GEOTECHNICAL ENGINEERING STUDY
CROCKER'S LOCKERS SELF STORAGE
70 NIELSON STREET
WATSONVILLE, CALIFORNIA

March 22, 2021

Prepared for

Mr. Ted Crocker
9502 Alder Court
Carmel, CA 93923

Prepared by

Earth Systems Pacific
48511 Warm Springs Boulevard, Suite 210
Fremont, CA 94539

Earth Systems
48511 Warm Springs Boulevard, Suite 210 | Fremont, CA 94539 | Ph: 510.353.3833 | www.earthsystems.com

March 22, 2021 File No.: 304272-001

Mr. Ted Crocker
9502 Alder Court
Carmel, CA 93923

PROJECT: CROCKER'S LOCKERS SELF STORAGE
70 NIELSON STREET
WATSONVILLE, CALIFORNIA

REF.: *Revised* Proposal for Soil Percolation Rate Testing and Geotechnical Engineering Investigation, Crocker's Lockers Self Storage, 70 Nielson Street, Watsonville, California, dated November 17, 2020

SUBJECT: Geotechnical Engineering Study

Dear Mr. Crocker:

Per your authorization of the above referenced proposal, Earth Systems Pacific (Earth Systems) has prepared this geotechnical engineering investigation report to address the current site development plans at the captioned site. The proposed development plan includes the construction of a new self-storage facility comprising of six storage unit buildings and one office building. The conclusions and recommendations presented herein are based on our understanding of the currently proposed development, a review of the subsurface conditions revealed by Cone Penetration Test (CPT) soundings advanced as a part of our investigation, and our engineering analysis of the subsurface data. Preliminary geotechnical recommendations for the proposed development are presented herein.

We appreciate the opportunity to assist you on this project. Should you have any questions regarding the contents of this report, please contact the undersigned.

Sincerely,

Earth Systems Pacific

Lauren Becker, EIT 170409
Staff Engineer

Ajay Singh, GE 3057
Principal Engineer

REGISTERED PROFESSIONAL ENGINEER
AJAY SINGH
GE 3057
GEOTECHNICAL
STATE OF CALIFORNIA

Doc. No.: 2103-018.SER/kt

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1.0 INTRODUCTION

Site Setting

The subject property is an irregular shaped, 4.39-acre parcel located at 70 Nielson Street in Watsonville, California (APN 051-111-049). The site area has a latitude of 36.9288°N and a longitude of 121.7930°W and the general location of the site is presented in the Site Location Map (Figure 1).

Site Description

The subject site is located on the northern side of Nielson Street and bounded by Nielson Street to the south, Airport Boulevard to the west, and industrial businesses to the north and east. The site shape is nearly a rectangle in the eastern portion. The northern property line has a slight dogleg and the western property line parallels Airport Boulevard. The longest dimensions for the site are approximately 700 feet in the east-west direction, and 300 feet in the north-south direction.

The site is currently occupied by an asphalt-paved parking lot. Aerial imagery records (Google Earth) reveal the site has been a parking lot for over 20 years. Watsonville Wetlands maps show the West Branch Struve Slough originating at the western portion of the site and running to the southeast; water flow has since been diverted downstream so water flow above the ground surface does not occur onsite. The parking lot has numerous at-grade planters located throughout the site with matures trees as well as trees along the perimeter of the property ranging from 10 feet tall to almost 50 feet tall. There are also numerous light posts within the parking lot area. The site generally slopes from the northeastern corner with an elevation of approximately 133 feet to the southwestern portion with an approximate elevation of 122 feet.

Project Description

Based on a review of the Site Plan prepared by Cubix Construction, LLC (dated October 27, 2020), it is our understanding that the proposed developments will include the demolition of the existing parking lot and associated curbs, trees, and site lighting, and the construction of seven buildings on site. Buildings A, B, E, and F are planned to be one-story storage unit buildings, with Buildings C and D planned to initially be one-story storage unit buildings with the possibility of constructing a second story in the future. A two-story office building is also planned on site. A bio retention swale is currently planned for the southwest corner of the site.

Preliminary grading plans by Roper Engineering (dated November 13, 2020), indicate Building A, an L-shaped building along the western property line, will have a finished floor elevation of 124.05 and will require cuts and fills of less than 3 feet. Building B, which parallels the southern

property line, will have a finished floor elevation ranging from 126.5 on the eastern side and 124.85 on the west side. Construction of this building will require cuts on the order of less than 1 foot to 3 feet in the northeastern corner of the building. Building C, located to the east of Building A, will also have a sloping floor with elevations ranging from 124.85 feet to 124.05 feet. Construction of this building will require cuts and fills of less than 2 feet. Building D is located north of Building B and east of Building C and will have a finished floor elevation ranging from 126.4 feet along the eastern boundary to 124.60 in the southwestern corner. Construction of this building will require slightly over 5 feet of cuts in the northeastern corner and very minor fills in the southwestern corner. Building E, located along the northern property line, will have finished floor elevations of 126.45 on the eastern side and 124.90 feet on the western side. Construction of this building will require about 3 feet of cuts on the western side and approximately 6 feet of cut on the western side. A retaining wall with a maximum height of approximately 7 feet is planned along the north, west, and east boundaries of the site to retain cuts.

Scope of Services

The scope of work for the geotechnical engineering study included a general site reconnaissance, subsurface exploration, engineering evaluation of the data collected by Earth Systems, and preparation of this report. The analysis and engineering recommendations presented in the following sections this report are based on the review of the Site Plan developed by Cubix Construction, LLC, dated October 27, 2020, and the review of the Preliminary Grading Plan by Roper Engineering, dated November 13, 2020.

The report and recommendations are intended to comply with the considerations of Section 1803 of the California Building Code (CBC), 2019 Edition, and common geotechnical engineering practice in this area at this time under similar conditions.

Preliminary geotechnical recommendations for site preparation and grading, foundations, slabs-on-grade, exterior flatwork, utility trench backfill, site drainage management, and geotechnical observation and testing are presented to guide the development of project plans and specifications. It is our intent that this report be used by the client to form the geotechnical basis of the design of the project as described herein.

Detailed evaluation of the site geology and potential geologic hazards, and analyses of the soil for infiltration rates, mold or other microbial content, asbestos, radioisotopes, hydrocarbons, or other chemical properties are beyond the scope of this report. This report also does not address issues in the domain of contractors such as, but not limited to, site safety, loss of volume due to

stripping of the site, shrinkage of soils during compaction, excavatability, shoring, temporary slope angles, and construction means and methods. Ancillary features such as temporary access roads, fences, light poles, and non-structural fills are not within our scope and are also not addressed.

To verify that pertinent issues have been addressed and to aid in the evaluation of conformance with the intent of this report, it is requested that final grading and foundation plans be submitted to this office for review. In the event that there are any changes in the nature, design, or locations of improvements, or if any assumptions used in the preparation of this report prove to be incorrect, the conclusions and recommendations contained herein should not be considered valid unless the changes are reviewed and the conclusions of this report are verified or modified in writing by the geotechnical engineer.

2.0 GEOLOGIC AND SEISMIC SETTING

The site is mapped as being underlain by Pleistocene fluvial facies (Qwf), typically comprising of silt, sand, silty clay, and gravel (Geologic Map of Santa Cruz County, Brabb et al., 1997). The site is in a low liquefaction potential zone as mapped by Dupre ("Geology and Liquefaction Potential of Quaternary Deposits in Santa Cruz County", 1975). California Department of Water Resources mapping shows historically that the West Branch Struve Slough crossed the southwestern portion of the project site prior to its current site use (Sustainable Groundwater Management Act [SGMA] Data Viewer, 2020).

Seismic Setting

The entire San Francisco Bay Area is an active seismic region due to the presence of several active faults. Three northwest-trending major earthquake faults in this area are the San Andreas fault, the Calaveras fault, and the Hayward fault. The San Andreas fault is located approximately 5.2 miles to the northeast of the site, the Calaveras fault is located approximately 17.5 miles to the northeast of the site, and the Hayward fault is located approximately 21.9 miles to the northeast of the site. The Zayante-Vergeles fault is a minor fault located approximately 1.6 miles to the northeast of the site.

Using information from recent earthquakes, improved mapping of active faults, and a new model for estimating earthquake probabilities, the 2014 Working Group on California Earthquake Probabilities updated the 30 years earthquake forecast for California. A summary of the significant faults in the near vicinity of the site and their respective probabilities of a seismic event of significant moment magnitude are listed below.

Major Active Faults

Fault	Distance from Site (miles)	Probability of $M_w \geq 6.7$ within 30 Years[1]
Zayante-Vergeles	1.6 (NE)	< 1%
San Andreas (Santa Cruz)	5.2 (NE)	16%
Calaveras (Central)	17.5 (NE)	14%
Hayward (South)	21.9 (NE)	5%

[1] Working Group on California Earthquake Probabilities, 2015

3.0 FIELD INVESTIGATION

Subsurface Exploration

Earth Systems evaluated subsurface soil and groundwater conditions at the site by pushing ten cone penetration tests (CPT) on December 9, 2020. The scope of the initial investigation was based on our understanding that the liquefaction potential at the site is low. The results of our engineering analysis revealed higher than tolerable liquefaction settlements; therefore, we performed a follow-up subsurface investigation which included performing four additional CPTs on January 28, 2021 at the approximate locations shown on the attached Site Plan (Figure 2). Two additional CPTs were performed around CPT-4 to confirm the previously collected data. Details of subsurface soil conditions revealed by the CPT sounding are included in Appendix A.

The CPT soundings were performed with Middle Earth Geo Testing's (MEGT) 25-ton truck mounted CPT rig. The soundings were conducted in accordance with ASTM specifications and pushed to depths ranging from 20 feet to 92 feet below the ground surface (bgs).

A CPT involves pushing a standardized size instrument of a conical shape into the ground at a specified constant rate. The cone used for this project had a tip area of 15 cm^2 and a friction sleeve area of 225 cm^2. The cone was pushed into ground at a constant rate of 20-mm per second using the 25-ton truck as reaction weight. The cone was fitted with load cells, which recorded the total force acting on the cone (Q_c), sleeve friction (F_s), and pore pressure (u) readings at 5 cm depth intervals. The data collected from the CPT was used to interpret site stratigraphy, soil consistency, and strength using published relationships. Generally, cohesive soils (clays) have high friction ratios (sleeve friction divided by cone bearing – R_f), low cone bearing, and generate large excess pore water pressures. Cohesionless soils (sands) have lower friction ratios, high cone bearing, and generate little in the way of excess pore water pressures.

Subsurface Profile

The CPT sounding data collected onsite revealed the presence of sands, silts, and clays and combinations thereof. The upper 2 feet of soil throughout the site was generally sandy with a dense consistency and is likely fill material associated with the original pavement construction. Below that are native soils comprising of clay, silty clay, and silty sand. The soil onsite has mostly dense consistency to depths of 5 feet below the surface (bgs), then becomes looser to the approximate depth of groundwater. Sand content in the site varied with depth and between soundings, with pockets of clean sand encountered in some soundings throughout the site. The depths of sand layers varied throughout the site, indicating that the sand layers are likely not continuous and instead are only pockets of sandy material. Generally, sand thickness was on the order of 1 foot or less. CPT-04, located on the western portion of the site, contained more sand layers than most on site, with approximately 4 feet total of sand present in the upper 15 feet. Please note that the CPT data reflects "soil behavior type" and does not directly correlate with the USCS Classification system.

While collecting near surface soil samples onsite using a hand auger, concrete debris was encountered near CPT-01 at approximately 3 feet bgs. Records of borings performed previously onsite by others during environmental soil sampling did not indicate the presence of undocumented fill. Since we do not have much information about the site history before its current use, it is possible that the site area could contain imported, undocumented fill. Therefore, the presence and nature of the near surface soil should be evaluated during the grading operations.

Groundwater was encountered in all soundings and ranged in depth from 8 to 18 feet bgs.

4.0 DATA ANALYSIS

Laboratory Testing

Near surface samples of soil were collected from multiple locations across the site and composited to create one sample for laboratory testing. This sample is intended to be representative of soil conditions near the surface after mass grading across the site has occurred. This sample was tested to determine the Liquid Limit (LL) and Plasticity Index (PI) of the soil (ASTM D 4318-17). These values are known as the Atterberg limits and can correlate to a soil's potential to experience a change in volume when exposed to changes in moisture, known as shrink/swell potential. The tested soil resulted in a Liquid Limit of 27 and a Plasticity Index of 10, correlating to a low swell potential. The sample was also tested for its Resistance Value (R-Value), which is used in pavement design. The R-value of the tested soil was 12. Copies of the laboratory test results are provided in Appendix B.

Subsurface Soil Classification

Based on the penetration resistance data and shear wave velocity of the soil obtained from the CPTs advanced at the site (Appendix A), the site is assigned to Site Class D ("stiff soil") as defined by Table 20.3-1 of the ASCE 7-16. The seismic factor S_1 is greater than 0.2g and the Site Class is 'D'. As such, a site-specific ground motion hazard analysis will need to be performed if the structural engineer determines that ASCE 7-16, Section 11.4.8, Exception 2 does not apply. Earth Systems should be notified to provide a site-specific ground motion hazard evaluation if needed. If required, the seismic factors presented will not be applicable to the project.

Seismic Design Parameters

The San Francisco Bay area is recognized by geologists and seismologists as one of the most seismically active regions in the United States. The significant earthquakes in this area are generally associated with crustal movement along well-defined, active fault zones which regionally trend in a northwesterly direction. Although research on earthquake prediction has greatly increased in recent years, seismologists cannot predict when and where an earthquake will occur. Nevertheless, on the basis of current technology, it is reasonable to assume that the proposed development will be subjected to at least one moderate to severe earthquake during its lifetime. During such an earthquake, the danger from fault offset on the site is low, but strong shaking of the site is likely to occur and, therefore, the project should be designed in accordance with the seismic design provisions of the latest California Building Code. It should be understood that the California Building Code seismic design parameters are not intended to prevent structural damage during an earthquake, but to reduce damage and minimize loss of life.

The following seismic design parameters represent the general procedure as outlined in Section 1613 of the California Building Code and in ASCE 7. The values determined below are based on the 2016 ASCE 7 maps and were obtained using the Office of Statewide Health Planning and Development Seismic Design Maps Web Application.

Summary of Seismic Parameters - CBC 2019
(Site Coordinates 36.9288°N, 121.7930°W)

Parameter	Design Value
Site Class	D
Mapped Short Term Spectral Response Parameter, (S_s)	2.453g
Mapped 1-second Spectral Response Parameter, (S_1)	0.94g
Site Coefficient, (F_a)	1.0
Site Coefficient, (F_v)	1.7[1,2]
Site Modified Short Term Response Parameter, (S_{Ms})	2.453g
Site Modified 1-second Response Parameter, (S_{M1})	1.598g[1]
Design Short Term Response Parameter, (S_{Ds})	1.635g
Design 1-second Response Parameter, (S_{D1})	1.065g[1]
Site modified peak ground acceleration (PGA_M)	1.131g

[1] The 2019 parameter is are based on the assumption that the buildings will conform to ASCE 7-16 11.4.8 - Exception No. 2.

[2] The 2019 CBC F_v parameter shall only be used for calculation of T_s. (ASCE Table 11.4-2, Supplement 1, Note a)

Static Settlement

Anticipated static settlements for the proposed building loads are less than 1 inch with a differential settlement of less than ½ inches within a distance of 40 feet. Settlements will likely be immediate in nature and occur as foundation loads are placed. Long-term settlement will be less than ½-inch.

Liquefaction

Soil liquefaction is a phenomenon where saturated granular soils undergo a substantial loss of strength due to increased pore water pressure resulting from cyclic stress applications induced by earthquakes or other vibrations. In this process, the soil acquires mobility sufficient to permit both vertical and horizontal movements, which may result in significant deformations. Soils most susceptible to liquefaction are loose, uniformly graded, fine-grained sands that are saturated below the groundwater table. Dry sand settlement is the densifying of dry, loose, granular soil deposits above the groundwater level induced by earthquakes or other vibrations. In addition, recent literature indicates that fine grained soils may also be susceptible to liquefaction or cyclic strain softening. Examples of highly susceptible fine-grained soil include "non-plastic silts and clayey silts of low plasticity (PI<12) at high water content to liquid limit ratios (w_c/LL>0.85)." Examples of soils moderately susceptible to liquefaction include "clayey silts and silty clays of moderate plasticity (12<PI<18) at natural water content and Liquid Limits ratios (w_c/LL) greater than 0.80" (Bray and Sancio, 2006).

Liquefaction Potential Index (LPI) is an index value that ranges from 0 to 100 that is calculated to assess the severity of liquefaction as a function of depth using the methodology from Iwasaki (1982). Generally, as the layers susceptible to liquefaction are deeper, then the potential for them to liquefy decreases due to the greater overburden pressure at depth. It is generally acknowledged that liquefaction will not affect surface improvements if these deposits are located at a depth greater than 50 feet below the ground surface. LPI calculated during the analysis and used to inform risk of liquefaction occurring during a design level seismic event.

Liquefaction Potential Index Range and Risk Categories

Liquefaction Potential Index Range	Risk Categories[1]
0 - 5	Low
5 - 15	Moderate[2] to High
>15	Very High

[1] As proposed by Iwasaki (1982), [2] Intermediate category added by Earth Systems

Analysis Parameters

CLiq software (v3.0.3.2) was utilized for the analysis. The liquefaction analysis was carried out using CPT sounding data from 14 CPTs soundings advanced throughout the site, with depth data truncated at 60 feet for analysis. Groundwater levels varied throughout the site during the time of our subsurface exploration; information on historic depth to groundwater for the area is not available. Therefore, the groundwater level used in the analysis was the in-situ levels recorded at each CPT sounding at the time of our subsurface exploration. According to United States Geological Survey's (USGS) Unified Hazard Tool, the mean magnitude using deaggregation is 7.12. The liquefaction analysis was performed utilizing the peak ground acceleration of 1.131g (PGAm) based on the Office of Statewide Health Planning and Development Seismic Design Maps Web Application. The liquefaction analysis was conducted using the methods suggested by Robertson (2009). Dry sand settlement calculations for soil above the groundwater table were conducted using the methods suggested by Pradel (1998).

Analysis Results

Based on the analysis methods, the total seismic-related vertical settlement for a design-level seismic shaking event was calculated to generally be between ¼-inch and 1-inches throughout the site, with some points of greater total settlements. Two CPT locations in the northwestern portion of the site (CPT-01 and CPT-04) yielded greater total seismic settlements that were on the order of 3- to 4-inches, respectively. Two CPT locations in the northeastern portion of the site (CPT-03 and CPT-14) yielded total seismic settlement on the order of 1.6 inches.

Tabulated results of dry sand settlement, liquefaction induced settlement, and total seismic settlement are shown in the table below.

Calculated Seismically Induced Settlements

Sounding	Dry Sand Settlement (inches)	Liquefaction Induced Settlement (inches)	Total Seismically Induced Settlement (inches)
CPT-01	2.5	0.6	***3.1***
CPT-02	0.9	0.1	1.0
CPT-03	0.1	1.5	***1.6***
CPT-04	2.7	1.3	***4.0***
CPT-05	0.1	0.6	0.7
CPT-06	0.3	0.3	0.6
CPT-07	0.1	0.7	0.8
CPT-08	0.1	0.2	0.3
CPT-09	0.5	0.3	0.8
CPT-10	0.3	0.6	0.9
CPT-11	0.4	0.5	0.9
CPT-12	0.2	0.3	0.5
CPT-13	0.1	0.4	0.5
CPT-14	1.0	0.6	***1.6***

CPT-01 and CPT-04, which were in the northeastern portion of the site, revealed high levels of seismic-induced settlement on the order of 4-inches. CPT-12, which was advanced in between these locations, has estimated seismic settlements less than ½-inches. To address the differences seen between these soundings and check for possible CPT equipment error during data collection, two additional CPT soundings were advanced less than 5 feet away from CPT-04 (CPT-04A and CPT-04B). CPT-04 was chosen for review as the calculated settlement was the highest throughout the site and thus the outlier. The additional CPT advanced to the south of CPT-04 (CPT-04A) had similar data to CPT-04, where the additional CPT advanced to the north of CPT-04 (CPT-04B) and in the direction of CPT-12 had data more similar to CPT-12. This indicates that the variance between CPT-04 and CPT-12 are likely not the fault of the CPT rig operational errors and instead are due to a highly variable subsurface between the CPT locations. The high subsurface variance could be the result of undocumented fill in this area of the site, as well as variance due to the geologic formation of the site associated with past slough flow across the site.

The liquefaction analysis results are included in Appendix C.

Discussion

In general, there is a low to moderate potential for the underlying soil deposits to liquefy during a seismic event. Should liquefaction occur, the total seismic-related settlement would generally be less than 1-inch throughout the site for a design level seismic event. Higher settlements were calculated from soundings advanced in both the northwestern and northeastern portions of the site. In the northwest portion of the site, calculated settlements are on the order of 3- to 4-inches of settlement from CPT-01 and CPT-04, respectively. In the northeastern portion of the site, seismic settlement was calculated to be 1.6 inches from both CPT-03 and CPT-14.

Settlement Mitigation

To mitigate the possible settlements resulting from dry sand settlement during a design-level seismic shaking event, a program of over-excavation and placement of excavated material as engineered fill may be performed. Over-excavations should be focused on the northeastern and northwestern portions of the site around CPT locations with high calculated settlements. Over-excavation depths are going to be dependent on the levels of acceptable settlement and will also depend on the depth to groundwater. We recommend that the excavation depths should be kept to at least 2 feet above water table. Actual depth and limits of over-excavations should be determined in the field by an Earth Systems engineer. Additionally, the undocumented fill across the site should be excavated and placed back as engineered fill if the fill material is deemed to be acceptable by the Project Geotechnical Engineer.

5.0 CONCLUSIONS

General

The subject site is suitable for the proposed storage unit facility and associated improvements from a geotechnical engineering standpoint, provided the recommendations included in this report are followed. The primary geotechnical concerns at the site are settlement during a seismic event and the possible presence of undocumented fill in the northwestern portion of the site.

Site Preparation and Grading

Current preliminary grading plans show cuts on the order of 7 feet across the site, with cuts in the northern area of the site being retained by a new retaining wall. Small amounts of fill are expected in the southwestern portion of the site. Demolition and removal of the existing pavement, site lighting, and trees is anticipated to result in some ground depressions. These depressions should be backfilled following the recommendations included in the following sections of this report and under the observations of our field technician. Additional grading work is anticipated to include backfill work related to the placement of new utility lines.

Due to the possible presence of undocumented fill in the northwestern portion of the site, potholing throughout the site under the observation of our engineer technician should occur before the grading program to explore the presence of undocumented fill onsite. Over-excavation in areas where higher than acceptable settlements were calculated should be performed to decrease seismic settlement. Grading operations are discussed in detail in the *Recommendations* section of this report.

Soil Expansion Potential

The results of Atterberg Limits test performed on a sample representative of near surface soils encountered in our soil borings indicated a liquid limit (LL) of 27 and a plasticity index (PI) of 10. Based on the test results the near surface soil is judged to have a low shrinkage/swelling potential.

Foundations

The anticipated loads of the storage unit facilities and associated structures may be adequately supported on spread/strip footings. Details of the foundation recommendations are included in the following sections of the report.

Groundwater

Groundwater was encountered during the subsurface exploration between 8 feet and 18 feet below the ground surface. In general, variations in rainfall may affect groundwater levels, and therefore groundwater levels should not be considered constant. Our proposed over-excavation program may be influenced by groundwater levels; however, groundwater level should not have an adverse effect on the improvements.

6.0 RECOMMENDATIONS

These recommendations are applicable for the proposed project as described in the "Introduction and Site Setting" Section of this report. If other improvements not previously mentioned are included, the Geotechnical Engineer should be contacted for revised recommendations.

Unless otherwise noted, the following definitions are used in the recommendations presented below. Where terms are not defined, definitions commonly used in the construction industry are intended.

- **Building Area:** The area within and extending a minimum of 5 feet beyond the perimeter of the foundations. The building area also includes the footprint of any improvements which are rigidly connected to the structure, such as retaining walls, and that are expected to perform in a similar manner.

- **Flatwork Areas:** The areas within and extending a minimum of 1 foot beyond the limits of exterior pedestrian flatwork.
- **Subgrade:** The elevation of the surface upon which a sand cushion/nonexpansive imported material or aggregate base (AB) will be placed for flatwork.
- **Existing Grade:** Elevations of the site that existed as of the date of this report.
- **Finish Pad Grade:** The elevation in the building area where earthwork operations are typically considered to be complete. It does not include any sand or gravel that might be placed below slabs in association with vapor protection for the slabs.
- **Scarified:** Thoroughly plowed or ripped in two orthogonal directions to a depth of not less than 8 inches.
- **Moisture Conditioned:** Soil moisture content adjusted to optimum moisture content, or just above, prior to application of compactive effort.
- **Compacted/Recompacted:** Soils placed in level lifts not exceeding 8 inches in loose thickness and compacted to a minimum of 90 percent of maximum dry density, unless specified otherwise. The standard tests used to establish maximum dry density and field density should be ASTM D 1557-12 and ASTM D 6938-17, respectively, or other methods acceptable to the geotechnical engineer and jurisdiction

Site Preparation and Grading

General Site Preparation

1. Site clearing, placement of fill, and grading operations at the site should be conducted in accordance with the recommendations provided in this report. Compaction recommendations for site grading can be found later in this section.

2. The site should be prepared for grading by removing structures scheduled for demolition, existing pavements, existing trees and their root systems, vegetation, debris, and other potentially deleterious materials from areas to receive improvements. Existing utility lines that will not be serving the proposed project should be either removed or abandoned. The appropriate method of utility abandonment will depend upon the type and depth of the utility. Recommendations for abandonment can be made as necessary.

3. Prior to the start of the grading program, potholing throughout the site should occur under the observation of our engineer technician to explore the presence of undocumented fill onsite and guide recommendations for over-excavation depths.

4. Due to potential ground disturbance from potential demolition activities, the possible presence of undocumented fill, and greater than allowable seismic settlement at relatively shallow depths, a program of over-excavation and backfilling with excavated material placed as engineered fill should be used. Loose, disturbed soil within the existing building should be cleaned out (excavated) to competent, undisturbed soil. The over-excavations may depend on the depths to which undocumented fill is present, the depth to groundwater, and the level to which dry sand settlement reduction is desired. The lateral extent of the over-excavation should extend at least 5 feet beyond the perimeter of the proposed improvements. The exposed ground should be reviewed by the geotechnical engineer to determine the need for additional excavation work. Actual depth and extent may be modified in the field by the geotechnical engineer. Excavated material deemed suitable for use by the geotechnical engineer in the field may be placed as structural fill and recompacted per the compaction recommendations in the next section.

5. Ruts or depressions resulting from the removal of the previous building foundations, slabs, utilities, fill soils, tree root systems, and abandoned and/or buried structures, buried debris, and remnants of the former use of the site that are discovered during site grading should be removed and properly cleaned out down to undisturbed native soil. The bottoms of the resulting depressions should be scarified and cross-scarified at least 8 inches in depth, moisture conditioned, and recompacted. The depressions should then be backfilled with approved, compacted, moisture conditioned structural fill, as recommended in other sections of this report.

6. Site clearing and backfilling operations should be conducted under the field observation of the geotechnical engineer. The geotechnical engineer should be notified at least 48 hours prior to commencement of grading operations.

<u>Compaction Recommendations</u>

1. In general, the underlying native soil should be scarified at least 8 inches, moisture conditioned and recompacted to the recommended relative compaction presented below, unless noted otherwise. This scarification operation should be performed at locations designated for proposed structural fill, concrete slabs-on-grade, exterior flatwork, foundations, and pavement areas.

2. Recompacted native soils and fill soils should be compacted to a minimum relative compaction of 90 percent of maximum dry density at a moisture content at least 2 percentage points above optimum.

3. In areas to be paved, the upper 8 inches of subgrade soil should be compacted to a minimum 92 percent of maximum dry density at a moisture content at least 2 percentage points over optimum. The aggregate base courses should be compacted to a minimum 95 percent of maximum dry density at a moisture content that is slightly over optimum. The subgrade and base should be firm and unyielding when proof-rolled with heavy, rubber-tired equipment prior to paving. The pavement subgrade soils should be periodically moistened as necessary prior to placement of the aggregate base to maintain the soil moisture content near optimum.

Fill Recommendations

1. Structural fill is defined herein as a native or import fill material which, when properly compacted, will support foundations, building slabs, pavements, and other fills. The on-site native fill soils that are free of debris, organics and other deleterious material, may be used as structural fill.

2. Import fill is not anticipated at the site. Should import fill be required, the soil should meet the following criteria:

   a. Be coarse grained and have a plasticity index of less than 12 and/or an expansion index less than 20;
   b. Be free of organics, debris or other deleterious material;
   c. Have a maximum rock size of 3 inches; and
   d. Contain sufficient clay binder to allow for stable foundation and utility trench excavations.

3. A sample of the soil proposed to be imported to the site should be submitted at least three days before being transported to the site for evaluation by the geotechnical engineer. During importation to the site the material should be further reviewed on an intermittent basis.

Foundations

1. The anticipated loads of the proposed storage unit facilities as well as the manager's building can be supported by conventional strip/spread footings bearing on firm native soil or compacted engineered fill. The footings should have minimum depths of 18 inches below the lowest adjacent grade and a minimum width of 18 inches. The footing excavations should be observed by the geotechnical engineer prior to placement of formwork or reinforcement.

2. The footings should be designed using a maximum allowable bearing capacity of 2,000 psf dead plus live load. This value may be increased by one-third when transient loads such as wind or seismicity are included.

3. Resistance to lateral loads should be calculated based on a passive equivalent fluid pressure of 250 pcf and a friction factor of 0.30. Passive and frictional resistance can be combined in the calculations without reductions. These values are based on the assumption that backfill adjacent to foundations is properly compacted. The upper 12 inches of embedment should be disregarded in calculating passive resistance where concrete or asphalt pavement does not abut the foundation.

4. For Buildings C and D where additional stories are anticipated to be added to the building in the future, the foundations should be designed such that they can support the loads associated with the future additions.

Retaining Walls

1. Retaining walls should be supported by conventional spread footings. The footings should have minimum depths of 30 inches below lowest adjacent grade and should bear in firm native soil or compacted engineered fill. The footing reinforcement should be specified by the design engineer. The footing excavations should be observed by the geotechnical engineer to verify penetration into firm native material prior to placement of formwork and should be moisture conditioned to close any desiccation cracks prior to concrete placement.

2. Footings should be designed using a maximum allowable bearing capacity of 2,000 psf dead plus live load. This value may be increased by one-third when transient loads such as wind or seismicity are included. Using these criteria, long term total and differential foundation settlements are expected to be on the order of ½ inch.

3. Resistance to lateral loads should be calculated based on a passive equivalent fluid pressure of 300 pcf and a friction factor of 0.3. Passive and frictional resistance can be combined in the calculations without reductions. These values are based on the assumption that backfill adjacent to foundations is compacted to the minimum recommended relative compaction values. The upper 12 inches of embedment should be disregarded in calculating passive resistance where concrete or asphalt pavement does not abut the foundation.

4. Lateral earth pressures for wall design should be based on the following parameters. For sloping backfill, the recommended active and at-rest pressures should be increased by 3 pcf for each 5 degree of slope:

   Active equivalent fluid pressure (horizontal backfill).....45 pcf
   At-rest equivalent fluid pressure (horizontal backfill).....65 pcf

5. If seismic forces are to be considered in the retaining wall design, the seismic increment of earth pressure should be 10H pounds per square foot, where H is the height of the retained soil. The seismic pressure should be applied uniformly on the back of the wall along the height of the retained material.

6. Retaining wall backfill should be fully drained utilizing either a free draining gravel blanket, permeable material, or a manufactured synthetic drainage system. Water from the drainage medium should be collected and discharged via either a rigid perforated pipe or weep holes. Collection pipes should be placed perforations downward near the bottom of the drainage medium and should discharge in a nonerosive manner away from foundations, slopes, and other improvements. Drainage medium consisting of a gravel blanket or permeable material should have a width of approximately 1 foot and should extend upward to within 1 foot of the top of the wall backfill. The upper foot of backfill over the drainage medium should consist of native soil to reduce the flow of surface drainage into the wall drain system. Gravel blankets should be separated from the backfill soil using a permeable synthetic fabric conforming to Caltrans Standard Specifications, Section 88-1.02B, Class A. Permeable material should conform to Section 68-2.02F(3), Class 2, of the Caltrans Standard Specifications. Manufactured synthetic drains such as Miradrain or Enkadrain should be installed in accordance with the recommendations of the manufacturer.

7. Water from the drainage medium can be drained using weep holes, provided that seepage at the base of the wall is acceptable. The weep holes should consist of minimum 1-½ inch diameter holes at 5-foot maximum spacings. The weep holes should be placed as low as possible on the wall. Corrosion-resistant screens or filter fabric should be placed behind the weep holes to reduce the chance of the drainage medium from washing out from behind the wall.

8. Retaining wall backfill should be placed in thin, moisture conditioned, lifts, compacted to a minimum 90 percent of maximum dry density, as tested by the geotechnical engineer.

9. The architect/engineer should bear in mind that retaining walls by their nature are flexible structures, and this flexibility can result in cracking of surface coatings. Where walls are to be plastered or will otherwise have a finish surface applied, this flexibility should be considered in determining the suitability of the surfacing material, spacing of horizontal and vertical joints, connections to structures, etc.

10. Long-term settlement of properly compacted sand or gravel retaining wall backfill should be assumed to be about ¼ percent of the depth of the backfill. Long-term settlement of properly compacted clayey retaining wall backfill should be assumed to be about ½ to 1 percent of the depth of the backfill. Improvements constructed near the tops of retaining walls should be designed to accommodate the estimated settlement.

Concrete Slab-on-Grade Construction

1. Interior slab-on-grade concrete should have a minimum thickness of 5 full inches and should be reinforced as directed by the architect/engineer.

2. For conventional interior slab-on-grade floor construction in areas which will receive carpet of other floor coverings or where moisture sensitive materials will be stored directly on the slab, a capillary break system that consists a vapor retarder and a 4-inch-thick, clean crushed rock layer should be placed above the pad subgrade to serve as a capillary break.

3. The vapor retarder should comply with ASTM Standard Specification E 1745-17 and the latest recommendations of ACI Committee 302. The vapor retarder should be installed in accordance with ASTM Standard Practice E 1643-18a. Care should be taken to properly lap and seal the vapor retarder, particularly around utilities, and to protect it from damage during construction.

4. A sand layer over the vapor retarder is optional. If sand, gravel or other permeable material is to be placed over the vapor retarder, the material over the vapor retarder should be only lightly moistened and not saturated prior to casting the slab. Excess water above the vapor retarder would increase the potential for moisture damage to floor coverings. Recent studies, including those by ACI Committee 302, have concluded that excess water above the vapor retarder would increase the potential for moisture damage to floor coverings and could increase the potential for mold growth or other microbial contamination. These studies also concluded that it is preferable to eliminate the sand layer and place the slab in direct contact with the vapor retarder, particularly during wet

weather construction. However, placing the concrete directly on the vapor retarder would require special attention to using the proper vapor retarder, concrete mix design, and finishing and curing techniques.

5. When concrete slabs are in direct contact with vapor retarders, the concrete water to cement (w/c) ratio must be correctly specified to control bleed water and plastic shrinkage and cracking. The concrete w/c ratio for this type of application is typically in the range of 0.45 to 0.50. The concrete should be properly cured to reduce slab curling and plastic shrinkage cracking. Concrete materials, placement, and curing methods should be specified by the architect/engineer.

Exterior Flatwork

1. Exterior flatwork should have a minimum thickness of 5 full inches and should be reinforced as directed by the architect/engineer.

2. Exterior flatwork should be cast on a minimum 4-inch layer of compacted Class 2 aggregate base conforming with Section 26-1.02B of the Caltrans Standard Specifications. Prior to placement of the aggregate base, the subgrade soil should be moistened as necessary to maintain the soil moisture content at or above optimum, and no desiccations cracks should be present. It may be necessary to over-excavate the subgrade soil to accommodate this import section.

3. Assuming that movement (i.e., 1/4-inch or more) of exterior flatwork beyond the structure is acceptable, the flatwork should be designed to be independent of the building foundations. The flatwork should not be doweled to foundations, and a separator should be placed between the two.

4. To reduce shrinkage cracks in concrete, the concrete aggregates should be of appropriate size and proportion, the water/cement ratio should be low, the concrete should be properly placed and finished, contraction joints should be installed, and the concrete should be properly cured. Concrete materials, placement and curing specifications should be at the direction of the designer; ACI 302.1R-04 and ACI 302.2R-04 are suggested as resources for the designer in preparing such specifications.

Flexible Pavement Sections

1. The asphalt pavement design sections were developed using the State of California Highway Design Manual, Chapter 630-Flexible Pavement. Based on the results of

laboratory tests, an R-Value of 12 was used in the design of pavement sections. Determination of the appropriate Traffic Index (TI) for each area to be paved should be established by the project Civil Engineer. The calculated Asphalt Concrete (AC) and aggregate base (AB) thicknesses are for compacted subgrade material. Normal Caltrans construction tolerances should apply. The aggregate base should conform to Caltrans Class 2.

Summary of Pavement Sections

Traffic Index	R-Value = 12	
	Asphaltic Concrete (AC) inches	Class II Aggregate Base (AB) inches
4	3	5½
4.5	3	7
5.0	3½	7½
5.5	3½	9½
6.0	4	10
6.5	4	12
7.0	4½	13

2. The upper 12 inches of native soil subgrade soil should be compacted to a minimum 92 percent of maximum dry density and the aggregate base courses should be compacted to a minimum 95 percent of maximum dry density. The subgrade and base should be firm and unyielding when proof-rolled with heavy, rubber-tired equipment prior to paving. The pavement subgrade soils should be frequently moistened as necessary prior to placement of the aggregate base to maintain the soil moisture content near optimum.

3. Pavement longevity will be enhanced if the surface grade drains away from the edges of the pavement. Finished AC surfaces should slope toward drainage facilities at 2 percent where practicable, but in no case, should water be allowed to pond.

4. Cutoff walls below curbs and around landscape islands may be used to extend the life of the pavement by reducing irrigation water and runoff that seeps into the aggregate base. Where utilized, cutoff walls should extend through the aggregate base to penetrate a minimum of 3 inches into the subgrade soils.

5. To reduce migration of surface drainage into the subgrade, maintenance of the paved areas is critical. Any cracks that develop in the AC should be promptly sealed.

Rigid Pavement Sections

1. Rigid Pavements should have a minimum thickness of 6 full inches with a minimum compressive strength of 3,000 psi and should be reinforced as directed by the architect/engineer. Rigid pavements should be cast on a minimum 6-inch layer of compacted Class 2 aggregate base (conforming with Section 26-1.02B of the Caltrans Standard Specifications) over a minimum of 18 inches compacted native soil or engineered fill.

2. The native soil in the pavement areas should be compacted to a minimum 95 percent relative compaction and the aggregate baserock should also be compacted to a minimum of 95 percent relative compaction. The subgrade and base should be firm and unyielding when proof-rolled with heavy, rubber-tired equipment prior to paving. The pavement subgrade soils should be frequently moistened as necessary prior to placement of the aggregate base to maintain the soil moisture content slightly above optimum.

3. If the rigid pavements are to be subjected to traffic, such as where the rigid pavement is adjacent to flexible pavement, it is recommended that the thickness of the edges be increased by 20 percent and tapered back to normal slab thickness over a distance of 10 times the slab thickness.

Utility Trench Backfills

1. A select, noncorrosive, granular, easily compacted material should be used as bedding and shading immediately around utility pipes. The site soils may be used for trench backfill above the select material.

2. Trench backfill in the upper 8 inches of subgrade beneath pavement areas should be compacted to a minimum of 92 percent of maximum dry density at a moisture content at least 2 percentage points above optimum moisture content and the aggregate base courses should be compacted to a minimum 95 percent of maximum dry density at a moisture content at least 2 percentage points over optimum. Trench backfill in other areas should be compacted to a minimum of 90 percent of maximum dry density at a moisture content at least 2 percentage points above optimum moisture content. Jetting of utility trench backfill should not be allowed.

3. Where utility trenches extend under perimeter foundations, the trenches should be backfilled entirely with approved fill soil compacted to a minimum of 90 percent of

maximum dry density at a moisture content at least 2 percentage points above optimum moisture content. The zone of approved fill soil should extend a minimum distance of 2 feet on both sides of the foundation. If utility pipes pass through sleeves cast into the perimeter foundations, the annulus between the pipes and sleeves should be completely sealed.

4. Parallel trenches excavated in the area under foundations defined by a plane radiating at a 45-degree angle downward from the bottom edge of the footing should be avoided, if possible. Trench backfill within this zone, if necessary, should consist of Controlled Density Fill (Flowable Fill).

Management of Site Drainage and Finish Improvements

1. Unpaved ground surfaces should be finish graded to direct surface runoff away from site improvements at a minimum 5 percent grade for a minimum distance of 10 feet. If this is not practical due to the terrain or other site features, swales with improved surfaces should be provided to divert drainage away from improvements. The landscaping should be planned and installed to maintain proper surface drainage conditions.

2. Runoff from driveways, roof gutters, downspouts, planter drains and other improvements should discharge in a non-erosive manner away from foundations, pavements, and other improvements. The downspouts may discharge onto splash blocks that direct the flow away from the foundation.

3. Stabilization of surface soils, particularly those disturbed during construction, by vegetation or other means during and following construction is essential to protect the site from erosion damage. Care should be taken to establish and maintain vegetation.

4. Raised planter beds adjacent to foundations should be provided with sealed sides and bottoms so that irrigation water is not allowed to penetrate the subsurface beneath foundations. Outlets should be provided in the planters to direct accumulated irrigation water away from foundations.

5. Open areas adjacent to exterior flatwork should be irrigated or otherwise maintained so that constant moisture conditions are created throughout the year. Irrigation systems should be controlled to the minimum levels that will sustain the vegetation without saturating the soil.

6. Bio-retention swales constructed within 10 feet or less from the building foundation should be lined with a 20-mil pond liner.

Geotechnical Observation and Testing

1. It must be recognized that the recommendations contained in this report are based on a limited number of subsurface soundings and rely on continuity of the subsurface conditions encountered.

2. It is assumed that the geotechnical engineer will be retained to provide consultation during the design phase, to interpret this report during construction, and to provide construction monitoring in the form of testing and observation.

3. Unless otherwise stated, the terms "compacted" and "recompacted" refer to soils placed in level lifts not exceeding 8 inches in loose thickness and compacted to a minimum of 90 percent of maximum dry density. The standard tests used to define maximum dry density and field density should be ASTM D 1557-12 and ASTM D 6938-17a, respectively, or other methods acceptable to the geotechnical engineer and jurisdiction.

4. "Moisture conditioning" refers to adjusting the soil moisture to at least 2 percentage points above optimum moisture content prior to application of compactive effort. If the soils are overly moist so that they become unstable, or if the recommended compaction cannot be readily achieved, drying the soil to optimum moisture content or just above may be necessary. Placement of gravel layers or geotextiles may also be necessary to help stabilize unstable soils. The geotechnical engineer should be contacted for recommendations for mitigating unstable soils.

5. At a minimum, the following should be provided by the geotechnical engineer:

    - Review of final grading and foundation plans,
    - Professional observation during site preparation, grading, and foundation excavation,
    - Oversight of soil compaction testing during grading,
    - Oversight of soil special inspection during grading.

6. Special inspection of grading should be provided as per Section 1705.6 and Table 1705.6 of the CBC; the soils special inspector should be under the direction of the geotechnical engineer. In our opinion, the following operations should be subject to *continuous* soils special inspection:

- Scarification and recompaction,
- Fill placement and compaction,
- Over-excavation to the recommended depth.

7. In our opinion, the following operations may be subject to *periodic* soils special inspection; subject to approval by the Building Official:

   - Site preparation,
   - Compaction of utility trench backfill,
   - Removal of existing development features,
   - Compaction of subgrade and aggregate base,
   - Observation of foundation excavations,
   - Building pad moisture conditioning.

8. It will be necessary to develop a program of quality control prior to beginning grading. It is the responsibility of the owner, contractor, or project manager to determine any additional inspection items required by the architect/engineer or the governing jurisdiction.

9. The locations and frequencies of compaction tests should be as per the recommendations of the geotechnical engineer at the time of construction. The recommended test locations and frequencies may be subject to modification by the geotechnical engineer based upon soil and moisture conditions encountered, the size and type of equipment used by the contractor, the general trend of the compaction test results, and other factors.

10. A preconstruction conference among a representative of the owner, the geotechnical engineer, soils special inspector, the architect/engineer, and contractors is recommended to discuss planned construction procedures and quality control requirements. Earth Systems should be notified at least 48 hours prior to beginning grading operations.

7.0 CLOSURE

This report is valid for conditions as they exist at this time for the type of project described herein. Our intent was to perform the investigation in a manner consistent with the level of care and skill ordinarily exercised by members of the profession currently practicing in the locality of this project at this time under similar conditions. No representation, warranty, or guarantee is either expressed or implied. This report is intended for the exclusive use by the client as discussed in the Scope of Services section. Application beyond the stated intent is strictly at the user's risk.

If changes with respect to the project type or location become necessary, if items not addressed in this report are incorporated into plans, or if any of the assumptions stated in this report are not correct, Earth Systems should be notified for modifications to this report. Any items not specifically addressed in this report should comply with the California Building Code and the requirements of the governing jurisdiction.

The preliminary recommendations of this report are based upon the geotechnical conditions encountered during the investigation, and may be augmented by additional requirements of the architect/engineer, or by additional recommendations provided by this firm based on conditions exposed at the time of construction.

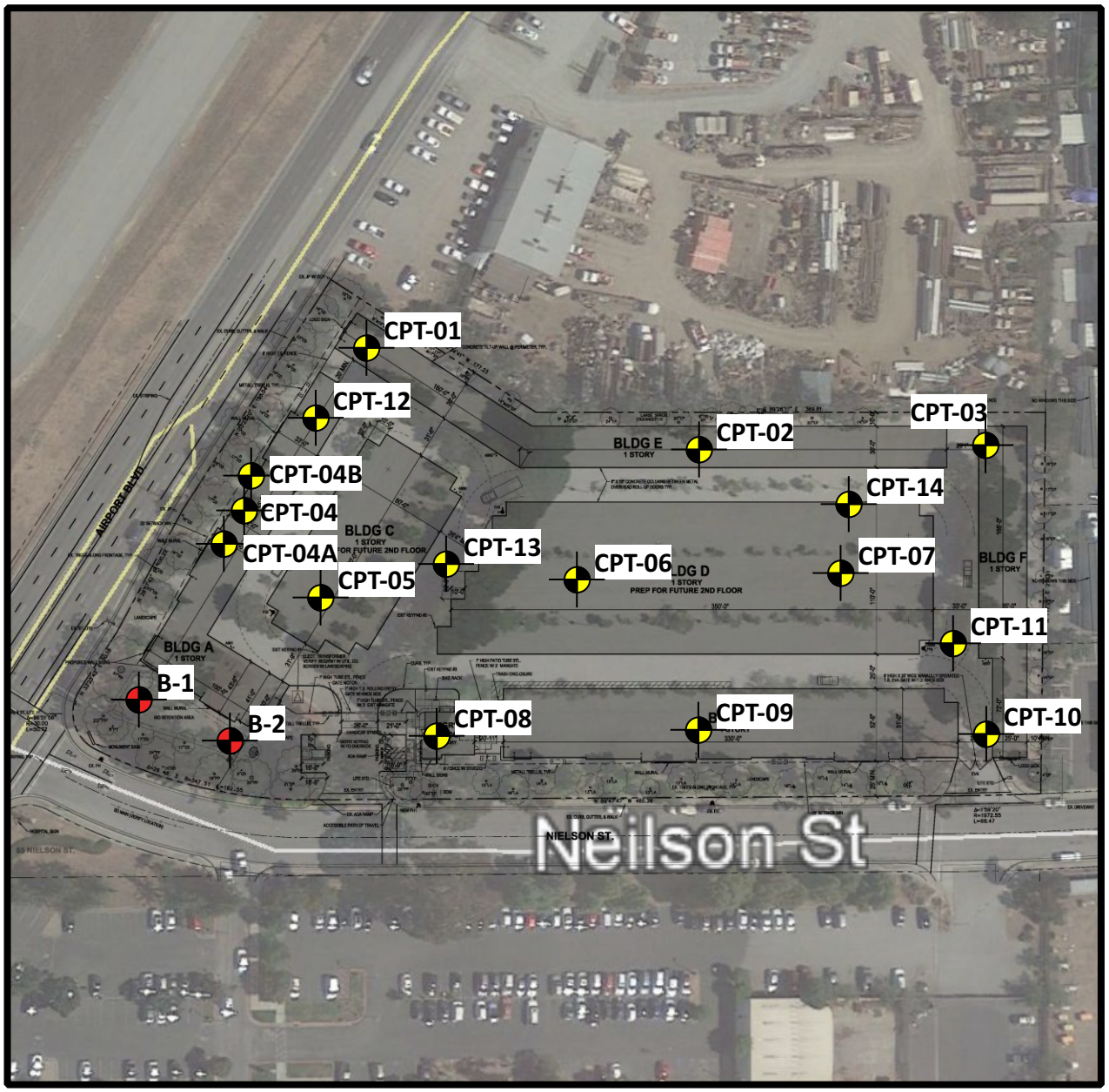
If Earth Systems is not retained to provide construction observation and testing services, it will not be responsible for the interpretation of the information by others or any consequences arising there from.

Thank you for this opportunity to have been of service. Please feel free to contact this office at your convenience if you have any questions regarding this report.

FIGURES

Figure 2

TN MN 13.5



120 0 120 240

Approximate Scale in Feet

B-2 Approximate Boring & Percolation Rate Test Location

CPT-14 Approximate CPT Location

Base: Google Earth (2020) and Site Plan (1A) by Cubix Construction (dated 10/27/2020)

Earth Systems Pacific	Crocker's Locker Self Storage 70 Nielson Street Watsonville, Monterey County, California	Site Plan 304272-001

Figure 1

Base: Google Earth (2020)

Earth Systems Pacific	Crocker's Lockers Self Storage 70 Nielson Street Watsonville, Monterey County, California	**Site Location Map** **304272-001**

APPENDIX A

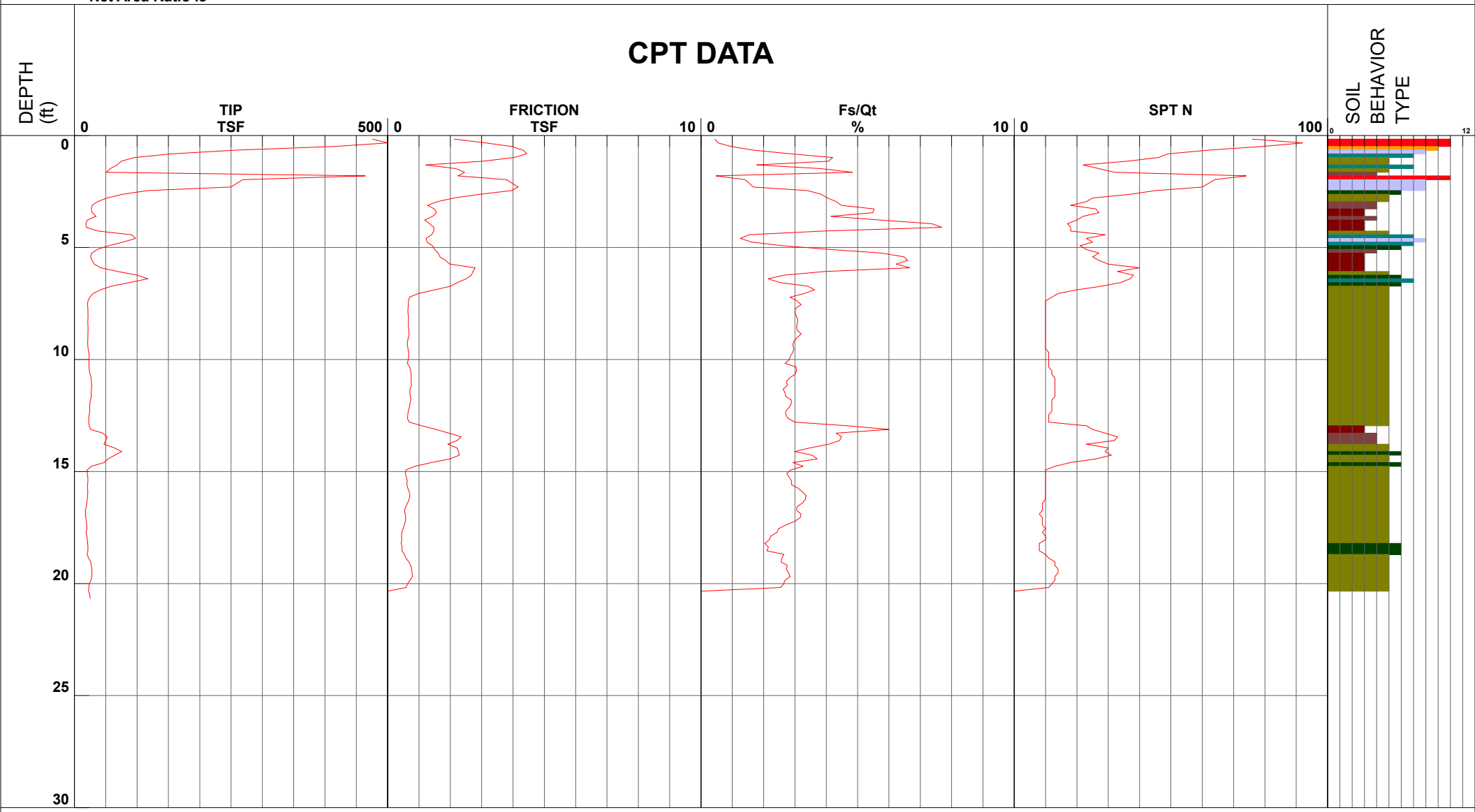
CPT Soundings (14)

Earth Systems

Project	Crocker's Locker Self Storage	Operator	JM-AJ	Filename	SDF(346).cpt
Job Number	304272-001	Cone Number	DDG1530	GPS	
Hole Number	CPT-01	Date and Time	12/9/2020 8:33:23 AM	Maximum Depth	20.67 ft
EST GW Depth During Test		11.00 ft			

Net Area Ratio .8

CPT DATA



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

Cone Size 15cm squared

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

Earth Systems

Project	Crocker's Locker Self Storage	Operator	JM-AJ	Filename	SDF(347).cpt
Job Number	304272-001	Cone Number	DDG1530	GPS	
Hole Number	CPT-02	Date and Time	12/9/2020 9:09:37 AM	Maximum Depth	20.67 ft
EST GW Depth During Test		13.90 ft			

Net Area Ratio .8

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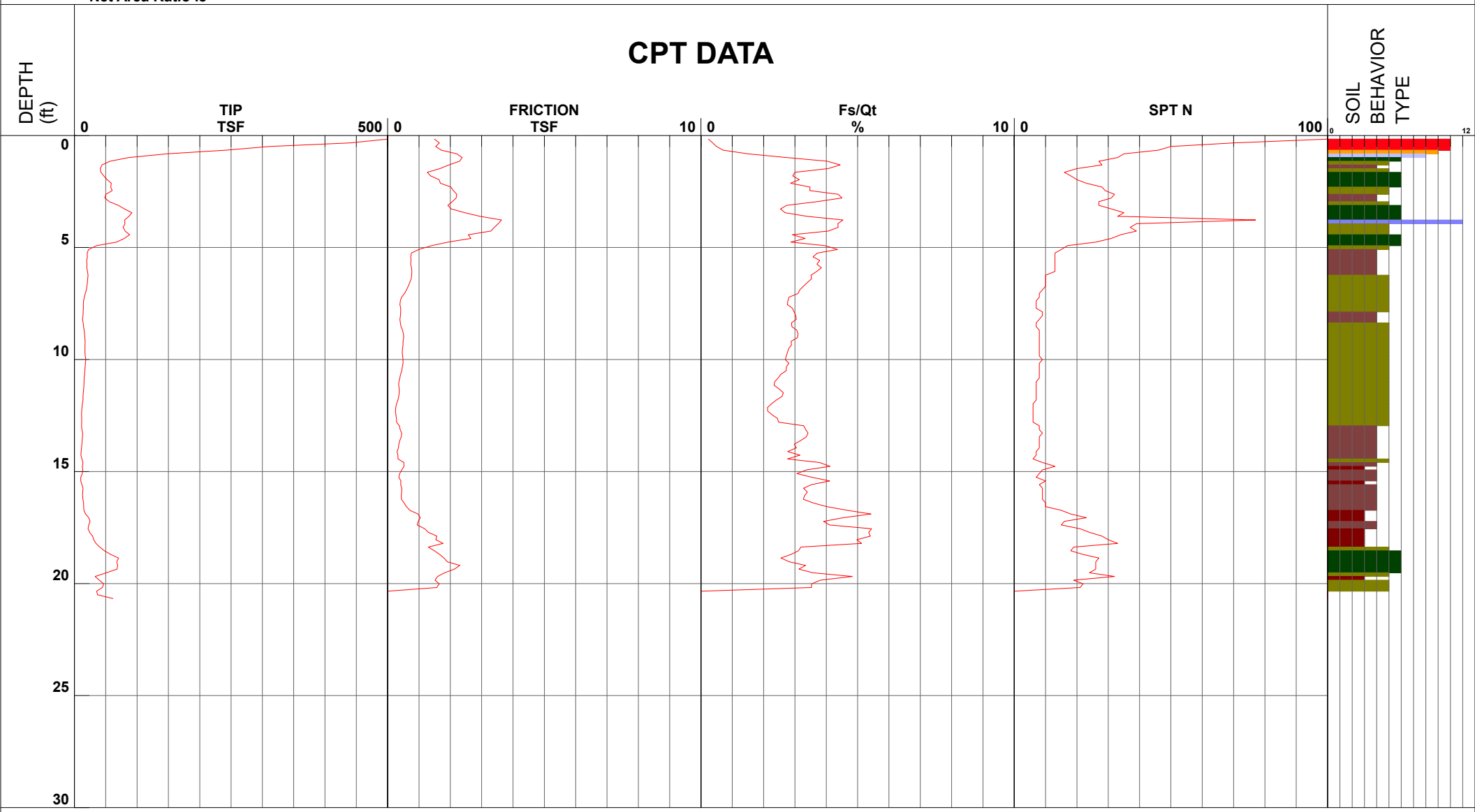

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11 - very stiff fine grained (*)
12 - sand to clayey sand (*)

Cone Size 15cm squared

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

Earth Systems

Project	Crocker's Locker Self Storage	Operator	JM-AJ	Filename	SDF(348).cpt
Job Number	304272-001	Cone Number	DDG1530	GPS	
Hole Number	CPT-03	Date and Time	12/9/2020 9:34:48 AM	Maximum Depth	30.68 ft
EST GW Depth During Test		8.10 ft			

Net Area Ratio .8

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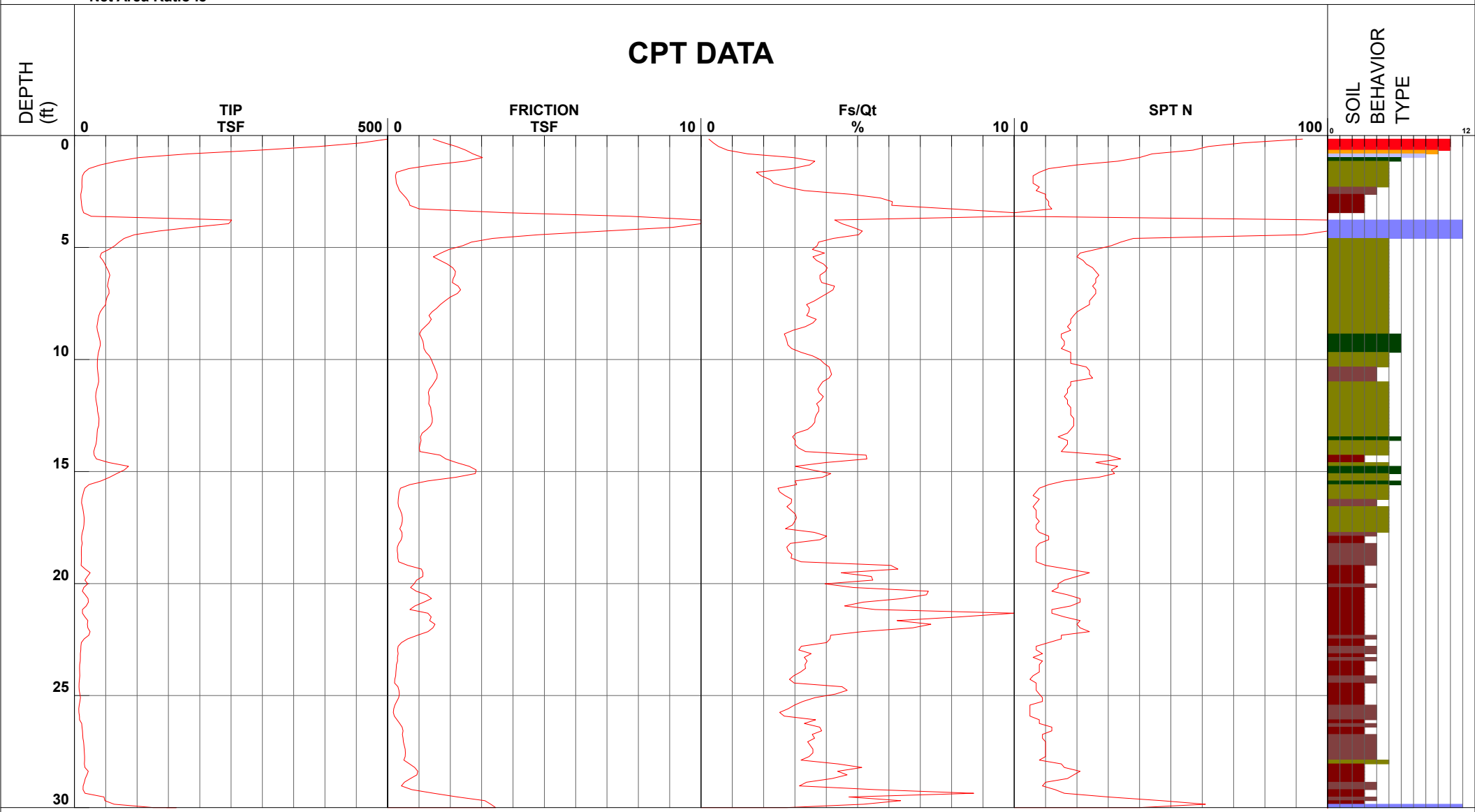

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12 - sand to clayey sand (*)

Cone Size 15cm squared

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

Earth Systems

Project	Crocker's Locker Self Storage	Operator	JM-AJ	Filename	SDF(351).cpt
Job Number	304272-001	Cone Number	DDG1530	GPS	
Hole Number	CPT-04	Date and Time	12/9/2020 12:00:09 PM	Maximum Depth	20.67 ft
EST GW Depth During Test		11.00 ft			

Net Area Ratio .8

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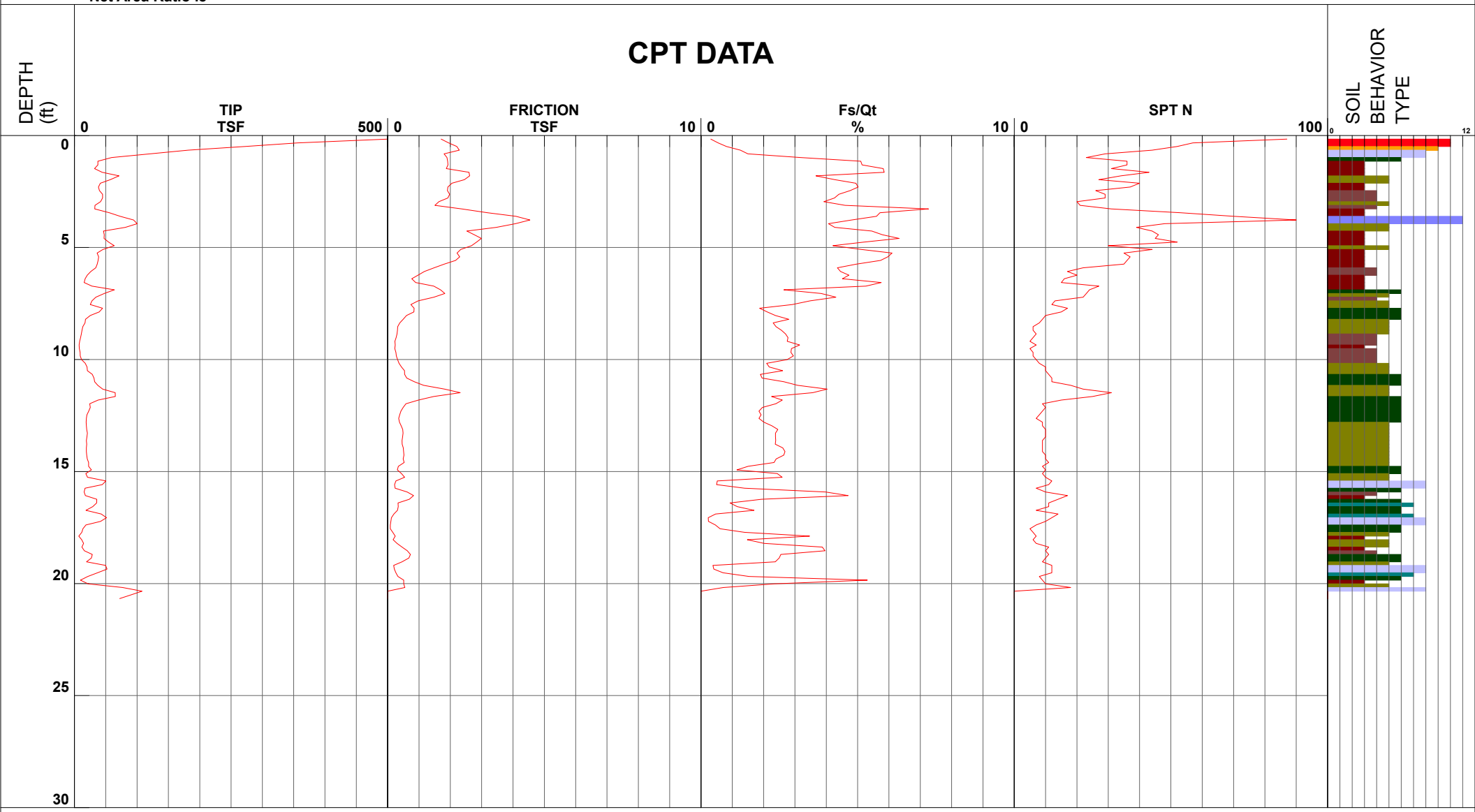

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11 - very stiff fine grained (*)
12 - sand to clayey sand (*)

Cone Size 15cm squared

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

Earth Systems

Project	Crockers Locker Self Storage	Operator	BH-ZG	Filename	SDF(253).cpt
Job Number	304272-001	Cone Number	DDG1587	GPS	
Hole Number	CPT-04A	Date and Time	2/5/2021 1:20:15 PM	Maximum Depth	20.67 ft
EST GW Depth During Test		0.00 ft			

Net Area Ratio .8

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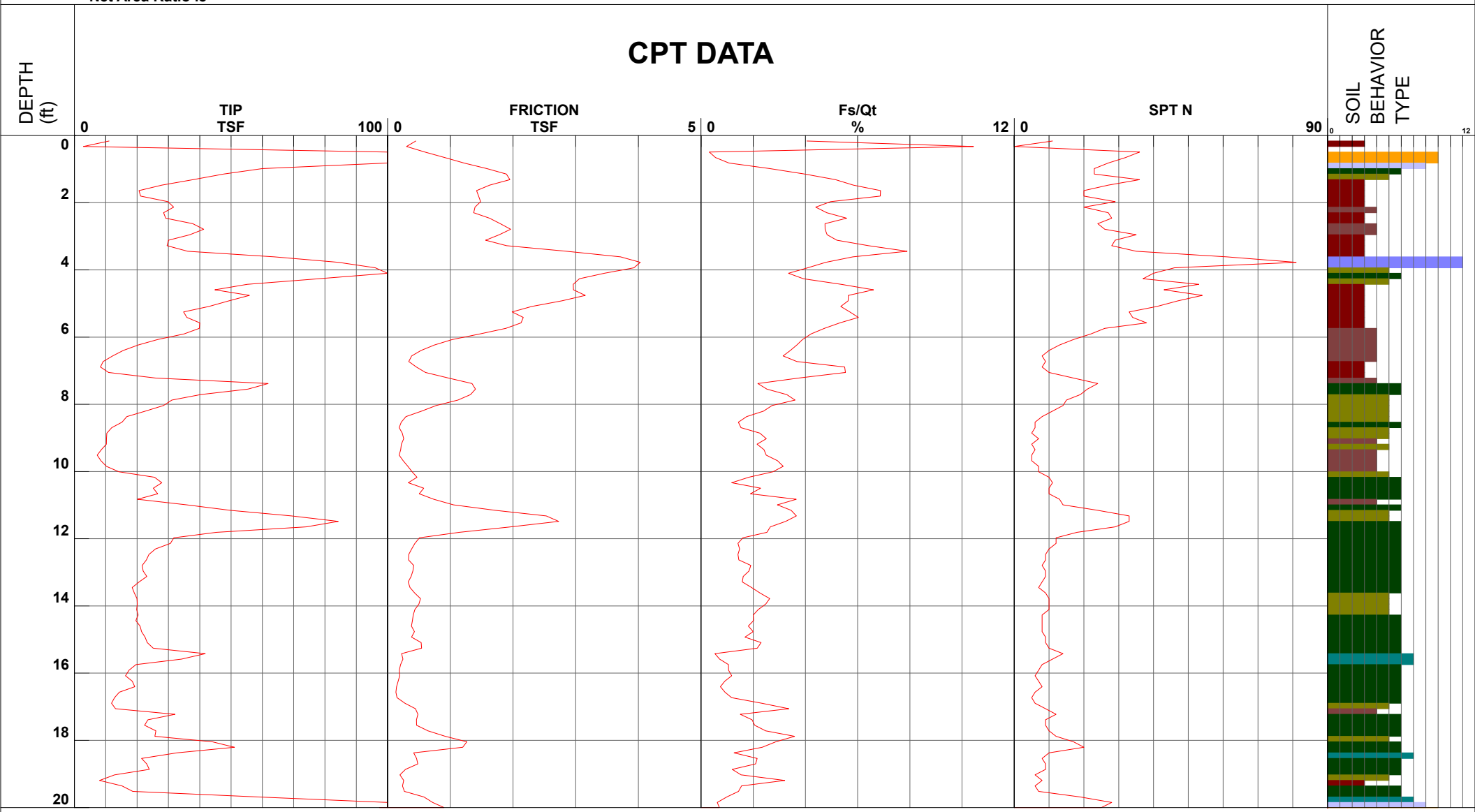

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9 - sand
10 - gravelly sand to sand
11 - very stiff fine grained (*)
12 - sand to clayey sand (*)

Cone Size 15cm squared

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

Earth Systems

Project	Crockers Locker Self Storage	Operator	BH-ZG	Filename	SDF(254).cpt
Job Number	304272-001	Cone Number	DDG1587	GPS	
Hole Number	CPT-04B	Date and Time	2/5/2021 1:37:33 PM	Maximum Depth	20.51 ft
EST GW Depth During Test		0.00 ft			

Net Area Ratio .8

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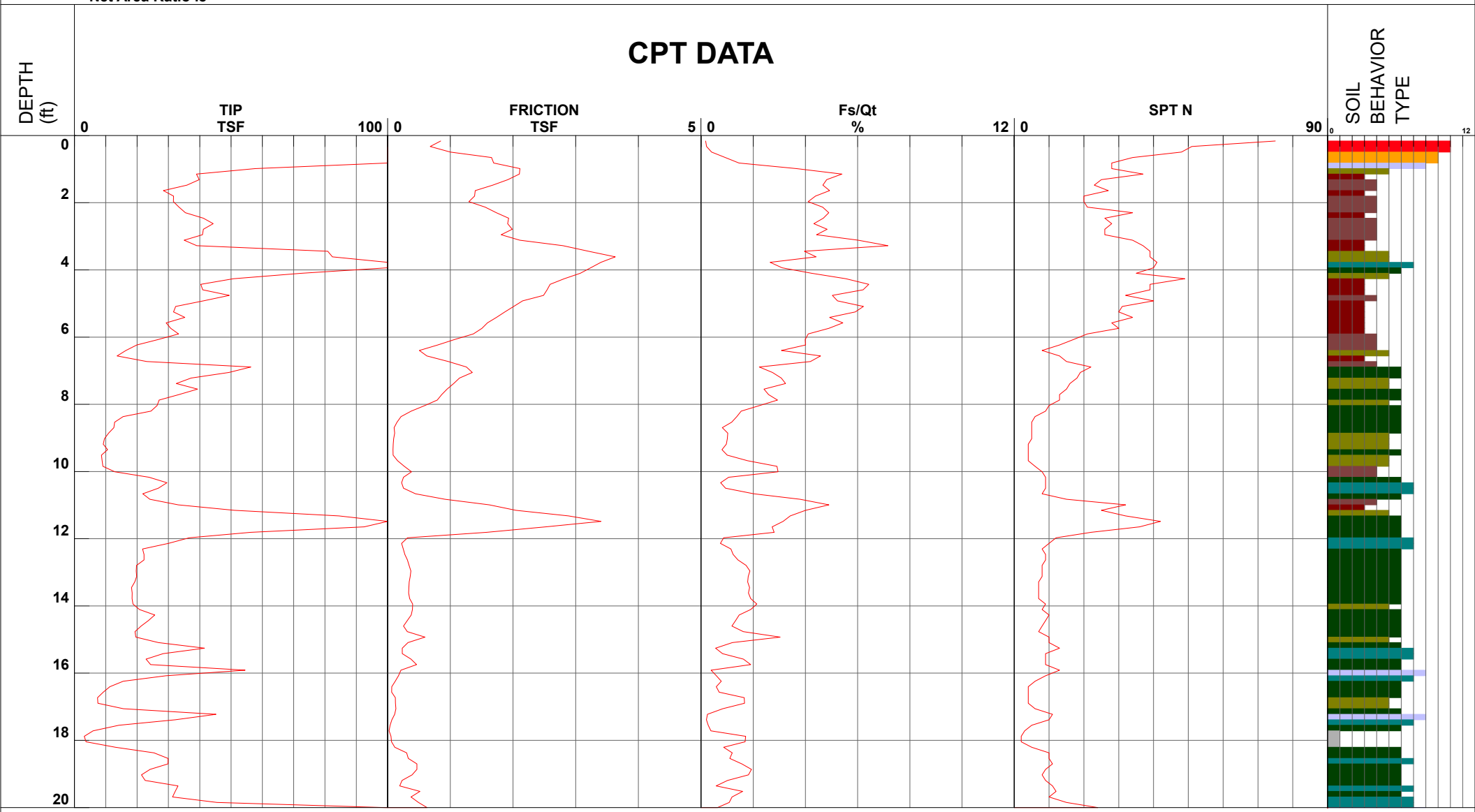

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7 - silty sand to sandy silt
8 - sand to silty sand
9 - sand
10 - gravelly sand to sand
11 - very stiff fine grained (*)
12 - sand to clayey sand (*)

Cone Size 15cm squared

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

Earth Systems

Project	Crocker's Locker Self Storage	Operator	JM-AJ	Filename	SDF(352).cpt
Job Number	304272-001	Cone Number	DDG1530	GPS	
Hole Number	CPT-05	Date and Time	12/9/2020 12:32:08 PM	Maximum Depth	30.51 ft
EST GW Depth During Test		9.00 ft			

Net Area Ratio .8

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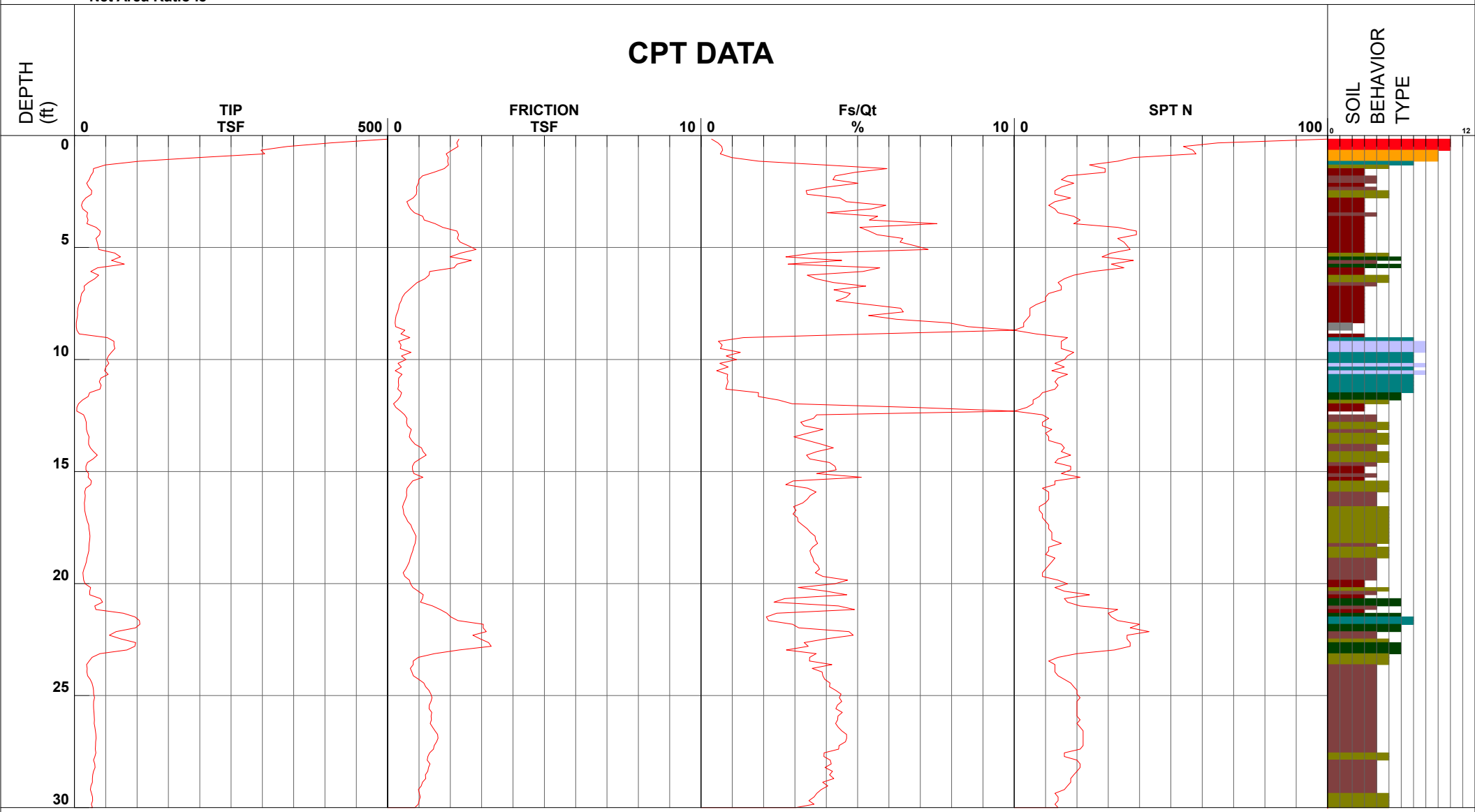

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Cone Size 15cm squared

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

Earth Systems

Project	Crocker's Locker Self Storage	Operator	JM-AJ	Filename	SDF(350).cpt
Job Number	304272-001	Cone Number	DDG1530	GPS	
Hole Number	CPT-06	Date and Time	12/9/2020 11:26:37 AM	Maximum Depth	30.51 ft
EST GW Depth During Test		9.00 ft			

Net Area Ratio .8

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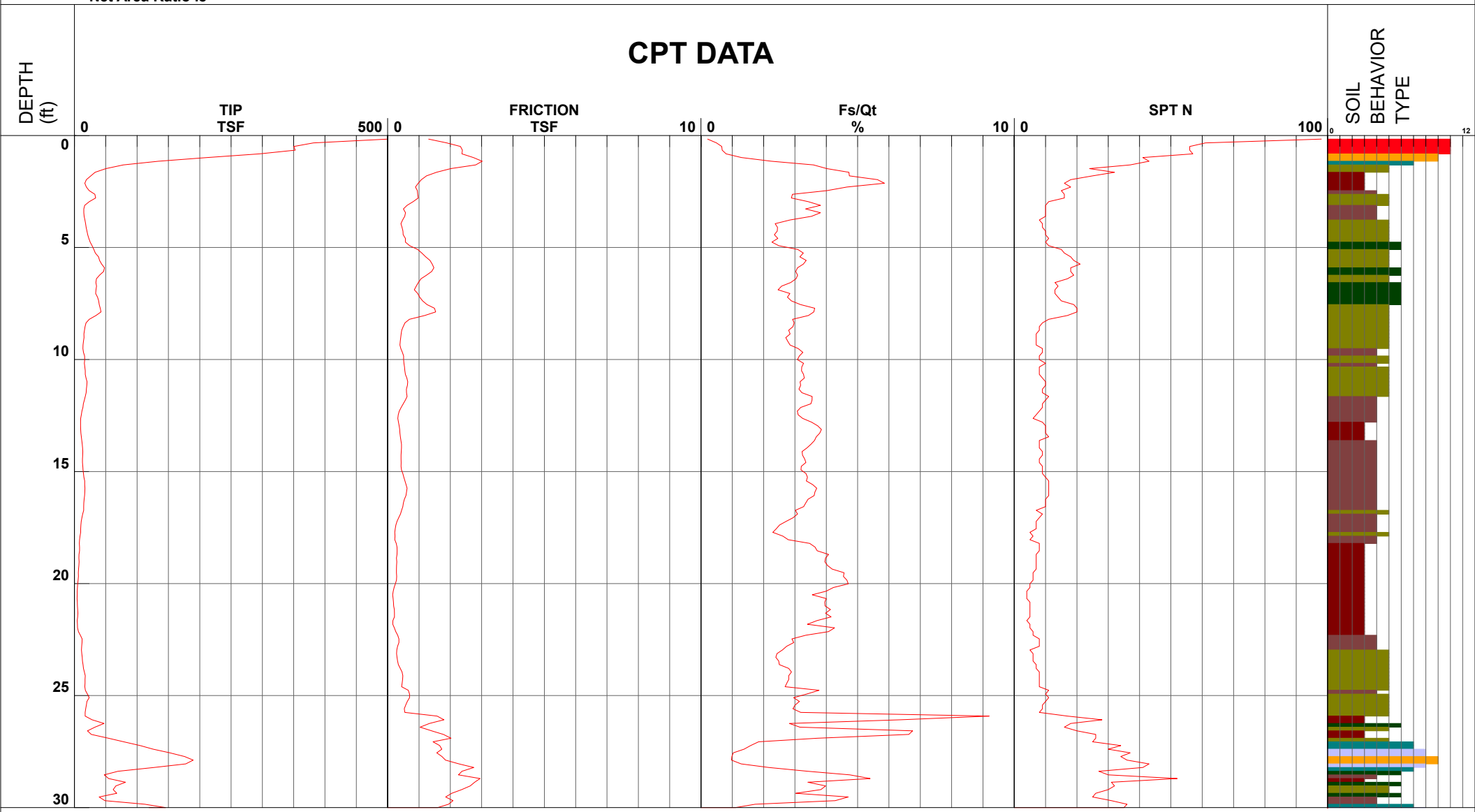

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12 - sand to clayey sand (*)

Cone Size 15cm squared

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

Earth Systems

Project	Crocker's Locker Self Storage	Operator	JM-AJ	Filename	SDF(349).cpt
Job Number	304272-001	Cone Number	DDG1530	GPS	
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EST GW Depth During Test		12.70 ft			

Net Area Ratio .8

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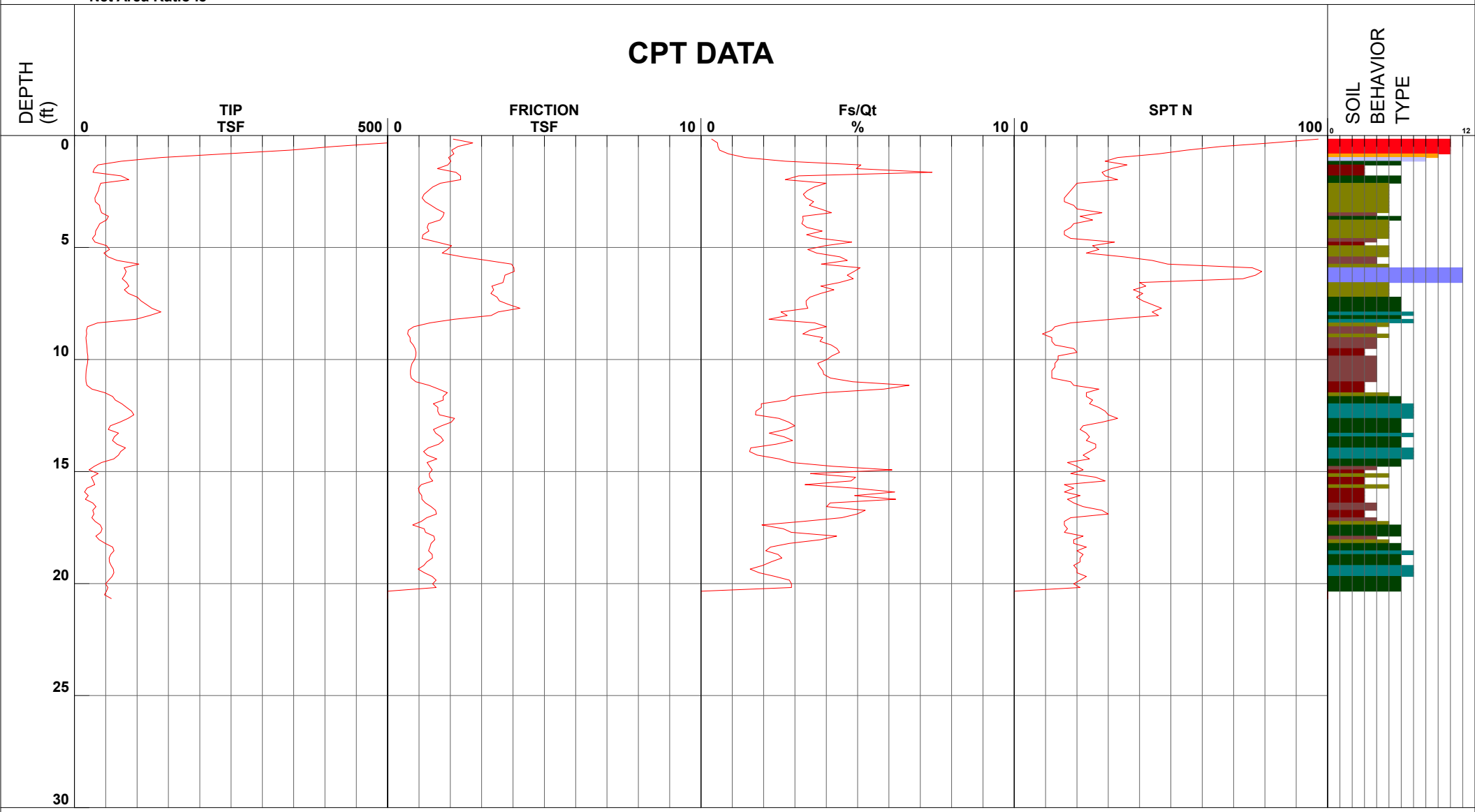

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4 - silty clay to clay
5 - clayey silt to silty clay
6 - sandy silt to clayey silt
7 - silty sand to sandy silt
8 - sand to silty sand
9 - sand
10 - gravelly sand to sand
11 - very stiff fine grained (*)
12 - sand to clayey sand (*)

Cone Size 15cm squared

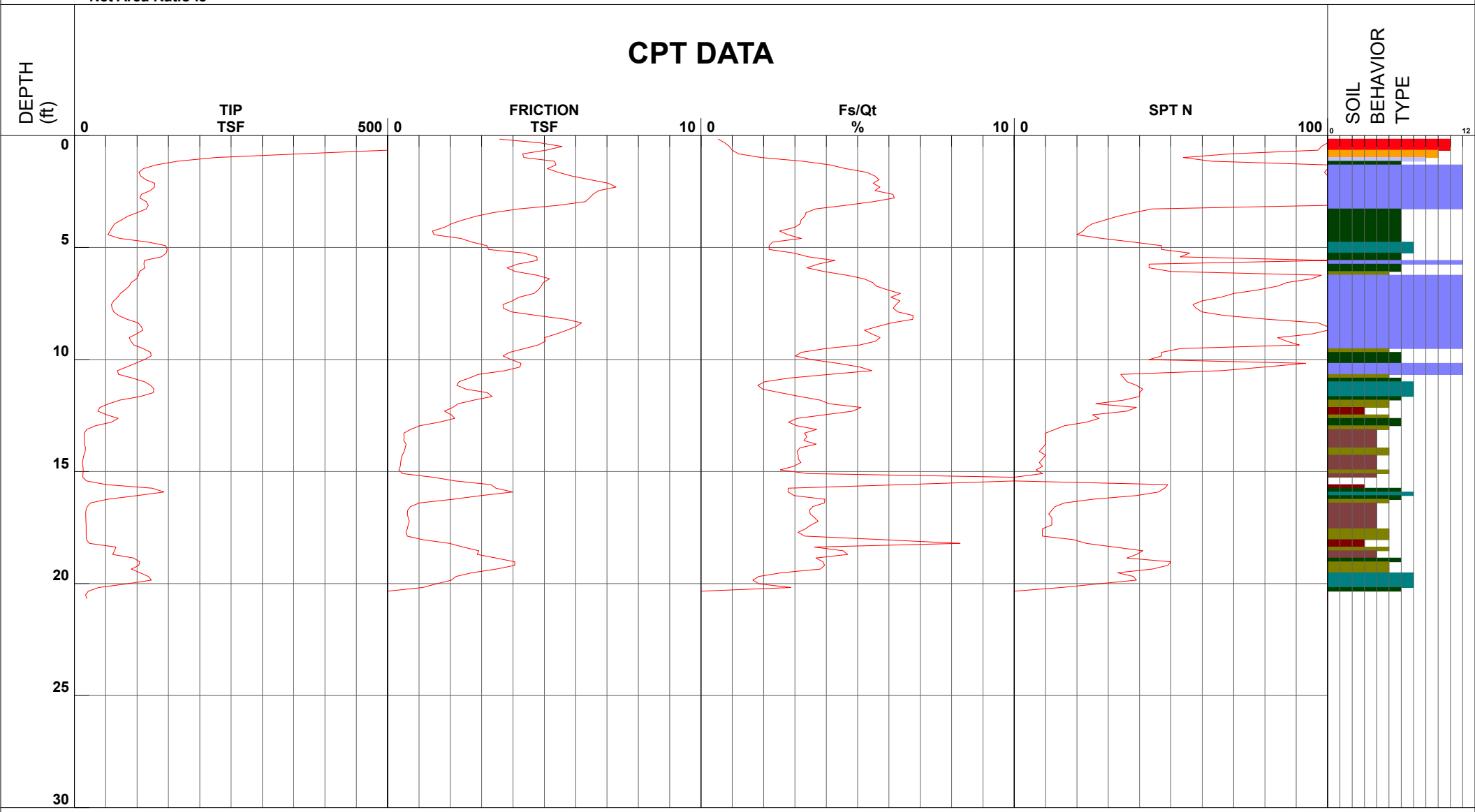
S*Soil behavior type and SPT based on data from UBC-1983

Earth Systems

Project	Crocker's Locker Self Storage	Operator	JM-AJ	Filename	SDF(353).cpt
Job Number	304272-001	Cone Number	DDG1530	GPS	
Hole Number	CPT-08	Date and Time	12/9/2020 12:59:30 PM	Maximum Depth	20.67 ft
EST GW Depth During Test		14.00 ft			

Net Area Ratio .8

CPT DATA



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

Cone Size 15cm squared

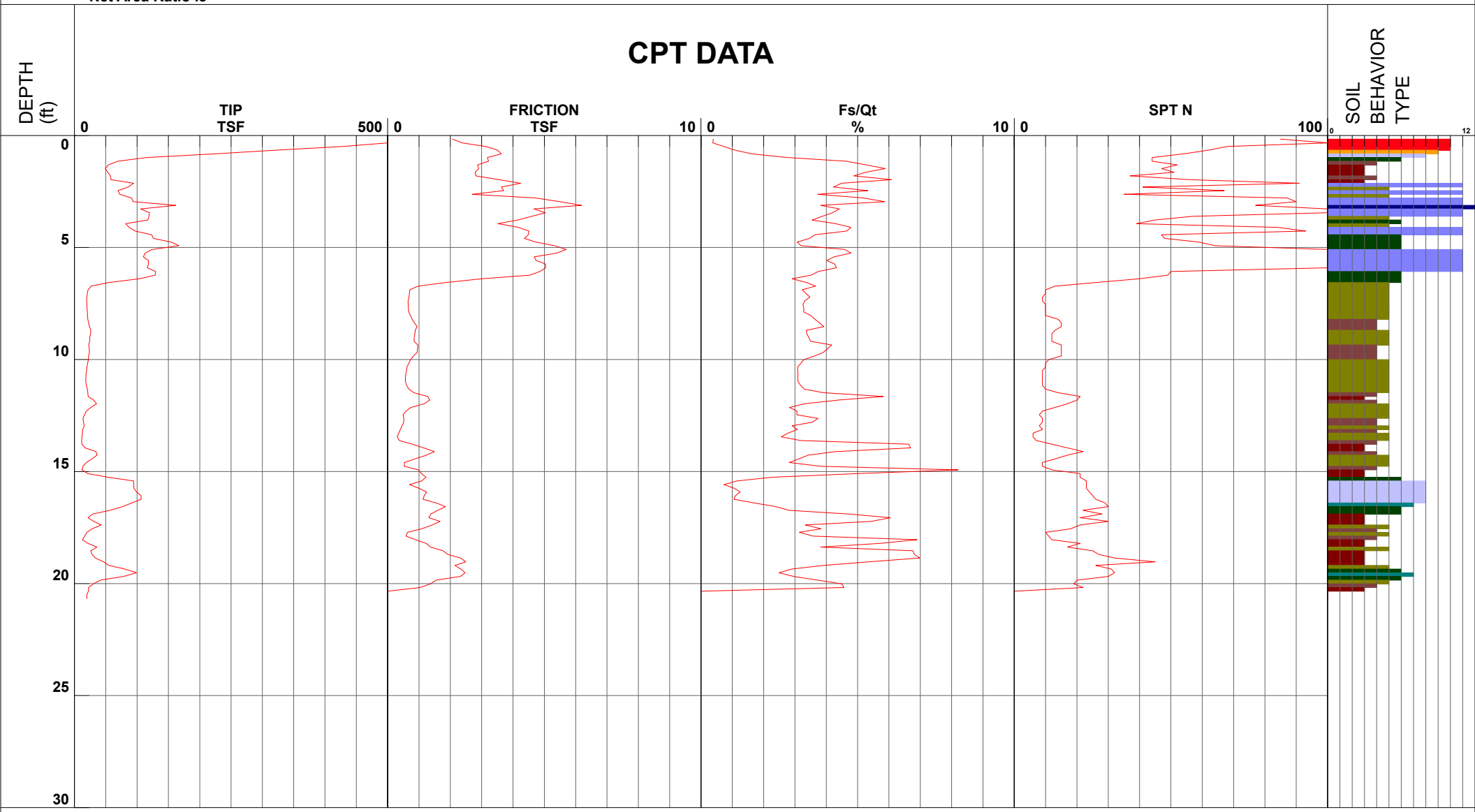
S*Soil behavior type and SPT based on data from UBC-1983

Earth Systems

Project	Crocker's Locker Self Storage	Operator	JM-AJ	Filename	SDF(354).cpt
Job Number	304272-001	Cone Number	DDG1530	GPS	
Hole Number	CPT-09	Date and Time	12/9/2020 1:28:00 PM	Maximum Depth	20.67 ft
EST GW Depth During Test		12.00 ft			

Net Area Ratio .8

CPT DATA



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

Cone Size 15cm squared

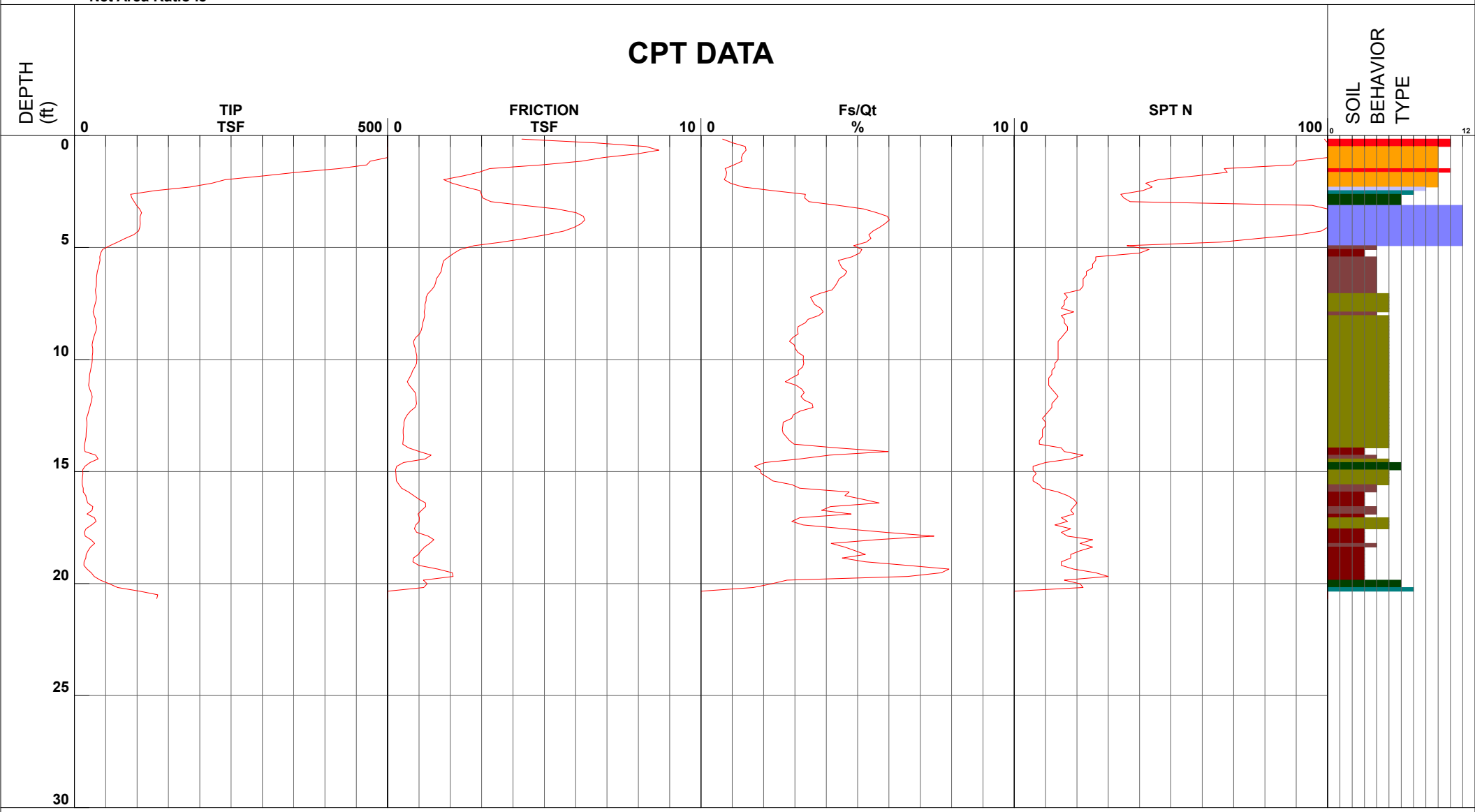
S*Soil behavior type and SPT based on data from UBC-1983

Earth Systems

Project	Crocker's Locker Self Storage	Operator	JM-AJ	Filename	SDF(355).cpt
Job Number	304272-001	Cone Number	DDG1530	GPS	
Hole Number	CPT-10	Date and Time	12/9/2020 1:54:10 PM	Maximum Depth	20.67 ft
EST GW Depth During Test		9.00 ft			

Net Area Ratio .8

CPT DATA



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

Cone Size 15cm squared

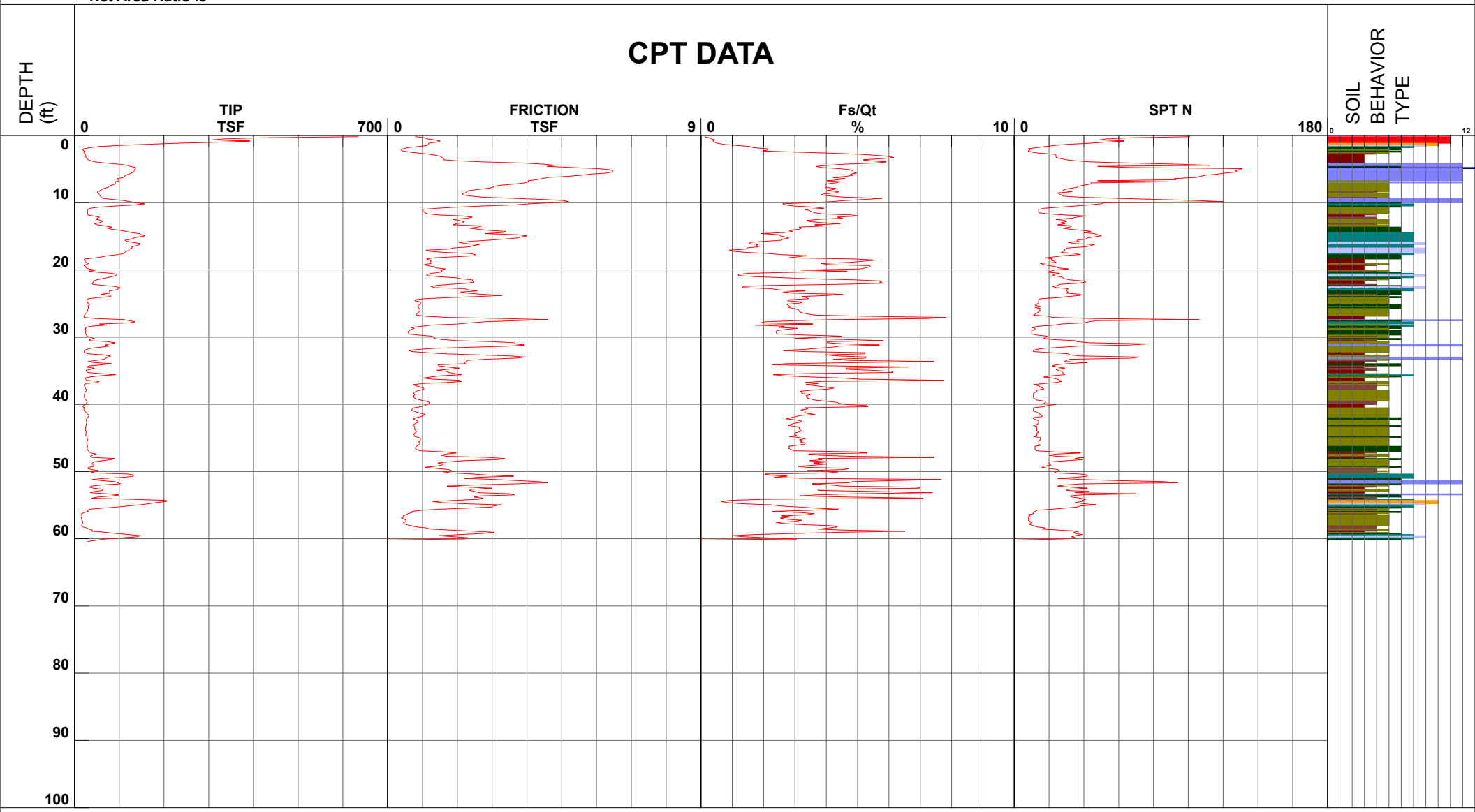
S*Soil behavior type and SPT based on data from UBC-1983

Earth Systems

Project	Crocker's Locker Self Storage	Operator	JM-AJ	Filename	SDF(013).cpt
Job Number	304272-001	Cone Number	DDG1542	GPS	
Hole Number	CPT-11	Date and Time	1/28/2021 8:40:47 AM	Maximum Depth	60.53 ft
EST GW Depth During Test		18.00 ft			

Net Area Ratio .8

CPT DATA



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

Cone Size 15cm squared

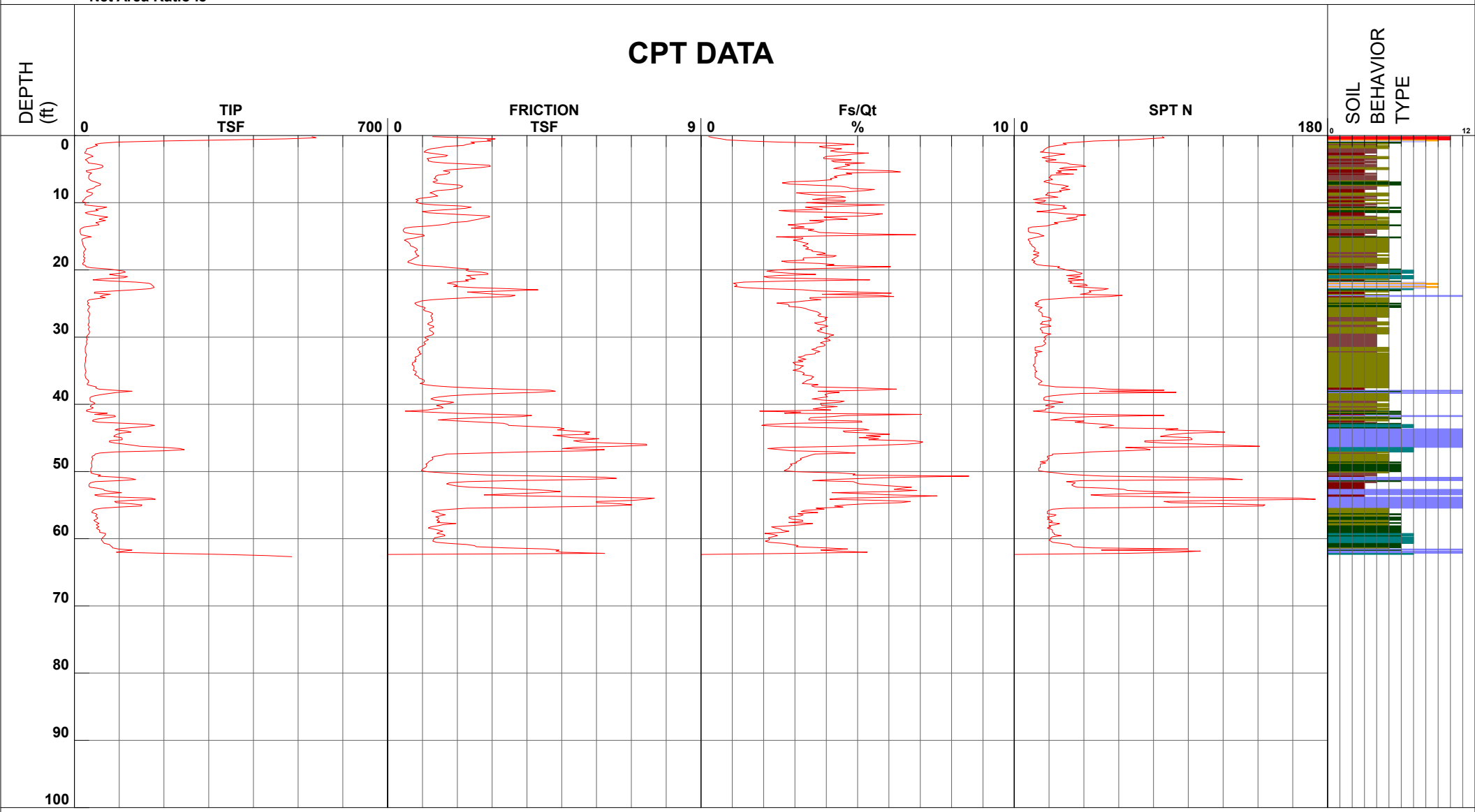
S*Soil behavior type and SPT based on data from UBC-1983

Earth Systems

Project	Crocker's Locker Self Storage	Operator	JM-AJ	Filename	SDF(014).cpt
Job Number	304272-001	Cone Number	DDG1542	GPS	
Hole Number	CPT-12	Date and Time	1/28/2021 9:39:13 AM	Maximum Depth	62.66 ft
EST GW Depth During Test		13.00 ft			

Net Area Ratio .8

CPT DATA



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

Cone Size 15cm squared

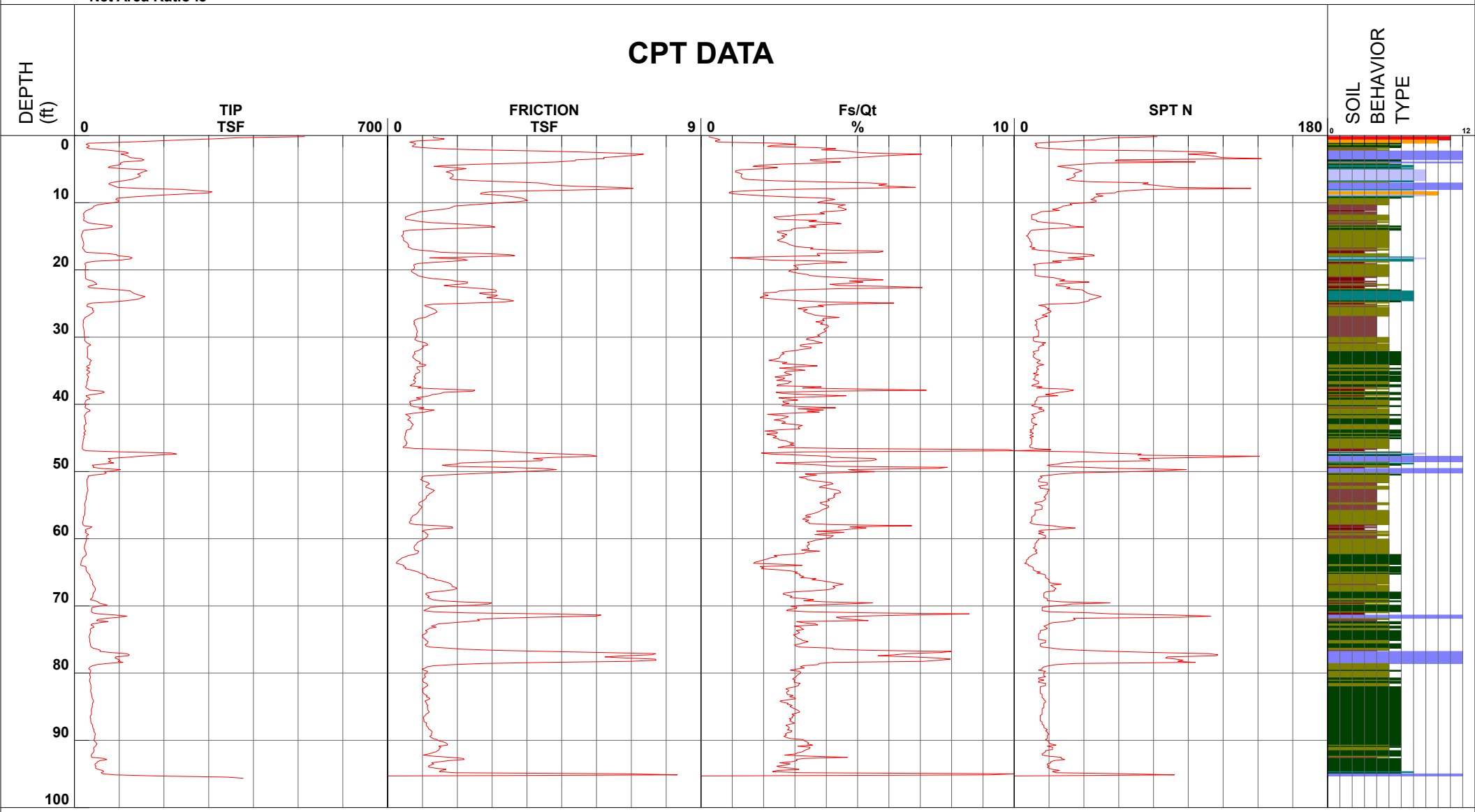
S*Soil behavior type and SPT based on data from UBC-1983

Earth Systems

Project	Crocker's Locker Self Storage	Operator	JM-AJ	Filename	SDF(015).cpt
Job Number	304272-001	Cone Number	DDG1542	GPS	
Hole Number	CPT-13	Date and Time	1/28/2021 10:22:13 AM	Maximum Depth	95.64 ft
EST GW Depth During Test		14.00 ft			

Net Area Ratio .8

CPT DATA



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

Cone Size 15cm squared

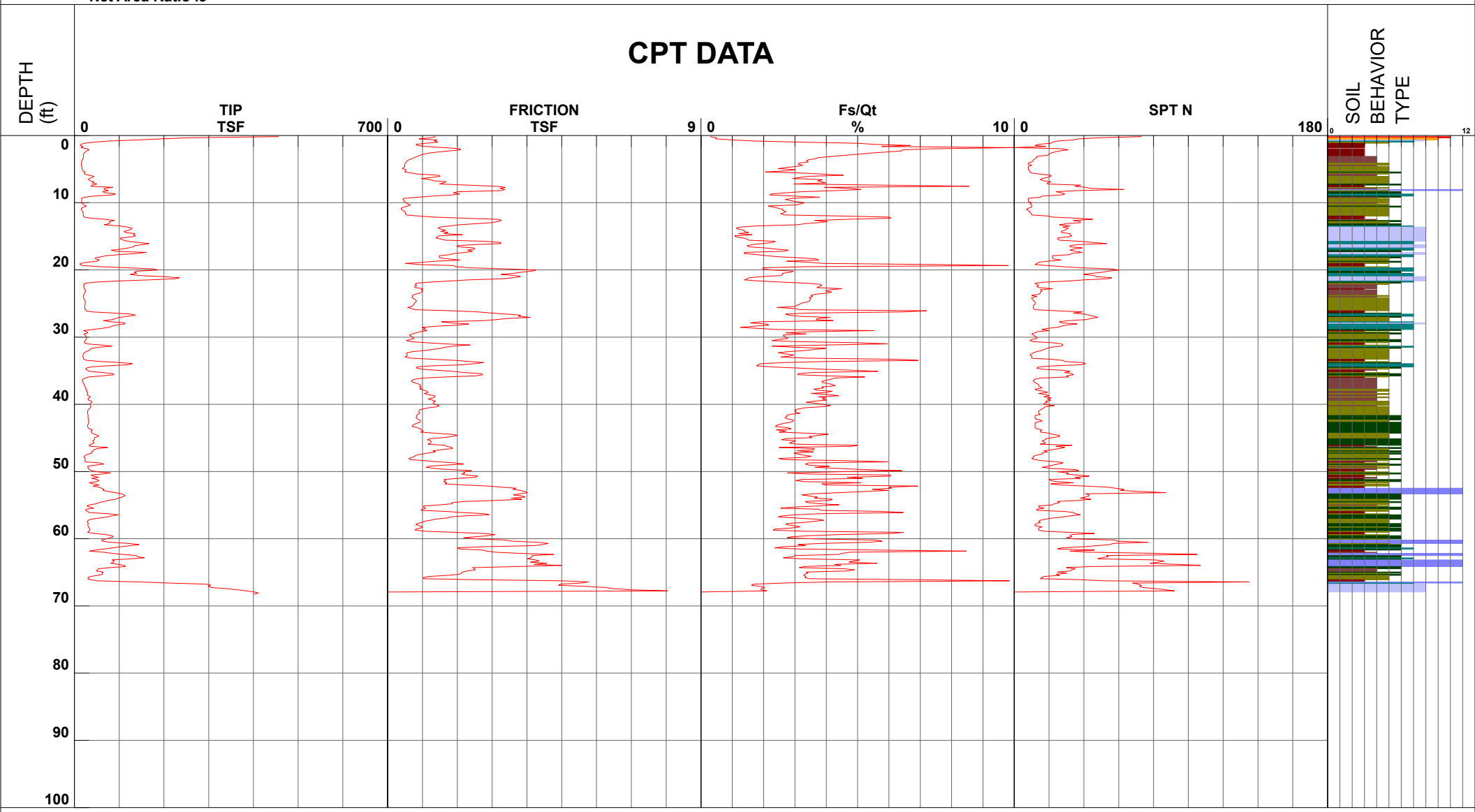
S*Soil behavior type and SPT based on data from UBC-1983

Earth Systems

Project	Crocker's Locker Self Storage	Operator	JM-AJ	Filename	SDF(016).cpt
Job Number	304272-001	Cone Number	DDG1542	GPS	
Hole Number	CPT-14	Date and Time	1/28/2021 11:26:57 AM	Maximum Depth	68.24 ft
EST GW Depth During Test		15.00 ft			

Net Area Ratio .8

CPT DATA



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

Cone Size 15cm squared

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

APPENDIX B

Laboratory Testing Results

Crocker Locker
Self Storage Watsonville

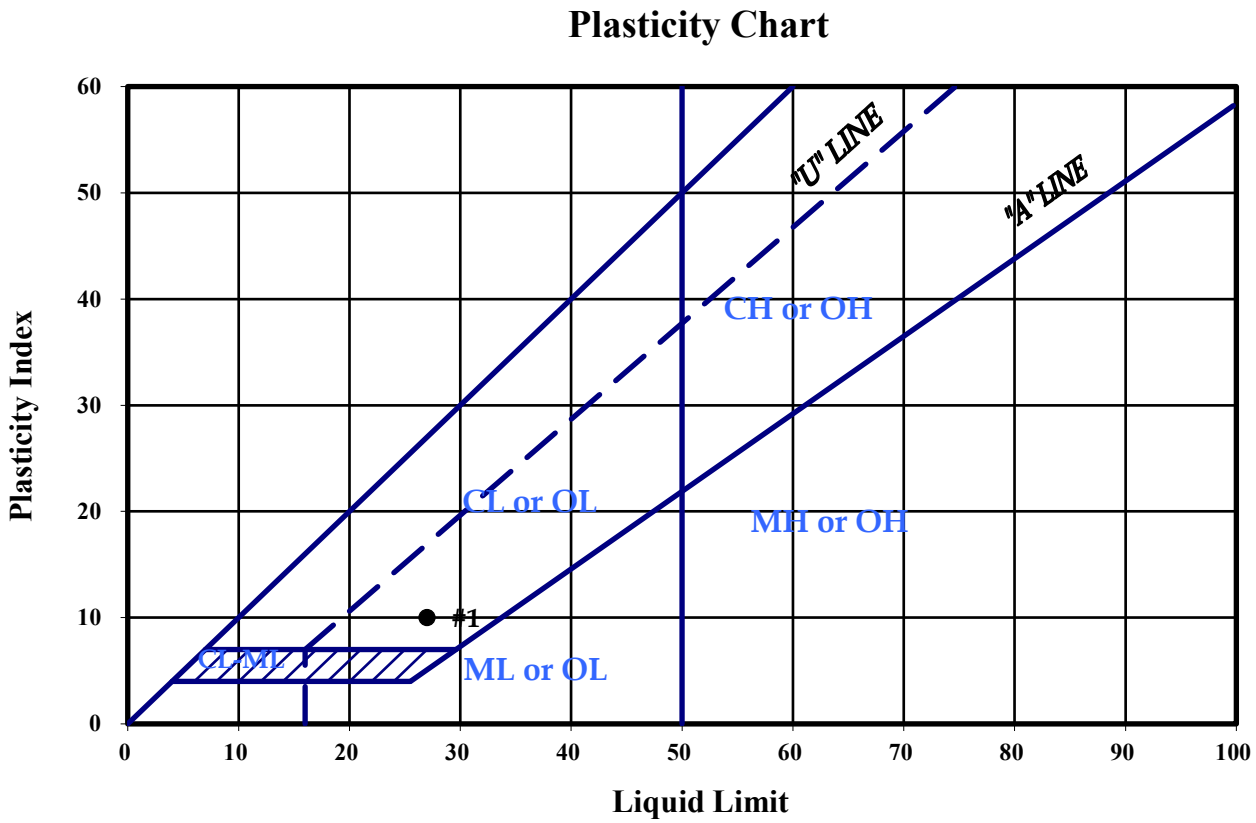
304272-001

PLASTICITY INDEX

ASTM D 4318-17

December 9, 2020

Test No.:	1	2	3	4	5
Boring No.:	Bag A				
Sample Depth:	0.0 - 5.0'				
Liquid Limit:	27				
Plastic Limit:	17				
Plasticity Index:	10				



Crocker's Lockers Self Storage
Watsonville, California

304272-001

RESISTANCE '*R* ' VALUE AND EXPANSION PRESSURE

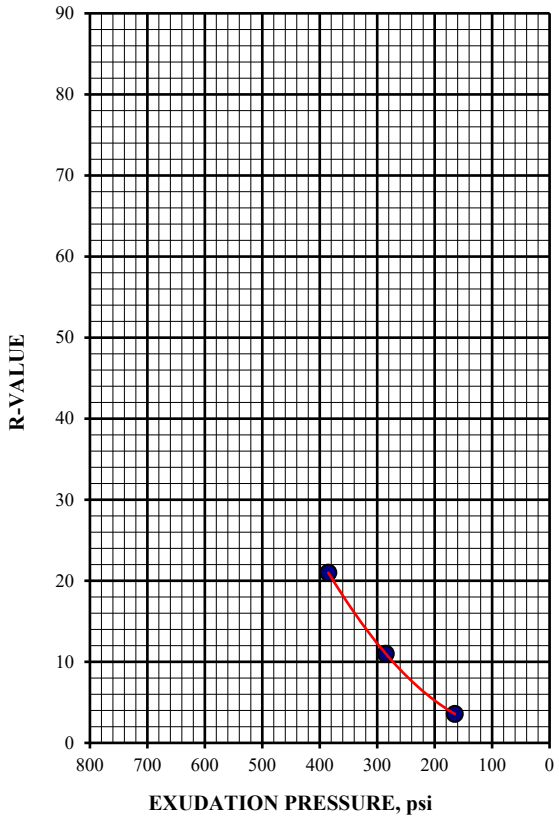
ASTM D 2844/D2844M-18

December 29, 2020

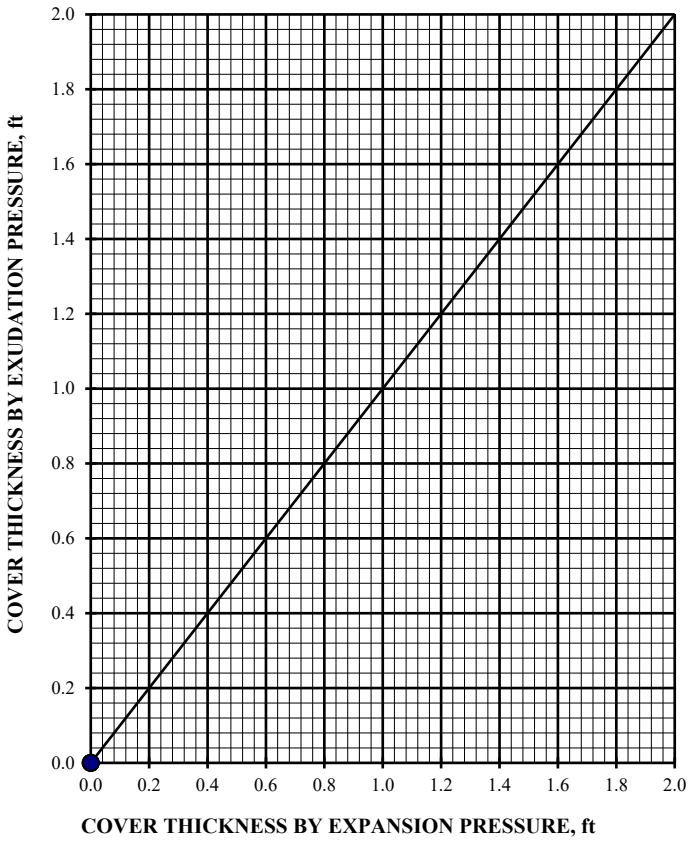
Bag A @ 0.0 - 5.0'
Reddish Brown Sandy Fat Clay (CH)

Dry Density @ 300 psi Exudation Pressure: 94.8-pcf
%Moisture @ 300 psi Exudation Pressure: 19.0%
R-Value - Exudation Pressure: 12
R-Value - Expansion Pressure: N/A
R-Value @ Equilibrium: 12

EXUDATION PRESSURE CHART



EXPANSION PRESSURE CHART



APPENDIX C

Liquefaction Analysis

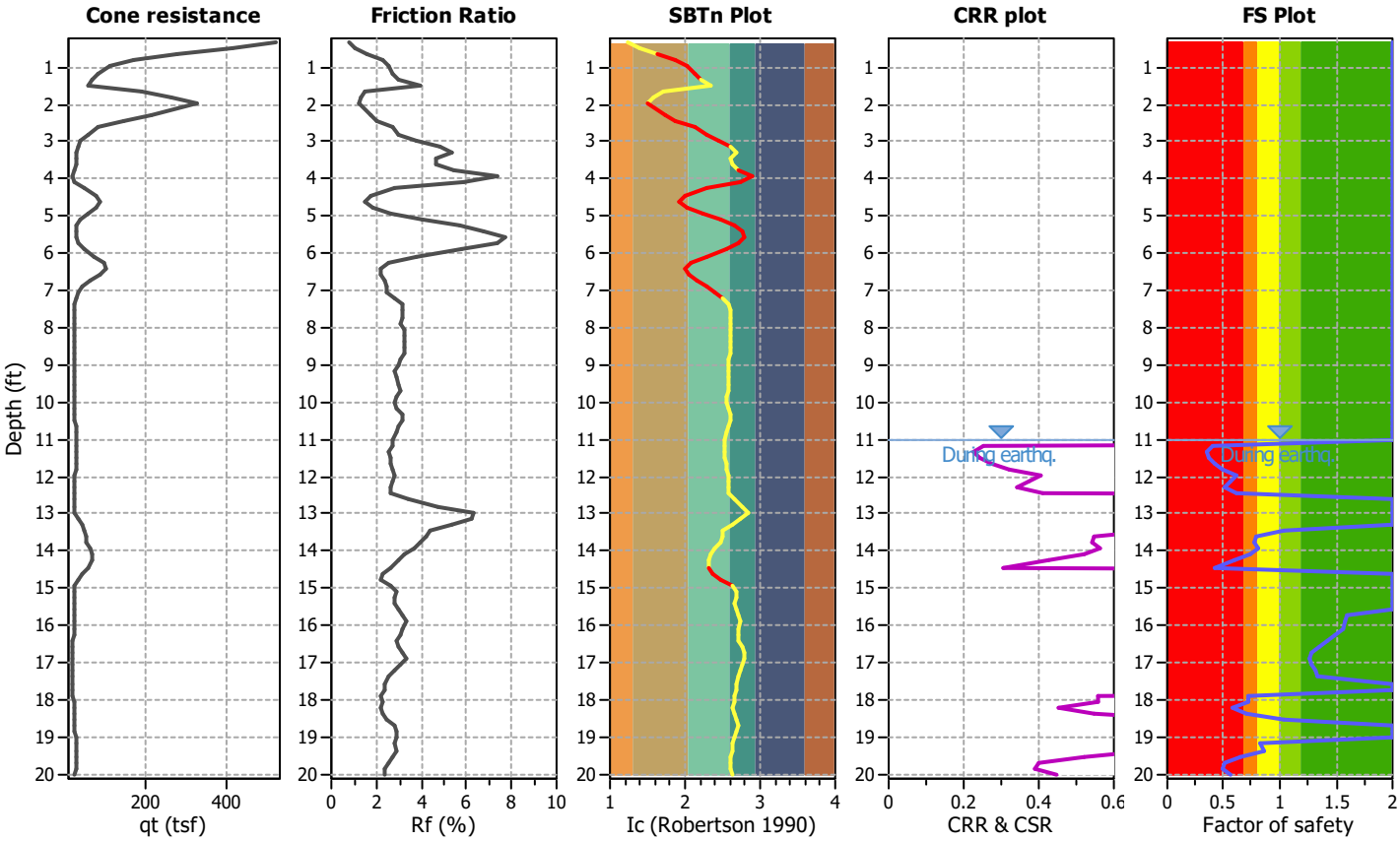
LIQUEFACTION ANALYSIS REPORT

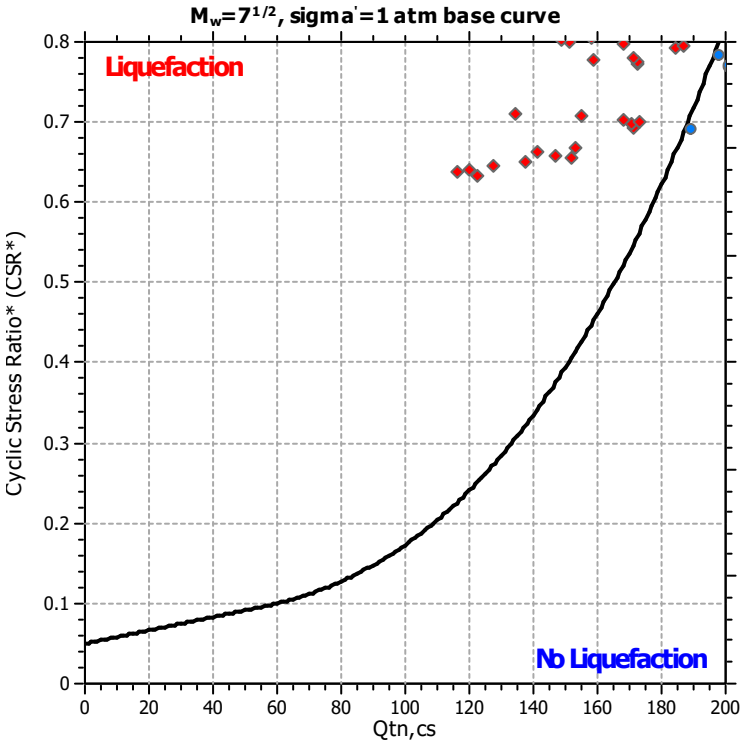
Project title : Crockers Lockers **Location : Watsonville**

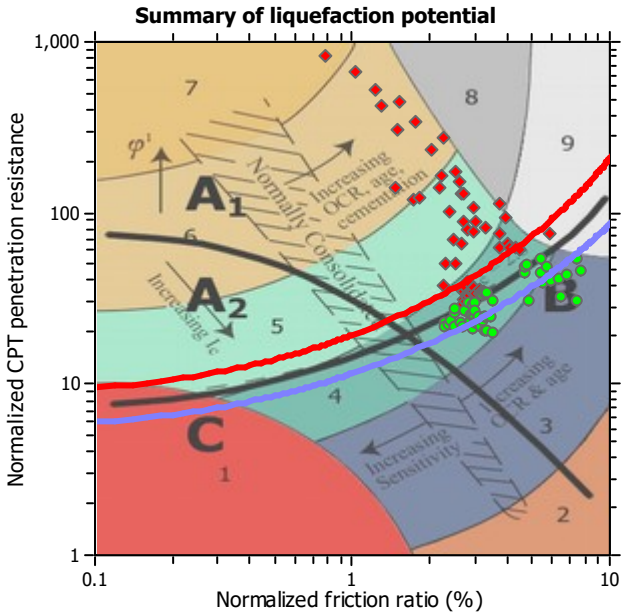
CPT file : CPT-01

Input parameters and analysis data

Analysis method:	Robertson (2009)	G.W.T. (in-situ):	11.00 ft	Use fill:	No	Clay like behavior applied:	All soils
Fines correction method:	Robertson (2009)	G.W.T. (earthq.):	11.00 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:	7.12	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method based
Peak ground acceleration:	1.13	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

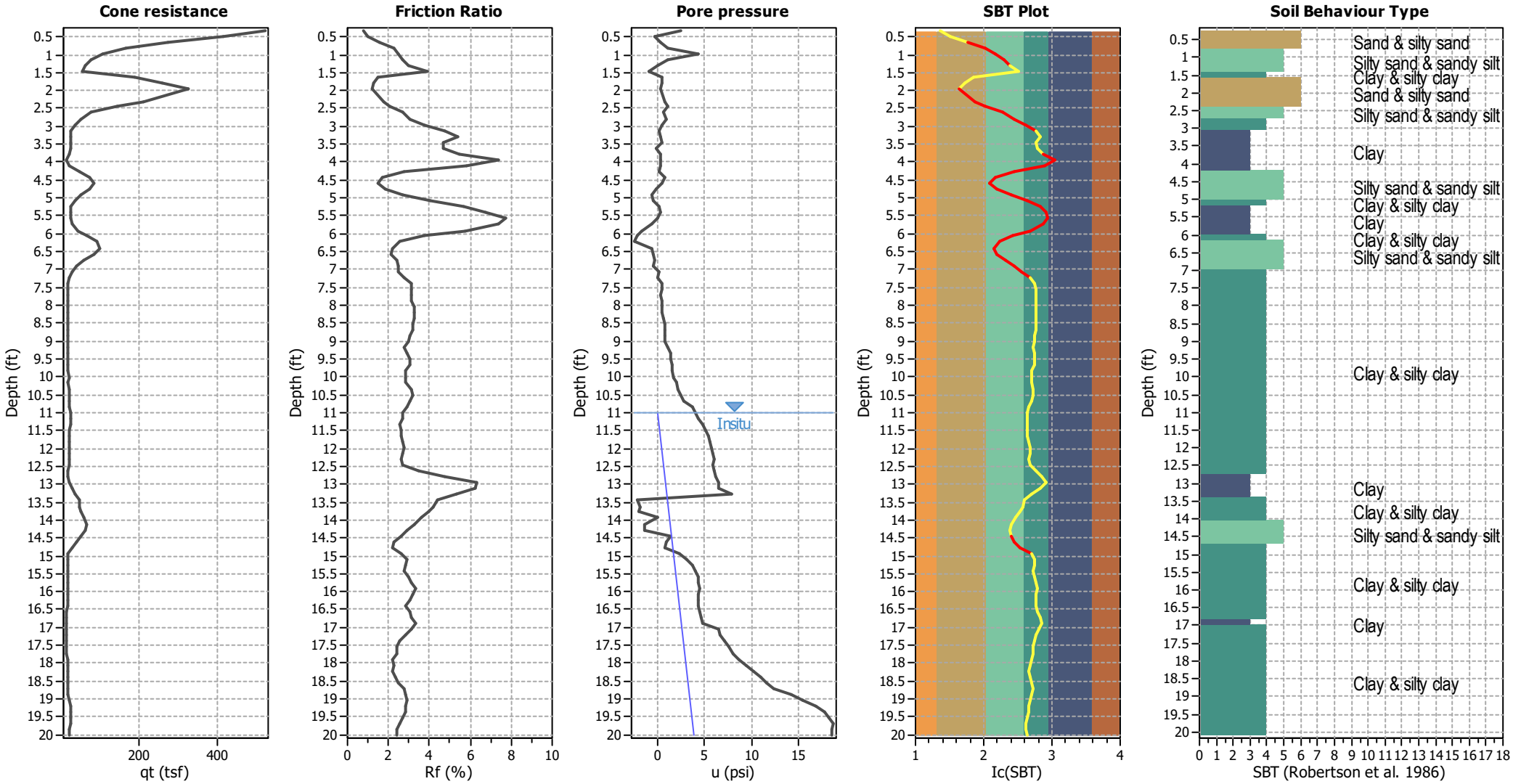






Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and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

CPT basic interpretation plots



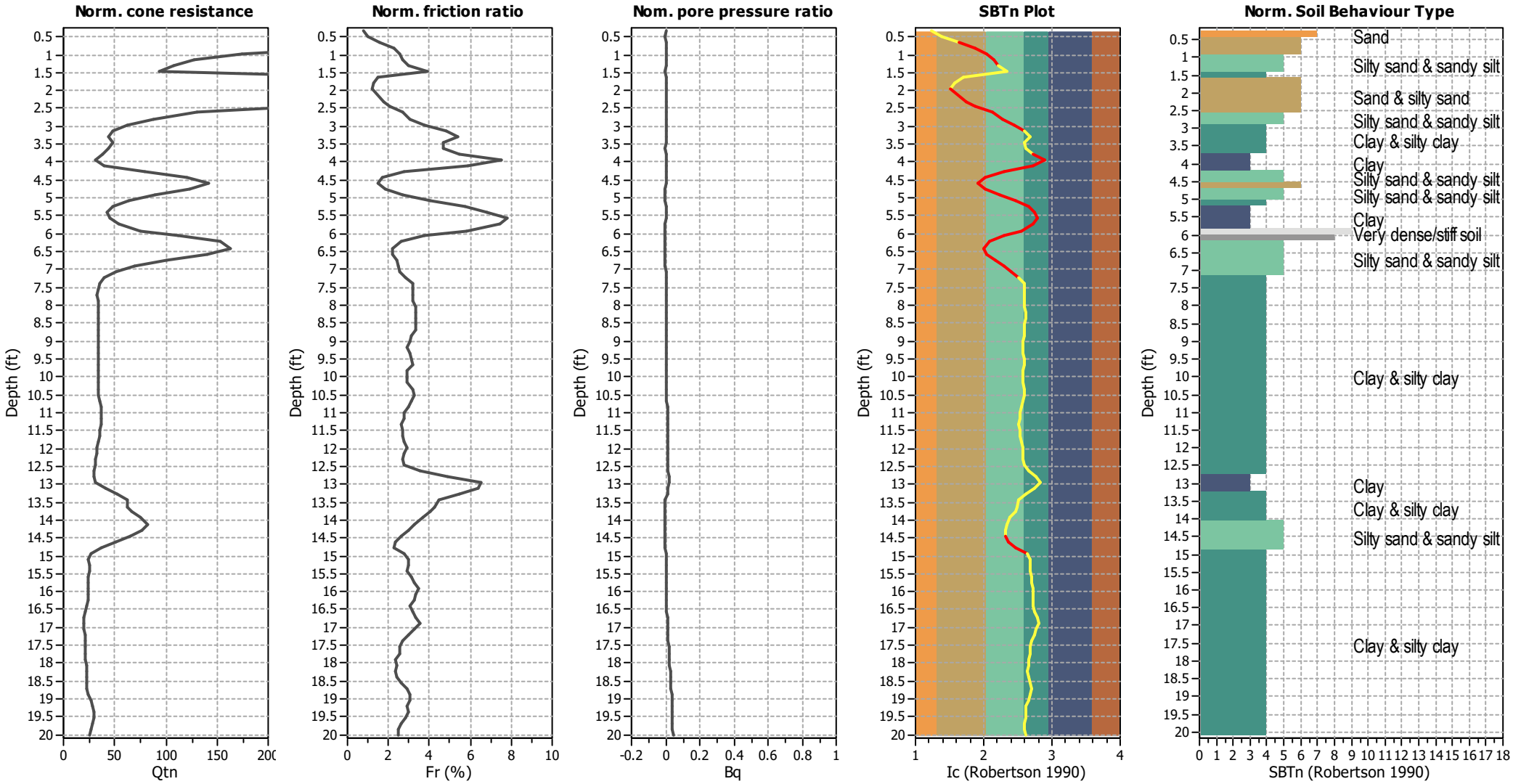
Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	11.00 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.12	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	1.13	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	11.00 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)



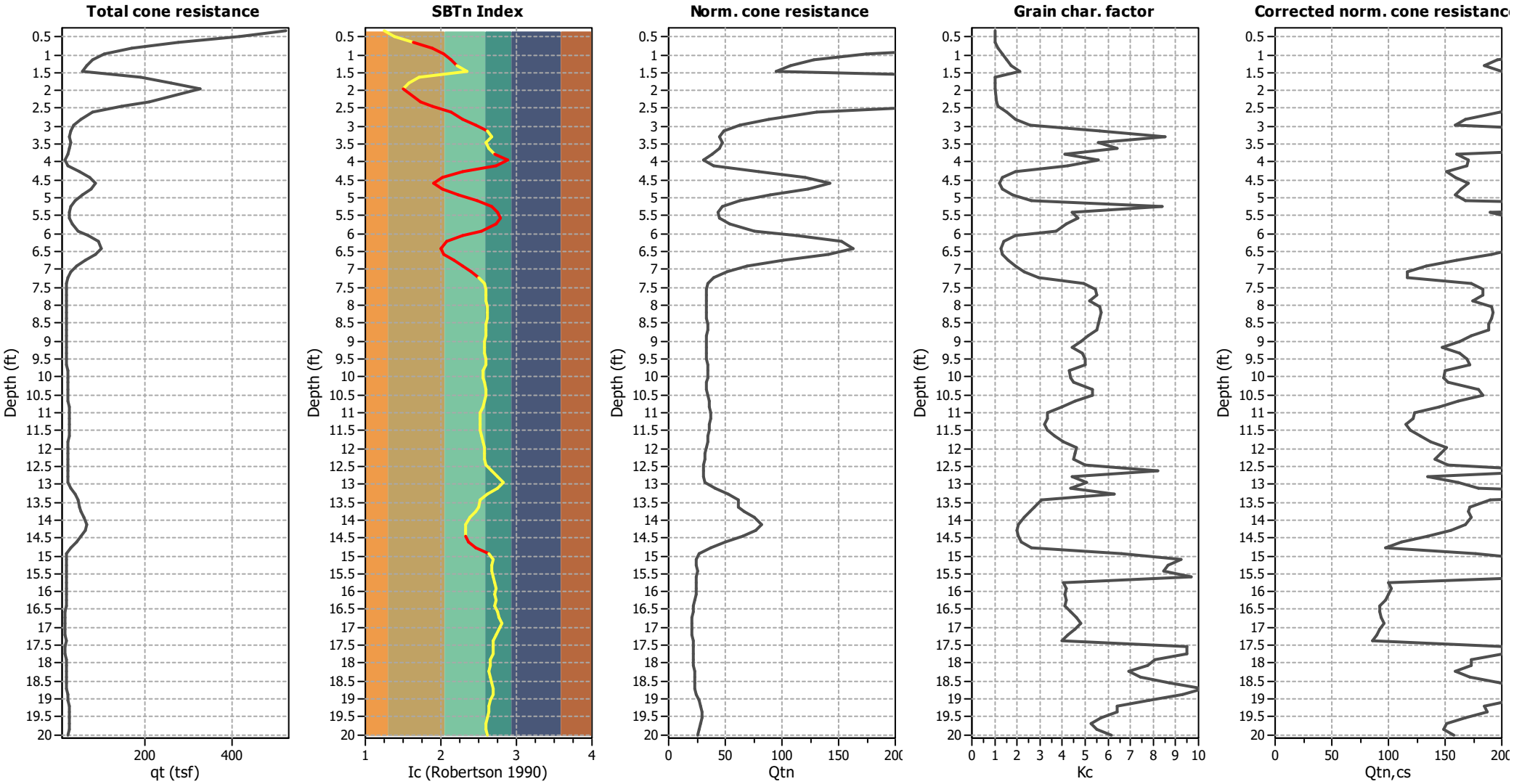
Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	11.00 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.12	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	1.13	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	11.00 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

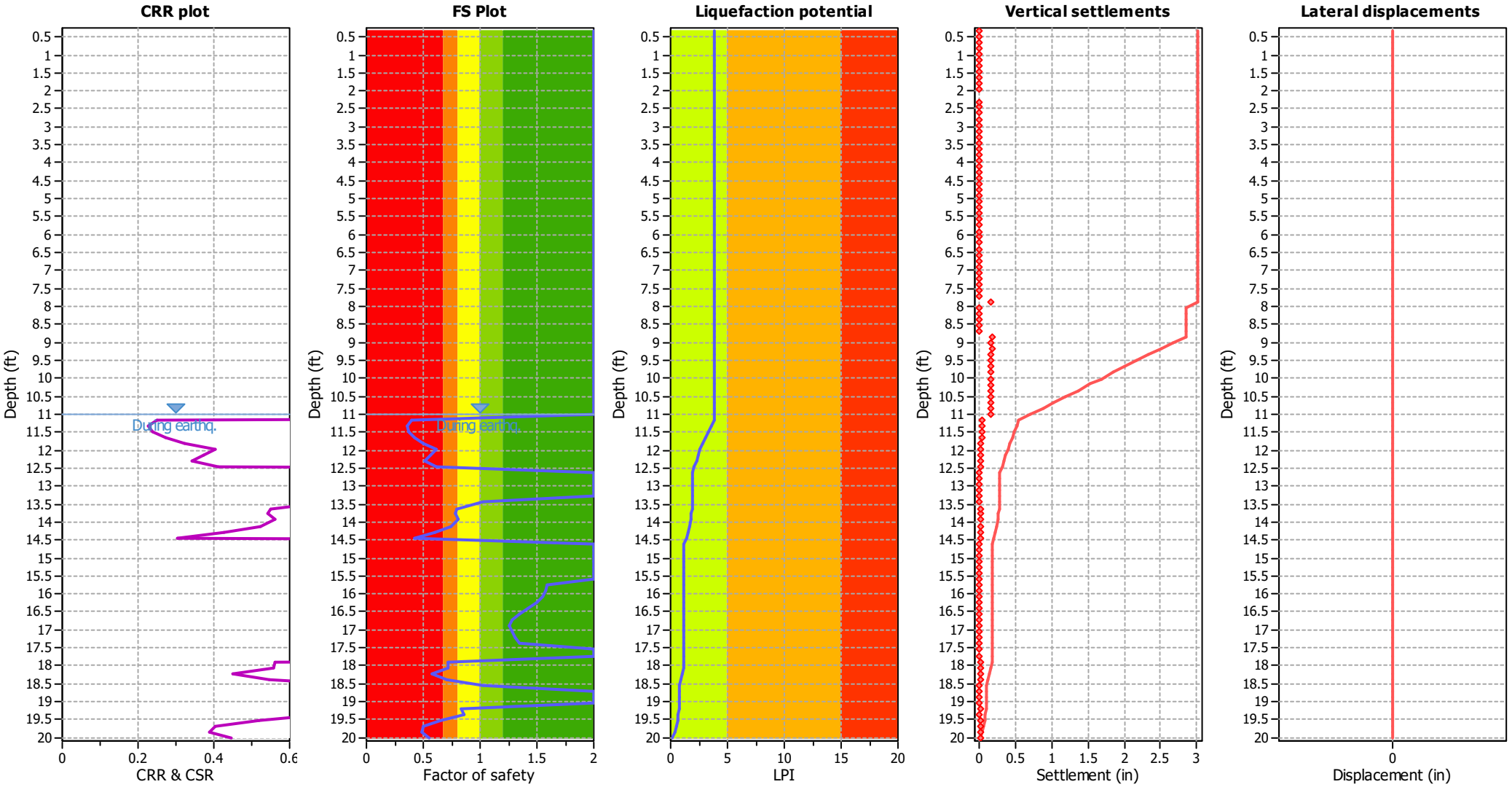
Liquefaction analysis overall plots (intermediate results)



Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	11.00 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.12	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	1.13	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	11.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	11.00 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.12	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	1.13	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	11.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

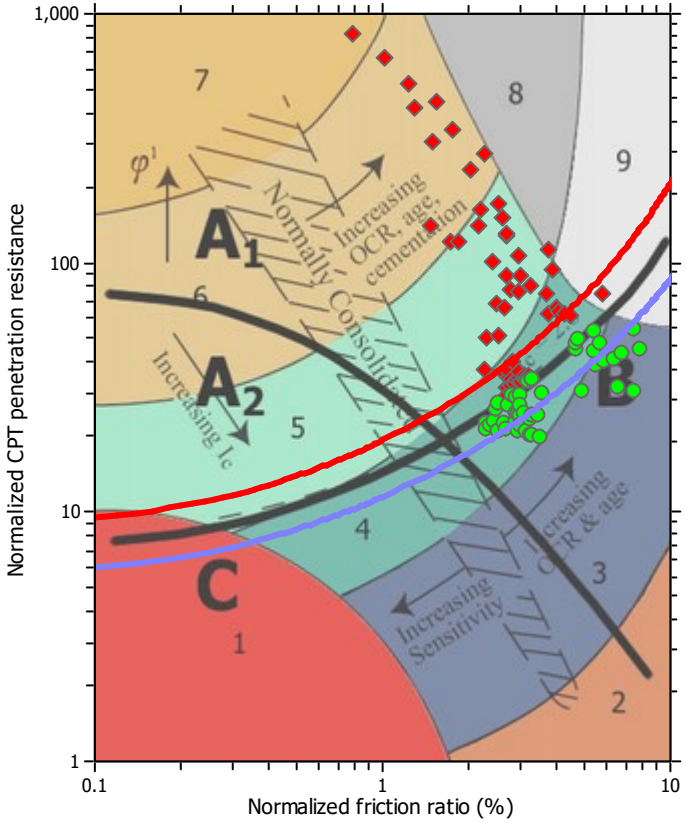
F.S. color scheme

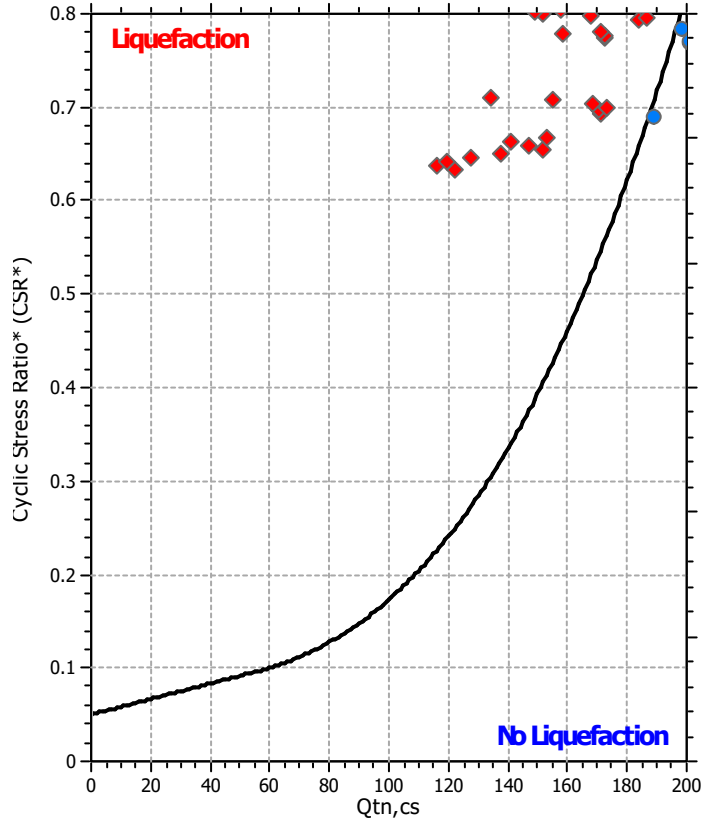
- Almost certain it will liquefy
- Very likely to liquefy
- Liquefaction and no liq. are equally likely
- Unlike to liquefy
- Almost certain it will not liquefy

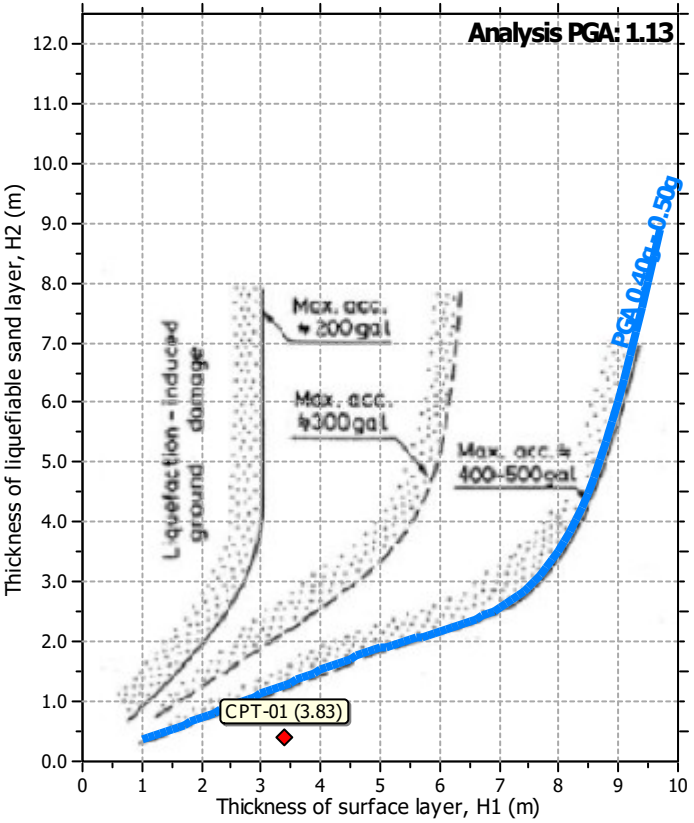
LPI color scheme

- Very high risk
- High risk
- Low risk

Liquefaction analysis summary plots



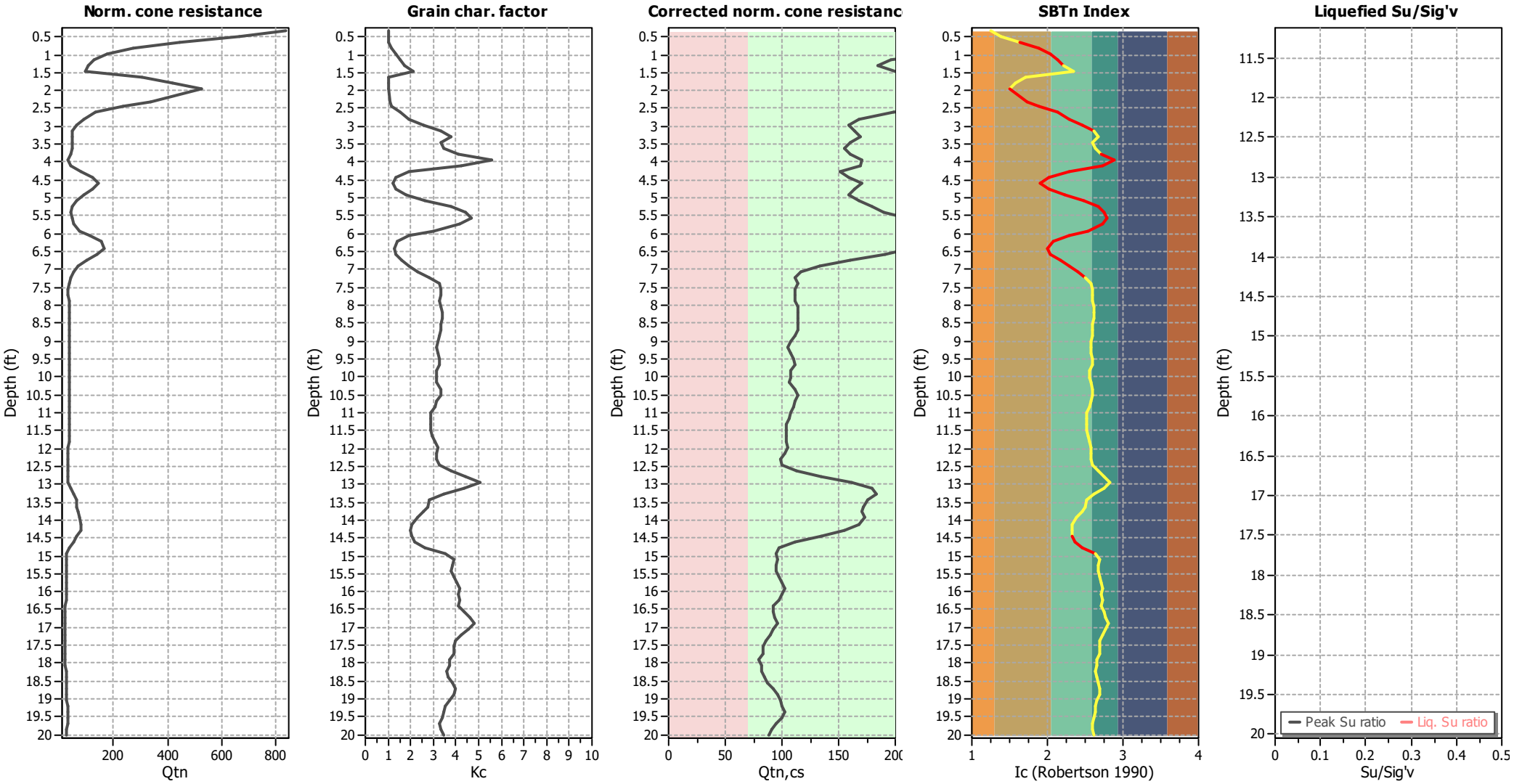




Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	11.00 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.12	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	1.13	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	11.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

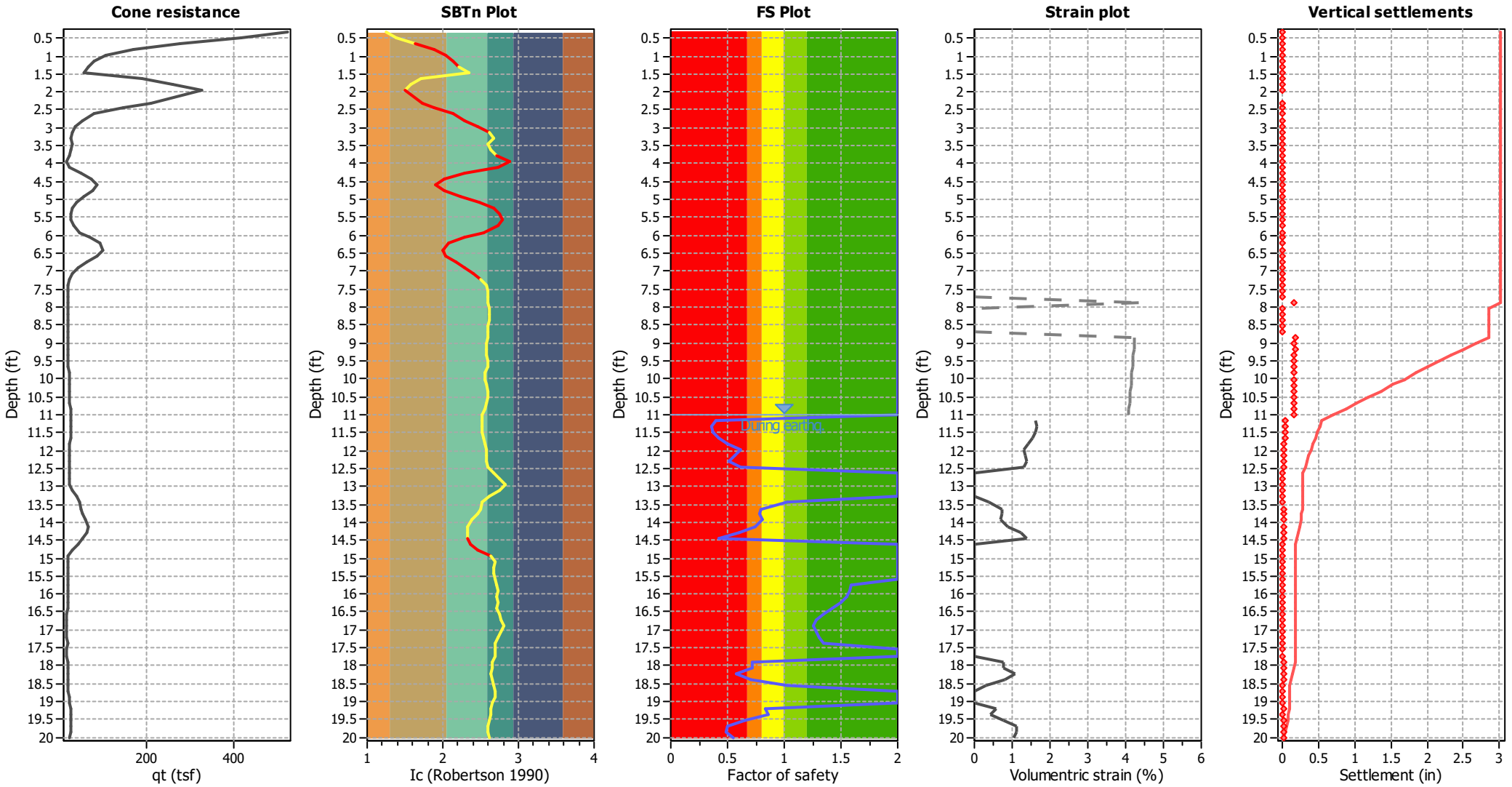
Check for strength loss plots (Robertson (2010))



Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	11.00 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.12	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	1.13	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	11.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

Estimation of post-earthquake settlements



Abbreviations

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

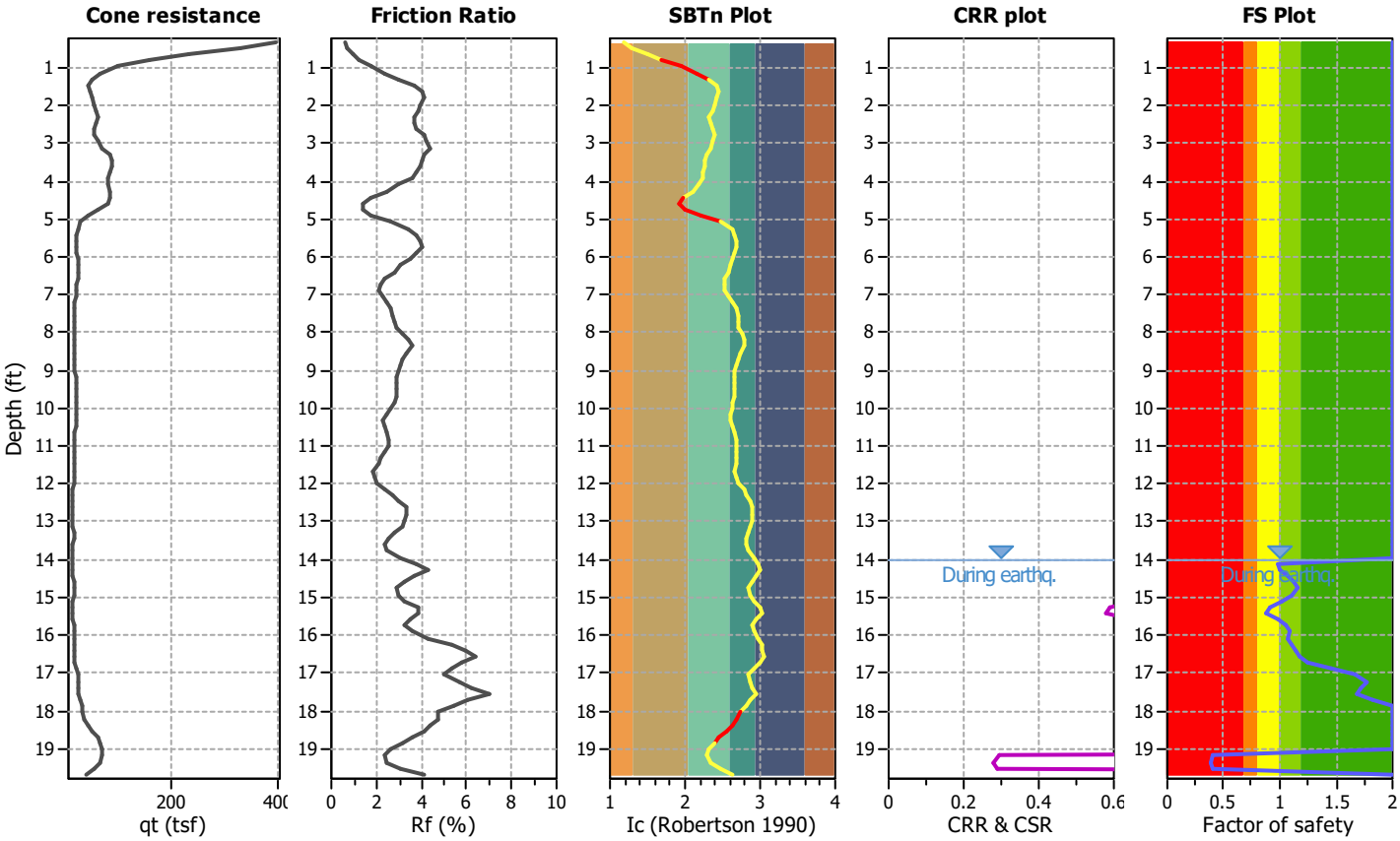
LIQUEFACTION ANALYSIS REPORT

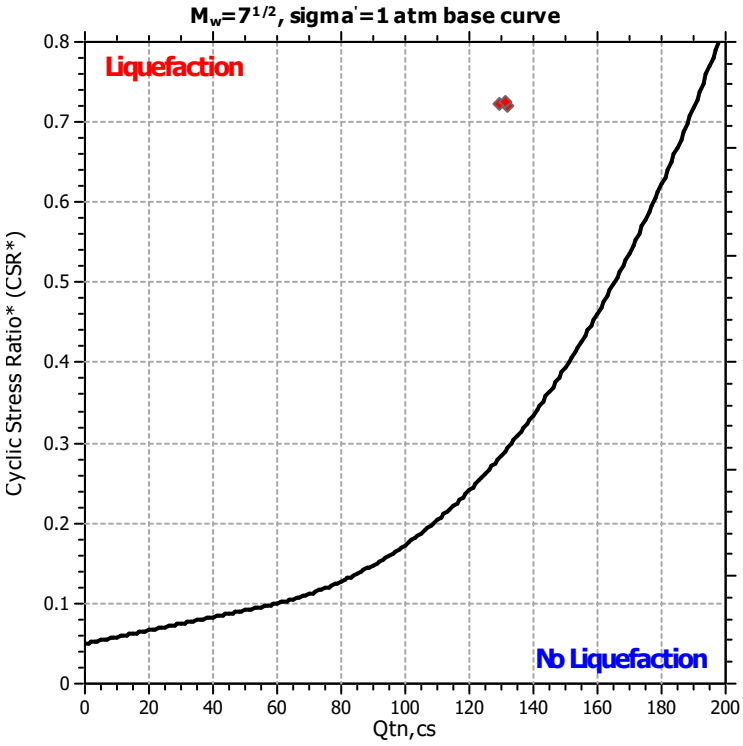
Project title : Crockers Lockers **Location : Watsonville**

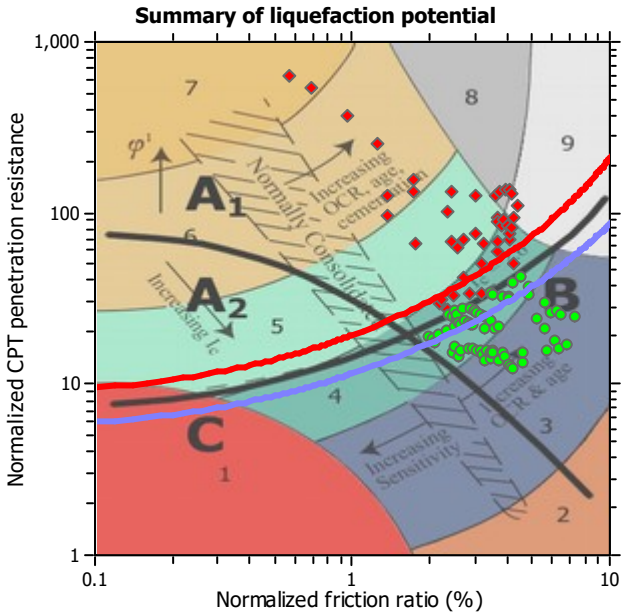
CPT file : CPT-02

Input parameters and analysis data

Analysis method:	Robertson (2009)	G.W.T. (in-situ):	14.00 ft	Use fill:	No	Clay like behavior applied:	All soils
Fines correction method:	Robertson (2009)	G.W.T. (earthq.):	14.00 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:	7.12	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method based
Peak ground acceleration:	1.13	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

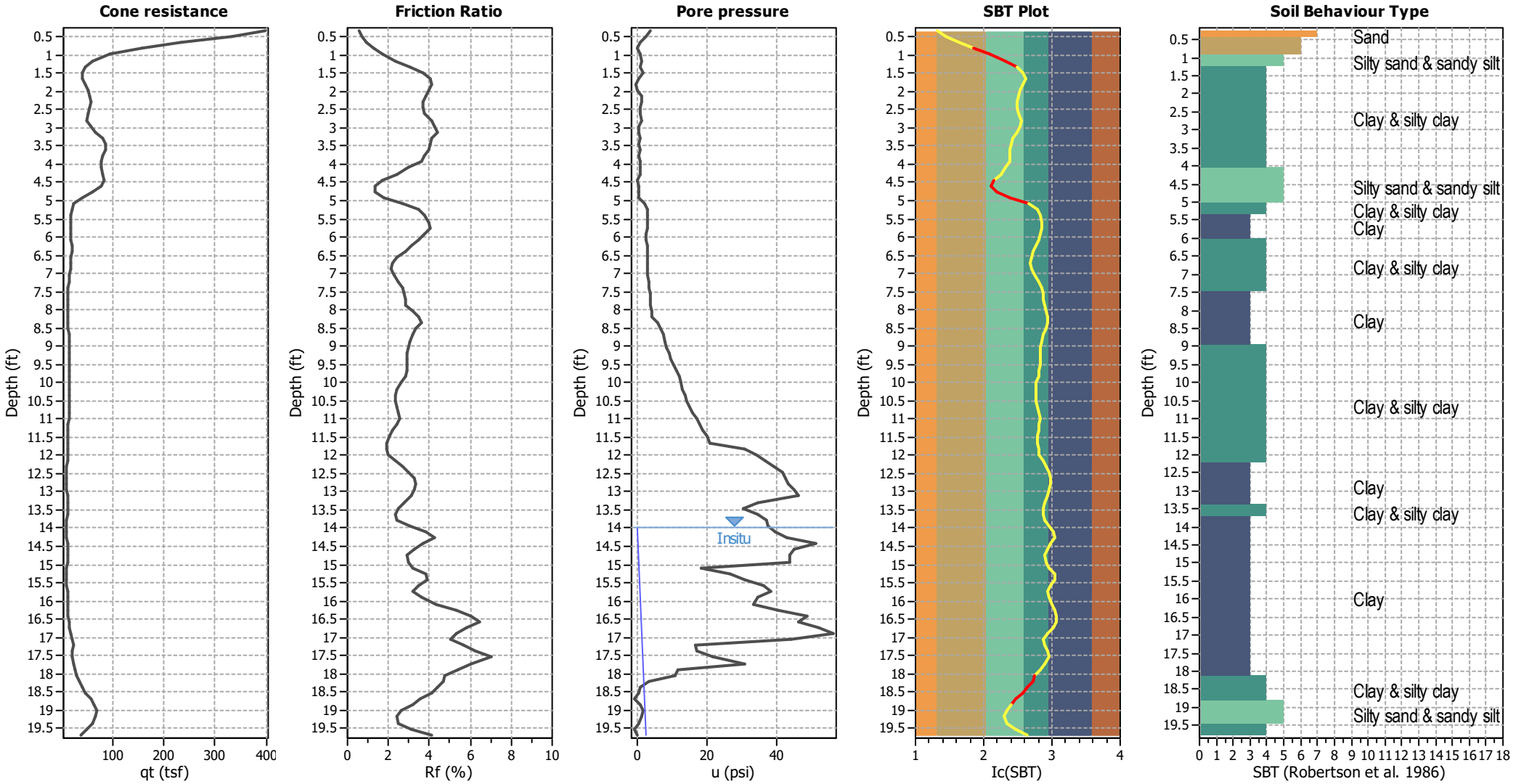






Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and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

CPT basic interpretation plots



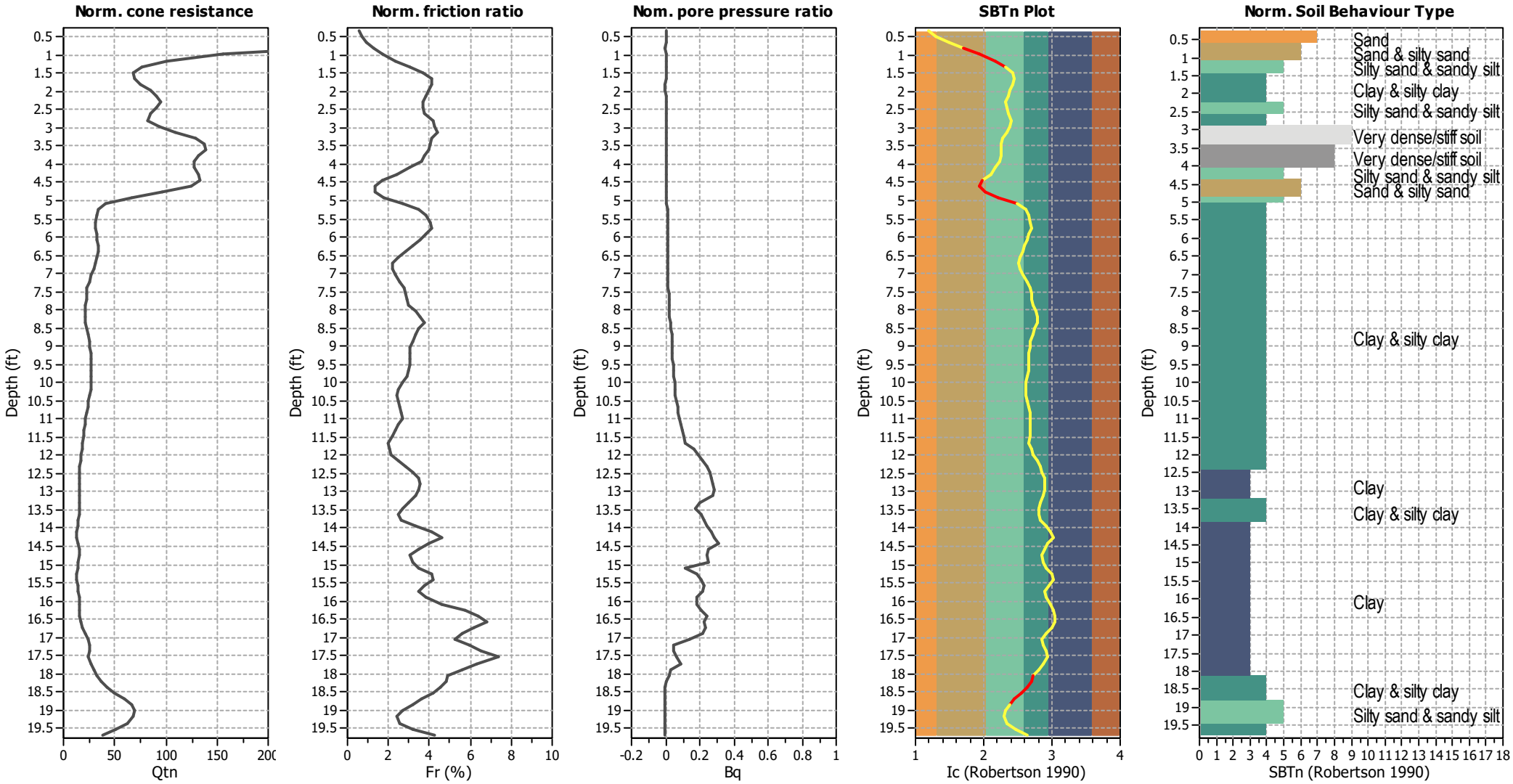
Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	14.00 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.12	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	1.13	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	14.00 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)



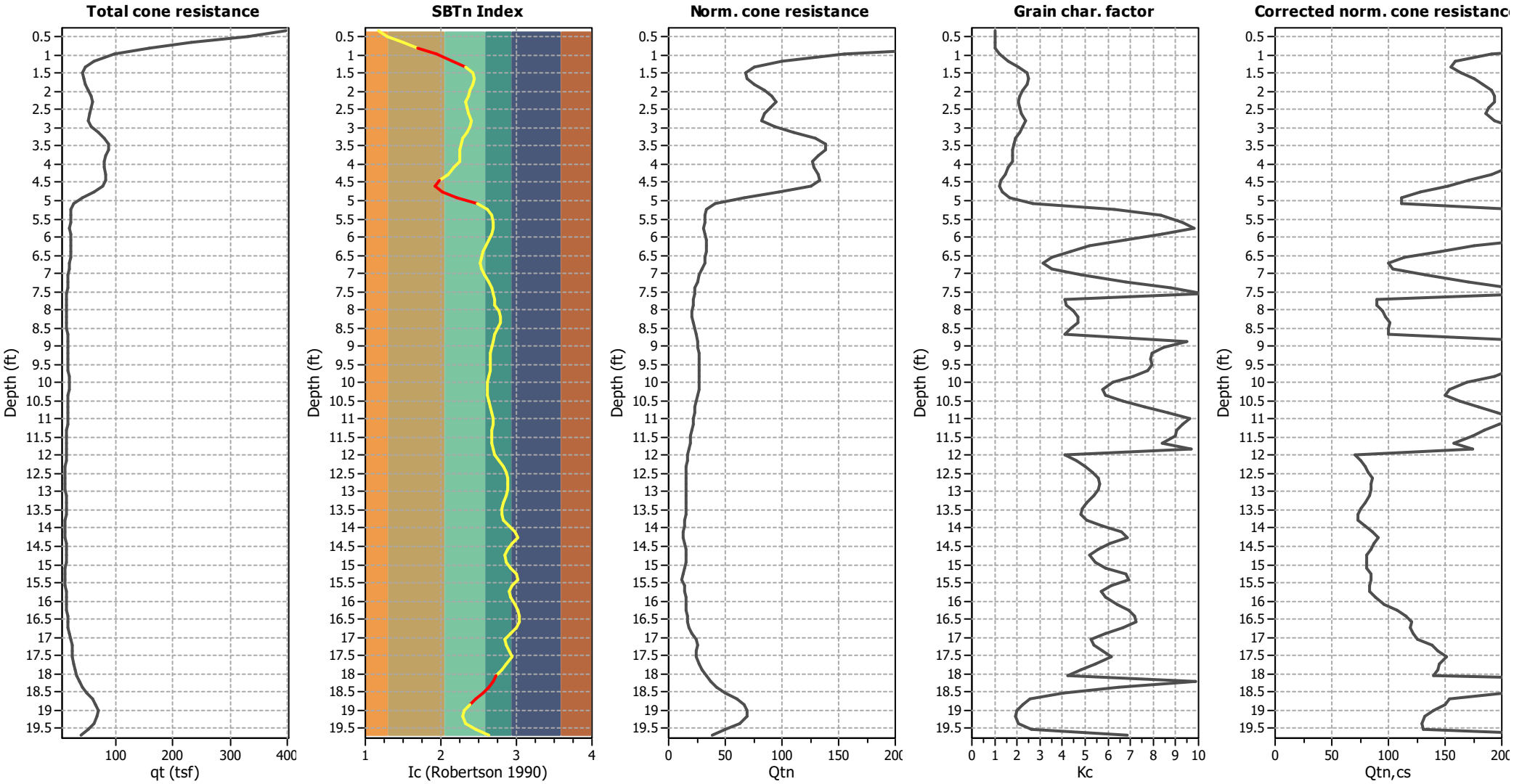
Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	14.00 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.12	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	1.13	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	14.00 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

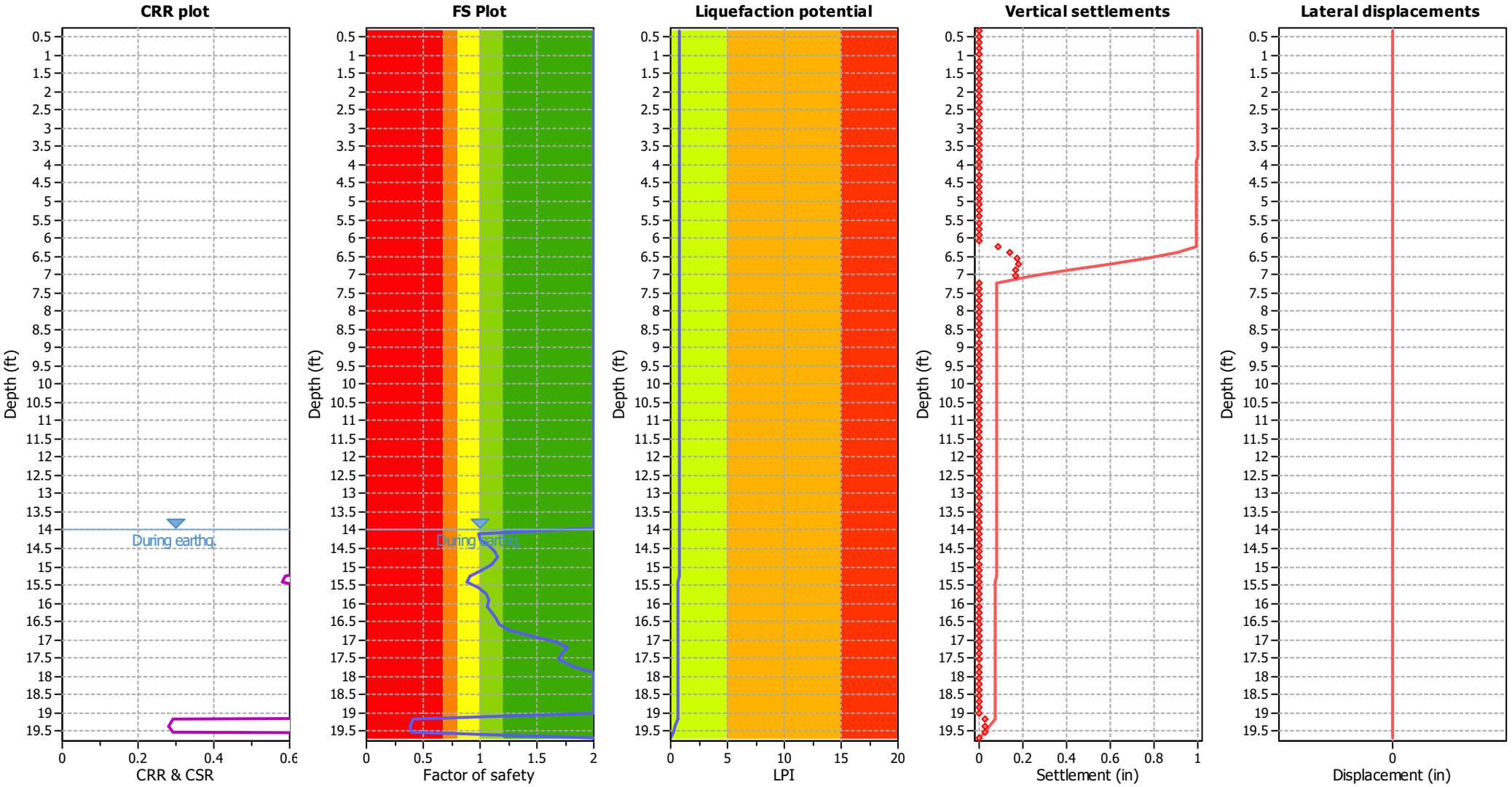
Liquefaction analysis overall plots (intermediate results)



Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	14.00 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.12	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	1.13	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	14.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	14.00 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.12	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	1.13	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	14.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

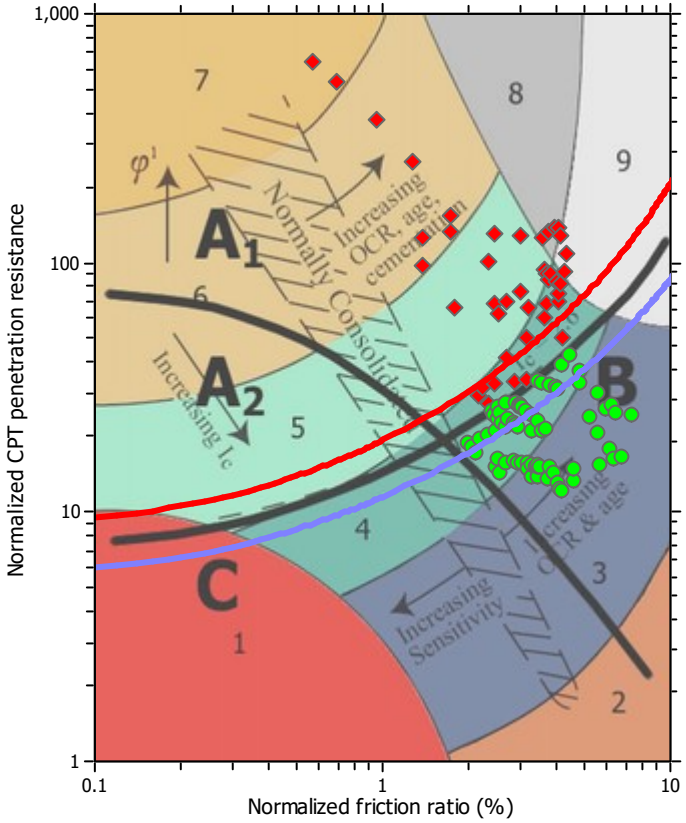
F.S. color scheme

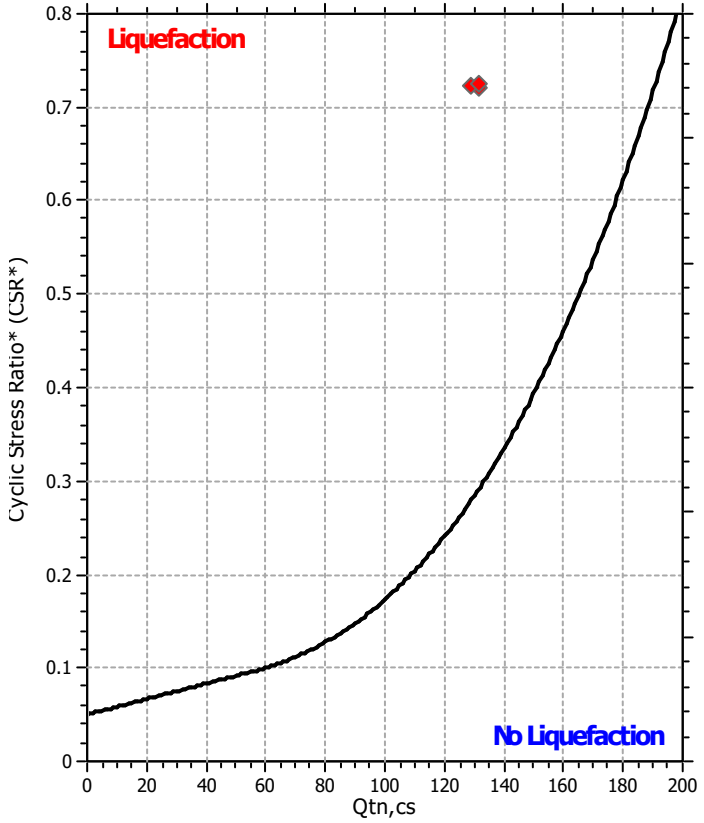
- Almost certain it will liquefy
- Very likely to liquefy
- Liquefaction and no liq. are equally likely
- Unlike to liquefy
- Almost certain it will not liquefy

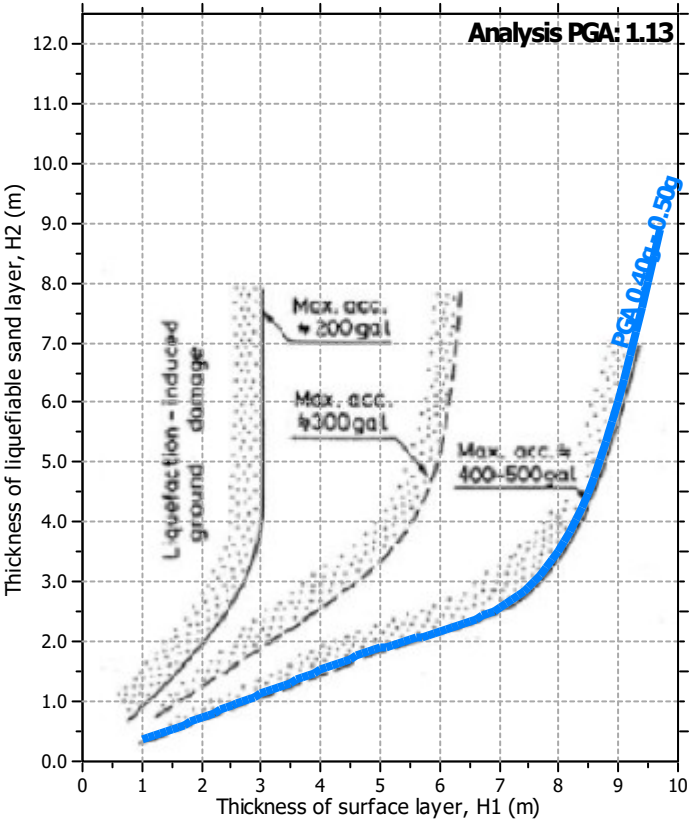
LPI color scheme

- Very high risk
- High risk
- Low risk

Liquefaction analysis summary plots



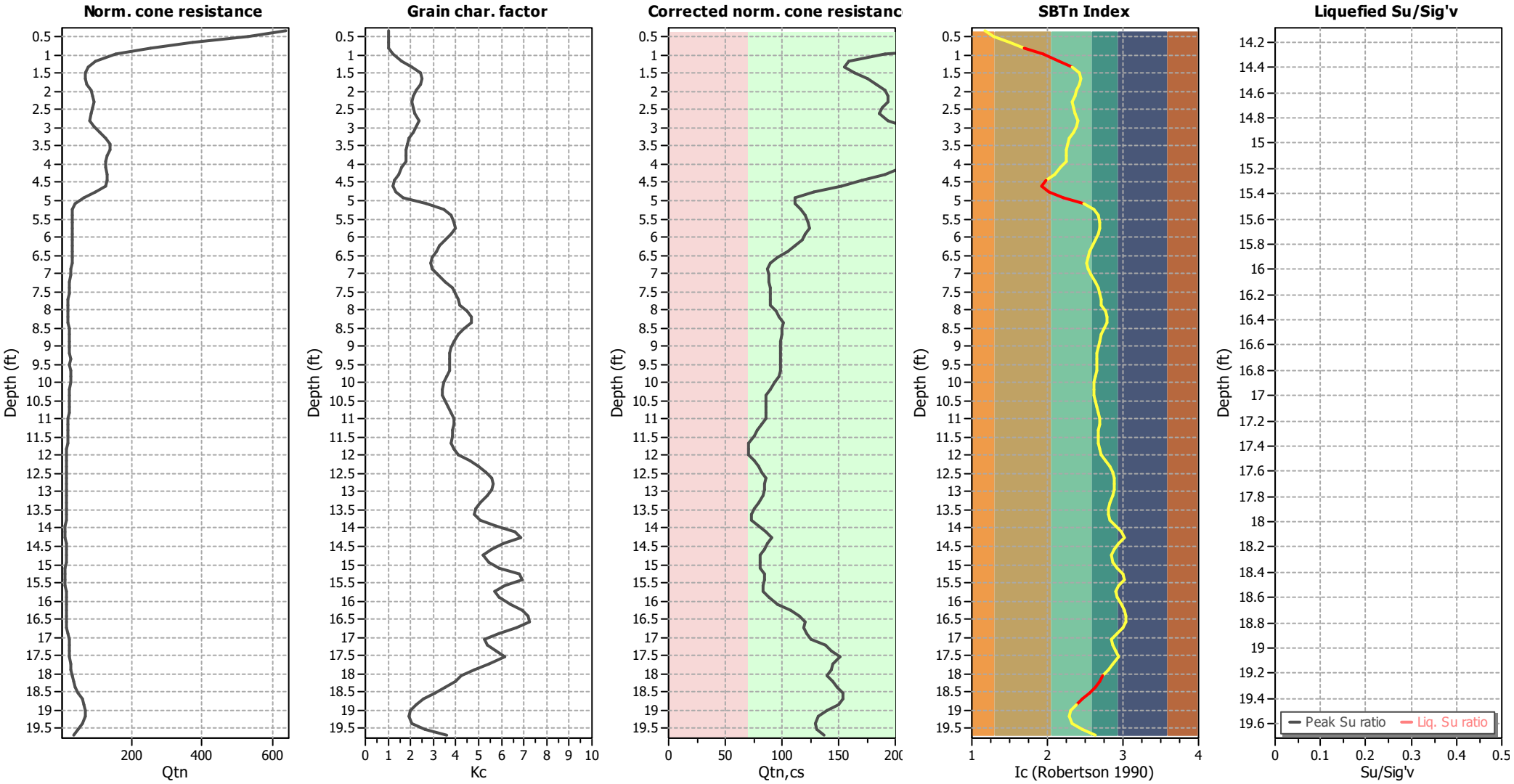




Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	14.00 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.12	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	1.13	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	14.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

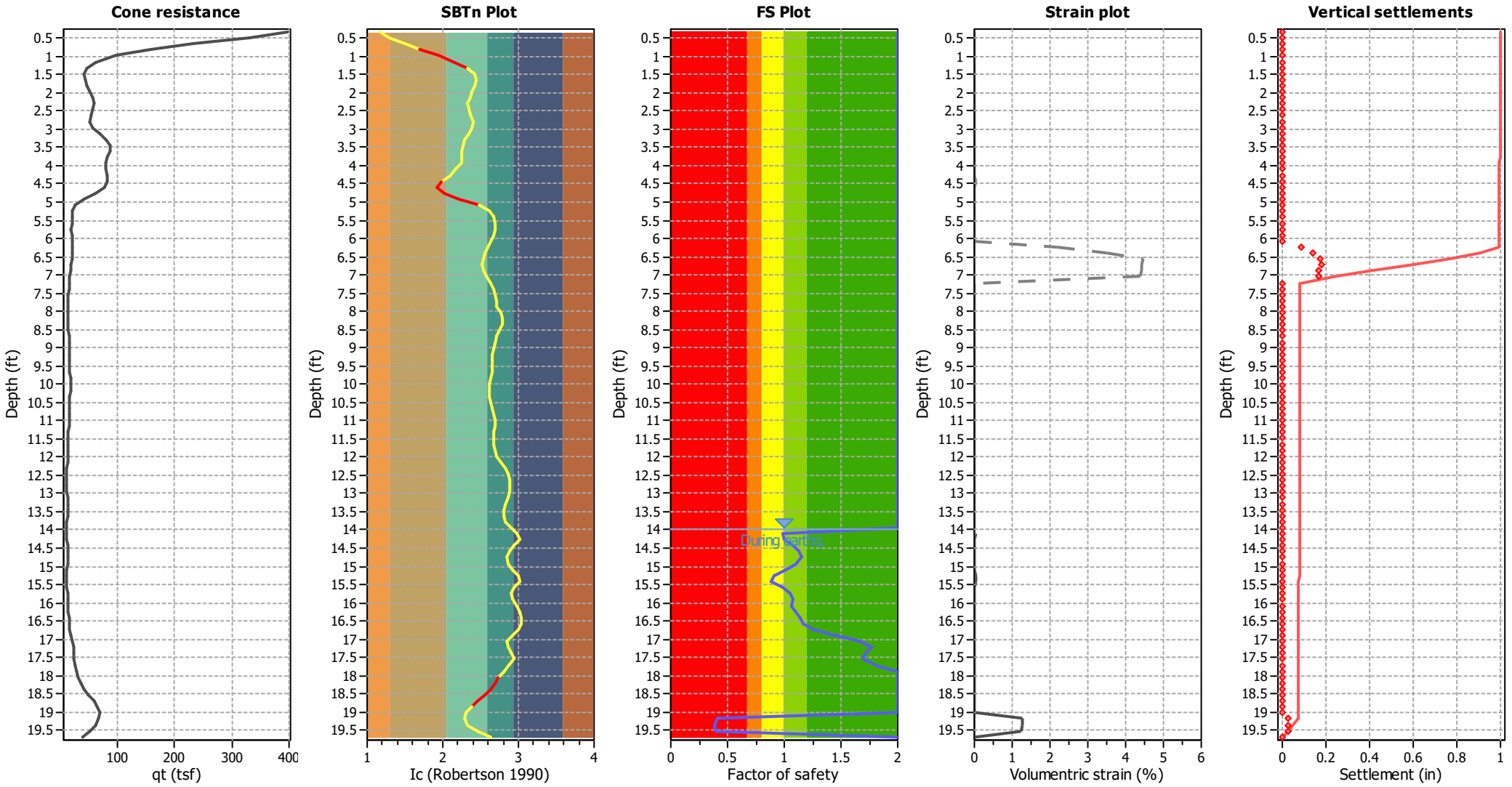
Check for strength loss plots (Robertson (2010))



Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	14.00 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.12	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	1.13	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	14.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

Estimation of post-earthquake settlements



Abbreviations

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

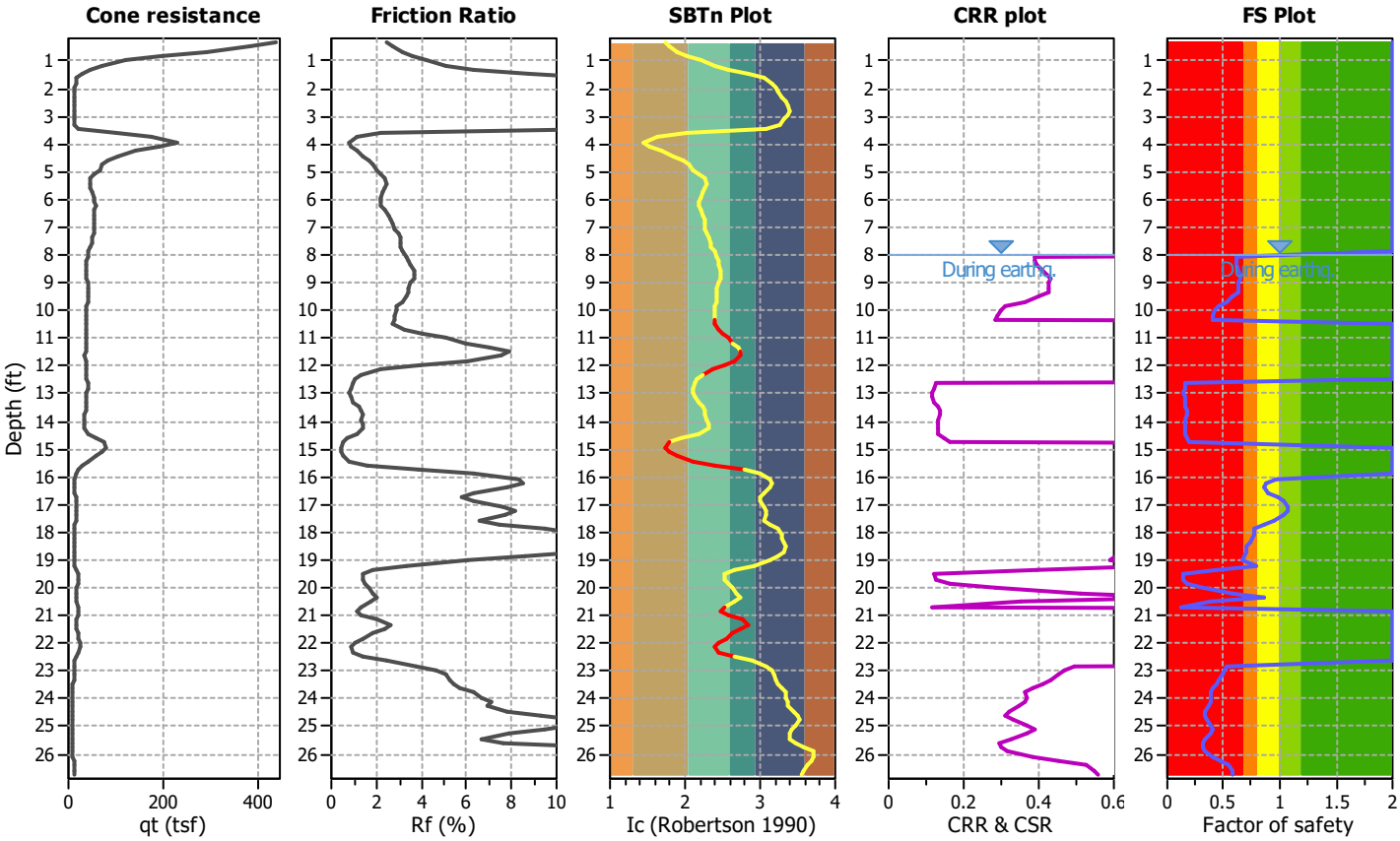
LIQUEFACTION ANALYSIS REPORT

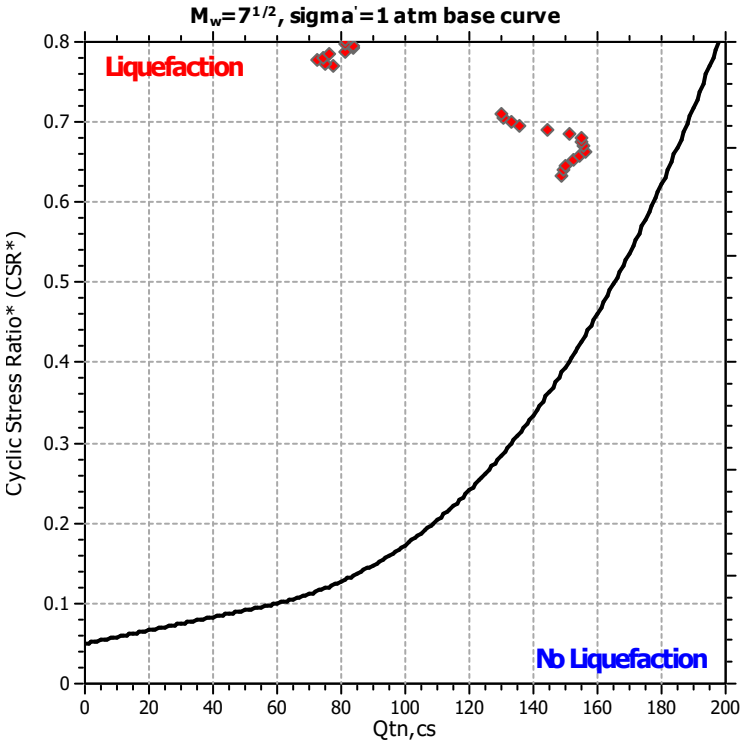
Project title : Crockers Lockers **Location : Watsonville**

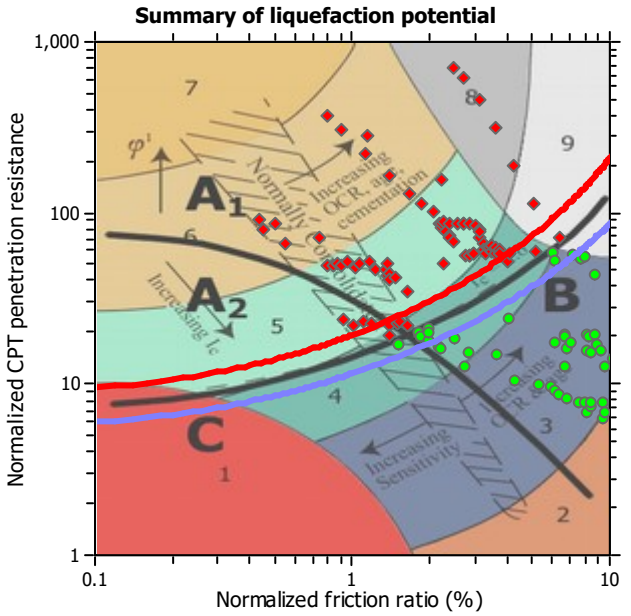
CPT file : CPT-03

Input parameters and analysis data

Analysis method:	Robertson (2009)	G.W.T. (in-situ):	8.00 ft	Use fill:	No	Clay like behavior applied:	All soils
Fines correction method:	Robertson (2009)	G.W.T. (earthq.):	8.00 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:	7.12	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method based
Peak ground acceleration:	1.13	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

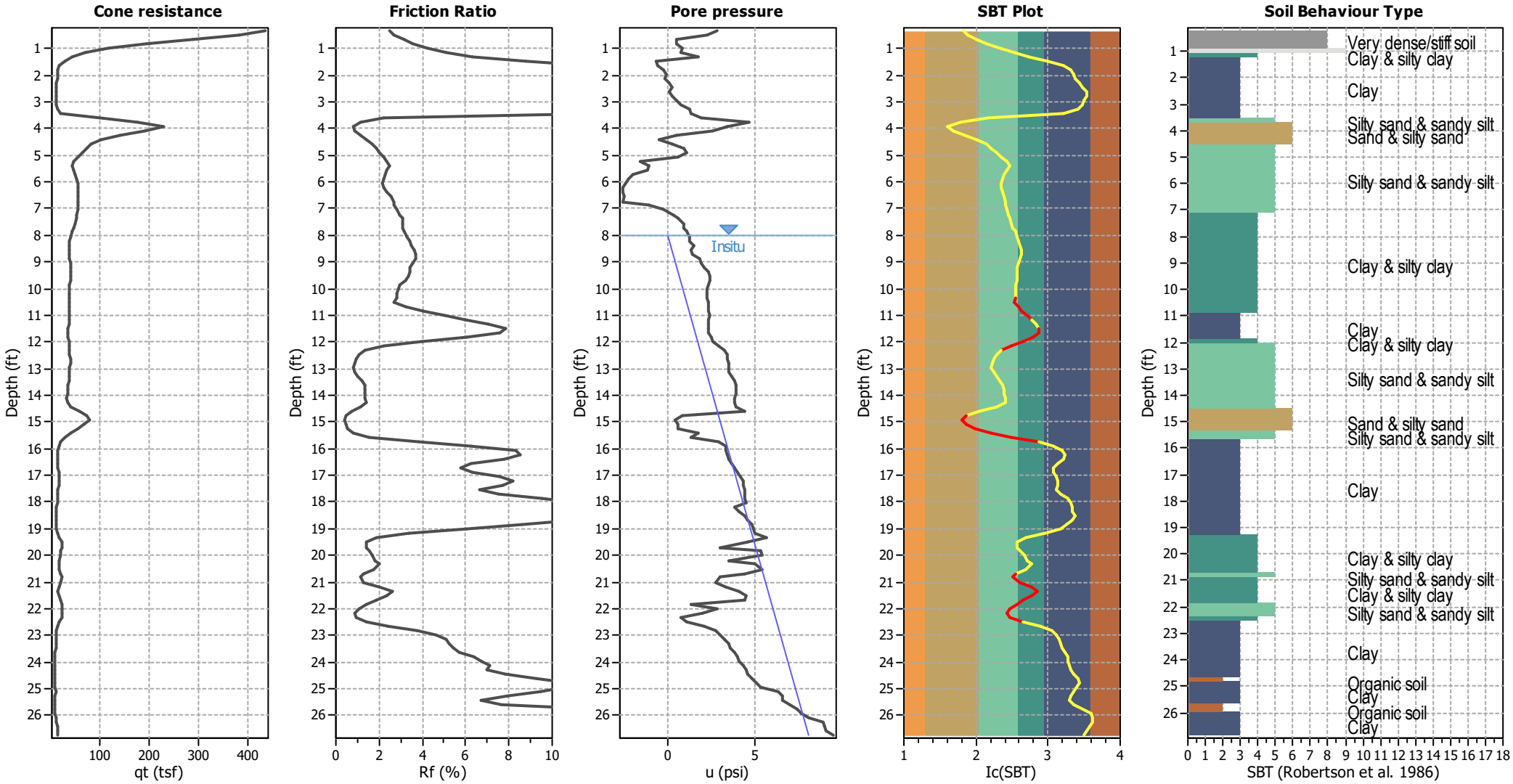






Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and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

CPT basic interpretation plots



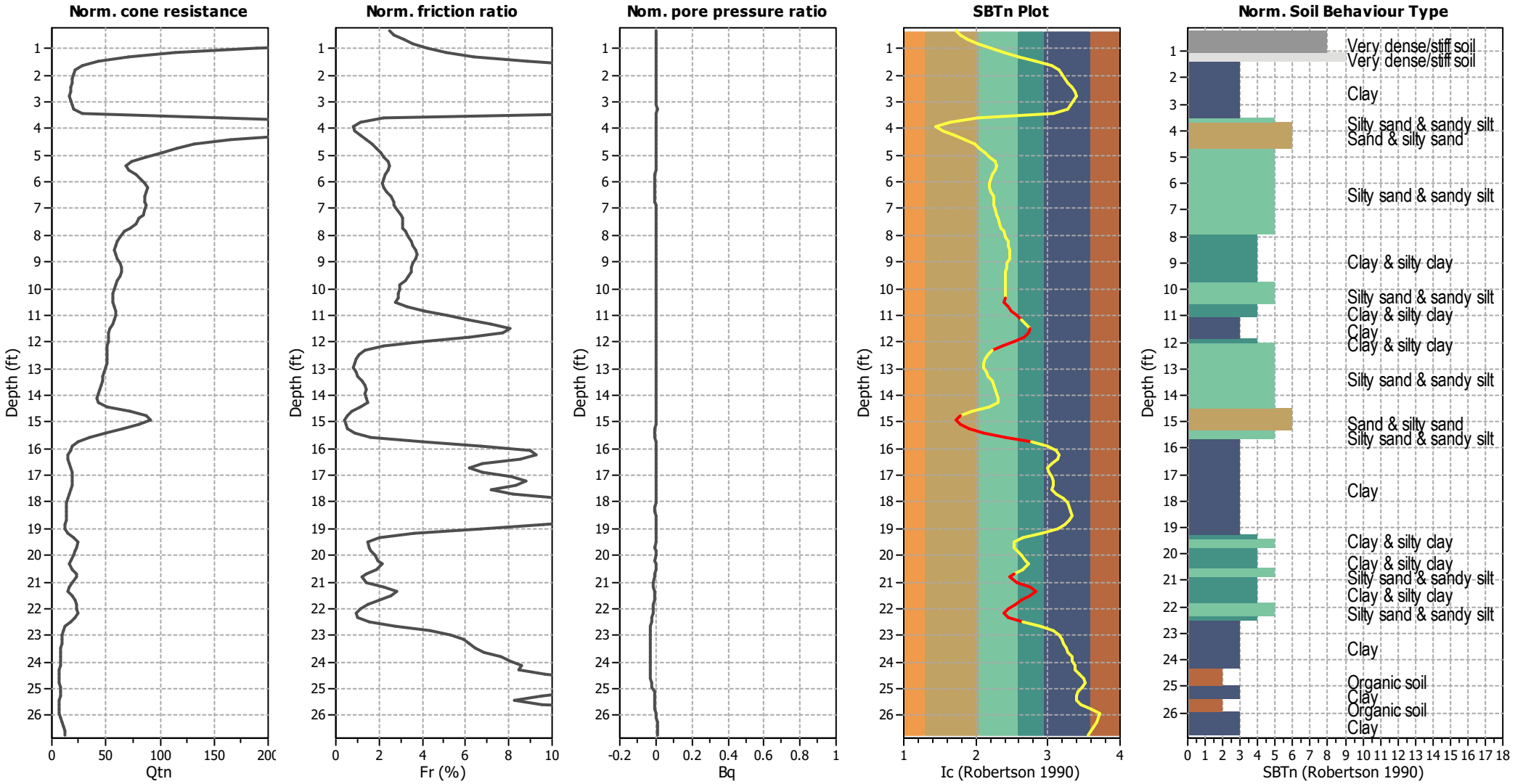
Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	8.00 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.12	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	1.13	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:	Robertson (2009)	Depth to water table (erthq.):	8.00 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.12	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	1.13	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
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3. Clay to silty clay
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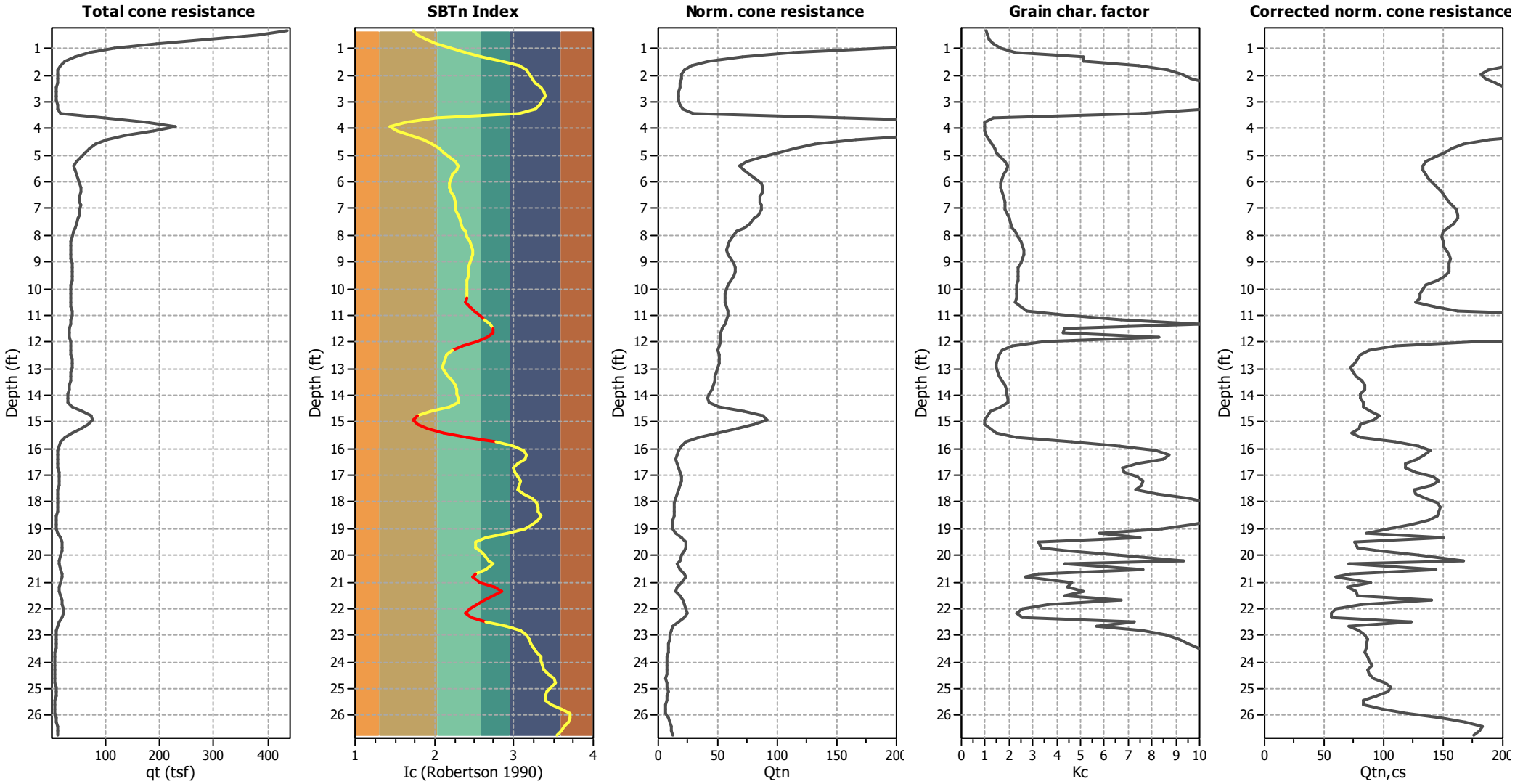
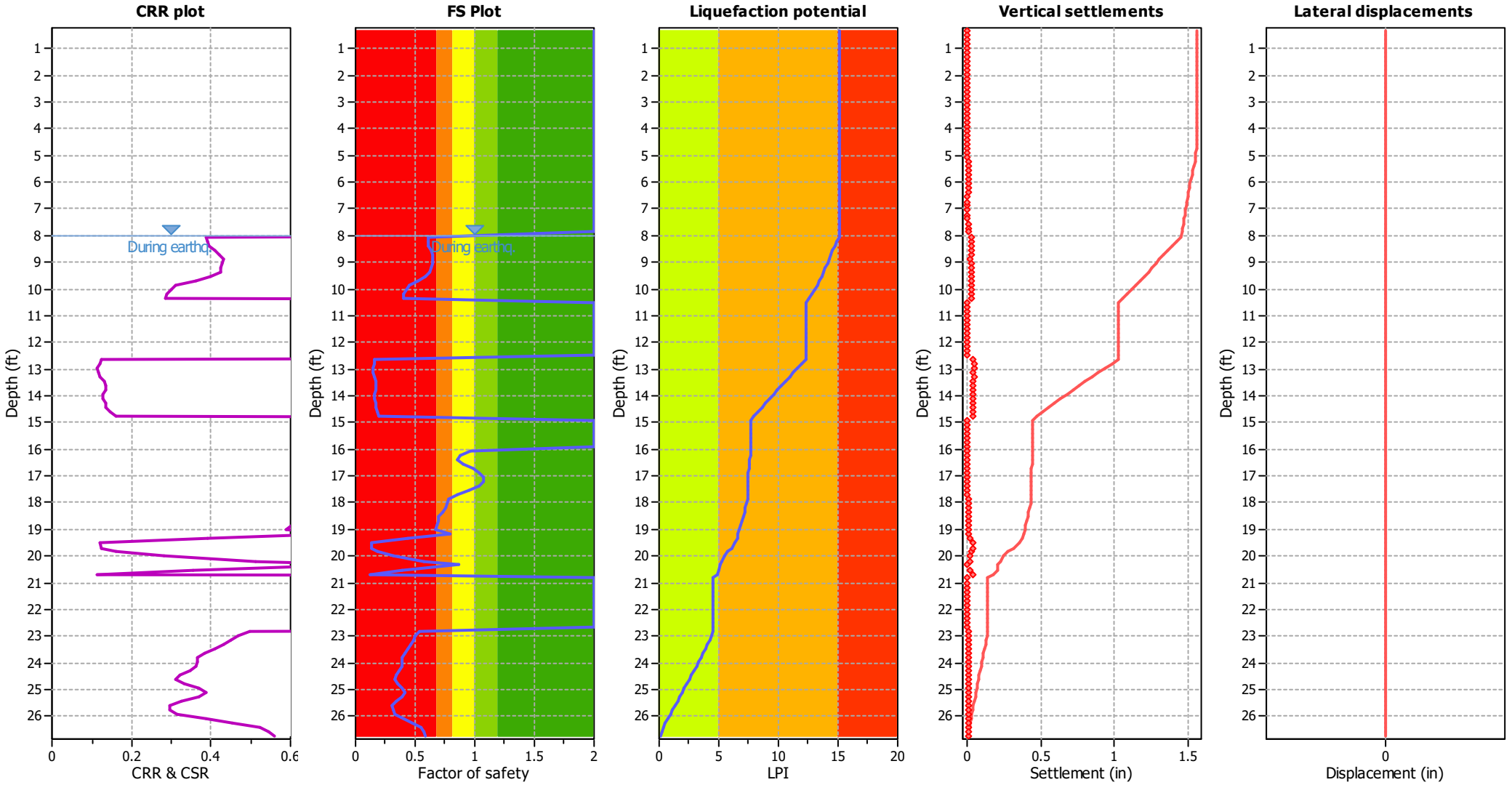
Liquefaction analysis overall plots (intermediate results)



Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	8.00 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.12	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	1.13	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:	Robertson (2009)	Depth to water table (erthq.):	8.00 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.12	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	1.13	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	8.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

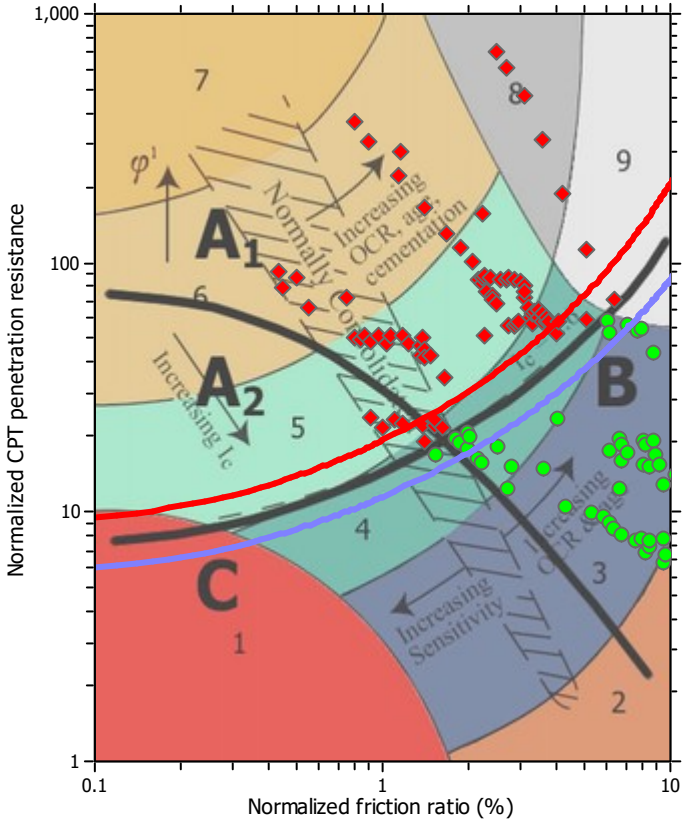
F.S. color scheme

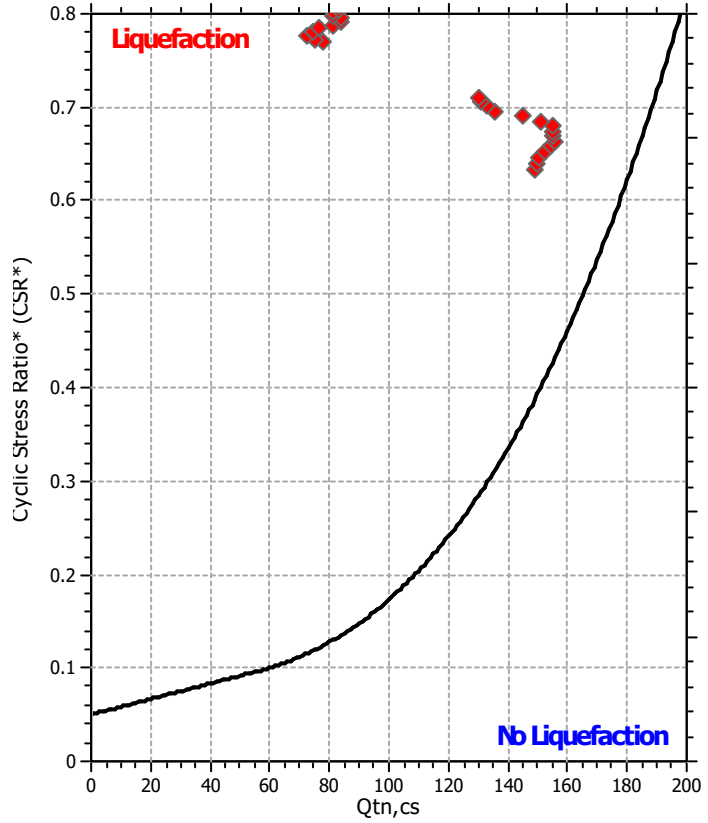
- Almost certain it will liquefy
- Very likely to liquefy
- Liquefaction and no liq. are equally likely
- Unlike to liquefy
- Almost certain it will not liquefy

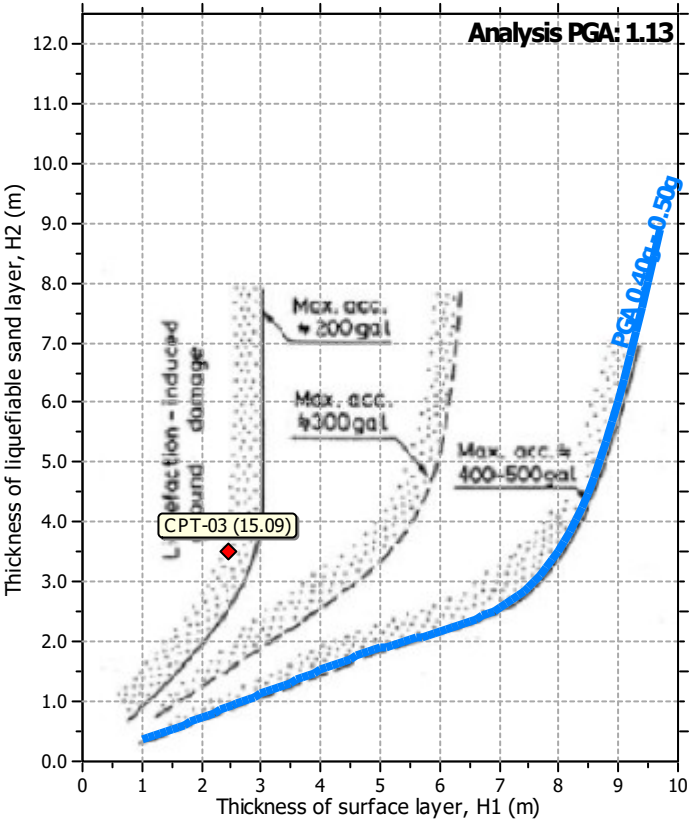
LPI color scheme

- Very high risk
- High risk
- Low risk

Liquefaction analysis summary plots



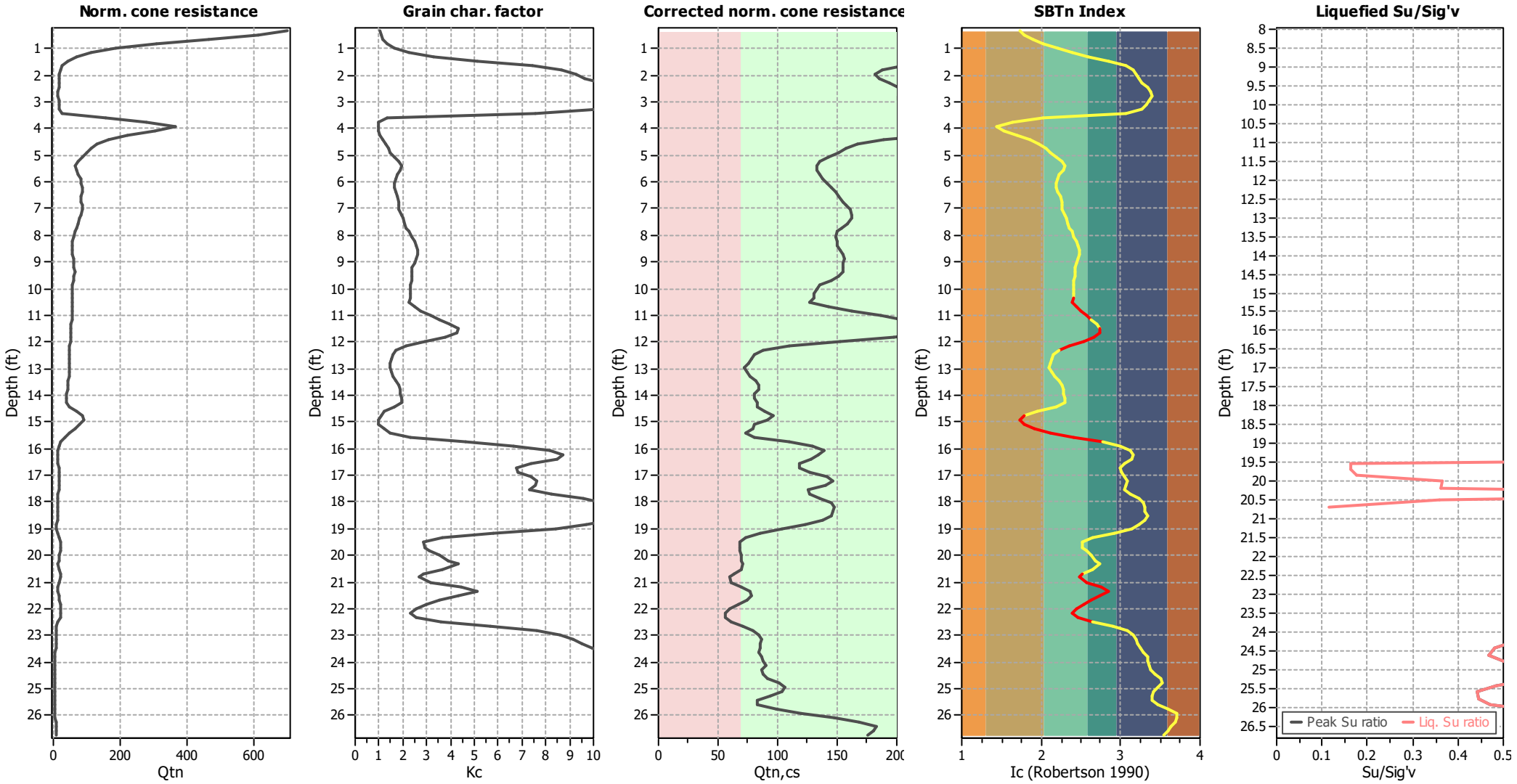




Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	8.00 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.12	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	1.13	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	8.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

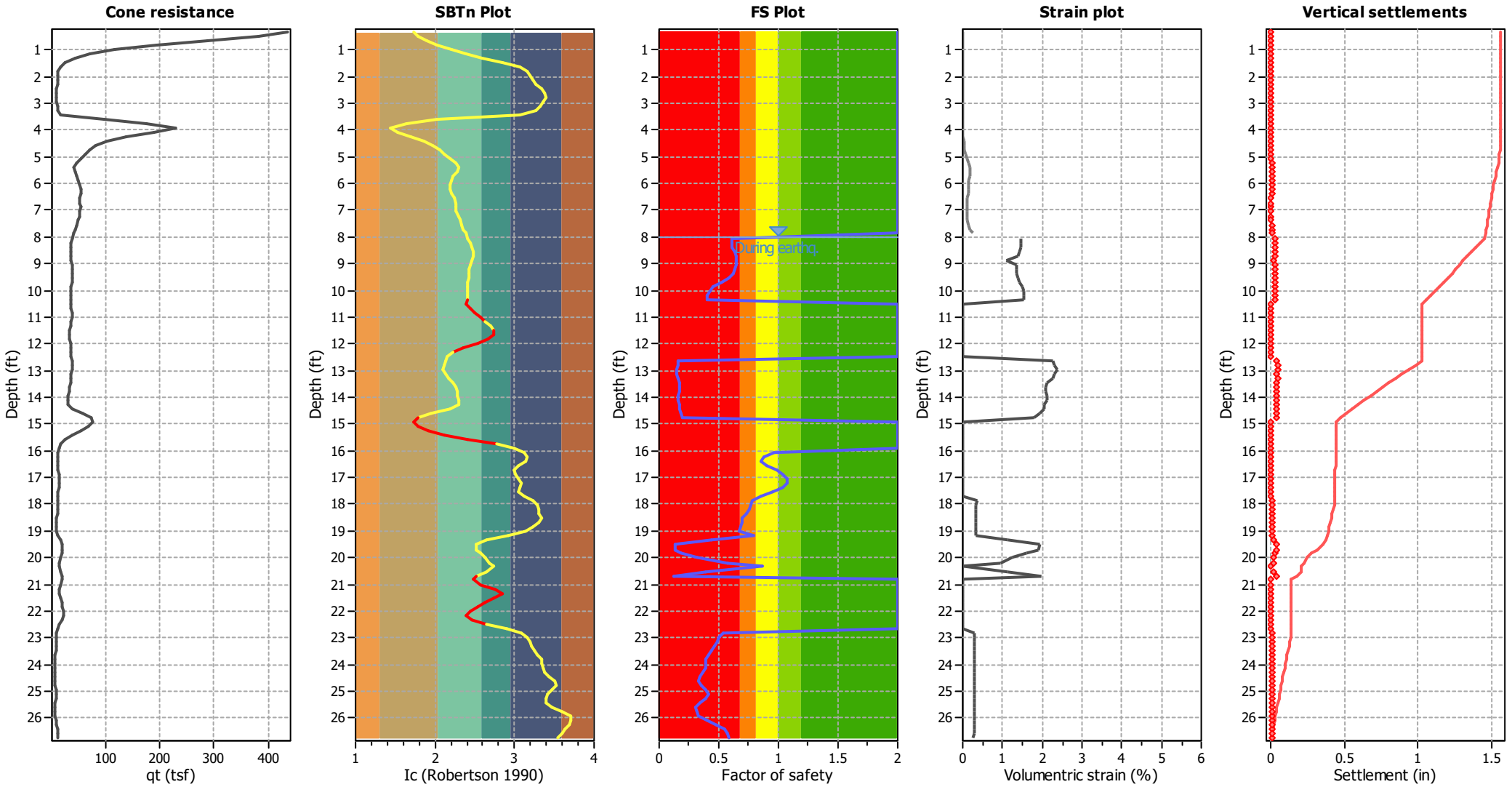
Check for strength loss plots (Robertson (2010))



Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	8.00 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.12	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	1.13	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	8.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

Estimation of post-earthquake settlements



Abbreviations

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

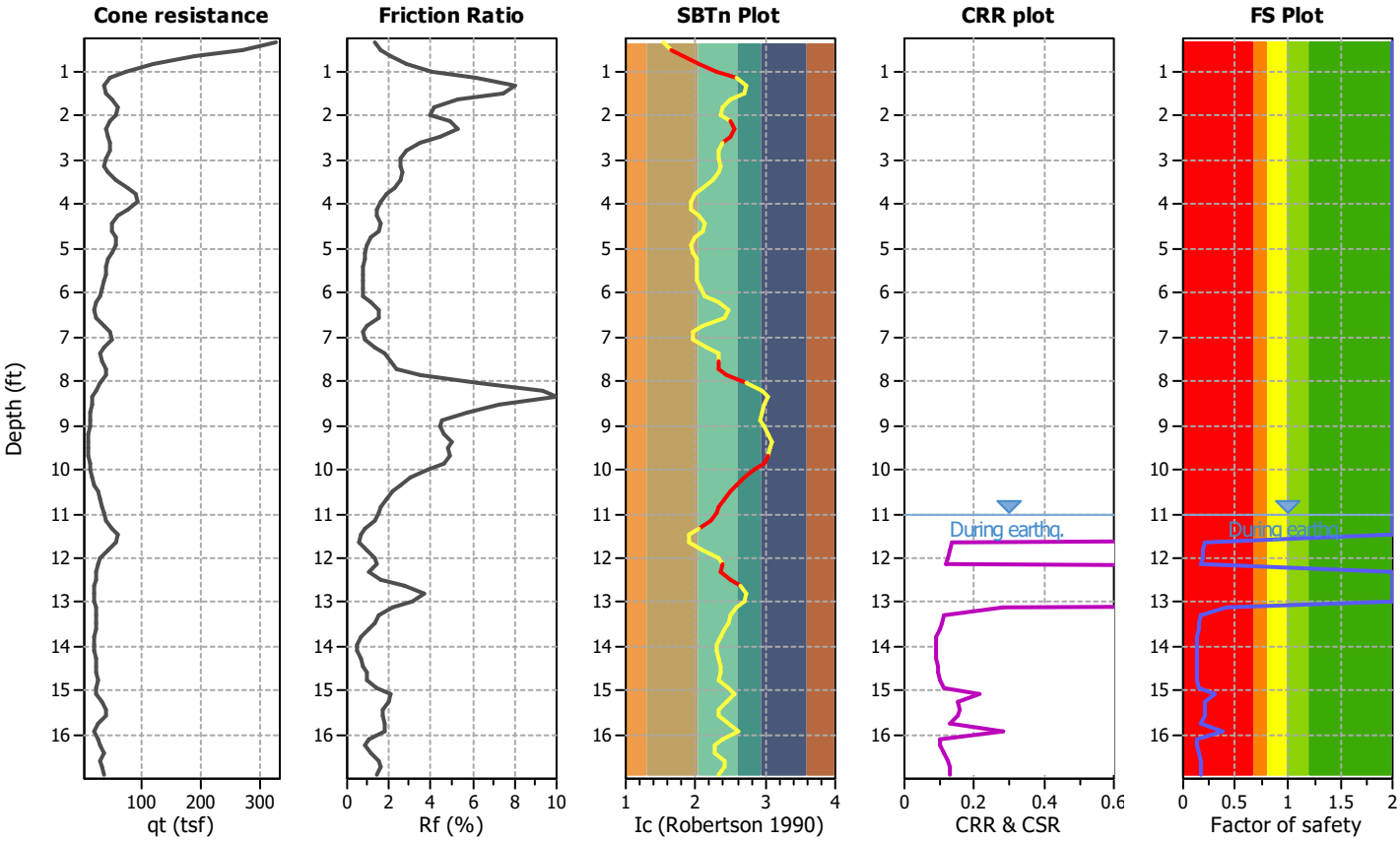
LIQUEFACTION ANALYSIS REPORT

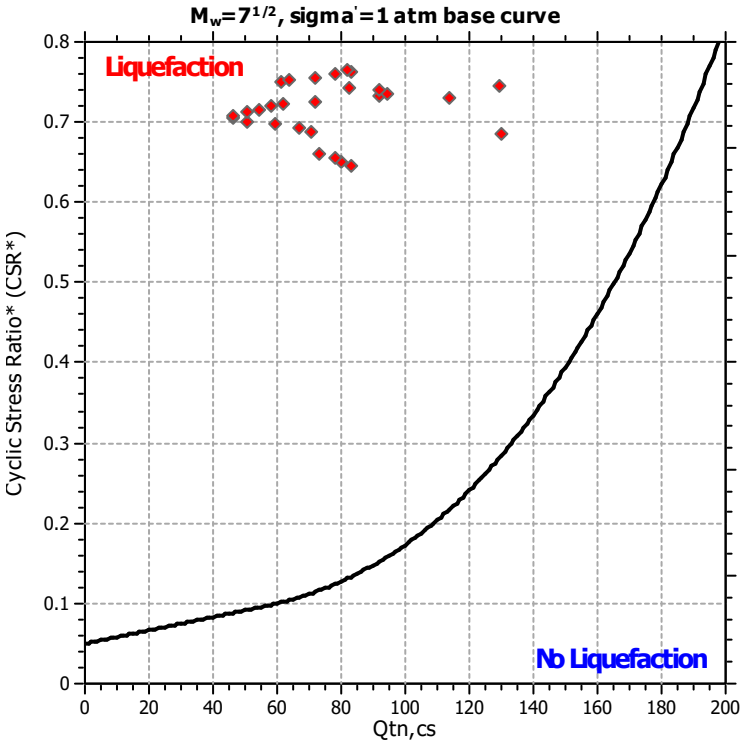
Project title : Crockers Lockers **Location : Watsonville**

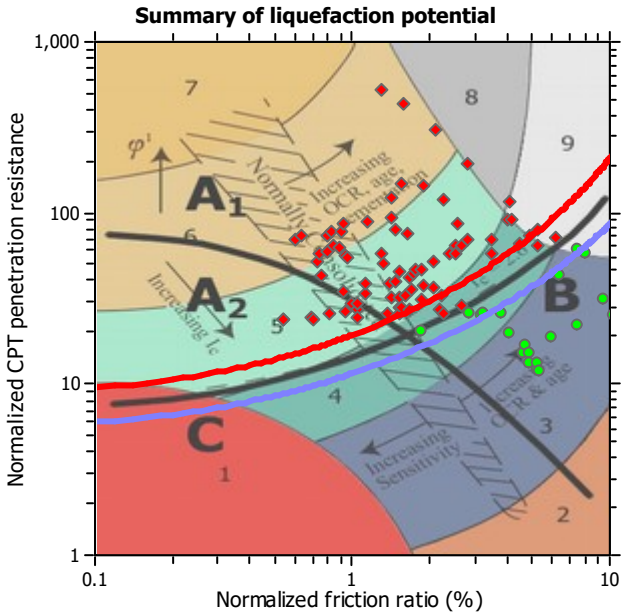
CPT file : CPT-04

Input parameters and analysis data

Analysis method:	Robertson (2009)	G.W.T. (in-situ):	11.00 ft	Use fill:	No	Clay like behavior applied:	All soils
Fines correction method:	Robertson (2009)	G.W.T. (earthq.):	11.00 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:	7.12	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method based
Peak ground acceleration:	1.13	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

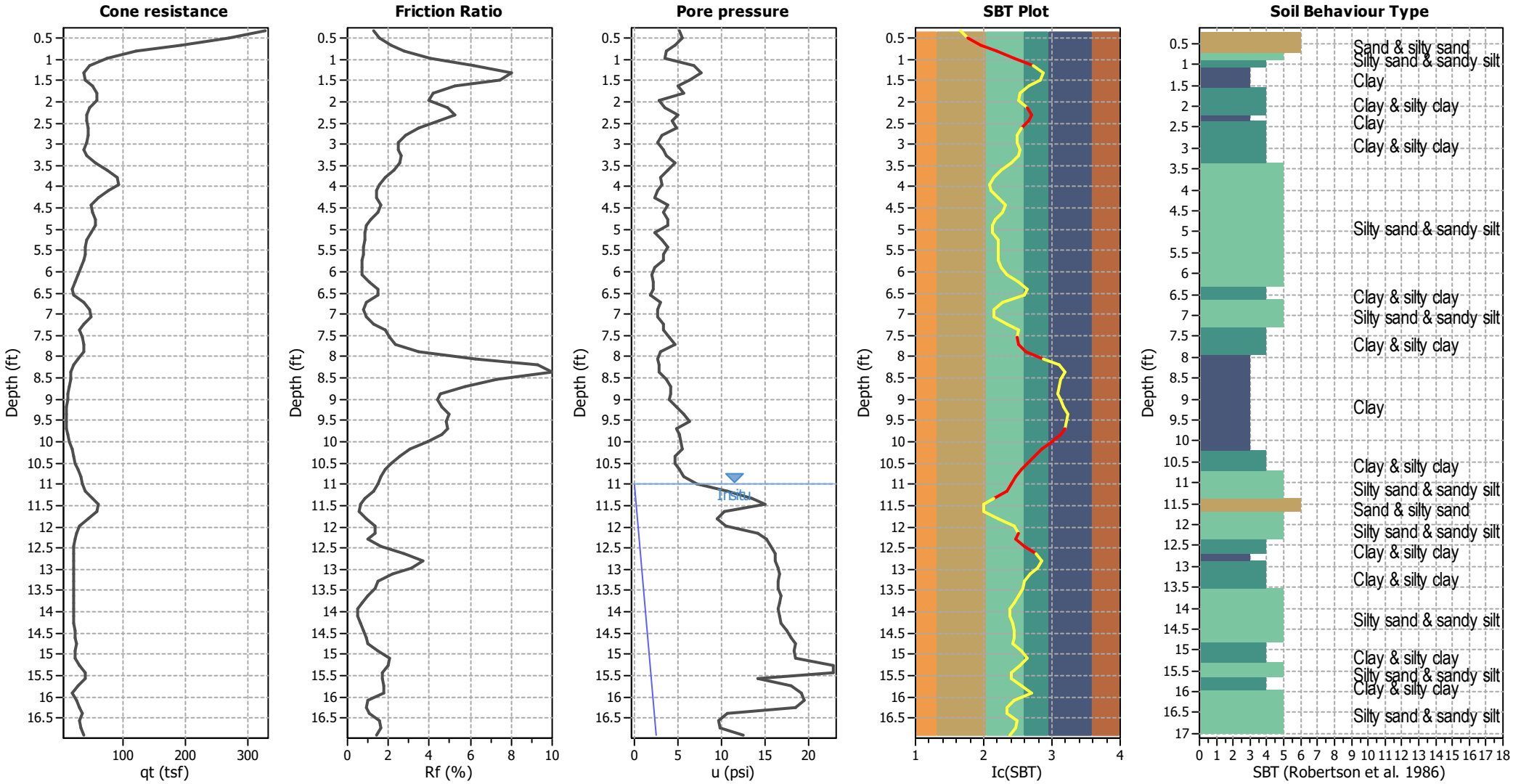






Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and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

CPT basic interpretation plots



Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	11.00 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.12	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	1.13	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	11.00 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
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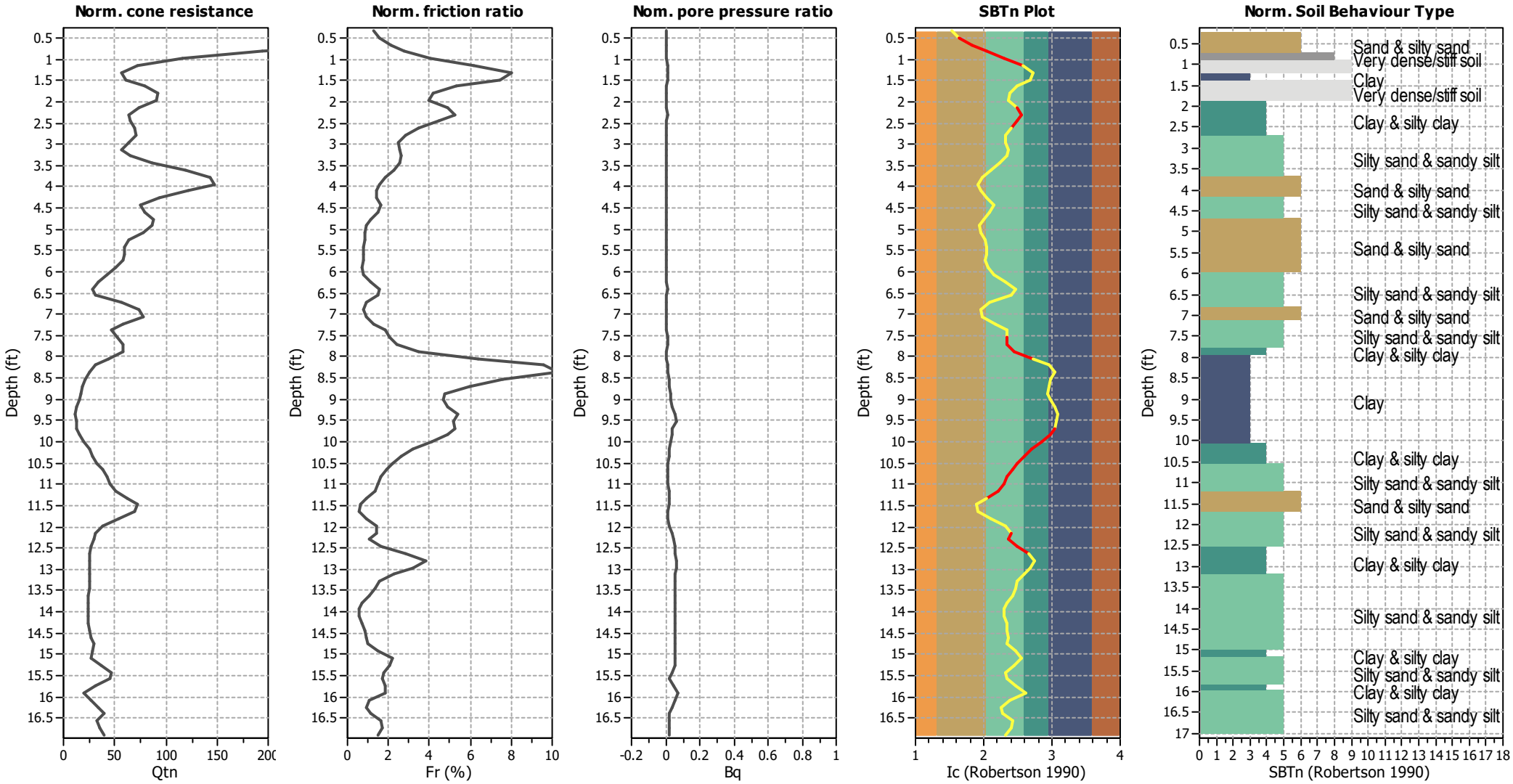
8. Very stiff sand to
9. Very stiff fine grained

CPT basic interpretation plots (normalized)



Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	11.00 ft	Fill weight:	N/A
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SBTn legend

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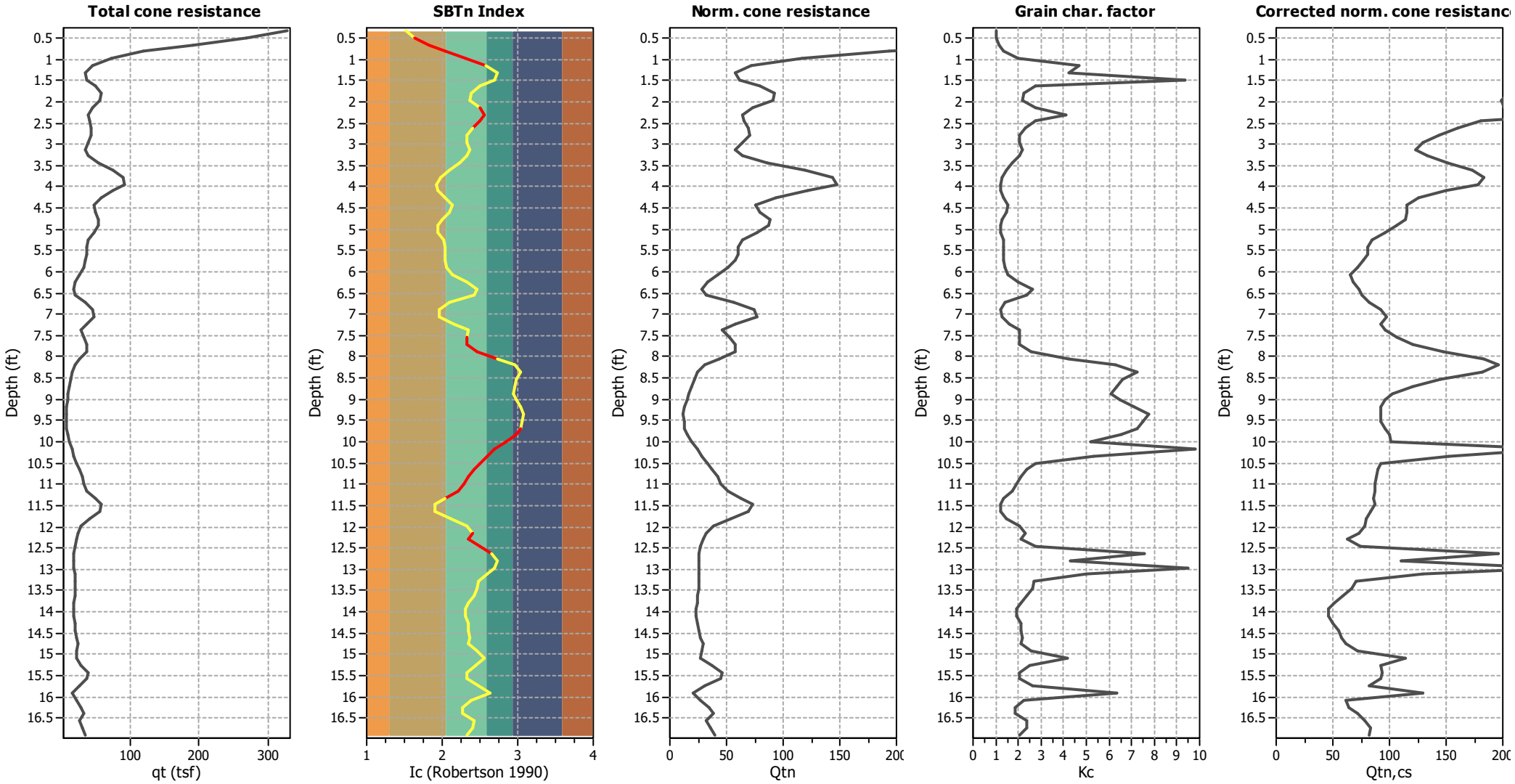
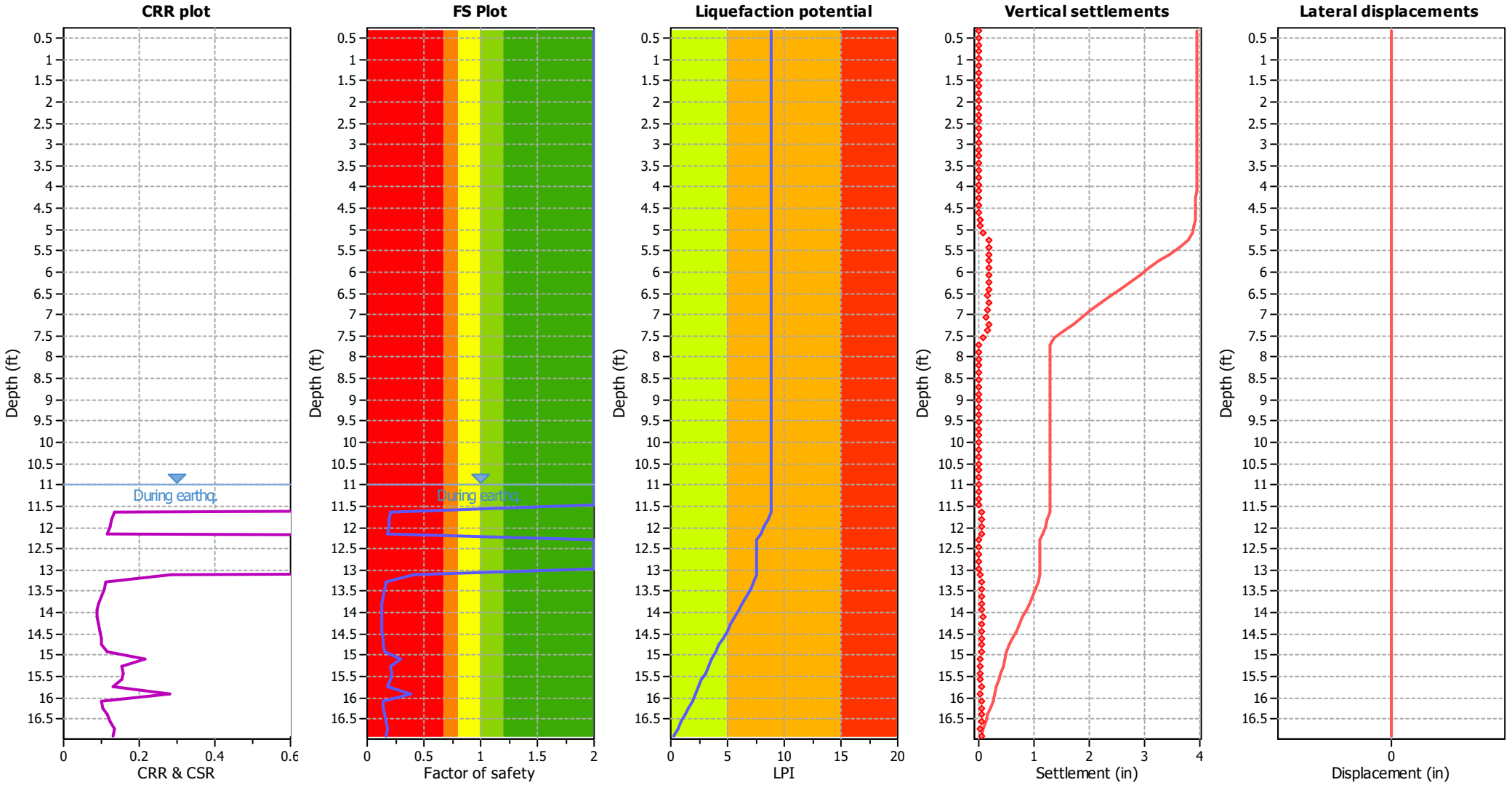
Liquefaction analysis overall plots (intermediate results)



Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	11.00 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.12	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	1.13	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	11.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	11.00 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.12	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	1.13	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	11.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

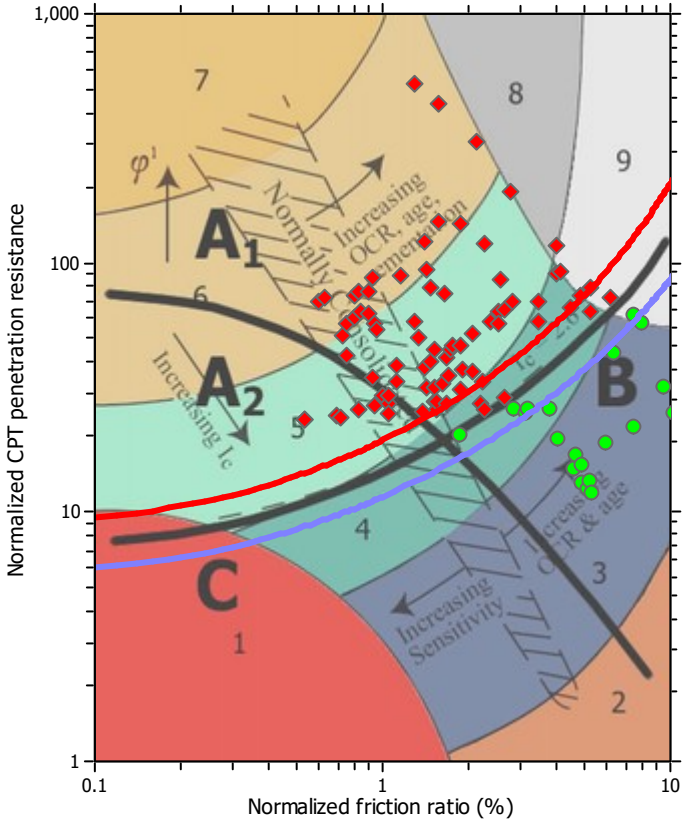
F.S. color scheme

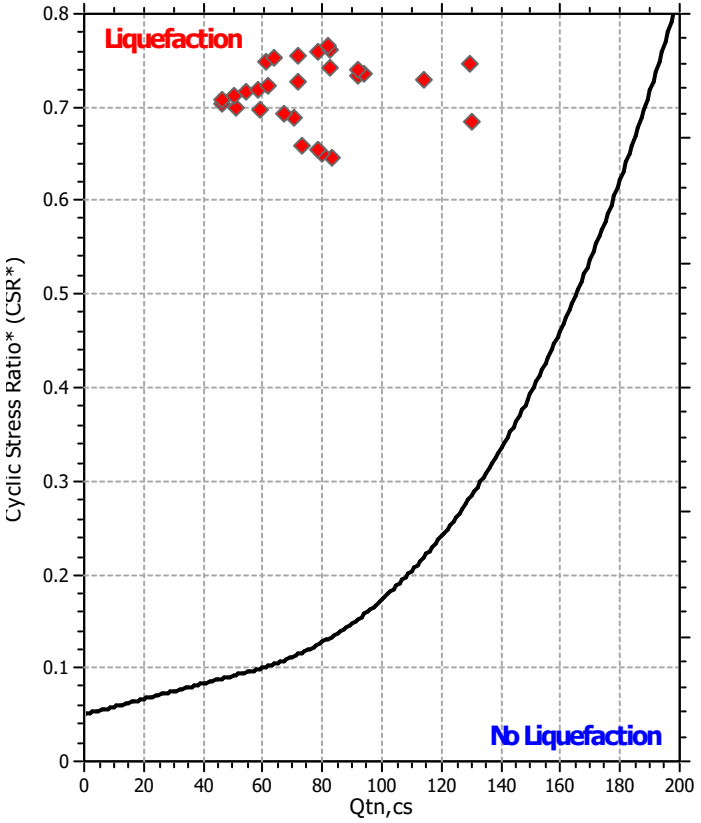
- Almost certain it will liquefy
- Very likely to liquefy
- Liquefaction and no liq. are equally likely
- Unlike to liquefy
- Almost certain it will not liquefy

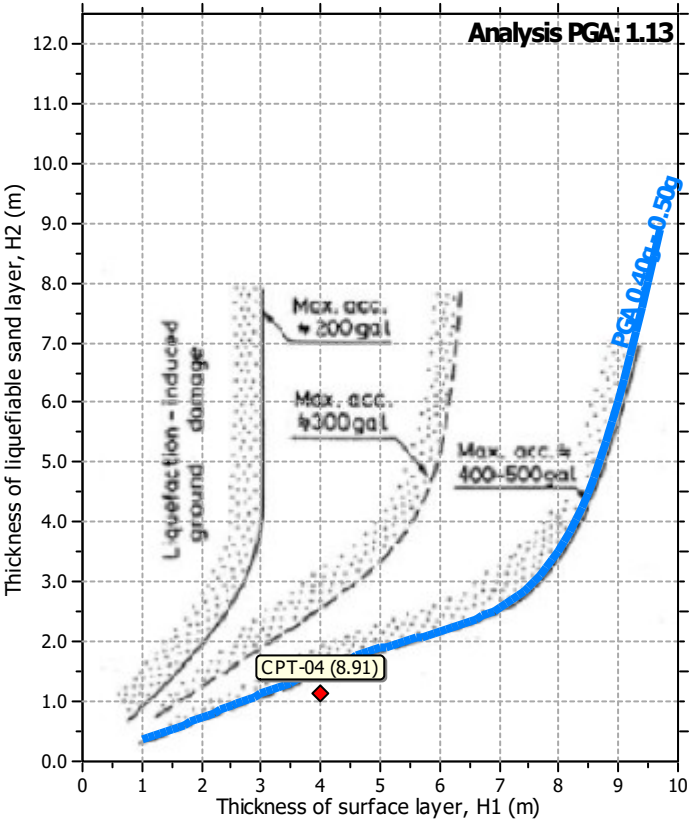
LPI color scheme

- Very high risk
- High risk
- Low risk

Liquefaction analysis summary plots



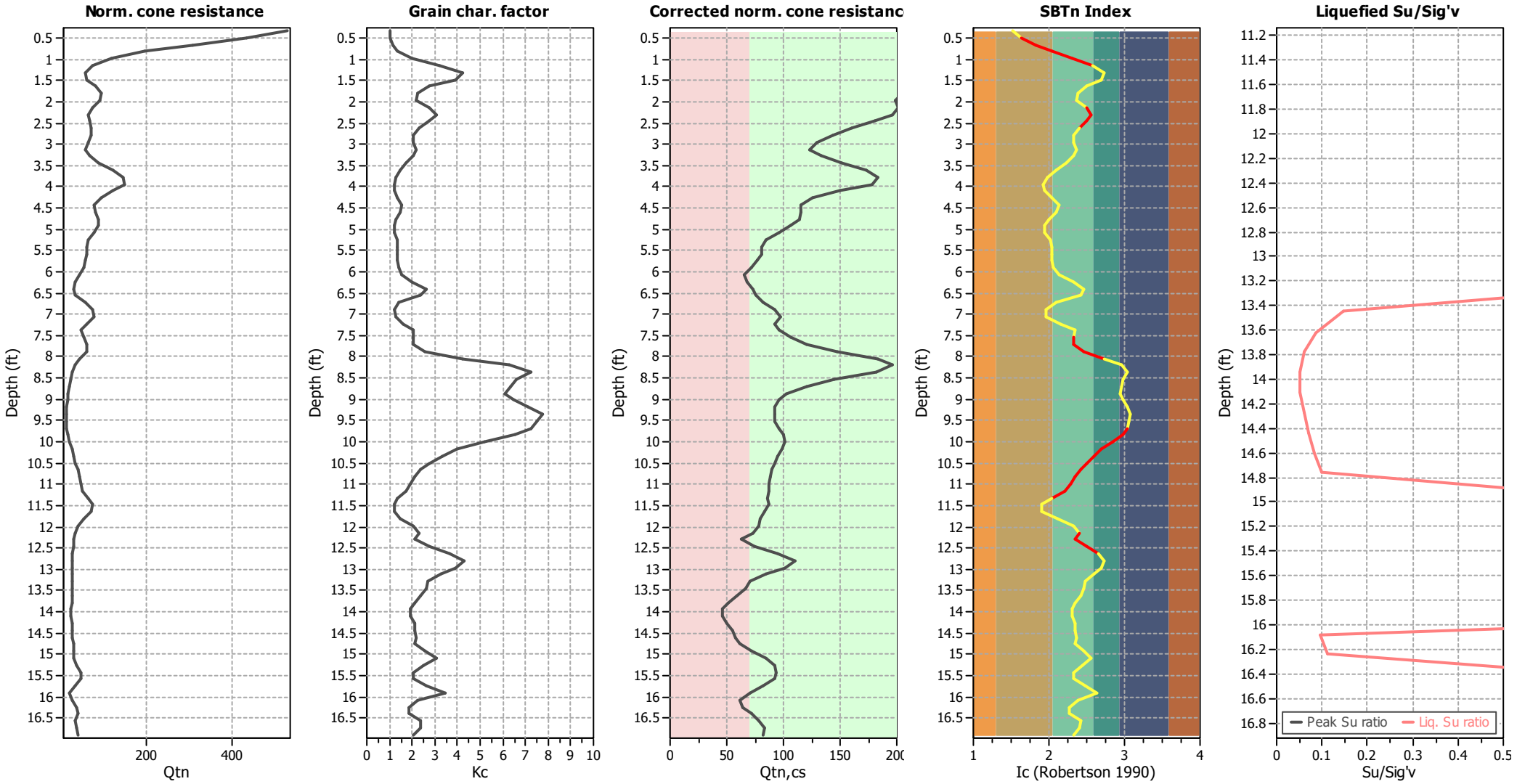




Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	11.00 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.12	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	1.13	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	11.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

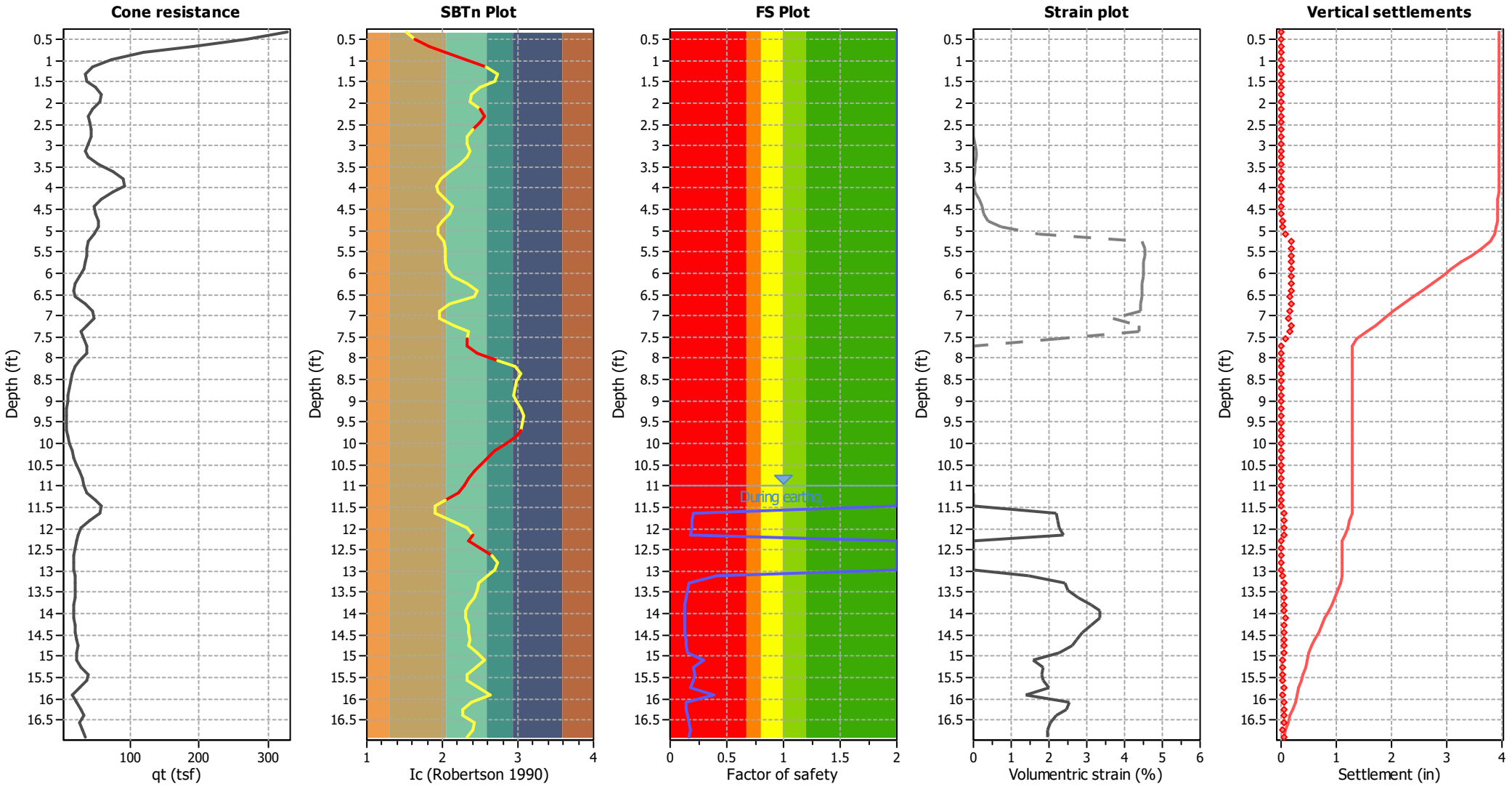
Check for strength loss plots (Robertson (2010))



Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	11.00 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.12	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	1.13	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	11.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

Estimation of post-earthquake settlements



Abbreviations

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

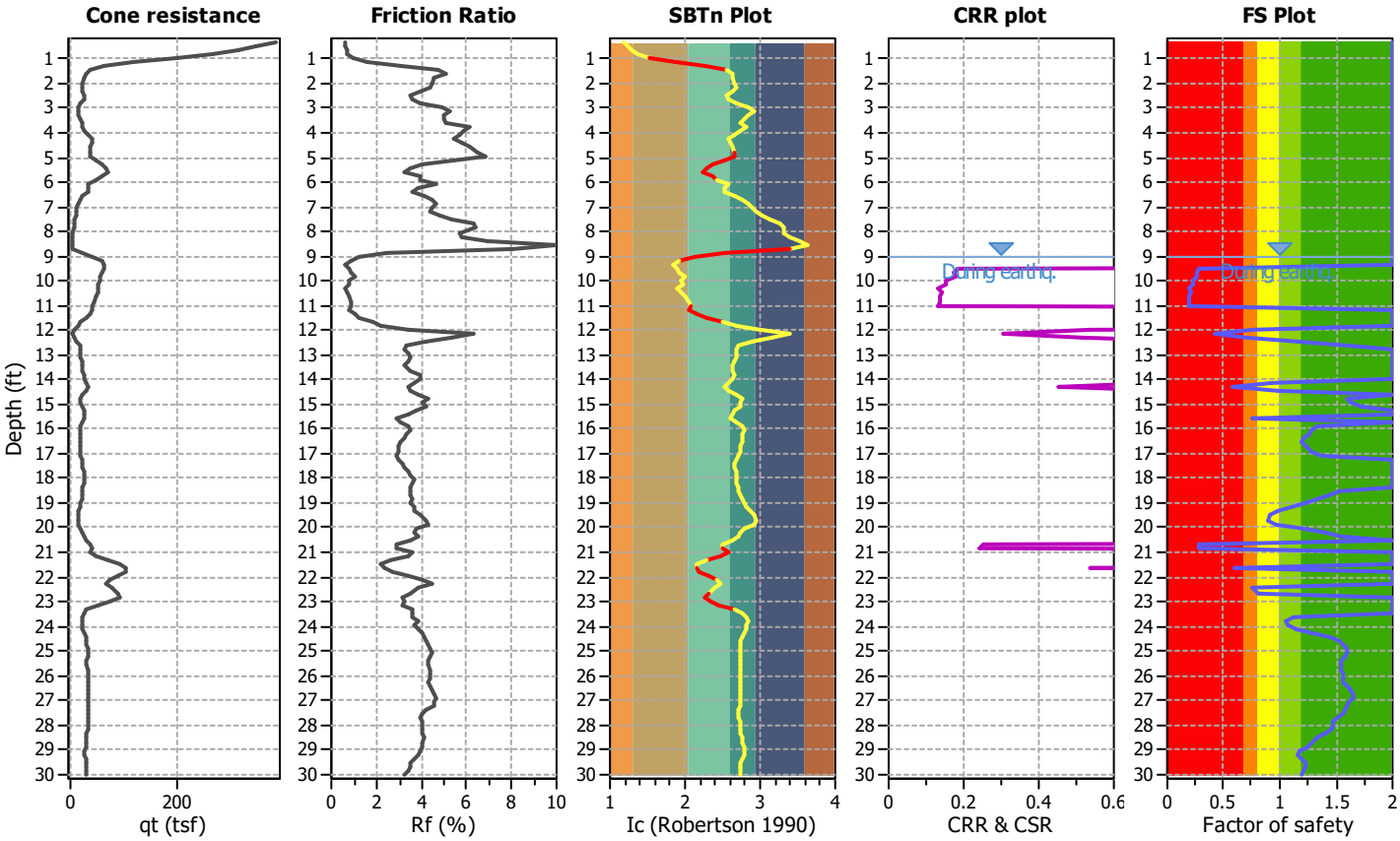
LIQUEFACTION ANALYSIS REPORT

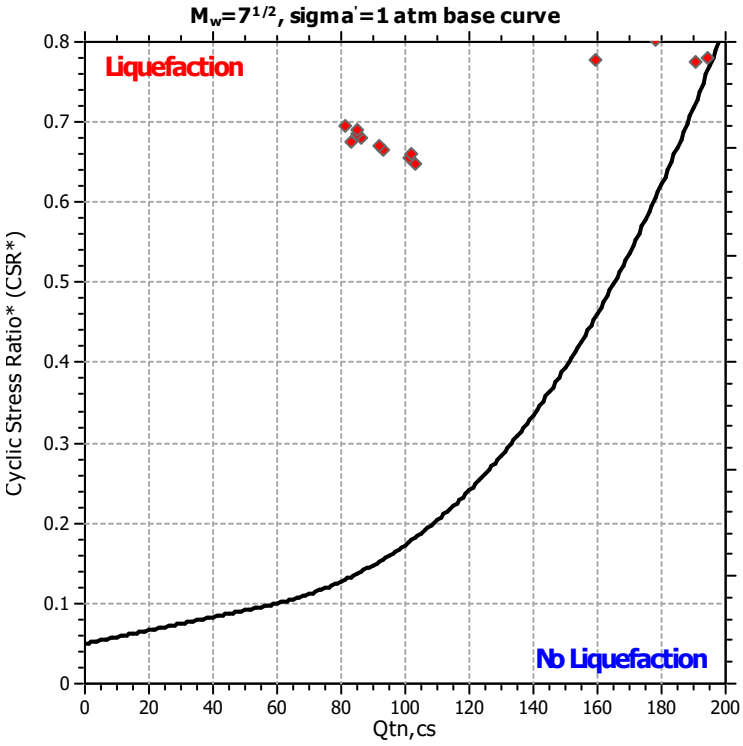
Project title : Crockers Lockers **Location : Watsonville**

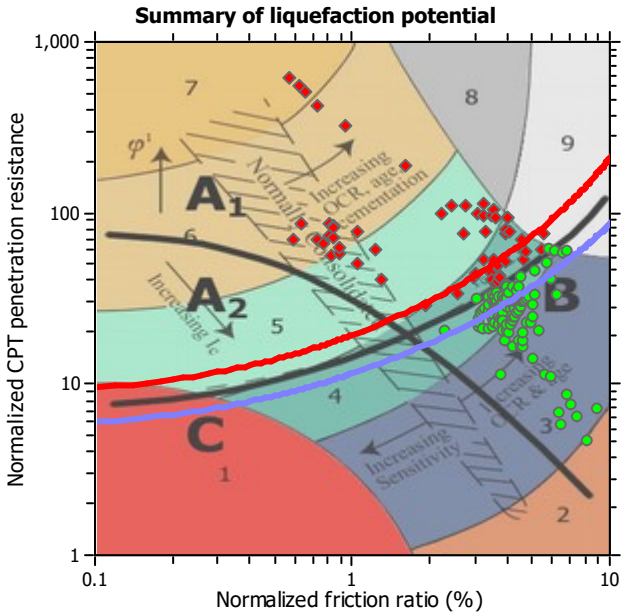
CPT file : CPT-05

Input parameters and analysis data

Analysis method:	Robertson (2009)	G.W.T. (in-situ):	9.00 ft	Use fill:	No	Clay like behavior applied:	All soils
Fines correction method:	Robertson (2009)	G.W.T. (earthq.):	9.00 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:	7.12	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method based
Peak ground acceleration:	1.13	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

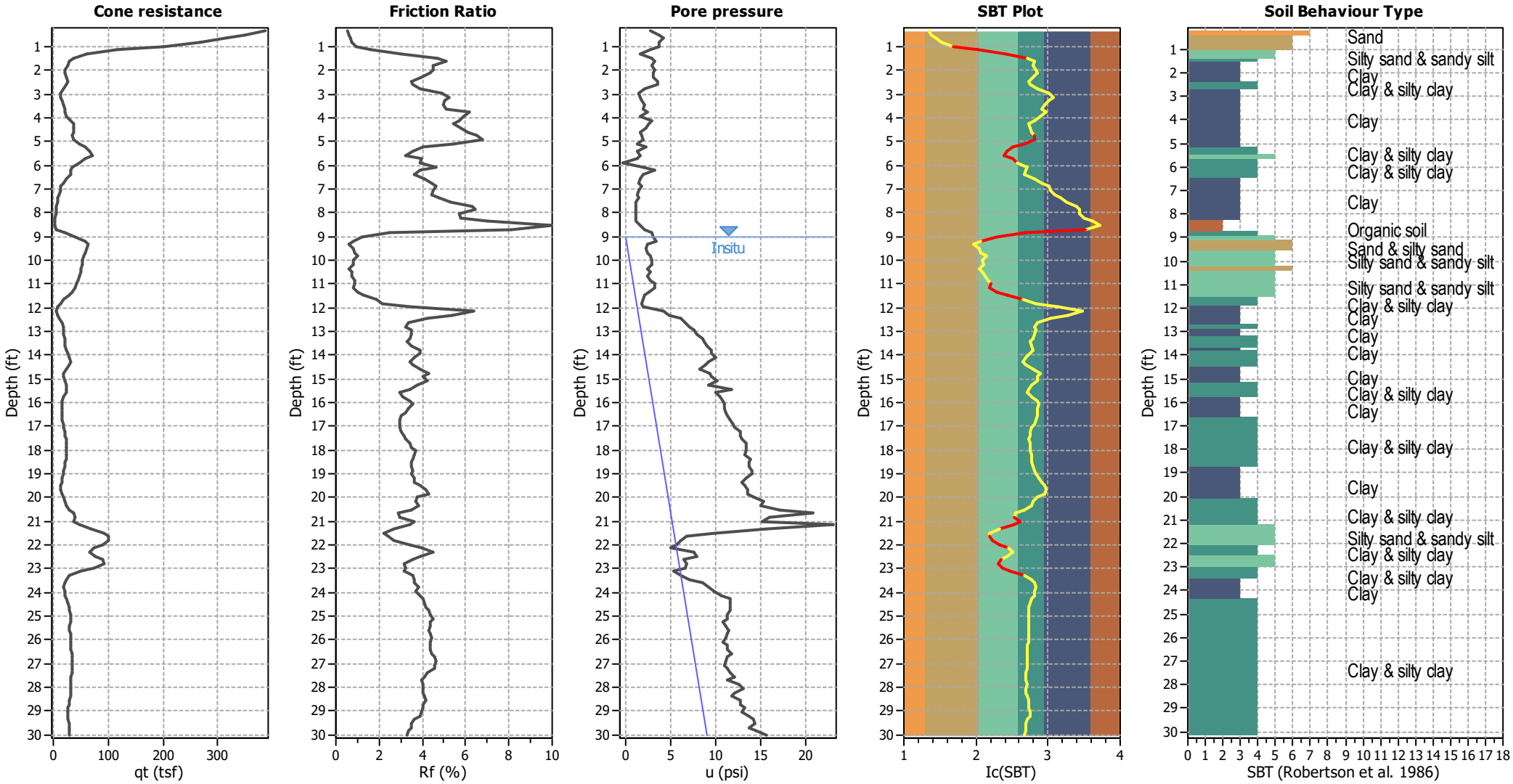






Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and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

CPT basic interpretation plots



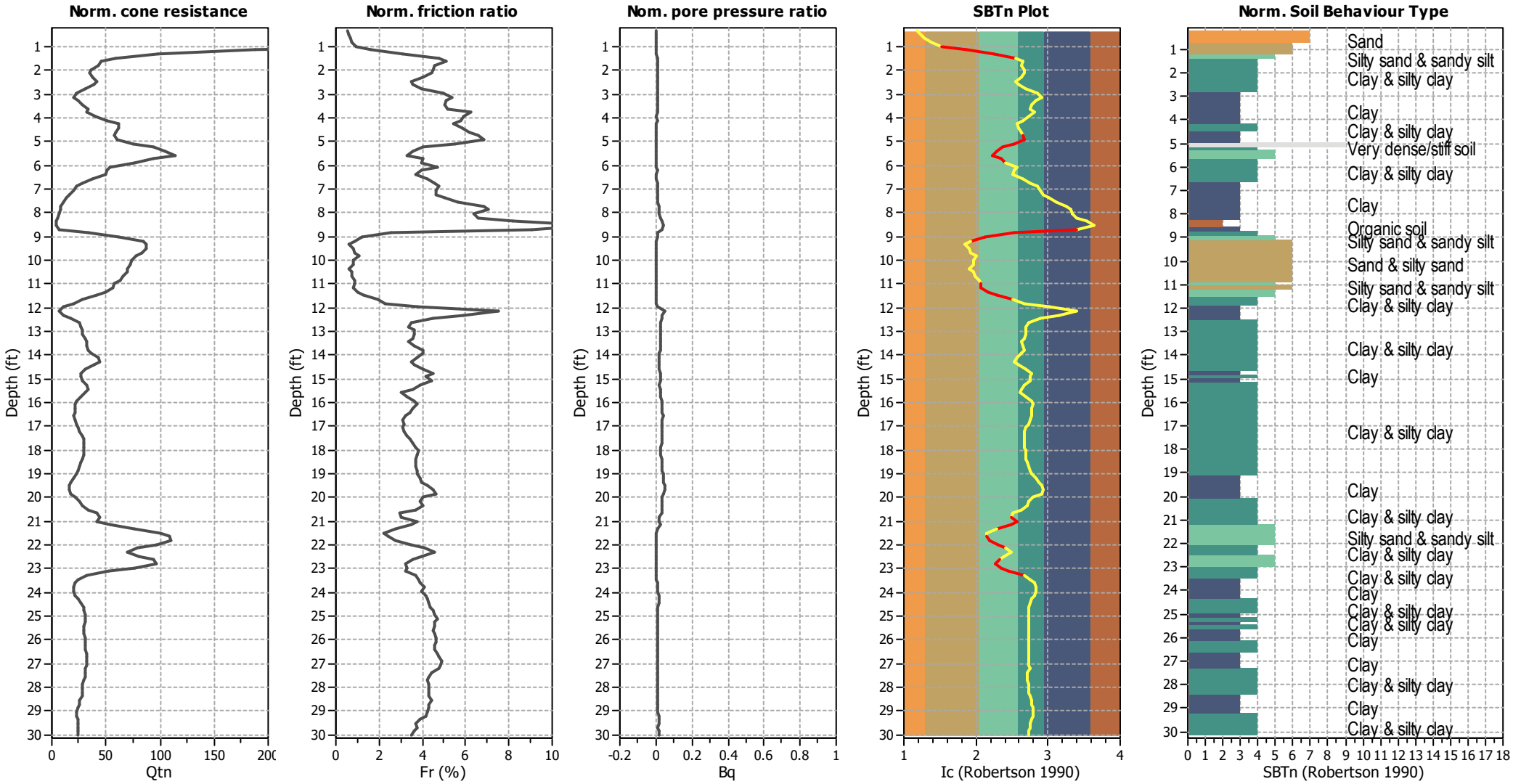
Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	9.00 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.12	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	1.13	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
2. Organic material
3. Clay to silty clay
4. Clayey silt to silty
5. Silty sand to sandy silt
6. Clean sand to silty sand
7. Gravely sand to sand
8. Very stiff sand to
9. Very stiff fine grained

CPT basic interpretation plots (normalized)



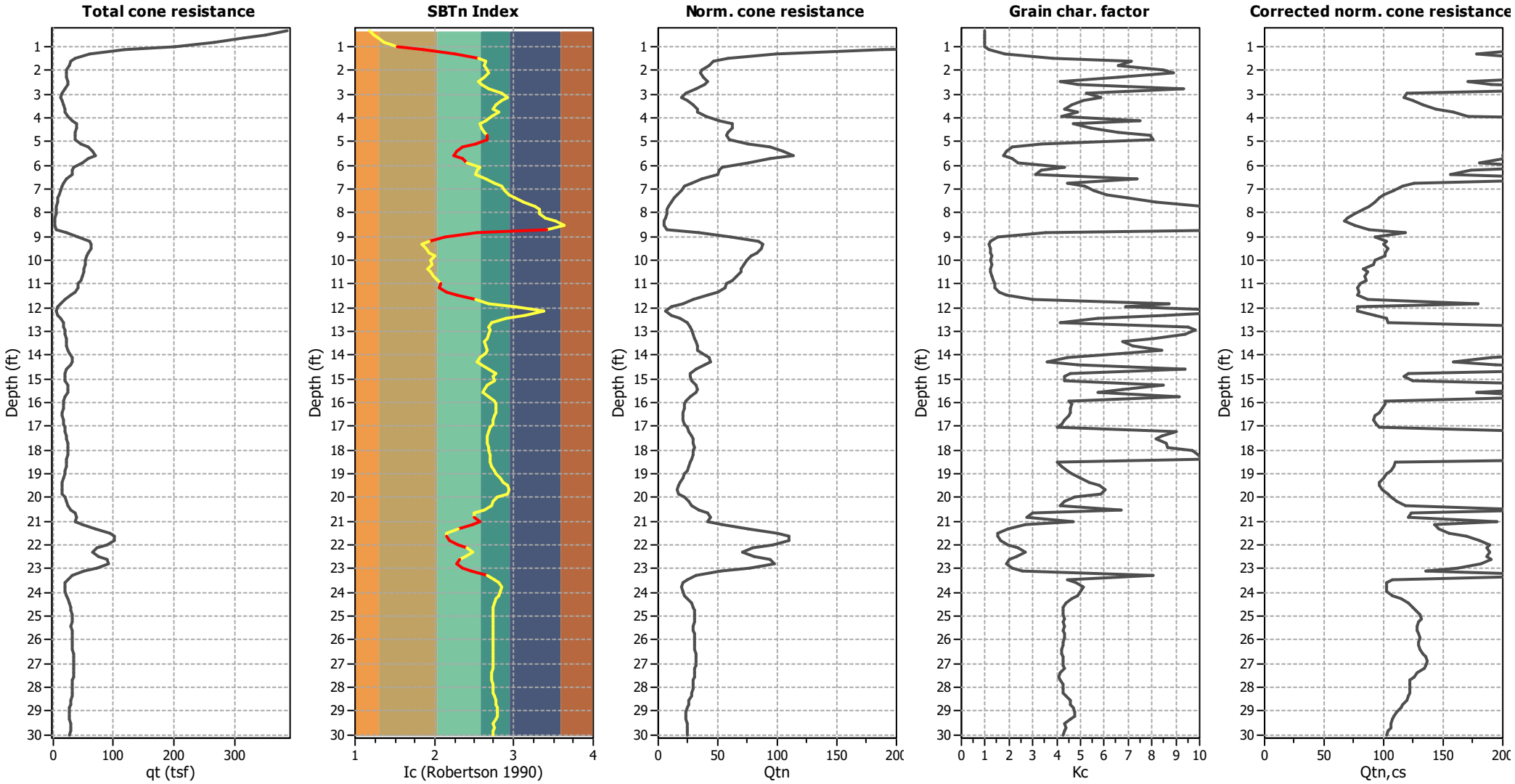
Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	9.00 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.12	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	1.13	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

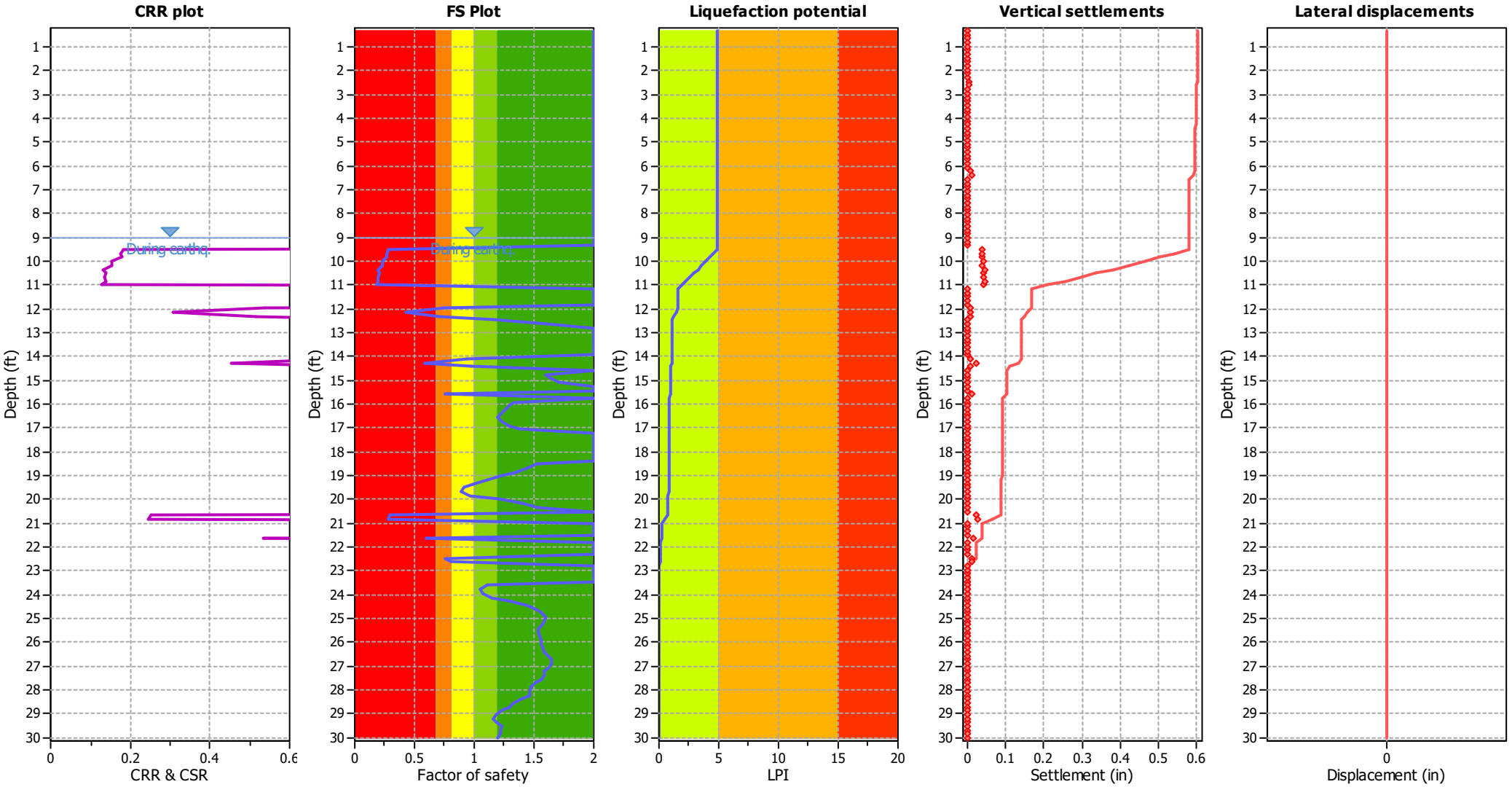
Liquefaction analysis overall plots (intermediate results)



Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	9.00 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.12	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	1.13	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:	Robertson (2009)	Depth to water table (erthq.):	9.00 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.12	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	1.13	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	9.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

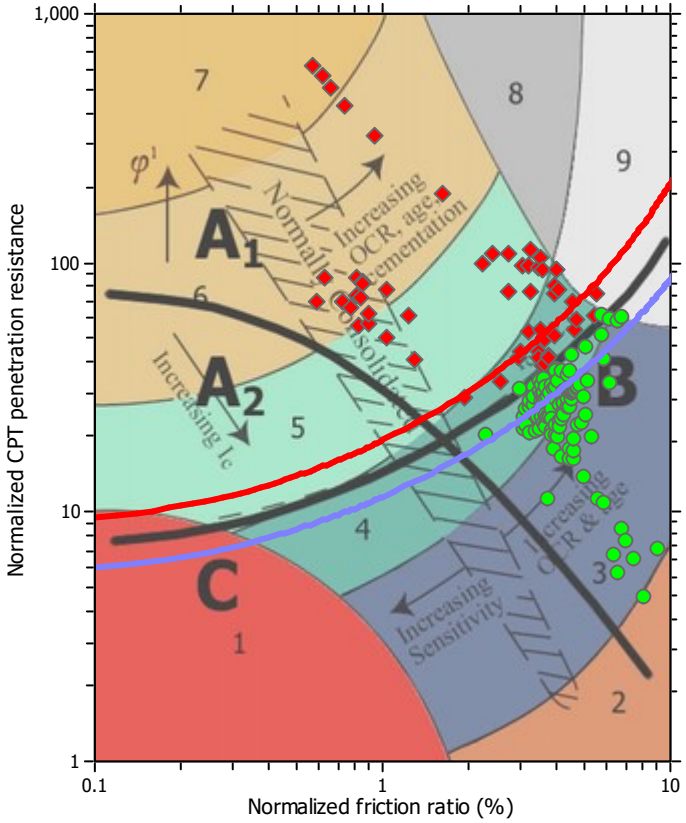
F.S. color scheme

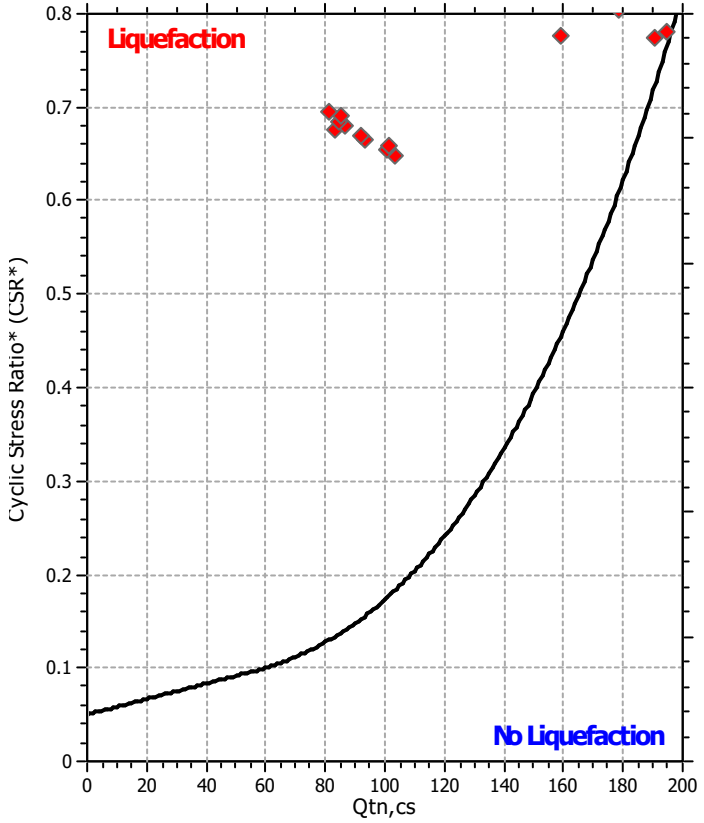
- Almost certain it will liquefy
- Very likely to liquefy
- Liquefaction and no liq. are equally likely
- Unlike to liquefy
- Almost certain it will not liquefy

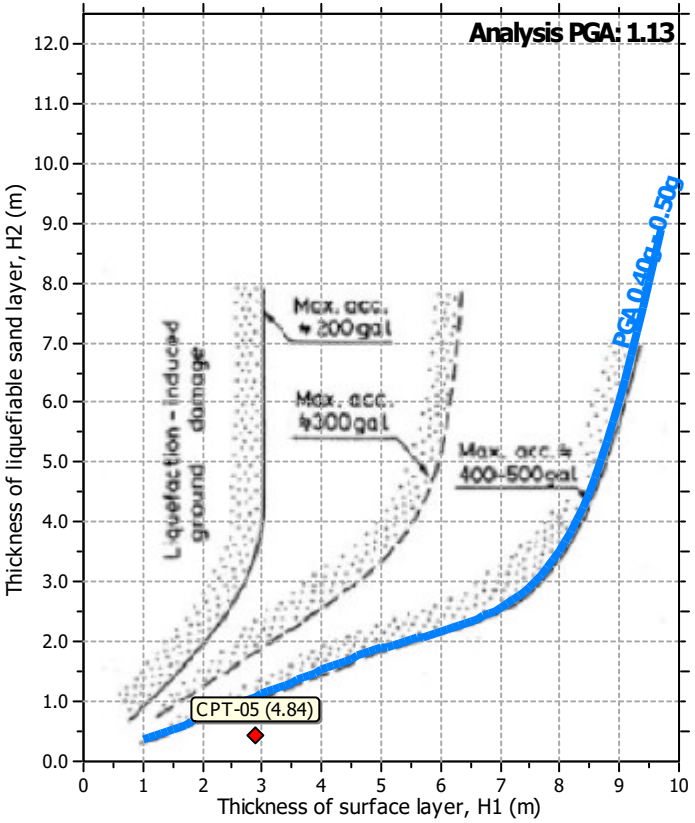
LPI color scheme

- Very high risk
- High risk
- Low risk

Liquefaction analysis summary plots



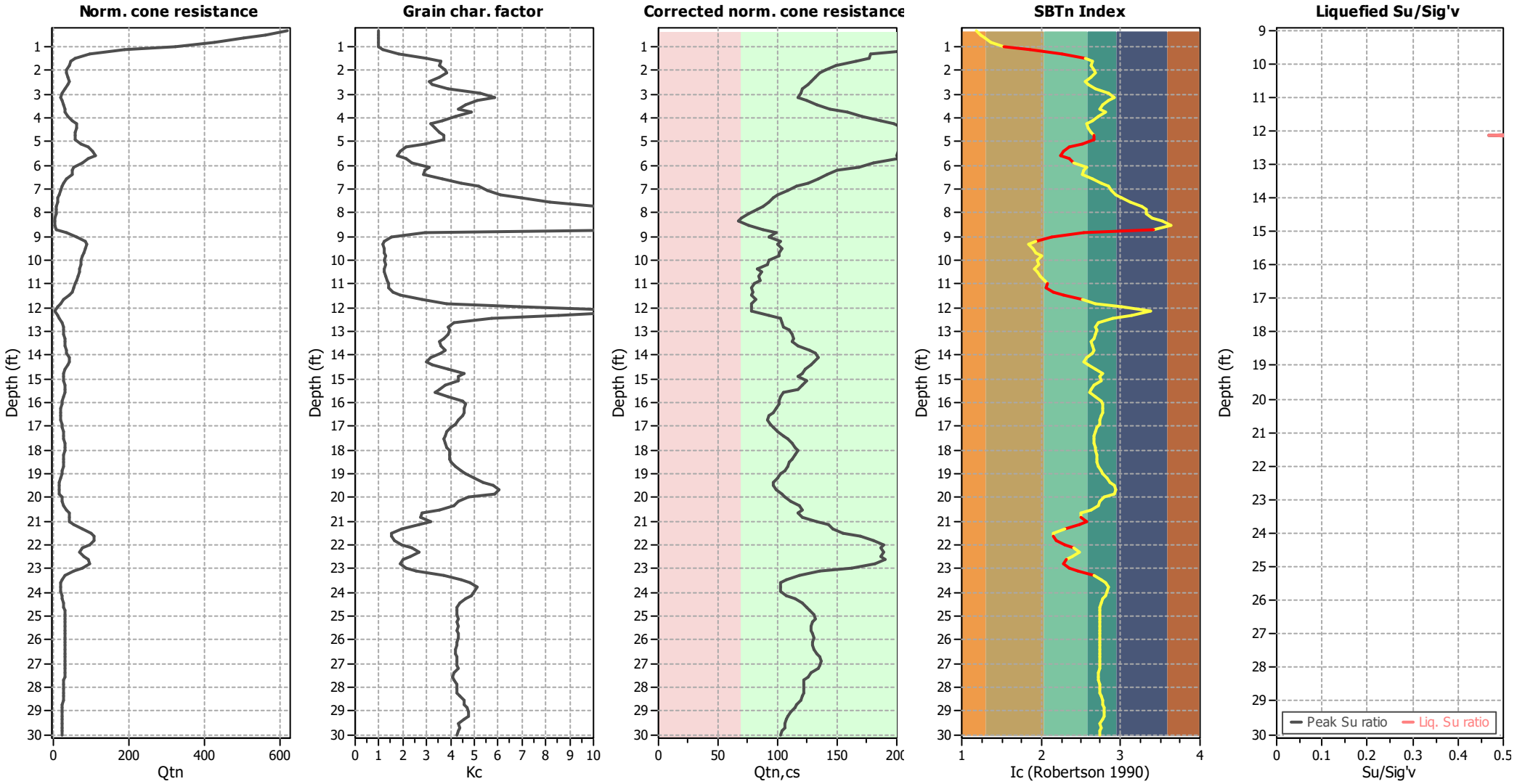




Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	9.00 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.12	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	1.13	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	9.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

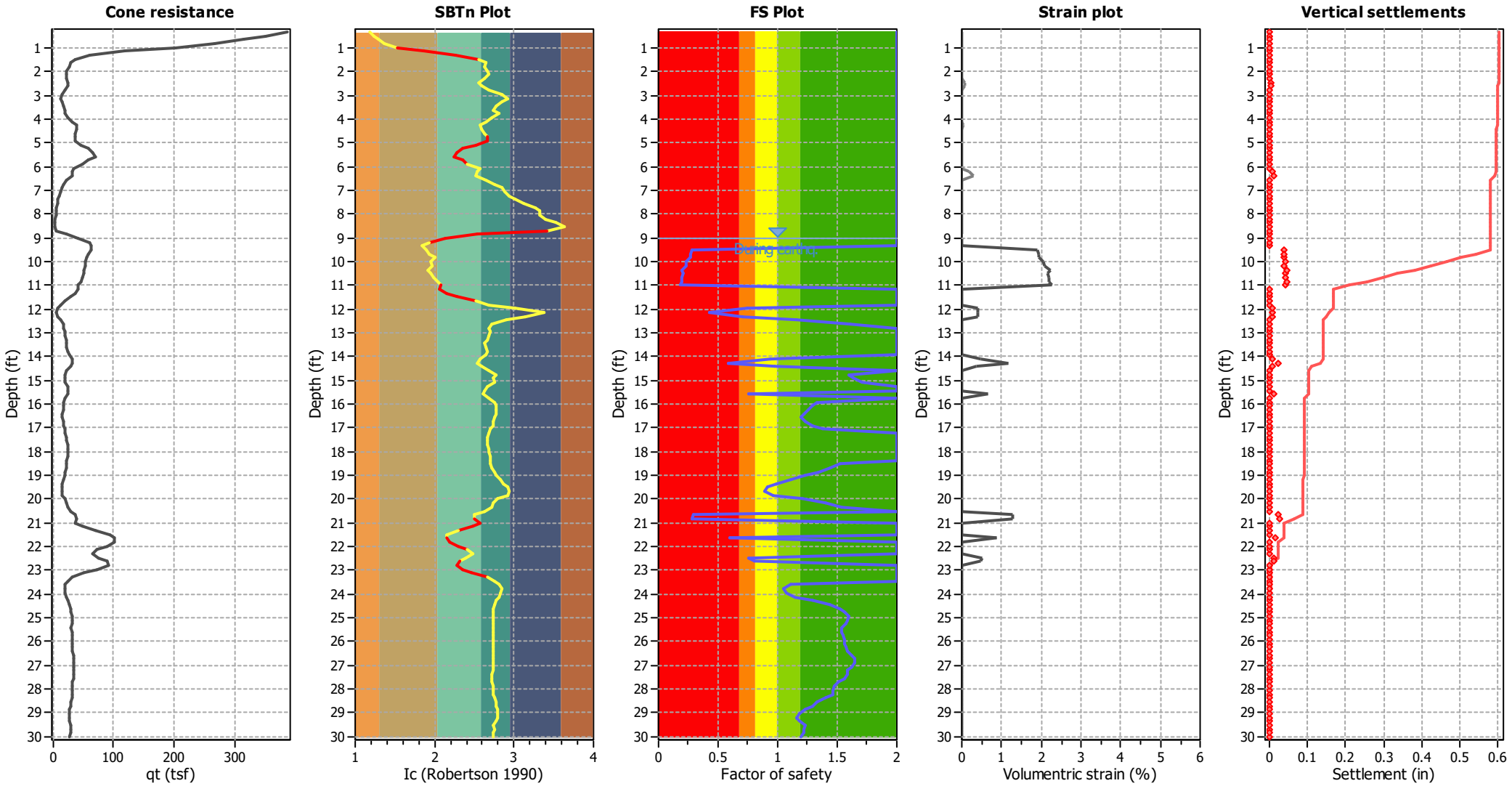
Check for strength loss plots (Robertson (2010))



Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	9.00 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.12	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	1.13	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	9.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

Estimation of post-earthquake settlements



Abbreviations

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

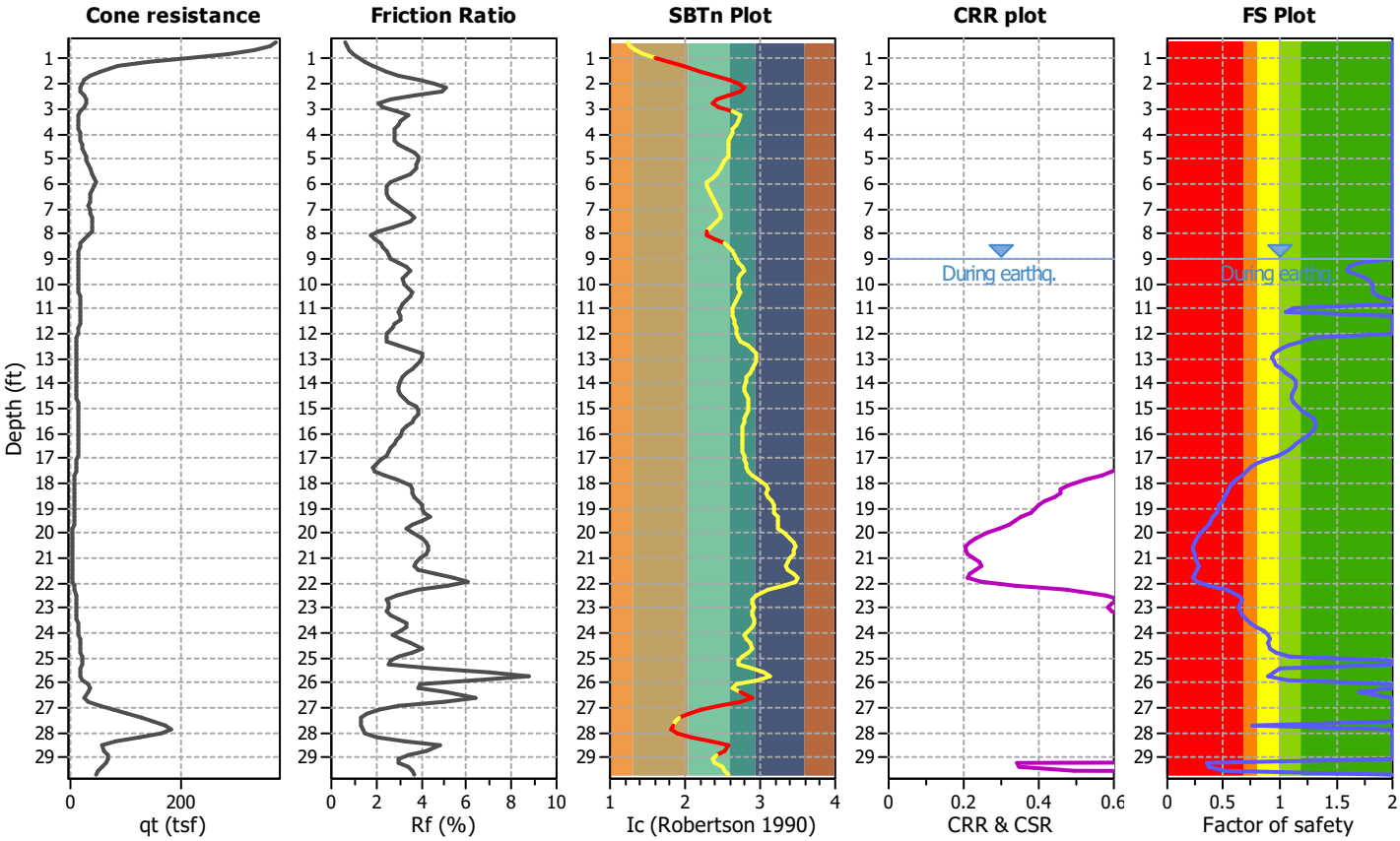
LIQUEFACTION ANALYSIS REPORT

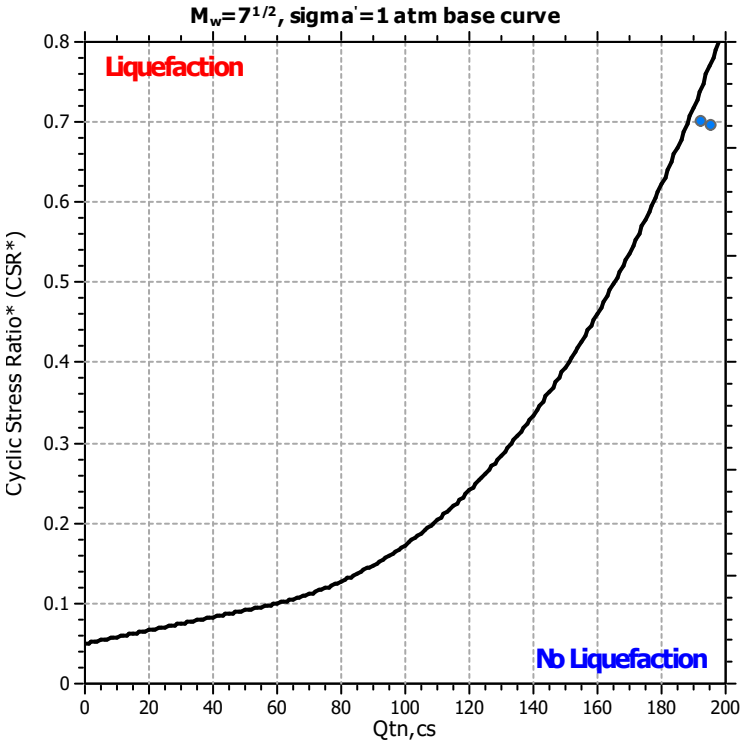
Project title : Crockers Lockers **Location : Watsonville**

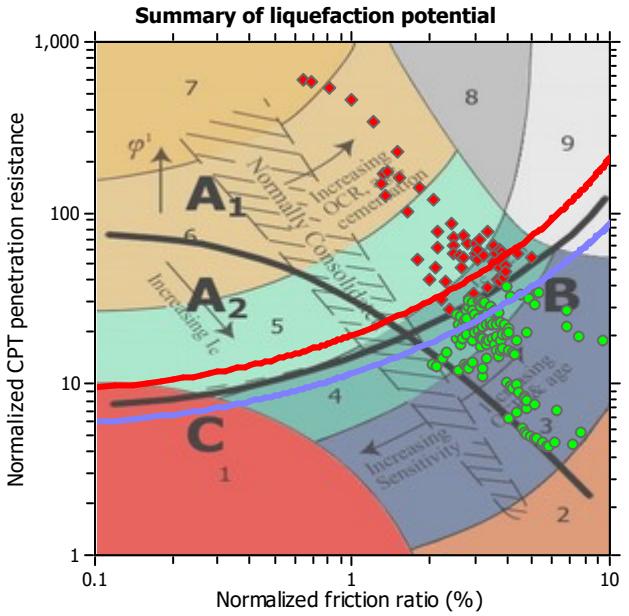
CPT file : CPT-06

Input parameters and analysis data

Analysis method:	Robertson (2009)	G.W.T. (in-situ):	9.00 ft	Use fill:	No	Clay like behavior applied:	All soils
Fines correction method:	Robertson (2009)	G.W.T. (earthq.):	9.00 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:	7.12	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method based
Peak ground acceleration:	1.13	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

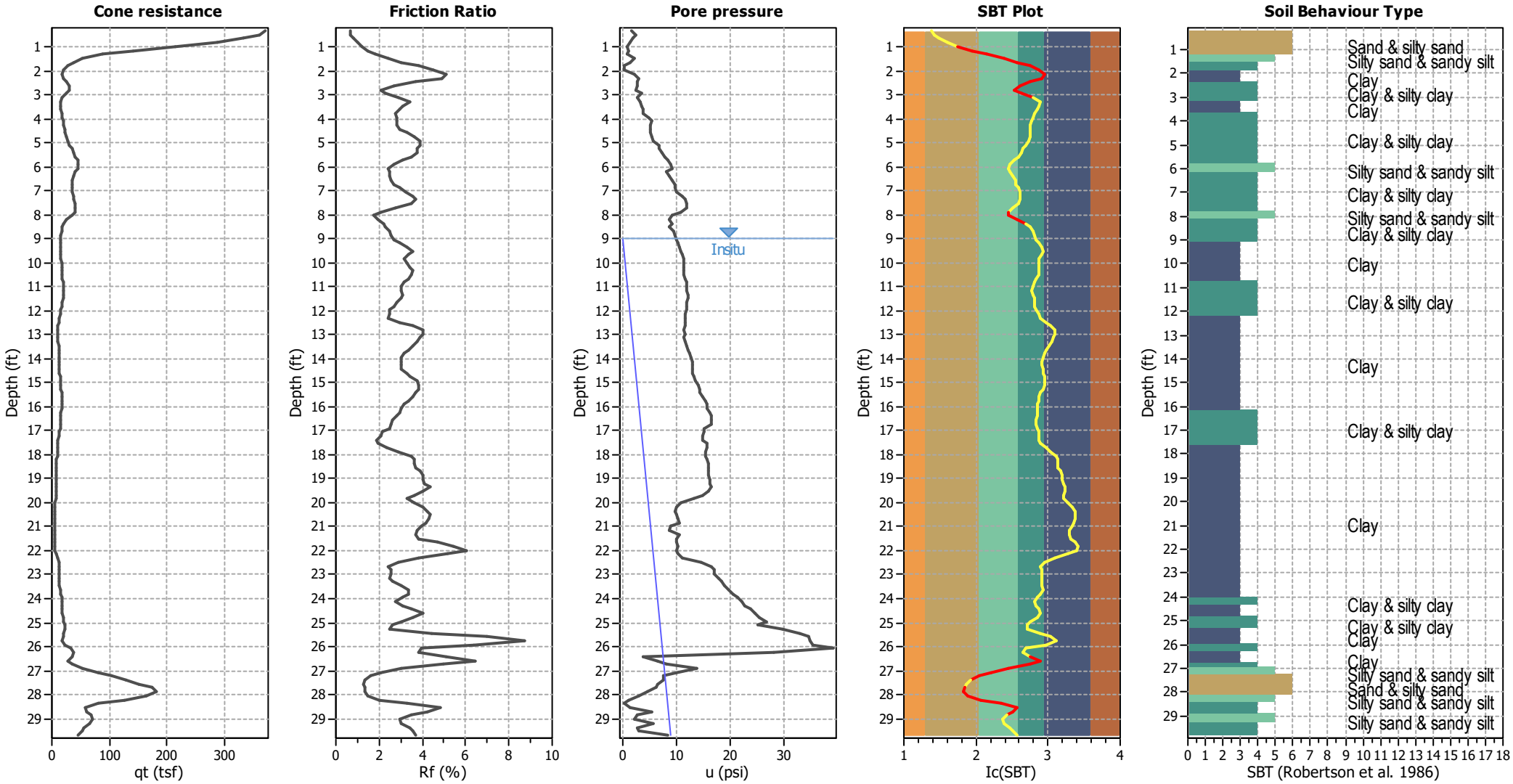






Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and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

CPT basic interpretation plots



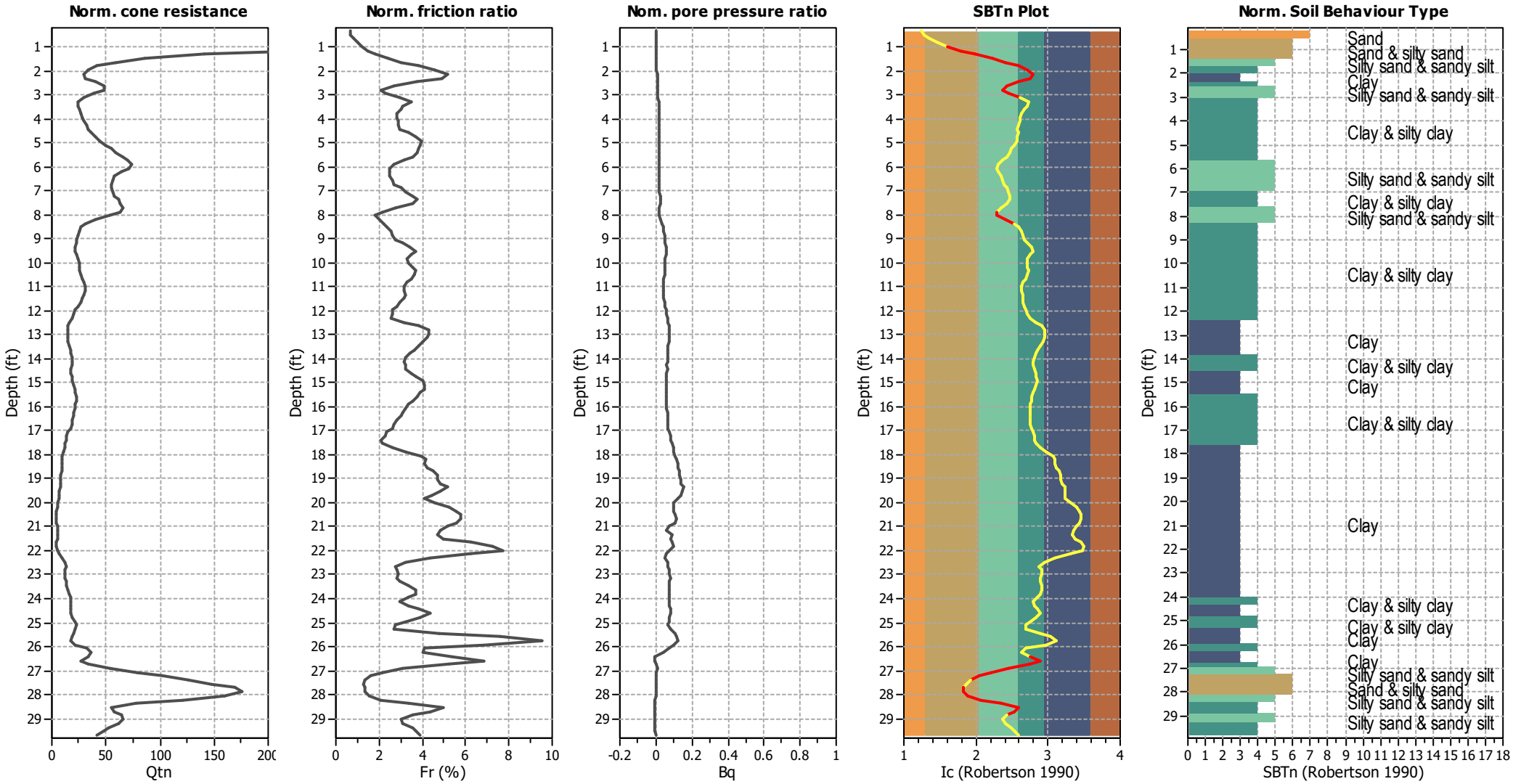
Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	9.00 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.12	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	1.13	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
2. Organic material
3. Clay to silty clay
4. Clayey silt to silty
5. Silty sand to sandy silt
6. Clean sand to silty sand
7. Gravely sand to sand
8. Very stiff sand to
9. Very stiff fine grained

CPT basic interpretation plots (normalized)



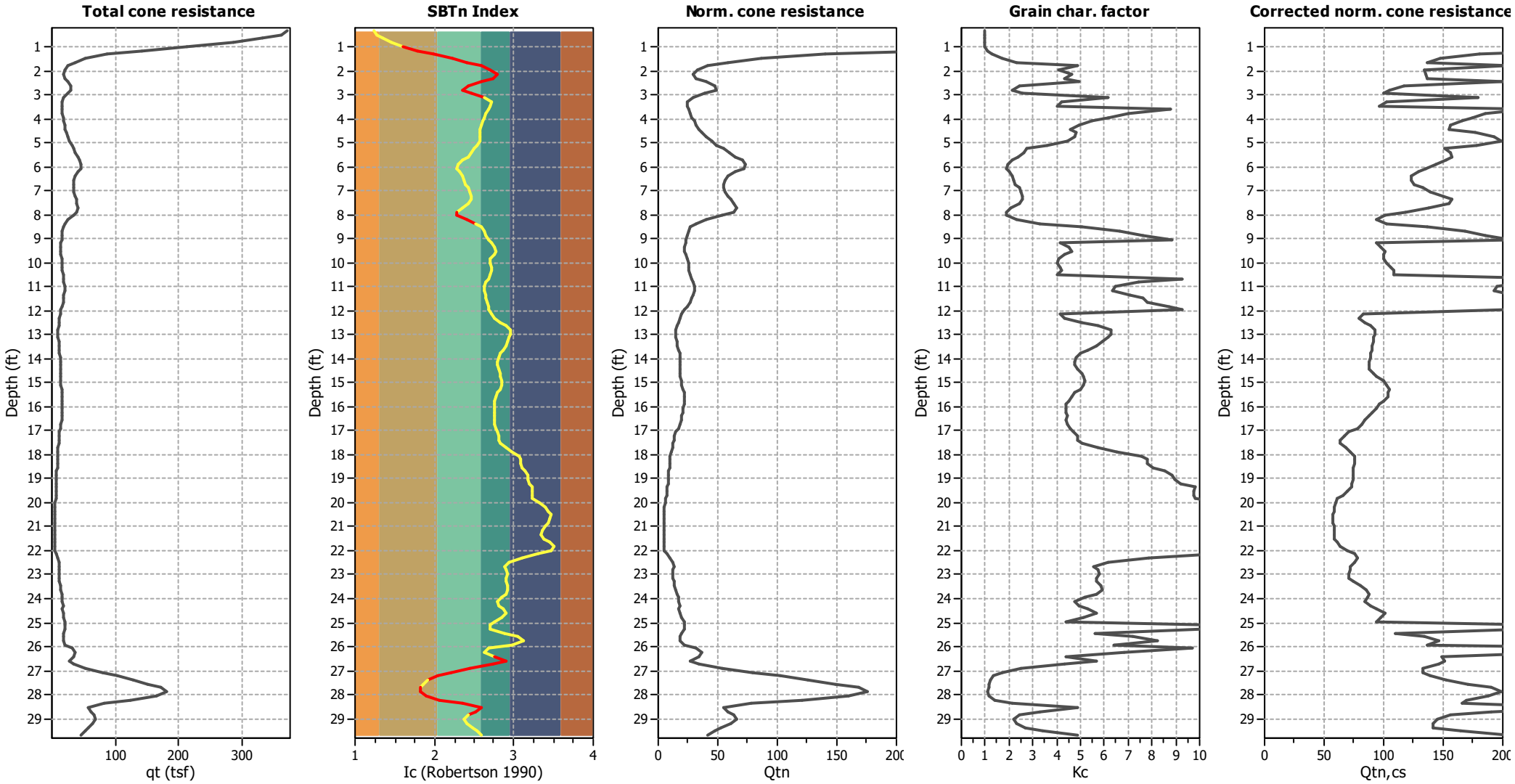
Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	9.00 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.12	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	1.13	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

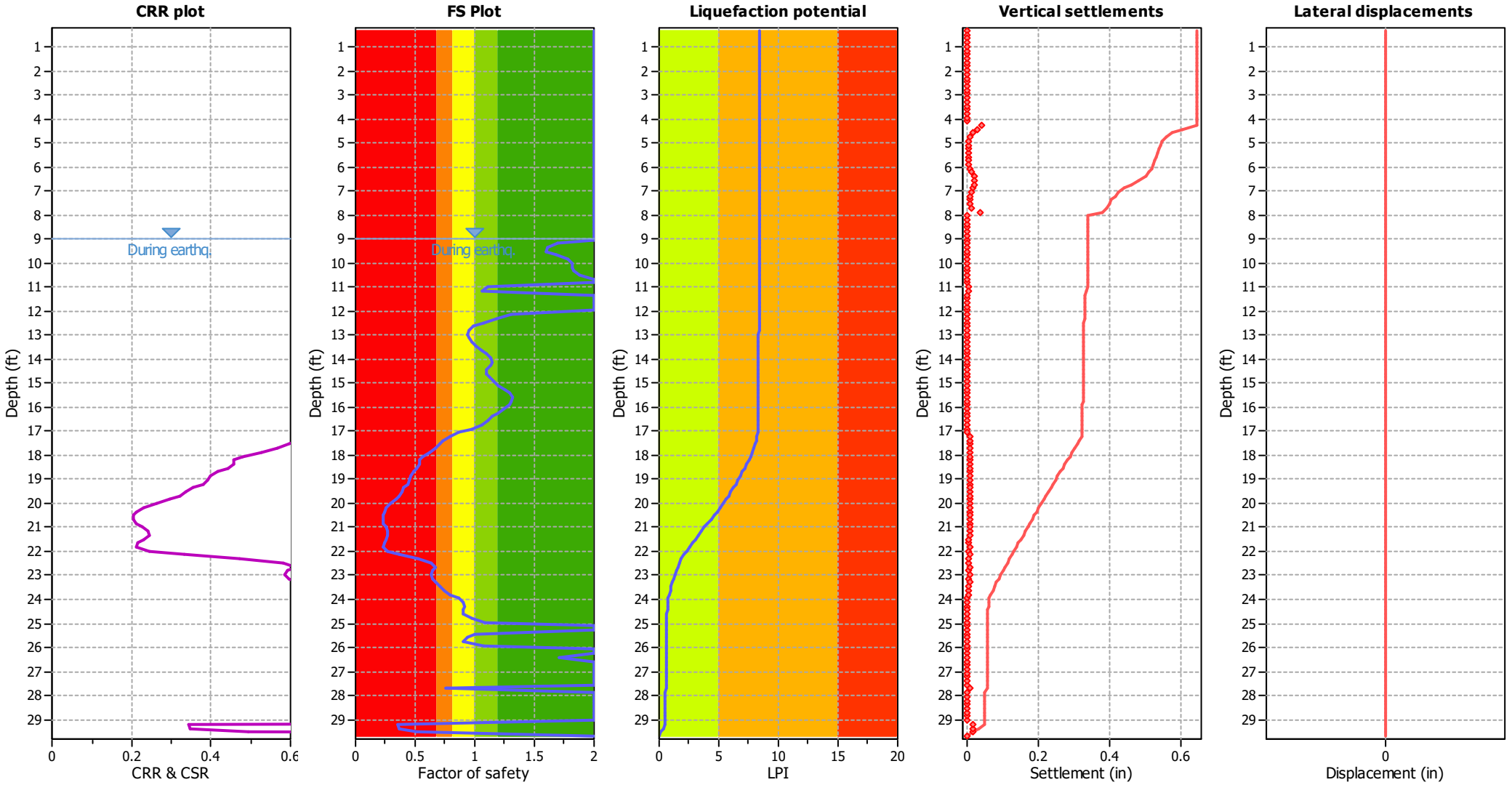
Liquefaction analysis overall plots (intermediate results)



Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	9.00 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.12	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	1.13	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:	Robertson (2009)	Depth to water table (erthq.):	9.00 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.12	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	1.13	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	9.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

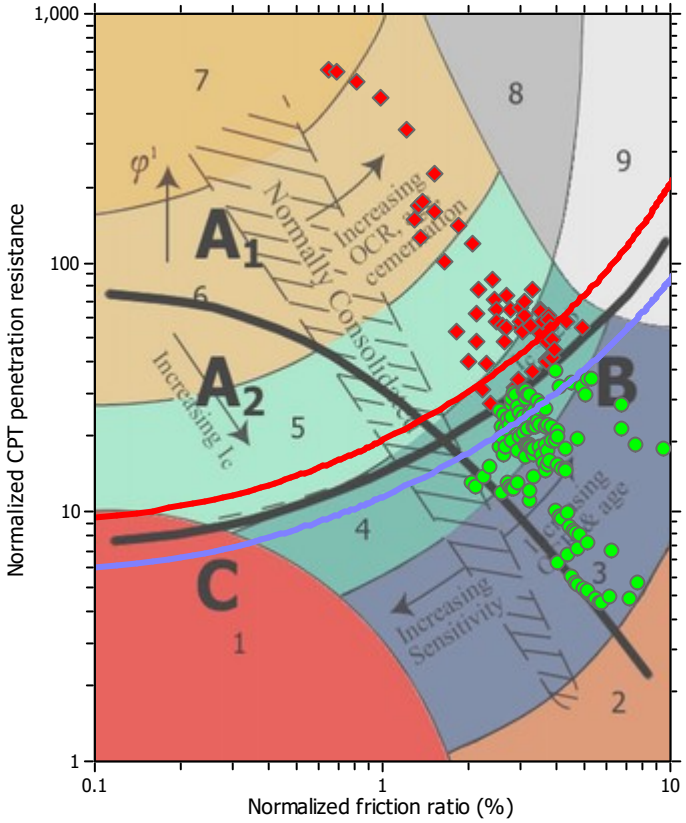
F.S. color scheme

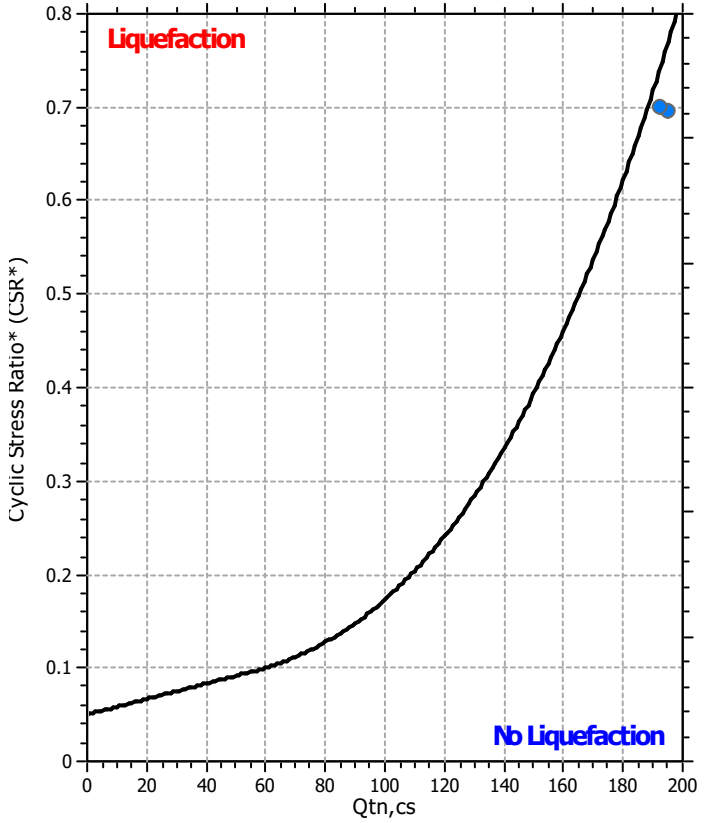
- Almost certain it will liquefy
- Very likely to liquefy
- Liquefaction and no liq. are equally likely
- Unlike to liquefy
- Almost certain it will not liquefy

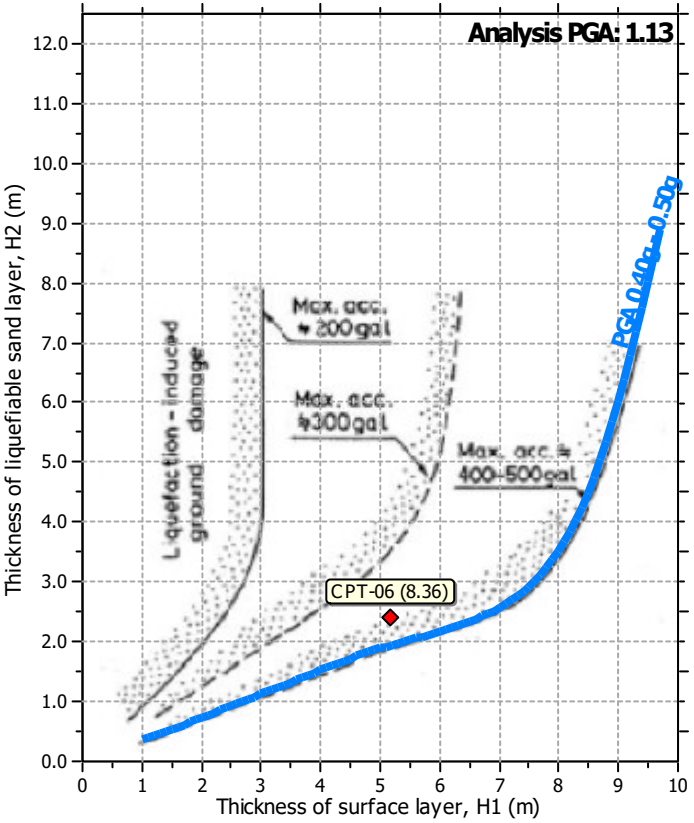
LPI color scheme

- Very high risk
- High risk
- Low risk

Liquefaction analysis summary plots



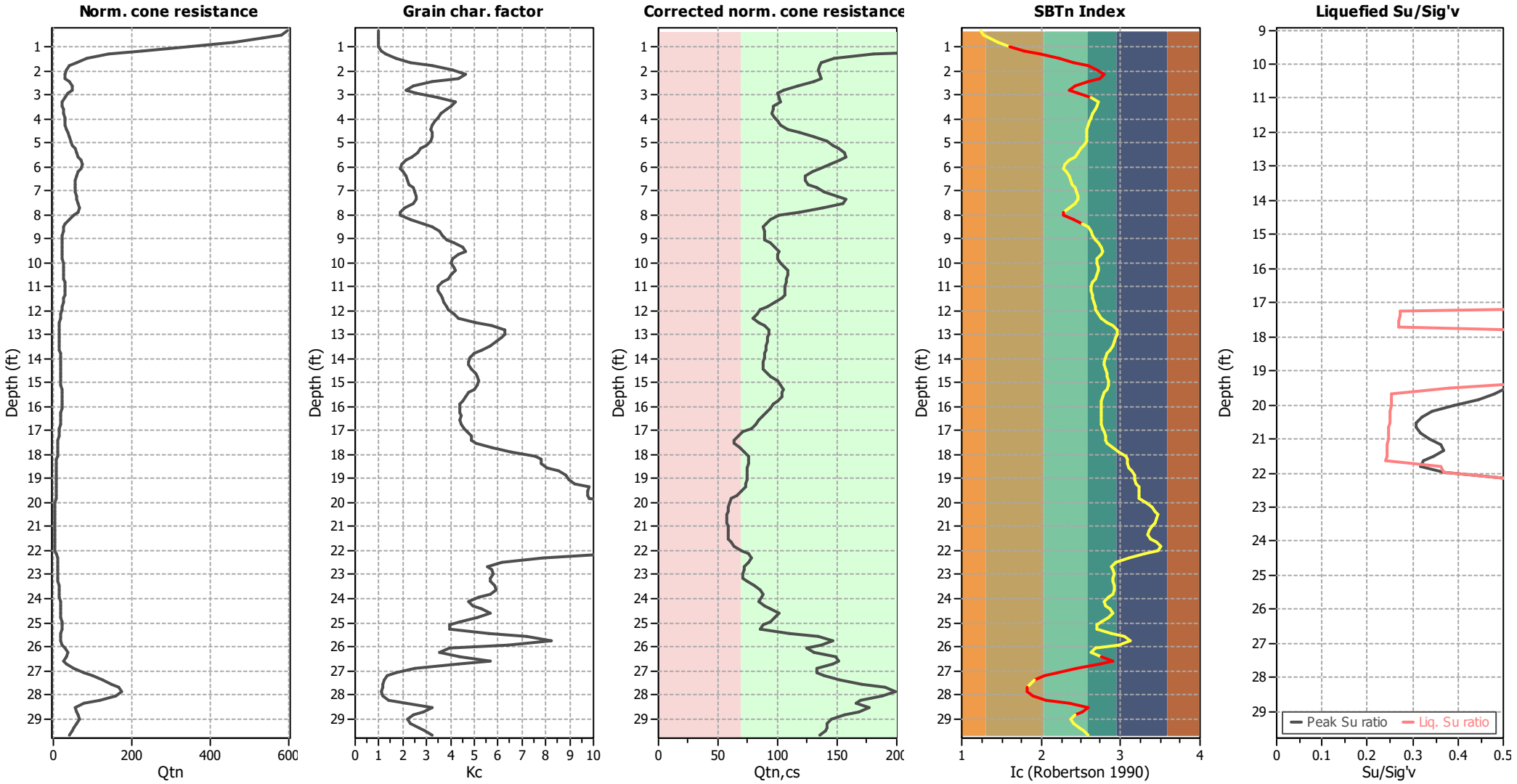




Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	9.00 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.12	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	1.13	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	9.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

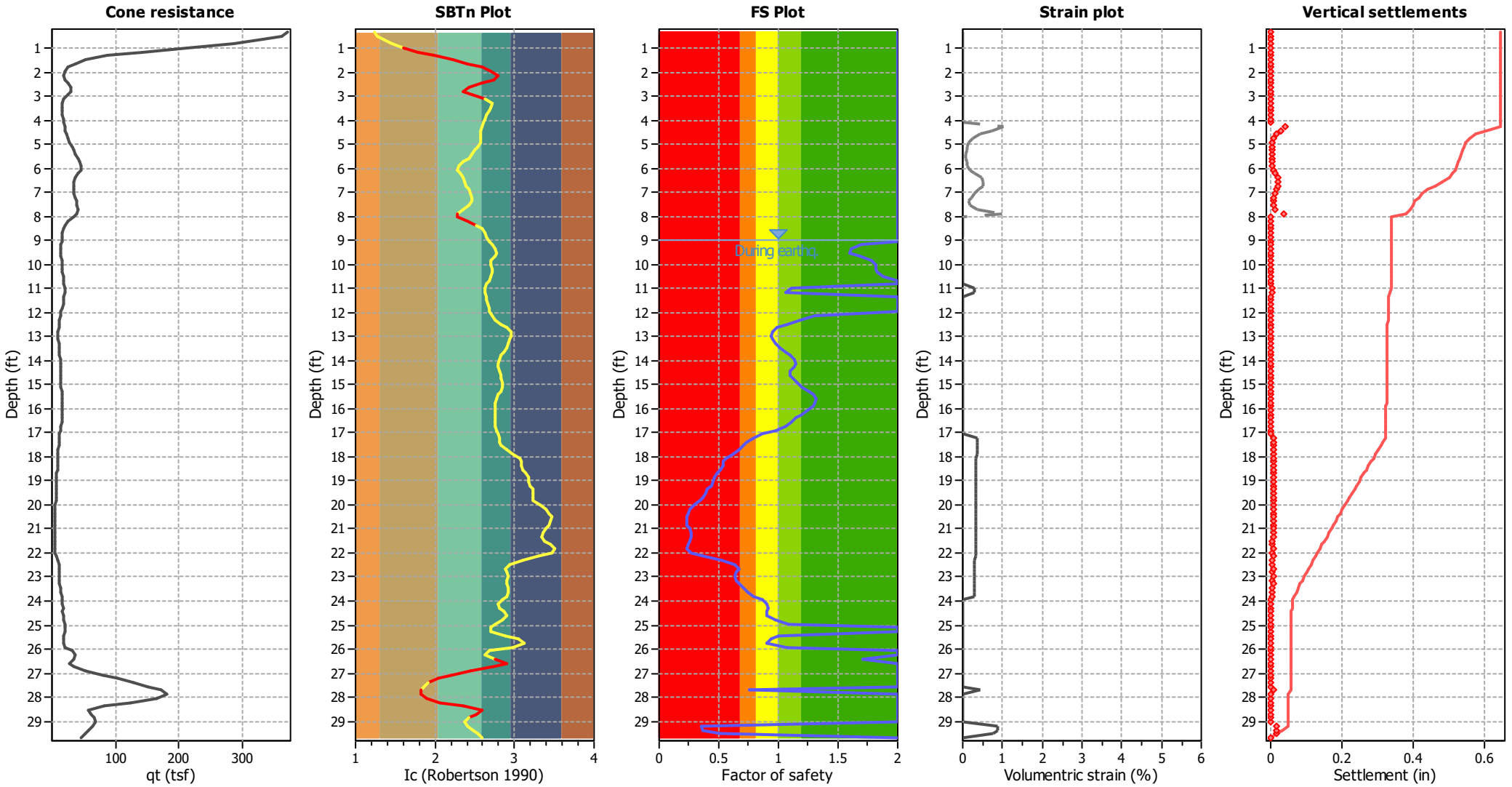
Check for strength loss plots (Robertson (2010))



Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	9.00 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.12	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	1.13	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	9.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

Estimation of post-earthquake settlements



Abbreviations

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

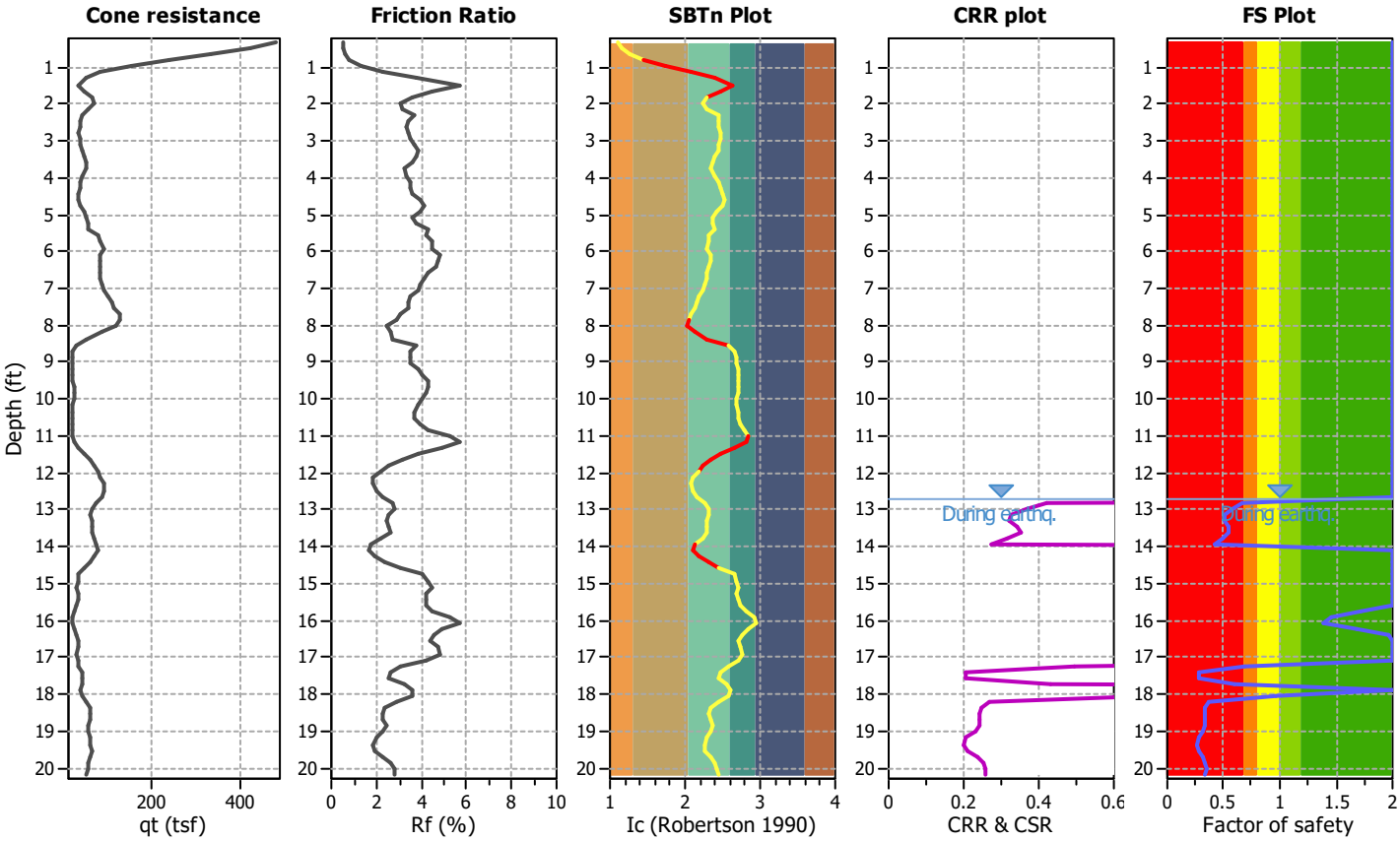
LIQUEFACTION ANALYSIS REPORT

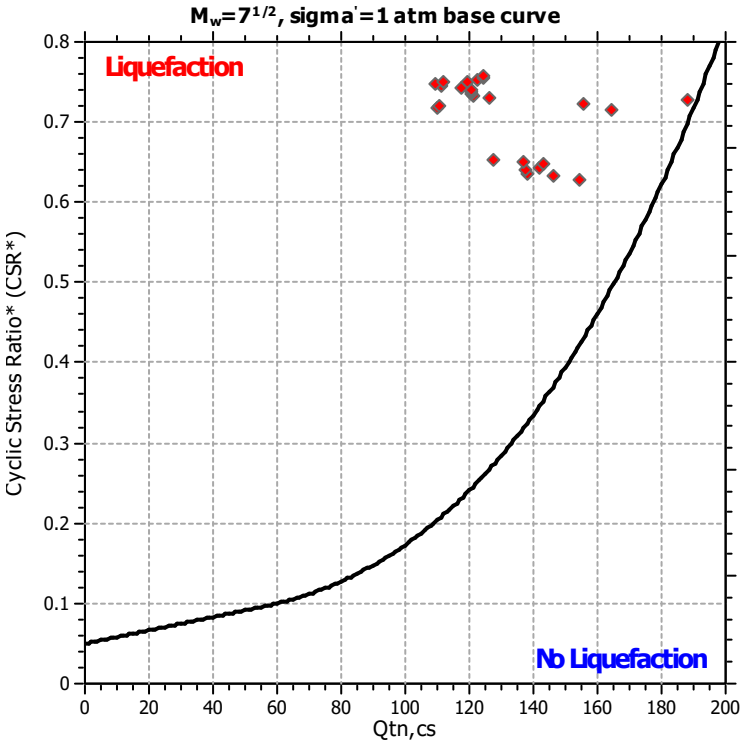
Project title : Crockers Lockers **Location : Watsonville**

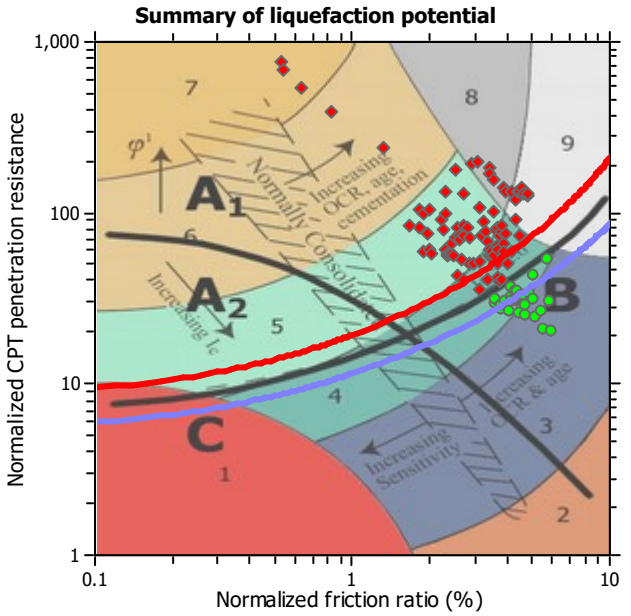
CPT file : CPT-07

Input parameters and analysis data

Analysis method:	Robertson (2009)	G.W.T. (in-situ):	12.70 ft	Use fill:	No	Clay like behavior applied:	All soils
Fines correction method:	Robertson (2009)	G.W.T. (earthq.):	12.70 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:	7.12	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method based
Peak ground acceleration:	1.13	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

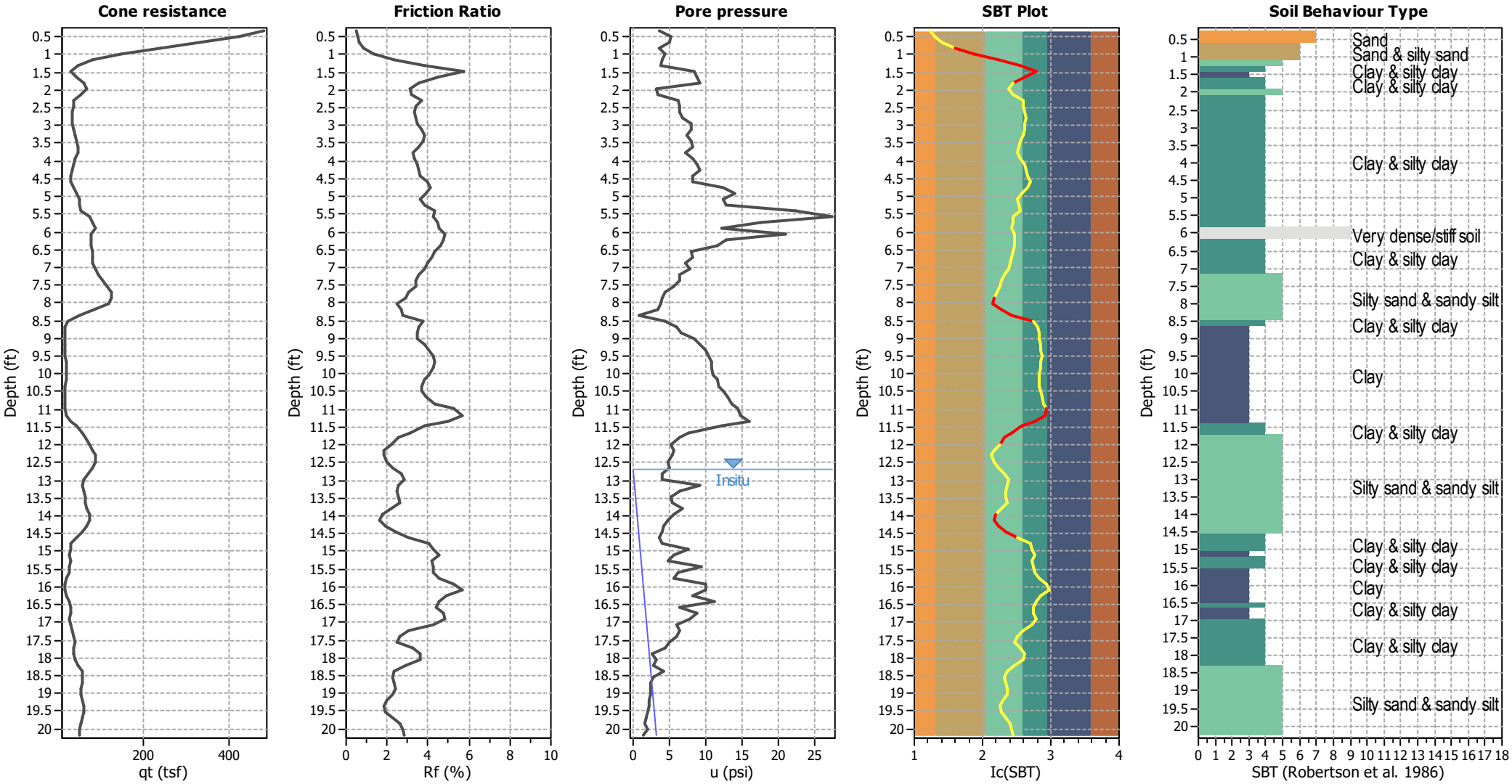






Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and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

CPT basic interpretation plots



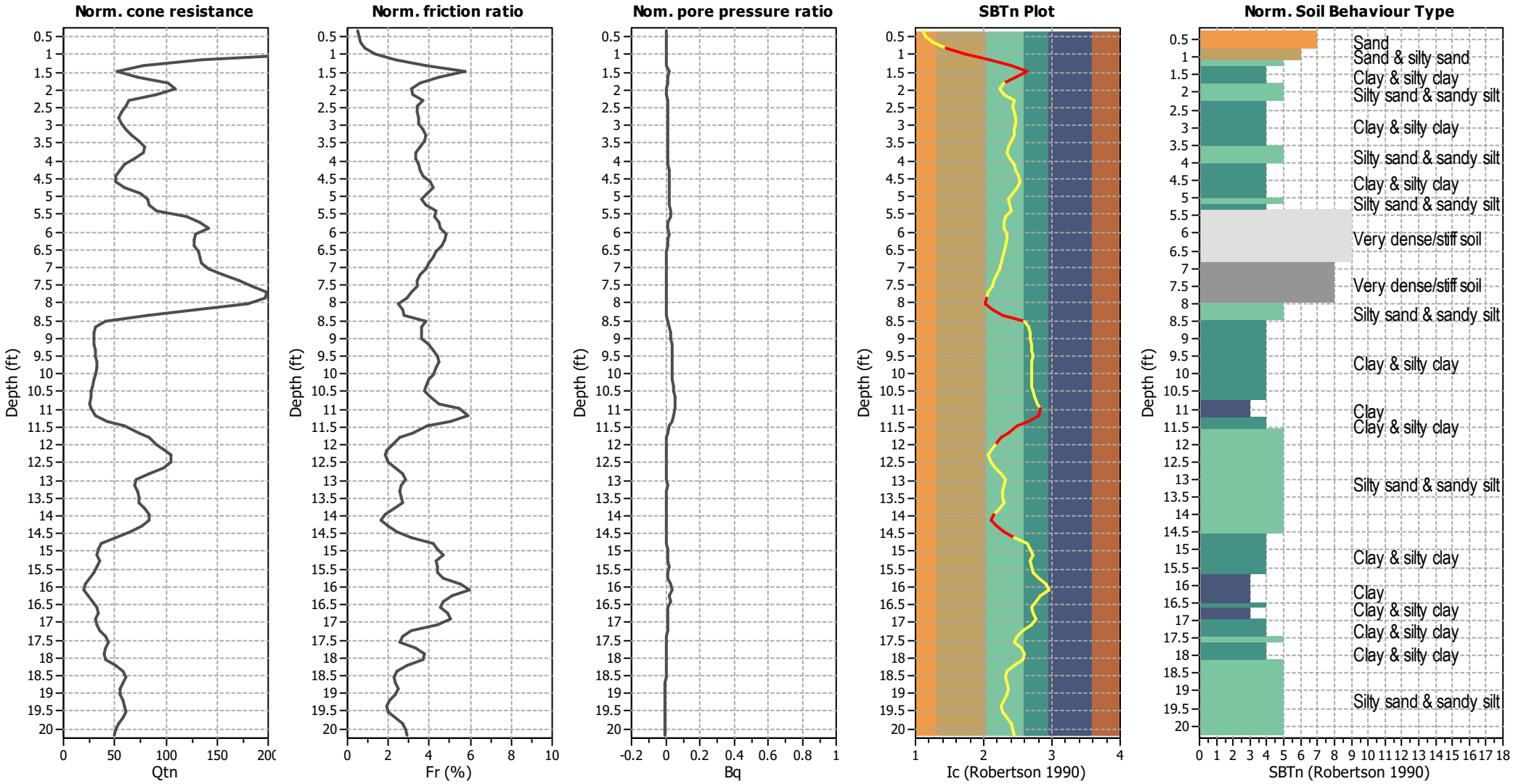
Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	12.70 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.12	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	1.13	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	12.70 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:	Robertson (2009)	Depth to water table (erthq.):	12.70 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.12	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	1.13	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	12.70 ft	Fill height:	N/A	Limit depth:	60.00 ft

SBTn legend

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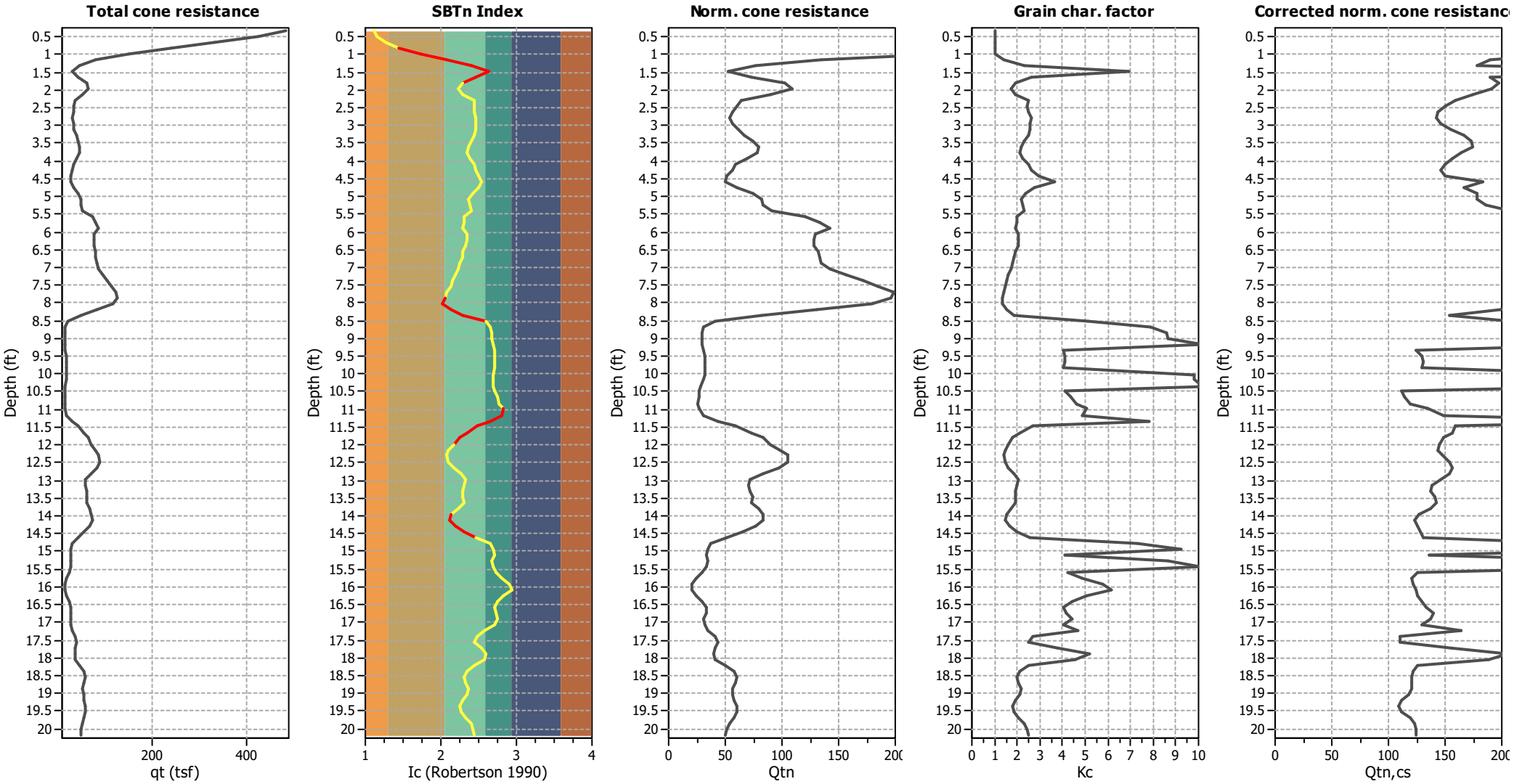
5. Silty sand to sandy silt
6. Clean sand to silty sand
7. Gravely sand to sand
8. Very stiff sand to
9. Very stiff fine grained

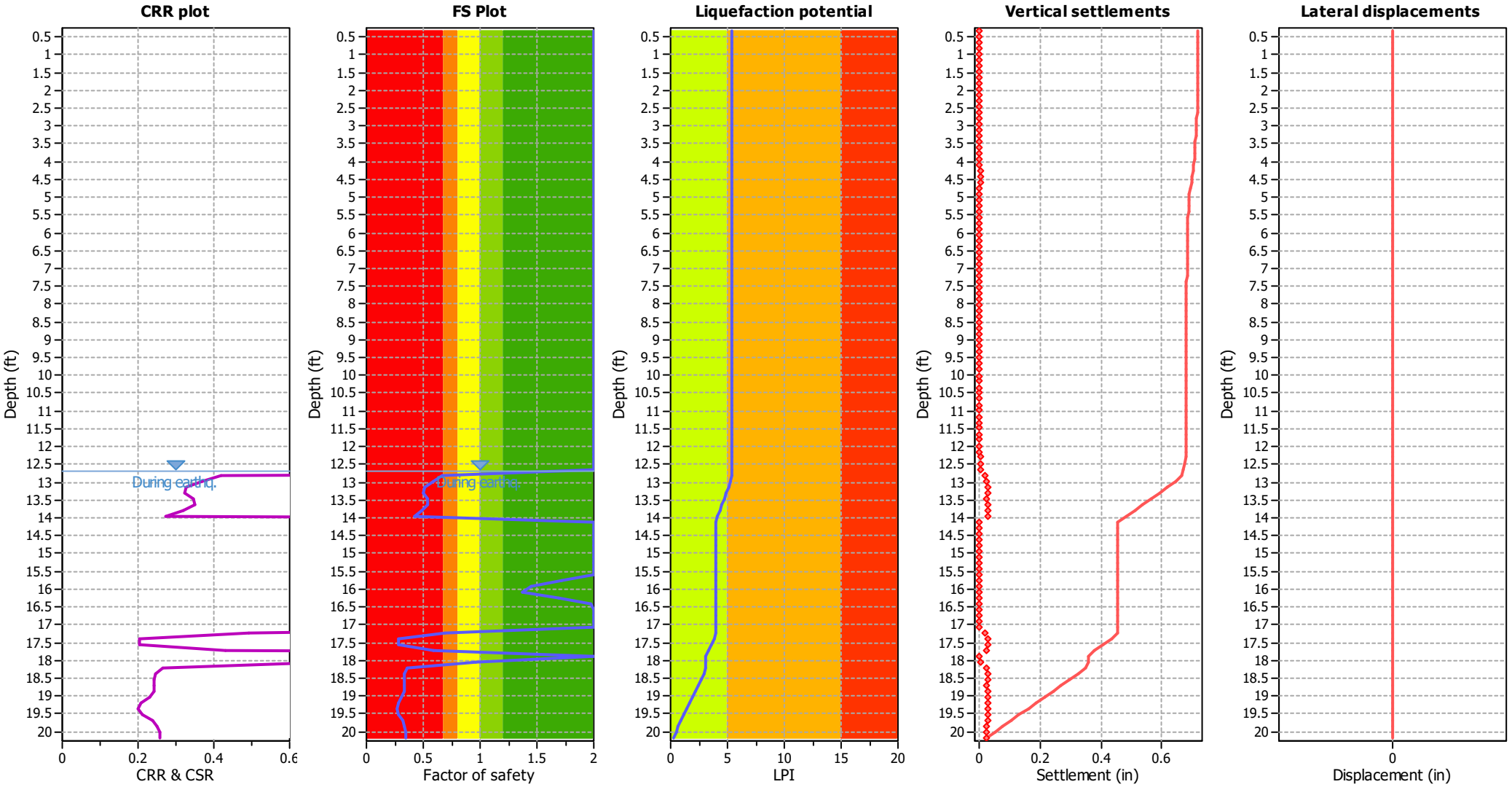
Liquefaction analysis overall plots (intermediate results)



Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	12.70 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.12	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	1.13	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	12.70 ft	Fill height:	N/A	Limit depth:	60.00 ft

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	12.70 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.12	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	1.13	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	12.70 ft	Fill height:	N/A	Limit depth:	60.00 ft

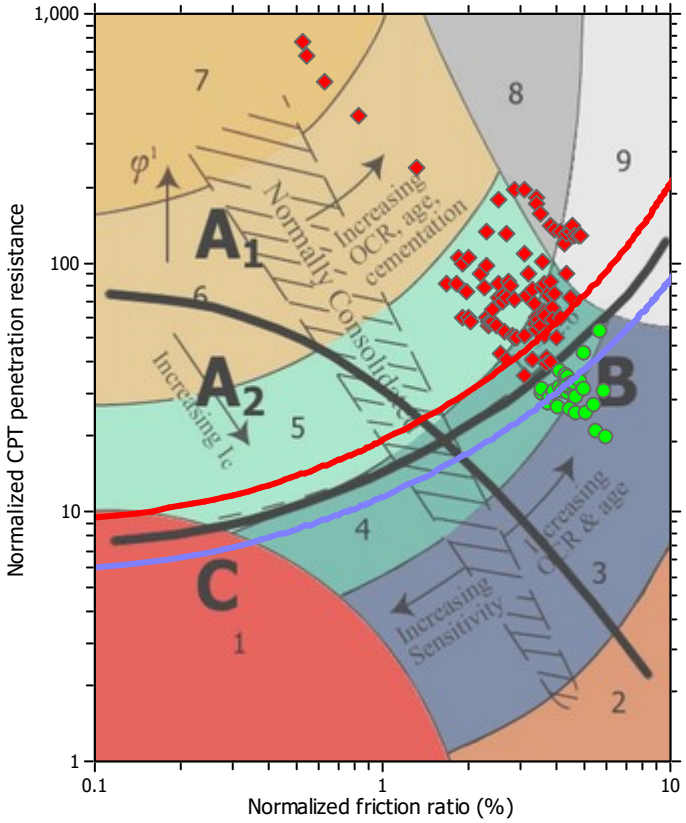
F.S. color scheme

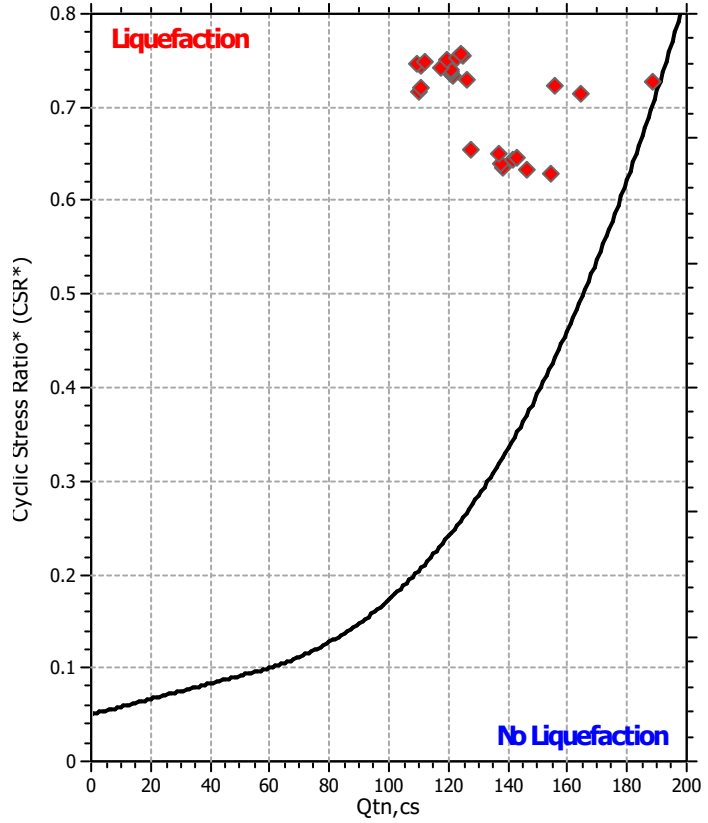
- Almost certain it will liquefy
- Very likely to liquefy
- Liquefaction and no liq. are equally likely
- Unlike to liquefy
- Almost certain it will not liquefy

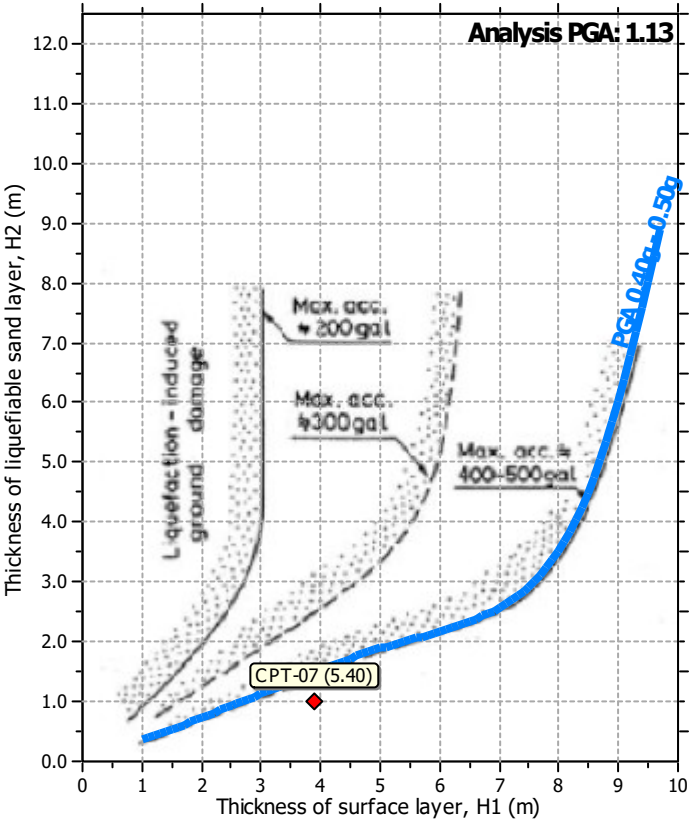
LPI color scheme

- Very high risk
- High risk
- Low risk

Liquefaction analysis summary plots



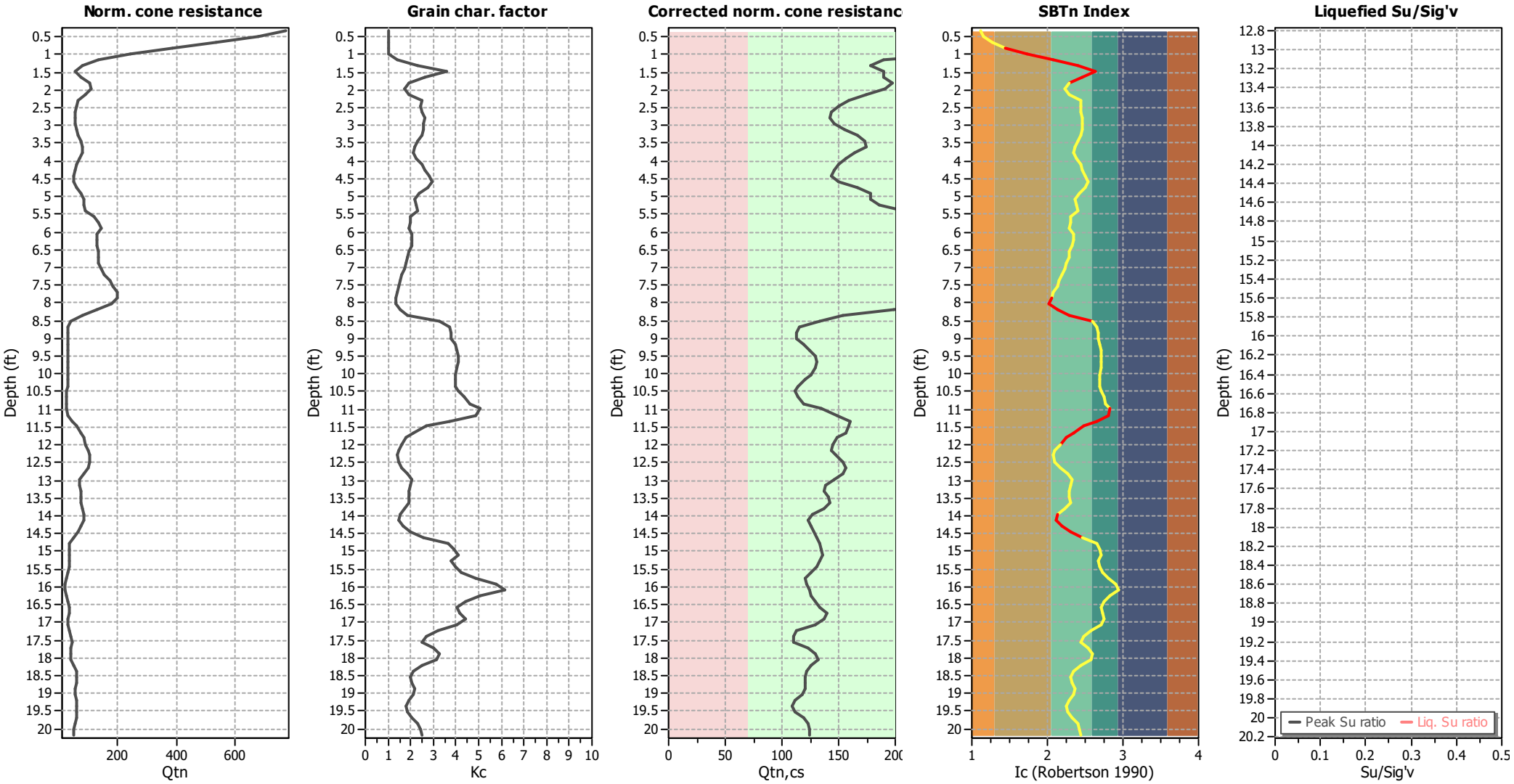




Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	12.70 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.12	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	1.13	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	12.70 ft	Fill height:	N/A	Limit depth:	60.00 ft

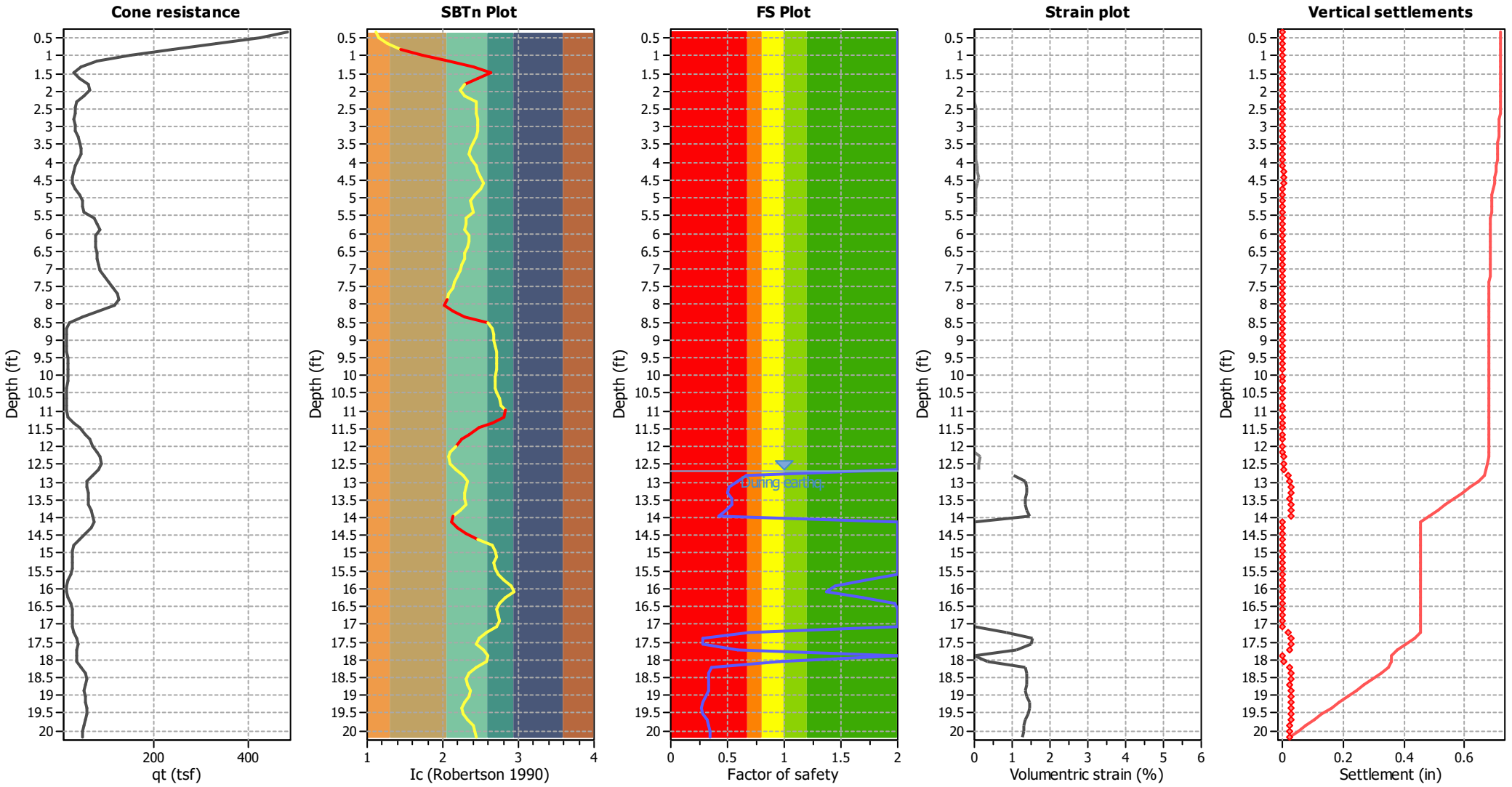
Check for strength loss plots (Robertson (2010))



Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	12.70 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.12	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	1.13	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	12.70 ft	Fill height:	N/A	Limit depth:	60.00 ft

Estimation of post-earthquake settlements



Abbreviations

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

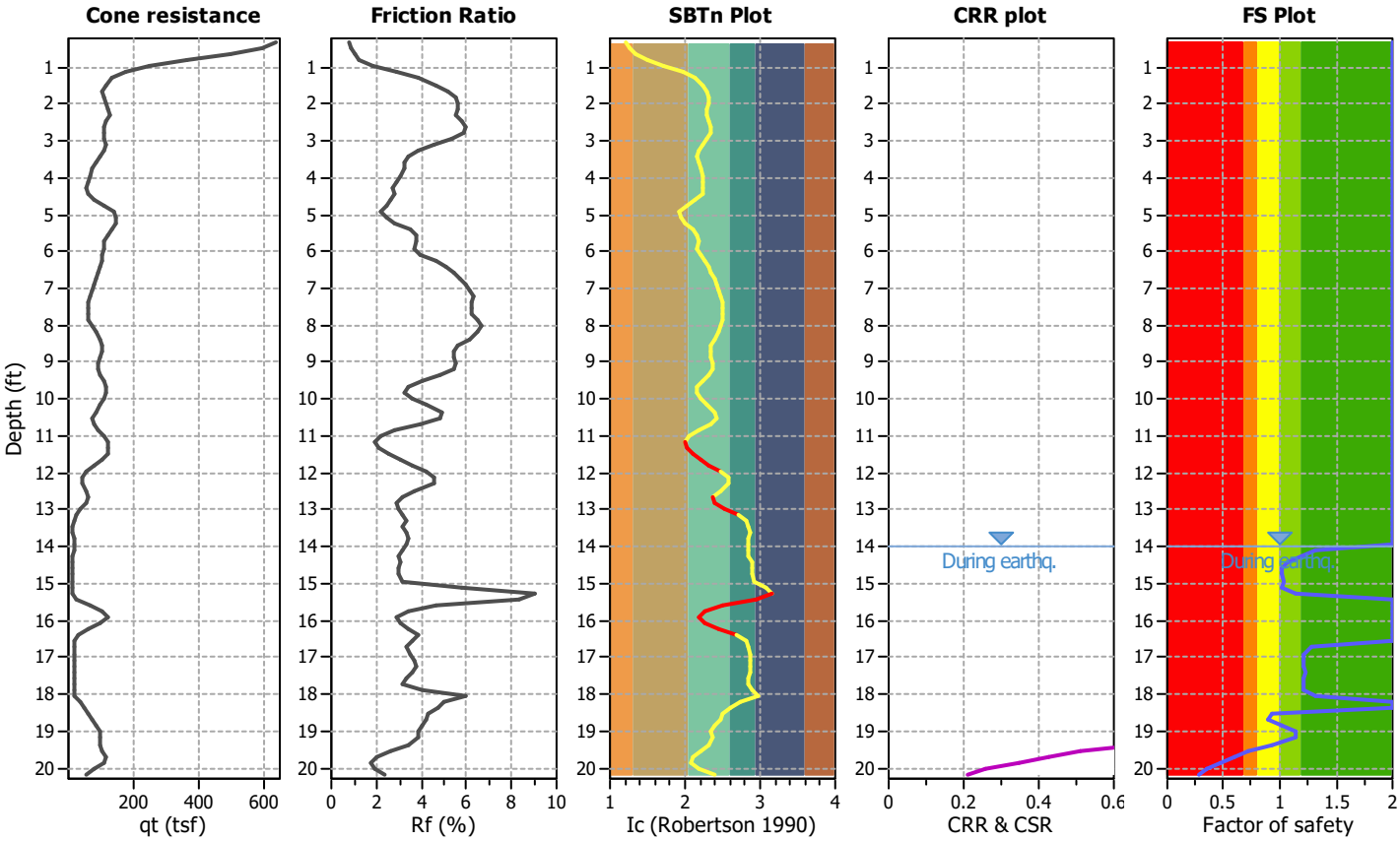
LIQUEFACTION ANALYSIS REPORT

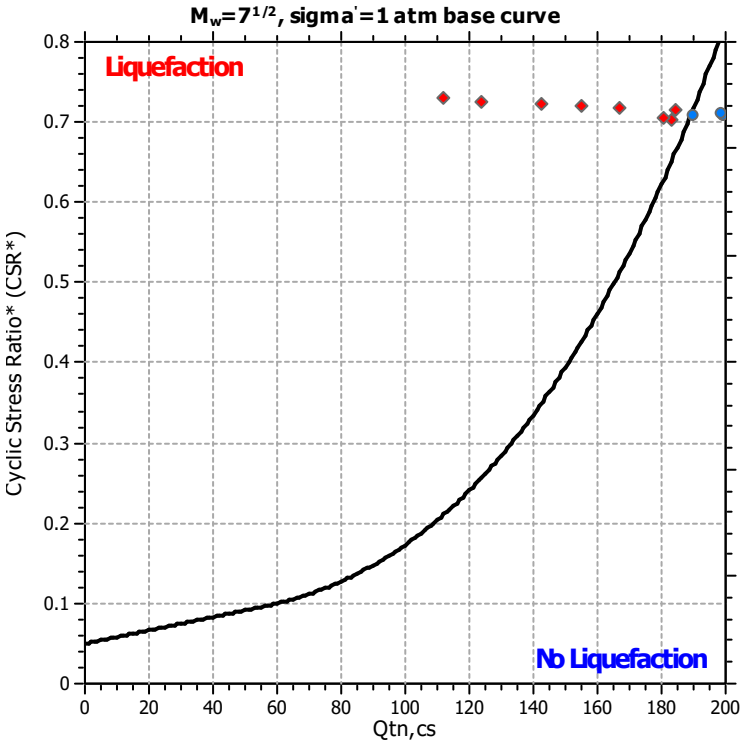
Project title : Crockers Lockers **Location : Watsonville**

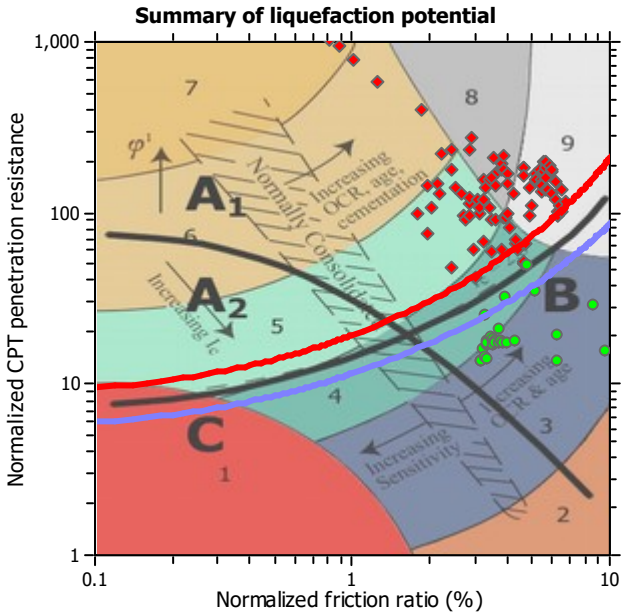
CPT file : CPT-08

Input parameters and analysis data

Analysis method:	Robertson (2009)	G.W.T. (in-situ):	14.00 ft	Use fill:	No	Clay like behavior applied:	All soils
Fines correction method:	Robertson (2009)	G.W.T. (earthq.):	14.00 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:	7.12	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method based
Peak ground acceleration:	1.13	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

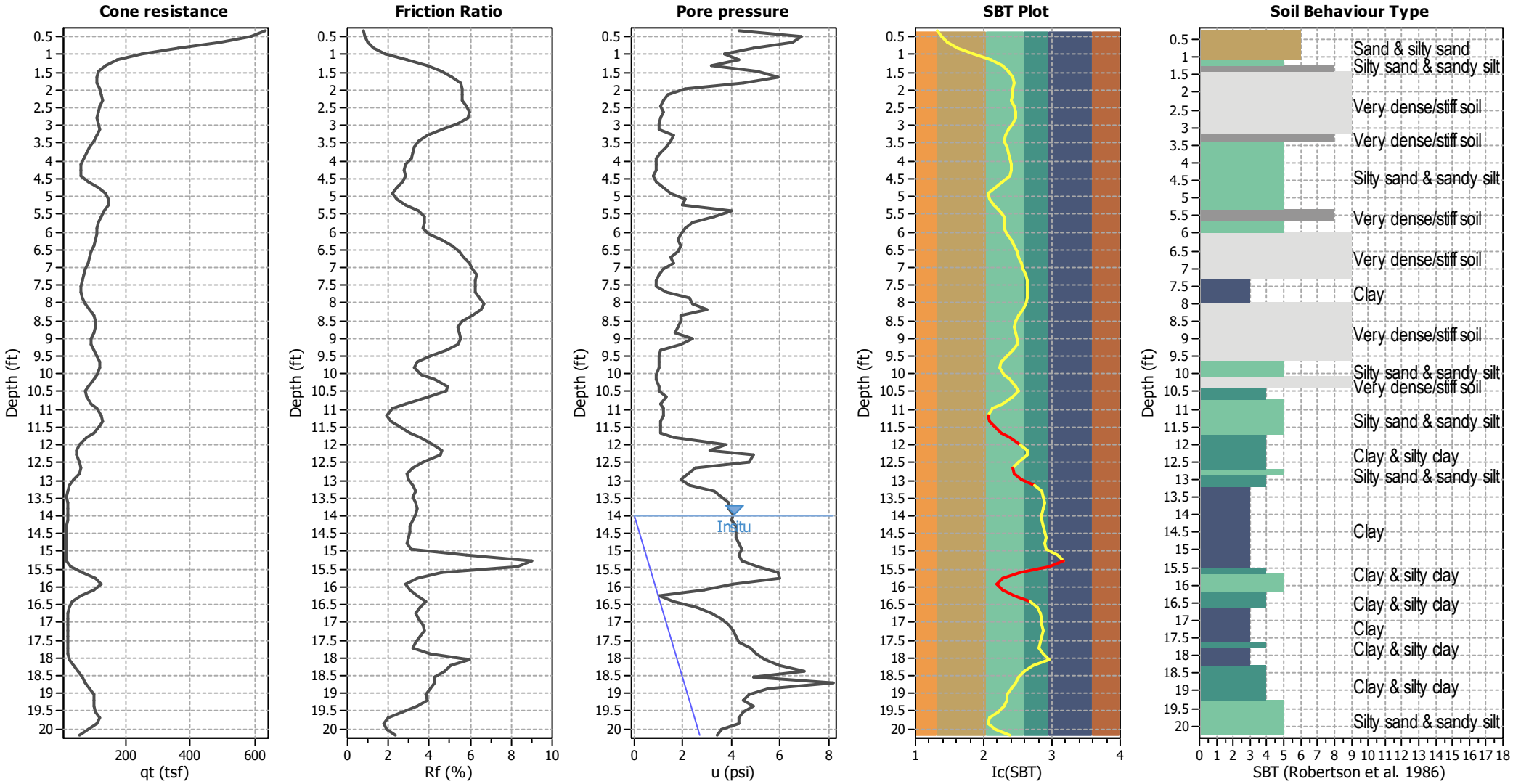






Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and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

CPT basic interpretation plots



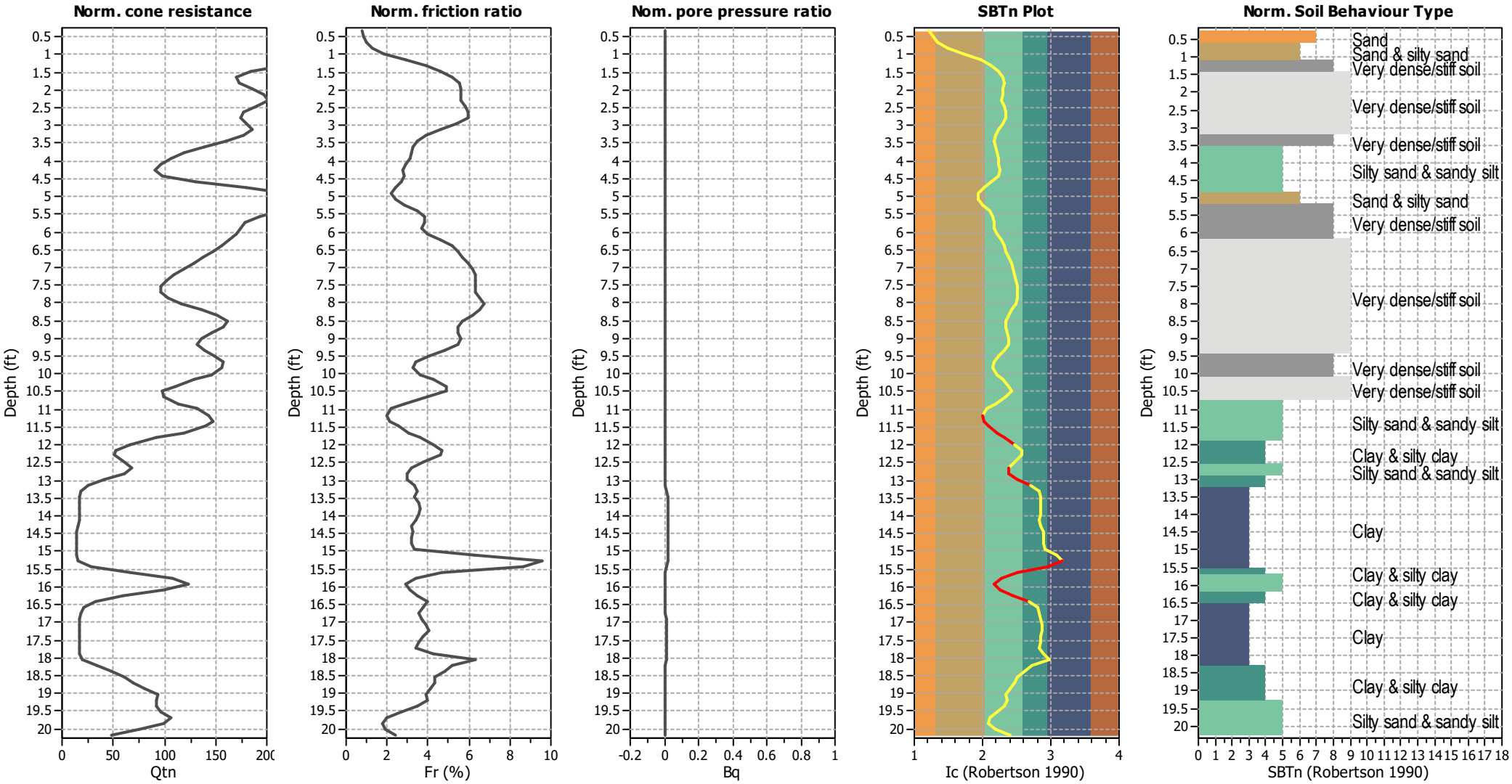
Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	14.00 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.12	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	1.13	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	14.00 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:	Robertson (2009)	Depth to water table (erthq.):	14.00 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.12	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	1.13	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	14.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

SBTn legend

1. Sensitive fine grained
2. Organic material
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4. Clayey silt to silty
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7. Gravely sand to sand
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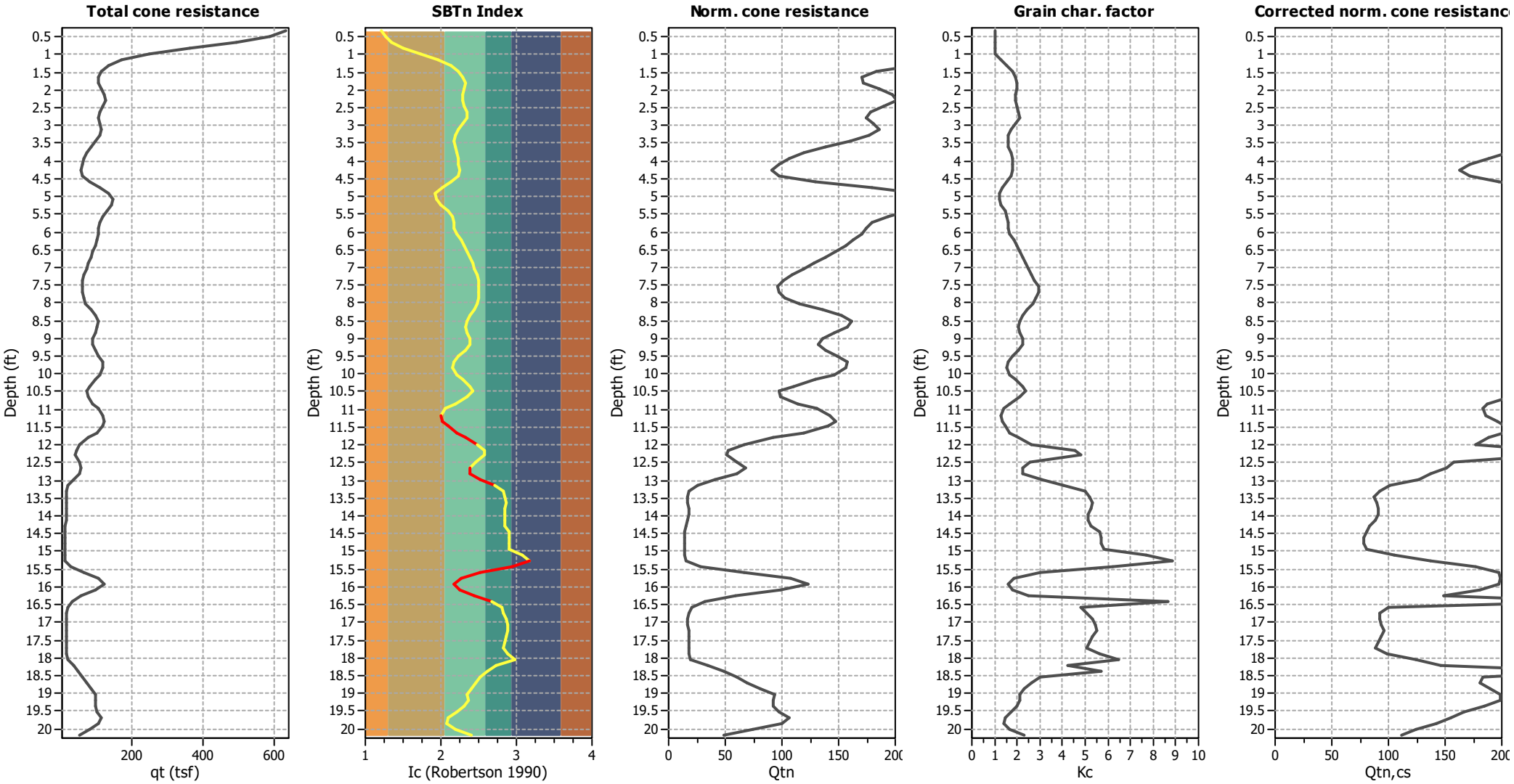
9. Very stiff fine grained

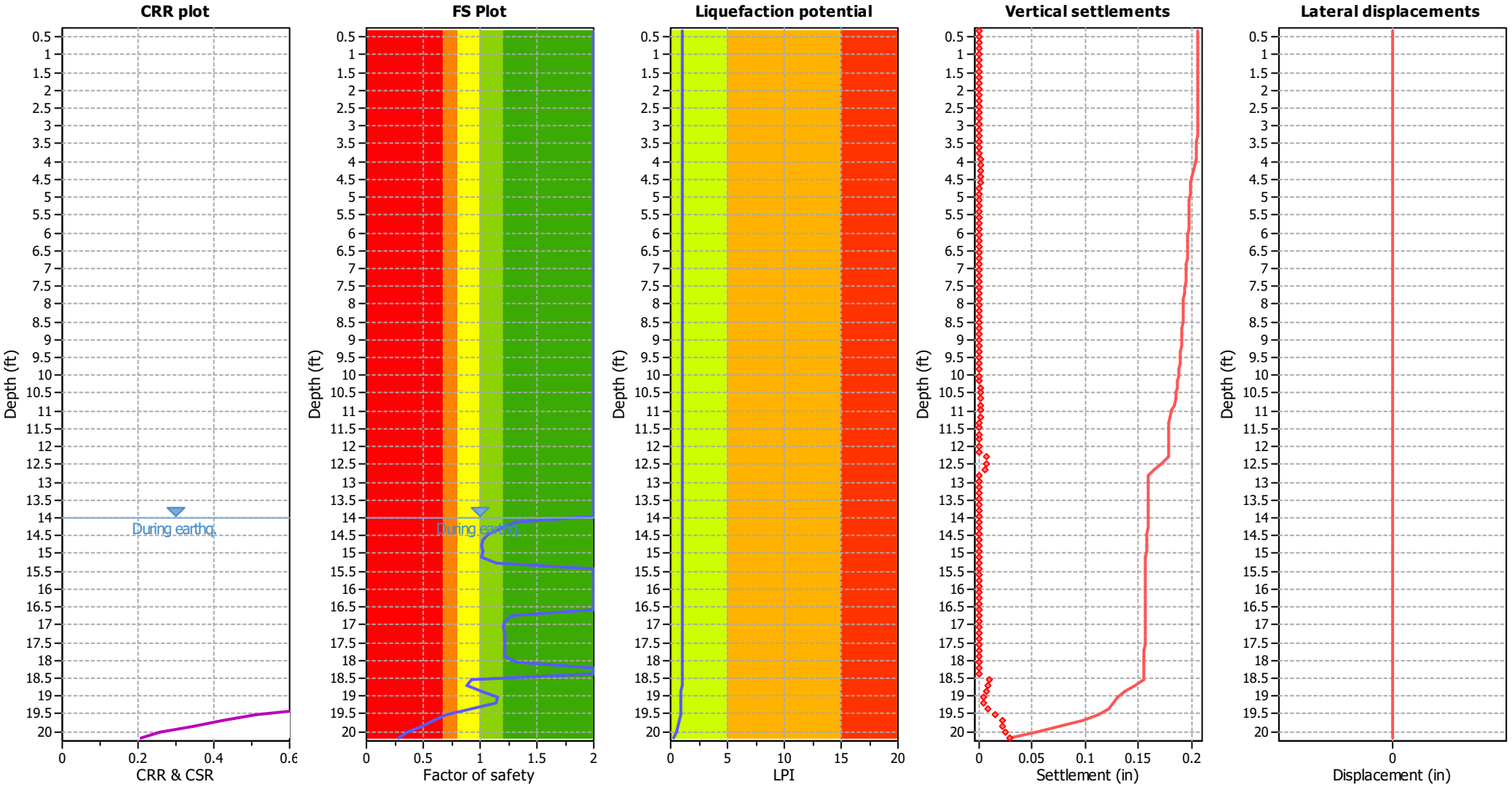
Liquefaction analysis overall plots (intermediate results)



Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	14.00 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.12	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	1.13	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	14.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	14.00 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.12	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	1.13	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	14.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

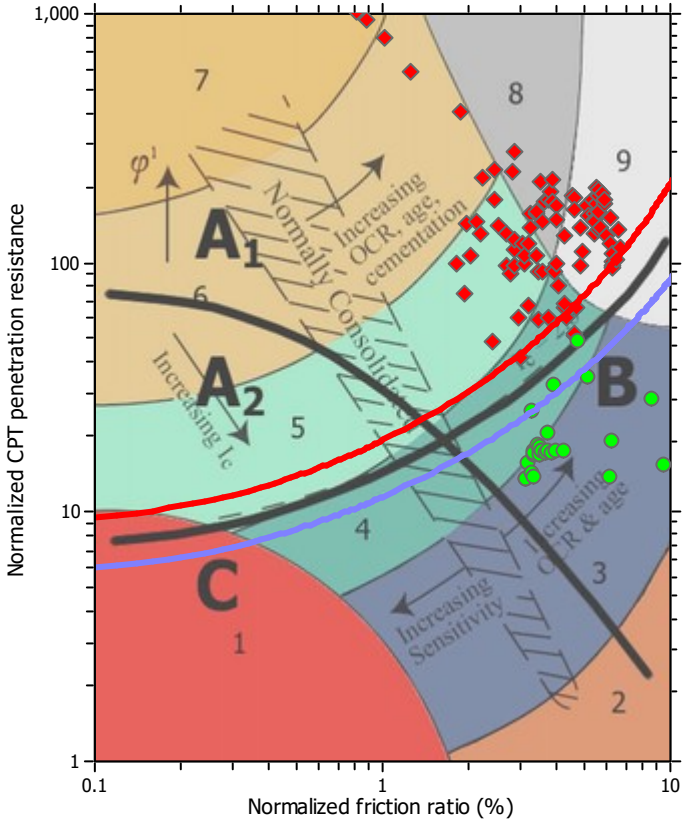
F.S. color scheme

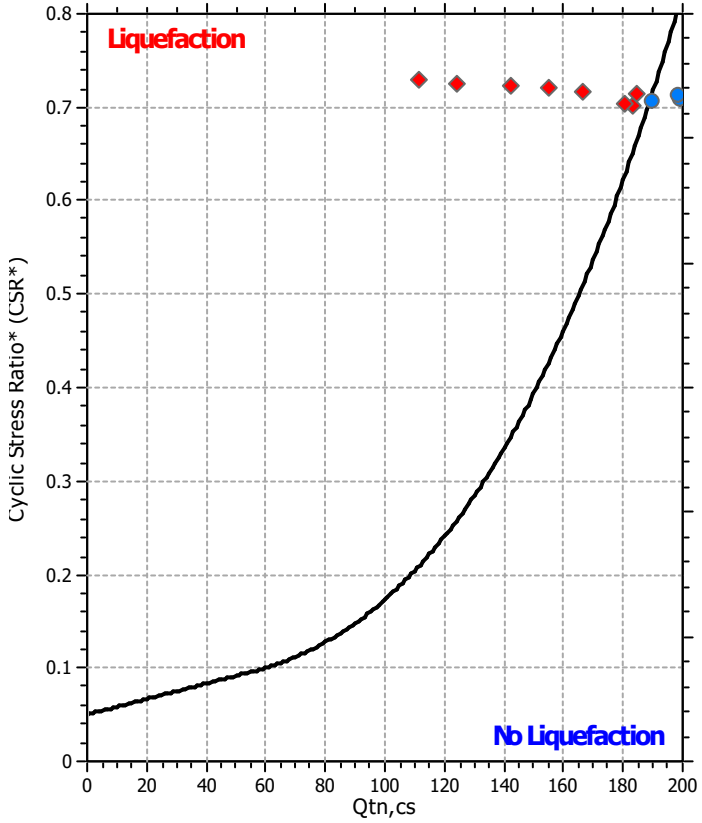
- Almost certain it will liquefy
- Very likely to liquefy
- Liquefaction and no liq. are equally likely
- Unlike to liquefy
- Almost certain it will not liquefy

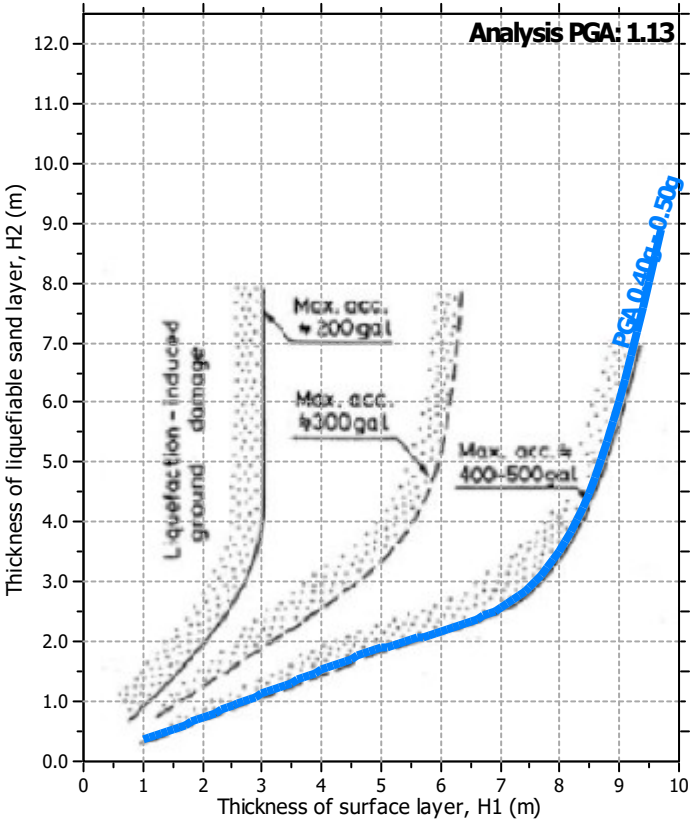
LPI color scheme

- Very high risk
- High risk
- Low risk

Liquefaction analysis summary plots



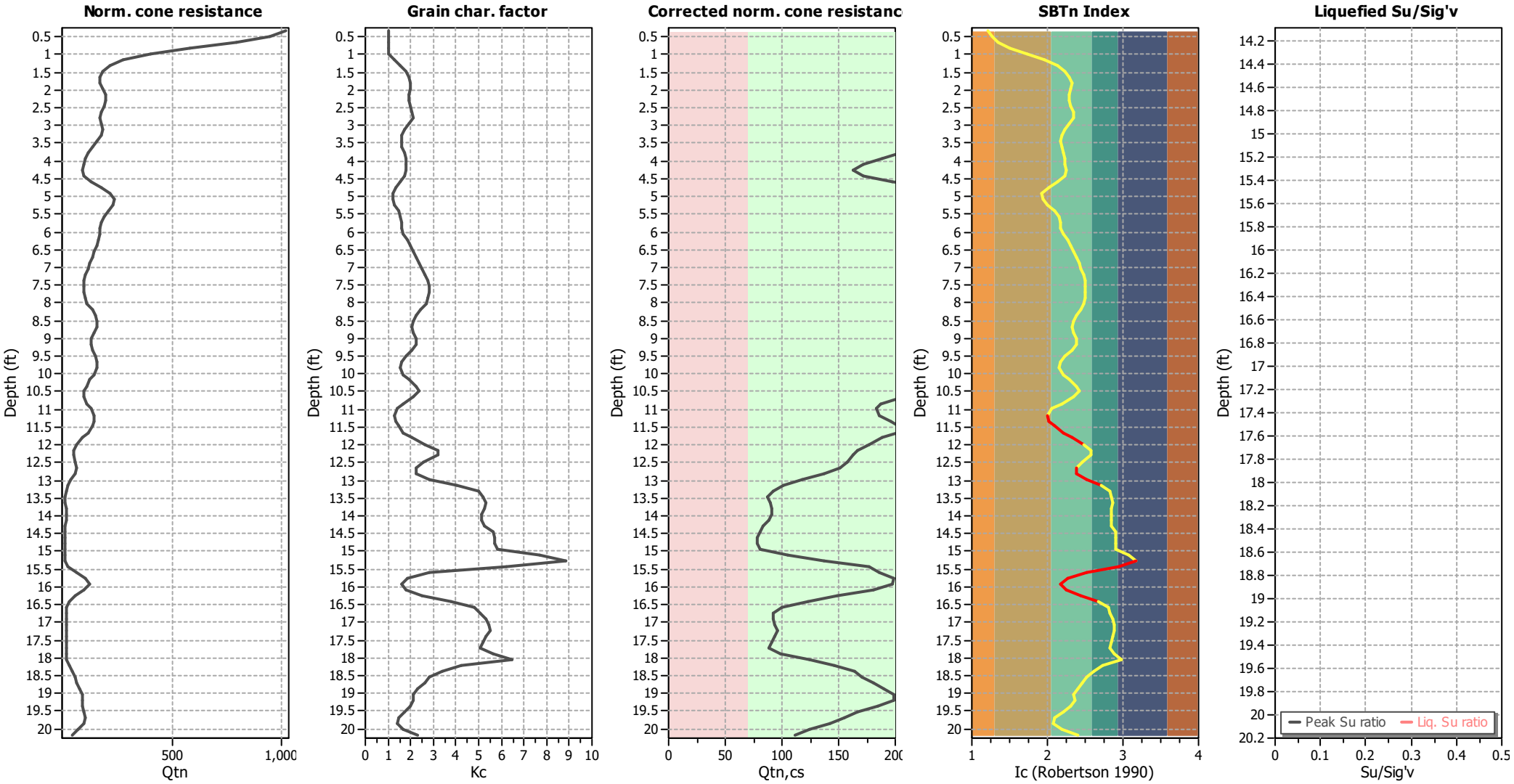




Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	14.00 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.12	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	1.13	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	14.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

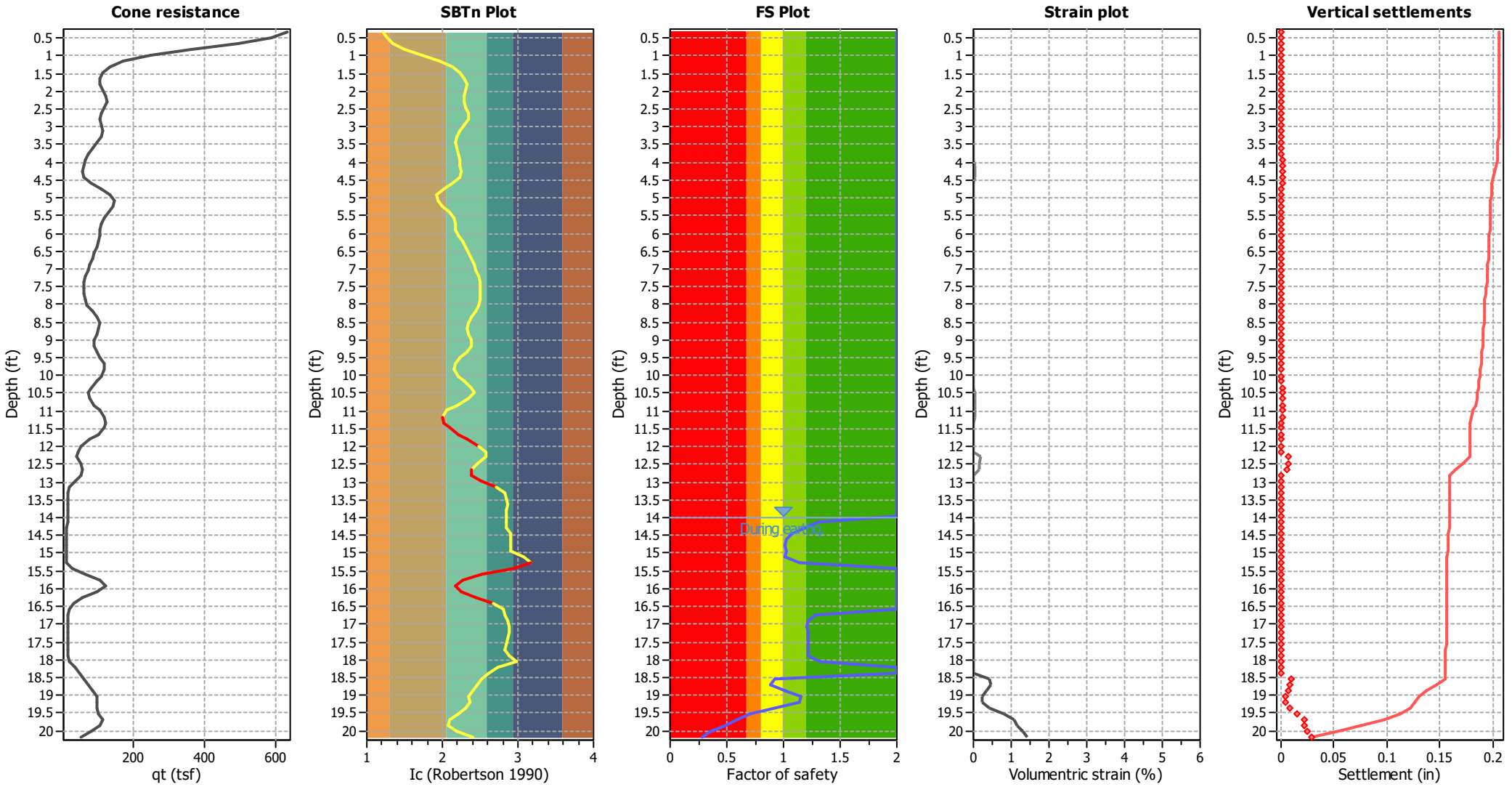
Check for strength loss plots (Robertson (2010))



Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	14.00 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.12	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	1.13	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	14.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

Estimation of post-earthquake settlements



Abbreviations

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

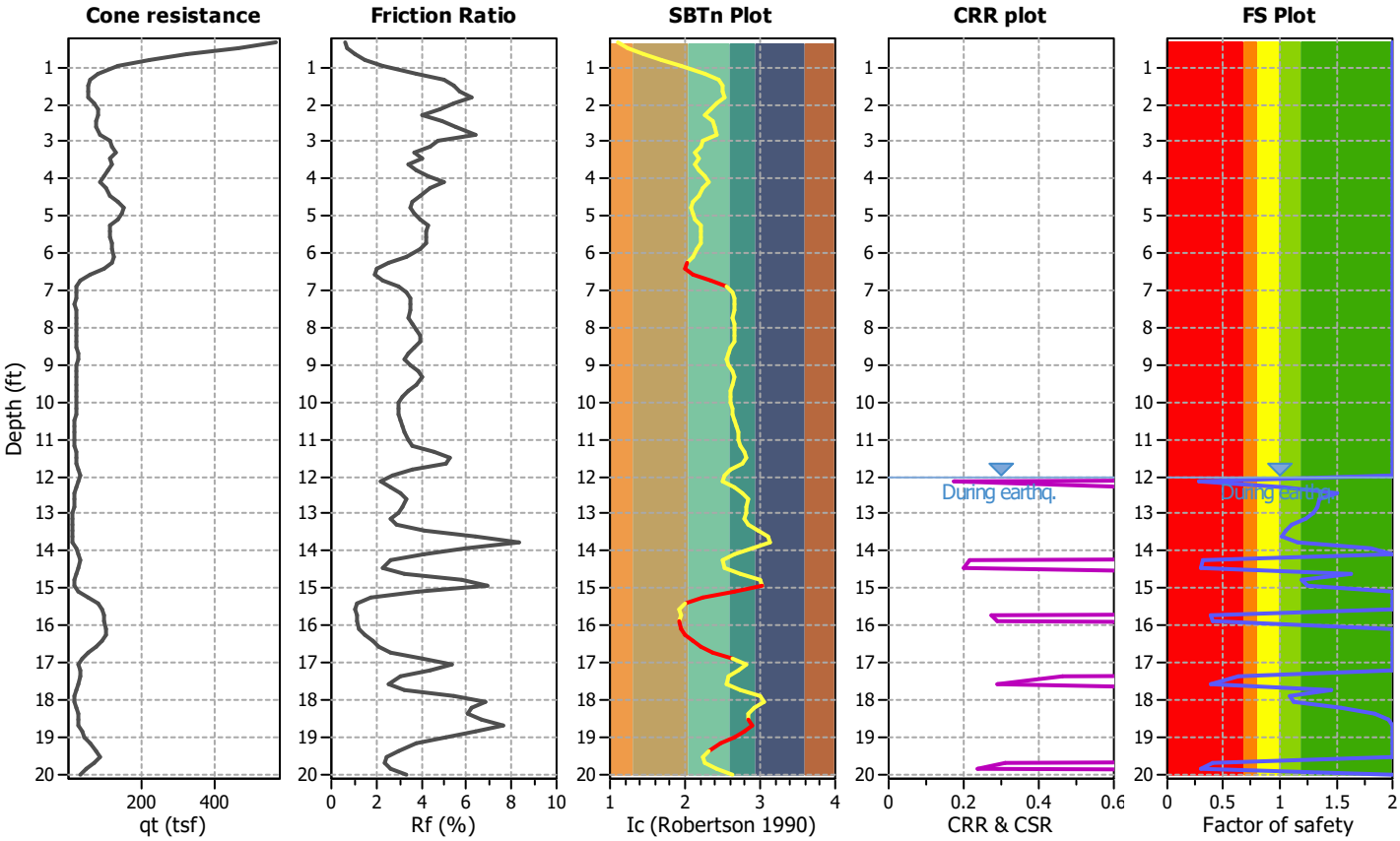
LIQUEFACTION ANALYSIS REPORT

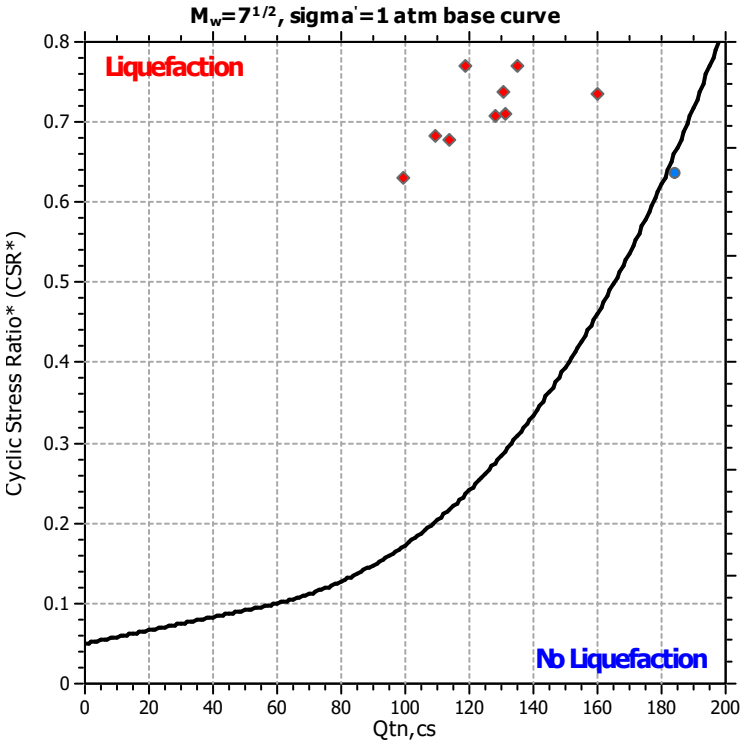
Project title : Crockers Lockers **Location : Watsonville**

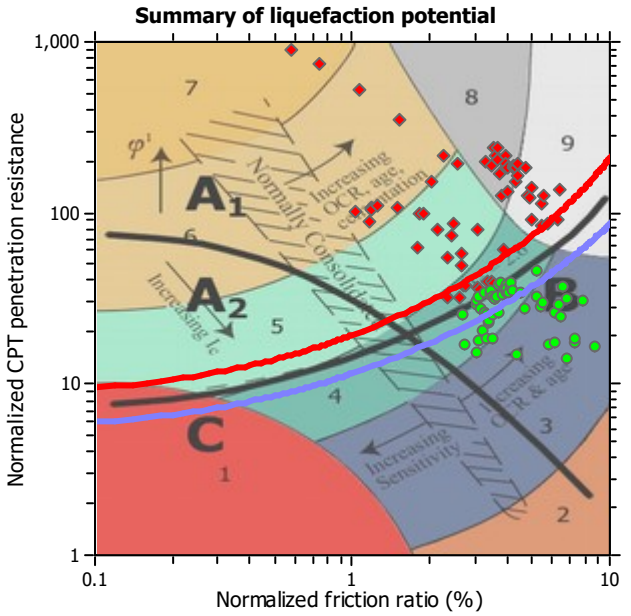
CPT file : CPT-09

Input parameters and analysis data

Analysis method:	Robertson (2009)	G.W.T. (in-situ):	12.00 ft	Use fill:	No	Clay like behavior applied:	All soils
Fines correction method:	Robertson (2009)	G.W.T. (earthq.):	12.00 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:	7.12	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method based
Peak ground acceleration:	1.13	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
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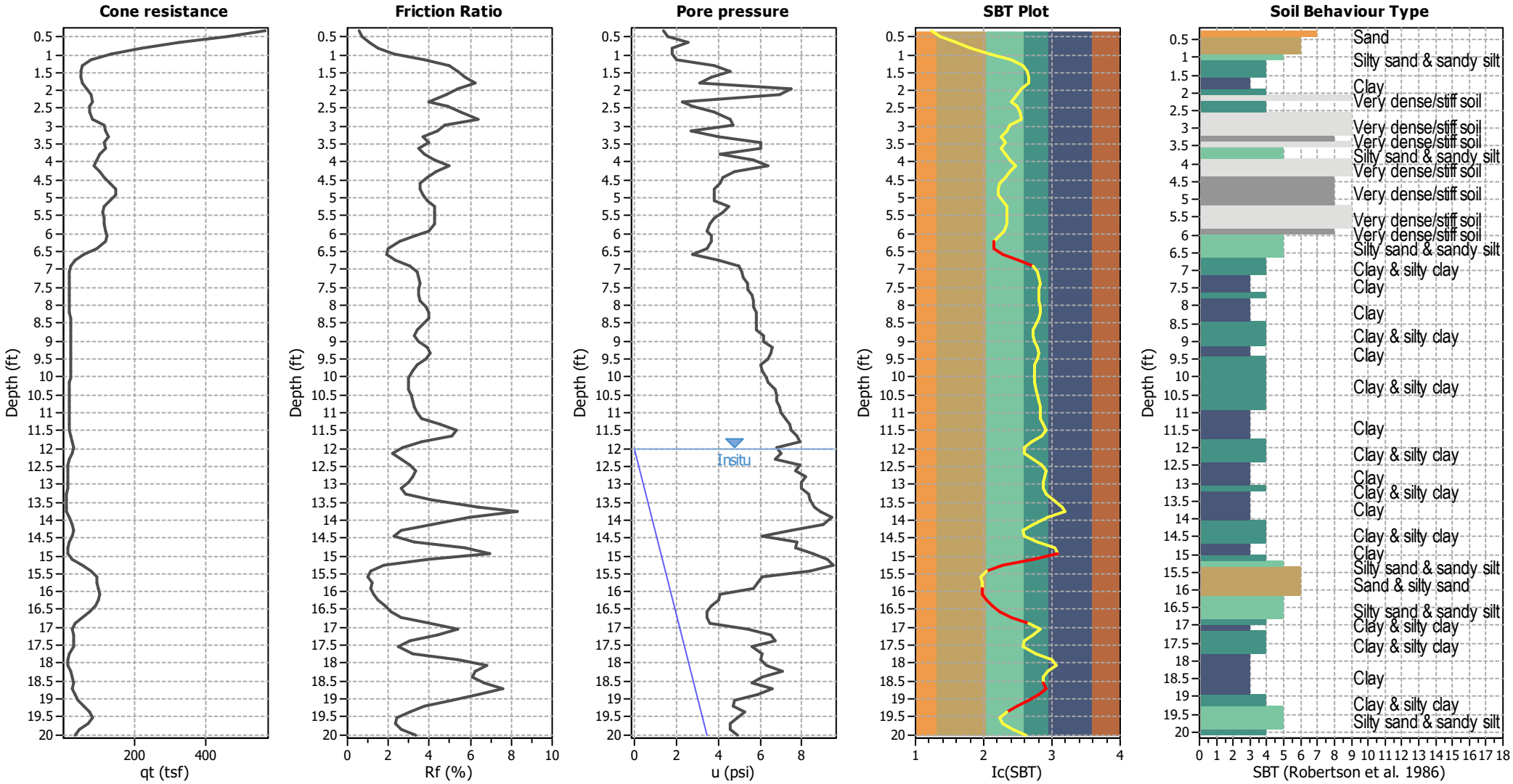
CPT basic interpretation plots



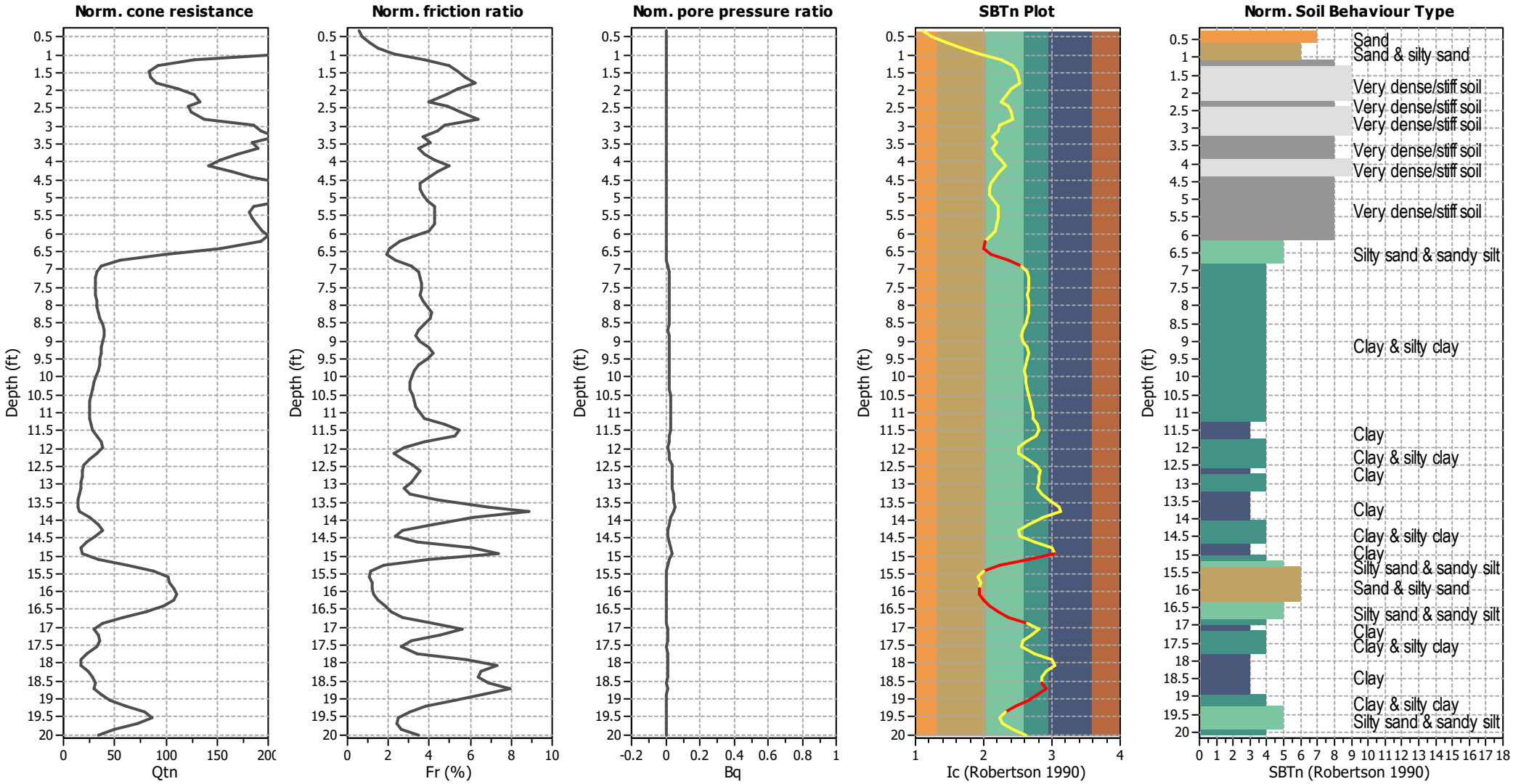
Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	12.00 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.12	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	1.13	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	12.00 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)



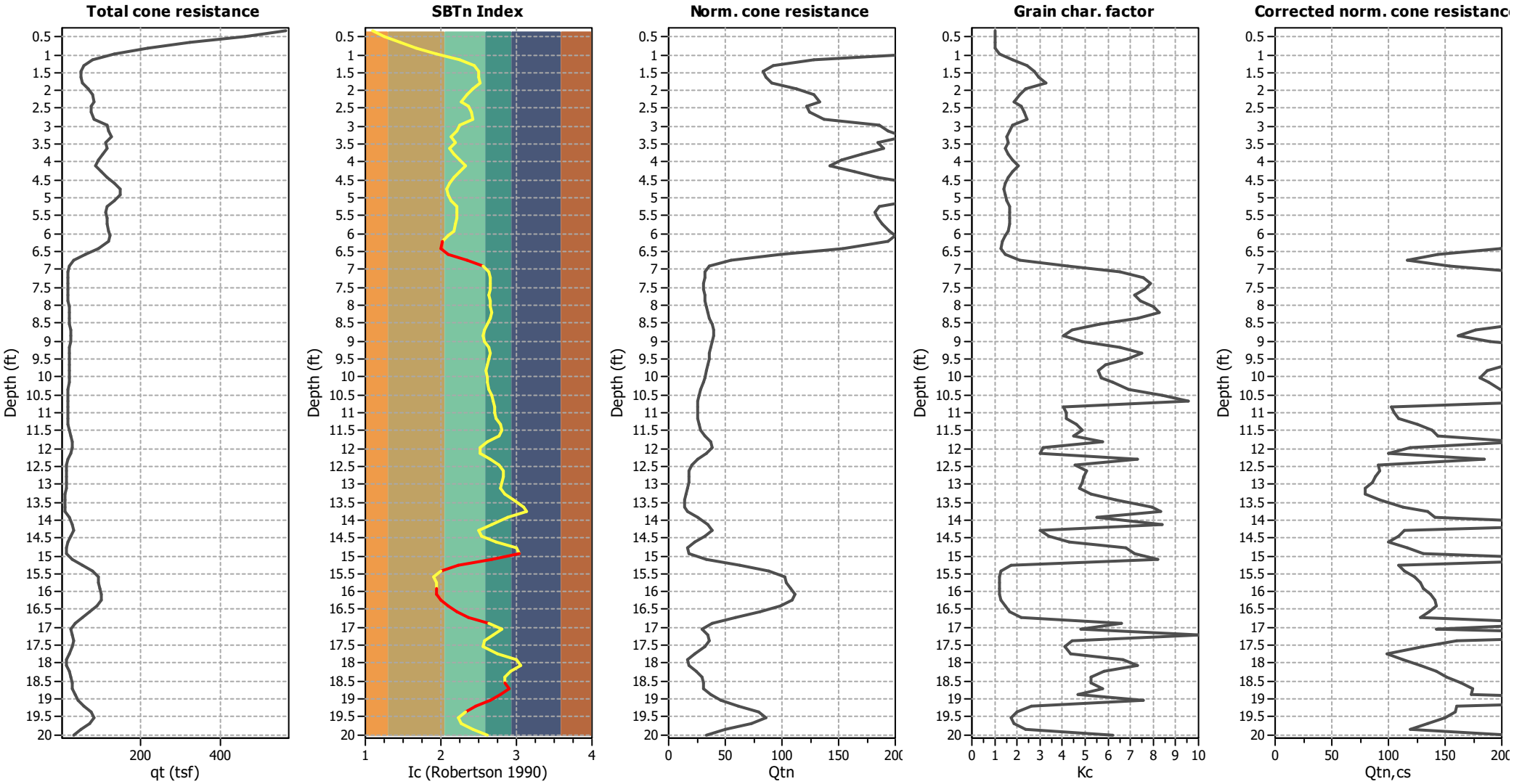
Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	12.00 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.12	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	1.13	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	12.00 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

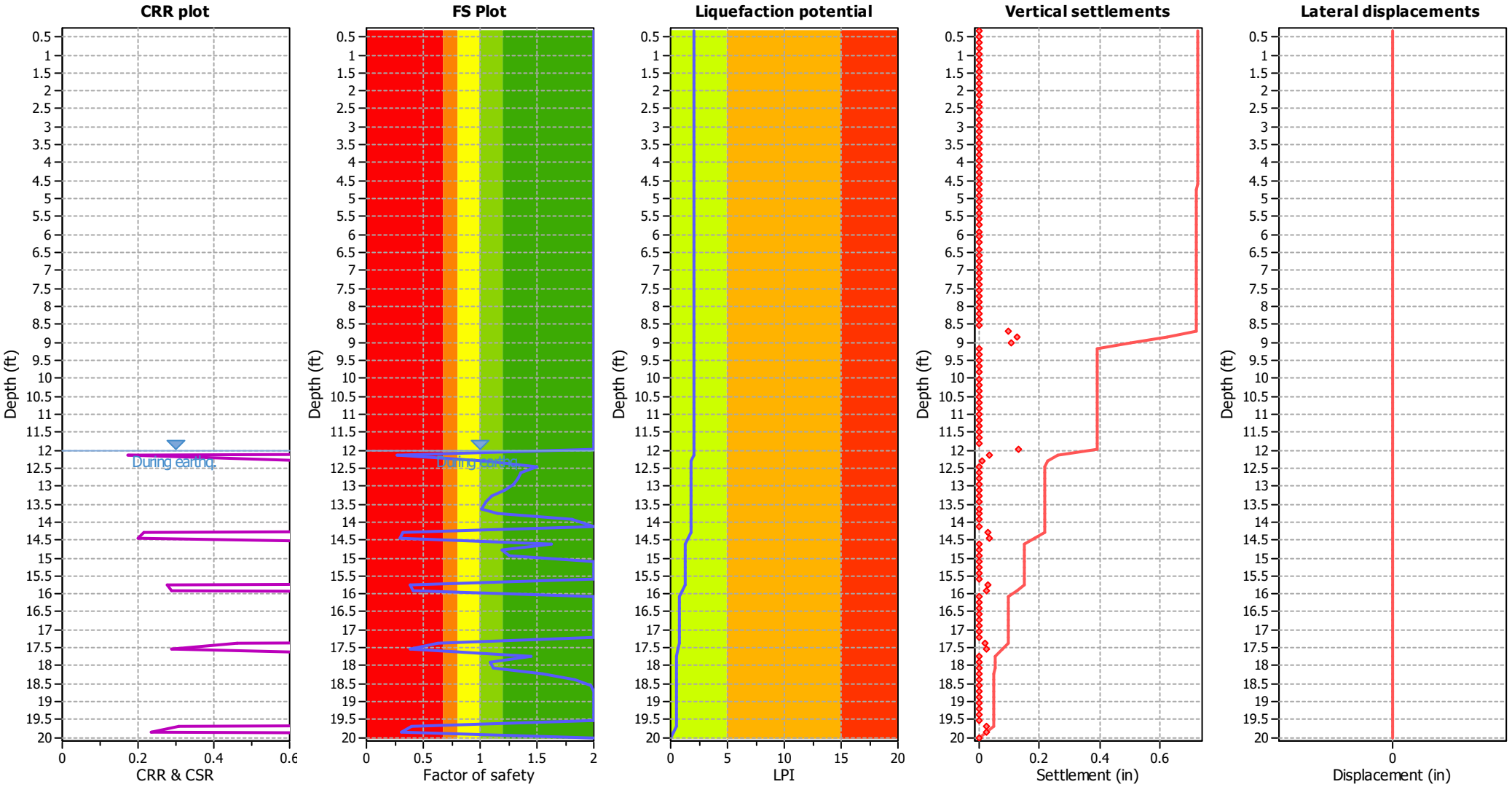
Liquefaction analysis overall plots (intermediate results)



Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	12.00 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.12	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	1.13	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	12.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	12.00 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.12	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	1.13	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	12.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

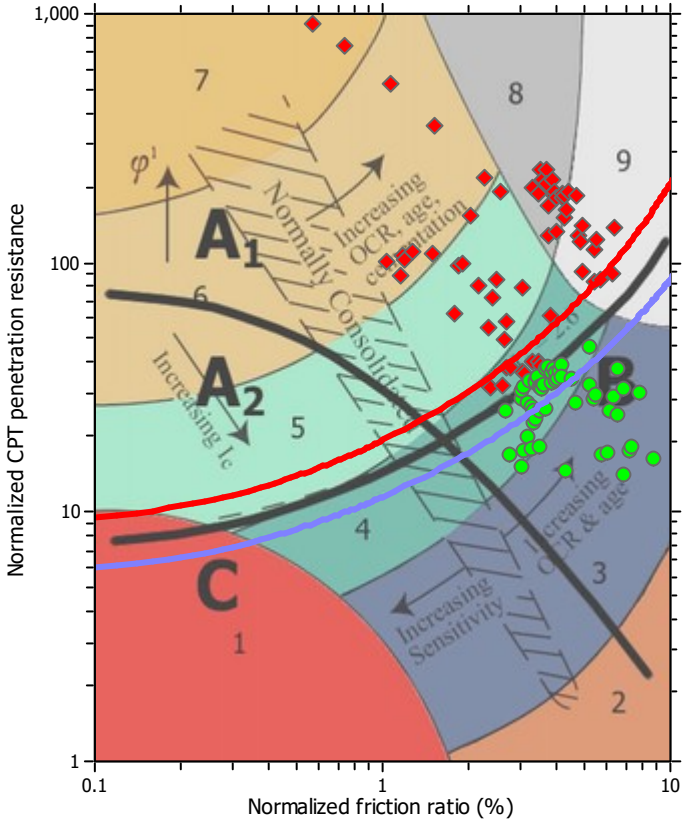
F.S. color scheme

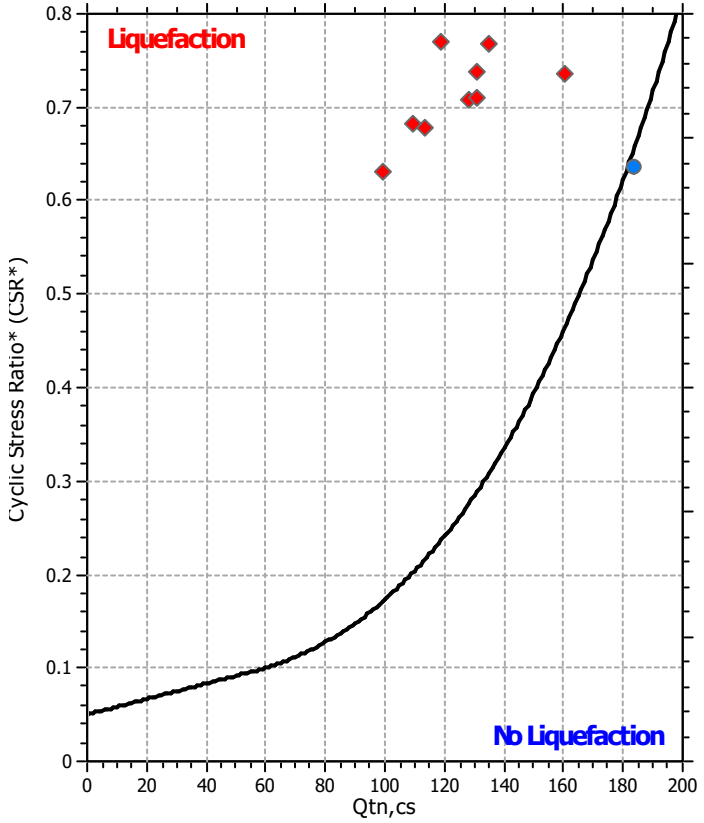
- Almost certain it will liquefy
- Very likely to liquefy
- Liquefaction and no liq. are equally likely
- Unlike to liquefy
- Almost certain it will not liquefy

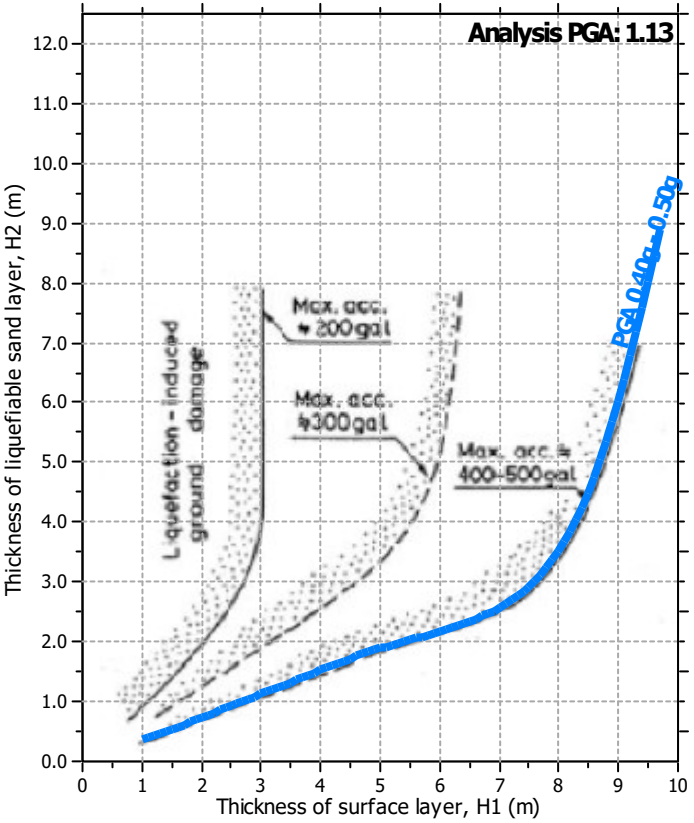
LPI color scheme

- Very high risk
- High risk
- Low risk

Liquefaction analysis summary plots



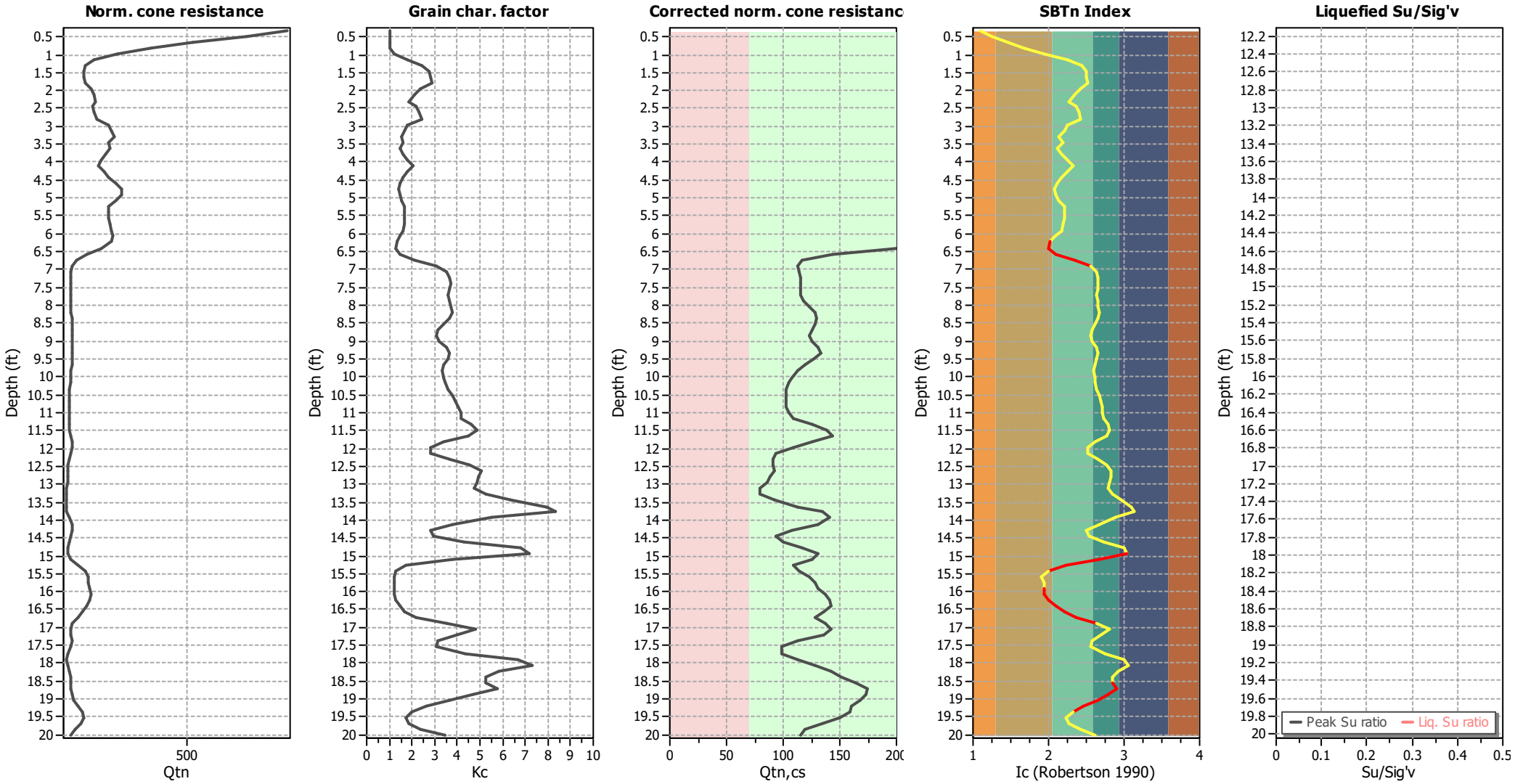




Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	12.00 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.12	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	1.13	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	12.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

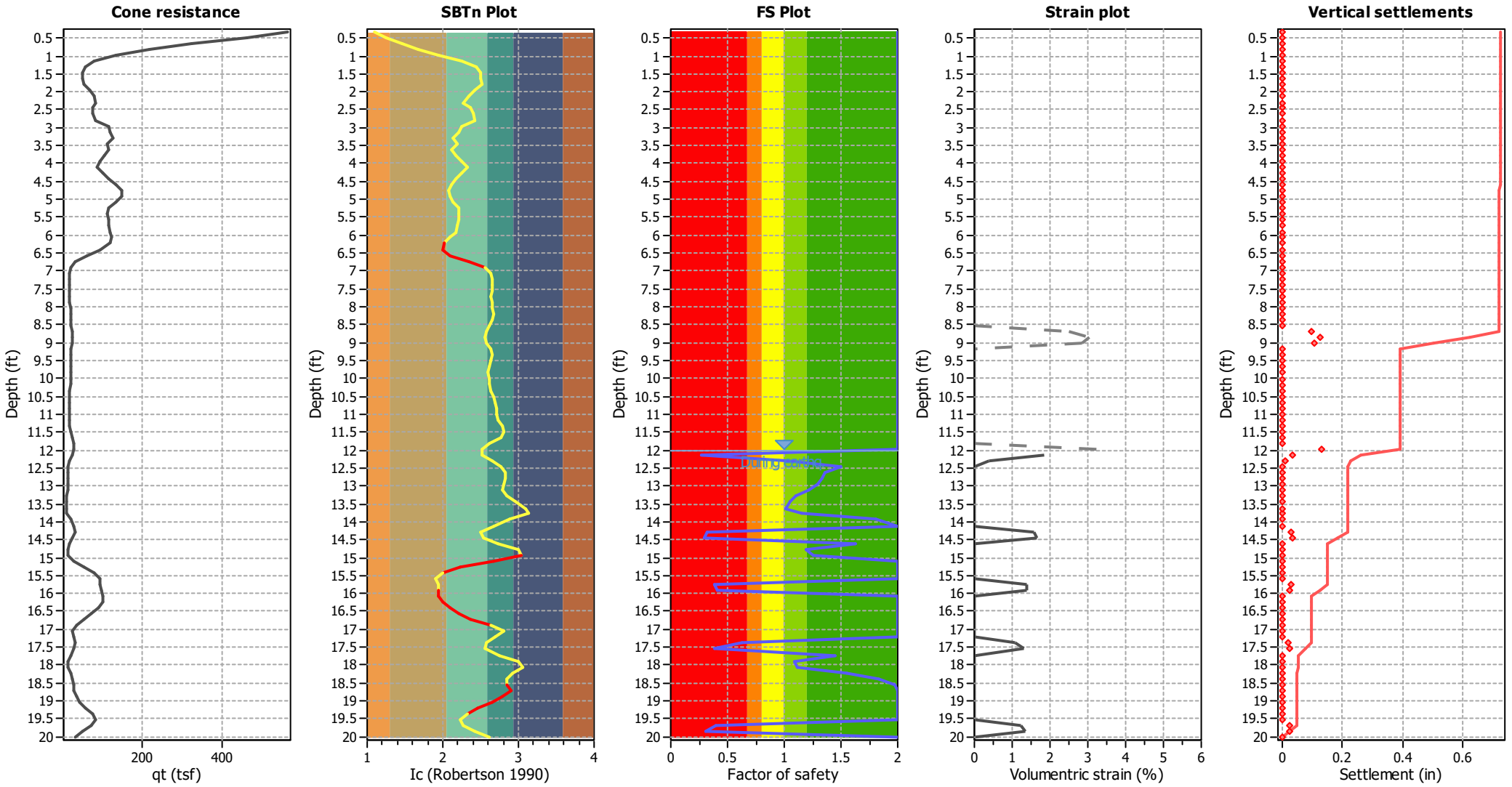
Check for strength loss plots (Robertson (2010))



Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	12.00 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.12	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	1.13	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	12.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

Estimation of post-earthquake settlements



Abbreviations

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

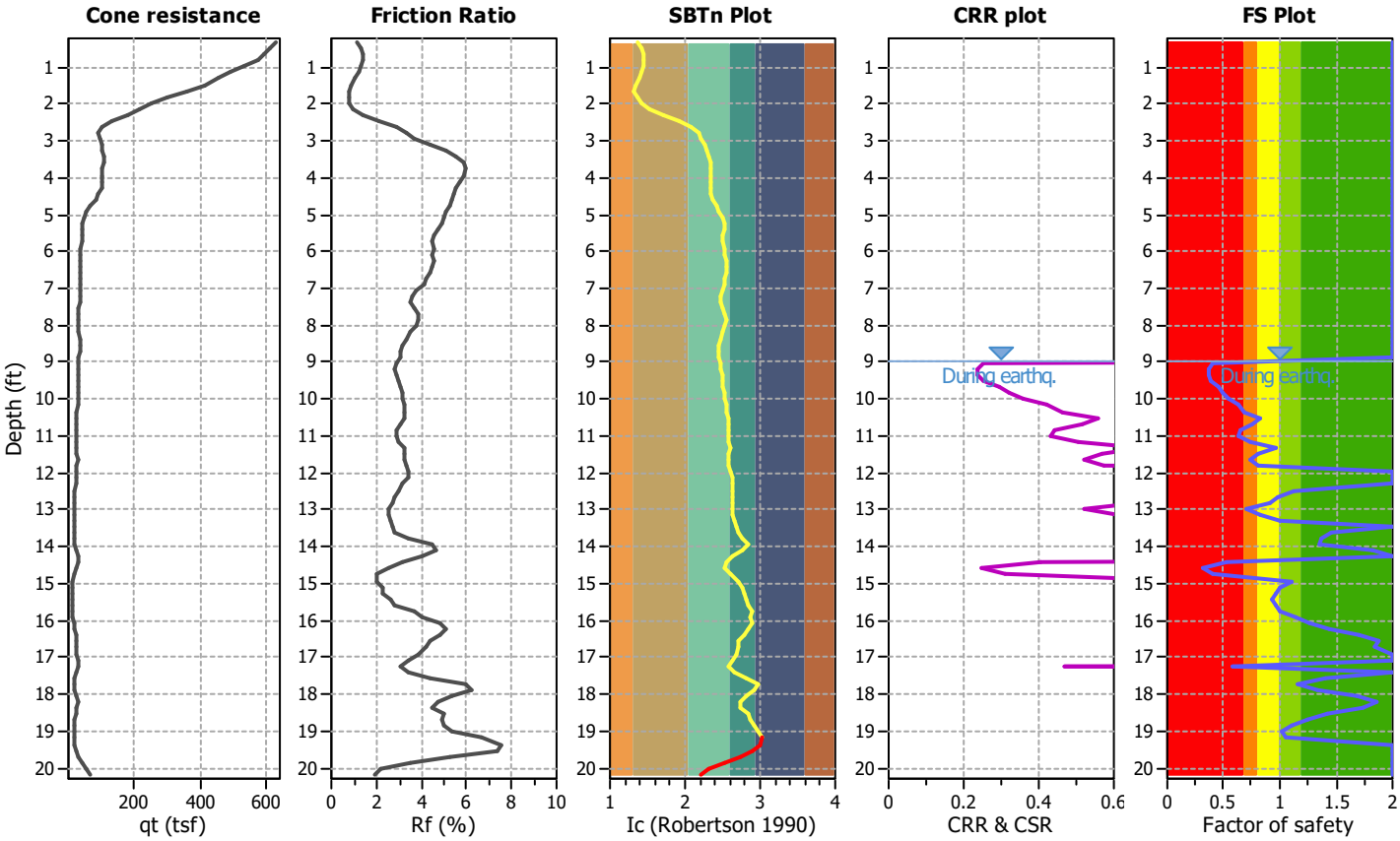
LIQUEFACTION ANALYSIS REPORT

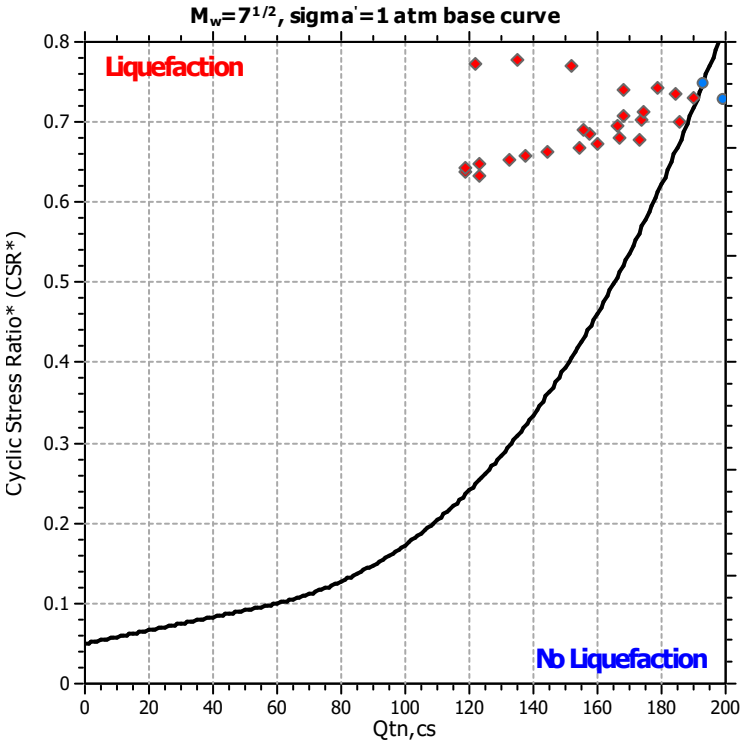
Project title : Crockers Lockers **Location : Watsonville**

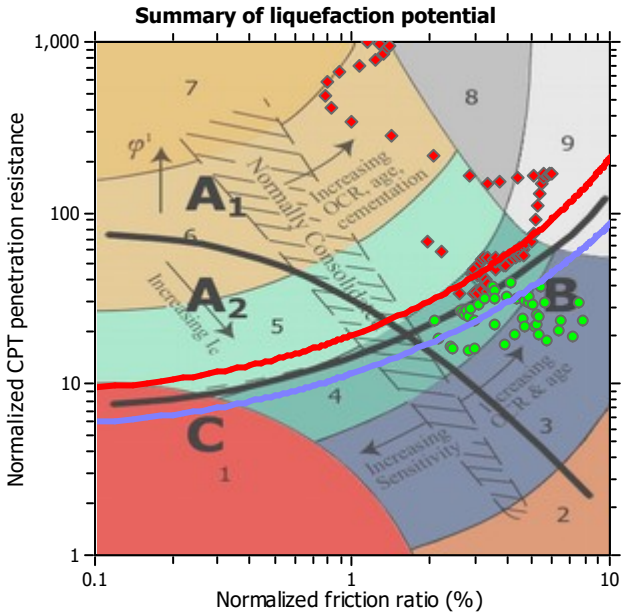
CPT file : CPT-10

Input parameters and analysis data

Analysis method:	Robertson (2009)	G.W.T. (in-situ):	9.00 ft	Use fill:	No	Clay like behavior applied:	All soils
Fines correction method:	Robertson (2009)	G.W.T. (earthq.):	9.00 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:	7.12	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method based
Peak ground acceleration:	1.13	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

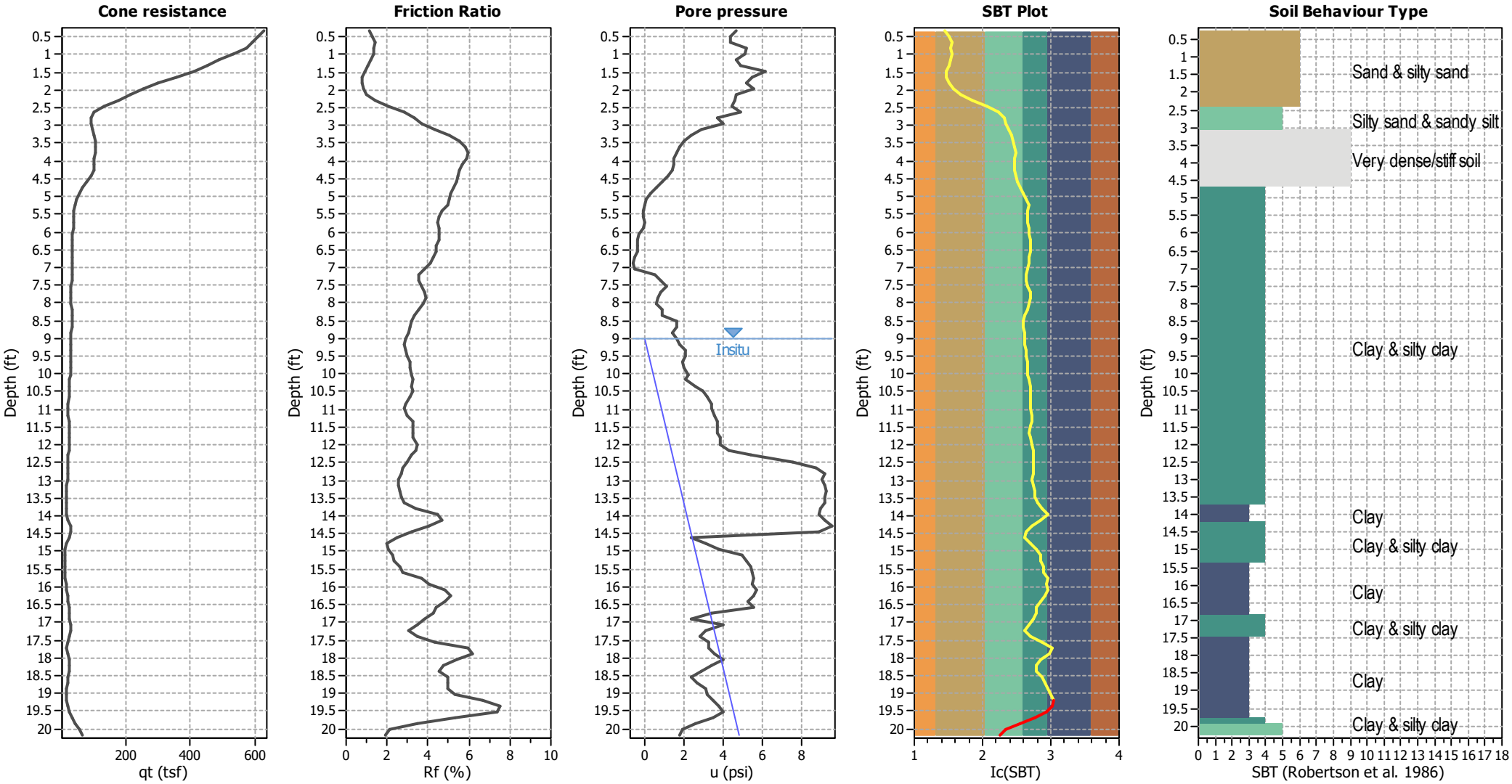






Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and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

CPT basic interpretation plots



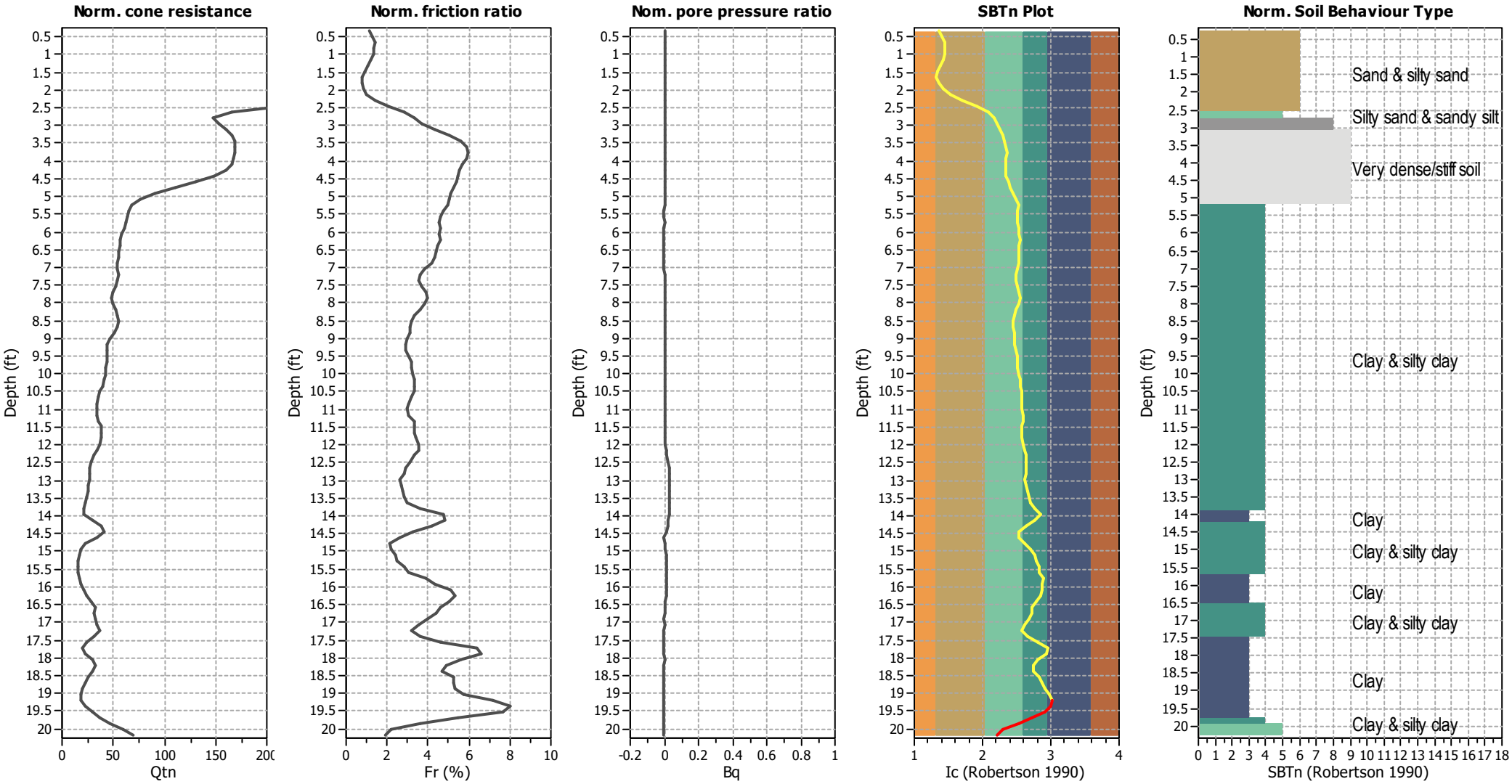
Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	9.00 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.12	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	1.13	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
2. Organic material
3. Clay to silty clay
4. Clayey silt to silty
5. Silty sand to sandy silt
6. Clean sand to silty sand
7. Gravely sand to sand
8. Very stiff sand to
9. Very stiff fine grained

CPT basic interpretation plots (normalized)



Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	9.00 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.12	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	1.13	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

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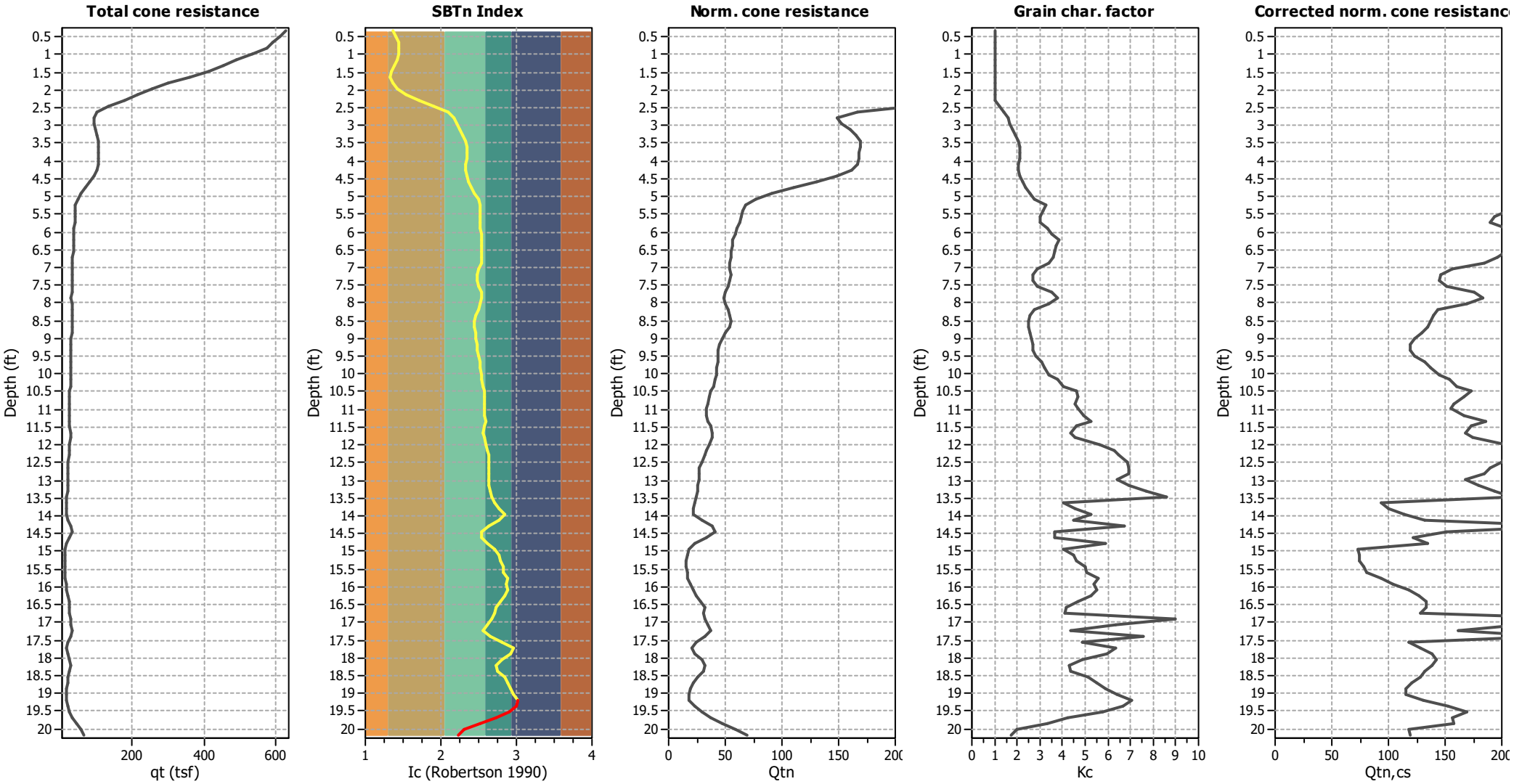
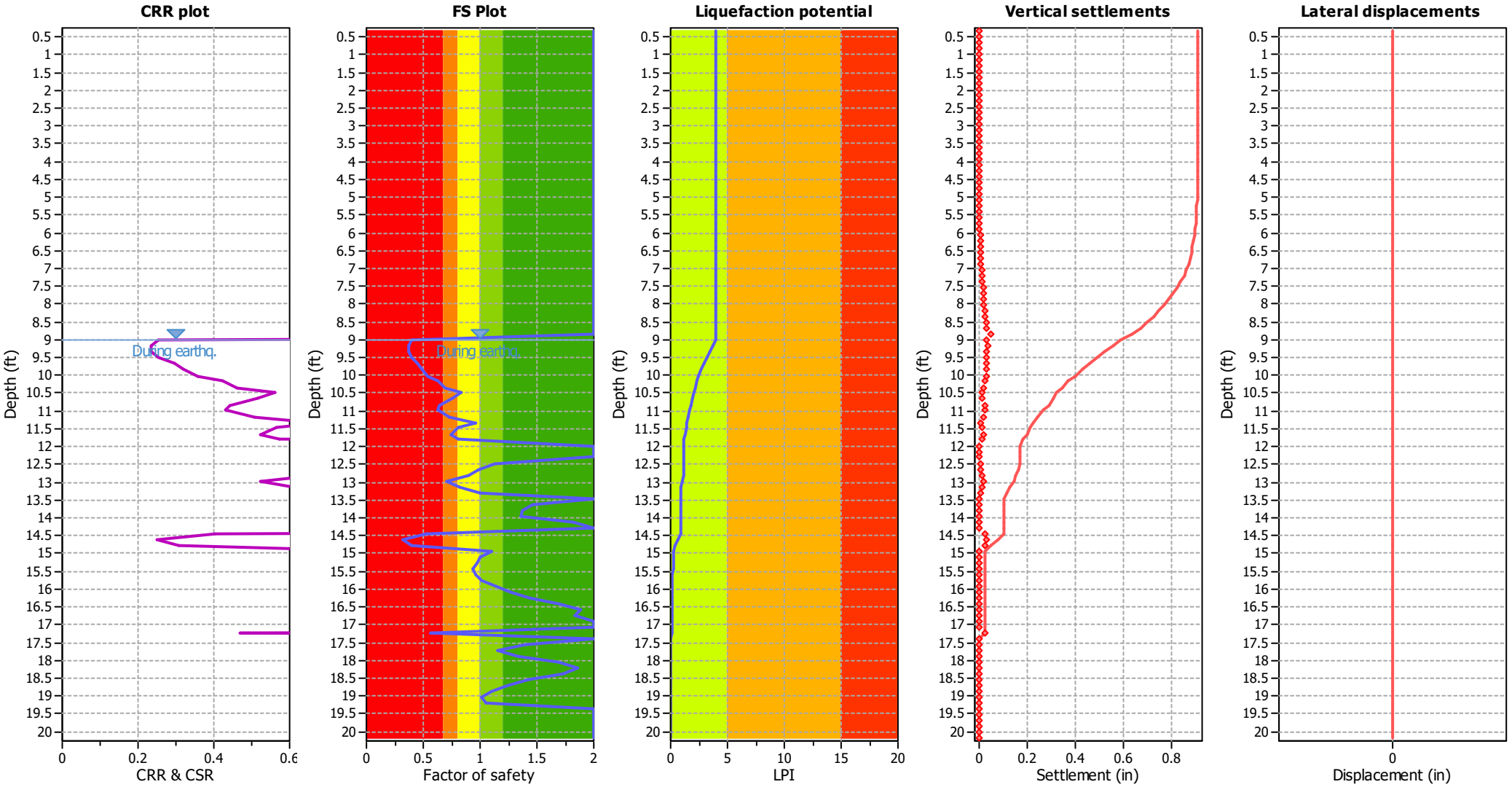
Liquefaction analysis overall plots (intermediate results)



Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	9.00 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.12	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	1.13	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:	Robertson (2009)	Depth to water table (erthq.):	9.00 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.12	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	1.13	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	9.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

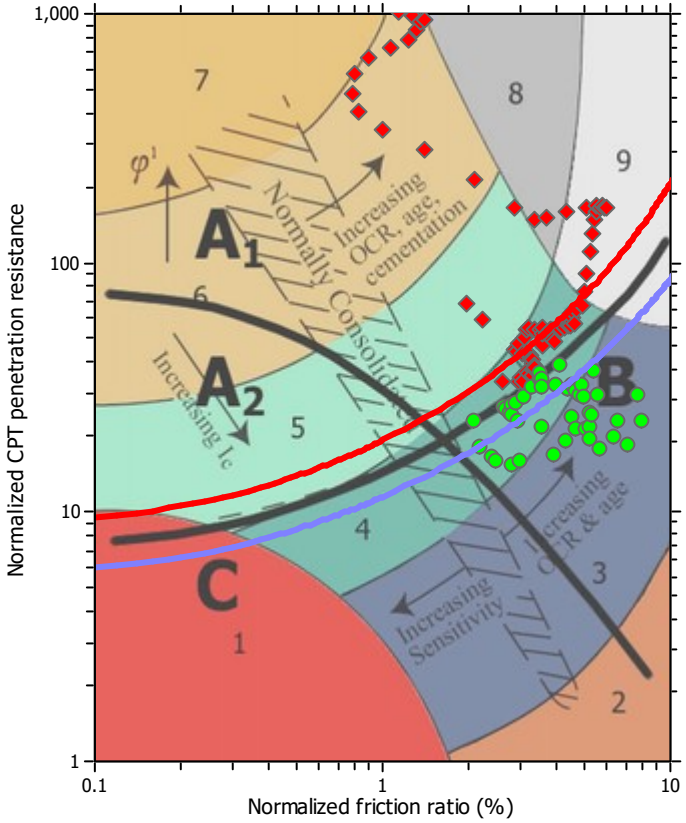
F.S. color scheme

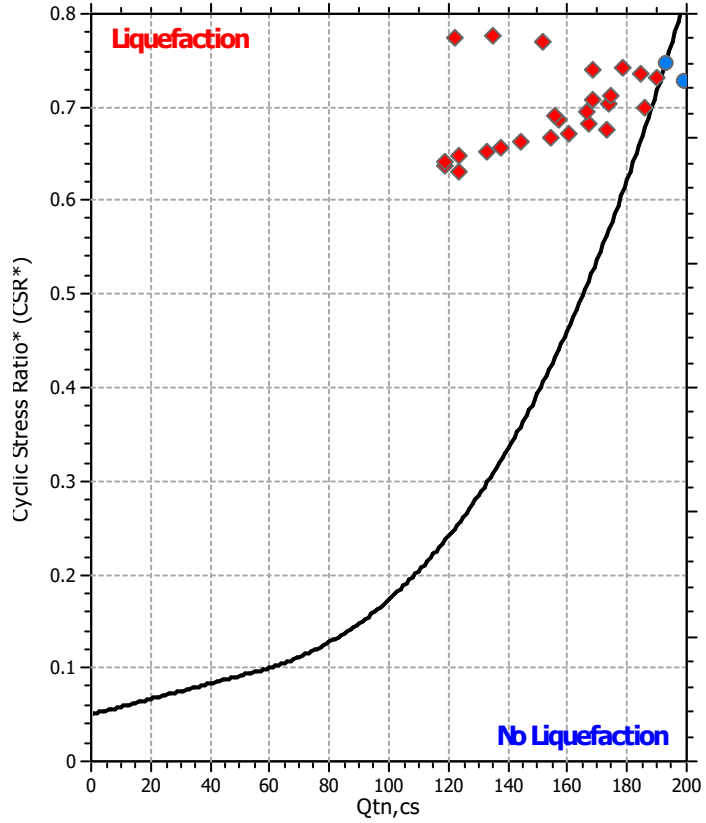
- Almost certain it will liquefy
- Very likely to liquefy
- Liquefaction and no liq. are equally likely
- Unlike to liquefy
- Almost certain it will not liquefy

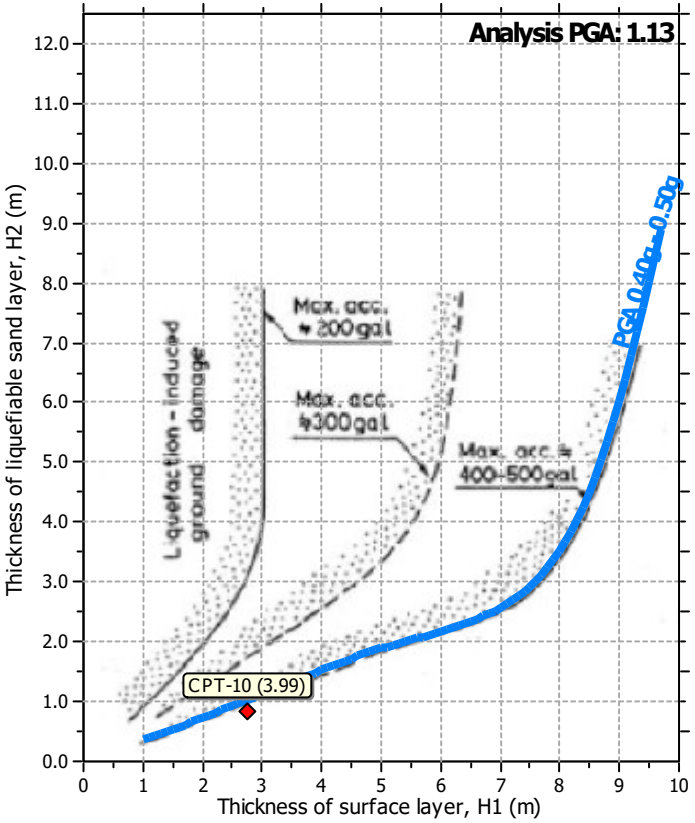
LPI color scheme

- Very high risk
- High risk
- Low risk

Liquefaction analysis summary plots



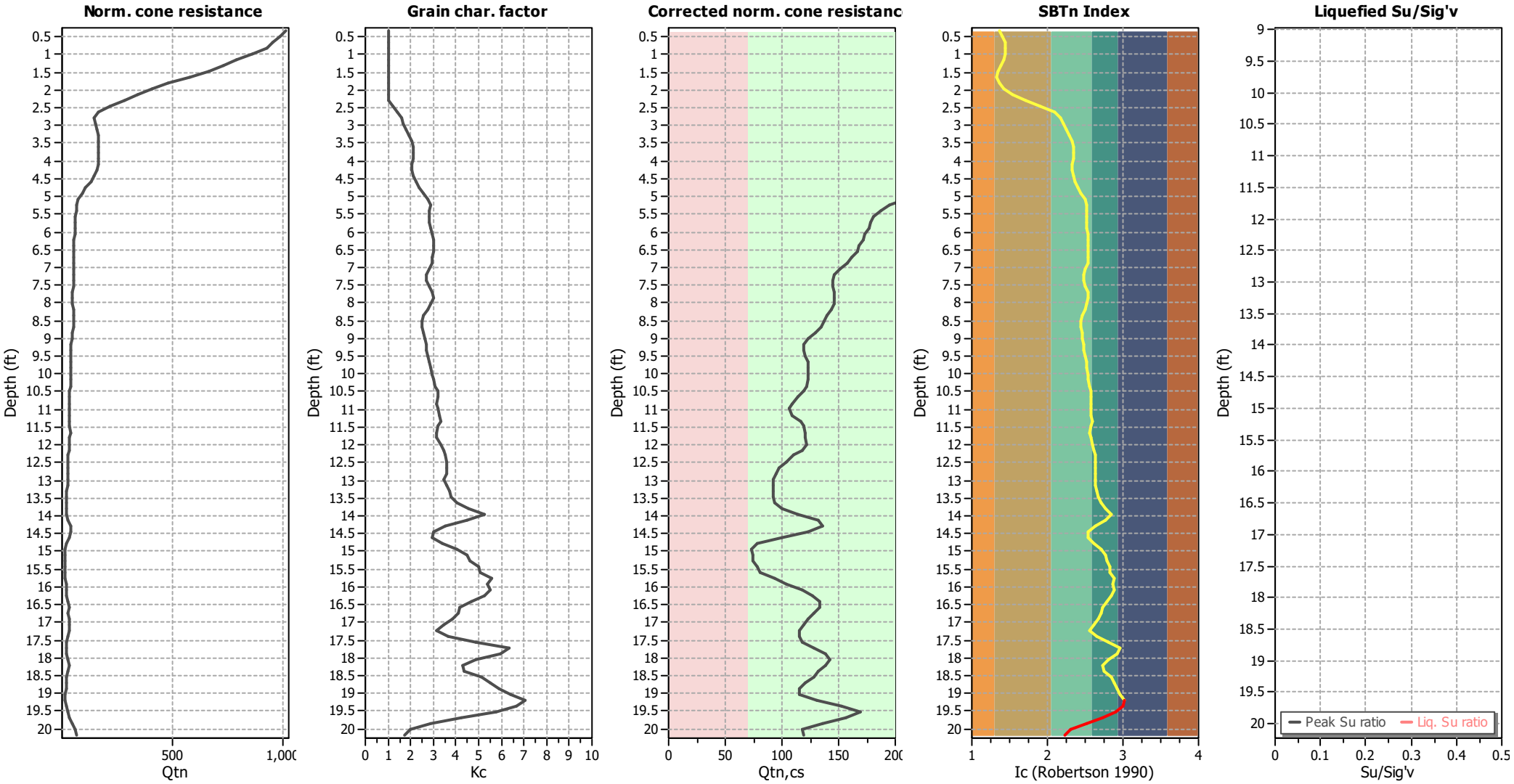




Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	9.00 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.12	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	1.13	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	9.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

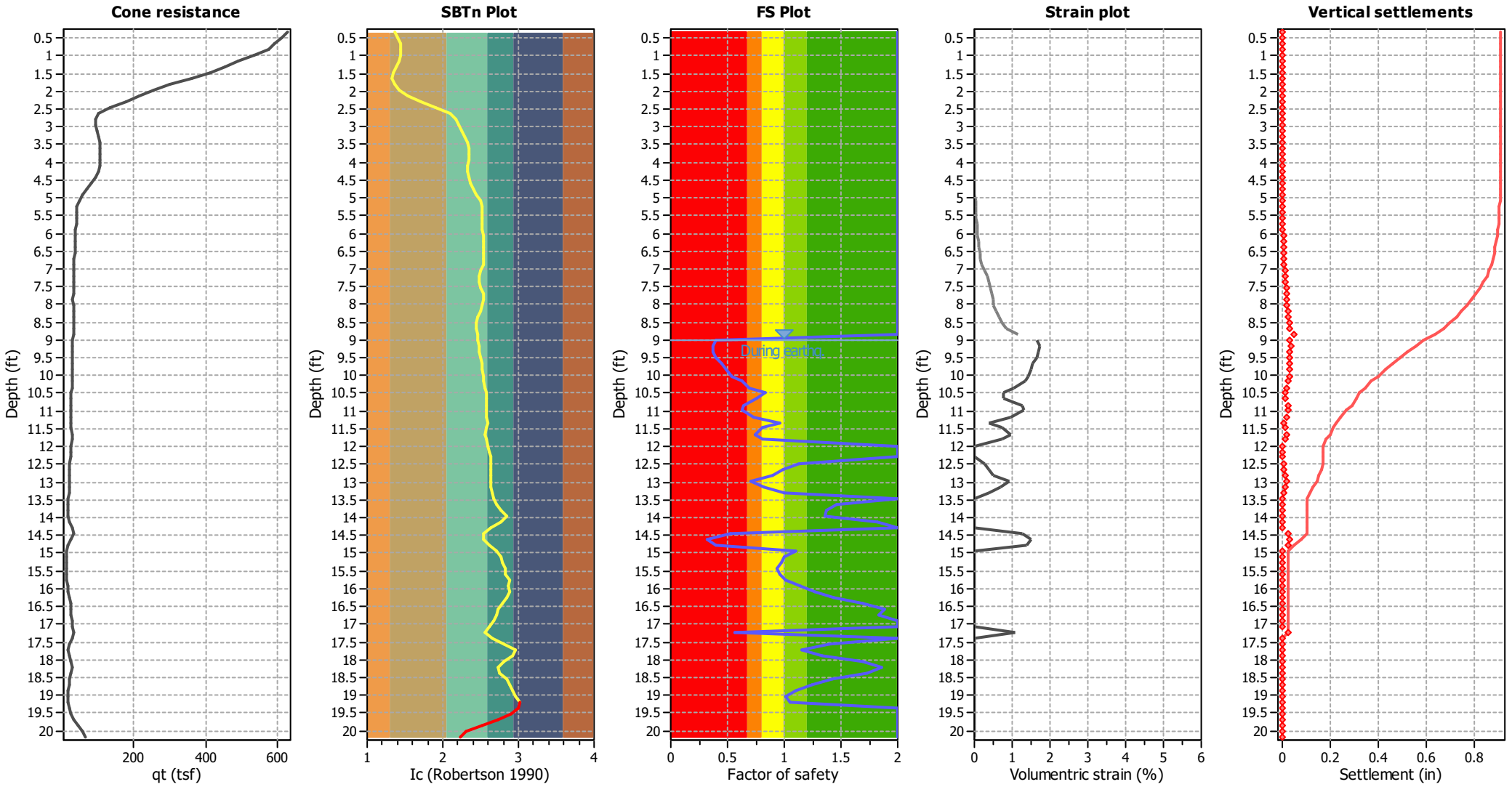
Check for strength loss plots (Robertson (2010))



Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	9.00 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.12	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	1.13	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	9.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

Estimation of post-earthquake settlements



Abbreviations

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

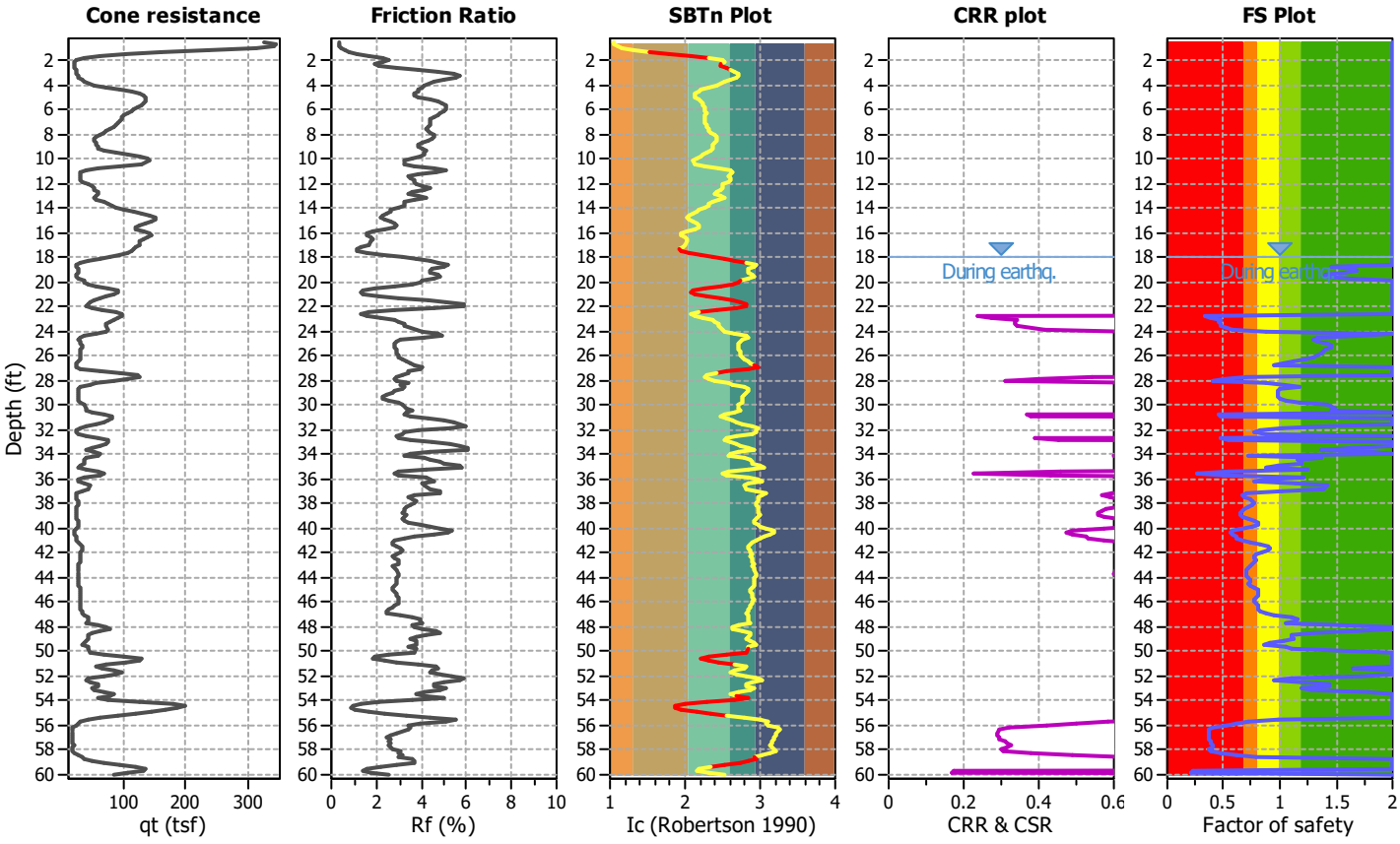
LIQUEFACTION ANALYSIS REPORT

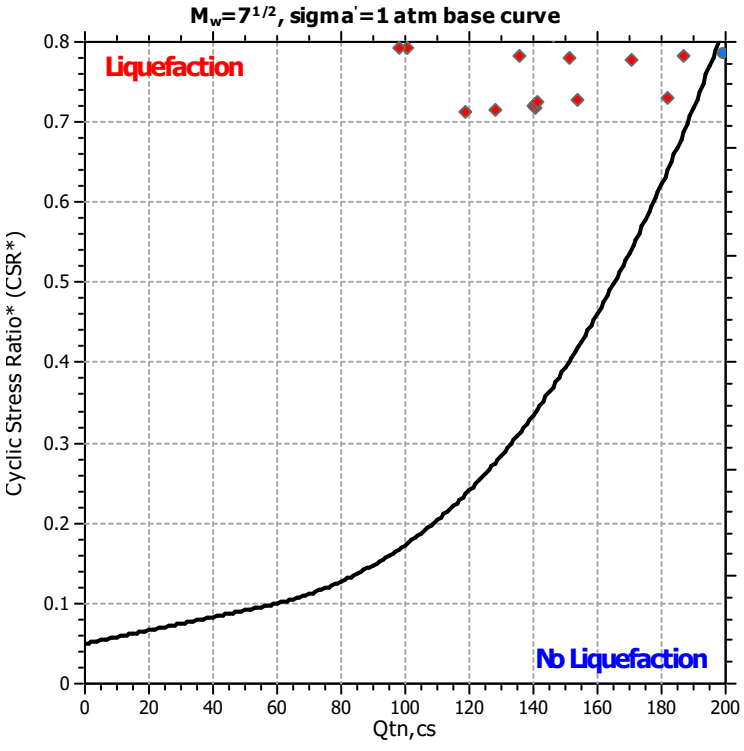
Project title : Crockers Lockers **Location : Watsonville**

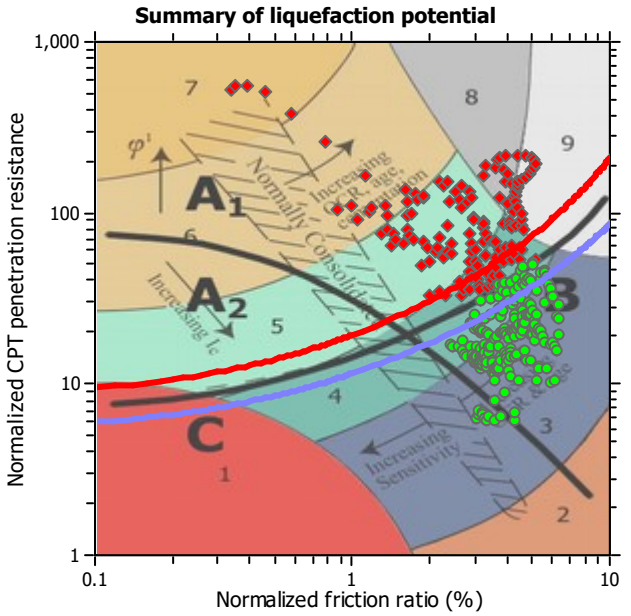
CPT file : CPT-11

Input parameters and analysis data

Analysis method:	Robertson (2009)	G.W.T. (in-situ):	18.00 ft	Use fill:	No	Clay like behavior applied:	All soils
Fines correction method:	Robertson (2009)	G.W.T. (earthq.):	18.00 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:	7.12	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method based
Peak ground acceleration:	1.13	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

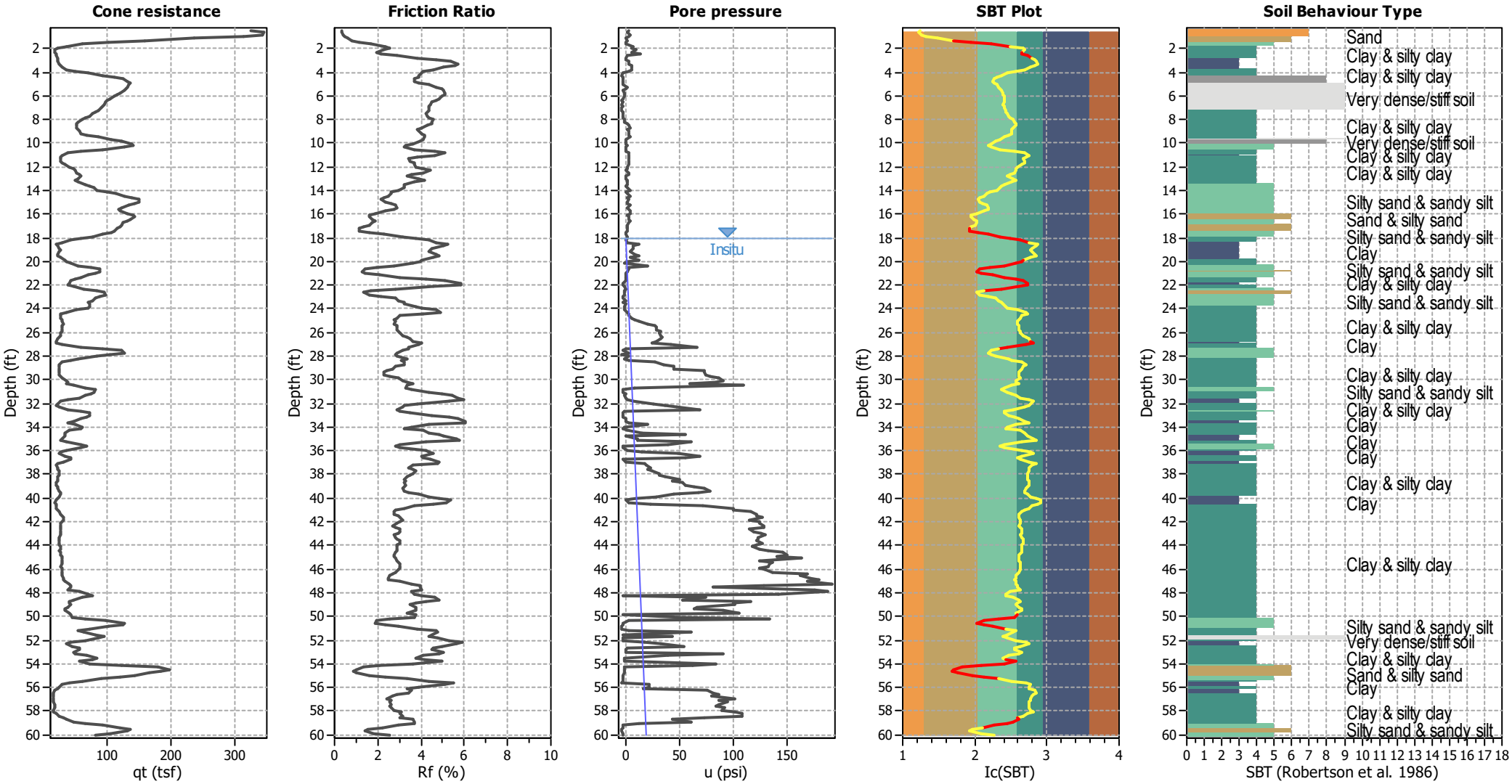






Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and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

CPT basic interpretation plots



Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	18.00 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.12	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	1.13	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	18.00 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
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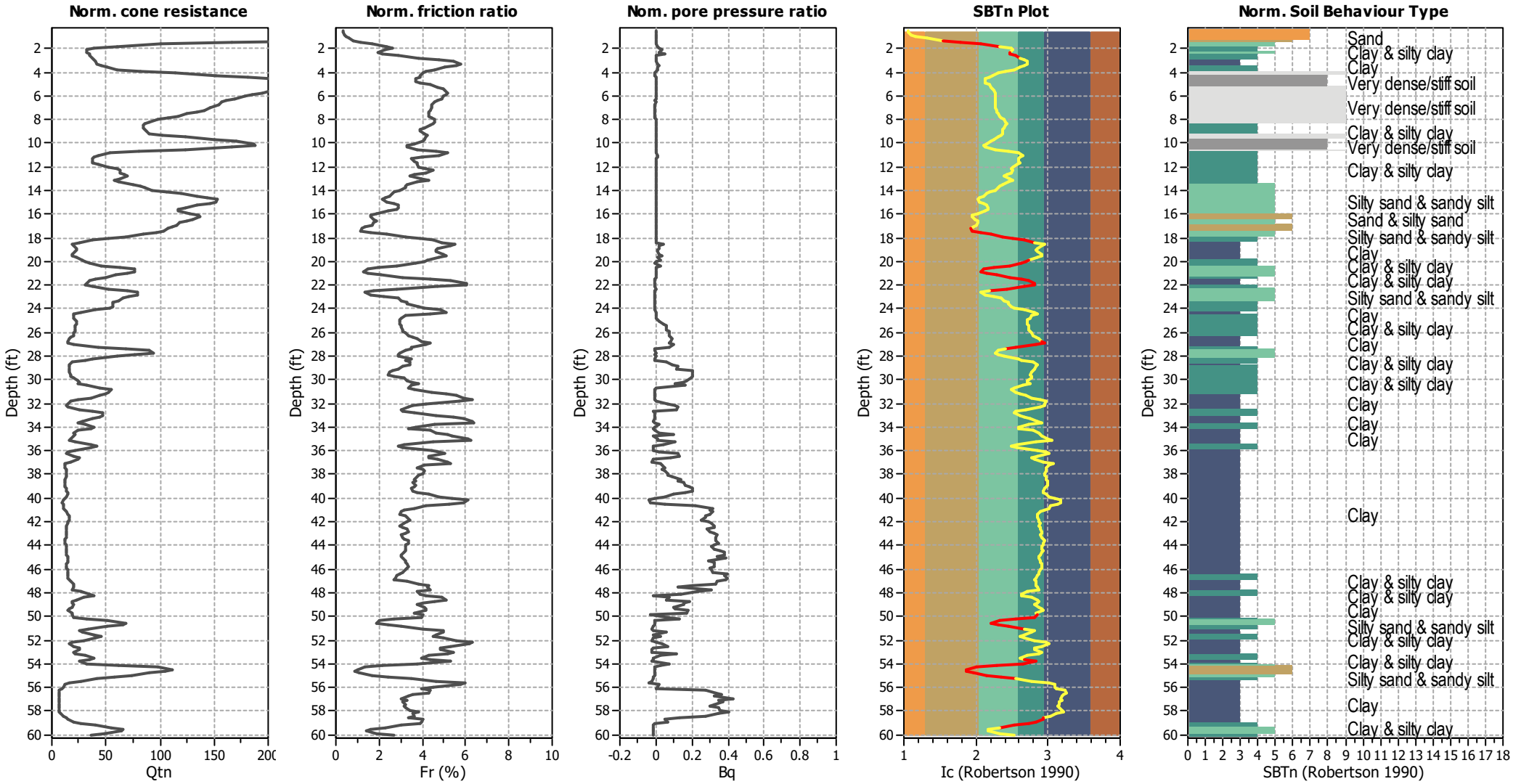
9. Very stiff fine grained

CPT basic interpretation plots (normalized)



Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	18.00 ft	Fill weight:	N/A
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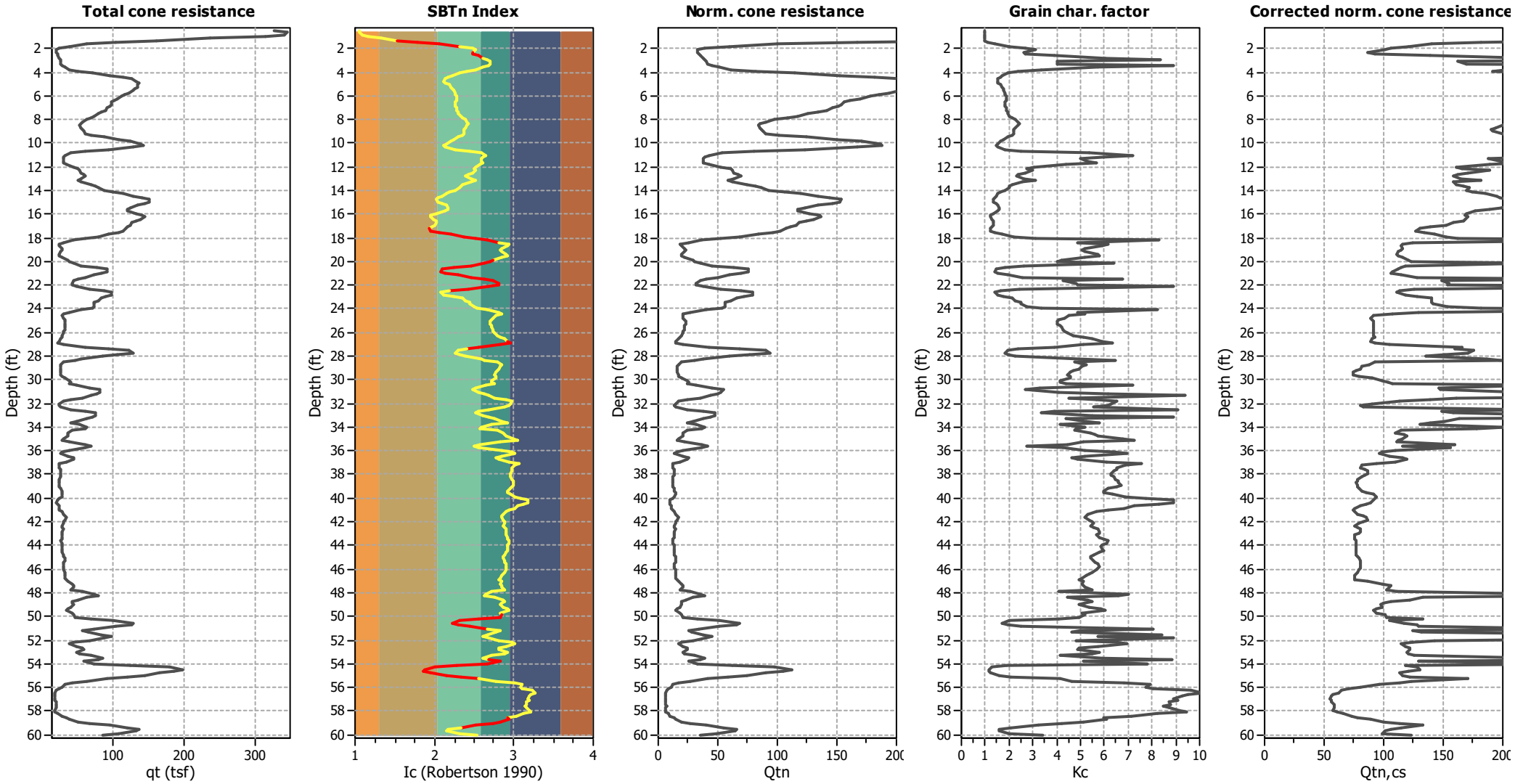
Liquefaction analysis overall plots (intermediate results)



Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	18.00 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	Yes
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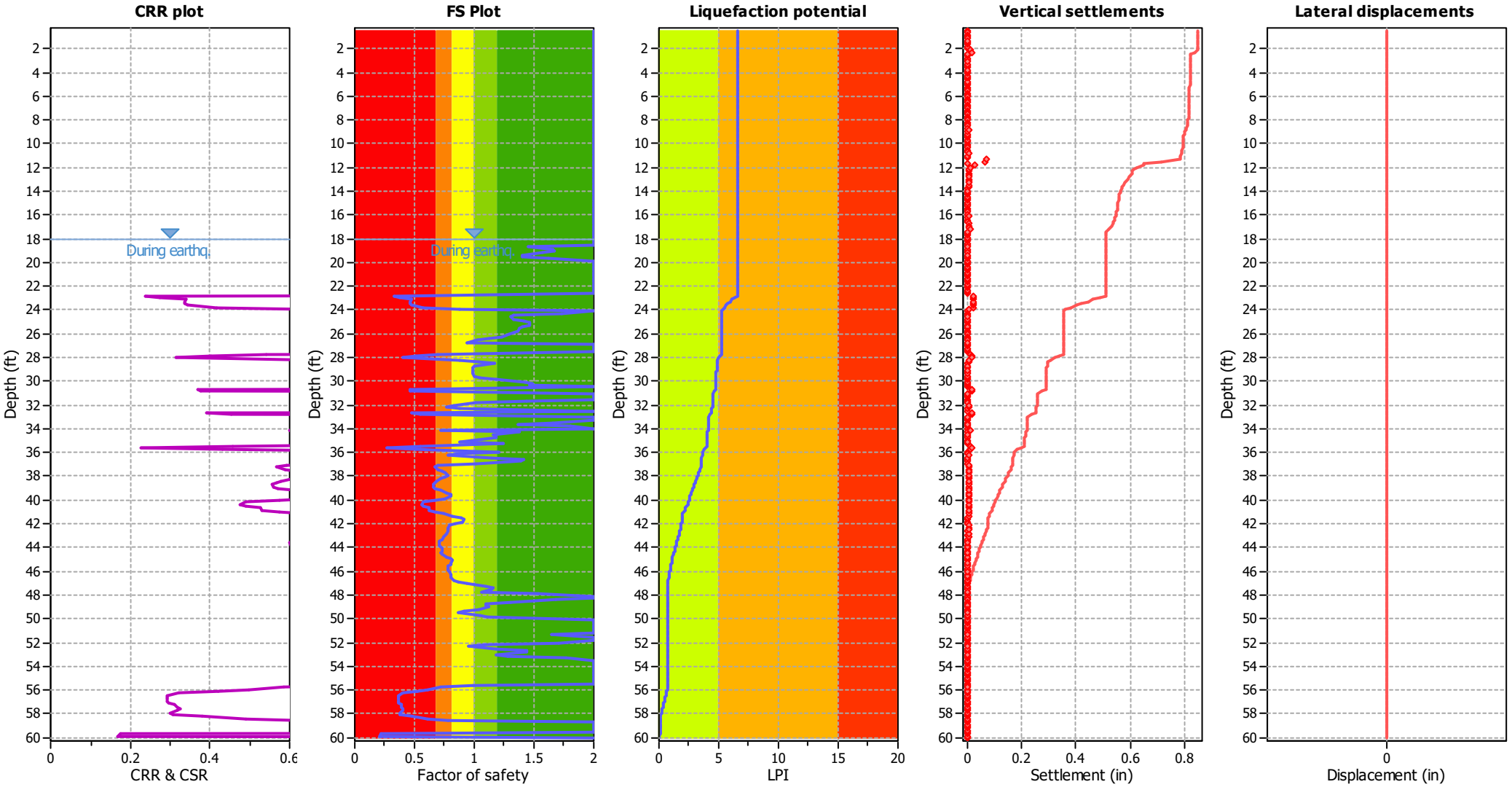
Earthquake magnitude M_w:	7.12	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	1.13	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	18.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

Liquefaction analysis overall plots



Input parameters and analysis data

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Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.12	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	1.13	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	18.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

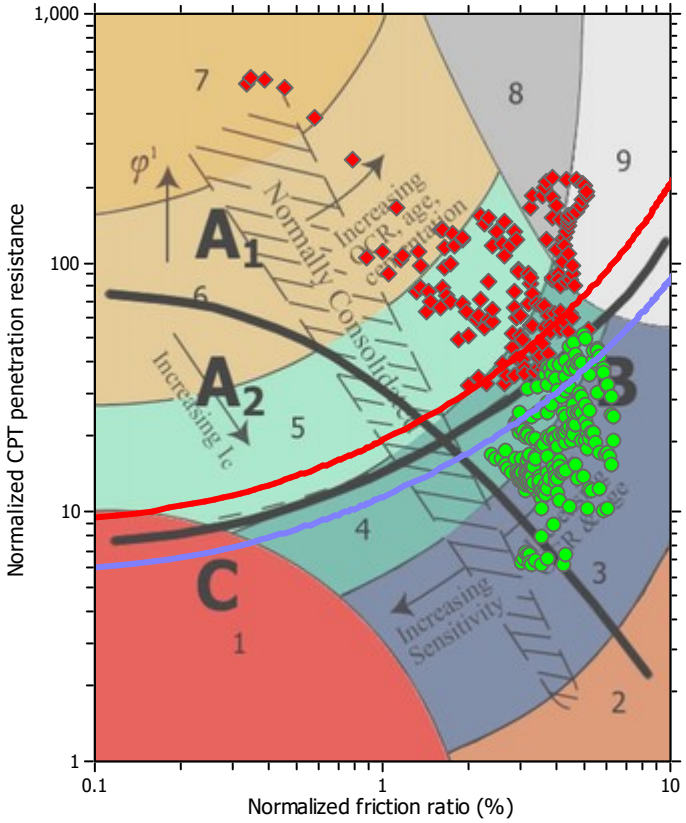
F.S. color scheme

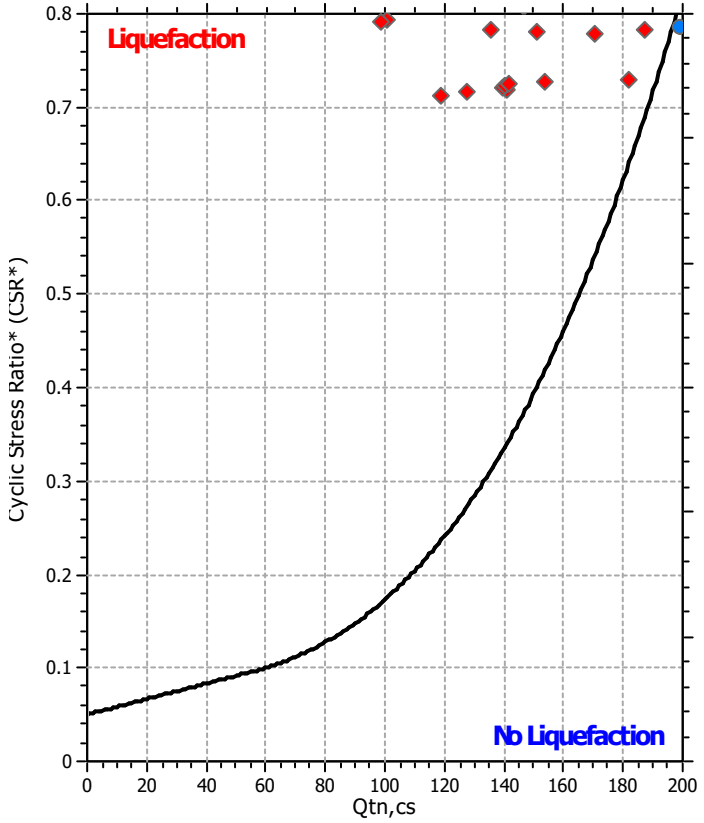
- Almost certain it will liquefy
- Very likely to liquefy
- Liquefaction and no liq. are equally likely
- Unlike to liquefy
- Almost certain it will not liquefy

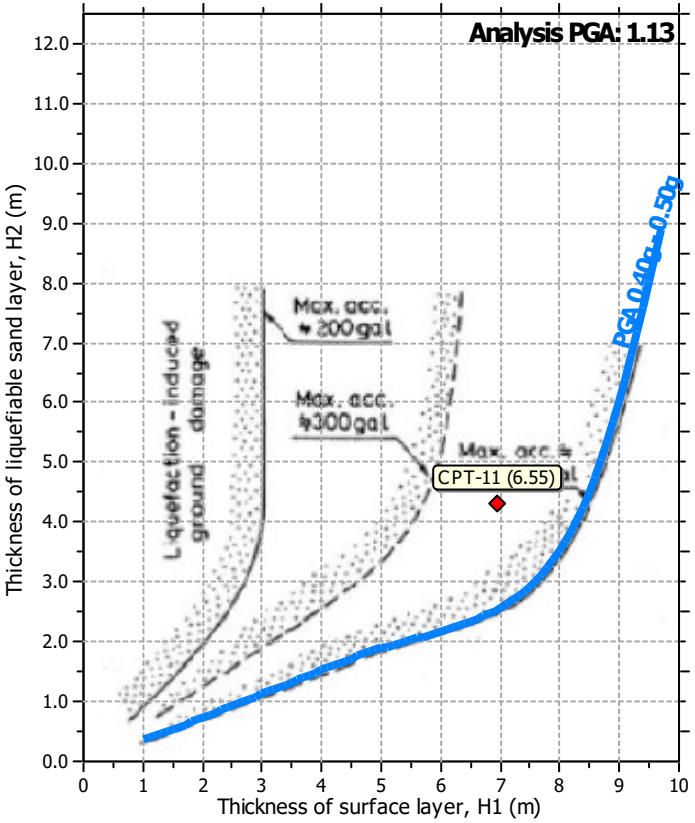
LPI color scheme

- Very high risk
- High risk
- Low risk

Liquefaction analysis summary plots



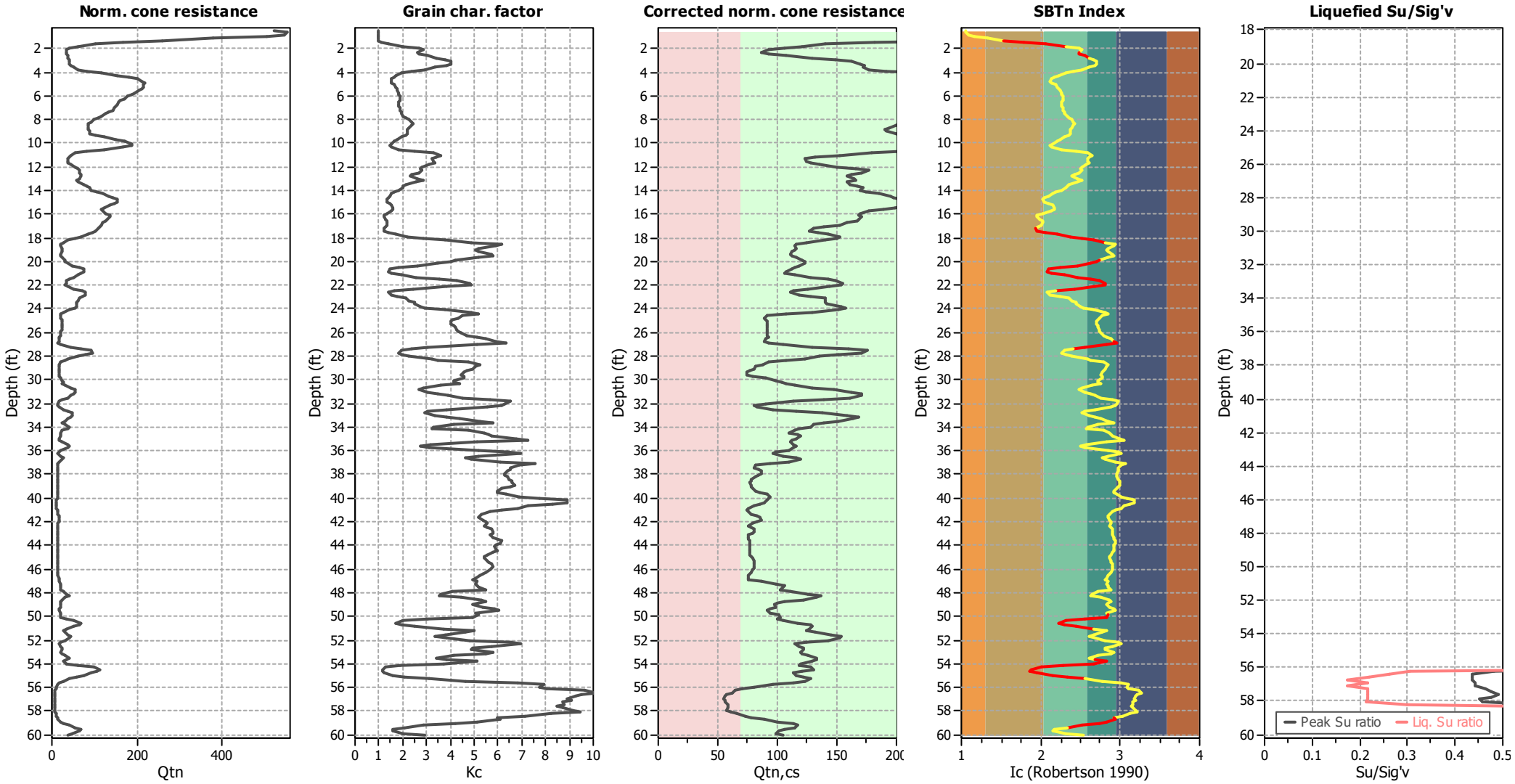




Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	18.00 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.12	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	1.13	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	18.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

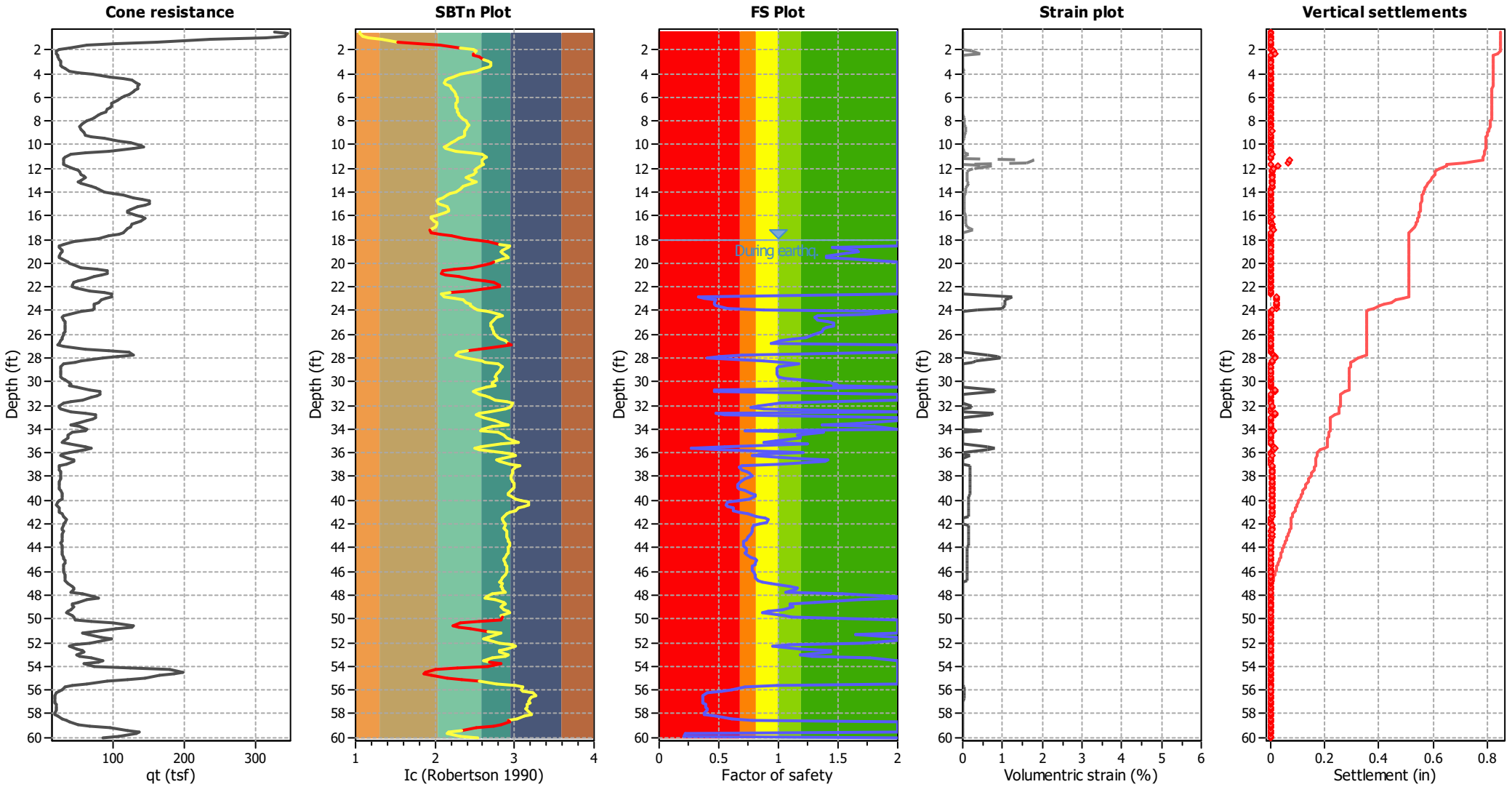
Check for strength loss plots (Robertson (2010))



Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	18.00 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.12	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	1.13	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	18.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

Estimation of post-earthquake settlements



Abbreviations

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

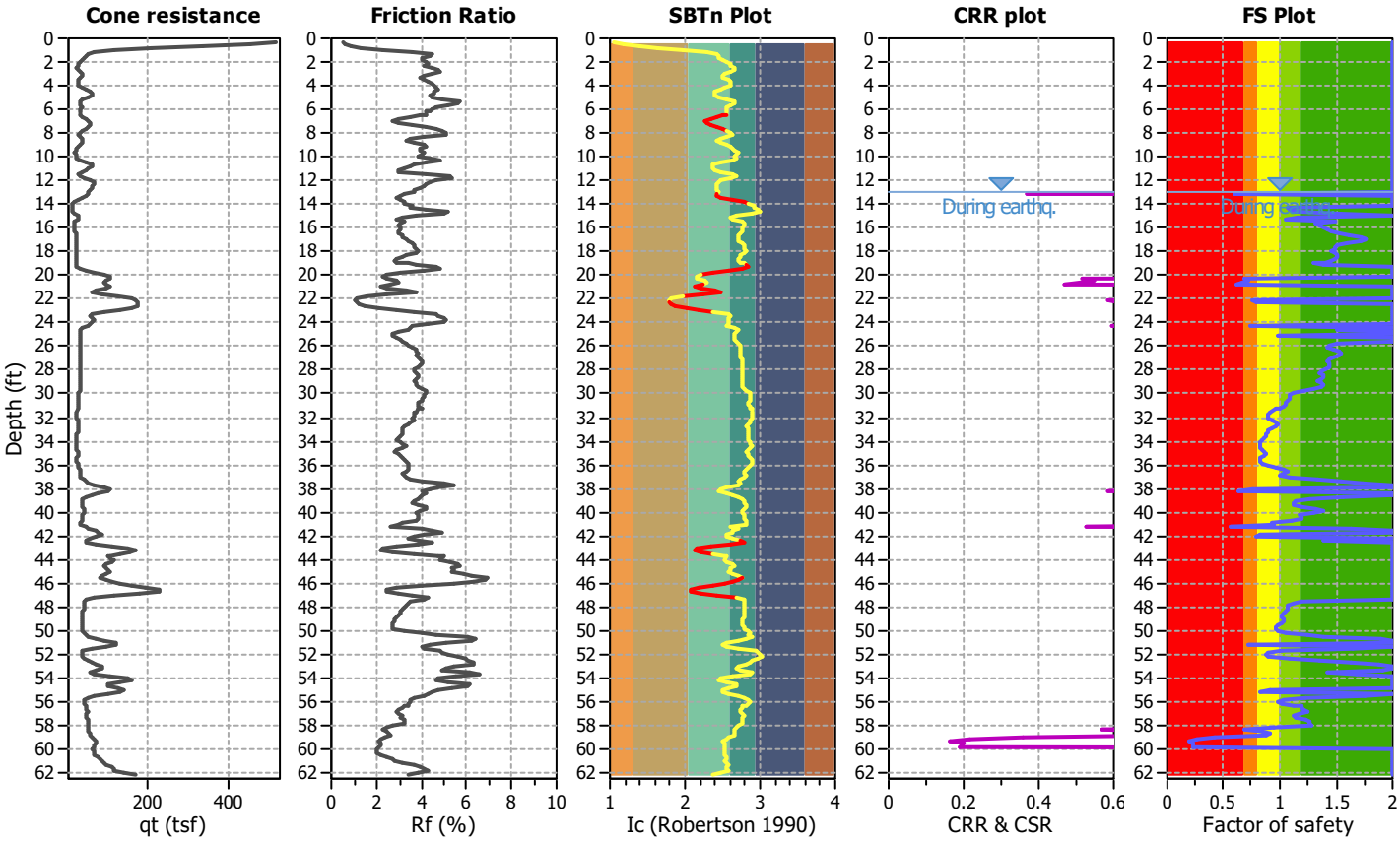
LIQUEFACTION ANALYSIS REPORT

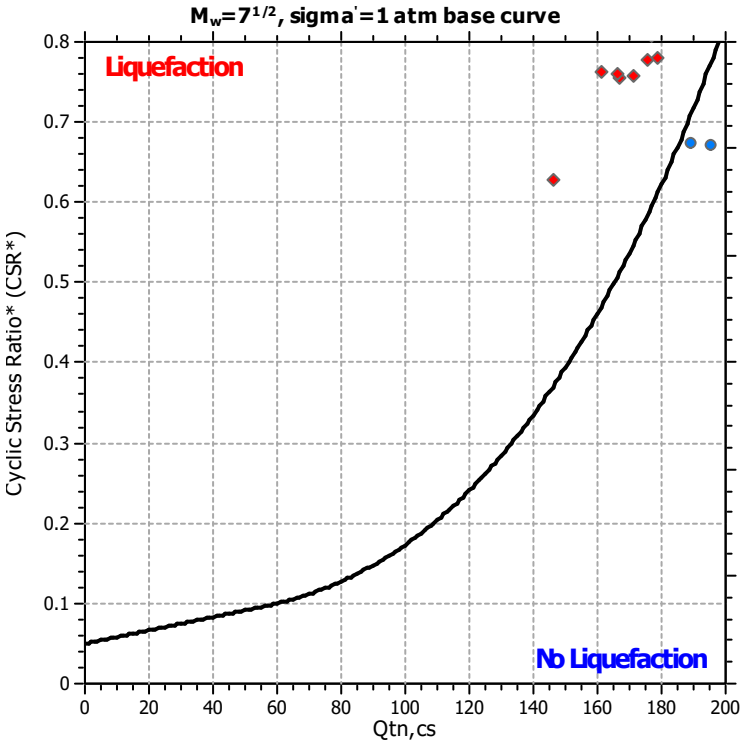
Project title : Crockers Lockers **Location : Watsonville**

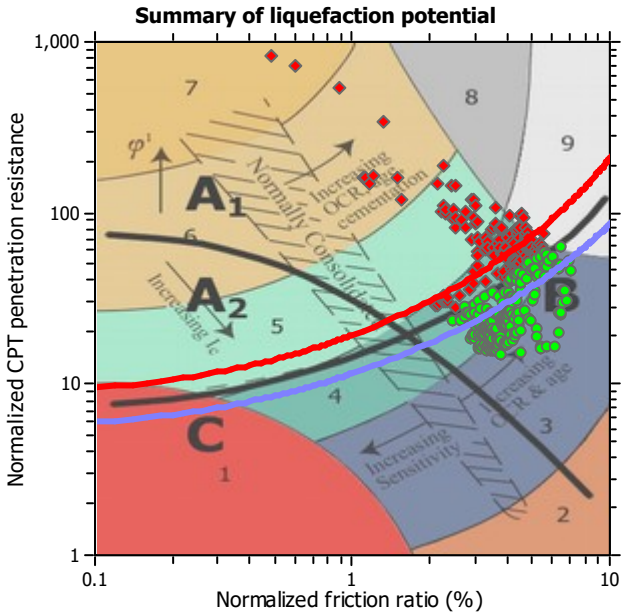
CPT file : CPT-12

Input parameters and analysis data

Analysis method:	Robertson (2009)	G.W.T. (in-situ):	13.00 ft	Use fill:	No	Clay like behavior applied:	All soils
Fines correction method:	Robertson (2009)	G.W.T. (earthq.):	13.00 ft	Fill height:	N/A	Limit depth applied:	Yes
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	60.00 ft
Earthquake magnitude M_w:	7.12	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method based
Peak ground acceleration:	1.13	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

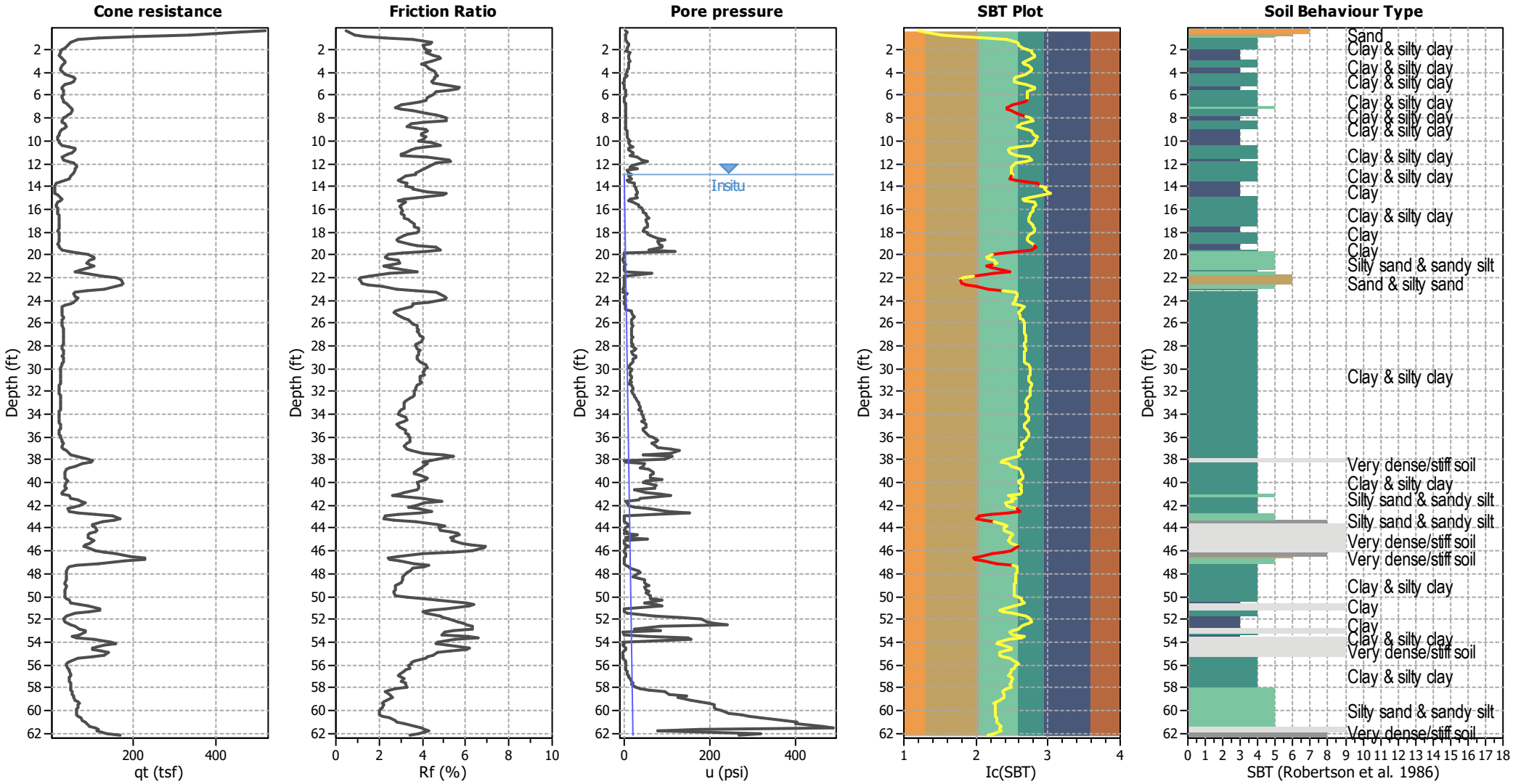






Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and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

CPT basic interpretation plots



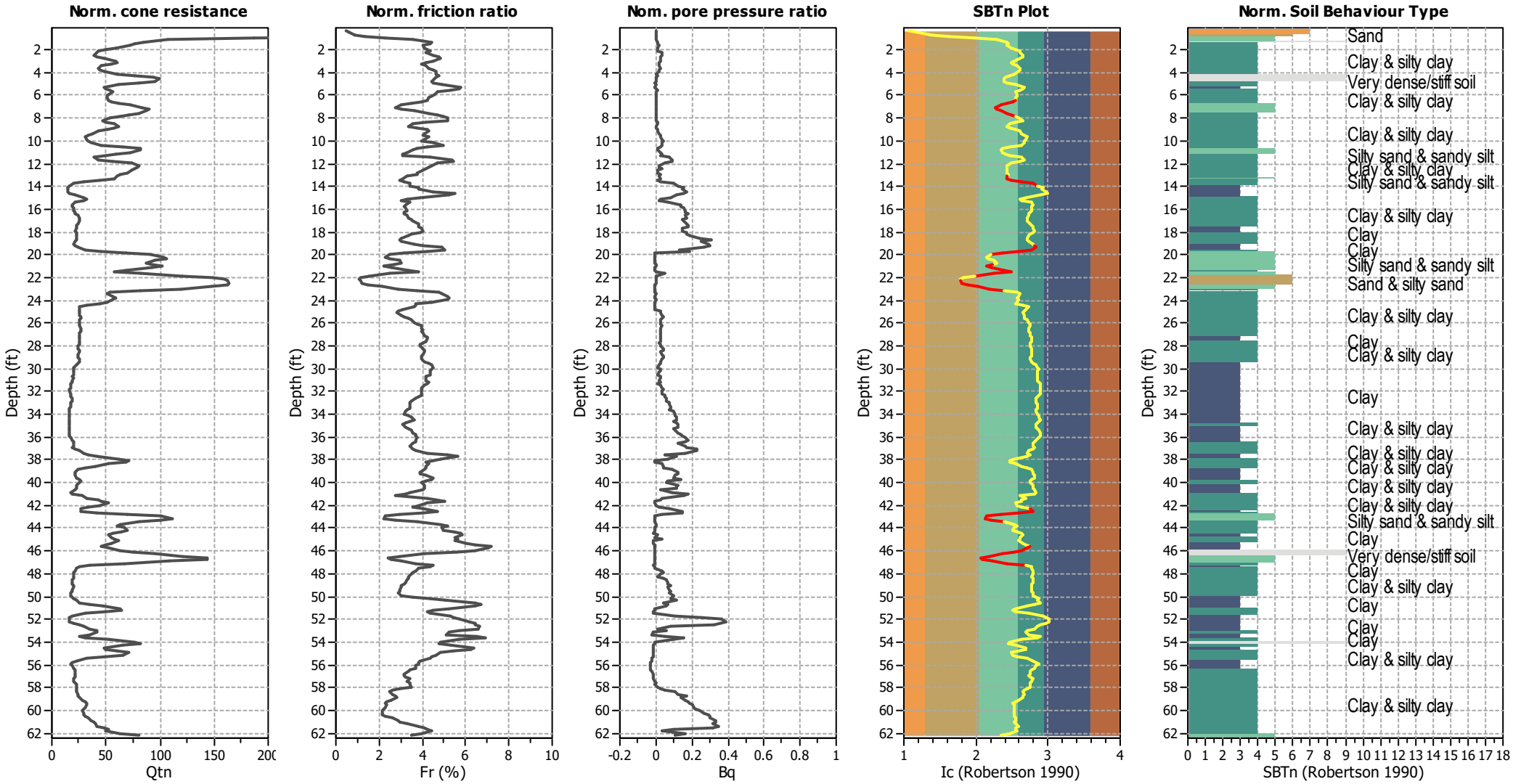
Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	13.00 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.12	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	1.13	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	13.00 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)



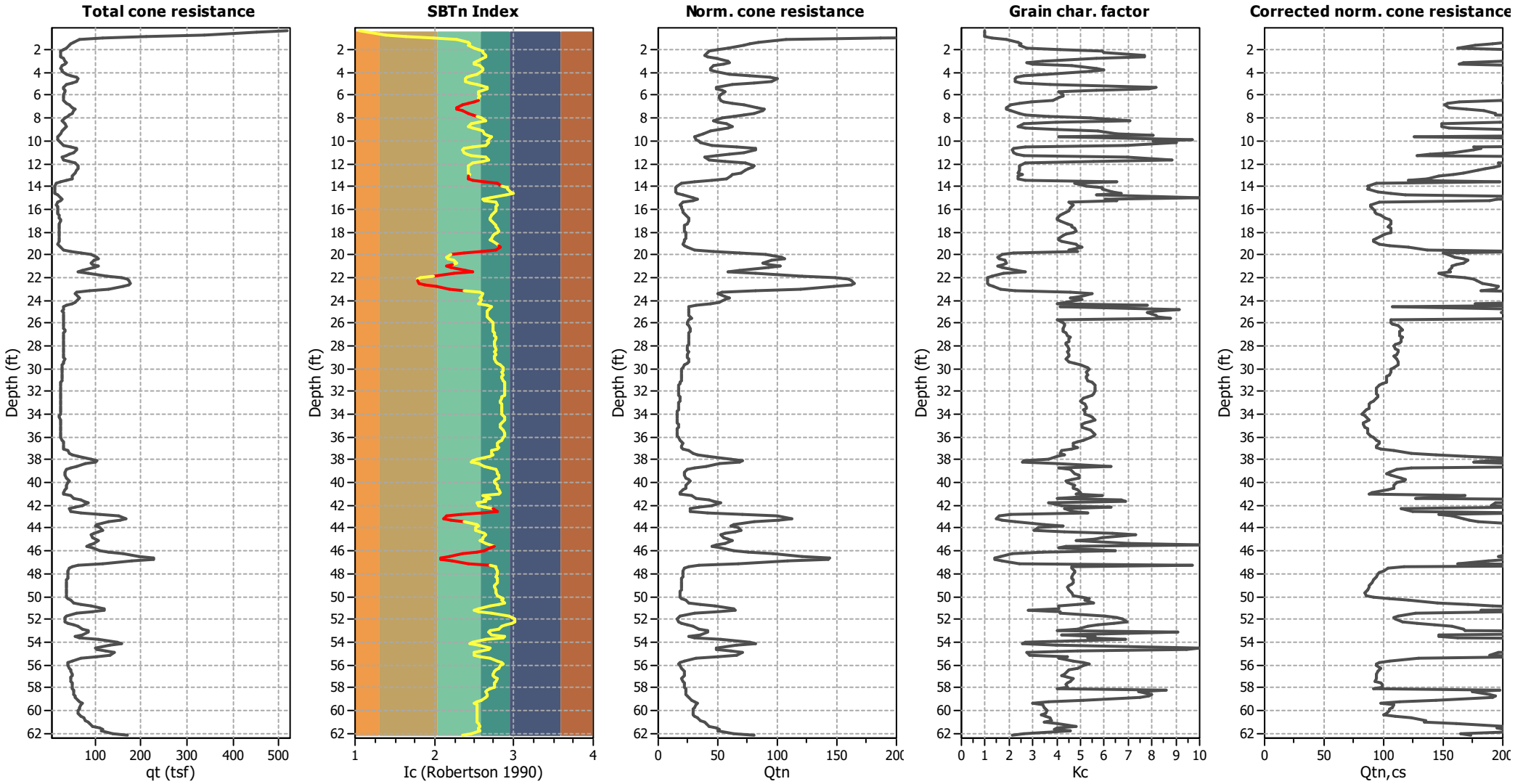
Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	13.00 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.12	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	1.13	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	13.00 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

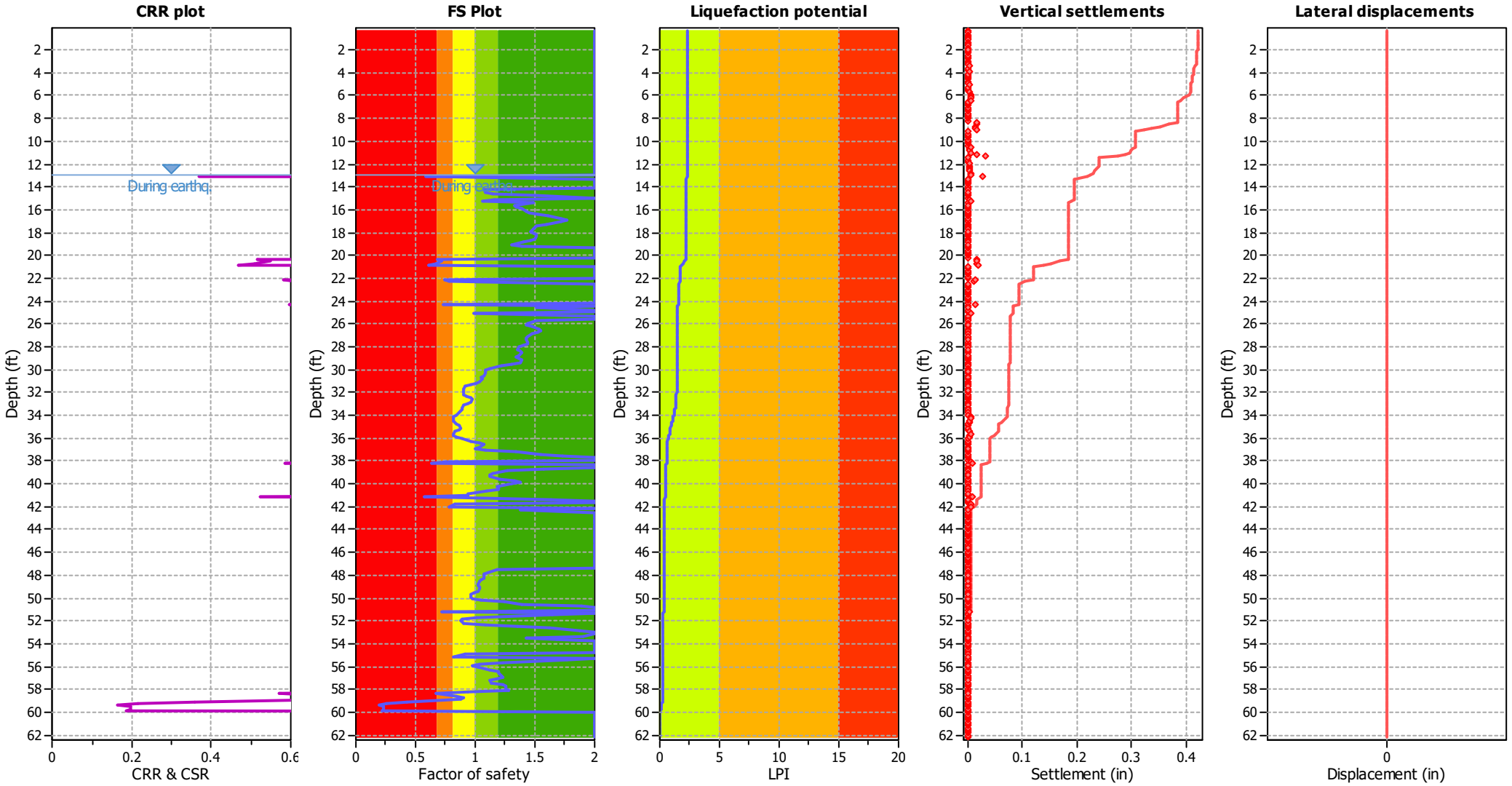
Liquefaction analysis overall plots (intermediate results)



Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	13.00 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.12	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	1.13	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	13.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	13.00 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.12	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	1.13	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	13.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

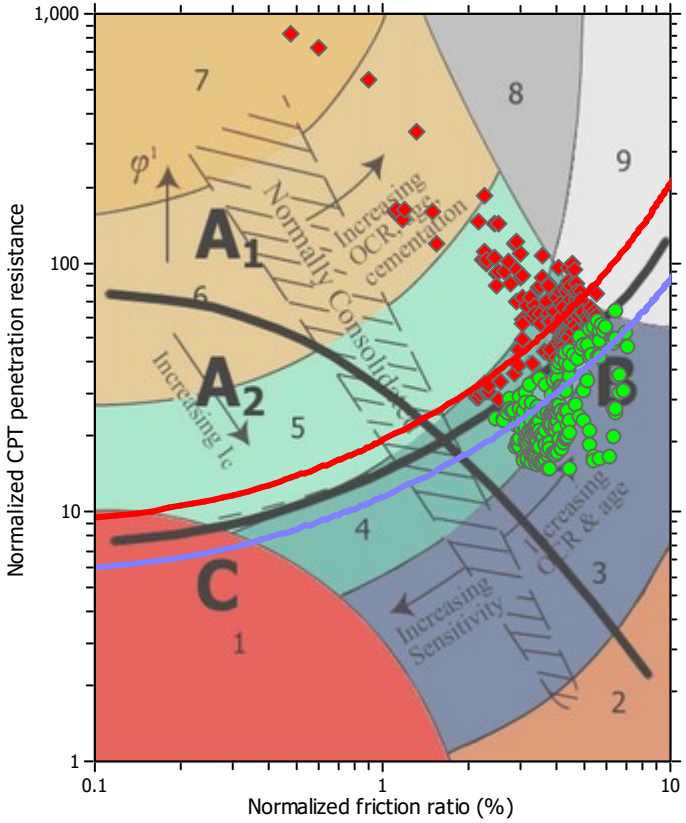
F.S. color scheme

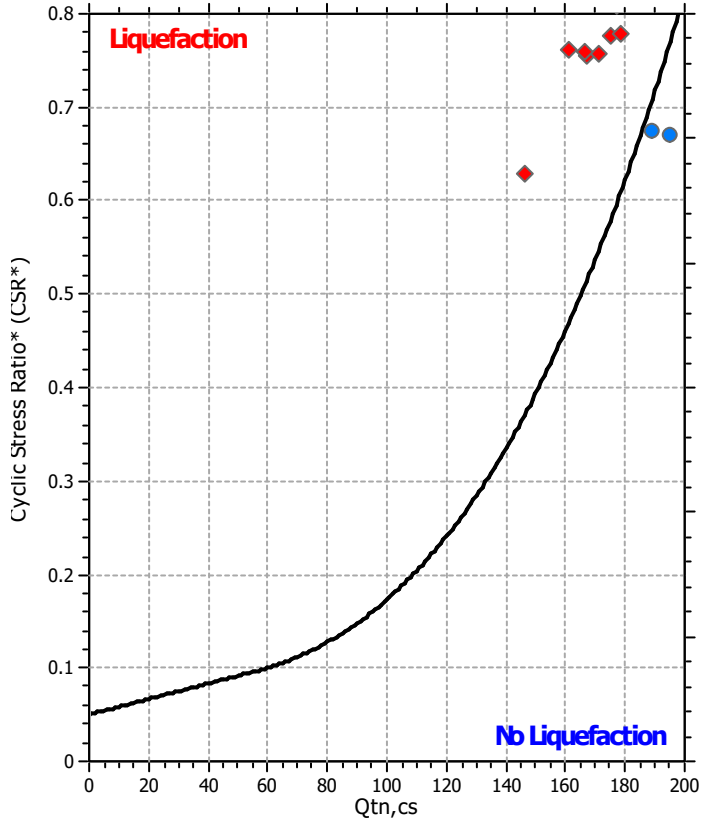
- Almost certain it will liquefy
- Very likely to liquefy
- Liquefaction and no liq. are equally likely
- Unlike to liquefy
- Almost certain it will not liquefy

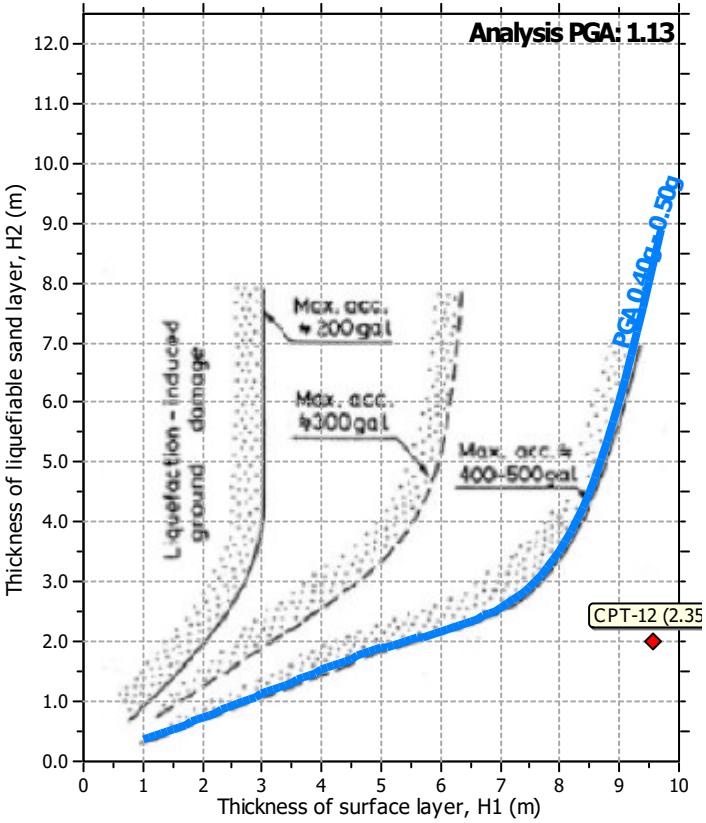
LPI color scheme

- Very high risk
- High risk
- Low risk

Liquefaction analysis summary plots



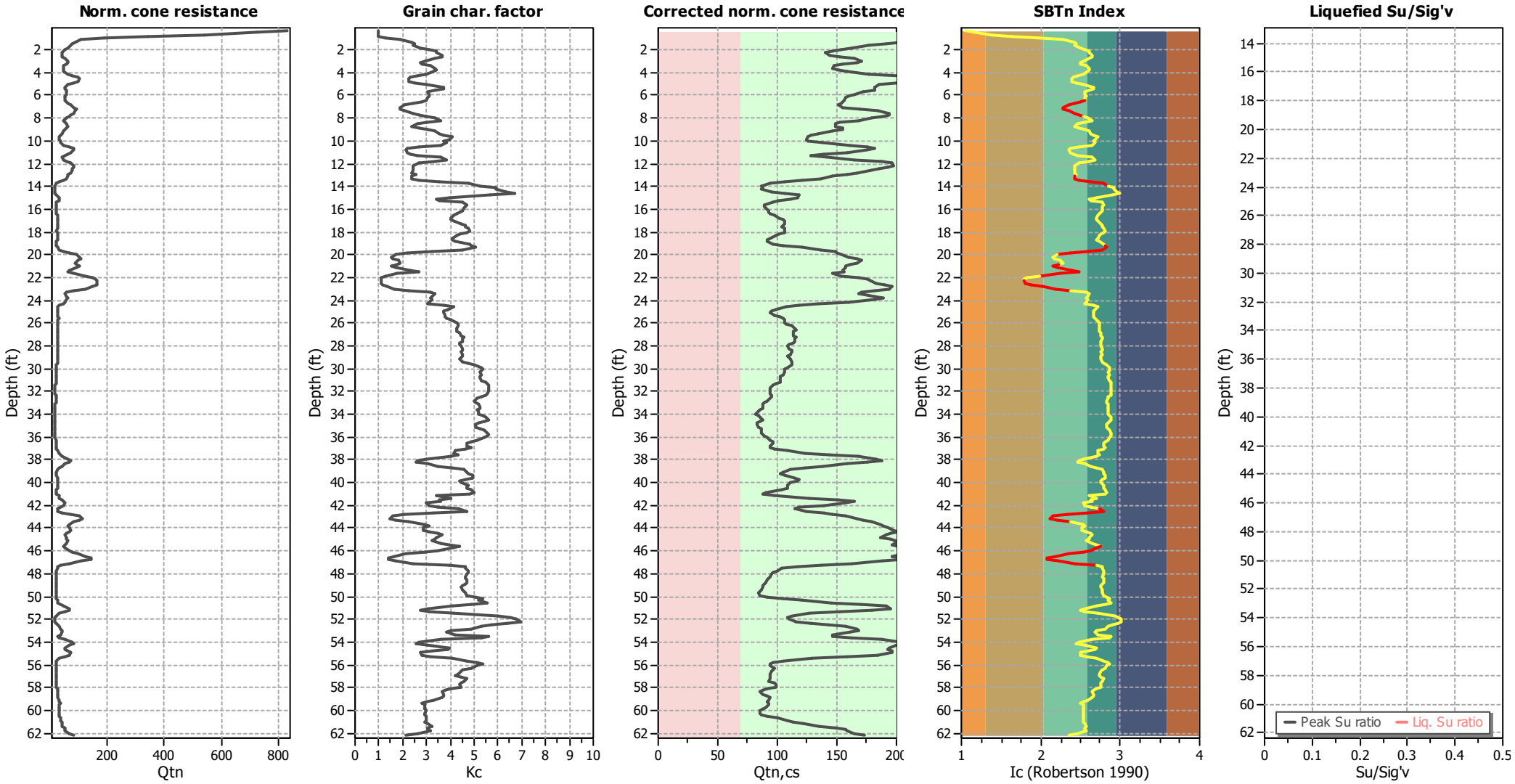




Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	13.00 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.12	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	1.13	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	13.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

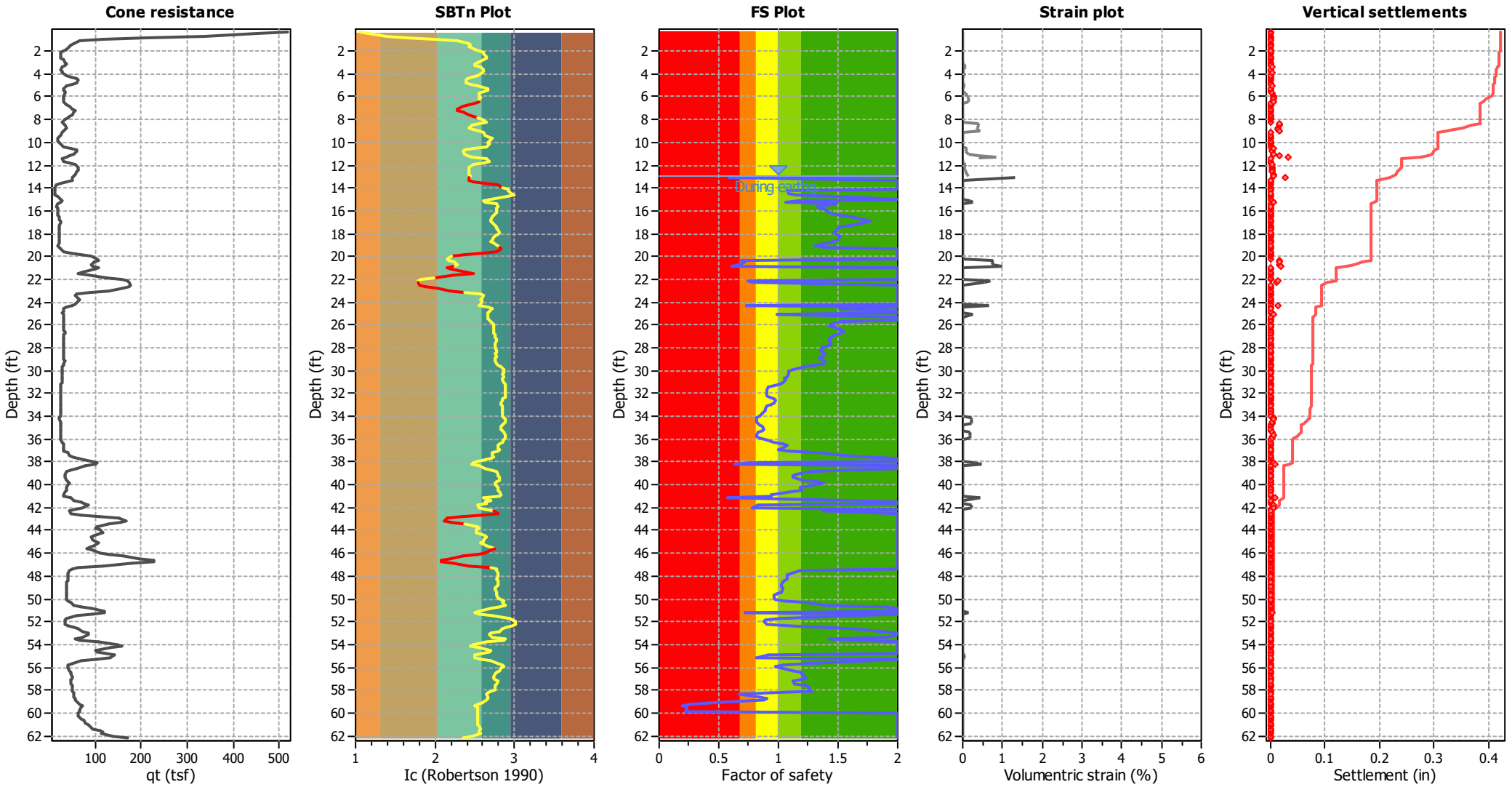
Check for strength loss plots (Robertson (2010))



Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	13.00 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.12	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	1.13	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	13.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

Estimation of post-earthquake settlements



Abbreviations

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

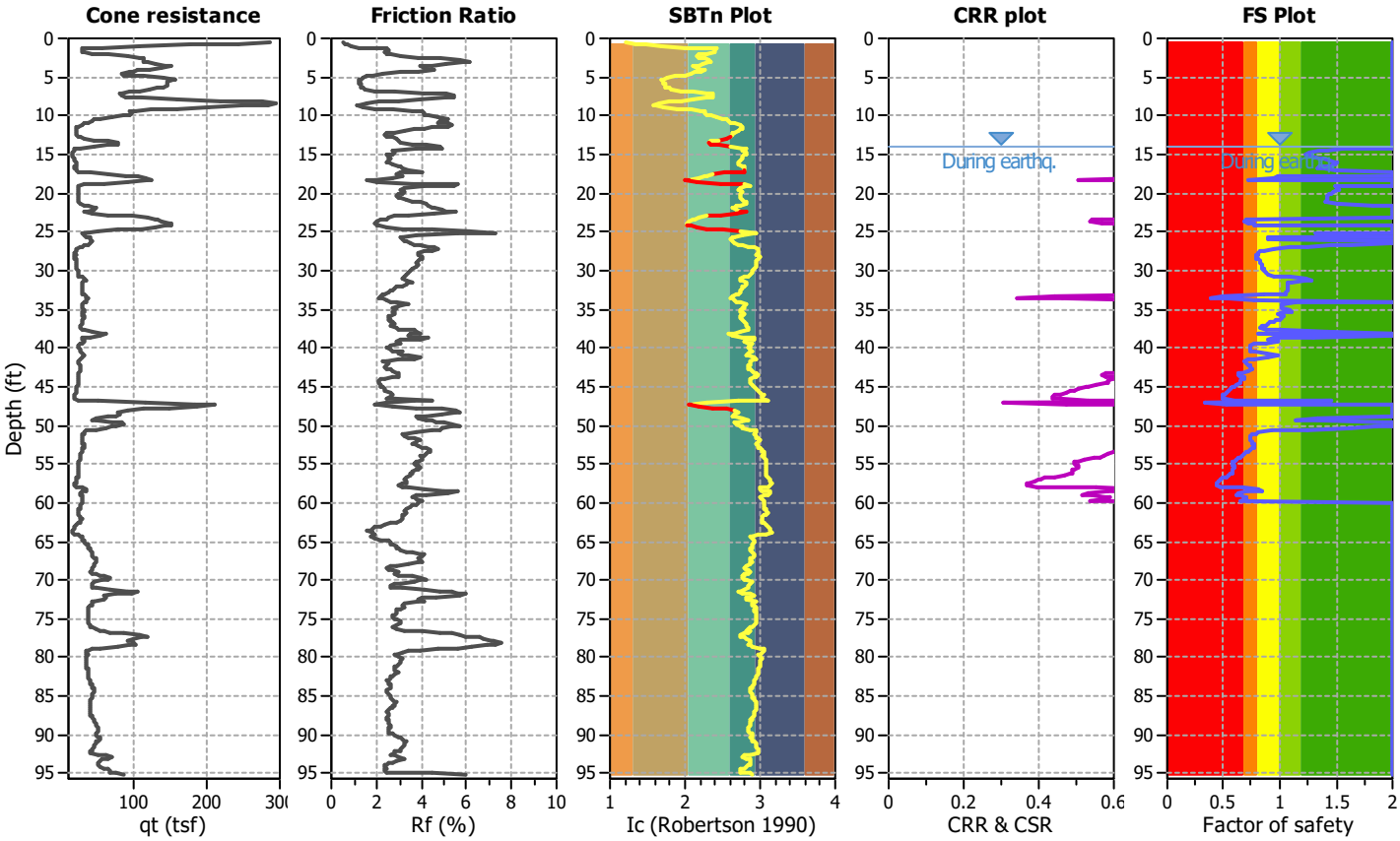
LIQUEFACTION ANALYSIS REPORT

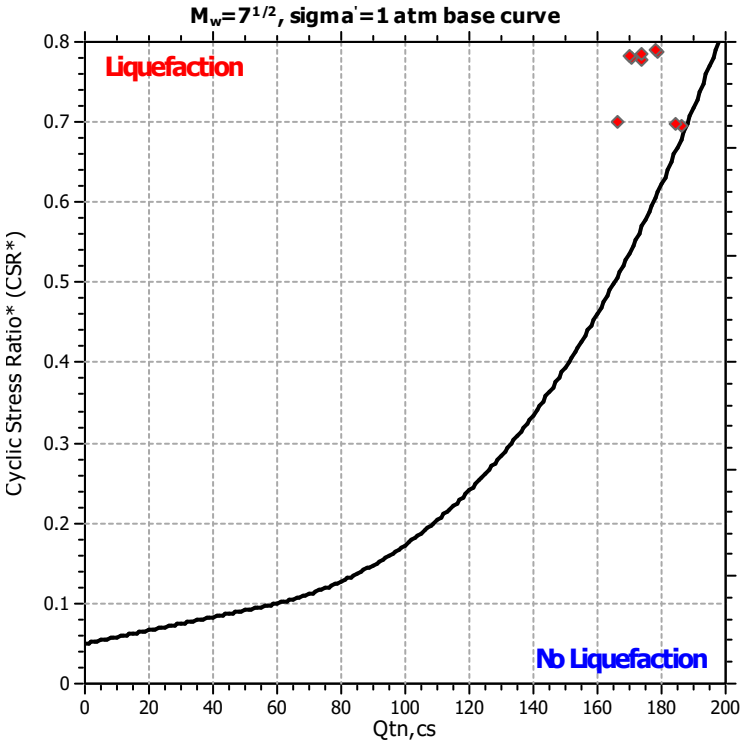
Project title : Crockers Lockers **Location : Watsonville**

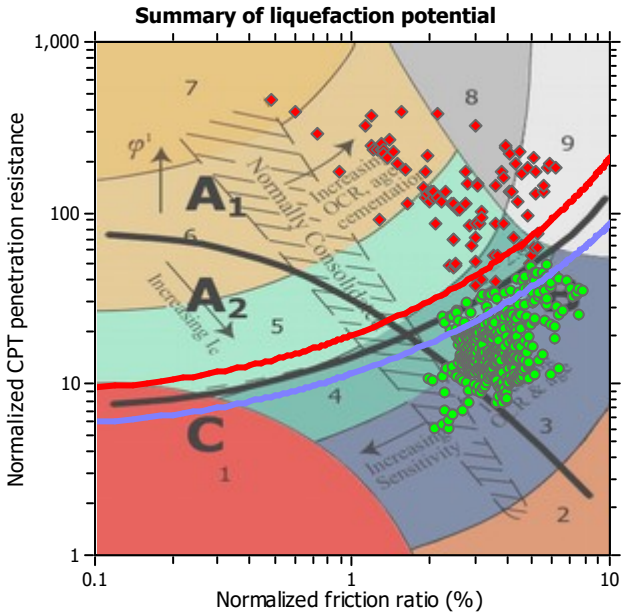
CPT file : CPT-13

Input parameters and analysis data

Analysis method:	Robertson (2009)	G.W.T. (in-situ):	14.00 ft	Use fill:	No	Clay like behavior applied:	All soils
Fines correction method:	Robertson (2009)	G.W.T. (earthq.):	14.00 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:	7.12	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method based
Peak ground acceleration:	1.13	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

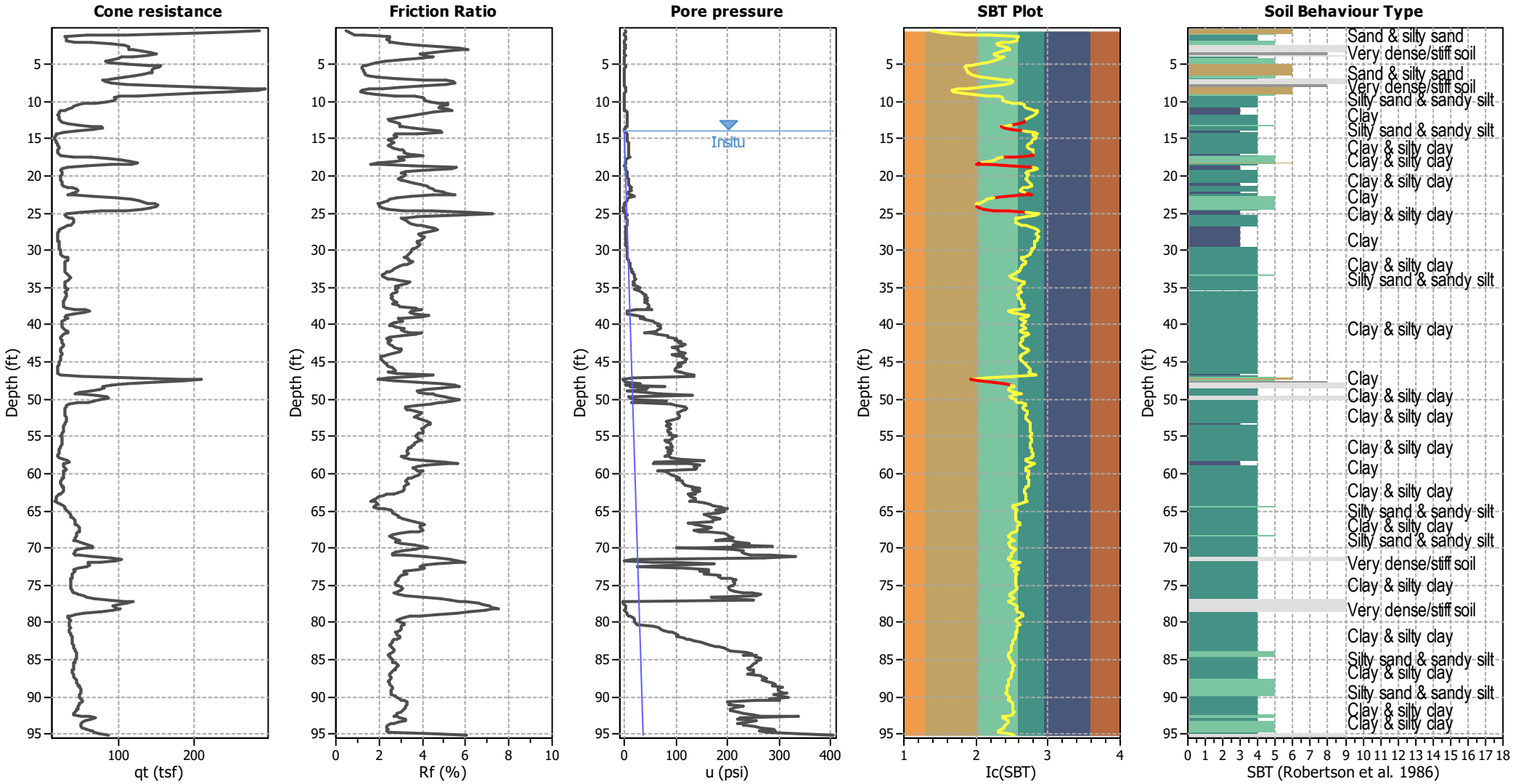






Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and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

CPT basic interpretation plots



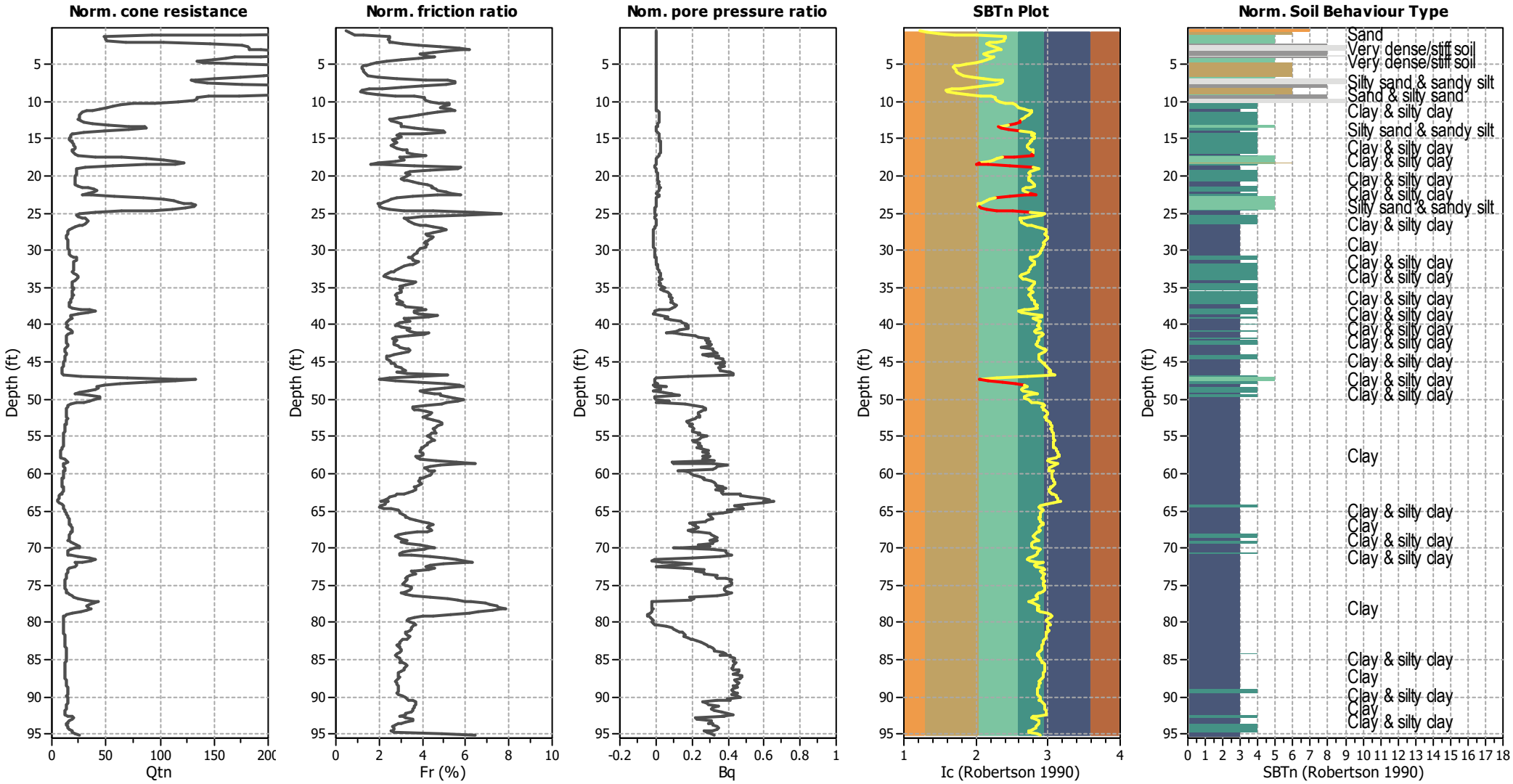
Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	14.00 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.12	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	1.13	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	14.00 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)



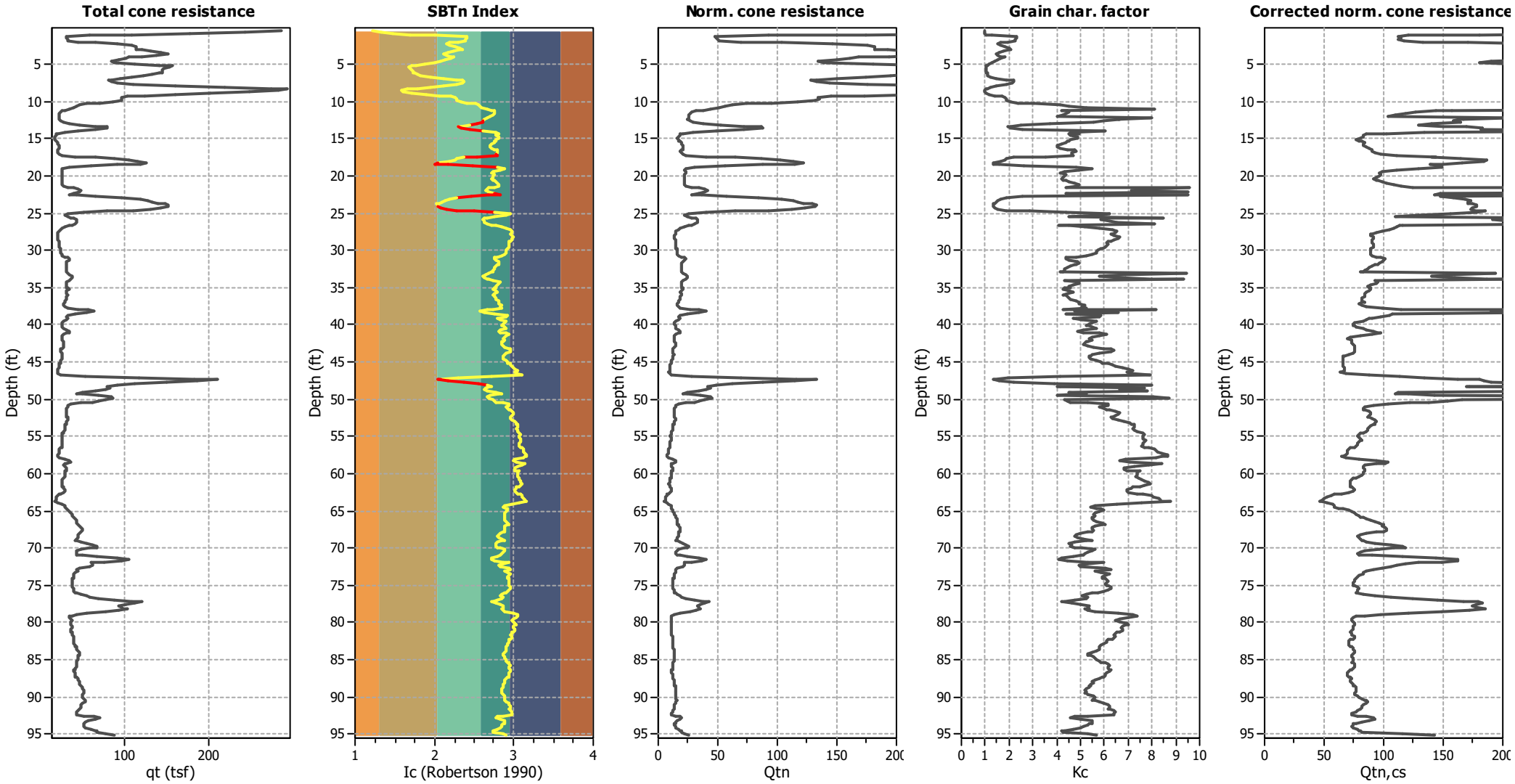
Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	14.00 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.12	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	1.13	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	14.00 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

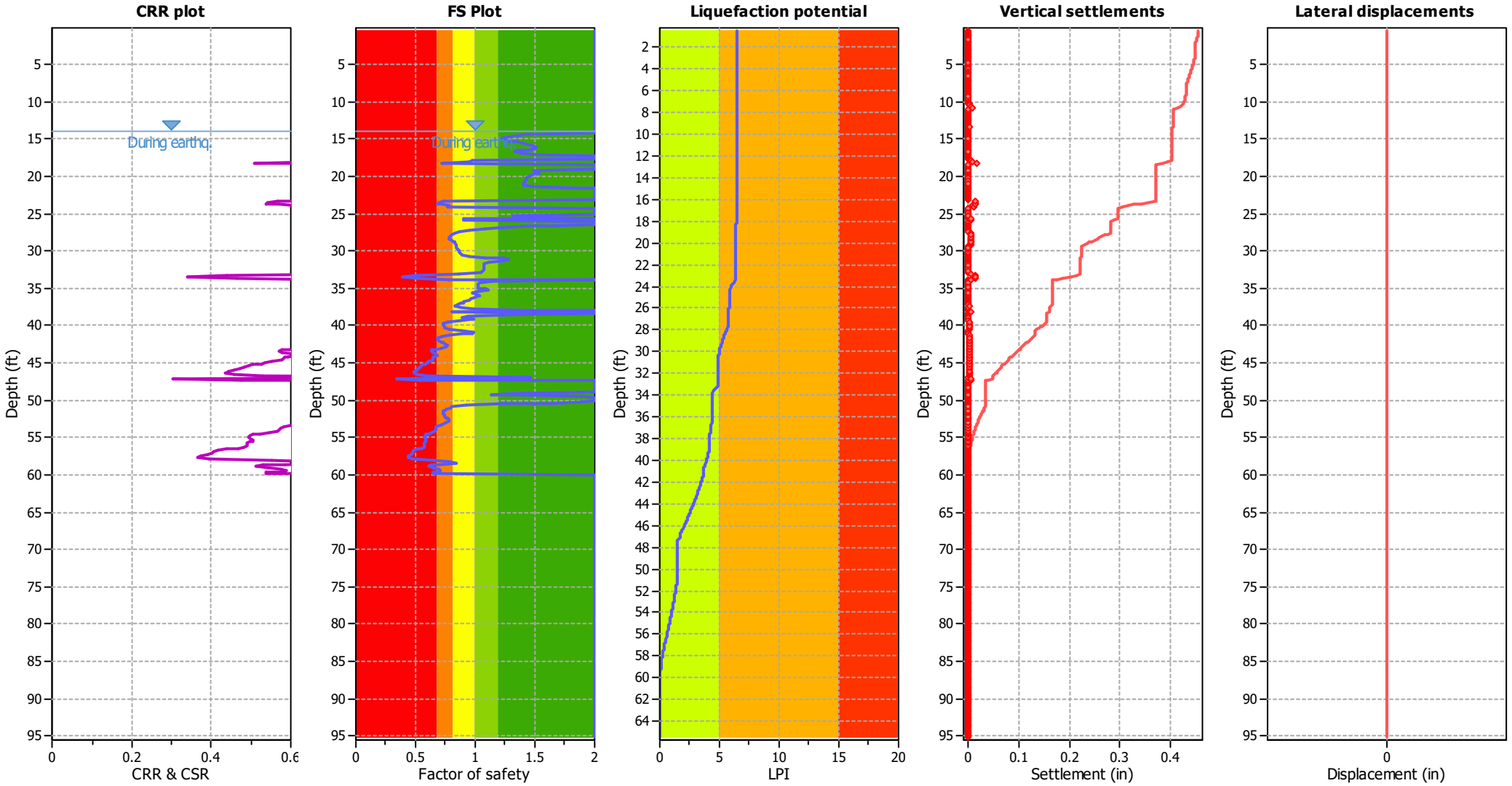
Liquefaction analysis overall plots (intermediate results)



Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	14.00 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.12	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	1.13	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	14.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	14.00 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.12	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	1.13	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	14.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

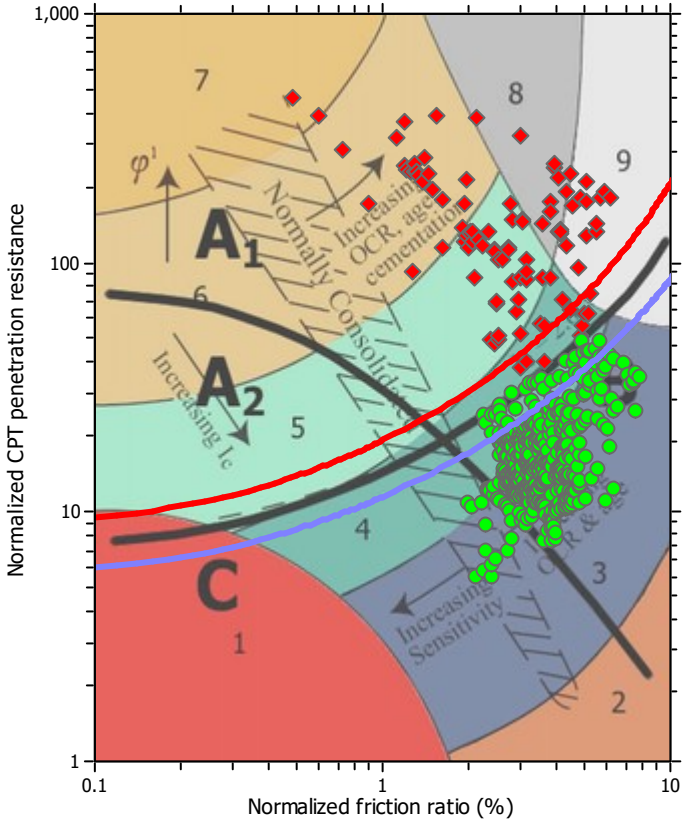
F.S. color scheme

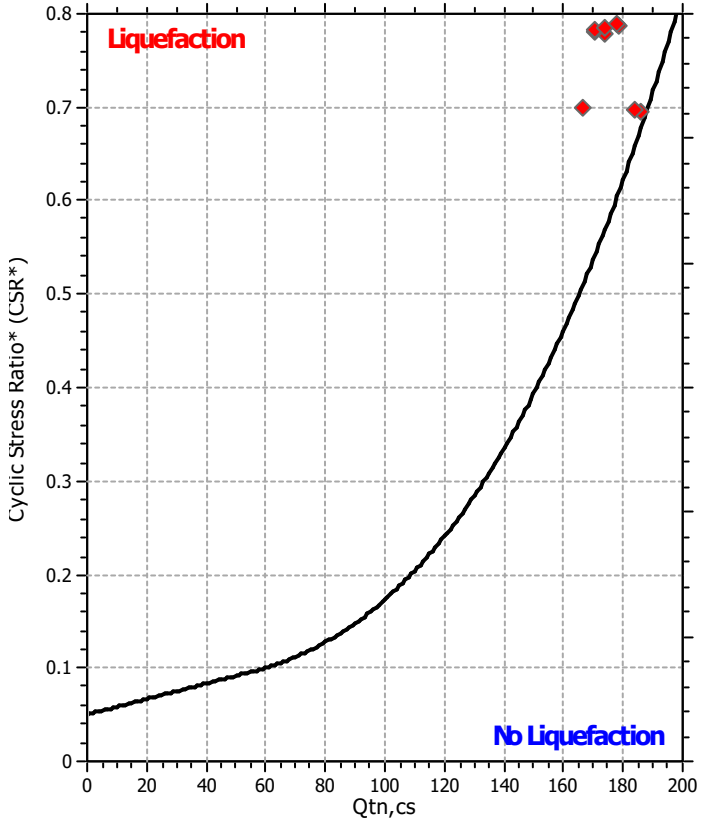
- Almost certain it will liquefy
- Very likely to liquefy
- Liquefaction and no liq. are equally likely
- Unlike to liquefy
- Almost certain it will not liquefy

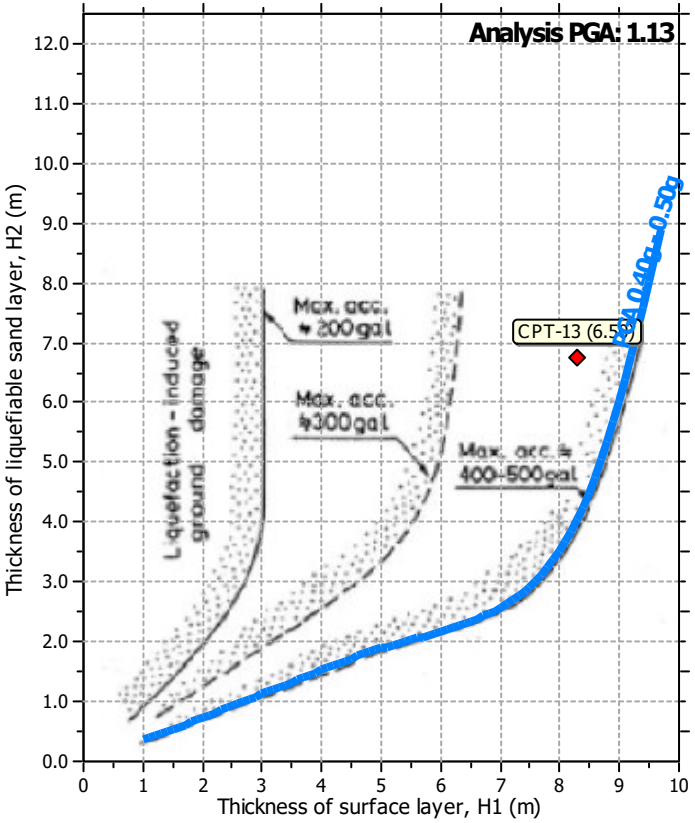
LPI color scheme

- Very high risk
- High risk
- Low risk

Liquefaction analysis summary plots



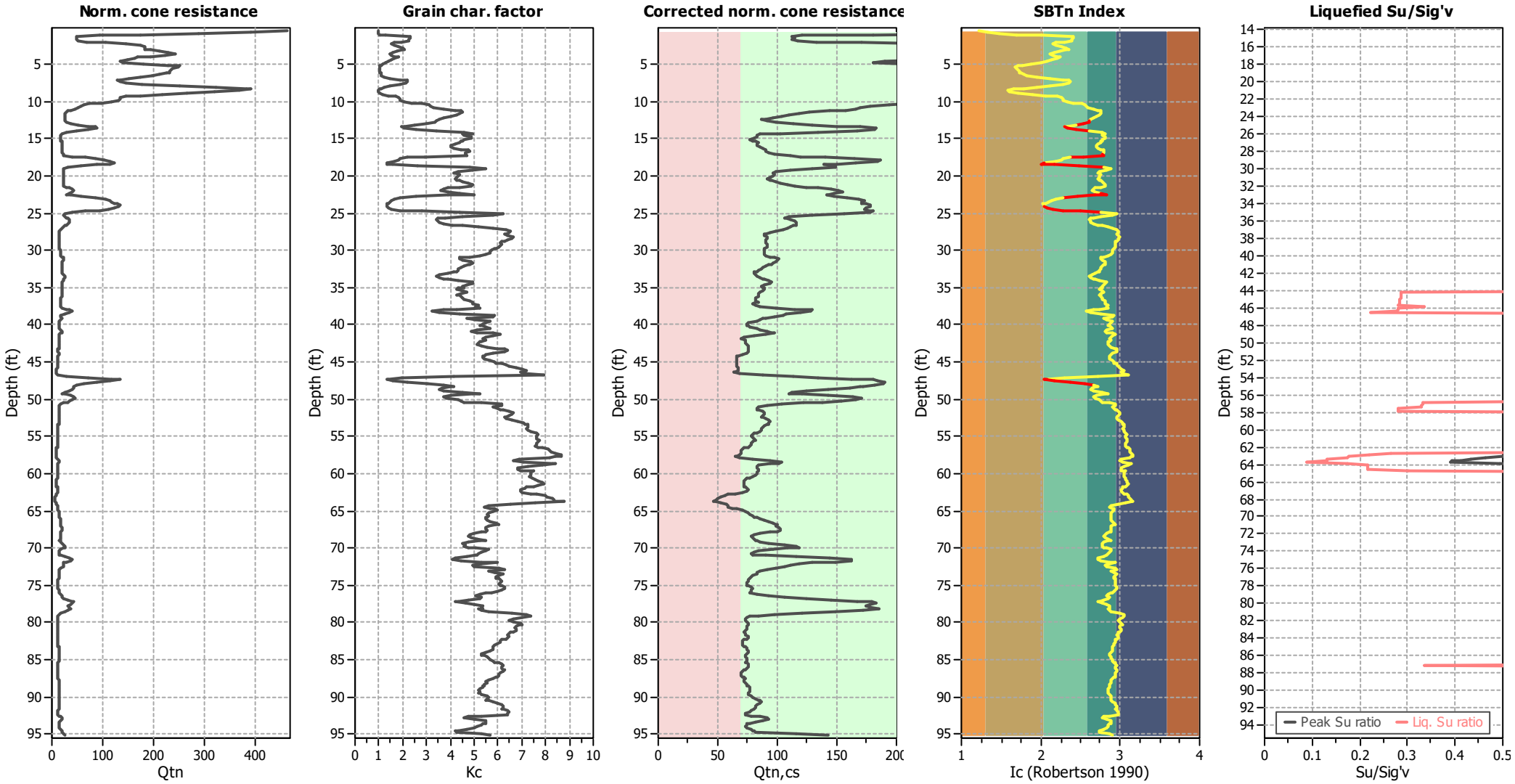




Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	14.00 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.12	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	1.13	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	14.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

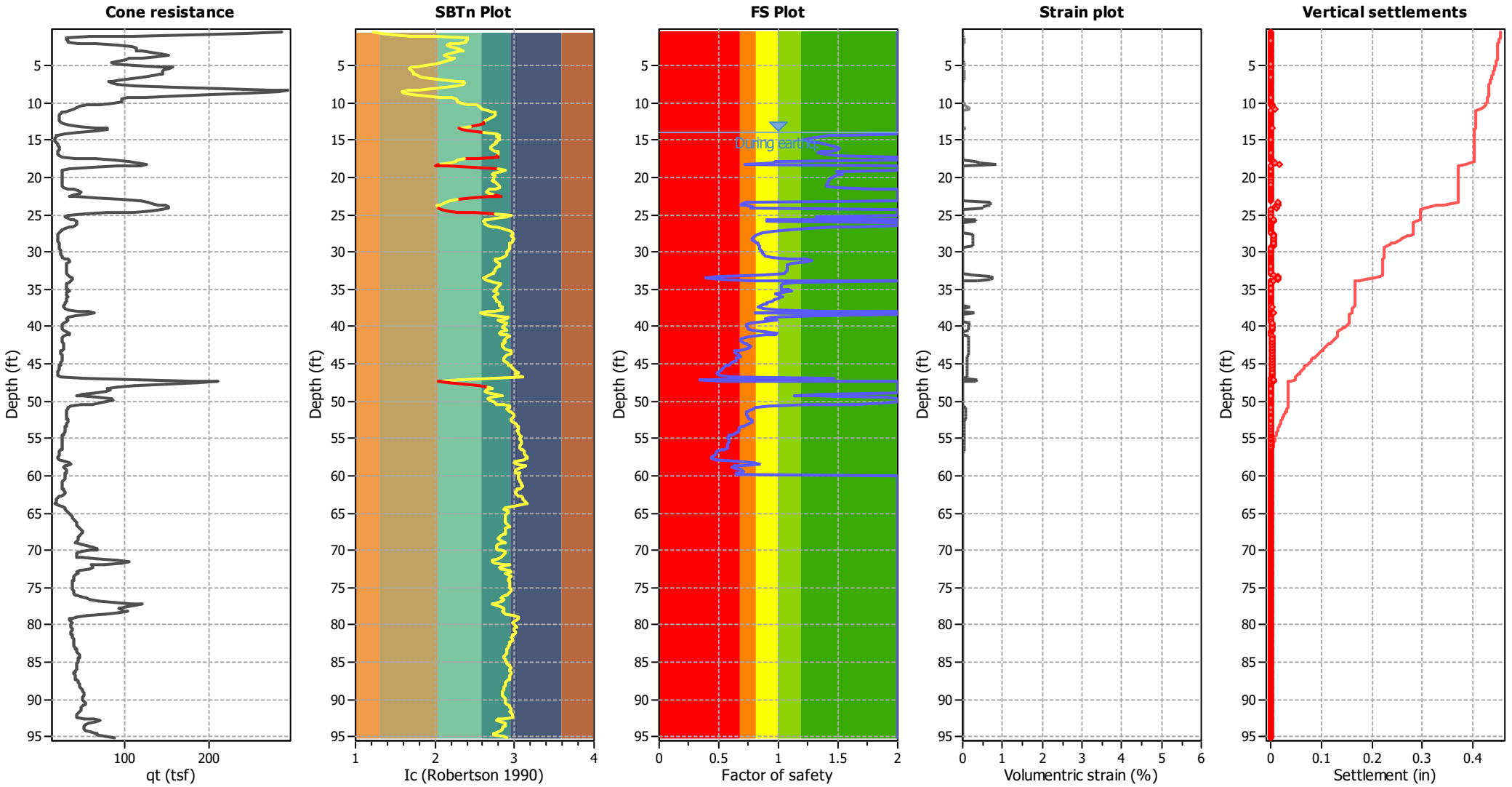
Check for strength loss plots (Robertson (2010))



Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	14.00 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.12	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	1.13	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	14.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

Estimation of post-earthquake settlements



Abbreviations

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

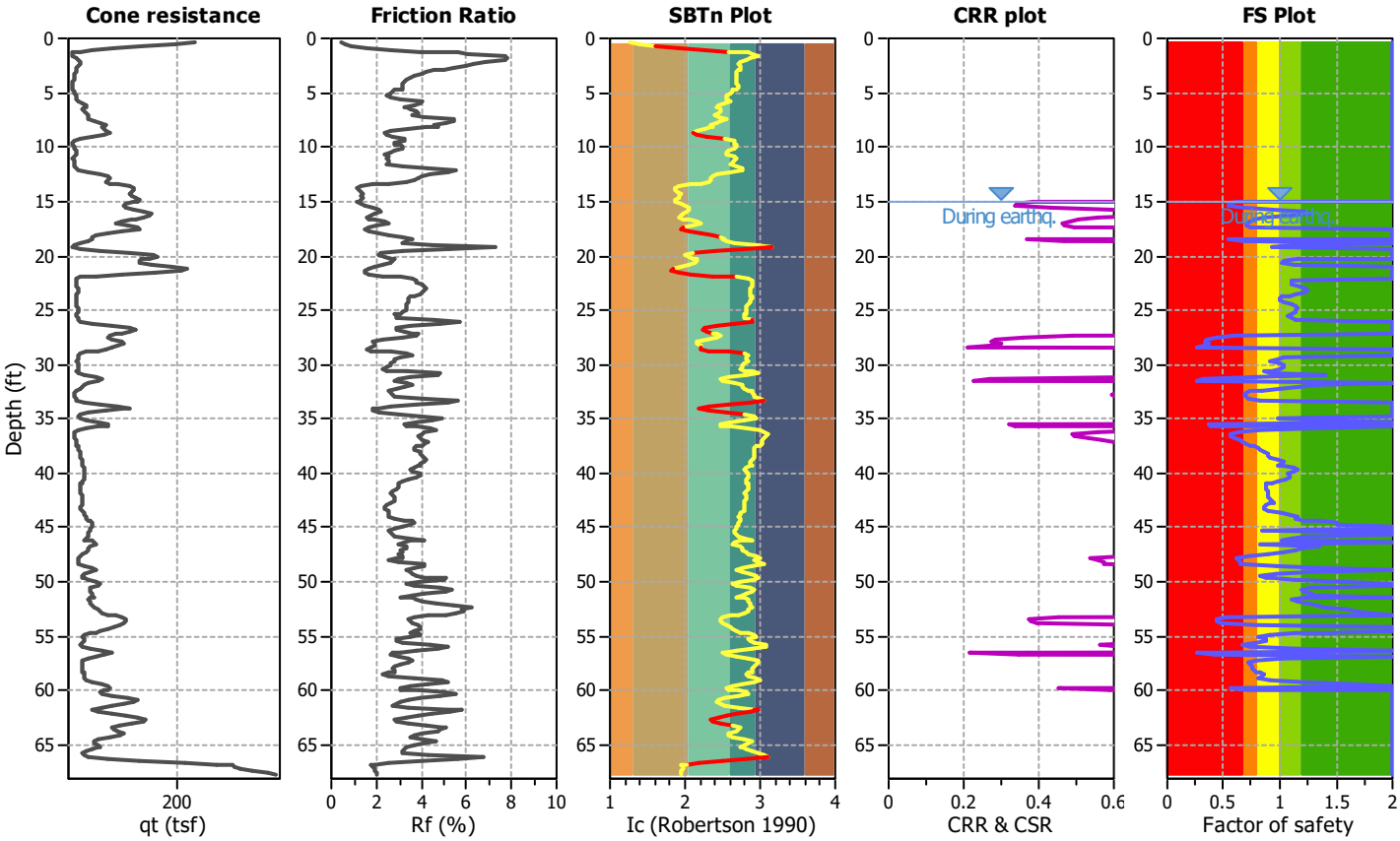
LIQUEFACTION ANALYSIS REPORT

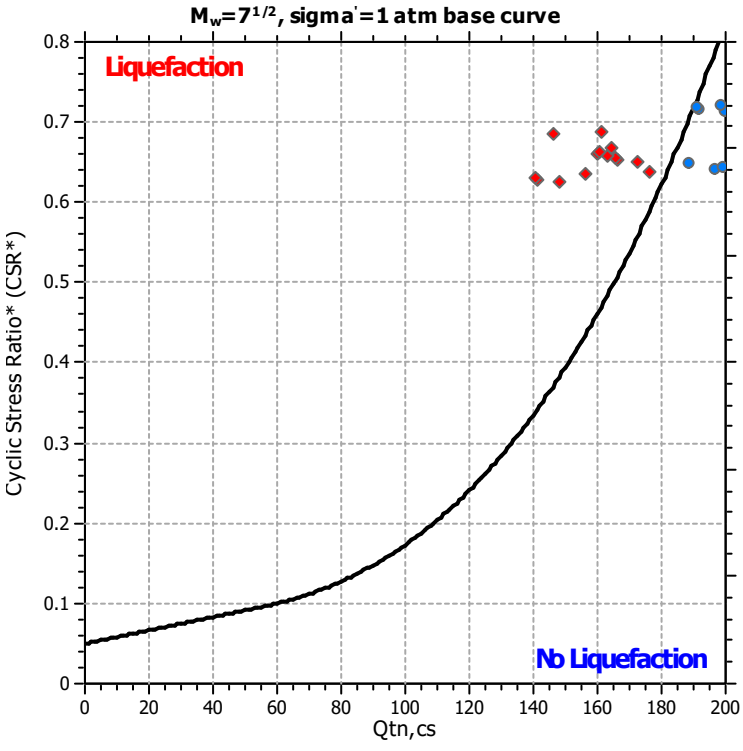
Project title : Crockers Lockers **Location : Watsonville**

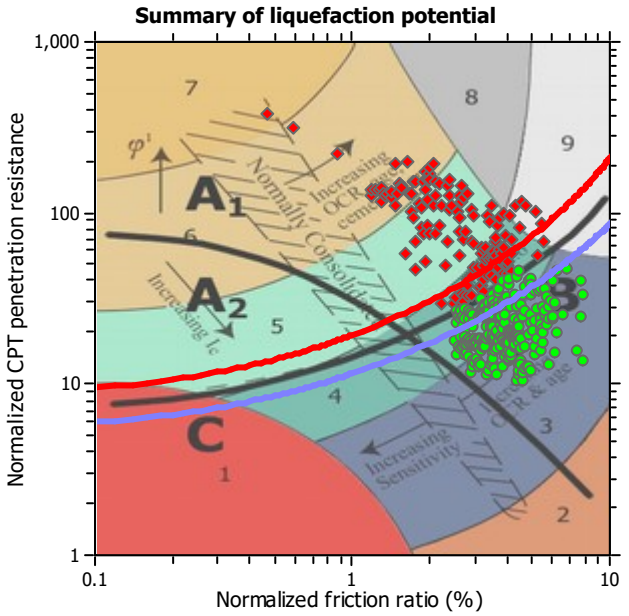
CPT file : CPT-14

Input parameters and analysis data

Analysis method:	Robertson (2009)	G.W.T. (in-situ):	15.00 ft	Use fill:	No	Clay like behavior applied:	All soils
Fines correction method:	Robertson (2009)	G.W.T. (earthq.):	15.00 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:	7.12	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method based
Peak ground acceleration:	1.13	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

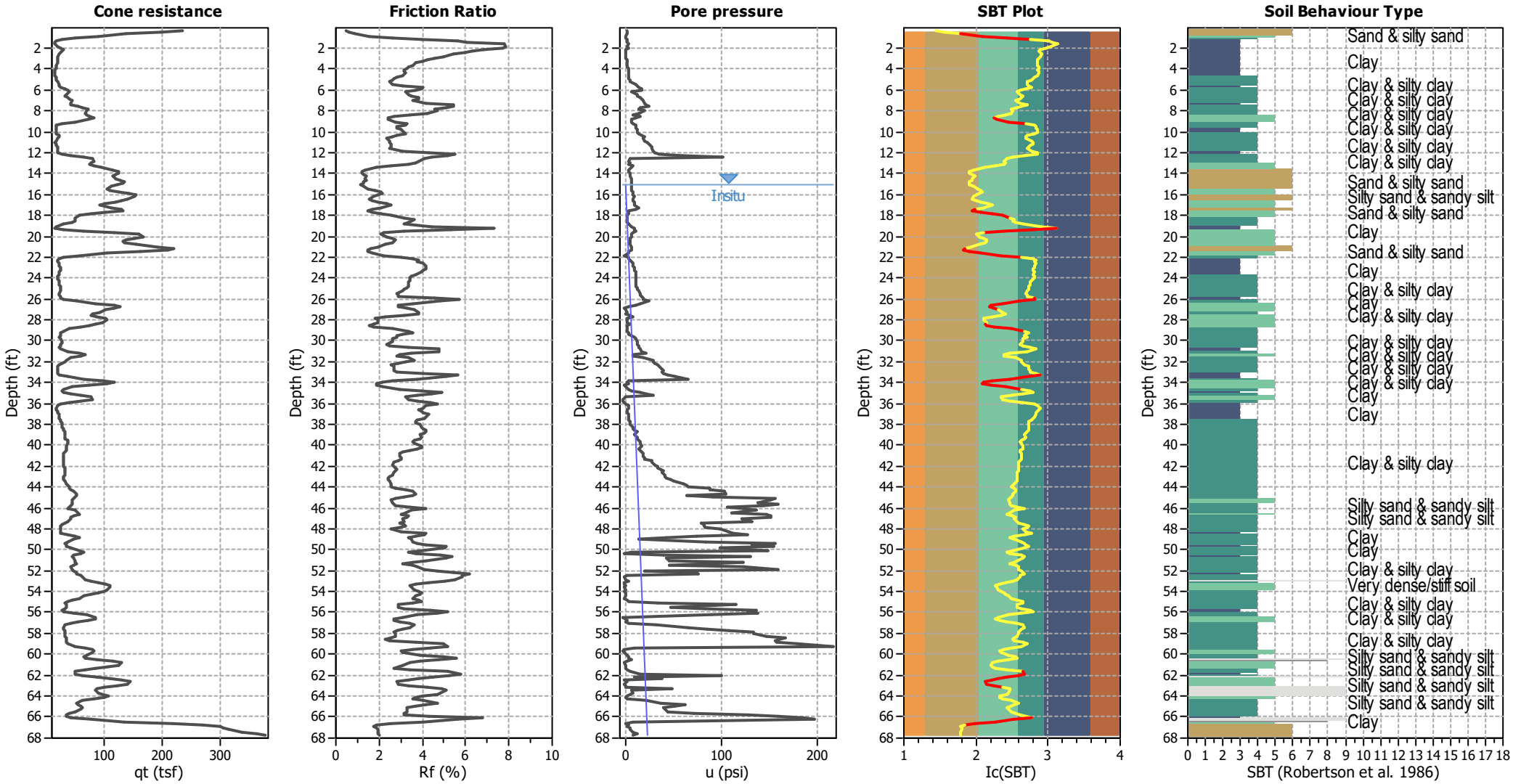






Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and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

CPT basic interpretation plots



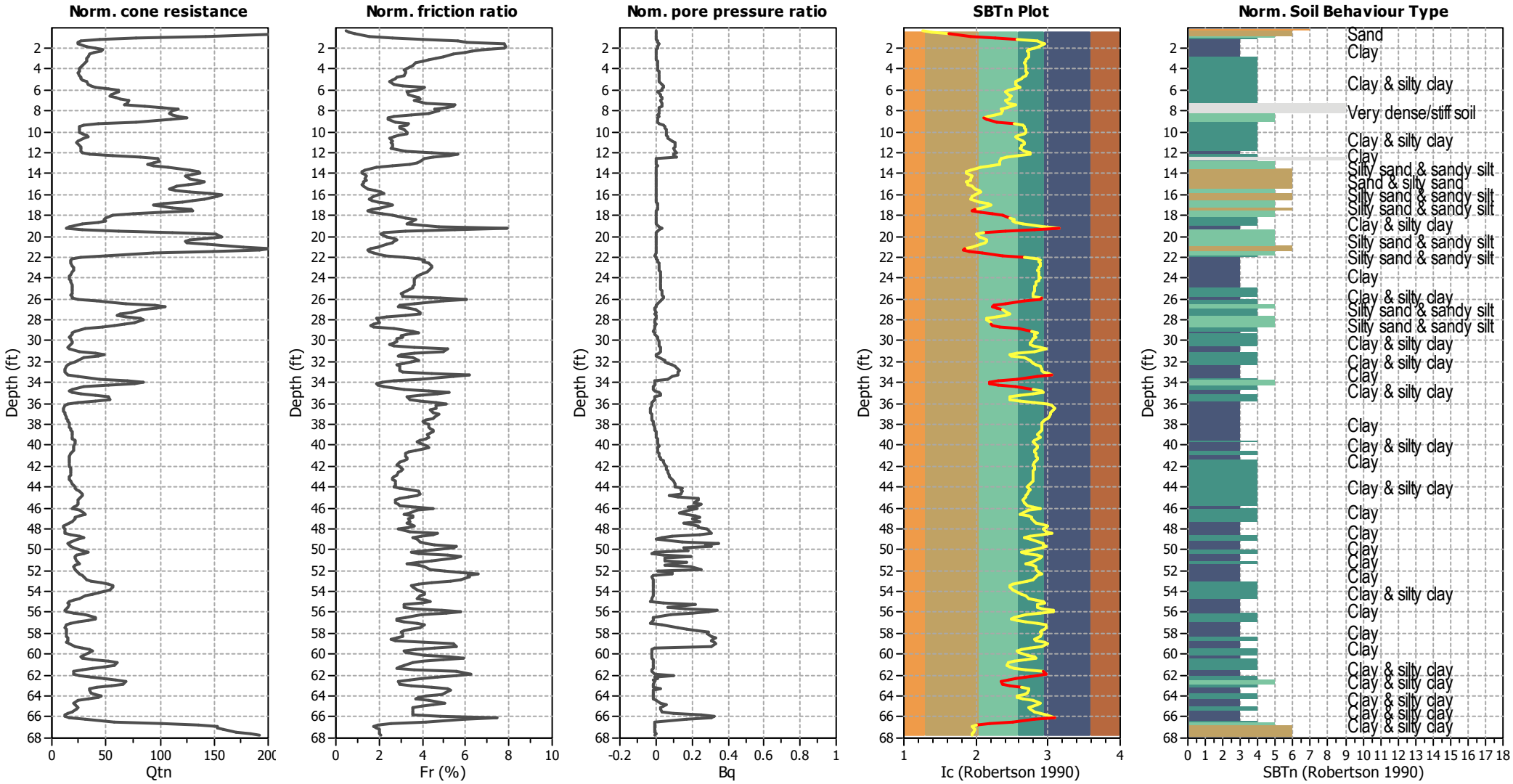
Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	15.00 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.12	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	1.13	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	15.00 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)



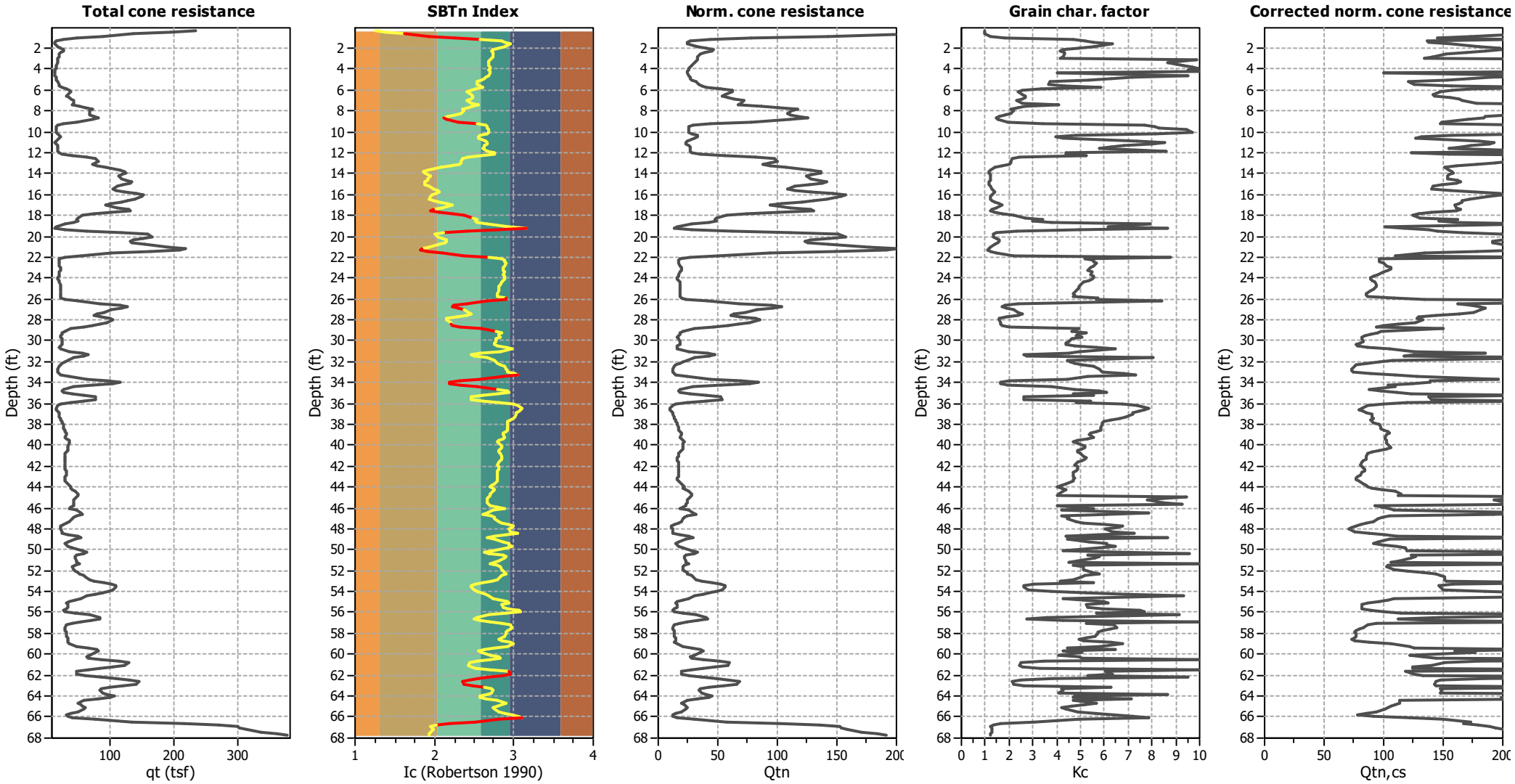
Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	15.00 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.12	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	1.13	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	15.00 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

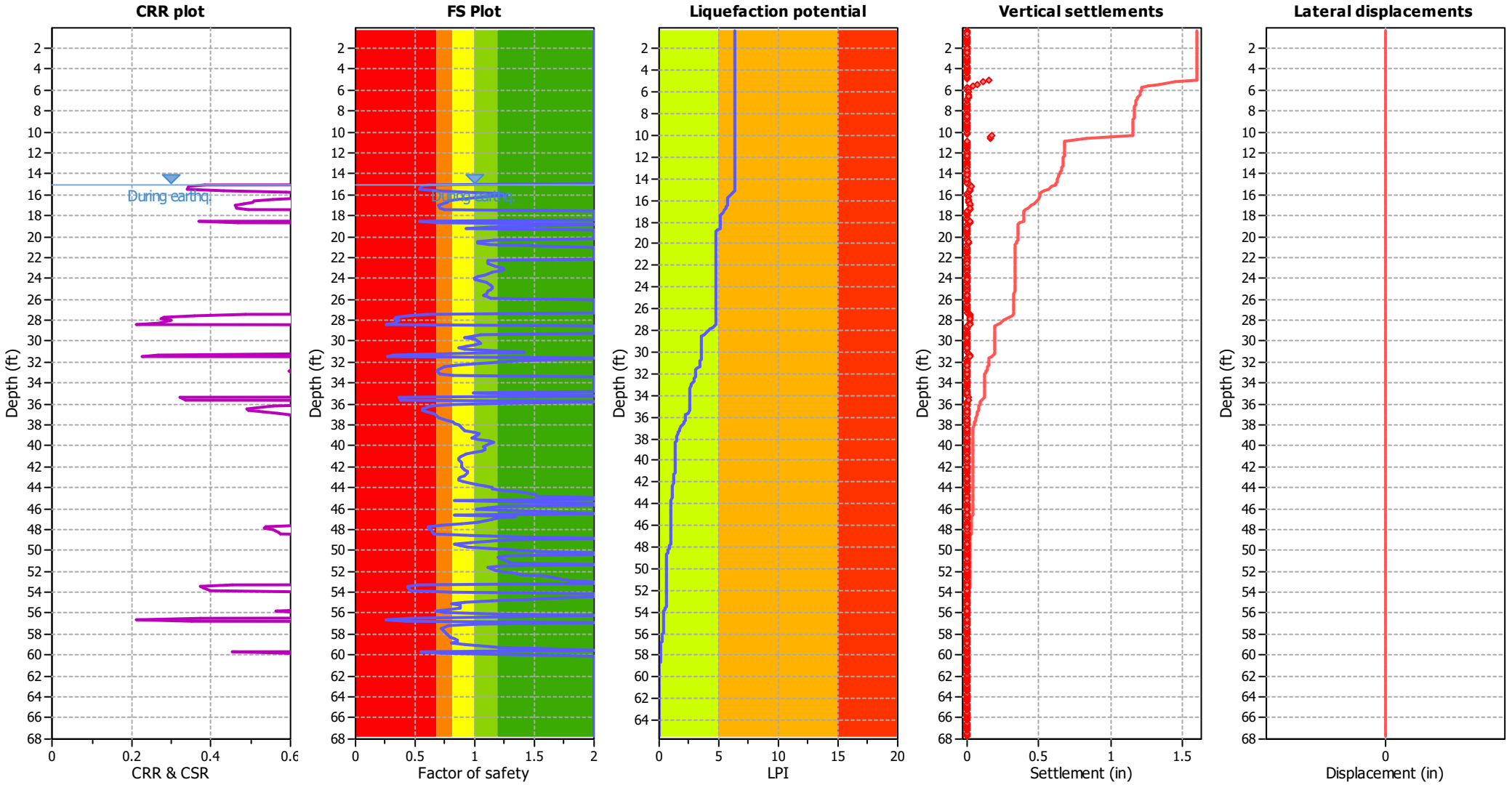
Liquefaction analysis overall plots (intermediate results)



Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	15.00 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.12	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	1.13	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	15.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	15.00 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.12	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	1.13	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	15.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

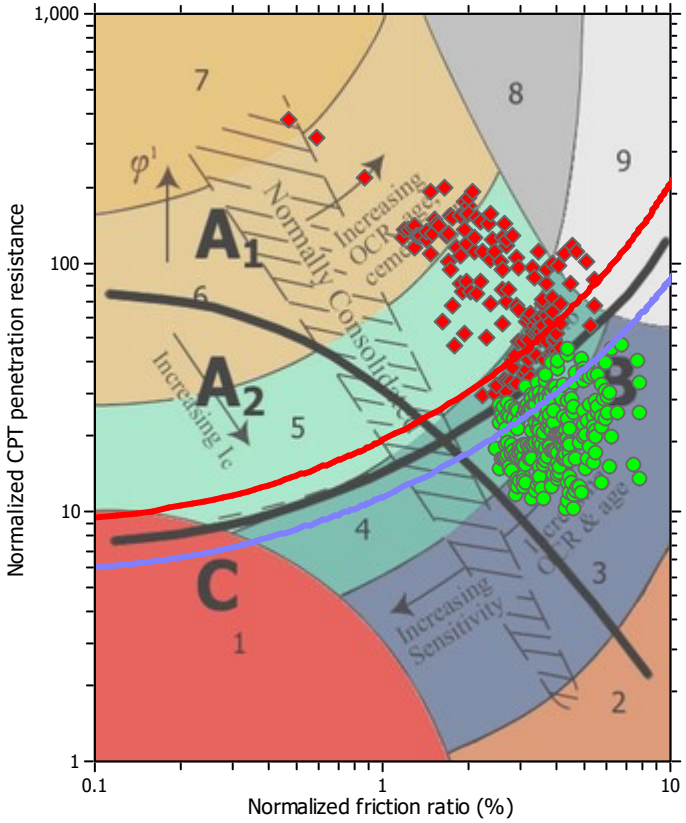
F.S. color scheme

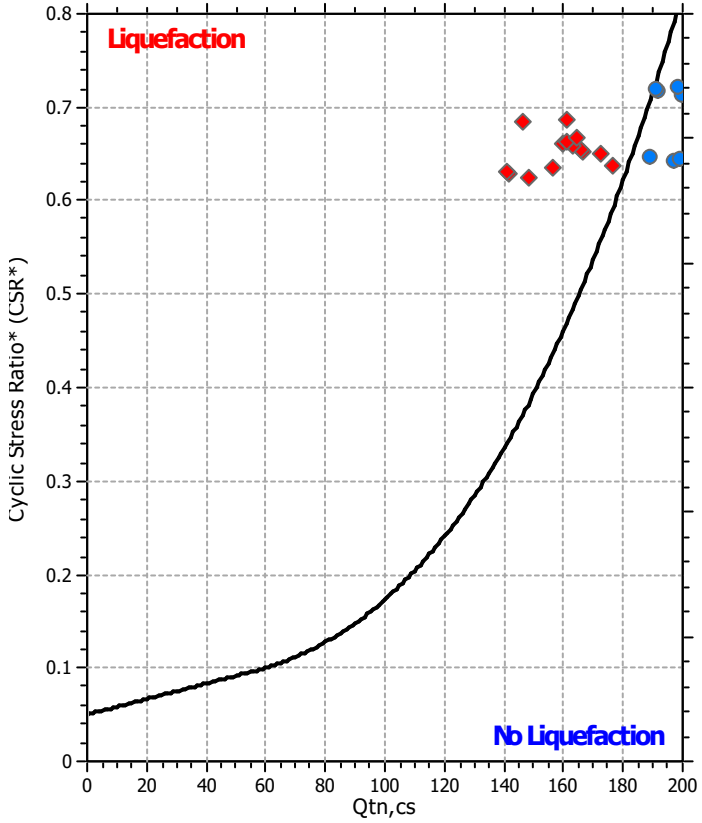
- Almost certain it will liquefy
- Very likely to liquefy
- Liquefaction and no liq. are equally likely
- Unlike to liquefy
- Almost certain it will not liquefy

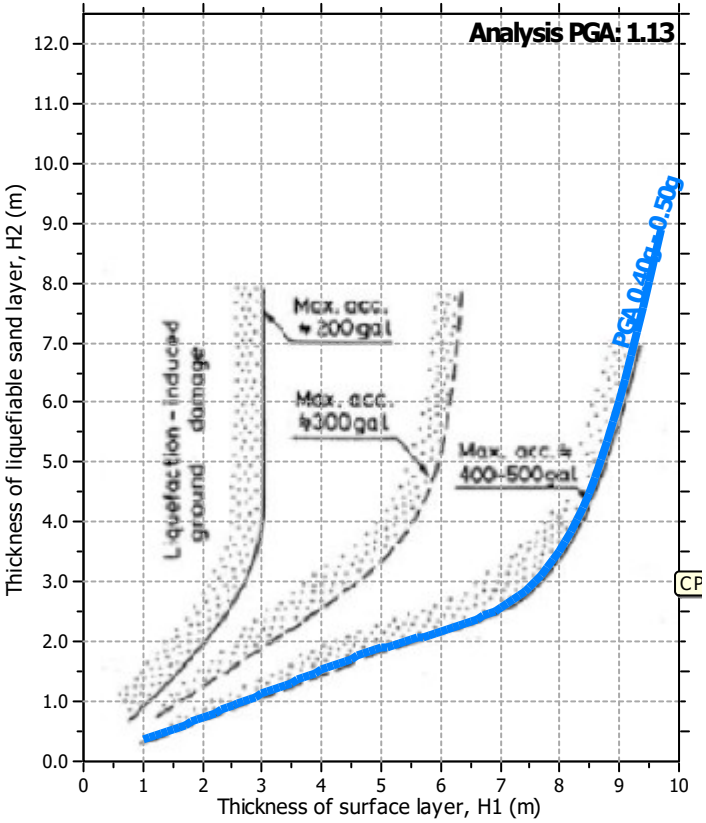
LPI color scheme

- Very high risk
- High risk
- Low risk

Liquefaction analysis summary plots



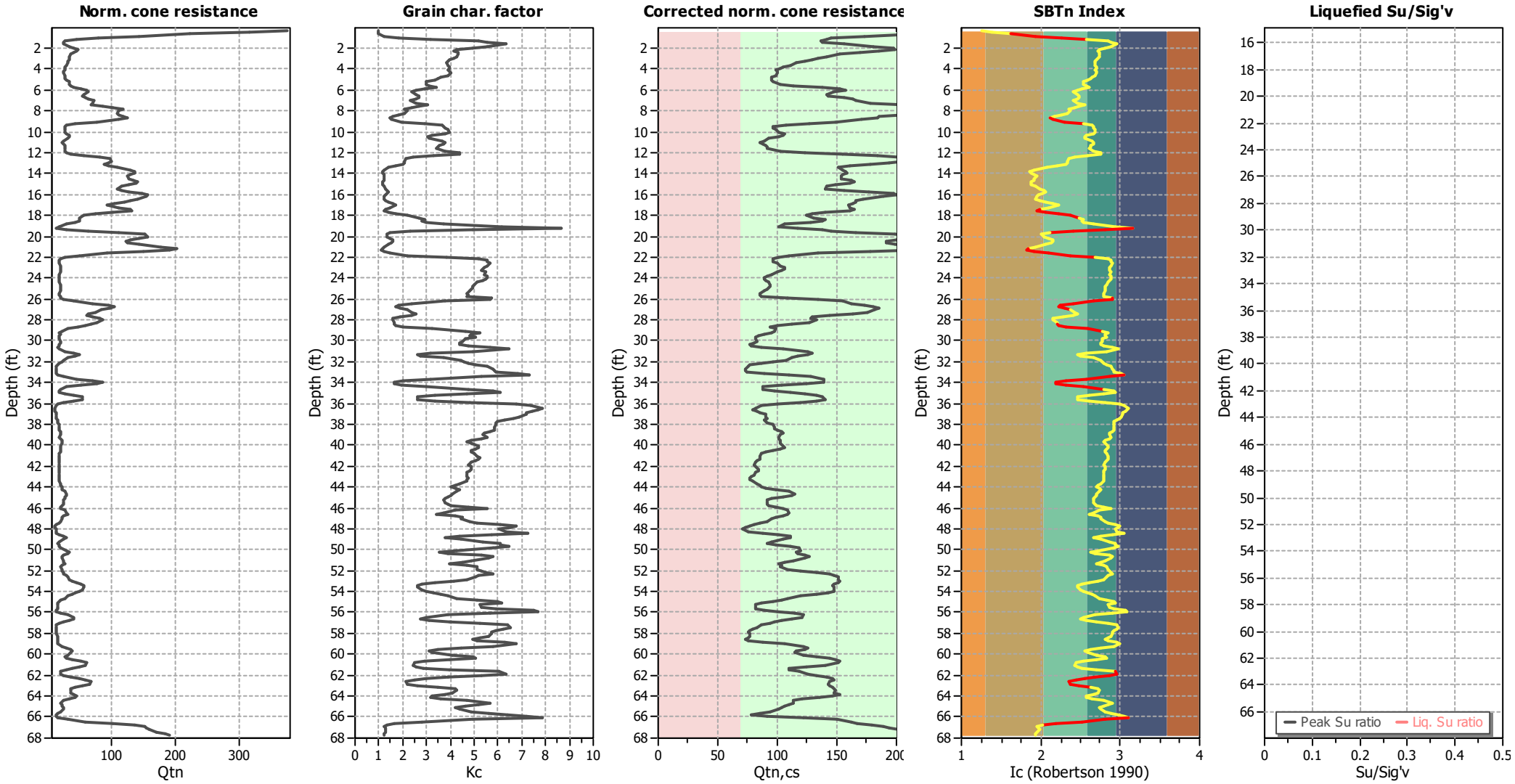




Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	15.00 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.12	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	1.13	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	15.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

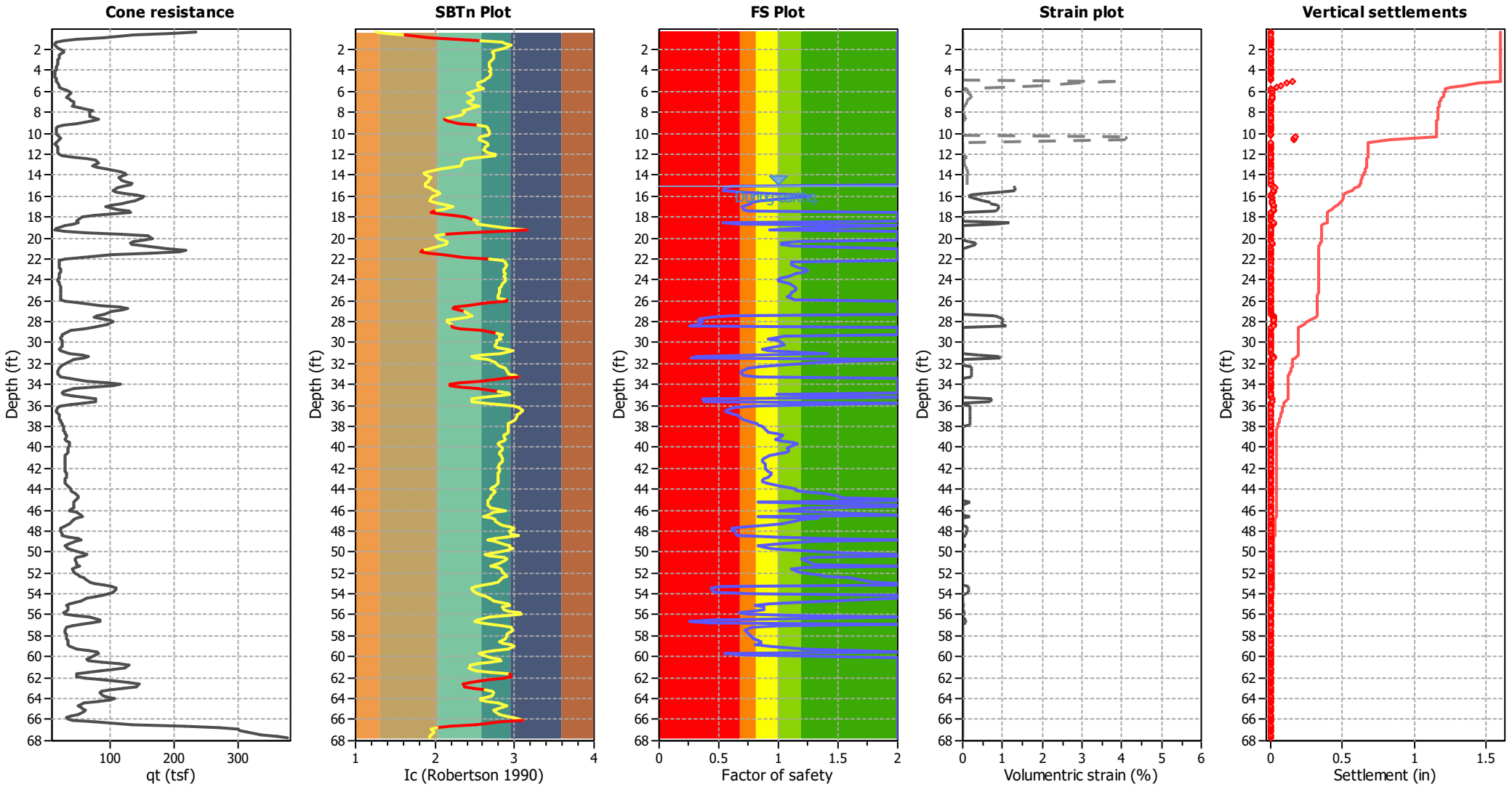
Check for strength loss plots (Robertson (2010))



Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	15.00 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.12	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	1.13	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	15.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

Estimation of post-earthquake settlements



Abbreviations

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

Project title : Crockers Lockers

Location : Watsonville

Overall vertical settlements report