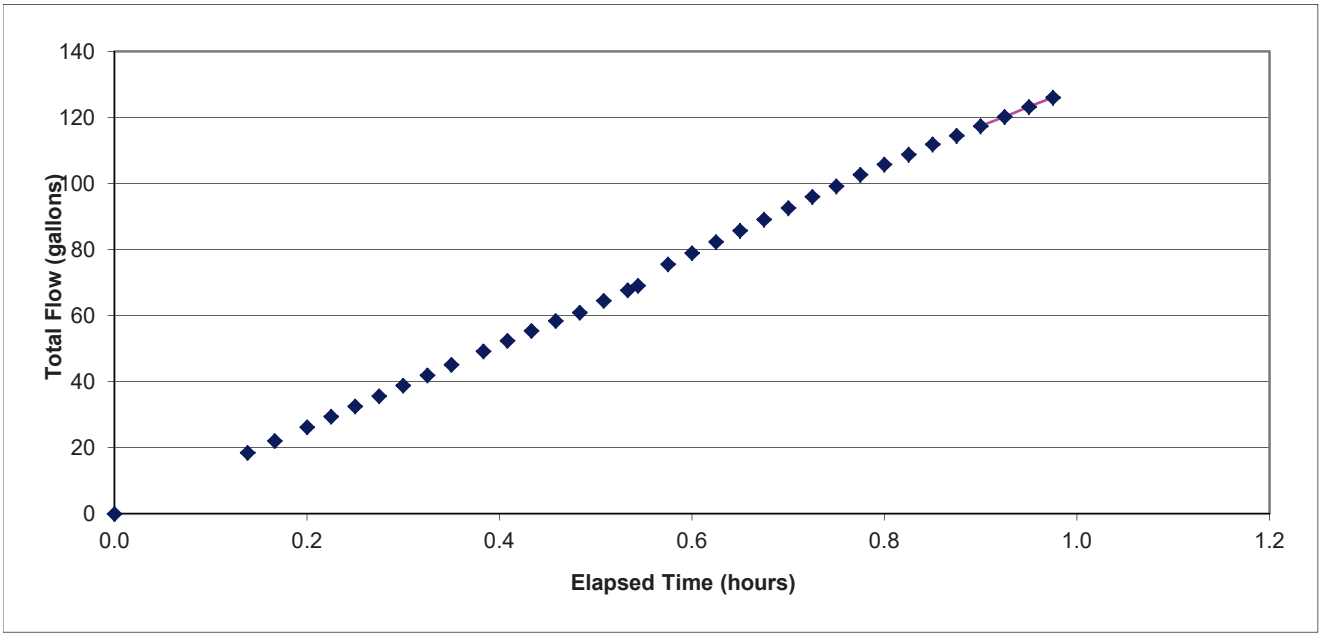
SUBJECT: Hydraulic Conductivity

LOCATION: DYP17-02 DATE OF TEST: 6/6/2017

Purpose: Calculate coefficient of permeability in accordance with USBR methods.

Reference: US Bureau of Reclamation, Procedure 7300-89 for Performing Field Permeability Testing by the Well Permeater Method

Height of water in well, h	54	inches
Depth to bottom of well	5	feet
Radius of well, r	2	inches
Discharge rate of water from the well for steady-state condition, q	115.20	gallons per hour
Water temperature, T	72	deg. F



Note: Line shows data considered to have achieved 'steady state' flow.

Kinematic viscosity ratio of water, V	0.95	
Coefficient of permeability at 20 C, k20	4.17	inches per hour

DIAZ•YOURMAN & ASSOCIATES
Geotechnical Services

PROJECT NO.	2014-029.01
DATE	6/7/2017
FIELD DATA BY	EMV 6/6/17
COMPUTED BY	EMV 6/7/17
CHECKED BY	SC 6/9/17
PAGE	2/2

PROJECT: 2014-029.01
SUBJECT: Hydraulic Conductivity
OCATION: DYP17-02 DATE OF TEST: 6/6/2017

Raw Data

Time	Reading (gal)
0.00	531.4
8.30	549.9
10.00	553.4
12.00	557.6
13.50	560.8
15.00	563.9
16.50	567
18.00	570.2
19.50	573.3
21.00	576.5
23.00	580.6
24.50	583.8
26.00	586.8
27.50	589.8
29.00	592.3
30.50	595.9
32.00	599.1
32.63	600.4
34.50	606.9
36.00	610.3
37.50	613.7
39.00	617.1
40.50	620.5
42.00	624
43.50	627.4
45.00	630.6
46.50	634
48.00	637.1
49.50	640.1
51.00	643.2
52.50	645.9
54.00	648.8
55.50	651.6
57.00	654.6
58.50	657.4

PLATE
A13

DIAZ•YOURMAN & ASSOCIATES
Geotechnical Services

PROJECT NO.	2014-029
DATE	8/20/2014
FIELD DATA BY	EMV
COMPUTED BY	EMV
CHECKED BY	MD

PROJECT: San Juan Capistrano - Community Park

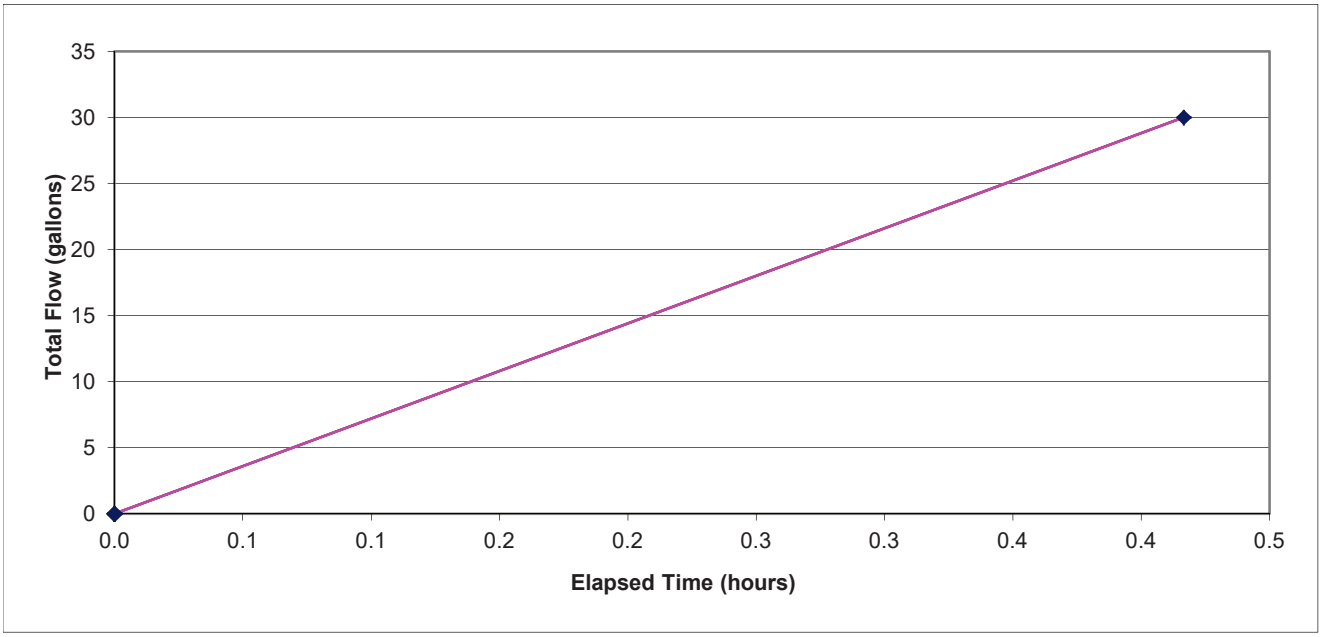
SUBJECT: Hydraulic Conductivity

LOCATION: DYB14-03 DATE OF TEST: 8/20/2014

Purpose: Calculate coefficient of permeability in accordance with USBR methods.

Reference: US Bureau of Reclamation, Procedure 7300-89 for Performing Field Permeability Testing by the Well Permeater Method

Height of water in well, h	36	inches
Depth to bottom of well	6	feet
Radius of well, r	2	inches
Discharge rate of water from the well for steady-state condition, q	72.00	gallons per hour
Water temperature, T	70	deg. F



Note: Line shows data considered to have achieved 'steady state' flow.

Kinematic viscosity ratio of water, V	0.97	
Coefficient of permeability at 20 C, k20	5.25	inches per hour

PLATE
A14

K:\datafls\PROJECTS\2014\2014-029\Calcs\DYB14-03

DIAZ•YOURMAN & ASSOCIATES
Geotechnical Services

PROJECT NO.	2014-029
DATE	8/20/2014
FIELD DATA BY	EMV
COMPUTED BY	EMV
CHECKED BY	MD
PAGE	2/2

PROJECT: San Juan Capistrano - Community Park
SUBJECT: Hydraulic Conductivity
OCATION: DYB14-03 DATE OF TEST: 8/20/2014

Raw Data

Time	Reading (gal)
0:00	0
0:25	30

PLATE
A15

APPENDIX G

Agronomic Laboratory Testing

WALLACE LABORATORIES, LLC
365 Coral Circle
El Segundo, CA 90245
phone (310) 615-0116 fax (310) 640-6863

July 16, 2025

Eddie Reyes, EReyes@gmugeo.com
GMU Engineers & Geologists
30336 Esperanza
Rancho Santa Margarita, CA 92688

RE: Soil Management Report
Northwest Open Space, 30291 Camino Capistrano
Four samples received July 14, 2025

Dear Eddie,

DH-2

The pH is highly alkaline at 8.28. The salinity is low at 0.12 millimho/cm.

Nitrogen, manganese, zinc and sulfur are low. Phosphorus, potassium, magnesium and boron are modest. Iron is moderate. Copper is high. The concentrations of common non-essential heavy metals are low.

Available sodium is low. SAR (sodium adsorption ratio) is 0.4.

The texture is gravelly sand. Based on the non-gravel fraction, it contains 94.3% sand, 2.9% silt and 2.8% clay. The gravel content is 42.9%. Gravel larger than ½ inch is 9.5%.

The presence of gravel is undesirable. Gravel and rocks dilute the soil fertility. Soil analyses are made with soil fraction that does not contain rocks and gravel. If the amount of rock and gravel were taken into account, the actual fertility would be lower than what is reported. Gravel does not supply nutrients nor does it holds moisture. Gravel blocks root growth. Gravel is not permeable. The path of travel of roots, drainage and air exchange is increased, is tortuous and is circuitous in the presence of large amounts of elevated gravel which restricts rooting, drainage and soil aeration.

Soil organic matter is low at 0.38% on a dry weight basis. The carbon:nitrogen ratio is 5.2.

The estimated rate of water percolation based on Soil Water Characteristics version 6.02.74 model developed by Keith Saxton of the USDA is moderate at 2.70 inches per hour for normal soil compaction. The model is based on the soil texture, percent gravel and percent soil organic matter.

DH-8

The pH is highly alkaline at 8.17. The salinity is modest at 0.79 millimho/cm.

Nitrogen, phosphorus, potassium and zinc are low. Manganese and sulfur are modest. Iron and boron are moderate. Copper and magnesium are high. The concentrations of common non-essential heavy metals are low.

Available sodium is modest. SAR is 1.6.

The texture is gravelly sand. Based on the non-gravel fraction, it contains 87.5% sand, 7.6% silt and 4.9% clay. The gravel content is 71.0%. Gravel larger than ½ inch is 48.9%.

Soil organic matter is low at 0.36% on a dry weight basis. The carbon:nitrogen ratio is 5.8.

The estimated rate of water percolation is moderate at 1.61 inches per hour for normal soil compaction.

DH-9

The pH is neutral at 7.05. The salinity is modest at 0.31 millimho/cm.

Nitrogen is low. Zinc, boron and sulfur are modest. Phosphorus, iron and manganese are moderate. Potassium, copper and magnesium are high. The concentrations of common non-essential heavy metals are low.

Available sodium is moderate. SAR is 1.4.

The texture is clay loam. Based on the non-gravel fraction, it contains 26.7% sand, 39.0% silt and 34.2% clay. The gravel content is 3.3%.

Soil organic matter is modest at 1.76% on a dry weight basis. The carbon:nitrogen ratio is 6.2.

The estimated rate of water percolation is slow at 0.15 inches per hour for normal soil compaction.

DH-11

The pH is modestly highly alkaline at 7.81. The salinity is low at 0.27 millimho/cm.

Nitrogen and sulfur are low. Phosphorus is modest. Potassium, iron, manganese and boron are moderate. Zinc, copper and magnesium are high. The concentrations of common non-essential heavy metals are low.

Available sodium is low. SAR is 0.4.

The texture is gravelly sandy loam. Based on the non-gravel fraction, it contains 65.0% sand, 23.9% silt and 11.0% clay. The gravel content is 38.4%. Gravel larger than ½ inch is 26.0%.

Soil organic matter is modest at 1.05% on a dry weight basis. The carbon:nitrogen ratio is 5.8.

The estimated rate of water percolation is moderate at 0.80 inches per hour for normal soil compaction.

Evaluations

Ideally for best growth, the soil pH should normally be in the range of about 6.5 to 7.5. At least, the pH should be less than about 8.0. The pH can be frequently lowered with the addition of gypsum and with deep irrigation.

The presence of gravel is undesirable. Gravel and rocks dilute the soil fertility. Soil analyses are made with soil fraction that does not contain rocks and gravel. If the amount of rock and gravel were taken into account, the actual fertility would be lower than what is reported. Gravel does not supply nutrients nor does it holds moisture. Gravel blocks root growth. Gravel is not permeable. The path of travel of roots, drainage and air exchange is increased, is tortuous and is circuitous in the presence of large amounts of elevated gravel which restricts rooting, drainage and soil aeration.

Recommendations

Lower the gravel content to less than 20% as feasible where gravel is high.

General soil preparation on a square foot basis. Broadcast the following uniformly; rates are per 1,000 square feet for a 6-inch lift. Incorporate them homogeneously 6" deep.

Ammonium sulfate (21-0-0) – 5 pounds for DH-9 and DH-11
Potassium sulfate (0-0-50) – 8 pounds for DH-8 and DH-11
K-Mag or Diamond K KMS (sul po mag) (0-0-22) – 12 pounds for DH-2
Triple superphosphate (0-45-0) – 4 pounds for all
Agricultural gypsum - 10 pounds for all
Organic soil amendment - about 4 cubic yards, sufficient for 4% to 6% soil organic matter on a dry weight basis

For the preparation on a volume basis, homogeneously blend the following materials into the soil. Rates are expressed per cubic yard:

Ammonium sulfate (21-0-0) – 1/4 pound for DH-9 and DH-11
Potassium sulfate (0-0-50) – 1/4 pound for DH-8 and DH-11
K-Mag or Diamond K KMS (sul po mag) (0-0-22) – 1/2 pound for DH-2
Triple superphosphate (0-45-0) – 1/4 pound for all
Agricultural gypsum – 1/2 pound for all
Organic soil amendment - about 20% by volume, sufficient for 4% to 6% soil organic matter on a dry weight basis

Organic soil amendment:

1. Humus material shall have an acid-soluble ash content of no less than 6% and no more than 20%. Organic matter shall be at least 50% on a dry weight basis.
2. The pH of the material shall be between 6 and 7.5.
3. The salt content shall be less than 10 millimho/cm @ 25° C. on a saturated paste extract.
4. Boron content of the saturated extract shall be less than 1.0 part per million.
5. Silicon content (acid-insoluble ash) shall be less than 50%.
6. Calcium carbonate shall not be present if to be applied on alkaline soils.
7. Types of acceptable products are composts, manures, mushroom composts, straw, alfalfa, peat mosses etc. low in salts, low in heavy metals, free from weed seeds, free of pathogens and other deleterious materials.
8. Composted wood products are conditionally acceptable [stable humus must be present]. Wood based products are not acceptable which are based on red wood or cedar.
9. Sludge-based materials are not acceptable.
10. Carbon:nitrogen ratio is less than 25:1.
11. The compost shall be aerobic without malodorous presence of decomposition products.
12. The maximum particle size shall be 0.5 inch, 80% or more shall pass a No. 4 screen for soil amending.

Maximum total permissible pollutant concentrations in amendment in parts per million on a dry weight basis:

arsenic	12	copper	100	selenium	10
cadmium	15	lead	150	silver	10
chromium	200	mercury	10	vanadium	50
cobalt	50	molybdenum	20	zinc	250
		nickel	100		

Higher amounts of salinity or boron may be present if the soils are to be preleached to reduce the excess or if the plant species will tolerate the salinity and/or boron.

Check the quality of the amended soils.

Irrigate deeply after amending the soil. Lower the pH to less than 8.0 where it is high. Afterwards, apply ammonium sulfate (21-0-0) at 5 pounds per 1,000 square feet if nitrogen is low.

For maintenance fertilization, apply ammonium sulfate (21-0-0) at 5 pounds per 1,000 square feet about once per quarter.

Monitor the site with periodic soil and leaf tissue testing. Adjust the maintenance program as needed.

Sincerely,

Garn Wallace

Garn A. Wallace, Ph. D.
GAW:n

WALLACE LABS	**SOILS REPORT**	Print Date	Jul. 16, 2025	Receive Date	7/14/25										
365 Coral Circle	Location	Northwest Open Space, 30291 Camino Capistrano													
El Segundo, CA 90245	Requester	Eddie Reyes, GMU Engineers & Geologists													
(310) 615-0116	graphic interpretation: * very low, ** low, *** moderate														
ammonium bicarbonate/DTPA		* * * * high, * * * * * very high													
extractable - mg/kg soil	**Sample ID Number**	25-196-42				25-196-43				25-196-44				25-196-45	
Interpretation of data	**Sample Description**	DH-2				DH-8				DH-9				DH-11	
low medium high	**elements**		graphic				graphic				graphic				graphic
0 - 7 8-15 over 15	**phosphorus**	3.13	**			2.08	*			9.52	***			6.64	**
0-60 60 -120 121-180	**potassium**	40.86	**			25.06	*			146.04	****			76.98	***
0 - 4 4 - 10 over 10	**iron**	8.91	***			9.59	***			5.35	***			9.84	***
0- 0.5 0.6- 1 over 1	**manganese**	0.28	*			0.35	**			0.79	***			0.76	***
0 - 1 1 - 1.5 over 1.5	**zinc**	0.32	*			0.35	*			0.90	**			1.79	****
0- 0.2 0.3- 0.5 over 0.5	**copper**	0.64	****			0.99	****			2.33	****			3.27	*****
0- 0.2 0.2- 0.5 over 1	**boron**	0.18	**			0.27	***			0.18	**			0.21	***
	calcium	397.84	***			363.06	***			400.07	****			430.83	****
	magnesium	49.92	**			126.13	****			461.11	*****			157.66	*****
	sodium	6.26	*			52.23	**			125.82	***			20.98	*
	sulfur	1.49	*			24.59	**			28.27	**			2.60	*
	molybdenum	0.02	***			0.02	***			0.10	****			0.02	**
	nickel	0.05	*			0.08	*			2.11	**			0.37	*
The following trace	**aluminum**	n d	*			n d	*			n d	*			n d	*
elements may be toxic	**arsenic**	0.25	*			0.25	*			0.18	*			0.40	*
The degree of toxicity	**barium**	1.96	*			1.17	*			0.30	*			0.72	*
depends upon the pH of	**cadmium**	0.02	*			0.02	*			0.31	*			0.13	*
the soil, soil texture,	**chromium**	n d	*			n d	*			n d	*			n d	*
organic matter, and the	**cobalt**	0.02	*			0.02	*			0.05	*			0.02	*
concentrations of the	**lead**	0.26	*			0.37	*			1.25	**			1.71	**
individual elements as	**lithium**	0.14	*			0.13	*			0.23	*			0.15	*
well as to their interactions.	**mercury**	n d	*			n d	*			n d	*			n d	*
	selenium	n d	*			n d	*			n d	*			n d	*
The pH optimum depends	**silver**	n d	*			n d	*			n d	*			n d	*
upon soil organic	**strontium**	2.18	*			1.92	*			0.93	*			1.52	*
matter and clay content-	**tin**	n d	*			n d	*			n d	*			n d	*
for clay and loam soils:	**vanadium**	0.08	*			0.11	*			0.27	*			0.22	*
under 5.2 is too acidic															
6.5 to 7 is ideal	**Saturation Extract**														
over 9 is too alkaline	**pH value**	8.28	****			8.17	****			7.05	***			7.81	****
The ECe is a measure of	**ECe (milli-**	0.12	*			0.79	**			0.31	**			0.27	*
the soil salinity:	**mho/cm)**			millieq/l				millieq/l				millieq/l			millieq/l
1-2 affects a few plants	**calcium**	10.4		0.5		69.8		3.5		17.5		0.9		34.6	1.7
2-4 affects some plants,	**magnesium**	4.4		0.4		16.8		1.4		5.6		0.5		7.4	0.6
> 4 affects many plants.	**sodium**	5.9		0.3		58.4		2.5		26.5		1.2		10.6	0.5
	potassium	2.3		0.1		6.6		0.2		4.3		0.1		3.2	0.1
	cation sum			1.2				7.6				2.6			2.9
problems over 150 ppm	**chloride**	64		1.8		97		2.7		53		1.5		29	0.8
	nitrate as N	1		0.1		4		0.3		3		0.2		6	0.4
	phosphorus as P	0.1		0.0		0.0		0.0		0.3		0.0		0.1	0.0
toxic over 800	**sulfate as S**	3.5		0.2		68.7		4.3		30.5		1.9		3.4	0.2
	anion sum			2.1				7.3				3.6			1.4
toxic over 1 for many plants	**boron as B**	0.06	*			0.05	*			0.07	*			0.09	*
increasing problems start at 3	**SAR**	0.4	*			1.6	**			1.4	*			0.4	*
est. gypsum requirement-lbs./1000 sq. ft.		1				9				91				4	
calculated infiltration rate inches/hour		2.70				1.61				0.15				0.80	
soil texture		gravelly sand		gravel > 2 mm		gravelly sand		gravel > 2 mm		clay loam		gravel > 2 mm		gravelly sandy loam	gravel > 2 mm
sand		94.3%		42.9%		87.5%		71.0%		26.7%		3.3%		65.0%	38.4%
silt		2.9%		gravel > 1/4 inch		7.6%		gravel > 1/4 inch		39.0%		gravel > 1/4 inch		23.9%	gravel > 1/4 inch
clay		2.8%		21.9%		4.9%		59.8%		34.2%		0.0%		11.0%	32.6%
lime (calcium carbonate)		no		gravel > 1/2 inch		no		gravel > 1/2 inch		no		gravel > 1/2 inch		no	gravel > 1/2 inch
Total nitrogen		0.036%		9.5%		0.031%		48.9%		0.142%		0.0%		0.091%	26.0%
Total carbon		0.190%				0.181%				0.881%				0.524%	
carbon:nitrogen ratio		5.2				5.8				6.2				5.8	
organic matter based on carbon		0.38%				0.36%				1.76%				1.05%	
moisture content of soil		1.9%				4.5%				14.6%				5.1%	
half saturation percentage		11.3%				13.8%				38.4%				15.8%	

Elements are expressed as mg/kg dry soil or mg/l for saturation extract.

pH and ECe are measured in a saturation paste extract. nd means not detected.

Analytical data determined on soil fraction passing a 2 mm sieve.