SJC04 & SJC06 Data Centers

Geotechnical Engineering Report

May 30, 2023 | Terracon Project No. ND215040

Prepared for:

Environmental Systems Design, Inc
223 South Wacker Drive, Suite
5300
Chicago, IL 60606

Explore with us

Nationwide

Terracon.com

- Facilities
- Environmental
- Geotechnical
- Materials

1220 Concord Avenue, Suite 450
Concord, CA 94520
P (925) 609-7224
Terracon.com

May 30, 2023

Environmental Systems Design, Inc
223 South Wacker Drive, Suite 5300
Chicago, IL 60606

Attn: Chad Mendell
P: Client (312) 456-2387
E: cmendell@esdglobal,com

Re: Geotechnical Engineering Report
SJC04 & SJC06 Data Centers
2515 Orchard Parkway
San Jose, Santa Clara County, California
Terracon Project No. ND215040

Dear Mr. Mendell:

We have completed Tasks 2 and 3 of the scope of Geotechnical Engineering services for the referenced project in general accordance with Terracon Proposal No. PND215040 dated January 4, 2022. This report summarizes the results of our previous subsurface investigations and the results of supplemental subsurface exploration and engineering consultation and analyses and provides geotechnical recommendations specific to earthwork and the design and construction of foundation systems for the currently proposed project.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning this report or if we may be of further service, please contact us.

Sincerely,

Terracon

Robert Fosse, P.E., G.E.
Principal

Noah T. Smith, P.E., G.E.
Principal

Table of Contents

Figures

Attachments

Note: This report was originally delivered in a web-based format. **Blue Bold** text in the report indicates a referenced section heading. The PDF version also includes hyperlinks which direct the reader to that section and clicking on the Terracon logo will bring you back to this page. For more interactive features, please view your project online at **client.terracon.com**.

Refer to each individual Attachment for a listing of contents.

Report Summary

Topic [1]	Overview Statement [2]
Project Description	The project site is currently undeveloped. The project will consist of the construction of (2) five-story data center buildings. Development will include a substation, a water tank, stormwater retention facilities, and access roads and parking areas.
Geotechnical Characterization	Subgrade soils encountered in our borings and CPTs generally consisted of 15 feet to 30 feet of lean to fat clay with variable amounts of sand underlain by about 5 feet to 20 feet of sand with variable amounts of clay. The sand was followed by lean to fat clay to the maximum depth explored of 100½ feet below the existing ground surface (bgs) with a 15 foot- to 25-foot-thick layer of sand encountered at a depth of approximately 45 feet bgs. Groundwater was encountered in the borings at depths ranging from 5 feet to 29 feet bgs and in the CPT soundings at depths of 4 feet to 10 feet bgs at the time they were performed.
Earthwork	Site grading will include excavation and cuts below existing grade of approximately 1 foot to 8 feet and fills up to approximately 1 foot to 4 feet. Preliminary earthwork quantities are estimated to export approximately 90,000 cubic yards of soils from the site. The near surface clays have moderate to high plasticity and are sensitive to moisture variation. The upper 18 inches of subgrade below soil supported floor slabs and exterior hardscapes should consist of chemically treated soil or granular structural fill. Grading should be conducted in accordance with the **Earthwork** section of this report.
Foundations	We estimate potential liquefaction settlement up to 2 inches across the site and the placement of fill will trigger on the order of 1 inch to 3 inches of settlement depending on the final fill thickness and location. In order to mitigate the effects of the total and associated differential settlements on the proposed buildings, substation, and water tank from liquefaction and fill

	placement, we have provided the following two options for foundation support for the proposed improvements. Option 1 – **Shallow Foundations** over Ground Improvement Option 2 – **Deep Foundations** consisting of either auger cast piles or driven piles Recommendations for the design of each option are provided in the **Foundations** section of this report.
Retaining Structures	Base isolation system excavations and building elevator pits. **Lateral Earth Pressures** have been provided for use in design.
Pavements	Pavement sections are provided for both rigid and flexible pavements. Alternate pavement sections utilizing chemical treatment are provided.
General Comments	This section contains important information about the limitations of this geotechnical engineering report.

1. If the reader is reviewing this report as a pdf, the topics above can be used to access the appropriate section of the report by simply clicking on the topic itself.
2. This summary is for convenience only. It should be used in conjunction with the entire report for design purposes.

Introduction

This report presents a summary and final report of the results of our subsurface exploration and Geotechnical Engineering services performed for the proposed SJC04 and SJC06 Data Centers to be located at 2515 Orchard Parkway in San Jose, Santa Clara County, California. The purpose of these services was to provide information and geotechnical engineering recommendations relative to:

- Subsurface soil conditions
- Groundwater conditions
- Seismic site classification per the 2022 California Building Code (CBC)
- Site preparation and earthwork
- Foundation design and construction
- Floor slab design and construction
- Pavement design and construction
- Liquefaction potential
- Percolation testing results
- Thermal resistivity
- Field electrical resistivity
- Soil corrosivity

The original 2020 geotechnical engineering Scope of Services for this project included the advancement of twenty-three test borings to depths ranging from approximately 5 feet to 51½ feet below existing site grades (bgs). Additionally, eleven Cone Penetration Test (CPT) soundings were advanced to depths varying from 50½ feet and 100½ feet bgs. Three additional CPT soundings were advanced in the Water Tank area at the northwest corner of the site in 2022 to depths ranging from approximately 57 feet to 69 feet bgs. Geophysical surveys consisting of four field electrical resistivity tests and a Multichannel Analysis of Surface Waves survey were performed on the site. Four percolation tests were also performed at a depth of 5 feet bgs.

Figures showing the site and boring locations are shown on the **Site Location** and **Exploration Plan**, respectively. The results of the laboratory testing performed on soil samples obtained from the site during our field exploration are included on the boring logs and/or as separate graphs in the **Exploration Results** section.

Project Description

Our initial understanding of the project was provided in our proposal and was discussed during project planning and entitlement and schematic design phases. A period of collaboration has transpired since the project was initiated, and our final understanding of the project conditions is as follows:

Item	Description
Information Provided	▪ Architectural/Engineering Design Scope of Services: SJC04 Datacenter, San Jose, CA, prepared by Microsoft, dated June 3, 2021. ▪ SJC04 Construction Administration Scope of Services, Datacenter Engineering, dated June 8, 2021. ▪ Grading and Drainage Plans, Sheets 4.0, 4.2 and 4.3, prepared by HMH Civil Engineers & Landscape Architects, dated October 26, 2022 (Entitlement Phase). ▪ Structural Systems and Seismic Performance Expectations, prepared by Thornton Tomassetti Structural Engineers, dated June 13, 2022.
Project Description	Development will include the construction of (2) new data center buildings with 48 MW of capacity each. A substation will also be constructed, as well as stormwater retention facilities, water tanks, access roads and parking areas.
Proposed Structures	The data center buildings will be five-story, five Colo structures with footprints of about 90,000 square feet (sf) each. The substation will be about 90,000 sf in size. We understand the proposed water tanks will be about 86 feet in diameter and approximately 40 feet tall.
Building Construction	Steel Buckling Restrained Brace (BRB) Frame Systems
Finished Floor Elevation	Finished floor elevations for the data center buildings and substation are anticipated to be as follows based on the plans provided by HMH Civil Engineers & Landscape Architects: ▪ Data Center Buildings – 32.0 feet to 33. feet above Mean Sea Level ▪ Substation – 30.0 feet above Mean Sea Level

Item	Description
Maximum Loads	The following anticipated structural loads were provided by Thornton Tomassetti Structural Engineers: ▪ Perimeter Columns: 1000 kips ▪ Interior Columns: 1700 kips to 2100 kips ▪ Floor Slabs: 500 pounds-per-square foot (psf) uniform loading
Grading	Site grading will include excavation and cuts below existing grade of approximately 1 foot to 8 feet and fills of up to approximately 1 foot to 4 feet. Preliminary earthwork quantities are estimated to export approximately 90,000 cubic yards of soils from the site.
Below-Grade Structures	Construction of the data center structures will include a Base Isolation System at the foundation level. The corresponding building pad levels will be at Elevation 23.5 to 24.5 feet to accommodate the Base Isolation Pit, approximately 8 feet below the first finish floor levels. Construction will also include below-grade elevator pits up to 5 feet deep for the data center buildings. We have assumed the elevator pit walls will consist of cantilevered concrete construction.
Free-Standing Retaining Walls	None anticipated
Pavements	We have anticipated both concrete and asphalt pavement will be utilized for development
Building Code	2022 California Building Code

Terracon should be notified if any of the above information is inconsistent with the planned construction, especially the grading limits, as modifications to our recommendations may be necessary.

Site Conditions

The following description of site conditions is derived from our site visit in association with the field exploration and our review of publicly available geologic and topographic maps.

Item	Description
Parcel Information	The proposed project is located at 2515 Orchard Parkway in San Jose, Santa Clara County, California. The project parcel encompasses approximately 22 acres. Latitude/Longitude: 37.3783°N / 121.9322°W (approximate) See **Site Location**
Existing Terracon Reports	Terracon prepared a Geotechnical Engineering Report (Project No. ND205079, Dated December 15, 2020) for development of the SJC04 Data Center project site during the due diligence phase, for another client. We also prepared a Geotechnical Engineering Report Addendum, specific to pavement design recommendations, dated January 21, 2021. Terracon is also currently providing geotechnical consultation services during master planning and preliminary design for the SJC04 and SJC06 Data Center project. In consultation with the project design team, we also recently issued a Technical Memorandum for Preliminary Drilled Displacement Foundation Recommendations, dated April 22, 2023. Our previous reports included preliminary geotechnical recommendations concerning earthwork and the design and construction of foundations, pavements, and floor slabs.
Existing Improvements	The project site currently consists of undeveloped land.
Current Ground Cover	Earthen and grasses.
Existing Topography	The site is relatively flat. However, based on the review of plans prepared by HMH Civil Engineers & Landscape Architects, the property varies in elevation from about 48.32 feet to about 26.5 feet above Mean Sea Level (MSL) due to the presence of a mound near the northwest edge of the property.

Geotechnical Characterization

Terracon previously performed field exploration at the SJC04 Data Center site in October 2020. Subgrade soils encountered in our borings and CPTs performed as part of our October 2020 field investigation generally consisted of 15 feet to 30 feet of lean to fat clay with variable amounts of sand underlain by about 5 feet to 20 feet of sand with variable amounts of clay. The sand was followed by lean to fat clay to the maximum depth explored of 100½ feet below the existing ground surface (bgs) with a 15 foot to 25-foot-thick layer of sand encountered at a depth of approximately 45 feet bgs.

Subsurface soil conditions encountered in our more recent 2022 CPTs for the Water Tank area generally consisted of a surficial moderately to highly plastic sandy fat clay layer overlying interbedded layers of sandy lean clay and silt. Dense sand and gravel layers were observed at depths ranging from about 40 feet to 50 feet to the maximum depths explored of approximately 57 feet to 69 feet bgs. The soil conditions encountered in CPTs performed for an adjacent Switch Station were relatively consistent with those encountered in the borings and CPTs performed on the SJC04 Data Center site.

We have developed a general characterization of the subsurface conditions based upon our review of the subsurface exploration, laboratory data, geologic setting, and our understanding of the project. This characterization, termed GeoModel, forms the basis of our geotechnical calculations and evaluation of the site. Conditions observed at each exploration point are indicated on the individual logs. The individual logs can be found in the **Exploration Results** and the GeoModel can be found in the **Figures** attachment of this report.

As part of our analyses, we identified the following model layers within the subsurface profile. For a more detailed view of the model layer depths at each boring location, refer to the GeoModel.

Model Layer	Layer Name	General Description
1	Fat Clay	Medium stiff to very stiff fat clay with variable amounts of sand and gravel
2	Lean Clay	Soft to very stiff lean clay with variable amounts of sand
3	Sand	Very loose to dense sand with variable amounts of clay, silt, and gravel
4	Silt	Medium stiff to very still sandy silt

Groundwater Conditions

The boreholes were observed while drilling and after completion for the presence and level of groundwater. Pore pressure dissipation tests were also performed in the CPTs to help determine approximate groundwater levels. The water levels observed in the boreholes and CPTs can be found on the boring/CPT logs in **Exploration Results** and are summarized below.

Boring/CPT Number	Approximate Depth to Groundwater while Drilling/Testing[1] (feet)	Approximate Depth to Groundwater immediately after Drilling[1] (feet)
B1	10	10
B2	20	5
B3, B6, B7, B8, B13	20	20
B4	23	23
B5	20	29
B9	10	14
B11	14	14
B12	10	13
B14	25	27
CPT-1, CPT-2, CPT-6, CPT-10, CPT-11	10	--
CPT-3, CPT-7, CPT-8, CPT-9	8	--
CPT-4	9	--
CPT-5	4	--
Tank CPT-1	2	--
Tank CPT-2	6	--
Tank CPT-3	16	--

1. Below ground surface.

Groundwater was not encountered in borings B10, P1 through P5, and I1 through I4. Since the borings were backfilled relatively soon after completion, the water levels summarized for the borings are not stable groundwater levels.

During the previous field investigation conducted at the SJC04 Data Center site, groundwater was encountered in borings at depths ranging from 5 feet to 29 feet bgs and in CPT soundings at depths ranging from 4 feet to 10 feet bgs at the time they were performed. Groundwater levels in the recent Tank area CPTs ranged from about 2 feet to 16 feet bgs. In addition, Seismic Hazard Zone Report 051 indicates the historical high groundwater level at the site is about 5 to 10 feet bgs

Due to the low permeability of soils encountered in the borings, a relatively long period may be necessary for a groundwater level to develop and stabilize in a borehole. Long term observations in piezometers or observation wells sealed from the influence of surface water are often required to define groundwater levels in materials of this type.

Groundwater level fluctuations occur due to seasonal variations in the amount of rainfall, runoff, and other factors not evident at the time the previous borings and CPTs were performed. Therefore, groundwater levels during construction or at other times in the life of the structures may be higher or lower than the levels indicated on the previous boring/CPT logs. The possibility of groundwater level fluctuations should be considered when developing the design and construction plans for the project.

Based on our review of the results of the 2020 subsurface investigation program for the SJC04 Data Center project, and more recent site investigation data, we recommend a design groundwater level of Elevation +24 feet be considered for final design. It is also our understanding that a 100-year flood level of Elevation +27 feet is also being considered for final design.

Geologic Hazards

Geologic maps indicate the subsurface conditions at the site consist of Holocene Age alluvial gravel, sand, and clay and including alluvial fan and levee deposits.[1] The subgrade soils encountered in our borings and CPTs were generally consistent with mapped geology.

Liquefaction

Liquefaction is a mode of ground failure that results from the generation of high pore water pressures during earthquake ground shaking, causing loss of shear strength. Liquefaction is typically a hazard where loose sandy soils or low plasticity fine grained soils exist below groundwater. The California Geological Survey (CGS) has designated

---

[1] *Dibblee, T.W., and Minch, J.A., 2005, Geologic map of the Milpitas quadrangle, Alameda & Santa Clara Counties, California: Dibblee Geological Foundation, Dibblee Foundation Map DF-153, scale 1:24,000*

certain areas within California as potential liquefaction hazard zones. These are areas considered at a risk of liquefaction-related ground failure during a seismic event, based upon mapped surficial deposits and the presence of a relatively shallow water table. The project site and surrounding area is within both a CGS liquefaction hazard zone and a Santa Clara County liquefaction hazard zone. Therefore, a liquefaction evaluation was performed to estimate the potential for liquefaction induced settlement. Details regarding our evaluation are presented in the **Liquefaction** section of this report.

Flooding

Based on a review of the Federal Emergency Management Agency (FEMA) National Flood Layer (NFHL), the project site is located within a mapped flood zone. The project site is in an area with a FEMA Flood Zone AH designation with a Base Flood Elevation (BFE) of 27 feet based on the North American Vertical Datum of 1988 (NAVD88) geodetic datum.

Seismic Considerations

Due to the subsurface conditions encountered our borings and CPTs, the potential for liquefaction at the site, and the proposed construction, an initial Site-Specific Ground Motion Study was performed in order to develop appropriate data for use in planning the proposed improvements during the due diligence phase of the project. The Site-Specific Ground Motion Study included both a ground motion hazard analysis and a site response analysis. The results of the study were presented in a report dated December 15, 2020 (Terracon Project No. ND205079). The study has been revised pursuant to a base isolation system being selected by the design team to enhance the seismic performance of the buildings and to provide time histories of acceleration for structural engineering analysis. The results of the revised study are presented in a letter dated May 25, 2023 (Terracon Project No. 81225049).

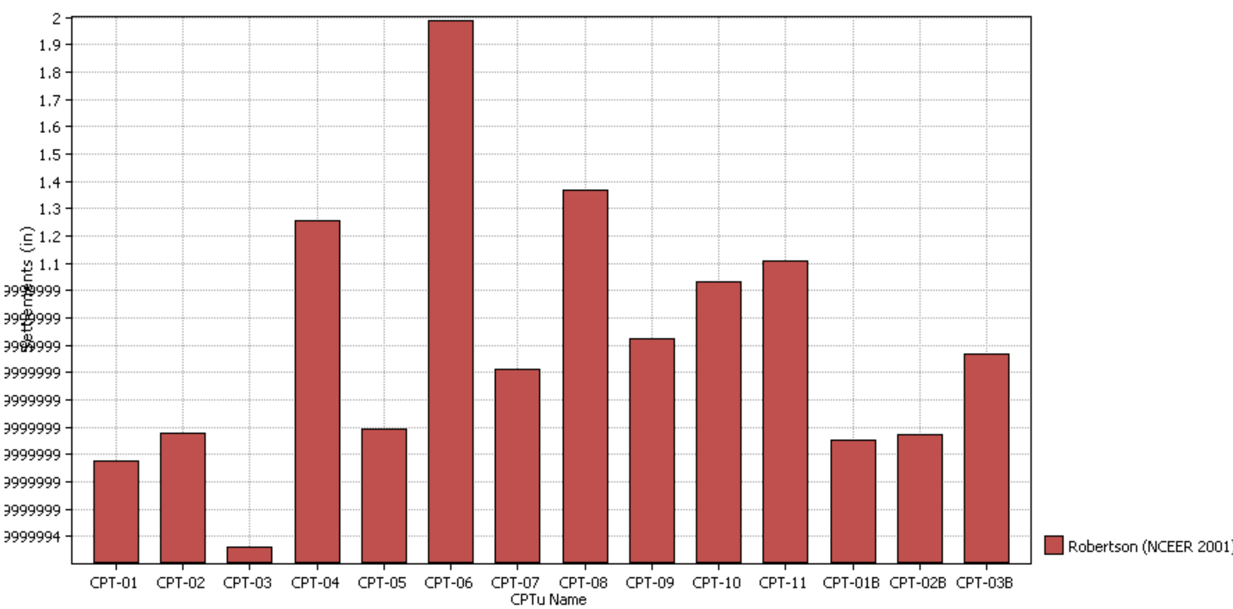
Liquefaction

We performed a liquefaction hazard evaluation in general compliance with the California Geological Survey (CGS) Special Publication 117A (2008); Southern California Earthquake Center "Recommended Procedures for Implementation of DMG Special Publication 117 Guidelines for Analyzing and Mitigating Liquefaction Hazards in California," 1999 report; and the Seismic Hazard Zone Report for the Milpitas 7.5-Minute Quadrangle, Alameda and Santa Clara Counties, California (SHZR 051).

As recommended in these reports, we performed a screening analysis to determine if there is a potential for liquefaction to occur at the site. We evaluated the soils encountered in our borings advanced to a maximum depth of 51½ feet below the existing ground surface (bgs) and fourteen cone penetration tests (CPTs) which were advanced to depths varying from 50½ feet to 100½ feet bgs. We evaluated these soils based on soil classification, corrected SPT blow counts, water content, Atterberg limits, groundwater elevation, shear strength, and peak ground acceleration, and CPT data. In our screening investigation we looked at the Atterberg limits for fine-grained soils in the upper 60 feet of our soil borings. The Atterberg limits for these fine-grained soils exhibited a liquid limit ranging from 21 to 77 and a plasticity index ranging from 3 to 54. We also calculated the ratio of the in-situ moisture content to the liquid limit. This data was then compared to the criteria by Idriss and Boulanger (2006) and Bray and Sancio (2006) for potential liquefaction or cyclic softening of fine-grained soils. The fine-grained soils in our borings classify as "clay-like" and non-liquefiable by Idriss/Boulanger with exception of the sandy silt later encountered at a depth of 26 feet bgs in Boring B6 which classified as "sand-like". Based on the plasticity index and the ratio of the in-situ moisture content to the liquid limit of the fine-grained soils, we believe the fine-grained soils at the site have a low susceptibility to cyclic softening/liquefaction by Bray/Sancio with exception of the sandy silt layer encountered at a depth of 26 feet bgs in Boring B6 that has a high susceptibility to liquefaction and the lean clay with sand layer encountered at a depth of 15 feet bgs in Boring B3. The sandy lean clay layer encountered at a depth of 30 feet bgs on Boring B8 classifies as having a moderate liquefaction susceptibility. However, CPT data indicates the sandy lean clay layer is over-consolidated. Subsequently, we believe the liquefaction susceptibility of this layer is low. The indicated sandy silt and lean clay with sand encountered in Borings B6 and B3, respectively, do not appear to be continuous layers across the site. We believe these soils are lenses that would not likely respond to earthquake ground motions independently. We believe if these lenses have a tendency to develop excessive pore pressure, they would become "soft inclusions" and the shear stresses would be controlled by the response of the surrounding materials. Subsequently, it is our opinion only the cohesionless soil layers encountered in our borings and CPTs would have the potential for liquefaction to occur and further evaluation of these layers was warranted. We therefore, performed a quantitative evaluation of the potential for liquefaction to occur considering the cohesionless soils only and the effects if liquefaction were to occur on this project.

A revised ground motion hazard analysis and site response analysis were performed for this site and the proposed development in accordance with ASCE 7-16. The results of these analyses are presented a letter (Terracon Project No. 81225049) dated May 25, 2023. Based on the results of these analyses, a Peak Ground Acceleration (PGA) of 0.512 and an earthquake magnitude of 7.0 for the project site was used in our evaluation. Seismic Hazard Zone Report 051 for the Milpitas Quadrangle indicates the historical high groundwater depth for the site varies between 5 feet and 10 feet bgs. Groundwater was encountered at depths varying from 5 feet to 29 feet bgs in our borings and at depths varying from 4 feet to 10 feet bgs in our CPTs at the time they were performed. As a result, a groundwater depth of 4 feet was utilized in our evaluation.

The liquefaction study utilized the software "CLiq" by GeoLogismiki Geotechnical Software. Our analysis was based on the soil data obtained from the CPT soundings supplemented by laboratory data performed on samples obtained from our borings. Analyses were performed on data obtained from CPT-01 through CPT-011 and CPT-01B through CPT-03B. CPT calculations were assessed using the Robertson (NCEER 2001) method. A factor of safety of 1.3 was used against liquefaction. The liquefaction potential analysis was calculated from a depth of 4 to 60 feet bgs. A summary of the results of our analysis using the Robertson (NCEER 2001) method has been attached to this report. The following table summarizes the vertical settlements calculated using the noted method.



Based on the analysis, the soil layers contributing to the majority of potential liquefaction settlement were encountered between the depths of approximately 10 feet to 35 feet bgs and 46 feet to 60 feet bgs across the site. Based on our review of the calculations, the anticipated potential total liquefaction-induced settlement across the site varies from negligible to about 2 inches. We estimate the differential liquefaction-induced settlement may be about ¾ inch over 100 feet.

Due to the cohesive nature and thickness of non-liquefiable soils across the surface of the site as well as the lithology consisting predominantly of clayey soils, we believe the probability for liquefaction to manifest at the surface is low. Furthermore, our review of Seismic Hazard Zone Report 051 for the Milpitas Quadrangle reported no historical evidence of surface manifestations of liquefaction or ground failures at the site. The only historical ground failure noted in the report in the area of the site was an occurrence of ground settlement approximately ½ mile north of the site.

With regards to the potential for lateral spreading, we note that the site and surrounding area is relatively level. The Guadalupe River borders the site to the west. Based on aerial photographs and relative topographic information, the bottom of the Guadalupe Rover appears to be about 6 feet lower in elevation than the project site. Given the relative flatness of the local topography and that identified liquefiable soils at the site were located at least 10 feet below the existing ground surface, it is our opinion the potential for lateral spreading to affect this site is low.

In order to help protect the proposed data center, water tanks, and substation against the effects of liquefaction, the improvements could be supported on **Shallow Foundations** over soils mitigated by **Ground Improvement**, or **Deep Foundations**.

Percolation Testing and Stormwater Infiltration

We performed four percolation tests within the proposed site development for use by the project civil engineer in the design on the storm water retention system. The percolation tests were performed using borings, I1, I2, P3, and I4, drilled to depths ranging from approximately 3½ feet to 5 feet bgs. The approximate locations of the test holes are shown on the **Exploration Plan**.

After drilling the test holes, we placed approximately 2 inches of gravel in the bottom of each hole, then placed a slotted PVC pipe in each hole, and filled the annual space around the pipe with gravel. The test holes were filled with water and left to saturate for a minimum 24 hours. We then filled the shallow holes with water to depths ranging from 1½ feet to 3½ feet and measured the drop-in water surface over a period varying from approximately 3 hours to 8 hours depending on the hole, refilling the holes as necessary to maintain the desired head.

The measured percolation rates and calculated infiltration rates are summarized in the following table.

Perc. Test Location	Depth (ft)	Avg. Head (ft)	Perc. Rate (min/inch)	Perc. Rate (inch/hr)	Infiltration Rate (inch/hr)
I1	3½	1.50	31.3	1.92	0.24
I2	4½	0.84	0	0	0
P3	5	1.26	500	0.12	0.01
I4	5	0.60	750	0.08	0.02

Since we used test borings to perform percolation testing, we have used the Porchet formula (aka Inverse Borehole Formula) to calculate the test infiltration rate which takes into account sidewall area of the bore hole. Storm water runoff may likely contain materials such as silt, leaves, oil residues, and other matter that may reduce the percolation characteristics of the soil. We therefore recommend that a filtration system be implemented into the design and installed. An appropriate safety factor should be applied to the measured infiltration rates by the designer for use in design and be based on the amount of filtration designed into the system, at a minimum a Safety Factor of 2 shall be utilized. The values presented in the table are clear water rates and do not have a safety factor applied. In addition, we recommend a regular maintenance program be implemented to monitor the storm drainage/filtration system prior to the beginning of each wet weather season.

We have provided the following considerations for the design and construction of the retention/detention facilities. Planned retention/detention facilities should be located no closer than 10 feet to structural site improvements.

The long-term infiltration rates will depend on many factors, and can vary or be reduced if the following conditions are present:

- Fill placement,
- Groundwater table,
- Variability of site soils,
- Fine layering of soils, or
- Maintenance and pre-treatment (filtration) of the influent are not performed regularly

Given the fine-grained nature of the near surface soils encountered on this site and the slow infiltration rates measured, it is our opinion that the native soils may not be very conductive for bioretention system design. We understand the site needs to handle the on-site storm water. Additional storage capacity of the proposed system may be needed.

<u>Fill Placement:</u> As indicated in the report, we anticipate earthwork required to develop the site may consist of excavation and cuts of about 1 foot to 8 feet and fills of about 1 foot to 4 feet. It is unknown whether final grades will consist of native material or imported fill. As a result, the percolation tests performed may not be representative of the final soil conditions depending on the blend of soils utilized as structural fill and native soils exposed where cuts are made. Additional percolation testing may be warranted following rough grading to confirm the values utilized in design are appropriate.

<u>Subsurface Soil Variation</u>: Variations in subsurface soil conditions and the presence of fine layering can affect the infiltration rate of the receptor soils. As shown in the **Geomodel** section of this report, fine grained alluvial soils (clay) were encountered in

most of our borings to depths ranging from about 15 feet to 30 feet bgs. Fine-grained soils were underlain by sands with variable amounts of clay and gravel. Due to variation in thickness of the upper surface fine grained soils, infiltration rates may vary across the site.

Groundwater: Based on the measured depth to groundwater ranging from approximately 4 feet to 25 feet bgs in our borings/CPTs at the time of our field exploration, we anticipate that there could be difficulty in maintaining adequate separation (greater than 5 feet) between the bottom of the system and groundwater depending on the final grades across the site.

Construction Considerations: The infiltration rate of the receptor soils will be reduced in the event that fine sediment, organic materials, and/or oil residue are allowed to accumulate in the retention facilities. The use of a filtration system is highly recommended as well as a maintenance program.

Operation of heavy equipment during construction may densify the receptor soils below the infiltration facility. The soils exposed in the bottom of the infiltration facility should not be compacted and should remain in their native condition. This may require scarification of the soils prior to construction.

Maintenance of Facilities: Satisfactory long-term performance of an infiltration facility will require some degree of maintenance. Accumulations of sediment, organic materials, or other material that serve to reduce their permeability of the receptor soils should be removed from the filtration system on a regular basis so as not to enter the retention system. The filtration system shall have a rigorous maintenance program, debris from the filtration maintenance should be disposed of at an approved facility in accordance with applicable regulation.

Field Electrical Resistivity

In-situ electrical resistivity testing was performed during our field explorations in general accordance with ASTM G57, utilizing the Wenner Four-Electrode Method. Each test consisted of two mutually perpendicular arrays approximately oriented in the north-south and east-west directions. Within the test array, potential electrodes are created on a transverse line between the current electrodes. An equal "A" spacing between electrodes is maintained. In-situ electrical resistivity measurements were taken at four test locations. Individual in-situ electrical resistivity values at various "A" spacings along each array are summarized in the table provided in the results. A Geophysical Survey Report (Project No. NS205134, Dated November 12, 2020) presenting the field test results and approximate test locations is presented in **Exploration Results** of this report.

As indicated, grading is anticipated to consist of excavation and cuts of about 1 foot to 8 feet and fills of about 1 foot to 4 feet to develop the site. Subsequently, field resistivity testing was conducted in areas that may experience these cuts and fills. As a result, the field resistivity test results for the existing subgrade conditions could vary from actual conditions following rough grading. Therefore, additional testing may be warranted following rough grading to obtain final field resistivity values.

Thermal Resistivity

We understand that new underground utilities will be installed as part of part of the proposed data center construction. Terracon collected bulk samples in borings B5, B8, B9, B10, B11, P1, P5, and I4 for testing to be completed on each sample. Laboratory compaction characteristics testing was performed on the samples in accordance with ASTM D1557. In accordance with IEEE Standard 442-2017, thermal resistivity testing was performed on the samples at 90 percent of maximum dry density as determined by ASTM D1557. A dry-out curve was performed for each thermal resistivity test. Tests include a minimum of three points, including optimum moisture content or as-received moisture (whichever is higher), totally dry condition, and 1 intermediate moisture content. The test results are presented in **Exploration Results** section of this report.

As indicated, grading is anticipated to consist of excavation and cuts of about 1 foot to 8 feet and fills of about 1 foot to 4 feet to develop the site. Thermal conductivity was performed on the native subsurface soils. Therefore, additional testing may be warranted following rough grading to obtain final thermal conductivity values. Terracon can collect fill samples and perform additional thermal resistivity tests if desired.

Corrosivity

The following table lists the results of laboratory soluble sulfate, soluble chloride, electrical resistivity, and pH testing. The values may be used to estimate potential corrosive characteristics of the on-site soils with respect to contact with the various underground materials which will be used for project construction.

Corrosivity Test Results Summary

Boring	Sample Depth (feet)	Soil Description	Soluble Sulfate (%)	Soluble Chloride (%)	Electrical Resistivity (Ω-cm)	pH
B2	1 to 2½	Silty Sand	0.0133	0.0038	2,959	7.81
B3	20 to 21½	Sand	0.0182	0.0060	1,455	8.04

Corrosivity Test Results Summary

Boring	Sample Depth (feet)	Soil Description	Soluble Sulfate (%)	Soluble Chloride (%)	Electrical Resistivity (Ω-cm)	pH
B5	5 to 6½	Lean Clay	0.0122	0.0113	644	7.55
B6	2½ to 4	Lean Clay	0.0103	0.0055	1,067	7.24
B13	5 to 6½	Lean Clay	0.0212	0.0045	1,213	7.44
B14	1 to 2½	Fat Clay	0.0115	0.0053	1,164	7.76

Results of soluble sulfate testing can be classified in accordance with ACI 318 – Building Code Requirements for Structural Concrete. Numerous sources are available to characterize corrosion potential to buried metals using the parameters presented in the previous table. ANSI/AWWA is commonly used for ductile iron, while threshold values for evaluating the effect on steel can be specific to the buried feature (e.g., piling, culverts, welded wire reinforcement, etc.) or agency for which the work is performed. Imported fill materials may have significantly different properties than the site materials noted in the table and should be evaluated if expected to be in contact with metals used for construction. Consultation with a NACE certified corrosion professional is recommended for buried metals on the site.

Mapping by the NRCS includes qualitative severity of corrosion to concrete and steel. Based on this source, the near-surface materials are rated "Moderate" for corrosion to concrete and "Moderate" for corrosion of steel.

Geotechnical Overview

The subject site has geotechnical considerations that will affect the construction and performance of the proposed improvements that are discussed in this report. The primary geotechnical considerations that have been identified at the subject site that will affect development of the site are the following:

- Expansive Soils
- Soft subgrade potential
- Consolidation settlement
- Liquefaction settlement

Expansive Soils

Expansive soils are present on this site. This report provides recommendations to help mitigate the effects of soil shrinkage and expansion. However, even if these procedures are followed, some movement and (at least minor) cracking in the structures should be anticipated. The severity of cracking and other damage such as uneven slabs will probably increase if modification of the site results in excessive wetting or drying of the expansive soils. Eliminating the risk of movement and distress may not be feasible, but it may be possible to further reduce the risk of movement if significantly more expensive measures are used during construction. Some of these options are discussed in this report.

The near surface native soils predominantly consist of stiff to very stiff moderate to high plasticity clay with variable amounts of sand and could become unstable with typical earthwork and construction traffic, especially after precipitation events. The effective drainage should be completed early in the construction sequence and maintained after construction to avoid potential issues. If possible, the grading should be performed during the warmer and drier times of the year. If grading is performed during the winter months or periods of normally high precipitation, an increased risk for possible undercutting and replacement of unstable subgrade will persist. Additional site preparation recommendations, including subgrade improvement and fill placement, are provided in the **Earthwork** section.

The native clay soils encountered in our borings/CPTs exhibit the potential for shrink-swell movements with changes in moisture content from seasonal or manmade conditions. Additional areas of localized moderately to highly plastic clays are likely present where borings/CPTs were not performed. In order to help mitigate the effects of moderate to high volume change clay, we recommend building floors slabs and exterior hardscapes be underlain by chemically treated soil or granular structural fill. If building floors will consist of structural floors spanning between foundation systems, floor slabs could be underlain by minimum 3-inch-thick void forms as an alternative to chemically treated soil or granular structural fill to help mitigate the effects of uplift pressures from the moderate to high volume change clays.

We anticipate the proposed improvements will be supported by **Deep Foundations, or Shallow Foundations support**ed by subgrade soils mitigated with **Ground Improvement.**

Soft Subgrade Potential

Lean and fat clay with variable amounts of sand were noted near the surface in our soil borings. These soils may become unstable when disturbed. During periods of dry weather, these soils may be stable upon initial exposure, however, these soils could become relatively soft and unstable under construction traffic. Furthermore, depending upon site conditions during construction, over-excavation or stabilization of the subgrade and/or base of over-excavations may be needed to achieve a suitable working surface. Accordingly, we recommend that the owner budget for the possibility that over-excavation and/or stabilization may be required, and contractors be prepared to handle potentially unstable and/or soft conditions. Stabilization may consist of aerating/drying the soil, a composite section of aggregate base and geogrid, or chemical stabilization using high calcium quick lime or Portland cement.

Consolidation Settlement

The site is underlain by moderately to highly compressible clay. CPT data obtained from the previous October 2020 investigation and recent 2022 investigation in the Water Tank area indicates the clay layers are generally over-consolidated. However, new fill placed across the site may cause consolidation settlement of the underlying moderately compressible clay deposits.

Preliminary site grading plans indicate that excavation and cuts below existing grade of approximately 1 foot to 8 feet (for the building base isolation pits) and fills of up to approximately 1 foot to 4 feet may be required to achieve final grades. Preliminary earthwork quantities are estimated to export approximately 90,000 cubic yards of soils from the site.

Placement of the fill will trigger consolidation settlement of the clay soils. A settlement analysis was previously performed to estimate the anticipated settlement generated under the weight of the fill. The analysis was performed using the results of laboratory testing, CPT data, and our experience. We estimate that approximately 1 to 3 inches of total consolidation settlement should be anticipated due to the current proposed fill thicknesses. The final project grading plan, once developed, should be provided to Terracon for review to help confirm the estimated consolidation settlement that may be anticipated due to proposed fill placement. We recommend any fill placement to occur early in the construction process or well in advance of mobilizing for other construction to allow for consolidation settlement from the fill to complete prior to foundation construction.

In order to mitigate the effects of total and differential settlements on the proposed improvements from structural loads and liquefaction, the improvements could be supported by **Shallow Foundations support**ed on subgrade mitigated by **Ground Improvement** methods, or by **Deep Foundations** provided settlement due to fill placement is complete prior to foundation construction. Deep foundation elements would need to be designed with consideration of negative side friction if installation is taking place while consolidation settlement is on-going.

In areas not improved by **Ground Improvement** methods, the anticipated differential movement should be considered when planning development. Special design details and long-term maintenance should be considered for underground utility lines; site development such as hardscape, entrances, and pavements adjacent to structures supported by **Deep Foundations** or **Ground Improvement**; and site drainage.

Liquefaction Settlement

The primary seismic hazards for the site are the potential for strong to very strong earthquake shaking within the lifetime of the improvements, and the potential for liquefaction at the site. Seismically induced settlements of up to ¼ to 2 inches should be expected in the event of liquefaction during the design earthquake. However, potentially liquefiable soils are not continuous or of uniform thickness across the site and ground settlements are expected to be irregular around and below the improvements. The effects of the anticipated liquefaction settlement can be mitigated by **Ground Improvement**, or the use of **Deep Foundations**.

The **General Comments** section provides an understanding of the report limitations.

Earthwork

We anticipate grading for this project will consist of excavations and cuts below existing grade of approximately 1 foot to 8 feet (for the building base isolation pits) and fills of up to approximately 1 foot to 4 feet to achieve final grades. Final site grading information was unavailable at the time this report was prepared. If elevation and site grading differ from our stated assumptions, Terracon should be contacted to determine if additional earthwork recommendations are warranted, particularly with regard to potential ground settlement.

Earthwork is anticipated to include clearing and grubbing, excavations, and engineered fill placement. The following sections provide recommendations for use in the preparation of specifications for the work. Recommendations include critical quality criteria, as necessary, to render the site in the state considered in our geotechnical engineering evaluation for foundations, floor slabs, and pavements.

Site Preparation

As previously indicated, the project site is currently undeveloped. Prior to placing fill, any debris, existing vegetation, topsoil, and root mats should be removed from the site. Complete stripping of the topsoil should be performed in the proposed building and parking/driveway areas. Stripping and removals should extend laterally a minimum of 5 feet beyond the perimeters of shallow foundations, equipment slabs, exterior concrete flatwork, and other facilities supported at grade; and 3 feet beyond the limits of pavements.

Although no evidence of pre-existing fill or underground facilities (such as septic tanks, cesspools, basements, and utilities) was observed during the exploration and site reconnaissance, such features could be encountered during construction. If unexpected pre-existing fills or underground facilities are encountered, such features should be removed, and the excavation thoroughly cleaned prior to backfill placement and/or construction.

Subgrade Preparation

After clearing, any required cuts and excavations should be made. The presence of a high volume of organic material may warrant additional cuts or over-excavation at the time of grading operations.

Excavated material may be stockpiled for use as fill provided it is cleaned of organic material, debris, and any other deleterious material and meets the criteria for general or structural fill specified in the ***Fill Material Types*** section of this report.

Once cuts and any required excavation operations are complete, the resulting subgrade should be proof-rolled with an adequately loaded vehicle such as a fully loaded tandem axle dump truck. The proof-rolling should be performed under the direction of the Geotechnical Engineer. Areas excessively deflecting under the proof-roll should be delineated and subsequently addressed by the Geotechnical Engineer. Such areas should either be removed or modified by stabilizing as noted in the ***Soil Stabilization*** section. Excessively wet or dry material should either be removed, or moisture conditioned and recompacted.

Once proof rolling has been performed, all exposed areas which will receive fill, once properly cleared, should be scarified, moisture conditioned where necessary, and compacted per the compaction requirements in this report. The depth of scarification of subgrade soils and moisture conditioning of the subgrade is highly dependent upon the time of year of construction and the site conditions that exist immediately prior to construction. If construction occurs during the winter or spring, when the subgrade soils are typically already in a moist condition, scarification and compaction may only be 12 inches. If construction occurs during the summer or fall when the subgrade soils have been allowed to dry out deeper, the depth of scarification and moisture conditioning may be as much as 18 inches. Due to groundwater being encountered as shallow as 2 feet bgs in CPTs performed, the subgrade soil may be in an elevated moisture condition and may require some drying to achieve the required compaction. A representative from Terracon should be present during earthwork to observe the exposed subgrade and confirm the depth of scarification and moisture conditioning required.

Following scarification, moisture conditioning, and compaction of the subgrade soils, any required fill should then be placed to the proposed design grade. Due to the moderate to high plasticity soils present across the site, the near surface soils at finished grades could be chemically treated to create a stable working surface during construction, especially during the rainy season. The moisture content and compaction of subgrade soils, and especially lime treated soil sections, should be maintained until foundation, slab, and pavement construction.

Based upon the subsurface conditions determined from the geotechnical exploration, subgrade soils exposed during construction are anticipated to be relatively workable; however, the workability of the subgrade may be affected by precipitation, repetitive construction traffic or other factors. If unworkable conditions develop, workability may be improved by scarifying and drying.

Soil Stabilization

Methods of subgrade improvement, as described in this section, could include scarification, moisture conditioning and recompaction, removal of unstable materials and replacement with granular fill (with or without geosynthetics), and chemical stabilization. The appropriate method of improvement, if required, would be dependent on factors such as schedule, weather, the size of the area to be stabilized, and the nature of the instability. More detailed recommendations can be provided during construction as the need for subgrade stabilization occurs. Performing site grading operations during warm seasons and dry periods would help to reduce the amount of subgrade stabilization required.

If the exposed subgrade is unstable during proof rolling operations, it could be stabilized using one of the following methods:

- **Scarification and Recompaction** – It may be feasible to scarify, dry, and recompact the exposed soils. The success of this procedure would depend primarily upon favorable weather and sufficient time to dry the soils. Stable subgrades likely would not be achievable if the thickness of the unstable soil is greater than about 1 foot, if the unstable soil is at or near groundwater levels, or if construction is performed during a period of wet or cool weather when drying is difficult.

- **Aggregate Base** – The use of Caltrans Class II aggregate base is the most common procedure to improve subgrade stability. Typical undercut depths would be expected to range from about 6 to 18 inches below finished subgrade elevation. The use of high modulus geosynthetics (i.e., engineering fabric or geogrid) could also be considered after underground work such as utility construction is completed. Prior to placing the fabric or geogrid, we recommend that all below-grade construction, such as utility line installation, be completed to avoid damaging the fabric or geogrid. Equipment should not be operated above the fabric or geogrid until one full lift of aggregate base is placed above it. The maximum particle size of granular material placed over geotextile fabric or geogrid should meet the manufacturer’s specifications.

- **Chemical Stabilization** – Improvement of subgrades with Portland cement or quicklime could be considered for improving unstable soils. Chemical stabilization should be performed by a pre-qualified contractor having experience with successfully stabilizing subgrades in the project area on similar sized projects with similar conditions. The hazard of chemicals blowing across the site or onto adjacent properties should also be considered. Additional testing would be needed to develop specific recommendations to improve subgrade stability by blending chemicals with the site soils. Additional testing could include, but not be limited to, determining the most suitable stabilizing agent, the optimum amounts required, and the presence of sulfates in the soil. If this method is chosen to stabilize subgrade soils the actual amount of high calcium quicklime/Portland cement to be used should be determined by Terracon and by laboratory testing **at least three weeks prior** to the start of grading operations.

Further evaluation of the need and recommendations for subgrade stabilization can be provided during construction as the geotechnical conditions are exposed.

Fill Material Types

Fill required to achieve design grade should be classified as structural fill and general fill. Structural fill is material used below, or within 5 feet of structures or within 3 feet of pavements. General fill is material used to achieve grade outside of these areas.

Reuse of On-Site Soil: Excavated on-site soil may be selectively reused as fill below pavement and landscaping areas. Portions of the on-site soil have an elevated fines content and will be sensitive to moisture conditions (particularly during seasonally wet periods) and may not be suitable for reuse when above optimum moisture content.

Material property requirements for on-site soil for use as general fill and structural fill are noted in the following table:

Property	General Fill	Structural Fill
Composition	Free of deleterious material	Free of deleterious material
Maximum particle size	6 inches (or 2/3 of the lift thickness)	3 inches
Fines content	Not limited	Less than 40% Passing No. 200 sieve
Plasticity	Not limited	Maximum liquid limit of 30 Maximum plasticity index of 10

Property	General Fill	Structural Fill
GeoModel Layer Expected to be Suitable[1]	1, 2, 3, 4	3

1. Based on subsurface exploration. Actual material suitability should be determined in the field at time of construction.

Imported Fill Materials: Imported fill materials should meet the following material property requirements. Regardless of its source, compacted fill should consist of approved materials that are free of organic matter and debris. For all import material, the contractor shall submit current verified reports from a recognized analytical laboratory indicating that the import has a "not applicable" (Class S0) potential for sulfate attack based upon current ACI criteria and is "mildly corrosive" to ferrous metal and copper. The reports shall be accompanied by a written statement from the contractor that the laboratory test results are representative of all import material that will be brought to the project.

Soil Type [1]	USCS Classification	Acceptable Parameters (for Structural Fill)
Low Plasticity Cohesive	CL	Liquid Limit less than 30 Plasticity index less than 10
Granular[2]	GW, GM, SW, SM	Less than 50% passing No. 200 sieve

1. Structural and general fill should consist of approved materials free of organic matter and debris and should contain no material larger than 3 inches and 6 inches in greatest dimension, respectively. A sample of each material type should be submitted to the Geotechnical Engineer for evaluation at least two weeks prior to use on this site.
2. Caltrans Class II aggregate base may be used for this material. Recycled aggregate base should not be used without prior approval by the Geotechnical Engineer.

Fill Placement and Compaction Requirements

Compacted native soil and structural and general fill should meet the following compaction requirements.

Item	Structural Fill	General Fill
Maximum Lift Thickness	8 inches or less in loose thickness when heavy, self-propelled compaction equipment is used 4 to 6 inches in loose thickness when hand-guided equipment (i.e. jumping jack or plate compactor) is used	Same as structural fill
Minimum Compaction Requirements [1,2]	95% of max. for structural fill below foundations and slabs, within 1 foot of finished pavement subgrade, for aggregate base and chemically treated soil, and for fills thicker than 5 feet 90% of max. for all other locations	90% of max.
Water Content Range [1]	Low plasticity cohesive: +1% to +3% above optimum Medium plasticity cohesive: +2% to +4% above optimum High plasticity cohesive: +3% to +5% above optimum Granular: -2% to +2% of optimum	As required to achieve min. compaction requirements

1. Maximum density and optimum water content as determined by the Modified Proctor test (ASTM D 1557).
2. If the granular material is a coarse sand or gravel, or of a uniform size, or has a low fines content, compaction comparison to relative density may be more appropriate. In this case, granular materials should be compacted to at least 70% relative density (ASTM D 4253 and D 4254). Materials not amenable to density testing should be placed and compacted to a stable condition observed full time by the Geotechnical Engineer or representative.

Utility Trench Backfill

Any soft or unsuitable materials encountered at the bottom of utility trench excavations should be removed and replaced with structural fill or bedding material in accordance with public works specifications for the utility be supported. This recommendation is particularly applicable to utility work requiring grade control and/or in areas where subsequent grade raising could cause settlement in the subgrade supporting the utility. Trench excavation should not be conducted below a downward 1:1 projection from existing foundations without engineering review of shoring requirements and geotechnical observation during construction.

Due to the anticipated settlements associated with fill placement and liquefaction, it is recommended utilities and piping in areas not mitigated with **Ground Improvement** be designed with flexible connections and/or other means to accommodate soil movement to preclude damage due to excessive settlement from liquefaction and/or consolidation between areas mitigated and not mitigated with **Ground Improvement** or between non-mitigated areas and structures supported by **Deep Foundations**. Utility and drain lines designed for gravity flow should consider steeper gradients to account for these settlements, especially where such lines intersect improvements supported over soil mitigated by **Ground Improvement**, or on **Deep Foundations**.

On-site materials are considered suitable for backfill of utility and pipe trenches from 1 foot above the top of the pipe to the final ground surface, provided the material is free of organic matter and deleterious substances. Where trenches are placed beneath slabs or foundations, the backfill should satisfy the gradation and Atterberg limit requirements of structural engineered fill discussed in this report.

Trench backfills should be mechanically placed and compacted as discussed earlier in this report. Compaction of initial lifts should be accomplished with hand-operated tampers or other lightweight compactors. Flooding or jetting for placement and compaction of backfill is not recommended.

All trench excavations should be made with sufficient working space to permit construction including backfill placement and compaction. If utility trenches are backfilled with relatively clean granular material, they should be capped with at least 18 inches of cementitious flowable fill or cohesive fill in non-pavement areas to reduce the infiltration and conveyance of surface water through the trench backfill. Attempts should also be made to limit the amount of fines migration into the clean granular material. Fines migration into clean granular fill may result in unanticipated localized settlements over a period of time. To help limit the amount of fines migration, Terracon recommends the use of a geotextile fabric that is designed to prevent fines migration in areas of contact between clean granular material and fine-grained soils. Terracon also recommends that clean granular fill be tracked or tamped in place where possible in order to limit the amount of future densification which may cause localized settlements over time.

For low permeability subgrades, utility trenches are a common source of water infiltration and migration. Utility trenches penetrating beneath improvements should be effectively sealed to restrict water intrusion and flow through the trenches, which could migrate below the improvements. The trench should provide an effective trench plug that extends at least 5 feet from the face of improvement exteriors. The plug material should consist of cementitious flowable fill or low permeability clay. The trench plug material should be placed to surround the utility line. If used, the clay trench plug material should be placed and compacted to comply with the water content and compaction recommendations for structural fill stated previously in this report.

If chemical treatment of subgrade soils occurs before utility construction, Controlled Low Strength Material (CLSM) or sand/cement slurry should be used as backfill material to cap utility trenches in all areas where trenches have cut through the treated subgrade. The thickness of the CLSM or slurry should be at least the thickness or depth of chemically treated subgrade. Below that depth, imported structural fill or moisture conditioned native clay may be used for backfill. Such areas trenched through chemically treated soil should not be backfilled with aggregate base, native soil, or disturbed chemically treated soil.

Post construction trenching through geogrid may be accomplished with conventional trenching equipment. Repairs to the trenched section shall be accomplished using a full structural replacement of the displaced materials or with a repaired section that is identical to the original section. If the trench section is repaired to match the original, the trench backfill must be compacted to the same or higher density and the geogrid must be over-lapped a minimum 3-inches at the proper geogrid elevation.

Grading and Drainage

All grades must provide effective drainage away from the improvements during and after construction and should be maintained throughout the life of the structures. Water retained next to the structures can result in soil movements greater than those discussed in this report. Greater movements can result in unacceptable differential floor slab and/or foundation movements, cracked slabs and walls, and roof leaks. Roofs should have gutters/drains with downspouts that discharge onto splash blocks a distance of at least 10 feet from the building, onto pavements, or are tied to tight lines that discharge into a storm drain system.

Exposed ground should be sloped and maintained at a minimum 5 percent away from the improvements for at least 10 feet beyond the perimeter of the foundations. If a minimum 5 percent slope cannot be achieved due to site grades, a minimum 2½ percent slope could be used provided pavement or hardscape surrounds and extends to the improvements or a subdrain could be installed around the perimeter of the foundations that carries water away from the improvements. Locally, flatter grades may be necessary to transition ADA access requirements for flatwork. After building construction and landscaping have been completed, final grades should be verified to document effective drainage has been achieved. Grades around the structure should also be periodically inspected and adjusted, as necessary, as part of the structures' maintenance program. Where paving or flatwork abuts the structure, a maintenance program should be established to effectively seal and maintain joints and prevent surface water infiltration.

Planters and bio-swales located within 10 feet of structures should be self-contained or lined with an impermeable membrane to prevent water from accessing subgrade soils below the structures. Sprinkler mains and spray heads should be located a minimum of 5 feet away from the foundation lines.

Trees or other vegetation whose root systems have the ability to remove excessive moisture from the subgrade and foundation soils should not be planted next to the structures. No vegetation over six feet in height shall be planted within 20 feet of the improvement perimeters unless a root barrier is provided between the structure and tree to limit roots within 10 feet of the structure. Roots can draw additional moisture from the soils and cause excessive volume changes in the soil resulting in movement of the improvements.

Implementation of adequate drainage for this project can affect the surrounding developments. Consequently, in addition to designing and constructing drainage for this project, the effects of site drainage should be taken into consideration for the planned structures on this property, the undeveloped portions of this property, and surrounding sites. Extra care should be taken to ensure irrigation and drainage from adjacent areas do not drain onto the project site or saturate the construction area.

Earthwork Construction Considerations

Shallow excavations for the proposed structures are anticipated to be accomplished with conventional construction equipment. Upon completion of filling and grading, care should be taken to maintain the subgrade water content prior to construction of grade supported improvements such as foundations, floor slabs, and pavements. Construction traffic over the completed subgrades should be avoided to the extent practical. The site should also be graded to prevent ponding of surface water on the prepared subgrades or in excavations. Water collecting over or adjacent to construction areas should be removed. If the subgrade desiccates, saturates, or is disturbed, the affected material should be removed, or the materials should be scarified, moisture conditioned, and recompacted prior to construction.

Groundwater was encountered as shallow as 2 feet bgs in CPTs performed. The groundwater table could affect over-excavation efforts, especially for over-excavation and replacement of lower strength soils. A temporary dewatering system consisting of sumps with pumps could be necessary to achieve the recommended depth of over-excavation. **Dewatering should be considered and planned for in proposed excavations if the excavations will extend near the groundwater levels encountered during our field exploration. The depth of dewatering below the bottom of excavations should be determined by the contractor and/or designer.** Pump tests for dewatering were not included in the scope of work for this report. However, Terracon can perform pump tests for an additional fee, if desired.

We recommend that the earthwork portion of this project be completed during extended periods of dry weather if possible. If earthwork is completed during the wet season (typically November through April) it may be necessary to take extra precautionary measures to protect subgrade soils. Wet season earthwork operations may require additional mitigation measures beyond that which would be expected during the drier summer and fall months. This could include ground stabilization utilizing chemical treatment of the subgrade, diversion of surface runoff around exposed soils, and draining of ponded water on the site. Once subgrades are established, it may be necessary to protect the exposed subgrade soils from construction traffic.

As a minimum, excavations should be performed in accordance with OSHA 29 CFR, Part 1926, Subpart P, "Excavations" and its appendices, and in accordance with any applicable local, and/or state regulations. Stockpiles of soil, construction materials, and construction equipment should not be placed near trenches or excavations. ***The Contractor is responsible for maintaining the stability of adjacent structures during construction.***

Construction site safety is the sole responsibility of the contractor who controls the means, methods, and sequencing of construction operations. Under no circumstances shall the information provided herein be interpreted to mean Terracon is assuming responsibility for construction site safety, or the contractor's activities; such responsibility shall neither be implied nor inferred.

Excavations or other activities resulting in ground disturbance have the potential to affect adjoining properties and structures. Our scope of services does not include review of available final grading information or consider potential temporary grading performed by the contractor for potential effects such as ground movement beyond the project limits. A preconstruction/ precondition survey should be conducted to document nearby property/infrastructure prior to any site development activity. Excavation or ground disturbance activities adjacent or near property lines should be monitored or instrumented for potential ground movements that could negatively affect adjoining property and/or structures.

Construction Observation and Testing

The earthwork efforts should be observed by the Geotechnical Engineer (or others under their direction). Observation should include documentation of adequate removal of surficial materials (vegetation, topsoil, and debris), as well as proofrolling and mitigation of unsuitable areas delineated by the proofroll.

Each lift of compacted fill should be tested, evaluated, and reworked, as necessary, until approved by the Geotechnical Engineer prior to placement of additional lifts. Each lift of fill should be tested for density and water content at a frequency of at least one test for every 2,500 square feet of compacted fill in the building, substation, and water tanks areas and 5,000 square feet in pavement areas. Where not specified by local ordinance, one density and water content test should be performed for every 50 linear feet of compacted utility trench backfill and a minimum of one test performed for every 12 vertical inches of compacted backfill.

In areas of foundation excavations, the bearing subgrade should be evaluated by the Geotechnical Engineer. If unanticipated conditions are encountered, the Geotechnical Engineer should prescribe mitigation options.

In addition to the documentation of the essential parameters necessary for construction, the continuation of the Geotechnical Engineer into the construction phase of the project provides the continuity to maintain the Geotechnical Engineer's evaluation of subsurface conditions, including assessing variations and associated design changes.

Foundations

We understand site grades may be elevated up to 1 foot to 4 feet in the area of the data center buildings and water tank and up to 3 feet in the area of the substation to accommodate development and raise the site grades above the design flood risk elevation. The placement of the fill will trigger consolidation settlement of the subgrade soils up to an estimated 1 inch to 3 inches. The foundation recommendations presented in this report have assumed fill placement will occur early in the construction process to allow for consolidation settlement from the fill to complete prior to foundation construction, and that the settlement period would be monitored.

In order to mitigate the effects of total and differential settlements on the proposed improvements from structural loads and liquefaction, we have provided the following two options for foundation support for the proposed improvements.

Option 1 – Shallow Foundations over Ground Improvement:

The lightly loaded improvements, such as the substation and other equipment pads, may be supported by **Shallow Foundations provide**d **Ground Improvement** is performed to mitigate the anticipated settlement from **Liquefaction** and structural loads. For this option, **Ground Improvement** should be performed to stiffen the upper compressible clay layers and help mitigate the potential liquefaction of the underlying sands. All footings should extend at least 24 inches below lowest adjacent grade. Floor slabs should be underlain by minimum 18 inches of chemically treated material or granular structural fill to help mitigate the effects of moderate to high volume change clays.

Option 2 – Deep Foundations:

If Ground Improvement will not be performed, the proposed improvements should be supported by **Deep Foundations** to help protect the improvements against the estimated total and differential settlements due to structural loads and **Liquefaction**. The **Deep Foundations** may consist of auger cast piles (ACP) or driven piles and should extend through the potentially liquefiable sand layers and derive their support from the subgrade soils below a depth of 60 feet below the existing ground surface (bgs). For this option, **Deep Foundations** will be required to account for a drag load imposed on the foundation from settlement due to liquefaction and building floor slabs should be designed as structural slabs that span between foundation elements and rely on the foundations for support. Deep foundation systems are currently being planned to support the main Data Center Structures and water tanks and may also be appropriate for other ancillary structures and equipment pads.

Ground Improvement

Ground improvement may be utilized to help mitigate the anticipated excessive settlement due to structural loads and the potential liquefaction of the underlying sand layers. As a cost-effective alternative to supporting improvements on **Deep Foundations**, the improvements could be supported on lower strength/lower density native soils if ground improvement methods are utilized. Ground improvement methods, such as aggregate piers and drilled displacement columns (DDC), are proprietary systems designed by licensed contractors who could provide further information regarding support options. Considering the various methods available for ground improvement, it is our opinion aggregate piers or drilled displacement columns (DDCs) would be suitable options for ground improvement at this site. Aggregate piers are often one of the most cost-effective methods for ground improvement and the spoils generated from installing aggregate piers would provide the added benefit of producing material that could be used as fill in raising portions of the site outside of the developed building area to design elevations. The installation of open graded aggregate piers prior to fill placement on the building site could also help reduce the time for consolidation settlement to occur due to fill placement. DDCs would help increase the bearing capacity of the subgrade soils while reducing settlement and help mitigate potential liquefaction settlement below the improvements by transferring loads to deeper, more competent soils and improving the soil around the DDCs. However, if the Contractor or Structural Engineer have worked with a different ground improvement method that has proven successful to mitigate the hazards present at this site with similar subgrade soil conditions, Terracon could consider such options if desired.

Aggregate Piers

As a way to mitigate excessive settlement below the proposed improvements due to structural loads and potential liquefaction, the subgrade soils could be improved with aggregate piers installed on a grid pattern. This option would allow for the use of **Shallow Foundations** over the aggregate pier-reinforced subgrade. Aggregate pier systems are typically installed after clearing and grubbing and could be installed prior to or after fill construction. If aggregate piers are installed prior to fill construction, spoils generated from the pier installation could be used as fill material across the site. The aggregate pier system will serve to stiffen the compressible clay and may also serve as gravel conduits for the dissipation of pore-water pressure depending on the aggregate grading, thereby shortening the time required for consolidation settlements. Aggregate piers can be used to densify the potentially liquefiable cohesionless soils.

Aggregate piers are typically constructed by advancing a drill or mandrel to design depths, then building a bottom bulb of clean, open-graded stone. The pier is built on top of the bottom bulb, using graded aggregate placed in thin lifts (12 to 24 inches compacted thickness). We anticipate the aggregate piers would need to extend to depths varying from 25 to 35 feet below the existing ground surface at the site depending on the soil layers targeted for improvement. The result is a reinforced zone of soils directly under the foundations, which allows for the design and construction of foundations for relatively higher bearing pressures and with lower anticipated settlements. Aggregate piers can also be installed where differential movement is a concern between underground utility lines; site development such as hardscape, entrances, and pavements adjacent to structures supported by **Ground Improvement** or **Deep Foundations**; and site drainage.

We anticipate foundations supported over aggregate piers installed following fill placement may be designed using an allowable bearing pressure of 2,500 to 3,000 pound per square foot (psf) for dead plus live loads. However, the final design allowable bearing pressure should be confirmed by the design-build contractor installing the aggregate piers and coordinated with the structural engineer. If aggregate piers are installed prior to fill placement, the allowable bearing pressure provided in the **Shallow Foundations** section of this report should be used and should be accounted for in the design of the aggregate pier system. The aggregate pier ground improvement system for this project should meet the following design criteria:

- Bearing Capacity Factor of Safety = 2.0
- Global Stability (static) = 1.3
- Global Stability (dynamic) = 1.1
- Post-construction Settlement:
  - < ½-inch if piers will be installed prior to fill placement
  - <1 inch if piers will be installed after fill placement
- Post-construction Differential Settlement:
  - < ¼ inch / 40 feet if piers will be installed prior to fill placement
  - < ½ inch / 40 feet if piers will be installed after fill placement

Aggregate pier systems should be designed and constructed by a specialty ground improvement contractor. At least one load test should be performed in the footprint of each improvement to confirm the aggregate pier design capacity prior to full production of aggregate piers. Since this would be specialty work, we recommend consideration of using a design-build process if this alternative is selected. A design and installation package including a quality control plan for aggregate pier installation should be prepared by the design-build contractor license in the State of California and submitted to Terracon for review and approval prior to construction. The package should also include information regarding load testing such as proposed test location, set-up, and testing parameters. Terracon should be present on-site during load test and production to observe installation and testing of the aggregate piers.

Drilled Displacement Columns

DDCs would help increase the bearing capacity of the subgrade soils while reducing settlement and help mitigate potential liquefaction settlement below the improvements by transferring their loads to deeper, more competent soils and improving the soil around the DDCs. We have assumed DDCs would be installed after fill placement and consolidation settlement due to the fill is complete. DDCs are constructed by using a displacement auger to create a soil shaft filled with Controlled Low Strength Material (CLSM) injected under pressure as the displacement auger is withdrawn. DDCs generate a minimal amount of soil cuttings compared to other foundation and ground improvement methods. The diameter of DDCs typically vary between 18 to 36 inches and based on foundation load requirements the strength of CLSM can typically vary between 100 to 500 psi at 28 days.

We anticipate foundations supported on DDCs may be designed using an allowable bearing pressure of 3,000 to 3,500 pounds per square foot (psf) for dead plus live loads. However, the final design allowable bearing pressure should be confirmed by the design-build contractor installing the DDCs and coordinated with the structural engineer. The DDC ground improvement system for this project should meet the following design criteria:

- Bearing Capacity Factor of Safety = 2.0
- Global Stability (static) = 1.3
- Global Stability (dynamic) = 1.1
- Post-construction Settlement: < 1-inch for combined static and liquefaction settlement
- Post-construction Differential Settlement:< ½ -inch / 40 feet for combined static and liquefaction settlement

DDC capacities and settlement based on anticipated loading should be evaluated by a design-build contractor. Terracon should be afforded the opportunity to review the bearing capacity and settlement evaluation.

We anticipate the DDCs would need to extend to depths of at least 40 to 50 feet bgs depending on the soil layers targeted for improvement. Minimum DDC lengths shall be confirmed by Terracon during construction. A 12 to 24-inch cushion of Caltrans Class II aggregate base should be installed between the top of the DDCs and the bottom of foundations and slabs.

Design and installation of DDCs shall be performed by a qualified design-build contractor. At least one load test should be performed in the footprint of each improvement to confirm DDC capacities prior to installing production columns. Axial compression load tests shall be performed according to ASTM D1143. Only columns meeting the load testing criteria shall be used as final production columns. A design and installation package including a quality control plan for DDC installation should be prepared by the design-build contractor and submitted to Terracon for review and approval prior to construction. The package should also include information regarding load test such as proposed test location, set-up, and testing parameters. Terracon should be present on-site during load test and production to observe installation and testing of the DDCs.

Shallow Foundations

If foundation support **Option 1** is utilized and the site has been prepared in accordance with the requirements noted in **Earthwork**, the improvements can be supported on shallow foundations**.** The following design parameters are applicable for shallow foundations and have prepared with the assumption that fill placement will occur early in the construction process to allow for consolidation settlement from the fill to complete prior to foundation construction.

Design Parameters – Compressive Loads

Item	Description
Maximum Net Allowable Bearing Pressure [1, 2]	■ 1,500 psf for footings over aggregate piers installed prior to fill placement (assumes footings will bear on 4 feet of structural fill placed over native soils mitigated with ground improvement). ■ Per ground improvement contractor design if ground improvement is installed directly below shallow foundation elements following fill placement.

Item	Description
Required Bearing Stratum [3]	■ Native soil or compacted structural fill improved by ground improvement methods ■ <u>If Ground improvement is performed prior to fill placement:</u> Compacted structural fill
Minimum Foundation Dimensions	Per CBC 1809.7
Maximum Foundation Dimensions	Columns: 15 feet Continuous: 8 feet
Passive Resistance[4, 8] (equivalent fluid pressures)	300 pcf (cohesive backfill)
Sliding Resistance [5, 8]	130 psf allowable cohesion (native/structural fill clay) 0.30 allowable coefficient of friction - granular material
Minimum Embedment below Finished Subgrade [6]	24 inches
Estimated Total Settlement from Structural Loads [2]	Less than about 1 inch (to be confirmed based on actual structural loading conditions)
Estimated Differential Settlement [2, 7]	About 1/2 of total settlement

1. The maximum net allowable bearing pressure is the pressure in excess of the minimum surrounding overburden pressure at the footing base elevation. This bearing pressure can be increased by 1/3 for transient loads unless those loads have been factored to account for transient conditions. Values assume that exterior grades are no steeper than **20% within 10** feet of structures.
2. Values provided are for maximum loads noted in **Project Description**. The settlement estimates are for static conditions and are inclusive of settlement with the ground improvement system, but do not include settlement associated with liquefaction.
3. Unsuitable or soft soils should be over-excavated and replaced per the recommendations presented in **Earthwork**.
4. Use of passive earth pressures require the sides of the excavation for the spread footing foundation to be nearly vertical and the concrete placed neat against these vertical faces or that the footing forms be removed and compacted structural fill be placed against the vertical footing face. Assumes no hydrostatic pressure.
5. Can be used to compute sliding resistance where foundations are placed on suitable soil/materials. **Frictional resistance for granular materials is dependent on the bearing pressure which may vary due to load combinations. For fine-grained materials, lateral resistance using cohesion should not exceed ½ the dead load.** Should be neglected for foundations subject to net uplift conditions.
6. Embedment necessary to minimize the effects of seasonal water content variations. **For sloping ground,** maintain depth below the lowest adjacent exterior subgrade within 5 horizontal feet of the structure.

Item	Description

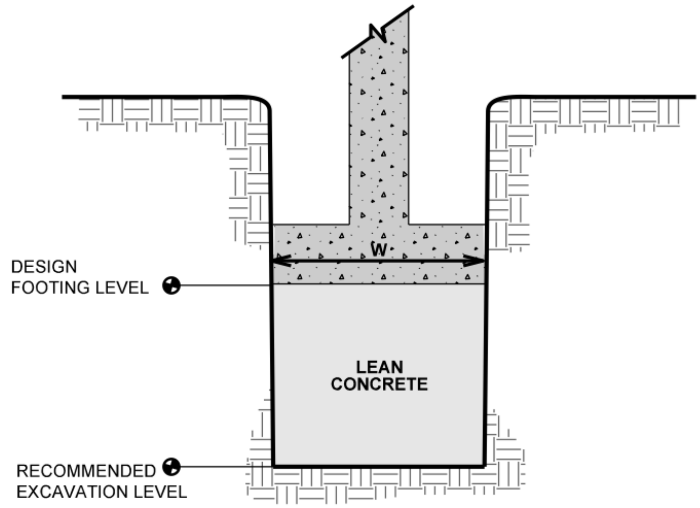
7. Differential settlements are noted for equivalent-loaded foundations and bearing elevation as measured over a span of 40 feet.
8. Passive Resistance and Sliding Resistance may be combined to resist sliding provided the Passive Resistance is reduced by 50 percent.

Foundation Construction Considerations

As noted in **Earthwork**, the footing excavations should be evaluated under the direction of the Geotechnical Engineer. The base of all foundation excavations should be free of water and loose soil, prior to placing concrete. Concrete should be placed soon after excavating to reduce bearing soil disturbance. Care should be taken to prevent wetting or drying of the bearing materials during construction. Excessively wet or dry material or any loose/disturbed material in the bottom of the footing excavations should be removed/reconditioned before foundation concrete is placed.

To ensure foundations have adequate support, special care should be taken when footings are located adjacent to trenches. The bottom of such footings should be at least 1 foot below an imaginary plane with an inclination of 1.5 horizontal to 1.0 vertical extending upward from the nearest edge of adjacent trenches.

If unsuitable bearing soils are encountered at the base of the planned footing excavation, the excavation should be extended deeper to the ground improvement elements or to suitable soils based on the support option being used, and the footings could bear directly on these soils at the lower level or on lean concrete backfill placed in the excavations. This is illustrated on the following sketch.



LEAN CONCRETE BACKFILL

NOTE: EXCAVATIONS ARE SHOWN VERTICAL; HOWEVER, THE SIDEWALLS SHOULD BE SLOPED AS NECESSARY FOR SAFETY

Deep Foundations

Terracon recently provided geotechnical consultation services during master planning and preliminary design for the project during the Entitlement Phase. In consultation with the project design team, we also issued a Technical Memorandum for Preliminary Drilled Displacement Foundation Recommendations, dated April 22, 2022, summarized as follows.

Preliminary geotechnical recommendations for drilled displacement pile foundation system design are intended for further internal discussions with the project design team during master planning and preliminary structural design. These recommendations are based on recent modifications to the project, consultation meetings with the structural and civil consultants and are supplemental to our December 16, 2020 geotechnical engineering report for the project.

Drilled Displacement Pile Design Parameters

Based on the current stage of design development and consultation with the design team, the proposed structure is recommended to be founded on augered cast-in-place or drilled displacement piles. This pile type is generally cost-effective, practical to install, appropriate for the site conditions, and has been used successfully to achieve relatively high axial compression capacities on similar projects. These types of foundation systems are typically developed through a design-build foundation sub-contractor

For conceptual and preliminary design, preliminary recommendations for the design of deep foundation system alternatives are provided herein. The design pile capacities and lengths should be determined by the Foundation Subcontractor and Geotechnical and Structural Engineers. We recommend that the deep foundation system be designed to develop axial compression pile capacities through a combination of skin friction and end bearing in the underlying dense sand and stiff clay layers below liquefiable sandy soil layers. Pile uplift capacity will be derived from skin friction only. We anticipate pile depths on the order of 75 to 80 feet below the existing ground surface will be required to achieve sufficient embedment into the dense sand and stiff lay below loose to medium dense sand layers susceptible to liquefaction, encountered at Elevations ranging from about +13 to +3 feet.

The range of pile tip elevations and driving resistances should be determined during the construction indicator pile program. Actual tip elevations and pile lengths will vary depending on the available ultimate geotechnical capacity and the consistency of the dense sand and stiff clay bearing layers.

Two design alternatives were evaluated by the project design team, both with finish floor levels at Elevation = +33 feet. Alternative 1 is a conventional fixed base design, with a building rough pad grade at Elevation +32 feet, and the bottom of the pilecaps (assumed top of pile) at Elevation +28 feet. Alternative 2 includes a base isolation pit with an excavated level of about Elevation +27 feet, and the bottoms of the pilecaps (assumed top of pile) at Elevation +23 feet. Both alternatives have a structural floor slab at the alternative elevations. Preliminary Design Parameters for a drilled displacement pile (DDP) foundation system are presented in the following table. It is our understanding that the base isolation alternative has been selected by the design team, and foundation system geometry will be developed further during the final design phase.

Based on our review of the results of the 2020 subsurface investigation program, and more recent site investigation data, we recommend a design groundwater level of Elevation +24 feet be considered for final design. It is also our understanding that a 100-year flood level of Elevation +27 feet is also being considered for final design.

DDP Axial Design Summary

Description	Recommendations
Pile Type	Drilled Displacement Pile
Pile Dimension (minimum)	18-inch diameter
Minimum Pile Embedment for Axial Design	Minimum Pile Tip Elevation -50.0 feet (Approximately 80 feet below the existing ground surface)

DDP Axial Design Summary

Description	Recommendations
Ultimate Axial Compression Capacity	500 kips
Ultimate Axial Uplift Capacity	300 kips
Total Estimated Settlement	Less than ½ inch (to be confirmed based on actual structural loading conditions)
Minimum center to center spacing to develop full skin friction	3 times the diameter of the DDP
Groups of 3 or more piles spaced closer than 3 pile diameters	Should be evaluated on a case-by-case basis by Terracon. Alternative installation sequences may be needed to allow for a minimum of 48 hours concrete curing time, before installation of adjacent piles.

1. Preliminary design capacity is dependent upon the method of installation, and quality control parameters, and should be evaluated further during final design.
2. Allowable capacities may be evaluated with a Factor of Safety of 2.0 (ASD).
3. Piles should extend at least 50 to 60 feet into the bearing stratum below the bottom of the potentially liquefiable sandy soil layer
4. Our current scope of work included extending test borings and CPTs to maximum depths ranging from about 50 to 100 feet bgs. We have assumed similar soils extend below the maximum explored depths. Deeper borings/CPTs shall be utilized for confirmation if needed.
5. Preliminary axial capacity design recommendations are applicable to either Alternative 1 or Alternative 2 pilecap elevations.

Negative skin friction, or drag loads, as a result consolidation settlement of moderately compressible clay soil layers due to proposed site grading fills should also be considered in the design of the deep foundation system. This settlement will result in additional loading on the pile foundations which should be considered, in addition to the long-term pile loads, for evaluating the structural capacity of the pile foundations. Liquefaction-induced settlements ranging from ¼ to 2 inches may also occur following a large seismic event.

<u>Terracon should be contacted to provide estimates of drag loads when structural design information and pile foundation system type and geometry is developed during final design.</u> The project Structural Engineer should confirm combined drag and design loads do not exceed the structural capacity of the pile.

Drilled Displacement Pile Lateral Loading

The lateral resistance of a foundation pile is a function of the surrounding soil strength and stiffness, size and stiffness of the pile, pile top connection, and induced moments and forces at the top of the pile. Resistance to lateral loads on piles will be provided by passive soil pressure against the pile and by the bending strength of the pile itself.

The following table lists input values for use in preliminary LPILE analyses. Modern versions of LPILE provide estimated default values of k_h and E_{50} based on strength and are recommended for the project. Since deflection or a service limit criterion will most likely control lateral capacity design, no safety/resistance factor is included with the parameters.

Stratigraphy[1]		L-Pile Soil Model	S_u (psf)[2]	ϕ[2]	γ' (pcf)[2]	ε_{50}	K (pci)	
Depth (ft)	Material						Static	Cyclic
2-4[3]	Sandy Clay	Stiff Clay w/o Free Water	2,000	---	53	Use Default Value		
4-10	Sandy Clay	Stiff Clay w/o Free Water	1,200	---	53	Use Default Value		
10–20	Poorly Graded Sand	Liquefied Sand Hybrid Model	500[5]	__	56	Use Default Value		
20-46	Sandy Lean Clay	Stiff Clay w/o Free Water	1,500	---	48	Use Default Value		
46-56	Poorly Graded Sand	Sand (Reese)	---	30°	68	Use Default Value		
56-66	Poorly Graded Sand	Sand (Reese)	---	33	68	Use Default Value		
66-90	Sandy Lean Clay	Stiff Clay w/o Free Water	3,000	---	58	Use Default Value		

1. See Subsurface Profile in **Geotechnical Characterization** for more details on Stratigraphy.
2. Definition of Terms:
   - S_u: Undrained shear strength
   - ϕ: Internal friction angle
   - γ': Effective unit weight

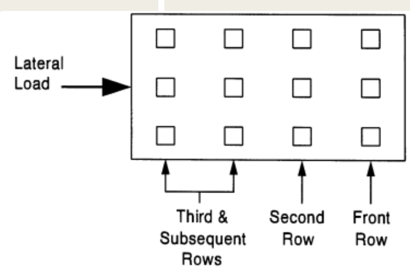
Stratigraphy[1]		L-Pile Soil Model	S_u (psf)[2]	ϕ[2]	γ' (pcf)[2]	ε_{50}	K (pci)	
Depth (ft)	Material						Static	Cyclic

3. Table assumes the top of the pile will be at Approximately Elevation +23 feet for the proposed base isolation pit excavation. Actual foundation system geometry should be evaluated further during final design. The upper 2 feet of the pile should be neglected from design.
4. Our current scope of work included extending test borings to a maximum depth of 51½ feet bgs and CPTs to a maximum depth of 100 feet bgs. We have assumed similar soils extend below the maximum explored depths.
5. Residual strength.

When piles are used in groups, the lateral capacities of the piles in the second, third, and subsequent rows of the group should be reduced as compared to the capacity of a single, independent pile. Guidance for applying p-multiplier factors to the p values in the p-y curves for each row of pile foundations within a pile group are as follows:

Center to Center Pile Spacing [1,2]	P-Multiplier, P_m [3]		
	Front Row	Second Row	Third and Subsequent Rows
3B	0.8	0.4	0.3
4B	0.9	0.65	0.5
5B	1.0	0.85	0.7
6B	1.0	1.0	1.0

1. Spacing in the direction of loading. B = pile diameter
2. For the case of a single row of piles supporting a laterally loaded grade beam, group action for lateral resistance of piles would need be considered when spacing is less than three pile diameters (measured center-to-center).
3. See adjacent figure for definition of front, second and third rows.



Spacing closer than 3D (where D is the diameter of the pile) is not recommended without additional geotechnical consultation due to potential for the installation of a new pile disturbing an adjacent installed pile likely resulting in axial capacity reduction.

The load capacities provided herein are based on the stresses induced in the supporting soil strata. The structural capacity of the piles should be checked to assure they can safely accommodate the combined stresses induced by axial and lateral forces. Lateral deflections of piles should be evaluated using an appropriate analysis method and will depend upon the pile's diameter, length, configuration, stiffness and "fixed head" or "free head" condition. We can provide additional analyses and estimates of lateral deflections for specific loading conditions upon request. The load-carrying capacity of piles may be improved by increasing the diameter and possibly the length.

Construction and Indicator and Pile Load Testing Program

Prior to construction, the design team and deep foundation sub-contractor should perform an indicator and pile load testing program for the deep foundation system selected. The indicator pile program should be designed to further define estimates of pile capacity, required embedment below potentially liquefiable sandy soil layers, and the range of pile tip elevations required across the building footprints. The indicator pile program should also evaluate the constructability of the selected deep foundation system and pile type(s) and provide guidelines for installation of the production piles.

Details for the indicator and pile load testing program should be developed when the deep foundation system geometry and structural loading conditions are more clearly defined. The pile foundation sub-contractor shall be required to provide a submittal detailing all pile design parameters, shop drawings, and details for the indicator pile installation and testing programs. The pile foundation subcontractor should consider the potential for variation in subsurface conditions across the site, and the constructability of the pile foundation type to determine the appropriate number of indicator piles required. Indicator piles may be installed at building column and production pile locations and should be installed using the same equipment and methods that will be used for the production piles. Sacrificial indicator piles can also be considered but should be located a minimum of 8 feet from production pile locations. We recommend that at a minimum, the indicator pile program consist of about 2 percent of the total number of production piles, with a minimum of 10 indicator piles, per structure.

Depending on the foundation system selected during final design, the indicator piles could be tested with high-strain dynamic testing methods using a drop hammer/weight and dynamic measurements in general conformance with ASTM D4945-08: High-Strain Dynamic Testing of Deep Foundations. The indicator piles should be instrumented with strain and acceleration transducers using a Pile Driving Analyzer (PDA). The ultimate capacity of each indicator pile should be evaluated in the field using the Case Method, and additional calculations using the Case Pile Wave Analysis Program (CAPWAP), which further estimates the soil resistance and capacity distribution.

Static load testing should also be considered in conjunction with the indicator pile dynamic testing program. We recommend that a minimum of one axial compression and one tension (uplift) load test be performed on select indicator piles, to correlate with the dynamic test results. Based on the type of deep foundation system selected, additional static load testing may be required. Static load testing should be performed in general conformance with ASTM Standard D1143 and D3689 for compression and tension, respectively.

Continuing consultation with the design team will evaluate alternatives and modifications to these preliminary geotechnical recommendations during final design.

Floor Slabs

Design parameters for floor slabs assume the requirements for **Earthwork** have been followed. Specific attention should be given to positive drainage away from the structures and positive drainage of the floor slab support course beneath the floor slabs.

The subgrade soils are comprised of moderate to high plasticity clays exhibiting the potential to shrink/swell with variations in water content. Construction of floor slabs, combined with revising site drainage creates the potential for gradual increased water contents within the clays. Increases in water content will cause the clays to swell and damage the floor slabs. Special measures should be taken to protect the floor slabs from the swelling pressures of the surficial clays.

If foundation **Option 1** is selected and the improvements are supported by **Shallow Foundations** over soils mitigated by **Ground Improvement**, floor slabs deriving support from compacted subgrade soils should be underlain by at least 18 inches of chemically treated soil or 24 inches of granular structural fill (excluding the floor slab support course).

Chemical treatment involves treating the subgrade soils with a certain percentage of high calcium quicklime, usually 3.5 to 5.5 percent based on the dry unit weight of the soil, for a depth of 18 inches. For estimating purposes, we recommend using 4.5 percent lime, and a soil unit weight of 110 pounds per cubic foot. For an 18-inch treatment depth, this results in an estimated minimum spread rate of 7.4 pounds per square foot lime. <u>The actual amount of lime to be used should be determined by Terracon and by laboratory testing **at least three weeks prior** to the start of grading operations</u>. Chemical treatment is performed after rough grading is completed. This procedure reduces the swell potential of the surface soils and creates a stable working platform on which construction can proceed. <u>All chemical treatment operations should be observed by a representative of the project Geotechnical Engineer.</u>

Due to the potential for significant moisture fluctuations of subgrade material beneath floor slabs supported at-grade, the Geotechnical Engineer should evaluate the material within 18 inches of the bottom of the granular structural fill or chemically treated zone immediately prior to placement of additional fill or floor slabs. In chemically treated areas, this can be accomplished by having the grading contractor excavate several test pits within the proposed construction areas prior to the start of grading operations to determine the moisture condition of the subgrade soils. A representative of the Geotechnical Engineer should be present during the excavation of these test pits and samples of the subgrade soils should be obtained for moisture content testing. Soils below the specified water contents within this zone should be moisture conditioned or replaced with structural fill as stated in our **Earthwork** section.

If foundation **Option 2** is selected and the improvements are supported by **Deep Foundations**, building floor slabs should be designed as structural slabs that span between foundation elements and rely on the foundations for support. Such structural floor slabs could be underlain by minimum 3-inch-thick voids forms as an alternative to chemically treated soils or granular structural fill to help mitigate the effects of uplift pressures from the moderate to high volume change clays on the floor slabs.

Floor Slab Design Parameters

Item	Description
Floor Slab Support[1]	Minimum 6 inches of Caltrans Class 2 aggregate base[3] overlying a minimum 24 inches granular structural fill or 18 inches chemically treated material. The subgrade should be compacted to the recommendations in **Earthwork**.
Estimated Modulus of Subgrade Reaction [2]	120 pounds per square inch per inch (psi/in) for point loads

1. Floor slabs should be structurally independent of footings or walls to reduce the possibility of floor slab cracking caused by differential movements between the slab and foundation.
2. Modulus of subgrade reaction is an estimated value based upon our experience with the subgrade condition, the requirements noted in **Earthwork**, and the floor slab support as noted in this table. It is provided for point loads. For large area loads the modulus of subgrade reaction would be lower.
3. The Caltrans Class 2 aggregate base may be omitted if granular structural fill consists of Class 2 aggregate base.

It is common to reduce the k-value to account for dimensional effects of large, loaded areas. For such features, the value of K_c in the formula below is the corrected or design modulus value in units of psi/in, k is the table value above, and b is the mat width (short dimension) or tributary loaded area measured in units of feet. Soft or unstable subgrade will be remediated by scarifying and re-compacting or by over-excavation and replacement.

This can be estimated as:

$$K_c = k(\frac{1}{b})$$

Terracon can provide refined estimates of K_c if provided more detailed information regarding the loads and application area to conduct settlement analysis.

Saw-cut contraction joints should be placed in the slab to help control the location and extent of cracking. For additional recommendations, refer to the ACI Design Manual. Joints or cracks should be sealed with a waterproof, non-extruding compressible compound specifically recommended for heavy duty concrete pavement and wet environments.

Where floor slabs are tied to perimeter walls or turn-down slabs to meet structural or other construction objectives, our experience indicates differential movement between the walls and slabs will likely be observed in adjacent slab expansion joints or floor slab cracks beyond the length of the structural dowels. The Structural Engineer should account for potential differential settlement through use of sufficient control joints, appropriate reinforcing, or other means.

Floor Slab Construction Considerations

Finished subgrade, within and for at least 10 feet beyond the floor slab, should be protected from traffic, rutting, or other disturbance and maintained in a relatively moist condition until floor slabs are constructed. If the subgrade should become damaged or desiccated prior to construction of floor slabs, the affected material should be removed, and structural fill should be added to replace the resulting excavation. Final conditioning of the finished subgrade should be performed immediately prior to placement of the floor slab support course.

The Geotechnical Engineer should observe the condition of the floor slab subgrades immediately prior to placement of the floor slab support course, reinforcing steel, and concrete. Attention should be paid to high traffic areas that were rutted and disturbed earlier, and to areas where backfilled trenches are located.

Floor Slab Construction Considerations

Finished subgrade, within and for at least 10 feet beyond floor slabs, should be protected from traffic, rutting, or other disturbance and maintained in a relatively moist condition until floor slabs are constructed. If the subgrade should become damaged or desiccated prior to construction of floor slabs, the affected material should be removed, and structural fill should be added to replace the resulting excavation. Final conditioning of the finished subgrade should be performed immediately prior to placement of the floor slab support course.

The Geotechnical Engineer should observe the condition of the floor slab subgrades immediately prior to placement of the floor slab support course, reinforcing steel, and concrete. Attention should be paid to high traffic areas that were rutted and disturbed earlier, and to areas where backfilled trenches are located.

Exterior Hardscape

In order to help protect the exterior hardscape against the swell pressure of the surficial moderately to highly plastic clays, we recommend the subgrade soil below hardscapes either be over-excavated to a minimum depth of 24 inches and replaced with compacted granular structural fill per the recommendations provided in this report or be chemically treated to a depth of 18 inches.

Exterior hardscape, exterior architectural features, and utilities may experience some movement due to the volume change of the subgrade soils. To reduce the potential for damage caused by movement, we recommend:

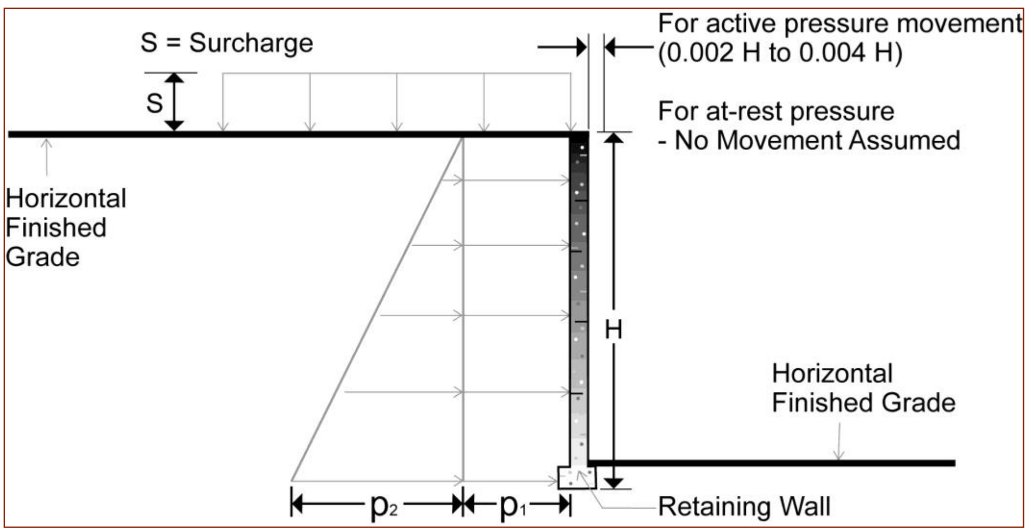
- Slabs should be underlain by a minimum of 24 inches of compacted granular structural fill or 18 inches of chemically treated material as indicated. However, at the contractor's discretion, gravel may be placed between the slab and granular structural fill or chemically treated material to assist with constructability.
- Minimizing moisture increases in the subgrade soils and backfill;
- Controlling moisture-density during placement of fill;
- Using designs which allow vertical movement between the exterior features and adjoining structural elements;
- Placing effective control joints on relatively close centers.
- Ensure clay subgrade soils are in a moist condition prior to slab construction.
- Reinforce exterior slabs and flatwork with a minimum No. 4 bars at 12 inches on center.

Lateral Earth Pressures

Design Parameters

We understand retaining walls are not planned for this site. However, below-grade walls will be required to facilitate construction of the base isolation system and building elevator pits. Construction of below grade walls for building elevator pits may consist of cantilevered concrete retaining walls. The lateral earth pressure recommendations given in the following paragraphs are applicable to the design of retaining walls subject to slight rotation and rigid retaining or below grade walls, such as cantilever or gravity type concrete walls. These recommendations are not applicable to the design of modular block - geogrid reinforced backfill walls. Recommendations covering these types of wall systems are beyond the scope of services for this assignment. However, we would be pleased to develop recommendations for the design of such wall systems upon request.

Structures with unbalanced backfill levels on opposite sides should be designed for earth pressures at least equal to values indicated in the following table. Earth pressures will be influenced by structural design of the walls, conditions of wall restraint, methods of construction, and/or compaction and the strength of the materials being restrained. Two wall restraint conditions are shown in the following diagram. Active earth pressure is commonly used for design of free-standing cantilever retaining walls and assumes wall movement. The "at-rest" condition assumes no wall movement and is commonly used for basement walls, loading dock walls, or other walls restrained at the top. The recommended design lateral earth pressures do not include a factor of safety and do not provide for possible hydrostatic pressure on the walls (unless stated).



Lateral Earth Pressure Design Parameters

Earth Pressure Condition [1]	Coefficient for Backfill Type [2]	Surcharge Pressure [3] p_1 (psf)	Equivalent Fluid Pressures (psf) [2,4]	
			Unsaturated [5]	Submerged [5]
Active (Ka)	Granular structural fill - 0.31	(0.31)S	(40)H	(80)H
	On-site clay soils - 0.41	(0.70)S	(85)H	(110)H

Lateral Earth Pressure Design Parameters

Earth Pressure Condition [1]	Coefficient for Backfill Type [2]	Surcharge Pressure [3] p_1 (psf)	Equivalent Fluid Pressures (psf) [2,4]	
			Unsaturated [5]	Submerged [5]
At-Rest (Ko)	Granular structural fill – 0.47	(0.47)S	(55)H	(90)H
	On-site clay soils – 0.83	(0.83)S	(100)H	(120)H

1. For active earth pressure, wall must rotate about base, with top lateral movements 0.002 H to 0.004 H, where H is wall height. Fat clay or other expansive soils should not be used as backfill behind the wall.
2. Uniform, horizontal backfill, with a maximum unit weight of120.
3. Uniform surcharge, where S is surcharge pressure.
4. Loading from heavy compaction equipment is not included.
5. To achieve "Unsaturated" conditions, follow guidelines in the following **Subsurface Drainage for Below-Grade Walls** section of this report. "Submerged" conditions are recommended when drainage behind walls is not incorporated into the design.
6. Values in the table are for flat backfill only.

Backfill placed against structures should consist of granular soils or low plasticity cohesive soils. For the granular values to be valid, the granular backfill must extend out and up from the base of the wall at an angle of at least 45 and 60 degrees from vertical for the active/at-rest and passive cases, respectively.

Total lateral earth pressure acting on retaining or below grade walls during a seismic event will likely include the active or at-rest static force and dynamic increment. The active dynamic increment should be applied to the wall as resultant force acting at 0.33H height from the base of the wall. Such increments should be added to the static earth pressures. A dynamic lateral earth resultant force of $15H^2$ (in units of pounds per linear foot (plf), where H (in units of feet) is the height of the soil behind the wall[1] should be used in design.

Heavy equipment should not operate within a distance closer than the exposed height of retaining or below grade walls to prevent lateral pressures more than those provided.

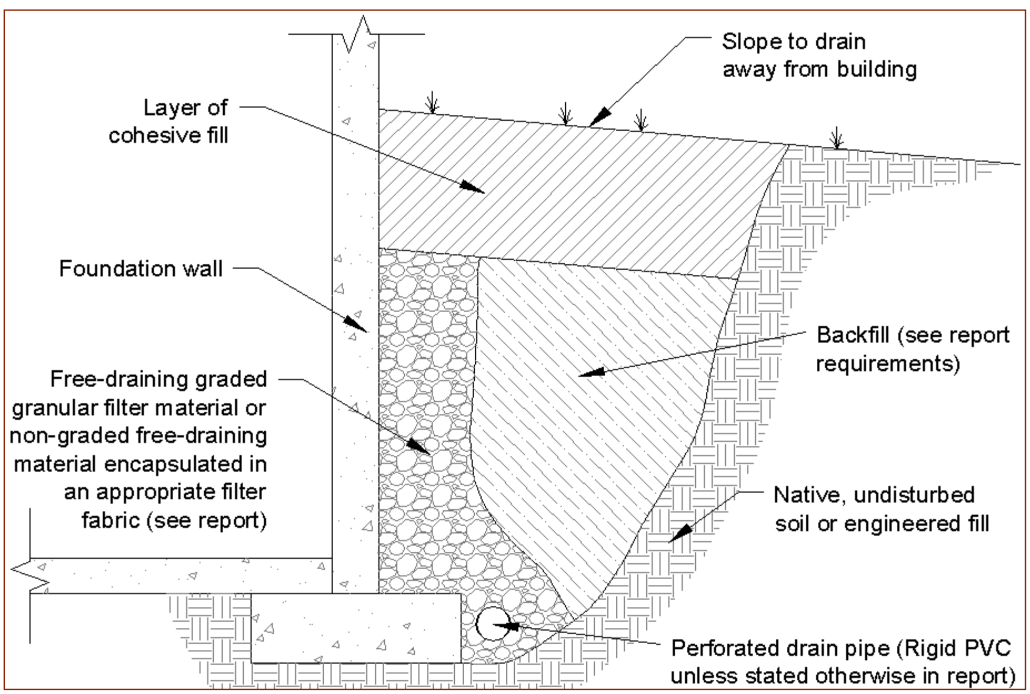
[1] *Seed & Whitman (1970)*

Compaction of each lift adjacent to wall should be accomplished with hand-operated tampers for other lightweight compactors. Over-compaction may cause excessive lateral earth pressures which could result in wall movement.

Footings, floor slabs or other loads bearing on backfill behind walls may have a significant influence on the lateral earth pressure. Placing footings within wall backfill and in the zone of active soil influence on the wall should be avoided unless structural analyses indicate the wall can safely withstand the increased pressure.

Subsurface Drainage for Below-Grade Walls

A perforated rigid plastic drain line installed behind the base of walls and extends below adjacent grade is recommended to prevent hydrostatic loading on the walls. The invert of a drain line around a below-grade building area or exterior retaining wall should be placed near foundation bearing level. The drain line should be sloped to provide positive gravity drainage to daylight or to a sump pit and pump. The drain line should be surrounded by clean, free-draining granular material having less than 5% passing the No. 200 sieve, such as No. 57 aggregate. The free-draining aggregate should be encapsulated in a filter fabric. The granular fill should extend to within 12 inches of final grade, where it should be capped with compacted cohesive fill to reduce infiltration of surface water into the drain system.



As an alternative to free-draining granular fill, a pre-fabricated composite drain may be used. A pre-fabricated composite drain is a plastic drainage core which is covered with filter fabric to prevent soil intrusion and is fastened to the wall prior to placing backfill.

Pavements

General Pavement Comments

Concrete and asphalt pavement alternatives have been considered for this project. Pavement thickness design is dependent upon:

- the anticipated traffic conditions during the life of the pavement,
- subgrade and paving material characteristics, and
- climatic conditions of the region.

A critical aspect of pavement performance is site preparation. Pavement designs noted in this section must be applied to the site which has been prepared as recommended in **Earthwork**.

Support characteristics of subgrade for pavement design do not account for shrink/swell movements of an expansive clay subgrade, such as the soils encountered on this project. Thus, the pavement may be adequate from a structural standpoint, yet still experience cracking and deformation due to shrink/swell related movement of the subgrade. Mitigation measures to reduce the potential for differential subgrade expansion are discussed in the **Earthwork** section this report.

The pavement sections were designed using the American Association of State and Highway Transportation Officials (AASHTO) Guide for Design of Pavement Structures (1993). Development of layer thicknesses were determined using the layered elastic design methodology as outlined in the AASHTO 93 Design Guide, Part II, Section 3.1.5 Layered Design Analysis.

Design Traffic Analysis

Terracon assumed traffic frequencies for the light-duty and heavy-duty based on an HS-20 traffic loading as requested in the Site Due Diligence and Master Planning Scope of Services document for the project. These traffic frequencies were converted into flexible AASHTO pavement 18-kip equivalent single axle loads (ESALs) for use in asphalt concrete (AC) pavement thickness design, and into rigid AASHTO pavement 18-kip ESALs for Portland cement concrete (PCC) design, as noted in the following table. Terracon should be contacted if there are any changes in the reported traffic patterns or frequency to review the enclosed values. A more detailed calculation of the design ESALs is presented in **Supporting Information**.

Design Equivalent Single-Axle Loads (ESALs) for Light and Heavy-Duty Pavement				
Vehicle	**Light Duty**		**Heavy Duty**	
	Flexible	**Rigid**	**Flexible**	**Rigid**
Autos/Light Trucks	1,098	1,441	1,098	1,441
Light Delivery and Trash Collection	--	--	145,939	198,897
Tractor-Trailer Trucks	--	--	59,905	107,018
Total	**1,098**	**1,441**	**206,974**	**307,356**

1. Assumes 20-year design life.

Pavement Subgrade Parameters

Subgrade support was estimated from laboratory-prepared remolded California Bearing Ratio (CBR) tests of collected composite bulk samples. CBR values of 7 and 8 were obtained from these tests. A design CBR value of 7 was used as the basis for pavement design. This value corresponds to a subgrade Resilient Modulus (M_r) of 8,877 psi (pounds per square inch) for use for flexible pavement design. An Effective Modulus of Subgrade Reaction (k) of 146 pci (pounds per cubic inch) at the top of the aggregate base layer was used in designing the rigid pavement sections.

Note that if actual subgrade conditions differ from the soil conditions and characteristics described here, we should be contacted to assess the construction conditions and review the pavement design recommendations.

Pavement Design Parameters

Analyses for the pavement design of the project have been based on the procedures of the AASHTO Guide for Design of Pavement Structures (1993). The following design parameters were utilized for pavement engineering analyses and the determination of design alternatives for the project:

Pavement Design Parameters		
Reliability	Level of Reliability	85%
	Flexible Overall Standard Deviation	0.45

	Rigid Overall Standard Deviation	0.35
Serviceability	Flexible Initial PSI	4.2
	Flexible Terminal PSI	2.0
	Rigid Terminal PSI	2.5
	Rigid Initial PSI	4.5
Subgrade Conditions	Subgrade Design CBR	7
	Correlated Resilient Modulus, Mr	8,877 psi
	Effective Modulus of Subgrade Reaction at the Top of the Aggregate Base Course, k	146 pci
Layer Properties	Asphalt Concrete (AC) Layer Coefficient	0.44
	Aggregate Base (ABC) Layer Coefficient	0.14
	Aggregate Base (ABC) Drainage Coefficient	1.0
	Aggregate Base (ABC) Resilient Modulus [1]	36,000 psi
	Load Transfer Coefficient J [2]	2.8 (doweled)
	3.9 (non-doweled)	

1. Reinforced AB Resilient Modulus values are limited to 5x the subgrade Resilient Modulus for the purposes of layered design analysis for flexible pavements.
2. Load transfer coefficient of 2.8 for dowel reinforced concrete joints.

The design period is considered the interval over which, with proper maintenance, the pavement will not require major repairs. We recommend a continuing regular maintenance program be implemented to maintain satisfactory serviceability over the design life. Please refer to ***Pavement Maintenance*** for additional information.

Asphalt Concrete Pavement Recommendations

The following table provides our recommended flexible pavement sections for this project:

Flexible Pavement Thickness Design Recommendations						
Layer	**Materials [2] (CalTrans Grading)**	**Thickness (in)[1]**				
		Light Duty		**Heavy Duty**		
		Alt A	**Alt B**	**Alt C**	**Alt D**	
Surface Course[2]	CalTrans Section 39, Type A HMA, ½ inch, PG 64-16	3	3	4	4	
Aggregate[2]	CalTrans Section 26 Class 2 Aggregate Base	6	6	8	6	
Chemically Stabilized Subgrade	Prepared in accordance with the **Earthwork** section of our report	--	12	--	12	
Total Pavement Section (in.)		9	21	12	22	

1. The individual and total material thickness values presented herein represent minimum thickness values, not averages.
2. Materials should meet the Standard Specifications State of California State Transportation Agency Department of Transportation, Sections 39 for Asphalt and Section 26 for Aggregate Base Course.

Terracon considered the climate conditions and traffic to determine the appropriate asphalt binder for this project. This was accomplished using the LTPPBind Version 3.1 Beta software, dated September 15, 2015, provided by the Federal Highway Administration (FHWA). This software utilizes historical temperature data from the 5 weather stations nearest the project and considers traffic speed and traffic loading to establish a recommended Performance Graded (PG) binder grade of asphalt concrete. Terracon then compared the software output to the binders that were indicated to be locally available, based on the CalTrans website, to determine the recommended binder selection for the project. The number of binders selected was limited for this recommendation to reduce the number of mix designs needed to construct the pavements.

Portland Cement Concrete Pavement Recommendations

The following table outlines our recommendations for Jointed Plain Concrete Pavements (JCPC) for the project.

Rigid Pavement Thickness Design Recommendations			
Layer	**Material**	**Thickness (in)** [1]	
		Light Duty	**Heavy Duty**[3]
Surface Course	Portland Cement Concrete [2, 3]	5	6.5
Aggregate	CalTrans Section 26 Aggregate Base Class 2 [4]	4	4
Subgrade	Prepared in accordance with the **Earthwork** section of this report.		
Total Pavement Section [1]		9	10.5

1. The individual and total material thickness values presented herein represent minimum thickness values, not averages.
2. The concrete should meet the Standard Specifications State of California State Transportation Agency Department of Transportation Section 40. It should be air entrained in accordance with a minimum compressive strength of 4,000 psi after 28 days of laboratory curing per ASTM C-31.
3. Heavy-duty concrete pavements should include 1-inch diameter by 13-inch-long dowel bars spaced at 12 inches center to center in all longitudinal and transverse contraction joints.
4. Materials should meet the Standard Specifications State of California State Transportation Agency Department of Transportation, Section 26 for Aggregate Base Course.

The recommendations presented require dowel reinforcement in longitudinal and transverse contraction joints as shown in ACI 330.2R-17. In locations where concrete slabs are used in isolated areas such as dumpster pads, joint reinforcement is not required. In these locations however, an additional two inches should be added to the thicknesses presented in the previous table to alleviate cracking of unsupported edges.

If Portland cement concrete is selected for use in general pavement areas, proper design and detailing of longitudinal and transverse control joints, tie bars and joint dowels will be required. In this situation, we should be contacted to provide more detailed recommendations and to review final jointing plans and details for the project.

The following general recommendations are presented for doweled PCC pavements:

Jointed Plain Concrete Pavement Jointing Requirements for Heavy Duty Pavements	
Item	**Description**
Contraction Joints	■ Joints should be reinforced with dowels in accordance with ACI 330.2R-21[1]. ■ Alternate joint reinforcement devices such as plate dowels will be considered if the device manufacturers recommendations showing they are equivalent to the dowel bar size and spacing presented in the concrete pavement section table above is submitted and approved by the engineer. ■ Joint cuts should be 1/5 of the depth of the concrete and should be cut as soon as the slab can support the weight of a man and the saw and can be cut without dislodging coarse aggregate particles from the surface. ■ Joints should have a maximum spacing no greater than 15 feet for heavy-duty sections or 12½ feet for light duty sections, as described in ACI 330.2R
Expansion (Isolation) Joints	■ Expansion joints are recommended to isolate fixed objects abutting or within the paved area, such as around light poles and drainage inlet structures. ■ Joints should be full depth and filled with pre-molded materials per ACI 330.2R-17. ■ Pavement edges at expansion joints located in areas that encounter wheel loads should be thickened by two inches wherever practical; the transition in thickness should occur over a minimum distance of five feet.
Construction Joints	■ Joints dowels should be provided at the same size and spacing as required for Contraction Joints as noted above. ■ For a butt end construction joint, an adequate number of ½ inch diameter (#4 bar) deformed steel tie bars, 30 inches in length and spaced no greater than 36 inches apart, are also recommended to tie the exterior curb

	and gutter to the outer concrete pavement edge to keep the outside slab from separating from the curb and gutter.

[1] *Guide for the Design and Construction of Concrete Site Paving for Industrial and Trucking Facilities, American Concrete Institute, ACI 330.2R-21.*

Pavement Drainage

Pavements should be sloped to provide rapid drainage of surface water. Water allowed to pond on or adjacent to the pavements could saturate the subgrade and contribute to premature pavement deterioration. In addition, the pavement subgrade should be graded to provide positive drainage within the granular base section. Appropriate sub-drainage or connection to a suitable daylight outlet should be provided to remove water from the granular subbase.

Based on the possibility of shallow and/or perched groundwater, we recommend installing a pavement subdrain system to control groundwater, improve stability, and improve long-term pavement performance.

Cold Weather Paving

Asphalt Concrete Pavement

Construction and quality of pavements, especially concrete pavements, can be negatively impacted when colder temperatures exist at the time of material placement.

The primary concern for asphalt concrete is the ability to adequately densify the pavement layer before it cools below the minimum allowable temperature for compaction. We recommend that pavement construction be performed in accordance with the *Standard Specifications State of California State Transportation Agency Department of Transportation, Section 39.*

When circumstances dictate, asphalt pavement construction during cold weather conditions may be necessary. However, placing asphalt in cold weather will increase the risk that adequate compaction is not achieved, resulting in a higher probability of premature cracking and increase rutting, stripping and raveling. If these increased risks are acceptable, we recommend that the following practices be observed:

- Compaction time should be calculated to determine the compaction equipment needed to complete compaction within the limited time. Tools are available for estimating the compaction. One example is the PaveCool application published by the Minnesota Department of Transportation: http://dot.state.mn.us/app/pavecool/index.html. Paving is not recommended if the calculated compaction time is less than required to adequately compact the pavement layer.

- Compaction of the asphalt should be avoided when the mixture temperature is less than 185º F.
- Warm mix asphalt additives can be used as a compaction aide.
- Additional and higher capacity rollers may be required, staged immediately behind the paver to provide immediate compaction.
- Layer lift thickness less than 2 inches should not be attempted.
- Increase the mix temperature and tightly control the mix temperature to reduce variability.
- Asphalt concrete loads should be tightly tarped to maintain uniform temperatures throughout the load. Tarps should tightly cover the load and seal over the sides of the truck bed.
- Minimize the time/length of haul to the jobsite.
- Haul trucks should be staged to unload immediately upon arrive at the job site.
- If the asphalt concrete is to be placed on an aggregate base, the aggregate base materials must not be excessively wet or below minimum allowable temperatures.
- Do not place asphalt concrete on frozen subgrade.
- Hand-worked areas should be avoided during cold weather conditions. If hand-work is necessary, these areas should be considered temporary and subject to replacement when favorable weather conditions permit.

Pavement Maintenance

The pavement sections represent minimum recommended thicknesses and, as such, periodic maintenance should be anticipated. Therefore, preventive maintenance should be planned and provided for through an on-going pavement management program. Maintenance activities are intended to slow the rate of pavement deterioration and to preserve the pavement investment. Maintenance consists of both localized maintenance (e.g., crack and joint sealing and patching) and global maintenance (e.g., surface sealing). Preventive maintenance is usually the priority when implementing a pavement maintenance program. Additional engineering observation is recommended to determine the type and extent of a cost-effective program. Even with periodic maintenance, some movements and related cracking may still occur, and repairs may be required.

Pavement performance is affected by its surroundings. In addition to providing preventive maintenance, the civil engineer should consider the following recommendations in the design and layout of pavements:

- Slope final grade adjacent to paved areas down from the edges at a minimum 2%.
- Slope subgrade and pavement surfaces with a minimum grade of 2% to promote proper surface drainage.

- Install below pavement drainage systems surrounding areas anticipated for frequent wetting.
- Install joint sealant and seal cracks immediately.
- Seal all landscaped areas in or adjacent to pavements to reduce moisture migration to subgrade soils.
- Place compacted, low permeability backfill against the exterior side of curb and gutter.
- Place curb, gutter and/or sidewalk directly on clay subgrade soils rather than on unbound granular base course materials.

General Comments

Our analysis and opinions are based upon our understanding of the project, the geotechnical conditions in the area, and the data obtained from our site exploration. Variations will occur between exploration point locations or due to the modifying effects of construction or weather. The nature and extent of such variations may not become evident until during or after construction. Terracon should be retained as the Geotechnical Engineer, where noted in this report, to provide observation and testing services during pertinent construction phases. If variations appear, we can provide further evaluation and supplemental recommendations. If variations are noted in the absence of our observation and testing services on-site, we should be immediately notified so that we can provide evaluation and supplemental recommendations.

Our Scope of Services does not include either specifically or by implication any environmental or biological (e.g., mold, fungi, bacteria) assessment of the site or identification or prevention of pollutants, hazardous materials, or conditions. If the owner is concerned about the potential for such contamination or pollution, other studies should be undertaken.

Our services and any correspondence are intended for the sole benefit and exclusive use of our client for specific application to the project discussed and are accomplished in accordance with generally accepted geotechnical engineering practices with no third-party beneficiaries intended. Any third-party access to services or correspondence is solely for information purposes to support the services provided by Terracon to our client. Reliance upon the services and any work product is limited to our client and is not intended for third parties. Any use or reliance of the provided information by third parties is done solely at their own risk. No warranties, either express or implied, are intended or made.

Site characteristics as provided are for design purposes and not to estimate excavation cost. Any use of our report in that regard is done at the sole risk of the excavating cost estimator as there may be variations on the site that are not apparent in the data that could significantly affect excavation cost. Any parties charged with estimating excavation costs should seek their own site characterization for specific purposes to obtain the specific level of detail necessary for costing. Site safety and cost estimating including excavation support and dewatering requirements/design are the responsibility of others. Construction and site development have the potential to affect adjacent properties. Such impacts can include damages due to vibration, modification of groundwater/surface water flow during construction, foundation movement due to undermining or subsidence from excavation, as well as noise or air quality concerns. Evaluation of these items on nearby properties are commonly associated with contractor means and methods and are not addressed in this report. The owner and contractor should consider a preconstruction/precondition survey of surrounding development. If changes in the nature, design, or location of the project are planned, our conclusions and recommendations shall not be considered valid unless we review the changes and either verify or modify our conclusions in writing. This report should not be used after 3 years without written authorization from Terracon.

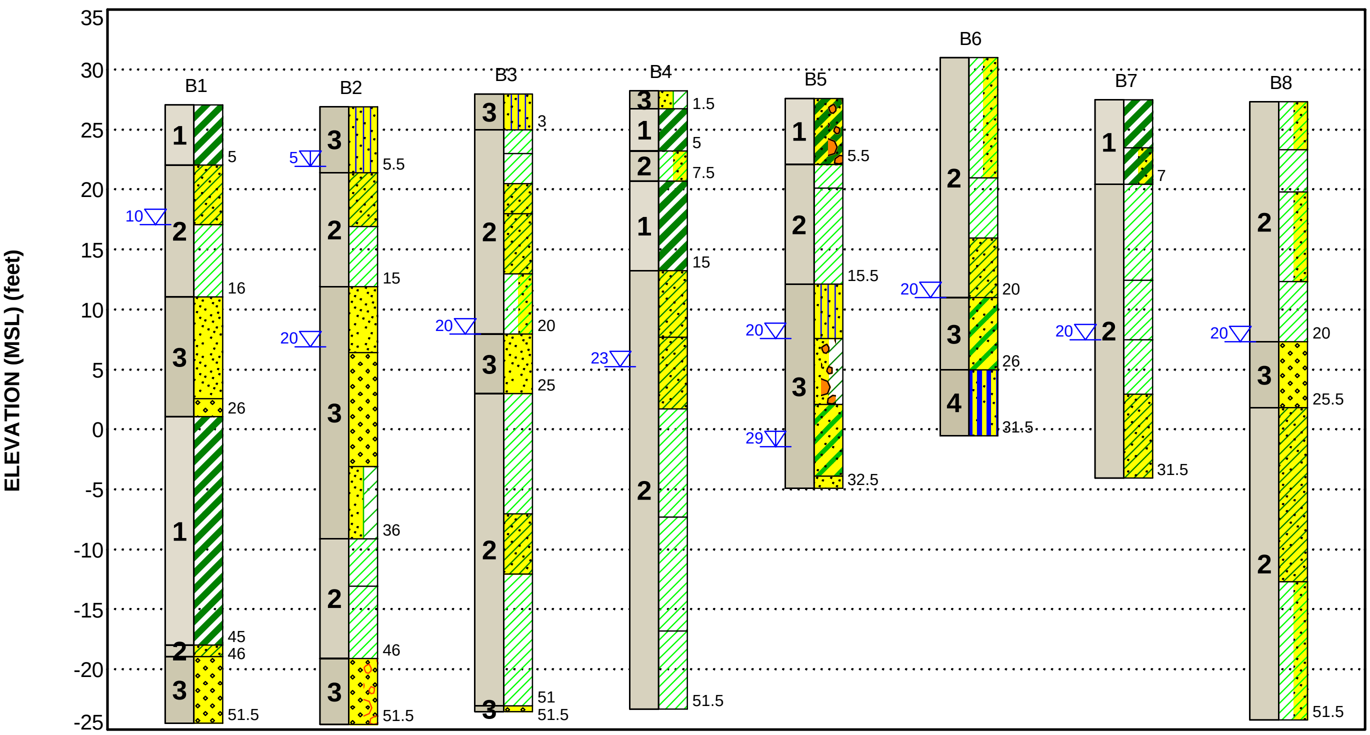
Figures

Contents:

GEOMODEL

Bay AZ1 Site (Northtown) ■ San Jose, CA
Terracon Project No. ND205079

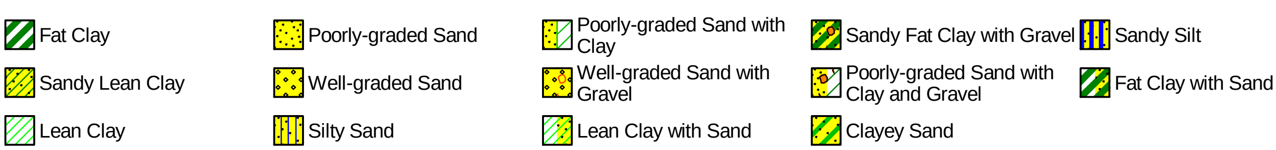
Terracon GeoReport



This is not a cross section. This is intended to display the Geotechnical Model only. See individual logs for more detailed conditions.

Model Layer	Layer Name	General Description
1	Fat Clay	Medium to very stiff fat clay with variable amounts of sand and gravel.
2	Lean Clay	Soft to very stiff lean clay with variable amounts of sand.
3	Sand	Very loose to dense sand with variable amounts of clay, silt, and gravel.
4	Silt	Medium to very stiff sandy silt.

LEGEND



▽ First Water Observation
▽ Second Water Observation

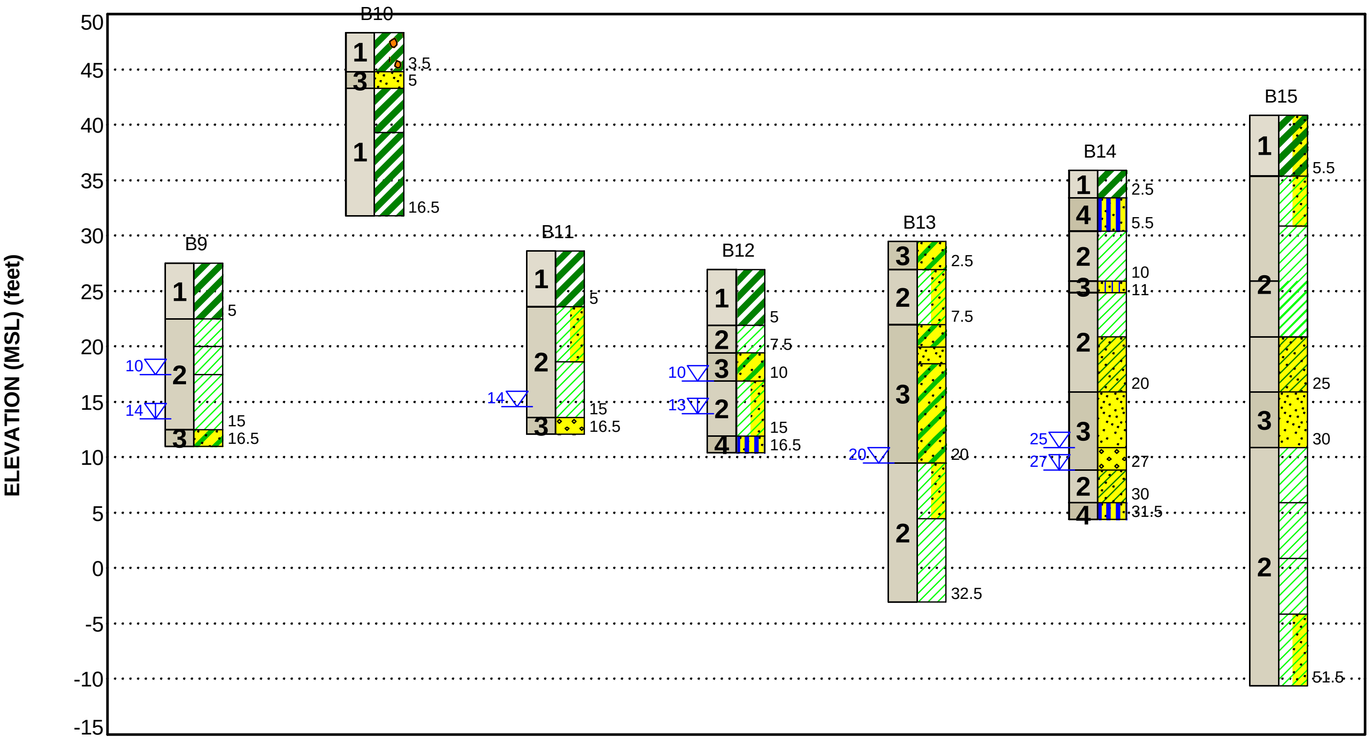
Groundwater levels are temporal. The levels shown are representative of the date and time of our exploration. Significant changes are possible over time.
Water levels shown are as measured during and/or after drilling. In some cases, boring advancement methods mask the presence/absence of groundwater. See individual logs for details.

NOTES:
Layering shown on this figure has been developed by the geotechnical engineer for purposes of modeling the subsurface conditions as required for the subsequent geotechnical engineering for this project.
Numbers adjacent to soil column indicate depth below ground surface.

GEOMODEL

Bay AZ1 Site (Northtown) ■ San Jose, CA
Terracon Project No. ND205079

Terracon GeoReport



This is not a cross section. This is intended to display the Geotechnical Model only. See individual logs for more detailed conditions.

Model Layer	Layer Name	General Description
1	Fat Clay	Medium to very stiff fat clay with variable amounts of sand and gravel.
2	Lean Clay	Soft to very stiff lean clay with variable amounts of sand.
3	Sand	Very loose to dense sand with variable amounts of clay, silt, and gravel.
4	Silt	Medium to very stiff sandy silt.

LEGEND

- Fat Clay
- Fat Clay with Gravel
- Well-graded Sand
- Sandy Lean Clay
- Lean Clay
- Poorly-graded Sand
- Sandy Silt
- Fat Clay with Sand
- Clayey Sand
- Lean Clay with Sand
- Silty Sand

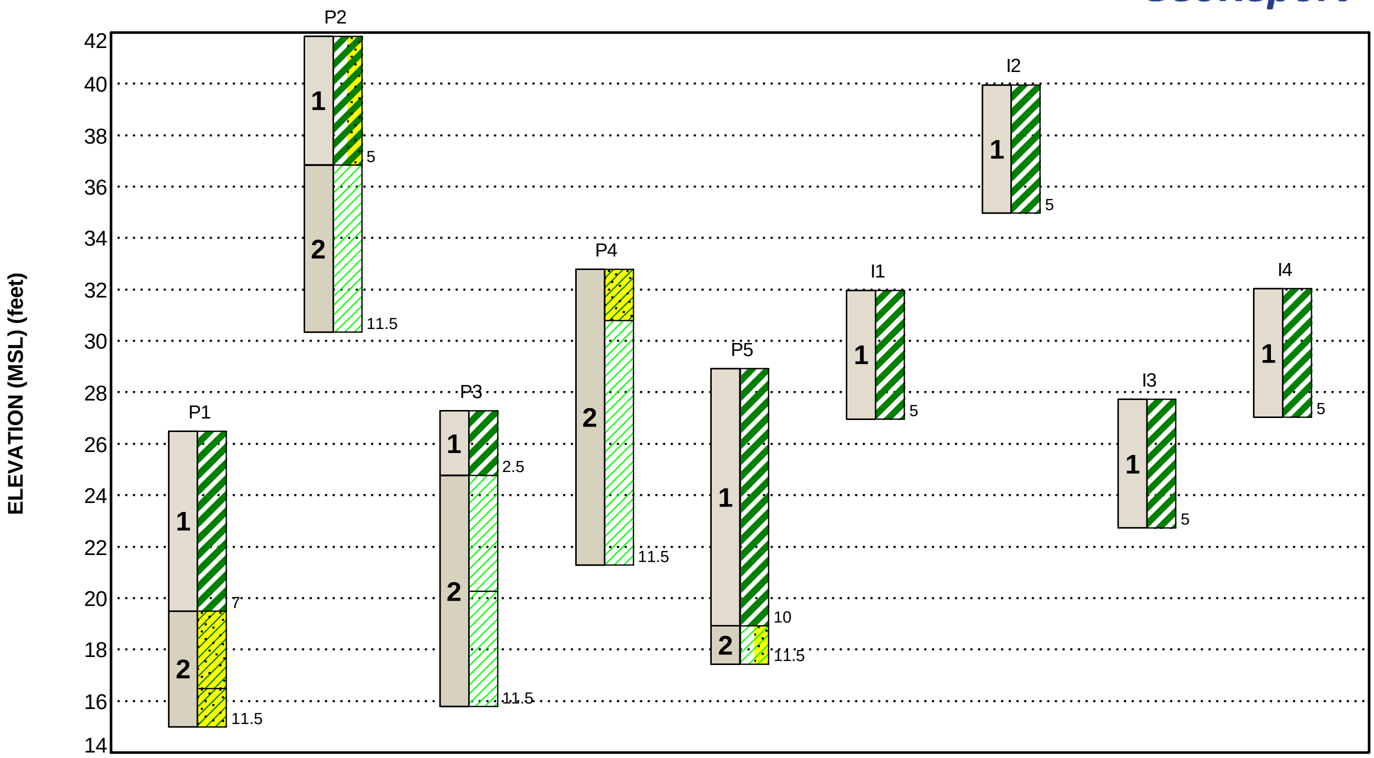
First Water Observation
Second Water Observation

Groundwater levels are temporal. The levels shown are representative of the date and time of our exploration. Significant changes are possible over time.
Water levels shown are as measured during and/or after drilling. In some cases, boring advancement methods mask the presence/absence of groundwater. See individual logs for details.

NOTES:
Layering shown on this figure has been developed by the geotechnical engineer for purposes of modeling the subsurface conditions as required for the subsequent geotechnical engineering for this project.
Numbers adjacent to soil column indicate depth below ground surface.

GEOMODEL

Bay AZ1 Site (Northtown) ■ San Jose, CA
Terracon Project No. ND205079



This is not a cross section. This is intended to display the Geotechnical Model only. See individual logs for more detailed conditions.

Model Layer	Layer Name	General Description
1	Fat Clay	Medium to very stiff fat clay with variable amounts of sand and gravel.
2	Lean Clay	Soft to very stiff lean clay with variable amounts of sand.
3	Sand	Very loose to dense sand with variable amounts of clay, silt, and gravel.
4	Silt	Medium to very stiff sandy silt.

LEGEND

- Fat Clay
- Lean Clay
- Sandy Lean Clay
- Lean Clay with Sand
- Fat Clay with Sand

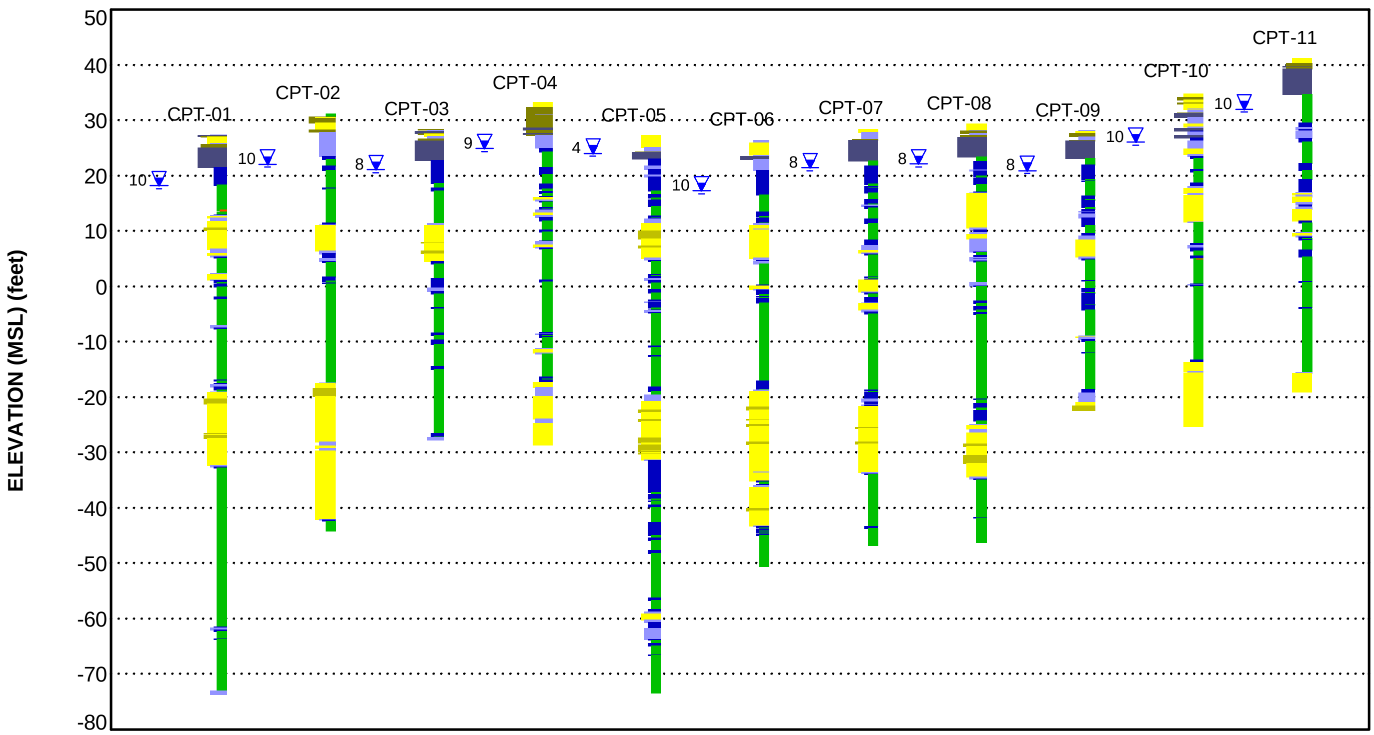
First Water Observation
Second Water Observation

Groundwater levels are temporal. The levels shown are representative of the date and time of our exploration. Significant changes are possible over time.
Water levels shown are as measured during and/or after drilling. In some cases, boring advancement methods mask the presence/absence of groundwater. See individual logs for details.

NOTES:
Layering shown on this figure has been developed by the geotechnical engineer for purposes of modeling the subsurface conditions as required for the subsequent geotechnical engineering for this project.
Numbers adjacent to soil column indicate depth below ground surface.

GEOMODEL

Bay AZ1 Site (Northtown) ■ San Jose, CA
Terracon Project No. ND205079



This is not a cross section. This is intended to display the Geotechnical Model only. See individual logs for more detailed conditions.

Model Layer	Layer Name	General Description
1	Fat Clay	Medium to very stiff fat clay with variable amounts of sand and gravel.
2	Lean Clay	Soft to very stiff lean clay with variable amounts of sand.
3	Sand	Very loose to dense sand with variable amounts of clay, silt, and gravel.
4	Silt	Medium to very stiff sandy silt.

LEGEND

Soil Behavior Type (SBT)

- 1 Sensitive, fine grained
- 2 Organic soils - clay
- 3 Clay - silty clay to clay
- 4 Silt mixtures - clayey silt to silty clay
- 5 Sand mixtures - silty sand to sandy silt
- 6 Sands - clean sand to silty sand
- 7 Gravelly sand to dense sand
- 8 Very stiff sand to clayey sand
- 9 Very stiff fine grained

CPT Assumed Water Depth

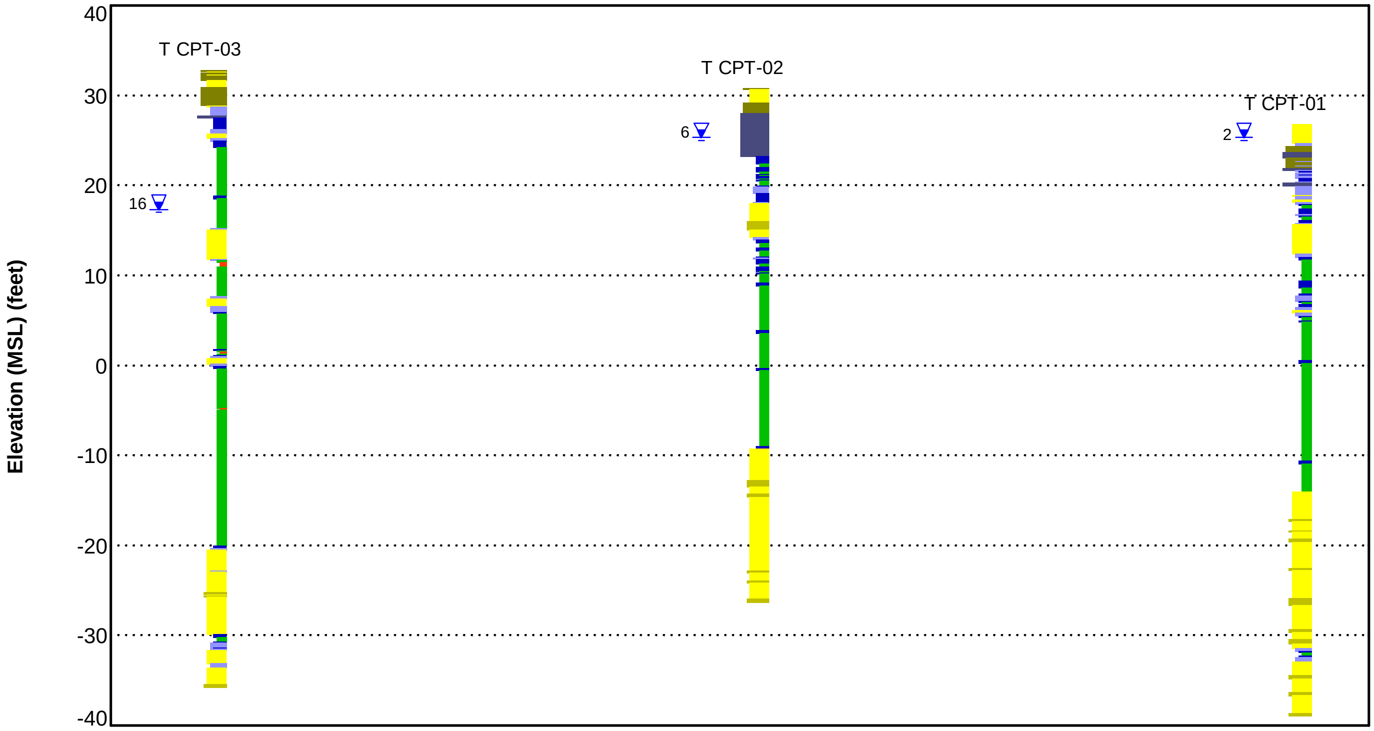
First Water Observation
Second Water Observation

Groundwater levels are temporal. The levels shown are representative of the date and time of our exploration. Significant changes are possible over time.
Water levels shown are as measured during and/or after drilling. In some cases, boring advancement methods mask the presence/absence of groundwater. See individual logs for details.

NOTES:
Layering shown on this figure has been developed by the geotechnical engineer for purposes of modeling the subsurface conditions as required for the subsequent geotechnical engineering for this project.
Numbers adjacent to soil column indicate depth below ground surface.

Terracon
1220 Concord Ave, Ste 450
Concord, CA

GeoModel



This is not a cross section. This is intended to display the Geotechnical Model only. See individual logs for more detailed conditions.

LEGEND

Soil Behavior Type (SBT)

1 Sensitive, fine grained	**2 Organic soils - clay**	**3 Clay - silty clay to clay**
4 Silt mixtures - clayey silt to silty clay	**5 Sand mixtures - silty sand to sandy silt**	**6 Sands - clean sand to silty sand**
7 Gravelly sand to dense sand	**8 Very stiff sand to clayey sand**	**9 Very stiff fine grained**

CPT Water Depth

NOTES:
Layering shown on this figure has been developed by the geotechnical engineer for purposes of modeling the subsurface conditions as required for the subsequent geotechnical engineering for this project.
Numbers adjacent to soil column indicate depth below ground surface.

Attachments

Exploration and Testing Procedures

Field Exploration

Number of Borings/CPTs	Approximate Boring/CPT Depth (feet)	Location
6	51½	Planned building and substation footprints
5	31½	Planned substation footprints
4	16½	Planned building footprints
4	11½	Planned parking and drive areas
2 CPT[1]	100 – 100½	Planned building footprints
4 CPT[1]	75½ - 77	Planned building footprint and substation footprints
3 CPT[1]	60½ - 62	Planned substation footprints
2 CPT[1]	50½ - 56	Planned substation footprints
3 CPT[1]	57½, 67, 69	Planned water tank footprint
4[2]	5	Planned bio-retention facility

1. Cone penetration test.
2. Percolation test boreholes

Boring/CPT Layout and Elevations: The original boring/CPT layout was performed by Terracon. The boring/CPT locations and elevations were surveyed and provided by HMH Engineers.

Terracon personnel provided the layout for the water tank CPTs using handheld GPS equipment (estimated horizontal accuracy of about ±15 feet) and referencing existing site features. Approximate CPT ground surface elevations were estimated using Google Earth. If elevations and a more precise layout are desired for the water tank CPTs, we recommend the exploration locations be surveyed.

Subsurface Exploration Procedures: We advanced the borings with a truck-mounted, rotary drill rig using continuous flight augers (solid stem and/or hollow stem, as necessary, depending on soil conditions). Two to four samples were obtained in the upper 10 feet of each boring and at intervals of 5 feet thereafter. Additionally, bulk samples were collected in upper 5 feet of borings B5, B8 through B12, P1 through P5, and I4. In the thin-walled tube sampling procedure, a thin-walled, seamless steel tube with a sharp cutting edge was pushed hydraulically into the soil to obtain a relatively undisturbed sample. In the split-barrel sampling procedure, a standard 2-inch outer diameter split-barrel sampling spoon was driven into the ground by a 140-pound automatic hammer falling a distance of 30 inches. The number of blows required to advance the sampling spoon the last 12 inches of a normal 18-inch penetration is recorded as the Standard Penetration Test (SPT) resistance value. The SPT resistance values, also referred to as N-values, are indicated on the boring logs at the test depths. A 3-inch O.D. split-barrel sampling spoon with 2.5-inch I.D. ring lined sampler was also used for sampling. Ring-lined, split-barrel sampling procedures are similar to standard split spoon sampling procedure; however, blow counts are typically recorded for 6-inch intervals for a total of 12 inches of penetration. We observed and recorded groundwater levels during drilling and sampling. For safety purposes, all borings were backfilled with auger cuttings/cement-grout after their completion. Pavements were patched with cold-mix asphalt and/or pre-mixed concrete, as appropriate.

For the cone penetrometer testing, the CPT rig hydraulically pushes an instrumented cone through the soil while nearly continuous readings are recorded to a portable computer. The cone is equipped with electronic load cells to measure tip resistance and sleeve resistance and a pressure transducer to measure the generated ambient pore pressure. The face of the cone has an apex angle of 60° and an area of 15 cm^2. Digital Data representing the tip resistance, friction resistance, pore water pressure, and probe inclination angle are recorded about every 2 centimeters while advancing through the ground at a rate between 1½ and 2½ centimeters per second. These measurements are correlated to various soil properties used for geotechnical design. No soil samples are gathered through this subsurface investigation technique. CPT testing was conducted in general accordance with ASTM D5778 “Standard Test Method for Performing Electronic Friction Cone and Piezocone Penetration Testing of Soils.”

The sampling depths, penetration distances, and other sampling information was recorded on the field boring logs. The samples were placed in appropriate containers and taken to our soil laboratory for testing and classification by a Geotechnical Engineer. Our exploration team prepared field boring logs as part of the drilling operations. These field logs included visual classifications of the materials observed during drilling and our interpretation of the subsurface conditions between samples. Final boring logs were prepared from the field logs. The final boring logs represent the Geotechnical Engineer's interpretation of the field logs and include modifications based on observations and tests of the samples in our laboratory.

Laboratory Testing

The project engineer reviewed the field data and assigned laboratory tests. The laboratory testing program included the following types of tests:

- Moisture Content
- Dry Unit Weight
- Unconfined Compression
- One Dimensional Consolidation
- Direct shear
- Atterberg Limits
- Fines Content
- California Bearing Ratio
- Thermal conductivity
- Proctor compaction

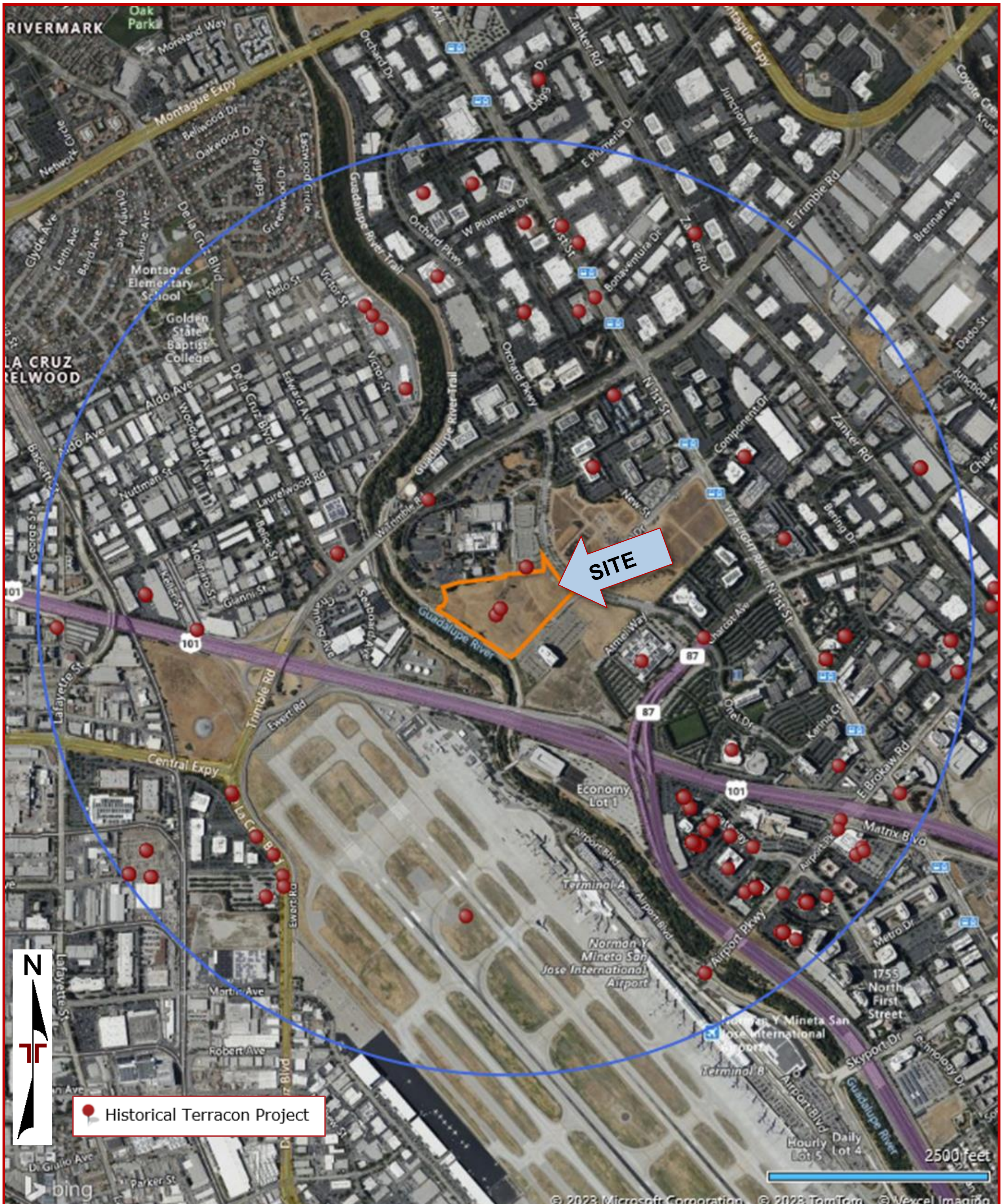
The laboratory testing program often included examination of soil samples by an engineer. Based on the results of our field and laboratory programs, we described and classified the soil samples in accordance with the Unified Soil Classification System.

Site Location and Exploration Plans

Contents:

Note: All attachments are one page unless otherwise noted.

Site Location



AGRAM IS FOR GENERAL LOCATION ONLY, AND IS NOT INTENDED FOR CONSTRUCTION PURPOSES MAP PROVIDED BY MICROSOFT BING MAPS

Exploration Plan

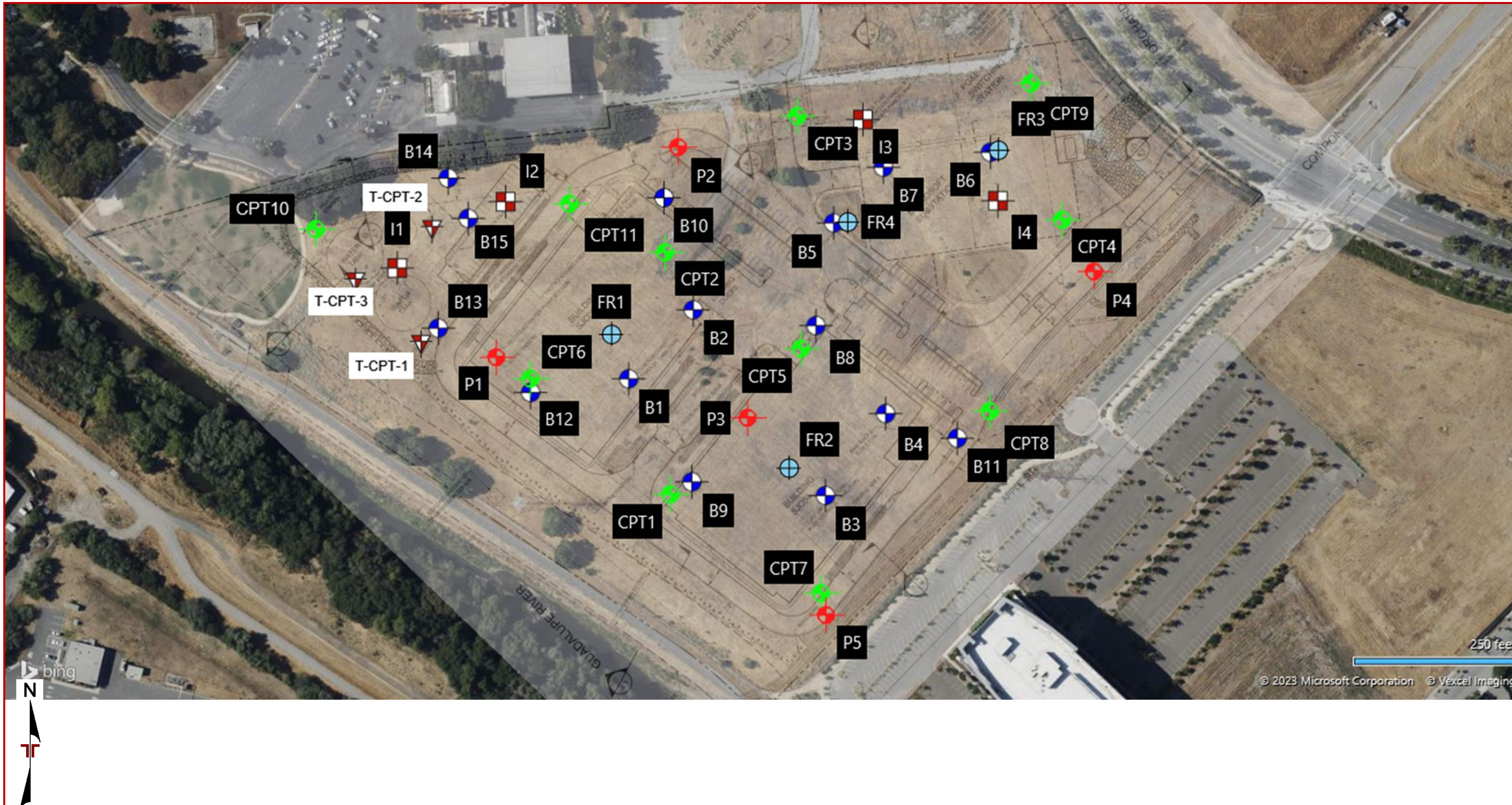


DIAGRAM IS FOR GENERAL LOCATION ONLY, AND IS NOT INTENDED FOR CONSTRUCTION PURPOSES

MAP PROVIDED BY MICROSOFT BING MAPS

Exploration and Laboratory Results

Contents:

Note: All attachments are one page unless otherwise noted.

BORING LOG NO. B1

PROJECT: Bay AZ1 Site (Northtown)

**CLIENT: Burns & McDonnell Engineering Company Inc
Columbus, OH**

**SITE: Orchard Parkway
San Jose, CA**

LOCATION See Exploration Plan

Northing: 37.3782205 Easting: -121.9935425

Surface Elev.: 27.06 (Ft.)

MODEL LAYER	DEPTH (Ft.)	ELEVATION (Ft.)	MATERIAL DESCRIPTION
1	0–5.0	22	**FAT CLAY (CH)**, trace sand, fine grained, dark brown, very stiff
2	5.0–10.0	17	**SANDY LEAN CLAY (CL)**, fine grained, brown to dark brown, medium stiff to stiff
2	10.0–16.0	11	**LEAN CLAY (CL)**, fine grained, brown with red brown mottling, stiff to very stiff
3	16.0–24.5	2.5	**POORLY GRADED SAND (SP)**, fine to medium grained, gray, dense to very dense
3	24.5–26.0	1	**WELL GRADED SAND (SW)**, fine to coarse grained, grayish brown, very loose
1	26.0–		**FAT CLAY (CH)**, some sand, fine grained, gray, stiff to very stiff

FIELD TEST RESULTS	LABORATORY HP (tsf)	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
7-16-17	>4.5	10	91	59-21-38	90
8-8-10 N=18	4.5 (HP)	24			
10-16-21	4.0 (HP)	20	100		
2-3-4 N=7	1.25 (HP)	22			
9-6-10	2.0 (HP)	29	93	41-23-18	97
7-9-9 N=18		15			
10-31-46		16	112		33
1-1-1 N=2	1.0 (HP)	30			
8-12-11	1.0 (HP)	32	89		

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
6" Hollow Stem Auger

Abandonment Method:
Boring backfilled with bentonite grout upon completion

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevations were provided by HMH

Notes:

Northing & Easting and Elevations were provided by HMH Engineers in Boring Locations plan dated 10/30/2020.
Northing & Easting and Elevations were provided by HMH Engineers in Boring Locations plan dated 10/30/2020.

WATER LEVEL OBSERVATIONS

At completion of drilling

Terracon
5075 Commercial Cir Ste E
Concord, CA

Boring Started: 10-26-2020	Boring Completed: 10-26-2020
Drill Rig: CME 95	Driller: Baja Exploration
Project No.: ND205079	

BORING LOG NO. B1

PROJECT: Bay AZ1 Site (Northtown)

CLIENT: Burns & McDonnell Engineering Company Inc Columbus, OH

SITE: Orchard Parkway San Jose, CA

LOCATION See Exploration Plan

Northing: 37.3782205 Easting: -121.9335425

Surface Elev.: 27.06 (Ft.)

MODEL LAYER	GRAPHIC LOG	Description / Depth (Ft.)	ELEVATION (Ft.)	DEPTH (In.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	LABORATORY HP (tsf)	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
1		**FAT CLAY (CH)**, some sand, fine grained, gray, stiff to very stiff *(continued)*					7-4-8 N=12	1.75 (HP)			52-22-30	99
				40			6-11-12	2.0 (HP)	36			
		45.0	-18	45								
2		**SANDY LEAN CLAY (CL)**, fine grained, brown, very hard					6-39-45 N=84	1.25 (HP)	30			
		46.0	-19									
3		**WELL GRADED SAND (SW)**, fine to coarse grained, brown and black, medium dense		50			3-6-9 No Recovery		22	98		
		51.5	-24.5									

Boring Terminated at 51.5 Feet

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
6" Hollow Stem Auger

Abandonment Method:
Boring backfilled with bentonite grout upon completion

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevations were provided by HMH

Notes:

WATER LEVEL OBSERVATIONS

▽ *At completion of drilling*

Terracon
5075 Commercial Cir Ste E
Concord, CA

Boring Started: 10-26-2020	Boring Completed: 10-26-2020
Drill Rig: CME 95	Driller: Baja Exploration
Project No.: ND205079	

BORING LOG NO. B2

PROJECT: Bay AZ1 Site (Northtown)

CLIENT: Burns & McDonnell Engineering Company Inc Columbus, OH

SITE: Orchard Parkway San Jose, CA

LOCATION See Exploration Plan

Northing: 37.3785126 Easting: -121.9331984

Surface Elev.: 26.92 (Ft.)

MODEL LAYER	DEPTH (Ft.)	DESCRIPTION	ELEVATION (Ft.)
3	0 – 5.5	**SILTY SAND (SM)**, fine grained, brown, medium dense	21.5
2	5.5 – 10.0	**SANDY LEAN CLAY (CL)**, fine to medium grained, brown with gray mottling, stiff to very stiff	17
2	10.0 – 15.0	**LEAN CLAY (CL)**, trace sand, fine grained, gray with black, medium stiff to stiff	12
3	15.0 – 20.5	**POORLY GRADED SAND (SP)**, fine to medium grained, grayish brown, very dense	6.5
3	20.5 – 30.0	**WELL GRADED SAND (SW)**, trace gravel, medium to coarse grained, dark gray, dense to very dense	-3
3	30.0 –	**POORLY GRADED SAND WITH CLAY (SP)**, fine to medium grained, gray, medium dense	

DEPTH (Ft.)	FIELD TEST RESULTS	LABORATORY HP (tsf)	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
~1	6-11-5 N=16	3.5 (HP)	5			
~2.5	7-9-12	3.5 (HP)	6	90		
5	2-5-10 N=15	2.5 (HP)	17			
7.5	7-10-18	2.0 (HP)	22	100	32-20-12	63
10	6-1-6 N=7	2.25 (HP)	32			
15	9-25-50		18	105		
20	14-25-46 N=71		17			
25	6-16-25		15	93		
30	4-7-8 N=15		23			

Water level observations: ▽ at approx. 4.5 ft (at completion of drilling); ▽ at approx. 19.5 ft (while sampling).

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
6" Hollow Stem Auger

Abandonment Method:
Boring backfilled with bentonite grout upon completion

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevations were provided by HMH

Notes:

Northing & Easting and Elevations were provided by HMH Engineers in Boring Locations plan dated 10/30/2020.
Northing & Easting and Elevations were provided by HMH Engineers in Boring Locations plan dated 10/30/2020.

WATER LEVEL OBSERVATIONS

▽ *While sampling*

▽ *At completion of drilling*

Terracon
5075 Commercial Cir Ste E
Concord, CA

Boring Started: 10-26-2020	Boring Completed: 10-26-2020
Drill Rig: CME 95	Driller: Baja Exploration
Project No.: ND205079	

BORING LOG NO. B2

PROJECT: Bay AZ1 Site (Northtown)

CLIENT: Burns & McDonnell Engineering Company Inc
Columbus, OH

SITE: Orchard Parkway
San Jose, CA

LOCATION See Exploration Plan

Northing: 37.3785126 Easting: -121.9331984

Surface Elev.: 26.92 (Ft.)

MODEL LAYER	GRAPHIC LOG	DEPTH / ELEVATION (Ft.) / DESCRIPTION	DEPTH (In.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	LABORATORY HP (tsf)	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
3		36.0 / -9				5-10-15		16	105		
2		**LEAN CLAY (CL)**, fine grained, gray, stiff to very stiff									
		40.0 / -13	40								
		LEAN CLAY (CL), fine grained, gray to dark gray, very stiff						30			
		46.0 / -19	45			18-50/-1"					
3		**WELL GRADED SAND WITH GRAVEL (SW)**, fine to coarse grained, brown, very dense									
		51.5 / -24.5	50			12-21-33 N=54		12	108		
		Boring Terminated at 51.5 Feet									

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
6" Hollow Stem Auger

Abandonment Method:
Boring backfilled with bentonite grout upon completion

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevations were provided by HMH

Notes:

WATER LEVEL OBSERVATIONS

While sampling

At completion of drilling

Terracon
5075 Commercial Cir Ste E
Concord, CA

Boring Started: 10-26-2020	Boring Completed: 10-26-2020
Drill Rig: CME 95	Driller: Baja Exploration
Project No.: ND205079	

BORING LOG NO. B3

PROJECT: Bay AZ1 Site (Northtown)

CLIENT: Burns & McDonnell Engineering Company Inc Columbus, OH

SITE: Orchard Parkway San Jose, CA

LOCATION See Exploration Plan

Northing: 37.3777266 Easting: -121.9324945

Surface Elev.: 27.98 (Ft.)

MODEL LAYER	DEPTH (Ft.)	DESCRIPTION	ELEVATION (Ft.)
3	0.0–3.0	**SILTY SAND (SM)**, fine grained, brown, loose to medium dense	25
2	3.0–5.0	**LEAN CLAY (CL)**, fine grained, grayish brown with red brown mottling, medium stiff to stiff	23
2	5.0–7.5	**LEAN CLAY (CL)**, trace sand, fine to medium grained, brown, stiff	20.5
2	7.5–10.0	**SANDY LEAN CLAY (CL)**, fine to medium grained, brown, stiff	18
2	10.0–15.0	**SANDY LEAN CLAY (CL)**, fine to medium grained, grayish brown with red brown mottling, stiff	13
2	15.0–20.0	**LEAN CLAY WITH SAND (CL)**, fine grained, grayish brown, soft to medium stiff	8
3	20.0–25.0	**POORLY GRADED SAND (SP)**, fine to medium grained, gray, medium dense	3
2	25.0–35.0	**LEAN CLAY (CL)**, fine grained, dark gray, medium stiff	-7

DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	LABORATORY HP (tsf)	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
1.0–2.5		X	6-6-4 N=10		5			
2.5–4.0		X	2-2-5 N=7	4.0 (HP)	5			
5.0–6.5		X	2-3-7 N=10	4.0 (HP)	19			
7.5–9.0		X	4-5-8 N=13	3.5 (HP)	23			
10.0–11.5		X	2-4-6 N=10	1.5 (HP)	25			
15.0–16.5		X	1-2-2 N=4	<0.25	36		34-18-16	80
20.0	▽							
20.0–21.5		X	5-8-14 N=22		26			
25.0–27.5		■					32-19-13	81
30.0–32.5		■						

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method: 6" Hollow Stem Auger	See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).
Abandonment Method: Boring backfilled with bentonite grout upon completion	See Supporting Information for explanation of symbols and abbreviations.
	Elevations were provided by HMH

Notes:

Northing & Easting and Elevations were provided by HMH Engineers in Boring Locations plan dated 10/30/2020.
Northing & Easting and Elevations were provided by HMH Engineers in Boring Locations plan dated 10/30/2020.

WATER LEVEL OBSERVATIONS

▽ *At completion of drilling*

Terracon
5075 Commercial Cir Ste E
Concord, CA

Boring Started: 10-27-2020	Boring Completed: 10-27-2020
Drill Rig: CME 95	Driller: Baja Exploration
Project No.: ND205079	

BORING LOG NO. B3

PROJECT: Bay AZ1 Site (Northtown)

CLIENT: Burns & McDonnell Engineering Company Inc Columbus, OH

SITE: Orchard Parkway San Jose, CA

LOCATION See Exploration Plan

Northing: 37.3777266 Easting: -121.9324945

Surface Elev.: 27.98 (Ft.)

MODEL LAYER	GRAPHIC LOG	DESCRIPTION / DEPTH / ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	LABORATORY HP (tsf)	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
2		**SANDY LEAN CLAY (CL)**, fine to medium grained, gray, stiff				8-9-12		27	98		
		40.0 / -12									
		LEAN CLAY (CL), fine grained, gray to grayish brown with brown motting, stiff	40			4-6-7 N=13	2.5 (HP)	30		39-23-16	100
			45			6-9-12	2.25 (HP)	28	93		
		51.0 / -23	50			20-18-20 N=38		21			
3		51.5 / -23.5 **WELL GRADED SAND (SW)**, fine grained, reddish brown, dense									
		Boring Terminated at 51.5 Feet									

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
6" Hollow Stem Auger

Abandonment Method:
Boring backfilled with bentonite grout upon completion

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevations were provided by HMH

Notes:

WATER LEVEL OBSERVATIONS

At completion of drilling

5075 Commercial Cir Ste E
Concord, CA

Boring Started: 10-27-2020	Boring Completed: 10-27-2020
Drill Rig: CME 95	Driller: Baja Exploration
Project No.: ND205079	

BORING LOG NO. B4

PROJECT: Bay AZ1 Site (Northtown)

CLIENT: Burns & McDonnell Engineering Company Inc Columbus, OH

SITE: Orchard Parkway San Jose, CA

LOCATION See Exploration Plan

Northing: 37.3780735 Easting: -121.9321738

Surface Elev.: 28.22 (Ft.)

MODEL LAYER	Depth (Ft.)	Description	ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	LABORATORY HP (tsf)	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
3	1.5	**POORLY GRADED SAND WITH CLAY (SP)**, fine to medium grained, brown and gray, medium dense	26.5									
1	5.0	**FAT CLAY (CH)**, fine to medium grained, dark brown, very stiff	23				6-15-18	>4.5	16	80		
							6-9-11 N=20	>4.5	22		76-31-45	95
2	7.5	**LEAN CLAY WITH SAND (CL)**, fine to medium grained, dark brown, very stiff	20.5	5			7-10-20	4.5 (HP)	24	100		
1	15.0	**FAT CLAY (CH)**, fine grained, grayish brown with red brown mottling, medium stiff	13				3-6-7 N=13	2.5 (HP)	31			
				10			5-4-7	2.0 (HP)	31	92	55-23-32	85
2	20.5	**SANDY LEAN CLAY (CL)**, fine to medium grained, grayish brown with red brown mottling, stiff	7.5	15			1-2-10 N=12	0.25 (HP)	19			
	26.5	**SANDY LEAN CLAY (CL)**, some silt, fine grained, gray, stiff	1.5	20			6-8-10	1.25 (HP)	32	92		
					▽							
				25			1-2-6 N=8		23			81
		LEAN CLAY (CL), fine grained, gray, medium stiff		30								
				35								

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
6" Hollow Stem Auger

Abandonment Method:
Boring backfilled with bentonite grout upon completion

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevations were provided by HMH

Notes:

Northing & Easting and Elevations were provided by HMH Engineers in Boring Locations plan dated 10/30/2020.
Northing & Easting and Elevations were provided by HMH Engineers in Boring Locations plan dated 10/30/2020.

WATER LEVEL OBSERVATIONS

▽ *At completion of drilling*

Terracon
5075 Commercial Cir Ste E
Concord, CA

Boring Started: 10-27-2020	Boring Completed: 10-27-2020
Drill Rig: CME 95	Driller: Baja Exploration
Project No.: ND205079	

BORING LOG NO. B4

PROJECT: Bay AZ1 Site (Northtown)

CLIENT: Burns & McDonnell Engineering Company Inc
Columbus, OH

SITE: Orchard Parkway
San Jose, CA

LOCATION See Exploration Plan

Northing: 37.3780735 Easting: -121.9321738

Surface Elev.: 28.22 (Ft.)

MODEL LAYER	GRAPHIC LOG	DEPTH / ELEVATION (Ft.) / Description	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	LABORATORY HP (tsf)	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
2		35.5 / -7.5 **LEAN CLAY (CL)**, fine grained, orange and brown, stiff				5-6-8 N=14	1.25 (HP)	23			
			40			6-9-10	1.0 (HP)	30	92		
		45.0 / -17 **LEAN CLAY (CL)**, fine grained, gray with brown, stiff to very stiff	45			4-5-8 N=13	1.25 (HP)	31			
		51.5 / -23.5	50			5-19-22	3.25 (HP)	26	99		

Boring Terminated at 51.5 Feet

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
6" Hollow Stem Auger

Abandonment Method:
Boring backfilled with bentonite grout upon completion

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevations were provided by HMH

Notes:

WATER LEVEL OBSERVATIONS

At completion of drilling

Terracon
5075 Commercial Cir Ste E
Concord, CA

Boring Started: 10-27-2020	Boring Completed: 10-27-2020
Drill Rig: CME 95	Driller: Baja Exploration
Project No.: ND205079	

BORING LOG NO. B5

PROJECT: Bay AZ1 Site (Northtown)

CLIENT: Burns & McDonnell Engineering Company Inc Columbus, OH

SITE: Orchard Parkway San Jose, CA

LOCATION See Exploration Plan

Northing: 37.3788802 Easting: -121.9324507

Surface Elev.: 27.6 (Ft.)

MODEL LAYER	DEPTH (Ft.)	LOCATION / DESCRIPTION	ELEVATION (Ft.)
1	5.5	**SANDY FAT CLAY WITH GRAVEL (CH)**, fine to coarse grained, dark brown, stiff to very stiff	22
2	7.5	**LEAN CLAY (CL)**, fine grained, grayish brown, stiff	20
2	15.5	**LEAN CLAY (CL)**, trace sand, fine to medium grained, light brown with red brown mottling, stiff to very stiff	12
3	20.0	**SILTY SAND (SM)**, fine to medium grained, gray, medium dense	7.5
3	25.5	**POORLY GRADED SAND WITH CLAY AND GRAVEL (SP)**, fine to coarse grained, gray, dense	2
3	31.5	**CLAYEY SAND (SC)**, with silt, fine to medium grained, gray, medium dense	-4
3	32.5	**POORLY GRADED SAND (SP)**, fine to medium grained, gray, loose	-5

Boring Terminated at 32.5 Feet

FIELD TEST RESULTS	LABORATORY HP (tsf)	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
6-7-6 N=13	>4.5	13			
12-13-15	>4.5	22			
3-4-7 N=11	4.5 (HP)	26			
10-12-20	3.5 (HP)	25			
3-4-6 N=10	2.0 (HP)	28			
4-10-20		18	107		
8-14-17 N=31		19			
7-6-11	1.0 (HP)	29	93		

DEPTH (ft.): 5, 10, 15, 20, 25, 30

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
6" Hollow Stem Auger

Abandonment Method:
Boring backfilled with auger cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevations were provided by HMH

Notes:

Northing & Easting and Elevations were provided by HMH Engineers in Boring Locations plan dated 10/30/2020.
Northing & Easting and Elevations were provided by HMH Engineers in Boring Locations plan dated 10/30/2020.

WATER LEVEL OBSERVATIONS

- ∇ *While drilling*
- ∇ *At completion of drilling*

Terracon
5075 Commercial Cir Ste E
Concord, CA

Boring Started: 10-23-2020	Boring Completed: 10-23-2020
Drill Rig: CME 95	Driller: Baja Exploration
Project No.: ND205079	

BORING LOG NO. B6

PROJECT: Bay AZ1 Site (Northtown)

CLIENT: Burns & McDonnell Engineering Company Inc
Columbus, OH

SITE: Orchard Parkway
San Jose, CA

LOCATION See Exploration Plan

Northing: 37.3791793 Easting: -121.931615

Surface Elev.: 30.98 (Ft.)

MODEL LAYER	DEPTH (Ft.)	DESCRIPTION	ELEVATION (Ft.)
2		**LEAN CLAY WITH SAND (CL)**, some gravel, fine to medium grained, brown to dark brown, very stiff	
	10.0	**LEAN CLAY (CL)**, trace sand, fine grained, brown with white mottling, very stiff	21
	15.0	**SANDY LEAN CLAY (CL)**, fine grained, grayish brown with red brown mottling, medium stiff to stiff	16
3	20.0	**CLAYEY SAND (SC)**, fine to medium grained, brown to gray, loose	11
4	26.0	**SANDY SILT (ML)**, fine grained, gray, very stiff	5
	31.5	***Boring Terminated at 31.5 Feet***	-0.5

FIELD TEST RESULTS	LABORATORY HP (tsf)	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
19-10-10 N=20	>4.5	10		48-23-25	78
7-14-21	>4.5	8			
5-11-10 N=21	>4.5	14			
12-10-13	4.5 (HP)	19			
3-6-10 N=16	4.0 (HP)	21			
6-5-6	1.25 (HP)	28	93		
3-3-4 N=7		19			
10-8-8	2.5 (HP)	21	102		
2-3-13 N=16		19		21-18-3	52

DEPTH (In.): 5, 10, 15, 20, 25, 30

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
6" Hollow Stem Auger

Abandonment Method:
Boring backfilled with auger cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevations were provided by HMH

Notes:

Northing & Easting and Elevations were provided by HMH Engineers in Boring Locations plan dated 10/30/2020.
Northing & Easting and Elevations were provided by HMH Engineers in Boring Locations plan dated 10/30/2020.

WATER LEVEL OBSERVATIONS

While drilling

Terracon
5075 Commercial Cir Ste E
Concord, CA

Boring Started: 10-27-2020	Boring Completed: 10-27-2020
Drill Rig: CME 95	Driller: Baja Exploration
Project No.: ND205079	

BORING LOG NO. B7

PROJECT: Bay AZ1 Site (Northtown)

CLIENT: Burns & McDonnell Engineering Company Inc Columbus, OH

SITE: Orchard Parkway San Jose, CA

LOCATION See Exploration Plan

Northing: 37.3791155 Easting: -121.9321857

Surface Elev.: 27.46 (Ft.)

MODEL LAYER	DEPTH (Ft.)	DESCRIPTION	ELEVATION (Ft.)	DEPTH (In.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	LABORATORY HP (tsf)	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
1	0.0–4.0	**FAT CLAY (CH)**, fine grained, dark brown, stiff to very stiff	23.5				10-14-27	>4.5	9			
							6-8-6 N=14	4.5 (HP)	27		77-23-54	93
	4.0–7.0	**FAT CLAY WITH SAND (CH)**, fine grained, dark brown, very stiff	20.5	5			12-18-24	4.5 (HP)	23		72-27-45	84
2	7.0–15.0	**LEAN CLAY (CL)**, trace sand, fine to medium grained, light brown with grayish white mottling, red brown blue motting, and red brown motting, stiff	12.5				4-3-6 N=9	2.5 (HP)	24			
				10			4-6-10	3.5 (HP)	24			
	15.0–20.0	**LEAN CLAY (CL)**, fine grained, grayish brown, medium stiff	7.5	15			1-2-3 N=5	1.0 (HP)	30			
	20.0–24.5	**LEAN CLAY (CL)**, fine grained, gray, very stiff to hard	3	20	▽		15-24-40		33	87		
	24.5–31.5	**SANDY LEAN CLAY (CL)**, fine to medium grained, gray, soft to stiff	-4	25			4-1-2 N=3	1.0 (HP)	22			
				30			13-12-13	0.5 (HP)	23	102		

Boring Terminated at 31.5 Feet

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
6" Hollow Stem Auger

Abandonment Method:
Boring backfilled with auger cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevations were provided by HMH

Notes:

Northing & Easting and Elevations were provided by HMH Engineers in Boring Locations plan dated 10/30/2020.
Northing & Easting and Elevations were provided by HMH Engineers in Boring Locations plan dated 10/30/2020.

WATER LEVEL OBSERVATIONS

▽ *While drilling*

Terracon
5075 Commercial Cir Ste E
Concord, CA

Boring Started: 10-23-2020	Boring Completed: 10-23-2020
Drill Rig: CME 95	Driller: Baja Exploration
Project No.: ND205079	

BORING LOG NO. B8

PROJECT: Bay AZ1 Site (Northtown)

CLIENT: Burns & McDonnell Engineering Company Inc Columbus, OH

SITE: Orchard Parkway San Jose, CA

LOCATION See Exploration Plan

Northing: 37.3784456 Easting: -121.9325447

Surface Elev.: 27.31 (Ft.)

MODEL LAYER	DEPTH (Ft.)	DESCRIPTION	ELEVATION (Ft.)
2	0 – 4.0	**LEAN CLAY WITH SAND (CL)**, fine grained, dark brown, stiff to very stiff	23.5
2	4.0 – 7.5	**LEAN CLAY (CL)**, fine grained, light brown, stiff	20
2	7.5 – 15.0	**LEAN CLAY WITH SAND (CL)**, fine grained, light brown with red brown mottling, stiff	12.5
2	15.0 – 20.0	**LEAN CLAY (CL)**, trace sand, fine grained, grayish brown, medium stiff	7.5
3	20.0 – 25.5	**WELL GRADED SAND (SW)**, fine to medium grained, gray, loose	2
2	25.5 –	**SANDY LEAN CLAY (CL)**, fine to medium grained, gray to dark gray, medium stiff to stiff	

DEPTH (In.)	WATER LEVEL OBSERVATIONS	FIELD TEST RESULTS	LABORATORY HP (tsf)	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
1 – 2.5		9-13-10 N=23	>4.5	12			
2.5 – 4		2-5-13	>4.5	28	77	49-23-26	80
5 – 6.5		1-7-7 N=14	3.75 (HP)	26			
7.5 – 9		7-11-15	1.5 (HP)	22	92	42-22-20	83
10 – 11.5		3-3-5 N=8	1.25 (HP)	24			
15 – 16.5		4-3-6	1.0 (HP)	26	91		
~19.5	▽						
20 – 21.5		3-2-6 N=8					
25 – 26.5		3-4-4		13	108		
26.5 – 29							58
30 – 31.5		5-5-9 N=14	2.5 (HP)	24		29-17-12	

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
6" Hollow Stem Auger

Abandonment Method:
Boring backfilled with bentonite grout upon completion

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevations were provided by HMH

Notes:

Northing & Easting and Elevations were provided by HMH Engineers in Boring Locations plan dated 10/30/2020.
Northing & Easting and Elevations were provided by HMH Engineers in Boring Locations plan dated 10/30/2020.

WATER LEVEL OBSERVATIONS

▽ *While sampling*

Terracon
5075 Commercial Cir Ste E
Concord, CA

Boring Started: 10-26-2020	Boring Completed: 10-26-2020
Drill Rig: CME 95	Driller: Baja Exploration
Project No.: ND205079	

BORING LOG NO. B8

PROJECT: Bay AZ1 Site (Northtown)

CLIENT: Burns & McDonnell Engineering Company Inc
Columbus, OH

SITE: Orchard Parkway
San Jose, CA

LOCATION See Exploration Plan

Northing: 37.3784456 Easting: -121.9325447

Surface Elev.: 27.31 (Ft.)

MODEL LAYER	GRAPHIC LOG	DEPTH / ELEVATION (Ft.)	DESCRIPTION	DEPTH (In.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	LABORATORY HP (tsf)	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
2			**SANDY LEAN CLAY (CL)**, fine to medium grained, gray to dark gray, medium stiff to stiff *(continued)*				4-4-9	0.75 (HP)	24			62
		40.0 / -12.5		40								
			LEAN CLAY WITH SAND (CL), fine grained, dark gray, stiff to very stiff				5-6-12 N=18	2.5 (HP)	32			
				45			7-14-19	3.75 (HP)	20		35-17-18	74
				50			4-6-10 N=16	2.0 (HP)	34			
		51.5 / -24	***Boring Terminated at 51.5 Feet***									

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
6" Hollow Stem Auger

Abandonment Method:
Boring backfilled with bentonite grout upon completion

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevations were provided by HMH

Notes:

WATER LEVEL OBSERVATIONS

∇ *While sampling*

Terracon
5075 Commercial Cir Ste E
Concord, CA

Boring Started: 10-26-2020	Boring Completed: 10-26-2020
Drill Rig: CME 95	Driller: Baja Exploration
Project No.: ND205079	

BORING LOG NO. B9

PROJECT: Bay AZ1 Site (Northtown)

CLIENT: Burns & McDonnell Engineering Company Inc Columbus, OH

SITE: Orchard Parkway San Jose, CA

LOCATION See Exploration Plan

Northing: 37.3777845 Easting: -121.933206

Surface Elev.: 27.5 (Ft.)

MODEL LAYER	GRAPHIC LOG	DEPTH (Ft.) / Description	ELEVATION (Ft.)	DEPTH (In.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	LABORATORY HP (tsf)	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
1		**FAT CLAY (CH)**, fine grained, dark brown, very stiff					9-19-22	>4.5	19			
							7-10-12 N=22	>4.5	26			
2		5.0 **LEAN CLAY (CL)**, fine grained, dark brown with light brown mottling, very stiff	22.5	5			7-19-25	>4.5	20			
		7.5 **LEAN CLAY (CL)**, trace sand, coarse to medium grained, light brown, stiff	20				4-5-5 N=10		25			
		10.0 **LEAN CLAY (CL)**, fine grained, grayish brown with red brown mottling, medium stiff	17.5	10	▽		3-4-6	0.75 (HP)	27	94		
					▽							
3		15.0 **CLAYEY SAND (SC)**, fine to medium grained, gray, loose	12.5	15			1-2-3 N=5		25			
		16.5	11									

Boring Terminated at 16.5 Feet

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
6" Hollow Stem Auger

Abandonment Method:
Boring backfilled with auger cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevations were provided by HMH

Notes:

Northing & Easting and Elevations were provided by HMH Engineers in Boring Locations plan dated 10/30/2020.

WATER LEVEL OBSERVATIONS

▽ *While drilling*

▽ *At completion of drilling*

Terracon
5075 Commercial Cir Ste E
Concord, CA

Boring Started: 10-23-2020

Boring Completed: 10-23-2020

Drill Rig: CME 95

Driller: Baja Exploration

Project No.: ND205079

BORING LOG NO. B10

PROJECT: Bay AZ1 Site (Northtown)

CLIENT: Burns & McDonnell Engineering Company Inc Columbus, OH

SITE: Orchard Parkway San Jose, CA

LOCATION See Exploration Plan

Northing: 37.3789866 Easting: -121.9333547

Surface Elev.: 48.32 (Ft.)

MODEL LAYER	GRAPHIC LOG	DEPTH / ELEVATION (Ft.)	DESCRIPTION	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	LABORATORY HP (tsf)	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
1		3.5 / 45	**FAT CLAY WITH GRAVEL (CH)**, fine to medium grained, brown, very stiff				15-15-12 N=27		5			
							5-11-18	3.5 (HP)	8	91		
3		5.0 / 43.5	**POORLY GRADED SAND (SP)**, fine to medium grained, light brown, medium dense	5								
1		9.0 / 39.5	**FAT CLAY (CH)**, some gravel, fine grained, brown with white mottling, very stiff				6-11-10 N=21	>4.5	13			
							8-12-17	4.5 (HP)	27			
1		16.5 / 32	**FAT CLAY (CH)**, some sand and gravel, fine to medium grained, dark brown with brown mottling, very stiff	10			6-7-10 N=17	4.5 (HP)	29			
				15			5-9-15	4.25 (HP)	22			

Boring Terminated at 16.5 Feet

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
6" Hollow Stem Auger

Abandonment Method:
Boring backfilled with auger cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevations were provided by HMH

Notes:

Northing & Easting and Elevations were provided by HMH Engineers in Boring Locations plan dated 10/30/2020.

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
5075 Commercial Cir Ste E
Concord, CA

Boring Started: 10-27-2020	Boring Completed: 10-27-2020
Drill Rig: CME 95	Driller: Baja Exploration
Project No.: ND205079	

BORING LOG NO. B11

PROJECT: Bay AZ1 Site (Northtown)	CLIENT: Burns & McDonnell Engineering Company Inc Columbus, OH
SITE: Orchard Parkway San Jose, CA	

LOCATION See Exploration Plan

Northing: 37.3779696 Easting: -121.9317919

Surface Elev.: 28.61 (Ft.)

MODEL LAYER	DEPTH (Ft.)	ELEVATION (Ft.)	DESCRIPTION	DEPTH (In.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	LABORATORY HP (tsf)	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
1			**FAT CLAY (CH)**, fine grained, dark brown, very stiff				13-12-12 N=24	>4.5	10			
	5.0	23.5					10-11-13	>4.5	25	92		
2			**LEAN CLAY WITH SAND (CL)**, fine to medium grained, brown with red brown mottling, very stiff	5			5-7-10 N=17	4.25 (HP)	25			
	10.0	18.5					8-11-19	2.5 (HP)	22	102		
			LEAN CLAY (CL), some gravel, fine to medium grained, brown with gray brown mottling, medium stiff	10			2-3-3 N=6		18			
	15.0	13.5			▽							
3	16.5	12	**WELL GRADED SAND (SW)**, some clay, fine to coarse grained, brown and black, medium dense	15			6-18-11		19	104		

Boring Terminated at 16.5 Feet

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
6" Hollow Stem Auger

Abandonment Method:
Boring backfilled with auger cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevations were provided by HMH

Notes:

Northing & Easting and Elevations were provided by HMH Engineers in Boring Locations plan dated 10/30/2020.

WATER LEVEL OBSERVATIONS

▽ *While drilling*

5075 Commercial Cir Ste E
Concord, CA

Boring Started: 10-23-2020	Boring Completed: 10-23-2020
Drill Rig: CME 95	Driller: Baja Exploration
Project No.: ND205079	

BORING LOG NO. B12

PROJECT: Bay AZ1 Site (Northtown)

CLIENT: Burns & McDonnell Engineering Company Inc
Columbus, OH

SITE: Orchard Parkway
San Jose, CA

LOCATION See Exploration Plan

Northing: 37.3781626 Easting: -121.9340656

Surface Elev.: 26.92 (Ft.)

MODEL LAYER	GRAPHIC LOG	DESCRIPTION	DEPTH (Ft.)	ELEVATION (Ft.)
1		**FAT CLAY (CH)**, fine grained, dark brown, stiff to very stiff	5.0	22
2		**LEAN CLAY (CL)**, fine grained, light brown with white mottling, stiff	7.5	19.5
3		**CLAYEY SAND (SC)**, fine to coarse grained, brown, loose	10.0	17
2		**LEAN CLAY WITH SAND (CL)**, fine grained, gray with reddish brown mottling, stiff to very stiff	15.0	12
4		**SANDY SILT (ML)**, fine to medium grained, gray, very stiff	16.5	10.5

Boring Terminated at 16.5 Feet

DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	LABORATORY HP (tsf)	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
			6-7-8 N=15	>4.5	14			
			8-17-34		21	91		
5			3-5-6 N=11	4.25 (HP)	21			
			4-5-7		21	100		
10	▽		0-4-5 N=9	1.25 (HP)	29			
	▽							
15			5-12-20		23	102		

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
6" Hollow Stem Auger

Abandonment Method:
Boring backfilled with auger cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevations were provided by HMH

Notes:

Northing & Easting and Elevations were provided by HMH Engineers in Boring Locations plan dated 10/30/2020.

WATER LEVEL OBSERVATIONS

▽ *While drilling*

▽ *At completion of drilling*

Terracon
5075 Commercial Cir Ste E
Concord, CA

Boring Started: 10-23-2020	Boring Completed: 10-23-2020
Drill Rig: CME 95	Driller: Baja Exploration
Project No.: ND205079	

BORING LOG NO. B13

PROJECT: Bay AZ1 Site (Northtown)

CLIENT: Burns & McDonnell Engineering Company Inc Columbus, OH

SITE: Orchard Parkway San Jose, CA

LOCATION See Exploration Plan

Northing: 37.3784349 Easting: -121.9345573

Surface Elev.: 29.47 (Ft.)

MODEL LAYER	DEPTH (Ft.)	DESCRIPTION	ELEVATION (Ft.)
3	2.5	**CLAYEY SAND (SC)**, fine to medium grained, light brown, loose	27
2	7.5	**LEAN CLAY WITH SAND (CL)**, some sand, fine to medium grained, dark brown with white mottling, very stiff	22
3	9.5	**CLAYEY SAND (SC)**, fine to medium grained, light brown with white mottling, medium dense	20
3	11.0	**POORLY GRADED SAND (SP)**, trace clay, fine to medium grained, brown with black, medium dense	18.5
3	20.0	**CLAYEY SAND (SC)**, trace silt, fine to medium grained, brown, medium dense	9.5
2	25.0	**LEAN CLAY WITH SAND (CL)**, fine to medium grained, light brown, stiff	4.5
2	32.5	**LEAN CLAY (CL)**, fine grained, gray, soft to medium stiff	-3

Boring Terminated at 32.5 Feet

DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	FIELD TEST RESULTS	LABORATORY HP (tsf)	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
1–2.5		8-3-4		8			
2.5–4		5-8-10 N=18	>4.5	15		38-19-19	73
5–6.5		8-13-15	4.5 (HP)	22	97		
7.5–9		5-11-14 N=25		17			
10–11.5		5-10-18		8			
15–16.5		2-6-11 N=17		29			33
~19.5	▽						
20–21.5		2-5-12		22	103		
25–26.5		2-1-3 N=4	1.25 (HP)	29			
26.5–32.5							95

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method: 6" Hollow Stem Auger Abandonment Method: Boring backfilled with auger cuttings upon completion.	See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any). See Supporting Information for explanation of symbols and abbreviations. Elevations were provided by HMH	Notes: Northing & Easting and Elevations were provided by HMH Engineers in Boring Locations plan dated 10/30/2020. Northing & Easting and Elevations were provided by HMH Engineers in Boring Locations plan dated 10/30/2020.

WATER LEVEL OBSERVATIONS ▽ *While drilling*	Terracon 5075 Commercial Cir Ste E Concord, CA	Boring Started: 10-23-2020 / Boring Completed: 10-23-2020 Drill Rig: CME 95 / Driller: Baja Exploration Project No.: ND205079

BORING LOG NO. B14

PROJECT: Bay AZ1 Site (Northtown)

CLIENT: Burns & McDonnell Engineering Company Inc
Columbus, OH

SITE: Orchard Parkway
San Jose, CA

LOCATION See Exploration Plan

Northing: 37.3790698 Easting: -121.934504

Surface Elev.: 35.89 (Ft.)

MODEL LAYER	DEPTH (Ft.)	DESCRIPTION	ELEVATION (Ft.)	FIELD TEST RESULTS	LABORATORY HP (tsf)	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
1	2.5	**FAT CLAY (CH)**, fine grained, brown to dark brown, very stiff	33.5	13-16-16	>4.5	19			
4	5.5	**SANDY SILT (ML)**, fine grained, light brown, stiff	30.5	4-7-8 N=15	>4.5	17			77
2	10.0	**LEAN CLAY (CL)**, some sand, fine to medium grained, dark brown, stiff to very stiff	26	9-13-12	4.5 (HP)	18	94	48-25-23	91
				5-8-10 N=18	>4.5	22			
3	11.0	**SILTY SAND (SM)**, fine grained, light brown, medium dense	25	6-9-16	>4.5	19	94		
2	15.0	**LEAN CLAY (CL)**, fine to medium grained, dark brown, very stiff	21						
2	20.0	**SANDY LEAN CLAY (CL)**, fine to medium grained, light brown with greyish white mottling, very stiff	16	3-9-11 N=20	2.5 (HP)	17			
3	25.0	**POORLY GRADED SAND (SP)**, some gravel, fine to coarse grained, brown with black and reddish brown, dense	11	7-15-29		13	118		
3	27.0	**WELL GRADED SAND (SW)**, fine to coarse grained, black with white and gray, loose	9	1-2-5 N=7		27			
2	30.0	**SANDY LEAN CLAY (CL)**, fine grained, gray, medium stiff	6						
4	31.5	**SANDY SILT (ML)**, fine grained, gray to black, stiff	4.5	6-5-5 N=10		21			

Boring Terminated at 31.5 Feet

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
6" Hollow Stem Auger

Abandonment Method:
Boring backfilled with auger cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevations were provided by HMH

Notes:

Northing & Easting and Elevations were provided by HMH Engineers in Boring Locations plan dated 10/30/2020.
Northing & Easting and Elevations were provided by HMH Engineers in Boring Locations plan dated 10/30/2020.

WATER LEVEL OBSERVATIONS

▽ *While drilling*

▼ *At completion of drilling*

5075 Commercial Cir Ste E
Concord, CA

Boring Started: 10-22-2020	Boring Completed: 10-22-2020
Drill Rig: CME 95	Driller: Baja Exploration
Project No.: ND205079	

BORING LOG NO. B15

PROJECT: Bay AZ1 Site (Northtown)

CLIENT: Burns & McDonnell Engineering Company Inc Columbus, OH

SITE: Orchard Parkway San Jose, CA

LOCATION See Exploration Plan

Northing: 37.3788994 Easting: -121.9343977

Surface Elev.: 40.89 (Ft.)

MODEL LAYER	GRAPHIC LOG	DEPTH (Ft.)	DESCRIPTION	ELEVATION (Ft.)	DEPTH (In.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	LABORATORY HP (tsf)	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
1			**FAT CLAY WITH SAND (CH)**, with sand and gravel, fine to coarse grained, brown and white, stiff to very stiff					4-7-2 N=9	>4.5	10			
								9-16-21	>4.5	16	83	62-21-41	82
		5.5		35.5	5								
2			**LEAN CLAY WITH SAND (CL)**, fine to medium grained, brown, very stiff					12-14-14 N=28	>4.5	13			
		10.0		31	10								
			LEAN CLAY (CL), trace sand, fine to medium grained, dark brown with grayish brown mottling, very stiff					5-8-9 N=17	4.0 (HP)	21			
					15								
			LEAN CLAY (CL), trace sand, fine to medium grained, dark brown, very stiff					7-12-20	4.5 (HP)	23	81		
		20.0		21	20								
3			**SANDY LEAN CLAY (CL)**, fine to medium grained, light brown with gray mottling, stiff to very stiff					6-7-9 N=16	3.0 (HP)	17			
		25.0		16	25								
			POORLY GRADED SAND (SP), trace gravel, fine to medium grained, light brown with gray, medium dense					3-10-11		23			
		30.0		11	30								
2			**LEAN CLAY (CL)**, fine grained, gray, medium stiff					1-3-5 N=8	0.5 (HP)	32			
		35.0		6	35								

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
6" Hollow Stem Auger

Abandonment Method:
Boring backfilled with bentonite grout upon completion

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevations were provided by HMH

Notes:

Northing & Easting and Elevations were provided by HMH Engineers in Boring Locations plan dated 10/30/2020.
Northing & Easting and Elevations were provided by HMH Engineers in Boring Locations plan dated 10/30/2020.

WATER LEVEL OBSERVATIONS

Terracon
5075 Commercial Cir Ste E
Concord, CA

Boring Started: 10-22-2020	Boring Completed: 10-22-2020
Drill Rig: CME 95	Driller: Baja Exploration
Project No.: ND205079	

BORING LOG NO. B15

PROJECT: Bay AZ1 Site (Northtown)

CLIENT: Burns & McDonnell Engineering Company Inc
Columbus, OH

SITE: Orchard Parkway
San Jose, CA

LOCATION See Exploration Plan

Northing: 37.3788994 Easting: -121.9343977

Surface Elev.: 40.89 (Ft.)

MODEL LAYER	DEPTH / ELEVATION (Ft.)	DESCRIPTION	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	LABORATORY HP (tsf)	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
2	40.0 / 1	**LEAN CLAY (CL)**, fine grained, black with gray mottling, stiff				4-6-8	1.5 (HP)	30			
	45.0 / -4	**LEAN CLAY (CL)**, trace sand, fine grained, black with brown mottling, medium stiff to stiff	40								
	51.5 / -10.5	**LEAN CLAY WITH SAND (CL)**, fine grained, gray, stiff	45			7-9-14	2.0 (HP)	26	100	40-18-22	88
			50			2-4-7 N=11		19			

Boring Terminated at 51.5 Feet

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
6" Hollow Stem Auger

Abandonment Method:
Boring backfilled with bentonite grout upon completion

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevations were provided by HMH

Notes:

WATER LEVEL OBSERVATIONS

Terracon
5075 Commercial Cir Ste E
Concord, CA

Boring Started: 10-22-2020	Boring Completed: 10-22-2020
Drill Rig: CME 95	Driller: Baja Exploration
Project No.: ND205079	

BORING LOG NO. P1

PROJECT: Bay AZ1 Site (Northtown)

CLIENT: Burns & McDonnell Engineering Company Inc Columbus, OH

SITE: Orchard Parkway San Jose, CA

LOCATION See Exploration Plan

Northing: 37.3783114 Easting: -121.9342412

Surface Elev.: 26.5 (Ft.)

MODEL LAYER	GRAPHIC LOG	DEPTH / ELEVATION (Ft.)	DESCRIPTION	DEPTH (ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	LABORATORY HP (tsf)	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
1		7.0 / 19.5	**FAT CLAY (CH)**, fine grained, brown to dark brown, very stiff	5			6-15-18	>4.5	26			
2		10.0 / 16.5	**SANDY LEAN CLAY (CL)**, fine to medium grained, light brown with white mottling, stiff				4-5-7 N=12	3.5 (HP)	18			
		11.5 / 15	**SANDY LEAN CLAY (CL)**, trace gravel, fine to medium grained, light brown with red brown mottling, medium stiff	10			3-5-7	0.5 (HP)	21			

Boring Terminated at 11.5 Feet

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
6" Hollow Stem Auger

Abandonment Method:
Boring backfilled with auger cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevations were provided by HMH

Notes:

Northing & Easting and Elevations were provided by HMH Engineers in Boring Locations plan dated 10/30/2020.

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
5075 Commercial Cir Ste E
Concord, CA

Boring Started: 10-22-2020	Boring Completed: 10-22-2020
Drill Rig: CME 95	Driller: Baja Exploration
Project No.: ND205079	

BORING LOG NO. P2

PROJECT: Bay AZ1 Site (Northtown)

CLIENT: Burns & McDonnell Engineering Company Inc
Columbus, OH

SITE: Orchard Parkway
San Jose, CA

LOCATION See Exploration Plan

Northing: 37.3792005 Easting: -121.9332728

Surface Elev.: 41.85 (Ft.)

MODEL LAYER	LOCATION / DESCRIPTION	DEPTH (Ft.)	ELEVATION (Ft.)	DEPTH (In.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	LABORATORY HP (tsf)	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
1	**FAT CLAY WITH SAND (CH)**, some gravel, fine to coarse grained, brown, stiff to very stiff	5.0	37				10-6-9 N=15	>4.5	8			
2	**LEAN CLAY (CL)**, fine to coarse grained, brown, very stiff			5			11-33-28	>4.5	13			
		11.5	30.5	10			4-7-11 N=18	3.75 (HP)	23			

Boring Terminated at 11.5 Feet

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
6" Hollow Stem Auger

Abandonment Method:
Boring backfilled with auger cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevations were provided by HMH

Notes:

Northing & Easting and Elevations were provided by HMH Engineers in Boring Locations plan dated 10/30/2020.

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
5075 Commercial Cir Ste E
Concord, CA

Boring Started: 10-22-2020	Boring Completed: 10-22-2020
Drill Rig: CME 95	Driller: Baja Exploration
Project No.: ND205079	

BORING LOG NO. P3

PROJECT: Bay AZ1 Site (Northtown)

CLIENT: Burns & McDonnell Engineering Company Inc
Columbus, OH

SITE: Orchard Parkway
San Jose, CA

LOCATION See Exploration Plan

Northing: 37.3780553 Easting: -121.9329027

Surface Elev.: 27.28 (Ft.)

MODEL LAYER	GRAPHIC LOG	DESCRIPTION	DEPTH / ELEVATION (Ft.)	DEPTH (In.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	LABORATORY HP (tsf)	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
1		**FAT CLAY (CH)**, fine grained, brown, stiff	2.5 / 25			Hand						
2		**LEAN CLAY (CL)**, fine grained, gray with brown mottling, stiff	7.0 / 20.5			SPT	2-4-6 N=10		22			
				5		Hand						
		LEAN CLAY (CL), fine grained, brown with gray mottling, stiff to very stiff	11.5 / 16			Modified California	10-11-11	3.25 (HP)	23			
				10		SPT	3-5-5 N=10	2.0 (HP)	31			

Boring Terminated at 11.5 Feet

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
6" Hollow Stem Auger

Abandonment Method:
Boring backfilled with auger cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevations were provided by HMH

Notes:

Northing & Easting and Elevations were provided by HMH Engineers in Boring Locations plan dated 10/30/2020.

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
5075 Commercial Cir Ste E
Concord, CA

Boring Started: 10-26-2020	Boring Completed: 10-26-2020
Drill Rig: CME 95	Driller: Baja Exploration
Project No.: ND205079	

BORING LOG NO. P4

PROJECT: Bay AZ1 Site (Northtown)

CLIENT: Burns & McDonnell Engineering Company Inc
Columbus, OH

SITE: Orchard Parkway
San Jose, CA

LOCATION See Exploration Plan

Northing: 37.3786742 Easting: -121.9310569

Surface Elev.: 32.8 (Ft.)

MODEL LAYER	GRAPHIC LOG	DEPTH (Ft.)	DESCRIPTION	ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	LABORATORY HP (tsf)	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
2			**SANDY LEAN CLAY (CL)**, fine to medium grained, grayish brown, stiff					8-13-12		21		32-15-17	53
		2.0	**LEAN CLAY (CL)**, fine grained, dark gray, very stiff	31									
					5			8-11-15 N=26	>4.5	11			
		11.5		21.5	10			7-13-14	>4.5	22			

Boring Terminated at 11.5 Feet

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
6" Hollow Stem Auger

Abandonment Method:
Boring backfilled with auger cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevations were provided by HMH

Notes:

Northing & Easting and Elevations were provided by HMH Engineers in Boring Locations plan dated 10/30/2020.

WATER LEVEL OBSERVATIONS

Groundwater not encountered

5075 Commercial Cir Ste E
Concord, CA

Boring Started: 10-27-2020	Boring Completed: 10-27-2020
Drill Rig: CME 95	Driller: Baja Exploration
Project No.: ND205079	

BORING LOG NO. P5

PROJECT: Bay AZ1 Site (Northtown)

CLIENT: Burns & McDonnell Engineering Company Inc Columbus, OH

SITE: Orchard Parkway San Jose, CA

LOCATION See Exploration Plan

Northing: 37.3772208 Easting: -121.932485

Surface Elev.: 28.94 (Ft.)

MODEL LAYER	GRAPHIC LOG	DEPTH / DESCRIPTION	ELEVATION (Ft.)	DEPTH (In.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	LABORATORY HP (tsf)	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
1		**FAT CLAY (CH)**, fine grained, dark brown, stiff to very stiff					6-8-9		18			
				5			7-10-10 N=20	4.5 (HP)	26			
		10.0	19									
2		**LEAN CLAY WITH SAND (CL)**, fine to medium grained, light brown with gray mottling, stiff		10					22			
		11.5	17.5									

Boring Terminated at 11.5 Feet

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
6" Hollow Stem Auger

Abandonment Method:
Boring backfilled with auger cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevations were provided by HMH

Notes:

Northing & Easting and Elevations were provided by HMH Engineers in Boring Locations plan dated 10/30/2020.

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
5075 Commercial Cir Ste E
Concord, CA

Boring Started: 10-23-2020	Boring Completed: 10-23-2020
Drill Rig: CME 95	Driller: Baja Exploration
Project No.: ND205079	

BORING LOG NO. I1

PROJECT: Bay AZ1 Site (Northtown)

CLIENT: Burns & McDonnell Engineering Company Inc
Columbus, OH

SITE: Orchard Parkway
San Jose, CA

LOCATION See Exploration Plan

Northing: 37.3786894 Easting: -121.9347755

Surface Elev.: 31.97 (Ft.)

MODEL LAYER	GRAPHIC LOG	DEPTH / ELEVATION (Ft.)	DEPTH (In.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	LABORATORY HP (tsf)	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
1		**FAT CLAY (CH)**, some sand, fine to medium grained, dark brown, stiff 5.0 / 27	5								
		Boring Terminated at 5 Feet									

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
6" Hollow Stem Auger

Abandonment Method:
Boring backfilled with auger cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevations were provided by HMH

Notes:

Northing & Easting and Elevations were provided by HMH Engineers in Boring Locations plan dated 10/30/2020.

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
5075 Commercial Cir Ste E
Concord, CA

Boring Started: 10-22-2020	Boring Completed: 10-22-2020
Drill Rig: CME 95	Driller: Baja Exploration
Project No.: ND205079	

BORING LOG NO. I2

PROJECT: Bay AZ1 Site (Northtown)

CLIENT: Burns & McDonnell Engineering Company Inc Columbus, OH

SITE: Orchard Parkway San Jose, CA

MODEL LAYER	GRAPHIC LOG	LOCATION See Exploration Plan Northing: 37.3789698 Easting: -121.9341981 Surface Elev.: 39.97 (Ft.) ELEVATION (Ft.)	DEPTH (In.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	LABORATORY HP (tsf)	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
1		**FAT CLAY (CH)**, fine grained, dark brown, stiff 5.0 35	5								
		Boring Terminated at 5 Feet									

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
6" Hollow Stem Auger

Abandonment Method:
Boring backfilled with auger cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevations were provided by HMH

Notes:

Northing & Easting and Elevations were provided by HMH Engineers in Boring Locations plan dated 10/30/2020.

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
5075 Commercial Cir Ste E
Concord, CA

Boring Started: 10-22-2020	Boring Completed: 10-22-2020
Drill Rig: CME 95	Driller: Baja Exploration
Project No.: ND205079	

BORING LOG NO. I3

PROJECT: Bay AZ1 Site (Northtown)

**CLIENT: Burns & McDonnell Engineering Company Inc
Columbus, OH**

**SITE: Orchard Parkway
San Jose, CA**

MODEL LAYER	GRAPHIC LOG	LOCATION See Exploration Plan Northing: 37.3793174 Easting: -121.9322947 Surface Elev.: 27.73 (Ft.) ELEVATION (Ft.)	DEPTH (In.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	LABORATORY HP (tsf)	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
1		**FAT CLAY (CH)**, fine grained, dark brown, stiff 5.0 22.5	5								
		Boring Terminated at 5 Feet									

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
6" Hollow Stem Auger

Abandonment Method:
Boring backfilled with auger cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevations were provided by HMH

Notes:

Northing & Easting and Elevations were provided by HMH Engineers in Boring Locations plan dated 10/30/2020.

WATER LEVEL OBSERVATIONS

Groundwater not encountered

5075 Commercial Cir Ste E
Concord, CA

Boring Started: 10-23-2020	Boring Completed: 10-23-2020
Drill Rig: CME 95	Driller: Baja Exploration
Project No.: ND205079	

BORING LOG NO. I4

PROJECT: Bay AZ1 Site (Northtown)

CLIENT: Burns & McDonnell Engineering Company Inc Columbus, OH

SITE: Orchard Parkway San Jose, CA

LOCATION See Exploration Plan

Northing: 37.3789737 Easting: -121.9315757

Surface Elev.: 32.04 (Ft.)

MODEL LAYER	GRAPHIC LOG	DEPTH / DESCRIPTION	ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	LABORATORY HP (tsf)	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
1		**FAT CLAY (CH)**, fine grained, brown, stiff										
		5.0	27	5								
		Boring Terminated at 5 Feet										

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
6" Hollow Stem Auger

Abandonment Method:
Boring backfilled with auger cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevations were provided by HMH

Notes:

Northing & Easting and Elevations were provided by HMH Engineers in Boring Locations plan dated 10/30/2020.

WATER LEVEL OBSERVATIONS

Groundwater not encountered

5075 Commercial Cir Ste E
Concord, CA

Boring Started: 10-23-2020	Boring Completed: 10-23-2020
Drill Rig: CME 95	Driller: Baja Exploration
Project No.: ND205079	

CPT LOG NO. CPT-01

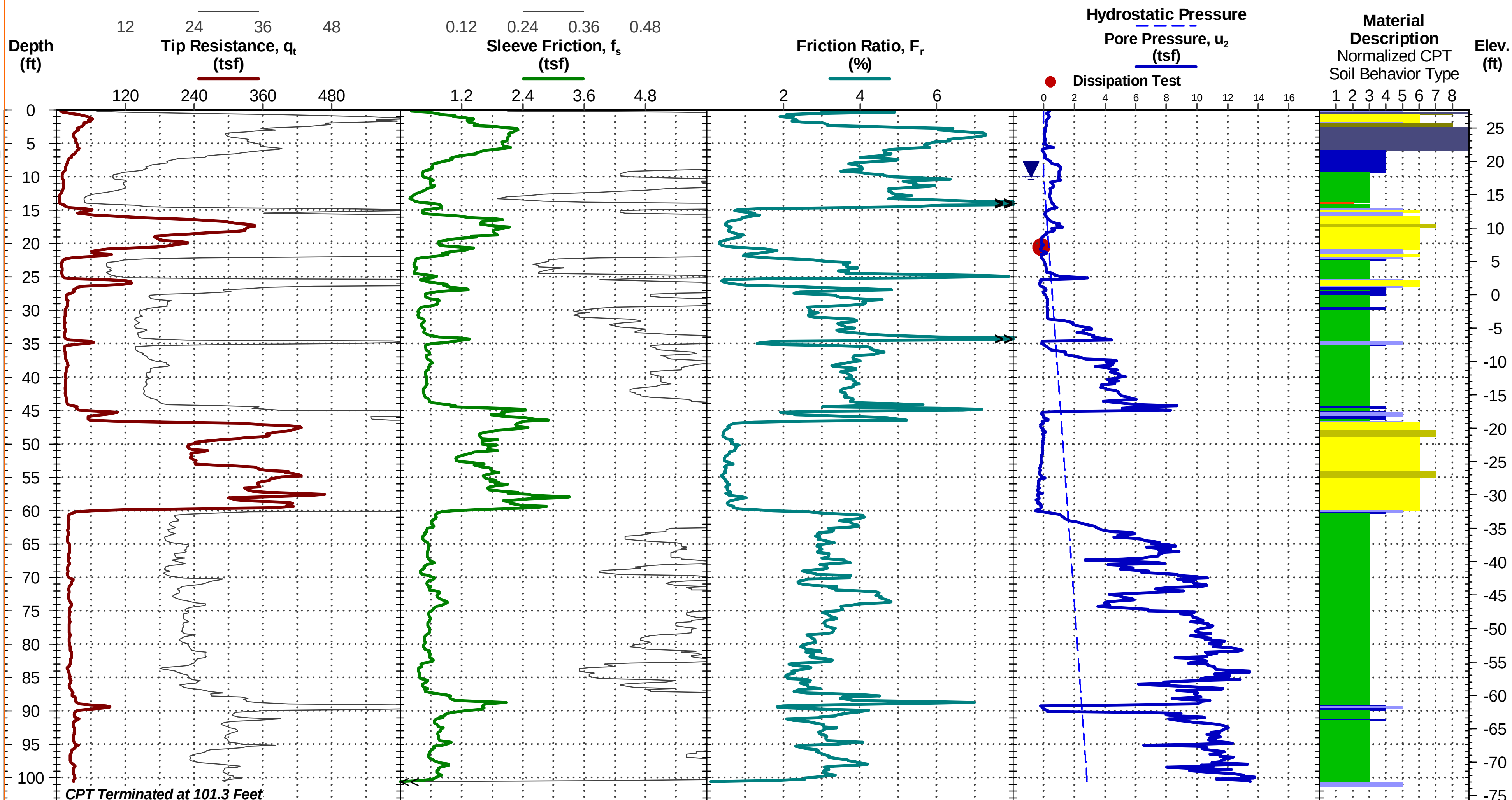
PROJECT: Bay AZ1 Site (Northtown)

CLIENT: Burns & McDonnell Engineering Company Inc
Columbus, OH

TEST LOCATION: See Exploration Plan

Surface Elev.: 27.65 ft
Northing: 37.3777314
Easting: -121.9333134

SITE: Orchard Parkway
San Jose, CA



See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).
Elevations were provided by HMH

Dead weight of rig used as reaction force.
CPT sensor calibration reports available upon request.

1 Sensitive, fine grained
2 Organic soils - clay
3 Clay - silty clay to clay
4 Silt mixtures - clayey silt to silty clay
5 Sand mixtures - silty sand to sandy silt
6 Sands - clean sand to silty sand
7 Gravelly sand to dense sand
8 Very stiff sand to clayey sand
9 Very stiff fine grained

WATER LEVEL OBSERVATION

10 ft measured water depth
(used in normalizations and correlations; See Supporting Information)

Probe no. DDG1530

Terracon
5075 Commercial Cir Ste E
Concord, CA

CPT Started: 10/23/2020	CPT Completed: 10/23/2020
Rig: CPT	Operator: Middle Earth
Project No.: ND205079	

CPT LOG NO. CPT-02

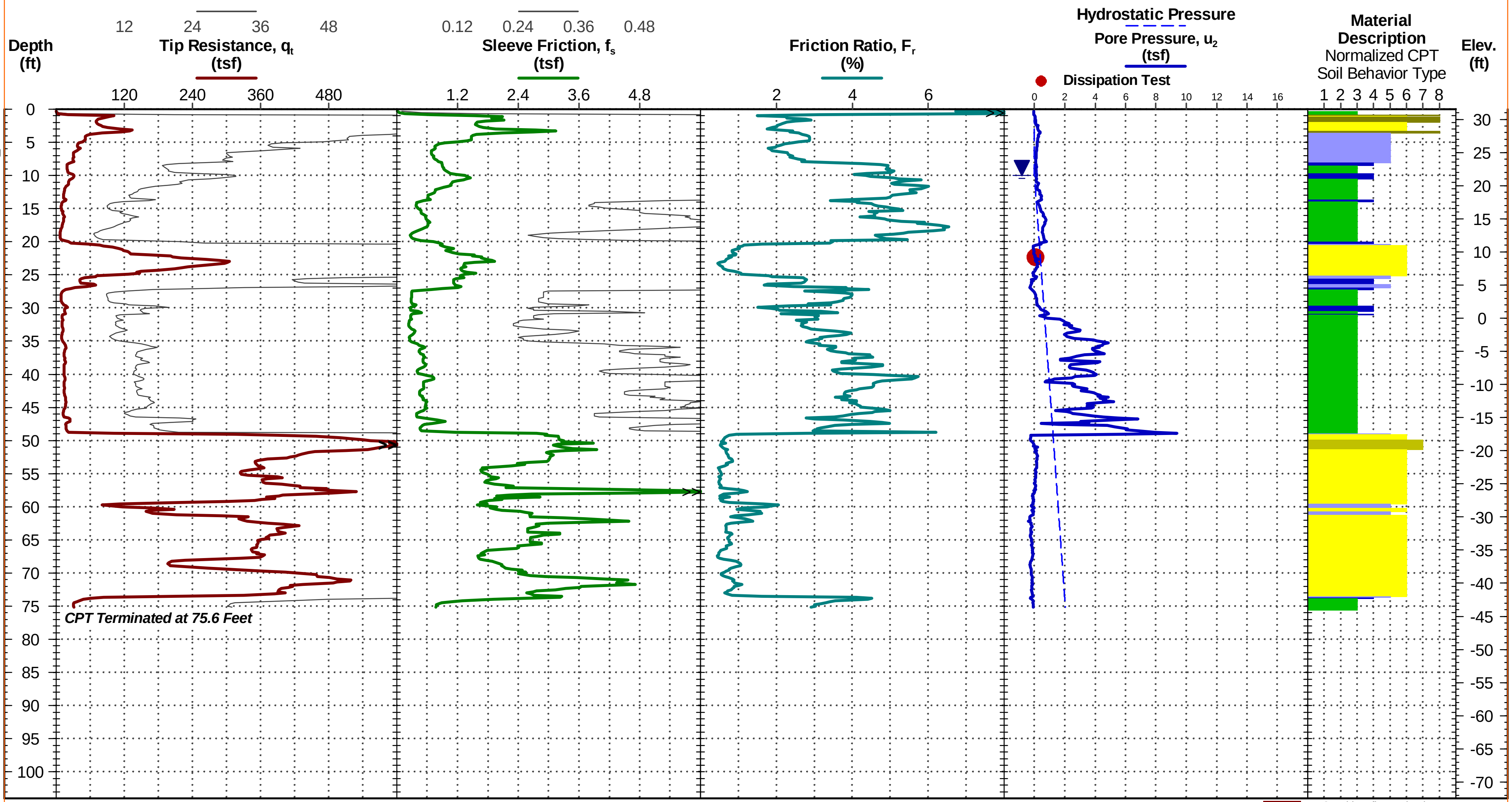
PROJECT: Bay AZ1 Site (Northtown)

CLIENT: Burns & McDonnell Engineering Company Inc
Columbus, OH

TEST LOCATION: See Exploration Plan

Surface Elev.: 31.53 ft
Northing: 37.3787553
Easting: -121.9333421

SITE: Orchard Parkway
San Jose, CA



See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).
Elevations were provided by HMH

Dead weight of rig used as reaction force.
CPT sensor calibration reports available upon request.

1 Sensitive, fine grained
2 Organic soils - clay
3 Clay - silty clay to clay
4 Silt mixtures - clayey silt to silty clay
5 Sand mixtures - silty sand to sandy silt
6 Sands - clean sand to silty sand
7 Gravelly sand to dense sand
8 Very stiff sand to clayey sand
9 Very stiff fine grained

WATER LEVEL OBSERVATION

10 ft measured water depth
(used in normalizations and correlations; See Supporting Information)

Probe no. DDG1530

5075 Commercial Cir Ste E
Concord, CA

CPT Started: 10/23/2020	CPT Completed: 10/23/2020
Rig: CPT	Operator: Middle Earth
Project No.: ND205079	

CPT LOG NO. CPT-03

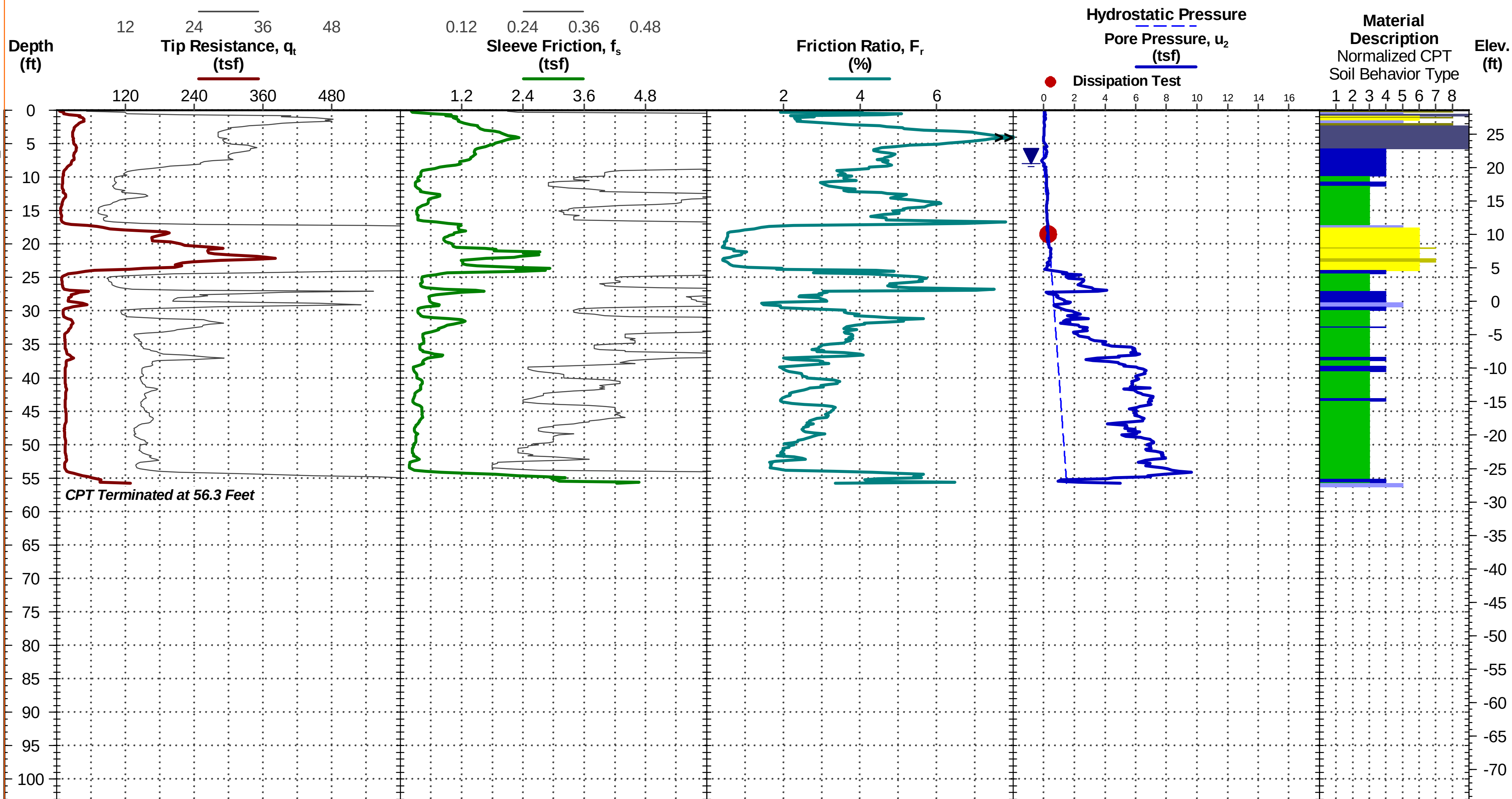
PROJECT: Bay AZ1 Site (Northtown)

CLIENT: Burns & McDonnell Engineering Company Inc
Columbus, OH

TEST LOCATION: See Exploration Plan

SITE: Orchard Parkway
San Jose, CA

Surface Elev.: 28.57 ft
Northing: 37.3793318
Easting: -121.9326379



See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).
Elevations were provided by HMH

Dead weight of rig used as reaction force.
CPT sensor calibration reports available upon request.

1 Sensitive, fine grained
2 Organic soils - clay
3 Clay - silty clay to clay
4 Silt mixtures - clayey silt to silty clay
5 Sand mixtures - silty sand to sandy silt
6 Sands - clean sand to silty sand
7 Gravelly sand to dense sand
8 Very stiff sand to clayey sand
9 Very stiff fine grained

WATER LEVEL OBSERVATION

8 ft measured water depth
(used in normalizations and correlations;
See Supporting Information)

Probe no. DDG1530

Terracon
5075 Commercial Cir Ste E
Concord, CA

CPT Started: 10/22/2020	CPT Completed: 10/22/2020
Rig: CPT	Operator: Middle Earth
Project No.: ND205079	

CPT LOG NO. CPT-04

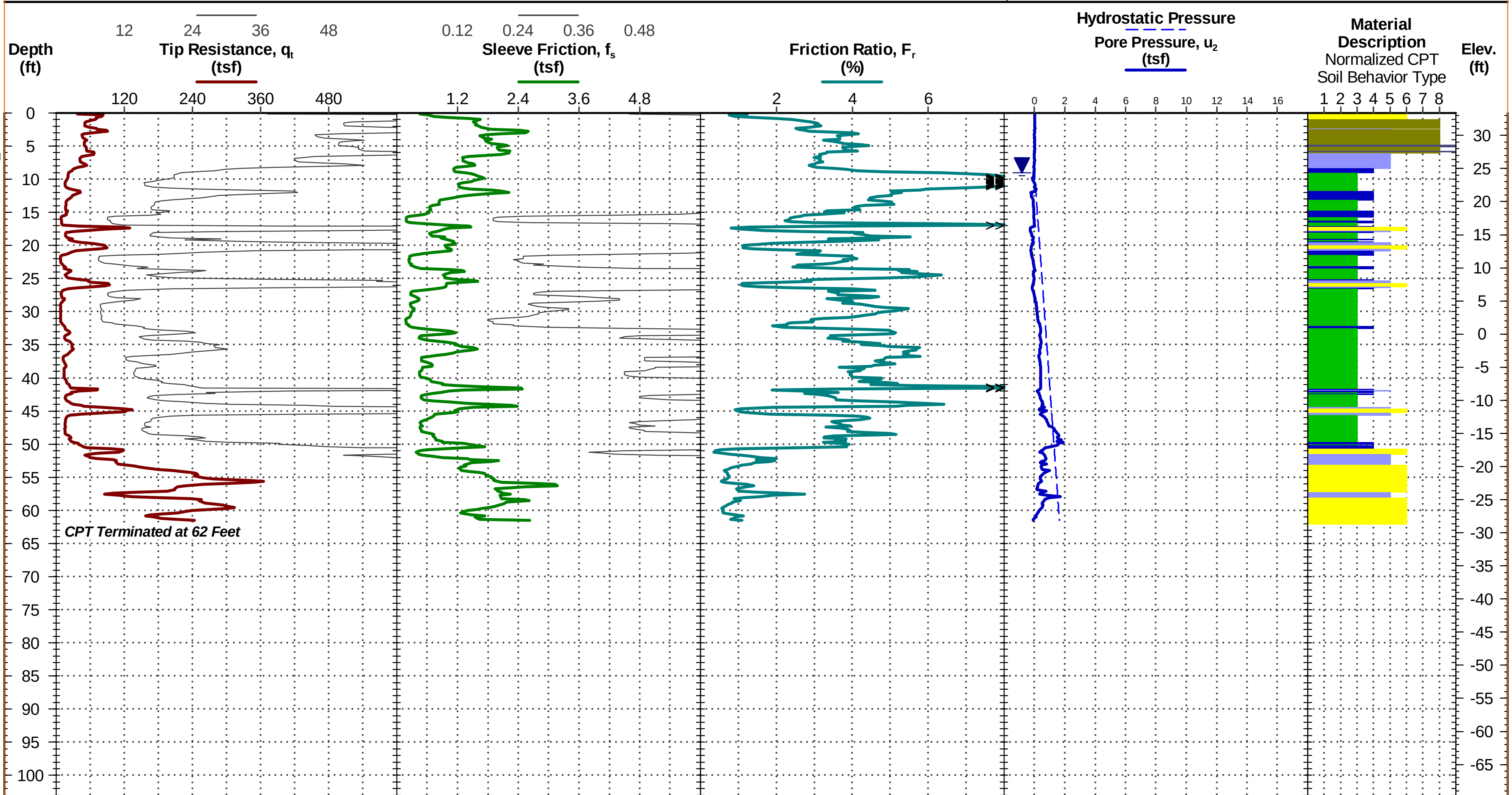
PROJECT: Bay AZ1 Site (Northtown)

CLIENT: Burns & McDonnell Engineering Company Inc
Columbus, OH

TEST LOCATION: See Exploration Plan

SITE: Orchard Parkway
San Jose, CA

Surface Elev.: 33.38 ft
Northing: 37.3788936
Easting: -121.9312269



See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).
Elevations were provided by HMH

Dead weight of rig used as reaction force.
CPT sensor calibration reports available upon request.

1 Sensitive, fine grained
2 Organic soils - clay
3 Clay - silty clay to clay
4 Silt mixtures - clayey silt to silty clay
5 Sand mixtures - silty sand to sandy silt
6 Sands - clean sand to silty sand
7 Gravelly sand to dense sand
8 Very stiff sand to clayey sand
9 Very stiff fine grained

WATER LEVEL OBSERVATION	Probe no. DDG1530		CPT Started: 10/22/2020	CPT Completed: 10/22/2020
9 ft measured water depth (used in normalizations and correlations; See Supporting Information)		5075 Commercial Cir Ste E Concord, CA	Rig: CPT	Operator: Middle Earth
			Project No.: ND205079	

CPT LOG NO. CPT-05

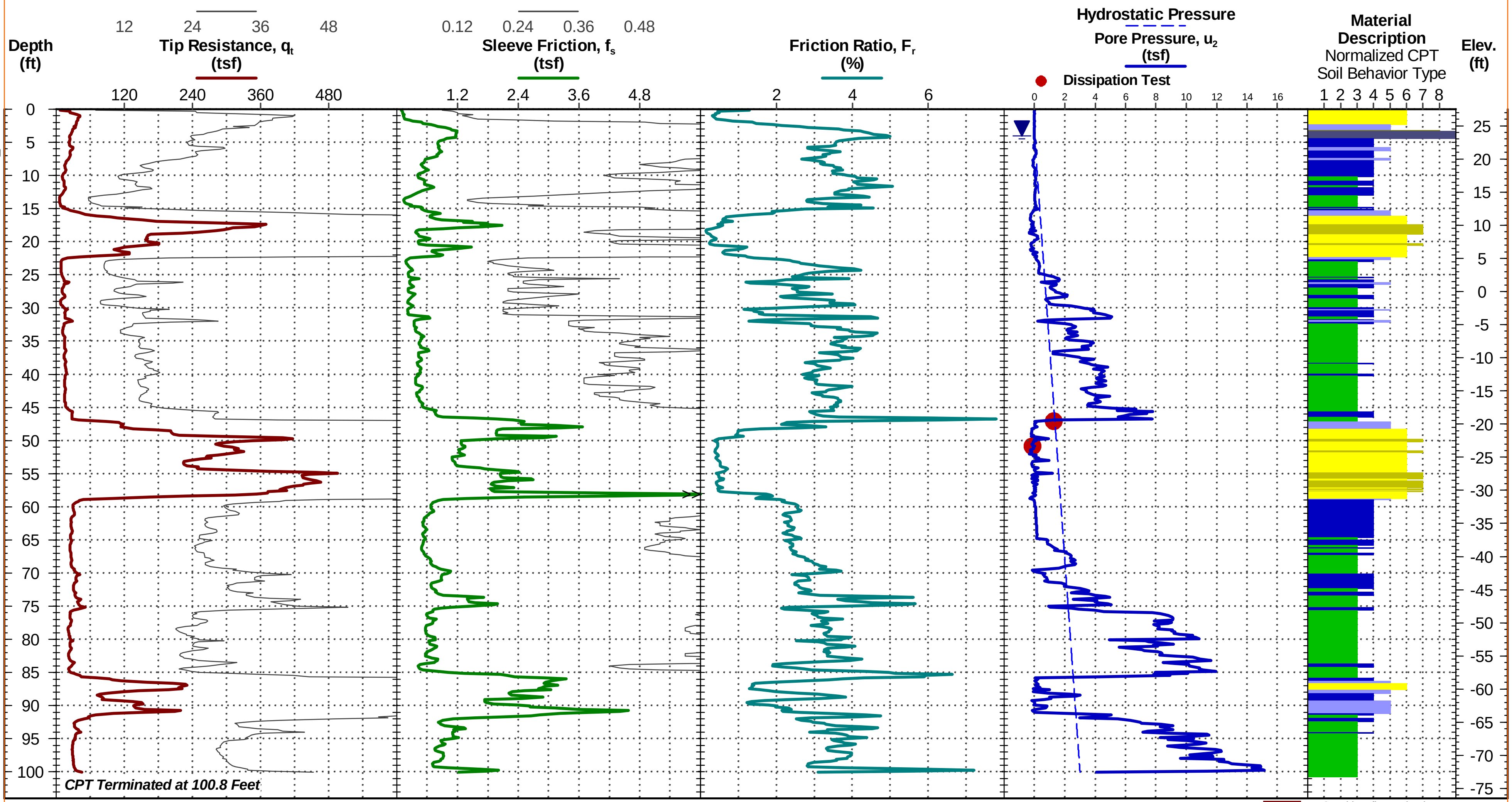
PROJECT: Bay AZ1 Site (Northtown)

CLIENT: Burns & McDonnell Engineering Company Inc
Columbus, OH

TEST LOCATION: See Exploration Plan

Surface Elev.: 27.51 ft
Northing: 37.3783481
Easting: -121.9326182

SITE: Orchard Parkway
San Jose, CA



See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).
Elevations were provided by HMH

Dead weight of rig used as reaction force.
CPT sensor calibration reports available upon request.

1 Sensitive, fine grained
2 Organic soils - clay
3 Clay - silty clay to clay
4 Silt mixtures - clayey silt to silty clay
5 Sand mixtures - silty sand to sandy silt
6 Sands - clean sand to silty sand
7 Gravelly sand to dense sand
8 Very stiff sand to clayey sand
9 Very stiff fine grained

WATER LEVEL OBSERVATION

4 ft measured water depth
(used in normalizations and correlations; See Supporting Information)

Probe no. DDG1530

Terracon
5075 Commercial Cir Ste E
Concord, CA

CPT Started: 10/22/2020	CPT Completed: 10/22/2020
Rig: CPT	Operator: Middle Earth
Project No.: ND205079	

CPT LOG NO. CPT-06

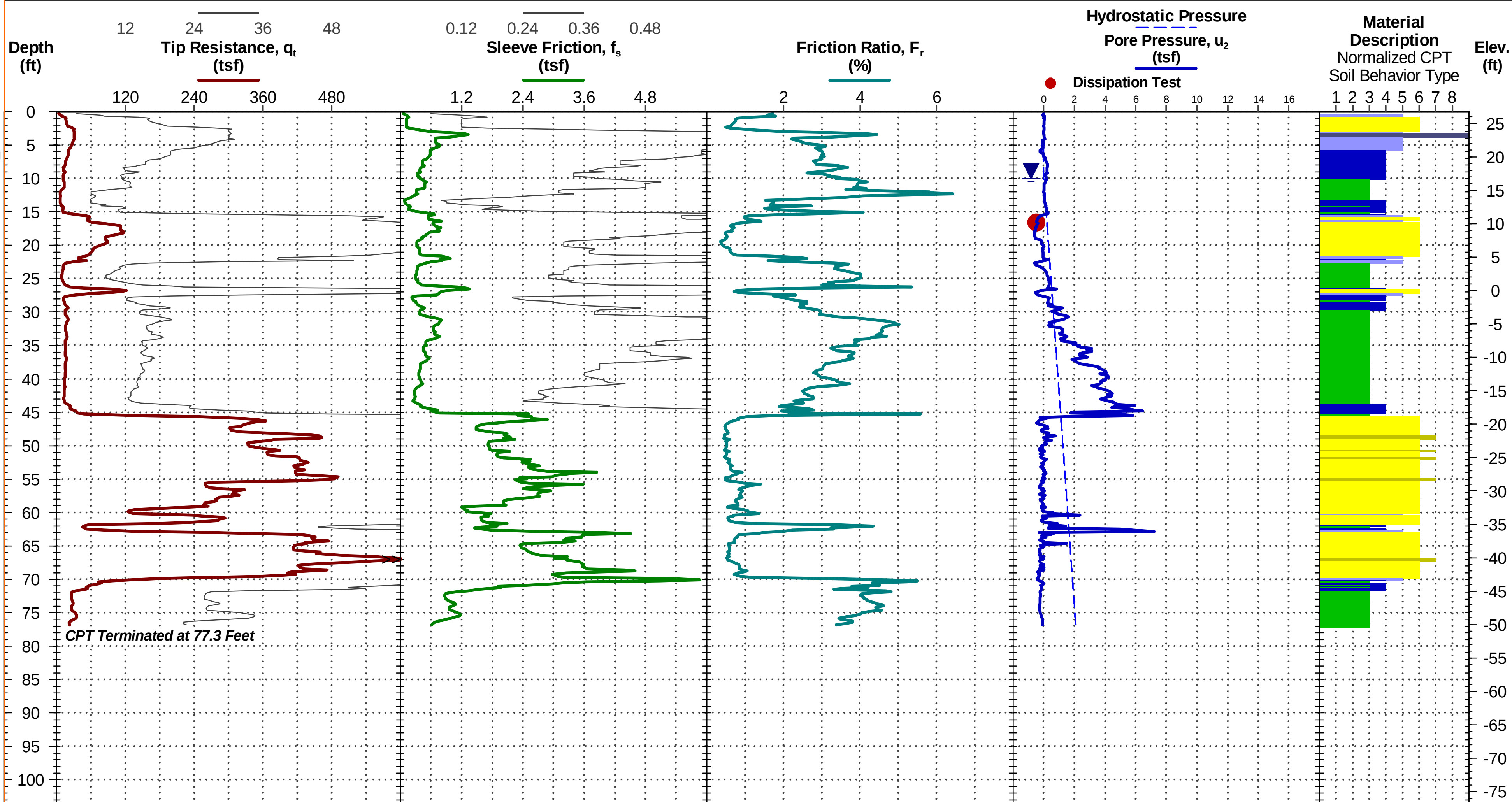
PROJECT: Bay AZ1 Site (Northtown)

CLIENT: Burns & McDonnell Engineering Company Inc
Columbus, OH

TEST LOCATION: See Exploration Plan

Surface Elev.: 26.77 ft
Northing: 37.378221
Easting: -121.9340598

SITE: Orchard Parkway
San Jose, CA



See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).
Elevations were provided by HMH

Dead weight of rig used as reaction force.
CPT sensor calibration reports available upon request.

1 Sensitive, fine grained
2 Organic soils - clay
3 Clay - silty clay to clay
4 Silt mixtures - clayey silt to silty clay
5 Sand mixtures - silty sand to sandy silt
6 Sands - clean sand to silty sand
7 Gravelly sand to dense sand
8 Very stiff sand to clayey sand
9 Very stiff fine grained

WATER LEVEL OBSERVATION	Probe no. DDG1530	Terracon 5075 Commercial Cir Ste E Concord, CA	CPT Started: 10/23/2020	CPT Completed: 10/23/2020
10 ft measured water depth (used in normalizations and correlations; See Supporting Information)			Rig: CPT	Operator: Middle Earth
			Project No.: ND205079	

CPT LOG NO. CPT-07

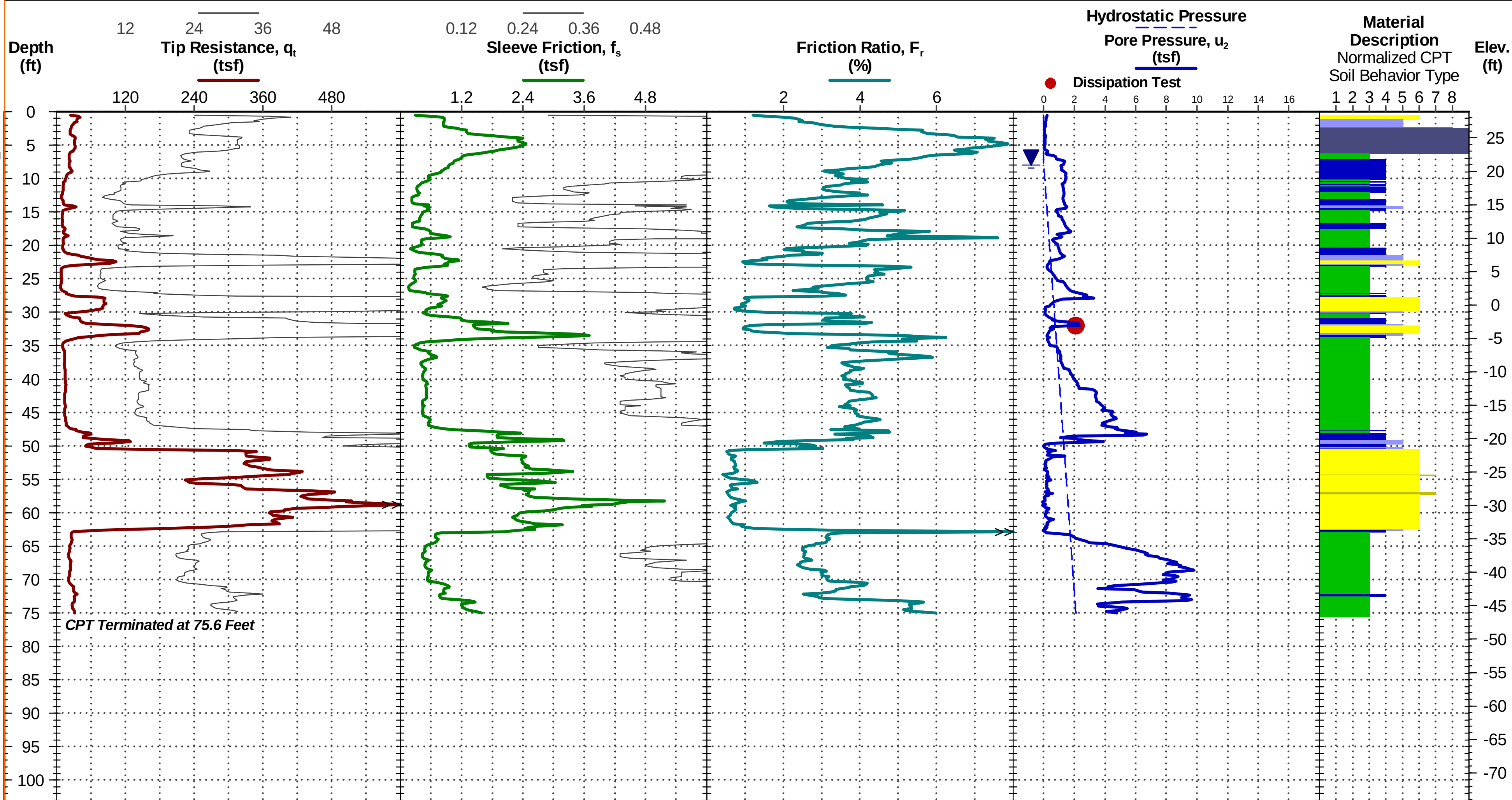
PROJECT: Bay AZ1 Site (Northtown)

CLIENT: Burns & McDonnell Engineering Company Inc
Columbus, OH

TEST LOCATION: See Exploration Plan

Surface Elev.: 28.91 ft
Northing: 37.3773138
Easting: -121.9325117

SITE: Orchard Parkway
San Jose, CA



See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).
Elevations were provided by HMH

Dead weight of rig used as reaction force.
CPT sensor calibration reports available upon request.

1 Sensitive, fine grained
2 Organic soils - clay
3 Clay - silty clay to clay
4 Silt mixtures - clayey silt to silty clay
5 Sand mixtures - silty sand to sandy silt
6 Sands - clean sand to silty sand
7 Gravelly sand to dense sand
8 Very stiff sand to clayey sand
9 Very stiff fine grained

WATER LEVEL OBSERVATION

8 ft measured water depth
(used in normalizations and correlations; See Supporting Information)

Probe no. DDG1530

Terracon
5075 Commercial Cir Ste E
Concord, CA

CPT Started: 10/22/2020	CPT Completed: 10/22/2020
Rig: CPT	Operator: Middle Earth
Project No.: ND205079	

CPT LOG NO. CPT-08

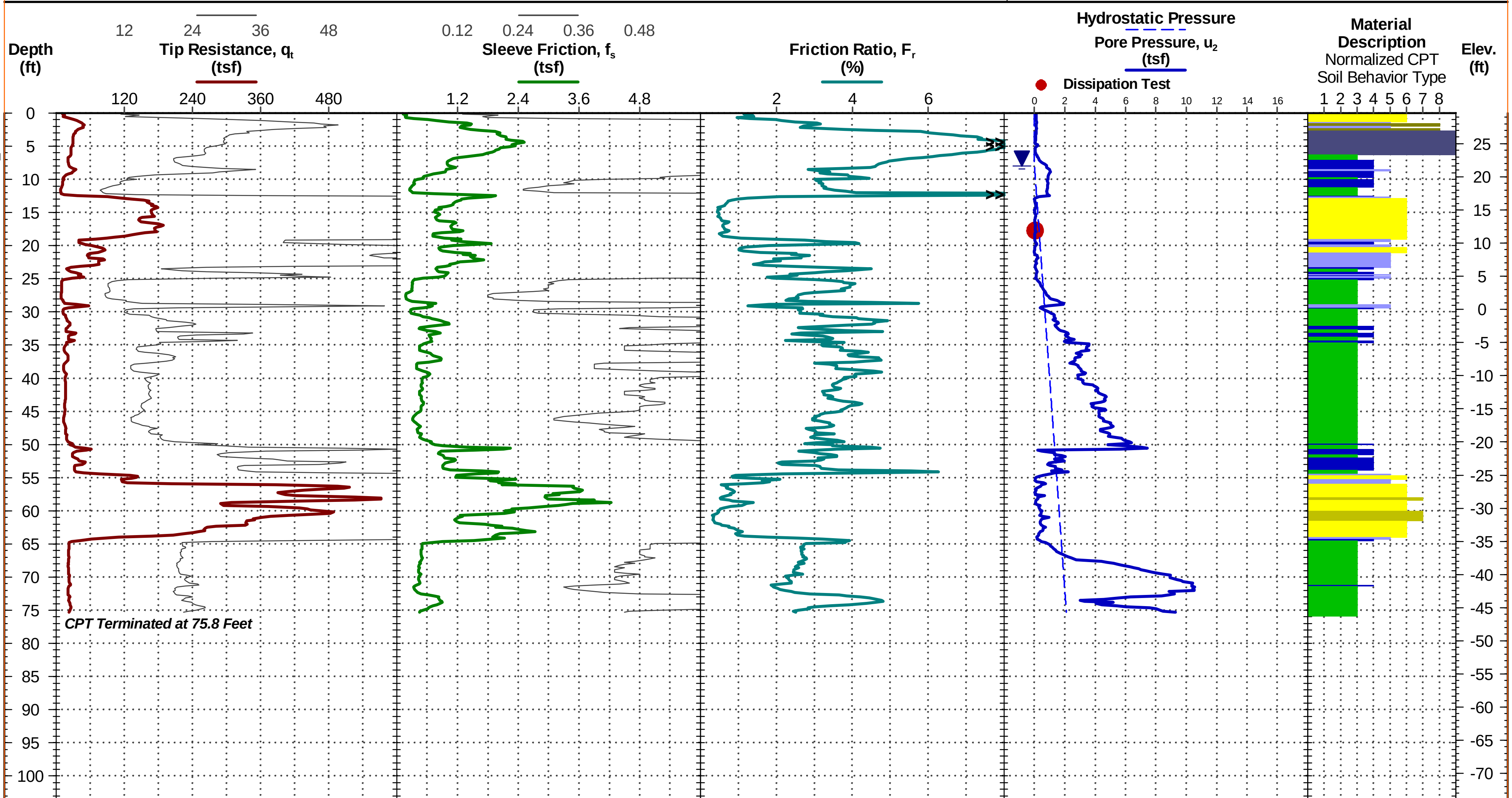
PROJECT: Bay AZ1 Site (Northtown)

CLIENT: Burns & McDonnell Engineering Company Inc
Columbus, OH

TEST LOCATION: See Exploration Plan

Surface Elev.: 29.61 ft
Northing: 37.3780836
Easting: -121.9316126

SITE: Orchard Parkway
San Jose, CA



See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).
Elevations were provided by HMH

Dead weight of rig used as reaction force.
CPT sensor calibration reports available upon request.

1 Sensitive, fine grained
2 Organic soils - clay
3 Clay - silty clay to clay
4 Silt mixtures - clayey silt to silty clay
5 Sand mixtures - silty sand to sandy silt
6 Sands - clean sand to silty sand
7 Gravelly sand to dense sand
8 Very stiff sand to clayey sand
9 Very stiff fine grained

WATER LEVEL OBSERVATION

8 ft measured water depth
(used in normalizations and correlations;
See Supporting Information)

Probe no. DDG1530

Terracon
5075 Commercial Cir Ste E
Concord, CA

CPT Started: 10/22/2020	CPT Completed: 10/22/2020
Rig: CPT	Operator: Middle Earth
Project No.: ND205079	

CPT LOG NO. CPT-09

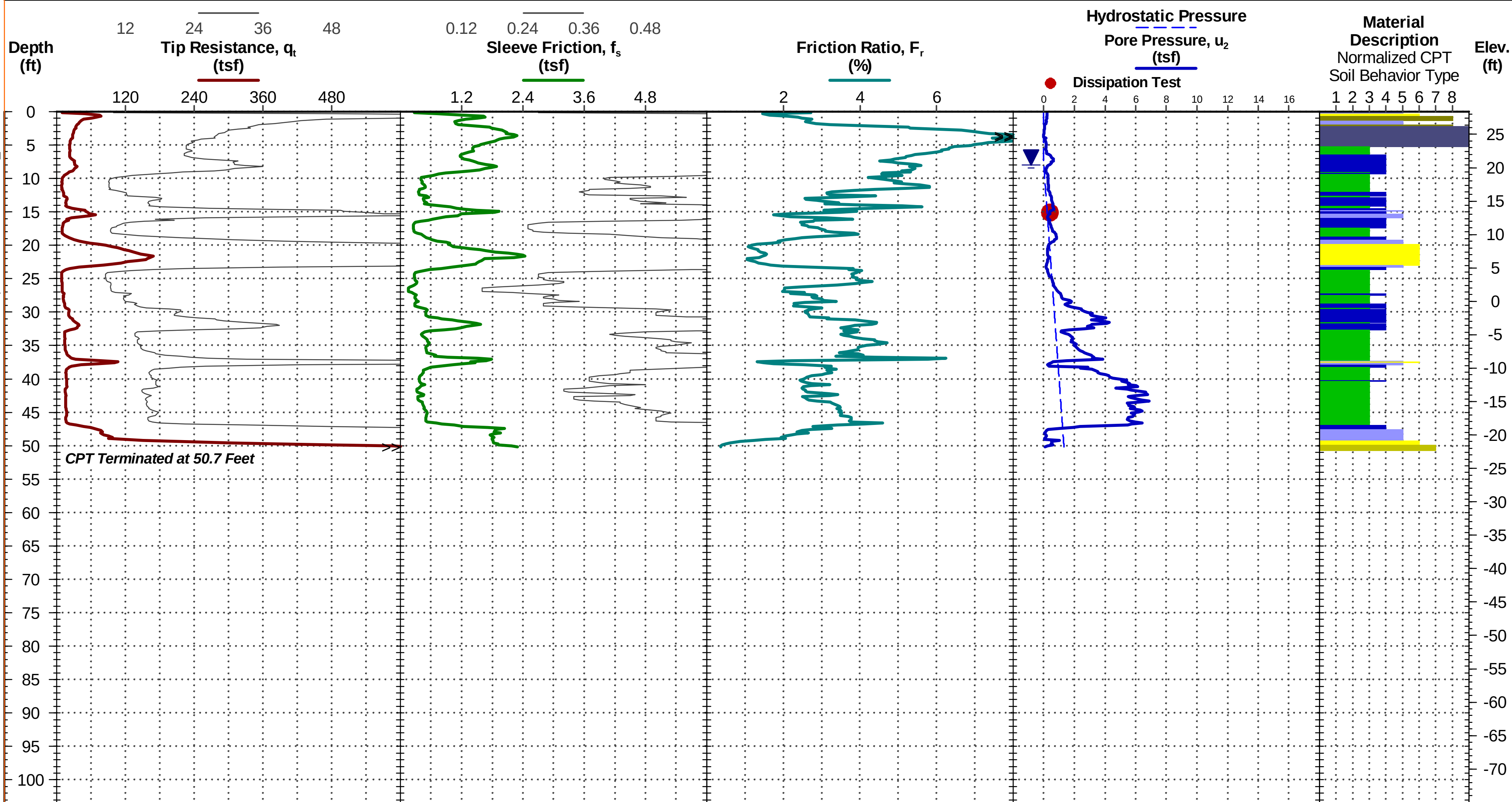
PROJECT: Bay AZ1 Site (Northtown)

CLIENT: Burns & McDonnell Engineering Company Inc
Columbus, OH

TEST LOCATION: See Exploration Plan

Surface Elev.: 28.39 ft
Northing: 37.3794703
Easting: -121.9313941

SITE: Orchard Parkway
San Jose, CA



See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).
Elevations were provided by HMH

Dead weight of rig used as reaction force.
CPT sensor calibration reports available upon request.

1 Sensitive, fine grained
2 Organic soils - clay
3 Clay - silty clay to clay
4 Silt mixtures - clayey silt to silty clay
5 Sand mixtures - silty sand to sandy silt
6 Sands - clean sand to silty sand
7 Gravelly sand to dense sand
8 Very stiff sand to clayey sand
9 Very stiff fine grained

WATER LEVEL OBSERVATION

8 ft measured water depth
(used in normalizations and correlations; See Supporting Information)

Probe no. DDG1530

5075 Commercial Cir Ste E
Concord, CA

CPT Started: 10/22/2020	CPT Completed: 10/22/2020
Rig: CPT	Operator: Middle Earth
Project No.: ND205079	

CPT LOG NO. CPT-10

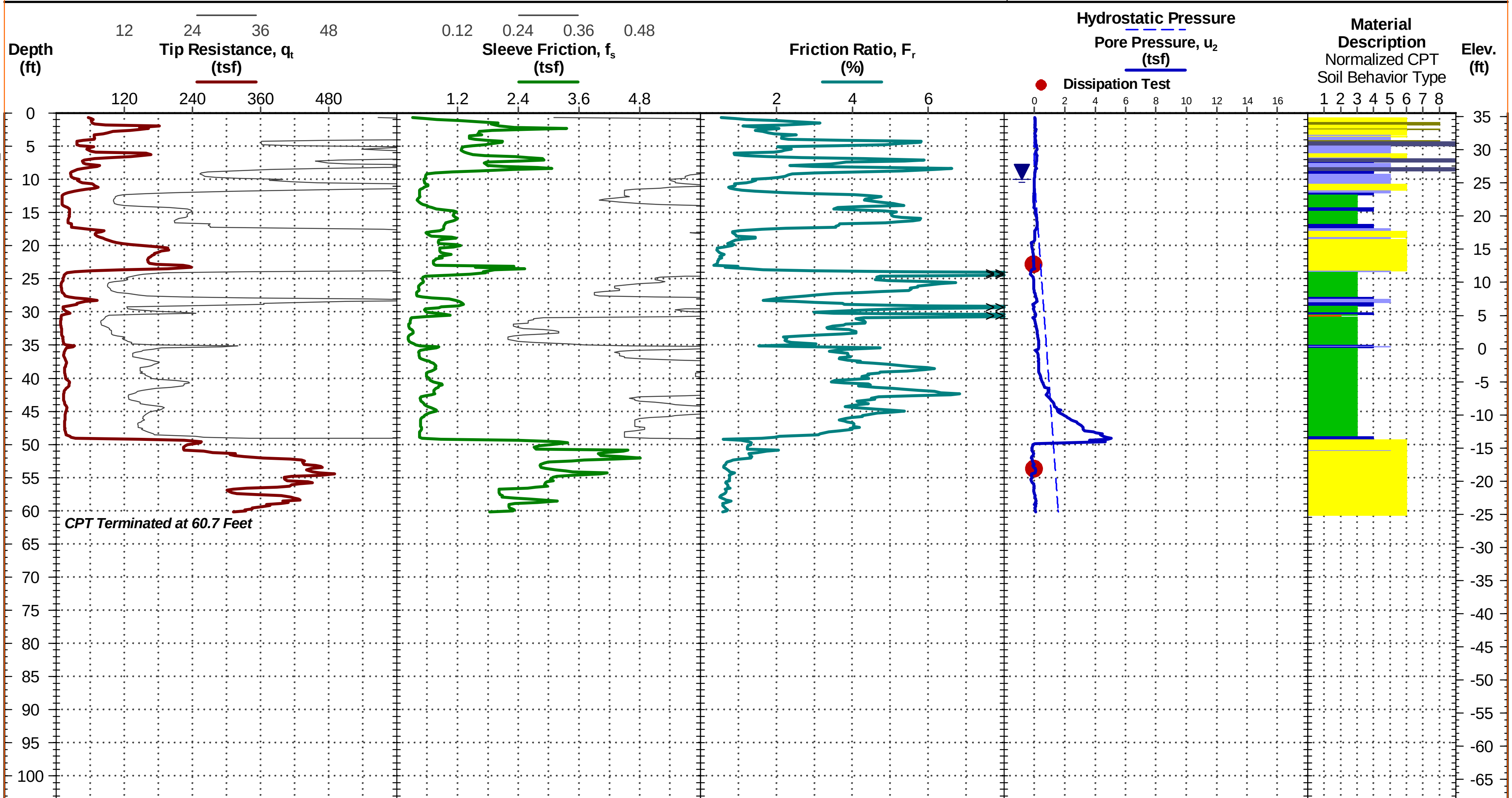
PROJECT: Bay AZ1 Site (Northtown)

CLIENT: Burns & McDonnell Engineering Company Inc
Columbus, OH

TEST LOCATION: See Exploration Plan

Surface Elev.: 35.53 ft
Northing: 37.3786438
Easting: -121.9350387

SITE: Orchard Parkway
San Jose, CA



See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).
Elevations were provided by HMH

Dead weight of rig used as reaction force.
CPT sensor calibration reports available upon request.

1 Sensitive, fine grained
2 Organic soils - clay
3 Clay - silty clay to clay
4 Silt mixtures - clayey silt to silty clay
5 Sand mixtures - silty sand to sandy silt
6 Sands - clean sand to silty sand
7 Gravelly sand to dense sand
8 Very stiff sand to clayey sand
9 Very stiff fine grained

WATER LEVEL OBSERVATION	Probe no. DDG1530	Terracon	CPT Started: 10/23/2020	CPT Completed: 10/23/2020
▽ 10 ft measured water depth (used in normalizations and correlations; See Supporting Information)		5075 Commercial Cir Ste E, Concord, CA	Rig: CPT	Operator: Middle Earth
			Project No.: ND205079	

CPT LOG NO. CPT-11

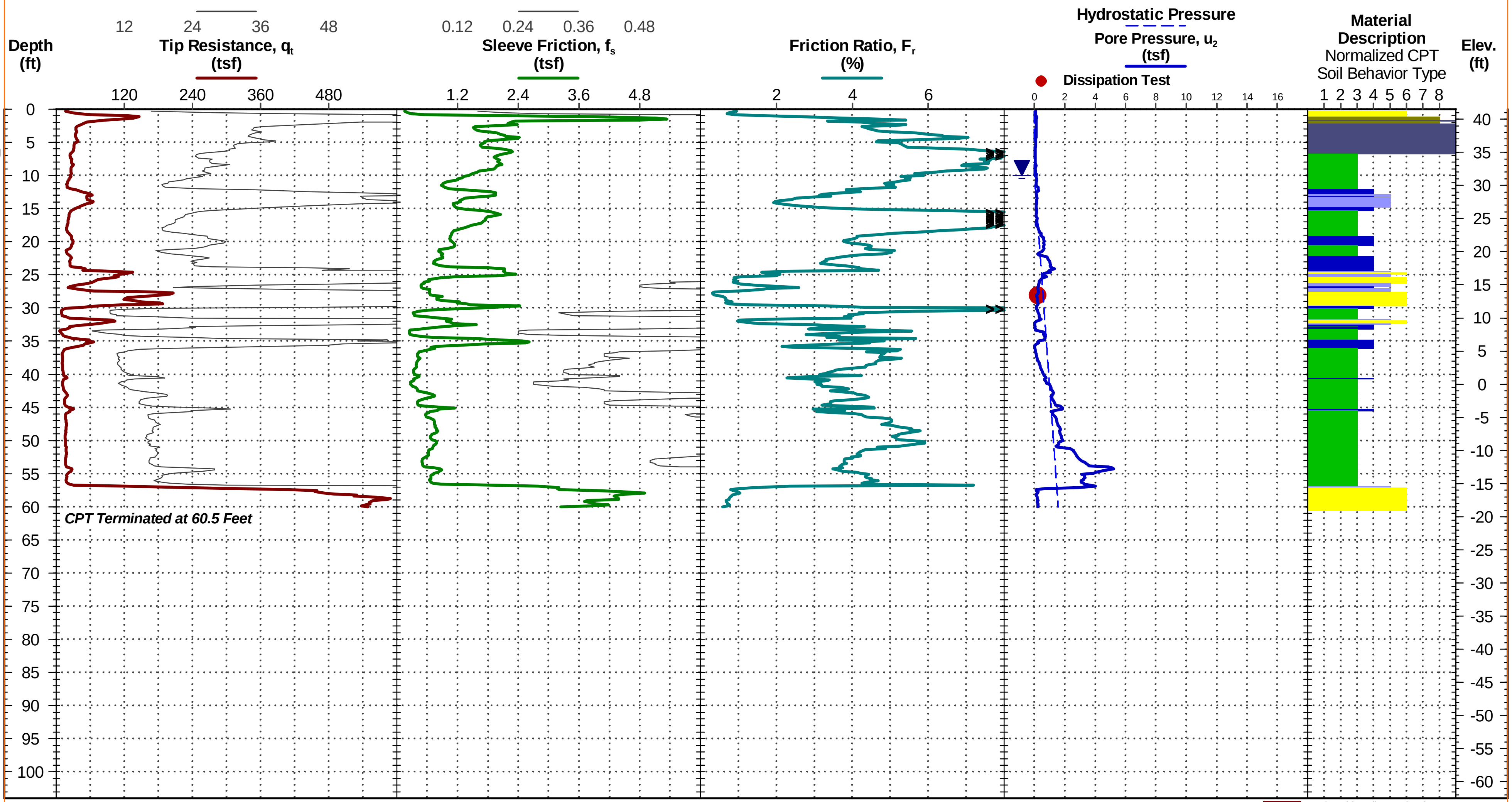
PROJECT: Bay AZ1 Site (Northtown)

CLIENT: Burns & McDonnell Engineering Company Inc
Columbus, OH

TEST LOCATION: See Exploration Plan

SITE: Orchard Parkway
San Jose, CA

Surface Elev.: 41.5 ft
Northing: 37.3789611
Easting: -121.9338514



See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).
Elevations were provided by HMH

Dead weight of rig used as reaction force.
CPT sensor calibration reports available upon request.

1 Sensitive, fine grained
2 Organic soils - clay
3 Clay - silty clay to clay
4 Silt mixtures - clayey silt to silty clay
5 Sand mixtures - silty sand to sandy silt
6 Sands - clean sand to silty sand
7 Gravelly sand to dense sand
8 Very stiff sand to clayey sand
9 Very stiff fine grained

WATER LEVEL OBSERVATION

10 ft measured water depth
(used in normalizations and correlations;
See Supporting Information)

Probe no. DDG1530

Terracon
5075 Commercial Cir Ste E
Concord, CA

CPT Started: 10/23/2020	CPT Completed: 10/23/2020
Rig: CPT	Operator: Middle Earth
Project No.: ND205079	

SJC04 Data Center
370 West Trimble Road | San Jose, CA
Terracon Project No. ND215040

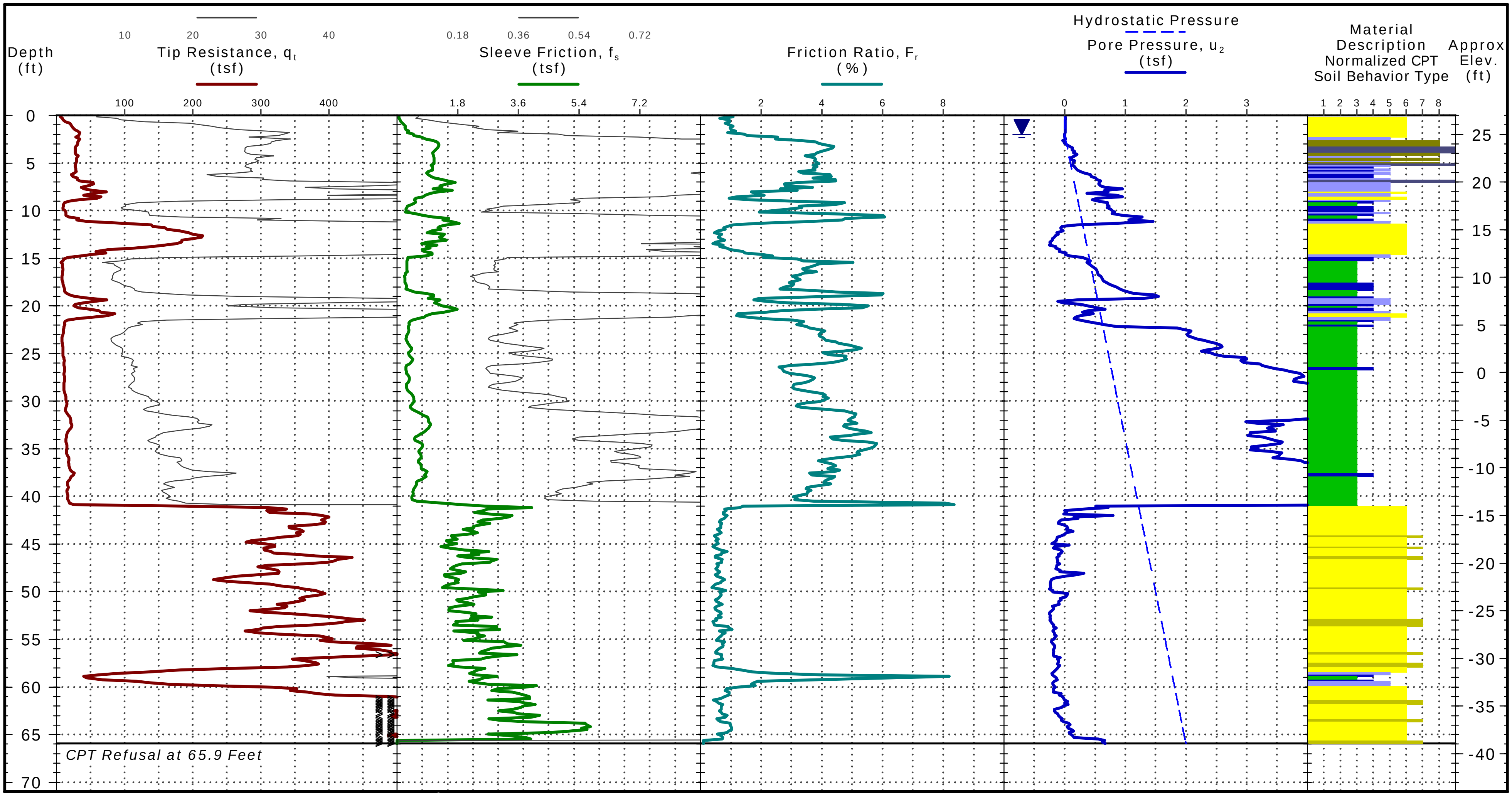
CPT Sounding ID T CPT-01

Terracon
1220 Concord Ave, Ste 450
Concord, CA

Latitude: 37.378300° Longitude: -121.934500°

Elevation: 27 (ft) +/-
Elevation Reference: Elevations were interpolated from elevations of previously surveyed borings/CPTs at the site.

CPT Started: 3/22/2022
CPT Completed: 3/22/2022



See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data, if any.

See Supporting Information for explanation of symbols and abbreviations.

Notes

Test Location: See Exploration Plan

CPT Equipment

CPT Rig: DDG1587

Operator: Middle Earth GeoTesting

CPT sensor calibration reports available upon request

Probe No. DDG1587

Water Level Observation

2 ft measured water depth

(used in normalizations and correlations)

Normalized Soil Behavior Type
(Robertson 1990)

1 Sensitive, fine grained
2 Organic soils - clay
3 Clay - silty clay to clay
4 Silt mixtures - clayey silt to silty clay
5 Sand mixtures - silty sand to sandy silt
6 Sands - clean sand to silty sand
7 Gravelly sand to dense sand
8 Very stiff sand to clayey sand
9 Very stiff fine grained

SJC04 Data Center
370 West Trimble Road | San Jose, CA
Terracon Project No. ND215040

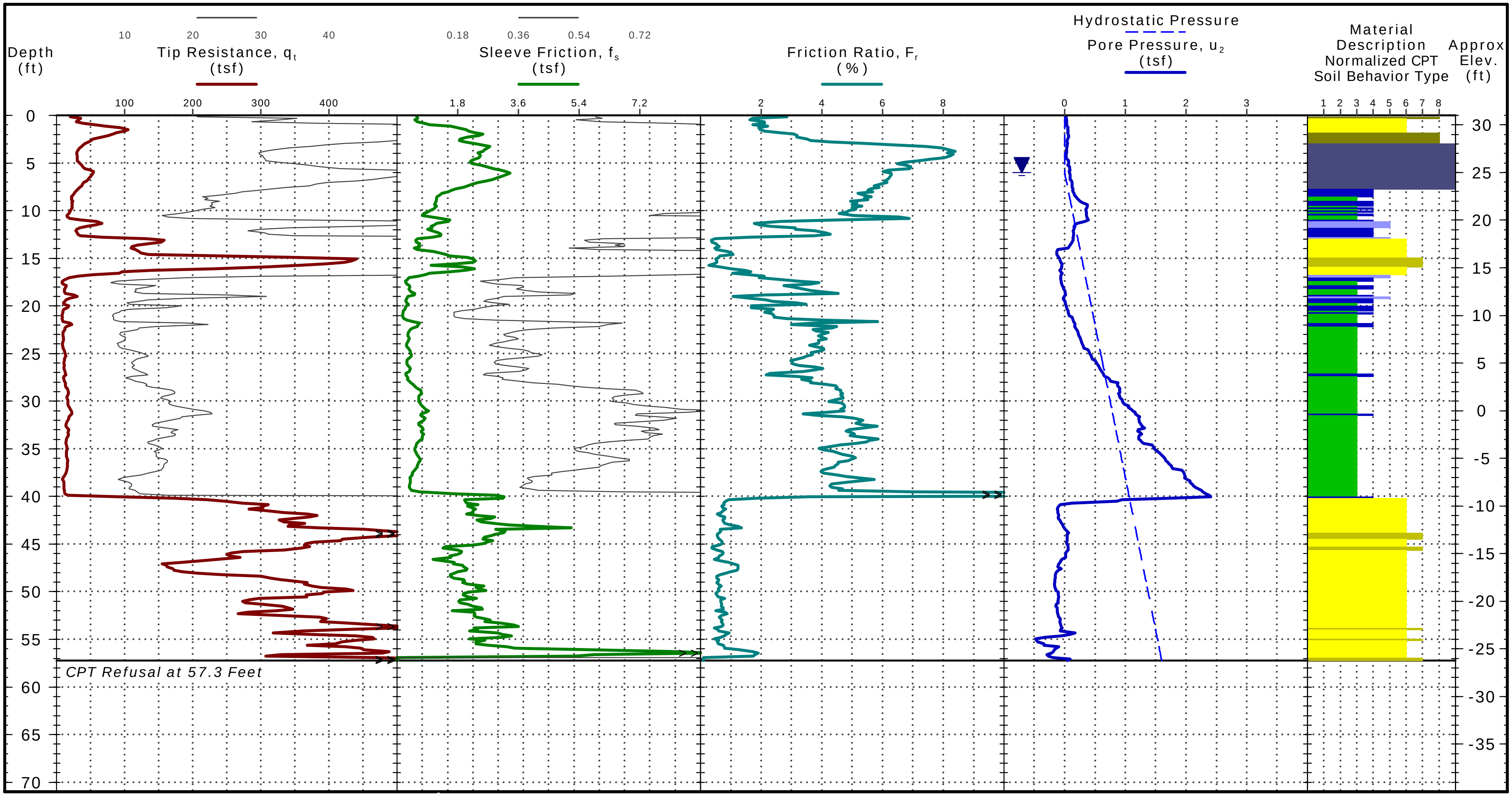
CPT Sounding ID T CPT-02

Terracon
1220 Concord Ave, Ste 450
Concord, CA

Latitude: 37.378600° Longitude: -121.934500°

Elevation: 31 (ft) +/-
Elevation Reference: Elevations were interpolated from elevations of previously surveyed borings/CPTs at the site.

CPT Started: 3/22/2022
CPT Completed: 3/22/2022



See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data, if any.

See Supporting Information for explanation of symbols and abbreviations.

Notes

Test Location: See Exploration Plan

CPT Equipment

CPT Rig: DDG1587

Operator: Middle Earth GeoTesting

CPT sensor calibration reports available upon request

Probe No. DDG1587

Water Level Observation

6 ft measured water depth

(used in normalizations and correlations)

Normalized Soil Behavior Type
(Robertson 1990)

1 Sensitive, fine grained
2 Organic soils - clay
3 Clay - silty clay to clay
4 Silt mixtures - clayey silt to silty clay
5 Sand mixtures - silty sand to sandy silt
6 Sands - clean sand to silty sand
7 Gravelly sand to dense sand
8 Very stiff sand to clayey sand
9 Very stiff fine grained

SJC04 Data Center
370 West Trimble Road | San Jose, CA
Terracon Project No. ND215040

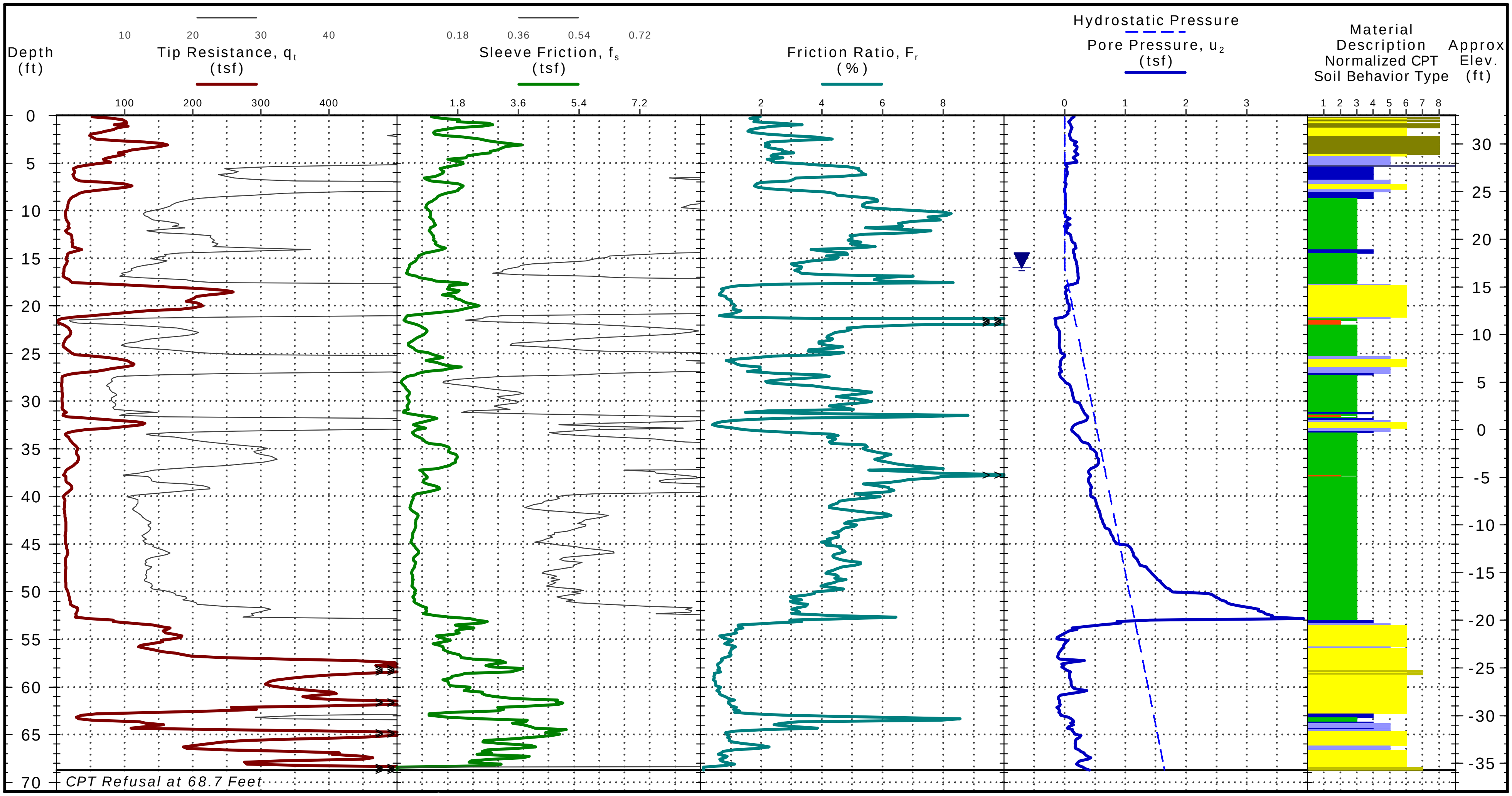
CPT Sounding ID T CPT-03

Terracon
1220 Concord Ave, Ste 450
Concord, CA

Latitude: 37.378500° Longitude: -121.934800°

Elevation: 33 (ft) +/-
Elevation Reference: Elevations were interpolated from elevations of previously surveyed borings/CPTs at the site.

CPT Started: 3/22/2022
CPT Completed: 3/22/2022



See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data, if any.

See Supporting Information for explanation of symbols and abbreviations.

Notes

Test Location: See Exploration Plan

CPT Equipment

CPT Rig: DDG1587

Operator: Middle Earth GeoTesting

CPT sensor calibration reports available upon request

Probe No. DDG1587

Water Level Observation

16 ft measured water depth

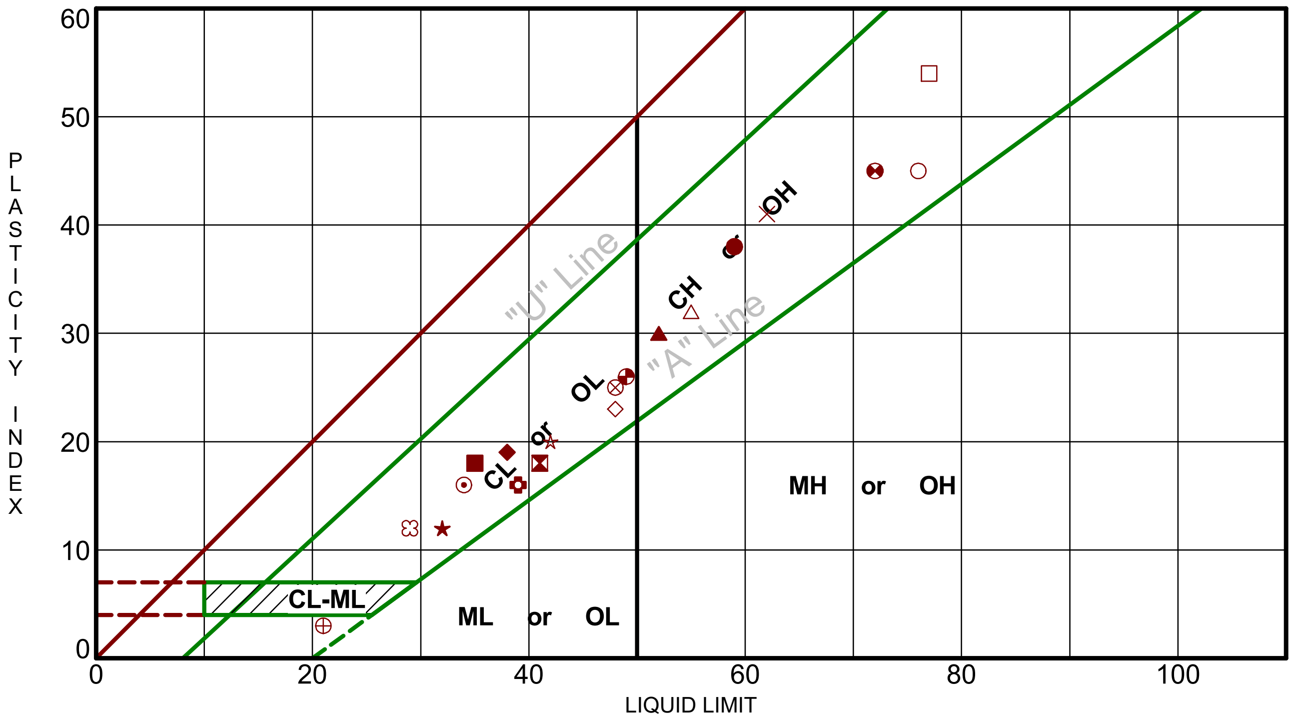
(used in normalizations and correlations)

Normalized Soil Behavior Type
(Robertson 1990)

1 Sensitive, fine grained
2 Organic soils - clay
3 Clay - silty clay to clay
4 Silt mixtures - clayey silt to silty clay
5 Sand mixtures - silty sand to sandy silt
6 Sands - clean sand to silty sand
7 Gravelly sand to dense sand
8 Very stiff sand to clayey sand
9 Very stiff fine grained

ATTERBERG LIMITS RESULTS

ASTM D4318



	Boring ID	Depth	LL	PL	PI	Fines	USCS	Description
●	B1	1 - 2.5	59	21	38	89.6	CH	FAT CLAY
⊠	B1	10 - 11.5	41	23	18	96.5	CL	LEAN CLAY
▲	B1	35 - 36.5	52	22	30	98.8	CH	FAT CLAY
★	B2	7.5 - 9	32	20	12	62.8	CL	SANDY LEAN CLAY
⊙	B3	15 - 16.5	34	18	16	79.7	CL	LEAN CLAY with SAND
✿	B3	40 - 41.5	39	23	16	99.5	CL	LEAN CLAY
○	B4	2.5 - 4	76	31	45	95.1	CH	FAT CLAY
△	B4	10 - 11.5	55	23	32	85.4	CH	Fat Clay
⊗	B6	1 - 2.5	48	23	25	77.6	CL	LEAN CLAY with SAND
⊕	B6	30 - 31.5	21	18	3	52.4	ML	SANDY SILT
□	B7	2.5 - 4	77	23	54	93.2	CH	FAT CLAY
	B7	5 - 6.5	72	27	45	84.1	CH	FAT CLAY with SAND
◕	B8	2.5 - 4	49	23	26	80.3	CL	LEAN CLAY with SAND
☆	B8	7.5 - 9	42	22	20	82.6	CL	LEAN CLAY with SAND
	B8	30 - 31.5	29	17	12			
■	B8	45 - 46.5	35	17	18	73.6	CL	LEAN CLAY with SAND
◆	B13	2.5 - 4	38	19	19	72.9	CL	LEAN CLAY with SAND
◇	B14	5 - 6.5	48	25	23	90.9	CL	LEAN CLAY
×	B15	2.5 - 4	62	21	41	81.8	CH	FAT CLAY with SAND

PROJECT: Bay AZ1 Site (Northtown)

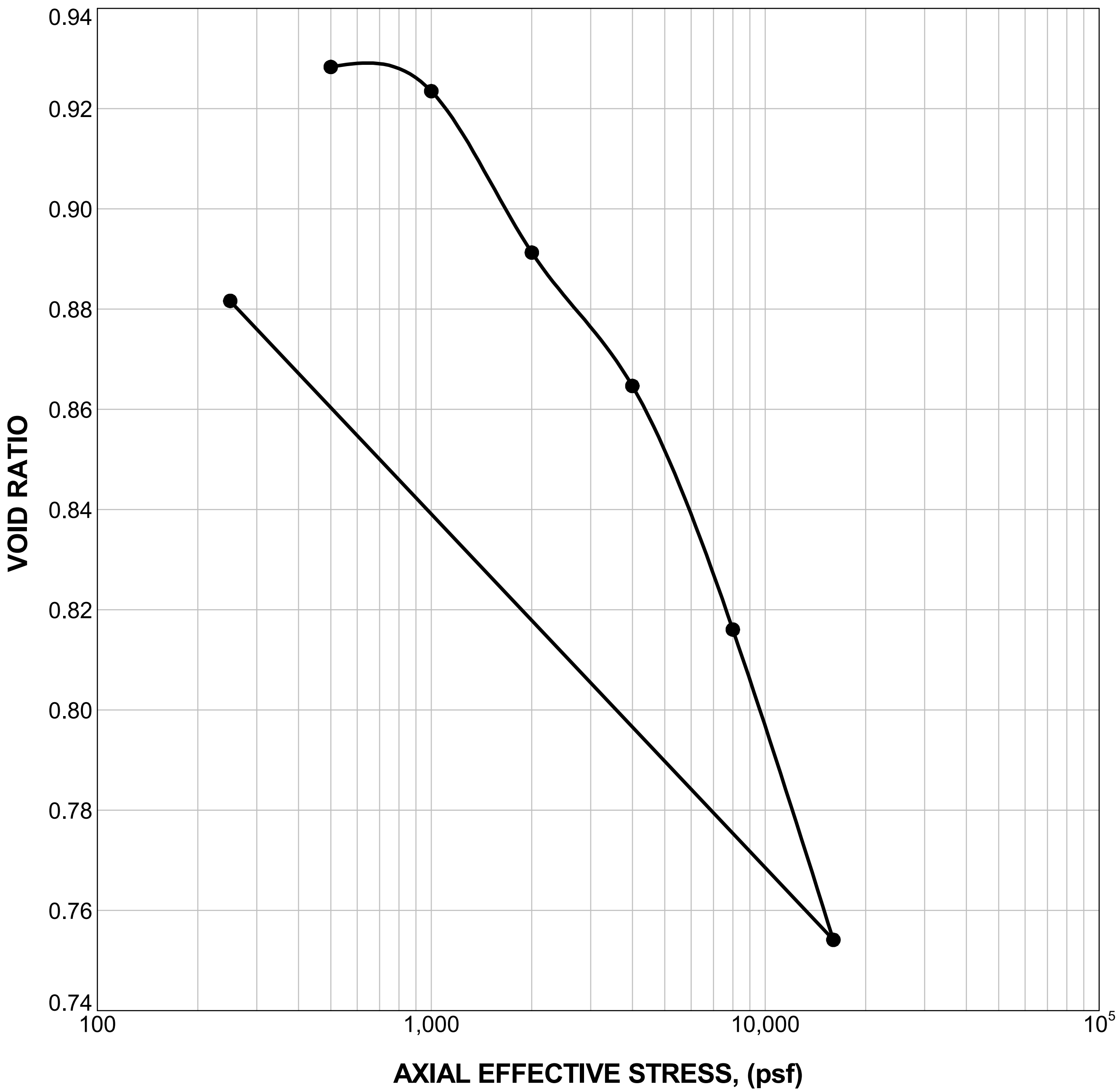
SITE: Orchard Parkway
San Jose, CA

Terracon
5075 Commercial Cir Ste E
Concord, CA

PROJECT NUMBER: ND205079

CLIENT: Burns & McDonnell Engineering Company Inc
Columbus, OH

CONSOLIDATION TEST (D2435)



Natural		Initial Dry Density (pcf)	LL	PI	Sp. Gr.	Overburden (psf)	P_c (psf)	C_c (vr / log stress)	C_r (vr / log stress)	Initial Void Ratio
Saturation	Moisture									
%	30.8 %	87.4	55	32	2.70					

MATERIAL DESCRIPTION	USCS	AASHTO
Fat Clay	CH	A-7-6

NOTES:

Borehole: B4 Depth: 10 ft Specimen #: 5

PROJECT: Bay AZ1 Site (Northtown)

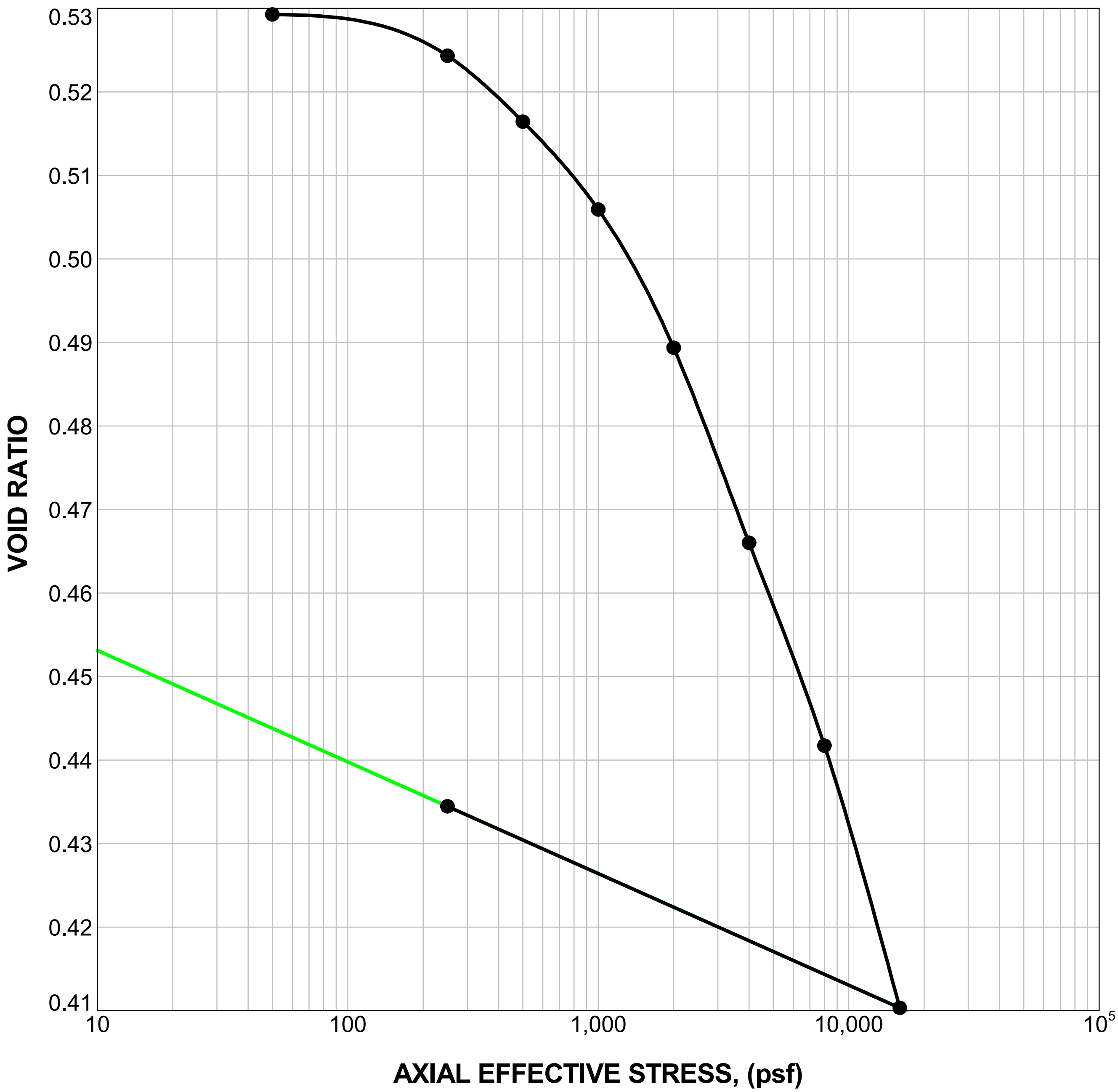
SITE: Orchard Parkway
San Jose, CA

5075 Commercial Cir Ste E
Concord, CA

PROJECT NUMBER: ND205079

CLIENT: Burns & McDonnell Engineering Company Inc
Columbus, OH

CONSOLIDATION TEST (D2435)



Natural		Initial Dry Density (pcf)	LL	PI	Sp. Gr.	Overburden (psf)	P_c (psf)	C_c (vr / log stress)	C_r (vr / log stress)	Initial Void Ratio
Saturation	Moisture									
97.7 %	19.8 %	109.0			2.70					0.547

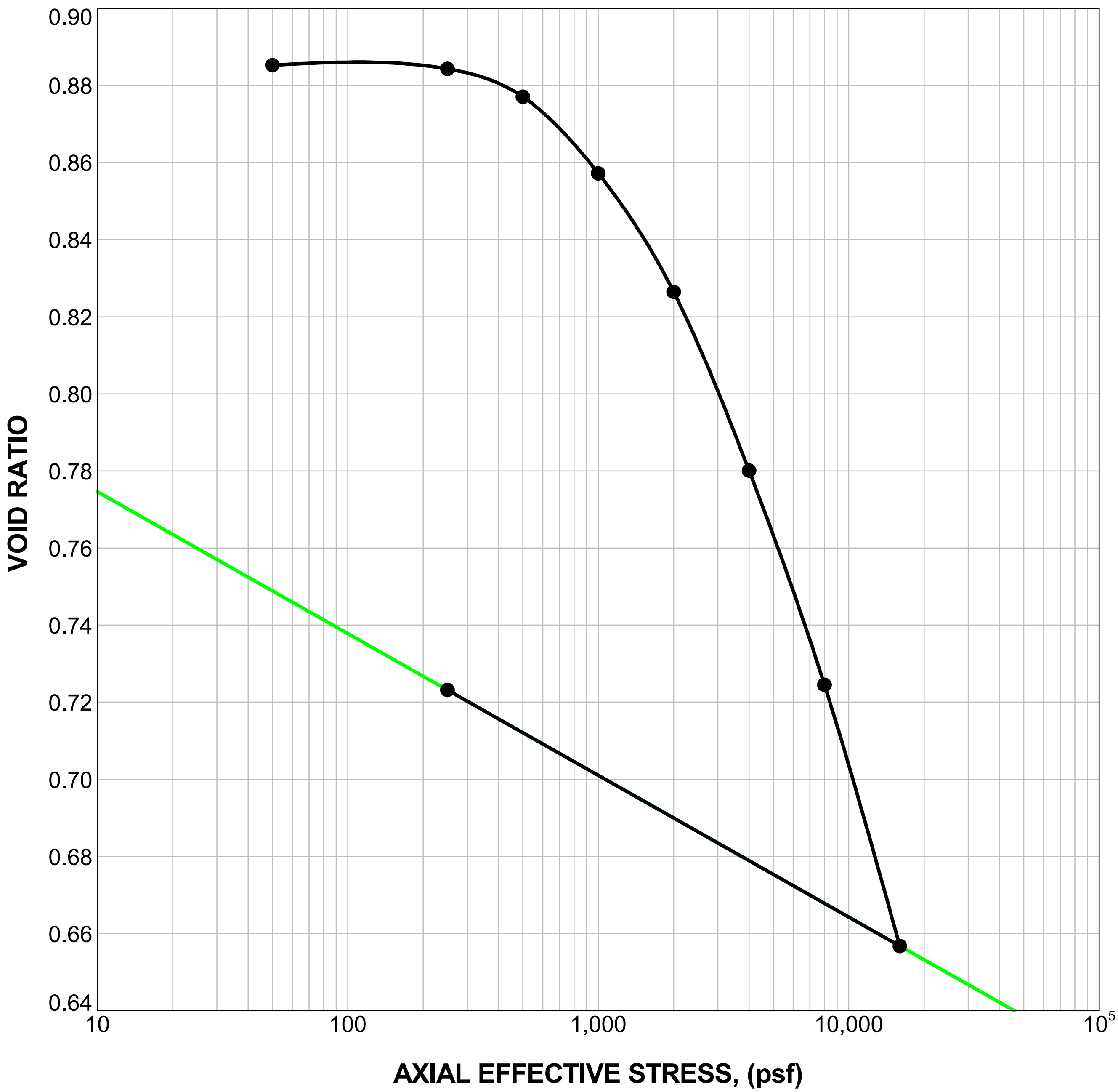
MATERIAL DESCRIPTION	USCS	AASHTO
Sandy Lean Clay	CL	

NOTES:

Borehole: B8 Depth: 26.5 ft Specimen #: 10

PROJECT: Bay AZ1 Site (Northtown)	Terracon 5075 Commercial Cir Ste E Concord, CA	PROJECT NUMBER: ND205079
SITE: Orchard Parkway San Jose, CA		CLIENT: Burns & McDonnell Engineering Company Inc Columbus, OH

CONSOLIDATION TEST (D2435)



Natural		Initial Dry Density (pcf)	LL	PI	Sp. Gr.	Overburden (psf)	P_c (psf)	C_c (vr / log stress)	C_r (vr / log stress)	Initial Void Ratio
Saturation	Moisture									
102.7 %	34.6 %	88.3			2.70					0.909

MATERIAL DESCRIPTION	USCS	AASHTO
Lean Clay	CL	

NOTES:

Borehole: B13 Depth: 26.5 ft Specimen #: 9

PROJECT: Bay AZ1 Site (Northtown)

SITE: Orchard Parkway
San Jose, CA

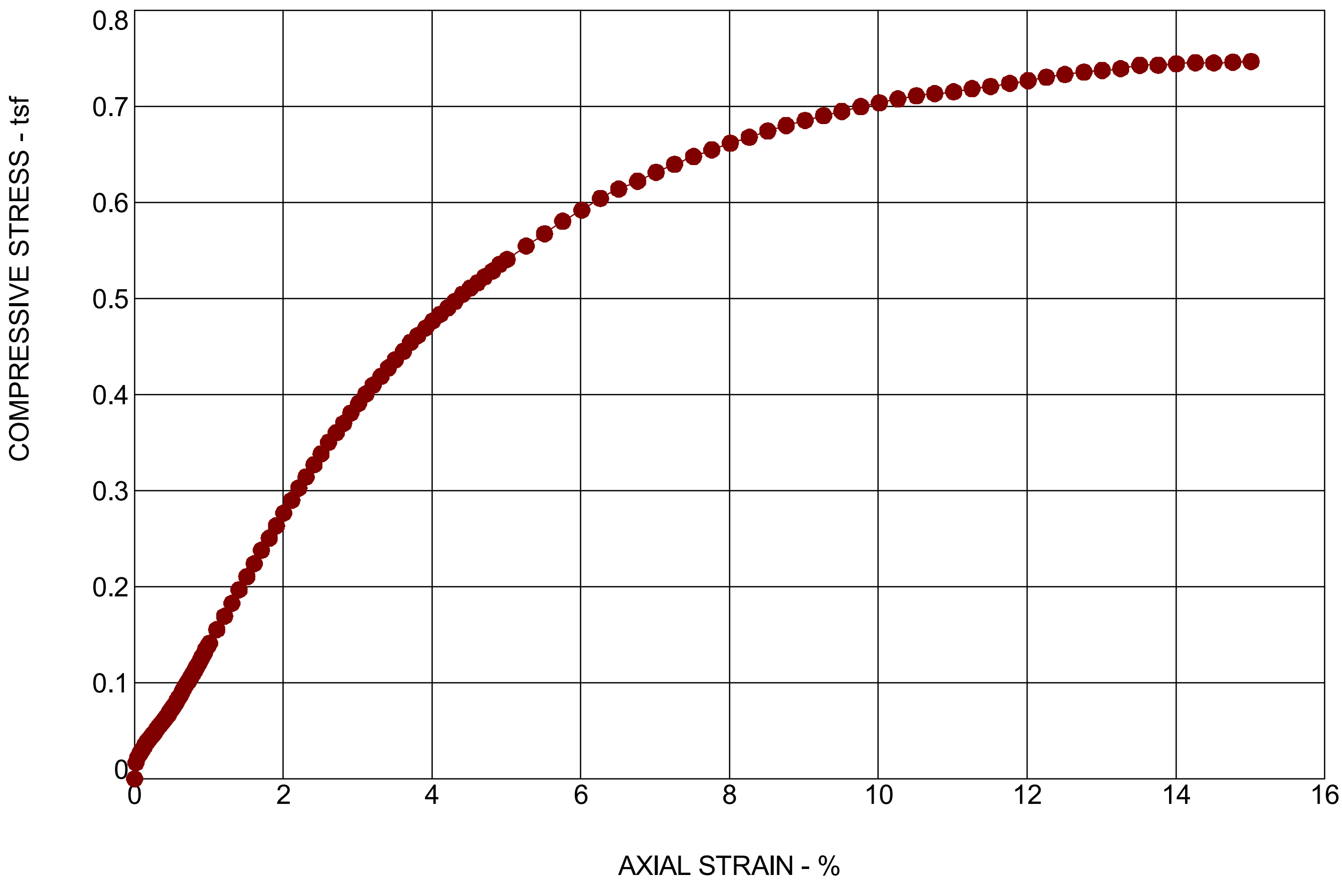
Terracon
5075 Commercial Cir Ste E
Concord, CA

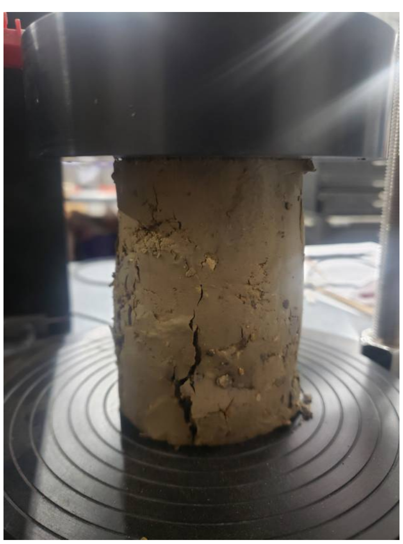
PROJECT NUMBER: ND205079

CLIENT: Burns & McDonnell Engineering Company Inc
Columbus, OH

UNCONFINED COMPRESSION TEST

ASTM D2166



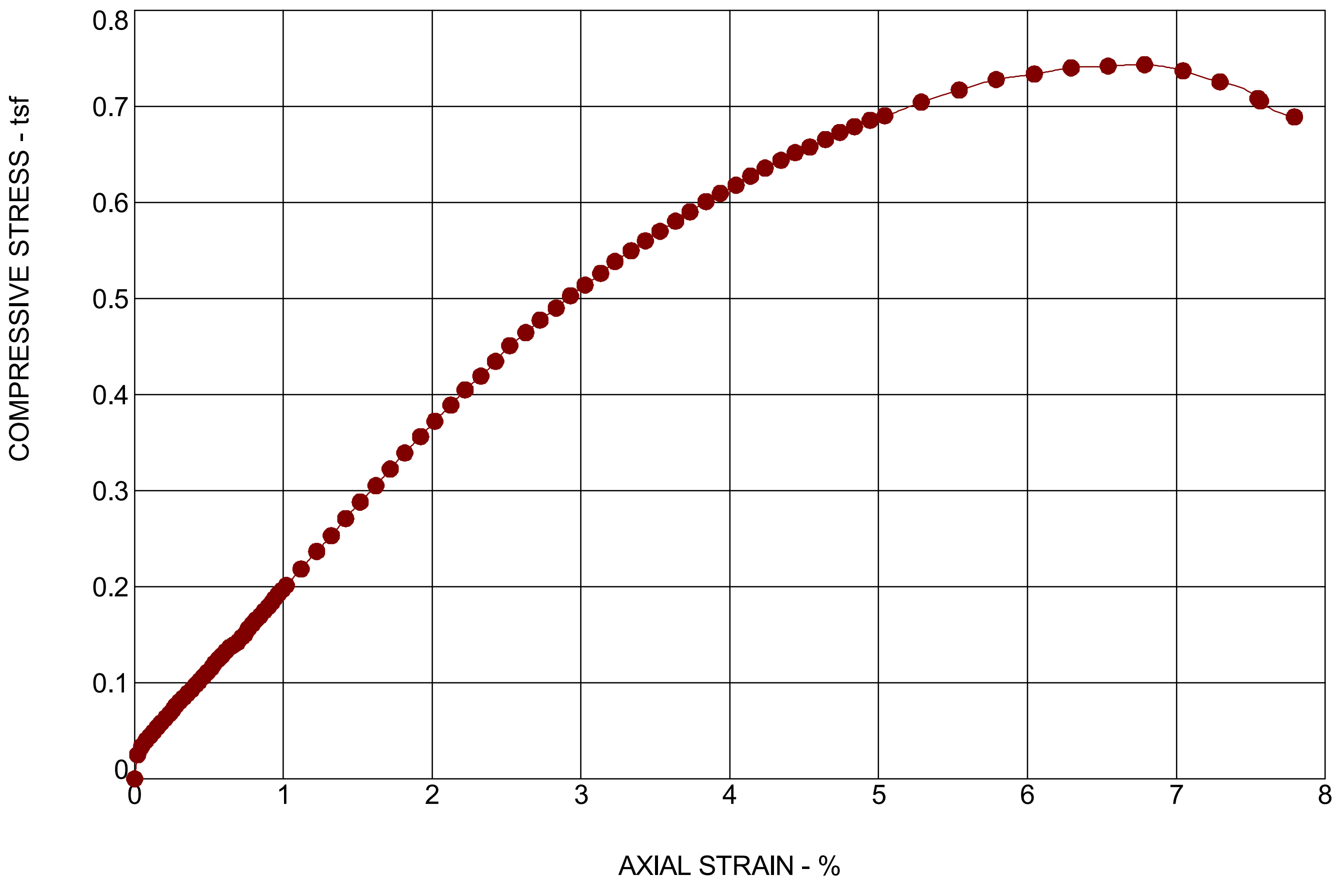
SPECIMEN FAILURE PHOTOGRAPH	SPECIMEN TEST DATA		
	Moisture Content:	%	29.3
	Dry Density:	pcf	98
	Diameter:	in.	2.37
	Height:	in.	3.90
	Height / Diameter Ratio:		1.65
	Calculated Saturation:	%	
	Calculated Void Ratio:		
	Assumed Specific Gravity:		
	Failure Strain:	%	15.00
	Unconfined Compressive Strength	(tsf)	0.75
	Undrained Shear Strength:	(tsf)	0.37
	Strain Rate:	in/min	
	Remarks:		

SAMPLE TYPE: CARS	SAMPLE LOCATION: B1 @ 10 - 11.5 feet			
DESCRIPTION: LEAN CLAY(CL)	LL	PL	PI	Percent < #200 Sieve
	41	23	18	97

PROJECT: Bay AZ1 Site (Northtown)	Terracon 5075 Commercial Cir Ste E Concord, CA	PROJECT NUMBER: ND205079
SITE: Orchard Parkway San Jose, CA		CLIENT: Burns & McDonnell Engineering Company Inc Columbus, OH

UNCONFINED COMPRESSION TEST

ASTM D2166



SPECIMEN FAILURE PHOTOGRAPH

SPECIMEN TEST DATA		
Moisture Content:	%	21.7
Dry Density:	pcf	105
Diameter:	in.	2.41
Height:	in.	4.07
Height / Diameter Ratio:		1.69
Calculated Saturation:	%	
Calculated Void Ratio:		
Assumed Specific Gravity:		
Failure Strain:	%	6.79
Unconfined Compressive Strength	(tsf)	0.74
Undrained Shear Strength:	(tsf)	0.37
Strain Rate:	in/min	
Remarks:		

SAMPLE TYPE: CARS	SAMPLE LOCATION: B2 @ 7.5 - 9 feet			
DESCRIPTION: SANDY LEAN CLAY(CL)	LL	PL	PI	Percent < #200 Sieve
	32	20	12	63

PROJECT: Bay AZ1 Site (Northtown)

SITE: Orchard Parkway
San Jose, CA

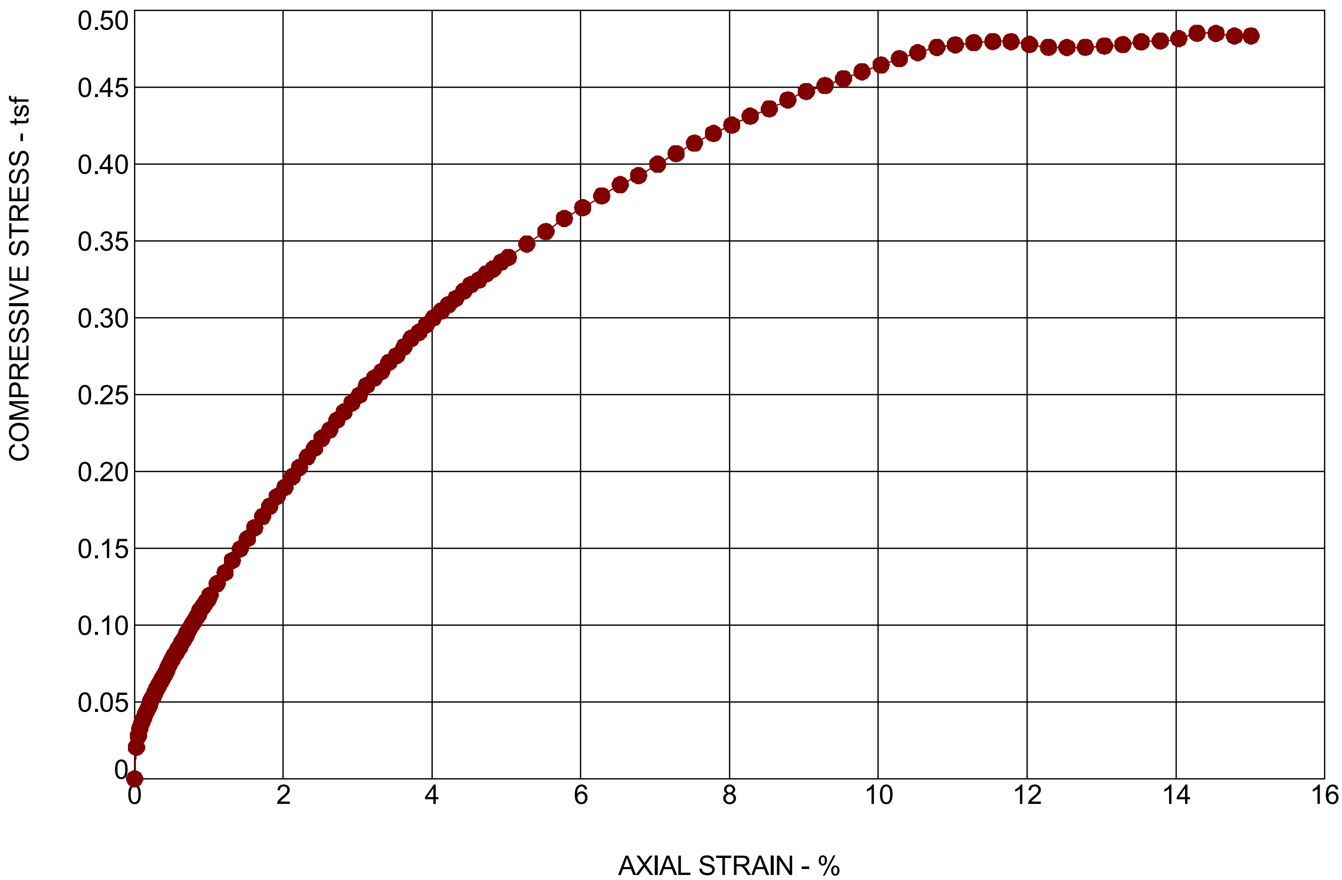
Terracon
5075 Commercial Cir Ste E
Concord, CA

PROJECT NUMBER: ND205079

CLIENT: Burns & McDonnell Engineering Company Inc
Columbus, OH

UNCONFINED COMPRESSION TEST

ASTM D2166



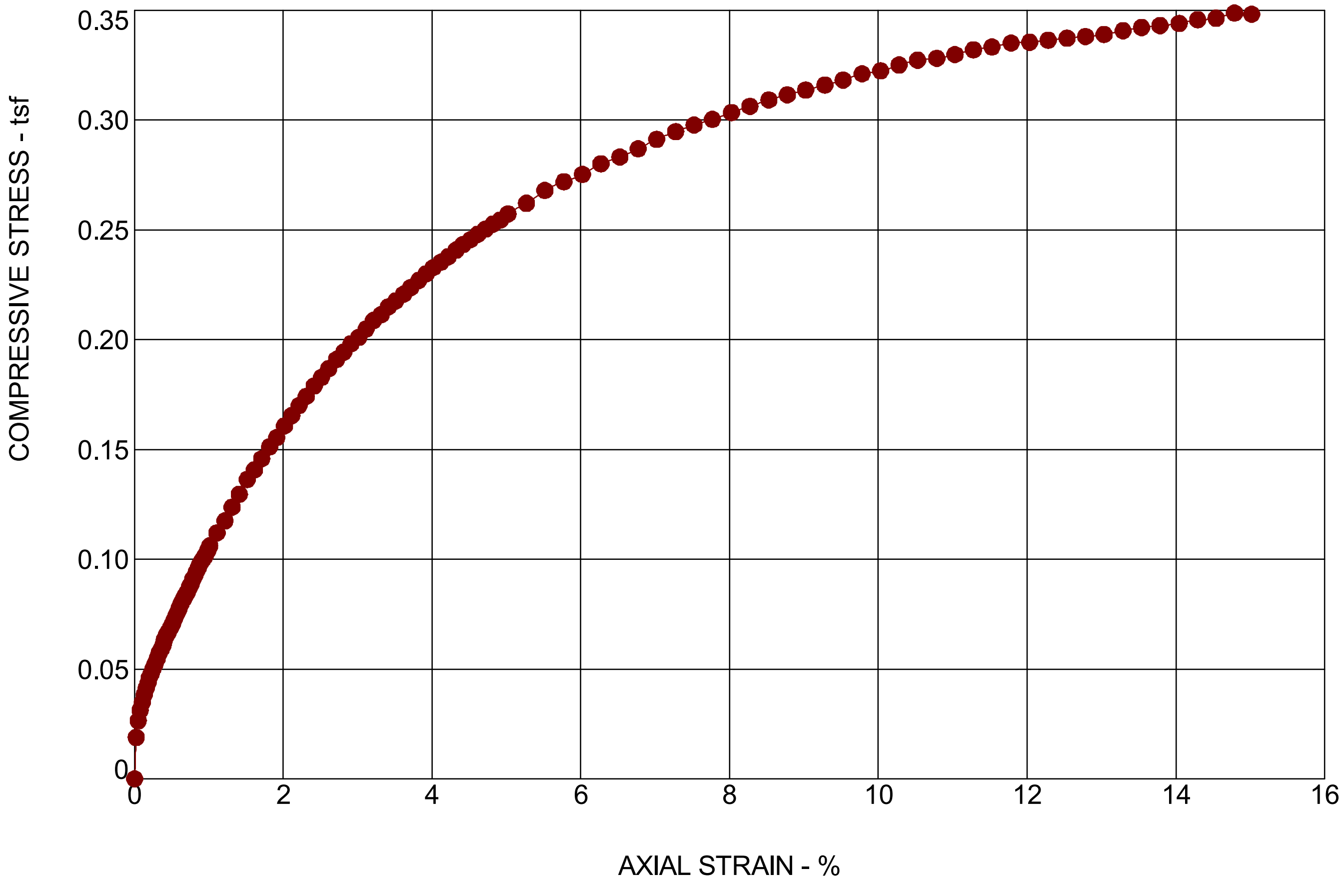
SPECIMEN FAILURE PHOTOGRAPH	SPECIMEN TEST DATA		
	Moisture Content:	%	16.3
	Dry Density:	pcf	117
	Diameter:	in.	2.30
	Height:	in.	3.83
	Height / Diameter Ratio:		1.66
	Calculated Saturation:	%	
	Calculated Void Ratio:		
	Assumed Specific Gravity:		
	Failure Strain:	%	14.28
	Unconfined Compressive Strength	(tsf)	0.49
	Undrained Shear Strength:	(tsf)	0.24
	Strain Rate:	in/min	
	Remarks:		

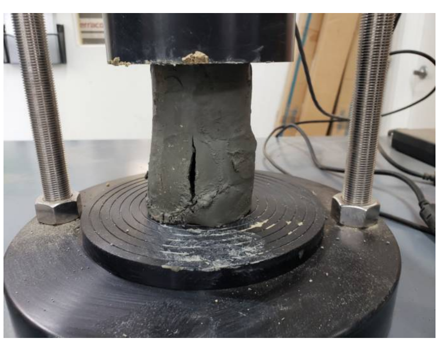
SAMPLE TYPE: CARS	SAMPLE LOCATION: B2 @ 35 - 36.5 feet			
DESCRIPTION: LEAN CLAY	LL	PL	PI	Percent < #200 Sieve

PROJECT: Bay AZ1 Site (Northtown)	Terracon 5075 Commercial Cir Ste E Concord, CA	PROJECT NUMBER: ND205079
SITE: Orchard Parkway San Jose, CA		CLIENT: Burns & McDonnell Engineering Company Inc Columbus, OH

UNCONFINED COMPRESSION TEST

ASTM D2166



SPECIMEN FAILURE PHOTOGRAPH	SPECIMEN TEST DATA		
	Moisture Content:	%	29.8
	Dry Density:	pcf	98
	Diameter:	in.	2.35
	Height:	in.	4.31
	Height / Diameter Ratio:		1.83
	Calculated Saturation:	%	
	Calculated Void Ratio:		
	Assumed Specific Gravity:		
	Failure Strain:	%	14.79
	Unconfined Compressive Strength	(tsf)	0.35
	Undrained Shear Strength:	(tsf)	0.17
	Strain Rate:	in/min	
	Remarks:		

SAMPLE TYPE: CARS	SAMPLE LOCATION: B4 @ 40 - 41.5 feet			
DESCRIPTION: LEAN CLAY	LL	PL	PI	Percent < #200 Sieve

PROJECT: Bay AZ1 Site (Northtown)

SITE: Orchard Parkway
San Jose, CA

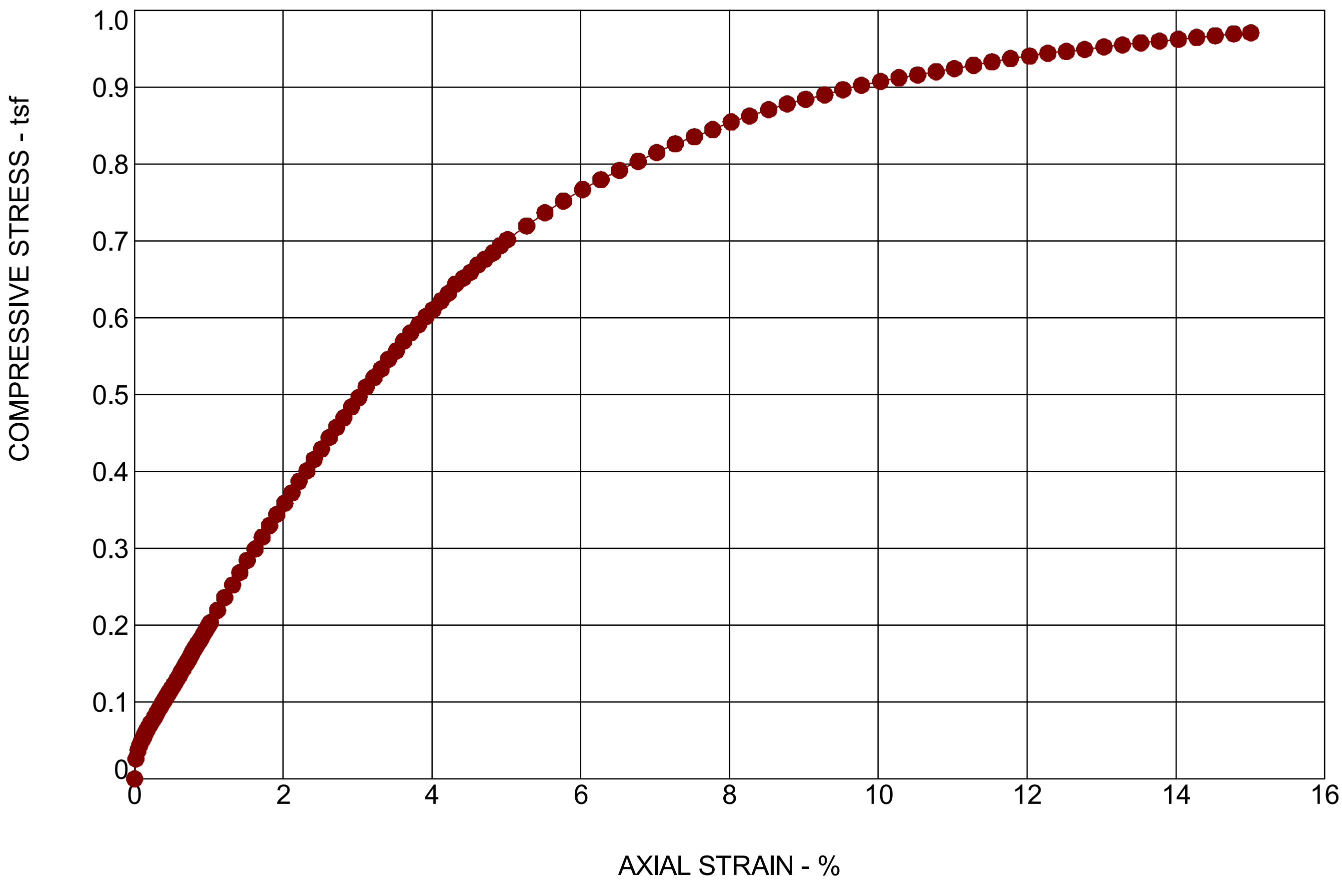
Terracon
5075 Commercial Cir Ste E
Concord, CA

PROJECT NUMBER: ND205079

CLIENT: Burns & McDonnell Engineering Company Inc
Columbus, OH

UNCONFINED COMPRESSION TEST

ASTM D2166



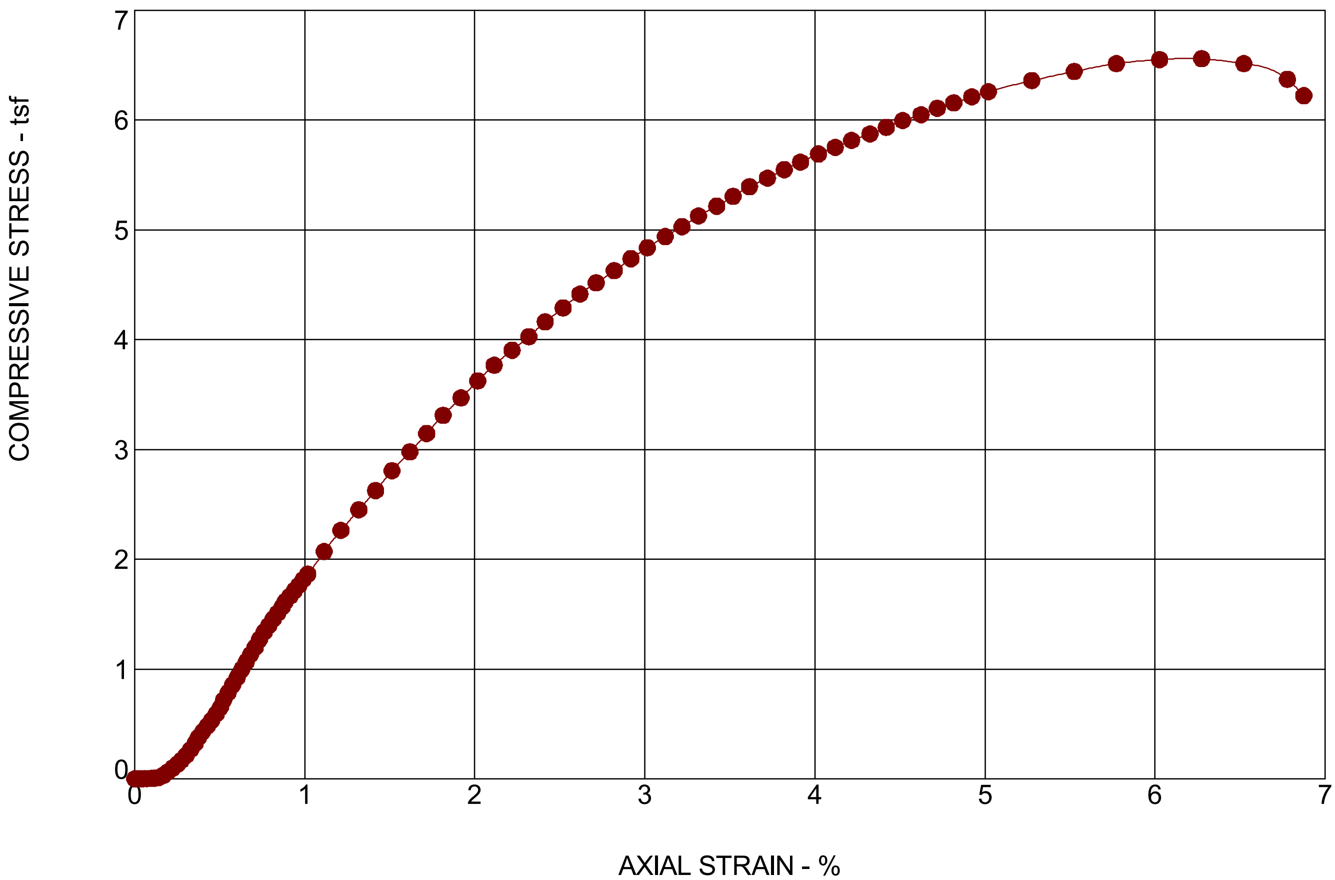
SPECIMEN FAILURE PHOTOGRAPH	SPECIMEN TEST DATA		
	Moisture Content:	%	32.9
	Dry Density:	pcf	91
	Diameter:	in.	2.40
	Height:	in.	4.14
	Height / Diameter Ratio:		1.72
	Calculated Saturation:	%	
	Calculated Void Ratio:		
	Assumed Specific Gravity:		
	Failure Strain:	%	15.00
	Unconfined Compressive Strength	(tsf)	0.97
	Undrained Shear Strength:	(tsf)	0.49
	Strain Rate:	in/min	
	Remarks:		

SAMPLE TYPE: CARS	SAMPLE LOCATION: B7 @ 20 - 21.5 feet			
DESCRIPTION: LEAN CLAY	LL	PL	PI	Percent < #200 Sieve

PROJECT: Bay AZ1 Site (Northtown)	Terracon 5075 Commercial Cir Ste E Concord, CA	PROJECT NUMBER: ND205079
SITE: Orchard Parkway San Jose, CA		CLIENT: Burns & McDonnell Engineering Company Inc Columbus, OH

UNCONFINED COMPRESSION TEST

ASTM D2166



SPECIMEN FAILURE PHOTOGRAPH	SPECIMEN TEST DATA		
	Moisture Content:	%	27.7
	Dry Density:	pcf	93
	Diameter:	in.	2.37
	Height:	in.	4.36
	Height / Diameter Ratio:		1.84
	Calculated Saturation:	%	
	Calculated Void Ratio:		
	Assumed Specific Gravity:		
	Failure Strain:	%	6.27
	Unconfined Compressive Strength	(tsf)	6.56
	Undrained Shear Strength:	(tsf)	3.28
	Strain Rate:	in/min	
	Remarks:		

SAMPLE TYPE: CARS	SAMPLE LOCATION: B8 @ 2.5 - 4 feet			
DESCRIPTION: LEAN CLAY with SAND(CL)	LL	PL	PI	Percent < #200 Sieve
	49	23	26	80

PROJECT: Bay AZ1 Site (Northtown)

SITE: Orchard Parkway
San Jose, CA

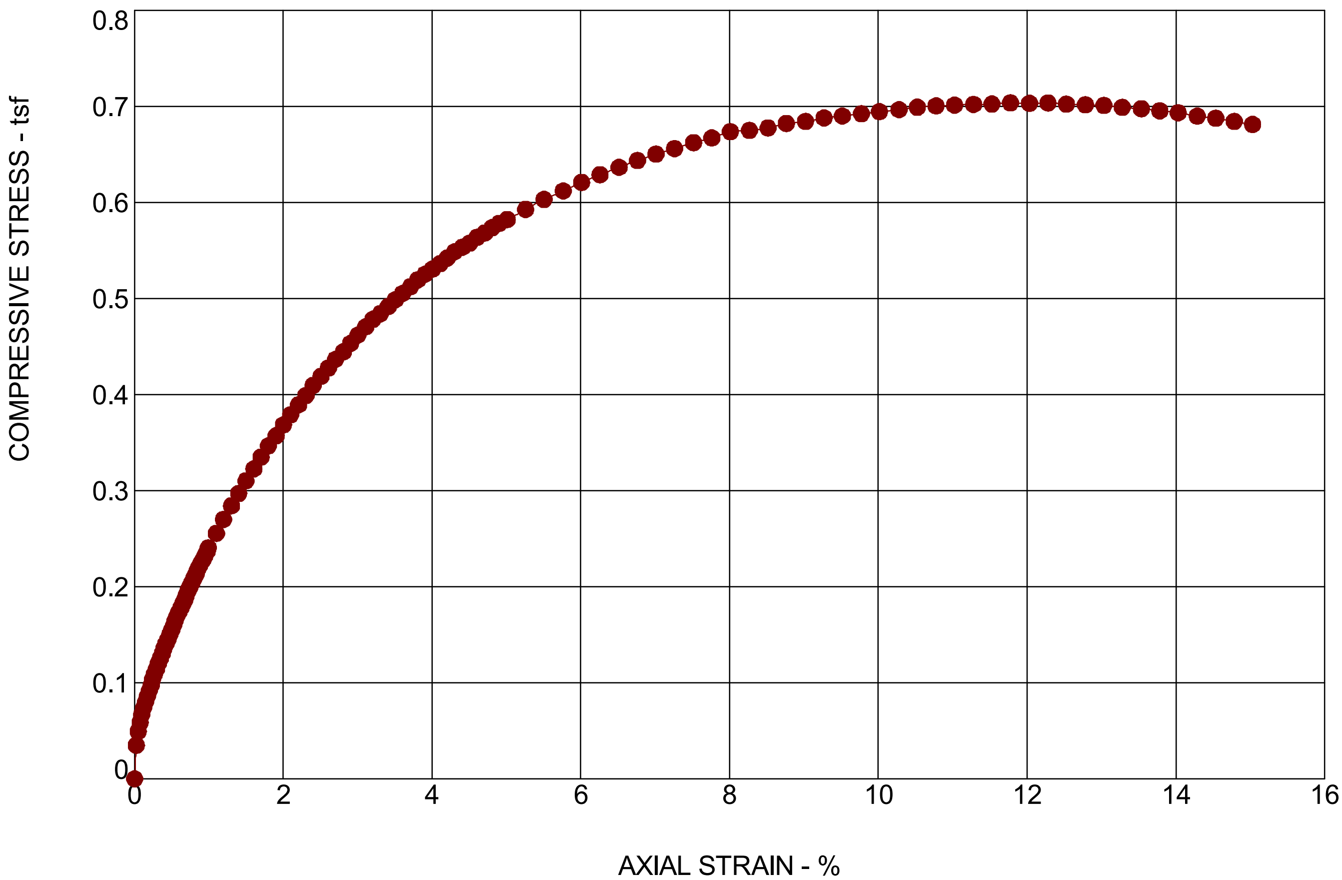
Terracon
5075 Commercial Cir Ste E
Concord, CA

PROJECT NUMBER: ND205079

CLIENT: Burns & McDonnell Engineering Company Inc
Columbus, OH

UNCONFINED COMPRESSION TEST

ASTM D2166



SPECIMEN FAILURE PHOTOGRAPH	SPECIMEN TEST DATA		
	Moisture Content:	%	26.4
	Dry Density:	pcf	99
	Diameter:	in.	2.36
	Height:	in.	4.18
	Height / Diameter Ratio:		1.77
	Calculated Saturation:	%	
	Calculated Void Ratio:		
	Assumed Specific Gravity:		
	Failure Strain:	%	11.78
	Unconfined Compressive Strength	(tsf)	0.70
	Undrained Shear Strength:	(tsf)	0.35
	Strain Rate:	in/min	
	Remarks:		

SAMPLE TYPE: CARS	SAMPLE LOCATION: B8 @ 15 - 16.5 feet			
DESCRIPTION: LEAN CLAY	LL	PL	PI	Percent < #200 Sieve

PROJECT: Bay AZ1 Site (Northtown)

SITE: Orchard Parkway
San Jose, CA

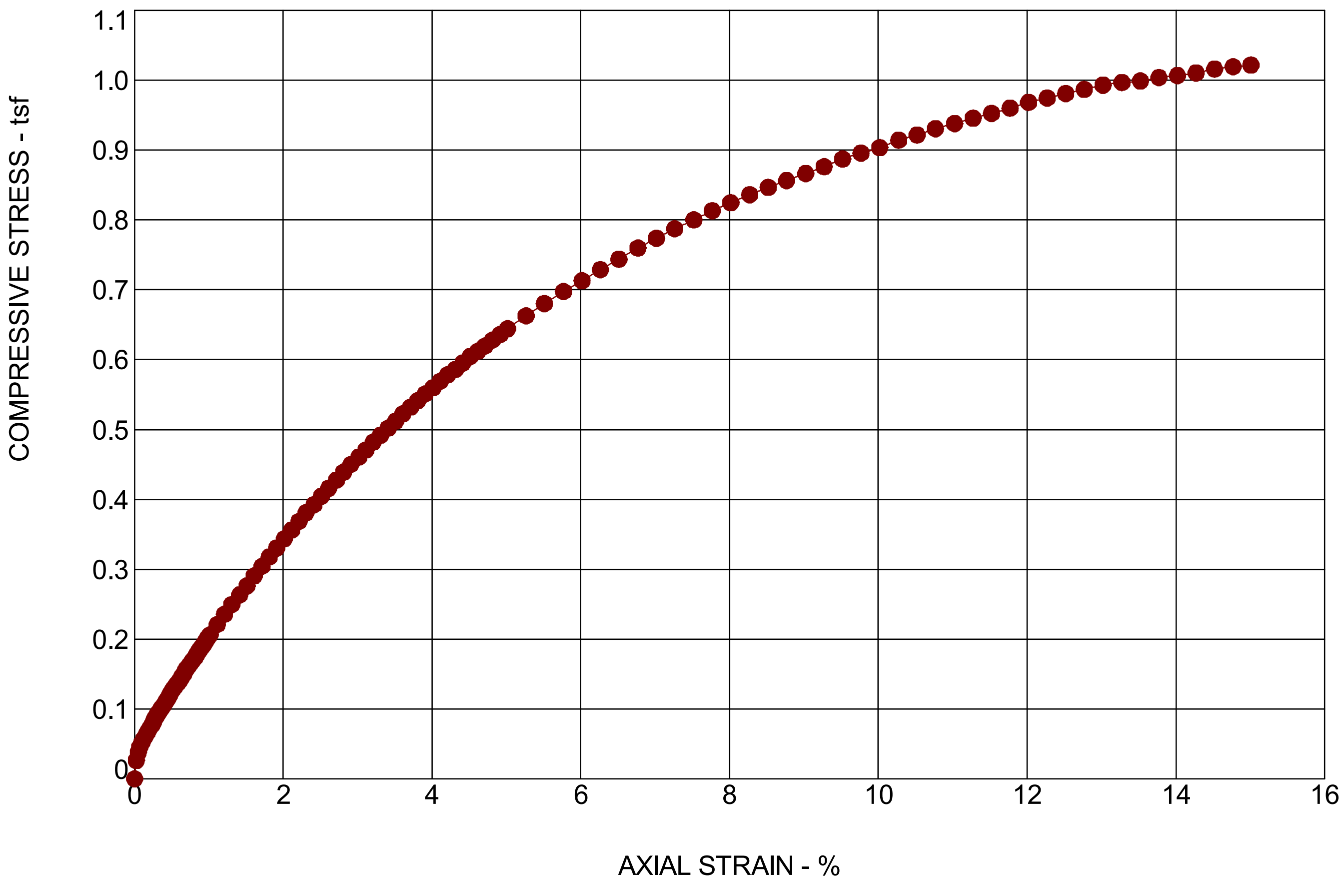
Terracon
5075 Commercial Cir Ste E
Concord, CA

PROJECT NUMBER: ND205079

CLIENT: Burns & McDonnell Engineering Company Inc
Columbus, OH

UNCONFINED COMPRESSION TEST

ASTM D2166



SPECIMEN FAILURE PHOTOGRAPH

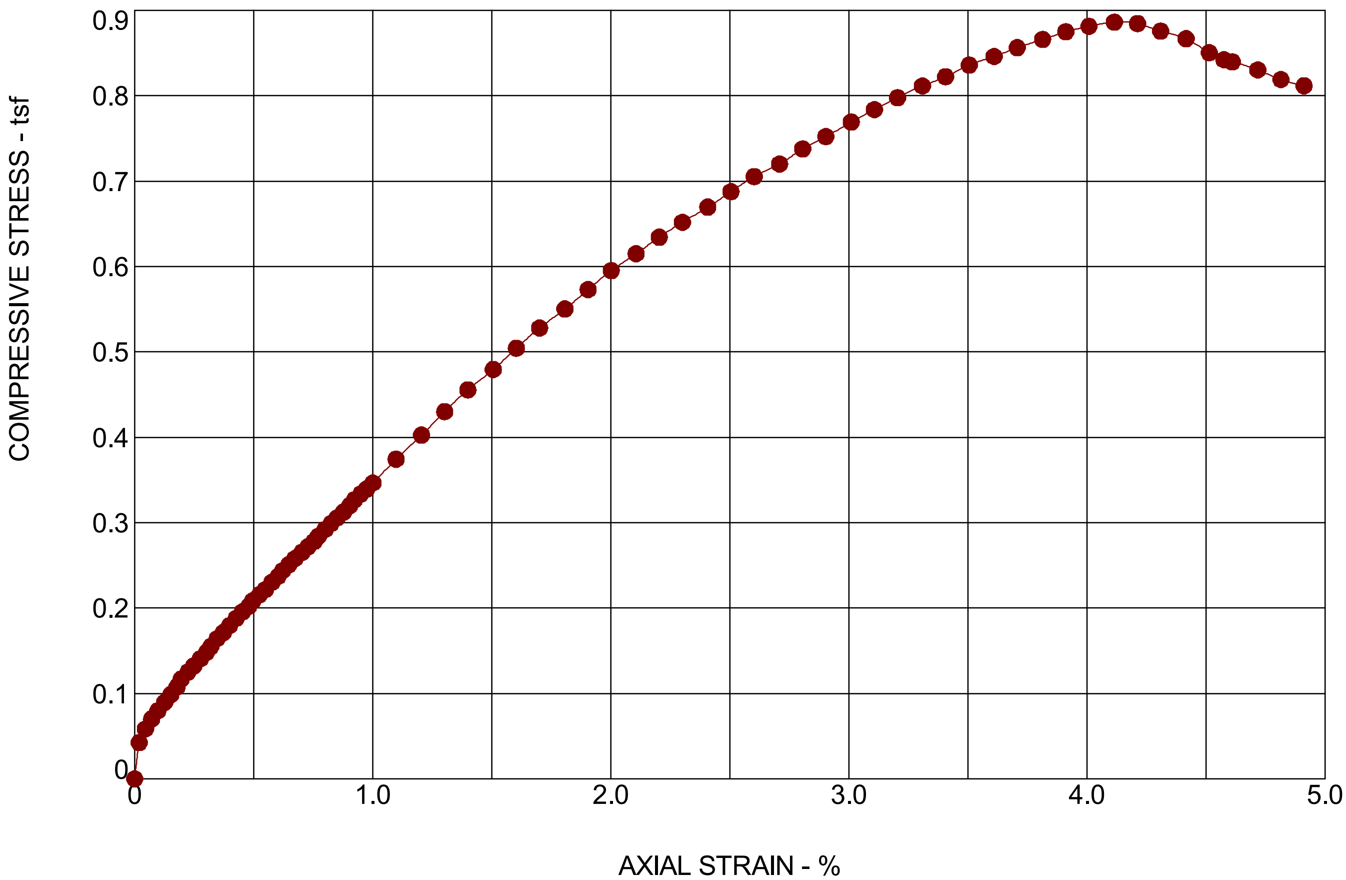

SPECIMEN TEST DATA		
Moisture Content:	%	27.3
Dry Density:	pcf	104
Diameter:	in.	2.33
Height:	in.	4.38
Height / Diameter Ratio:		1.88
Calculated Saturation:	%	
Calculated Void Ratio:		
Assumed Specific Gravity:		
Failure Strain:	%	15.00
Unconfined Compressive Strength	(tsf)	1.02
Undrained Shear Strength:	(tsf)	0.51
Strain Rate:	in/min	
Remarks:		

SAMPLE TYPE: CARS	SAMPLE LOCATION: B9 @ 10 - 11.5 feet				
DESCRIPTION: LEAN CLAY	LL	PL	PI	Percent < #200 Sieve	

PROJECT: Bay AZ1 Site (Northtown)	Terracon 5075 Commercial Cir Ste E Concord, CA	PROJECT NUMBER: ND205079
SITE: Orchard Parkway San Jose, CA		CLIENT: Burns & McDonnell Engineering Company Inc Columbus, OH

UNCONFINED COMPRESSION TEST

ASTM D2166



SPECIMEN FAILURE PHOTOGRAPH	SPECIMEN TEST DATA		
	Moisture Content:	%	19.4
	Dry Density:	pcf	112
	Diameter:	in.	2.36
	Height:	in.	4.22
	Height / Diameter Ratio:		1.79
	Calculated Saturation:	%	
	Calculated Void Ratio:		
	Assumed Specific Gravity:		
	Failure Strain:	%	4.11
	Unconfined Compressive Strength	(tsf)	0.89
	Undrained Shear Strength:	(tsf)	0.44
	Strain Rate:	in/min	
	Remarks:		

SAMPLE TYPE: CARS	SAMPLE LOCATION: B11 @ 7.5 - 9 feet			
DESCRIPTION: LEAN CLAY WITH SAND	LL	PL	PI	Percent < #200 Sieve

PROJECT: Bay AZ1 Site (Northtown)

SITE: Orchard Parkway
San Jose, CA

Terracon
5075 Commercial Cir Ste E
Concord, CA

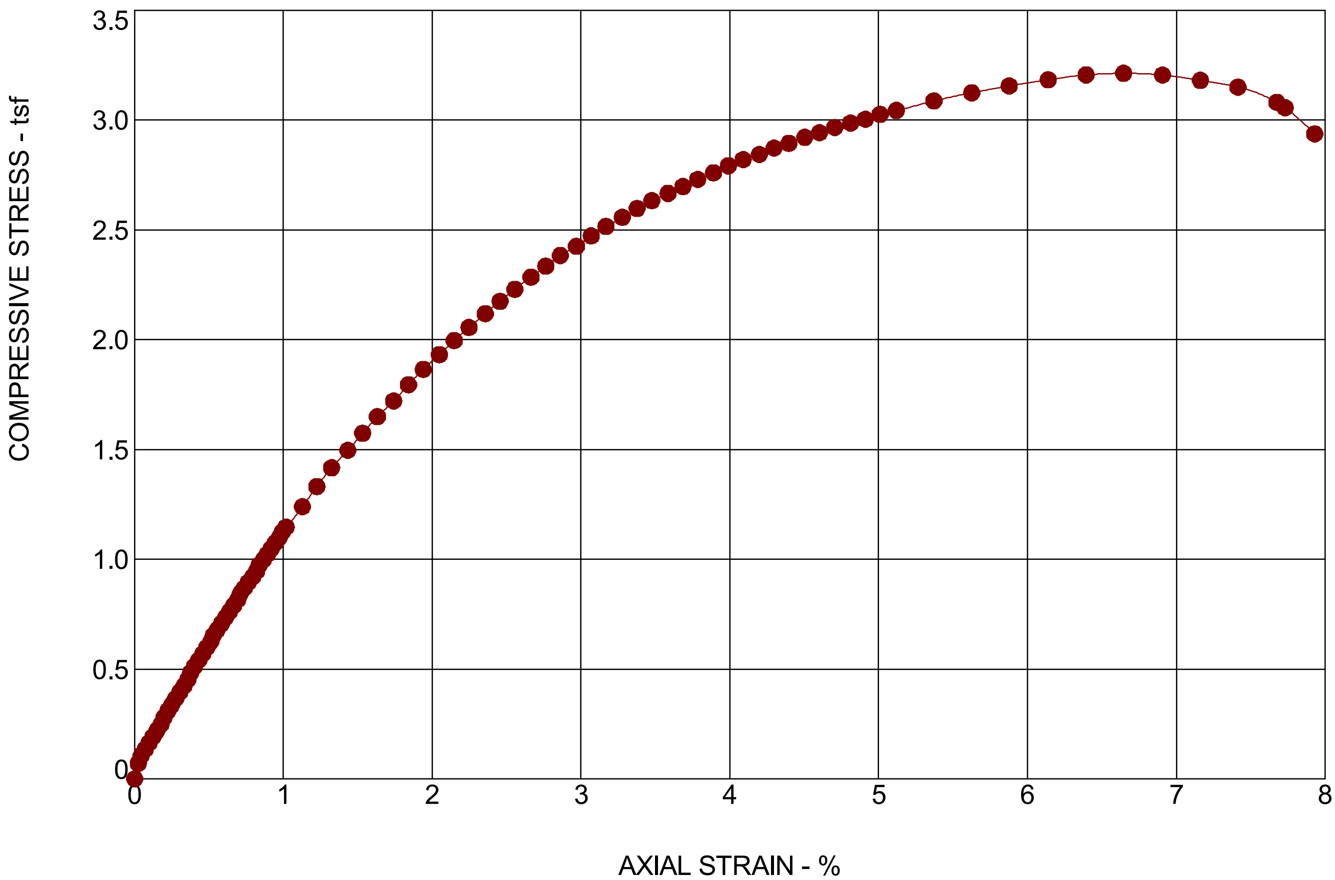
PROJECT NUMBER: ND205079

CLIENT: Burns & McDonnell Engineering Company Inc
Columbus, OH

LABORATORY TESTS ARE NOT VALID IF SEPARATED FROM ORIGINAL REPORT. UNCONFINED WITH PHOTOS ND205079 BAY AZ1 SITE (NOR.GPJ TERRACON_DATATEMPLATE.GDT 11/30/20

UNCONFINED COMPRESSION TEST

ASTM D2166



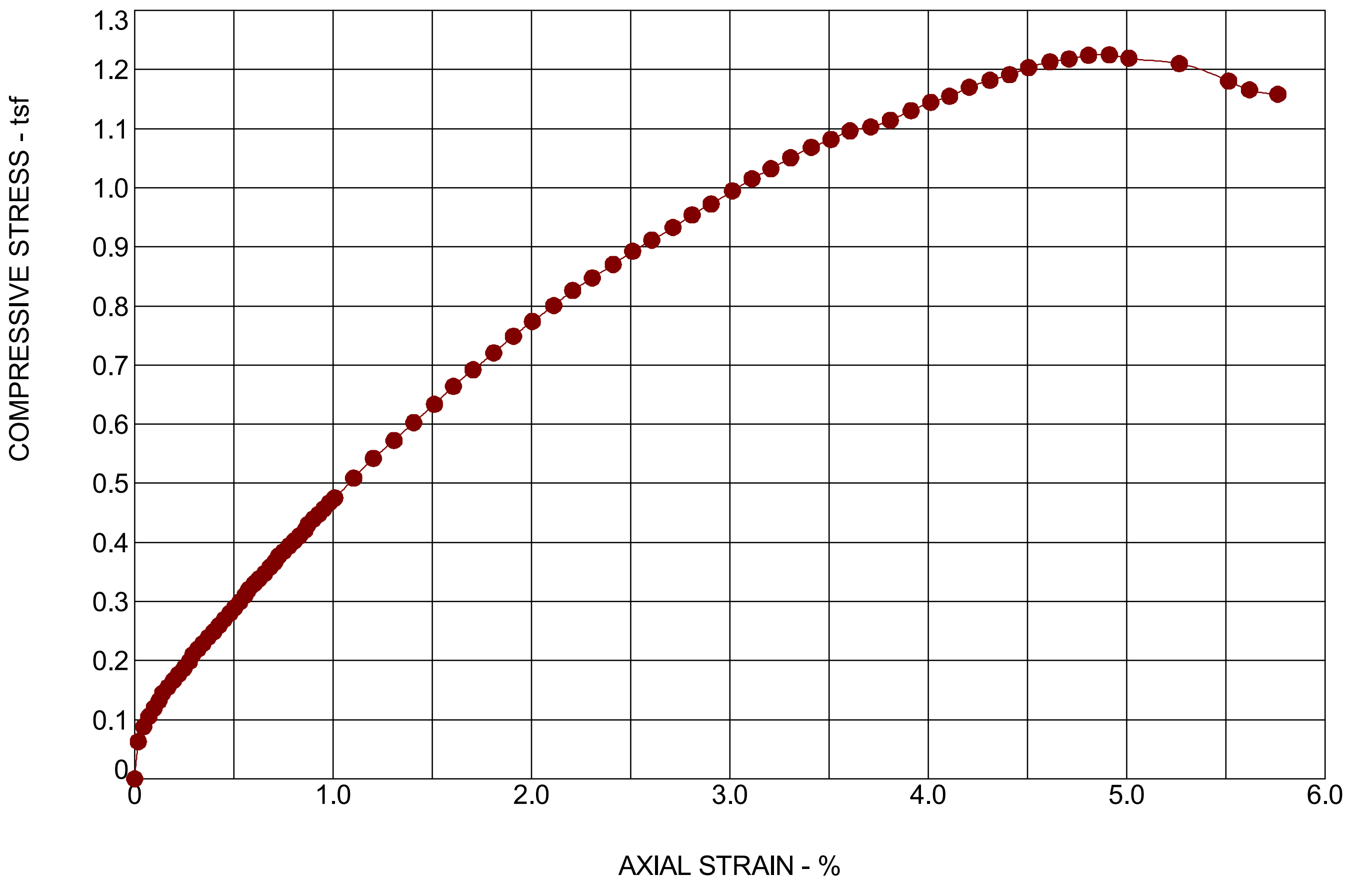
SPECIMEN FAILURE PHOTOGRAPH	SPECIMEN TEST DATA		
	Moisture Content:	%	23.1
	Dry Density:	pcf	99
	Diameter:	in.	2.38
	Height:	in.	4.13
	Height / Diameter Ratio:		1.73
	Calculated Saturation:	%	
	Calculated Void Ratio:		
	Assumed Specific Gravity:		
	Failure Strain:	%	6.65
	Unconfined Compressive Strength	(tsf)	3.21
	Undrained Shear Strength:	(tsf)	1.61
	Strain Rate:	in/min	
	Remarks:		

SAMPLE TYPE: CARS	SAMPLE LOCATION: B13 @ 5 - 6.5 feet			
DESCRIPTION: LEAN CLAY WITH SAND	LL	PL	PI	Percent < #200 Sieve

PROJECT: Bay AZ1 Site (Northtown)	Terracon 5075 Commercial Cir Ste E Concord, CA	PROJECT NUMBER: ND205079
SITE: Orchard Parkway San Jose, CA		CLIENT: Burns & McDonnell Engineering Company Inc Columbus, OH

UNCONFINED COMPRESSION TEST

ASTM D2166



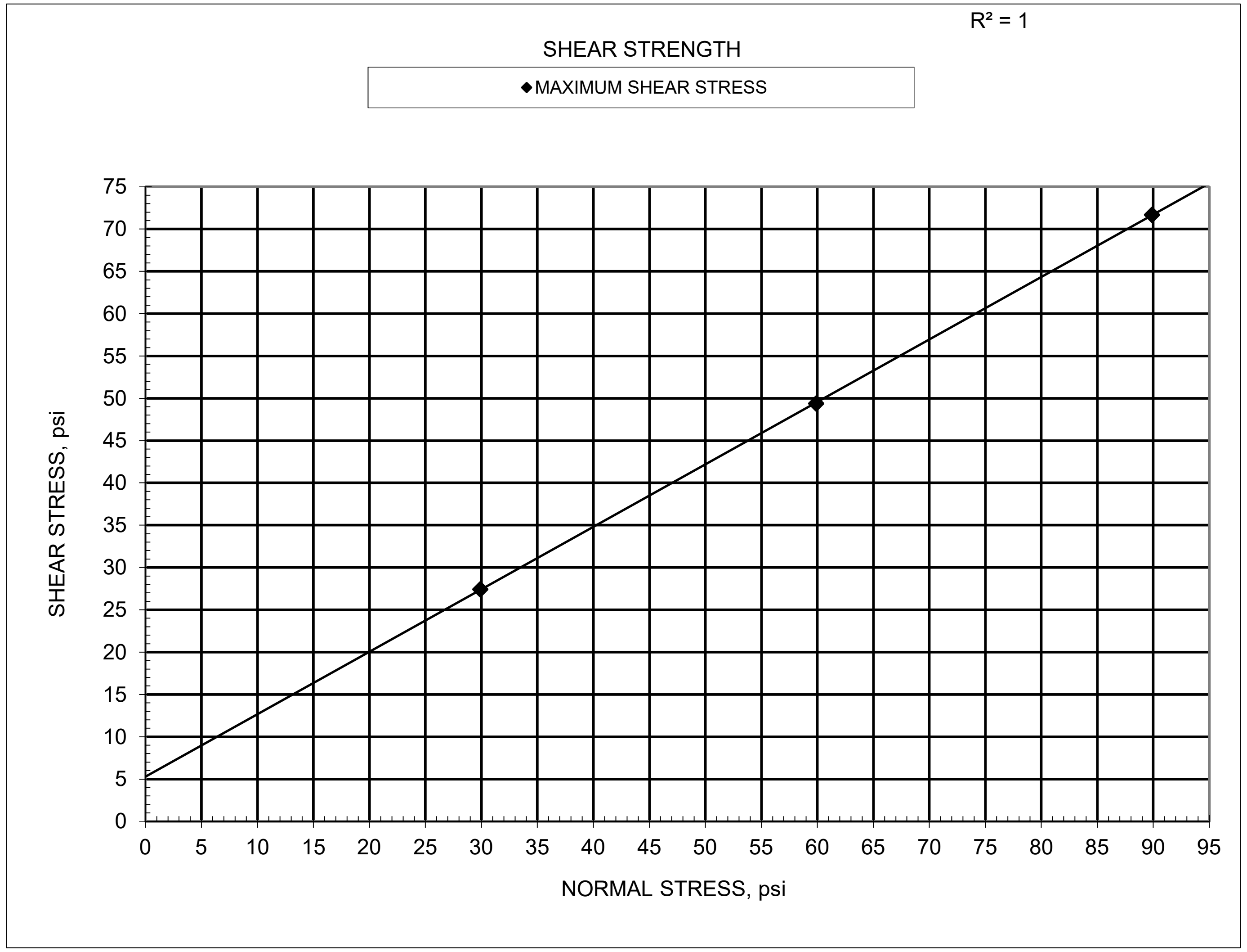
SPECIMEN FAILURE PHOTOGRAPH

SPECIMEN TEST DATA		
Moisture Content:	%	23.3
Dry Density:	pcf	95
Diameter:	in.	2.37
Height:	in.	3.34
Height / Diameter Ratio:		1.41
Calculated Saturation:	%	
Calculated Void Ratio:		
Assumed Specific Gravity:		
Failure Strain:	%	4.91
Unconfined Compressive Strength	(tsf)	1.22
Undrained Shear Strength:	(tsf)	0.61
Strain Rate:	in/min	
Remarks:		

SAMPLE TYPE: CARS	SAMPLE LOCATION: B15 @ 15 - 16.5 feet			
DESCRIPTION: LEAN CLAY	LL	PL	PI	Percent < #200 Sieve

PROJECT: Bay AZ1 Site (Northtown)	Terracon 5075 Commercial Cir Ste E Concord, CA	PROJECT NUMBER: ND205079
SITE: Orchard Parkway San Jose, CA		CLIENT: Burns & McDonnell Engineering Company Inc Columbus, OH

DIRECT SHEAR TEST OF SOILS UNDER CONSOLIDATED DRAINED CONDITIONS
ASTM D3080



		FRICTION ANGLE		COHESION		NORMAL STRESS, psi	NORMAL STRESS, psi	NORMAL STRESS, psi
AT MAXIMUM SHEAR STRESS		36.4	deg	5.3	psi	29.91	59.90	89.89
INITIAL AREA, mm2	3166.9	INITIAL MOISTURE, %				16.6	18.1	19.5
INITIAL LENGTH, mm	25.15	INITIAL DRY DENSITY, pcf				111.7	109.1	109.0
SPECIFIC GRAVITY	2.70	INITIAL SATURATION, %				88	90	97
SG TESTED		INITIAL VOID RATIO				0.51	0.54	0.55
SG ASSUMED	X	FINAL MOISTURE, %				20.9	19.3	27.1
LIQUID LIMIT		FINAL SATURATION, %				126	102	122
PLASTIC LIMIT		FINAL VOID RATIO				0.45	0.51	0.60
PLASTICITY INDEX		MAXIMUM SHEAR STRESS, psi				27.41	49.37	71.68
SAMPLE TYPE	RECOMPACTED	RATE OF LOADING, in/min				0.0050	0.0050	0.0050
DESCRIPTION								

PROJECT NAME: Bay AZ1 Site (Northtown)   BORING NO. B1

LOCATION: San Jose, CA   SAMPLE NO. 7

JOB NO.: ND205079   DEPTH, feet 20 TO 21.5

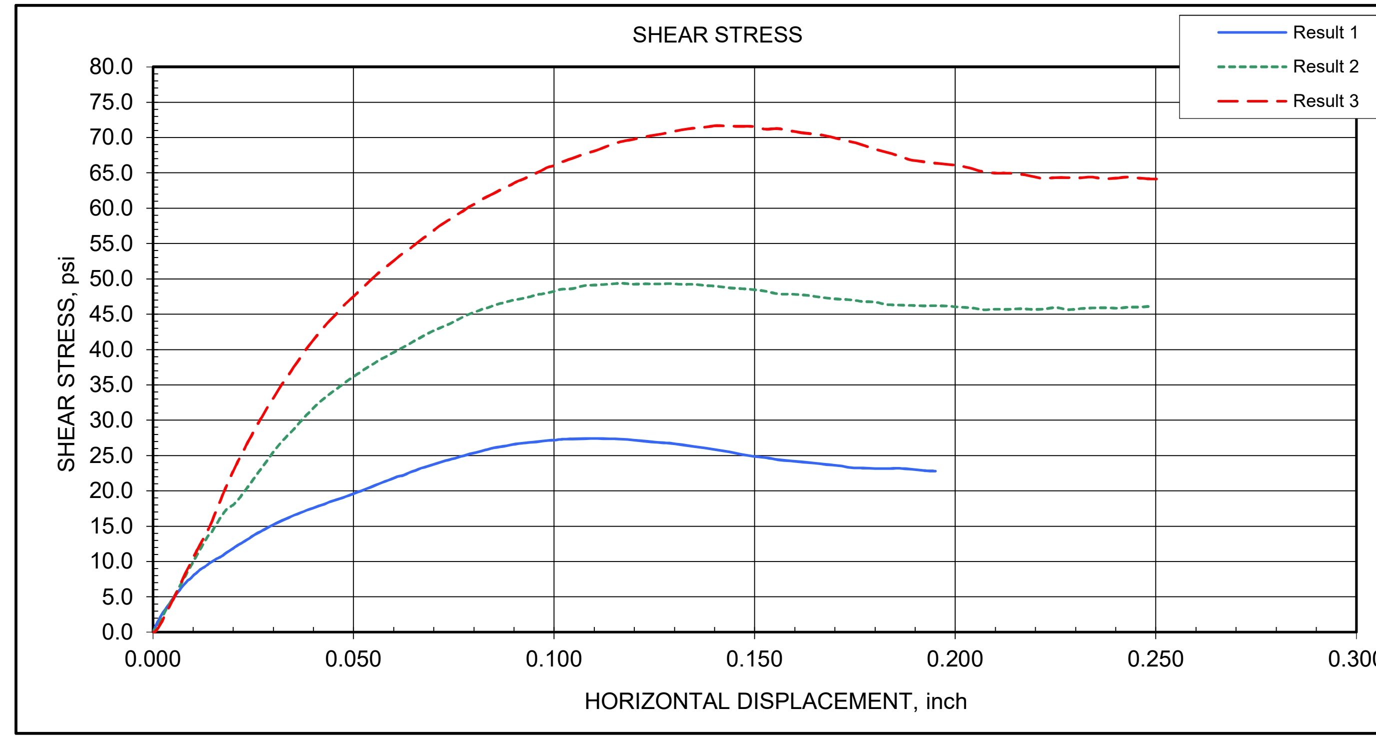
DATE: 11/10/2020

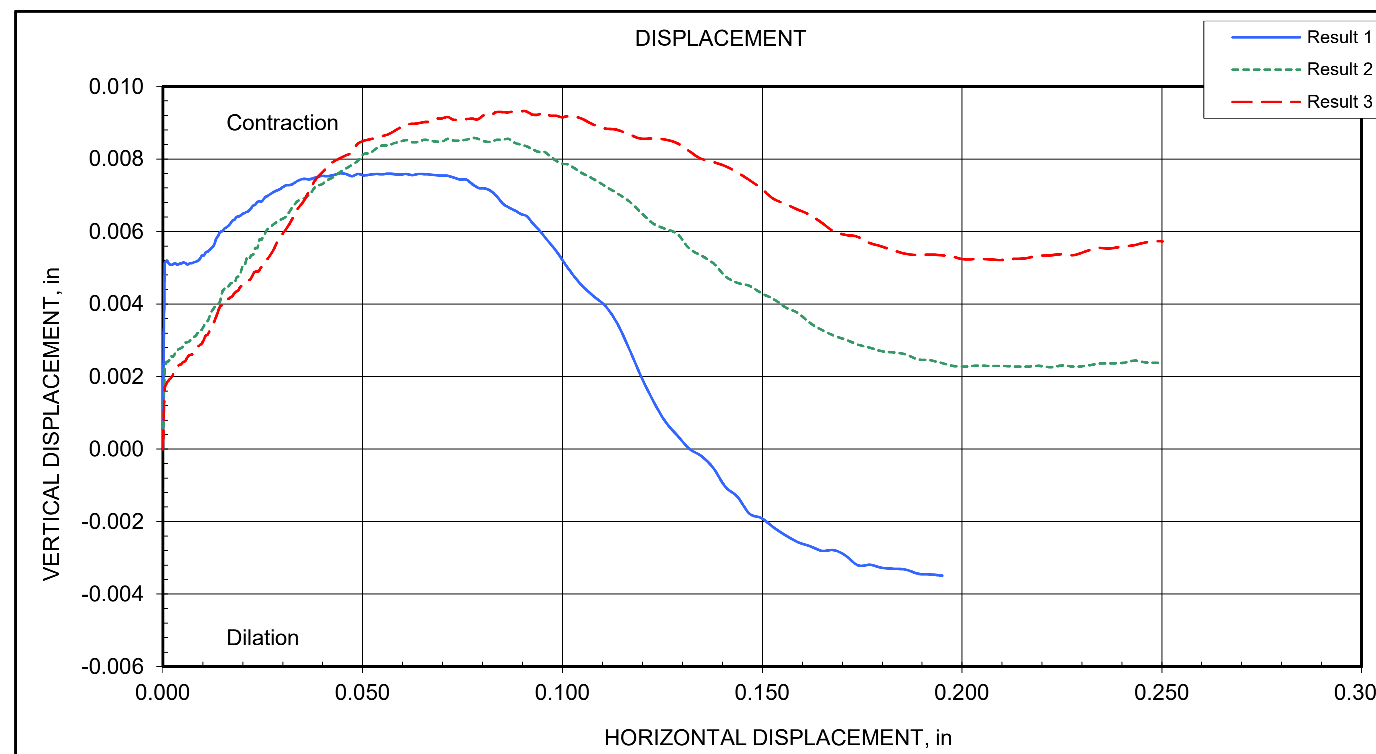
Terracon

Bay AZ1 Site (Northtown)

ND205079
11/10/2020

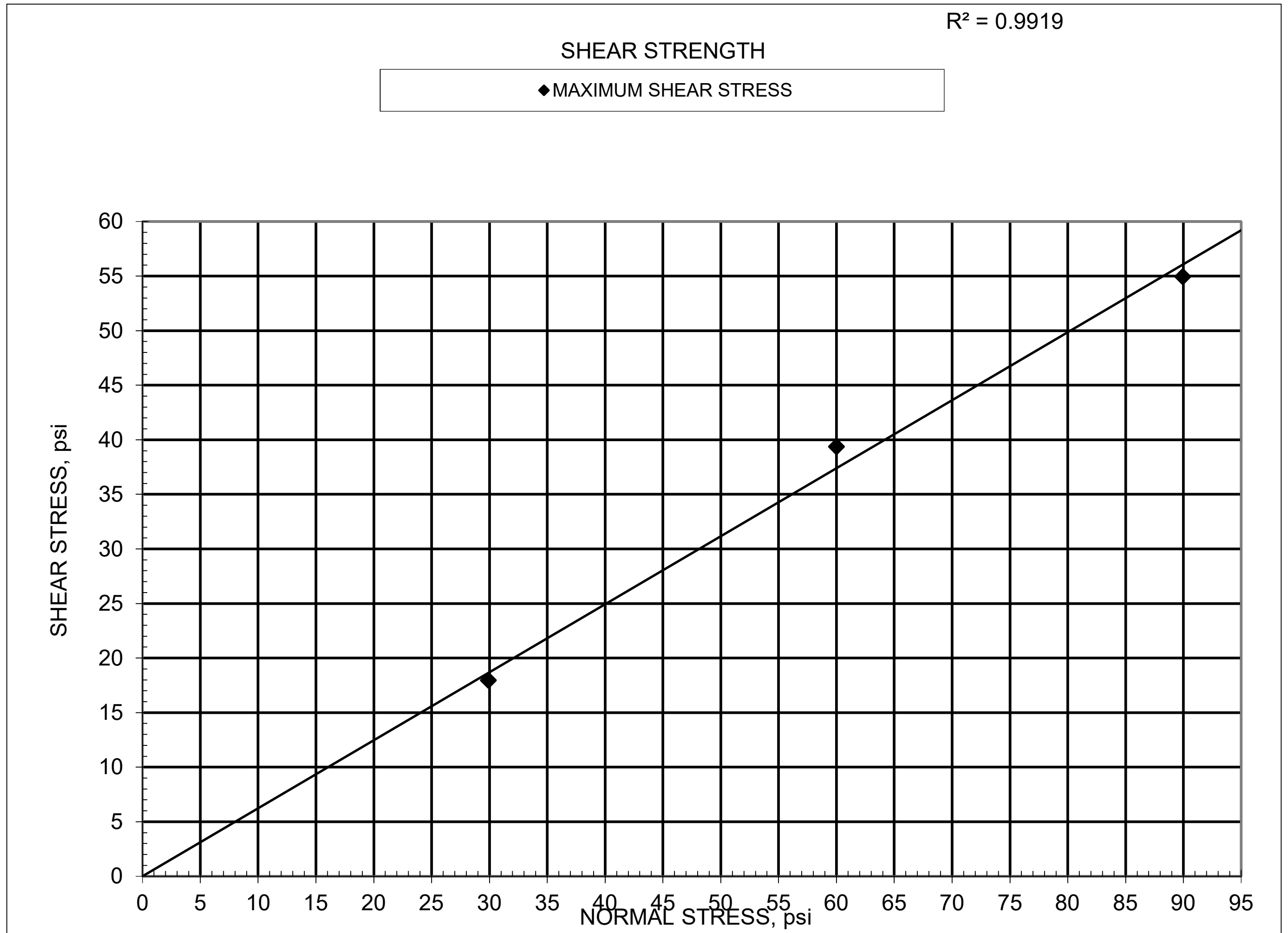
BORING NO. B1
SAMPLE NO. 7
DEPTH, feet 20 TO 21.5





Terracon

DIRECT SHEAR TEST OF SOILS UNDER CONSOLIDATED DRAINED CONDITIONS
ASTM D3080



		FRICTION ANGLE		COHESION		NORMAL STRESS, psi	NORMAL STRESS, psi	NORMAL STRESS, psi
AT MAXIMUM SHEAR STRESS		31.6	deg	0.5	psi	29.91	60.00	89.94
INITIAL AREA, mm2	3166.9	INITIAL MOISTURE, %				21.2	19.5	19.6
INITIAL LENGTH, mm	24.89	INITIAL DRY DENSITY, pcf				84.1	83.7	83.7
SPECIFIC GRAVITY	2.70	INITIAL SATURATION, %				57	52	52
SG TESTED		INITIAL VOID RATIO				1.00	1.01	1.01
SG ASSUMED	X	FINAL MOISTURE, %				22.1	20.4	20.9
LIQUID LIMIT		FINAL SATURATION, %				242	107	103
PLASTIC LIMIT		FINAL VOID RATIO				0.25	0.51	0.55
PLASTICITY INDEX		MAXIMUM SHEAR STRESS, psi				17.97	39.36	54.94
SAMPLE TYPE	RECOMPACTED	RATE OF LOADING, in/min				0.0030	0.0030	0.0030
DESCRIPTION								

PROJECT NAME: Bay AZ1 Site (Northtown)　　BORING NO. B2-2-1

LOCATION: San Jose, CA　　SAMPLE NO. 2

JOB NO.: ND205079　　DEPTH, feet 2.5 TO 4

DATE: 11/12/2020

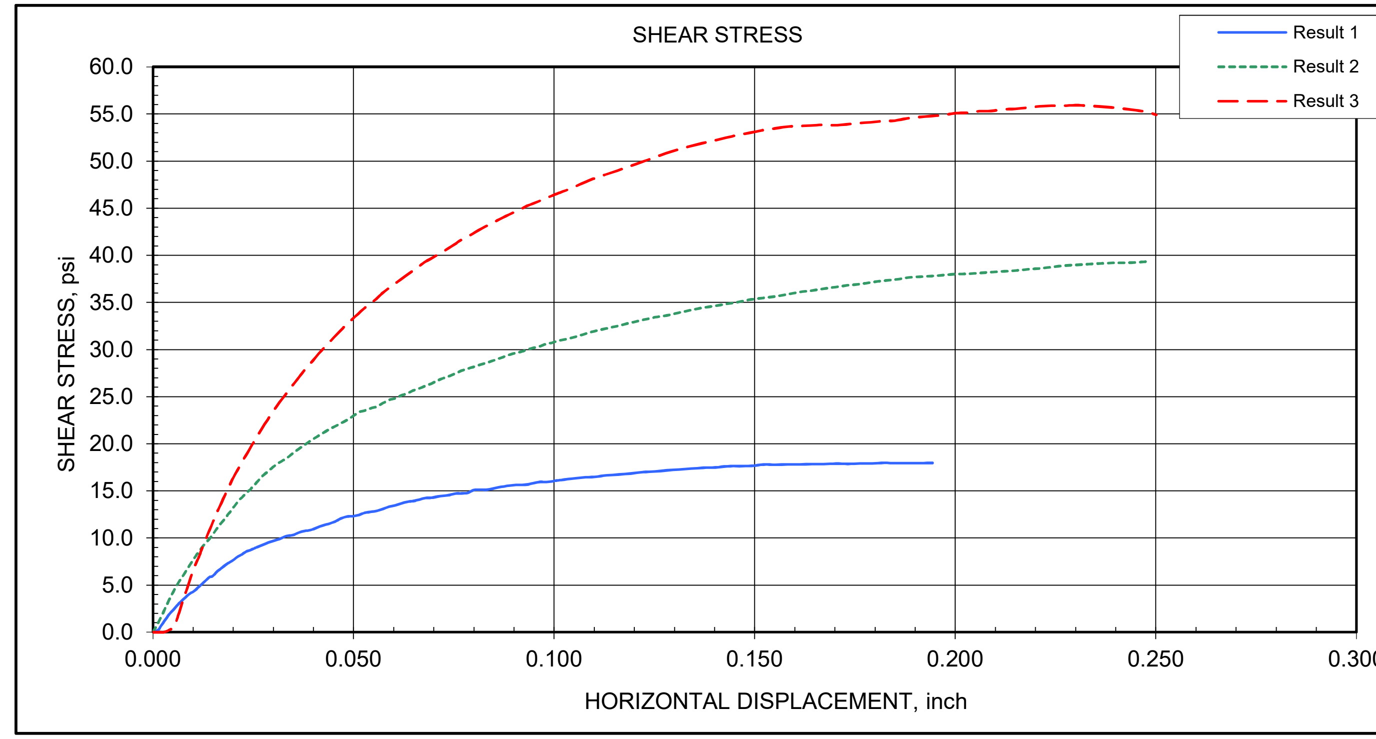
N:\Projects\2020\ND205079\Working Files\Laboratory-Field Data-Boring Logs\[Direct Shear Data_B2-2-1.xls]Report

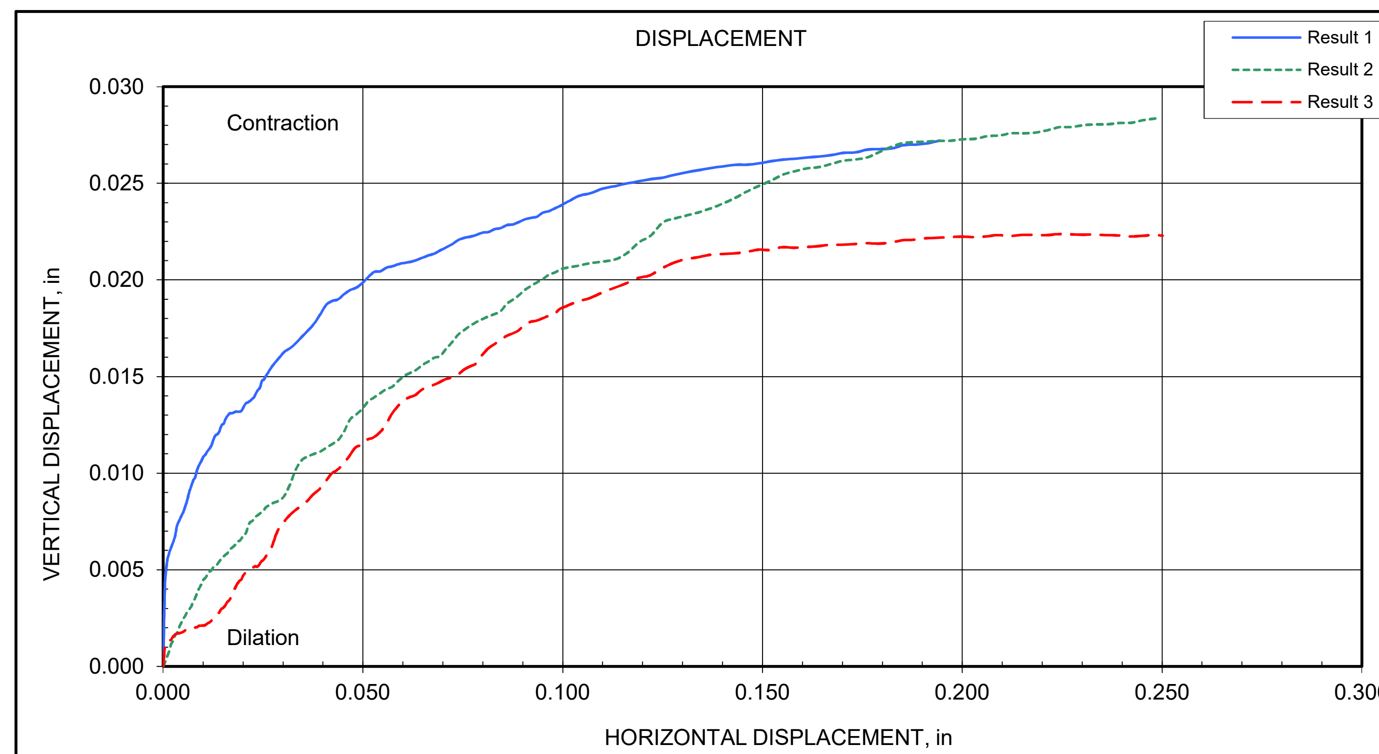
Terracon

Bay AZ1 Site (Northtown)

ND205079
11/12/2020

BORING NO.	B2-2-1
SAMPLE NO.	2
DEPTH, feet	2.5 TO 4





N:\Projects\2020\ND205079\Working Files\Laboratory-Field Data-Boring Logs\[Direct Shear Data_B2-2-1.xls]Report

Terracon

750 Pilot Road, Suite F
Las Vegas, Nevada 89119
(702) 597-9393

Terracon GeoReport

Client

Burns & McDonnell Engineering Company Inc
Colombus, OH

Project

Bay AZ1 Site (Northtown)

Sample Submitted By: Terracon (ND) **Date Received:** 11/10/2020 **Lab No.: 20-1214**

Results of Corrosion Analysis

Sample Number	1	7	3	2
Sample Location	B2	B3	B5	B6
Sample Depth (ft.)	1.0-2.5	20.0-21.5	5.0-6.5	2.5-4.0
pH Analysis, ASTM G 51	7.81	8.04	7.55	7.24
Water Soluble Sulfate (SO4), ASTM C 1580 (mg/kg)	133	182	122	103
Sulfides, AWWA 4500-S D, (mg/kg)	Nil	Nil	Nil	Nil
Chlorides, ASTM D 512, (mg/kg)	38	60	113	55
Red-Ox, ASTM G 200, (mV)	+686	+685	+686	+684
Total Salts, AWWA 2540, (mg/kg)	1131	1579	1971	1540
Resistivity (Saturated), ASTM G 57, (ohm-cm)	2959	1455	664	1067

Analyzed By: Trisha Campo

Trisha Campo
Chemist

750 Pilot Road, Suite F
Las Vegas, Nevada 89119
(702) 597-9393

Terracon GeoReport

Client

Burns & McDonnell Engineering Company Inc
Colombus, OH

Project

Bay AZ1 Site (Northtown)

Sample Submitted By: Terracon (ND) **Date Received:** 11/10/2020 **Lab No.: 20-1214**

Results of Corrosion Analysis

Sample Number	3	1
Sample Location	B13	B14
Sample Depth (ft.)	5.0-6.5	1.0-2.5
pH Analysis, ASTM G 51	7.44	7.76
Water Soluble Sulfate (SO4), ASTM C 1580 (mg/kg)	212	115
Sulfides, AWWA 4500-S D, (mg/kg)	Nil	Nil
Chlorides, ASTM D 512, (mg/kg)	45	53
Red-Ox, ASTM G 200, (mV)	+685	+687
Total Salts, AWWA 2540, (mg/kg)	1333	1355
Resistivity (Saturated), ASTM G 57, (ohm-cm)	1213	1164

Analyzed By: Trisha Campo

Trisha Campo
Chemist

21239 FM529 Rd., Bldg. F
Cypress, TX 77433
Tel: 281-985-9344
Fax: 832-427-1752
info@geothermusa.com
http://www.geothermusa.com

November 17, 2020

Terracon Consultants, Inc.
5075 Commercial Circle, Suite E
Concord, CA 94520
Attn: Hoda Alinasab

Re: Thermal Analysis of Native Soil Samples
Bay AZ1- San Jose, CA (Project No. ND205079)

The following is the report of thermal dryout characterization tests conducted on the eight (8) native soil samples from the referenced project sent to our laboratory.

Thermal Resistivity Tests: The samples were tested their 'optimum' moisture content and 90% of maximum dry density ***provided by Terracon***. The tests were conducted in accordance with the IEEE standard 442-2017. The results are tabulated below and the thermal dryout curves are presented in **Figures 1 to 8.**

Sample ID, Description, Thermal Resistivity, Moisture Content and Density

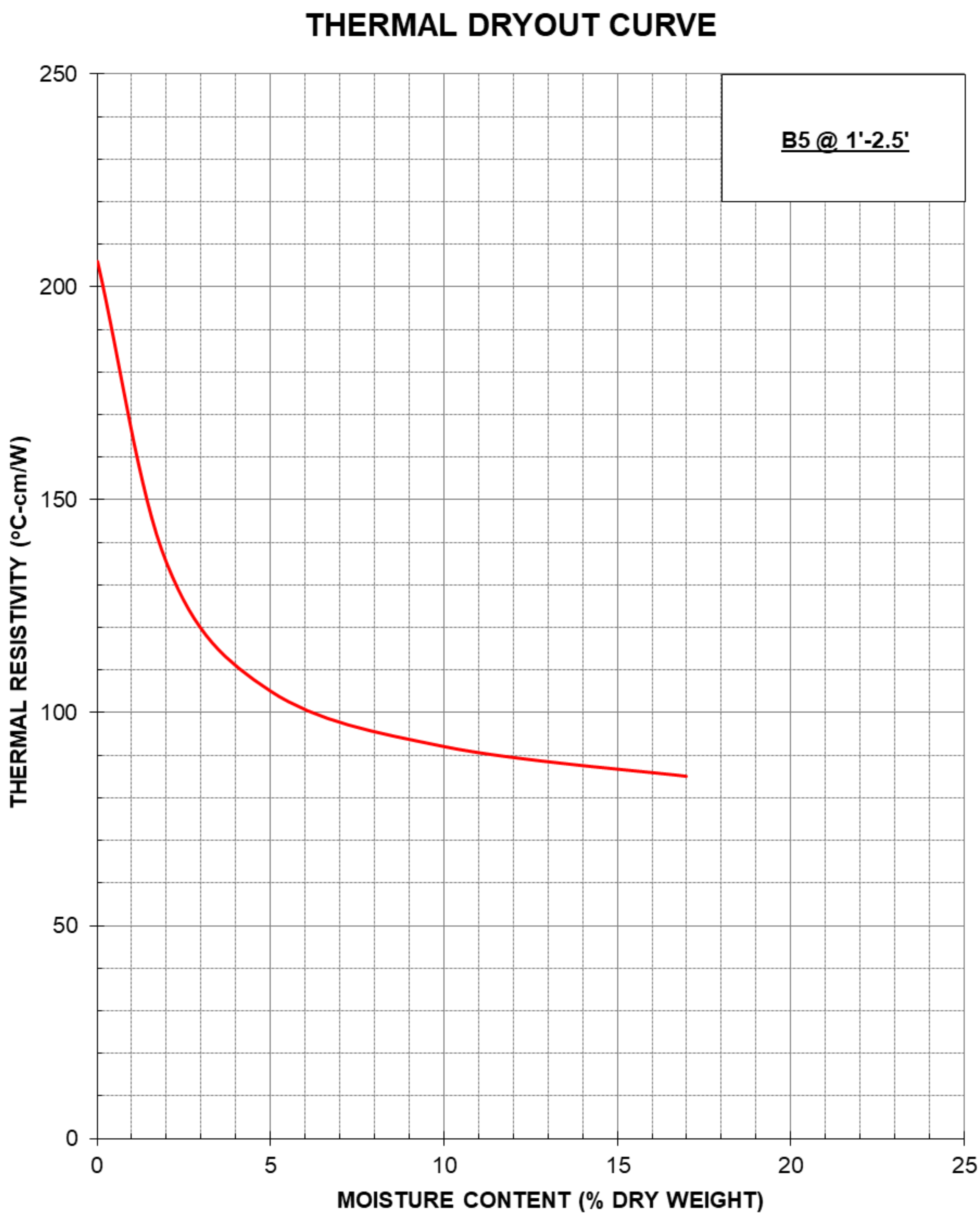
Sample ID	Depth (ft)	Description (Terracon)	Thermal Resistivity (°C-cm/W)		Moisture Content (%)	Dry Density (lb/ft^3)
			Wet	Dry		
B5	1'-2.5'	Sandy fat clay w/ gravel	85	206	17	94
B8	1'-2.5'	Fat clay	94	196	19	93
B9	1'-2.5'	Fat clay	83	189	18	99
B10	1'-2.5'	Fat clay w/ gravel	81	142	9	115
B11	1'-2.5'	Fat clay	88	186	15	101
P1	0'-2'	Fat clay	91	174	14	105
P5	0'-1'	Fat clay	96	189	14	102
I4	0'-5'	Fat clay	99	185	13	103

Comments: The thermal characteristic depicted in the dryout curves apply for the soils at their respective test dry density.

Please contact us if you have any questions or if we can be of further assistance.

Geotherm USA

Deepak Parmar

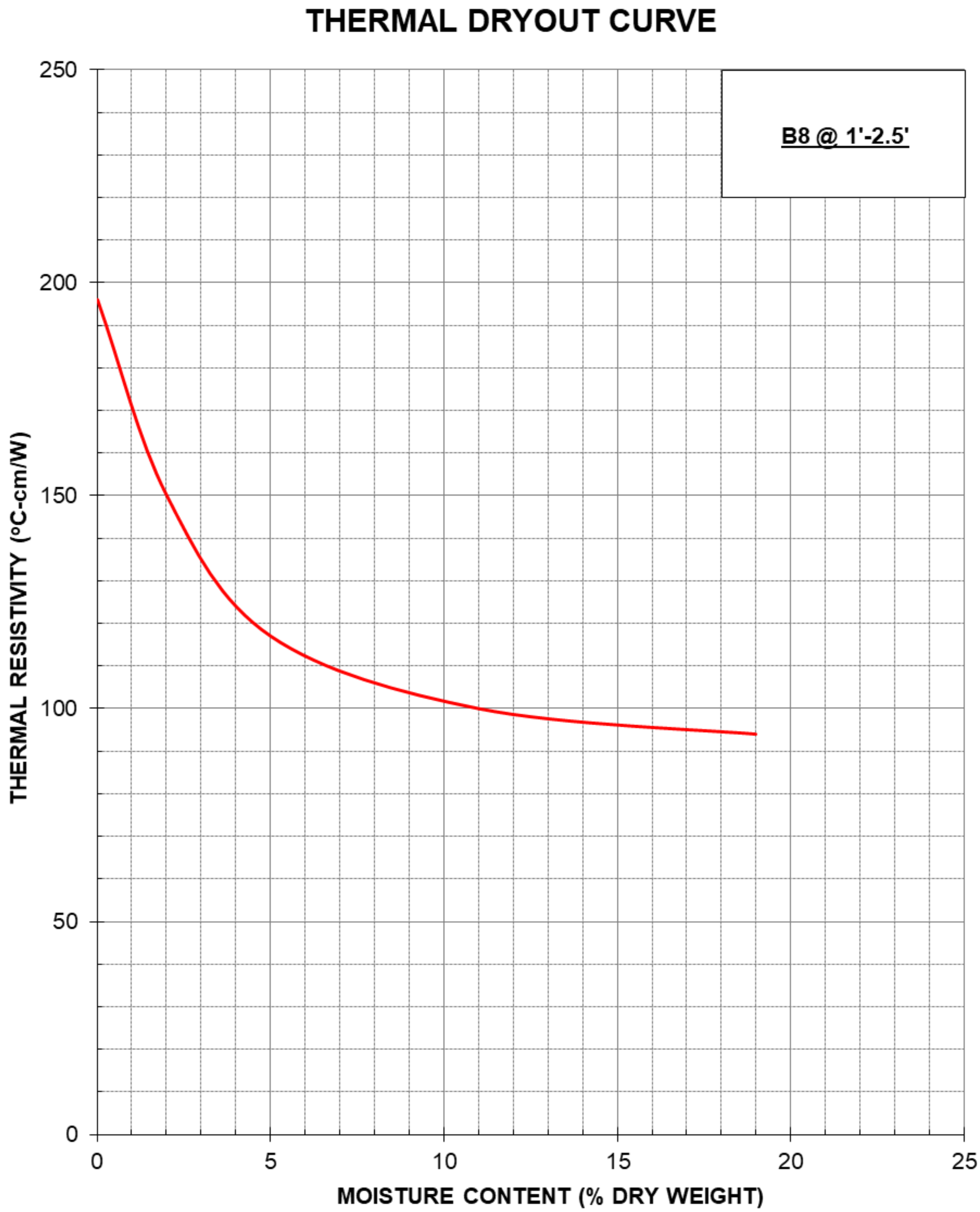


Terracon Consultants, Inc. (Project No. ND205079)

Thermal Analysis of Native Soils

Bay AZ1- San Jose, CA

November 2020 **Figure 1**

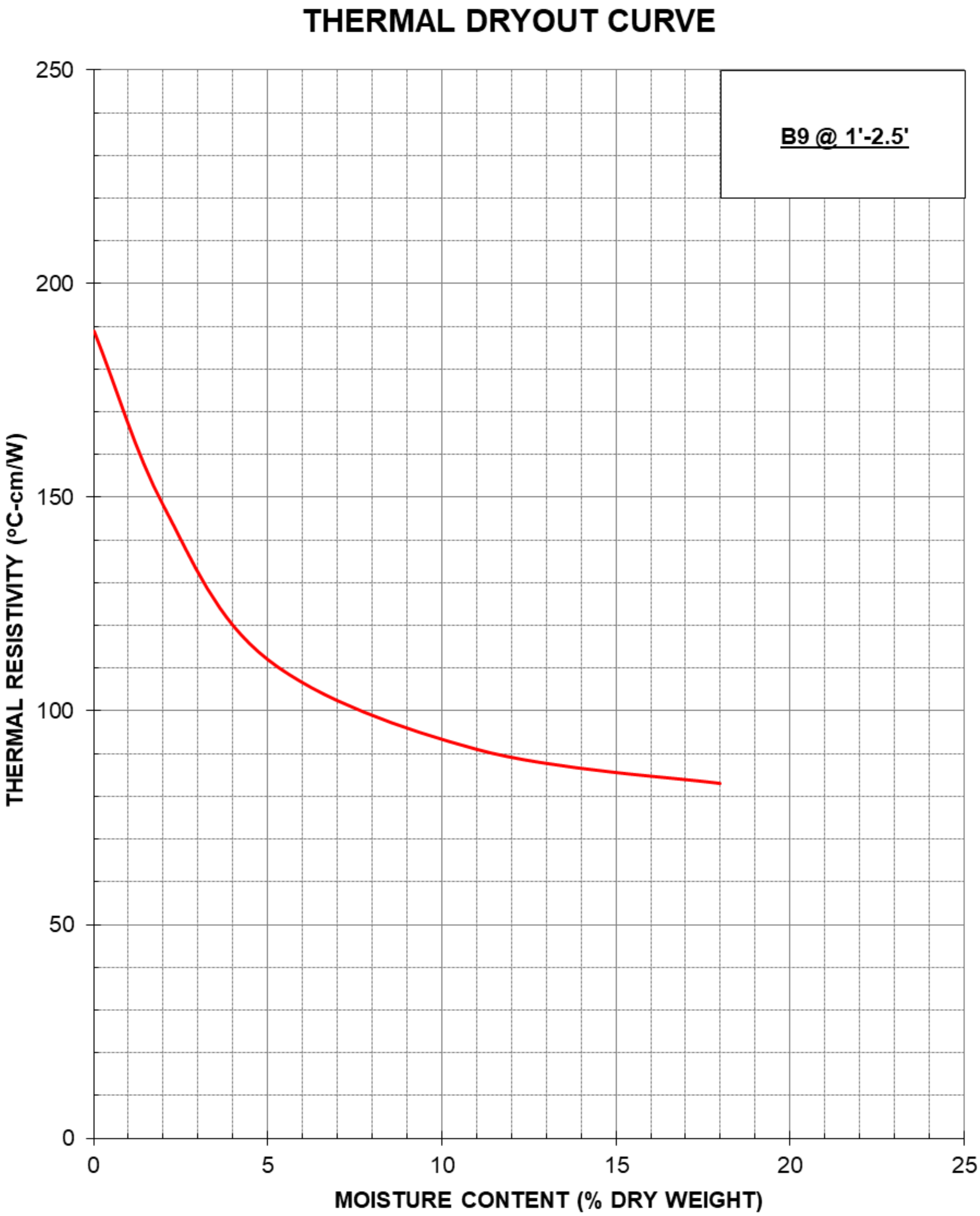


Terracon Consultants, Inc. (Project No. ND205079)

Thermal Analysis of Native Soils

Bay AZ1- San Jose, CA

November 2020 **Figure 2**



Terracon Consultants, Inc. (Project No. ND205079)

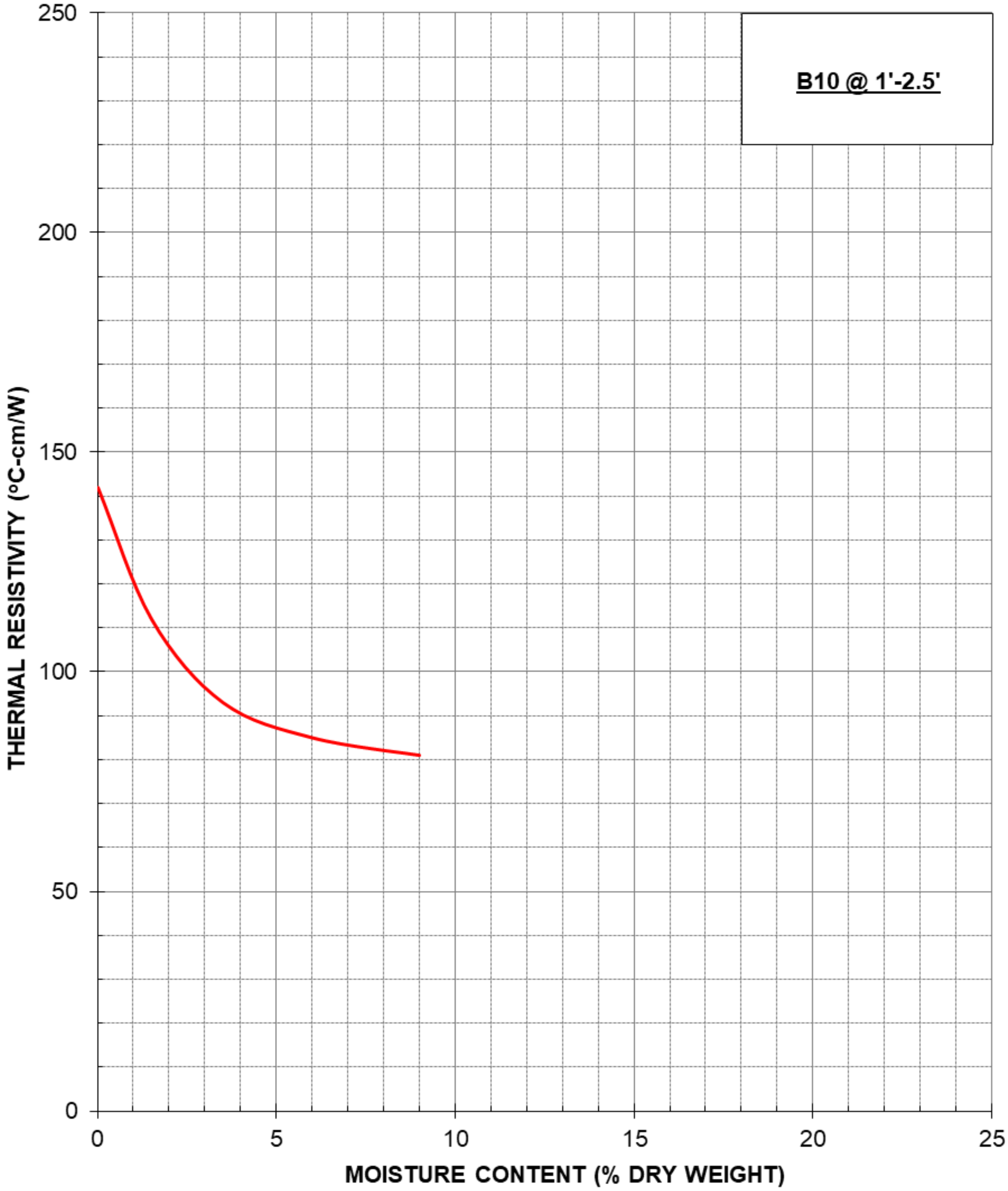
Thermal Analysis of Native Soils

Bay AZ1- San Jose, CA

November 2020 **Figure 3**

Geotherm USA

THERMAL DRYOUT CURVE



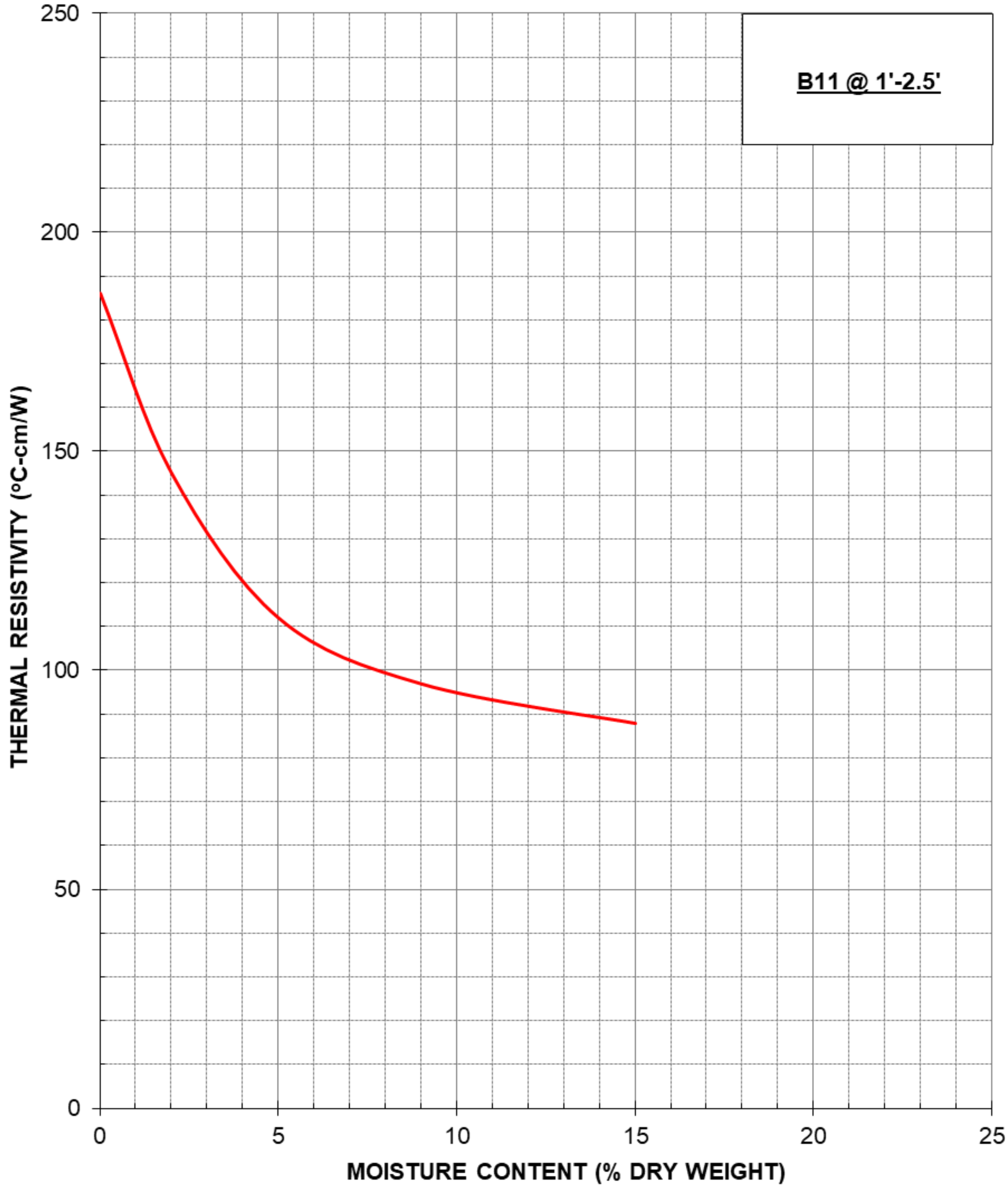
Terracon Consultants, Inc. (Project No. ND205079)

Thermal Analysis of Native Soils

Bay AZ1- San Jose, CA

November 2020 **Figure 4**

THERMAL DRYOUT CURVE



Terracon Consultants, Inc. (Project No. ND205079)

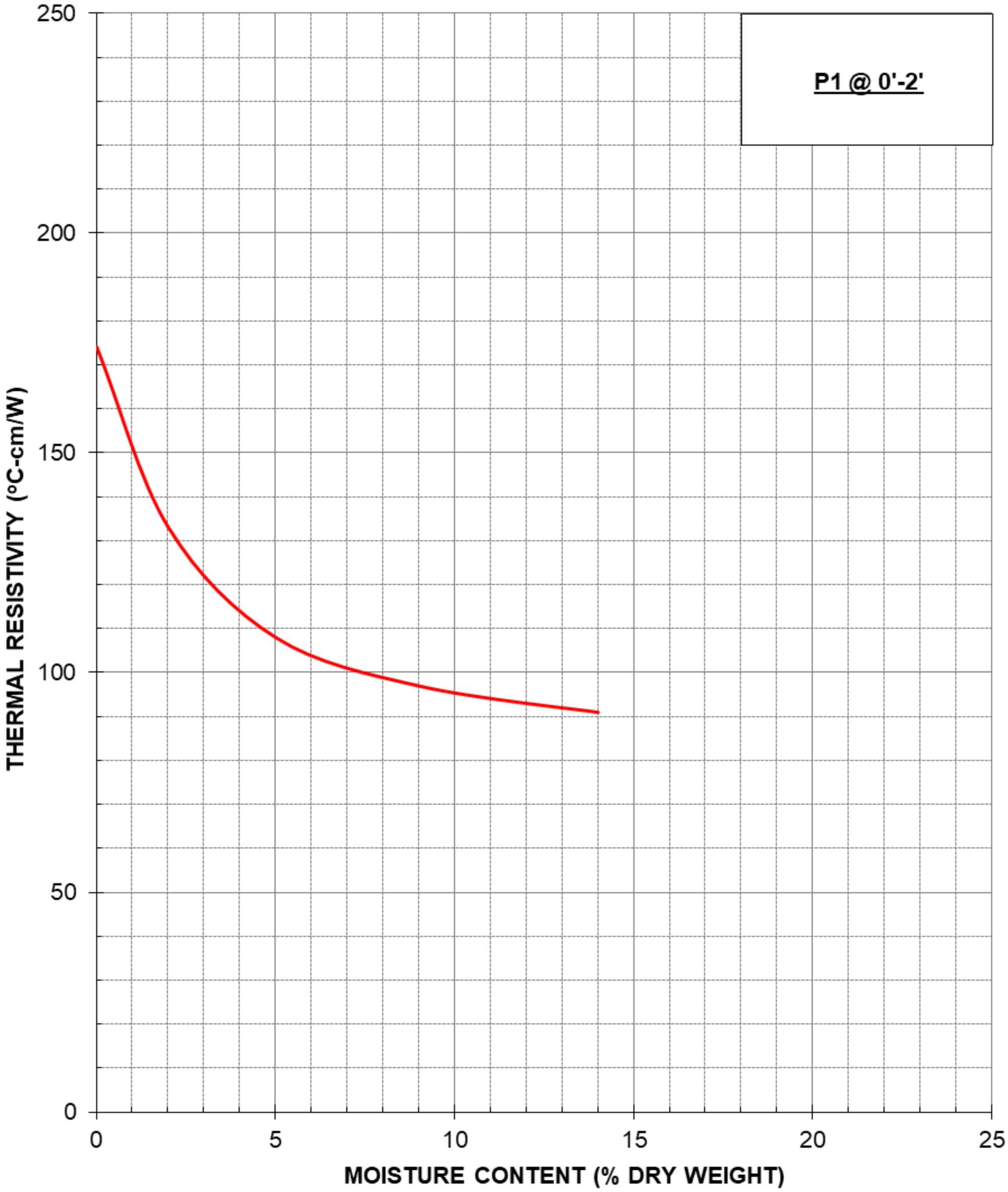
Thermal Analysis of Native Soils

Bay AZ1- San Jose, CA

November 2020 **Figure 5**

Geotherm USA

THERMAL DRYOUT CURVE



Terracon Consultants, Inc. (Project No. ND205079)

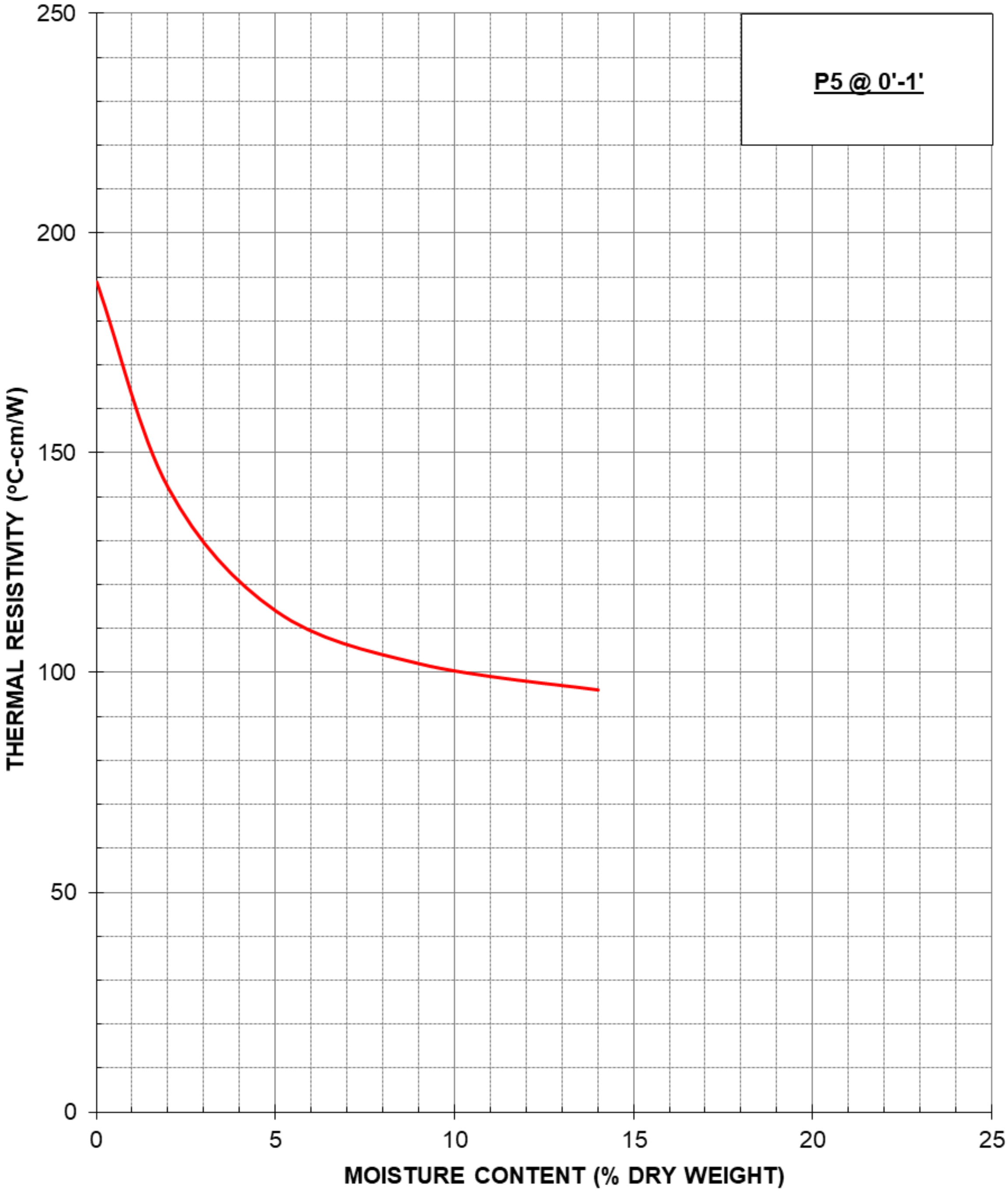
Thermal Analysis of Native Soils

Bay AZ1- San Jose, CA

November 2020 **Figure 6**

Geotherm USA

THERMAL DRYOUT CURVE



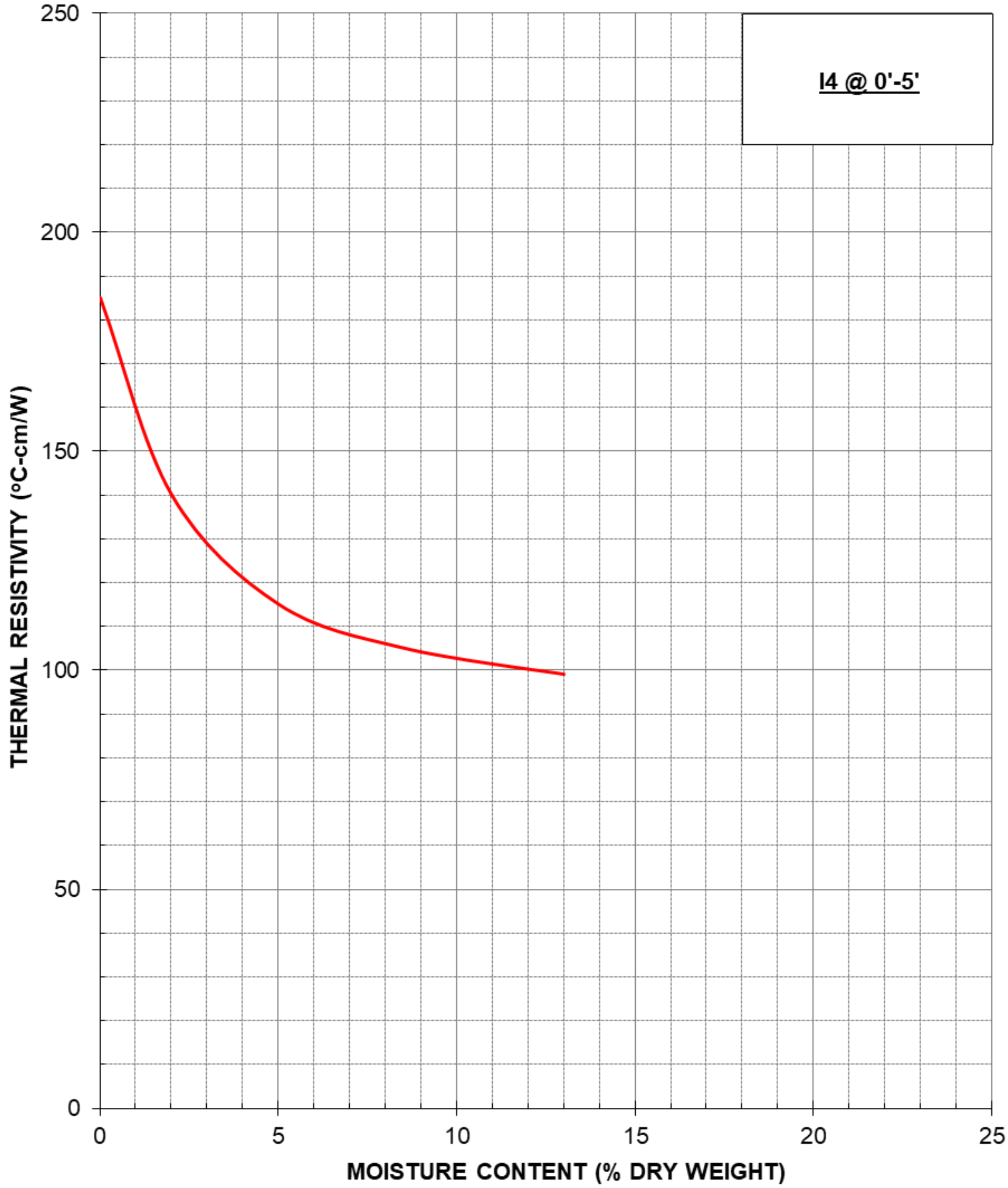
Terracon Consultants, Inc. (Project No. ND205079)

Thermal Analysis of Native Soils

Bay AZ1- San Jose, CA

November 2020 **Figure 7**

THERMAL DRYOUT CURVE



Terracon Consultants, Inc. (Project No. ND205079)

Thermal Analysis of Native Soils

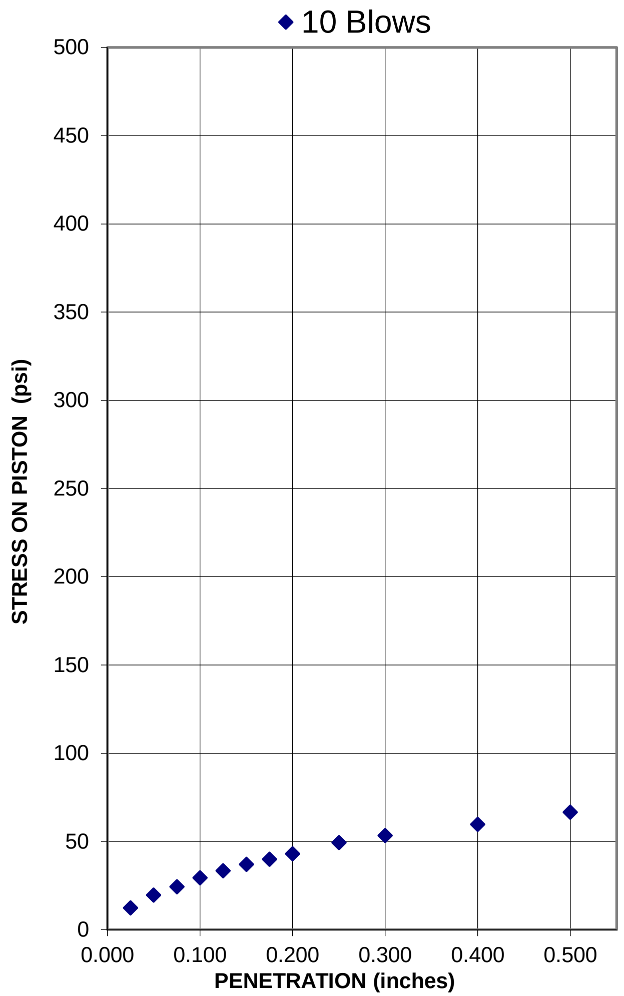
Bay AZ1- San Jose, CA

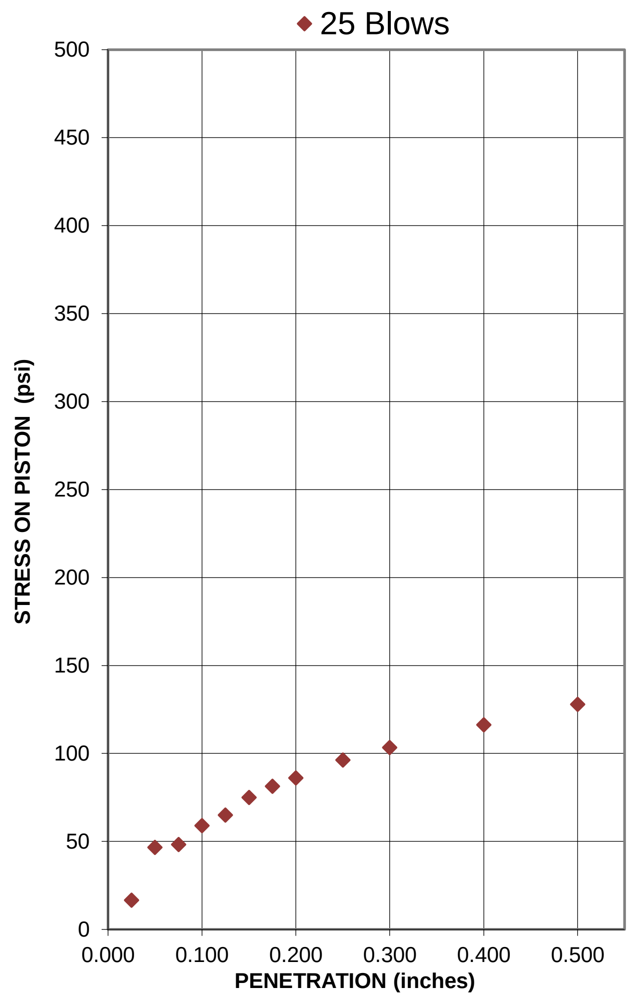
November 2020 **Figure 8**

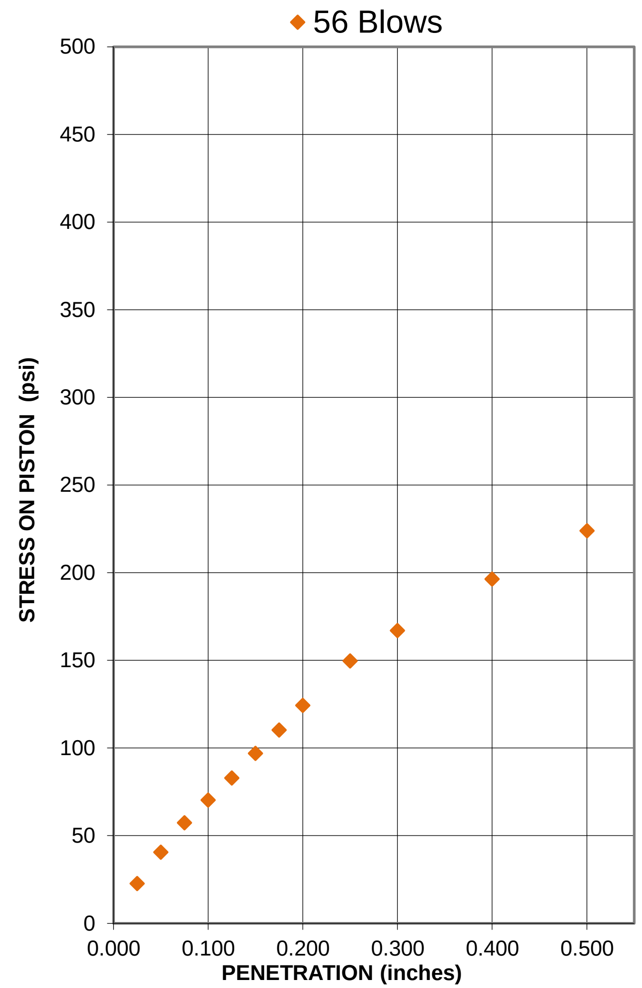
CBR(CALIFORNIA BEARING RATIO) OF LABORATORY-COMPACTED SOILS
ASTM D1883 (SOAKED)

PROJECT:	Bay AZ1 Site (Northtown)	**PROJECT NO:**	ND205079
LOCATION:	P1/P2	**WORK ORDER NO:**	
MATERIAL:		**LAB NO:**	
SAMPLE SOURCE:		**DATE SAMPLED:**	

	Blows per Lift	Compaction %	Compaction Method	Surcharge Weight (Lb.)	Sample Condition	Percent Swell	Before Soak		After Soak	
							Dry Density	Moisture %	Dry Density	Moisture %
Point 1	10	89.6	AASHTO T180	10	Soak	2.47	112.8	8.5	111.5	19.1
Point 2	25	94.2	AASHTO T180	10	Soak	2.44	118.6	8.7	115.3	19.1
Point 3	56	100.8	AASHTO T180	10	Soak	2.23	126.9	8.6	121.6	16.4







REVIEWED BY

CBR(CALIFORNIA BEARING RATIO) OF LABORATORY-COMPACTED SOILS
ASTM D1883 (SOAKED)

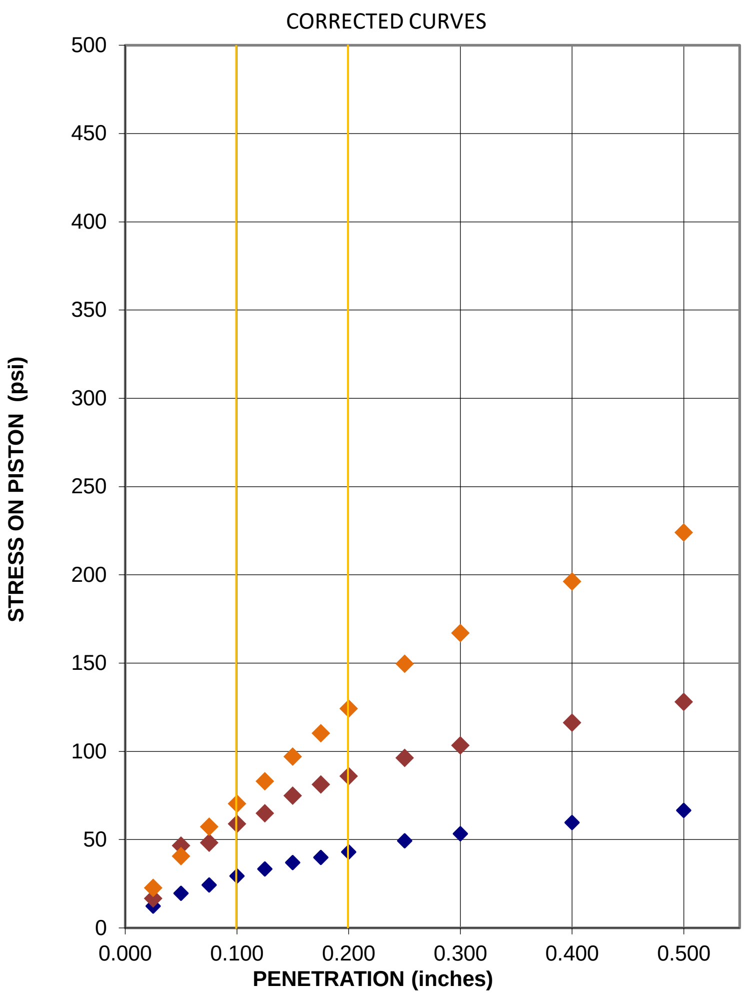
Terracon

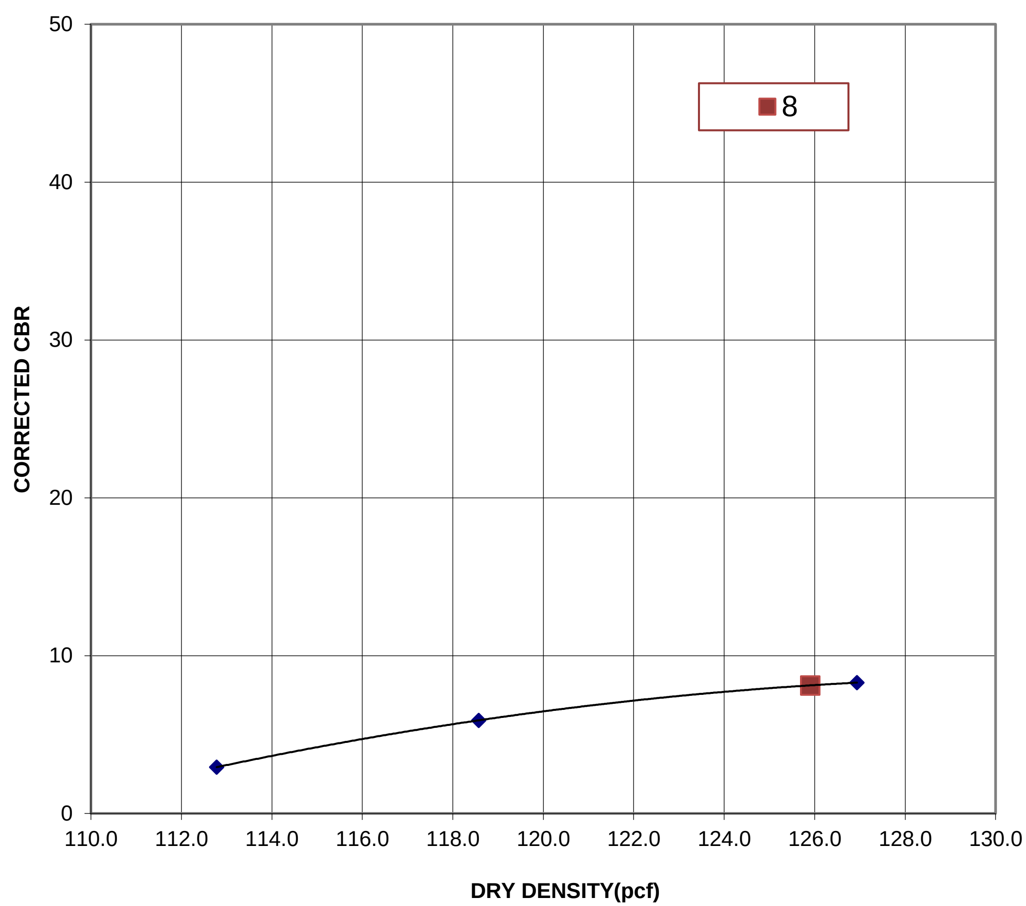
PROJECT: Bay AZ1 Site (Northtown)
LOCATION: P1/P2
MATERIAL:
SAMPLE SOURCE:

JOB NO: ND205079
WORK ORDER NO:
LAB NO:
DATE SAMPLED:

	Correction Factor		Corrected CBR		CBR
	0.1"	0.2"	0.1"	0.2"	
Point 1	0.00	0.00	3	3	3
Point 2	0.00	0.00	6	6	6
Point 3	0.00	0.00	7	8	8

AASHTO T180				100% COMPACTION CBR (.2")
Moisture	Dry Density (pcf)			
%	100%	95%	90%	
6.6	125.9	119.6	113.3	8





REVIEWED BY

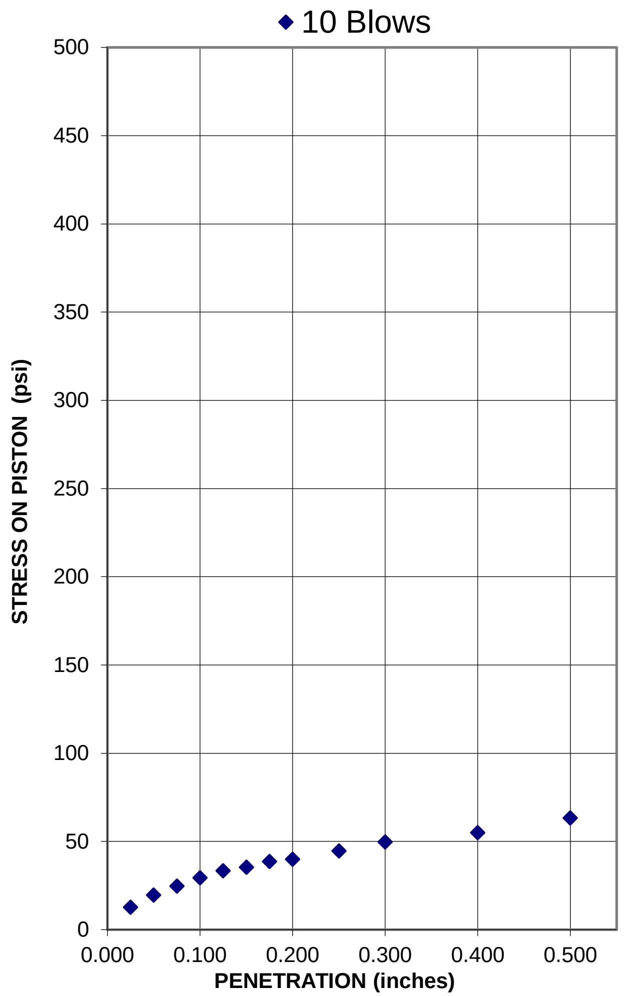
CBR(CALIFORNIA BEARING RATIO) OF LABORATORY-COMPACTED SOILS
ASTM D1883 (SOAKED)

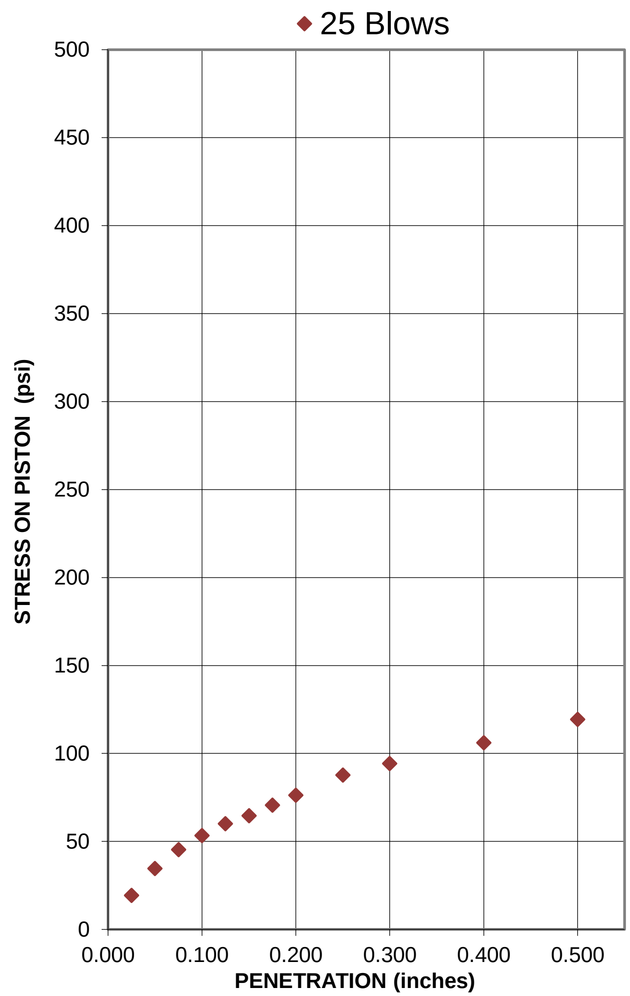
Terracon

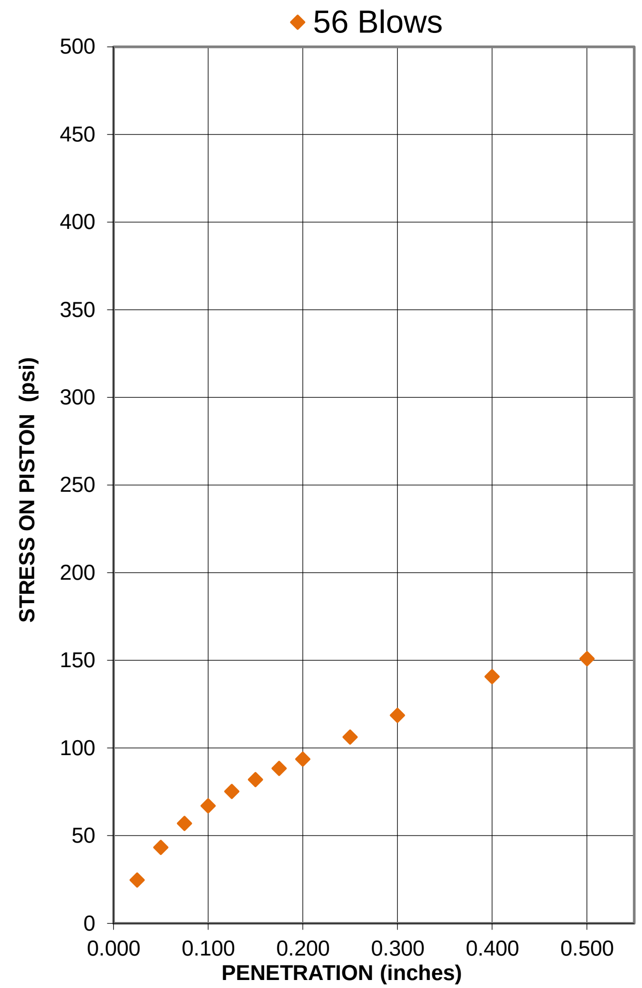
PROJECT: Bay AZ1 Site (Northtown)
LOCATION: P4
MATERIAL:
SAMPLE SOURCE:

PROJECT NO: ND205079
WORK ORDER NO:
LAB NO:
DATE SAMPLED:

	Blows per Lift	Compaction %	Compaction Method	Surcharge Weight (Lb.)	Sample Condition	Percent Swell	Before Soak Dry Density	Before Soak Moisture %	After Soak Dry Density	After Soak Moisture %
Point 1	10	88.3	AASHTO T180	10	Soak	2.25	115.2	8.4	112.1	19.5
Point 2	25	92.2	AASHTO T180	10	Soak	1.51	120.4	12.3	118.2	19.3
Point 3	65	100.6	AASHTO T180	10	Soak	1.79	131.2	10.3	123.4	16.6







REVIEWED BY

CBR(CALIFORNIA BEARING RATIO) OF LABORATORY-COMPACTED SOILS
ASTM D1883 (SOAKED)

Terracon

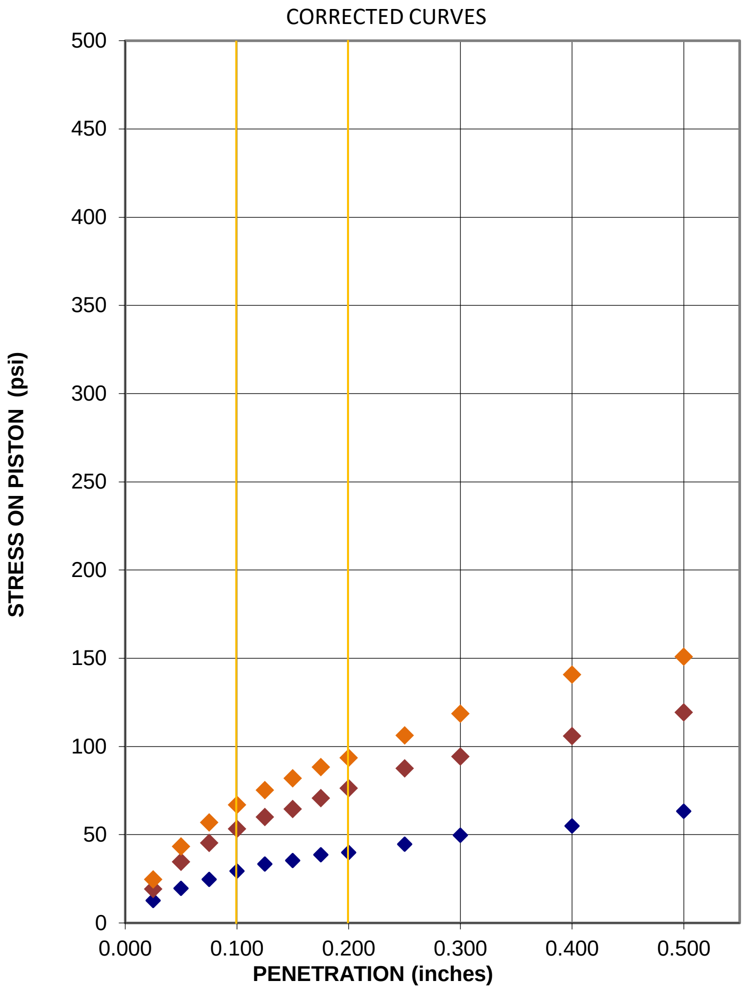
PROJECT:	**Bay AZ1 Site (Northtown)**	**JOB NO:**	**ND205079**
LOCATION:	**P4**	**WORK ORDER NO:**	
MATERIAL:		**LAB NO:**	
SAMPLE SOURCE:		**DATE SAMPLED:**	

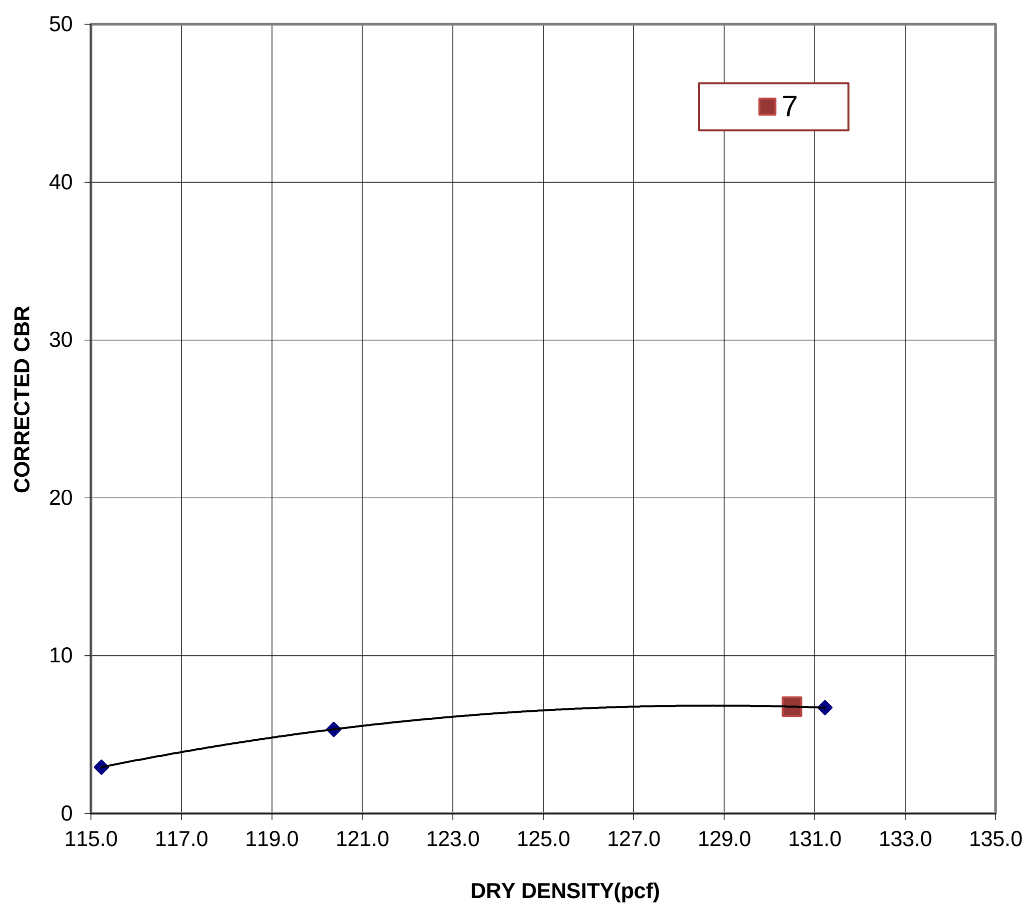
	Correction Factor		Corrected CBR		
	0.1"	0.2"	0.1"	0.2"	CBR
Point 1	0.00	0.00	3	3	3
Point 2	0.00	0.00	5	5	5
Point 3	0.00	0.00	7	6	7

AASHTO T180			
Moisture	Dry Density (pcf)		
%	100%	95%	90%
8.3	130.5	124.0	117.5

100% COMPACTION CBR (.2")

7





REVIEWED BY ____________

Geophysical Report

Geophysical Survey
Bay AZ1
Orchard Parkway
San Jose, California

November 12, 2020
NORCAL JOB NO. NS205134

Prepared for:

BURNS & McDONNELL

530 West Spring Street, Suite 200
Columbus, Ohio 43215

Prepared by:

NORCAL GEOPHYSICAL CONSULTANTS INC.
A Terracon COMPANY

November 12, 2020

BURNS & McDONNELL
530 West Spring Street, Suite 200
Columbus, Ohio 43215

Subject: Geophysical Survey
Bay AZ1
Orchard Parkway
San Jose, California

NORCAL Project No. NS205134

Attention: Ms. Brandi Sauter:

Dear Ms. Sauter:

This report presents the findings of a geophysical survey performed by NORCAL Geophysical Consultants, Inc. for Burns & McDonnell Engineering Company, Inc at your Bay AZ1 site on Orchard Parkway in San Jose, California. The work was authorized under a Terracon Inter-Office Service agreement for Terracon Concord Project No. ND205079. NORCAL Professional Geophysicist David T. Hagin (CA PGp No. 1033) and Senior Geophysical Technician Travis W. Black performed the survey on November 3, 2020.

The scope of NORCAL's services for this project consisted of using geophysical methods to characterize the subsurface. The accuracy of our findings is subject to specific site conditions and limitations inherent to the techniques used. We performed our services in a manner consistent with the standard of care ordinarily exercised by members of the profession currently employing similar methods. No warranty, with respect to the performance of services or products delivered under this agreement, expressed or implied, is made by NORCAL.

We appreciate having the opportunity to provide our services for this project. If you have any questions or require additional geophysical services, please do not hesitate to call on us.

Sincerely,

NORCAL Geophysical Consultants, Inc.

David Hagin

David T. Hagin
California Professional Geophysicist
PGp 1033

Donald J. Kirker

Donald J. Kirker
California Professional Geophysicist
PGp No. 997

Geophysical Report

Geophysical Survey
Bay AZ1 - Orchard Parkway
San Jose, California

November 12, 2020

1.0 INTRODUCTION

This report presents the results of a geophysical survey performed to aid in planning and design for proposed improvements at the Bay AZ1 site in San Jose, California. The survey consists of two parts:

- Seismic Multichannel Analysis of Surface Waves (MASW) survey, to measure the shear-wave velocities of the subsurface as a function of depth. The survey method is a sounding, producing one-dimensional (1-D) data that is presented in tabular form. Descriptions of the MASW methodology, our data acquisition and analysis procedures, and the instrumentation we used for the MASW method are provided in **Appendix A – MASW Survey**.

- Vertical Electrical Sounding (VES) survey, using the Wenner 4-Pin method, to measure the Electrical Resistivity (ER) of the shallow sub-surface. The survey results are presented in tabular form. Descriptions of the VES methodology, our data acquisition and analysis procedures, and the instrumentation we used are provided in **Appendix B – VES Survey**.

Figure 1 shows an aerial photograph of the site, indicating the locations of the one (1) MASW sounding (yellow line), designated as MASW-1, and the four (4) VES, designated as FR1 through FR4 (white crosses). Each VES consists of data measured by two perpendicular electrode arrays with a common center point. The purpose of measuring along perpendicular arrays is to account for possible anisotropy in the electrical properties of the sub-surface.

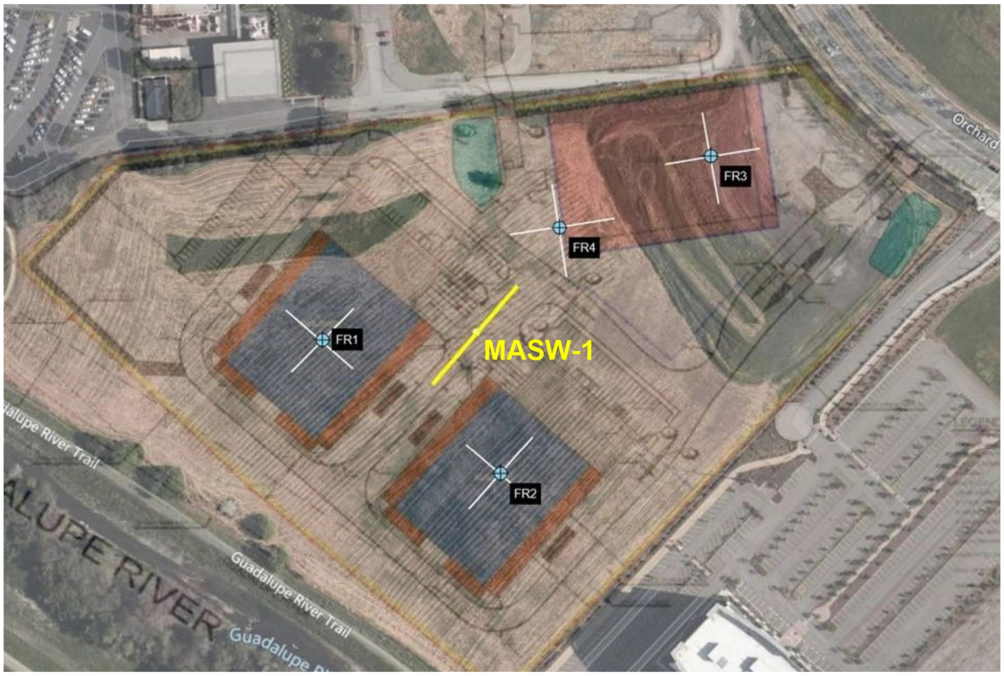


Figure 1: *Site map showing MASW-1 and VES-FR1 through FR4.*

2.0 SITE CONDITIONS

The following description of site conditions is derived from our site visit and our review of publicly available geologic and topographic maps.

Item	Description
Site information	The Bay AZ1 site is located to the northwest of the intersection of Orchard Parkway and Component Drive. The approximate coordinates of the MASW sounding are: MASW-1 (37.378442º N, 121.932817º W). The VES coordinates are approximately: VES-FR1 (37.378411º N, 121.933637º W), VES-FR2 (37.377845º N, 121.932691º W), VES-FR3 (37.379190º N, 121.931576º W), VES-FR4 (37.378887º N, 121.932379º W),
Existing improvements	The site is currently undeveloped and has no existing improvements, aside from fencing around the perimeter.
Current ground cover	The site consists of grass-covered terrain. At the time of the survey, the field had been recently mowed.
Existing topography	Based on Google Earth data, the survey area topography is flat, with a ground surface elevation ranging from about 28-ft to 48-ft (NAVD88).
Site geology	Available geologic maps (USGS, 2003; CGS 2010) indicate that the site is underlain by Quaternary age alluvial deposits.

3.0 SCOPE OF WORK

Our scope of work consisted of obtaining MASW data along a single geophone array, as shown in yellow on Figure 1, and VES data along soundings comprised of two orthogonal electrode arrays, as displayed in white on Figure 1. Terracon Concord personnel determined the positions of the soundings prior to our arrival on site. The survey sites were located by navigation to pre-determined coordinates using a Trimble Geo 7X GPS. Our scope of work also consists of processing the geophysical data and presenting our findings in a written report.

4.0 MASW RESULTS

The MASW results are listed in Table A for the vertical sounding, which is designated as MASW-1. The left column of the table contains the calculated depth range of each seismic layer (feet below ground surface) and the right column comprises the associated shear (S-) wave values in feet per second (ft/sec).

Table A : *MASW-1 Seismic Velocity vs Depth*

DEPTH RANGE (FT)	S-WAVE VELOCITY (FT/SEC)
0 - 3	470
3 - 6	530
6 - 10	470
10 - 16	1,220
16 - 22	1,070
22 - 30	410
30 - 41	610
41 - 53	1,260
53 - 70	1,480
70 - 100	1,820

The measured Vs values range from a low of 410 ft/sec to a maximum of 1,820 ft/sec. Generally, Vs tends to increase with increasing depth; however, a significant velocity inversion (a decrease in Vs with depth) is apparent between 22-ft and 41-ft.

The standard method of reporting MASW data is to consider the location of the 1D velocity vs. depth model as the center point of the MASW spread. However, this does not mean that the measured velocity values represent materials solely beneath that location. In fact, the subsurface conditions underlying the entire length of the array, and for several tens of feet to either side, contribute to the measured velocity values.

5.0 VES RESULTS

The results of the VES survey are listed in Tables B through E. The left column of the table contains the a-spacing and the right two columns comprise the associated electrical resistivity values in ohm-meters.

Table B : *VES-FR1 Electrical Resistivity vs. A-Spacing*

A-SPACING (FT)	ELECTRICAL RESISTIVITY (OHM-METERS)	
	Northwest-Southeast	Southwest-Northeast
2.5	31.70	52.44
5	45.19	53.48
10	45.12	45.45
20	57.64	44.70
50	70.98	69.43

Table C : *VES-FR2 Electrical Resistivity vs. A-Spacing*

A-SPACING (FT)	ELECTRICAL RESISTIVITY (OHM-METERS)	
	Northwest-Southeast	Southwest-Northeast
2.5	532.7	377.5
5	180.8	227.5
10	48.76	74.09
20	45.08	46.18
50	60.64	61.23

Table D : *VES-FR3 Electrical Resistivity vs. A-Spacing*

A-SPACING (FT)	ELECTRICAL RESISTIVITY (OHM-METERS)	
	North-South	East-West
2.5	266.5	228.8
5	165.3	133.4
10	63.83	61.09
20	43.46	43.86
50	58.49	58.22

Table E : *VES-FR4 Electrical Resistivity vs. A-Spacing*

A-SPACING (FT)	ELECTRICAL RESISTIVITY (OHM-METERS)	
	North-South	East-West
2.5	50.51	98.77
5	52.03	40.95
10	32.01	32.95
20	38.64	41.67
50	60.93	60.68

The overall range of values measured varies from 31.7 to over 500 ohm-meters. Generally, we note agreement between the orthogonal readings at each location, especially at greater depth. While near-surface readings vary from one location to another, the data show substantial consistency between the deeper readings, with most values at a-spacings of 10-ft or greater falling between approximately 40 and 70 ohm-meters.

APPENDIX A:

1-D Multi-Channel Analysis of Surface Waves (MASW)

APPENDIX A:

1-D Multi-Channel Analysis of Surface Waves (MASW)

1.0 METHODOLOGY

When seismic energy is generated at or near the ground surface, both body and surface waves are produced. Body waves expand omni-directionally throughout the subsurface. They consist of both compressional (P) and shear (S) waves. Surface waves (e.g., Rayleigh, Love, etc.) radiate along the ground surface at velocities that are proportional to shear wave velocity (Vs). Rayleigh waves are characterized by retrograde elliptical particle motion, and travel at approximately 0.9 times the velocity of S-waves.

If a vertical impact source is used, approximately two-thirds of the seismic energy that is produced is in the form of ground roll. As a result, surface waves are typically the most prominent signal on multi-channel seismic records. In addition, surface waves have dispersion properties that body waves lack. That is, different wavelengths have different penetration depths and, therefore, propagate at different velocities. By analyzing the dispersion of surface waves, it is possible to obtain an S-wave versus depth velocity profile. Since S-wave velocity is directly proportional to shear modulus, this provides a direct indication in the variation of stiffness (or rigidity) of subsurface materials with depth.

Surface waves can be recorded and analyzed using a method referred to as Multichannel Analysis of Surface Waves (MASW). This method is used to collect surface wave data using a fixed array of geophones and shot points. This is referred to as a sounding and results in a 1D model depicting variation in S-wave velocity versus depth beneath the center of the array. However, the subsurface conditions underlying the entire length of the array, and for several tens of feet to either side, contribute to the measured velocity values. The method requires an energy source that is capable of producing ground roll and geophones that are capable of detecting low frequencies (<10 Hz) signals.

2.0 DATA ACQUISITION

We acquired one MASW sounding, denoted MASW-1, as indicated by the yellow line on Figure 1 of the report. The location and orientation of the MASW-1 were determined by Terracon Concord. The sounding was configured using a seismic array consisting of four shot points and 24-geophones distributed at 6-ft intervals in a collinear array, as shown in Figure 1 of this appendix, below. The center of the array is considered the 1-D sounding location.

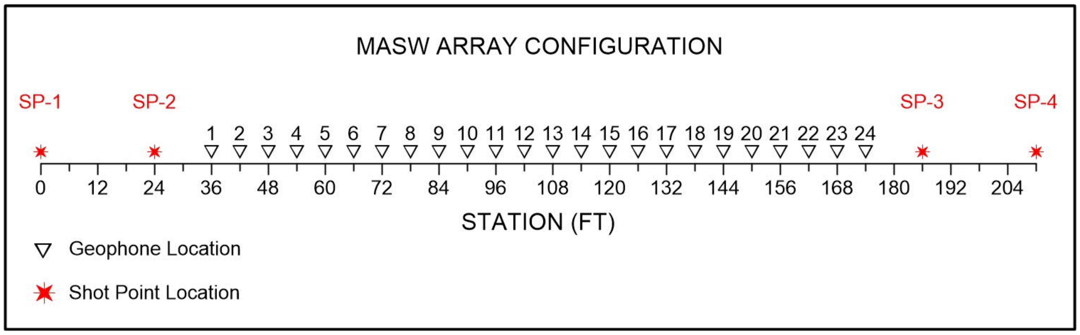


Figure 1: *MASW Array Configuration*

Seismic energy was produced at each shot point using a 16-pound sledgehammer striking a polyurethane plate on the ground surface. The resulting seismic waveforms were detected by an array of 24 Oyo ***Geospace*** geophones with a natural frequency of 8-Hz and recorded using a Geometrics ***Geode*** 24-channel distributed array engineering seismograph. The seismic waveforms were digitized, processed and amplified by the Geode and transmitted via a ruggedized Ethernet cable to a field computer. The recorded data were archived for subsequent processing and displayed on the computer screen in the form of seismograms for quality assurance purposes.

3.0 DATA ANALYSIS

The seismic wave-traces (shot gathers) recorded at each shot point were analyzed using the computer program ***SURFSEIS*** developed by the Kansas Geological Survey (Version 5.0, 2016). This interactive program converts the data acquired from all four shot points in a given sounding into a dispersion curve representing phase velocity versus frequency. This curve is then inverted to produce a 1D model indicating S-wave velocity versus depth. The steps involved in this procedure are as follows:

1) The shot gathers are converted to KGS format.
2) Stations are assigned to the geophone and shot point locations.
3) The resulting records are viewed to determine their overall quality. If necessary, portions of the records are muted to remove interference from refractions, reflections and higher mode events.
4) For each formatted (and/or muted) record, the program produces what is referred to as an "overtone plot". This is a colored cross-section indicating phase velocity versus frequency and amplitude. The vertical axis represents phase velocity (increasing upward); the horizontal axis represents frequency (increasing to the right); and signal amplitude is indicated by various colors, with the hottest colors (orange to red to dark brown) representing the greatest signal to noise ratio. Typically, the strongest signals align in a

curved pattern with a symmetry similar to a “hockey stick” where the blade is pointing upward at the lower end of the frequency spectrum (higher velocity at greater depth) and the handle projects to the right in the direction of increasing frequencies indicating lower velocities.

5) The overtone plots compiled from the four shot points are reviewed to determine their overall quality and the best among them (possibly all) are merged to form a single overtone. This enhances the overall signal to noise ratio of the survey and incorporates data from both ends of the spread (if feasible).
6) The resulting overtone plot is used as a guide in deriving a dispersion curve representing phase velocity versus frequency. This is done by fitting the curve along the center of the hockey stick where the signal to noise ratio is highest.
7) The resulting dispersion curve is inverted through an iterative process to compute a 1D model representing S-wave velocity versus depth.

The calculated seismic S-wave velocities in each depth range for MASW-1 are presented in Table A, in the main body of the report.

APPENDIX B:

Electrical Resistivity Sounding

APPENDIX B:

Electrical Resistivity Sounding

1.0 METHODOLOGY

1.1 ELECTRICAL RESISTIVITY: DEFINITION AND APPLICATIONS

Electrical resistivity (ER) is the resistance of a volume of earth material to the flow of electrical current. The ER of sedimentary earth materials is directly affected by factors such as grain size, porosity, mineralogy, moisture content and groundwater salinity. However, it has been our experience through numerous ER surveys conducted throughout the Bay Area that, in unconsolidated materials, grain size seems to have the largest effect on ER of all these parameters. Specifically, fine grained materials such as clays and silts typically have relatively low ER whereas coarse grained materials such as sands and gravels have relatively high ER.

The ER of rock is affected primarily by mineralogy and the degree of weathering and fracturing. Rock formations that are deeply buried and not exposed to chemical weathering are generally impermeable, contain little water, and have a relatively high electrical resistivity. Conversely, highly weathered and fractured rock that contains moisture typically has lower resistivity values. Alternatively, some rocks contain conductive minerals that can result in the rock having relatively low ER.

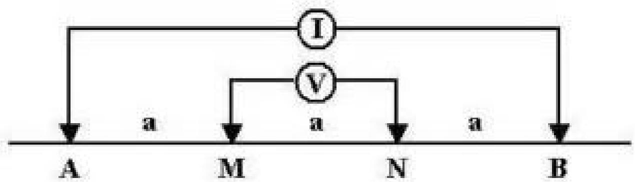
Given the relationships described above, geophysical methods that measure subsurface ER can be used to determine the depth, thickness and lateral extent of groundwater aquifers, the depth to groundwater, the depth to rock, the depth, thickness and lateral extent of clay layers and the depth, thickness and lateral extent of sand/gravel deposits. ER measurements can also be used to evaluate soil corrosion potential and to provide parameters for the design of electrical grounding systems.

1.2 ELECTRICAL RESISTIVITY SOUNDING

Measuring the variation in ER versus depth beneath a fixed point is referred to as a vertical electric sounding (VES). This involves transmitting electrical current *(I)* into the ground between two electrodes, and measuring the resulting electrical potential or voltage drop (*V*) between two other electrodes. There are many different electrode configurations that can be used. The most common are the Wenner and Schlumberger arrays. With both techniques, the four electrodes are arranged in a collinear array. Current is transmitted between the outer two electrodes (referred to as A and B) and the resulting voltage is measured across the inner two electrodes (referred to as

M and N). Readings are typically taken with many different electrode separations, ranging from less than one foot to several hundreds of feet. The larger the separation, the deeper the current is forced to flow to complete a circuit. The actual current flow occurs within a generally hemi-spherical volume of earth between the current electrodes. The readings obtained with each electrode separation are used to compute a value referred to as apparent resistivity *(ρ_a)*. The term "apparent" is used because the value represents the resistivity of a volume of earth with varying resistivity values rather than a discrete layer with consistent resistivity. The location of the sounding is defined as the center of the electrode array.

For ER surveys involving the design of grounding systems, including this survey, the Four Pin Wenner Array is typically used. With this array the electrode separation, "a", is uniform between all four electrodes but varies from one reading to the next. The array configuration diagram and the equation that is used to compute apparent resistivity are illustrated in Figure 1.



$$\rho_A = 2\pi\, a \frac{V}{I}$$

Figure 1: *Physical layout of the Wenner Array and associated Apparent Resistivity (ρ_a) Equation.*

2.0 INSTRUMENTATION

We collected VES data using a ***SuperSting R1*** Resistivity Meter, manufactured by Advanced Geosciences Incorporated (AGI). The SuperSting is a self-contained unit that transmits current at outputs ranging from 1 to 2,000 milliamps (mA). The instrument measures the potential drop (voltage) caused by the current influx and converts the data to values of apparent resistivity. The data are stored in internal memory and can be downloaded to a computer for subsequent archiving.

3.0 DATA ACQUISITION

The VES survey consisted of four soundings, each comprised of two orthogonal arrays. The VES are designated as FR1 through FR4, as shown on Figure 1 of the report. The ***SuperSting R1*** was connected to the four electrodes in the array using 14-gauge insulated single conductor wires. Once programmed with the a-spacing for a given measurement, the instrument transmitted electrical current through the outer electrodes (A and B) and measured the voltage drop across the inner pair (M and N). Each measurement was made twice, and the results compared to make sure that there was no more than 2% deviation between the measurements. The averaged readings were then used to automatically calculate the apparent resistivity values (ρ_a) according to the equation shown in Figure 1. This procedure was repeated for every prescribed a-spacing starting with small values (a=2.5-ft) and expanding with each subsequent measurement to the largest spacing (a=50-ft). The survey results are presented in Tables B through E, in the main body of the report.

Supporting Information

Contents:

Note: All attachments are one page unless otherwise noted.

GENERAL NOTES

DESCRIPTION OF SYMBOLS AND ABBREVIATIONS

Bay AZ1 Site (Northtown) ■ San Jose, CA

Terracon Project No. ND205079

Terracon GeoReport

SAMPLING

Auger Cuttings

Modified California Ring Sampler

Grab Sample

Shelby Tube

Standard Penetration Test

WATER LEVEL

Water Initially Encountered

Water Level After a Specified Period of Time

Water Level After a Specified Period of Time

Cave In Encountered

Water levels indicated on the soil boring logs are the levels measured in the borehole at the times indicated. Groundwater level variations will occur over time. In low permeability soils, accurate determination of groundwater levels is not possible with short term water level observations.

FIELD TESTS

N	**Standard Penetration Test Resistance (Blows/Ft.)**
(HP)	**Hand Penetrometer**
(T)	**Torvane**
(DCP)	**Dynamic Cone Penetrometer**
UC	**Unconfined Compressive Strength**
(PID)	**Photo-Ionization Detector**
(OVA)	**Organic Vapor Analyzer**

DESCRIPTIVE SOIL CLASSIFICATION

Soil classification as noted on the soil boring logs is based Unified Soil Classification System. Where sufficient laboratory data exist to classify the soils consistent with ASTM D2487 "Classification of Soils for Engineering Purposes" this procedure is used. ASTM D2488 "Description and Identification of Soils (Visual-Manual Procedure)" is also used to classify the soils, particularly where insufficient laboratory data exist to classify the soils in accordance with ASTM D2487. In addition to USCS classification, coarse grained soils are classified on the basis of their in-place relative density, and fine-grained soils are classified on the basis of their consistency. See "Strength Terms" table below for details. The ASTM standards noted above are for reference to methodology in general. In some cases, variations to methods are applied as a result of local practice or professional judgment.

LOCATION AND ELEVATION NOTES

Exploration point locations as shown on the Exploration Plan and as noted on the soil boring logs in the form of Latitude and Longitude are approximate. See Exploration and Testing Procedures in the report for the methods used to locate the exploration points for this project. Surface elevation data annotated with +/- indicates that no actual topographical survey was conducted to confirm the surface elevation. Instead, the surface elevation was approximately determined from topographic maps of the area.

STRENGTH TERMS

RELATIVE DENSITY OF COARSE-GRAINED SOILS (More than 50% retained on No. 200 sieve.) Density determined by Standard Penetration Resistance			**CONSISTENCY OF FINE-GRAINED SOILS** (50% or more passing the No. 200 sieve.) Consistency determined by laboratory shear strength testing, field visual-manual procedures or standard penetration resistance			
Descriptive Term (Density)	**Standard Penetration or N-Value Blows/Ft.**	**Ring Sampler Blows/Ft.**	**Descriptive Term (Consistency)**	**Unconfined Compressive Strength Qu, (tsf)**	**Standard Penetration or N-Value Blows/Ft.**	**Ring Sampler Blows/Ft.**
Very Loose	0 - 3	0 - 6	Very Soft	less than 0.25	0 - 1	< 3
Loose	4 - 9	7 - 18	Soft	0.25 to 0.50	2 - 4	3 - 4
Medium Dense	10 - 29	19 - 58	Medium Stiff	0.50 to 1.00	4 - 8	5 - 9
Dense	30 - 50	59 - 98	Stiff	1.00 to 2.00	8 - 15	10 - 18
Very Dense	> 50	> 99	Very Stiff	2.00 to 4.00	15 - 30	19 - 42
			Hard	> 4.00	> 30	> 42

RELEVANCE OF SOIL BORING LOG

The soil boring logs contained within this document are intended for application to the project as described in this document. Use of these soil boring logs for any other purpose may not be appropriate.

CPT GENERAL NOTES

DESCRIPTION OF MEASUREMENTS AND CALIBRATIONS

To be reported per ASTM D5778:

Uncorrected Tip Resistance, q_c
Measured force acting on the cone divided by the cone's projected area

Corrected Tip Resistance, q_t
Cone resistance corrected for porewater and net area ratio effects
$q_t = q_c + u_2(1 - a)$

Where a is the net area ratio, a lab calibration of the cone typically between 0.70 and 0.85

Pore Pressure, u
Pore pressure measured during penetration
u_1 - sensor on the face of the cone
u_2 - sensor on the shoulder (more common)

Sleeve Friction, f_s
Frictional force acting on the sleeve divided by its surface area

Normalized Friction Ratio, F_r
The ratio as a percentage of f_s to q_t, accounting for overburden pressure

To be reported per ASTM D7400, if collected:

Shear Wave Velocity, V_s
Measured in a Seismic CPT and provides direct measure of soil stiffness

DESCRIPTION OF GEOTECHNICAL CORRELATIONS

Normalized Tip Resistance, Q_{tn}
$Q_{tn} = ((q_t - \sigma_{V0})/P_a)(P_a/\sigma'_{V0})^n$
$n = 0.381(I_c) + 0.05(\sigma'_{V0}/P_a) - 0.15$

Over Consolidation Ratio, OCR
$OCR\ (1) = 0.25(Q_{tn})^{1.25}$
$OCR\ (2) = 0.33(Q_{tn})$

Undrained Shear Strength, S_u
$S_u = Q_{tn} \times \sigma'_{V0}/N_{kt}$
N_{kt} is a soil-specific factor (shown on S_u plot)

Sensitivity, S_t
$S_t = (q_t - \sigma_{V0}/N_{kt}) \times (1/f_s)$

Effective Friction Angle, ϕ'
$\phi'\ (1) = \tan^{-1}(0.373[\log(q_t/\sigma'_{V0}) + 0.29])$
$\phi'\ (2) = 17.6 + 11[\log(Q_{tn})]$

Unit Weight, γ
$\gamma = (0.27[\log(F_r)] + 0.36[\log(q_t/atm)] + 1.236) \times \gamma_{water}$
σ_{V0} is taken as the incremental sum of the unit weights

Small Strain Shear Modulus, G_0
$G_0\ (1) = \rho V_s^2$
$G_0\ (2) = 0.015 \times 10^{(0.55Ic + 1.68)}(q_t - \sigma_{V0})$

Soil Behavior Type Index, I_c
$I_c = [(3.47 - \log(Q_{tn}))^2 + (\log(F_r) + 1.22)^2]^{0.5}$

SPT N_{60}
$N_{60} = (q_t/atm) / 10^{(1.1268 - 0.2817Ic)}$

Elastic Modulus, E_s (assumes $q/q_{ultimate}$ ~ 0.3, i.e. FS = 3)
$E_s\ (1) = 2.6\psi G_0$ where $\psi = 0.56 - 0.33\log Q_{tn,clean\ sand}$
$E_s\ (2) = G_0$
$E_s\ (3) = 0.015 \times 10^{(0.55Ic + 1.68)}(q_t - \sigma_{V0})$
$E_s\ (4) = 2.5q_t$

Constrained Modulus, M
$M = \alpha_M(q_t - \sigma_{V0})$
For $I_c > 2.2$ (fine-grained soils)
$\alpha_M = Q_{tn}$ with maximum of 14
For $I_c < 2.2$ (coarse-grained soils)
$\alpha_M = 0.0188 \times 10^{(0.55Ic + 1.68)}$

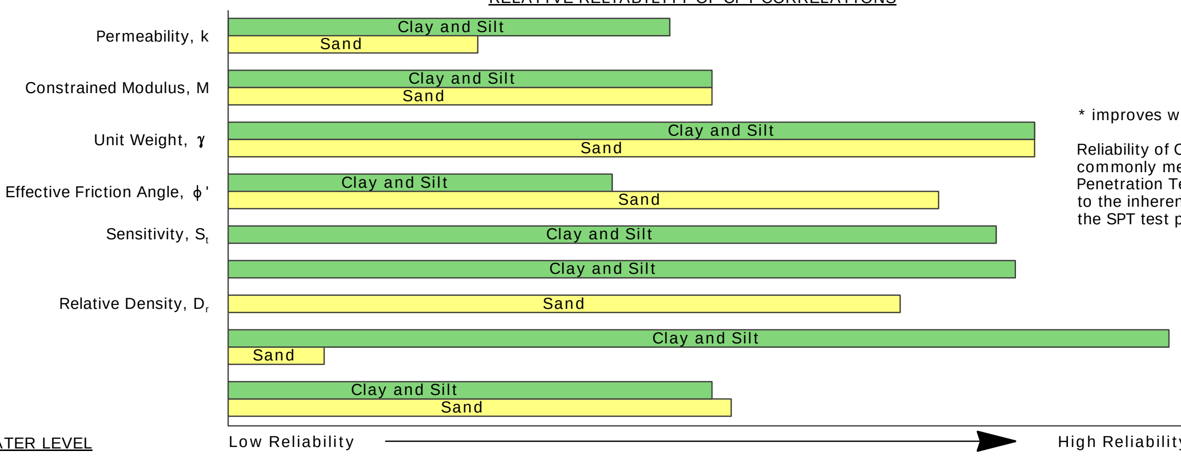
Hydraulic Conductivity, k
For $1.0 < I_c < 3.27$ $k = 10^{(0.952 - 3.04Ic)}$
For $3.27 < I_c < 4.0$ $k = 10^{(-4.52 - 1.37Ic)}$

Relative Density, D_r
$D_r = (Q_{tn} / 350)^{0.5} \times 100$

REPORTED PARAMETERS

CPT logs as provided, at a minimum, report the data as required by ASTM D5778 and ASTM D7400 (if applicable). This minimum data include q_t, f_s, and u. Other correlated parameters may also be provided. These other correlated parameters are interpretations of the measured data based upon published and reliable references, but they do not necessarily represent the actual values that would be derived from direct testing to determine the various parameters. To this end, more than one correlation to a given parameter may be provided. The following chart illustrates estimates of reliability associated with correlated parameters based upon the literature referenced below.

RELATIVE RELIABILITY OF CPT CORRELATIONS



* improves with seismic V_s measurements

Reliability of CPT-predicted N_{60} values as commonly measured by the Standard Penetration Test (SPT) is not provided due to the inherent inaccuracy associated with the SPT test procedure.

WATER LEVEL

The groundwater level at the CPT location is used to normalize the measurements for vertical overburden pressures and as a result influences the normalized soil behavior type classification and correlated soil parameters. The water level may either be "measured" or "estimated:"

Measured - Depth to water directly measured in the field

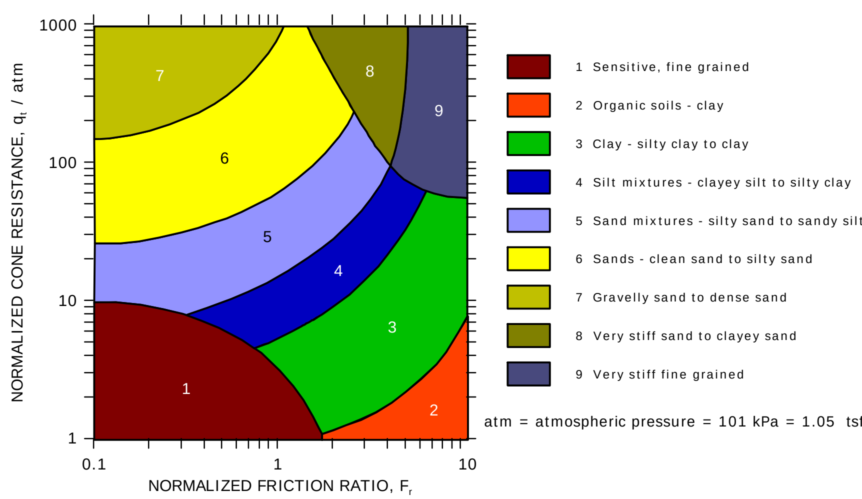
Estimated - Depth to water interpolated by the practitioner using pore pressure measurements in coarse grained soils and known site conditions

While groundwater levels displayed as "measured" more accurately represent site conditions at the time of testing than those "estimated," in either case the groundwater should be further defined prior to construction as groundwater level variations will occur over time.

CONE PENETRATION SOIL BEHAVIOR TYPE

The estimated stratigraphic profiles included in the CPT logs are based on relationships between corrected tip resistance (q_t), friction resistance (f_s), and porewater pressure (u_2). The normalized friction ratio (F_r) is used to classify the soil behavior type.

Typically, silts and clays have high F_r values and generate large excess penetration porewater pressures; sands have lower F_r's and do not generate excess penetration porewater pressures. The adjacent graph (Robertson *et al.*) presents the soil behavior type correlation used for the logs. This normalized SBT chart, generally considered the most reliable, does not use pore pressure to determine SBT due to its lack of repeatability in onshore CPTs.



atm = atmospheric pressure = 101 kPa = 1.05 tsf

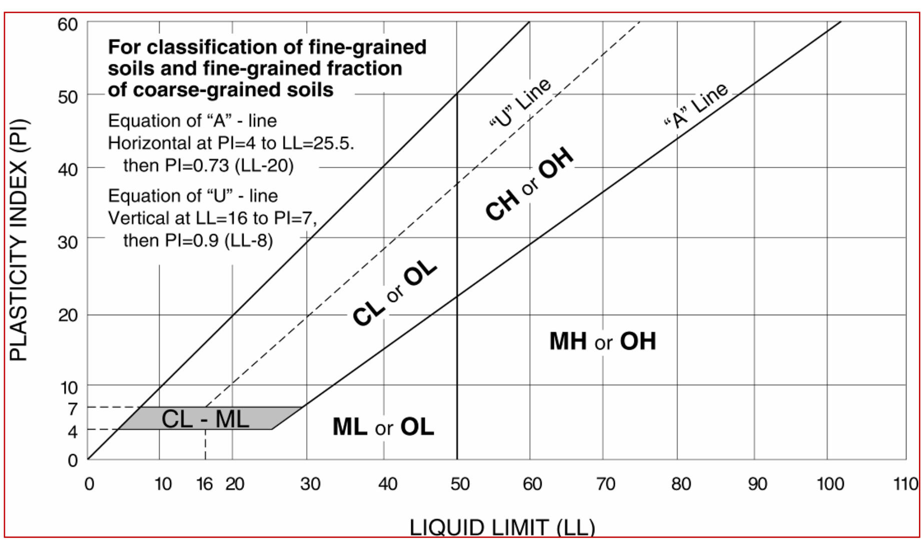
REFERENCES

Kulhawy, F.H., Mayne, P.W., (1997). "Manual on Estimating Soil Properties for Foundation Design," Electric Power Research Institute, Palo Alto, CA.
Mayne, P.W., (2013). "Geotechnical Site Exploration in the Year 2013," Georgia Institue of Technology, Atlanta, GA.
Robertson, P.K., Cabal, K.L. (2012). "Guide to Cone Penetration Testing for Geotechnical Engineering," Signal Hill, CA.
Schmertmann, J.H., (1970). "Static Cone to Compute Static Settlement over Sand,"*Journal of the Soil Mechanics and Foundations Division*,96(SM3), 1011-1043.

Unified Soil Classification System

Criteria for Assigning Group Symbols and Group Names Using Laboratory Tests [A]				Soil Classification	
				Group Symbol	**Group Name** [B]
Coarse-Grained Soils: More than 50% retained on No. 200 sieve	**Gravels:** More than 50% of coarse fraction retained on No. 4 sieve	**Clean Gravels:** Less than 5% fines [C]	Cu≥4 and 1≤Cc≤3 [E]	GW	Well-graded gravel [F]
			Cu<4 and/or [Cc<1 or Cc>3.0] [E]	GP	Poorly graded gravel [F]
		Gravels with Fines: More than 12% fines [C]	Fines classify as ML or MH	GM	Silty gravel [F, G, H]
			Fines classify as CL or CH	GC	Clayey gravel [F, G, H]
	Sands: 50% or more of coarse fraction passes No. 4 sieve	**Clean Sands:** Less than 5% fines [D]	Cu≥6 and 1≤Cc≤3 [E]	SW	Well-graded sand [I]
			Cu<6 and/or [Cc<1 or Cc>3.0] [E]	SP	Poorly graded sand [I]
		Sands with Fines: More than 12% fines [D]	Fines classify as ML or MH	SM	Silty sand [G, H, I]
			Fines classify as CL or CH	SC	Clayey sand [G, H, I]
Fine-Grained Soils: 50% or more passes the No. 200 sieve	**Silts and Clays:** Liquid limit less than 50	**Inorganic:**	PI > 7 and plots above "A" line [J]	CL	Lean clay [K, L, M]
			PI < 4 or plots below "A" line [J]	ML	Silt [K, L, M]
		Organic:	$\frac{LL\ oven\ dried}{LL\ not\ dried} < 0.75$	OL	Organic clay [K, L, M, N]
					Organic silt [K, L, M, O]
	Silts and Clays: Liquid limit 50 or more	**Inorganic:**	PI plots on or above "A" line	CH	Fat clay [K, L, M]
			PI plots below "A" line	MH	Elastic silt [K, L, M]
		Organic:	$\frac{LL\ oven\ dried}{LL\ not\ dried} < 0.75$	OH	Organic clay [K, L, M, P]
					Organic silt [K, L, M, Q]
Highly organic soils:	Primarily organic matter, dark in color, and organic odor			PT	Peat

[A] Based on the material passing the 3-inch (75-mm) sieve.
[B] If field sample contained cobbles or boulders, or both, add "with cobbles or boulders, or both" to group name.
[C] Gravels with 5 to 12% fines require dual symbols: GW-GM well-graded gravel with silt, GW-GC well-graded gravel with clay, GP-GM poorly graded gravel with silt, GP-GC poorly graded gravel with clay.
[D] Sands with 5 to 12% fines require dual symbols: SW-SM well-graded sand with silt, SW-SC well-graded sand with clay, SP-SM poorly graded sand with silt, SP-SC poorly graded sand with clay.
[E] $Cu = D_{60}/D_{10}$ $\quad Cc = \frac{(D_{30})^2}{D_{10} \times D_{60}}$
[F] If soil contains ≥ 15% sand, add "with sand" to group name.
[G] If fines classify as CL-ML, use dual symbol GC-GM, or SC-SM.
[H] If fines are organic, add "with organic fines" to group name.
[I] If soil contains ≥ 15% gravel, add "with gravel" to group name.
[J] If Atterberg limits plot in shaded area, soil is a CL-ML, silty clay.
[K] If soil contains 15 to 29% plus No. 200, add "with sand" or "with gravel," whichever is predominant.
[L] If soil contains ≥ 30% plus No. 200 predominantly sand, add "sandy" to group name.
[M] If soil contains ≥ 30% plus No. 200, predominantly gravel, add "gravelly" to group name.
[N] PI ≥ 4 and plots on or above "A" line.
[O] PI < 4 or plots below "A" line.
[P] PI plots on or above "A" line.
[Q] PI plots below "A" line.



Terracon Consultants, Inc.
5075 Commercial Cir.,Suite E
Concord, CA 94520
www.terracon.com

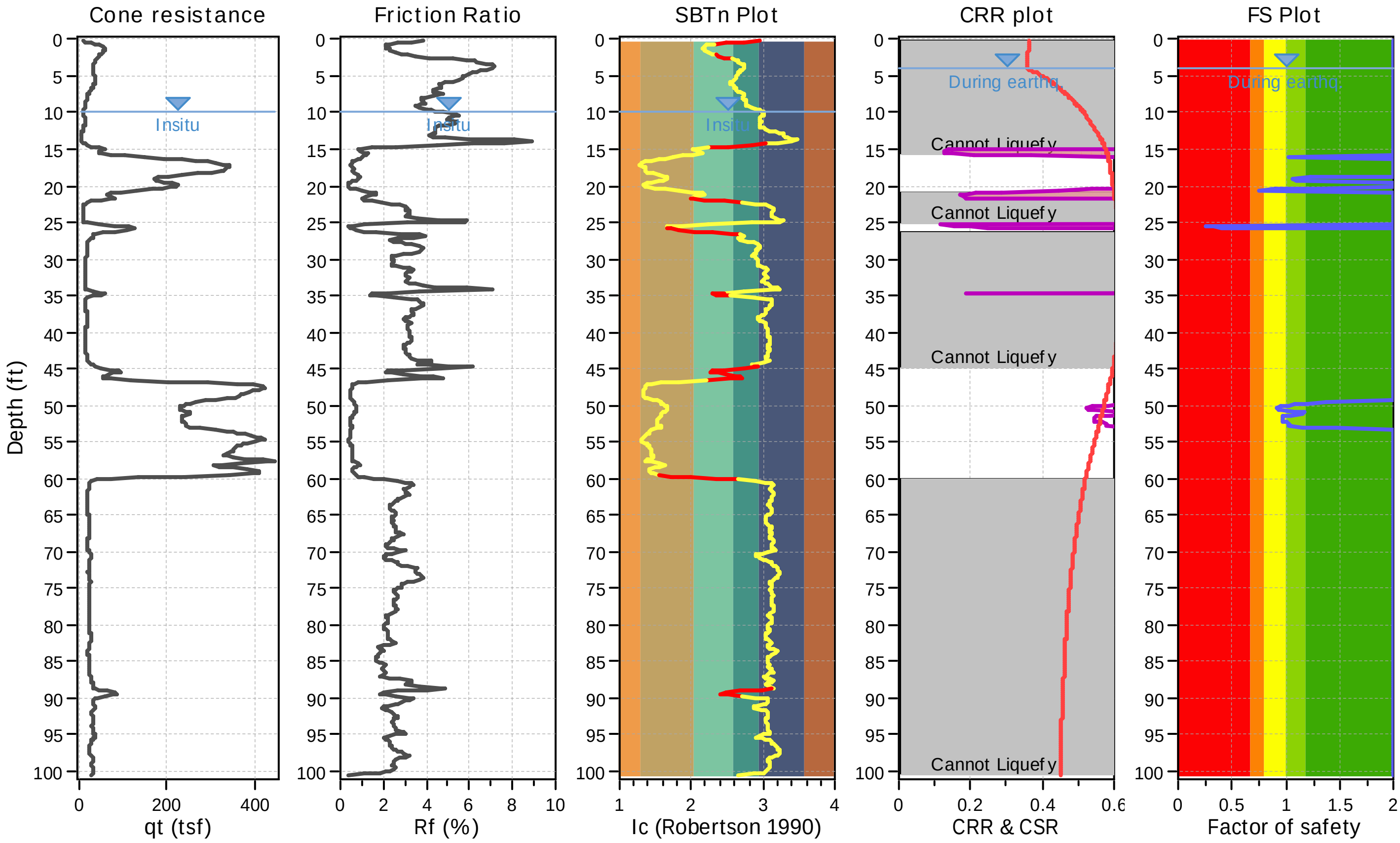
LIQUEFACTION ANALYSIS REPORT

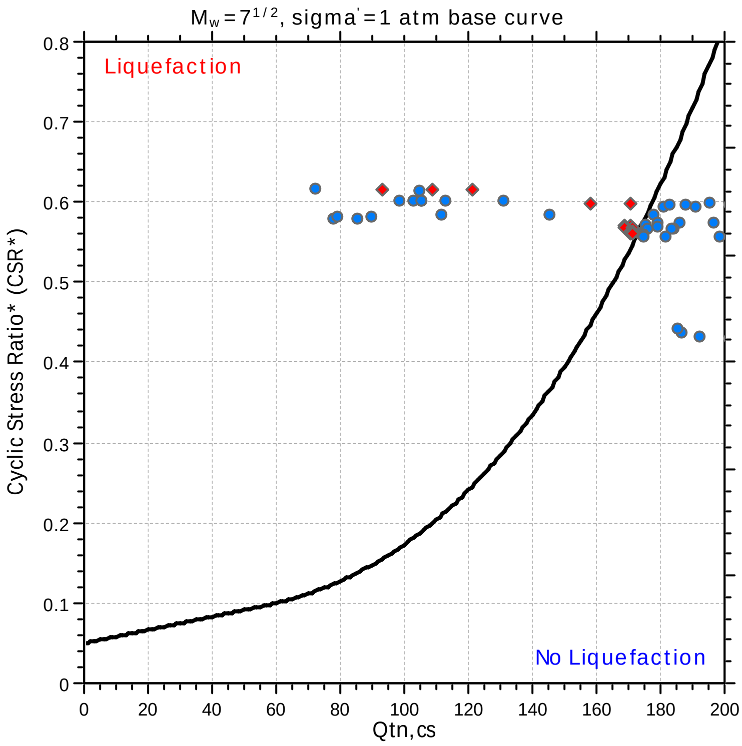
Project title : SJC04 Location : San Jose, CA

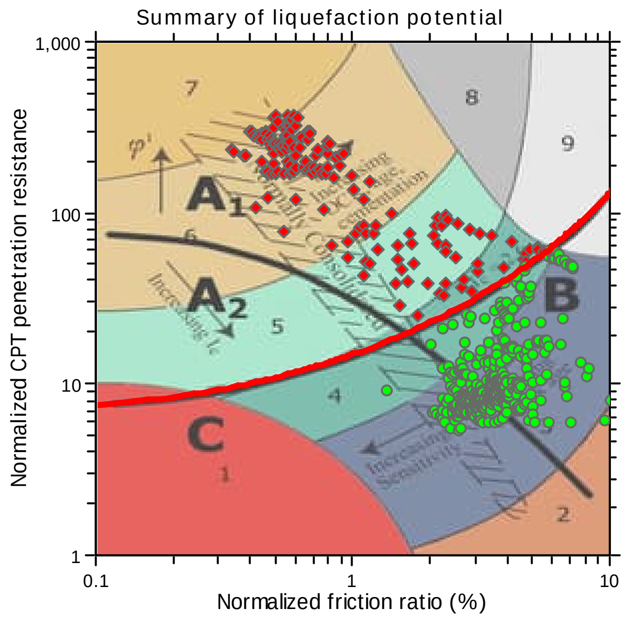
CPT file : CPT-01

Input parameters and analysis data

Analysis method:	NCEER (1998)	G.W.T. (in-situ):	10.00 ft	Use fill:	No	Clay like behavior applied:	Sands only
Fines correction method:	NCEER (1998)	G.W.T. (earthq.):	4.00 ft	Fill height:	N/A		
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth applied:	Yes
Earthquake magnitude M_w:	7.00	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	Limit depth:	60.00 ft
Peak ground acceleration:	0.51	Unit weight calculation:	Based on SBT	K_σ applied:	Yes	MSF method:	Method based

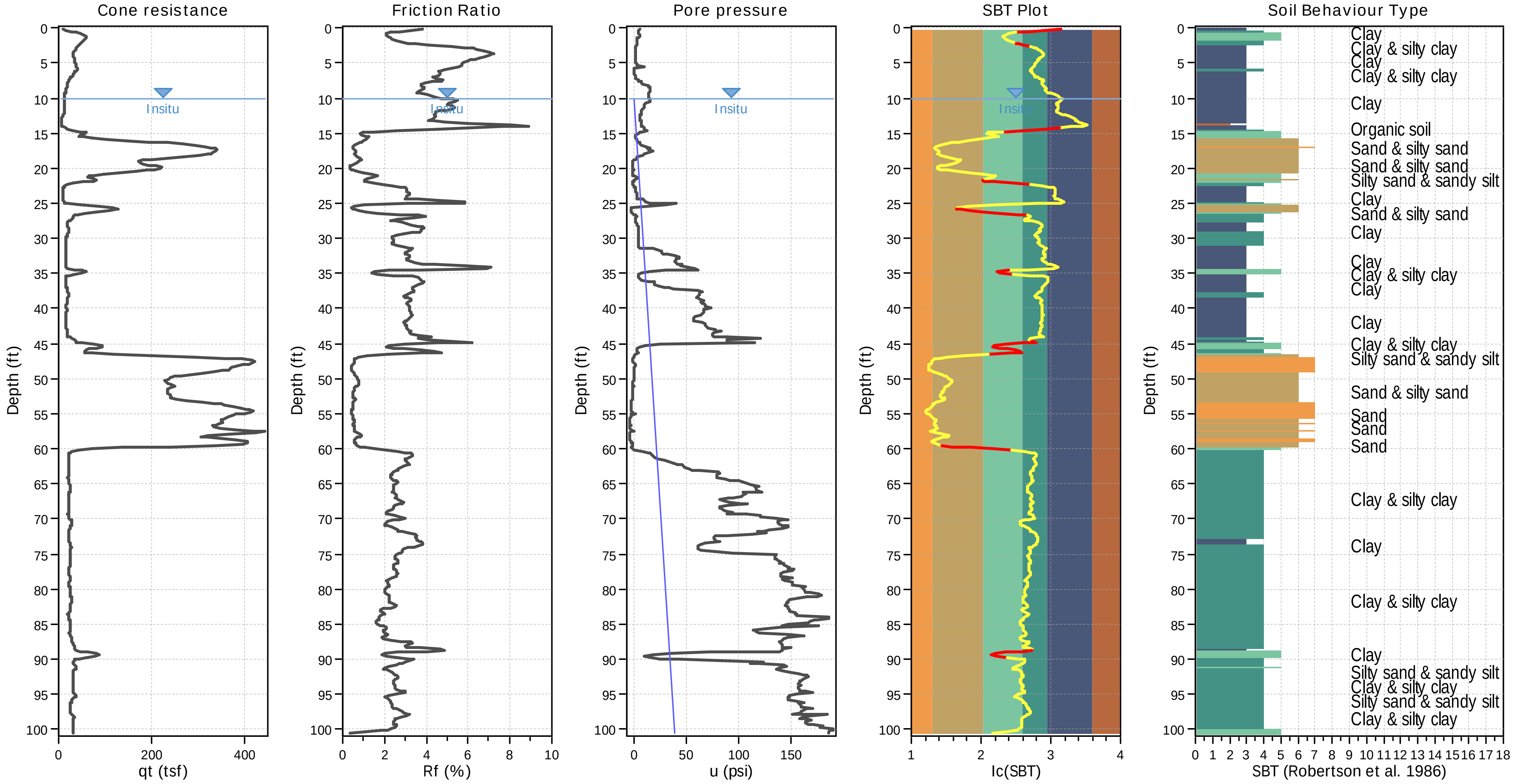






Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and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

CPT basic interpretation plots



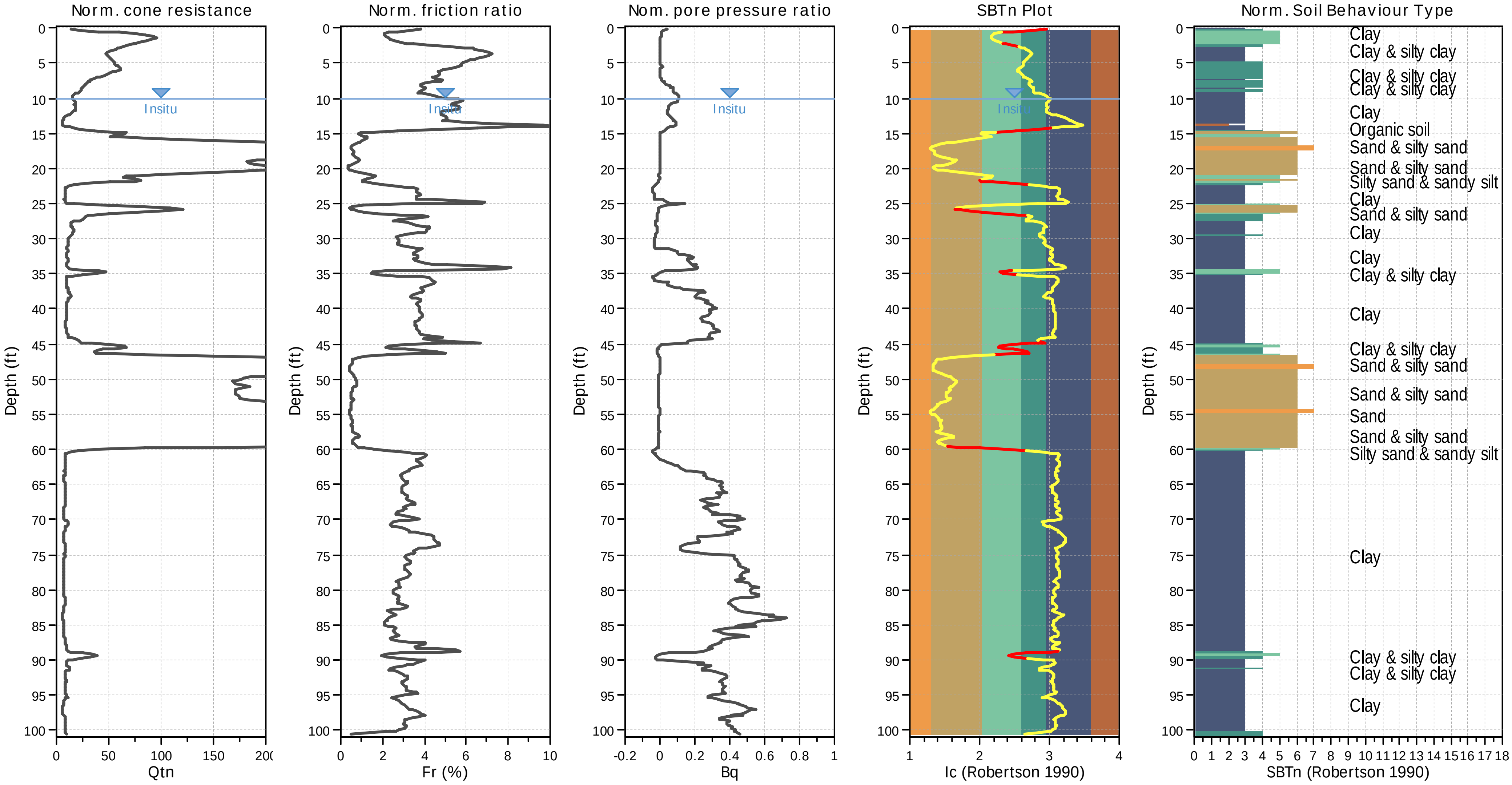
Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	4.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.00	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.51	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	10.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

SBT legend

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

CPT basic interpretation plots (normalized)



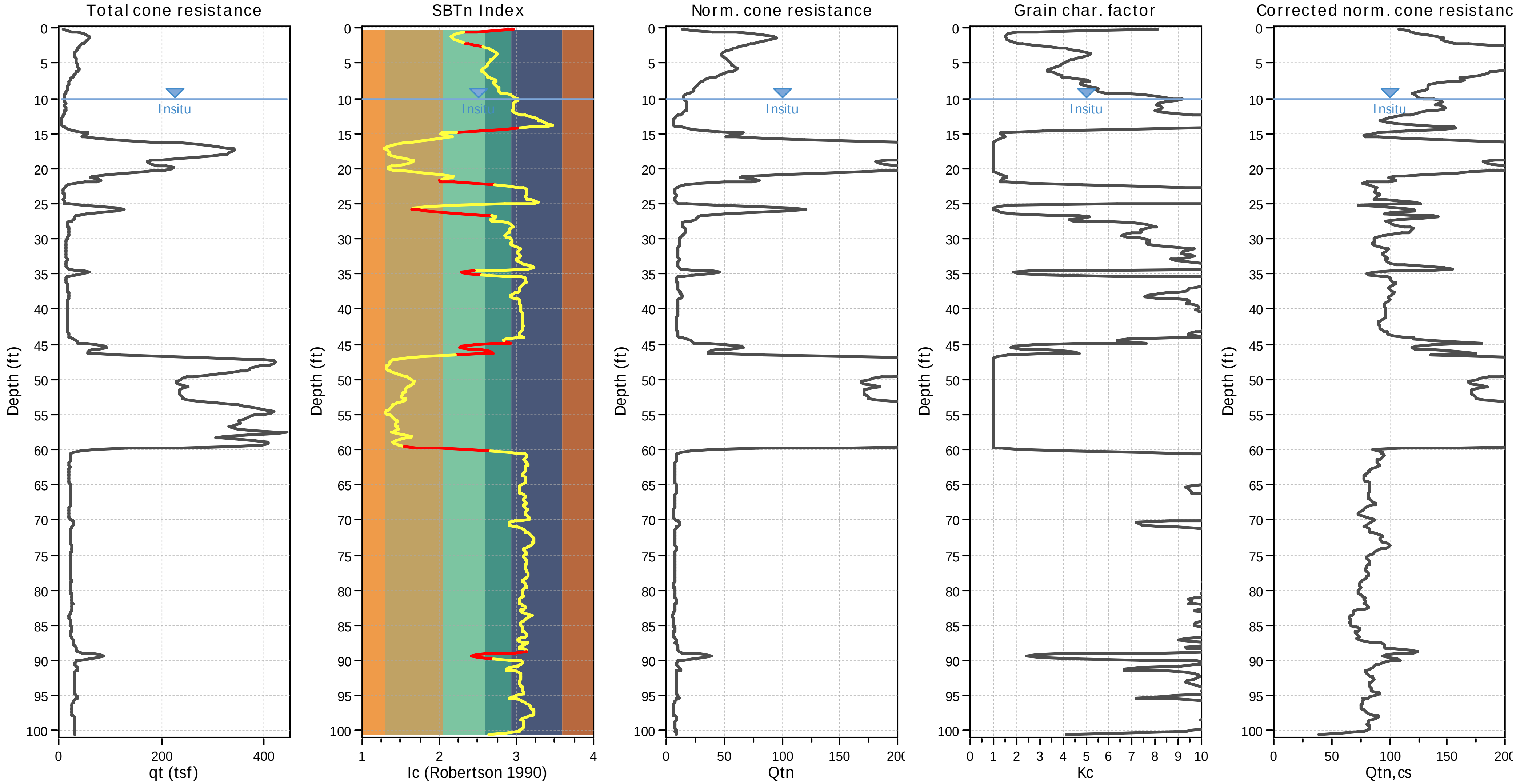
Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	4.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.00	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.51	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	10.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

SBTn legend

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

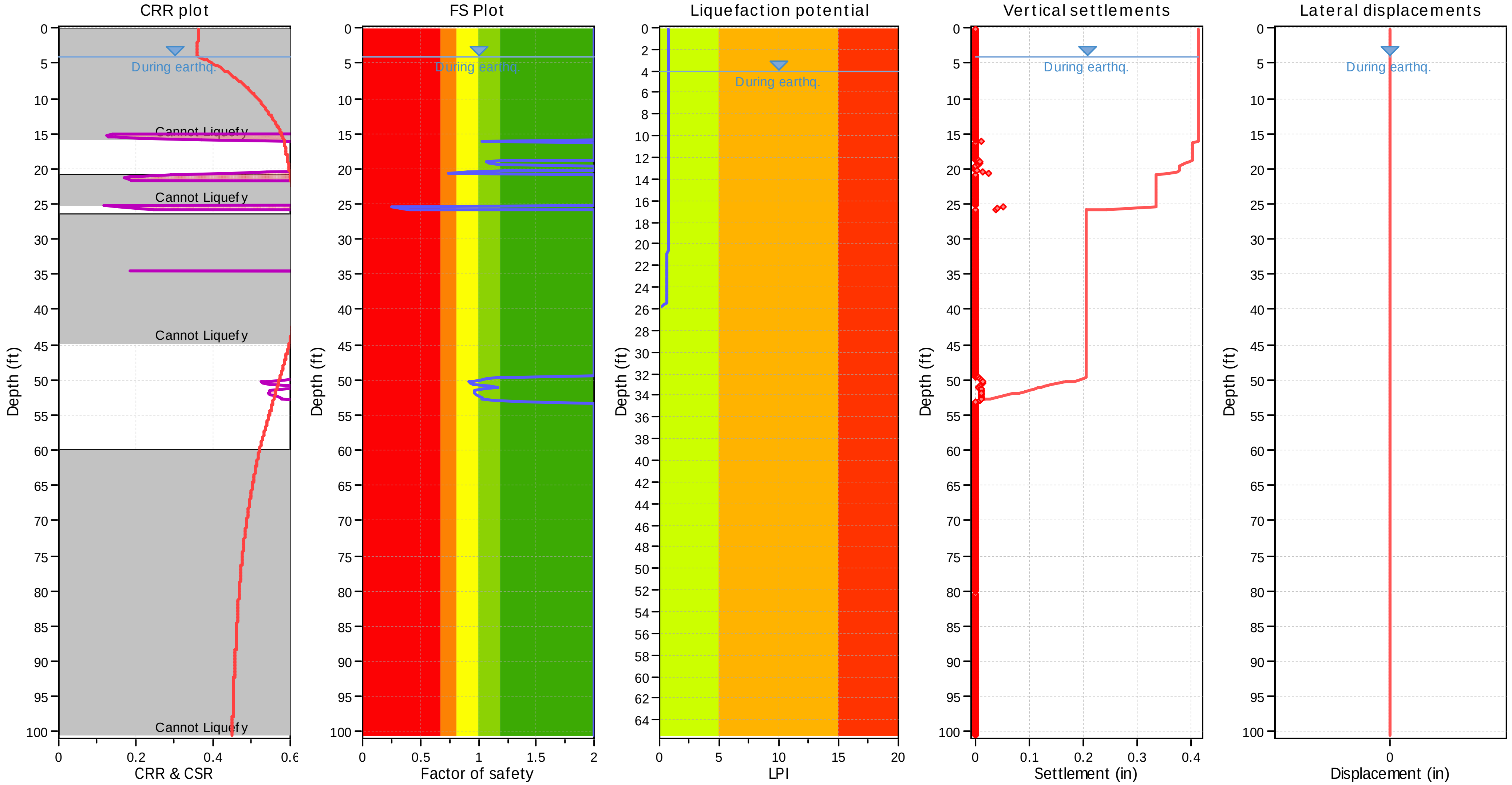
Liquefaction analysis overall plots (intermediate results)



Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	4.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.00	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.51	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	10.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	4.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.00	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.51	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	10.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

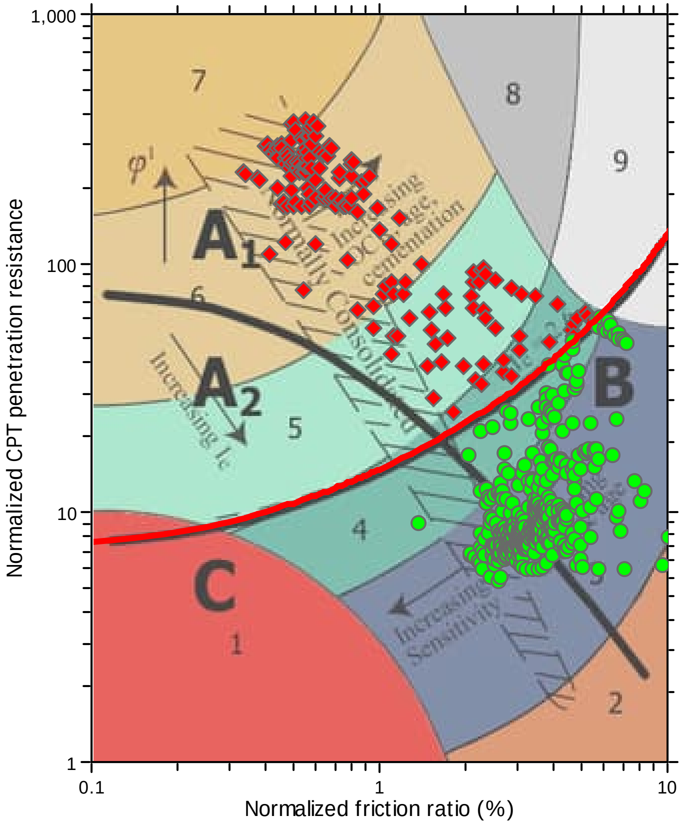
F.S. color scheme

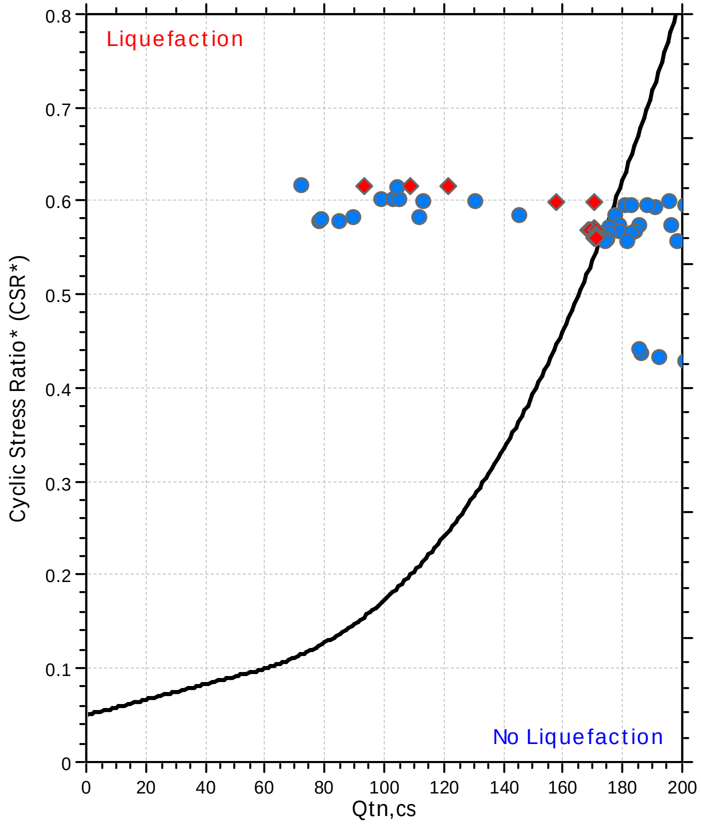
- Almost certain it will liquefy
- Very likely to liquefy
- Liquefaction and no liq. are equally likely
- Unlike to liquefy
- Almost certain it will not liquefy

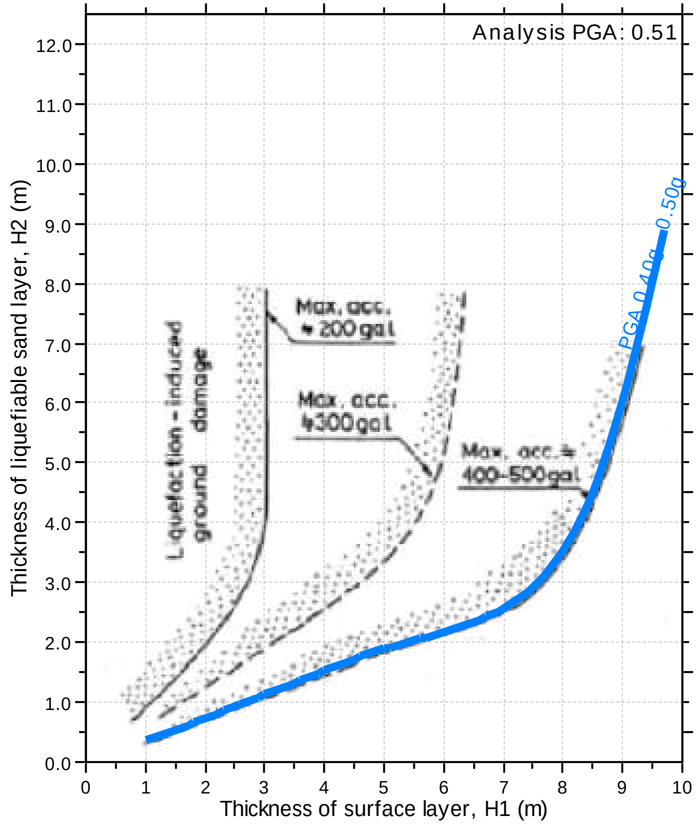
LPI color scheme

- Very high risk
- High risk
- Low risk

Liquefaction analysis summary plots



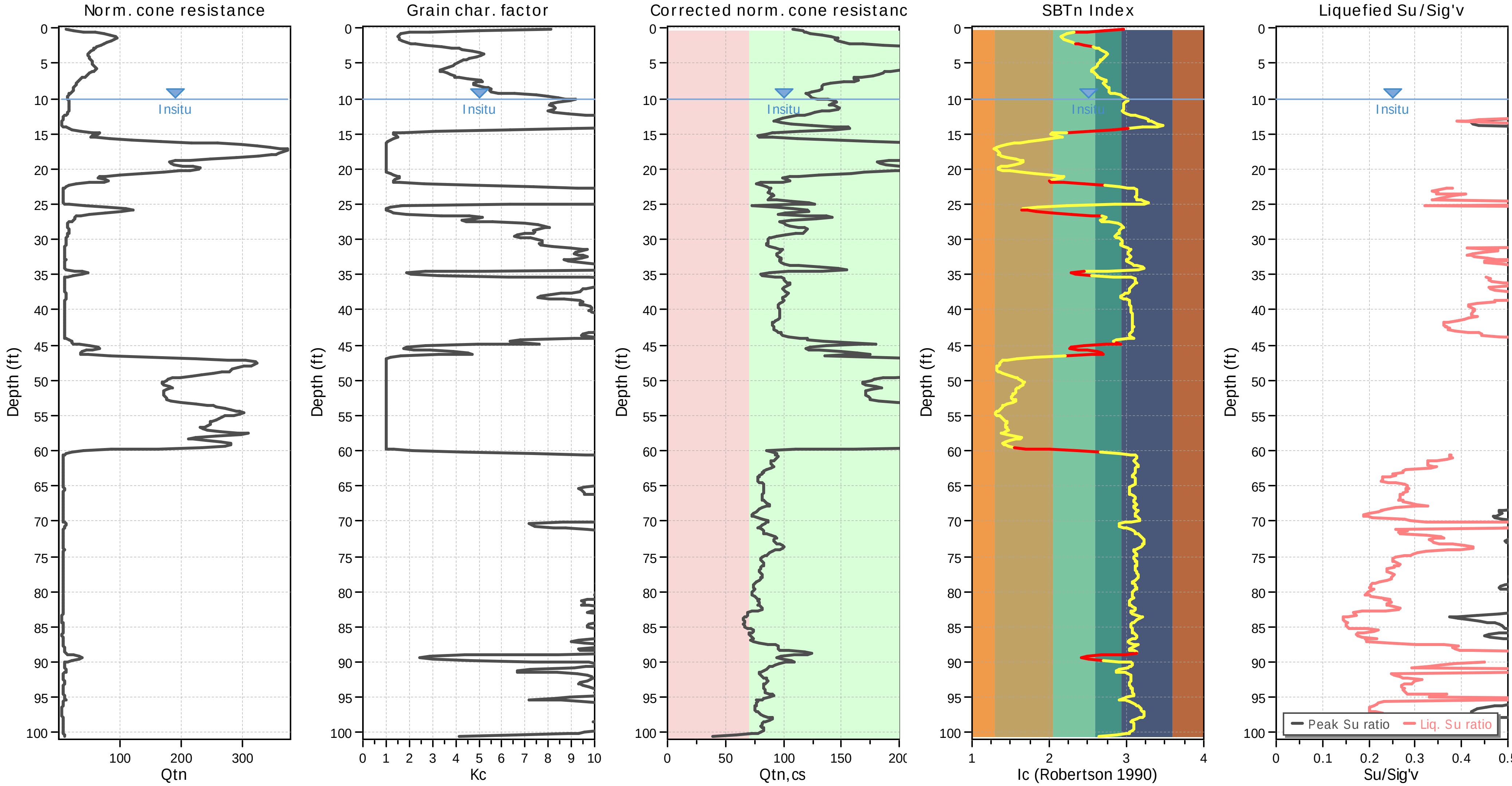




Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	4.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.00	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.51	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	10.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

Check for strength loss plots (Robertson (2010))



Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	4.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.00	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.51	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	10.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

Terracon Consultants, Inc.
5075 Commercial Cir.,Suite E
Concord, CA 94520
www.terracon.com

LIQUEFACTION ANALYSIS REPORT

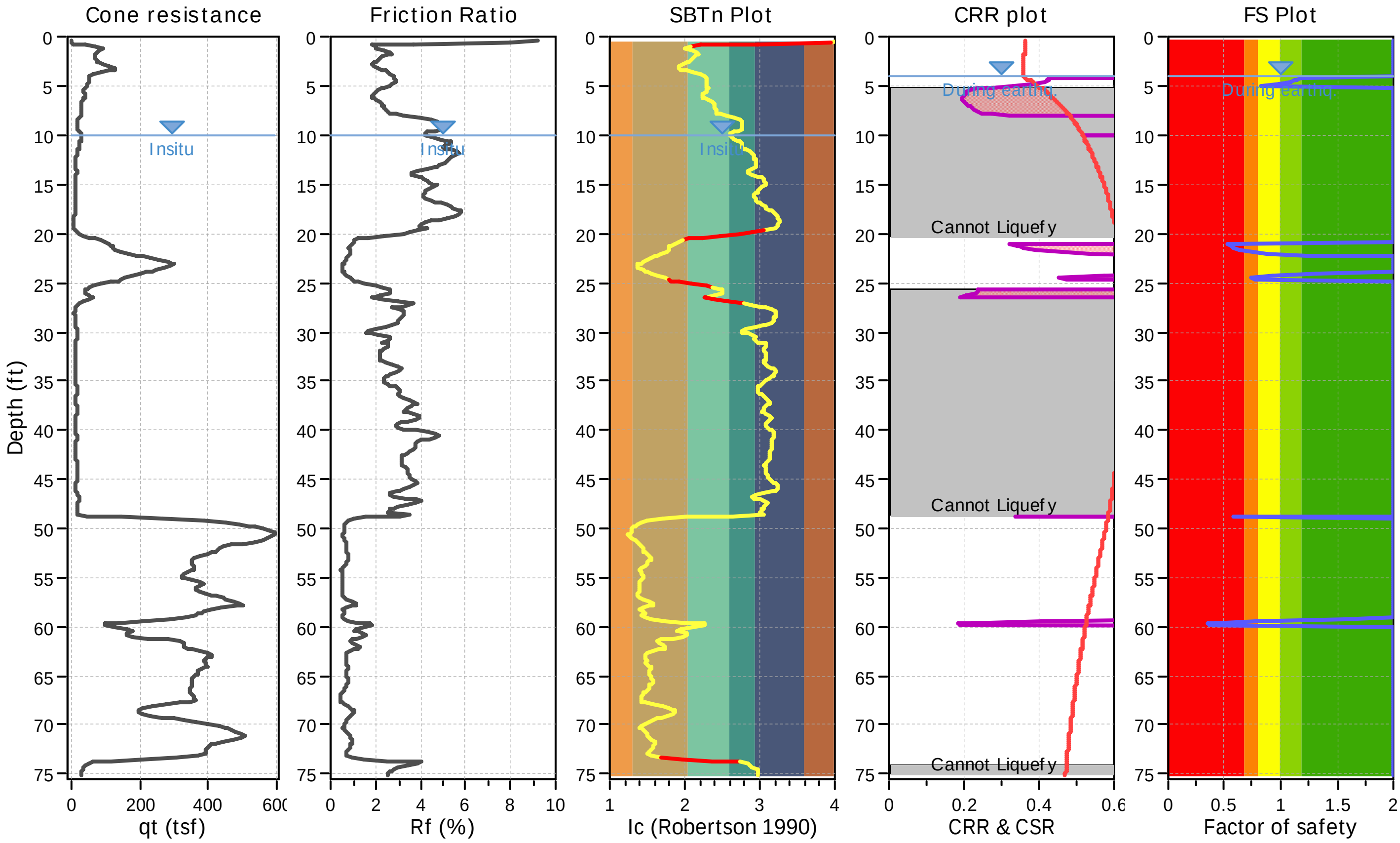
Project title : SJC04

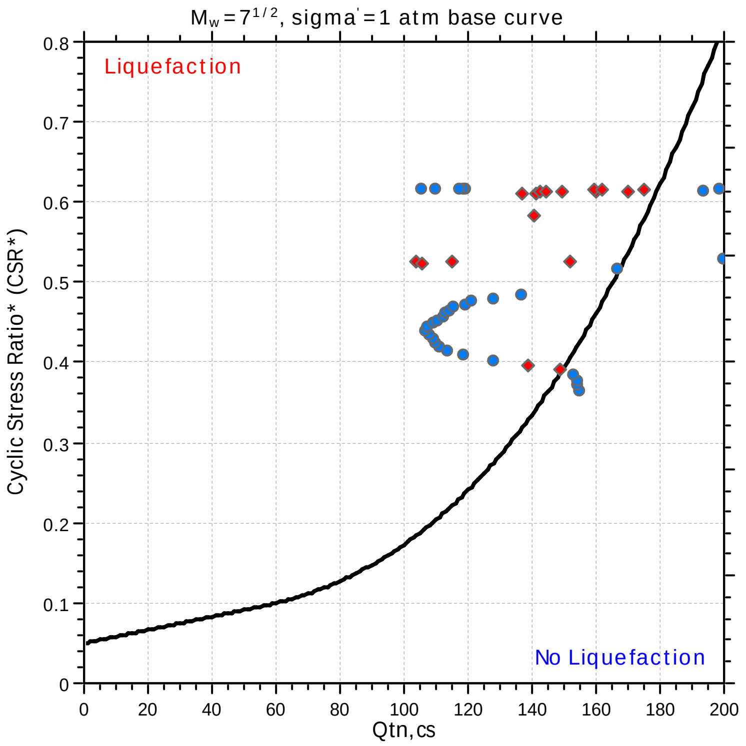
Location : San Jose, CA

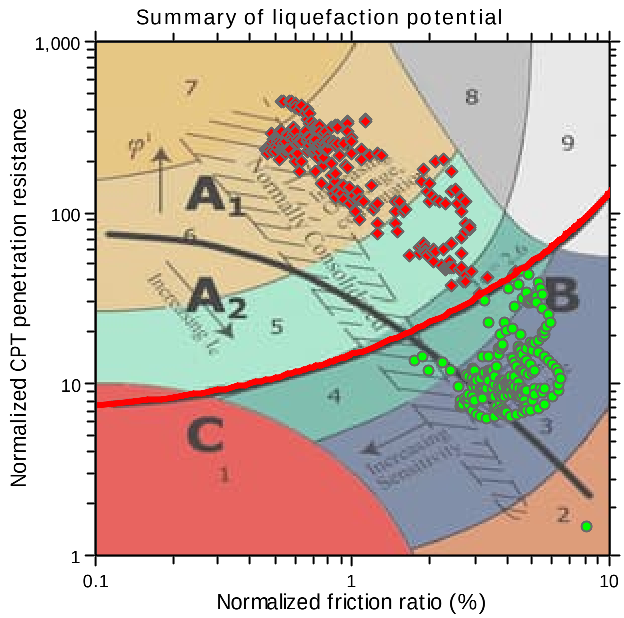
CPT file : CPT-02

Input parameters and analysis data

Analysis method:	NCEER (1998)	G.W.T. (in-situ):	10.00 ft	Use fill:	No	Clay like behavior applied:	Sands only
Fines correction method:	NCEER (1998)	G.W.T. (earthq.):	4.00 ft	Fill height:	N/A	Limit depth applied:	Yes
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	60.00 ft
Earthquake magnitude M_w:	7.00	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method based
Peak ground acceleration:	0.51	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

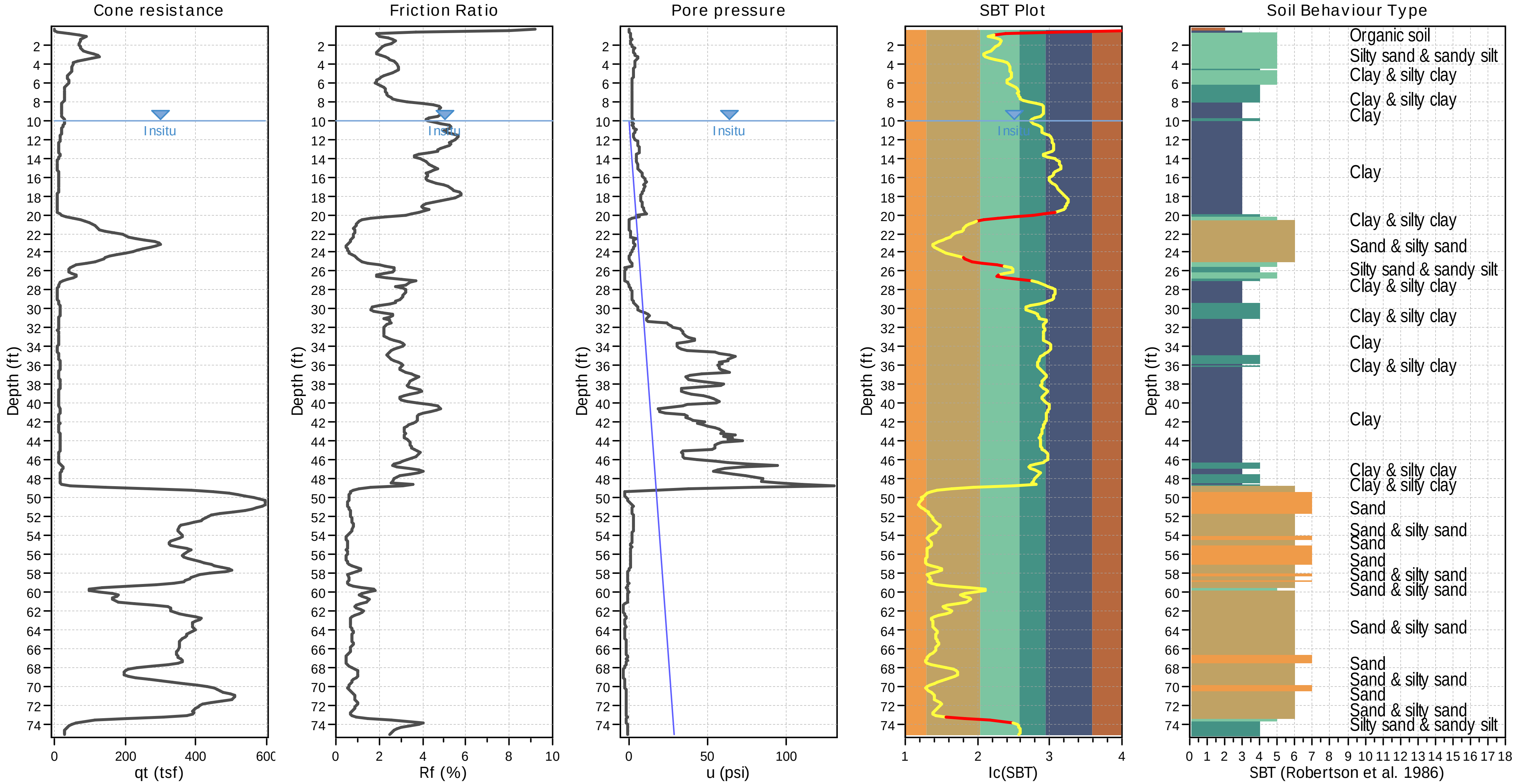






Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and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

CPT basic interpretation plots



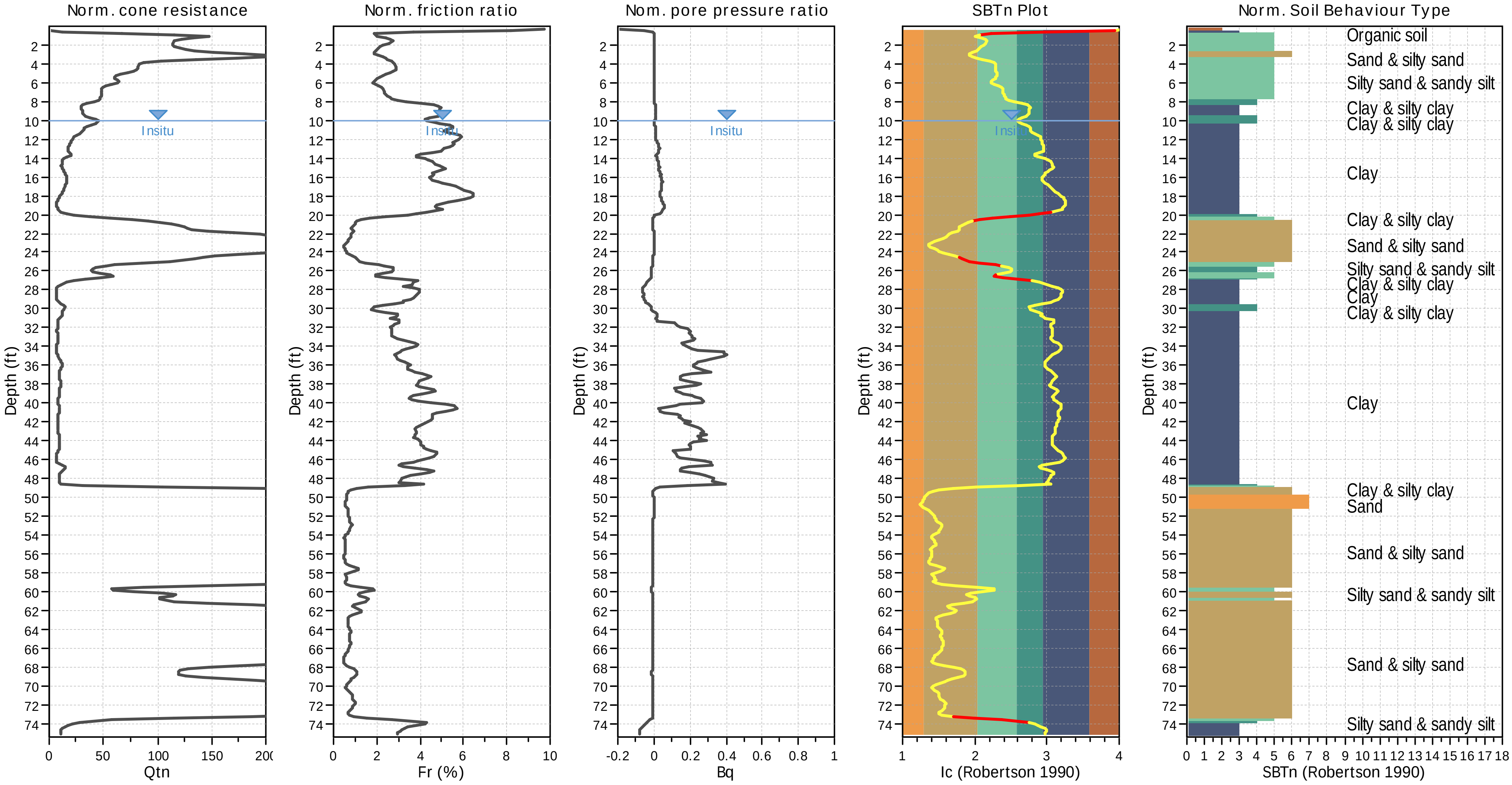
Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	4.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.00	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.51	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	10.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

SBT legend

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

CPT basic interpretation plots (normalized)



Input parameters and analysis data

Analysis method:	NCEER (1998)
Fines correction method:	NCEER (1998)
Points to test:	Based on Ic value
Earthquake magnitude M_w:	7.00
Peak ground acceleration:	0.51
Depth to water table (insitu):	10.00 ft

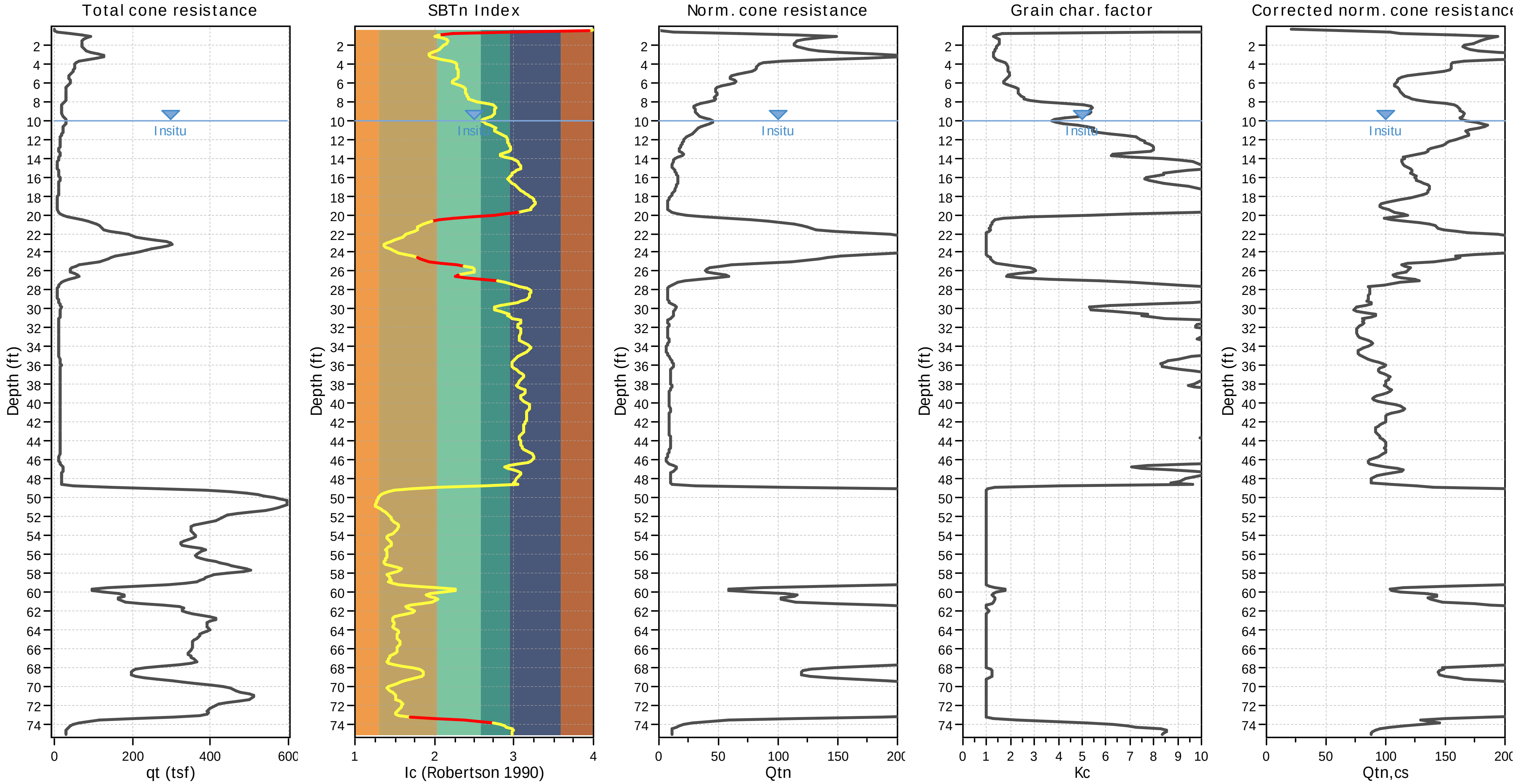
Depth to water table (erthq.):	4.00 ft
Average results interval:	3
Ic cut-off value:	2.60
Unit weight calculation:	Based on SBT
Use fill:	No
Fill height:	N/A

Fill weight:	N/A
Transition detect. applied:	Yes
K_σ applied:	Yes
Clay like behavior applied:	Sands only
Limit depth applied:	Yes
Limit depth:	60.00 ft

SBTn legend

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

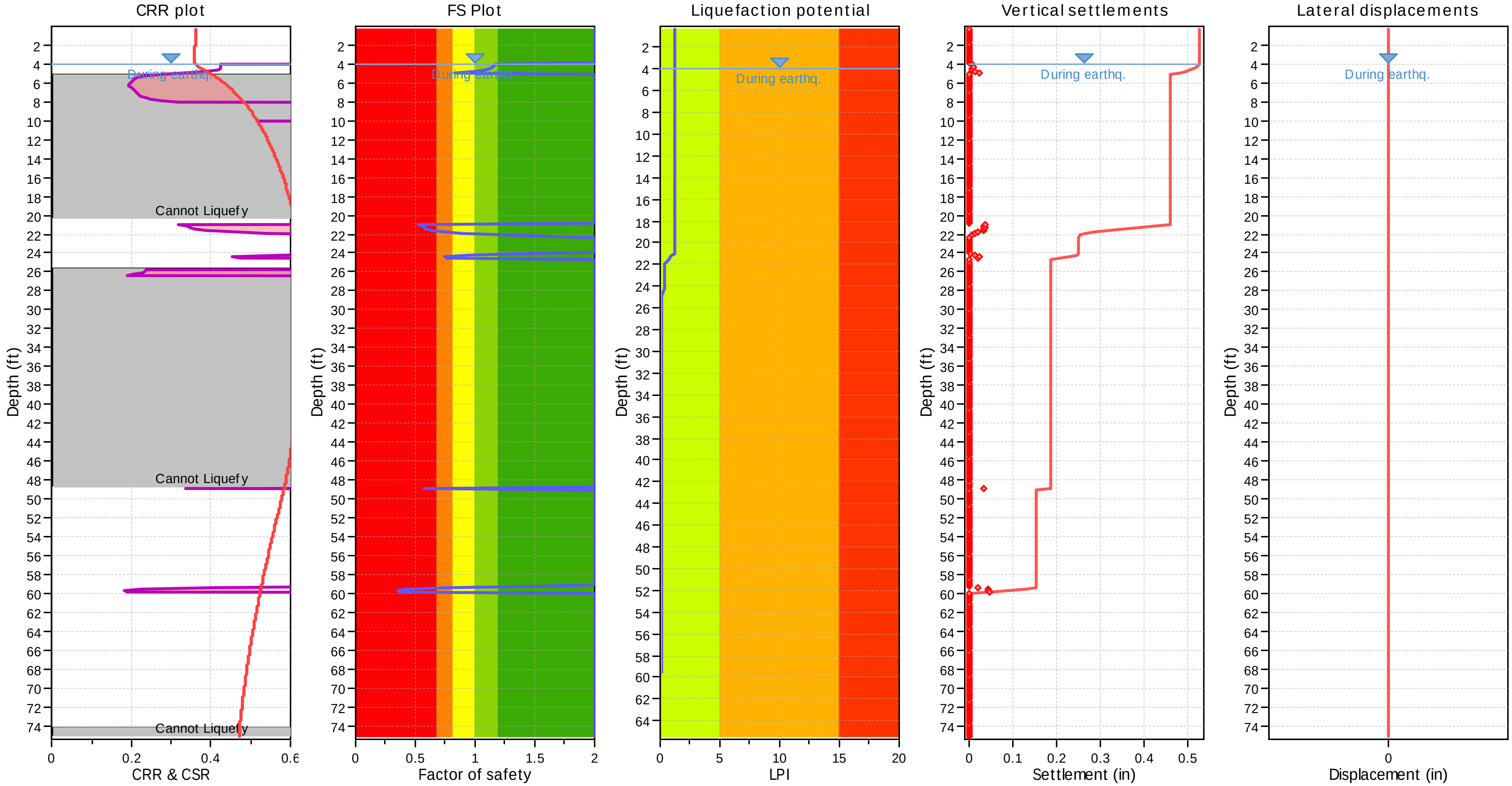
Liquefaction analysis overall plots (intermediate results)



Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	4.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.00	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.51	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	10.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	4.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.00	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.51	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	10.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

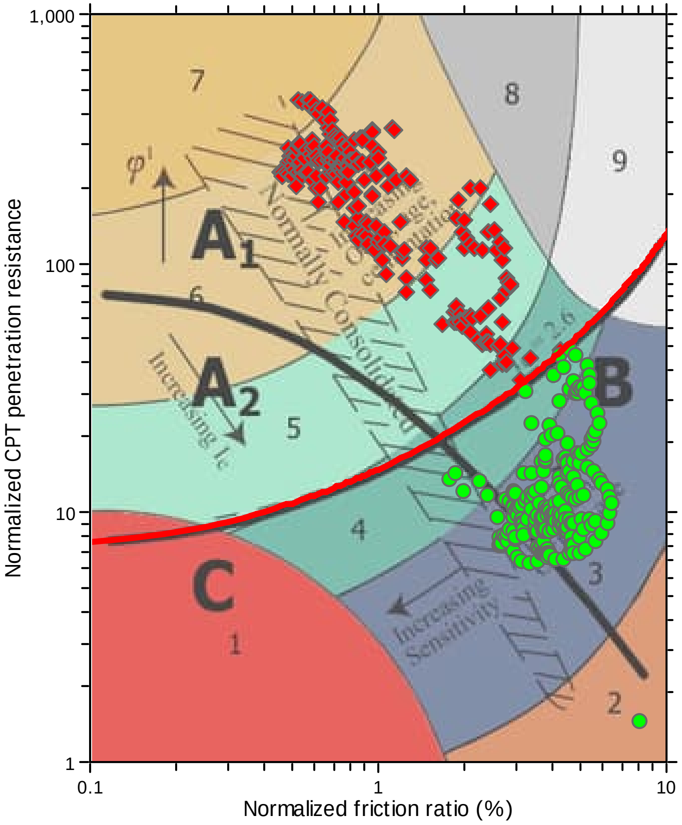
F.S. color scheme

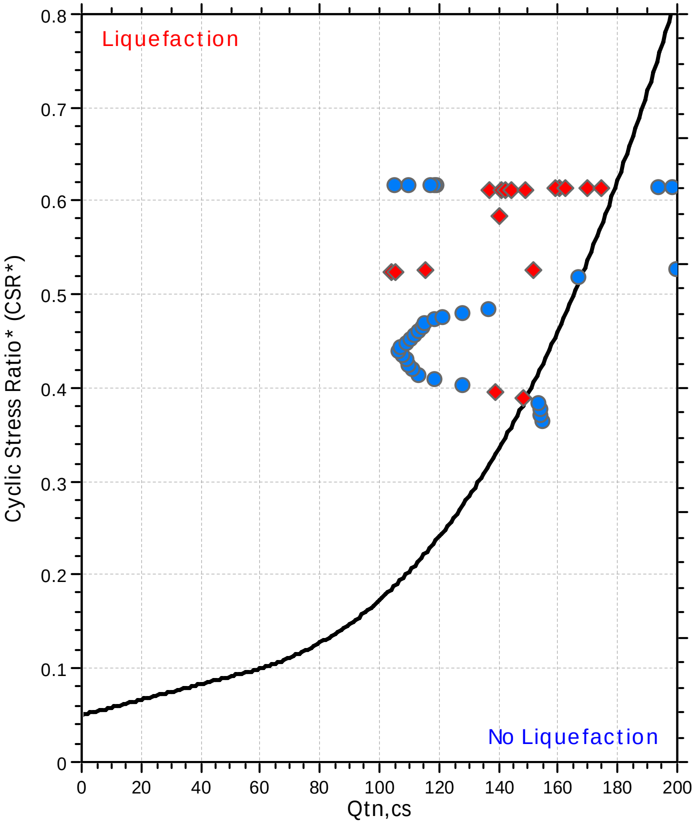
- Almost certain it will liquefy
- Very likely to liquefy
- Liquefaction and no liq. are equally likely
- Unlike to liquefy
- Almost certain it will not liquefy

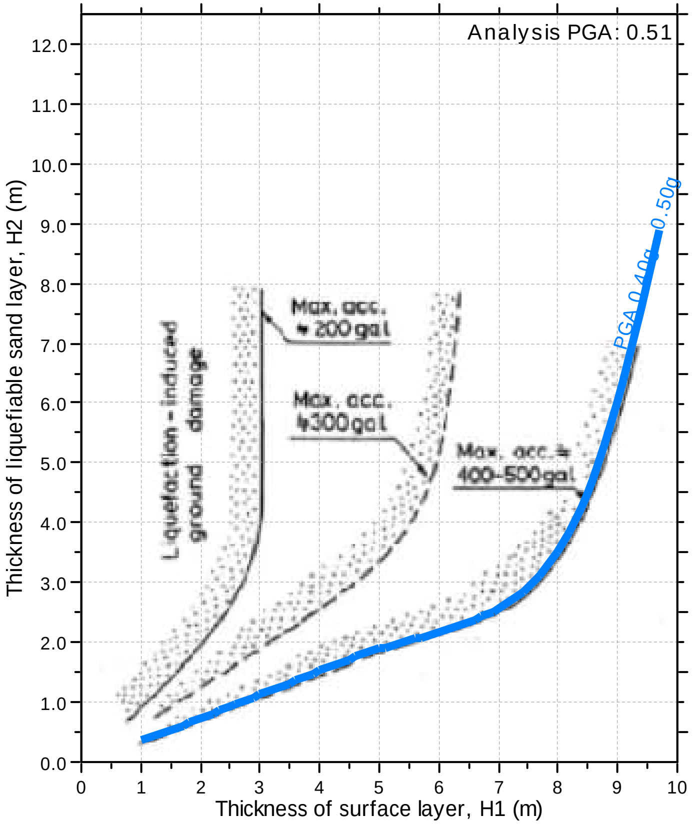
LPI color scheme

- Very high risk
- High risk
- Low risk

Liquefaction analysis summary plots



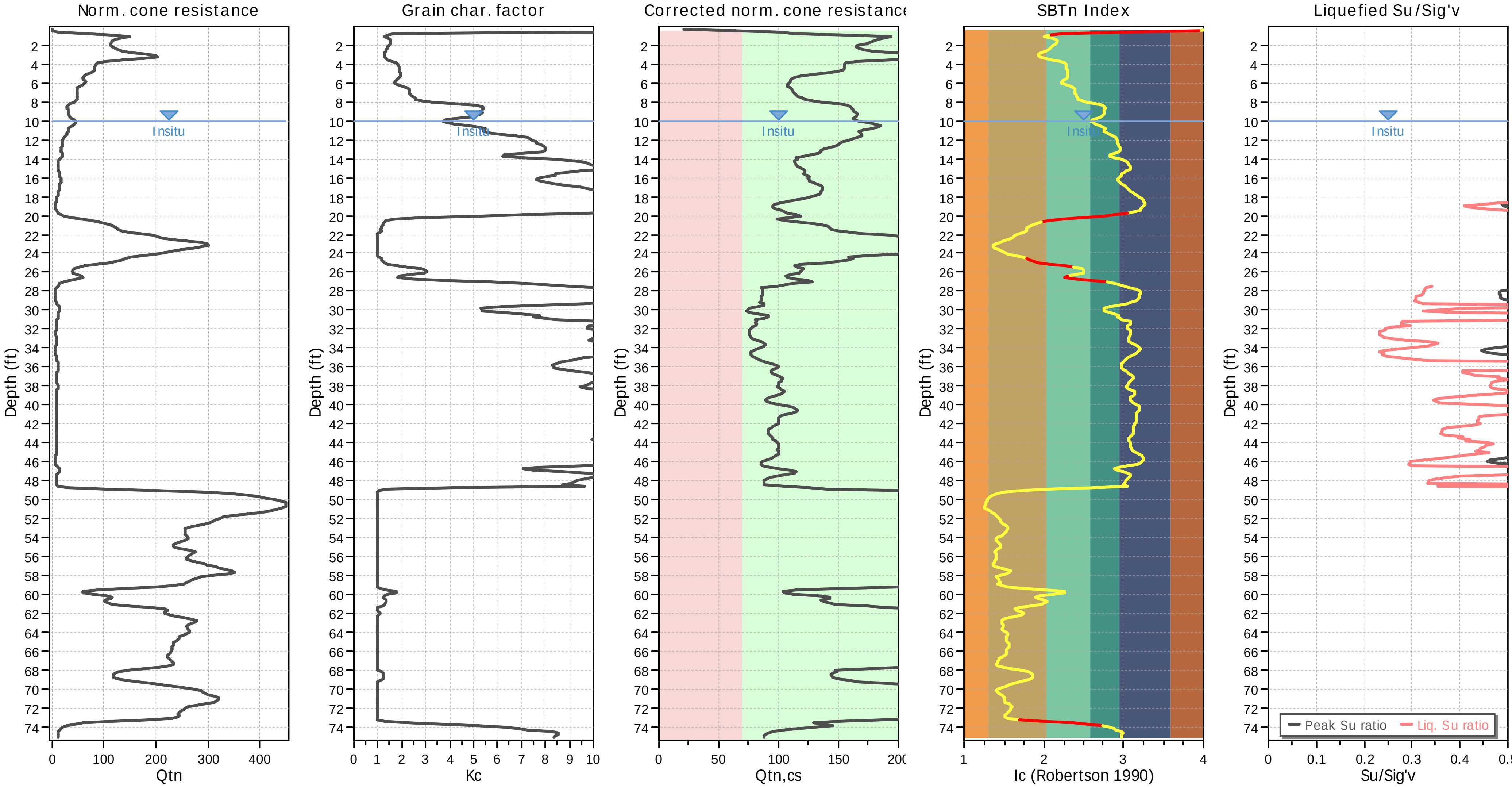




Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	4.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_{σ} applied:	Yes
Earthquake magnitude M_w:	7.00	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.51	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	10.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

Check for strength loss plots (Robertson (2010))



Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	4.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.00	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.51	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	10.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

Terracon Consultants, Inc.
5075 Commercial Cir.,Suite E
Concord, CA 94520
www.terracon.com

LIQUEFACTION ANALYSIS REPORT

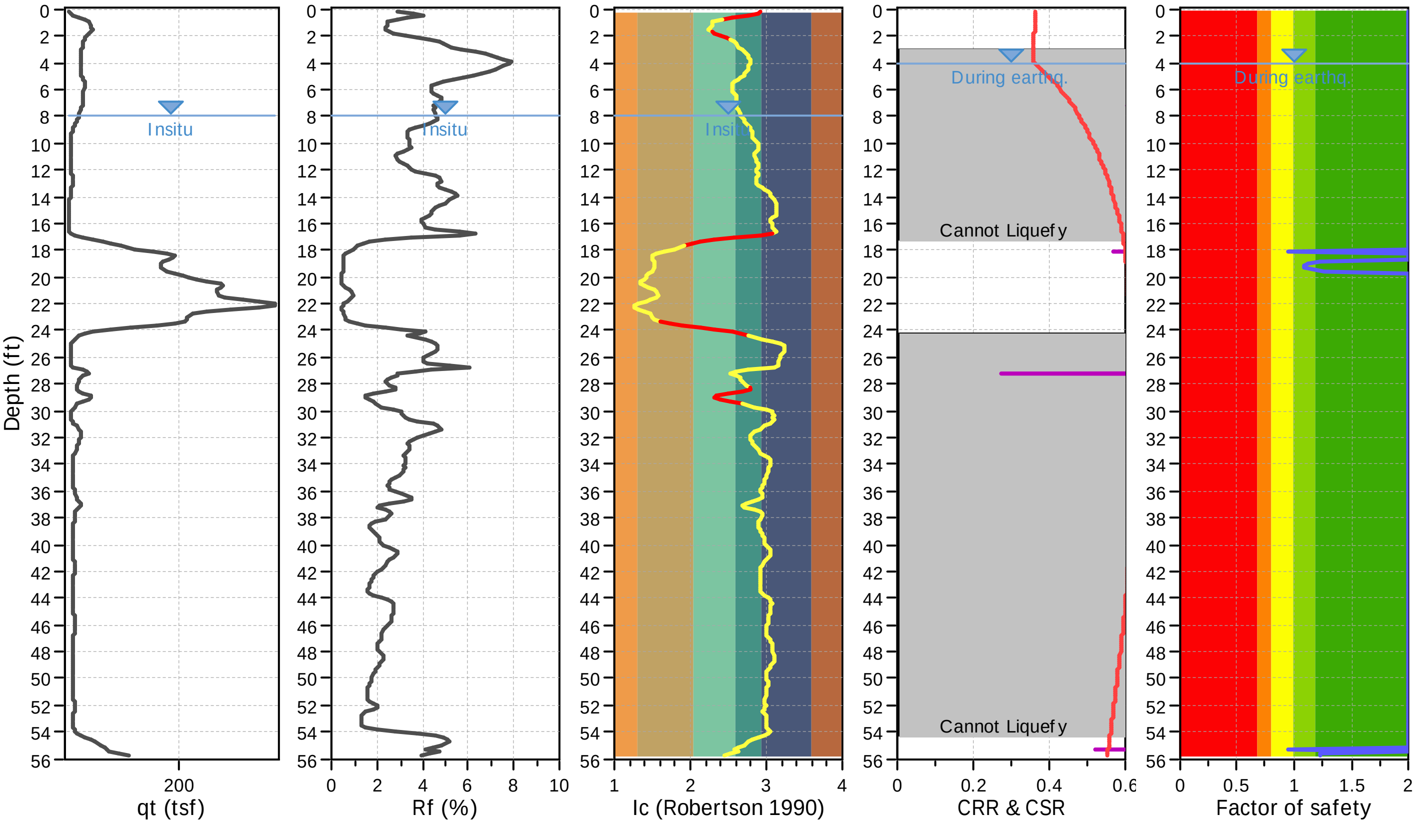
Project title : SJC04 Location : San Jose, CA

CPT file : CPT-03

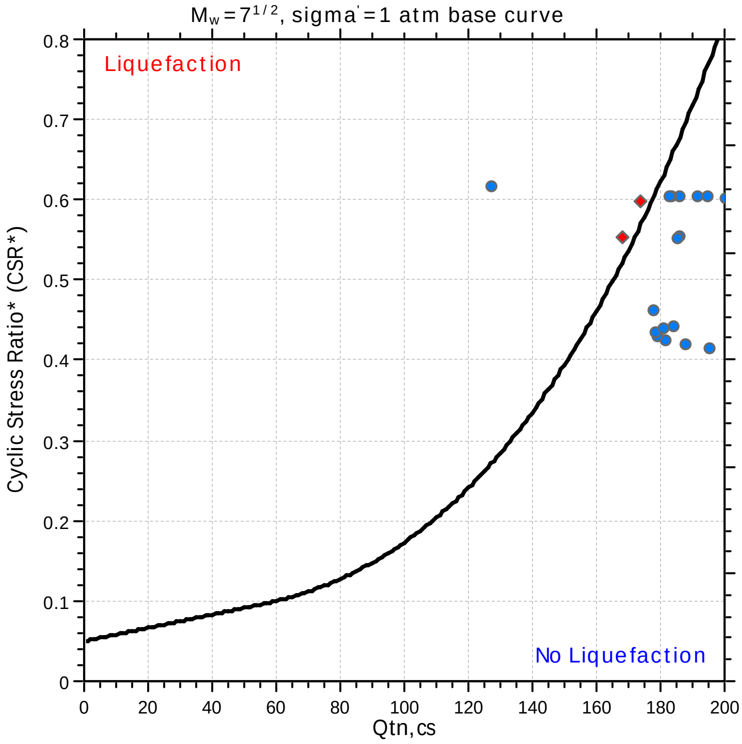
Input parameters and analysis data

Analysis method:	NCEER (1998)	G.W.T. (in-situ):	8.00 ft	Use fill:	No	Clay like behavior applied:	Sands only
Fines correction method:	NCEER (1998)	G.W.T. (earthq.):	4.00 ft	Fill height:	N/A	Limit depth applied:	Yes
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	60.00 ft
Earthquake magnitude M_w:	7.00	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method based
Peak ground acceleration:	0.51	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

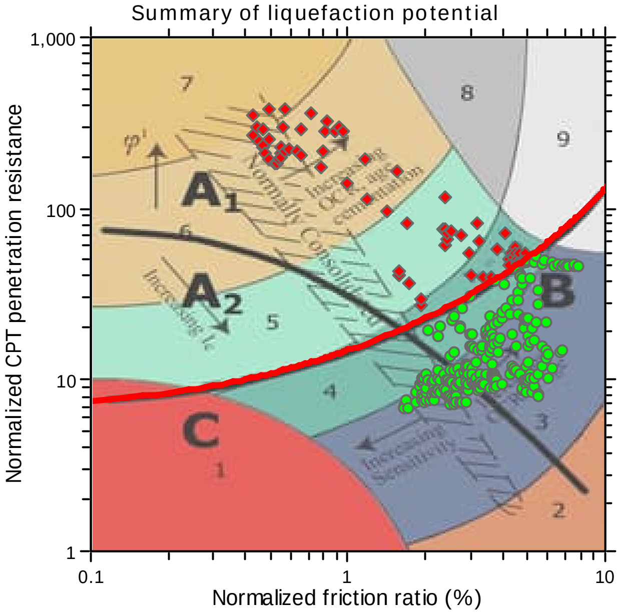
Cone resistance Friction Ratio SBTn Plot CRR plot FS Plot



$M_w = 7^{1/2}$, sigma'=1 atm base curve

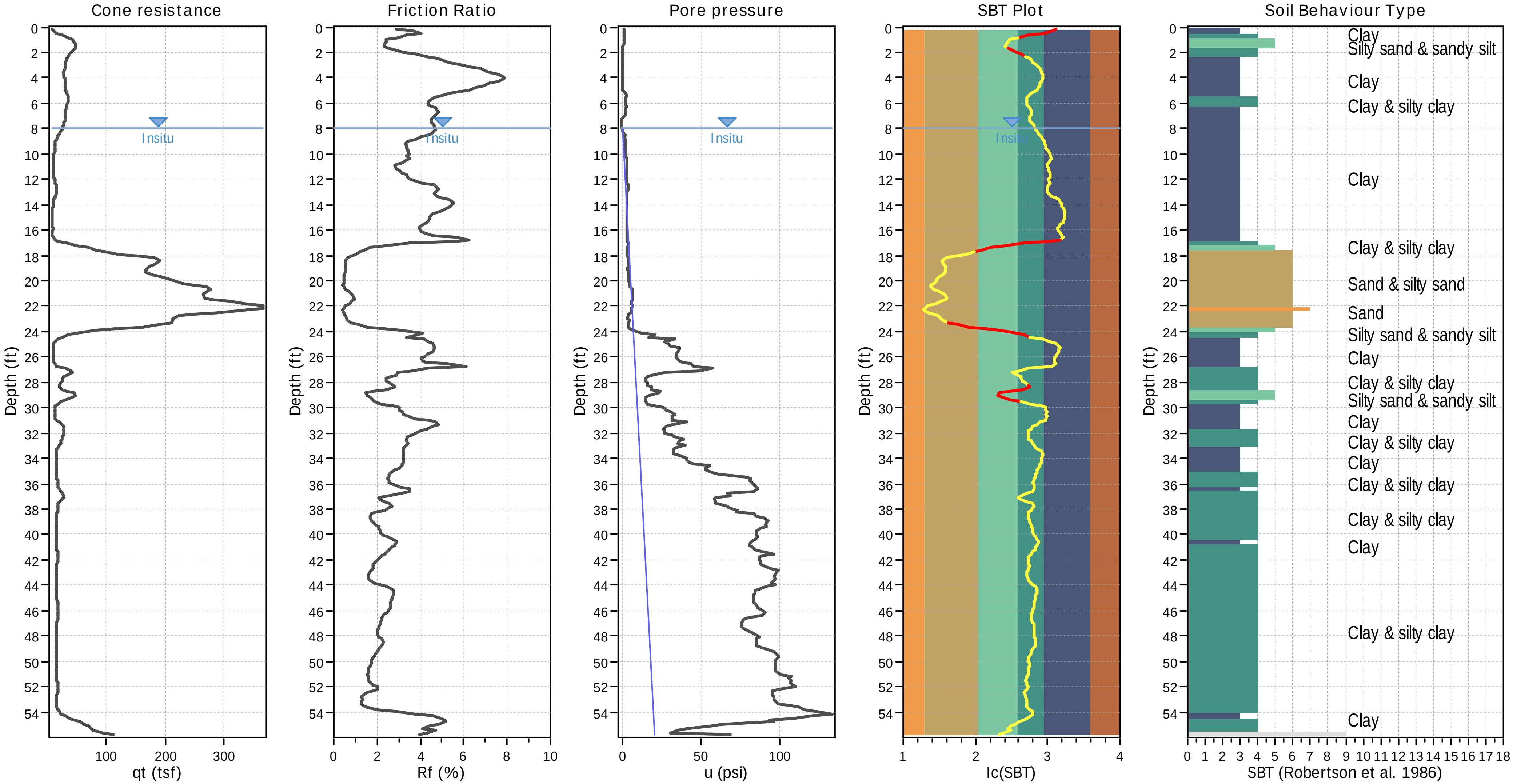


Summary of liquefaction potential



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



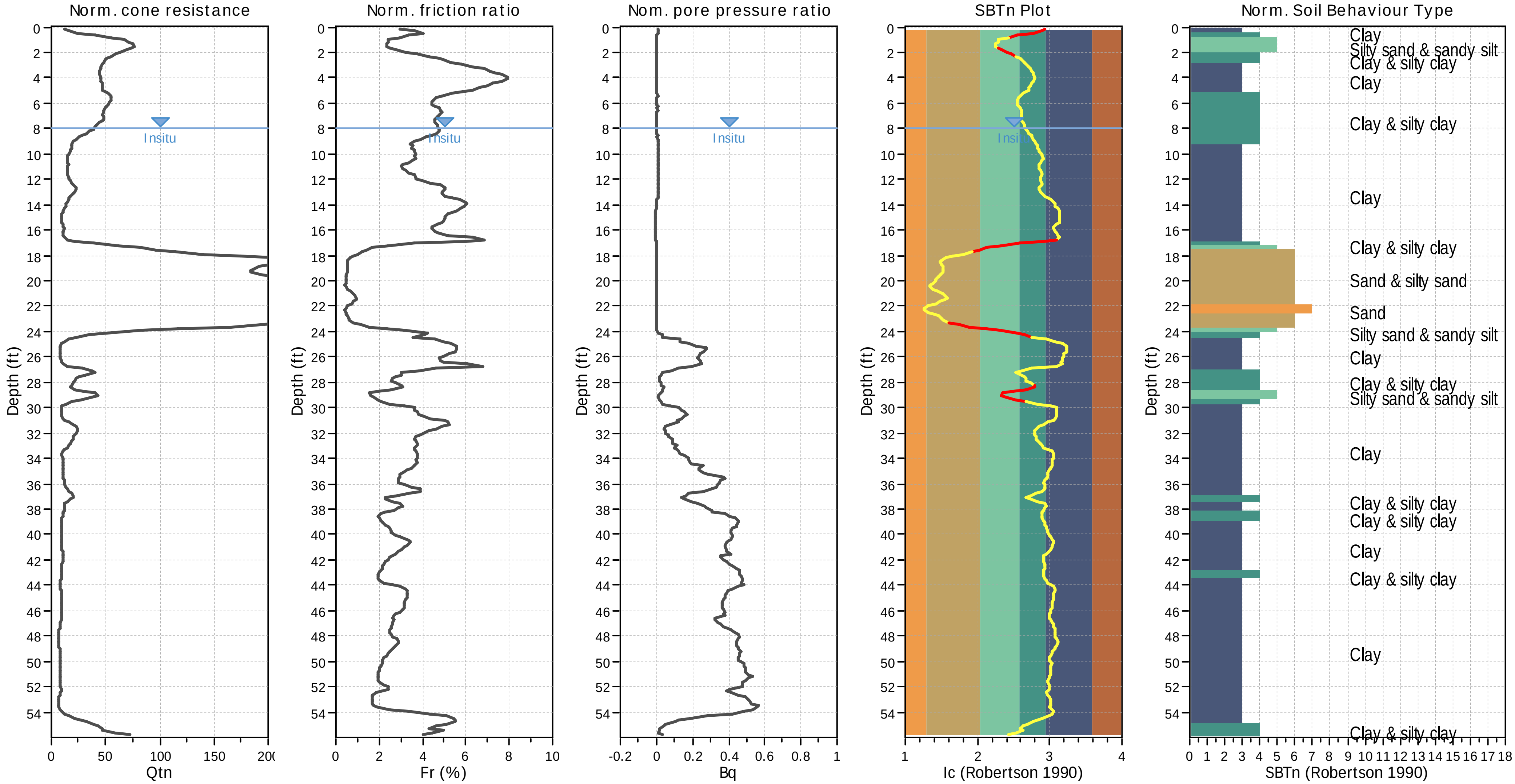
Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	4.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.00	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.51	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	8.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

SBT legend

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

CPT basic interpretation plots (normalized)



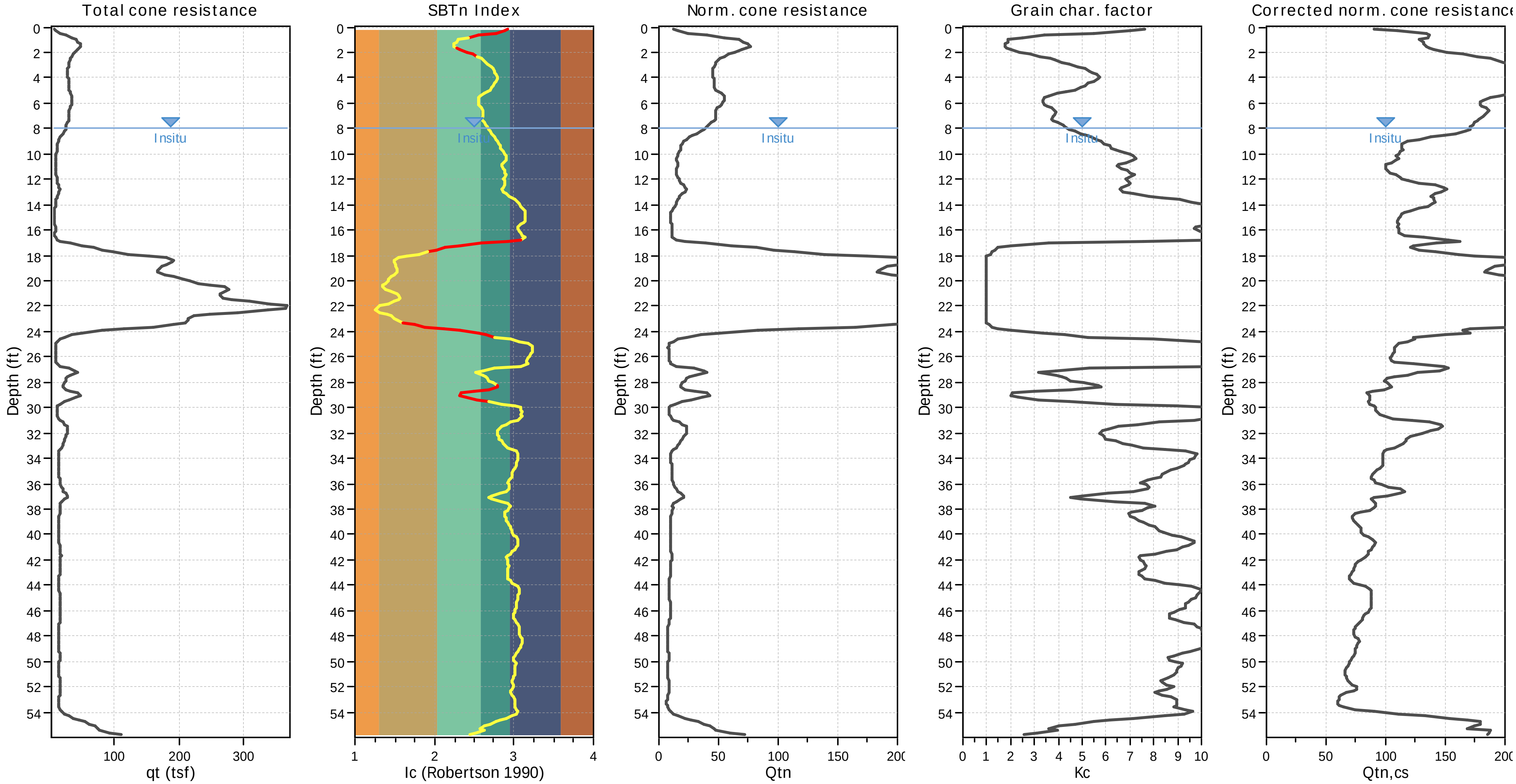
Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	4.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.00	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.51	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	8.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

SBTn legend

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

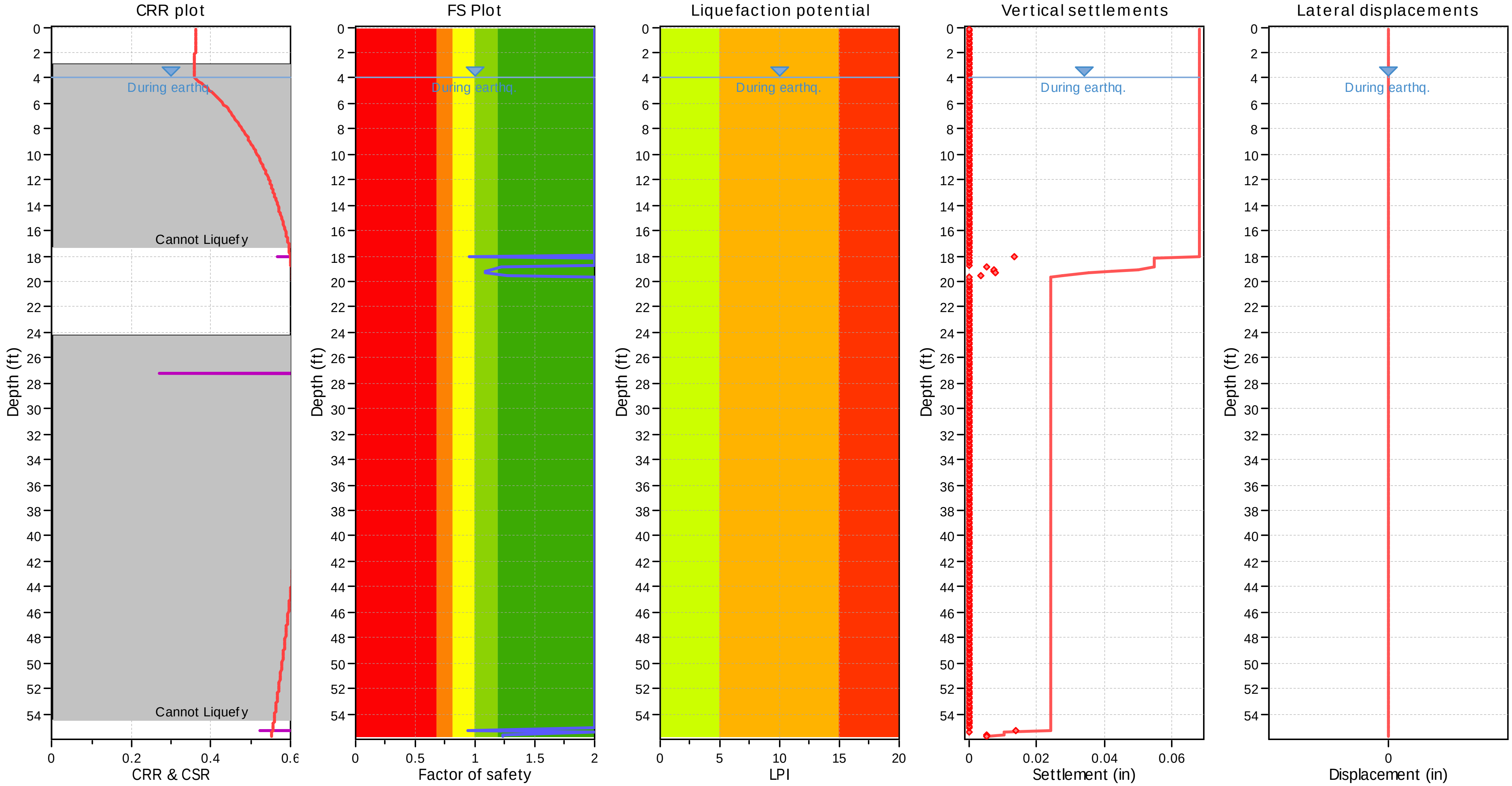
Liquefaction analysis overall plots (intermediate results)



Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	4.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.00	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.51	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	8.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	4.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.00	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.51	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	8.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

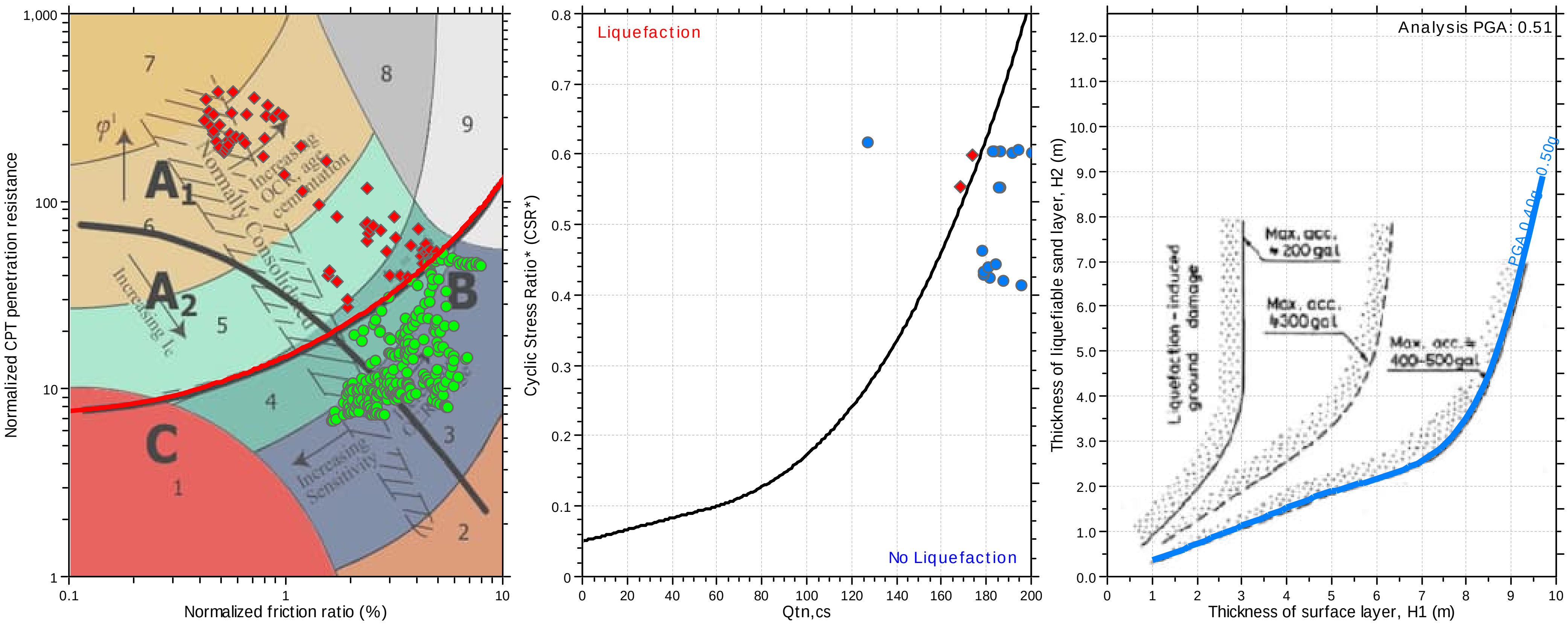
F.S. color scheme

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

LPI color scheme

- Very high risk
- High risk
- Low risk

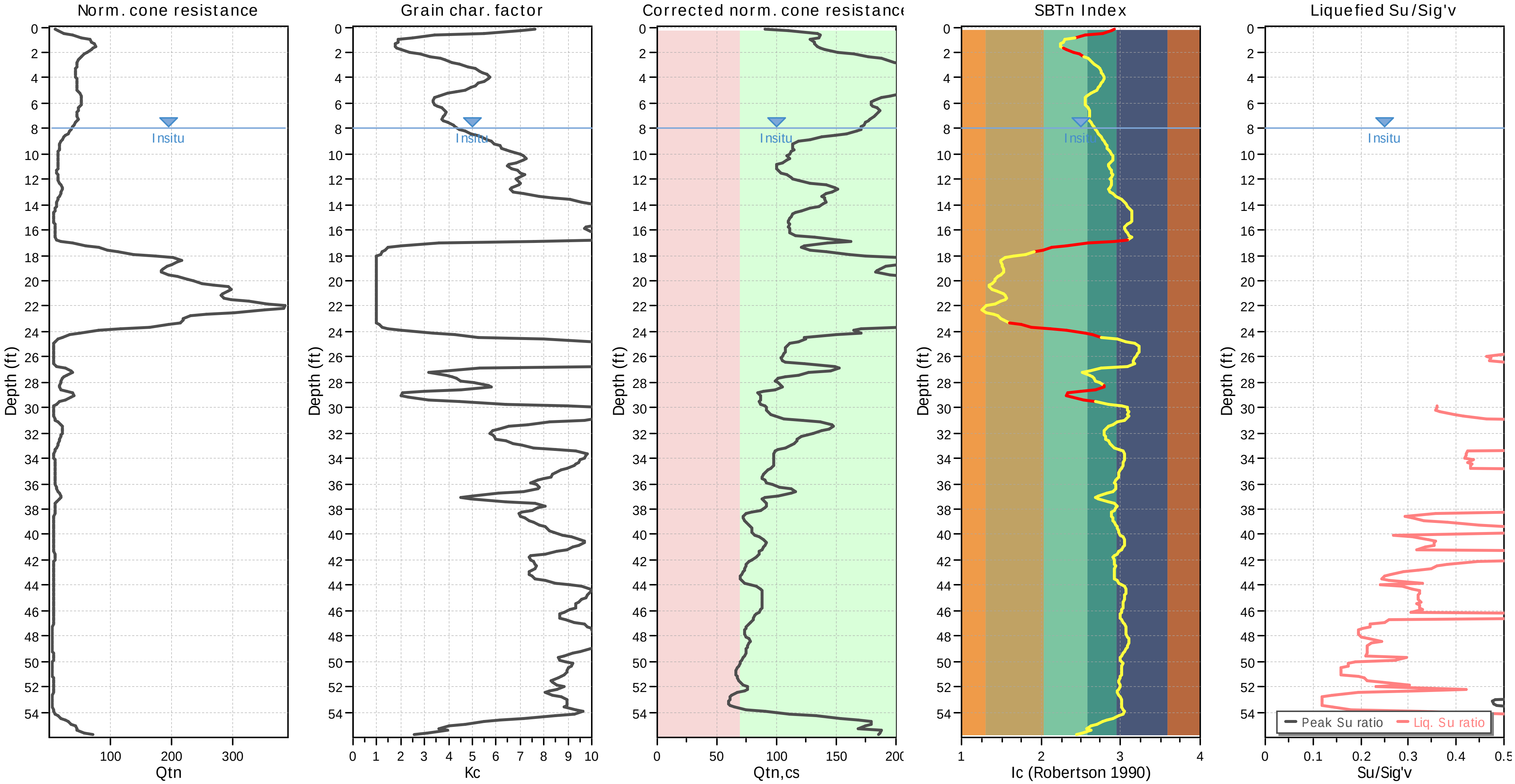
Liquefaction analysis summary plots



Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	4.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.00	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.51	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	8.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

Check for strength loss plots (Robertson (2010))



Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	4.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_{σ} applied:	Yes
Earthquake magnitude M_w:	7.00	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.51	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	8.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

Terracon Consultants, Inc.
5075 Commercial Cir.,Suite E
Concord, CA 94520
www.terracon.com

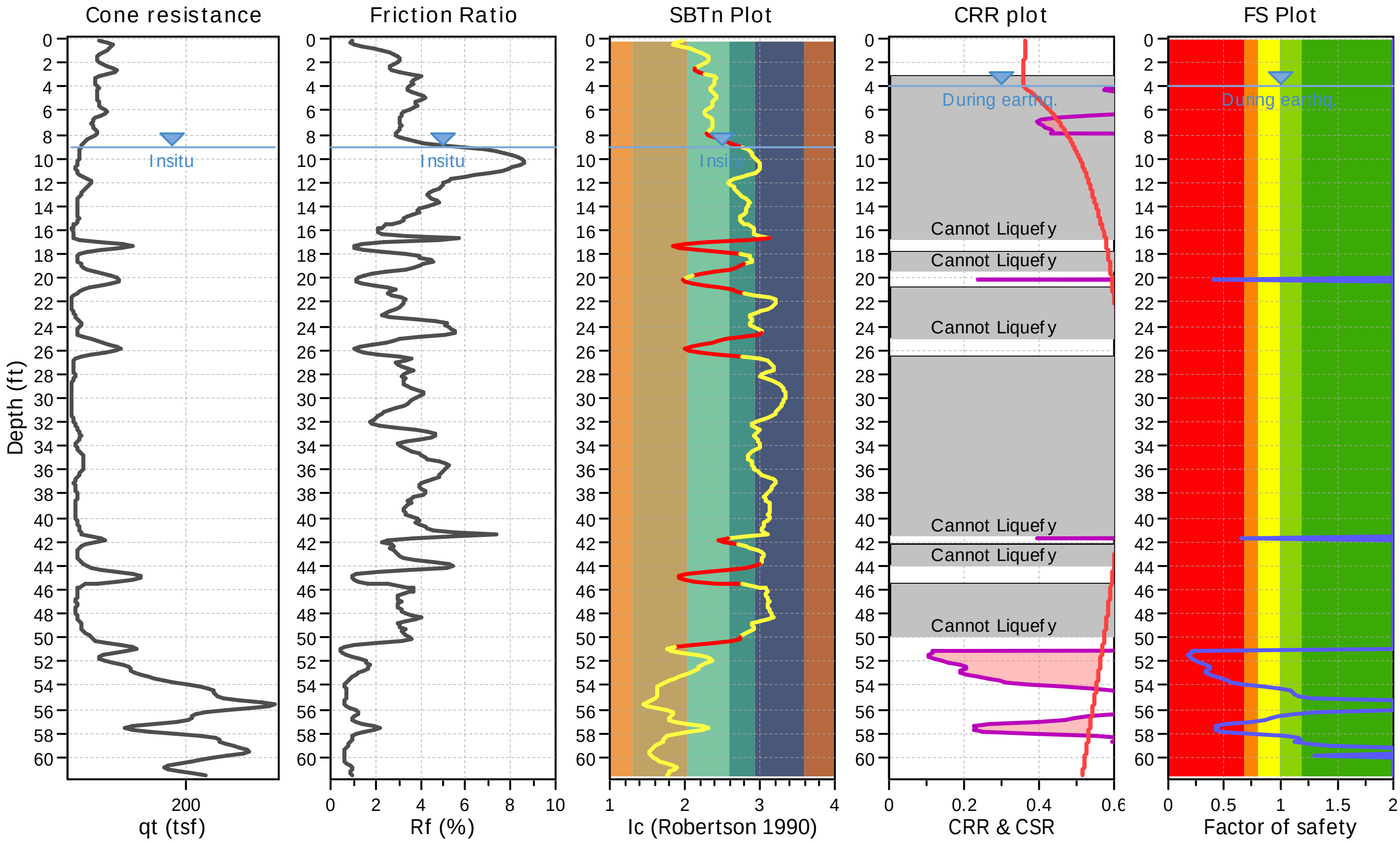
LIQUEFACTION ANALYSIS REPORT

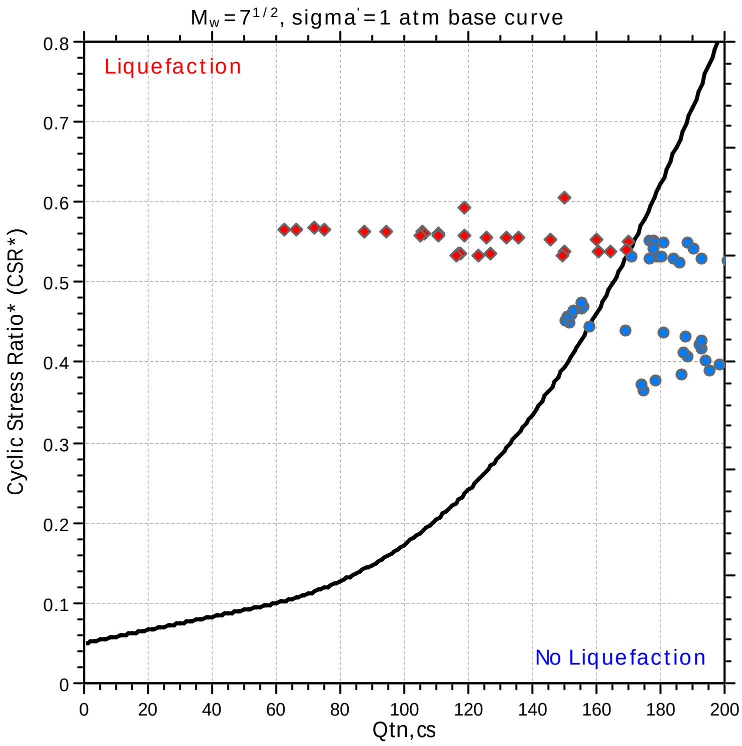
Project title : SJC04 Location : San Jose, CA

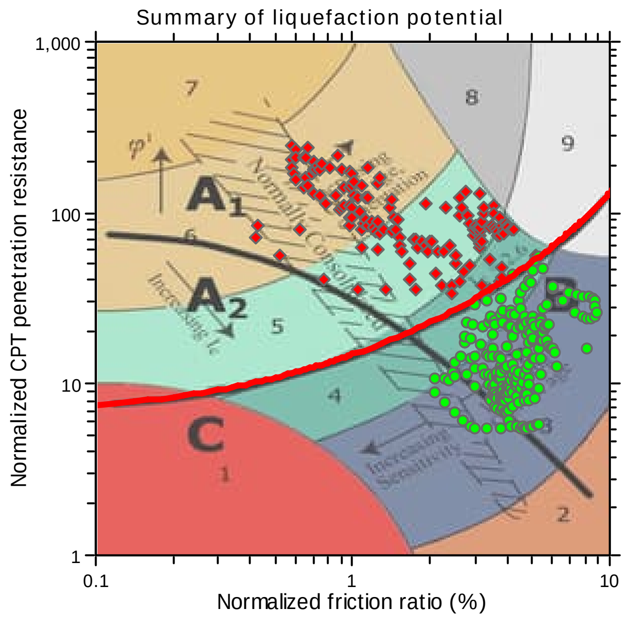
CPT file : CPT-04

Input parameters and analysis data

Analysis method:	NCEER (1998)	G.W.T. (in-situ):	9.00 ft	Use fill:	No	Clay like behavior applied:	Sands only
Fines correction method:	NCEER (1998)	G.W.T. (earthq.):	4.00 ft	Fill height:	N/A	Limit depth applied:	Yes
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	60.00 ft
Earthquake magnitude M_w:	7.00	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method based
Peak ground acceleration:	0.51	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

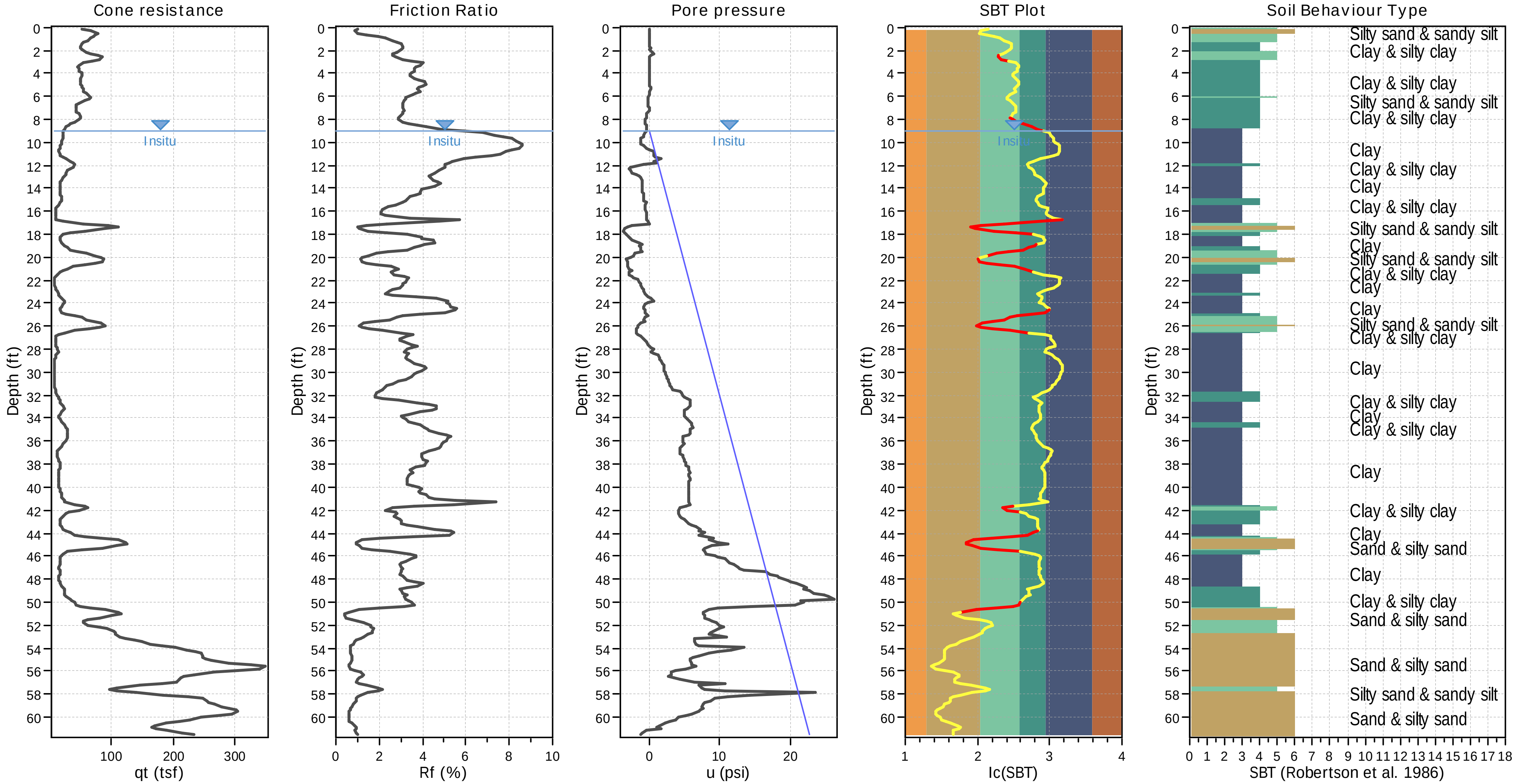






Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and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

CPT basic interpretation plots



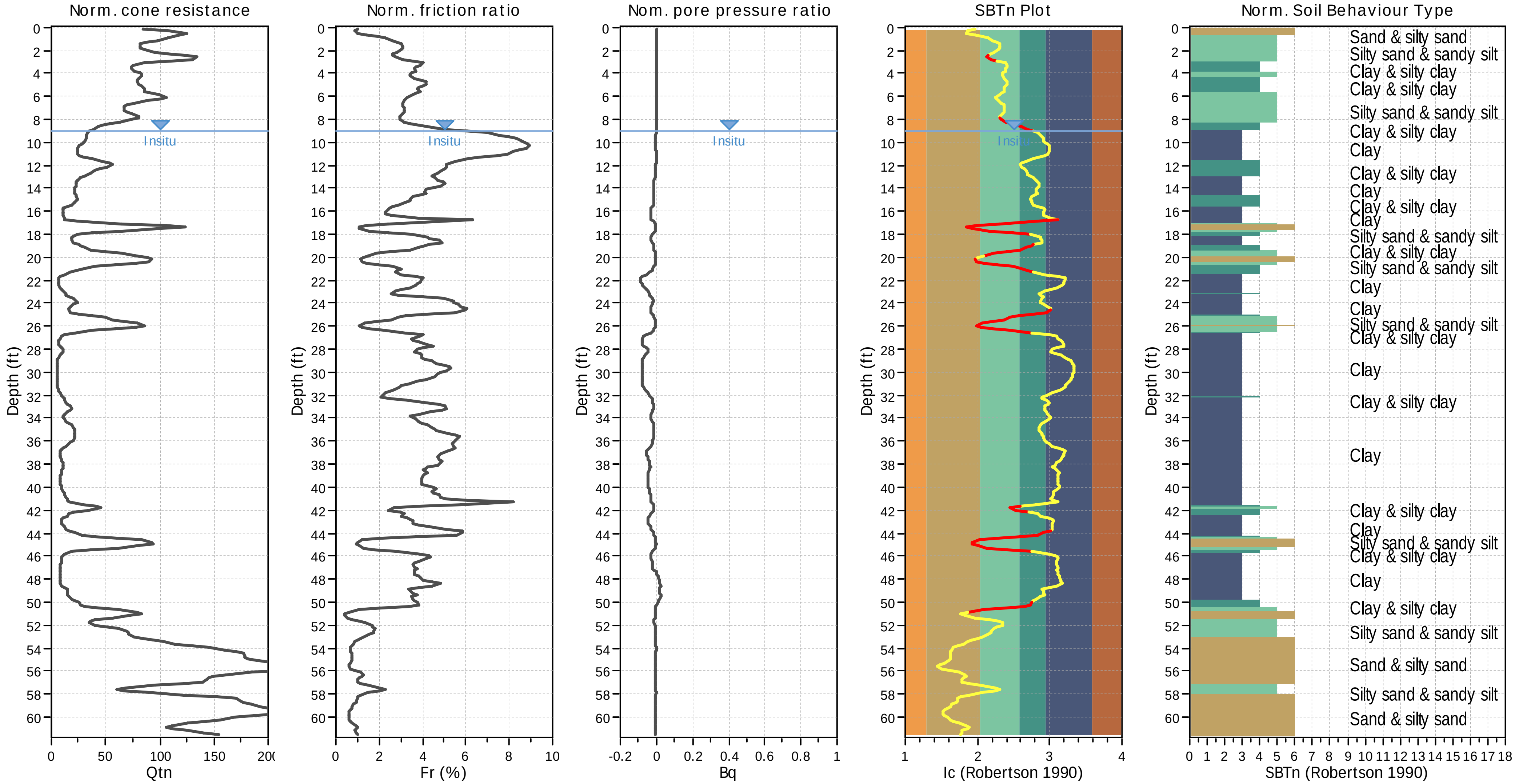
Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	4.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.00	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.51	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	9.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

SBT legend

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

CPT basic interpretation plots (normalized)



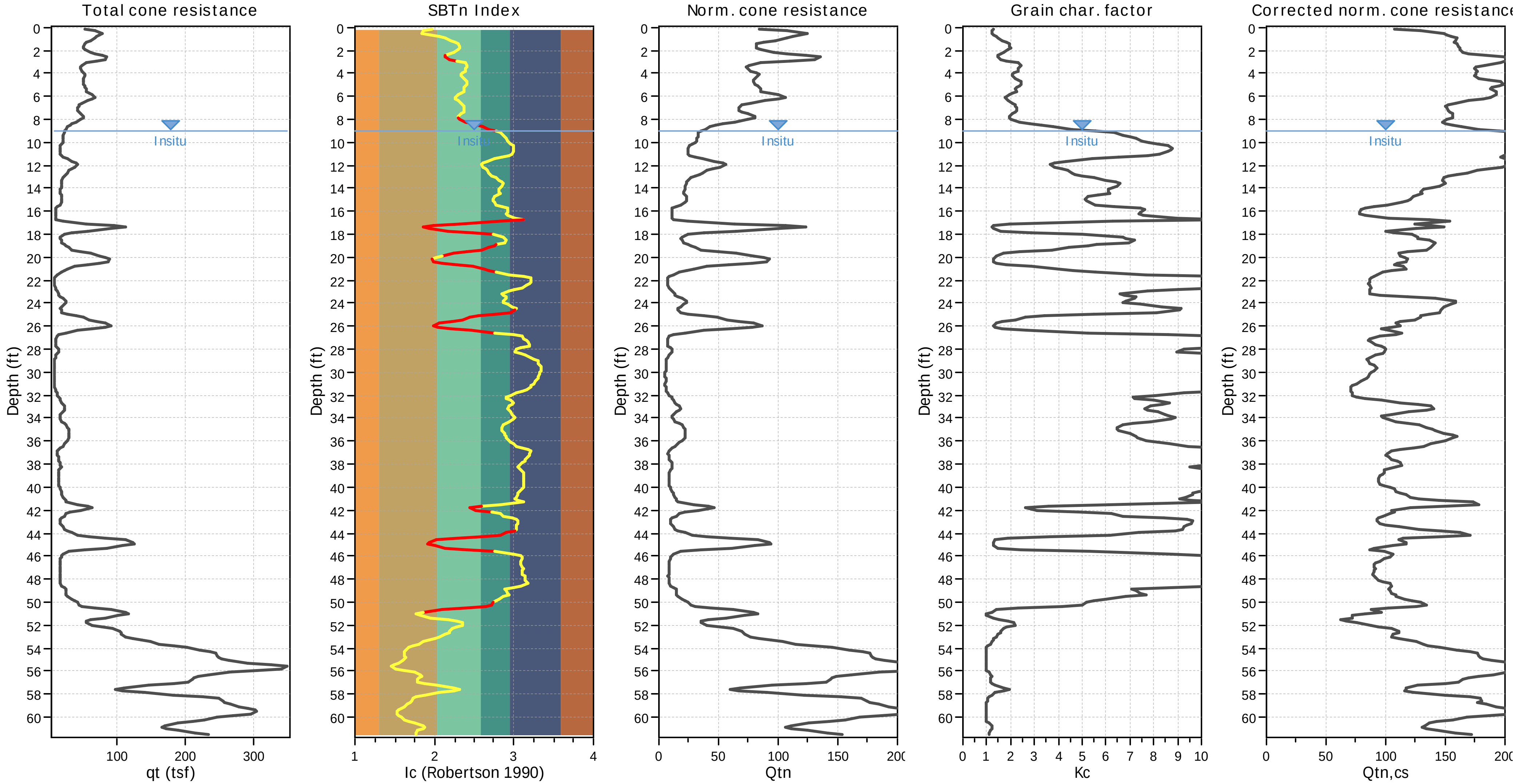
Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	4.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.00	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.51	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	9.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

SBTn legend

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

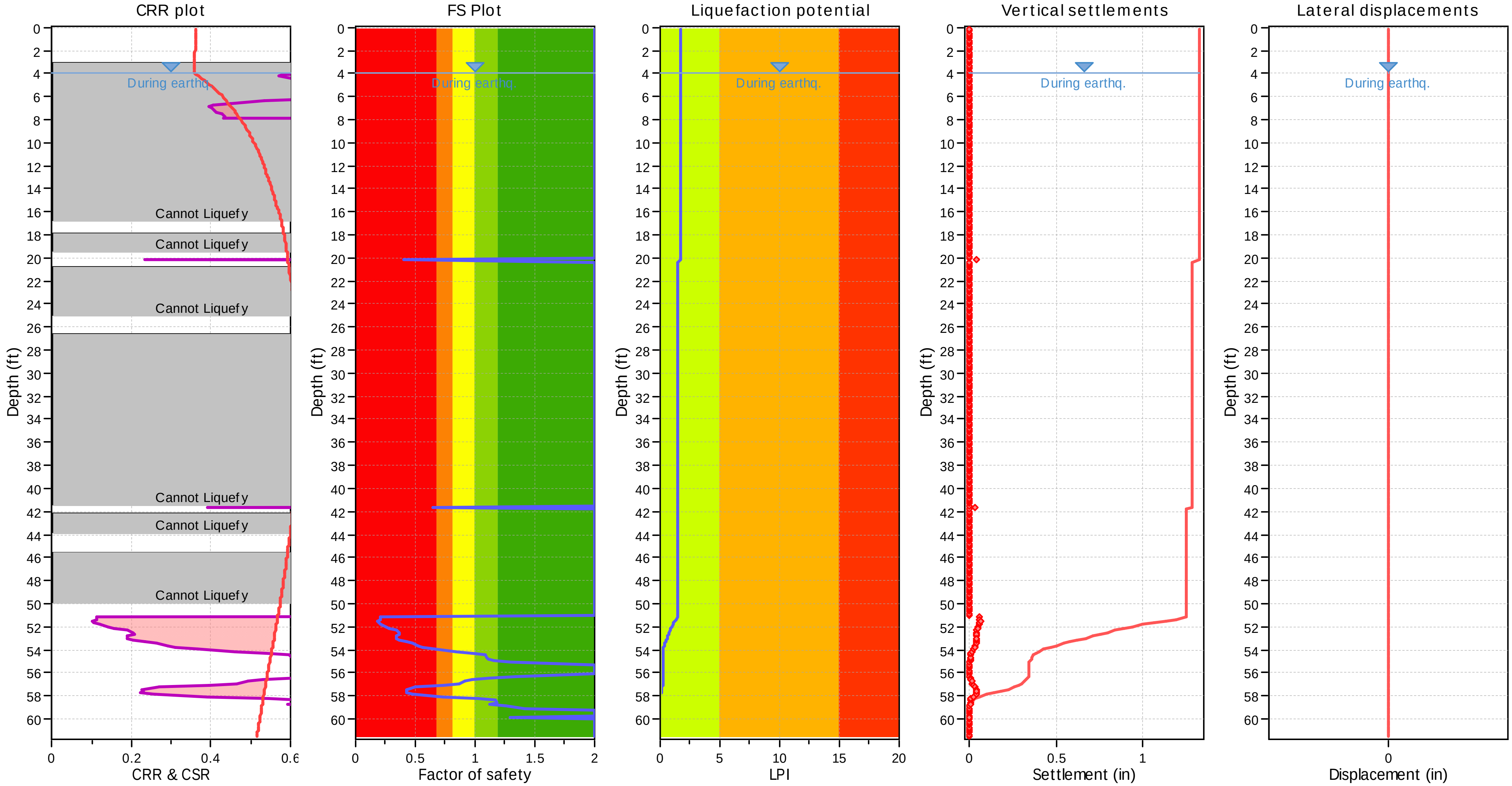
Liquefaction analysis overall plots (intermediate results)



Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	4.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_{σ} applied:	Yes
Earthquake magnitude M_w:	7.00	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.51	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	9.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	4.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.00	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.51	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	9.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

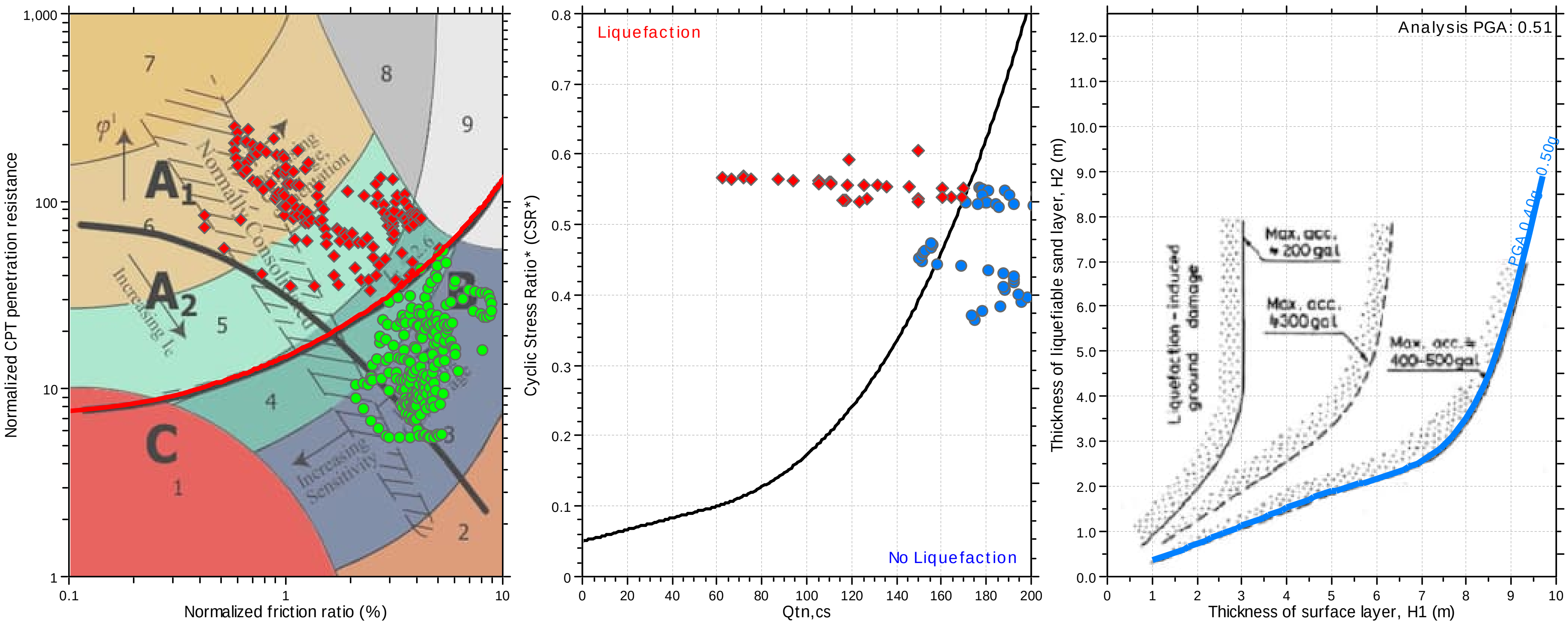
F.S. color scheme

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

LPI color scheme

- Very high risk
- High risk
- Low risk

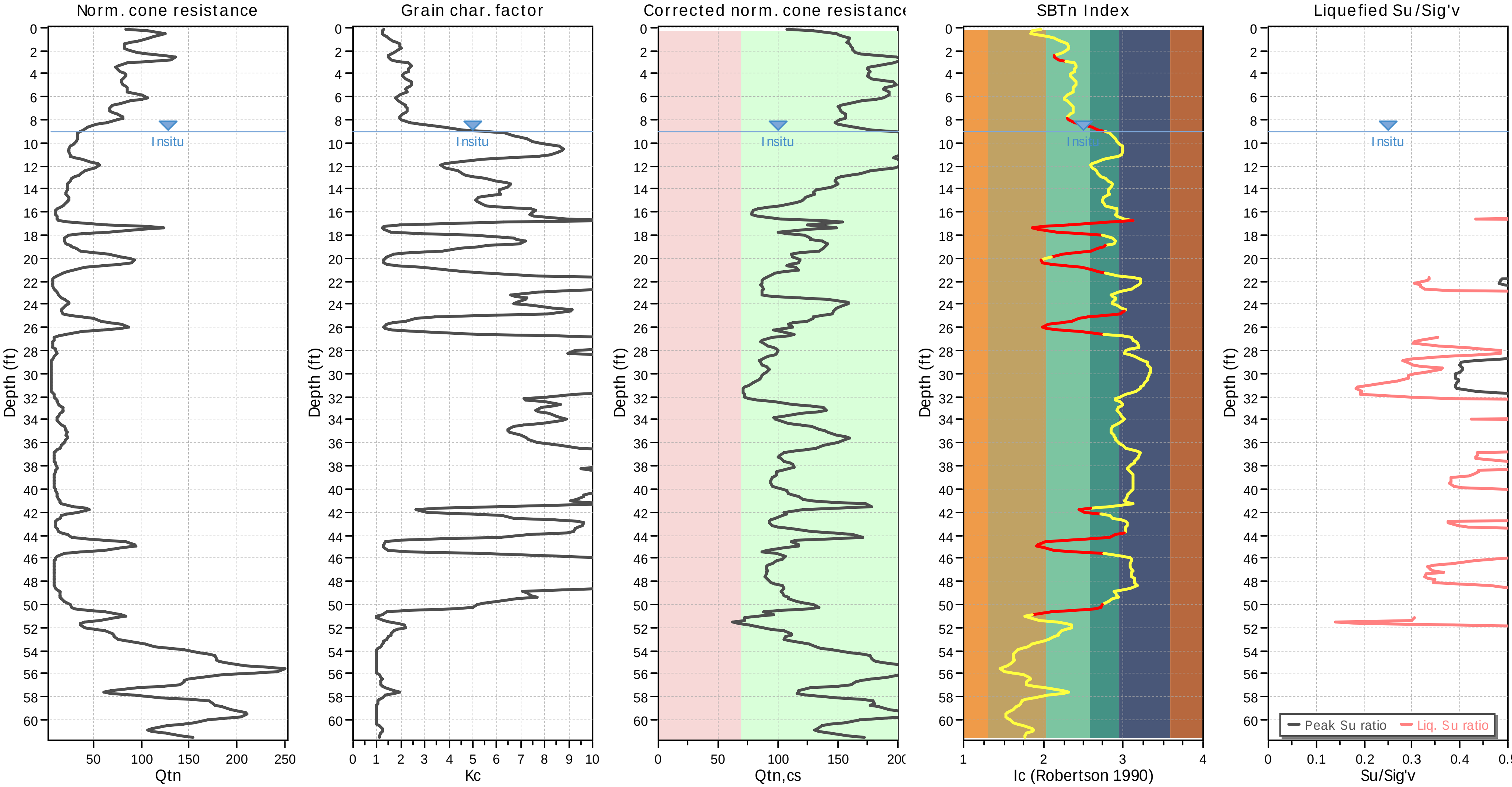
Liquefaction analysis summary plots



Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	4.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.00	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.51	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	9.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

Check for strength loss plots (Robertson (2010))



Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	4.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.00	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.51	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	9.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

Terracon Consultants, Inc.
5075 Commercial Cir.,Suite E
Concord, CA 94520
www.terracon.com

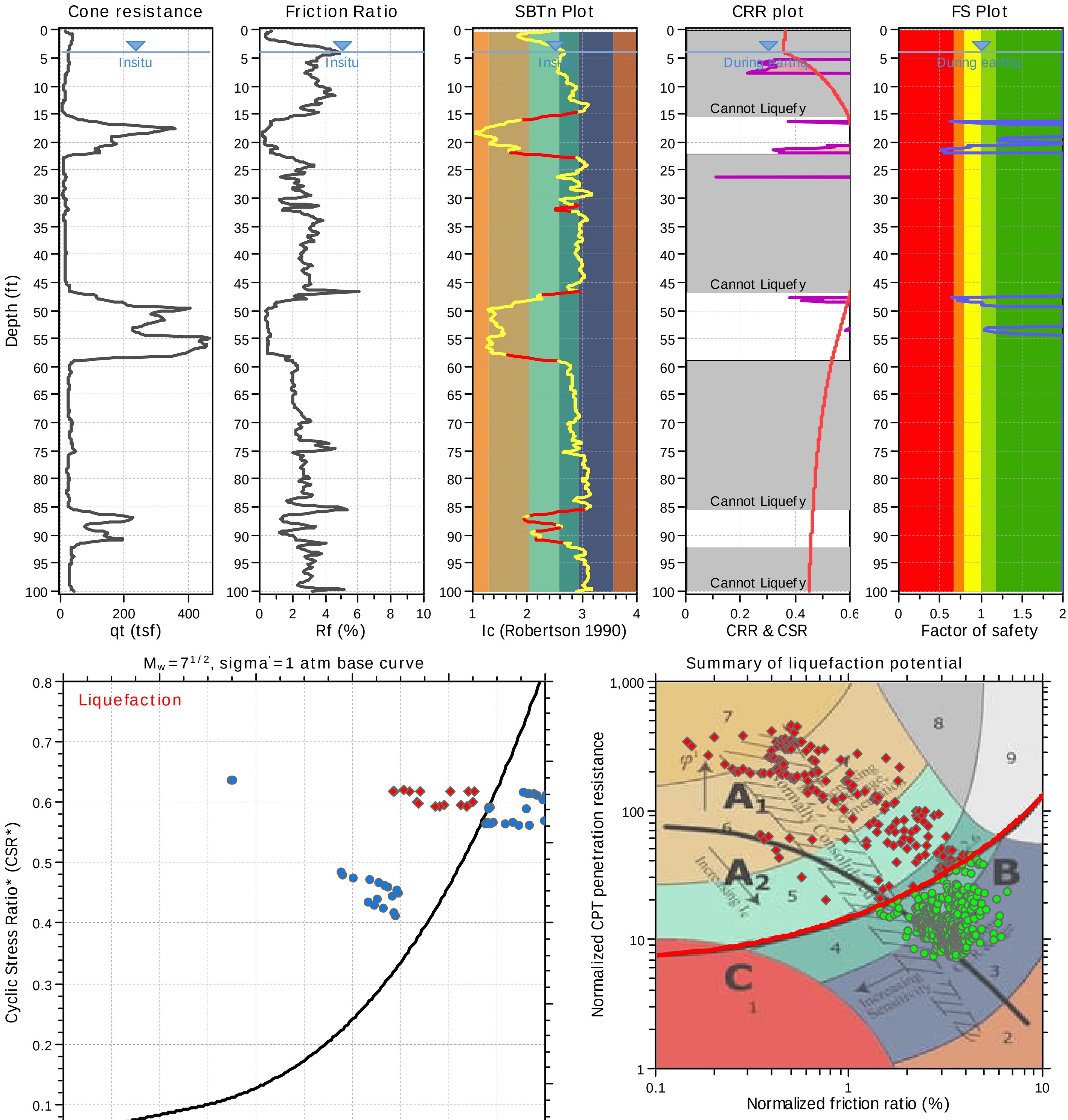
LIQUEFACTION ANALYSIS REPORT

Project title : SJC04 Location : San Jose, CA

CPT file : CPT-05

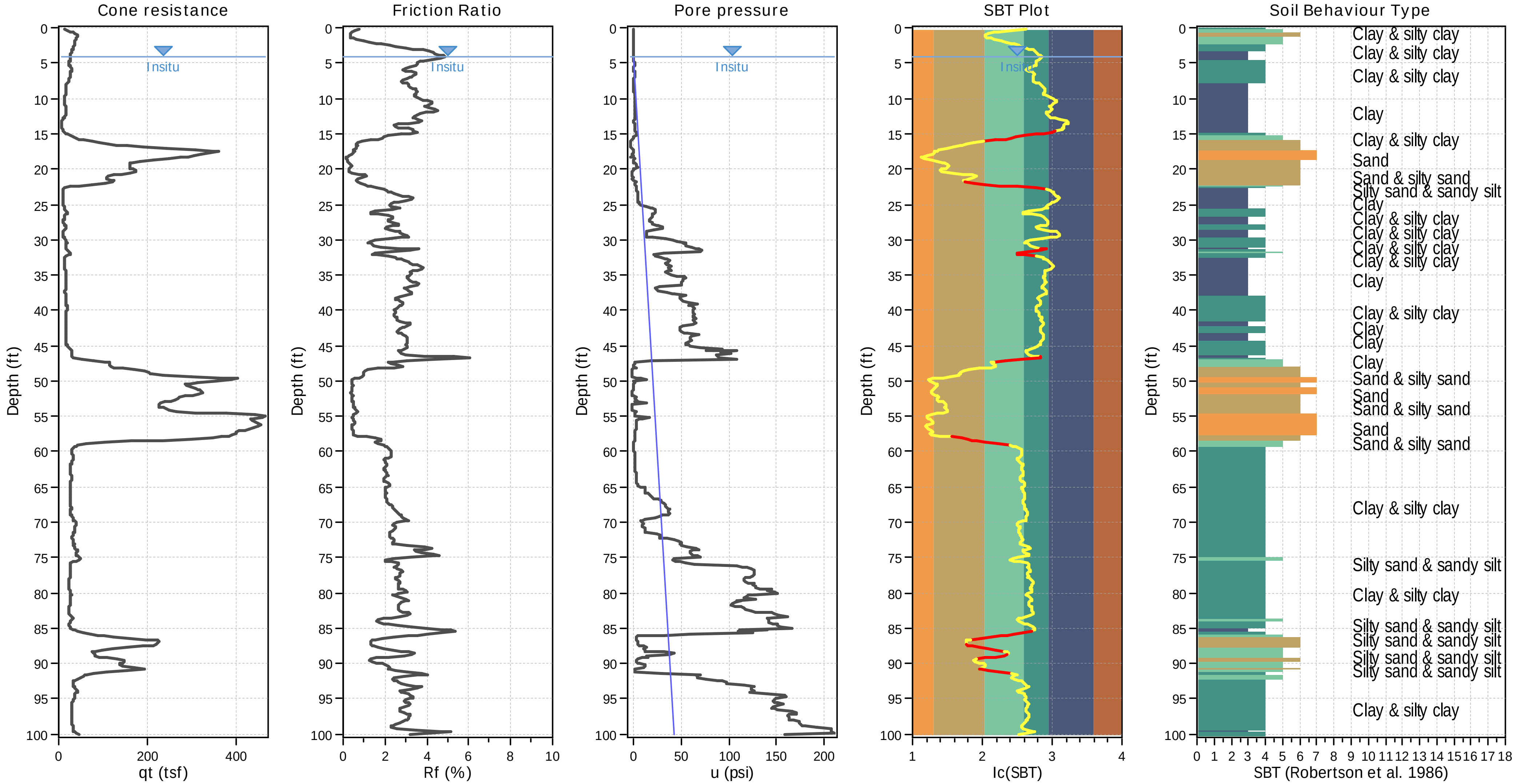
Input parameters and analysis data

Analysis method:	NCEER (1998)	G.W.T. (in-situ):	4.00 ft	Use fill:	No	Clay like behavior applied:	Sands only
Fines correction method:	NCEER (1998)	G.W.T. (earthq.):	4.00 ft	Fill height:	N/A	Limit depth applied:	Yes
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	60.00 ft
Earthquake magnitude M_w:	7.00	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method based
Peak ground acceleration:	0.51	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



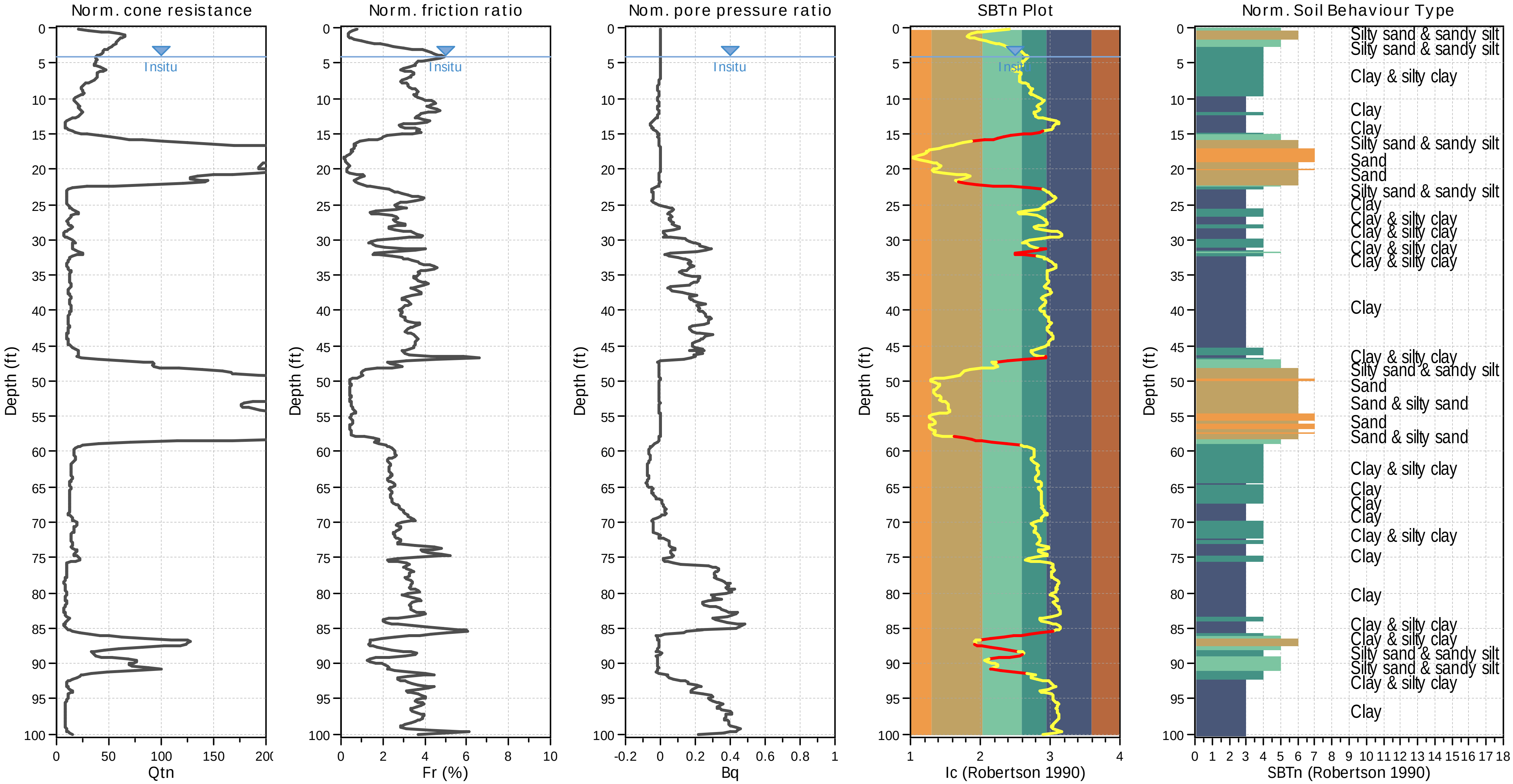
Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	4.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.00	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.51	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	4.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

SBT legend

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

CPT basic interpretation plots (normalized)



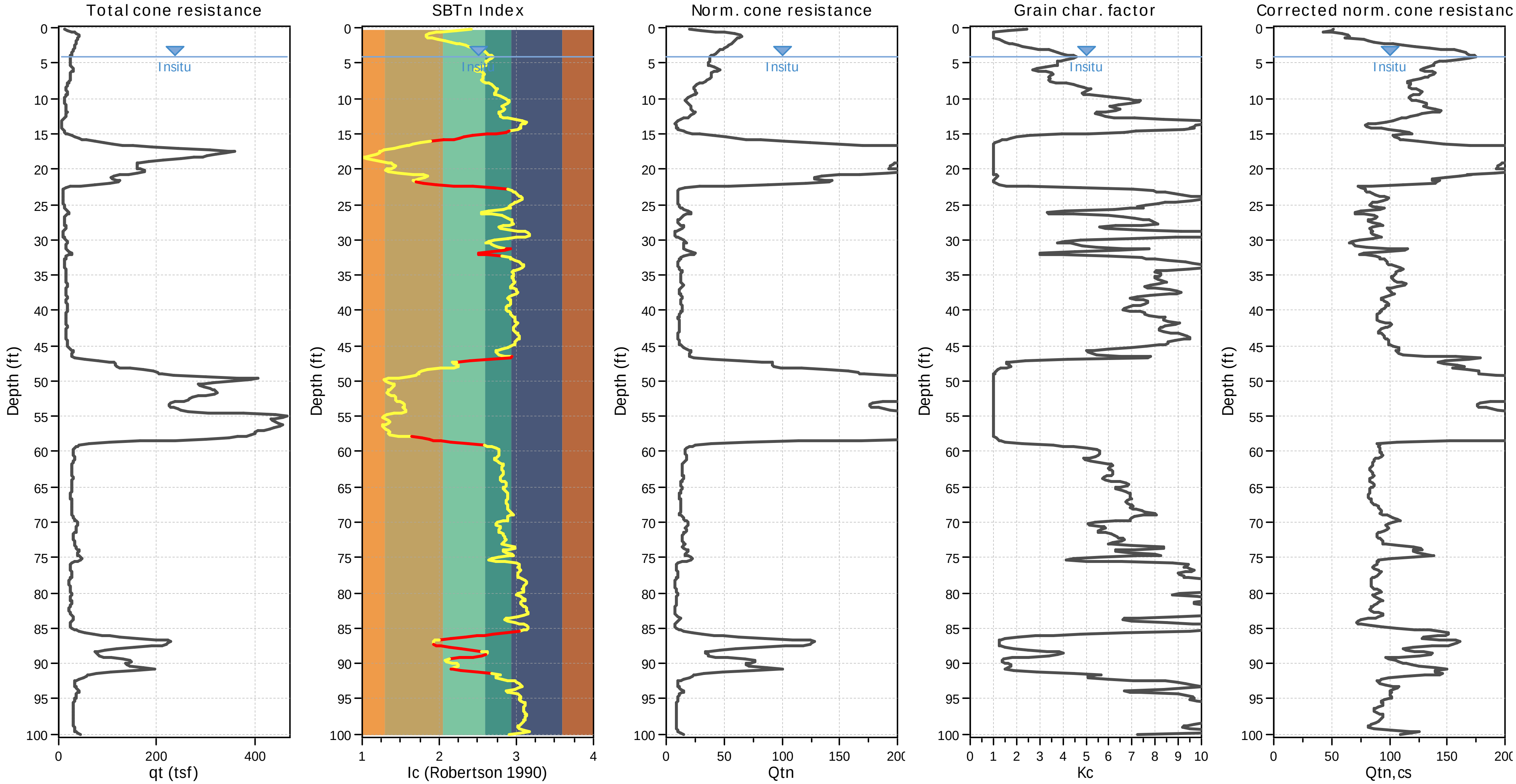
Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	4.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.00	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.51	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	4.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

SBTn legend

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

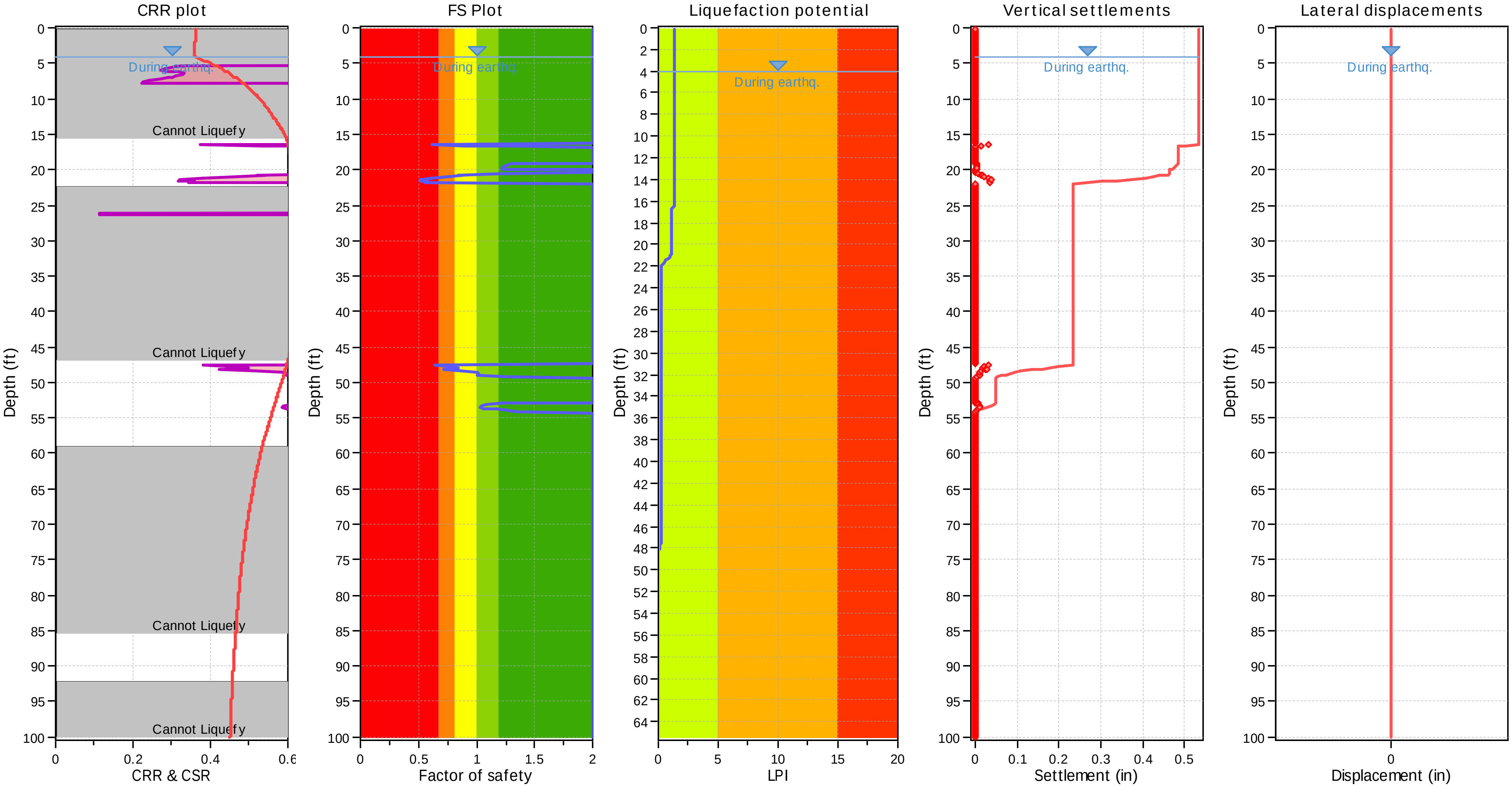
Liquefaction analysis overall plots (intermediate results)



Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	4.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.00	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.51	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	4.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	4.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_{σ} applied:	Yes
Earthquake magnitude M_w:	7.00	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.51	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	4.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

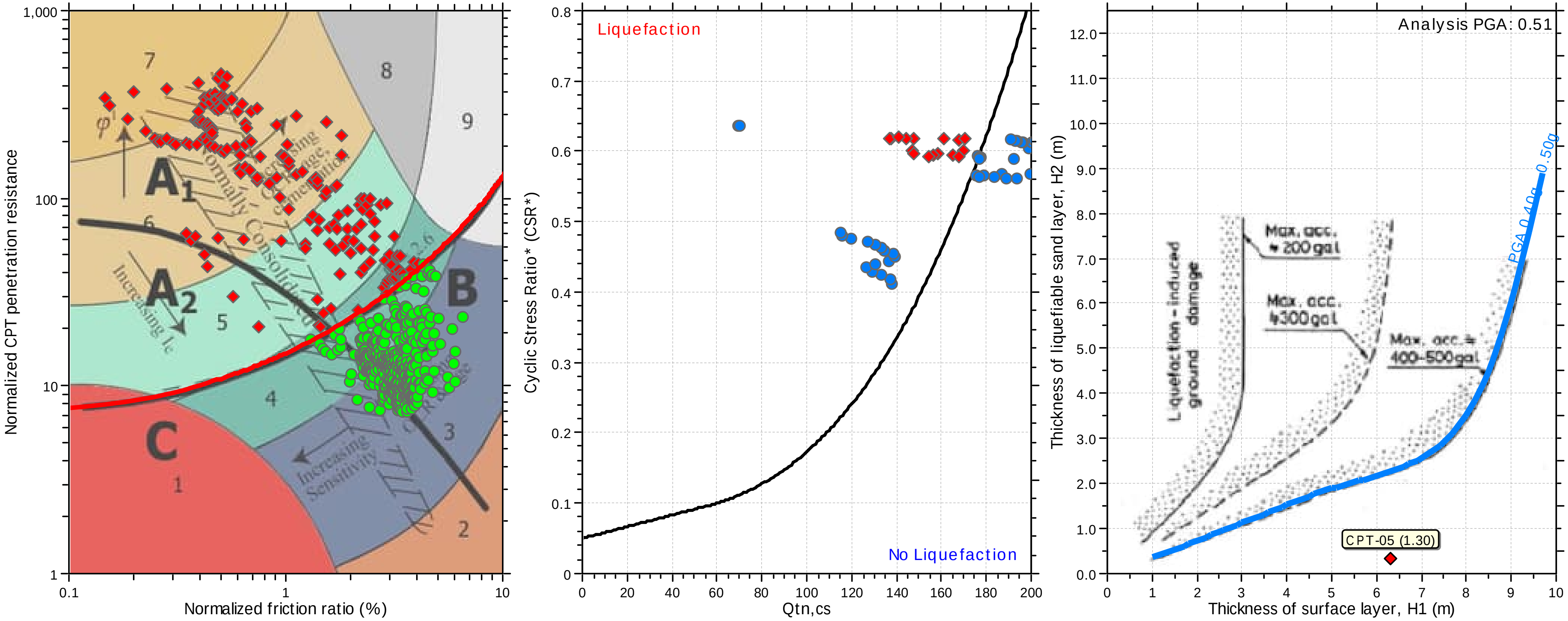
F.S. color scheme

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

LPI color scheme

- Very high risk
- High risk
- Low risk

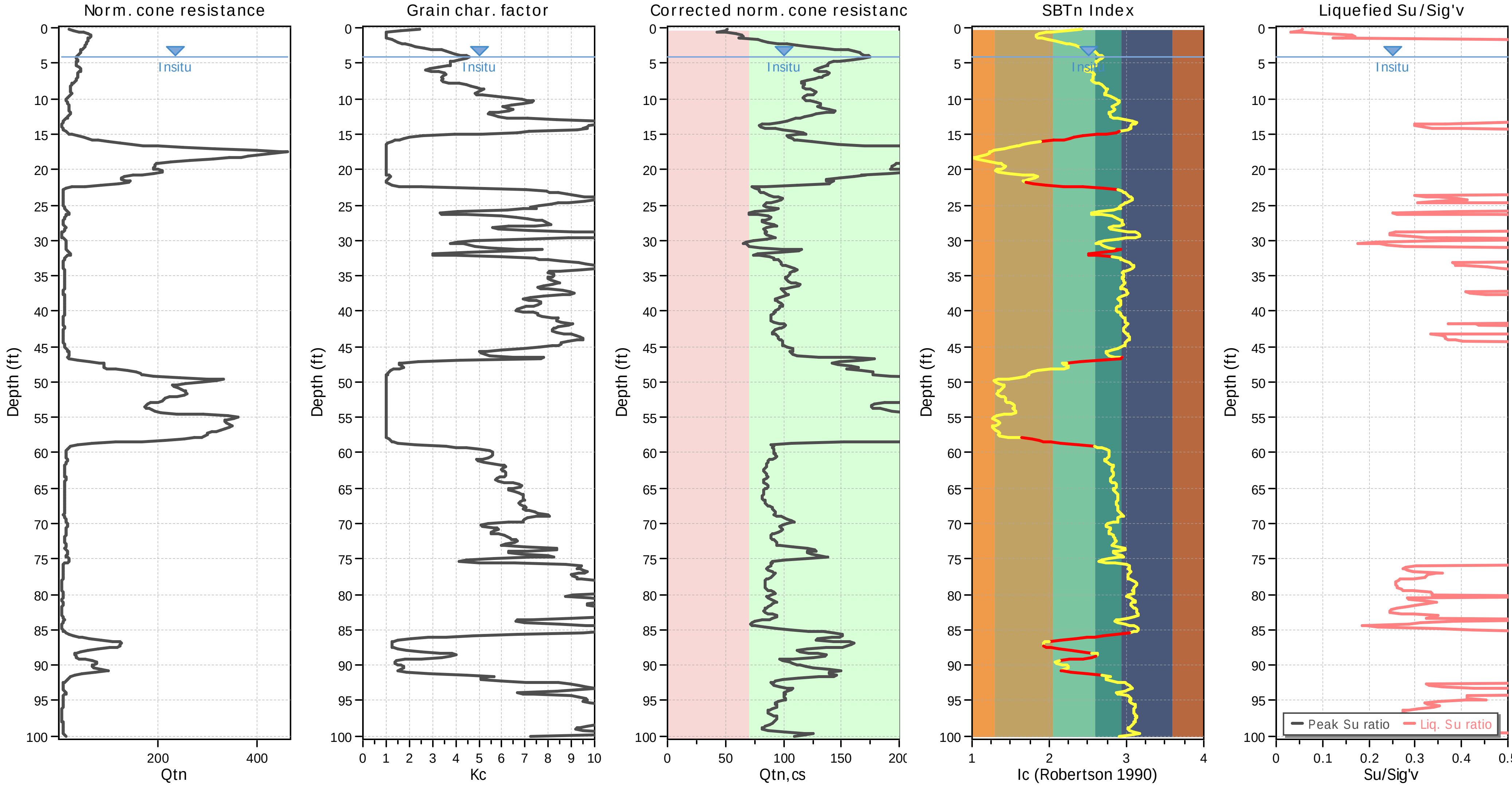
Liquefaction analysis summary plots



Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	4.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.00	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.51	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	4.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

Check for strength loss plots (Robertson (2010))



Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	4.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.00	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.51	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	4.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

Terracon Consultants, Inc.
5075 Commercial Cir.,Suite E
Concord, CA 94520
www.terracon.com

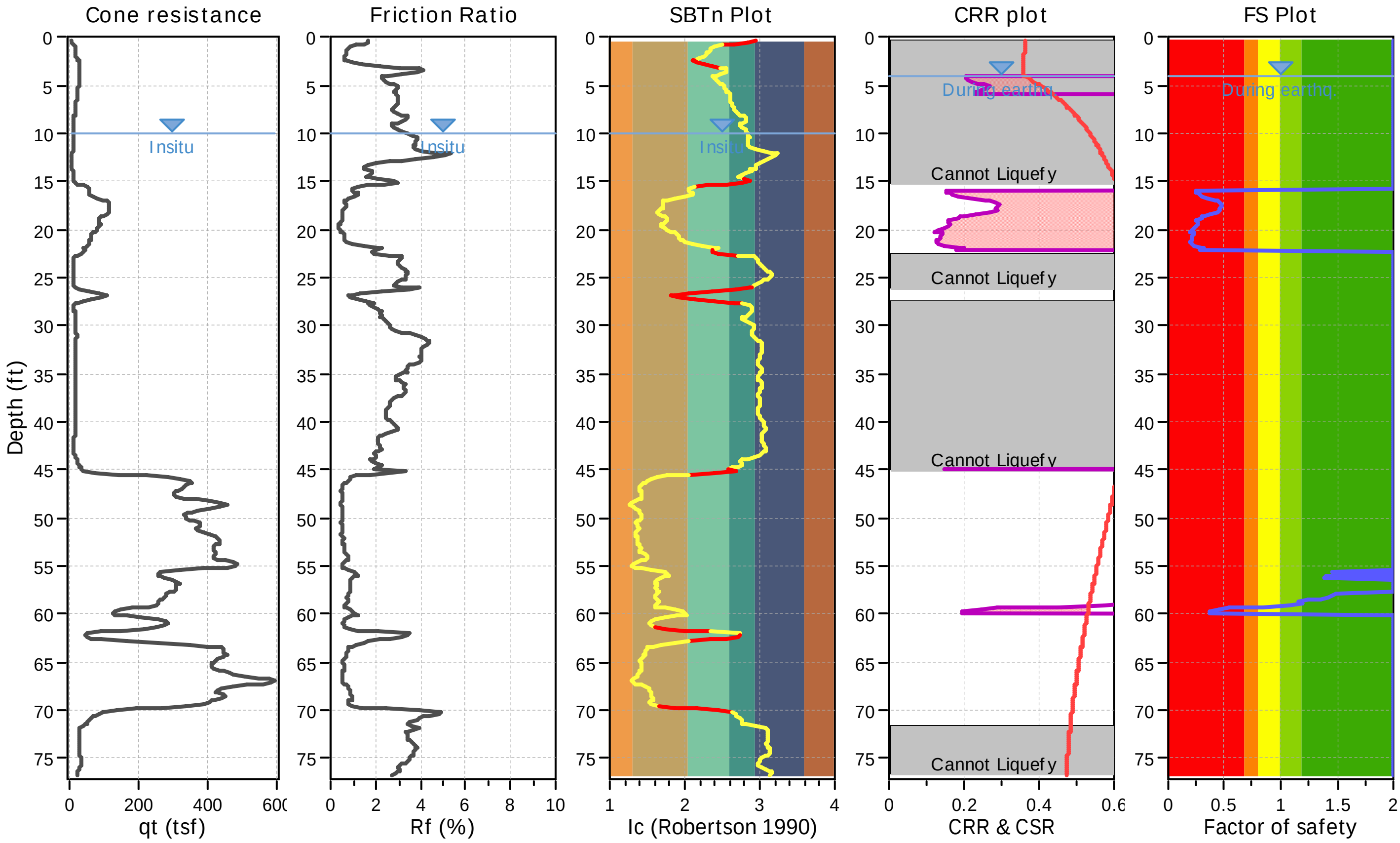
LIQUEFACTION ANALYSIS REPORT

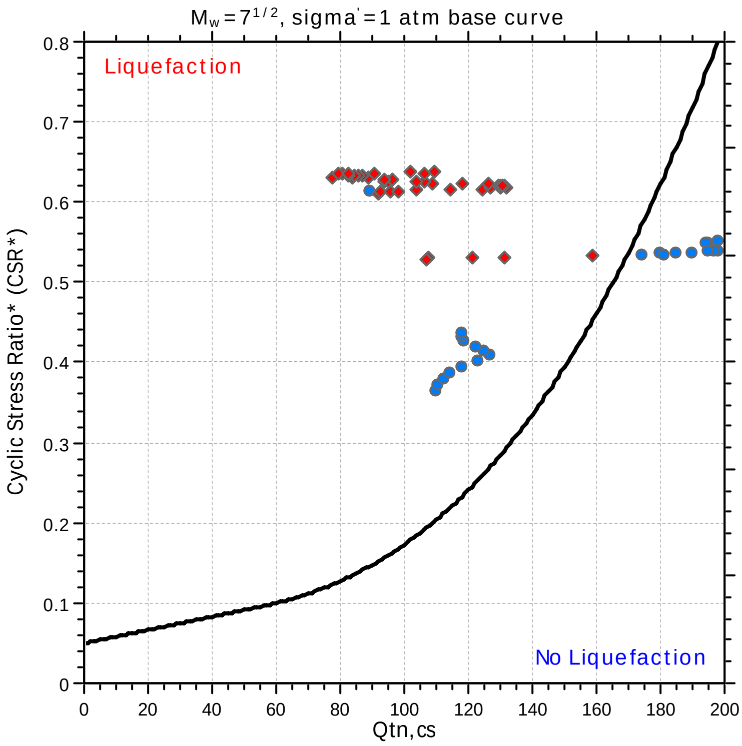
Project title : SJC04 — Location : San Jose, CA

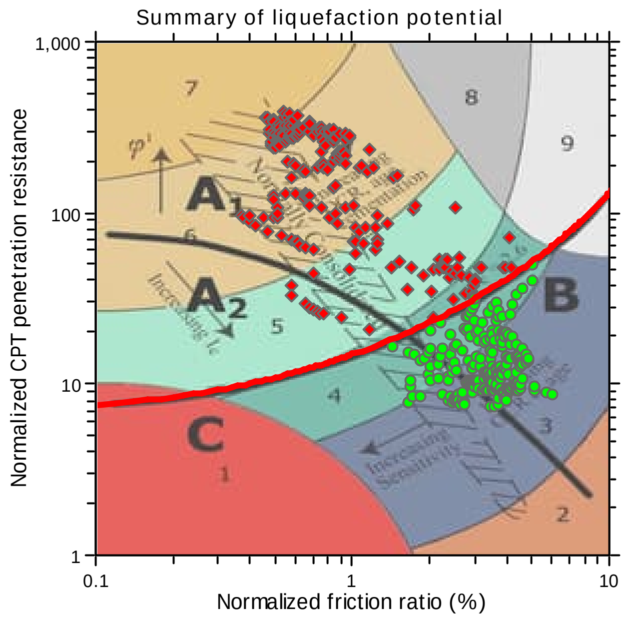
CPT file : CPT-06

Input parameters and analysis data

Analysis method:	NCEER (1998)	G.W.T. (in-situ):	10.00 ft	Use fill:	No	Clay like behavior applied:	Sands only
Fines correction method:	NCEER (1998)	G.W.T. (earthq.):	4.00 ft	Fill height:	N/A	Limit depth applied:	Yes
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	60.00 ft
Earthquake magnitude M_w:	7.00	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method based
Peak ground acceleration:	0.51	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

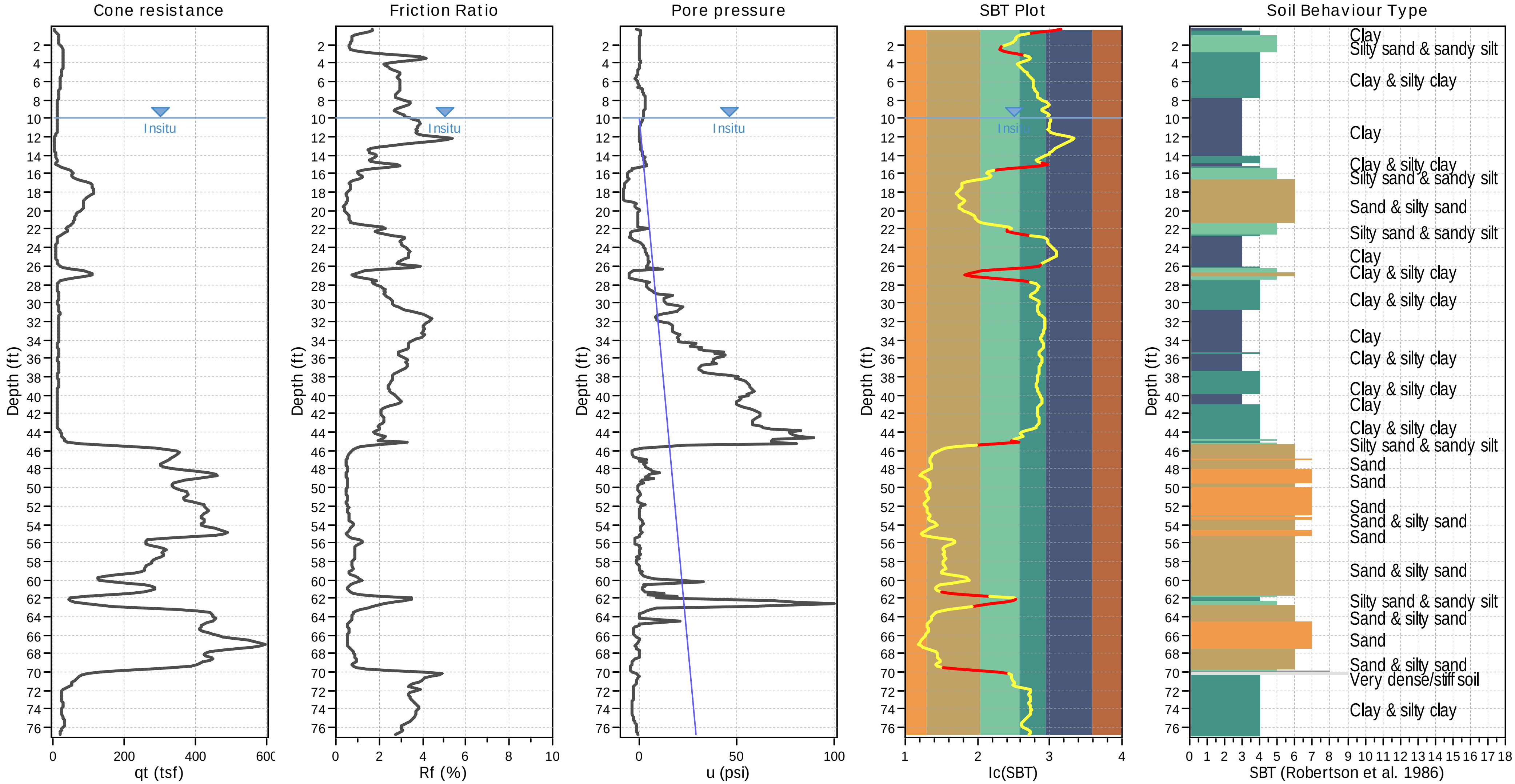






Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and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

CPT basic interpretation plots



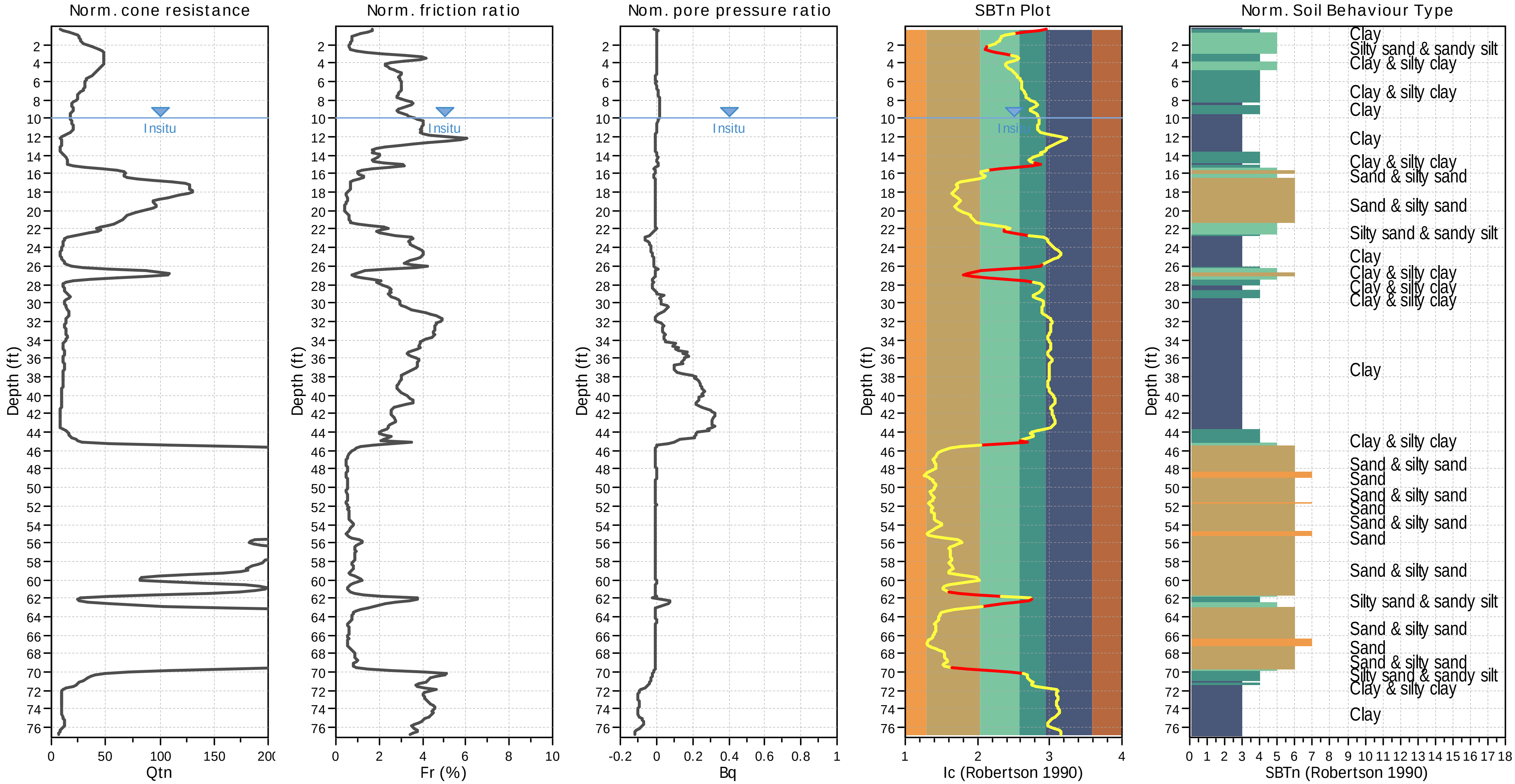
Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	4.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.00	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.51	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	10.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

SBT legend

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

CPT basic interpretation plots (normalized)



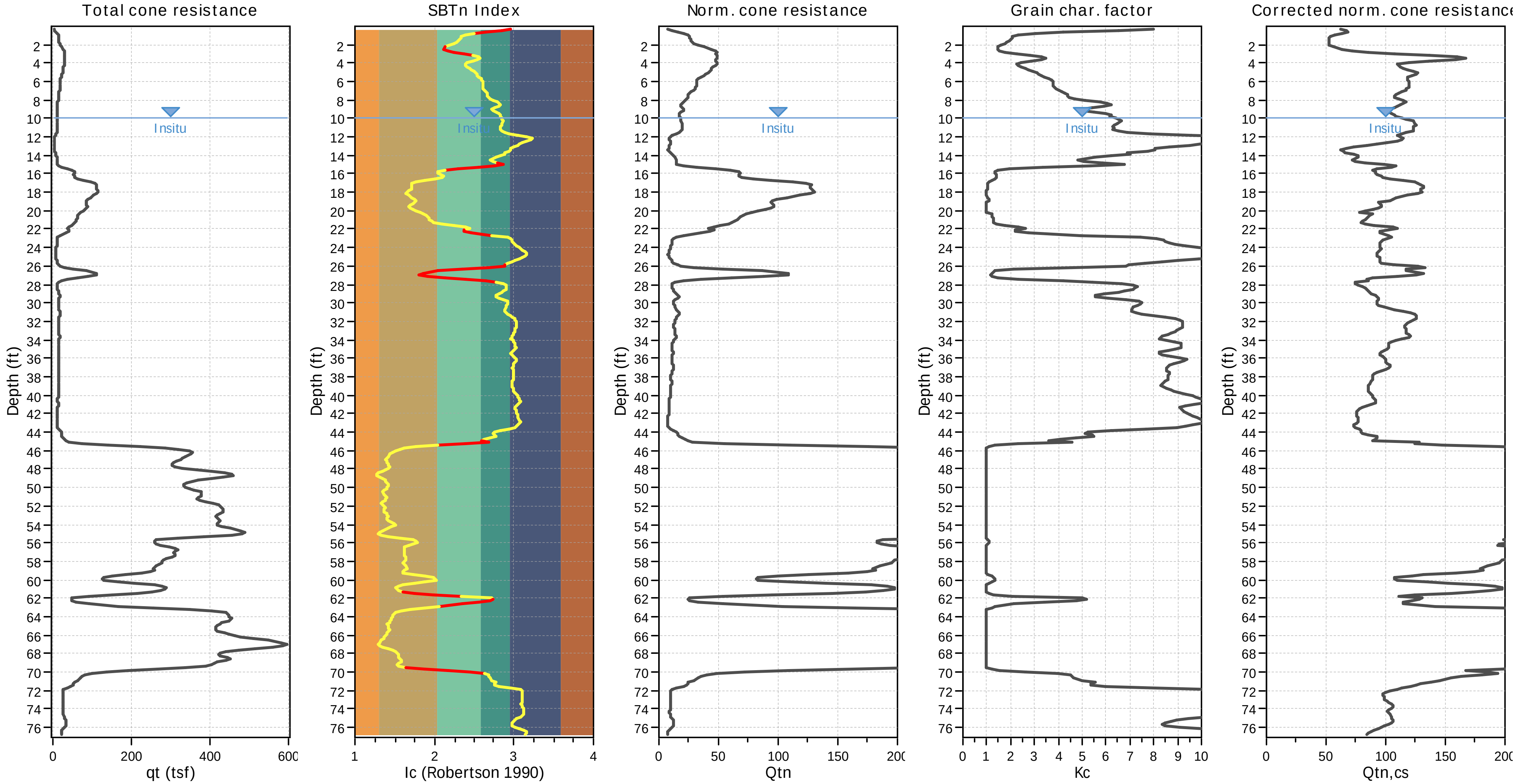
Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	4.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.00	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.51	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	10.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

SBTn legend

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

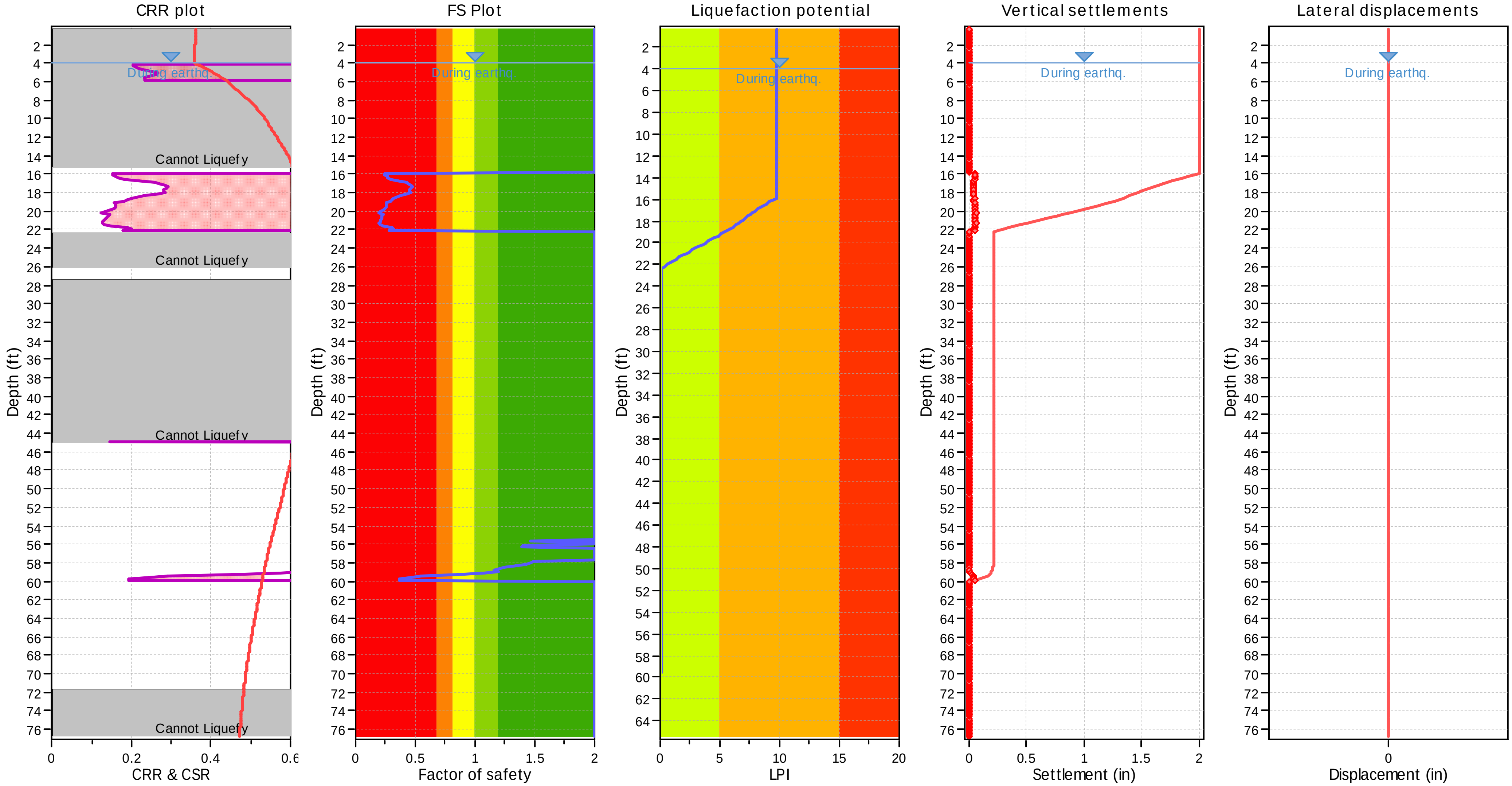
Liquefaction analysis overall plots (intermediate results)



Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	4.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.00	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.51	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	10.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	4.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.00	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.51	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	10.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

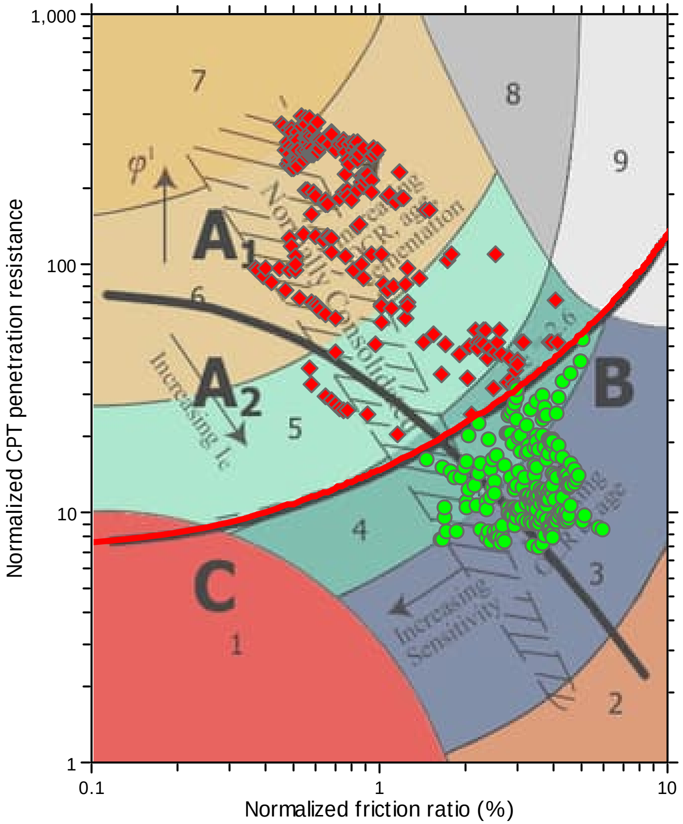
F.S. color scheme

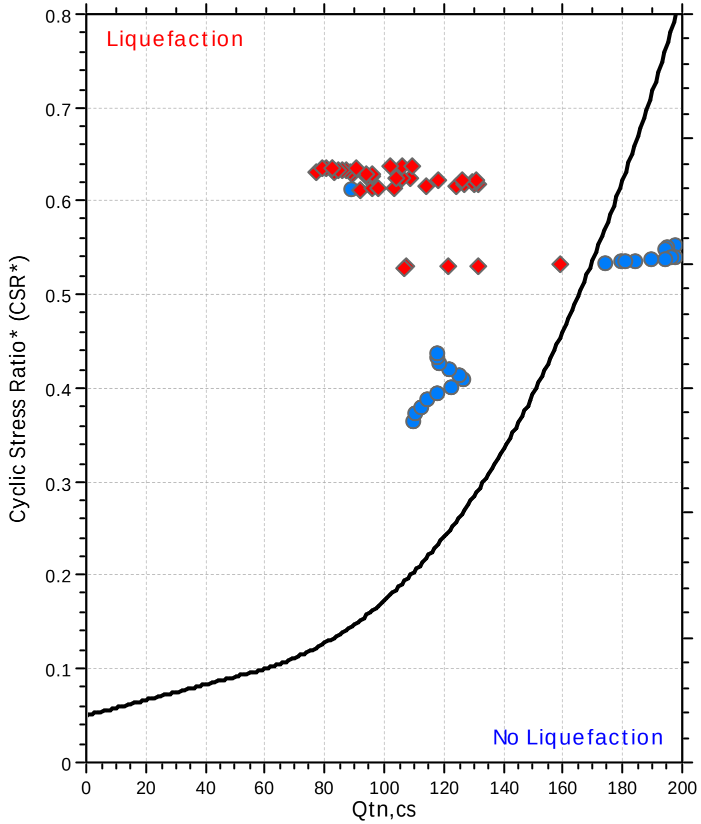
- Almost certain it will liquefy
- Very likely to liquefy
- Liquefaction and no liq. are equally likely
- Unlike to liquefy
- Almost certain it will not liquefy

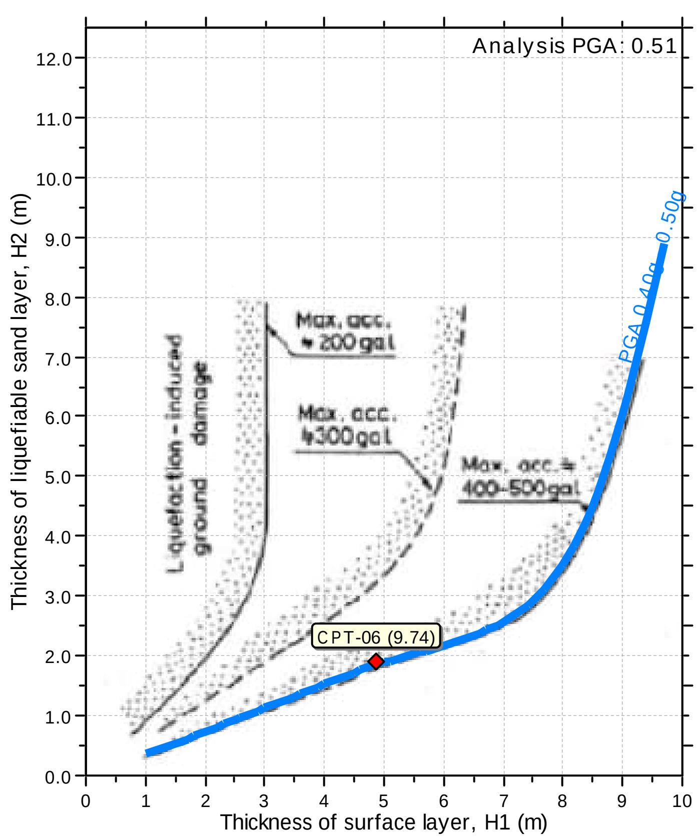
LPI color scheme

- Very high risk
- High risk
- Low risk

Liquefaction analysis summary plots



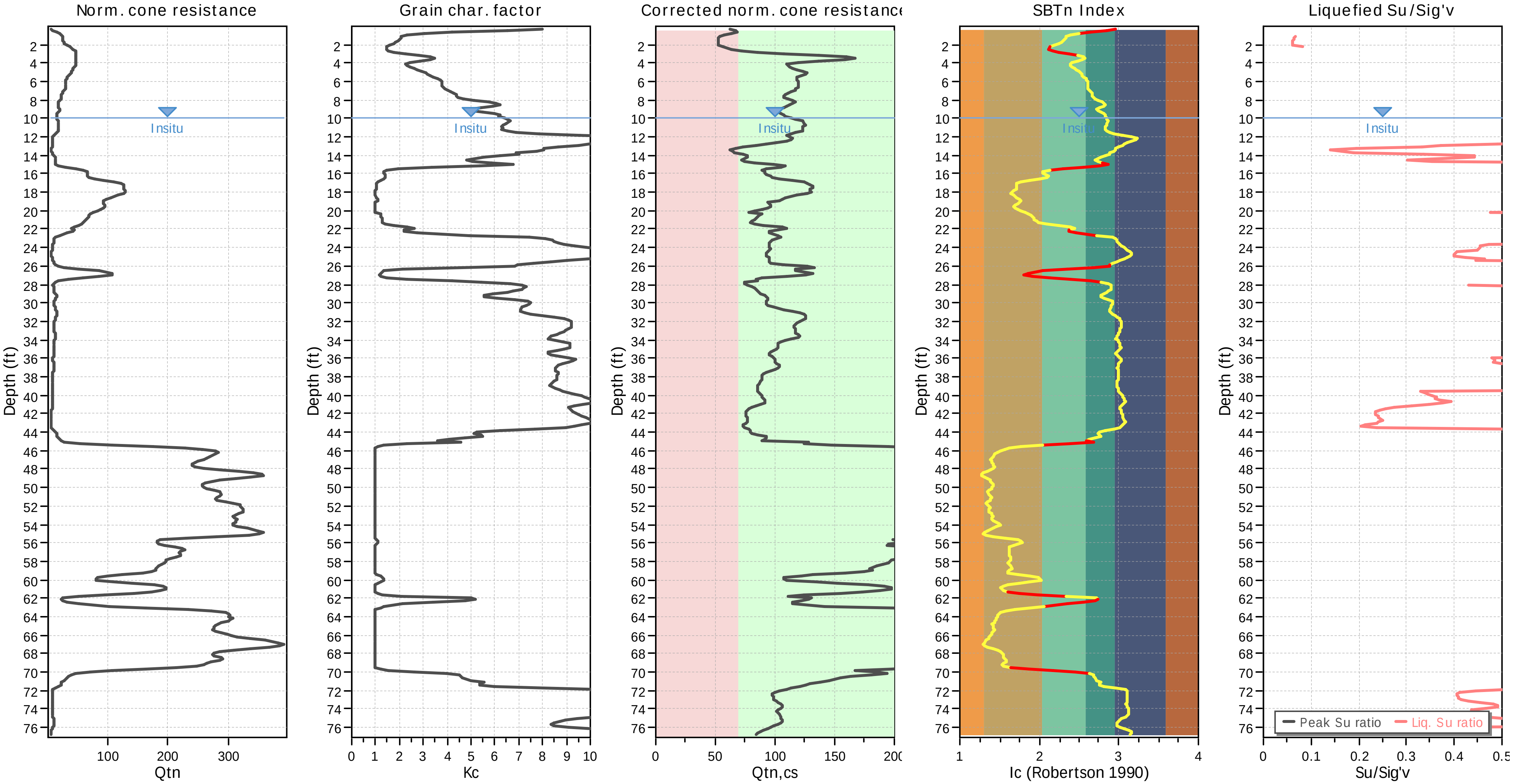




Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	4.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.00	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.51	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	10.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

Check for strength loss plots (Robertson (2010))



Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	4.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.00	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.51	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	10.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

Terracon Consultants, Inc.
5075 Commercial Cir.,Suite E
Concord, CA 94520
www.terracon.com

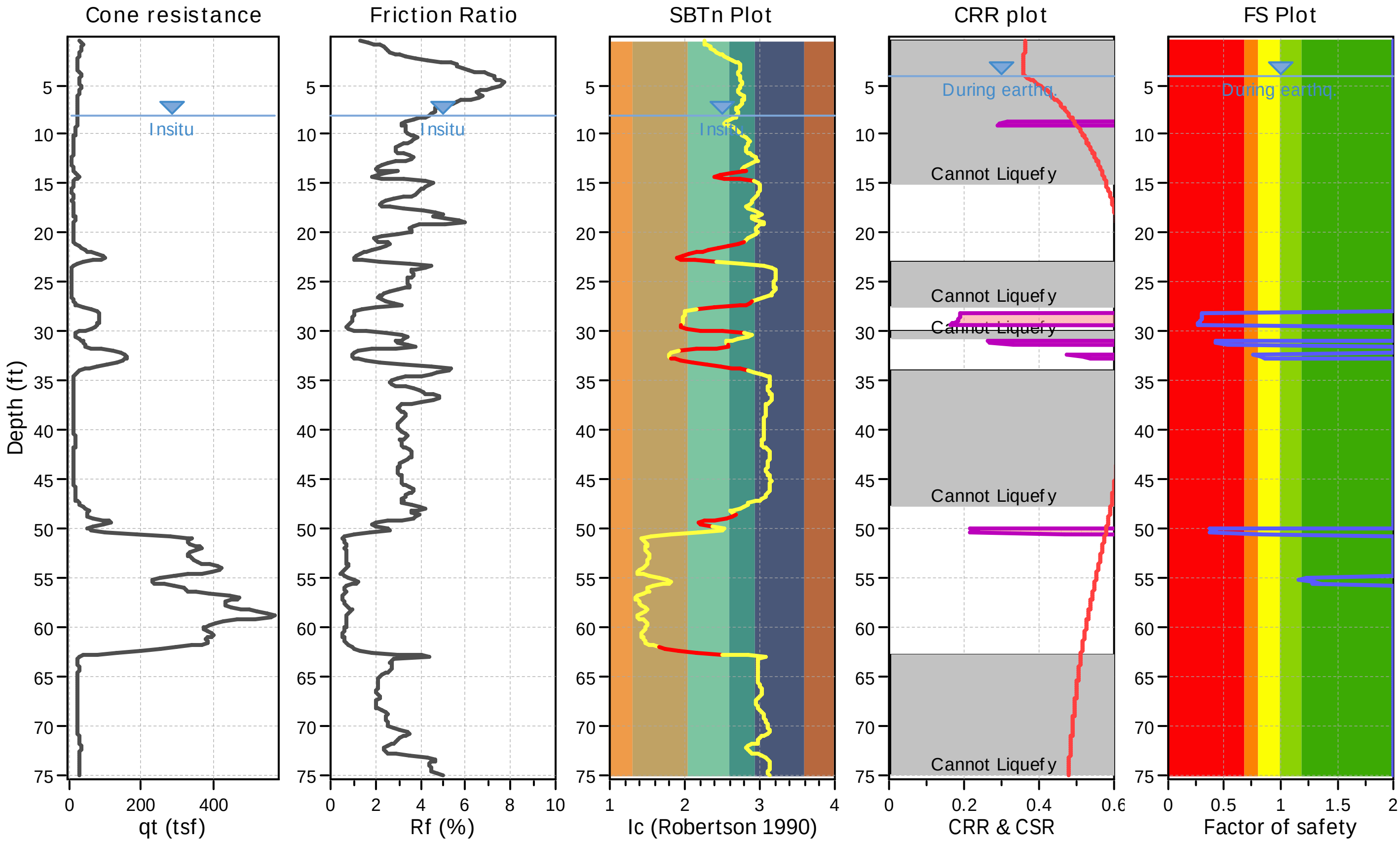
LIQUEFACTION ANALYSIS REPORT

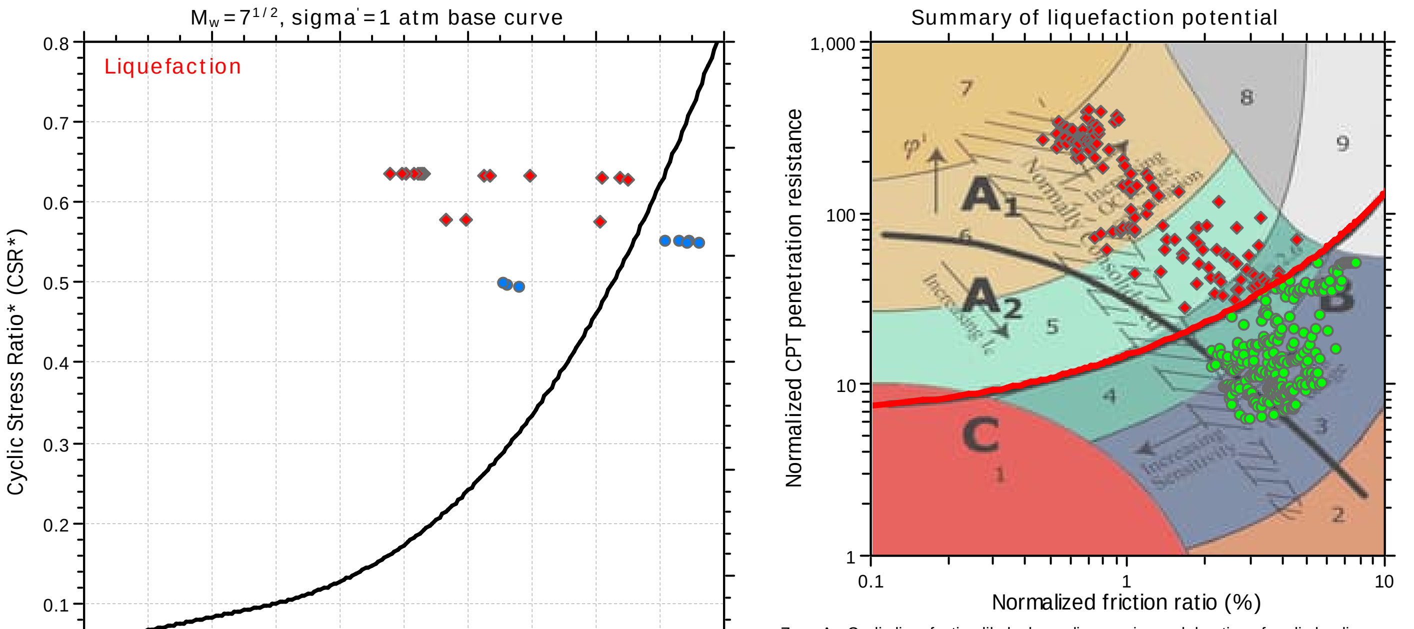
Project title : SJC04 Location : San Jose, CA

CPT file : CPT-07

Input parameters and analysis data

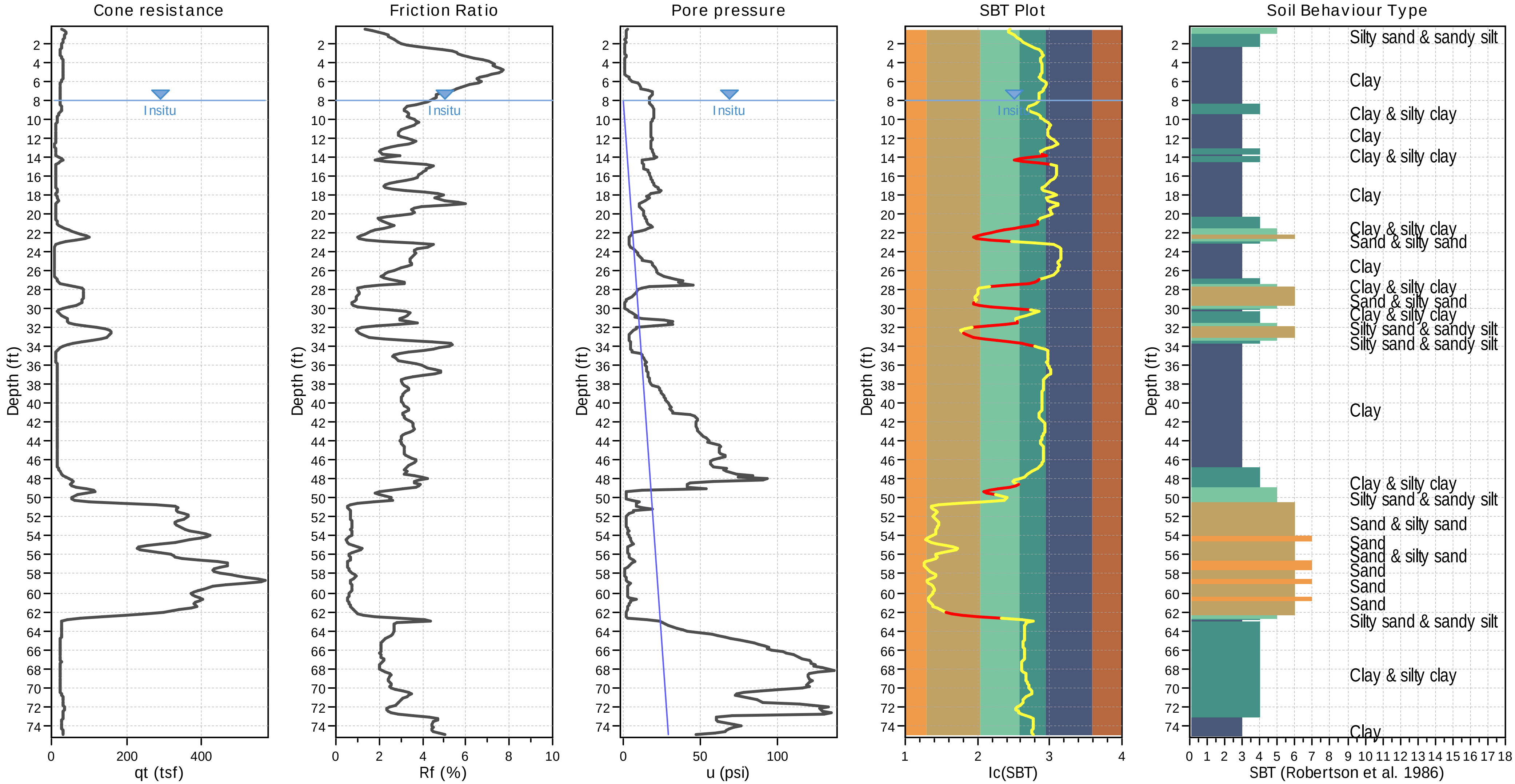
Analysis method:	NCEER (1998)	G.W.T. (in-situ):	8.00 ft	Use fill:	No	Clay like behavior applied:	Sands only
Fines correction method:	NCEER (1998)	G.W.T. (earthq.):	4.00 ft	Fill height:	N/A		
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth applied:	Yes
Earthquake magnitude M_w:	7.00	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	Limit depth:	60.00 ft
Peak ground acceleration:	0.51	Unit weight calculation:	Based on SBT	K_σ applied:	Yes	MSF method:	Method based





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



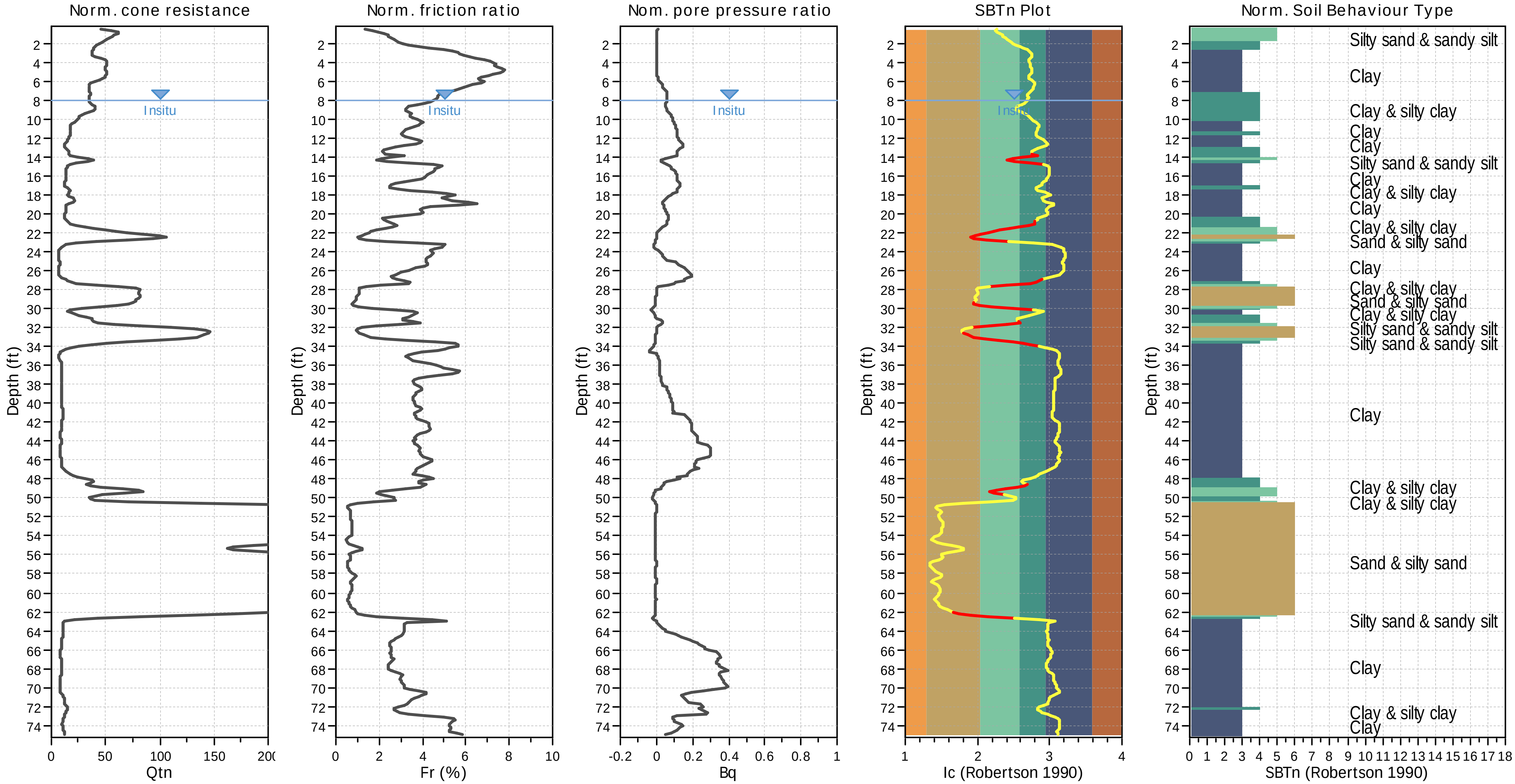
Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	4.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.00	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.51	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	8.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

SBT legend

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

CPT basic interpretation plots (normalized)



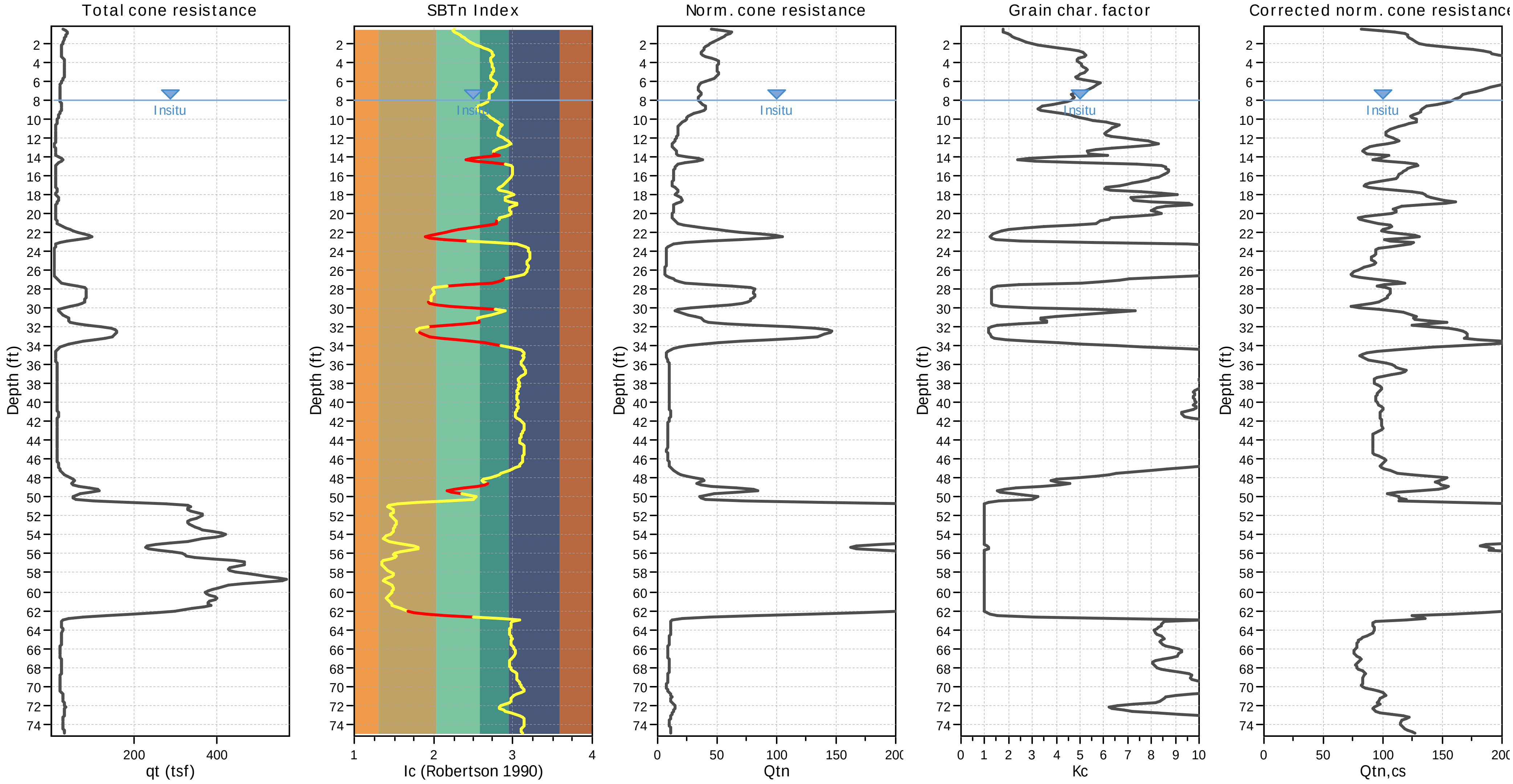
Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	4.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.00	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.51	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	8.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

SBTn legend

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

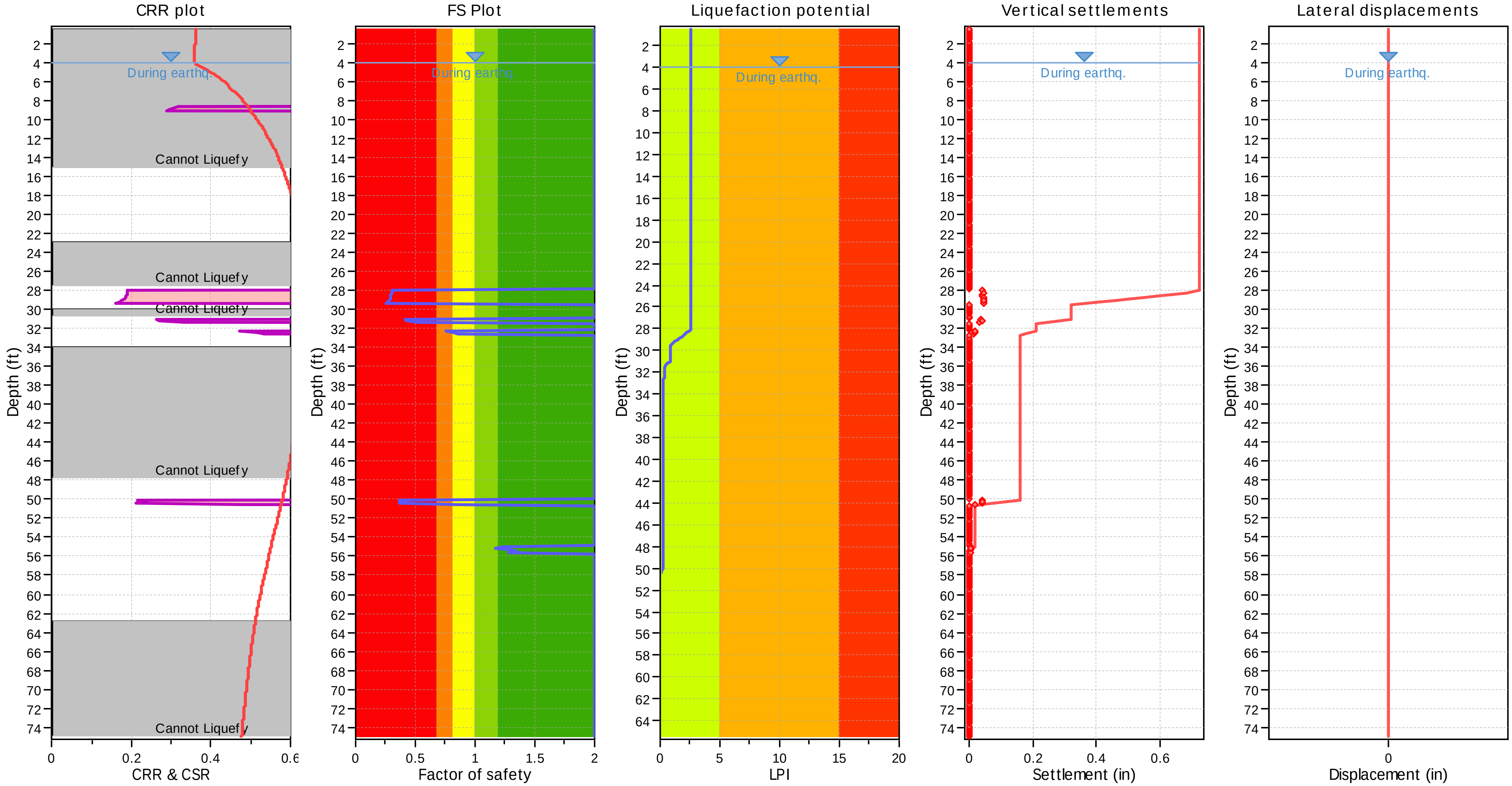
Liquefaction analysis overall plots (intermediate results)



Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	4.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.00	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.51	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	8.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	4.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.00	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.51	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	8.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

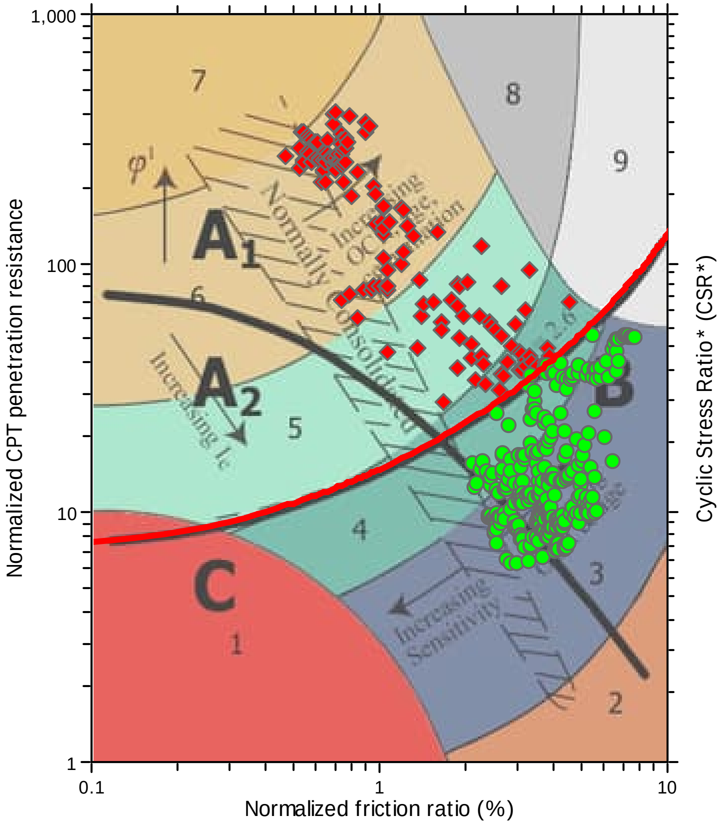
F.S. color scheme

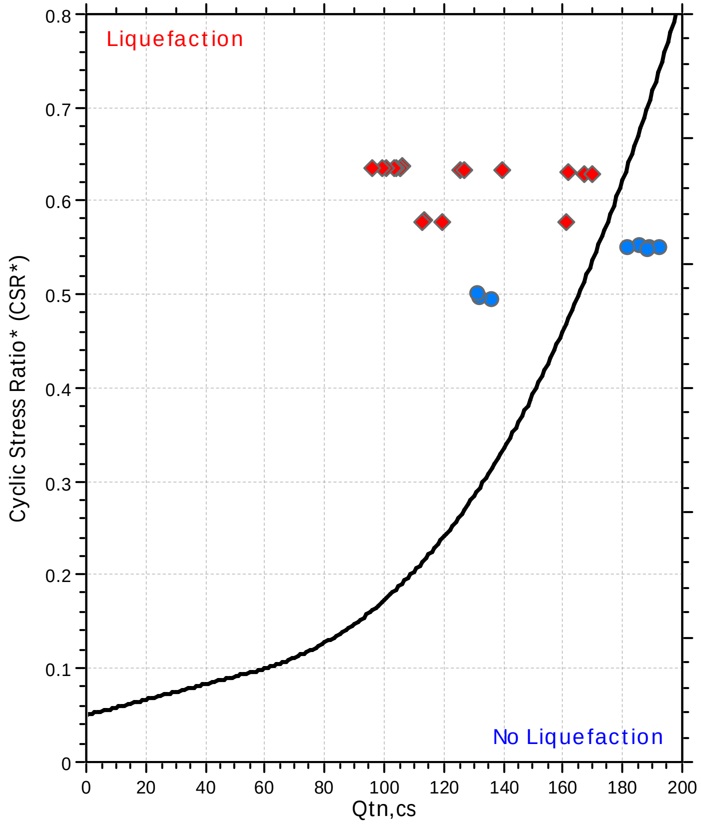
- Almost certain it will liquefy
- Very likely to liquefy
- Liquefaction and no liq. are equally likely
- Unlike to liquefy
- Almost certain it will not liquefy

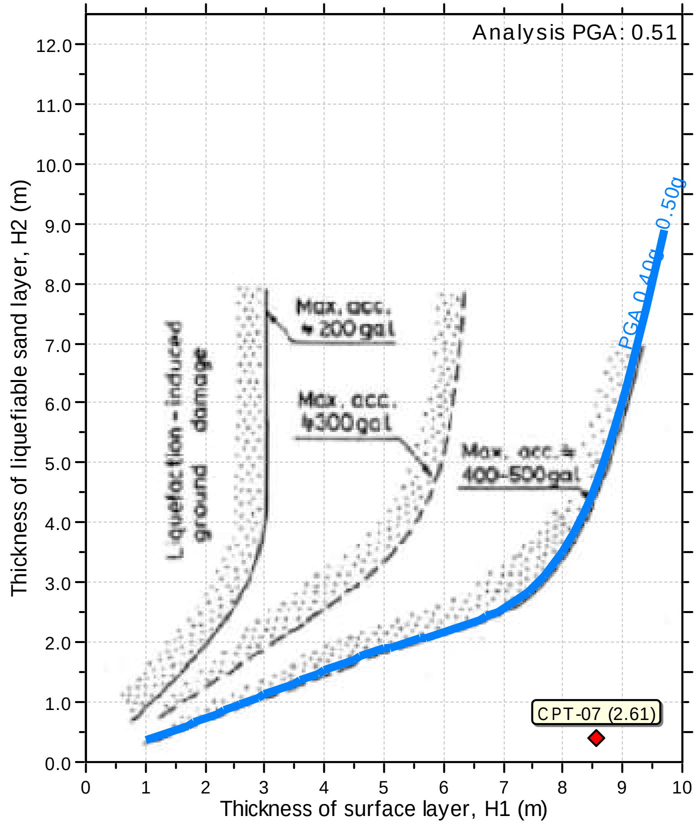
LPI color scheme

- Very high risk
- High risk
- Low risk

Liquefaction analysis summary plots



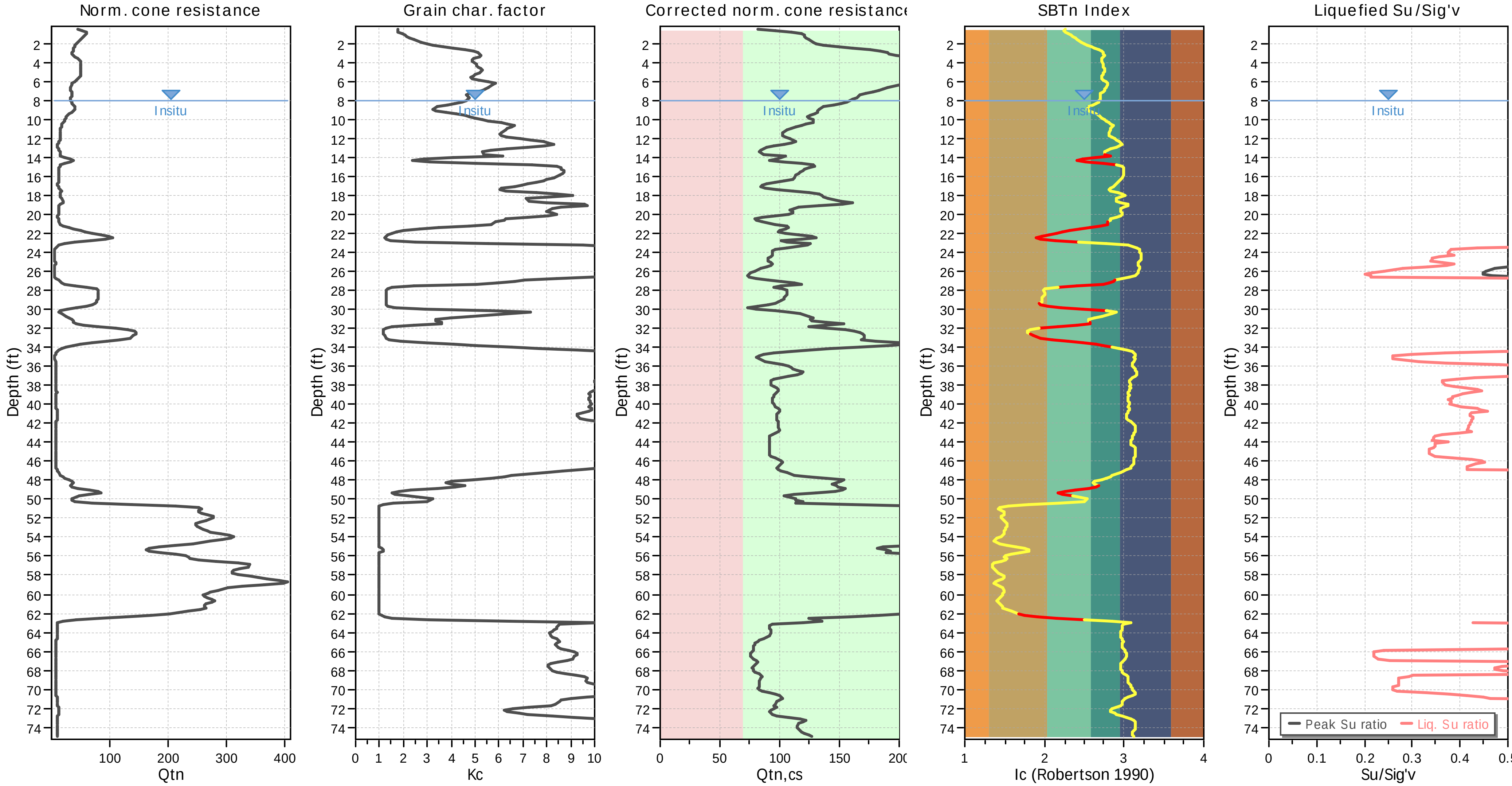




Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	4.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.00	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.51	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	8.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

Check for strength loss plots (Robertson (2010))



Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	4.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.00	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.51	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	8.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

LIQUEFACTION ANALYSIS REPORT

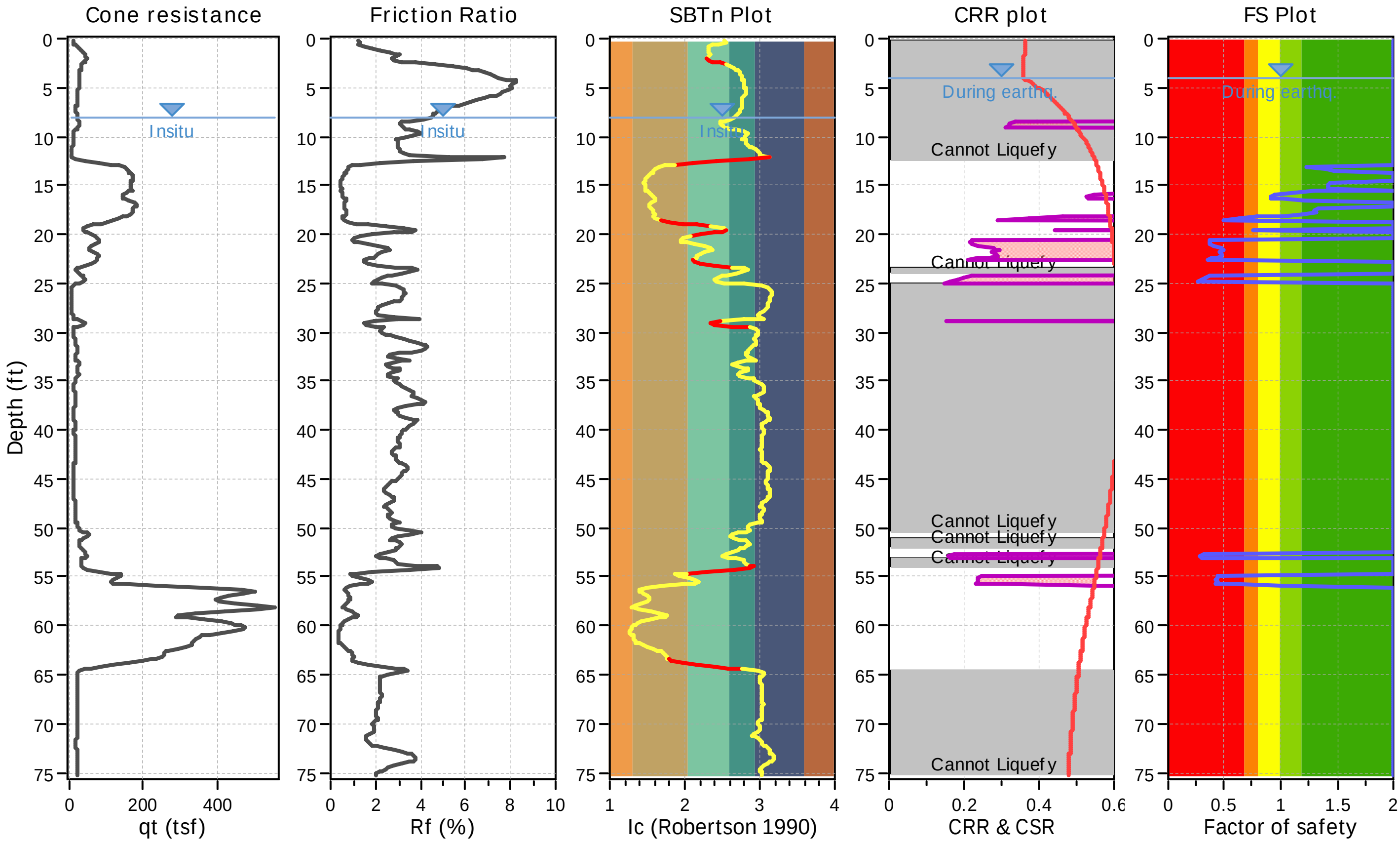
Project title : SJC04

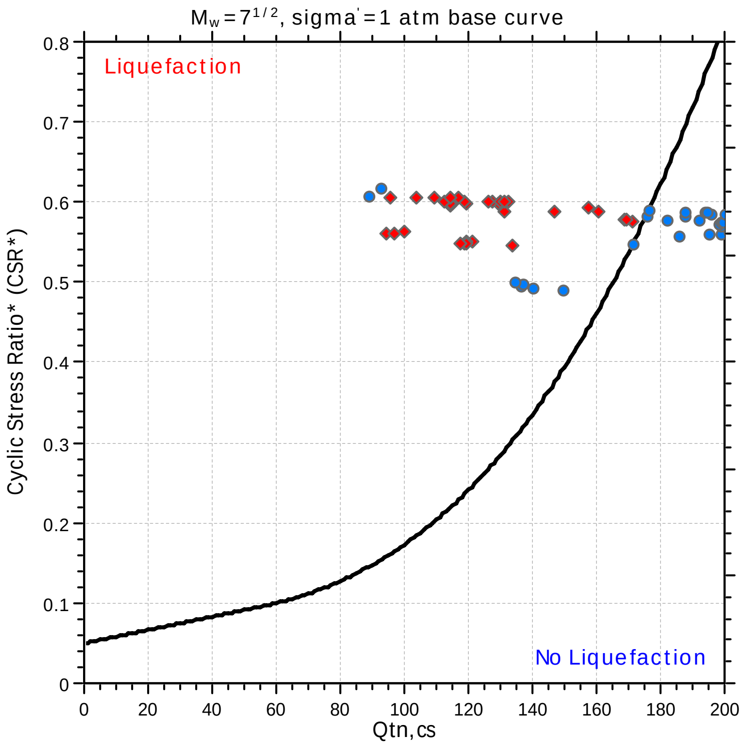
Location : San Jose, CA

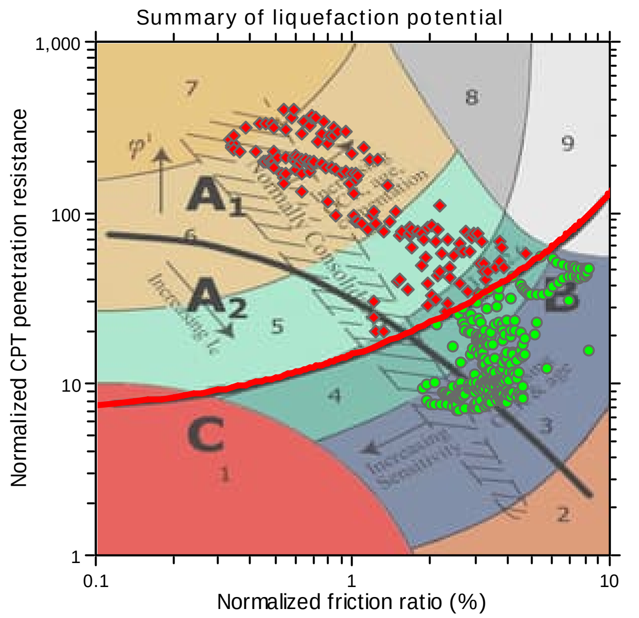
CPT file : CPT-08

Input parameters and analysis data

Analysis method:	NCEER (1998)	G.W.T. (in-situ):	8.00 ft	Use fill:	No	Clay like behavior applied:	Sands only
Fines correction method:	NCEER (1998)	G.W.T. (earthq.):	4.00 ft	Fill height:	N/A		
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth applied:	Yes
Earthquake magnitude M_w:	7.00	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	Limit depth:	60.00 ft
Peak ground acceleration:	0.51	Unit weight calculation:	Based on SBT	K_σ applied:	Yes	MSF method:	Method based

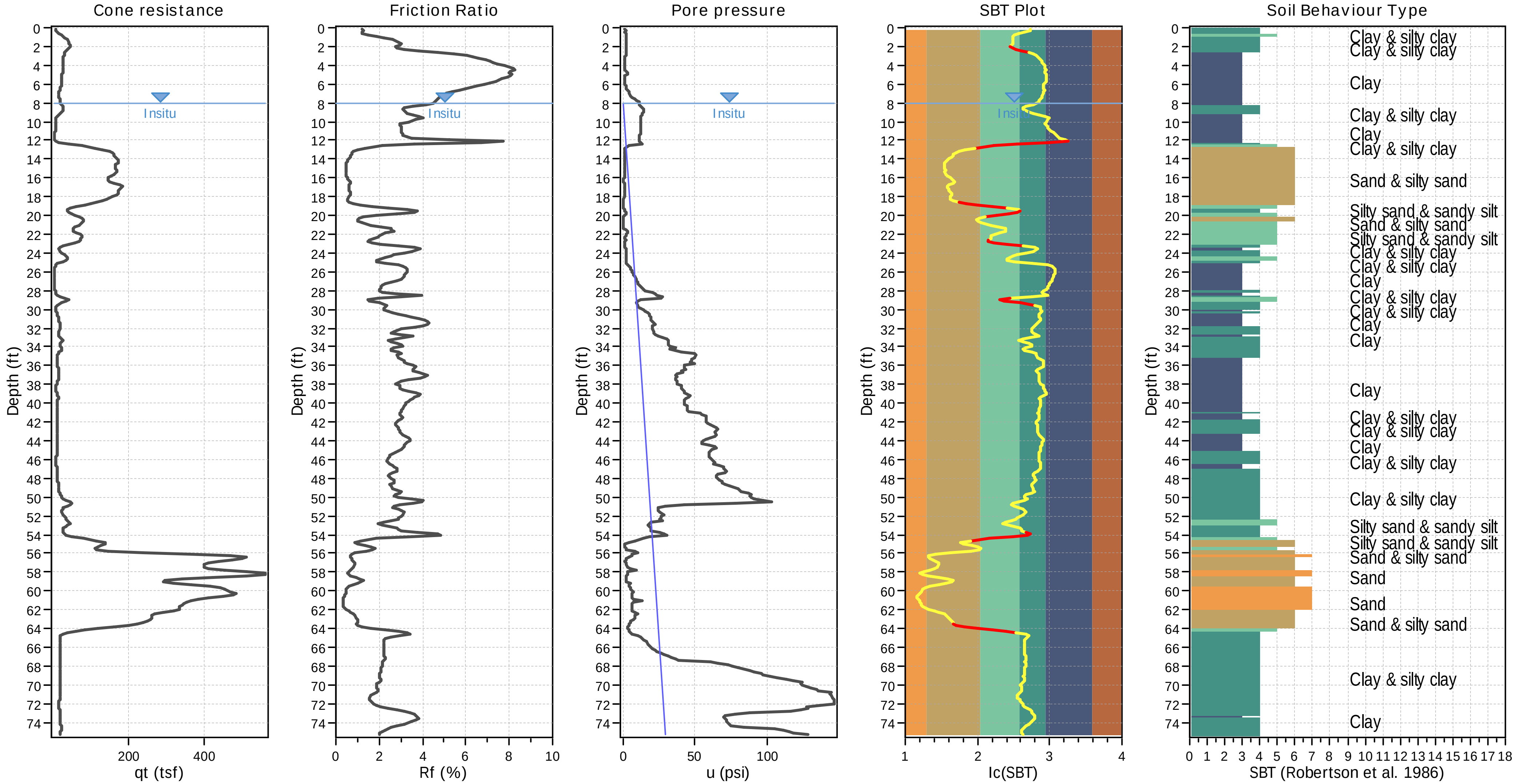






Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and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

CPT basic interpretation plots



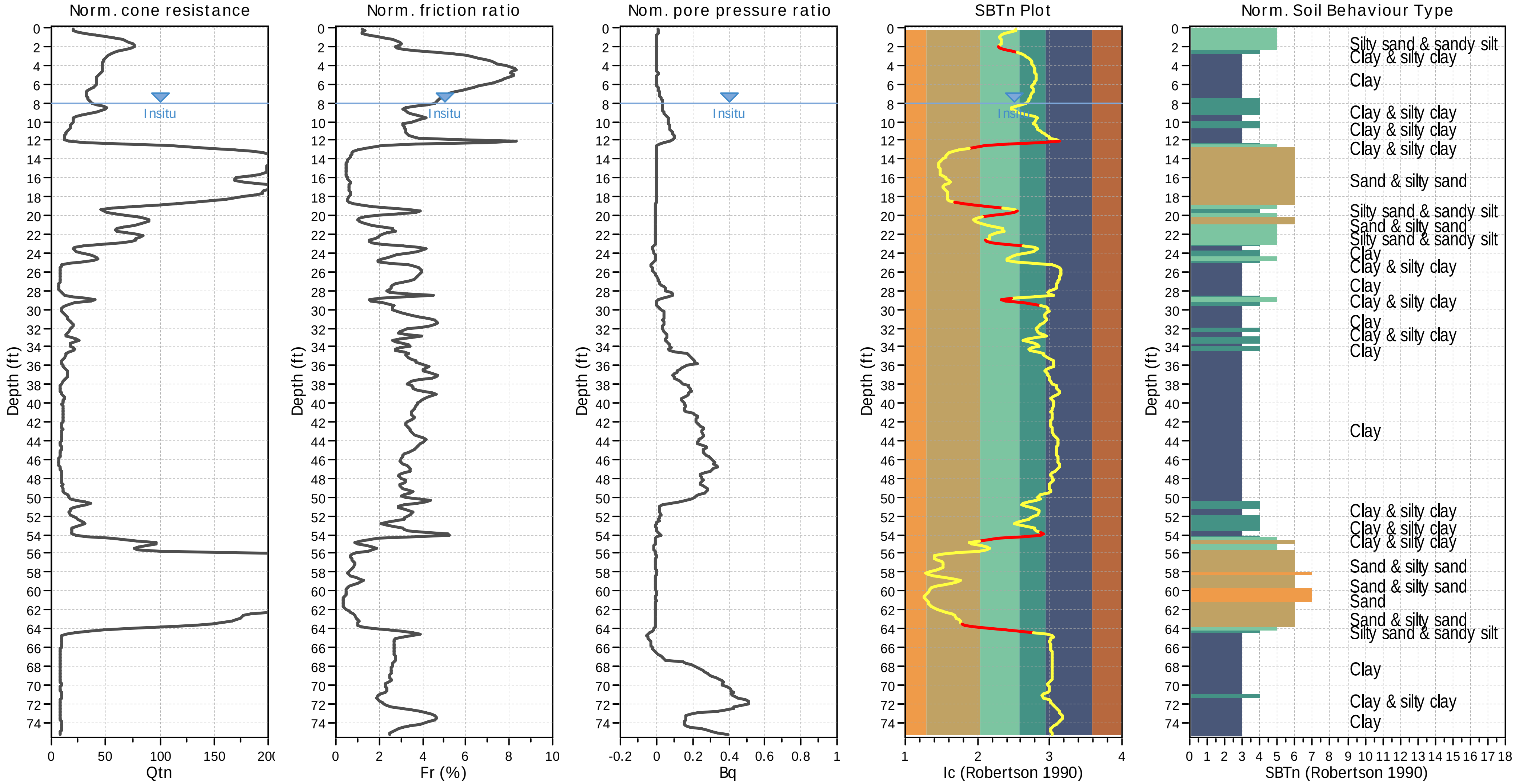
Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	4.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.00	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.51	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	8.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

SBT legend

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

CPT basic interpretation plots (normalized)



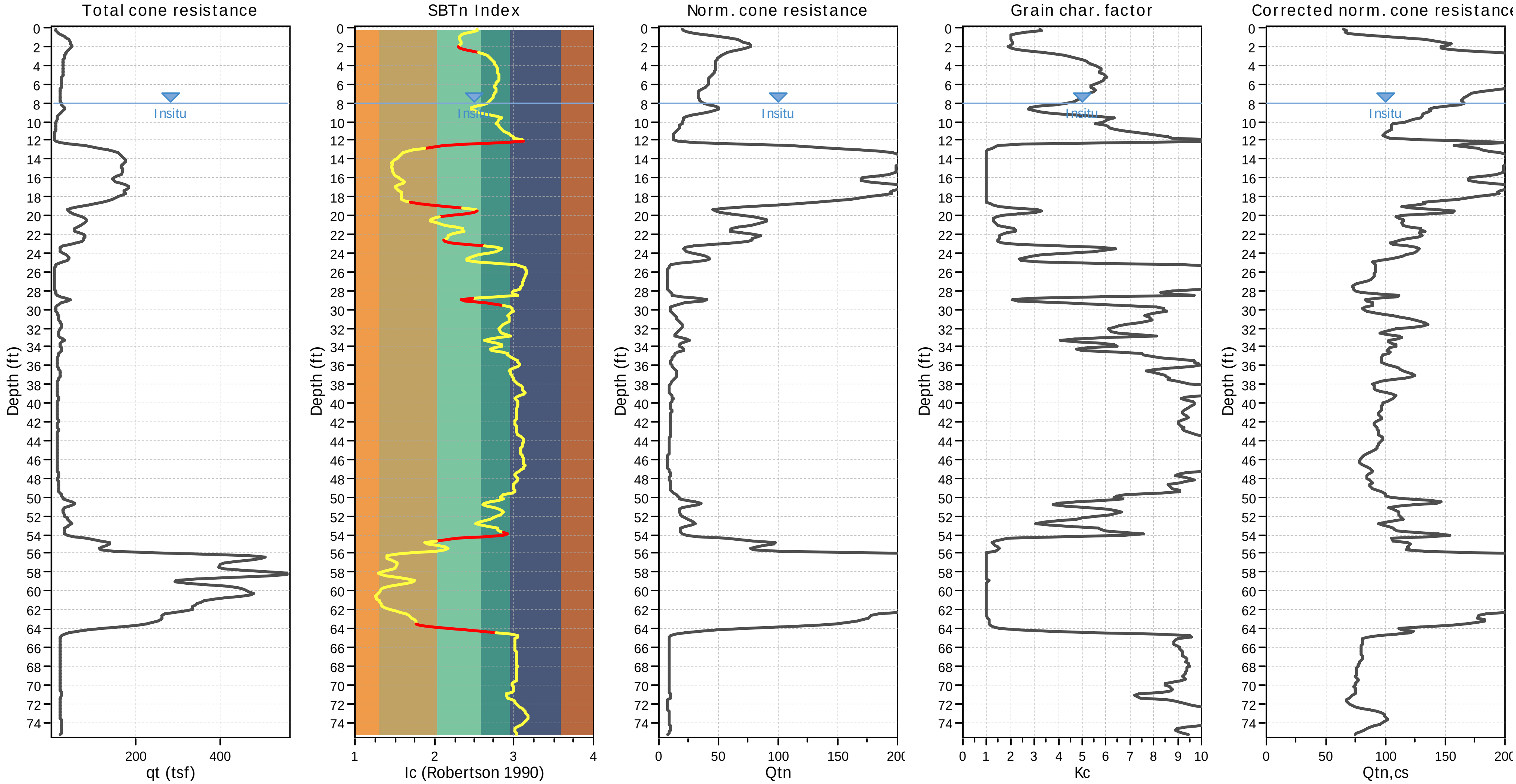
Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	4.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.00	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.51	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	8.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

SBTn legend

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

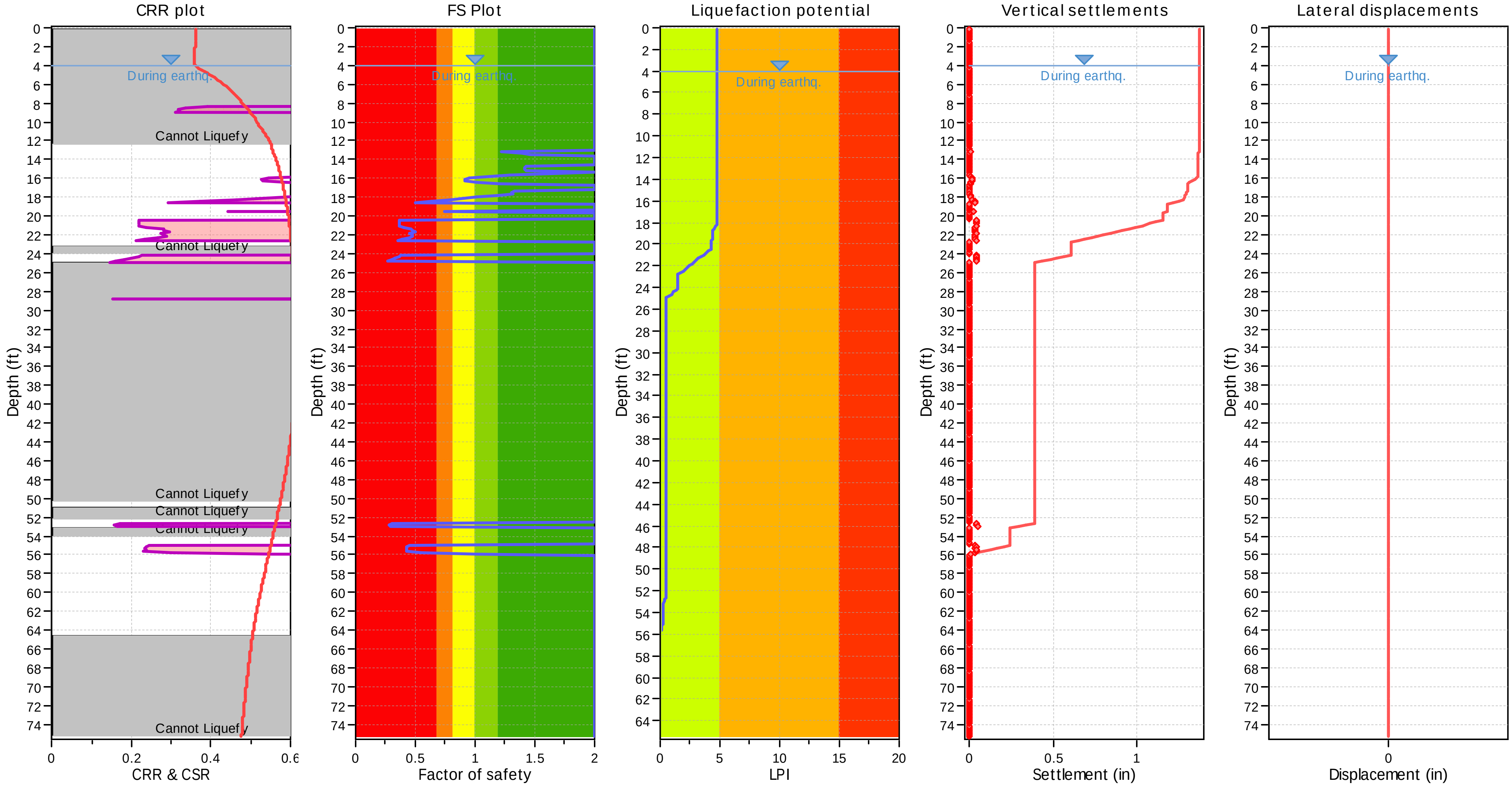
Liquefaction analysis overall plots (intermediate results)



Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	4.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.00	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.51	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	8.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	4.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.00	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.51	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	8.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

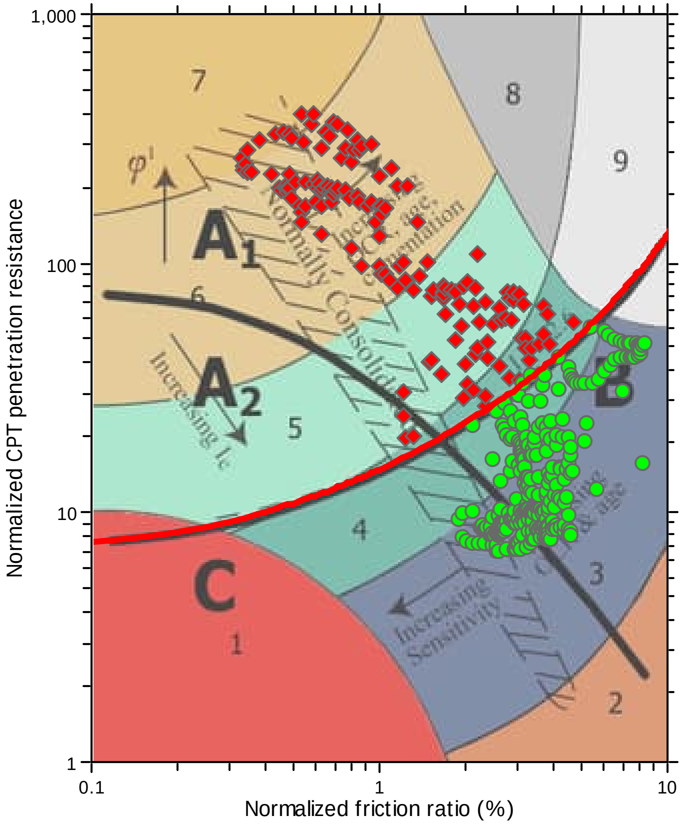
F.S. color scheme

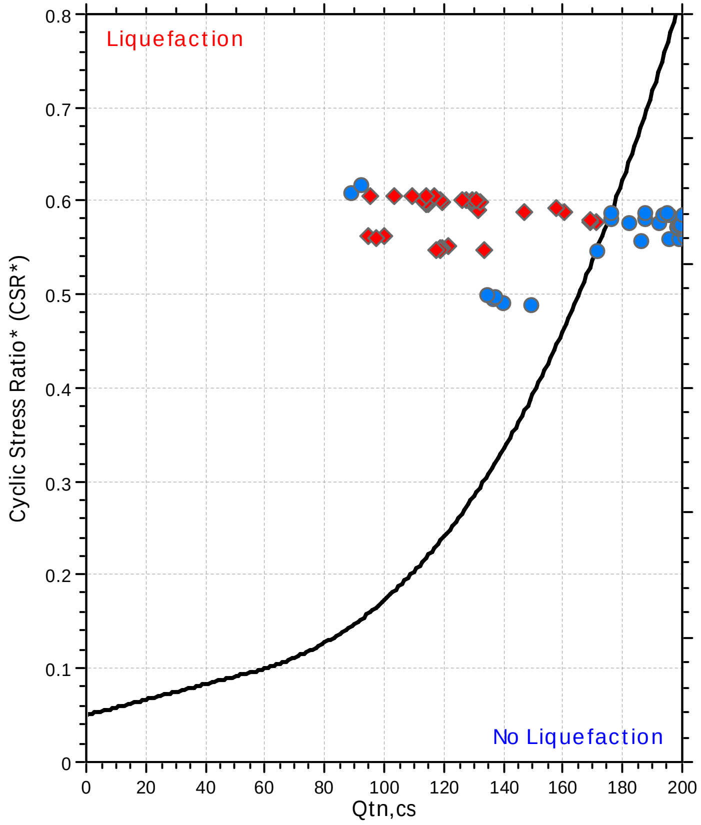
- Almost certain it will liquefy
- Very likely to liquefy
- Liquefaction and no liq. are equally likely
- Unlike to liquefy
- Almost certain it will not liquefy

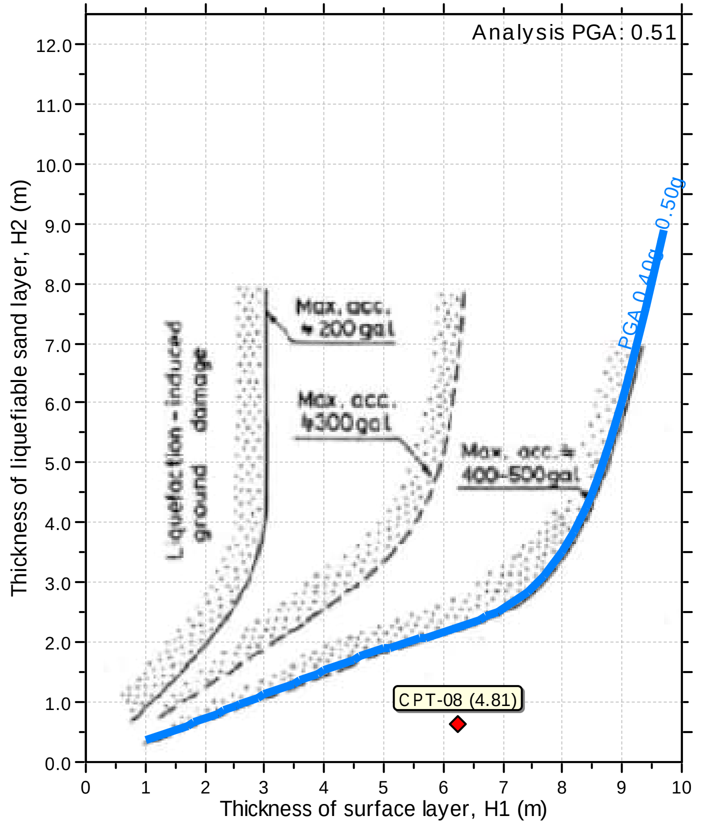
LPI color scheme

- Very high risk
- High risk
- Low risk

Liquefaction analysis summary plots



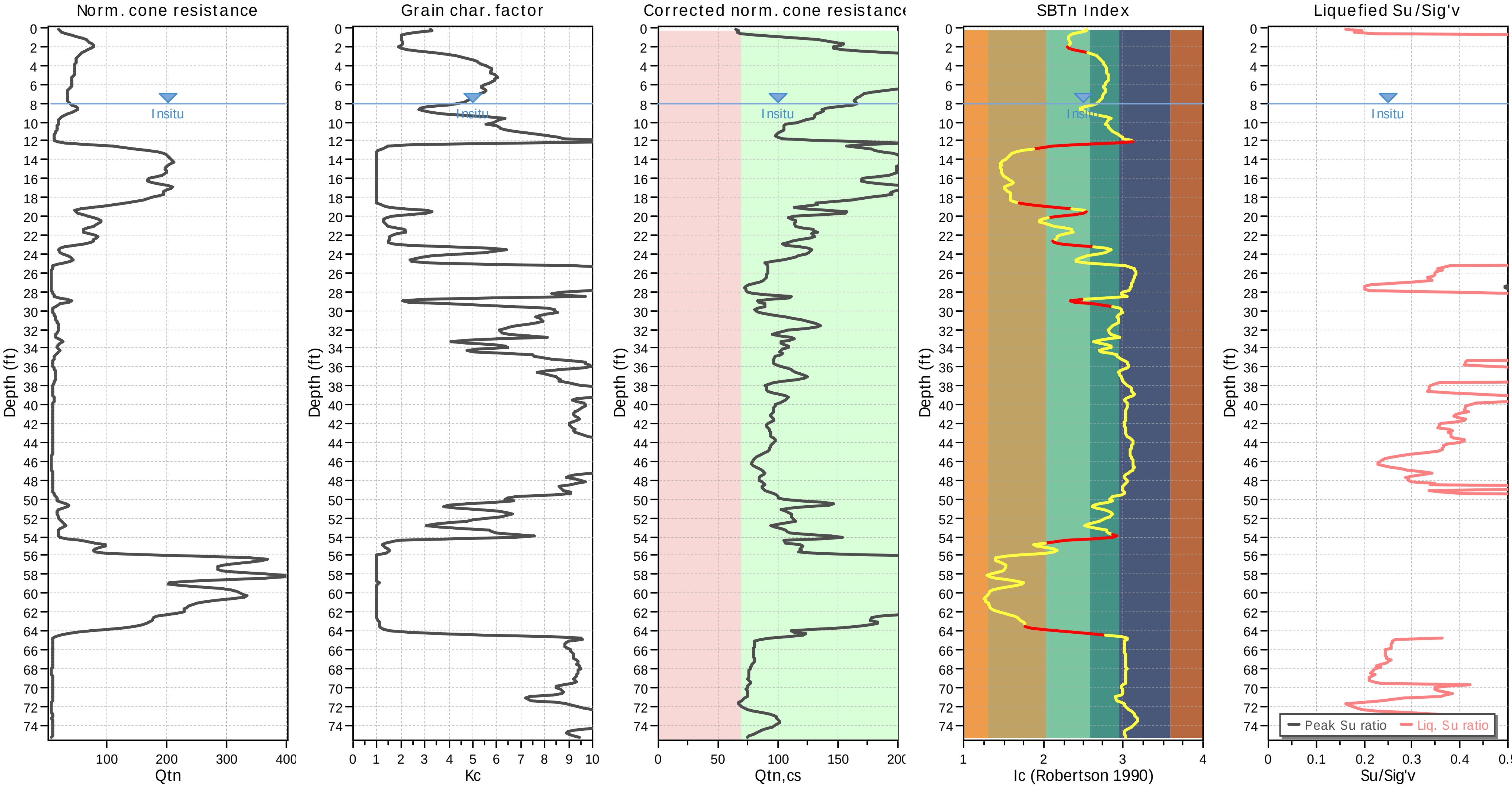




Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	4.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.00	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.51	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	8.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

Check for strength loss plots (Robertson (2010))



Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	4.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.00	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.51	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	8.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

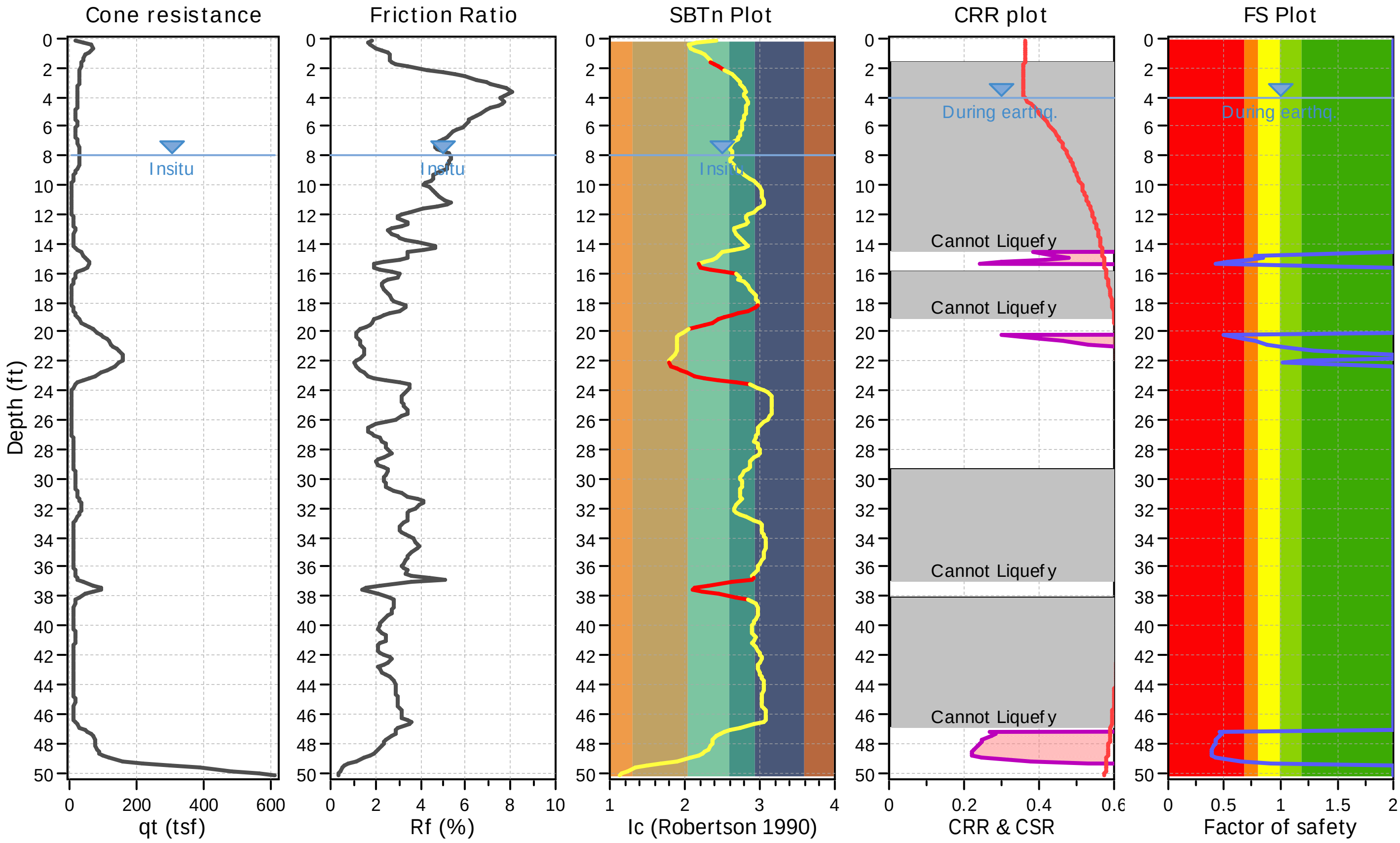
LIQUEFACTION ANALYSIS REPORT

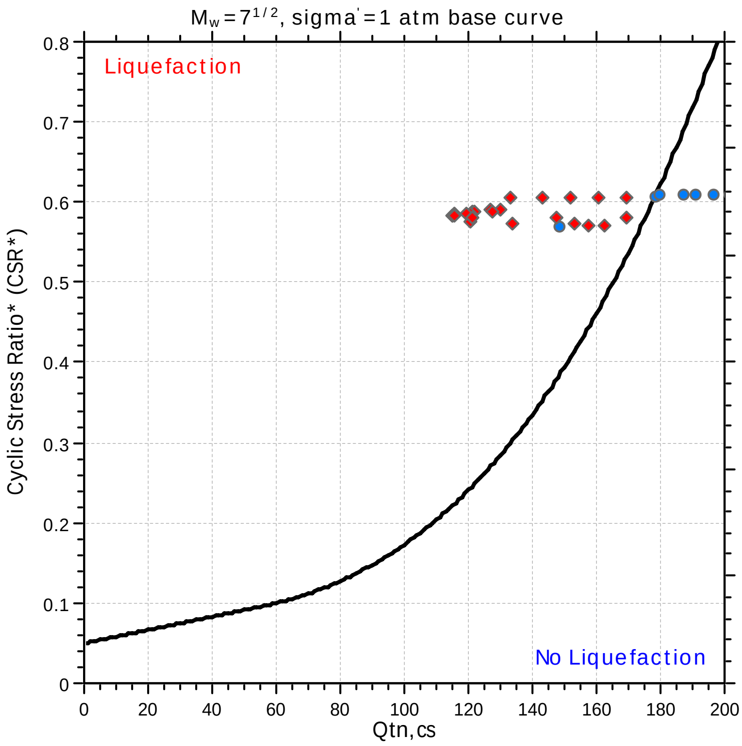
Project title : SJC04 Location : San Jose, CA

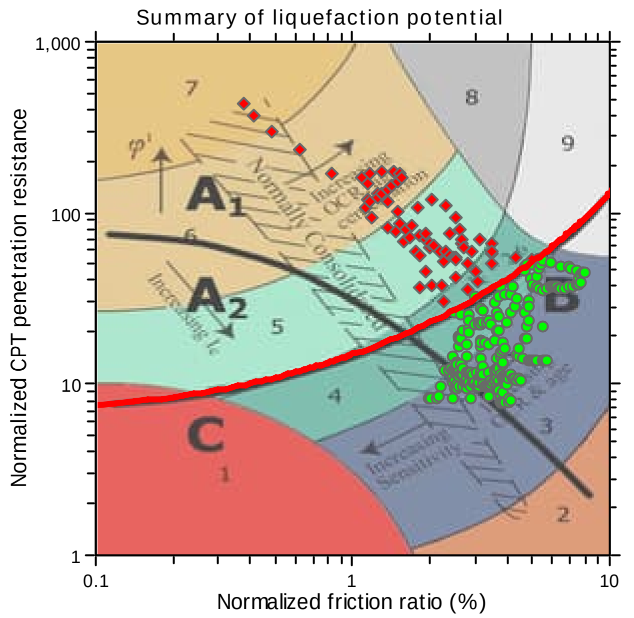
CPT file : CPT-09

Input parameters and analysis data

Analysis method:	NCEER (1998)	G.W.T. (in-situ):	8.00 ft	Use fill:	No	Clay like behavior applied:	Sands only
Fines correction method:	NCEER (1998)	G.W.T. (earthq.):	4.00 ft	Fill height:	N/A	Limit depth applied:	Yes
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	60.00 ft
Earthquake magnitude M_w:	7.00	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method based
Peak ground acceleration:	0.51	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

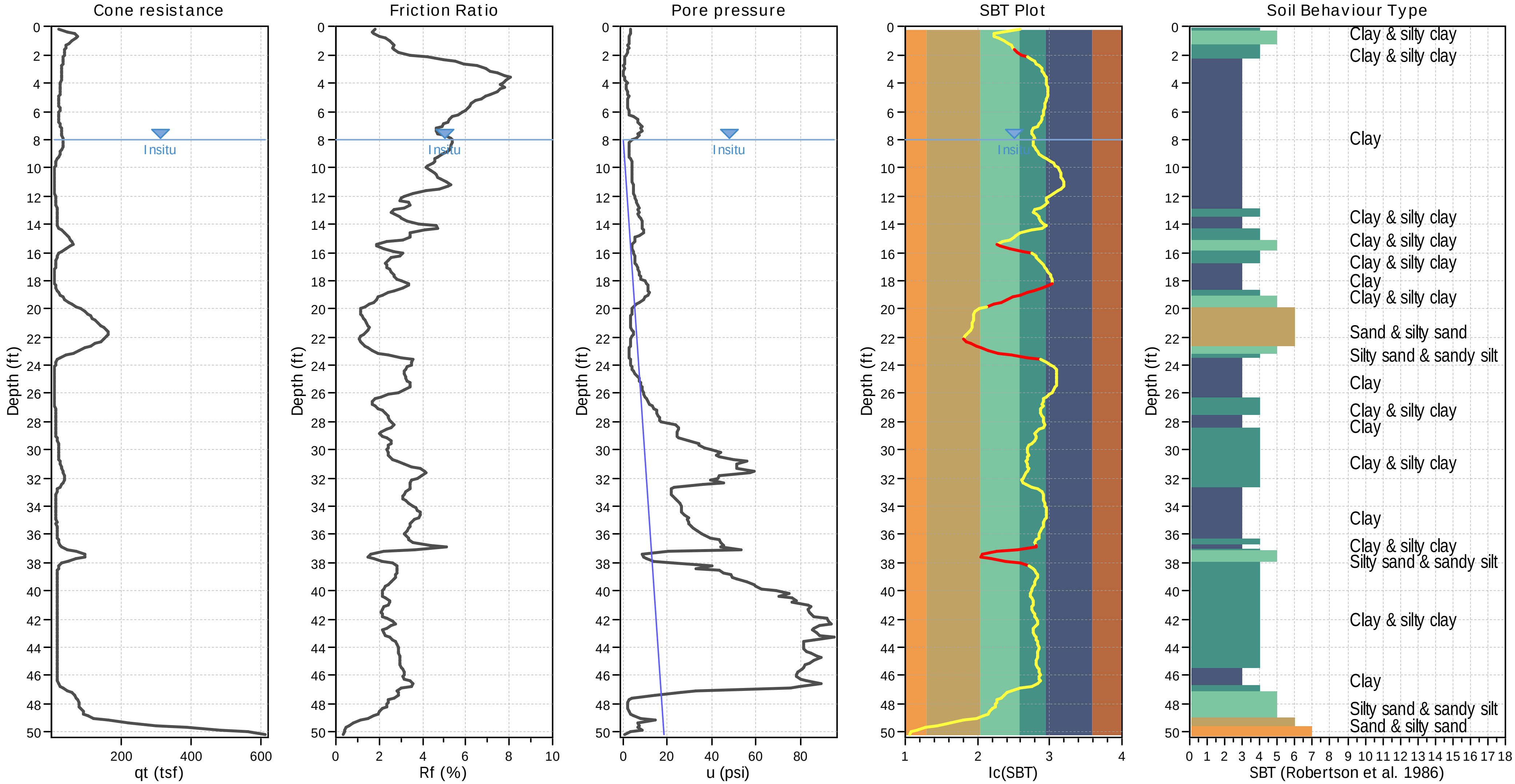






Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and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

CPT basic interpretation plots



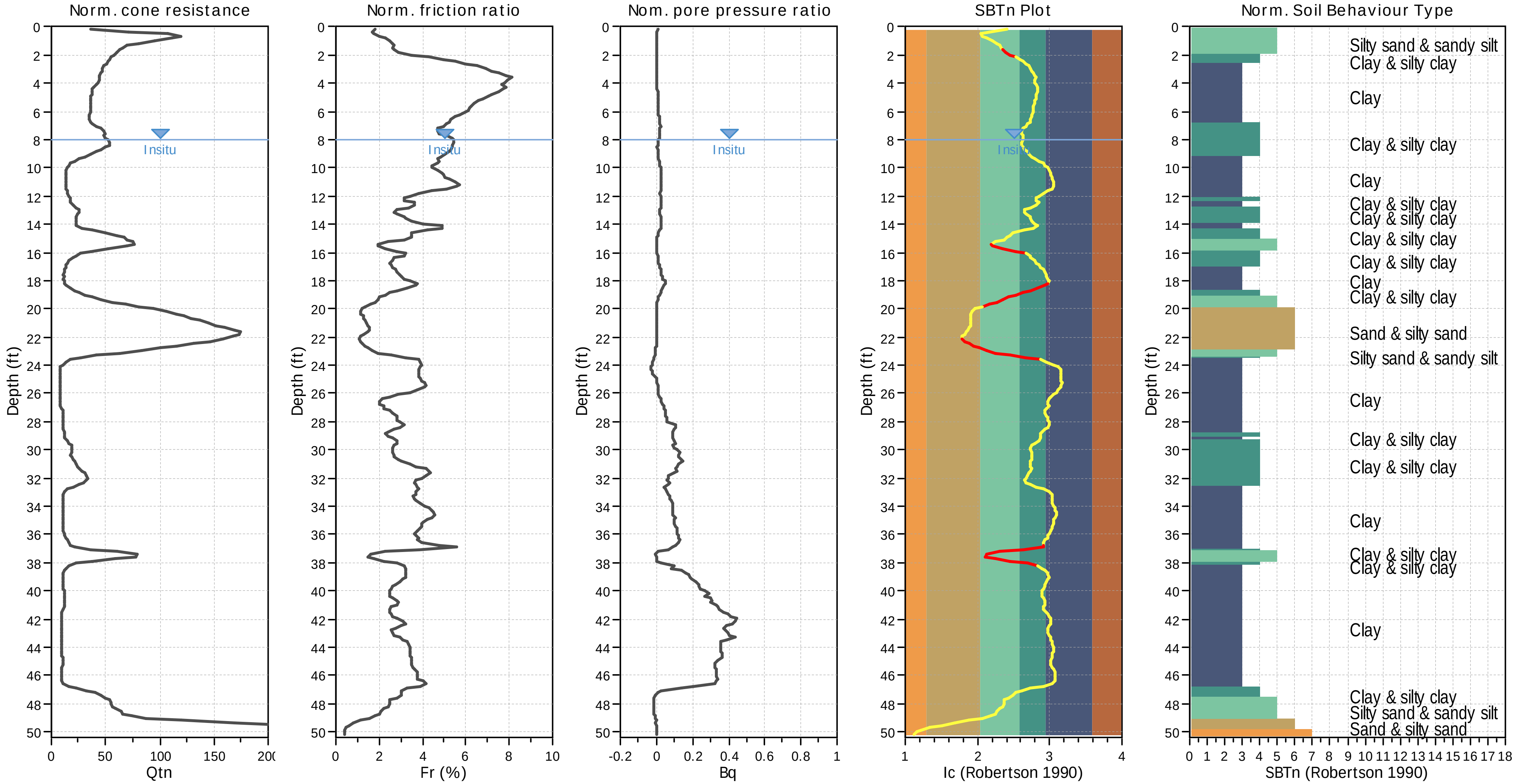
Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	4.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.00	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.51	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	8.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

SBT legend

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

CPT basic interpretation plots (normalized)



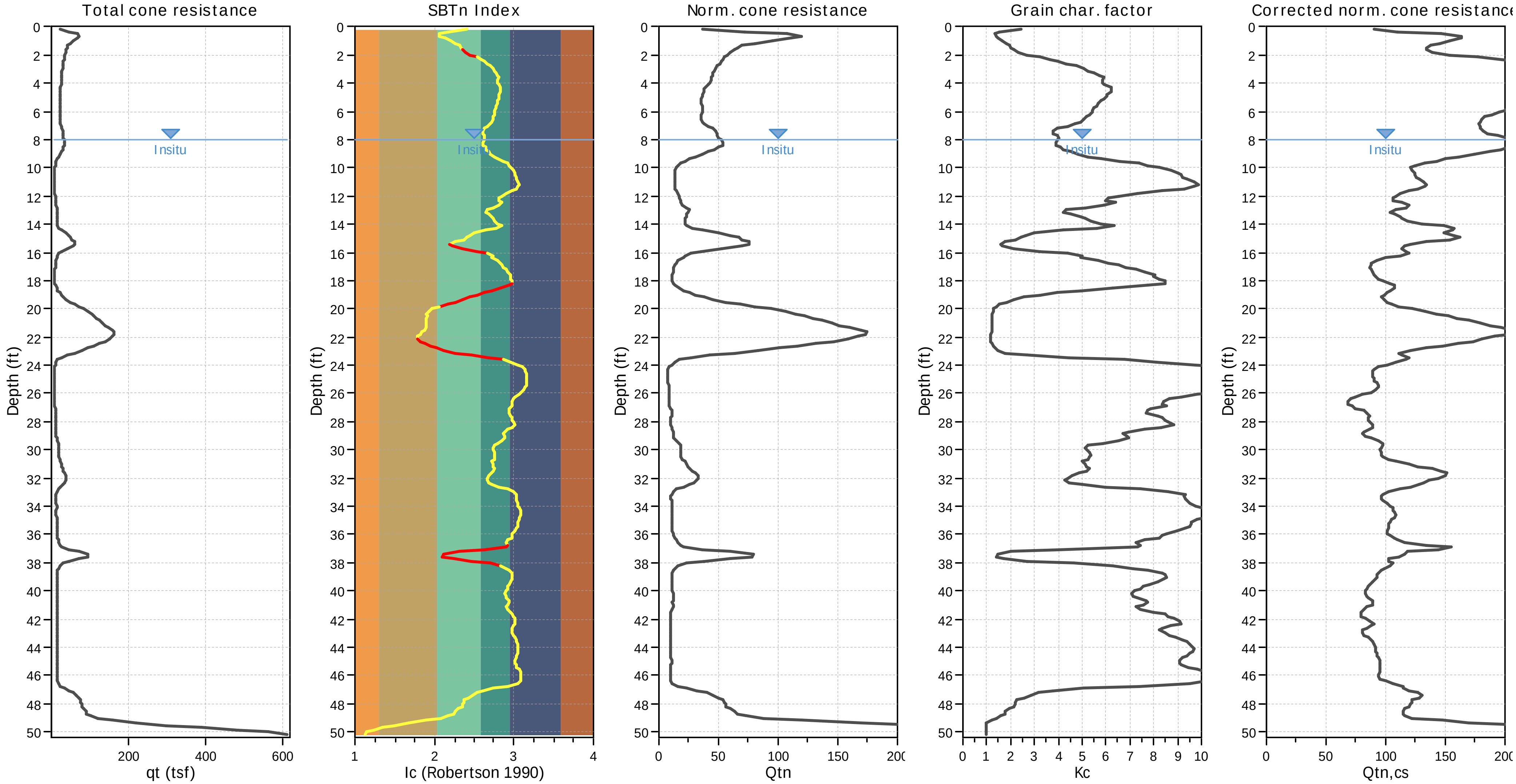
Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	4.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.00	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.51	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	8.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

SBTn legend

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

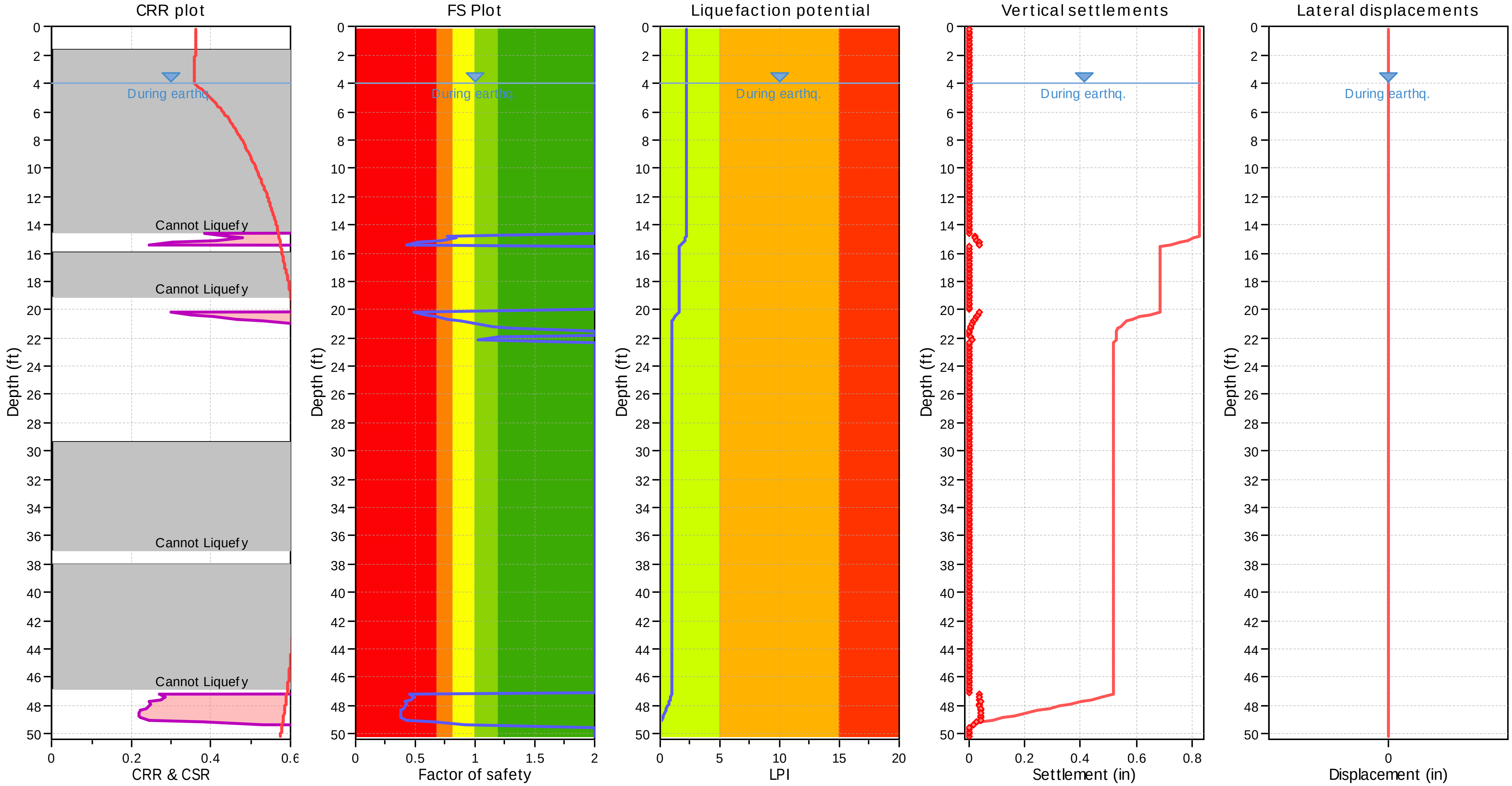
Liquefaction analysis overall plots (intermediate results)



Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	4.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.00	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.51	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	8.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	4.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.00	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.51	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	8.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

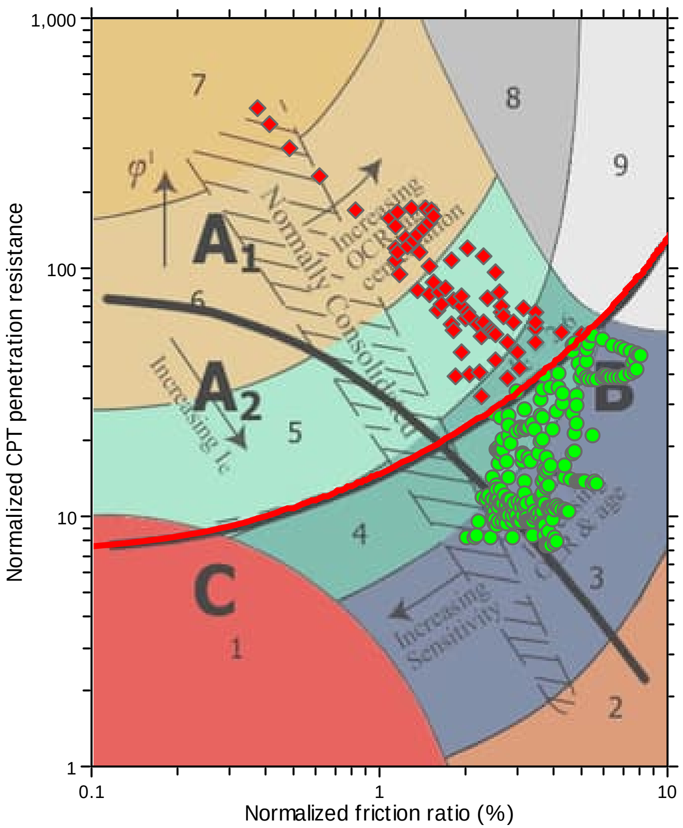
F.S. color scheme

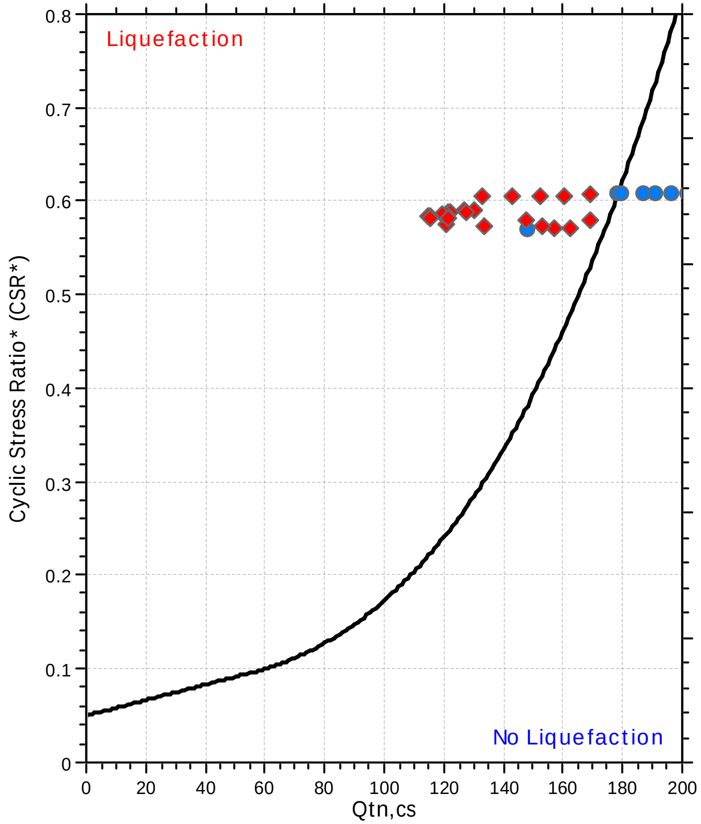
- Almost certain it will liquefy
- Very likely to liquefy
- Liquefaction and no liq. are equally likely
- Unlike to liquefy
- Almost certain it will not liquefy

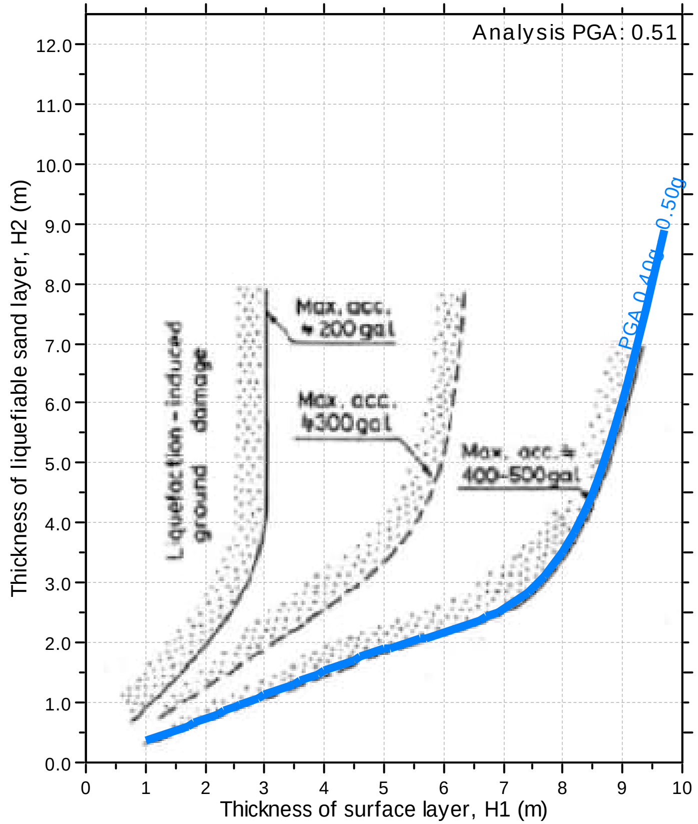
LPI color scheme

- Very high risk
- High risk
- Low risk

Liquefaction analysis summary plots



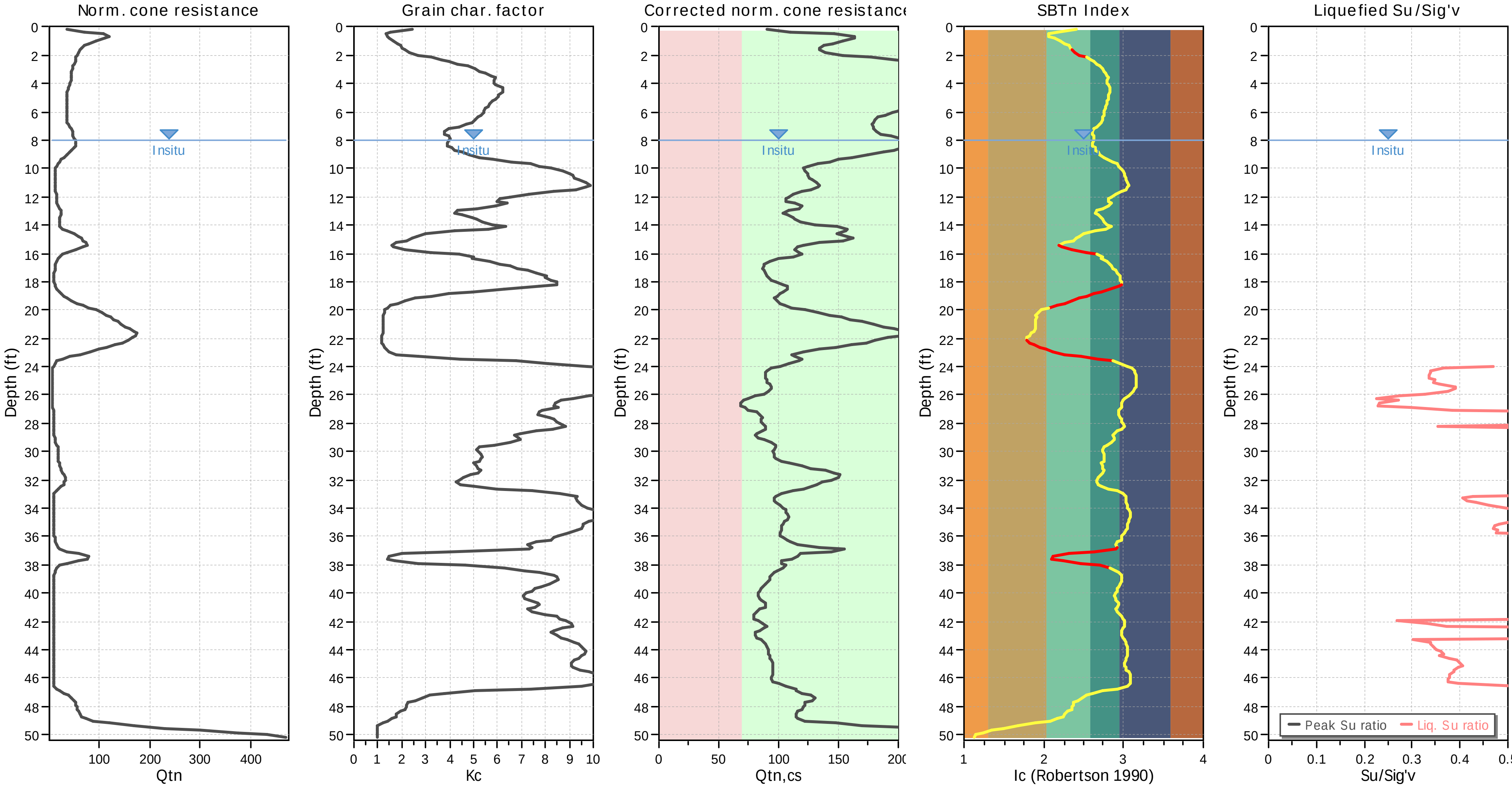




Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	4.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.00	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.51	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	8.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

Check for strength loss plots (Robertson (2010))



Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	4.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.00	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.51	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	8.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

Terracon Consultants, Inc.
5075 Commercial Cir.,Suite E
Concord, CA 94520
www.terracon.com

LIQUEFACTION ANALYSIS REPORT

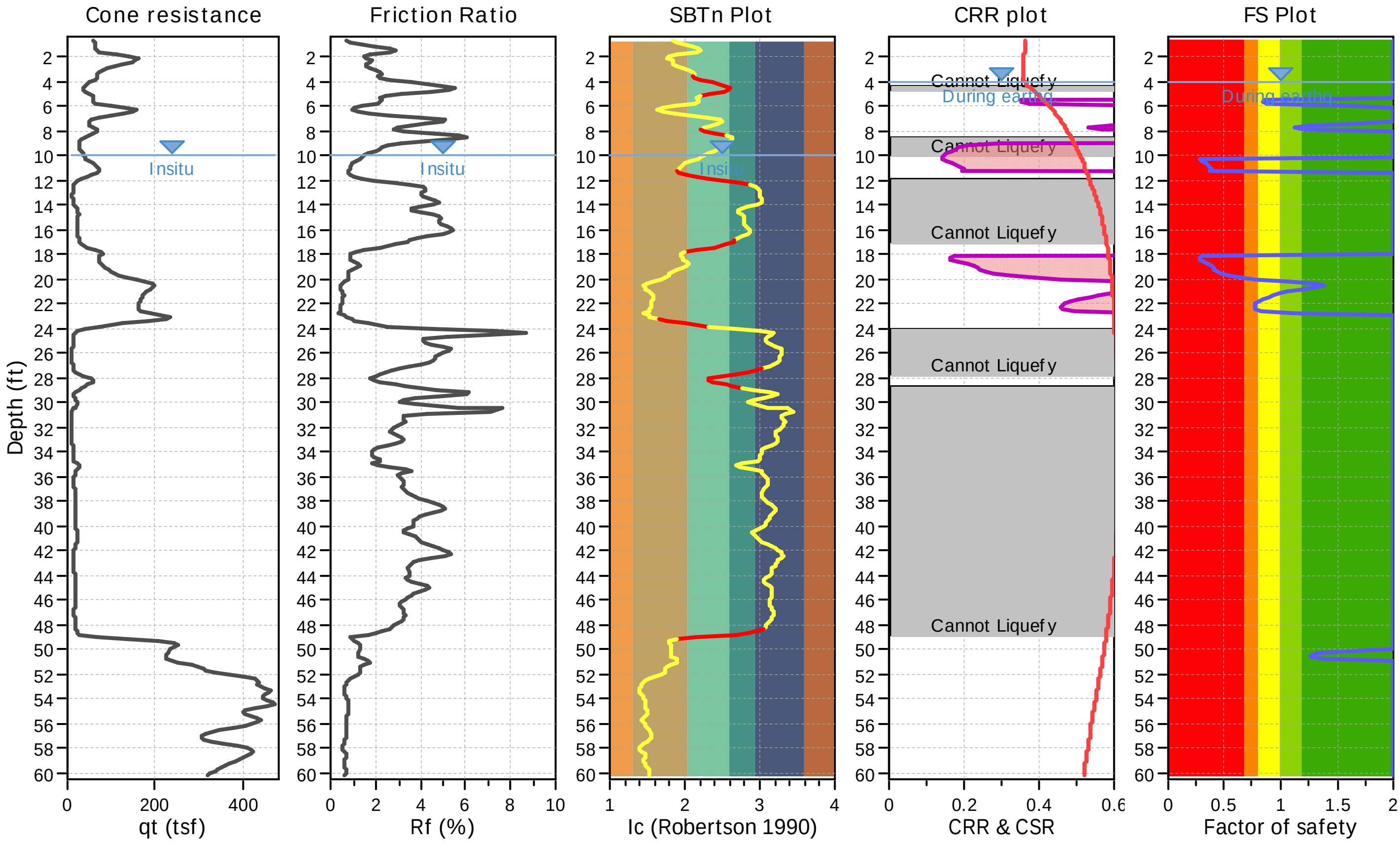
Project title : SJC04

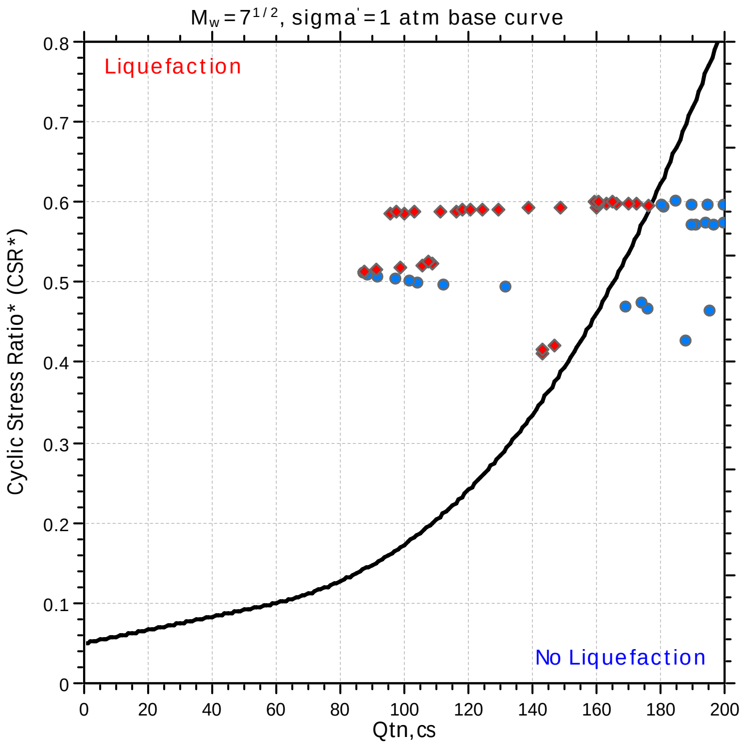
Location : San Jose, CA

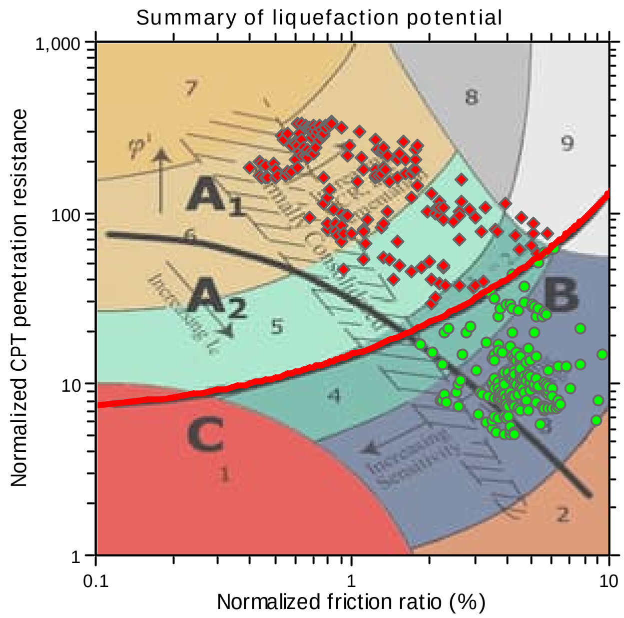
CPT file : CPT-10

Input parameters and analysis data

Analysis method:	NCEER (1998)	G.W.T. (in-situ):	10.00 ft	Use fill:	No	Clay like behavior applied:	Sands only
Fines correction method:	NCEER (1998)	G.W.T. (earthq.):	4.00 ft	Fill height:	N/A		
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth applied:	Yes
Earthquake magnitude M_w:	7.00	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	Limit depth:	60.00 ft
Peak ground acceleration:	0.51	Unit weight calculation:	Based on SBT	K_σ applied:	Yes	MSF method:	Method based

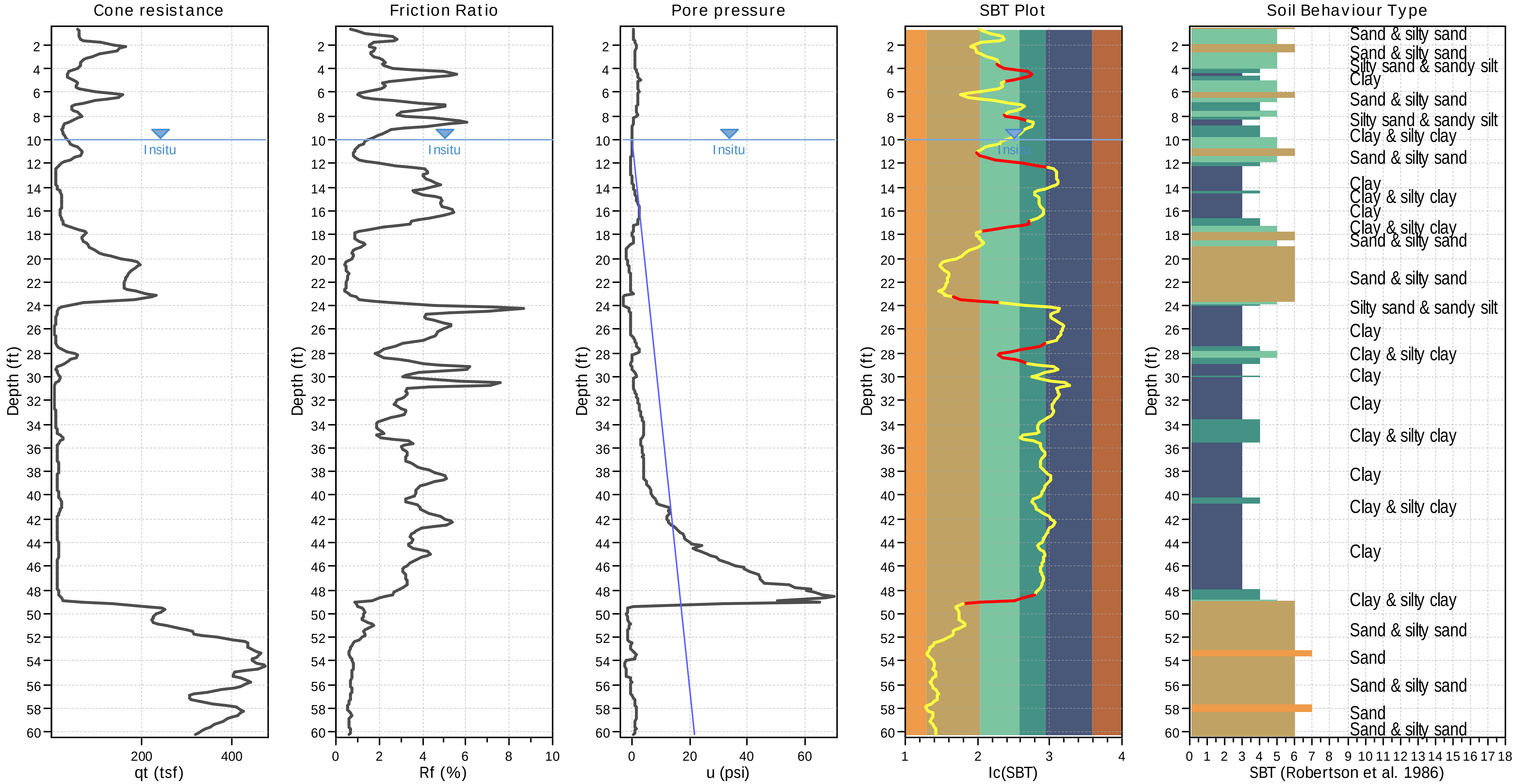






Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and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

CPT basic interpretation plots



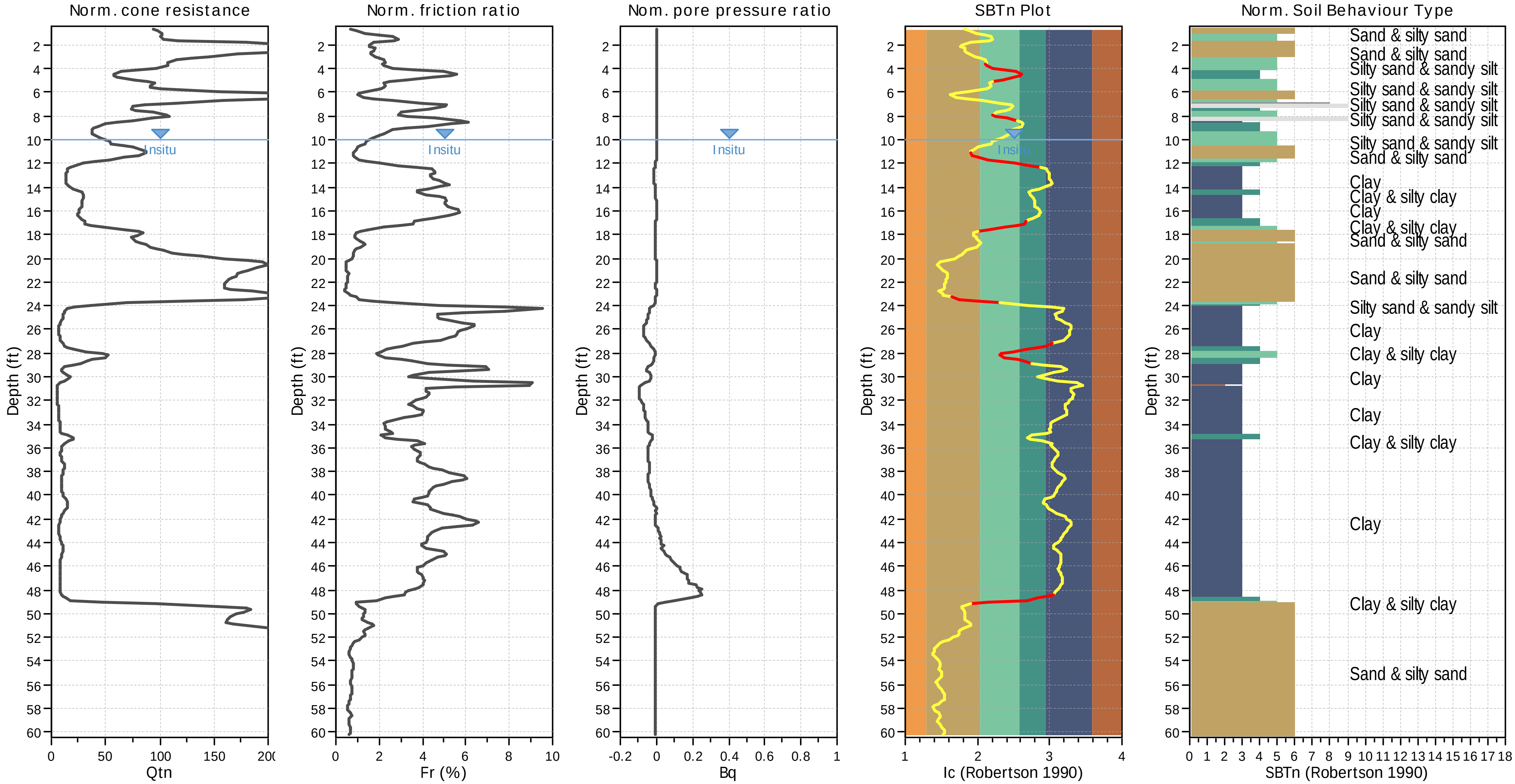
Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	4.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.00	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.51	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	10.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

SBT legend

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

CPT basic interpretation plots (normalized)



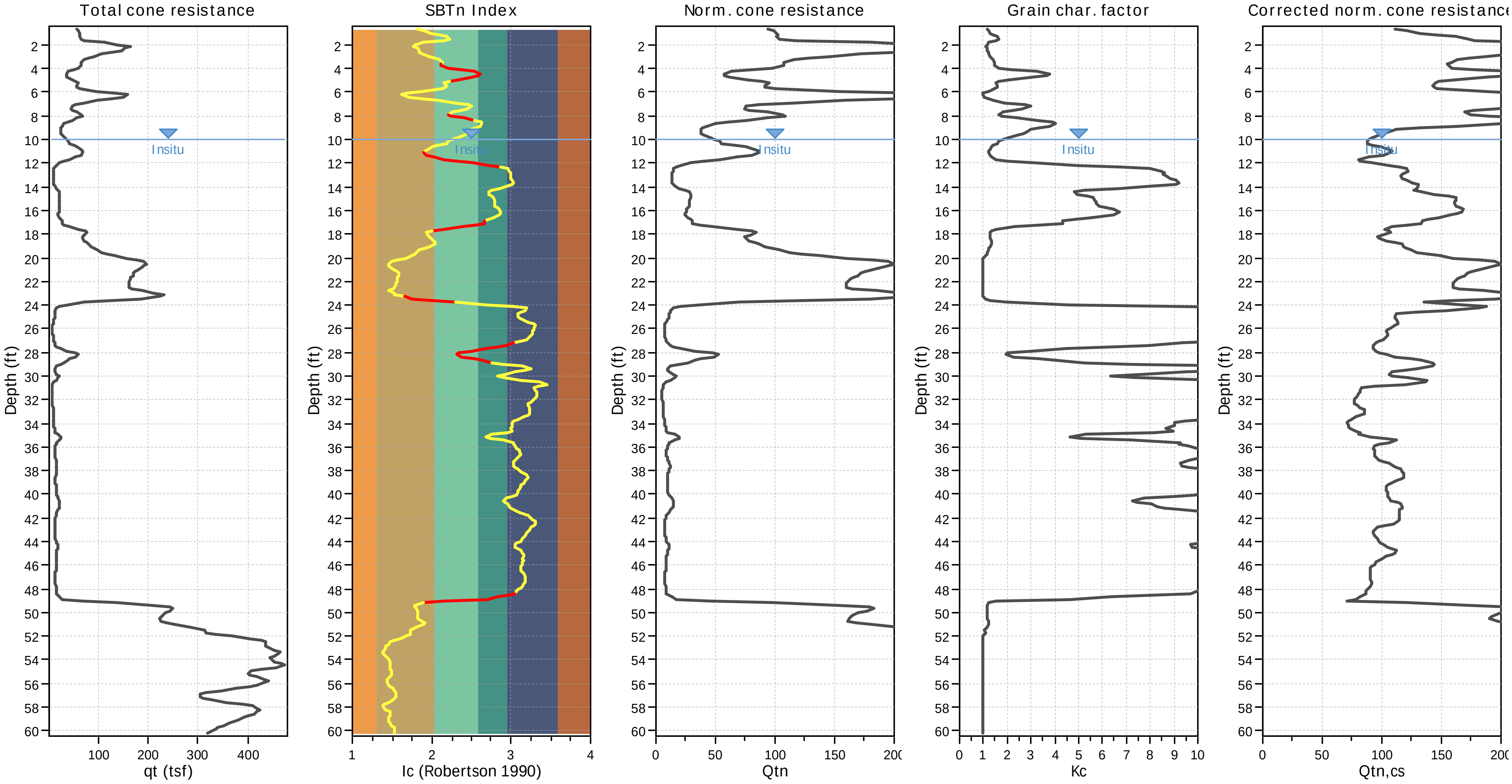
Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	4.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.00	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.51	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	10.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

SBTn legend

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

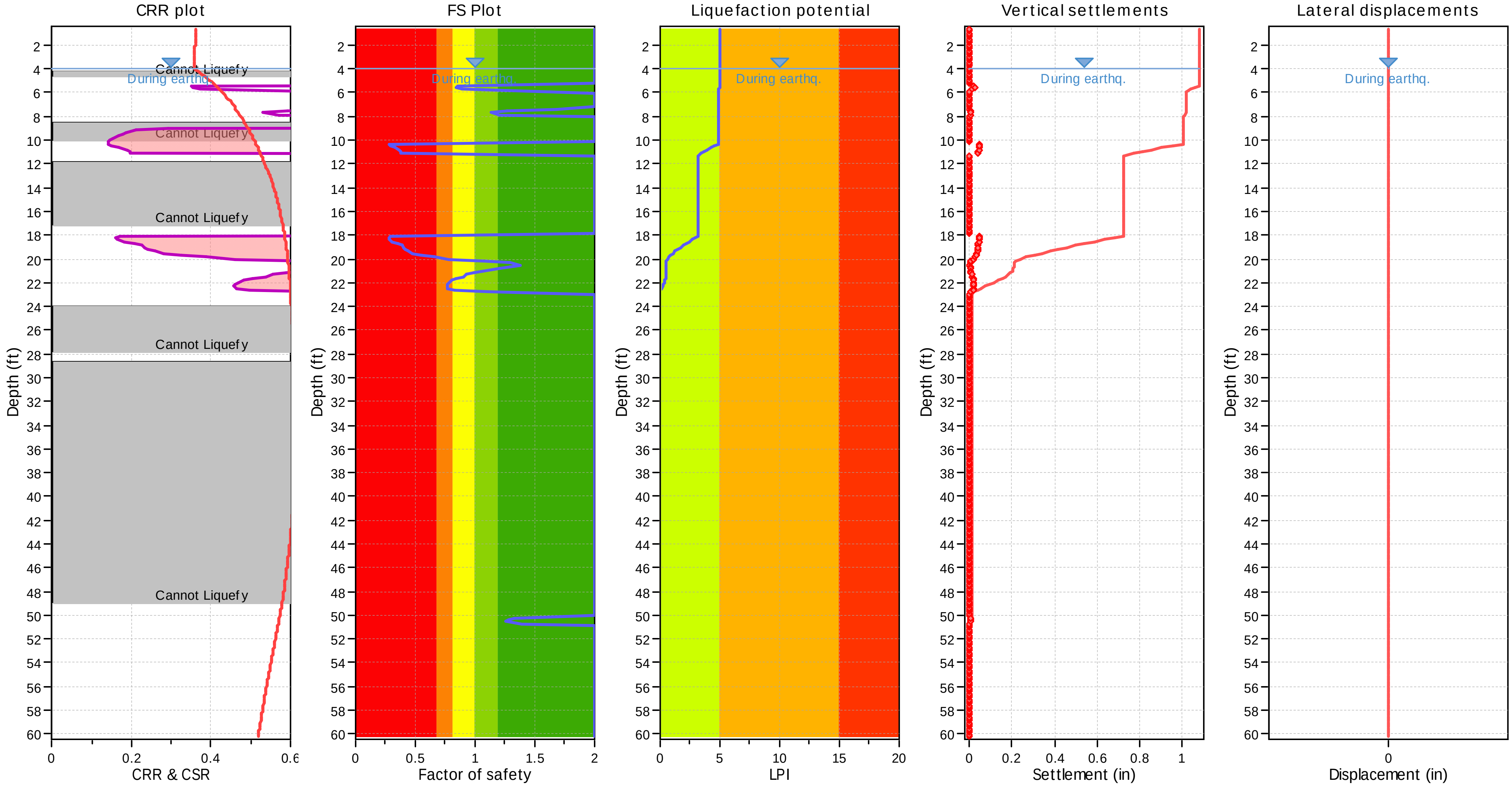
Liquefaction analysis overall plots (intermediate results)



Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	4.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.00	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.51	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	10.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

Liquefaction analysis overall plots



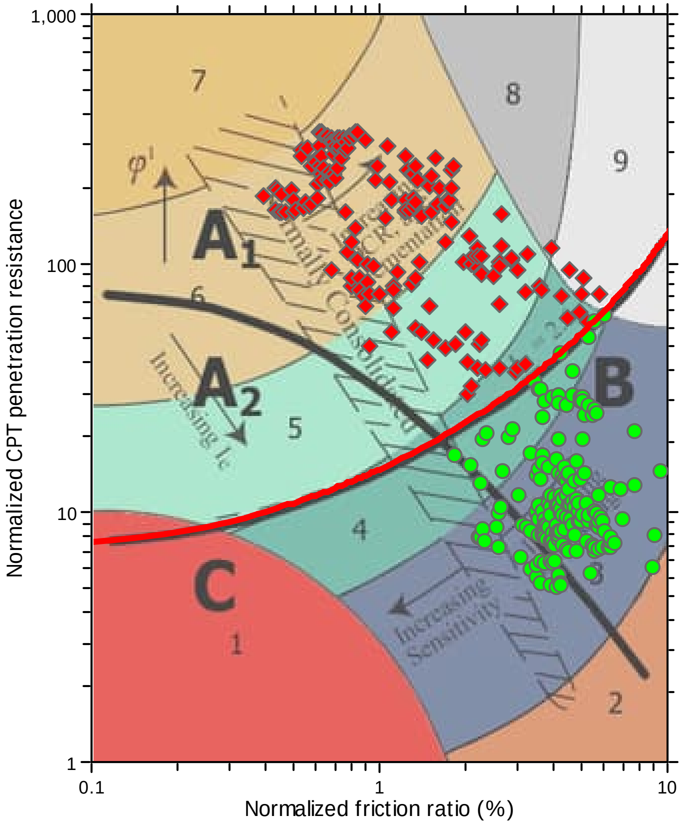
Input parameters and analysis data

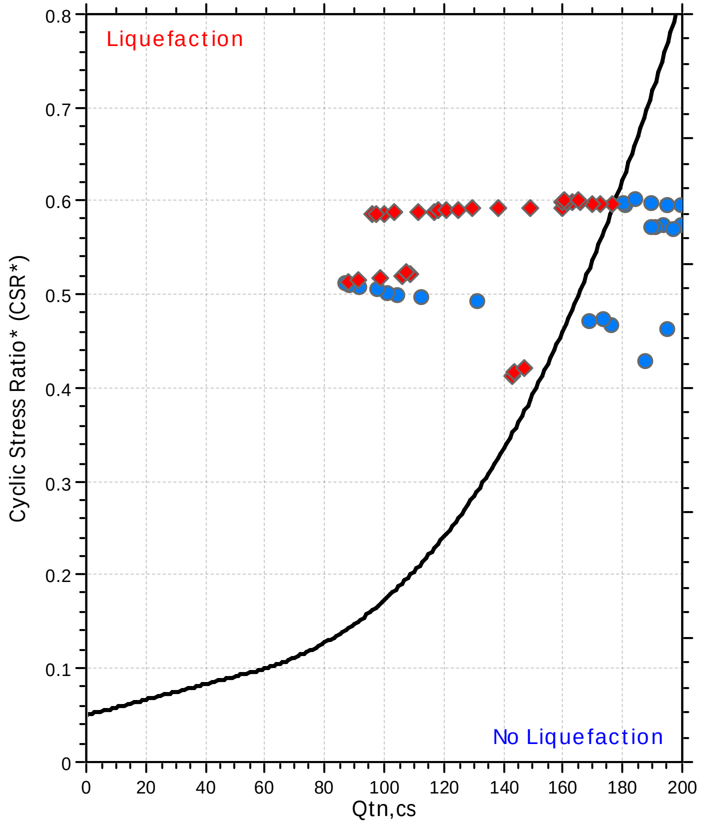
Analysis method:	NCEER (1998)	Depth to water table (erthq.):	4.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.00	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.51	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	10.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

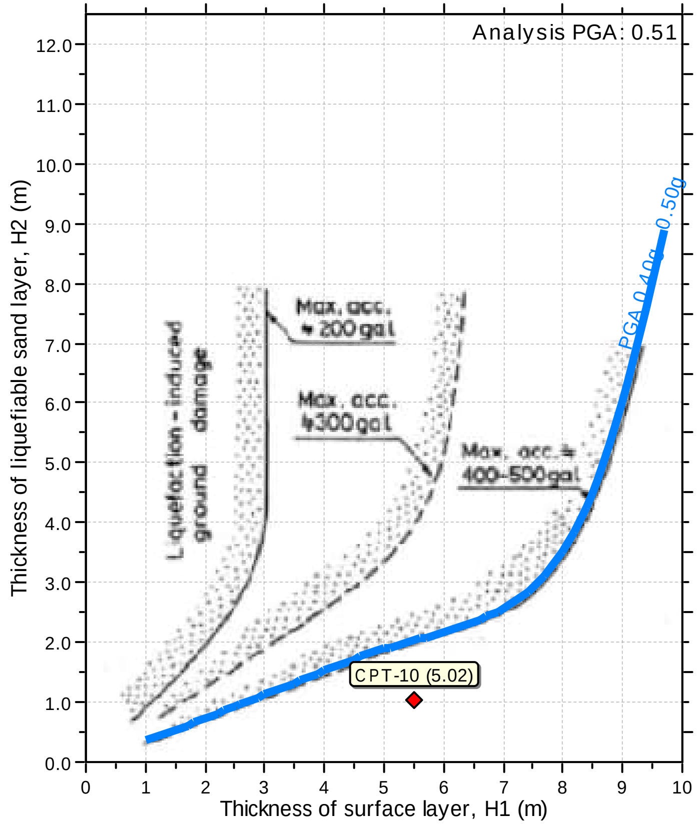
F.S. color scheme
- Almost certain it will liquefy
- Very likely to liquefy
- Liquefaction and no liq. are equally likely
- Unlike to liquefy
- Almost certain it will not liquefy

LPI color scheme
- Very high risk
- High risk
- Low risk

Liquefaction analysis summary plots



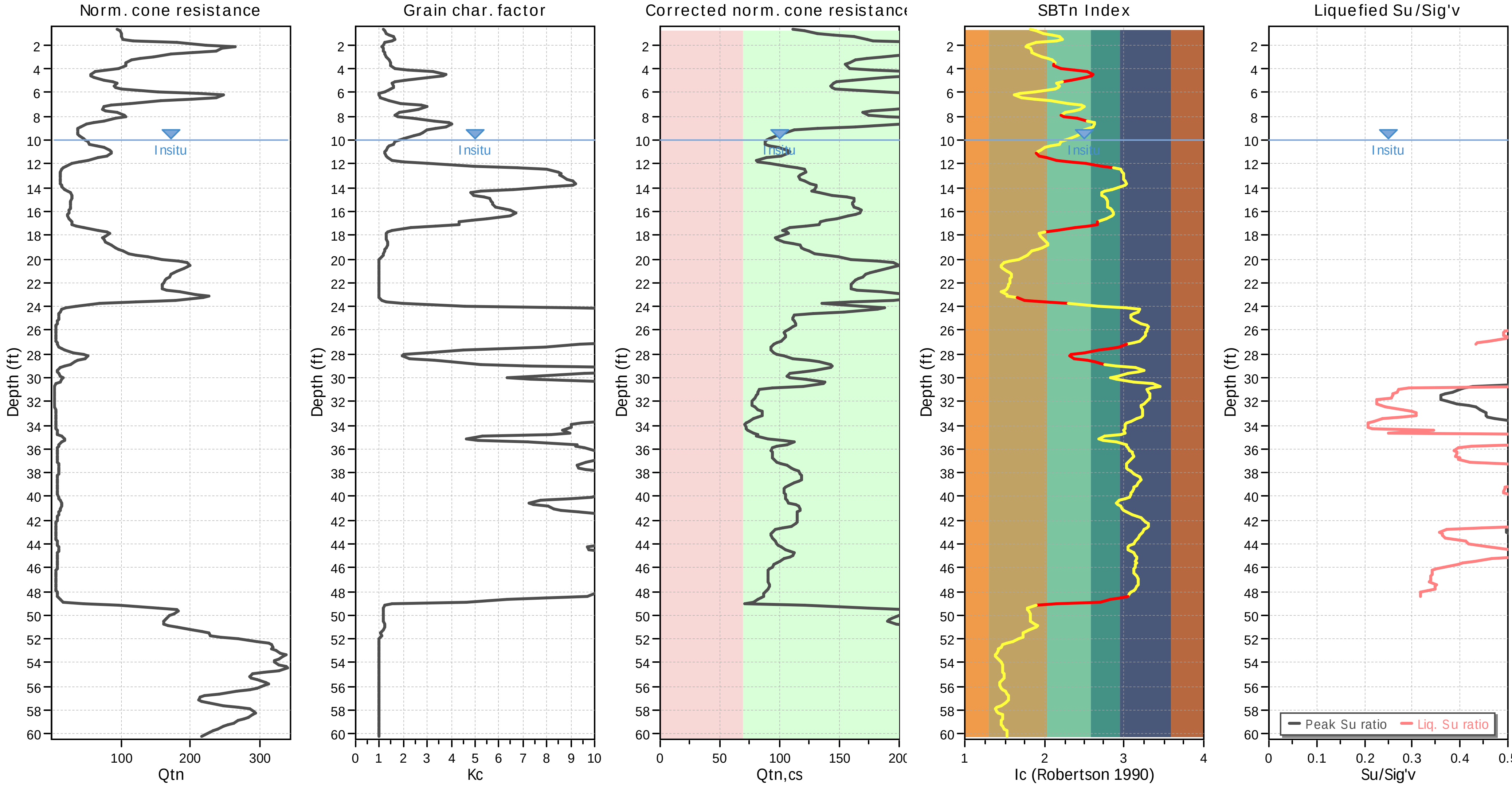




Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	4.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.00	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.51	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	10.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

Check for strength loss plots (Robertson (2010))



Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	4.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.00	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.51	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	10.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

LIQUEFACTION ANALYSIS REPORT

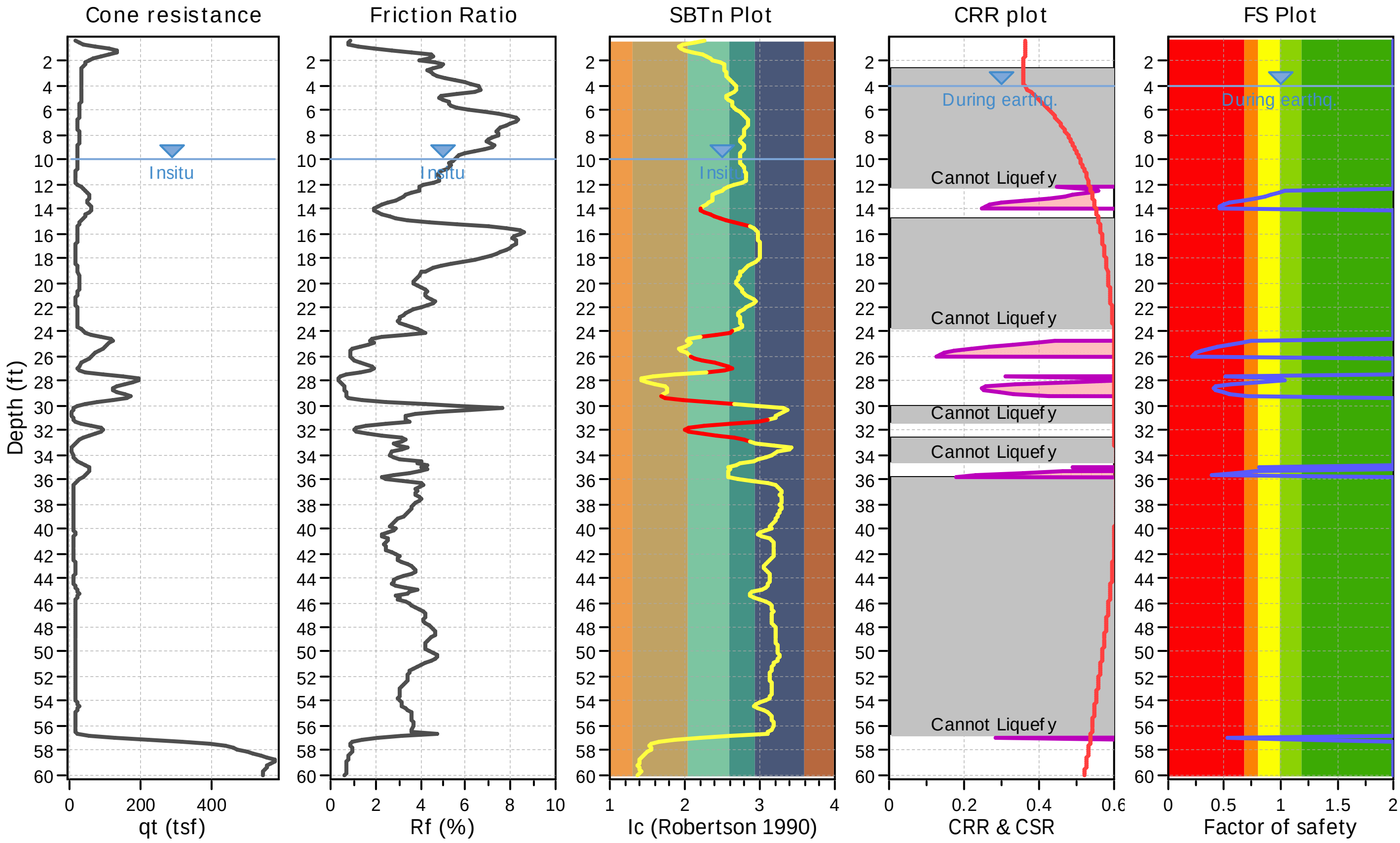
Project title : SJC04

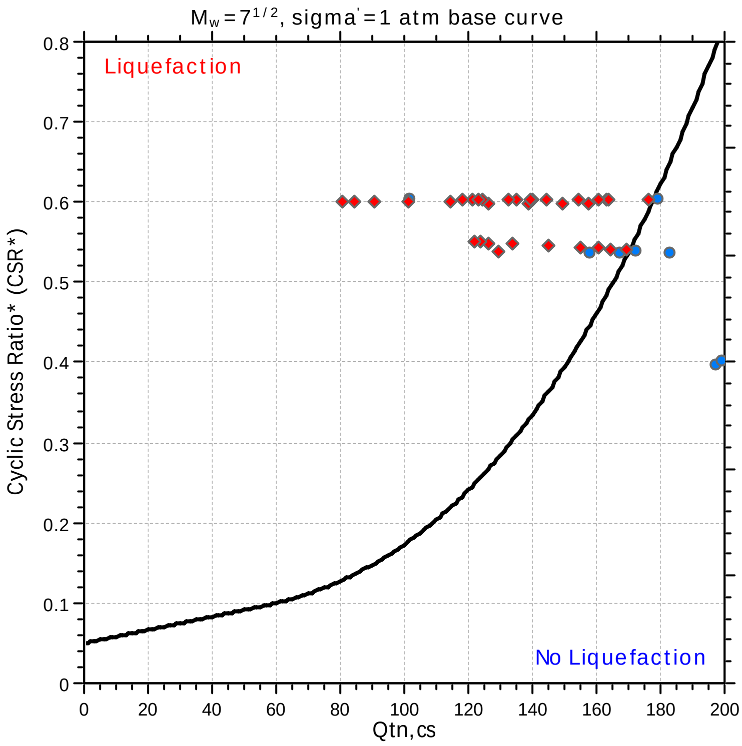
Location : San Jose, CA

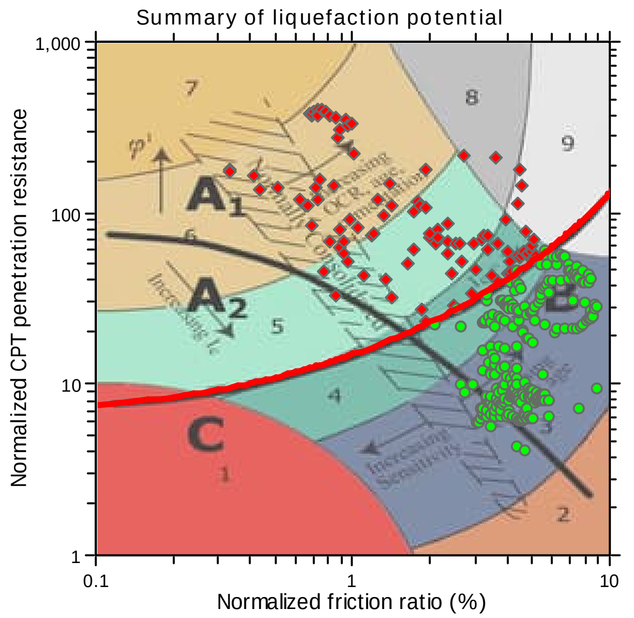
CPT file : CPT-11

Input parameters and analysis data

Analysis method:	NCEER (1998)	G.W.T. (in-situ):	10.00 ft	Use fill:	No	Clay like behavior applied:	Sands only
Fines correction method:	NCEER (1998)	G.W.T. (earthq.):	4.00 ft	Fill height:	N/A	Limit depth applied:	Yes
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	60.00 ft
Earthquake magnitude M_w:	7.00	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method based
Peak ground acceleration:	0.51	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

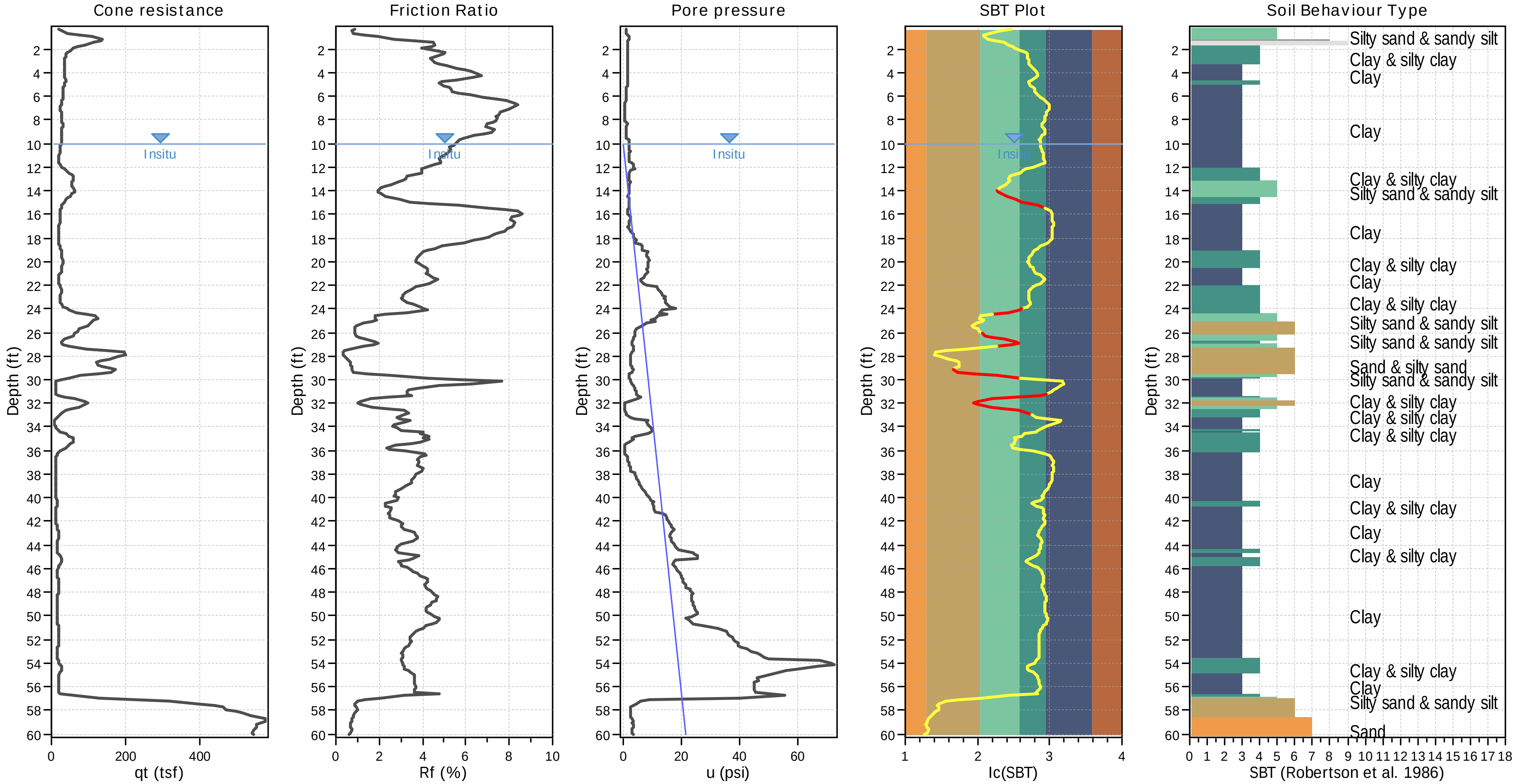






Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and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

CPT basic interpretation plots



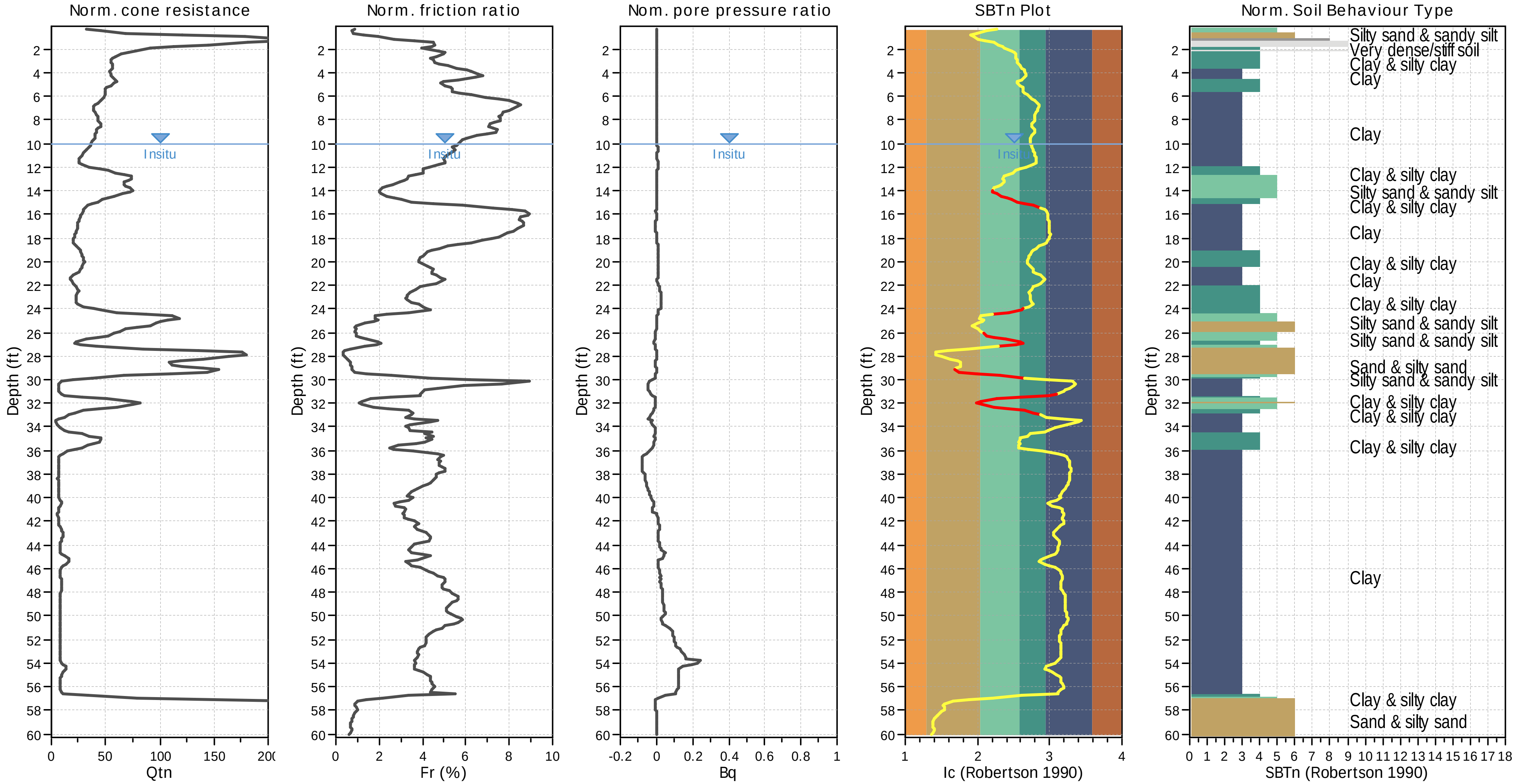
Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	4.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.00	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.51	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	10.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

SBT legend

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

CPT basic interpretation plots (normalized)



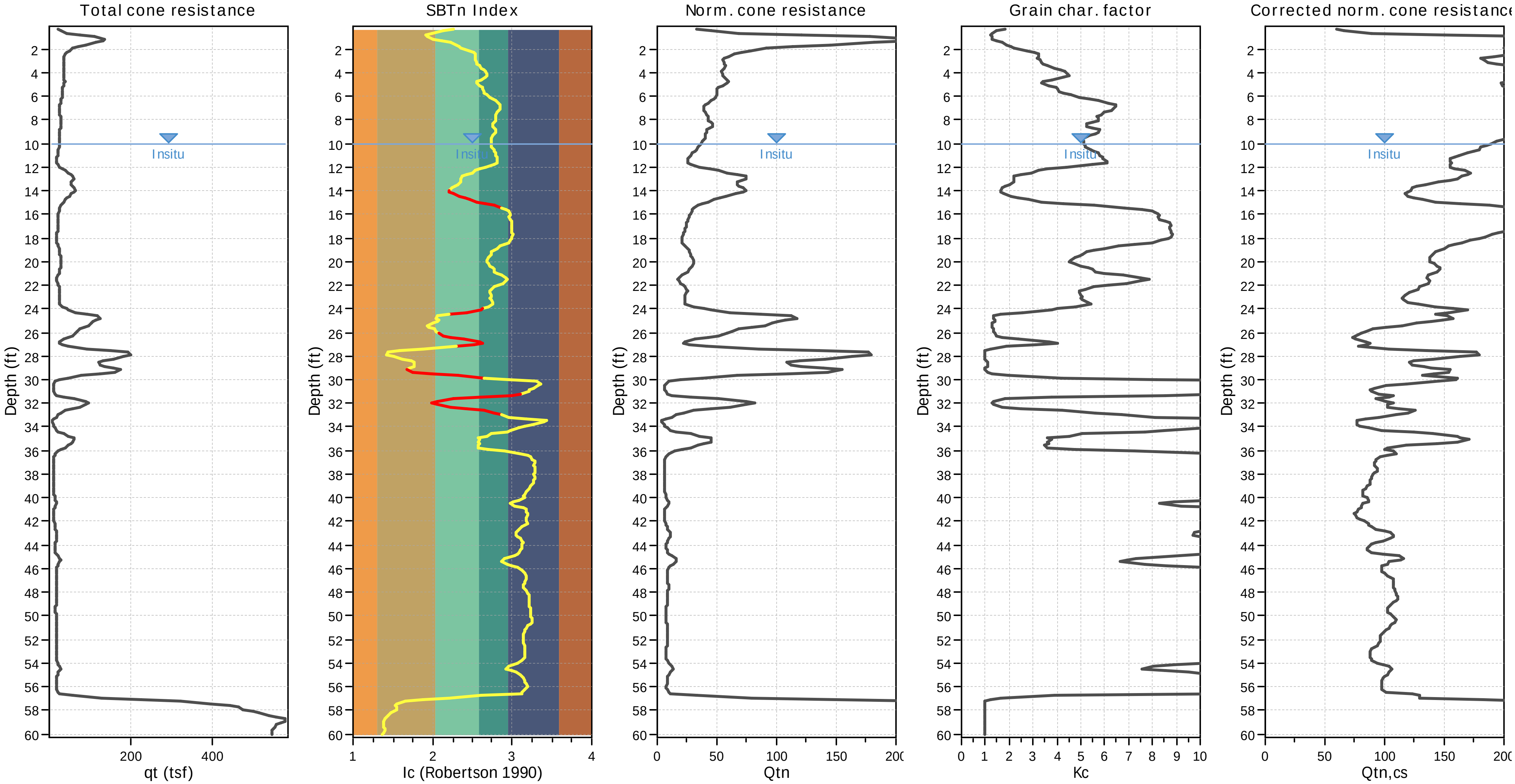
Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	4.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.00	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.51	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	10.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

SBTn legend

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

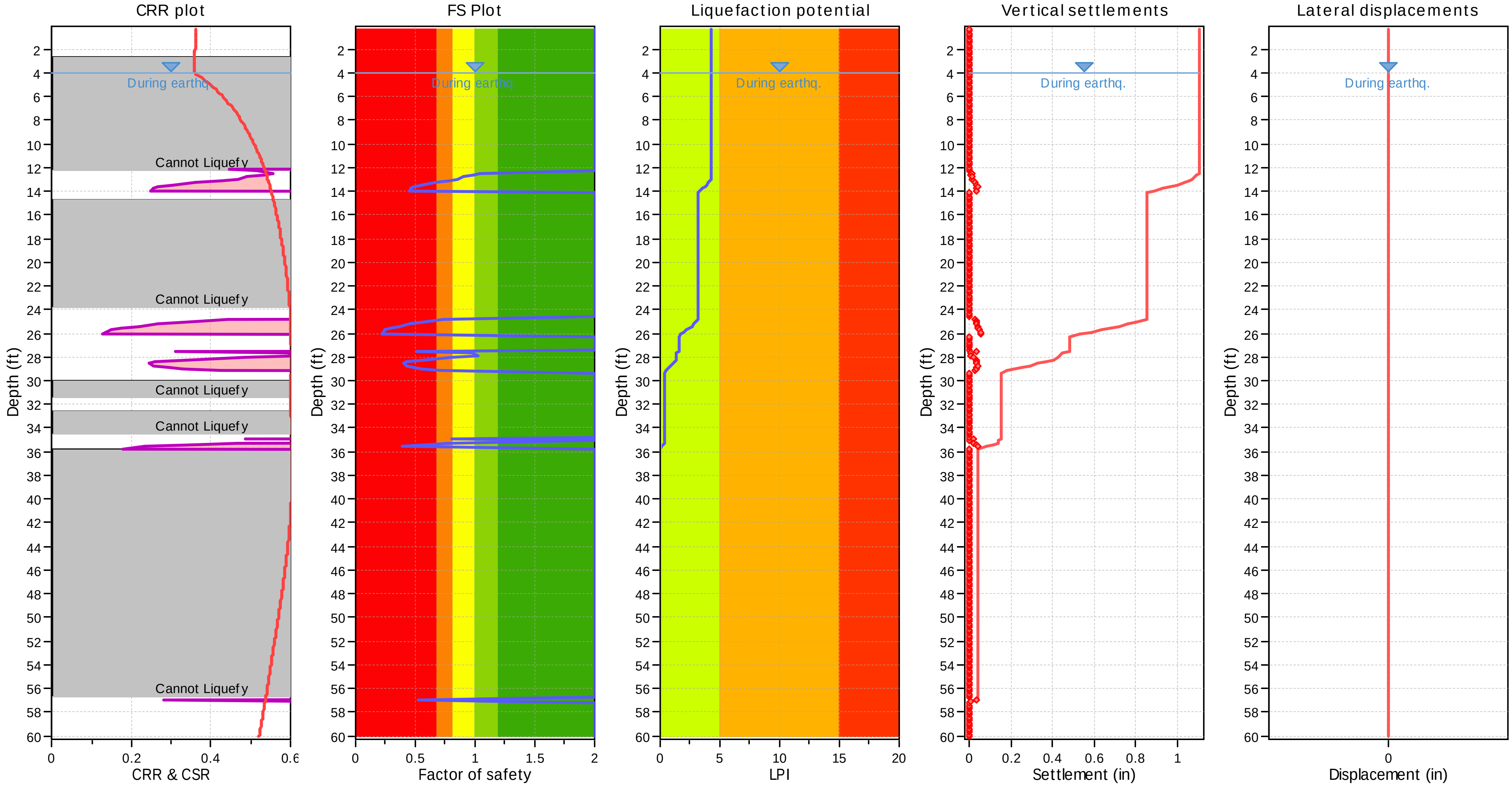
Liquefaction analysis overall plots (intermediate results)



Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	4.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.00	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.51	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	10.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

Liquefaction analysis overall plots



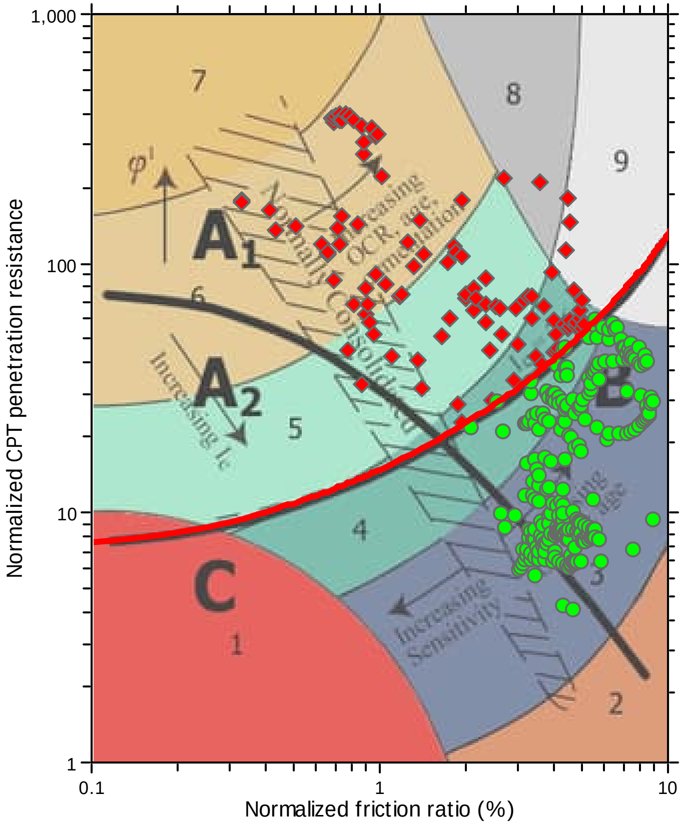
Input parameters and analysis data

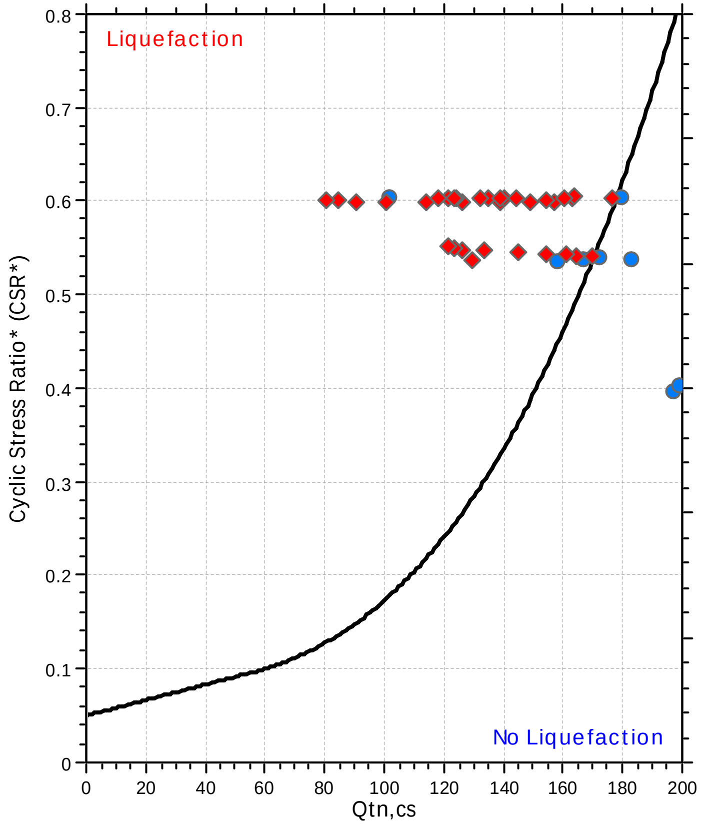
Analysis method:	NCEER (1998)	Depth to water table (erthq.):	4.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.00	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.51	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	10.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

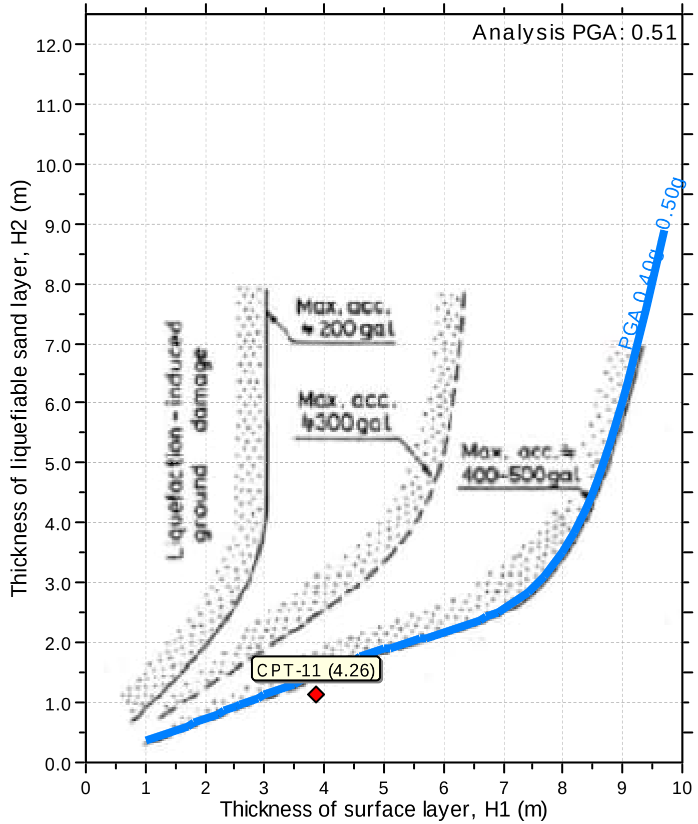
F.S. color scheme
- Almost certain it will liquefy
- Very likely to liquefy
- Liquefaction and no liq. are equally likely
- Unlike to liquefy
- Almost certain it will not liquefy

LPI color scheme
- Very high risk
- High risk
- Low risk

Liquefaction analysis summary plots



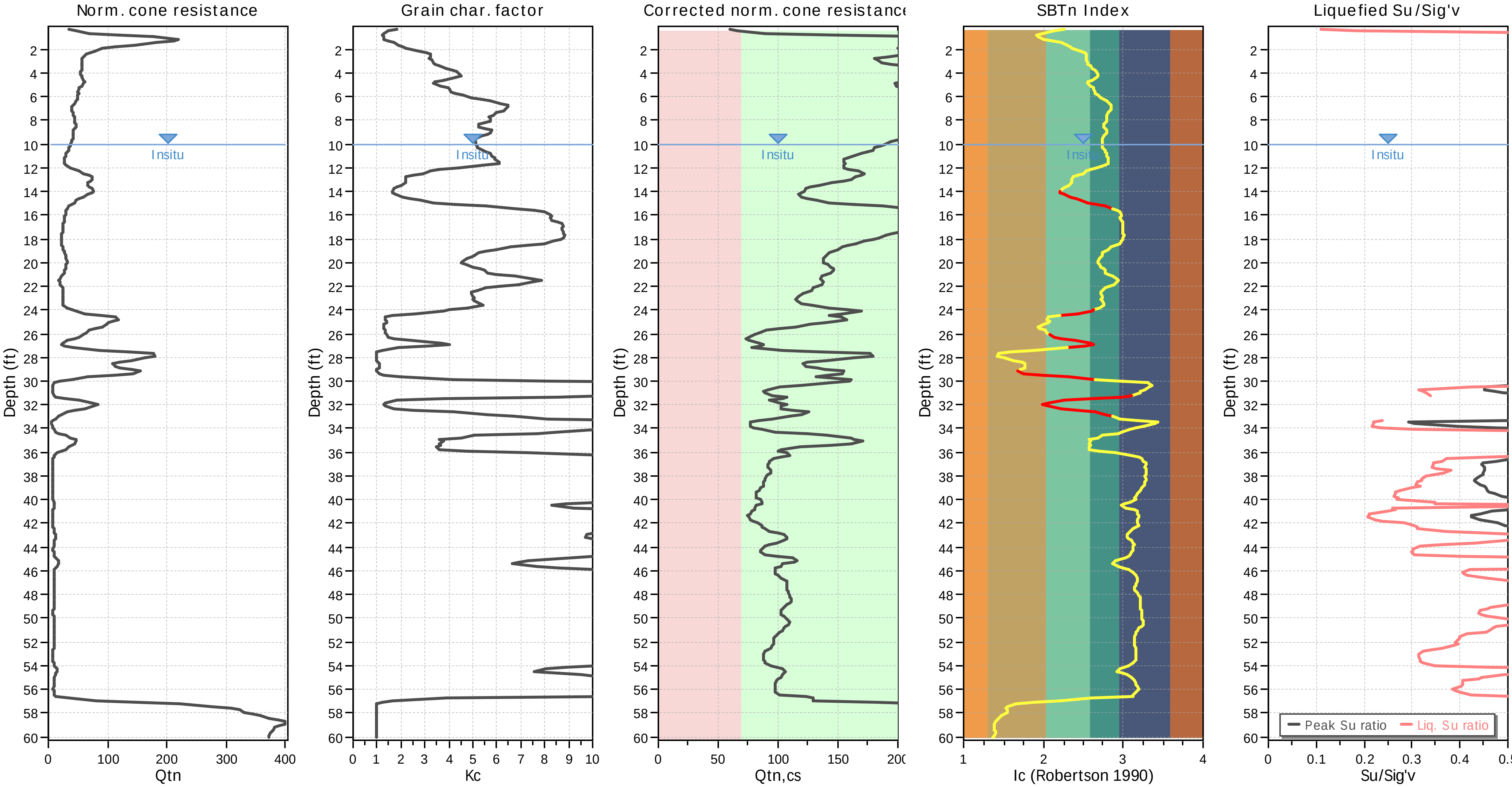




Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	4.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.00	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.51	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	10.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

Check for strength loss plots (Robertson (2010))



Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	4.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.00	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.51	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	10.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

Terracon Consultants, Inc.
5075 Commercial Cir.,Suite E
Concord, CA 94520
www.terracon.com

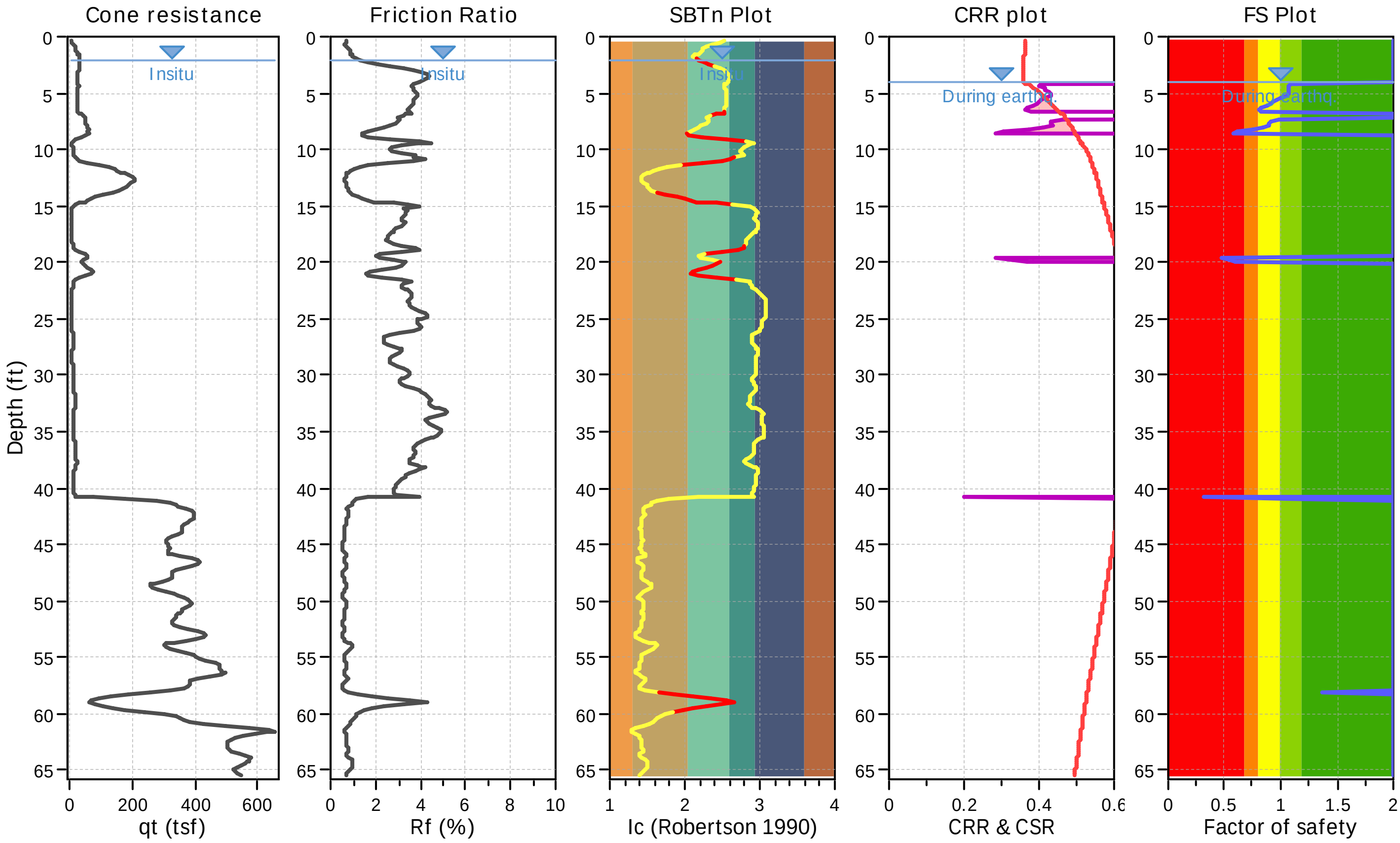
LIQUEFACTION ANALYSIS REPORT

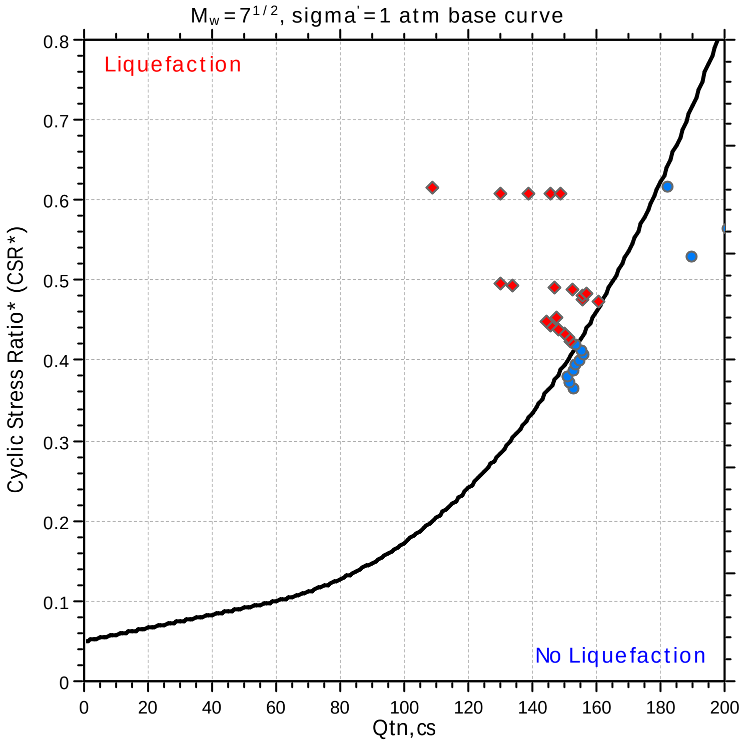
Project title : SJC04 Location : San Jose, CA

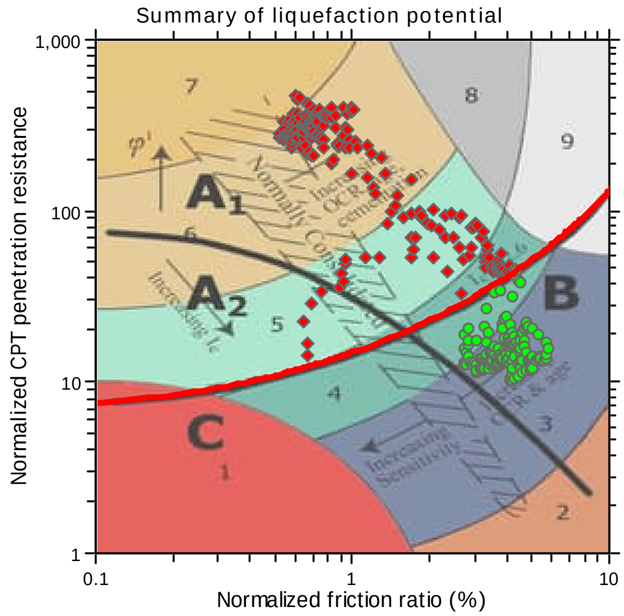
CPT file : CPT-01B

Input parameters and analysis data

Analysis method:	NCEER (1998)	G.W.T. (in-situ):	2.00 ft	Use fill:	No	Clay like behavior applied:	Sands only
Fines correction method:	NCEER (1998)	G.W.T. (earthq.):	4.00 ft	Fill height:	N/A	Limit depth applied:	Yes
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	60.00 ft
Earthquake magnitude M_w:	7.00	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method based
Peak ground acceleration:	0.51	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

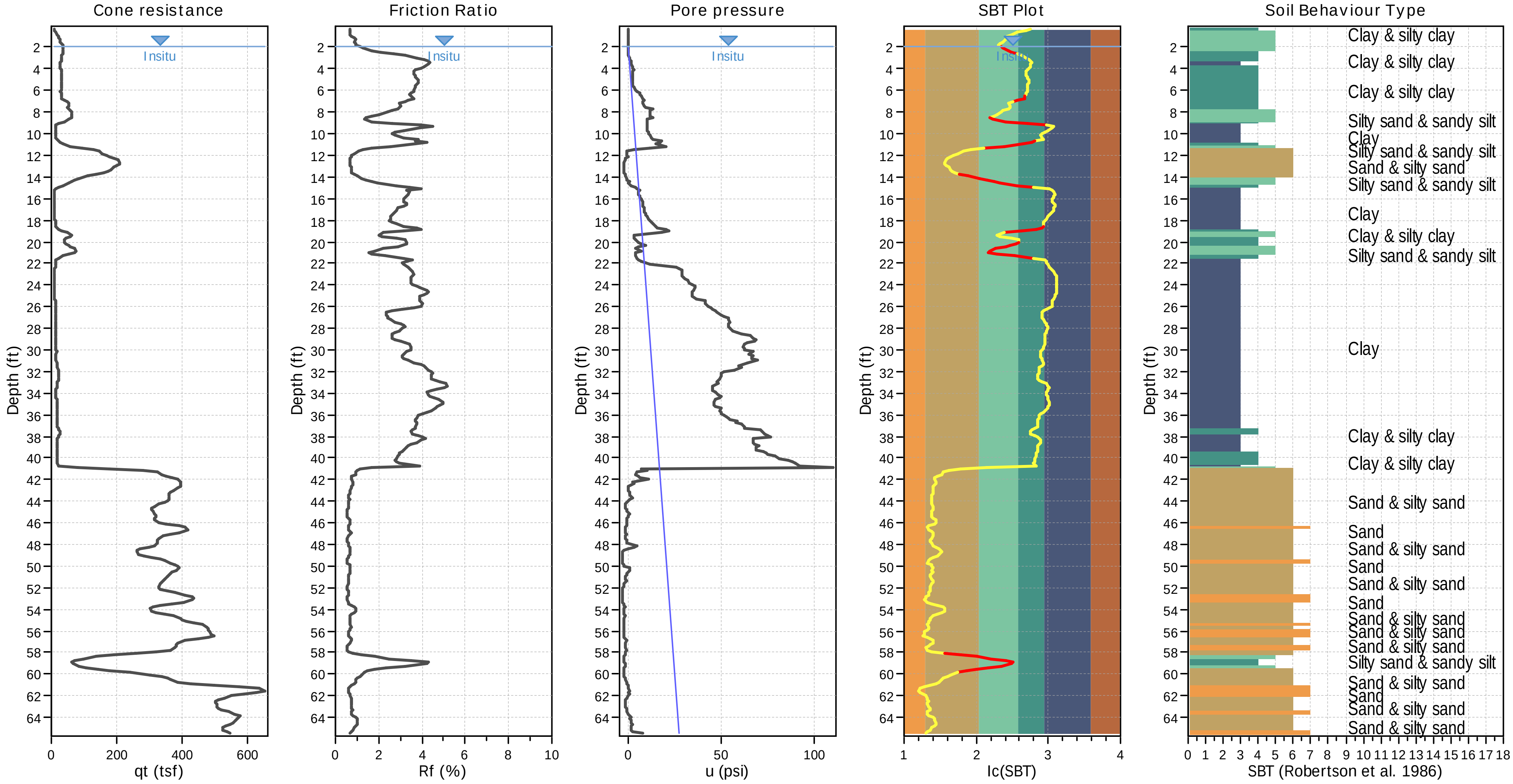






Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and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

CPT basic interpretation plots



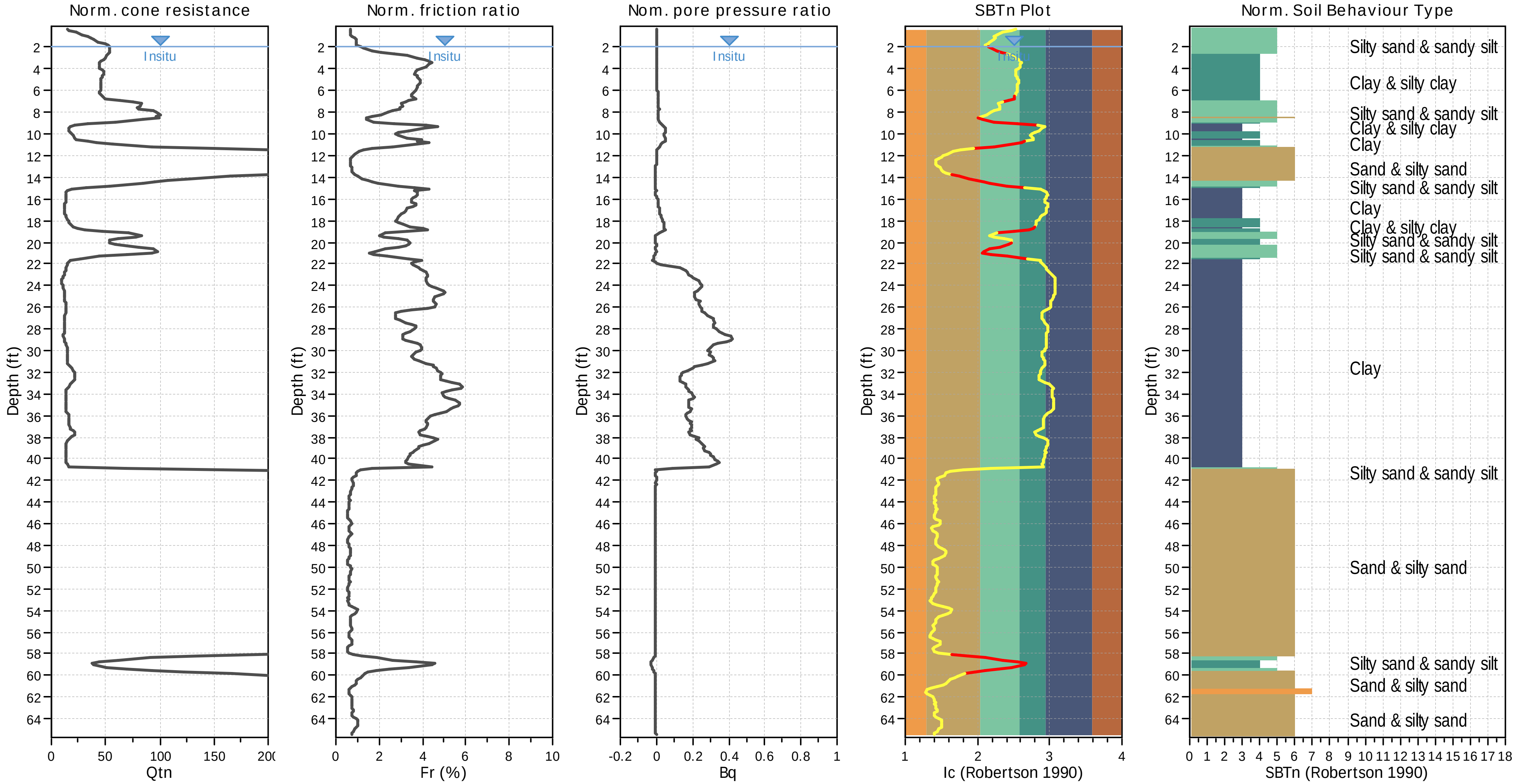
Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	4.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.00	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.51	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	2.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

SBT legend

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

CPT basic interpretation plots (normalized)



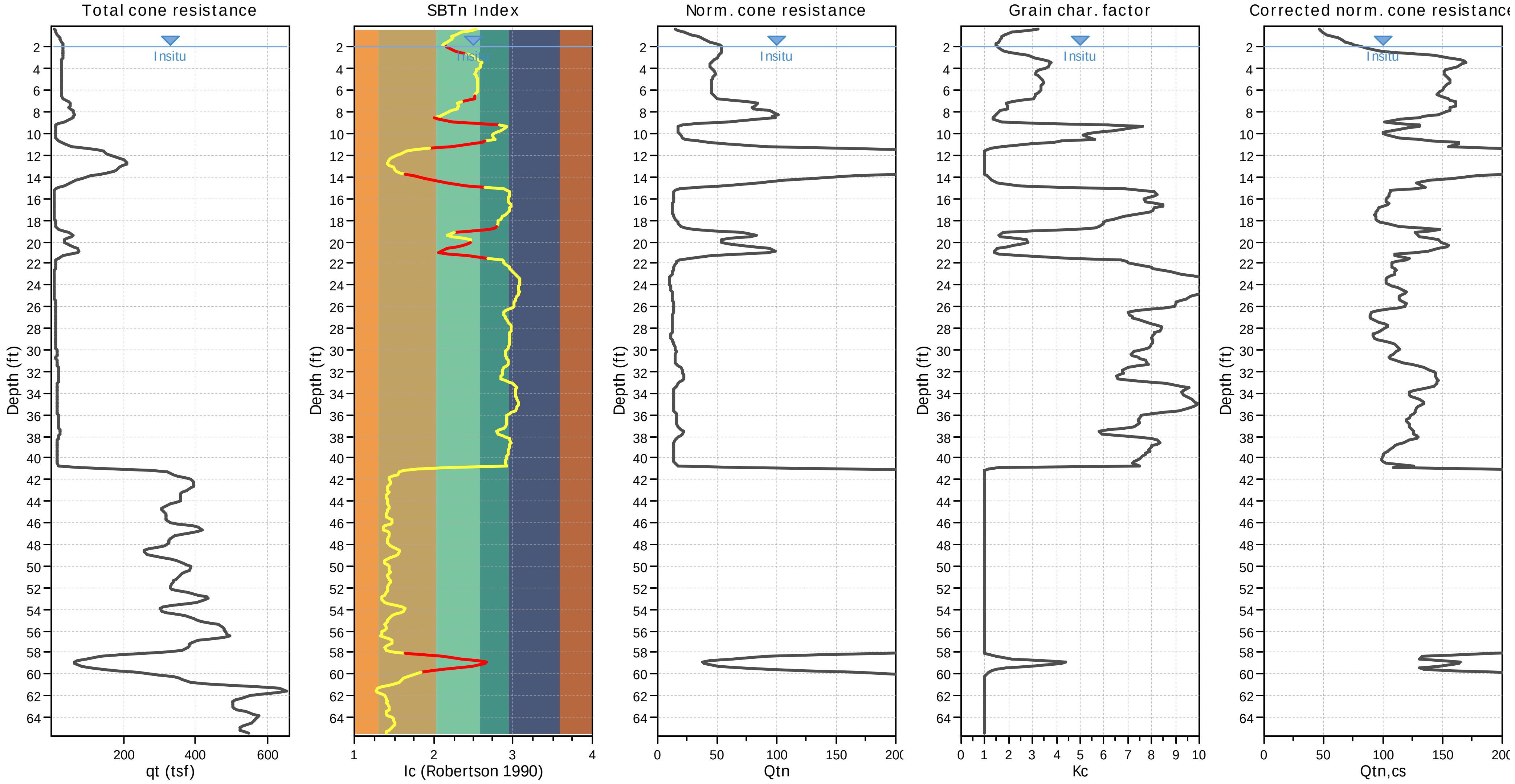
Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	4.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.00	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.51	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	2.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

SBTn legend

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

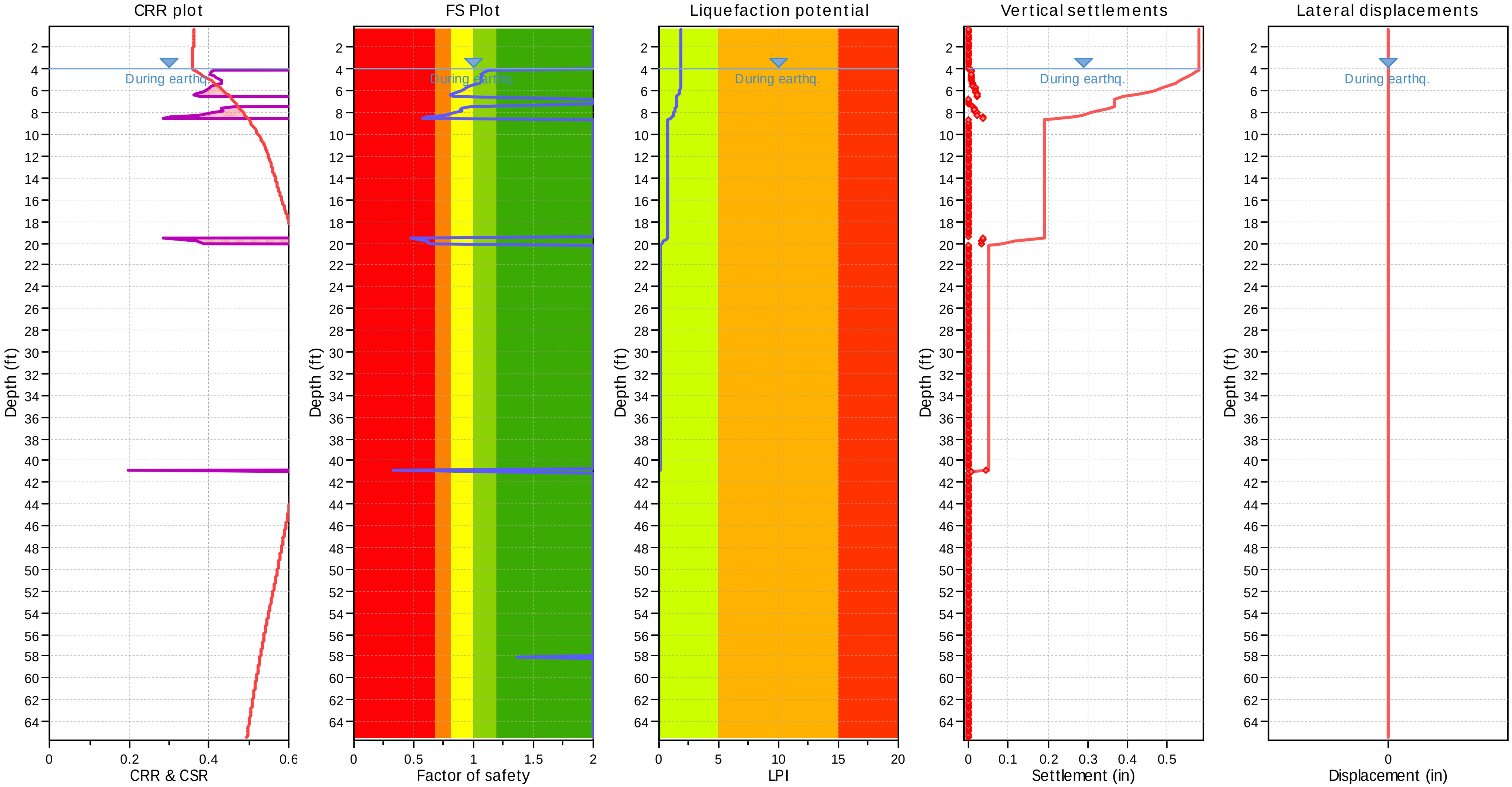
Liquefaction analysis overall plots (intermediate results)



Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	4.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.00	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.51	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	2.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	4.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_{σ} applied:	Yes
Earthquake magnitude M_w:	7.00	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.51	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	2.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

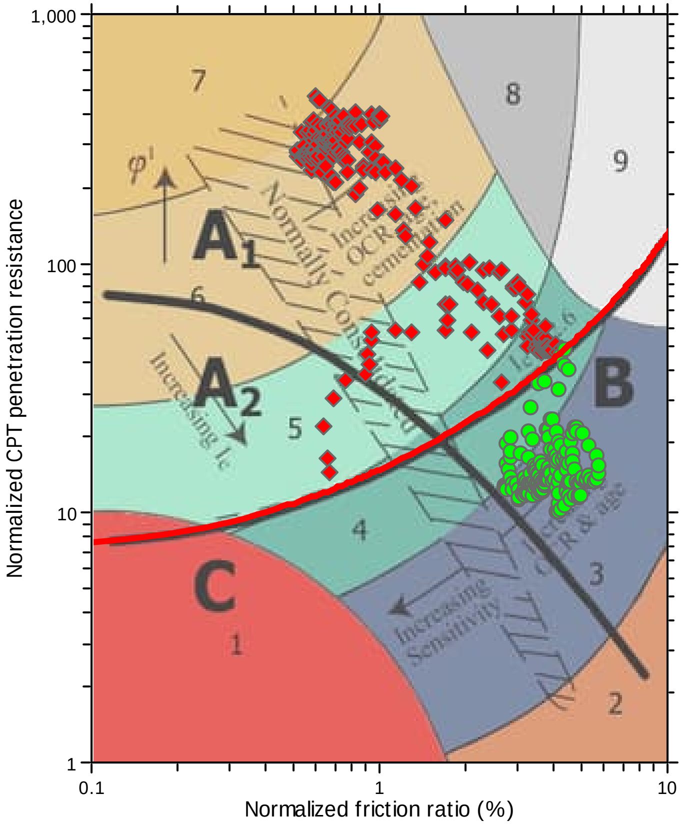
F.S. color scheme

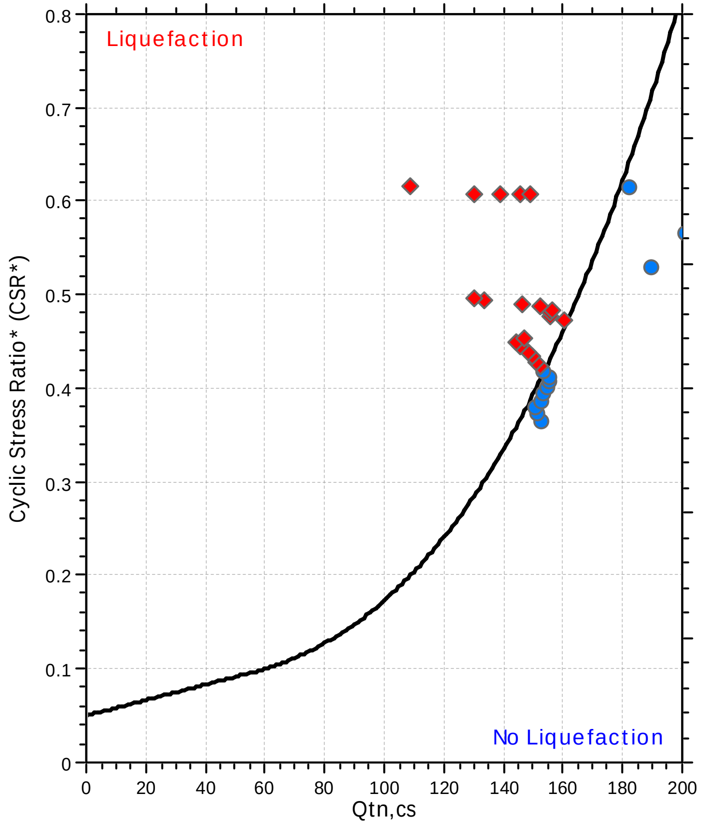
- Almost certain it will liquefy
- Very likely to liquefy
- Liquefaction and no liq. are equally likely
- Unlike to liquefy
- Almost certain it will not liquefy

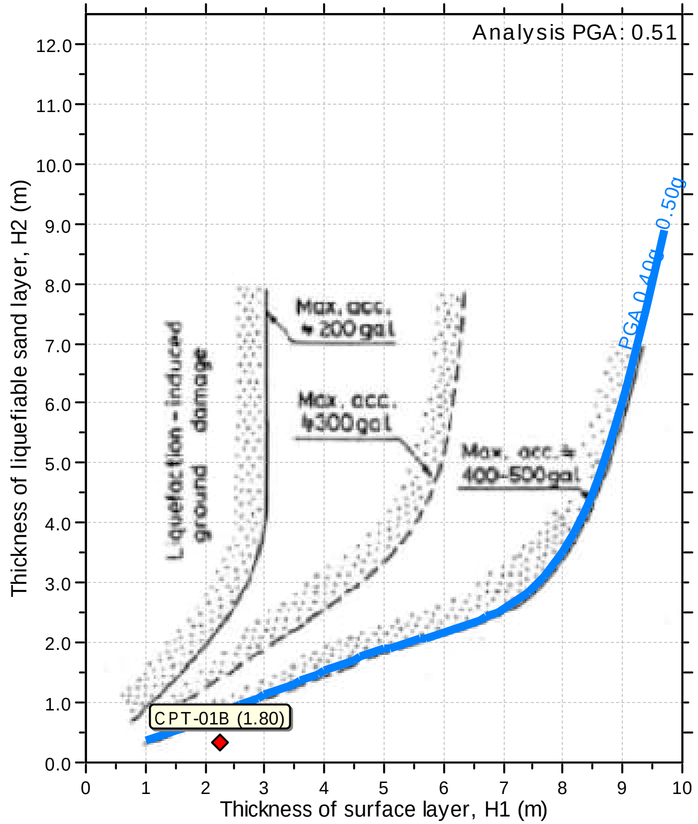
LPI color scheme

- Very high risk
- High risk
- Low risk

Liquefaction analysis summary plots



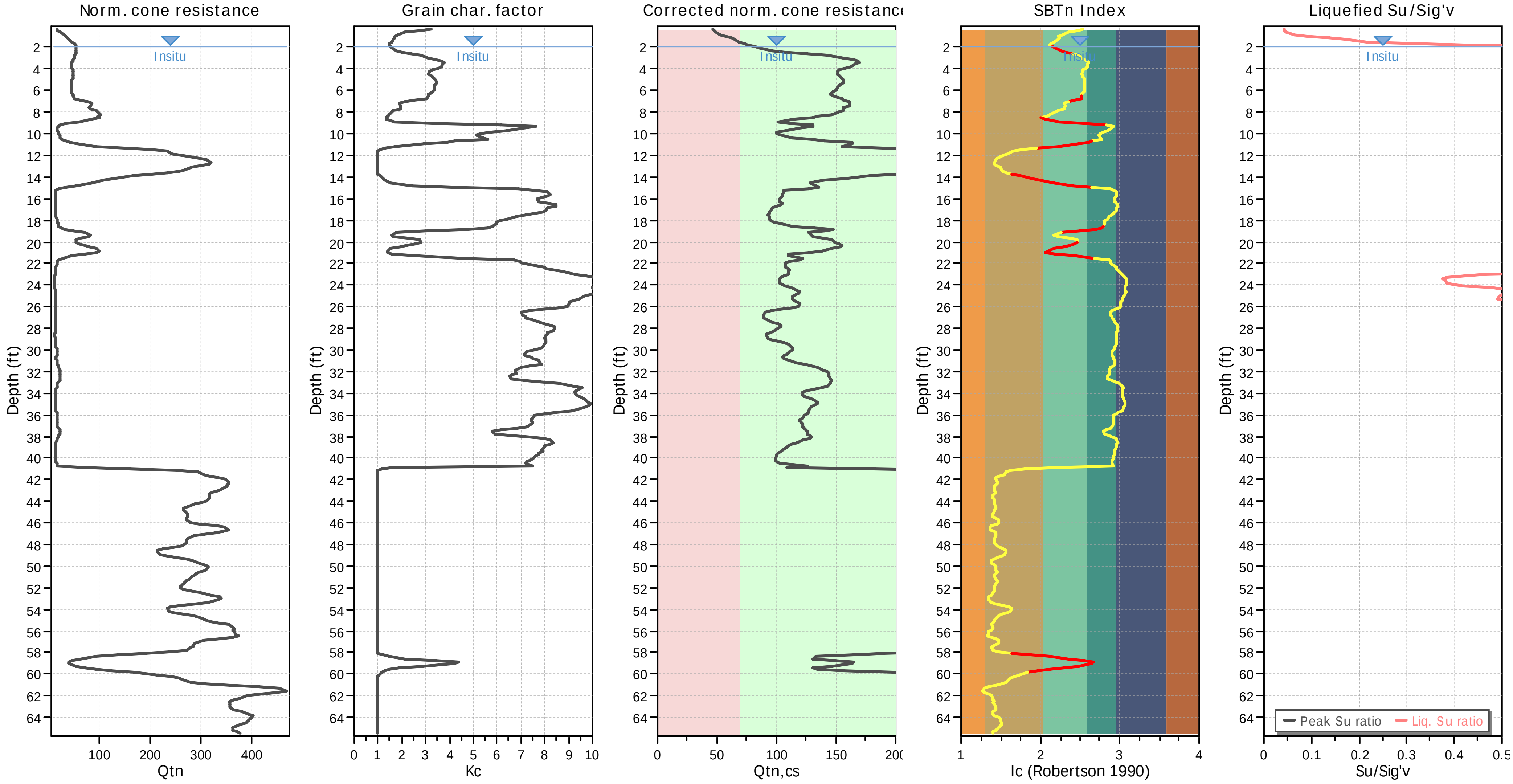




Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	4.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.00	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.51	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	2.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

Check for strength loss plots (Robertson (2010))



Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	4.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.00	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.51	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	2.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

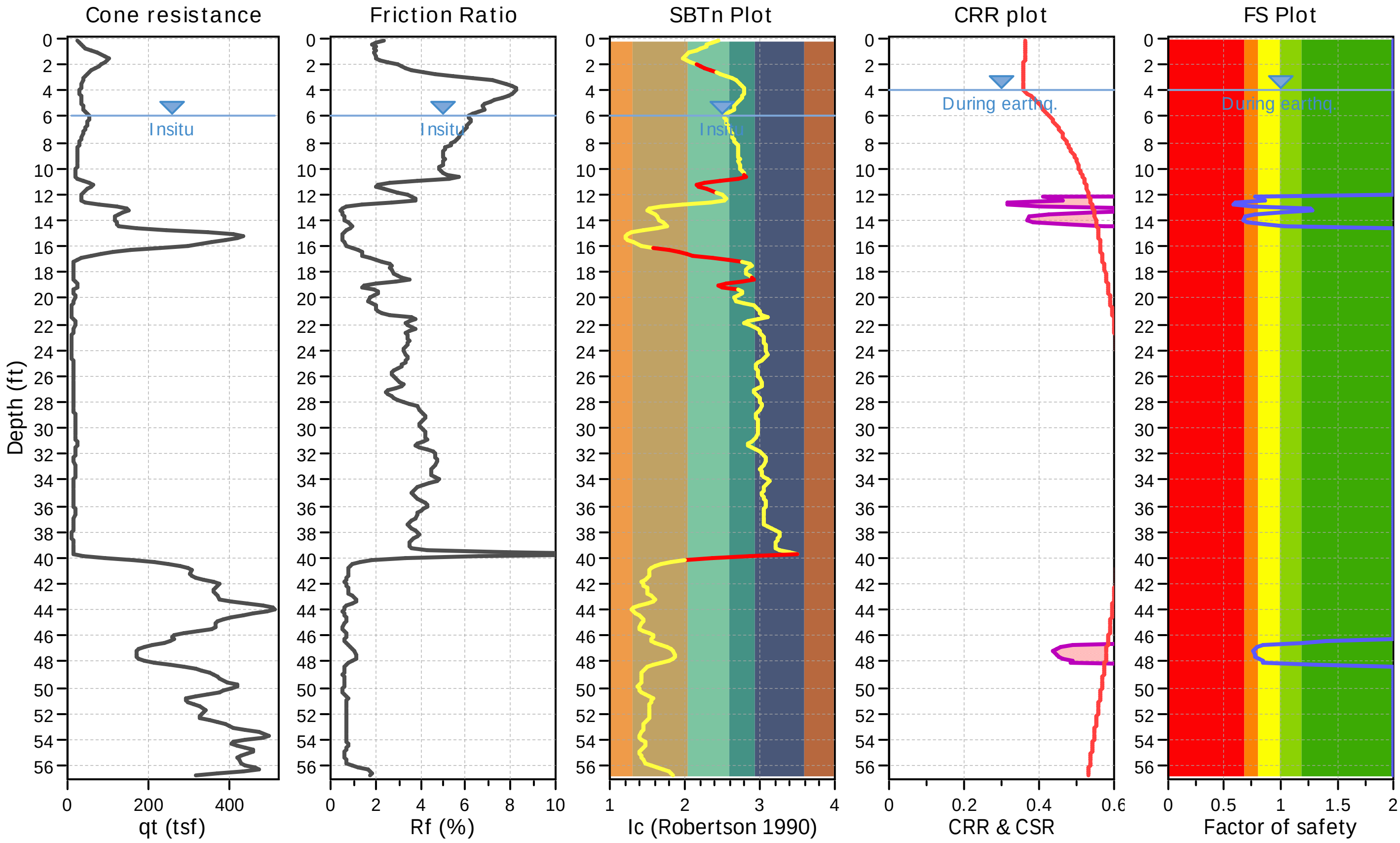
LIQUEFACTION ANALYSIS REPORT

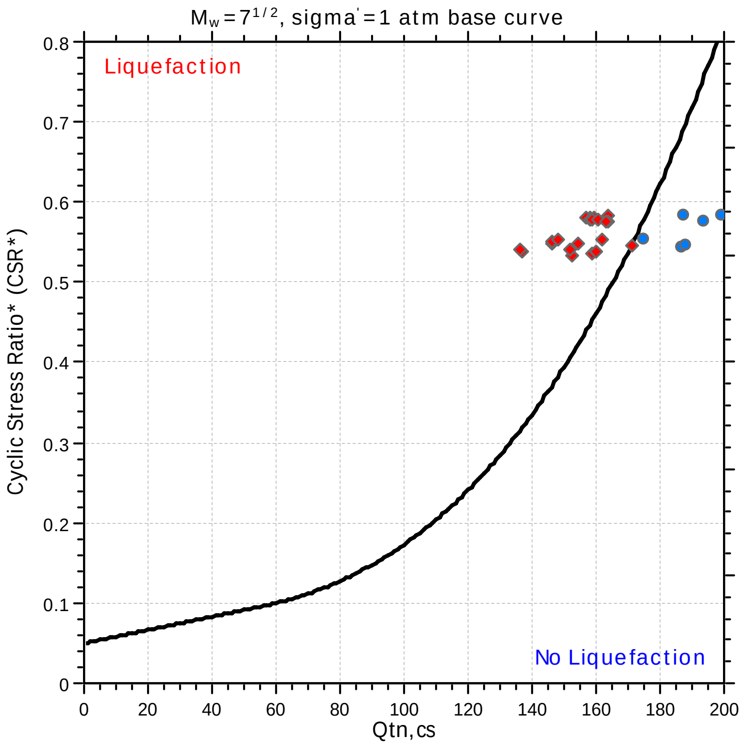
Project title : SJC04 Location : San Jose, CA

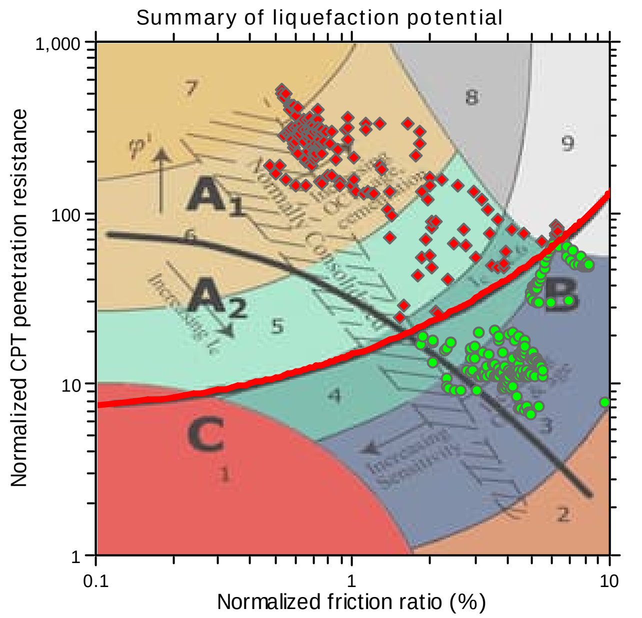
CPT file : CPT-02B

Input parameters and analysis data

Analysis method:	NCEER (1998)	G.W.T. (in-situ):	6.00 ft	Use fill:	No	Clay like behavior applied:	Sands only
Fines correction method:	NCEER (1998)	G.W.T. (earthq.):	4.00 ft	Fill height:	N/A	Limit depth applied:	Yes
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	60.00 ft
Earthquake magnitude M_w:	7.00	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method based
Peak ground acceleration:	0.51	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

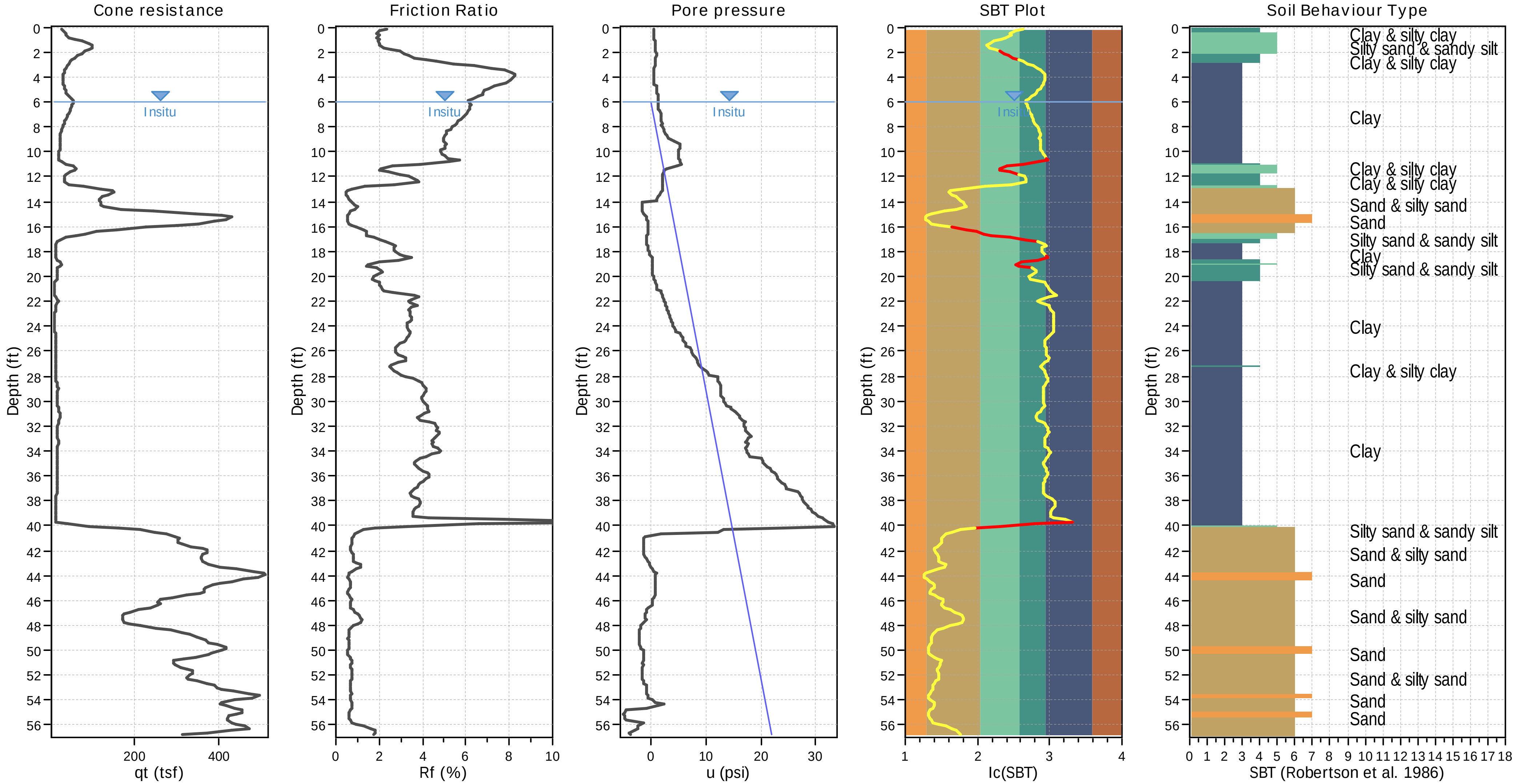






Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and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

CPT basic interpretation plots



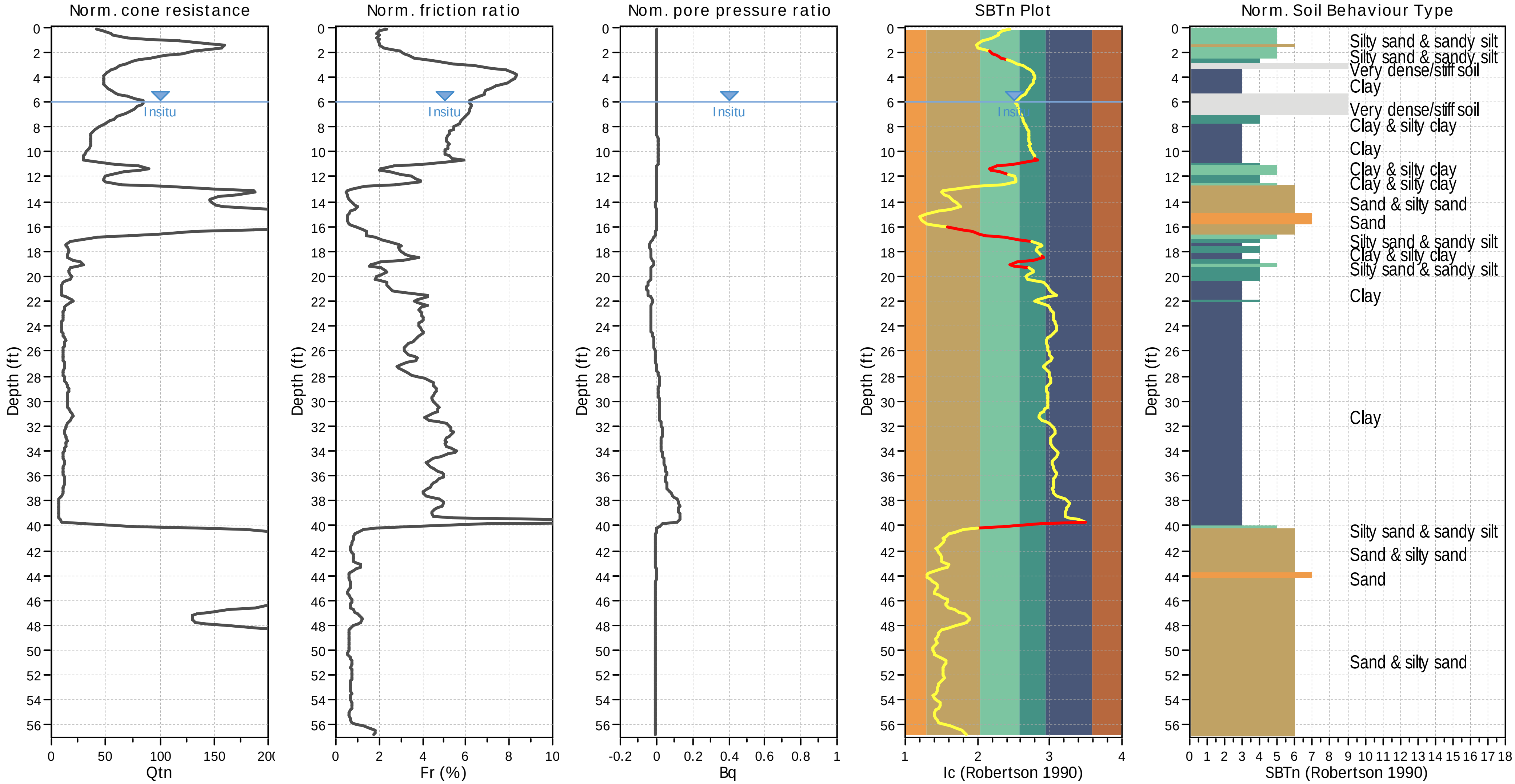
Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	4.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.00	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.51	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	6.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

SBT legend

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

CPT basic interpretation plots (normalized)



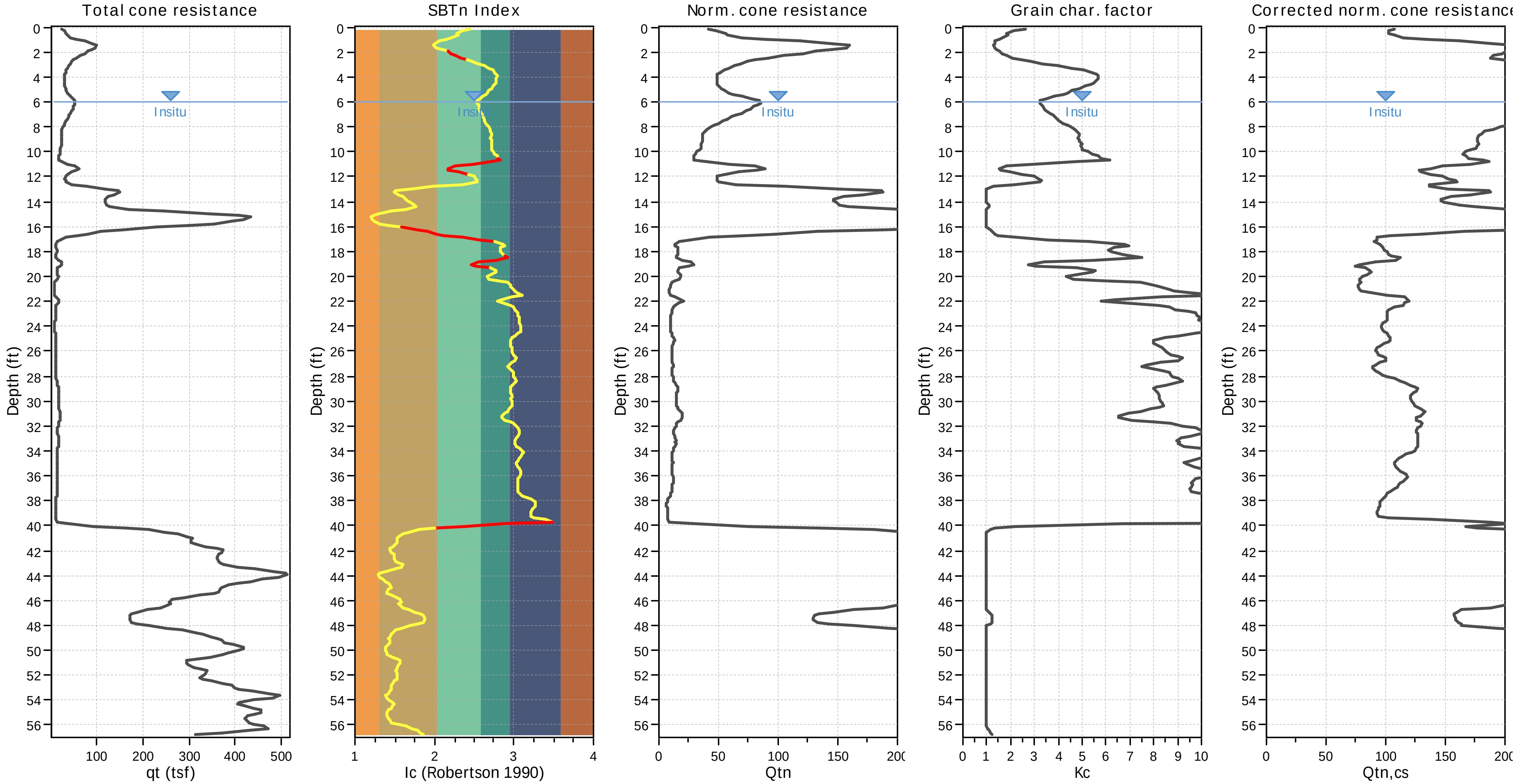
Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	4.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.00	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.51	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	6.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

SBTn legend

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

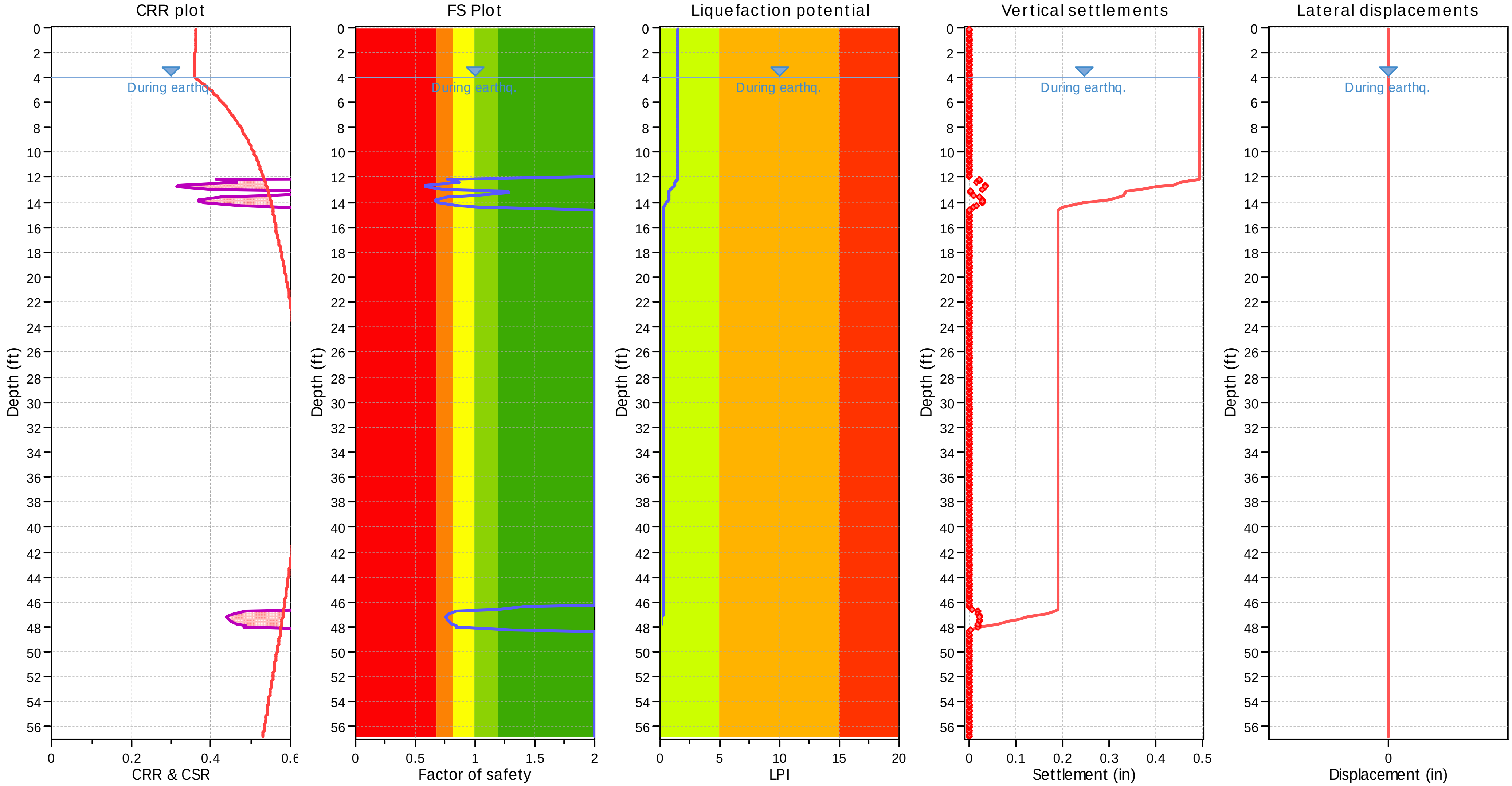
Liquefaction analysis overall plots (intermediate results)



Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	4.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.00	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.51	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	6.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	4.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.00	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.51	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	6.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

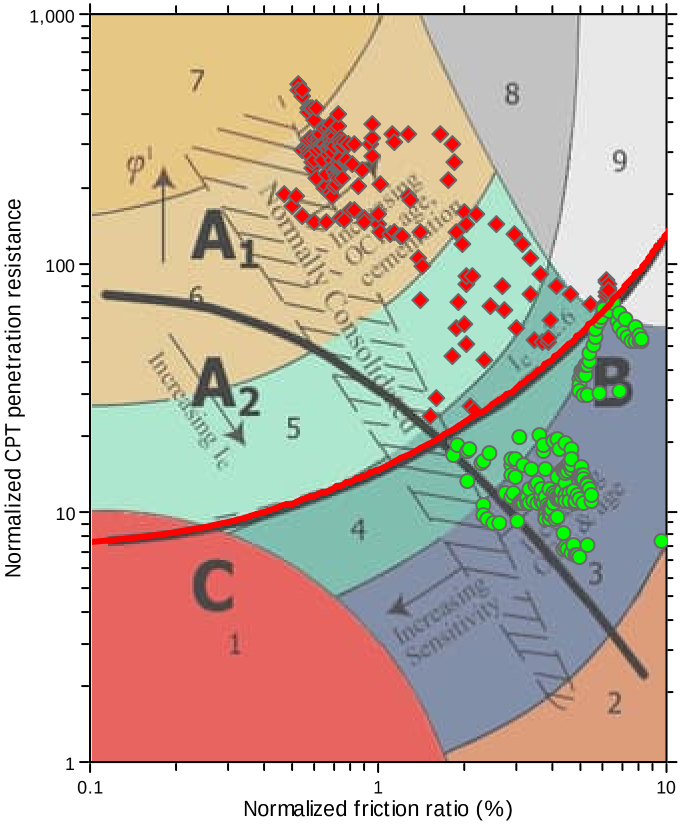
F.S. color scheme

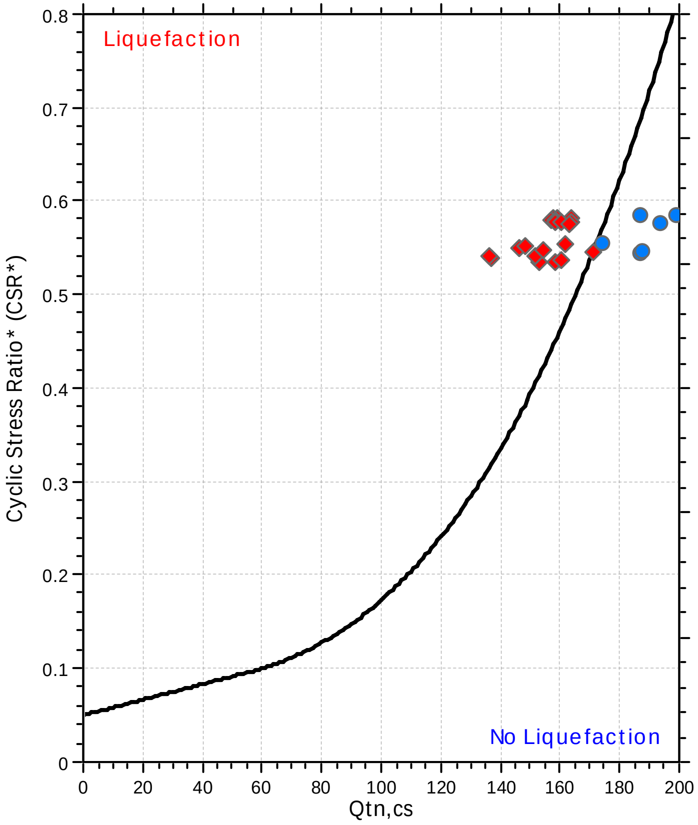
- Almost certain it will liquefy
- Very likely to liquefy
- Liquefaction and no liq. are equally likely
- Unlike to liquefy
- Almost certain it will not liquefy

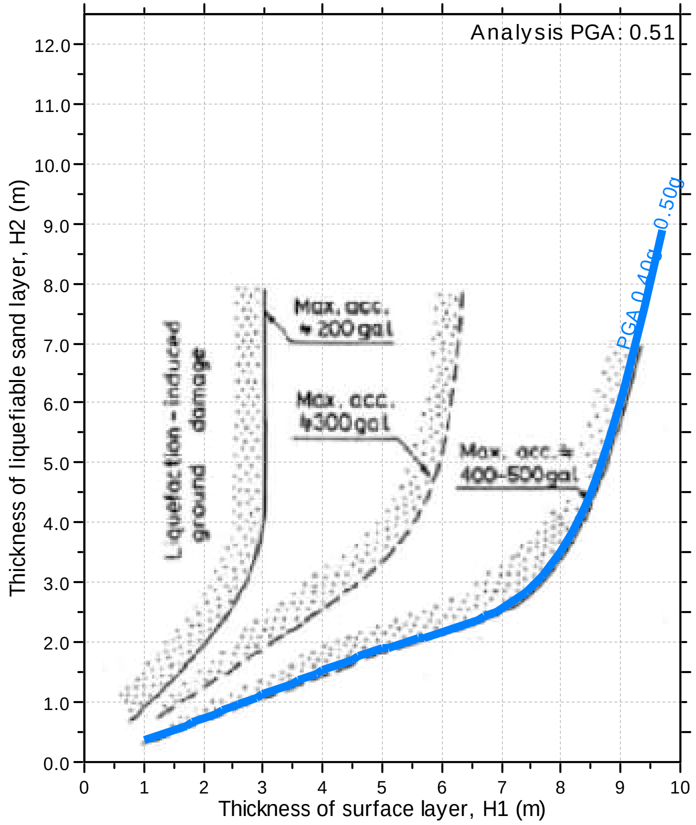
LPI color scheme

- Very high risk
- High risk
- Low risk

Liquefaction analysis summary plots



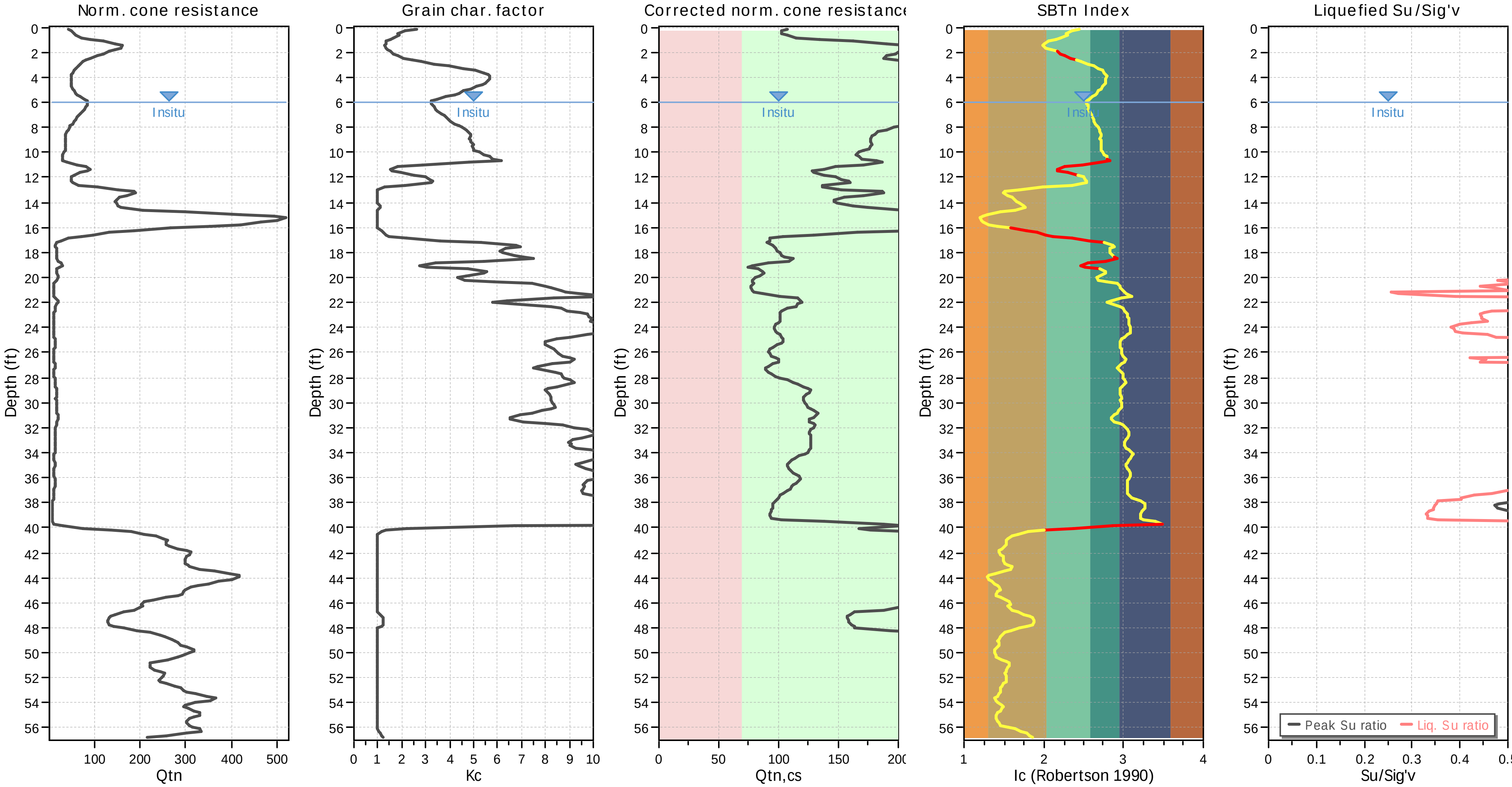




Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	4.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.00	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.51	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	6.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

Check for strength loss plots (Robertson (2010))



Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	4.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.00	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.51	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	6.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

Terracon Consultants, Inc.
5075 Commercial Cir.,Suite E
Concord, CA 94520
www.terracon.com

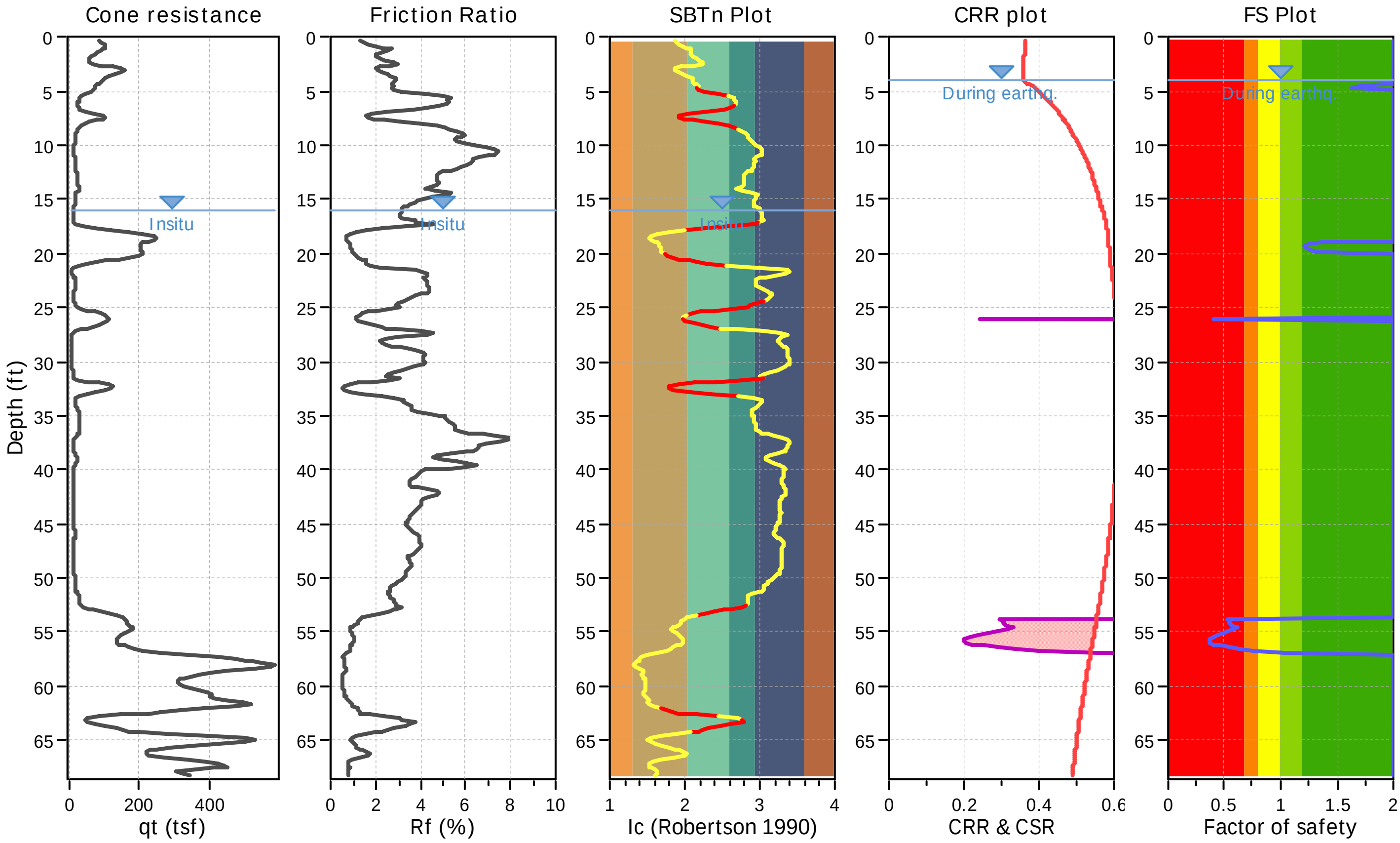
LIQUEFACTION ANALYSIS REPORT

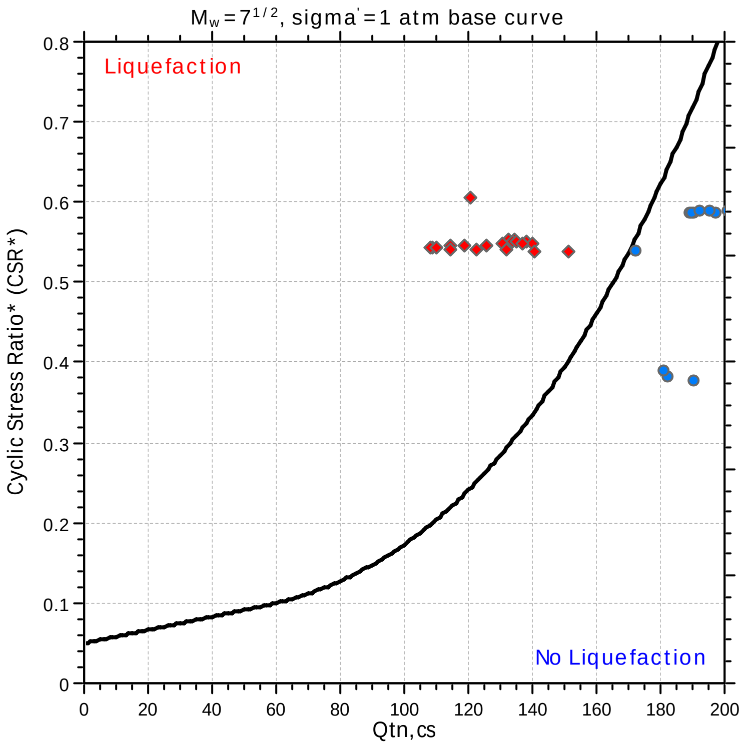
Project title : SJC04　　　　Location : San Jose, CA

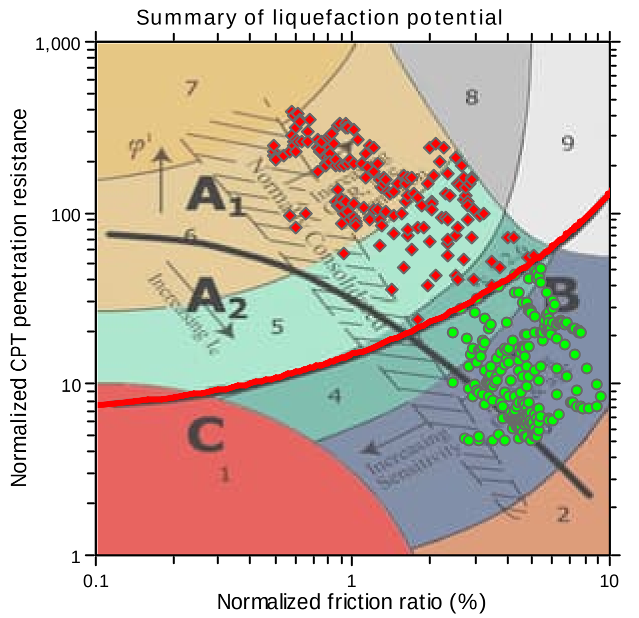
CPT file : CPT-03B

Input parameters and analysis data

Analysis method:	NCEER (1998)	G.W.T. (in-situ):	16.00 ft	Use fill:	No	Clay like behavior applied:	Sands only
Fines correction method:	NCEER (1998)	G.W.T. (earthq.):	4.00 ft	Fill height:	N/A	Limit depth applied:	Yes
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	60.00 ft
Earthquake magnitude M_w:	7.00	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method based
Peak ground acceleration:	0.51	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

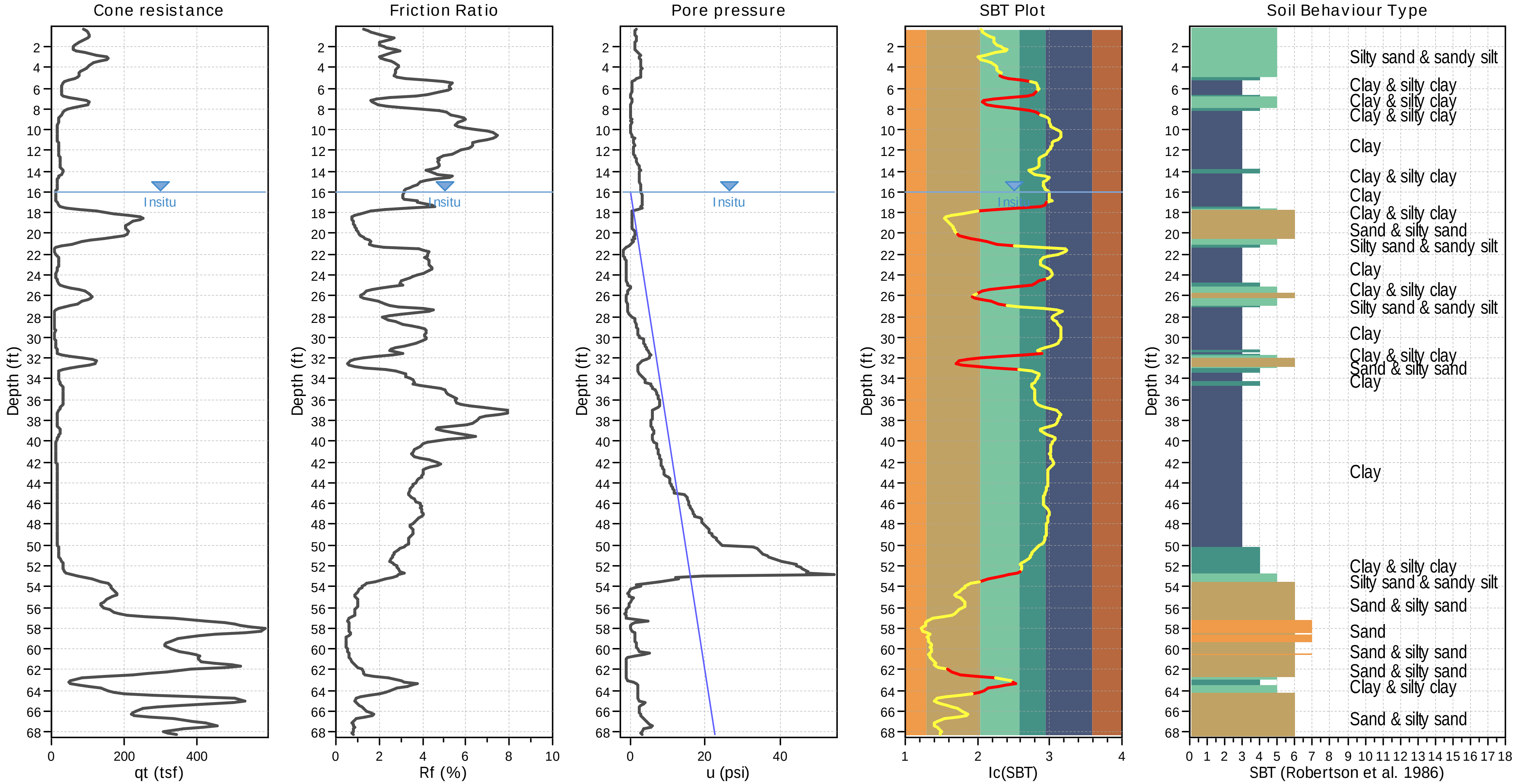






Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and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

CPT basic interpretation plots



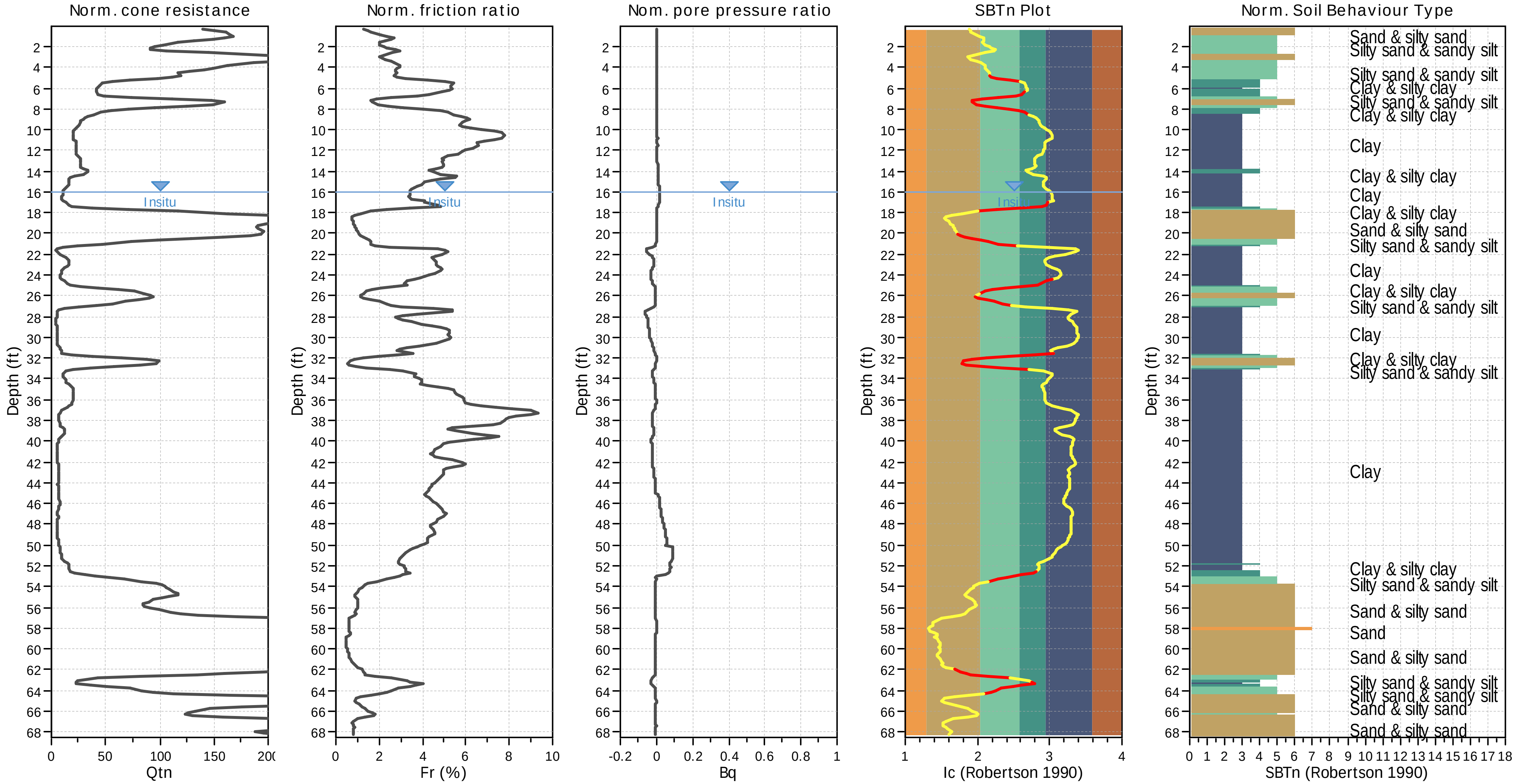
Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	4.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.00	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.51	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	16.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

SBT legend

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

CPT basic interpretation plots (normalized)



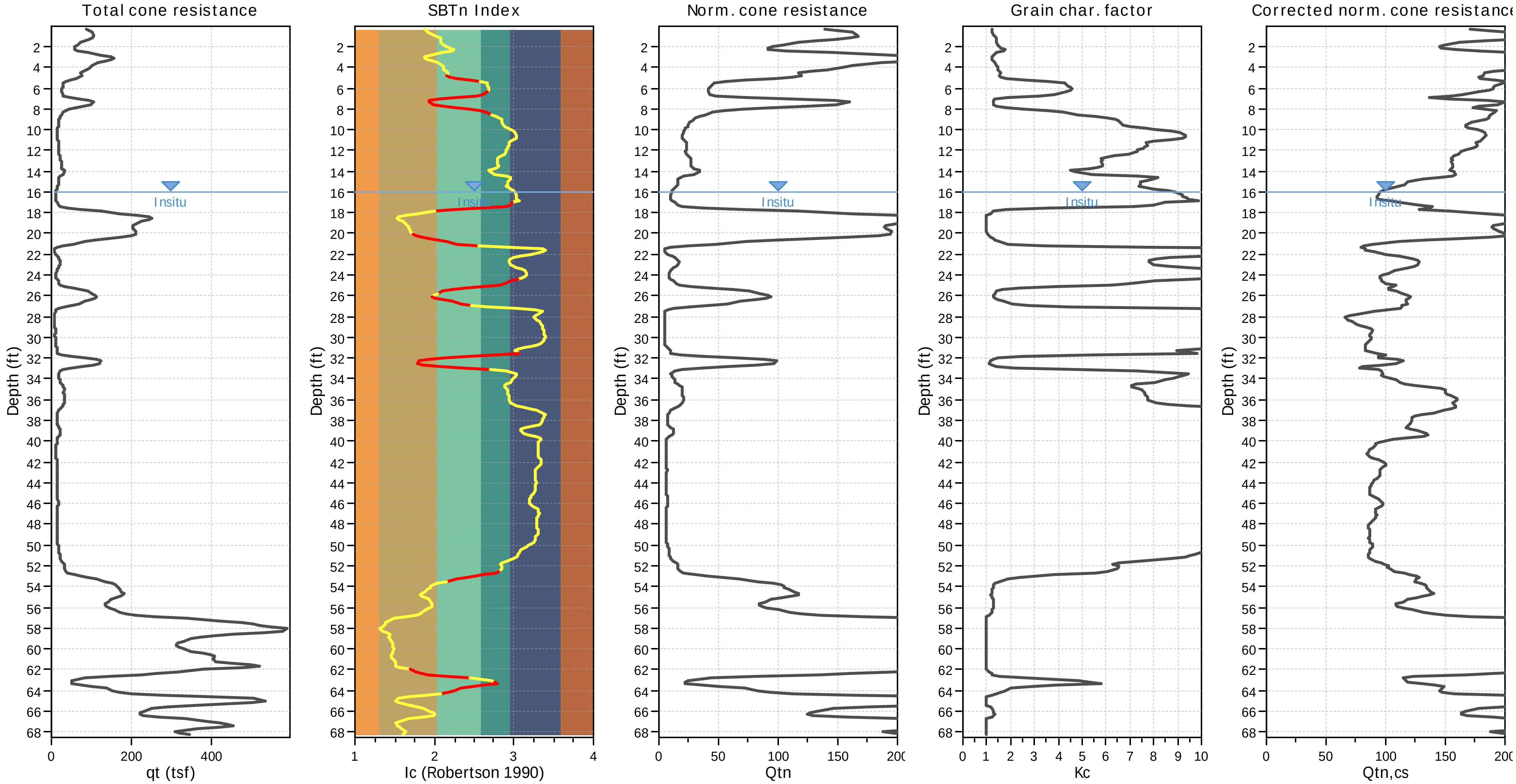
Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	4.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.00	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.51	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	16.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

SBTn legend

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

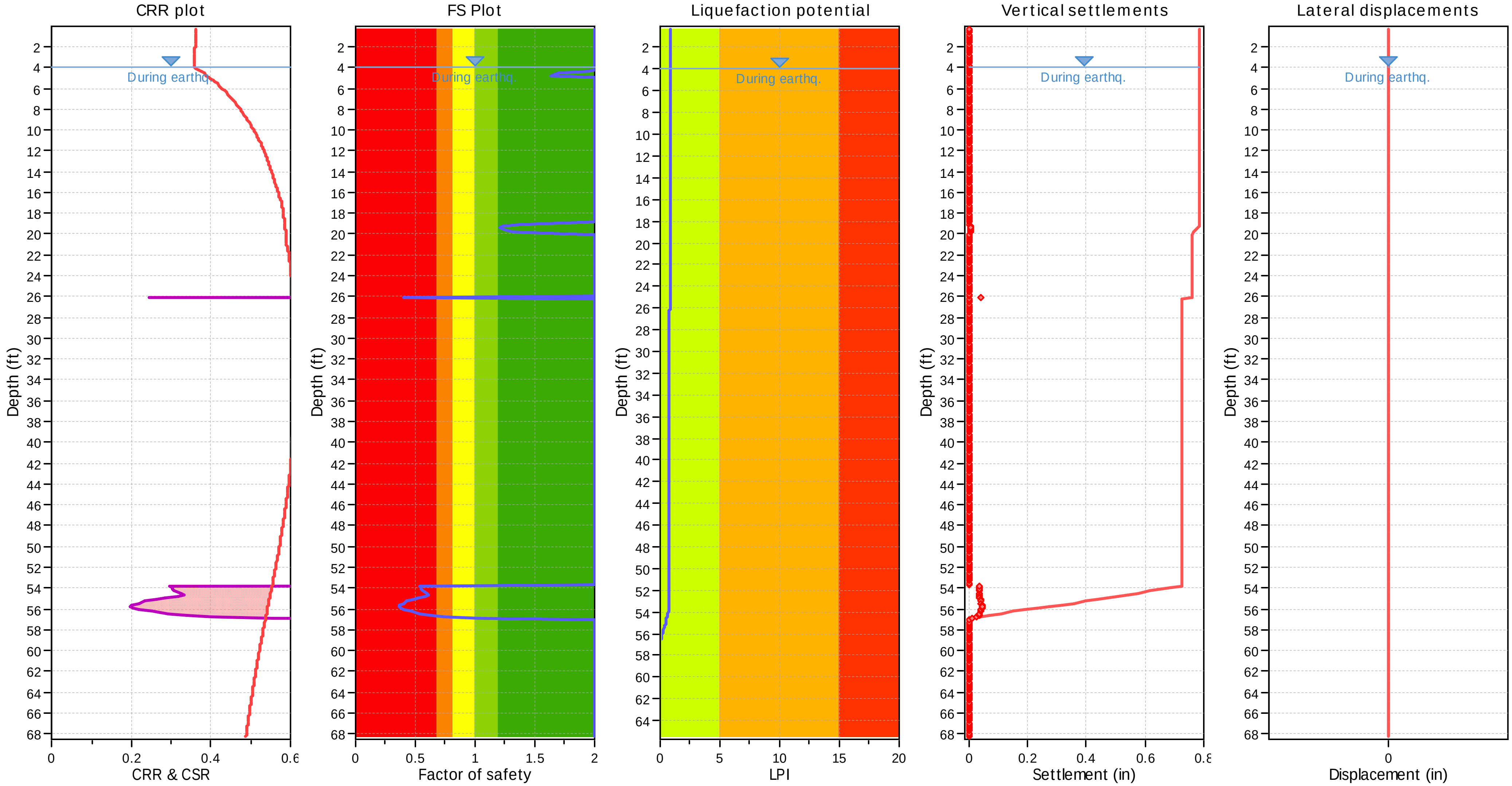
Liquefaction analysis overall plots (intermediate results)



Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	4.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.00	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.51	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	16.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	4.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.00	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.51	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	16.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

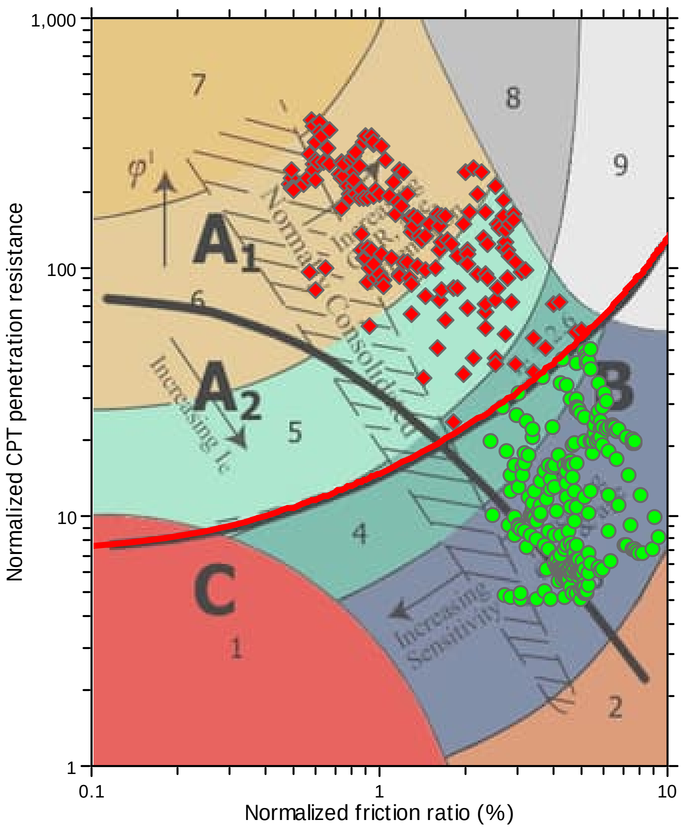
F.S. color scheme

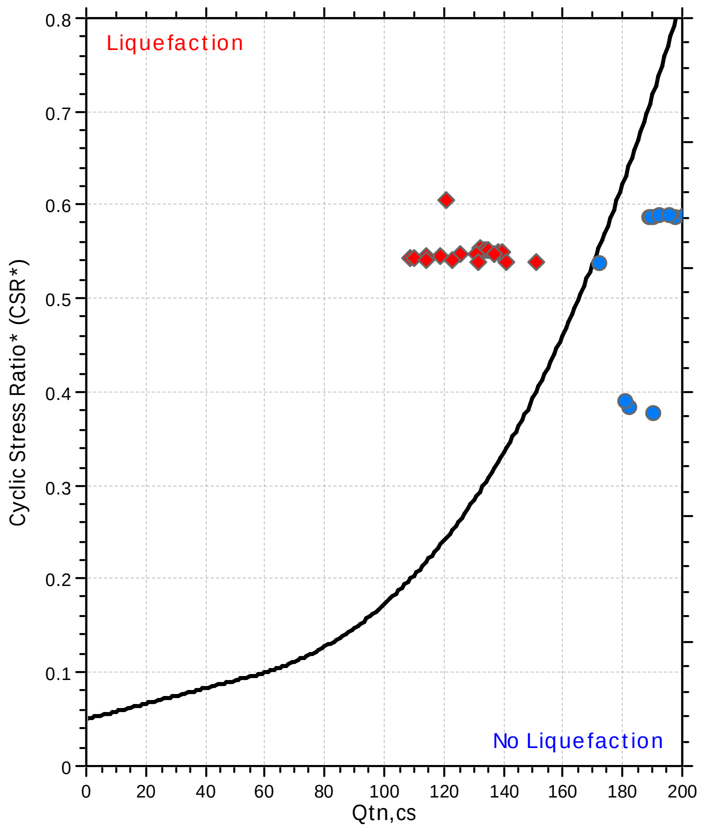
- Almost certain it will liquefy
- Very likely to liquefy
- Liquefaction and no liq. are equally likely
- Unlike to liquefy
- Almost certain it will not liquefy

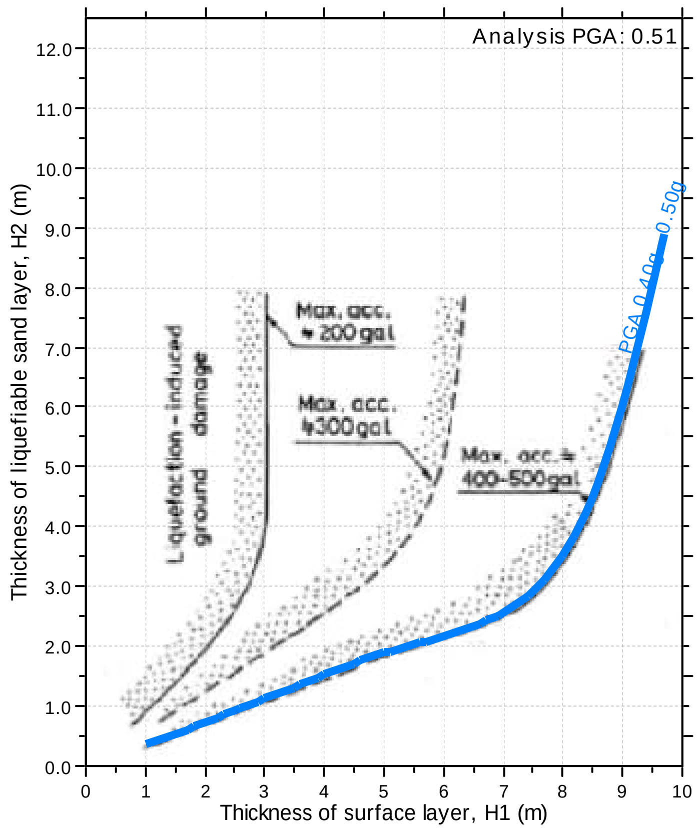
LPI color scheme

- Very high risk
- High risk
- Low risk

Liquefaction analysis summary plots



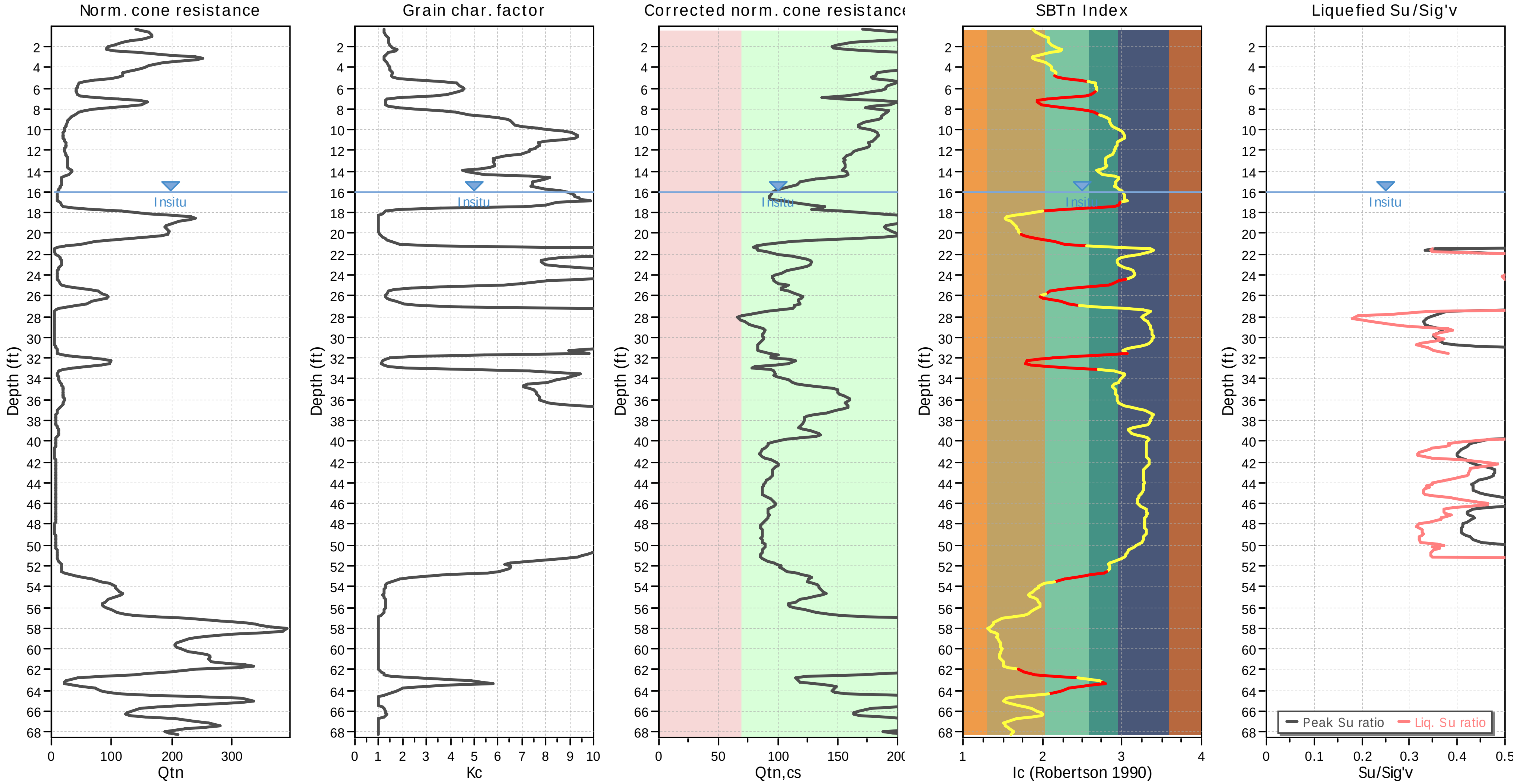




Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	4.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.00	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.51	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	16.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

Check for strength loss plots (Robertson (2010))



Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	4.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.00	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.51	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	16.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

AASHTO 1993 ESAL Calculator for Flexible Pavements

Vehicle Description	Traffic Volume			Analysis Period (years)	Axle Load and Type						Gross Weight (pounds)	Equivalency Factors			ESAL's
	Quantity in the Design Lane	Days per Week	Weeks per Year		Axle 1 (kips)		Axle 2 (kips)		Axle 3 (kips)			Axle 1	Axle 2	Axle 3	
Passenger car	**500**	**7**	**52**	**20**	2	S	2	S			4,000	0.0002	0.0002	0	1,098
Pick-up truck or van					2	S	4	S			6,000	0.0002	0.0017	0	0
Recreational vehicle					4	S	4	S			8,000	0.0017	0.0017	0	0
School bus					6	S	14	S			20,000	0.0087	0.3294	0	0
TARC bus					8	S	14	S			22,000	0.029	0.3294	0	0
Greyhound MC-12 bus					13.4	S	18.4	S	6	S	37,800	0.2715	1.102	0.0087	0
Package delivery truck					4	S	14	S			18,000	0.0017	0.3294	0	0
Beverage delivery truck					6	S	12	S	12	S	30,000	0.0087	0.1672	0.1672	0
Garbage/dumpster truck	**50**	**1**	**52**	**20**	20	S	35	T			55,000	1.592	1.2145	0	145,939
Concrete truck (full)					20	S	48	R			68,000	1.592	0.9848	0	0
Dump truck (full)					20	S	48	R			68,000	1.592	0.9848	0	0
Semi-tractor (no trailer)					8	S	2	T			10,000	0.029	3E-05	0	0
Semi-tractor trailer (empty)					8	S	8	T	6	T	22,000	0.029	0.0024	0.0008	0
Semi-tractor trailer	**25**	**1**	**52**	**20**	12	S	34	T	34	T	80,000	0.1672	1.0684	1.0684	59,905
M1097 HMMWV					3.5	S	6.5	S			10,000	0.0011	0.0121	0	0
Diesel Forklifts					26.432	S	134.41	S			160,843	5.3909	7686.3	0	0
Fire Truck (aerial platform)					24.3	S	28.35	S	28.35	S	81,000	3.74	7.298	7.298	0
Vehicle type H10					4	S	16	S			20,000	0.0017	0.5941	0	0
Vehicle type H15					6	S	24	S			30,000	0.0087	3.5427	0	0
Vehicle type H20					8	S	32	S			40,000	0.029	12.278	0	0
Vehicle type 3					16	S	34	T			50,000	0.5941	1.0684	0	0
Vehicle type HS15					6	S	24	S	24	S	54,000	0.0087	3.5427	3.5427	0
Vehicle type HS20					8	S	32	S	32	S	72,000	0.029	12.278	12.278	0
Vehicle type 3S2					10	S	31	T	31	T	72,000	0.0755	0.7102	0.7102	0

Terminal Serviceability, r_t	**2.0**
Assumed Structural Number, SN	**6.3**
Traffic Growth Rate, %/yr	**0**

Summary:		
	Total AASHTO ESAL's	**206,942**
	Traffic Category	**Heavy Duty**

Project: Bay AZ1 Site (Northtown) Location:

Job No.: ND205079 Date: 1/8/2021

Terracon

AASHTO 1993 ESAL Calculator for Concrete Pavements

Vehicle Description	Traffic Volume			Analysis Period (years)	Axle Load and Type						Gross Weight (pounds)	Equivalency Factors			ESAL's
	Quantity in the Design Lane	Days per Week	Weeks per Year		Axle 1 (kips)		Axle 2 (kips)		Axle 3 (kips)			Axle 1	Axle 2	Axle 3	
Passenger car	**500**	**7**	**52**	**20**	2	S	2	S			4,000	0.0002	0.0002	0	1,441
Pick-up truck or van					2	S	4	S			6,000	0.0002	0.0021	0	0
Recreational vehicle					4	S	4	S			8,000	0.0021	0.0021	0	0
School bus					6	S	14	S			20,000	0.0099	0.3356	0	0
TARC bus					8	S	14	S			22,000	0.0317	0.3356	0	0
Greyhound MC-12 bus					13.4	S	18.4	S	6	S	37,800	0.2779	1.101	0.0099	0
Package delivery truck					4	S	14	S			18,000	0.0021	0.3356	0	0
Beverage delivery truck					6	S	12	S	12	S	30,000	0.0099	0.1732	0.1732	0
Garbage/dumpster truck	**50**	**1**	**52**	**20**	20	S	35	T			55,000	1.5876	2.2373	0	198,897
Concrete truck (full)					20	S	48	R			68,000	1.5876	2.6059	0	0
Dump truck (full)					20	S	48	R			68,000	1.5876	2.6059	0	0
Semi-tractor (no trailer)					8	S	2	T			10,000	0.0317	8E-05	0	0
Semi-tractor trailer (empty)					8	S	8	T	6	T	22,000	0.0317	0.0053	0.0019	0
Semi-tractor trailer	**25**	**1**	**52**	**20**	12	S	34	T	34	T	80,000	0.1732	1.9714	1.9714	107,018
M1097 HMMWV					3.5	S	6.5	S			10,000	0.0013	0.0136	0	0
Diesel Forklifts					26.432	S	134.41	S			160,843	5.4504	7310.9	0	0
Fire Truck (aerial platform)					24.3	S	28.35	S	28.35	S	81,000	3.7522	7.4439	7.4439	0
Vehicle type H10					4	S	16	S			20,000	0.0021	0.5982	0	0
Vehicle type H15					6	S	24	S			30,000	0.0099	3.5512	0	0
Vehicle type H20					8	S	32	S			40,000	0.0317	12.774	0	0
Vehicle type 3					16	S	34	T			50,000	0.5982	1.9714	0	0
Vehicle type HS15					6	S	24	S	24	S	54,000	0.0099	3.5512	3.5512	0
Vehicle type HS20					8	S	32	S	32	S	72,000	0.0317	12.774	12.774	0
Vehicle type 3S2					10	S	31	T	31	T	72,000	0.0801	1.3191	1.3191	0

Terminal Serviceability, r_t	**2.0**
Assumed Pavement Thickness, in.	**15**
Traffic Growth Rate, %/yr	**0**

Summary:		
	Total AASHTO Rigid ESAL's	**307,356**
	Traffic Category	**Heavy Duty**

Project: Bay AZ1 Site (Northtown) Location:

Job No.: ND205079 Date: 1/8/2021

Terracon

AASHTO 1993 ESAL Calculator for Flexible Pavements

Vehicle Description	Traffic Volume: Quantity in the Design Lane	Traffic Volume: Days per Week	Traffic Volume: Weeks per Year	Analysis Period (years)	Axle 1 (kips)	Type	Axle 2 (kips)	Type	Axle 3 (kips)	Type	Gross Weight (pounds)	Equivalency Factors: Axle 1	Equivalency Factors: Axle 2	Equivalency Factors: Axle 3	ESAL's
Passenger car	**500**	**7**	**52**	**20**	2	S	2	S			4,000	0.0002	0.0002	0	1,098
Pick-up truck or van					2	S	4	S			6,000	0.0002	0.0017	0	0
Recreational vehicle					4	S	4	S			8,000	0.0017	0.0017	0	0
School bus					6	S	14	S			20,000	0.0087	0.3294	0	0
TARC bus					8	S	14	S			22,000	0.029	0.3294	0	0
Greyhound MC-12 bus					13.4	S	18.4	S	6	S	37,800	0.2715	1.102	0.0087	0
Package delivery truck					4	S	14	S			18,000	0.0017	0.3294	0	0
Beverage delivery truck					6	S	12	S	12	S	30,000	0.0087	0.1672	0.1672	0
Garbage/dumpster truck					20	S	35	T			55,000	1.592	1.2145	0	0
Concrete truck (full)					20	S	48	R			68,000	1.592	0.9848	0	0
Dump truck (full)					20	S	48	R			68,000	1.592	0.9848	0	0
Semi-tractor (no trailer)					8	S	2	T			10,000	0.029	3E-05	0	0
Semi-tractor trailer (empty)					8	S	8	T	6	T	22,000	0.029	0.0024	0.0008	0
Semi-tractor trailer					12	S	34	T	34	T	80,000	0.1672	1.0684	1.0684	0
M1097 HMMWV					3.5	S	6.5	S			10,000	0.0011	0.0121	0	0
Diesel Forklifts					26.432	S	134.41	S			160,843	5.3909	7686.3	0	0
Fire Truck (aerial platform)					24.3	S	28.35	S	28.35	S	81,000	3.74	7.298	7.298	0
Vehicle type H10					4	S	16	S			20,000	0.0017	0.5941	0	0
Vehicle type H15					6	S	24	S			30,000	0.0087	3.5427	0	0
Vehicle type H20					8	S	32	S			40,000	0.029	12.278	0	0
Vehicle type 3					16	S	34	T			50,000	0.5941	1.0684	0	0
Vehicle type HS15					6	S	24	S	24	S	54,000	0.0087	3.5427	3.5427	0
Vehicle type HS20					8	S	32	S	32	S	72,000	0.029	12.278	12.278	0
Vehicle type 3S2					10	S	31	T	31	T	72,000	0.0755	0.7102	0.7102	0

Terminal Serviceability, r_t	**2.0**
Assumed Structural Number, SN	**6.3**
Traffic Growth Rate, %/yr	**0**

Summary:	
Total AASHTO ESAL's	**1,098**
Traffic Category	**Light Duty**

Project: Bay AZ1 Site (Northtown) Location:

Job No.: ND205079 Date: 1/8/2021

Terracon

AASHTO 1993 ESAL Calculator for Concrete Pavements

Vehicle Description	Traffic Volume: Quantity in the Design Lane	Traffic Volume: Days per Week	Traffic Volume: Weeks per Year	Analysis Period (years)	Axle Load and Type: Axle 1 (kips)		Axle 2 (kips)		Axle 3 (kips)		Gross Weight (pounds)	Equivalency Factors: Axle 1	Axle 2	Axle 3	ESAL's
Passenger car	**500**	**7**	**52**	**20**	2	S	2	S			4,000	0.0002	0.0002	0	1,441
Pick-up truck or van					2	S	4	S			6,000	0.0002	0.0021	0	0
Recreational vehicle					4	S	4	S			8,000	0.0021	0.0021	0	0
School bus					6	S	14	S			20,000	0.0099	0.3356	0	0
TARC bus					8	S	14	S			22,000	0.0317	0.3356	0	0
Greyhound MC-12 bus					13.4	S	18.4	S	6	S	37,800	0.2779	1.101	0.0099	0
Package delivery truck					4	S	14	S			18,000	0.0021	0.3356	0	0
Beverage delivery truck					6	S	12	S	12	S	30,000	0.0099	0.1732	0.1732	0
Garbage/dumpster truck					20	S	35	T			55,000	1.5876	2.2373	0	0
Concrete truck (full)					20	S	48	R			68,000	1.5876	2.6059	0	0
Dump truck (full)					20	S	48	R			68,000	1.5876	2.6059	0	0
Semi-tractor (no trailer)					8	S	2	T			10,000	0.0317	8E-05	0	0
Semi-tractor trailer (empty)					8	S	8	T	6	T	22,000	0.0317	0.0053	0.0019	0
Semi-tractor trailer					12	S	34	T	34	T	80,000	0.1732	1.9714	1.9714	0
M1097 HMMWV					3.5	S	6.5	S			10,000	0.0013	0.0136	0	0
Diesel Forklifts					26.432	S	134.41	S			160,843	5.4504	7310.9	0	0
Fire Truck (aerial platform)					24.3	S	28.35	S	28.35	S	81,000	3.7522	7.4439	7.4439	0
Vehicle type H10					4	S	16	S			20,000	0.0021	0.5982	0	0
Vehicle type H15					6	S	24	S			30,000	0.0099	3.5512	0	0
Vehicle type H20					8	S	32	S			40,000	0.0317	12.774	0	0
Vehicle type 3					16	S	34	T			50,000	0.5982	1.9714	0	0
Vehicle type HS15					6	S	24	S	24	S	54,000	0.0099	3.5512	3.5512	0
Vehicle type HS20					8	S	32	S	32	S	72,000	0.0317	12.774	12.774	0
Vehicle type 3S2					10	S	31	T	31	T	72,000	0.0801	1.3191	1.3191	0

Terminal Serviceability, r_t	**2.0**
Assumed Pavement Thickness, in.	**15**
Traffic Growth Rate, %/yr	**0**

Summary:

Total AASHTO Rigid ESAL's	**1,441**
Traffic Category	**Light Duty**

Project: Bay AZ1 Site (Northtown) Location:

Job No.: ND205079 Date: 1/8/2021

Terracon