Appendix G1

Geotechnical Investigation Parcel A

LIMITED
GEOTECHNICAL INVESTIGATION

COLLINS AEROSPACE
REDEVELOPMENT SITE – PARCEL A
NORTHWEST CORNER OF
H STREET AND BAY BOULEVARD
CHULA VISTA, CALIFORNIA

GEOCON
INCORPORATED

GEOTECHNICAL
ENVIRONMENTAL
MATERIALS

PREPARED FOR

WOHL

OCTOBER 12, 2020
PROJECT NO. G2559-52-01

Project No. G2559-52-01
October 12, 2020

Wohl Property Group
1081 Camino Del Rio South, Suite 115
San Diego, California 92108

Attention: Mr. Emil Wohl

Subject: LIMITED GEOTECHNICAL INVESTIGATION
COLLINS AEROSPACE REDEVELOPMENT SITE – PARCEL A
NORTHWEST CORNER OF H STREET AND BAY BOULEVARD
CHULA VISTA, CALIFORNIA

Dear Mr. Wohl:

In accordance with your request and authorization of our Proposal No. LG-20157 dated April 14, 2020, we herein submit the results of our limited geotechnical investigation for the subject project. We performed our limited investigation to evaluate the underlying soil and geologic conditions and potential geologic hazards, and to assist in the design of the proposed building tenant improvements.

The accompanying report presents the results of our study and conclusions and recommendations pertaining to geotechnical aspects of the proposed project. The site is suitable for the proposed building tenant improvements provided the recommendations of this report are incorporated into the design and construction of the planned project.

Should you have questions regarding this report, or if we may be of further service, please contact the undersigned at your convenience.

Very truly yours,

GEOCON INCORPORATED

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(email) Addressee

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LIMITED GEPOTECHNICAL INVESTIGATION

1. PURPOSE AND SCOPE

This report presents the results of our limited geotechnical investigation related to the planned improvements to the subject property currently identified as Collins Aerospace – Parcel A in Chula Vista, California (see Vicinity Map).

Vicinity Map

The purpose of this limited geotechnical investigation is to evaluate the surface and subsurface soil conditions and general site geology, and to identify geotechnical constraints that may affect development of the property including faulting, liquefaction and seismic shaking based on the 2019 CBC seismic design criteria. In addition, we provided recommendations for remedial grading, shallow foundations, concrete slab-on-grade, concrete flatwork, and retaining walls.

We reviewed the following plans and reports in preparation of this report:

1. *[Preliminary Structural Plans for:] UTAS Collins Dock Wall, Chula Vista, California,* prepared by Geocon Incorporated, dated September 17, 2020 (Job No. 20064.00).

2. *Geotechnical Reconnaissance, Collins Aerospace Redevelopment Site – Parcel A, Chula Vista, California,* prepared by Geocon Incorporated, dated June 25, 2020 (Project No. G2559-52-01).

3. *Geotechnical Investigation, OMPPA Project on Goodrich Property, Chula Vista, California,* prepared by Geocon Incorporated, dated September 12, 2005 (Project No. 07050-22-30).

4. *Limited Geotechnical Investigation, B.F. Goodrich Site Development, Chula Vista, California,* prepared by Geocon Incorporated, dated June 24, 1999 (Project No. 06327-22-01).

5. *Soil Investigation, Sauder Furnace Foundation, Building No. 1, Column E11-F11, Chula Vista, California,* prepared by Geocon Incorporated, dated July 14, 1980 (Project No. 02080-02-02).

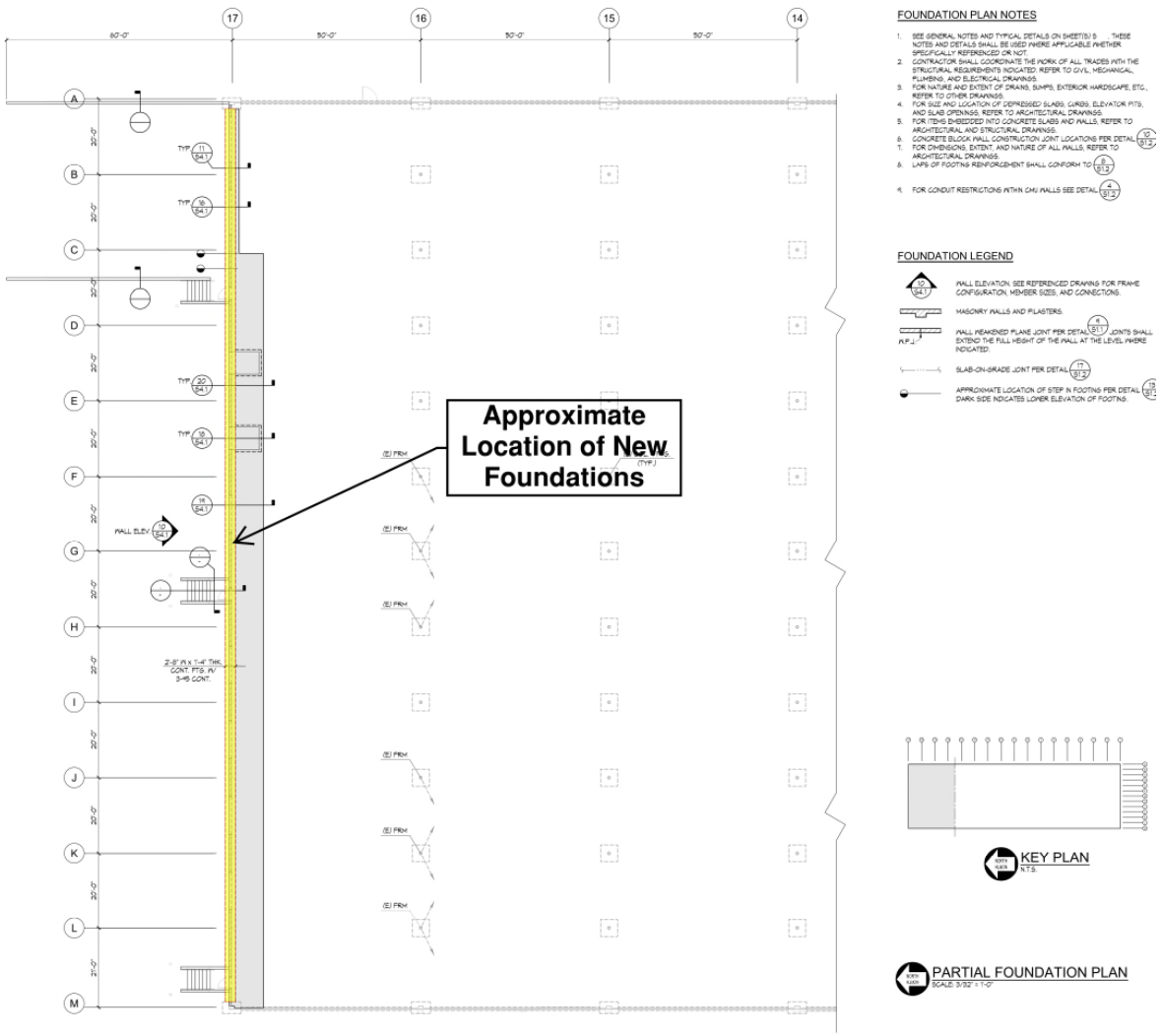
The scope of this investigation included reviewing readily available published and unpublished geologic literature (see List of References); performing engineering analyses; and preparing this report. We also advanced 6 exploratory Cone Penetrometer Tests (CPTs) and 1 seismic CPT (SCPT) to a maximum depth of about 100 feet. Appendix A presents the CPT soundings, SCPT profile and details of the field investigation. Appendix B presents the exploratory boring logs and laboratory testing from the our referenced report dated September 12, 2005 previously performed on the property. The locations of the current CPTs and previous borings at the property are shown on the Geologic Map, Figure 1. Appendix C presents the results of our liquefaction analysis.

2. SITE AND PROJECT DESCRIPTION

The Collins Aerospace – Parcel A property consists of the eastern portion of the existing Collins Aerospace facility (also identified as Rohr Industries, B. F. Goodrich and/or UTC Aerospace property) and includes 2 existing buildings. The property is bounded by Bay Boulevard and Interstate 5 to the east, H Street to the south, undeveloped land to the north and the remainder of the Collins Aerospace facility to the west. An existing rail line is present along the western border of the property. The site is currently occupied by two industrial buildings located to the south and north of G Street, and an on-grade asphalt concrete and Portland Cement concrete parking lots along with other associated improvements. A concrete loading dock is present on the northern portion of the southern building. Existing grades are relatively flat with elevations of approximately 12 to 20 feet Mean Sea Level (MSL) on the south and northeast, respectively. The Existing Site Map shows the current site conditions.

Existing Site Map

Based on discussions with you and the referenced structural plans, we understand the proposed development will consist of improving the existing buildings and incorporating tenant improvements. The improvements include the addition of an approximately 120-foot long CMU block wall and loading dock on the northwest perimeter of the existing building located south of G Street. In addition, we expect other architectural interior and exterior improvements are proposed. The referenced plans indicate new foundation improvements will be required to accommodate the new improvement loads. We do not expect the site will require storm water management devices. The Proposed Site Plan shows the proposed structural foundation plan for the northern portion of the existing building located to the south of G Street.



Proposed Site Plan

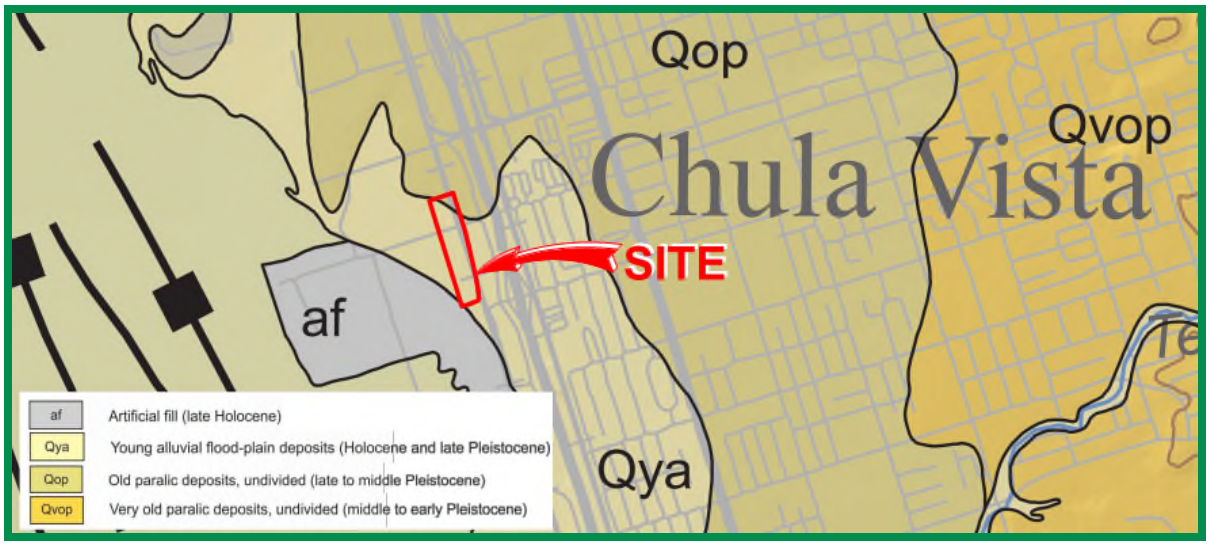
3. GEOLOGIC SETTING

Regionally, the site is located in the Peninsular Ranges geomorphic province. The province is bounded by the Transverse Ranges to the north, the San Jacinto Fault Zone on the east, the Pacific Ocean coastline on the west, and the Baja California on the south. The province is characterized by elongated northwest-trending mountain ridges separated by straight-sided sediment-filled valleys. The northwest trend is further reflected in the direction of the dominant geologic structural features of the province that are northwest to west-northwest trending folds and faults, such as the nearby Rose Canyon fault zone.

Locally, the site is within the coastal plain of San Diego County. The coastal plain is underlain by a thick sequence of relatively undisturbed and non-conformable sedimentary bedrock units that thicken to the west and range in age from Upper Cretaceous age through the Pleistocene age which have been deposited on Cretaceous to Jurassic age igneous and volcanic bedrock. Geomorphically, the coastal plain

is characterized by a series of 21, stair-stepped marine terraces (younger to the west) that have been dissected by west flowing rivers. The coastal plain is a relatively stable block that is dissected by relatively few faults consisting of the potentially active La Nacion Fault Zone and the active Rose Canyon Fault Zone.

The site is located on the western portion of the coastal plain. Marine sedimentary units make up the geologic sequence encountered on the site and consist of Pleistocene-age Old Paralic Deposits (formerly known as the Bay Point Formation). The Old Paralic Deposits are shallow marine deposits generally consisting of sand and silty sand units interfingered with layers of silt and clay. Based on published geologic information, we expect this unit to be in excess of 150 to 160 feet deep and extend below the current sea level. The mapped geologic conditions at the site is presented on the Regional Geologic Map.



Regional Geologic Map

4. SOIL AND GEOLOGIC CONDITIONS

Based on our review of published geologic maps, and the current and previous investigations at the site, we expect the site is underlain by two surficial soil types (consisting of undocumented fill and Holocene-age Bay Deposits) and two formational unit (consisting of Old Paralic Deposits and the San Diego Formation). The occurrence, distribution, and description of each unit encountered is shown on the Geologic Map, Figure 1 and on the boring logs in Appendix B. The geologic units are discussed herein in order of increasing age.

4.1 Undocumented Fill (Qudf)

We expect that undocumented fill associated with the existing site improvements is present across the majority of the site to depths of about 5 to 10 feet. In general, the fill consists of loose to medium

dense, moist to wet, silty sand and possesses a “very low” to “low” expansion index (expansion index of 50 or less). The fill located below the groundwater elevation possesses a potential for liquefaction. The upper portion of the undocumented fill is likely unsuitable for the support of proposed structures or structural fill and will require remedial grading. However, we expect the remedial grading operations will be limited to the groundwater elevation and/or saturated soil conditions.

4.2 Bay Deposits (Qb)

The Bay Deposits (bay mud) exist below the undocumented fill or at-grade to a maximum depth of approximately 20 to 25 feet. The bay deposits generally consist of very loose to medium dense, silty and clayey sand and soft, wet to saturated, sandy silt and clay. Sandy portions of the Bay Deposits are potentially liquefiable when subjected to strong ground motion. Additionally, the soft muds within the Bay Deposits are subject to consolidation settlement. We consider these materials unsuitable for the support of structures or structural fill in their present condition.

4.3 Old Paralic Deposits (Qop)

The Quaternary-age Old Paralic Deposits (formally called the Bay Point Formation) exist below the undocumented fill and/or Bay Deposits across the site. The Old Paralic Deposits consist of medium dense to very dense sand layers interbedded with stiff clay and silt layers. The Old Paralic Deposits are considered suitable for the support of the proposed structures. However, we do not expect the Old Paralic Deposits will be encountered during the construction of the planned improvements.

4.4 San Diego Formation (Tsd)

Based on published geologic information, we expect the San Diego Formation underlies the Old Paralic Deposits. Based on our experience in the area, the top of the San Diego Formation is at about 150 to 160 feet deep (an elevation of -140 to -150 MSL). The San Diego Formation consists of dense to very dense silty, to clayey sandstone and siltstone. We do not expect to encounter the San Diego Formation during the construction of the planned improvements.

5. GROUNDWATER

We previously encountered groundwater at depths ranging from about 8 to 14 feet below the existing ground surface (approximate elevation of 2 to 7 feet above MSL). In addition, we encountered groundwater during our current study within the CPTs at depths ranging from approximately 12 to 20 feet below the existing ground surface (approximate elevation of 1 to 5 feet above MSL). Several groundwater monitoring wells have been installed on and adjacent to the property. Based on review of our existing information in the vicinity of the site, the groundwater depths range from about 3 to 11 feet. The water elevations fluctuate due to tidal influences. The groundwater should be considered brackish due to the close proximity to the San Diego Bay and Pacific Ocean. Groundwater will be a

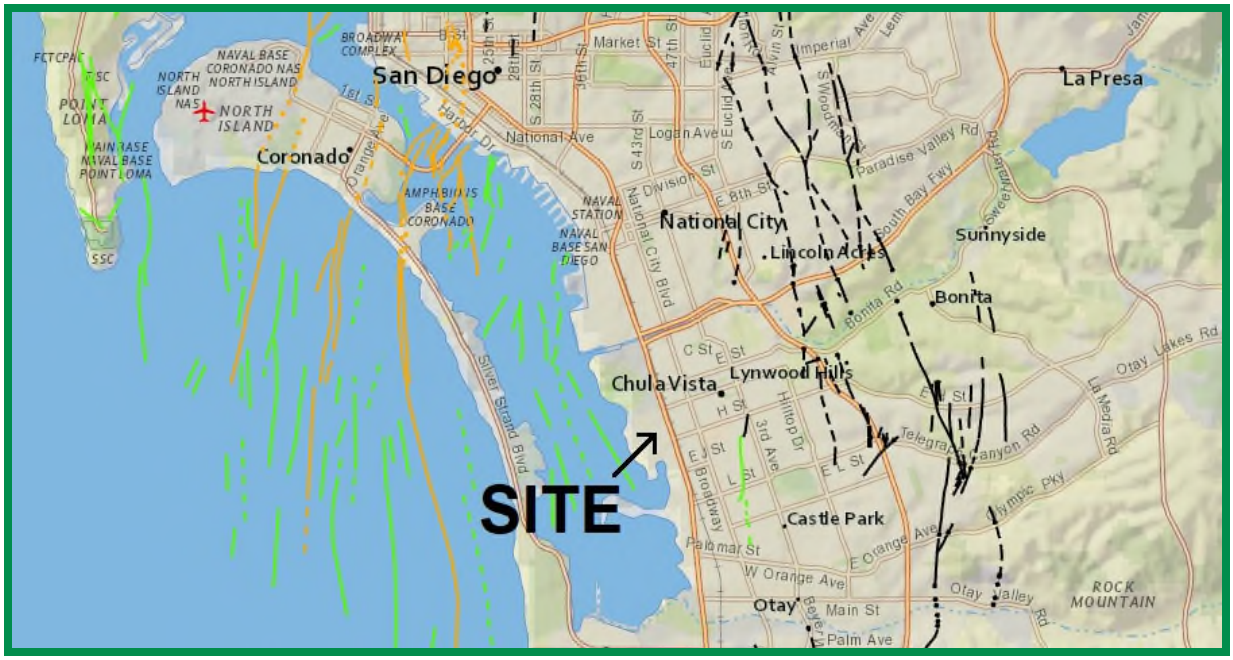
factor in development especially in liquefaction remediation, deep foundation design and construction, grading operations and utility installation. A groundwater elevation of 6 feet above MSL should be incorporated into the design and construction operations. In addition, the soil about 2 to 3 feet above the groundwater elevation may be saturated. Groundwater and seepage is dependent on seasonal precipitation, tidal influence, irrigation, land use, among other factors, and varies as a result. Proper surface drainage will be important to future performance of the project.

6. GEOLOGIC HAZARDS

6.1 Faulting and Seismicity

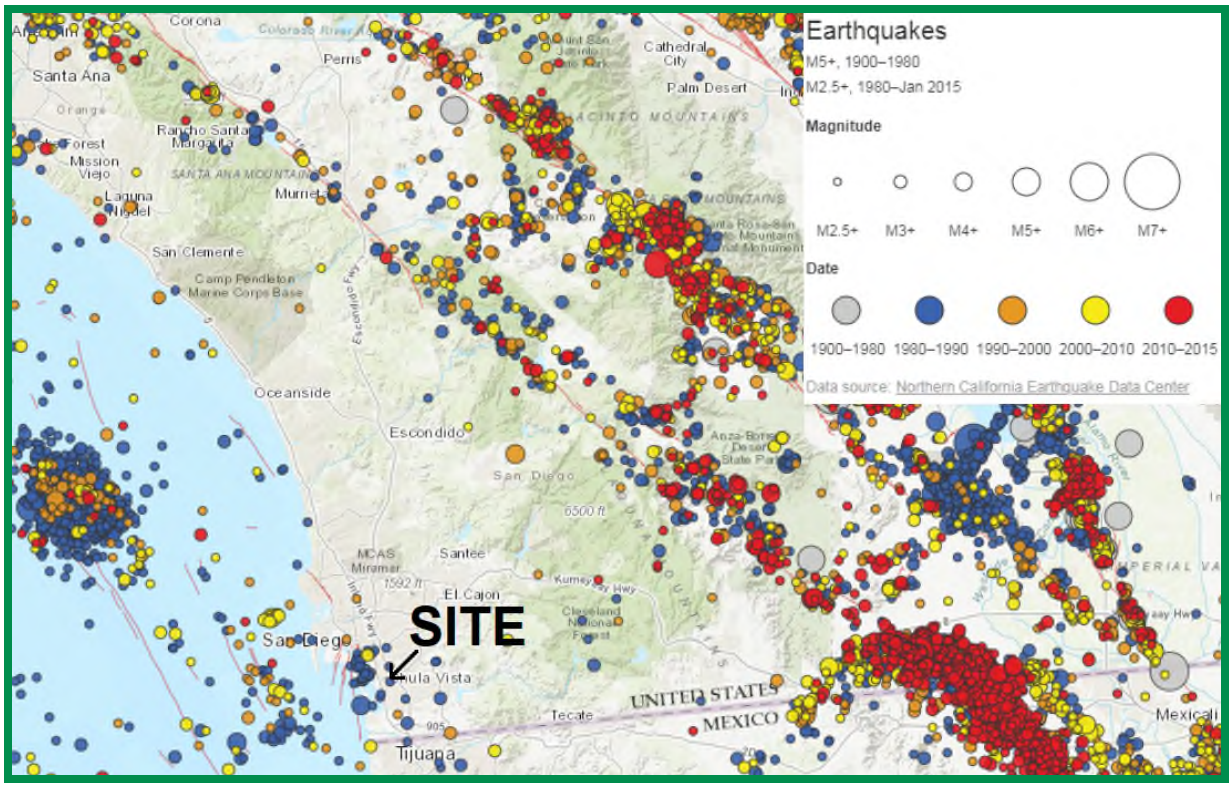
A review of the referenced geologic materials and our knowledge of the general area indicate that the site is not underlain by active, potentially active, or inactive faults. An active fault is defined by the California Geological Survey (CGS) as a fault showing evidence for activity within the last 11,700 years. The site is not located within a State of California Earthquake Fault Zone.

The USGS has developed a program to evaluate the approximate location of faulting in the area of properties. The following figure shows the location of the existing faulting in the San Diego County and Southern California region. The fault traces are shown as solid, dashed and dotted that represent well-constrained, moderately constrained and inferred, respectively. The fault line colors represent faults with ages less than 150 years (red), 15,000 years (orange), 130,000 years (green), 750,000 years (blue) and 1.6 million years (black).



Faults in Southern California

The San Diego County and Southern California region is seismically active. The following figure presents the occurrence of earthquakes with a magnitude greater than 2.5 from the period of 1900 through 2015 according to the Bay Area Earthquake Alliance website.



Earthquakes in Southern California

Considerations important in seismic design include the frequency and duration of motion and the soil conditions underlying the site. Seismic design of structures should be evaluated in accordance with the California Building Code (CBC) guidelines currently adopted by the local agency.

6.2 Ground Rupture

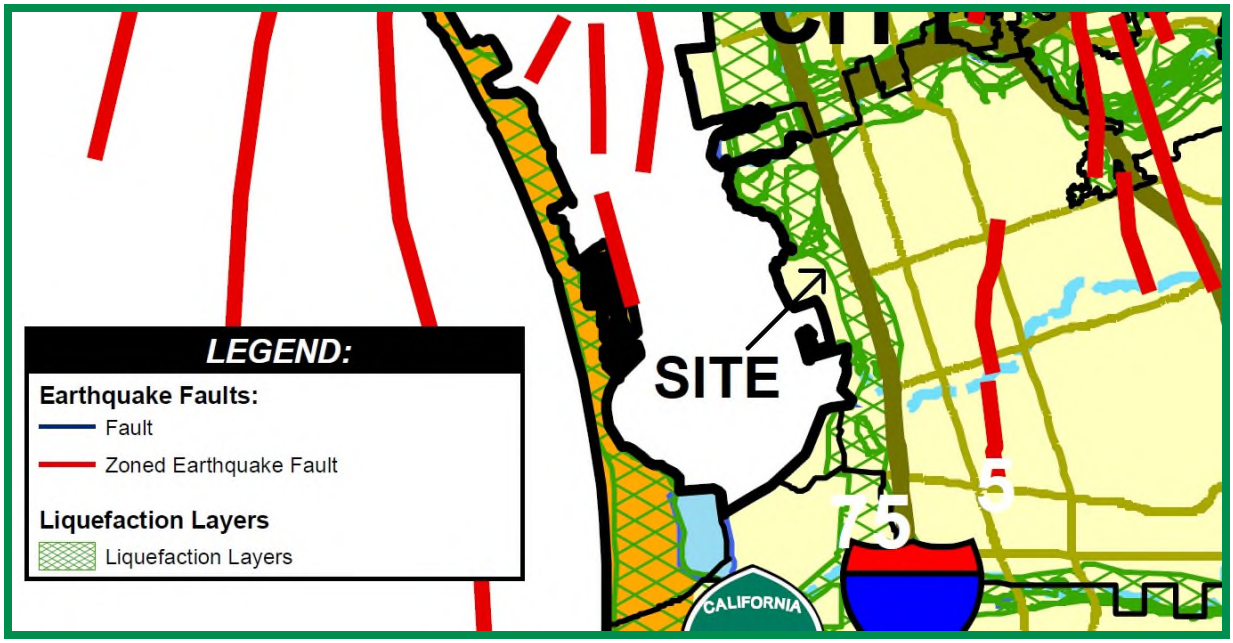
Ground surface rupture occurs when movement along a fault is sufficient to cause a gap or rupture where the upper edge of the fault zone intersects the ground surface. The potential for ground rupture is considered to be very low due to the absence of active faults at the subject site.

6.3 Liquefaction Potential and Seismically Induced Settlement

Liquefaction typically occurs when a site is located in a zone with seismic activity, onsite soils are cohesionless or silt/clay with low plasticity, groundwater is encountered within 50 feet of the surface, and soil densities are less than about 70 percent of the maximum dry densities. If the four previous

criteria are met, a seismic event could result in a rapid pore water pressure increase from the earthquake-generated ground accelerations.

The surficial soil (undocumented fill and Bay Deposits) at the site is generally loose/soft and considered to possess a potential for liquefaction below the groundwater elevation. The Multi-Jurisdictional-Hazard Mitigation Plan (2017) maps the site as having zones of liquefiable layers.



Liquefaction Hazard Map

The current standard of practice, as outlined in the *Recommended Procedures for Implementation of DMG Special Publication 117A, Guidelines for Analyzing and Mitigating Liquefaction in California* requires liquefaction analysis to a depth of 50 feet below the lowest portion of the proposed structure. Liquefaction typically occurs in areas where the soils below the water table are composed of poorly consolidated, fine to medium-grained, primarily sandy soil. In addition to the requisite soil conditions, the ground acceleration and duration of the earthquake must also be of a sufficient level to induce liquefaction.

We performed liquefaction analyses with our CPT soundings using the program CLiq (Version 3.0). This program utilizes the 2001 NCEER method of analysis. We used a static groundwater elevation of 6 feet MSL, a modal magnitude of 6.12 earthquake (attributed to the Rose Canyon Fault), and a peak horizontal site acceleration, PGA_M, of 0.631g calculated from ASCE 7-16 Section 11.8.3. This semi-empirical method is based on correlations with the data collected from the CPT soundings and field performance data.

The liquefaction analyses (included in Appendix C) indicate the soils to depths between approximately 10 and 50 feet below the existing grade at the locations of CPT-1, CPT-2, and CPT-4 through CPT-6 could be prone to between 0.4 and 0.8 inches during ground motion resulting in an average of about 0.5 inches. We estimate the differential settlement of ⅔ the total settlement ranging from 0.3 to 0.5 inches. The CPT-3 sounding was terminated at a depth of approximately 10 feet above groundwater due to refusal within the existing soils, therefore, the data from CPT-3 was not included as part of the estimated seismic settlements.

Sand boils occur where liquefiable soil is extruded upward through the soil deposit to the ground surface. Providing an increase in overburden pressure and a compacted fill mat can mitigate surface manifestation. Research presented by Ishihara (1985) indicates that the presence of a non-liquefiable surface layer typically results in the effects of at-depth liquefaction from reaching the surface. Modifications to Ishihara's chart have been made to include higher ground accelerations (Ishihara's 1985 chart was based on a 0.25g ground acceleration) by Youd and Garris (1995). Based on Youd's modified curves and the thickness of the non-liquefiable soil layer (layer above the assumed groundwater table), the potential for surface manifestation does not exist.

Lateral spreading occurs when liquefiable soil is in the immediate vicinity of a free face such as a slope. Factors controlling lateral displacement include earthquake magnitude, distance from the earthquake epicenter, thickness of liquefiable soil layer, grain size characteristics, fines content of the soil and SPT blow counts. Bartlett and Youd (1995) have concluded that lateral spreading is restricted to sediments with corrected SPT blow counts of 15 or less for earthquake magnitudes less than or equal to 8.0. The potential of lateral spreading in the liquefiable soil below the groundwater table is not considered an adverse impact to the proposed development due to relatively flat topography of the site and distance to the San Diego Bay from the site.

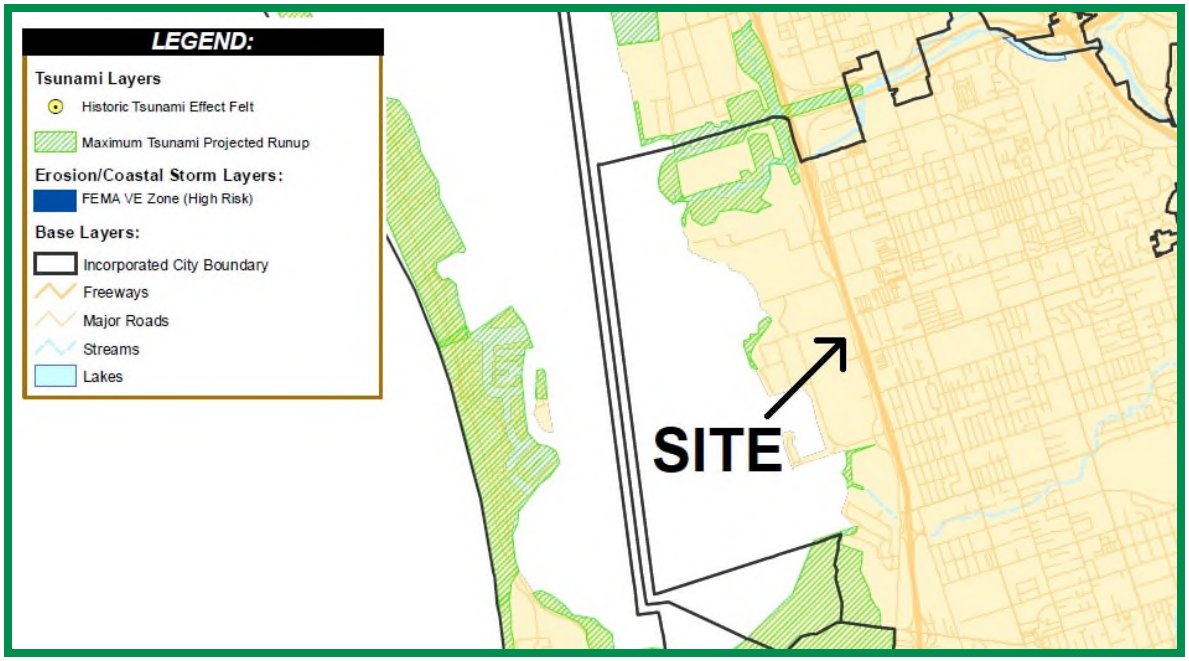
The mitigation of potential hazards due to liquefaction can be accomplished by the densification or removal of the potentially liquefiable soil or the use of foundation systems that still provide acceptable structural support should liquefaction occur. Soil densification can be accomplished by compaction grouting, vibrocompaction, soil mixing, and deep dynamic compaction (among others). We understand the use of vibrocompaction or stone columns may be unacceptable due to the creation of potential vertical pathways for contamination and potential distress to existing structures. Soil densification is generally used to increase the density and provide liquefaction mitigation of sensitive soil to relatively shallow depths over large areas. Deep foundation systems may be used to transmit structural loads to bearing depths below the liquefiable zones and may consist of driven piles or drilled piles. Deep foundations are designed to mitigate damage to the structures supported on the piles; however, they do not generally reduce the potential for damage to underground utilities and peripheral site improvements. The effects of differential settlement between ridged structures and attached

settlement-sensitive surface improvements can be mitigated by designing the utilities to accommodate differential movement at the connections.

6.4 Storm Surge, Tsunamis, and Seiches

Storm surges are large ocean waves that sweep across coastal areas when storms make landfall. Storm surges can cause inundation, severe erosion and backwater flooding along the water front. The site is located approximately 2,100 feet from San Diego Bay, is at an elevation of about 10 feet or greater above Mean Sea Level (MSL) and is protected from ocean waves by the Silver Strand to the west. Based on historic and predicated wave heights and runout lengths, the proposed site elevation with neighboring topographic features is likely sufficient to mitigate the risk; therefore, the potential of storm surges affecting the site is considered low.

A tsunami is a series of long period waves generated in the ocean by a sudden displacement of large volumes of water. Causes of tsunamis include underwater earthquakes, volcanic eruptions, or offshore slope failures. The first-order driving force for locally generated tsunamis offshore southern California is expected to be tectonic deformation from large earthquakes (Legg, *et al.*, 2002). Historically, tsunami wave heights have ranged up to 3.7 feet in the San Diego area. Wave heights and run-up elevations from tsunamis along the San Diego Coast have historically fallen within the normal range of the tides. The Multi-Jurisdictional Hazard Mitigation Plan (2017) maps zones of possible tsunami inundation for coastal areas throughout the county. The site is not included within one of these high-risk hazard areas. Therefore, we consider the risk of a tsunami hazard at the site to be low.



Tsunami Inundation Map

A seiche is a run-up of water within a lake or embayment triggered by fault- or landslide-induced ground displacement. The site is located approximately 2,100 feet from San Diego Bay, is at an elevation of about 10 feet or greater above Mean Sea Level (MSL) and is protected from ocean waves by the Silver Strand to the west. Based on historic and predicated wave heights and runout lengths, we expect the proposed site elevation is sufficient to mitigate the risk; therefore, we consider the potential for seiches to impact the site low.

6.5 Hazardous Subsurface Materials

We understand contaminated soil and contaminated groundwater have been encountered at locations in the vicinity of the property associated with past and current uses as an industrial facility (AECOM, 2017). Where proposed remedial grading, installation of utilities or other improvements extend into areas identified as containing contaminated soil and/or contaminated groundwater, special provisions may be required for the health and safety of workers and to limit movement of the contamination in accordance with the project environmental consultant. Construction techniques to limit movement of contaminates may be required. Additionally, we understand the use of certain ground improvement techniques (i.e. stone columns or wick drains, modifying the use of pipe bedding and certain types of deep foundations) may be restricted due to the existing contaminated soil.

7. CONCLUSIONS AND RECOMMENDATIONS

7.1 General

7.1.1 From a geotechnical engineering standpoint, we opine the building site is suitable for the proposed tenant improvements provided the recommendations presented herein are implemented in design and construction of the project.

7.1.2 The site may be subject to geologic hazards, including moderate to strong seismic shaking, liquefaction, seismically induced settlement and consolidation settlement. From a geotechnical engineering standpoint, we opine soil or geologic conditions do not exist at the subject site that is considered adverse to proposed improvements at the site, assuming they are designed to accommodate the potential geologic hazards at the site.

7.1.3 Based on a review of the referenced documents and our experience in the area, we expect the site is underlain by undocumented fill and Bay Deposits overlying Old Paralic Deposits and San Diego Formation. Based on a limited site reconnaissance, the underlying soil appears to be adequately supporting the current development. The existing geologic units are considered suitable for support of structural loads from the proposed development. However, remedial grading of these materials will need to be performed. We should evaluate the excavation for footings at the base of the removal for compaction. We expect the upper 3 feet of the soil below the proposed shallow foundations should be processed, moisturized as necessary and properly compacted.

7.1.4 We assume grading will not be required to construct the planned tenant improvements. If plans change and grading is required, Geocon Incorporated should be contacted to provide recommendations.

7.1.5 We encountered groundwater at a depth of approximately 8 to 20 feet below the existing ground surface (approximate elevation of 1 to 7 feet above MSL). Groundwater will likely have a significant influence on construction of deep utilities (if constructed), and during remedial grading. Dewatering will likely be required for excavations below the fluctuating groundwater elevation. The project should be designed with a groundwater elevation of 6 feet MSL.

7.1.6 Excavation of the fill, Bay Deposits and Old Paralic Deposits should generally be possible with moderate to heavy effort using conventional, heavy-duty equipment during grading and trenching operations. We expect the excavated soil will likely be comprised of silty sand. Cohesionless soil should be expected during the excavations for the planned improvements.

7.1.7 Final foundation plans have not been provided for our review. Geocon Incorporated should review the plans prior to the submittal to regulatory agencies for approval. Additional analyses may be required once the plans have been provided.

7.1.8 Adequate drainage provisions are imperative to the performance of the development. Site drainage should be maintained to direct surface runoff into controlled drainage devices. Positive site drainage should be maintained away from structures and pavements and tops of slopes and directed to storm drain facilities.

7.2 Soil Characteristics

7.2.1 Based on the soil encountered during previous investigations for the site, we expect the soil is considered to be "non-expansive" and "expansive" (expansion index [EI] of 20 or less and greater than 20, respectively) as defined by 2019 California Building Code (CBC) Section 1803.5.3. Table 7.2.1 presents soil classifications based on the expansion index. We expect a majority of the soil encountered possess a "very low" to "low" expansion potential (EI of 50 or less).

TABLE 7.2.1
EXPANSION CLASSIFICATION BASED ON EXPANSION INDEX

Expansion Index (EI)	ASTM D 4829 Expansion Classification	2019 CBC Expansion Classification
0 – 20	Very Low	Non-Expansive
21 – 50	Low	Expansive
51 – 90	Medium	
91 – 130	High	
Greater Than 130	Very High	

7.2.2 Previously reported laboratory water-soluble sulfate content test results indicate the on-site materials possess "S0" to "S2" sulfate exposure to concrete structures as defined by 2019 CBC Section 1904 and ACI 318-14 Chapter 19. Table 7.2.2 presents a summary of concrete requirements set forth by 2019 CBC Section 1904 and ACI 318. The presence of water-soluble sulfates is not a visually discernible characteristic; therefore, other soil samples from the site could yield different concentrations. Additionally, over time landscaping activities (i.e., addition of fertilizers and other soil nutrients) may affect the concentration.

TABLE 7.2.2
REQUIREMENTS FOR CONCRETE EXPOSED TO SULFATE-CONTAINING SOLUTIONS

Exposure Class	Water-Soluble Sulfate (SO_4) Percent by Weight	Cement Type (ASTM C 150)	Maximum Water to Cement Ratio by Weight[1]	Minimum Compressive Strength (psi)
S0	SO_4<0.10	No Type Restriction	n/a	2,500
S1	0.10≤SO_4<0.20	II	0.50	4,000
S2	0.20≤SO_4≤2.00	V	0.45	4,500
S3	SO_4>2.00	V+Pozzolan or Slag	0.45	4,500

[1] Maximum water to cement ratio limits do not apply to lightweight concrete

7.2.3 Geocon Incorporated does not practice in the field of corrosion engineering. Therefore, further evaluation by a corrosion engineer may be performed if improvements susceptible to corrosion are planned.

7.3 Temporary Excavations

7.3.1 The recommendations included herein are provided for stable excavations. It is the responsibility of the contractor and their competent person to ensure all excavations, temporary slopes and trenches are properly constructed and maintained in accordance with applicable OSHA guidelines in order to maintain safety and the stability of the excavations and adjacent improvements. These excavations should not be allowed to become saturated or to dry out. Surcharge loads should not be permitted to a distance equal to the height of the excavation from the top of the excavation. The top of the excavation should be a minimum of 15 feet from the edge of existing improvements. Excavations steeper than those recommended or closer than 15 feet from an existing surface improvement should be shored in accordance with applicable OSHA codes and regulations.

7.3.2 The stability of the excavations is dependent on the design and construction of the shoring system and site conditions. Therefore, Geocon Incorporated cannot be responsible for site safety and the stability of the proposed excavations

7.4 Seismic Design Criteria

7.4.1 Table 7.4.1 summarizes site-specific design criteria obtained from the 2019 California Building Code (CBC; Based on the 2018 International Building Code [IBC] and ASCE 7-16), Chapter 16 Structural Design, Section 1613 Earthquake Loads. We used the computer

program *U.S. Seismic Design Maps*, provided by the Structural Engineers Association (SEA) to calculate the seismic design parameters. The short spectral response uses a period of 0.2 second. We evaluated the Site Class based on the discussion in Section 1613.2.2 of the 2019 CBC and Table 20.3-1 of ASCE 7-16. However, we expect the building possesses a period of less than 0.5 second; therefore, the building improvements can be designed based on the soil conditions (ASCE 7-16, Section 20.3.1). The values presented herein are for the risk-targeted maximum considered earthquake (MCE_R). Sites designated as Site Class D, E and F may require additional analyses if requested by the project structural engineer and client.

TABLE 7.4.1
2019 CBC SEISMIC DESIGN PARAMETERS

Parameter	Value	2019 CBC Reference
Site Class	E	Section 1613.2.2
MCE_R Ground Motion Spectral Response Acceleration – Class B (short), S_S	1.217g	Figure 1613.2.1(1)
MCE_R Ground Motion Spectral Response Acceleration – Class B (1 sec), S_1	0.407g	Figure 1613.2.1(2)
Site Coefficient, F_A	1.200	Table 1613.2.3(1)
Site Coefficient, F_V	2.387*	Table 1613.2.3(2)
Site Class Modified MCE_R Spectral Response Acceleration (short), S_{MS}	1.460g	Section 1613.2.3 (Eqn 16-36)
Site Class Modified MCE_R Spectral Response Acceleration – (1 sec), S_{M1}	0.970g*	Section 1613.2.3 (Eqn 16-37)
5% Damped Design Spectral Response Acceleration (short), S_{DS}	0.974g	Section 1613.2.4 (Eqn 16-38)
5% Damped Design Spectral Response Acceleration (1 sec), S_{D1}	0.647g*	Section 1613.2.4 (Eqn 16-39)

***** Using the code-based values presented in this table, in lieu of a performing a ground motion hazard analysis, requires the exceptions outlined in ASCE 7-16 Section 11.4.8 be followed by the project structural engineer. Per Section 11.4.8 of ASCE/SEI 7-16, a ground motion hazard analysis should be performed for projects for Site Class "E" sites with Ss greater than or equal to 1.0g and for Site Class "D" and "E" sites with S1 greater than 0.2g. Section 11.4.8 also provides exceptions which indicates that the ground motion hazard analysis may be waived provided the exceptions are followed.

7.4.2 Table 7.4.2 presents the mapped maximum considered geometric mean (MCE_G) seismic design parameters for projects located in Seismic Design Categories of D through F in accordance with ASCE 7-16.

TABLE 7.4.2
ASCE 7-16 PEAK GROUND ACCELERATION

Parameter	Value	ASCE 7-16 Reference
Mapped MCE_G Peak Ground Acceleration, PGA	0.548g	Figure 22-7
Site Coefficient, F_{PGA}	1.152	Table 11.8-1
Site Class Modified MCE_G Peak Ground Acceleration, PGA_M	0.631g	Section 11.8.3 (Eqn 11.8-1)

7.4.3 Conformance to the criteria in Tables 7.4.1 and 7.4.2 for seismic design does not constitute any kind of guarantee or assurance that significant structural damage or ground failure will not occur in the event of a large earthquake. The primary goal of seismic design is to protect life, not to avoid all damage, since such design may be economically prohibitive.

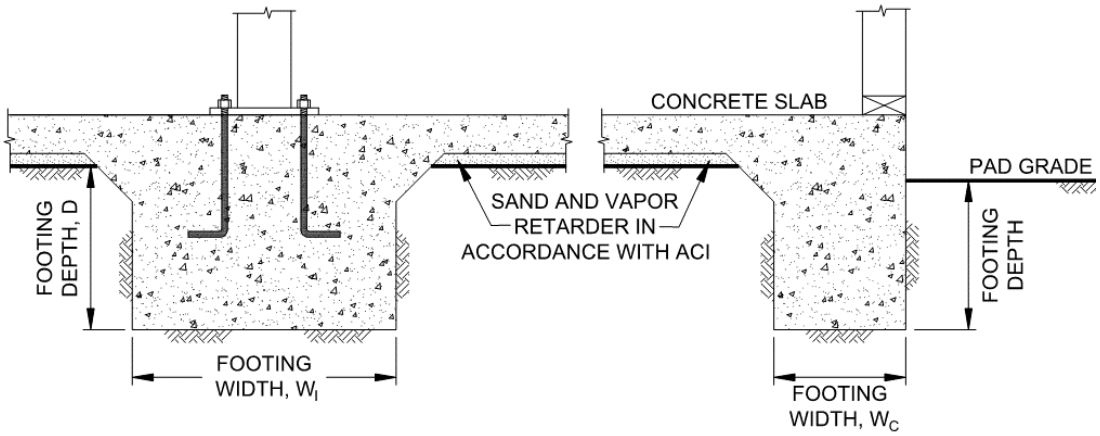
7.5 Shallow Foundations

7.5.1 The proposed improvements to the structure south of G Street can be supported on a shallow foundation system founded in compacted fill materials. We anticipate that the upper 3 feet of soil below the foundations will be removed and replaced as compacted fill. Foundations for the structure should consist of continuous strip footings and/or isolated spread footings. Footings should be deepened such that the bottom outside edge of the footing is at least 7 feet horizontally from the face of the slope. Table 7.5.1 provides a summary of the foundation design recommendations.

TABLE 7.5.1
SUMMARY OF FOUNDATION RECOMMENDATIONS

Parameter	Value
Minimum Continuous Foundation Width, W_C	18 inches
Minimum Isolated Foundation Width, W_I	24 inches
Minimum Foundation Depth, D	24 Inches Below Lowest Adjacent Grade
Minimum Steel Reinforcement	4 No. 5 Bars, 2 at the Top and 2 at the Bottom
Allowable Bearing Capacity	2,000 psf
Estimated Total Settlement	1 Inch
Estimated Differential Settlement	½ Inch in 40 Feet
Footing Size Used for Settlement	9-Foot Square
Design Expansion Index	50 or less

7.5.2 The foundations should be embedded in accordance with the recommendations herein and the Wall/Column Footing Dimension Detail. The embedment depths should be measured from the lowest adjacent pad grade for both interior and exterior footings. Footings should be deepened such that the bottom outside edge of the footing is at least 7 feet horizontally from the face of the slope (unless designed with a post-tensioned foundation system as discussed herein).



Wall/Column Footing Dimension Detail

7.5.3 The bearing capacity values presented herein are for dead plus live loads and may be increased by one-third when considering transient loads due to wind or seismic forces.

7.5.4 We understand the existing foundation system includes conventional shallow foundations. If we were to install piles or mitigate the soil, the building would potentially experience increased differential distress due to the differences in bearing materials. Therefore, we opine the new foundations should be similar to the existing foundations. If desired, tie-beams can be installed and connected to the isolated foundations to help prevent additional settlement due to static and seismic loads. The project structural engineer should evaluate if tie-beams should be installed.

7.5.5 We should observe the foundation excavations prior to the placement of reinforcing steel and concrete to check that the exposed soil conditions are similar to those expected and that they have been extended to the appropriate bearing strata. Foundation modifications may be required if unexpected soil conditions are encountered.

7.5.6 Geocon Incorporated should be consulted to provide additional design parameters as required by the structural engineer.

7.6 Concrete Slabs-On-Grade

7.6.1 Concrete slabs-on-grade for the structures should be constructed in accordance with Table 7.6.1.

TABLE 7.6.1
MINIMUM CONCRETE SLAB-ON-GRADE RECOMMENDATIONS

Parameter	Value
Minimum Concrete Slab Thickness	5 inches
Minimum Steel Reinforcement	No. 3 Bars 18 Inches on Center, Both Directions
Typical Slab Underlayment	3 to 4 Inches of Sand/Gravel/Base
Design Expansion Index	50 or less

7.6.2 Slabs that may receive moisture-sensitive floor coverings or may be used to store moisture-sensitive materials should be underlain by a vapor retarder. The vapor retarder design should be consistent with the guidelines presented in the American Concrete Institute's (ACI) *Guide for Concrete Slabs that Receive Moisture-Sensitive Flooring Materials* (ACI 302.2R-06). In addition, the membrane should be installed in accordance with manufacturer's recommendations and ASTM requirements and installed in a manner that prevents puncture. The vapor retarder used should be specified by the project architect or developer based on the type of floor covering that will be installed and if the structure will possess a humidity controlled environment.

7.6.3 The bedding sand thickness should be determined by the project foundation engineer, architect, and/or developer. It is common to have 3 to 4 inches of sand in the southern California region. However, we should be contacted to provide recommendations if the bedding sand is thicker than 6 inches. The foundation design engineer should provide appropriate concrete mix design criteria and curing measures to assure proper curing of the slab by reducing the potential for rapid moisture loss and subsequent cracking and/or slab curl. We suggest that the foundation design engineer present the concrete mix design and proper curing methods on the foundation plans. It is critical that the foundation contractor understands and follows the recommendations presented on the foundation plans.

7.6.4 Concrete slabs should be provided with adequate crack-control joints, construction joints and/or expansion joints to reduce unsightly shrinkage cracking. The design of joints should consider criteria of the American Concrete Institute (ACI) when establishing crack-control spacing. Crack-control joints should be spaced at intervals no greater than 12 feet.

Additional steel reinforcing, concrete admixtures and/or closer crack control joint spacing should be considered where concrete-exposed finished floors are planned.

7.6.5 Special subgrade presaturation is not deemed necessary prior to placing concrete; however, the exposed foundation and slab subgrade soil should be moisturized to maintain a moist condition as would be expected in any such concrete placement.

7.6.6 The concrete slab-on-grade recommendations are based on soil support characteristics only. The project structural engineer should evaluate the structural requirements of the concrete slabs for supporting expected loads.

7.6.7 The recommendations of this report are intended to reduce the potential for cracking of slabs due to expansive soil (if present), differential settlement of existing soil or soil with varying thicknesses. However, even with the incorporation of the recommendations presented herein, foundations, stucco walls, and slabs-on-grade placed on such conditions may still exhibit some cracking due to soil movement and/or shrinkage. The occurrence of concrete shrinkage cracks is independent of the supporting soil characteristics. Their occurrence may be reduced and/or controlled by limiting the slump of the concrete, proper concrete placement and curing, and by the placement of crack control joints at periodic intervals, in particular, where re-entrant slab corners occur.

7.7 Settlement Considerations

7.7.1 Soft clays within the Bay Deposits at the site are potentially subject to consolidation settlement (densification by the removal of water within the soil) under loads imposed by placement of fill or structure loads. The amount of settlement that could occur is a function of how thick the layer is, how compressible the layer is and the magnitude of the new vertical load (weight of new fill or future building loads).

7.7.2 The planned building improvements should be designed with the appropriate settlement. Table 7.7 provides a summary of the estimated static and seismic settlements for the project.

TABLE 7.7
SUMMARY OF ESTIMATED SETTLEMENT DUE TO STATIC AND SEISMIC LOADING

Foundation Type	Estimated Total Seismic Settlement (inches)	Estimated Static Settlement Due to New Foundation Loads (inches)	Estimated Total Settlement (inches)
New Shallow Foundations	½	1	1½

7.8 Exterior Concrete Flatwork

7.8.1 Exterior concrete flatwork not subject to vehicular traffic should be constructed in accordance with the recommendations presented in Table 7.8. The recommended steel reinforcement would help reduce the potential for cracking.

TABLE 7.8
MINIMUM CONCRETE FLATWORK RECOMMENDATIONS

Expansion Index, EI	Minimum Steel Reinforcement* Options	Minimum Thickness
EI ≤ 90	6x6-W2.9/W2.9 (6x6-6/6) welded wire mesh	4 Inches
	No. 3 Bars 18 inches on center, Both Directions	

* In excess of 8 feet square.

7.8.2 The subgrade soil should be properly moisturized and compacted prior to the placement of steel and concrete. The subgrade soil should be compacted to a dry density of at least 90 percent of the laboratory maximum dry density near to slightly above optimum moisture content in accordance with ASTM D 1557.

7.8.3 Even with the incorporation of the recommendations of this report, the exterior concrete flatwork has a potential to experience some uplift due to expansive soil beneath grade. The steel reinforcement should overlap continuously in flatwork to reduce the potential for vertical offsets within flatwork. Additionally, flatwork should be structurally connected to the curbs, where possible, to reduce the potential for offsets between the curbs and the flatwork.

7.8.4 Concrete flatwork should be provided with crack control joints to reduce and/or control shrinkage cracking. Crack control spacing should be determined by the project structural engineer based on the slab thickness and intended usage. Criteria of the American Concrete Institute (ACI) should be taken into consideration when establishing crack control spacing. Subgrade soil for exterior slabs not subjected to vehicle loads should be compacted in accordance with criteria presented in the grading section prior to concrete placement. Subgrade soil should be properly compacted and the moisture content of subgrade soil should be verified prior to placing concrete. Base materials will not be required below concrete improvements.

7.8.5 Where exterior flatwork abuts the structure at entrant or exit points, the exterior slab should be dowelled into the structure's foundation stemwall. This recommendation is intended to reduce the potential for differential elevations that could result from differential settlement

or minor heave of the flatwork. Dowelling details should be designed by the project structural engineer.

7.8.6 The recommendations presented herein are intended to reduce the potential for cracking of exterior slabs as a result of differential movement. However, even with the incorporation of the recommendations presented herein, slabs-on-grade will still crack. The occurrence of concrete shrinkage cracks is independent of the soil supporting characteristics. Their occurrence may be reduced and/or controlled by limiting the slump of the concrete, the use of crack control joints and proper concrete placement and curing. Crack control joints should be spaced at intervals no greater than 12 feet. Literature provided by the Portland Concrete Association (PCA) and American Concrete Institute (ACI) present recommendations for proper concrete mix, construction, and curing practices, and should be incorporated into project construction.

7.9 Retaining Walls

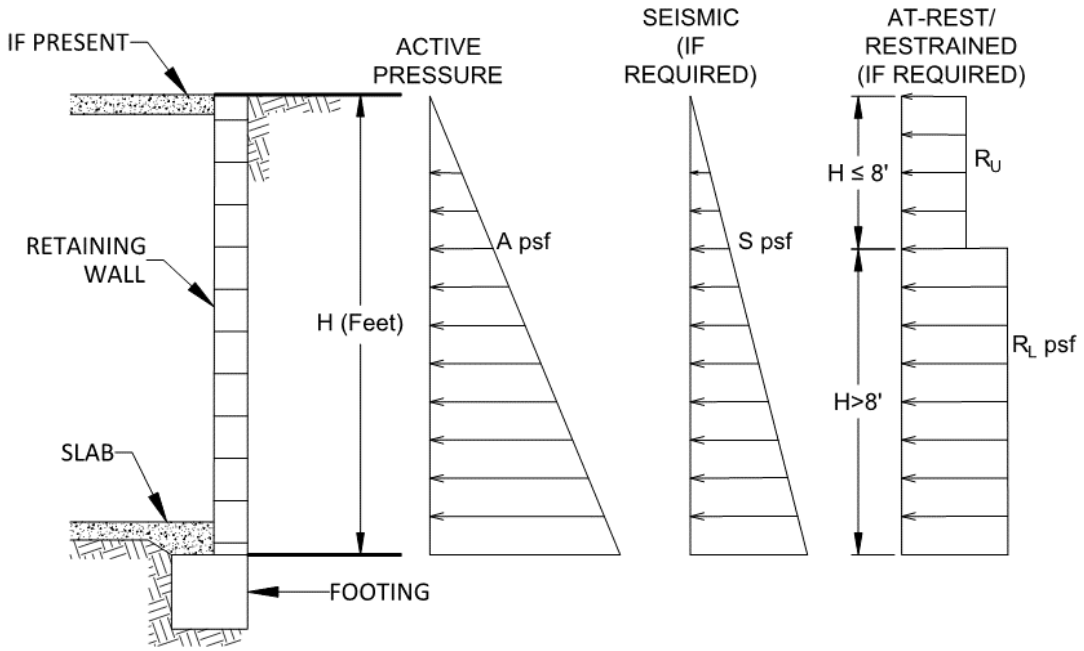
7.9.1 Retaining walls should be designed using the values presented in Table 7.9.1. Soil with an expansion index (EI) of greater than 50 should not be used as backfill material behind retaining walls.

TABLE 7.9.1
RETAINING WALL DESIGN RECOMMENDATIONS

Parameter	Value
Active Soil Pressure, A (Fluid Density, Level Backfill)	35 pcf
Active Soil Pressure, A (Fluid Density, 2:1 Sloping Backfill)	50 pcf
Seismic Pressure, S	20H psf
At-Rest/Restrained Walls Additional Uniform Pressure (0 to 8 Feet High)	7H psf
At-Rest/Restrained Walls Additional Uniform Pressure (8+ Feet High)	13H psf
Expected Expansion Index for the Subject Property	EI$\leq$50

H equals the height of the retaining portion of the wall

7.9.2 The project retaining walls should be designed as shown in the Retaining Wall Loading Diagram.



Retaining Wall Loading Diagram

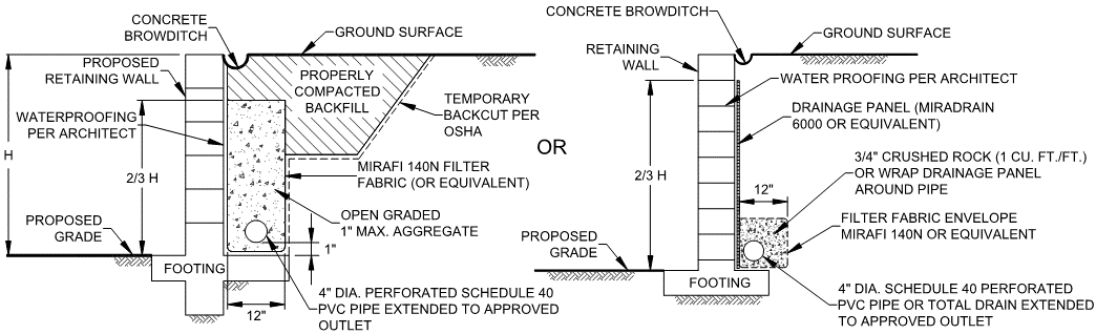
7.9.3 Unrestrained walls are those that are allowed to rotate more than 0.001H (where H equals the height of the retaining portion of the wall) at the top of the wall. Where walls are restrained from movement at the top (at-rest condition), an additional uniform pressure should be applied to the wall. For retaining walls subject to vehicular loads within a horizontal distance equal to two-thirds the wall height, a surcharge equivalent to 2 feet of fill soil should be added.

7.9.4 Unrestrained walls will move laterally when backfilled and loading is applied. The amount of lateral deflection is dependent on the wall height, the type of soil used for backfill, and loads acting on the wall. The retaining walls and improvements above the retaining walls should be designed to incorporate an appropriate amount of lateral deflection as determined by the structural engineer.

7.9.5 The structural engineer should determine the Seismic Design Category for the project in accordance with Section 1613.3.5 of the 2019 CBC or Section 11.6 of ASCE 7-10. For structures assigned to Seismic Design Category of D, E, or F, retaining walls that support more than 6 feet of backfill should be designed with seismic lateral pressure in accordance with Section 1803.5.12 of the 2019 CBC. The seismic load is dependent on the retained height where H is the height of the wall, in feet, and the calculated loads result in pounds per square foot (psf) exerted at the base of the wall and zero at the top of the wall.

7.9.6 Retaining walls should be designed to ensure stability against overturning sliding, and excessive foundation pressure. Where a keyway is extended below the wall base with the intent to engage passive pressure and enhance sliding stability, it is not necessary to consider active pressure on the keyway.

7.9.7 Drainage openings through the base of the wall (weep holes) should not be used where the seepage could be a nuisance or otherwise adversely affect the property adjacent to the base of the wall. The recommendations herein assume a properly compacted granular (EI of 90 or less) free-draining backfill material with no hydrostatic forces or imposed surcharge load. The retaining wall should be properly drained as shown in the Typical Retaining Wall Drainage Detail. If conditions different than those described are expected, or if specific drainage details are desired, Geocon Incorporated should be contacted for additional recommendations.



Typical Retaining Wall Drainage Detail

7.9.8 The retaining walls may be designed using either the active and restrained (at-rest) loading condition or the active and seismic loading condition as suggested by the structural engineer. Typically, it appears the design of the restrained condition for retaining wall loading may be adequate for the seismic design of the retaining walls. However, the active earth pressure combined with the seismic design load should be reviewed and also considered in the design of the retaining walls.

7.9.9 In general, wall foundations should be designed in accordance with Table 7.9.2. The proximity of the foundation to the top of a slope steeper than 3:1 could impact the allowable soil bearing pressure. Therefore, retaining wall foundations should be deepened such that the bottom outside edge of the footing is at least 7 feet horizontally from the face of the slope.

TABLE 7.9.2
SUMMARY OF RETAINING WALL FOUNDATION RECOMMENDATIONS

Parameter	Value
Minimum Retaining Wall Foundation Width	12 inches
Minimum Retaining Wall Foundation Depth	12 Inches
Minimum Steel Reinforcement	Per Structural Engineer
Maximum Allowable Bearing Capacity	2,000 psf
Estimated Total Settlement	1 Inch
Estimated Differential Settlement	½ Inch in 40 Feet

7.9.10 The recommendations presented herein are generally applicable to the design of rigid concrete or masonry retaining walls. In the event that other types of walls (such as mechanically stabilized earth [MSE] walls, soil nail walls, or soldier pile walls) are planned, Geocon Incorporated should be consulted for additional recommendations.

7.9.11 Soil contemplated for use as retaining wall backfill, including import materials, should be identified in the field prior to backfill. At that time, Geocon Incorporated should obtain samples for laboratory testing to evaluate its suitability. Modified lateral earth pressures may be necessary if the backfill soil does not meet the required expansion index or shear strength. City or regional standard wall designs, if used, are based on a specific active lateral earth pressure and/or soil friction angle. In this regard, on-site soil to be used as backfill may or may not meet the values for standard wall designs. Geocon Incorporated should be consulted to assess the suitability of the on-site soil for use as wall backfill if standard wall designs will be used.

7.10 Lateral Loading

7.10.1 Table 7.10 should be used to help design the proposed structures and improvements to resist lateral loads for the design of footings or shear keys. The allowable passive pressure assumes a horizontal surface extending at least 5 feet, or three times the surface generating the passive pressure, whichever is greater. The upper 12 inches of material in areas not protected by floor slabs or pavement should not be included in design for passive resistance.

TABLE 7.10
SUMMARY OF LATERAL LOAD DESIGN RECOMMENDATIONS

Parameter	Value
Passive Pressure Fluid Density	350 pcf
Coefficient of Friction (Concrete and Soil)	0.30
Coefficient of Friction (Along Vapor Barrier)	0.2 to 0.25*

*Per manufacturer's recommendations.

7.10.2 The passive and frictional resistant loads can be combined for design purposes. The lateral passive pressures may be increased by one-third when considering transient loads due to wind or seismic forces.

7.11 Site Drainage and Moisture Protection

7.11.1 Adequate site drainage is critical to reduce the potential for differential soil movement, erosion and subsurface seepage. Under no circumstances should water be allowed to pond adjacent to footings. The site should be graded and maintained such that surface drainage is directed away from structures in accordance with 2019 CBC 1804.4 or other applicable standards. In addition, surface drainage should be directed away from the top of slopes into swales or other controlled drainage devices. Roof and pavement drainage should be directed into conduits that carry runoff away from the proposed structure.

7.11.2 Underground utilities should be leak free. Utility and irrigation lines should be checked periodically for leaks, and detected leaks should be repaired promptly. Detrimental soil movement could occur if water is allowed to infiltrate the soil for prolonged periods of time.

7.11.3 Landscaping planters adjacent to paved areas are not recommended due to the potential for surface or irrigation water to infiltrate the pavement's subgrade and base course. We recommend that area drains to collect excess irrigation water and transmit it to drainage structures or impervious above-grade planter boxes be used. In addition, where landscaping is planned adjacent to the pavement, we recommend construction of a cutoff wall along the edge of the pavement that extends at least 6 inches below the bottom of the base material.

7.12 Storm Water Management

7.12.1 The United States Department of Agriculture (USDA), Natural Resources Conservation Services, possesses general information regarding the existing soil conditions for areas within the United States. The USDA website also provides the Hydrologic Soil Group. Table 7.12 presents the descriptions of the hydrologic soil groups. If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. In addition, the USDA website also provides an estimated saturated hydraulic conductivity for the existing soil.

TABLE 7.12
HYDROLOGIC SOIL GROUP DEFINITIONS

Soil Group	Soil Group Definition
A	Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.
B	Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.
C	Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.
D	Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high-water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

7.12.2 Based on information from the USDA, the property is designated as Huerohuero Urban Land Complex (2 to 9 percent slopes) and is classified as Soil Group D with a saturated hydraulic conductivity rate of 0.00 to 0.06 inches per hour, as shown on the USDA Hydrologic Soil Group Map.

USDA Hydrologic Soil Group Map

7.12.3 We should provide storm water infiltration recommendations if storm water management devices are planned.

7.13 Foundation Plan Review

7.13.1 Geocon Incorporated should review the project foundation plans prior to final design submittal to check if additional analysis and/or recommendations are required.

LIMITATIONS AND UNIFORMITY OF CONDITIONS

1. The firm that performed the geotechnical investigation for the project should be retained to provide testing and observation services during construction to provide continuity of geotechnical interpretation and to check that the recommendations presented for geotechnical aspects of site development are incorporated during site grading, construction of improvements, and excavation of foundations. If another geotechnical firm is selected to perform the testing and observation services during construction operations, that firm should prepare a letter indicating their intent to assume the responsibilities of project geotechnical engineer of record. A copy of the letter should be provided to the regulatory agency for their records. In addition, that firm should provide revised recommendations concerning the geotechnical aspects of the proposed development, or a written acknowledgement of their concurrence with the recommendations presented in our report. They should also perform additional analyses deemed necessary to assume the role of Geotechnical Engineer of Record.

2. The recommendations of this report pertain only to the site investigated and are based upon the assumption that the soil conditions do not deviate from those disclosed in the investigation. If any variations or undesirable conditions are encountered during construction, or if the proposed construction will differ from that anticipated herein, Geocon Incorporated should be notified so that supplemental recommendations can be given. The evaluation or identification of the potential presence of hazardous or corrosive materials was not part of the scope of services provided by Geocon Incorporated.

3. This report is issued with the understanding that it is the responsibility of the owner or his representative to ensure that the information and recommendations contained herein are brought to the attention of the architect and engineer for the project and incorporated into the plans, and the necessary steps are taken to see that the contractor and subcontractors carry out such recommendations in the field.

4. The findings of this report are valid as of the present date. However, changes in the conditions of a property can occur with the passage of time, whether they be due to natural processes or the works of man on this or adjacent properties. In addition, changes in applicable or appropriate standards may occur, whether they result from legislation or the broadening of knowledge. Accordingly, the findings of this report may be invalidated wholly or partially by changes outside our control. Therefore, this report is subject to review and should not be relied upon after a period of three years.

COLLINS AEROSPACE REDEVELOPMENT
PARCEL A
CHULA VISTA, CALIFORNIA

0' 100' 200' 300' 400'

SCALE 1"=200'(on 11x17)

GEOCON LEGEND

Qudf .....UNDOCUMENTED FILL

Qb .....BAY DEPOSITS
(Dotted Where Buried)

Qop .....OLD PARALIC DEPOSITS
(Dotted Where Buried)

CPT-6 .....APPROX. LOCATION OF CPT
(Current Study)

B-11 .....APPROX. LOCATION OF BORING
(Geocon, 2005)

B-6 .....APPROX. LOCATION OF BORING
(Geocon, 1999)

B-7 .....APPROX. LOCATION OF BORING
(Geocon, 1980)

Qudf - 0-4
Qb - 4-23
Qop - 23-26 .....PREVIOUSLY ENCOUNTERED
GEOLOGIC CONDITIONS (In Feet)
Qudf = Undocumented fill
Qb = Bay Deposits
Qop = Old Paralic Deposits

Gw - 15 .....GROUNDWATER DEPTH (In Feet)

GEOLOGIC MAP

GEOCON
INCORPORATED
GEOTECHNICAL ■ ENVIRONMENTAL ■ MATERIALS
6960 FLANDERS DRIVE - SAN DIEGO, CALIFORNIA 92121 - 2974
PHONE 858 558-6900 - FAX 858 558-6159

PROJECT NO. G2559 - 52 - 01
FIGURE 1
DATE 10 - 12 - 2020

Plotted:10/12/2020 3:29PM | By:ALVIN LADRILLONO | File Location:Y:\PROJECTS\G2559-52-01 (Collins Aerospace Redevelopment - Parcel A)\SHEETS\G2559-52-01 Boring Location Map.20.dwg

APPENDIX A

APPENDIX A

FIELD INVESTIGATION

We performed our field investigation on September 29, 2020 that consisted of performing 6 CPTs. In addition, a seismic CPT (SCPT) was performed at CPT-5. The CPTs extended to a maximum depth of approximately 100 feet, and the locations of the CPTs are shown on the Geologic Map, Figure 1. The CPT soundings and the SCPT profile are presented in this Appendix. We located the CPTs in the field using a measuring tape and existing reference points; therefore, actual locations may deviate slightly.

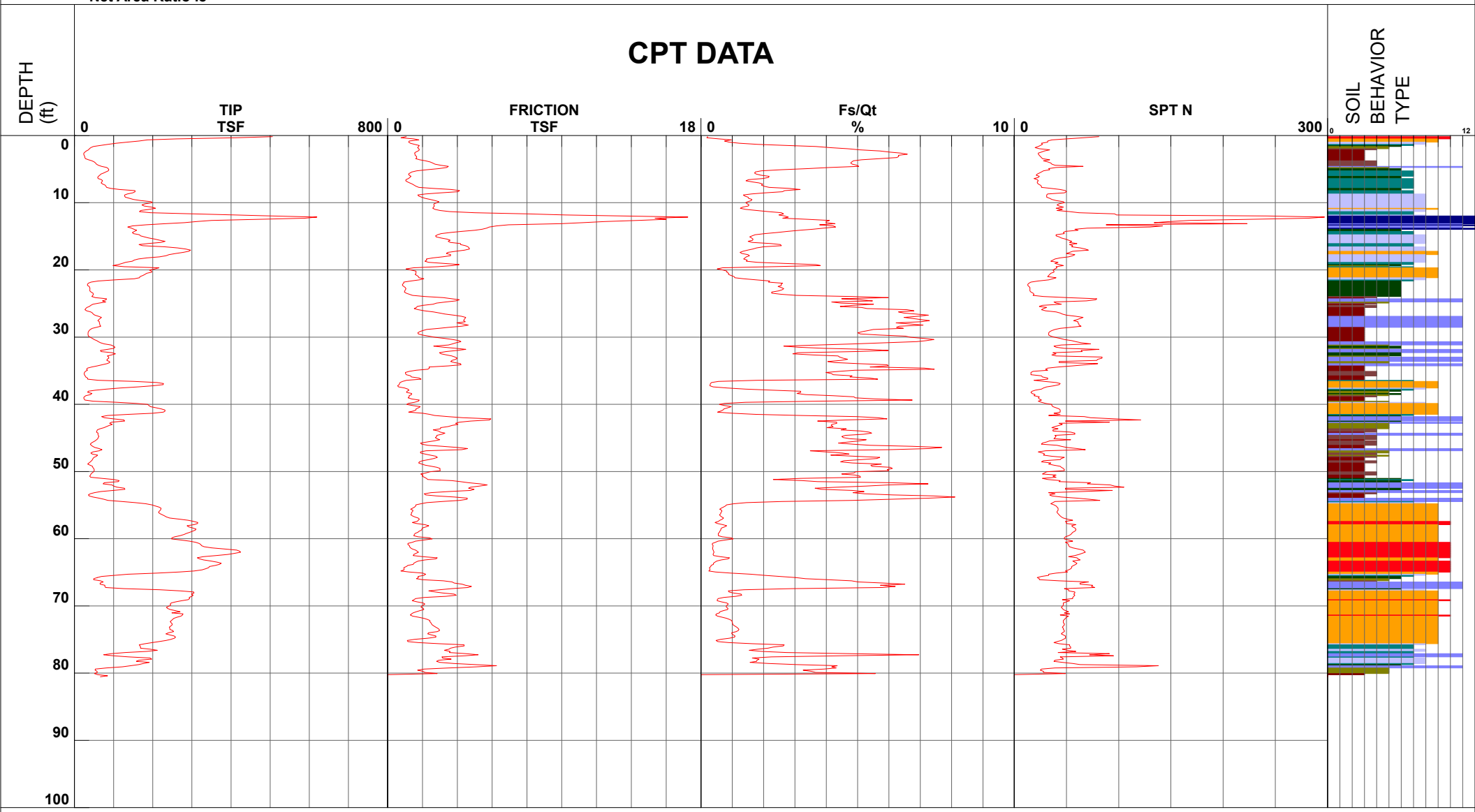
Middle Earth Geo Testing performed the CPTs and SCPT. The soil conditions encountered during the field investigation were automatically logged in a nearly continuous profile of penetration resistance as each CPT sounding was being conducted. The recorded tip stress, sleeve stress, and pore pressure of the soil is used to develop a stratigraphic interpretation of the soil profile. In addition, the SCPT measured the shear waves generated at the ground surface to a depth of 100 feet below the existing ground surface at the location of CPT-5.

Geocon Inc.

Project	Collins Aerospace	Operator	BH-AH	Filename	SDF(133).cpt
Job Number	G2559-52-01	Cone Number	DDG1530	GPS	
Hole Number	CPT-01	Date and Time	9/29/2020 7:57:37 AM	Maximum Depth	80.54 ft
EST GW Depth During Test		20.00 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

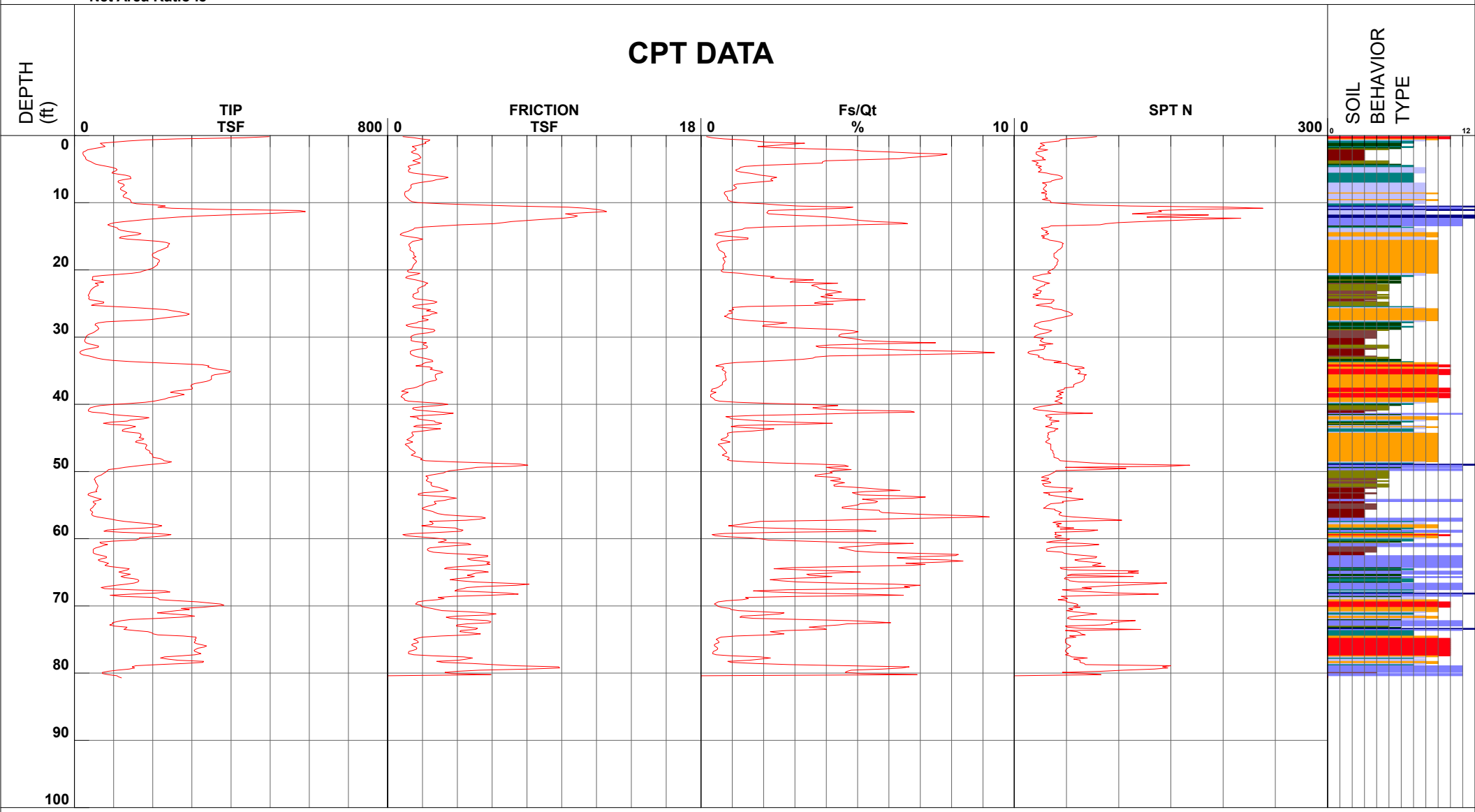
S*Soil behavior type and SPT based on data from UBC-1983

Geocon Inc.

Project	Collins Aerospace	Operator	BH-AH	Filename	SDF(134).cpt
Job Number	G2559-52-01	Cone Number	DDG1530	GPS	
Hole Number	CPT-02	Date and Time	9/29/2020 9:18:08 AM	Maximum Depth	80.71 ft
EST GW Depth During Test		13.00 ft			

Net Area Ratio .8

CPT DATA



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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

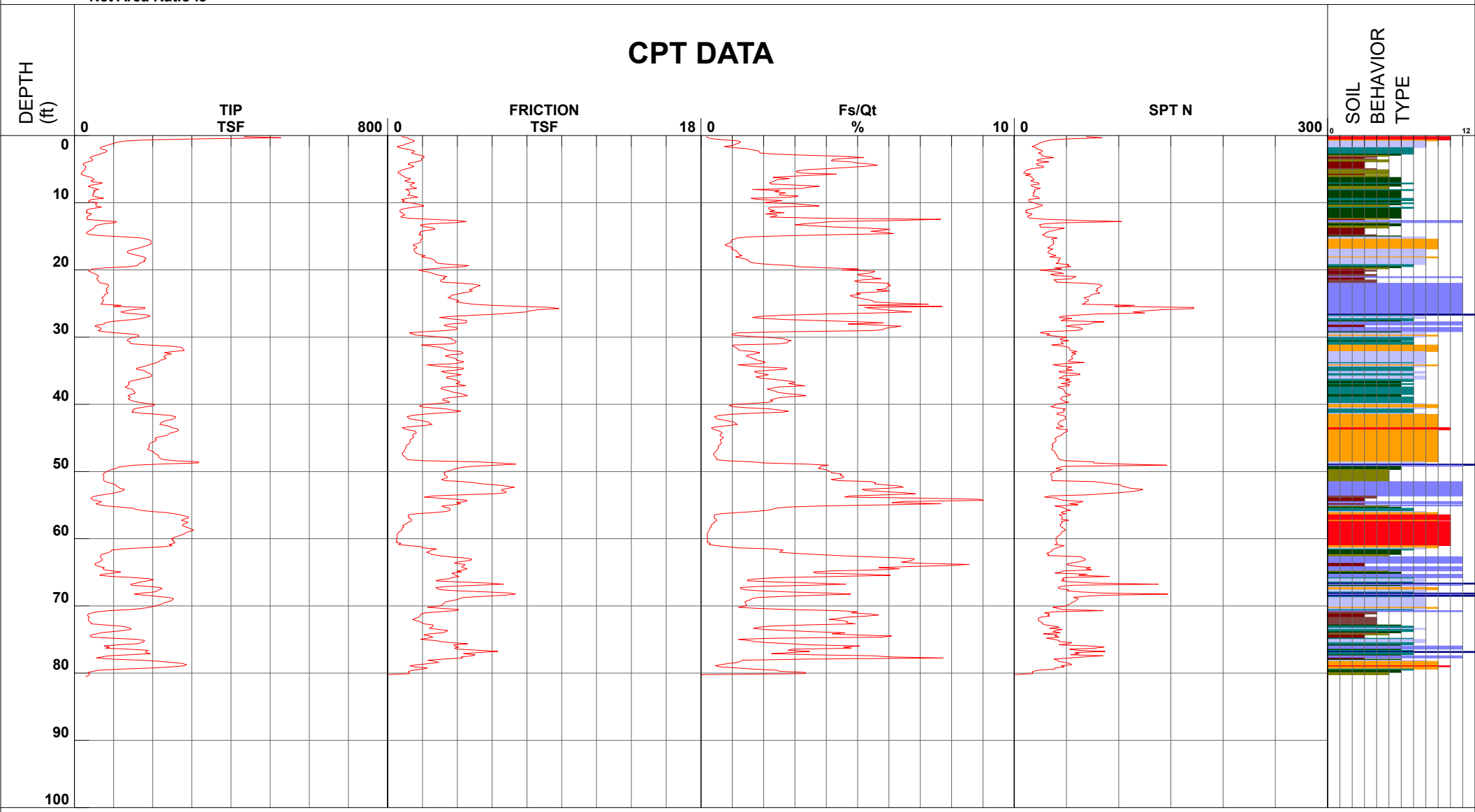
S*Soil behavior type and SPT based on data from UBC-1983

Geocon Inc.

Project	Collins Aerospace	Operator	BH-AH	Filename	SDF(136).cpt
Job Number	G2559-52-01	Cone Number	DDG1530	GPS	
Hole Number	CPT-04	Date and Time	9/29/2020 11:18:16 AM	Maximum Depth	80.54 ft
EST GW Depth During Test		10.00 ft			

Net Area Ratio .8

CPT DATA



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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

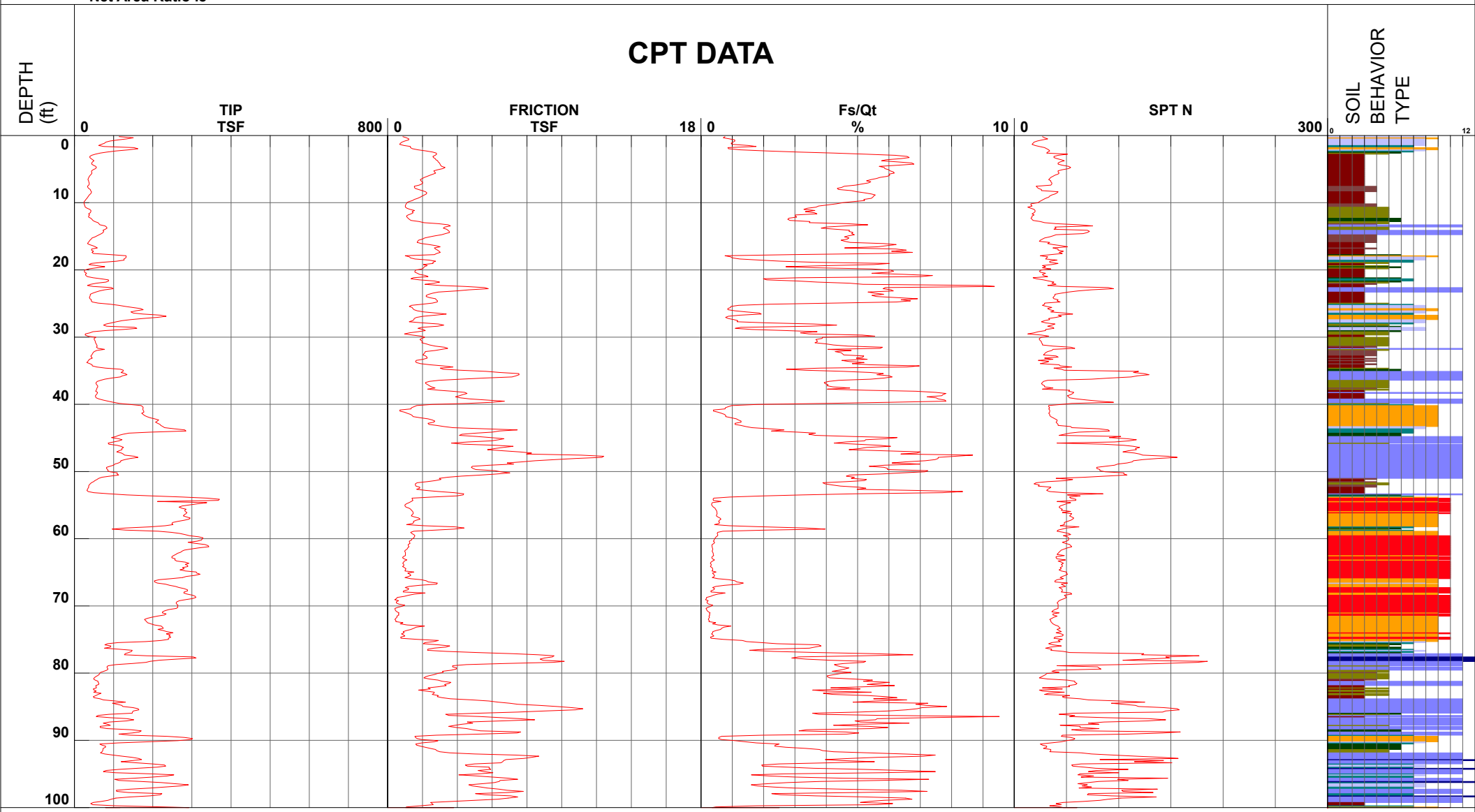
S*Soil behavior type and SPT based on data from UBC-1983

Geocon Inc.

Project	Collins Aerospace	Operator	BH-AH	Filename	SDF(137).cpt
Job Number	G2559-52-01	Cone Number	DDG1530	GPS	
Hole Number	CPT-05	Date and Time	9/29/2020 12:54:48 PM	Maximum Depth	101.05 ft
EST GW Depth During Test		15.00 ft			

Net Area Ratio .8

CPT DATA



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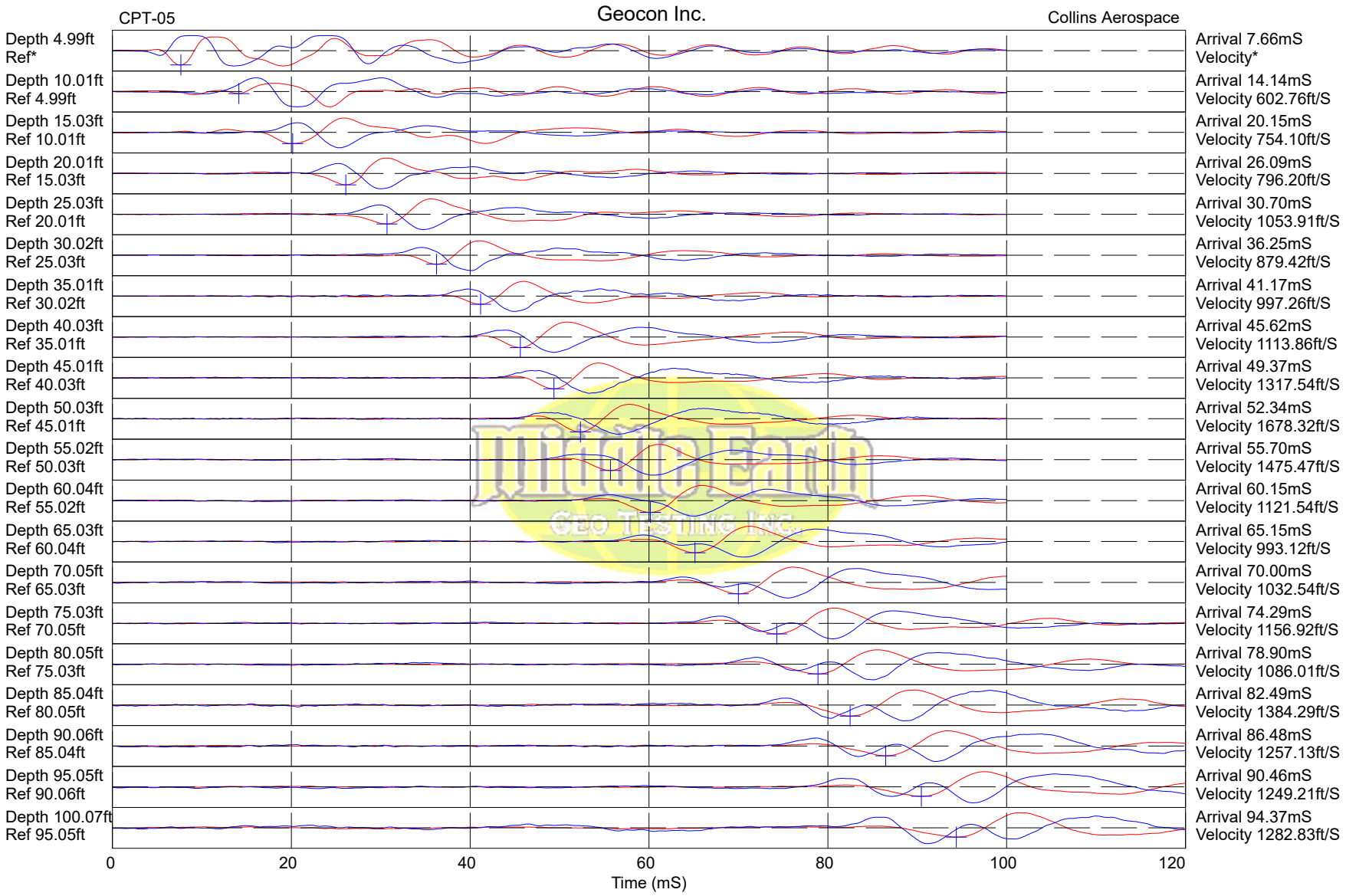
7 - silty sand to sandy silt
8 - sand to silty sand
9 - sand
10 - gravelly sand to sand
11 - very stiff fine grained (*)
12 - sand to clayey sand (*)

Cone Size 15cm squared

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

SCPT-05



Hammer to Rod String Distance (ft): 5.83
* = Not Determined

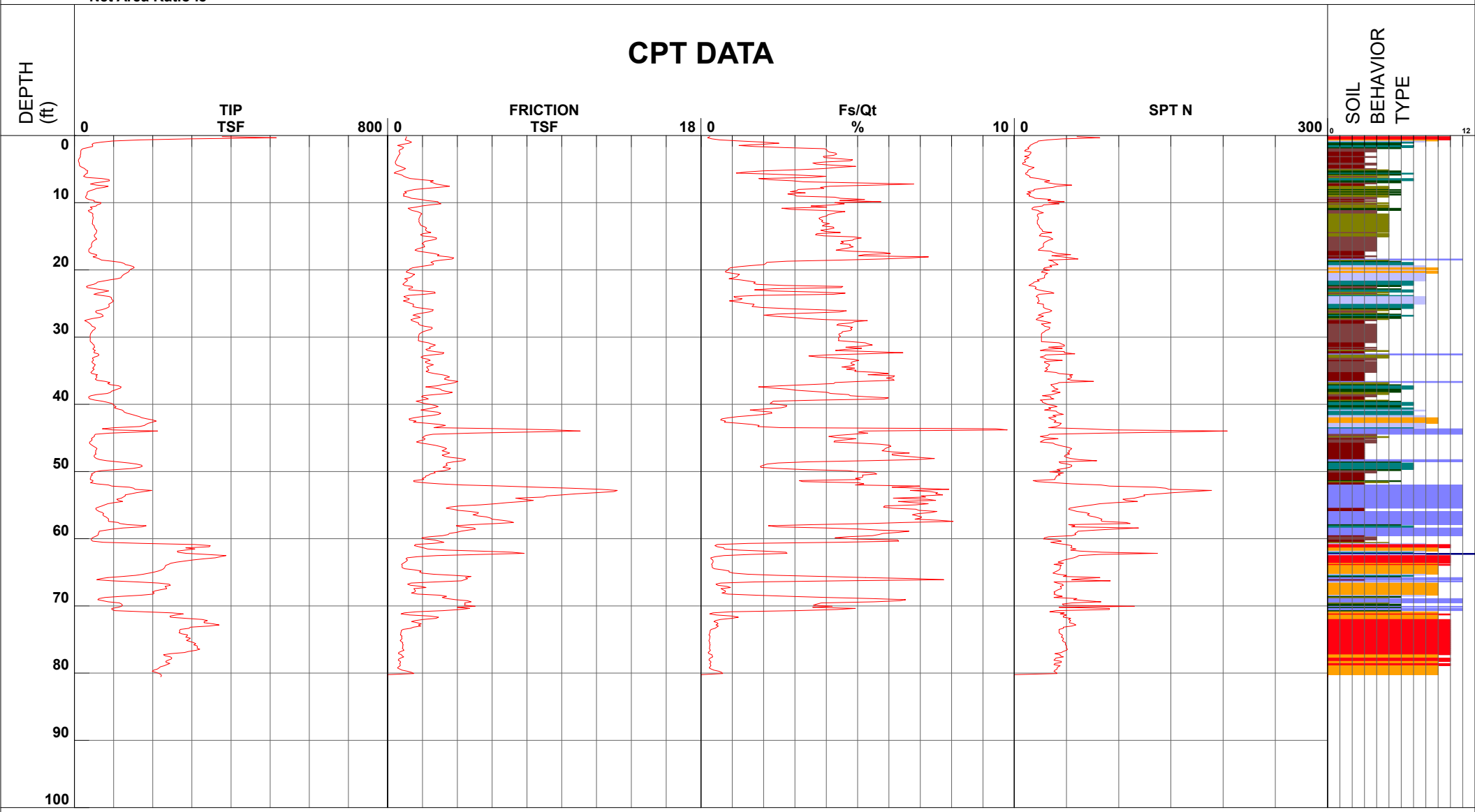
COMMENT:

Geocon Inc.

Project	Collins Aerospace	Operator	BH-AH	Filename	SDF(138).cpt
Job Number	G2559-52-01	Cone Number	DDG1530	GPS	
Hole Number	CPT-06	Date and Time	9/29/2020 2:34:19 PM	Maximum Depth	80.54 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

APPENDIX B

APPENDIX B

BORING LOGS AND LABORATORY TESTING RESULTS

FROM

OOMPA PROJECT ON GOODRICH PROPERTY
PREPARED BY GEOCON INCORPORATED
DATED SEPTEMBER 12, 2005
PROJECT NO. 07050-22-30

FOR

COLLINS AEROSPACE REDEVELOPMENT SITE – PARCEL A
NORTHWEST CORNER OF H STREET AND BAY BOULEVARD
CHULA VISTA, CALIFORNIA

PROJECT NO. G2559-52-01

PROJECT NO. 07050-22-30

BORING B 1

ELEV. (MSL.) ~16.5' DATE COMPLETED 07-12-2005

EQUIPMENT CME 75

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0					GRAVEL 4" thick			
2	B1-1			SM	**FILL** Loose, moist, moderate brown, Silty, fine SAND			
4	B1-2				**BAY POINT FORMATION** Hard, moist, medium brown, Sandy CLAY	76	124.0	11.7
6	B1-3			CL		50/6"	120.2	13.4
8					Dense, moist, moderate olive brown, Clayey, fine SAND with 1" to 2" thick, stiff to hard clay layers			
10	B1-4			SC		41		
12			▽		-Groundwater depth of 12' at the end of drilling			
14			▼		-Groundwater depth of 14' during drilling			
16	B1-5					39	105.7	20.1
					BORING TERMINATED AT 16 FEET Backfilled with approximately 5.5 cu. ft. of hydrated bentonite chips			

Figure A-1,
Log of Boring B 1, Page 1 of 1

07050-22-30.GPJ

SAMPLE SYMBOLS

- ☐ ... SAMPLING UNSUCCESSFUL
- ◧ ... STANDARD PENETRATION TEST
- ■ ... DRIVE SAMPLE (UNDISTURBED)
- ▨ ... DISTURBED OR BAG SAMPLE
- ◪ ... CHUNK SAMPLE
- ▼ ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

PROJECT NO. 07050-22-30

BORING B 2

ELEV. (MSL.) ~12.3' DATE COMPLETED 07-12-2005

EQUIPMENT CME 75

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0					4"ASPHALT			
					4" AGGREGATE BASE			
2	B2-1 B2-2			SC	**BAY POINT FORMATION** Very dense, moist, moderate yellowish brown, Clayey SAND	74	120.4	13.1
4	B2-3				Very hard, moist, moderate brown, CLAY with sand	92/10"	117.7	12.5
6				CL				
8					Very dense, wet, pale yellowish brown, poorly graded, fine to medium SAND			
			▽		-Groundwater depth of 9' at the end of drilling			
10	B2-4		▼	SP	-Groundwater depth of 10' during drilling	52		
12								
14				SW	Very dense, wet to saturated, pale yellowish brown, well graded, fine to coarse SAND			
	B2-5					54	112.1	15.1
16					BORING TERMINATED AT 16 FEET Backfilled with approximately 5.5 cu. ft. of hydrated bentonite grout, capped with concrete			

Figure A-2,
Log of Boring B 2, Page 1 of 1

07050-22-30.GPJ

SAMPLE SYMBOLS

- ☐ ... SAMPLING UNSUCCESSFUL
- ◧ ... STANDARD PENETRATION TEST
- ■ ... DRIVE SAMPLE (UNDISTURBED)
- ▨ ... DISTURBED OR BAG SAMPLE
- ◪ ... CHUNK SAMPLE
- ▼ ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

PROJECT NO. 07050-22-30

BORING B 3

ELEV. (MSL.) ~12' DATE COMPLETED 07-11-2005

EQUIPMENT CME 75

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0					ASPHALT 4" thick			
2	B3-1			SM	**FILL** Loose, moist, medium brown, Silty SAND			
	B3-2			CL	**BAY DEPOSITS** Hard, moist, moderate brown, CLAY with fine sand	30	112.1	16.4
4					Very dense, moist, moderate yellowish brown, Silty, fine SAND			
6	B3-3			SM		92	102.9	20.9
8			▼		Medium dense, wet to saturated, moderate yellowish brown, poorly graded, fine to medium SAND with silt			
10	B3-4			SP-SM		18		
12					-2" clay layer			
14					Dense, saturated, medium yellow brown, poorly graded, fine to medium SAND			
16	B3-5					41	114.6	16.1
18								
20	B3-6			SP		34		
22								
24								
26	B3-7			CL	**BAY POINT FORMATION** Hard, moist, moderate olive brown and dark yellowish orange, CLAY with sand	58	103.7	22.8
					BORING TERMINATED AT 26 FEET Backfilled with approximately 9 cu. ft. of hydrated bentonite grout, capped with concrete			

Figure A-3,
Log of Boring B 3, Page 1 of 1

07050-22-30.GPJ

SAMPLE SYMBOLS

- ... SAMPLING UNSUCCESSFUL
- ... STANDARD PENETRATION TEST
- ... DRIVE SAMPLE (UNDISTURBED)
- ... DISTURBED OR BAG SAMPLE
- ... CHUNK SAMPLE
- ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

PROJECT NO. 07050-22-30

BORING B 4

ELEV. (MSL.) ~12.3' DATE COMPLETED 07-11-2005

EQUIPMENT CME 75

DEPTH IN FEET	SAMPLE NO.	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0			ASPHALT 3" thick			
2	B4-1 B4-2	CL	**FILL** Hard, moist, moderate brown, mottled black, Sandy CLAY	98	94.2	13.3
4						
6	B4-3	CL	**BAY DEPOSITS** Hard, moist, moderate to dark yellowish brown, CLAY with sand	60		
8						
10	B4-4	SC	Medium dense, moist, moderate to dark yellowish brown, Clayey SAND	18		
12						
14			-Wet to saturated below 13 feet			
16	B4-5			32	110.4	19.3
18						
20	B4-6	SP	Medium dense, saturated, pale yellowish brown, poorly graded, fine to medium SAND -Possible slough	11		
22						
24		CL	**BAY POINT FORMATION** Hard, moist, moderate olive brown, CLAY			
26	B4-7			72	102.8	21.5
			BORING TERMINATED AT 26 FEET Backfilled with approximately 9 cu. ft. of hydrated bentonite grout, capped with concrete			

Figure A-4,
Log of Boring B 4, Page 1 of 1

07050-22-30.GPJ

SAMPLE SYMBOLS

- ☐ ... SAMPLING UNSUCCESSFUL
- ◧ ... STANDARD PENETRATION TEST
- ■ ... DRIVE SAMPLE (UNDISTURBED)
- ▨ ... DISTURBED OR BAG SAMPLE
- ◪ ... CHUNK SAMPLE
- ▼ ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

PROJECT NO. 07050-22-30

BORING B 5

ELEV. (MSL.) ~11.5' DATE COMPLETED 07-11-2005

EQUIPMENT CME 75

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0					ASPHALT 4" thick			
2	B5-1			SM	FILL Loose, moist, moderate brown, Silty SAND			
	B5-2				BAY DEPOSITS Dense, moist, moderate brown, Clayey SAND	50/6"	106.1	7.6
4								
6	B5-3					42	115.2	14.7
8				SC				
10	B5-4					34		
12			▼					
14								
16	B5-5			SM	Dense, wet to saturated, moderate brown, Silty SAND	41	103.2	23.6
18								
20	B5-6					39		
22								
24								
					BORING TERMINATED AT 25 FEET Backfilled with approximately 8.5 cu. ft. of hydrated bentonite grout, capped with concrete			

Figure A-5,
Log of Boring B 5, Page 1 of 1

07050-22-30.GPJ

SAMPLE SYMBOLS

- ☐ ... SAMPLING UNSUCCESSFUL
- ▥ ... DISTURBED OR BAG SAMPLE
- ▮ ... STANDARD PENETRATION TEST
- ◣ ... CHUNK SAMPLE
- ■ ... DRIVE SAMPLE (UNDISTURBED)
- ▼ ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

PROJECT NO. 07050-22-30

BORING B 6

ELEV. (MSL.) ~11.5' DATE COMPLETED 07-11-2005

EQUIPMENT CME 75

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0					ASPHALT 3" thick			
2	B6-1			CL	**BAY DEPOSITS** Very stiff to hard, moist, moderate to dark yellowish brown, CLAY with sand			
4								
6	B6-2					76	115.4	16.4
8			▼					
10	B6-3			SC	Medium dense, wet, moderate yellowish brown, Clayey SAND with layers (1" to 2") of clay, micaceous	30		
12								
14					Medium dense, wet, dark yellowish brown, poorly graded, fine SAND, micaceous			
16	B6-4			SP		25	109.3	17.4
18								
20	B6-5					20		
22								
24				CL	**BAY POINT FORMATION** Hard, moist, pale yellowish brown, CLAY			
26	B6-6					40	103.8	21.5
					BORING TERMINATED AT 26 FEET Backfilled with approximately 9 cu. ft. of hydrated bentonite grout, capped with concrete			

07050-22-30.GPJ

Figure A-6,
Log of Boring B 6, Page 1 of 1

SAMPLE SYMBOLS

☐ ... SAMPLING UNSUCCESSFUL ◧ ... STANDARD PENETRATION TEST ■ ... DRIVE SAMPLE (UNDISTURBED)

▨ ... DISTURBED OR BAG SAMPLE ◥ ... CHUNK SAMPLE ▼ ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

PROJECT NO. 07050-22-30

BORING B 10

ELEV. (MSL.) ~10.5' DATE COMPLETED 07-27-2005

EQUIPMENT CME 75

DEPTH IN FEET	SAMPLE NO.	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0	B10-1		ASPHALT 2" thick			
2		SC	**FILL** Medium dense, damp, light to dark brown, Clayey SAND			
2	B10-2		**BAY DEPOSITS** Stiff, moist, dark yellowish brown, CLAY with sand	15	100.9	23.9
4						
6	B10-3	CL		31	116.2	16.3
8			Medium dense, moist, moderate yellowish brown, Clayey SAND			
10	B10-4	SC	▼	21		
12			Medium dense, wet to saturated, dark yellowish brown, Silty, medium -grained SAND			
14		SM				
16	B10-5		Stiff, moist, dark reddish brown, Silty CLAY		~~104.9~~	~~22.0~~
18		CL				
20	B10-6		**BAY POINT FORMATION** Hard, moist, light olive gray, CLAY	30		
22		CL				
24						
26	B10-7			~~50/5"~~	~~107.2~~	~~21.3~~
28		SM	Very dense, moist, olive brown and reddish brown mottled, Silty SAND			
30	B10-8			50/6"		
			BORING TERMINATED AT 31 FEET Backfilled with approximately 10.5 cu. ft. of hydrated bentonite chips, capped with concrete			

Figure A-10,
Log of Boring B 10, Page 1 of 1

07050-22-30.GPJ

SAMPLE SYMBOLS

- ☐ ... SAMPLING UNSUCCESSFUL
- ▩ ... STANDARD PENETRATION TEST
- ■ ... DRIVE SAMPLE (UNDISTURBED)
- ▨ ... DISTURBED OR BAG SAMPLE
- ◪ ... CHUNK SAMPLE
- ▼ ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

PROJECT NO. 07050-22-30

BORING B 11

ELEV. (MSL.) _____ DATE COMPLETED 07-27-2005

EQUIPMENT CME 75

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0	B11-1			CL	**FILL** Stiff, dry, brown, Sandy CLAY			
2	B11-2			SM	Loose to medium dense, dry, reddish brown, fine-grained Silty SAND			6.4
4								
6	B11-3				**BAY DEPOSITS** Medium dense, dry to damp, brown with white, Clayey, medium-grained SAND	56	112.0	5.5
8								
10	B11-4			SC		23		
12					-Becomes moist to wet			
14								
16	B11-5				-Medium- to coarse-grained sand	27	114.0	15.4
					BORING TERMINATED AT 16 FEET Backfilled with approximately 5.5 cu. ft. of hydrated bentonite chips			

Figure A-11,
Log of Boring B 11, Page 1 of 1

07050-22-30.GPJ

SAMPLE SYMBOLS

- ☐ ... SAMPLING UNSUCCESSFUL
- ▥ ... STANDARD PENETRATION TEST
- ■ ... DRIVE SAMPLE (UNDISTURBED)
- ▨ ... DISTURBED OR BAG SAMPLE
- ◪ ... CHUNK SAMPLE
- ▼ ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

PROJECT NO. 07050-22-30

BORING B 12

ELEV. (MSL.) _____ DATE COMPLETED 07-27-2005

EQUIPMENT CME 75

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0	B12-1			SC	**FILL** Loose, dry, light brown, Clayey, fine-grained SAND			
2				CL	Stiff, moist, dark brown, Silty CLAY			
	B12-2				**BAY DEPOSITS**	18	93.9	5.2
4				SC	Medium dense, damp, brown, Clayey SAND			
	B12-3					30	107.4	4.5
6					Very stiff, damp, dark brown, Sandy CLAY			
8				CL				
10	B12-4				Very hard, damp, dark brown, Silty CLAY with sand	50/6"		
12				CL				
			▼		Very stiff, wet to saturated, dark grayish brown, Sandy, Silty CLAY			
14				CL				
	B12-5					32	100.9	22.6
16					BORING TERMINATED AT 16 FEET Backfilled with approximately 5.5 cu. ft. of hydrated bentonite chips			

Figure A-12,
Log of Boring B 12, Page 1 of 1

07050-22-30.GPJ

SAMPLE SYMBOLS

☐ ... SAMPLING UNSUCCESSFUL ▮ ... STANDARD PENETRATION TEST ■ ... DRIVE SAMPLE (UNDISTURBED)

▨ ... DISTURBED OR BAG SAMPLE ◪ ... CHUNK SAMPLE ▼ ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

PROJECT NO. 07050-22-30

BORING B 13

ELEV. (MSL.) ~11.5' DATE COMPLETED 07-12-2005

EQUIPMENT CME 75

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0					ASPHALT 3" thick			
2	B13-1				**BAY DEPOSITS** Hard, moist, moderate brown, Sandy CLAY; trace gravel			
	B13-2					39	109.6	18.4
4								
6	B13-2			CL		77	111.9	18.0
8			▽		-Groundwater depth of 8' at the end of drilling			
10	B13-3		▼		-Groundwater depth of 10' during drilling -Becomes firm, with 3"-6" interbeds of loose clayey sand	20		
12								
14								
16	B13-4					58		
					BORING TERMINATED AT 16 FEET Backfilled with approximately 5.5 cu. ft. of hydrated bentonite grout, capped with concrete			

Figure A-13,
Log of Boring B 13, Page 1 of 1

07050-22-30.GPJ

SAMPLE SYMBOLS

- ☐ ... SAMPLING UNSUCCESSFUL
- ▥ ... STANDARD PENETRATION TEST
- ■ ... DRIVE SAMPLE (UNDISTURBED)
- ▨ ... DISTURBED OR BAG SAMPLE
- ◪ ... CHUNK SAMPLE
- ▼ ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

APPENDIX B

LABORATORY TESTING

Laboratory tests were performed in accordance with generally accepted test methods of the American Society for Testing and Materials (ASTM) or other suggested procedures. Selected soil samples were tested for their in-place dry density and moisture content, shear strength, gradation, permeability, and compaction and consolidation characteristics. Selected soils samples were also tested for R-value, thermal resistivity, pH, resistivity, and water-soluble sulfate content. The results of our laboratory tests are presented in Tables B-I through B-VI and on Figures B-1 through B-3. The in-place dry density and moisture content of the samples tested are presented on the boring logs, Appendix A.

TABLE B-I
SUMMARY OF LABORATORY DIRECT SHEAR TEST RESULTS
ASTM D 3080-03

Sample No.	Sample Top Depth (feet)	Dry Density (pcf)	Moisture Content (%)	Unit Cohesion (psf)	Angle of Shear Resistance (degrees)
B3-2	2	102.9	20.9	300	39
B3-7	25	103.7	22.8	320	32
B4-5	15	110.4	19.3	290	37
B5-5	15	103.2	23.6	320	31
B9-5	15	94.0	29.3	720	32

TABLE B-II
SUMMARY OF LABORATORY MAXIMUM DRY DENSITY AND OPTIMUM MOISTURE CONTENT TEST RESULTS
ASTM D 1557-02

Sample No.	Sample Top Depth (feet)	Description	Maximum Dry Density (pcf)	Optimum Moisture Content (% dry wt.)
B2-1	1	Dark brown, Clayey SAND, trace gravel (SC)	131.2	9.2
B9-1	1	Dark reddish brown, Sandy CLAY, trace gravel (CL)	127.6	8.6

TABLE B-III
SUMMARY OF LABORATORY POTENTIAL OF HYDROGEN (pH) AND RESISTIVITY TEST RESULTS CALIFORNIA TEST NO. 643

Sample No.	Sample Top Depth (feet)	pH	Resistivity (ohm centimeters)
B1-1	1	7.4	3380
B10-1	0	7.9	390

TABLE B-IV
SUMMARY OF LABORATORY WATER-SOLUBLE SULFATE TEST RESULTS CALIFORNIA TEST NO. 417

Sample No.	Sample Top Depth (feet)	Water Soluble Sulfate (%)
B1-1	1	0.040
B10-1	0	0.290

TABLE B-V
SUMMARY OF LABORATORY R-VALUE TEST RESULTS CALIFORNIA TEST NO. 301

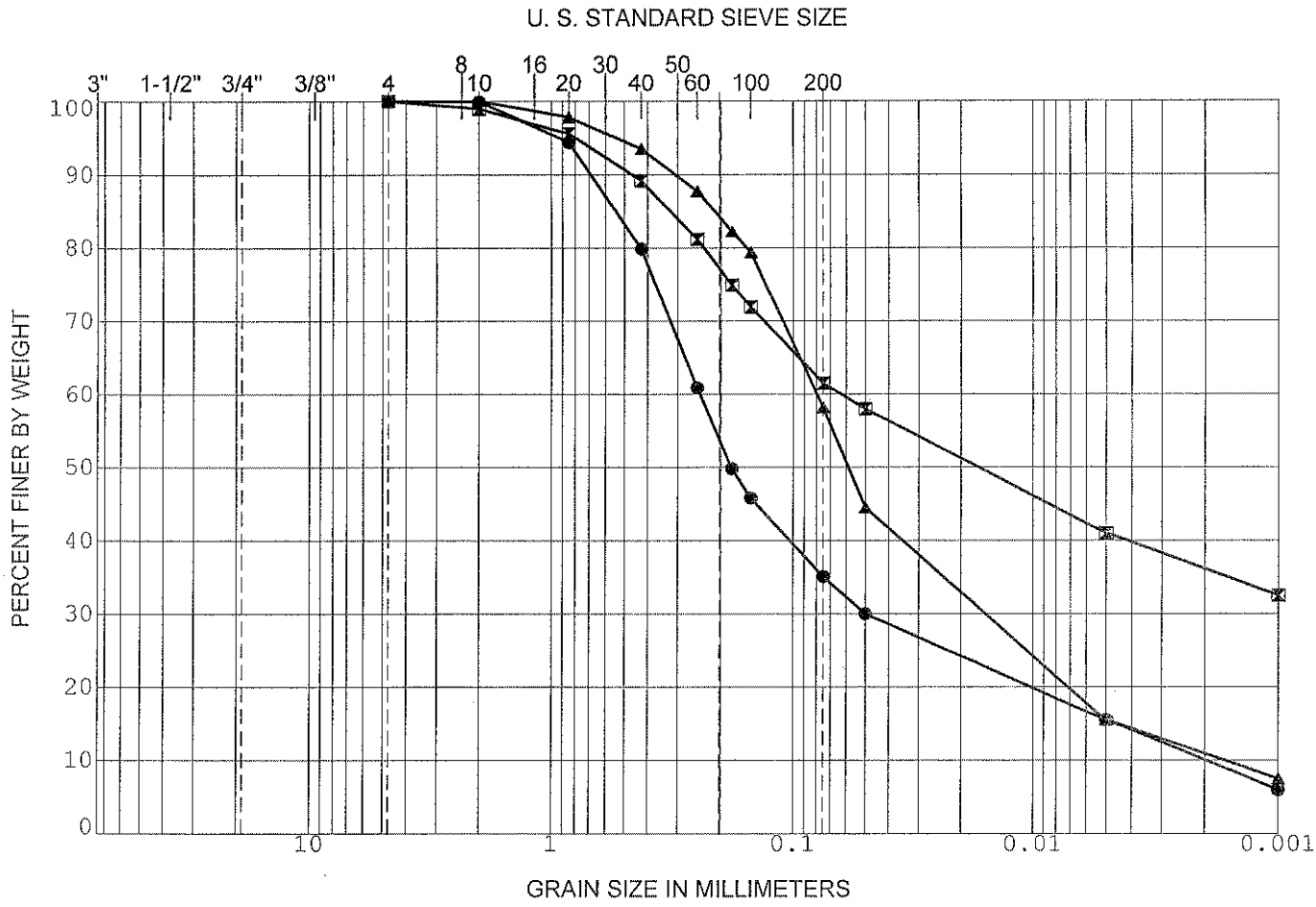
Sample No.	Sample Top Depth (feet)	Description	R-Value
B13-1	1	Dark reddish brown, Sandy CLAY, trace gravel	Less than 5

TABLE B-VI
SUMMARY OF LABORATORY PERMEABILITY TEST RESULTS ASTM D 5084-00

Sample No.	Sample Top Depth (feet)	Description	Permeability (cm/sec)
B4-3	5	Dark brown, Sandy, lean CLAY	4.99E-09
B7-3	5	Dark yellowish brown, lean CLAY with sand	6.36E-09
B8-5	25	Olive, fat CLAY	1.35E-08

PROJECT NO. 07050-22-30

GRAVEL		SAND			SILT OR CLAY
COARSE	FINE	COARSE	MEDIUM	FINE	



	SAMPLE	DEPTH (ft)	CLASSIFICATION	NAT WC	LL	PL	PI
●	B4-4	10.0	SC				
⊠	B7-4	10.0	CL				
▲	B8-4	20.0	SC				

GRADATION CURVE

GOODRICH OMPPA PROJECT

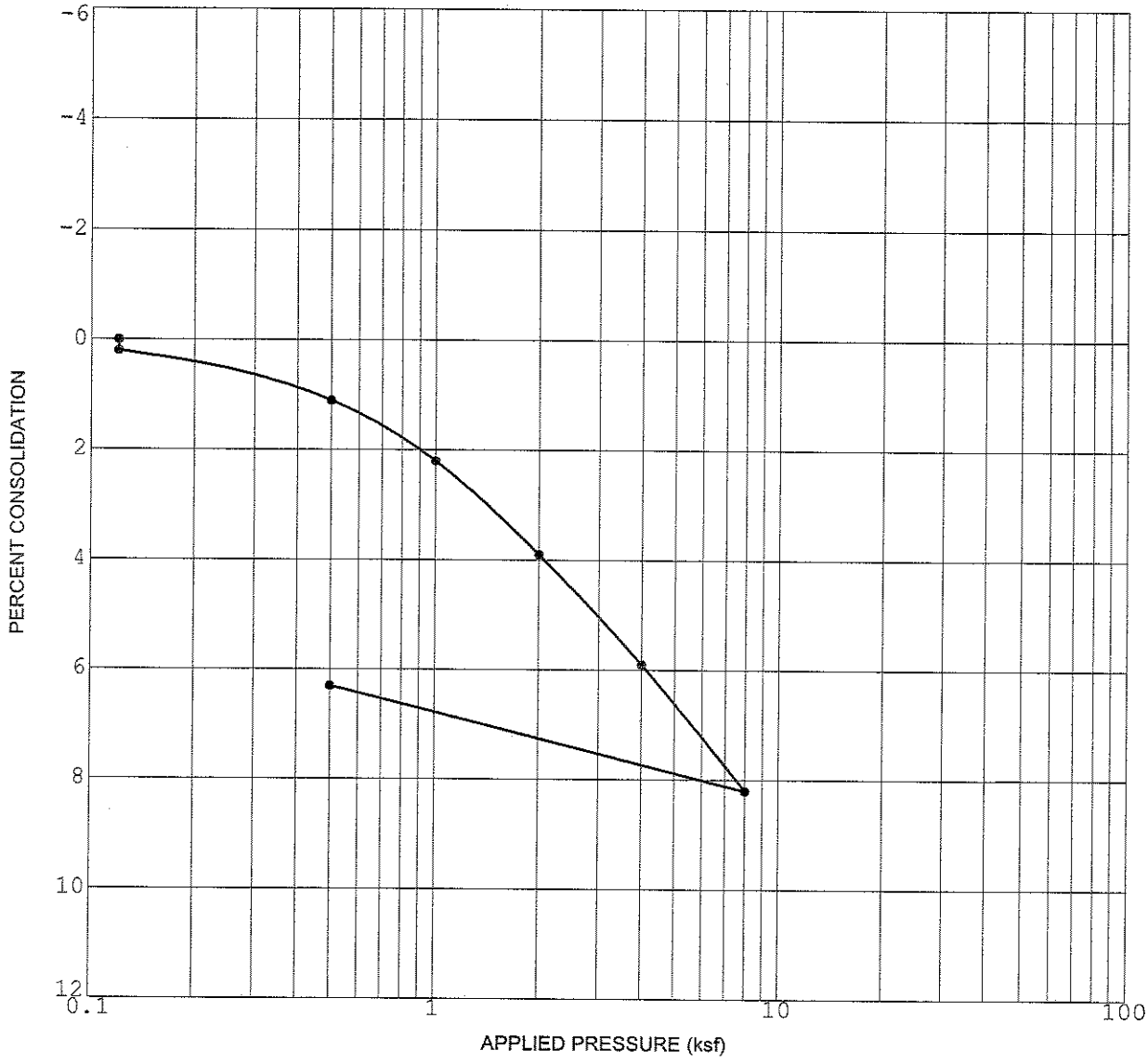
CHULA VISTA, CALIFORNIA

07050-22-30.GPJ

Figure B-1

PROJECT NO. 07050-22-30

SAMPLE NO. B3-7



Initial Dry Density (pcf)	103.4
Initial Water Content (%)	22.8

Initial Saturation (%)	99.9
Sample Saturated at (ksf)	.125

CONSOLIDATION CURVE

GOODRICH OMPPA PROJECT

CHULA VISTA, CALIFORNIA

07050-22-30.GPJ

Figure B-2

APPENDIX C

APPENDIX C

LIQUEFACTION ANALYSIS

FOR

COLLINS AEROSPACE REDEVELOPMENT SITE – PARCEL A
NORTHWEST CORNER OF H STREET AND BAY BOULEVARD
CHULA VISTA, CALIFORNIA

PROJECT NO. G2559-52-01

Geocon Incorporated
6960 Flanders Drive
San Diego, California 92121-2974
www.geoconinc.com

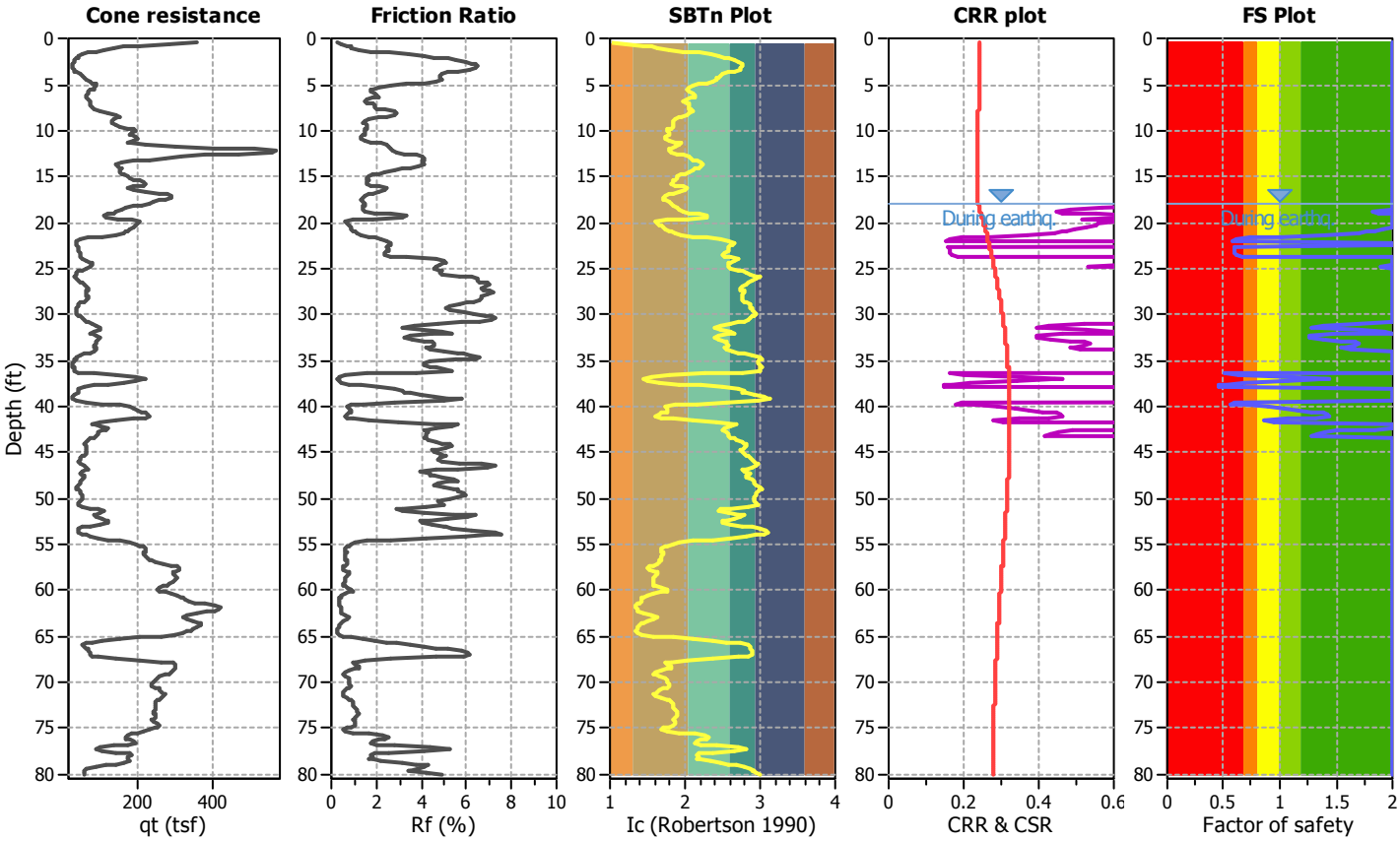
LIQUEFACTION ANALYSIS REPORT

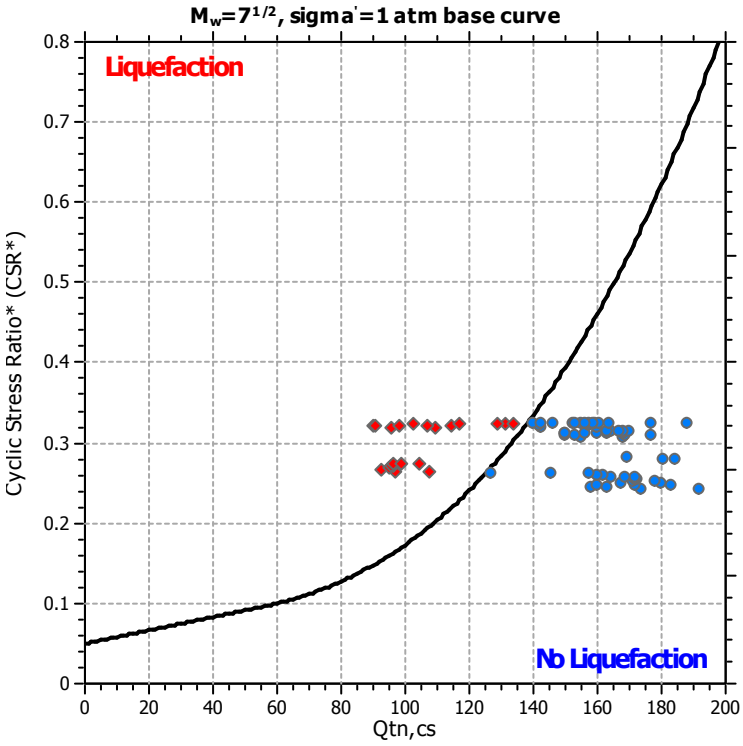
Project title : Collins Aerospace **Location : Parcel A**

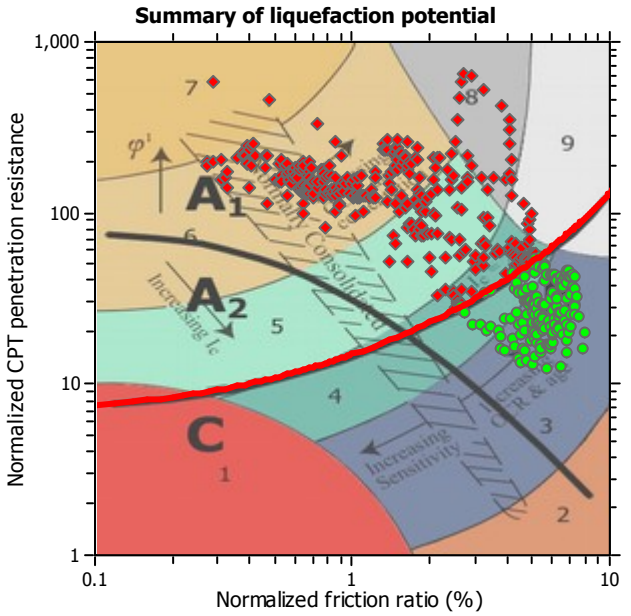
CPT file : CPT-01

Input parameters and analysis data

Analysis method:	NCEER (1998)	G.W.T. (in-situ):	18.00 ft	Use fill:	No	Clay like behavior applied:	Sands only
Fines correction method:	NCEER (1998)	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:	50.00 ft
Earthquake magnitude M_w:	6.12	Ic cut-off value:	2.60	Trans. detect. applied:	No	MSF method:	Method based
Peak ground acceleration:	0.63	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

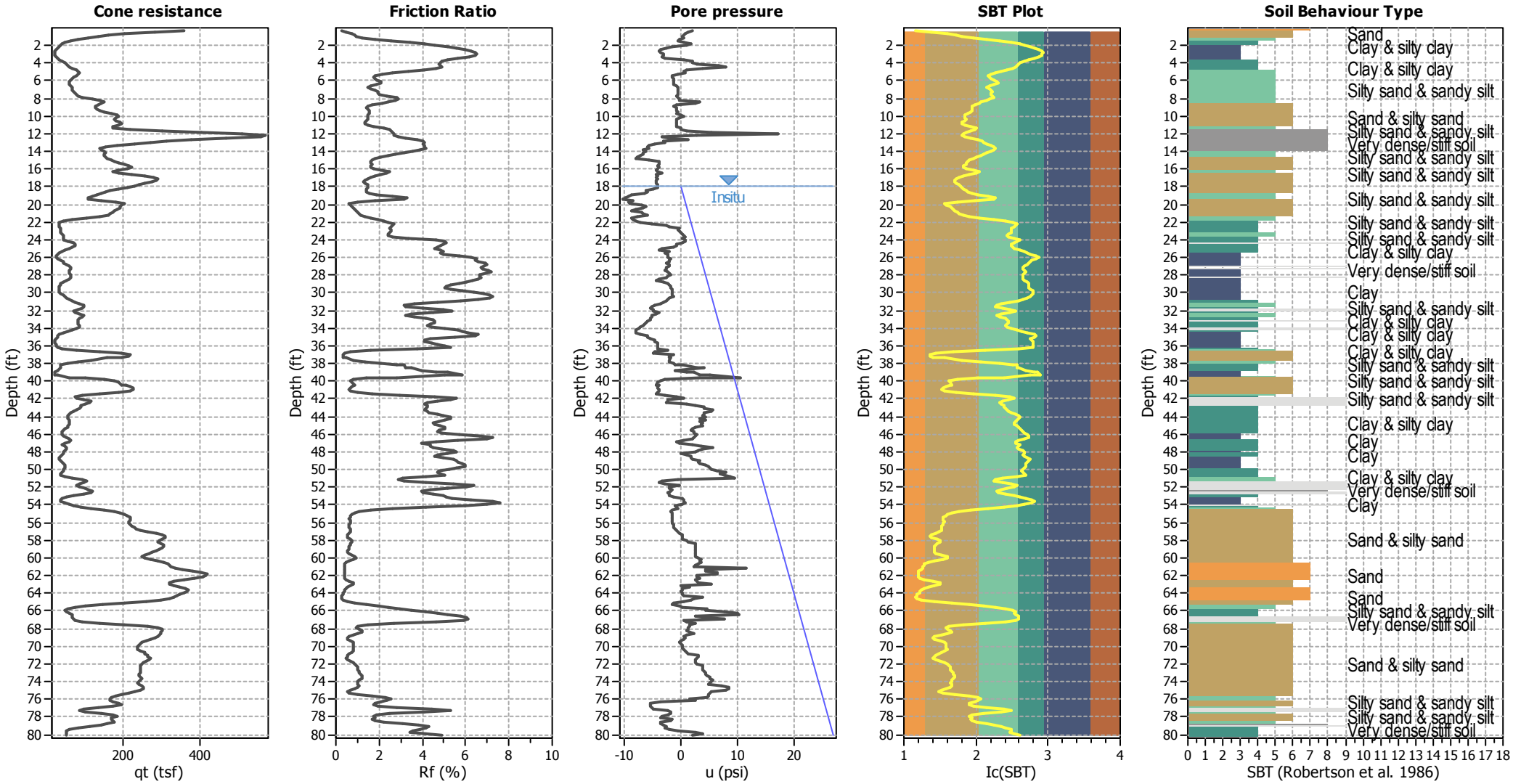






Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and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

CPT basic interpretation plots



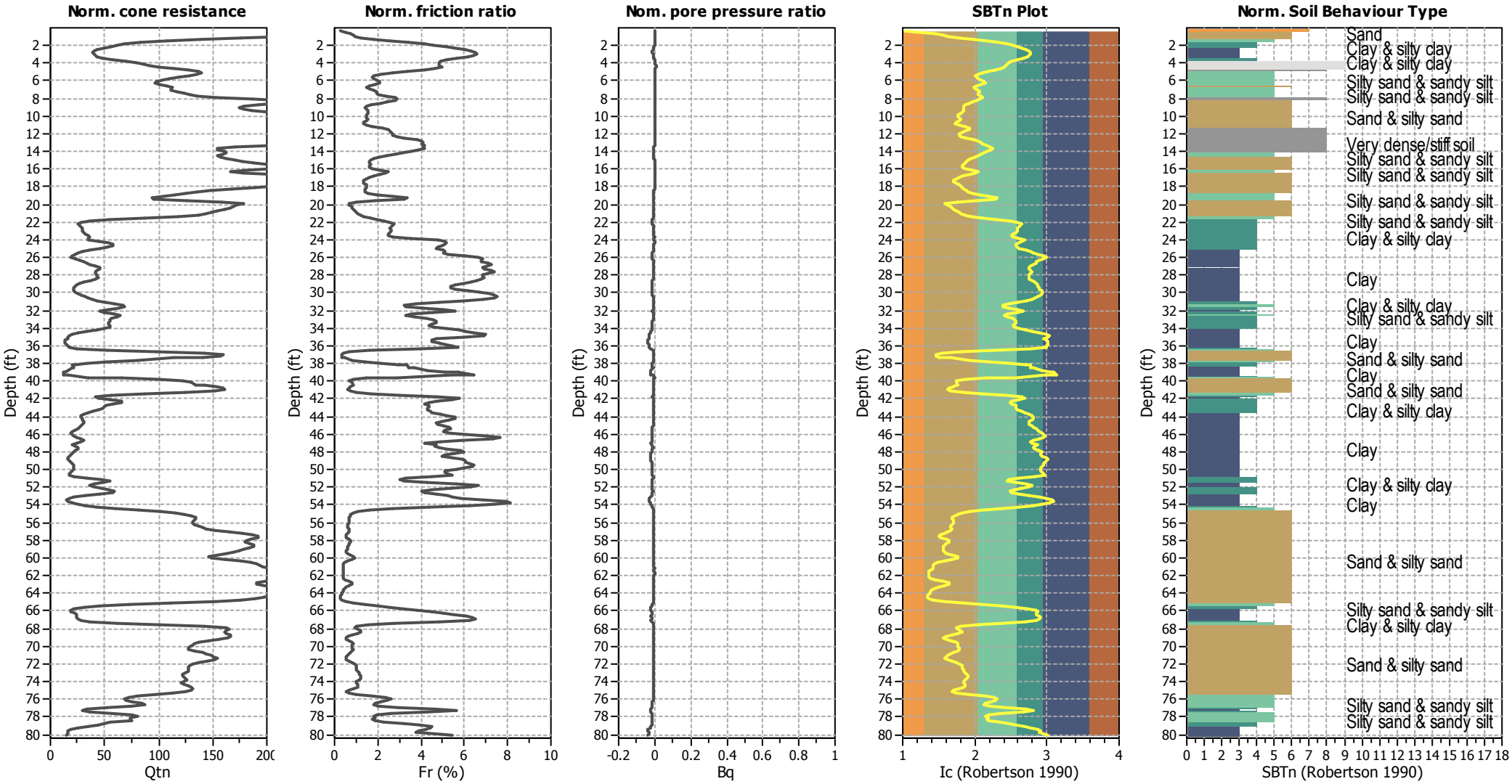
Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	18.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	6.12	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.63	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	18.00 ft	Fill height:	N/A	Limit depth:	50.00 ft

SBT legend

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

CPT basic interpretation plots (normalized)



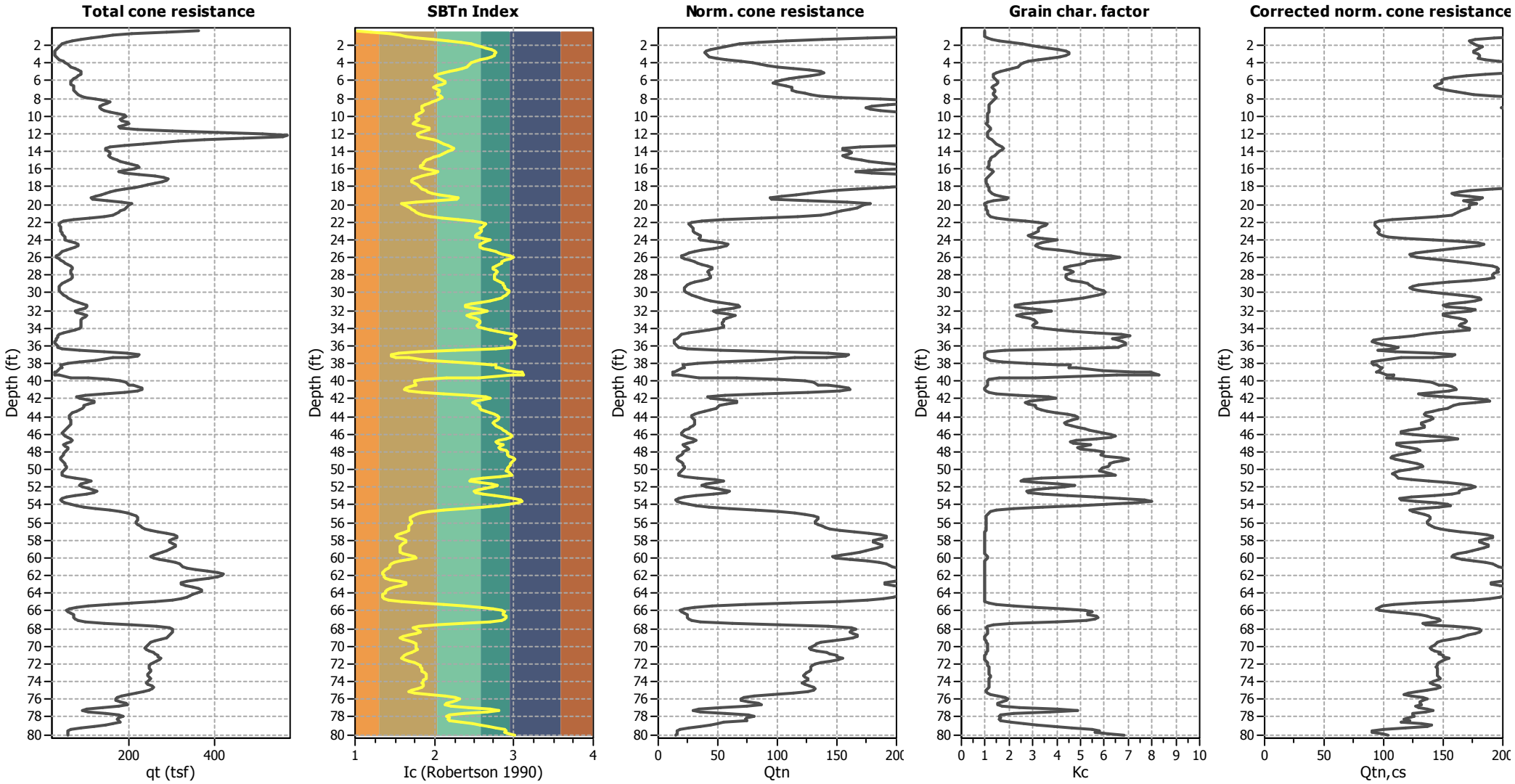
Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	18.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	6.12	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.63	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	18.00 ft	Fill height:	N/A	Limit depth:	50.00 ft

SBTn legend

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

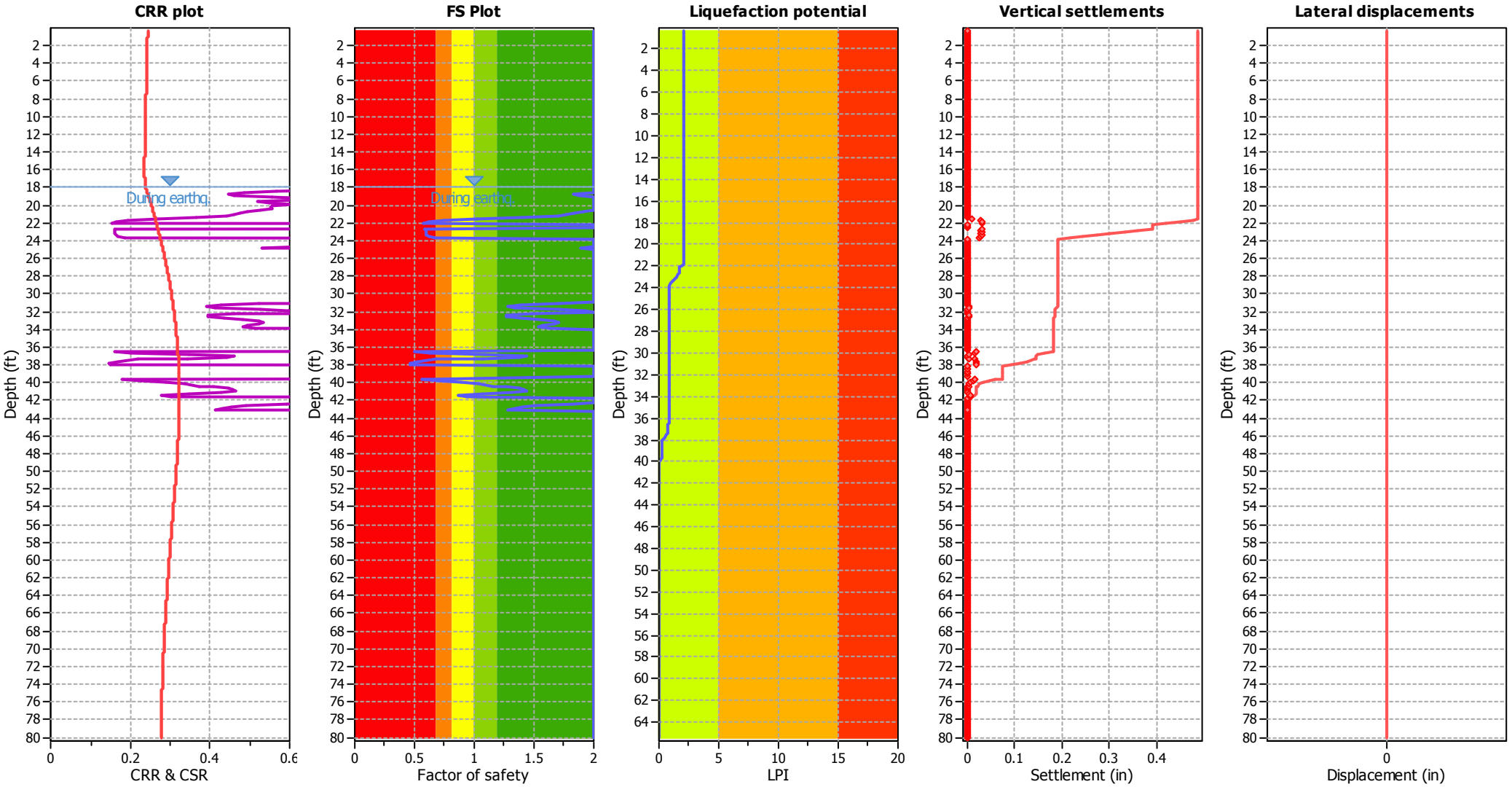
Liquefaction analysis overall plots (intermediate results)



Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	18.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	6.12	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.63	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	18.00 ft	Fill height:	N/A	Limit depth:	50.00 ft

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	18.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	6.12	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.63	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	18.00 ft	Fill height:	N/A	Limit depth:	50.00 ft

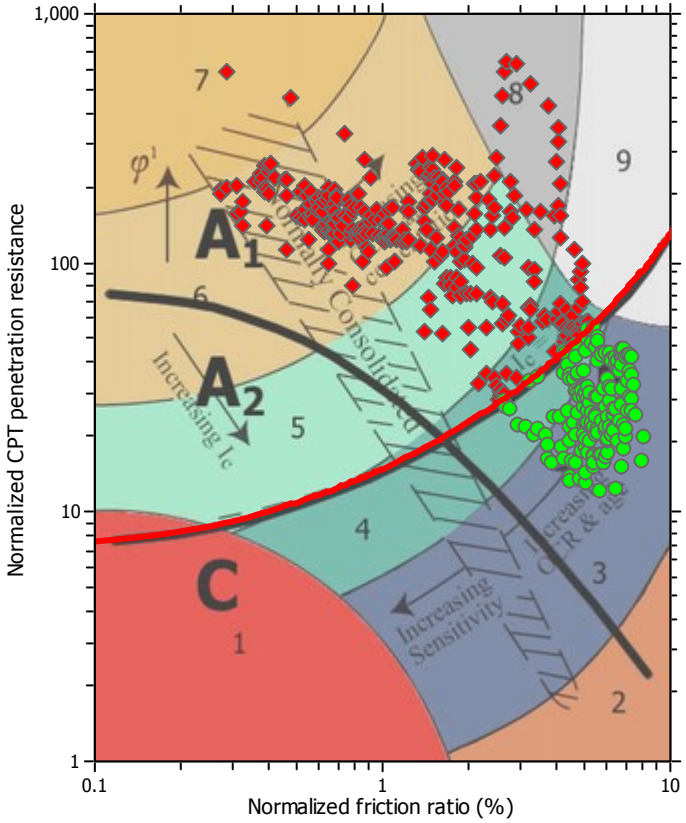
F.S. color scheme

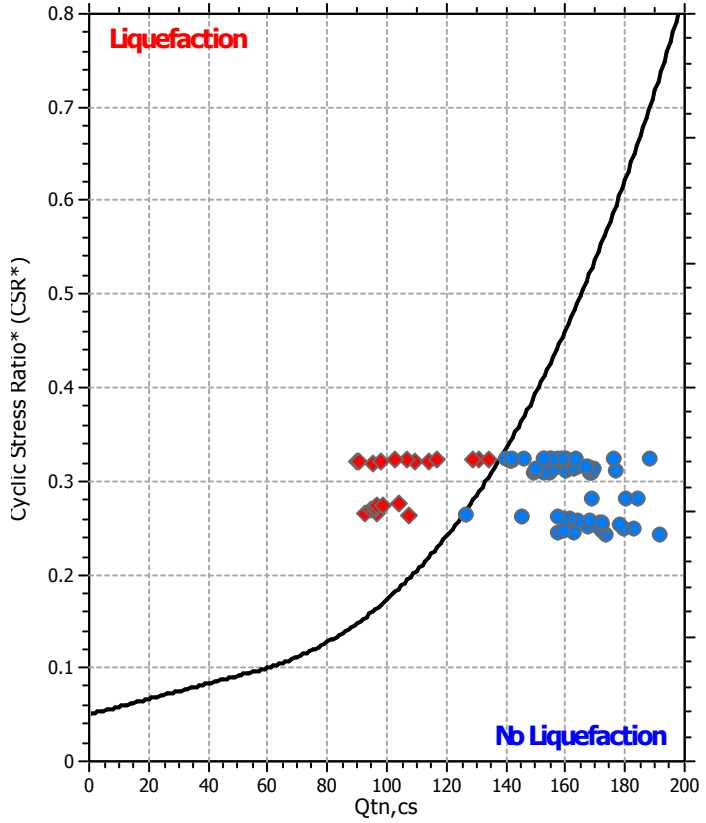
- Almost certain it will liquefy
- Very likely to liquefy
- Liquefaction and no liq. are equally likely
- Unlike to liquefy
- Almost certain it will not liquefy

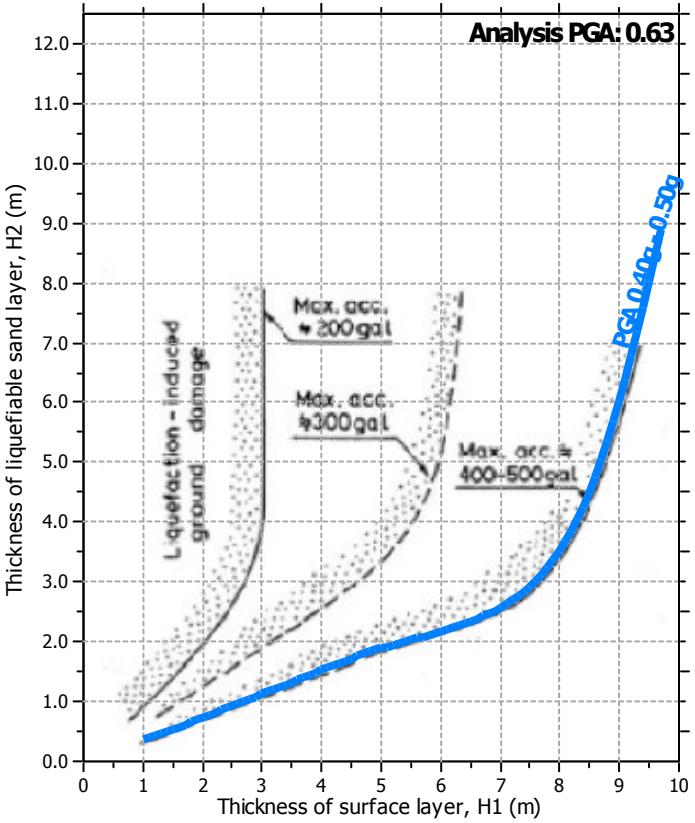
LPI color scheme

- Very high risk
- High risk
- Low risk

Liquefaction analysis summary plots



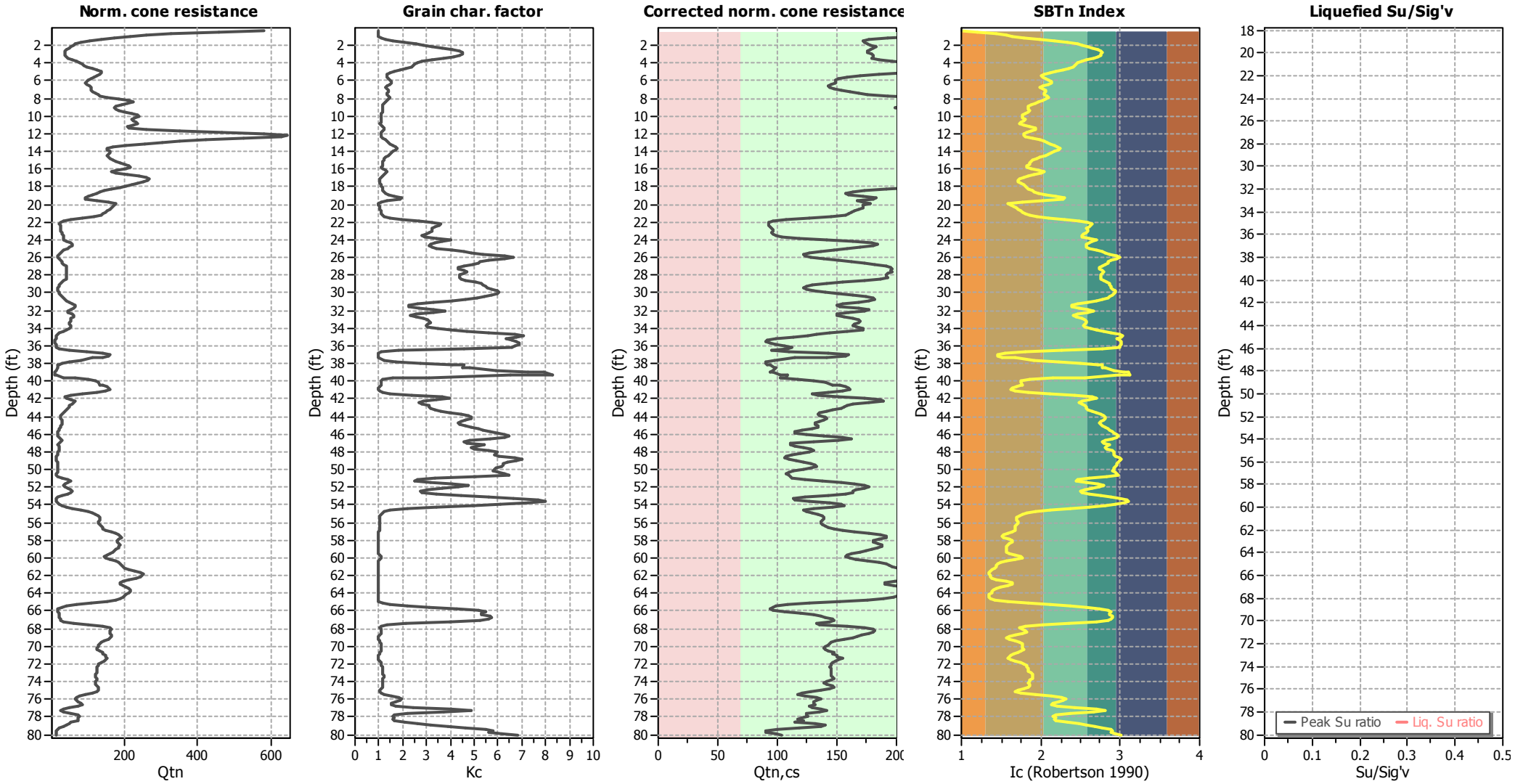




Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	18.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	6.12	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.63	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	18.00 ft	Fill height:	N/A	Limit depth:	50.00 ft

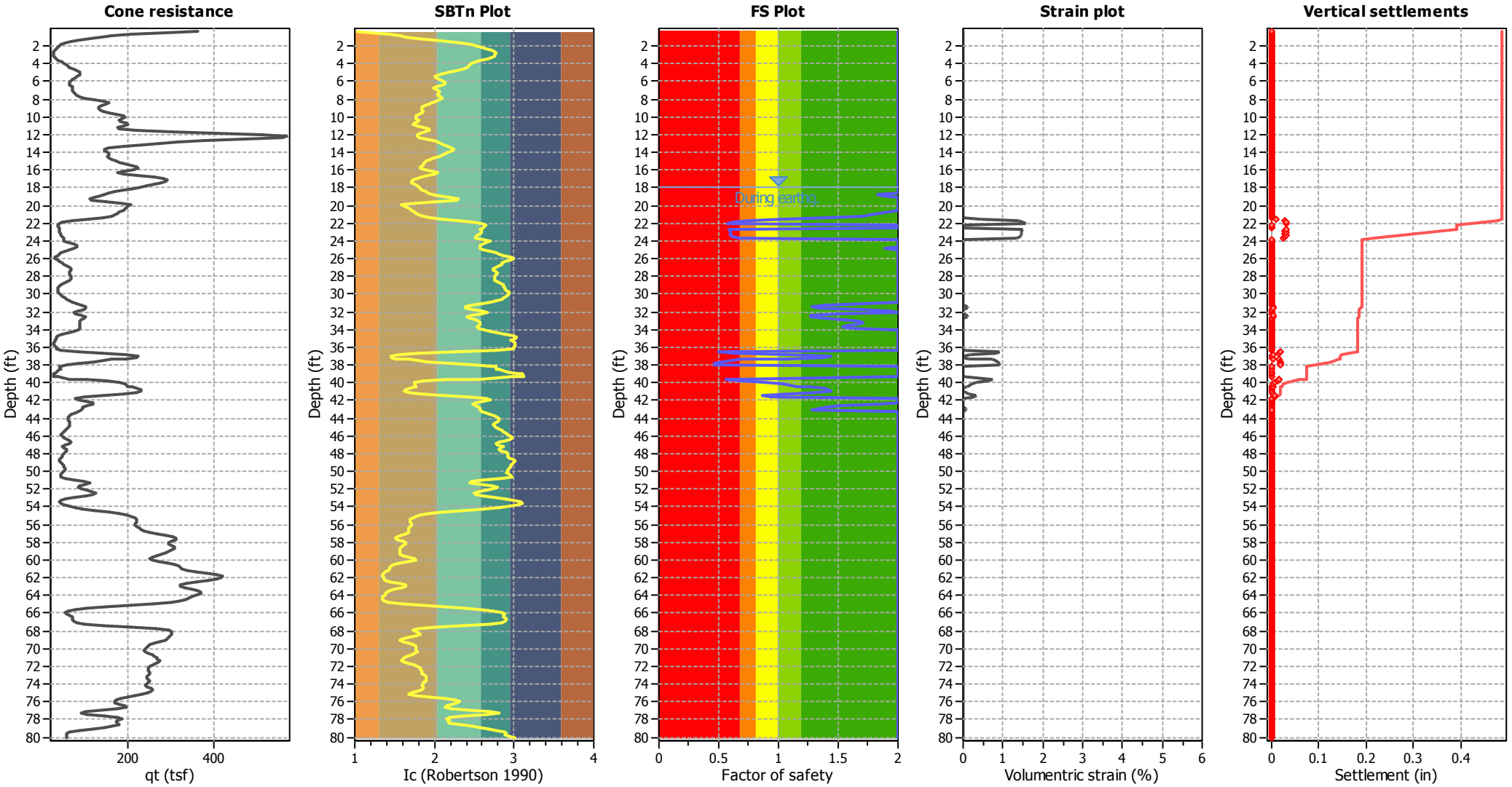
Check for strength loss plots (Robertson (2010))



Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	18.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	6.12	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.63	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	18.00 ft	Fill height:	N/A	Limit depth:	50.00 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

:: Post-earthquake settlement due to soil liquefaction ::

Depth (ft)	$Q_{tn,cs}$	FS	e_v (%)	DF	Settlement (in)	Depth (ft)	$Q_{tn,cs}$	FS	e_v (%)	DF	Settlement (in)
18.05	213.31	2.00	0.00	0.69	0.00	18.21	191.64	2.00	0.00	0.69	0.00
18.37	173.72	2.00	0.00	0.69	0.00	18.54	163.28	1.99	0.00	0.69	0.00
18.70	157.83	1.82	0.00	0.68	0.00	18.87	160.00	1.88	0.00	0.68	0.00
19.03	172.19	2.00	0.00	0.68	0.00	19.19	182.93	2.00	0.00	0.67	0.00
19.36	179.96	2.00	0.00	0.67	0.00	19.52	167.64	2.00	0.00	0.67	0.00
19.69	171.47	2.00	0.00	0.67	0.00	19.85	178.28	2.00	0.00	0.66	0.00
20.01	172.45	2.00	0.00	0.66	0.00	20.18	171.71	2.00	0.00	0.66	0.00
20.34	172.18	2.00	0.00	0.66	0.00	20.51	168.63	2.00	0.00	0.65	0.00
20.67	164.51	1.92	0.00	0.65	0.00	20.83	161.95	1.84	0.00	0.65	0.00
21.00	159.99	1.77	0.00	0.64	0.00	21.16	157.63	1.70	0.00	0.64	0.00
21.33	145.55	1.40	0.00	0.64	0.00	21.49	126.72	1.02	0.45	0.64	0.01
21.65	107.38	0.74	1.40	0.63	0.03	21.82	96.79	0.62	1.51	0.63	0.03
21.98	92.45	0.58	1.56	0.63	0.03	22.15	93.23	2.00	0.00	0.62	0.00
22.31	92.89	2.00	0.00	0.62	0.00	22.47	93.89	2.00	0.00	0.62	0.00
22.64	94.82	0.59	1.50	0.62	0.03	22.80	96.17	0.60	1.48	0.61	0.03
22.97	96.04	0.60	1.48	0.61	0.03	23.13	95.68	0.59	1.47	0.61	0.03
23.30	96.49	0.60	1.46	0.61	0.03	23.46	98.73	0.62	1.42	0.60	0.03
23.62	104.15	0.67	1.36	0.60	0.03	23.79	118.01	2.00	0.00	0.60	0.00
23.95	142.01	2.00	0.00	0.59	0.00	24.12	163.43	2.00	0.00	0.59	0.00
24.28	179.59	2.00	0.00	0.59	0.00	24.44	184.31	2.00	0.00	0.59	0.00
24.61	180.47	2.00	0.00	0.58	0.00	24.77	169.33	1.89	0.00	0.58	0.00
24.94	158.14	2.00	0.00	0.58	0.00	25.10	147.53	2.00	0.00	0.57	0.00
25.26	137.10	2.00	0.00	0.57	0.00	25.43	127.43	2.00	0.00	0.57	0.00
25.59	121.93	2.00	0.00	0.57	0.00	25.76	123.25	2.00	0.00	0.56	0.00
25.92	127.85	2.00	0.00	0.56	0.00	26.08	139.52	2.00	0.00	0.56	0.00
26.25	151.27	2.00	0.00	0.56	0.00	26.41	162.13	2.00	0.00	0.55	0.00
26.58	172.57	2.00	0.00	0.55	0.00	26.74	182.25	2.00	0.00	0.55	0.00
26.90	191.04	2.00	0.00	0.54	0.00	27.07	194.88	2.00	0.00	0.54	0.00
27.23	196.14	2.00	0.00	0.54	0.00	27.40	195.56	2.00	0.00	0.54	0.00
27.56	196.17	2.00	0.00	0.53	0.00	27.72	192.42	2.00	0.00	0.53	0.00
27.89	190.91	2.00	0.00	0.53	0.00	28.05	191.31	2.00	0.00	0.52	0.00
28.22	193.24	2.00	0.00	0.52	0.00	28.38	186.81	2.00	0.00	0.52	0.00
28.54	173.07	2.00	0.00	0.52	0.00	28.71	155.03	2.00	0.00	0.51	0.00
28.87	140.91	2.00	0.00	0.51	0.00	29.04	129.59	2.00	0.00	0.51	0.00
29.20	124.13	2.00	0.00	0.51	0.00	29.36	121.80	2.00	0.00	0.50	0.00
29.53	123.84	2.00	0.00	0.50	0.00	29.69	131.04	2.00	0.00	0.50	0.00
29.86	139.78	2.00	0.00	0.49	0.00	30.02	151.71	2.00	0.00	0.49	0.00
30.19	162.84	2.00	0.00	0.49	0.00	30.35	174.07	2.00	0.00	0.49	0.00
30.51	180.68	2.00	0.00	0.48	0.00	30.68	181.27	2.00	0.00	0.48	0.00
30.84	176.61	2.00	0.00	0.48	0.00	31.01	168.34	1.71	0.00	0.47	0.00
31.17	155.14	1.39	0.00	0.47	0.00	31.33	149.89	1.28	0.10	0.47	0.00
31.50	152.94	1.34	0.10	0.47	0.00	31.66	168.81	1.71	0.00	0.46	0.00
31.83	176.98	1.92	0.00	0.46	0.00	31.99	173.76	2.00	0.00	0.46	0.00
32.15	160.14	1.49	0.00	0.46	0.00	32.32	150.23	1.27	0.10	0.45	0.00
32.48	150.17	1.27	0.10	0.45	0.00	32.65	156.12	1.39	0.00	0.45	0.00
32.81	163.26	1.55	0.00	0.44	0.00	32.97	168.31	1.67	0.00	0.44	0.00
33.14	169.72	1.71	0.00	0.44	0.00	33.30	168.11	1.66	0.00	0.44	0.00
33.47	164.53	1.57	0.00	0.43	0.00	33.63	163.17	1.54	0.00	0.43	0.00

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

Depth (ft)	$Q_{tn,cs}$	FS	e_v (%)	DF	Settlement (in)	Depth (ft)	$Q_{tn,cs}$	FS	e_v (%)	DF	Settlement (in)
33.79	166.99	1.63	0.00	0.43	0.00	33.96	172.55	2.00	0.00	0.42	0.00
34.12	171.67	2.00	0.00	0.42	0.00	34.29	158.65	2.00	0.00	0.42	0.00
34.45	144.08	2.00	0.00	0.42	0.00	34.61	133.37	2.00	0.00	0.41	0.00
34.78	125.73	2.00	0.00	0.41	0.00	34.94	113.53	2.00	0.00	0.41	0.00
35.11	98.83	2.00	0.00	0.40	0.00	35.27	91.45	2.00	0.00	0.40	0.00
35.43	90.08	2.00	0.00	0.40	0.00	35.60	93.77	2.00	0.00	0.40	0.00
35.76	98.48	2.00	0.00	0.39	0.00	35.93	106.26	2.00	0.00	0.39	0.00
36.09	112.47	2.00	0.00	0.39	0.00	36.26	108.64	2.00	0.00	0.39	0.00
36.42	95.63	0.50	0.93	0.38	0.02	36.58	109.23	0.63	0.83	0.38	0.02
36.75	142.31	1.09	0.17	0.38	0.00	36.91	160.16	1.44	0.00	0.37	0.00
37.08	157.53	1.38	0.00	0.37	0.00	37.24	141.56	1.07	0.16	0.37	0.00
37.40	114.11	0.68	0.75	0.37	0.01	37.57	98.05	0.52	0.86	0.36	0.02
37.73	90.07	0.46	0.92	0.36	0.02	37.90	90.47	0.46	0.91	0.36	0.02
38.06	91.31	2.00	0.00	0.35	0.00	38.22	94.01	2.00	0.00	0.35	0.00
38.39	97.28	2.00	0.00	0.35	0.00	38.55	98.50	2.00	0.00	0.35	0.00
38.72	96.26	2.00	0.00	0.34	0.00	38.88	93.87	2.00	0.00	0.34	0.00
39.04	95.89	2.00	0.00	0.34	0.00	39.21	102.23	2.00	0.00	0.34	0.00
39.37	108.65	2.00	0.00	0.33	0.00	39.54	107.03	0.60	0.73	0.33	0.01
39.70	102.76	0.56	0.75	0.33	0.01	39.86	116.91	0.71	0.64	0.32	0.01
40.03	130.97	0.89	0.34	0.32	0.01	40.19	140.21	1.04	0.21	0.32	0.00
40.36	146.50	1.15	0.10	0.32	0.00	40.52	152.69	1.27	0.07	0.31	0.00
40.68	157.81	1.38	0.00	0.31	0.00	40.85	159.60	1.42	0.00	0.31	0.00
41.01	160.60	1.44	0.00	0.30	0.00	41.18	155.06	1.32	0.06	0.30	0.00
41.34	142.23	1.08	0.13	0.30	0.00	41.50	128.85	0.86	0.32	0.30	0.01
41.67	134.03	0.94	0.30	0.29	0.01	41.83	150.84	2.00	0.00	0.29	0.00
42.00	173.34	2.00	0.00	0.29	0.00	42.16	187.11	2.00	0.00	0.29	0.00
42.32	188.43	2.00	0.00	0.28	0.00	42.49	176.63	1.83	0.00	0.28	0.00
42.65	163.80	1.51	0.00	0.28	0.00	42.82	158.89	1.40	0.00	0.27	0.00
42.98	156.02	1.34	0.06	0.27	0.00	43.15	153.17	1.28	0.06	0.27	0.00
43.31	146.25	2.00	0.00	0.27	0.00	43.47	141.57	2.00	0.00	0.26	0.00
43.64	135.12	2.00	0.00	0.26	0.00	43.80	134.76	2.00	0.00	0.26	0.00
43.97	134.80	2.00	0.00	0.25	0.00	44.13	140.06	2.00	0.00	0.25	0.00
44.29	141.37	2.00	0.00	0.25	0.00	44.46	139.59	2.00	0.00	0.25	0.00
44.62	135.49	2.00	0.00	0.24	0.00	44.79	132.13	2.00	0.00	0.24	0.00
44.95	132.02	2.00	0.00	0.24	0.00	45.11	133.60	2.00	0.00	0.24	0.00
45.28	133.55	2.00	0.00	0.23	0.00	45.44	129.56	2.00	0.00	0.23	0.00
45.61	120.51	2.00	0.00	0.23	0.00	45.77	114.36	2.00	0.00	0.22	0.00
45.93	114.08	2.00	0.00	0.22	0.00	46.10	123.81	2.00	0.00	0.22	0.00
46.26	138.99	2.00	0.00	0.22	0.00	46.43	154.64	2.00	0.00	0.21	0.00
46.59	162.70	2.00	0.00	0.21	0.00	46.75	150.75	2.00	0.00	0.21	0.00
46.92	131.06	2.00	0.00	0.20	0.00	47.08	111.54	2.00	0.00	0.20	0.00
47.25	110.62	2.00	0.00	0.20	0.00	47.41	114.82	2.00	0.00	0.20	0.00
47.57	122.06	2.00	0.00	0.19	0.00	47.74	128.19	2.00	0.00	0.19	0.00
47.90	130.20	2.00	0.00	0.19	0.00	48.07	126.78	2.00	0.00	0.19	0.00
48.23	119.67	2.00	0.00	0.18	0.00	48.39	112.17	2.00	0.00	0.18	0.00
48.56	106.72	2.00	0.00	0.18	0.00	48.72	106.67	2.00	0.00	0.17	0.00
48.89	110.06	2.00	0.00	0.17	0.00	49.05	115.76	2.00	0.00	0.17	0.00
49.22	121.86	2.00	0.00	0.17	0.00	49.38	127.71	2.00	0.00	0.16	0.00

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

Depth (ft)	$Q_{tn,cs}$	FS	e_v (%)	DF	Settlement (in)	Depth (ft)	$Q_{tn,cs}$	FS	e_v (%)	DF	Settlement (in)
49.54	131.21	2.00	0.00	0.16	0.00	49.71	132.57	2.00	0.00	0.16	0.00
49.87	128.25	2.00	0.00	0.15	0.00	50.04	122.11	2.00	0.00	0.15	0.00
50.20	113.31	2.00	0.00	0.15	0.00	50.36	109.72	2.00	0.00	0.15	0.00
50.53	107.81	2.00	0.00	0.14	0.00	50.69	109.45	2.00	0.00	0.14	0.00
50.86	111.41	2.00	0.00	0.14	0.00	51.02	112.60	2.00	0.00	0.14	0.00
51.18	123.64	2.00	0.00	0.13	0.00	51.35	137.40	2.00	0.00	0.13	0.00
51.51	153.75	2.00	0.00	0.13	0.00	51.68	164.59	2.00	0.00	0.12	0.00
51.84	173.44	2.00	0.00	0.12	0.00	52.00	176.50	2.00	0.00	0.12	0.00
52.17	172.73	2.00	0.00	0.12	0.00	52.33	165.31	2.00	0.00	0.11	0.00
52.50	162.82	2.00	0.00	0.11	0.00	52.66	162.81	2.00	0.00	0.11	0.00
52.82	157.07	2.00	0.00	0.10	0.00	52.99	142.21	2.00	0.00	0.10	0.00
53.15	123.31	2.00	0.00	0.10	0.00	53.32	113.10	2.00	0.00	0.10	0.00
53.48	115.24	2.00	0.00	0.09	0.00	53.64	127.43	2.00	0.00	0.09	0.00
53.81	143.47	2.00	0.00	0.09	0.00	53.97	154.18	2.00	0.00	0.09	0.00
54.14	156.69	2.00	0.00	0.08	0.00	54.30	146.41	2.00	0.00	0.08	0.00
54.46	130.26	2.00	0.00	0.08	0.00	54.63	121.68	2.00	0.00	0.07	0.00
54.79	124.00	2.00	0.00	0.07	0.00	54.96	129.67	2.00	0.00	0.07	0.00
55.12	134.07	2.00	0.00	0.07	0.00	55.28	137.33	2.00	0.00	0.06	0.00
55.45	138.57	2.00	0.00	0.06	0.00	55.61	138.95	2.00	0.00	0.06	0.00
55.78	137.94	2.00	0.00	0.05	0.00	55.94	137.17	2.00	0.00	0.05	0.00
56.11	136.60	2.00	0.00	0.05	0.00	56.27	137.55	2.00	0.00	0.05	0.00
56.43	139.87	2.00	0.00	0.04	0.00	56.60	143.03	2.00	0.00	0.04	0.00
56.76	147.28	2.00	0.00	0.04	0.00	56.93	154.41	2.00	0.00	0.04	0.00
57.09	164.77	2.00	0.00	0.03	0.00	57.25	177.20	2.00	0.00	0.03	0.00
57.42	186.80	2.00	0.00	0.03	0.00	57.58	191.56	2.00	0.00	0.02	0.00
57.75	191.67	2.00	0.00	0.02	0.00	57.91	185.80	2.00	0.00	0.02	0.00
58.07	180.16	2.00	0.00	0.02	0.00	58.24	179.96	2.00	0.00	0.01	0.00
58.40	184.47	2.00	0.00	0.01	0.00	58.57	187.74	2.00	0.00	0.01	0.00
58.73	187.47	2.00	0.00	0.00	0.00	58.89	183.99	2.00	0.00	0.00	0.00
59.06	179.09	2.00	0.00	0.00	0.00	59.22	174.29	2.00	0.00	0.00	0.00
59.39	168.97	2.00	0.00	0.00	0.00	59.55	162.68	2.00	0.00	0.00	0.00
59.71	157.94	2.00	0.00	0.00	0.00	59.88	157.09	2.00	0.00	0.00	0.00
60.04	160.52	2.00	0.00	0.00	0.00	60.21	165.74	2.00	0.00	0.00	0.00
60.37	176.18	2.00	0.00	0.00	0.00	60.53	185.32	2.00	0.00	0.00	0.00
60.70	190.87	2.00	0.00	0.00	0.00	60.86	193.77	2.00	0.00	0.00	0.00
61.03	196.27	2.00	0.00	0.00	0.00	61.19	201.74	2.00	0.00	0.00	0.00
61.35	213.35	2.00	0.00	0.00	0.00	61.52	229.87	2.00	0.00	0.00	0.00
61.68	243.92	2.00	0.00	0.00	0.00	61.85	251.98	2.00	0.00	0.00	0.00
62.01	250.69	2.00	0.00	0.00	0.00	62.17	244.38	2.00	0.00	0.00	0.00
62.34	231.53	2.00	0.00	0.00	0.00	62.50	215.07	2.00	0.00	0.00	0.00
62.67	199.28	2.00	0.00	0.00	0.00	62.83	189.74	2.00	0.00	0.00	0.00
63.00	190.05	2.00	0.00	0.00	0.00	63.16	197.33	2.00	0.00	0.00	0.00
63.32	206.11	2.00	0.00	0.00	0.00	63.49	214.94	2.00	0.00	0.00	0.00
63.65	218.98	2.00	0.00	0.00	0.00	63.82	217.91	2.00	0.00	0.00	0.00
63.98	211.70	2.00	0.00	0.00	0.00	64.14	206.04	2.00	0.00	0.00	0.00
64.31	200.93	2.00	0.00	0.00	0.00	64.47	196.95	2.00	0.00	0.00	0.00
64.64	189.38	2.00	0.00	0.00	0.00	64.80	175.85	2.00	0.00	0.00	0.00
64.96	152.89	2.00	0.00	0.00	0.00	65.13	126.57	2.00	0.00	0.00	0.00

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

Depth (ft)	$Q_{tn,cs}$	FS	e_v (%)	DF	Settlement (in)	Depth (ft)	$Q_{tn,cs}$	FS	e_v (%)	DF	Settlement (in)
65.29	108.49	2.00	0.00	0.00	0.00	65.46	99.28	2.00	0.00	0.00	0.00
65.62	96.31	2.00	0.00	0.00	0.00	65.78	93.60	2.00	0.00	0.00	0.00
65.95	95.75	2.00	0.00	0.00	0.00	66.11	105.89	2.00	0.00	0.00	0.00
66.28	119.34	2.00	0.00	0.00	0.00	66.44	130.25	2.00	0.00	0.00	0.00
66.60	136.12	2.00	0.00	0.00	0.00	66.77	140.34	2.00	0.00	0.00	0.00
66.93	145.78	2.00	0.00	0.00	0.00	67.10	147.62	2.00	0.00	0.00	0.00
67.26	143.65	2.00	0.00	0.00	0.00	67.42	133.19	2.00	0.00	0.00	0.00
67.59	135.72	2.00	0.00	0.00	0.00	67.75	158.61	2.00	0.00	0.00	0.00
67.92	173.00	2.00	0.00	0.00	0.00	68.08	180.02	2.00	0.00	0.00	0.00
68.24	181.66	2.00	0.00	0.00	0.00	68.41	180.75	2.00	0.00	0.00	0.00
68.57	176.65	2.00	0.00	0.00	0.00	68.74	170.49	2.00	0.00	0.00	0.00
68.90	167.03	2.00	0.00	0.00	0.00	69.07	163.25	2.00	0.00	0.00	0.00
69.23	156.36	2.00	0.00	0.00	0.00	69.39	148.76	2.00	0.00	0.00	0.00
69.56	145.56	2.00	0.00	0.00	0.00	69.72	143.90	2.00	0.00	0.00	0.00
69.89	142.42	2.00	0.00	0.00	0.00	70.05	140.39	2.00	0.00	0.00	0.00
70.21	138.92	2.00	0.00	0.00	0.00	70.38	139.83	2.00	0.00	0.00	0.00
70.54	143.14	2.00	0.00	0.00	0.00	70.71	147.31	2.00	0.00	0.00	0.00
70.87	146.33	2.00	0.00	0.00	0.00	71.03	149.40	2.00	0.00	0.00	0.00
71.20	150.35	2.00	0.00	0.00	0.00	71.36	154.69	2.00	0.00	0.00	0.00
71.53	151.62	2.00	0.00	0.00	0.00	71.69	148.55	2.00	0.00	0.00	0.00
71.85	146.93	2.00	0.00	0.00	0.00	72.02	145.63	2.00	0.00	0.00	0.00
72.18	144.54	2.00	0.00	0.00	0.00	72.35	144.18	2.00	0.00	0.00	0.00
72.51	144.57	2.00	0.00	0.00	0.00	72.67	145.60	2.00	0.00	0.00	0.00
72.84	145.71	2.00	0.00	0.00	0.00	73.00	145.04	2.00	0.00	0.00	0.00
73.17	144.68	2.00	0.00	0.00	0.00	73.33	144.91	2.00	0.00	0.00	0.00
73.49	146.51	2.00	0.00	0.00	0.00	73.66	147.51	2.00	0.00	0.00	0.00
73.82	145.34	2.00	0.00	0.00	0.00	73.99	141.11	2.00	0.00	0.00	0.00
74.15	138.81	2.00	0.00	0.00	0.00	74.31	141.96	2.00	0.00	0.00	0.00
74.48	146.54	2.00	0.00	0.00	0.00	74.64	147.93	2.00	0.00	0.00	0.00
74.81	144.04	2.00	0.00	0.00	0.00	74.97	136.85	2.00	0.00	0.00	0.00
75.13	128.05	2.00	0.00	0.00	0.00	75.30	121.22	2.00	0.00	0.00	0.00
75.46	117.41	2.00	0.00	0.00	0.00	75.63	123.40	2.00	0.00	0.00	0.00
75.79	133.09	2.00	0.00	0.00	0.00	75.96	136.79	2.00	0.00	0.00	0.00
76.12	132.99	2.00	0.00	0.00	0.00	76.28	129.93	2.00	0.00	0.00	0.00
76.45	130.06	2.00	0.00	0.00	0.00	76.61	131.20	2.00	0.00	0.00	0.00
76.78	126.59	2.00	0.00	0.00	0.00	76.94	128.71	2.00	0.00	0.00	0.00
77.10	137.06	2.00	0.00	0.00	0.00	77.27	141.41	2.00	0.00	0.00	0.00
77.43	134.80	2.00	0.00	0.00	0.00	77.60	124.40	2.00	0.00	0.00	0.00
77.76	124.35	2.00	0.00	0.00	0.00	77.92	125.16	2.00	0.00	0.00	0.00
78.09	120.88	2.00	0.00	0.00	0.00	78.25	117.22	2.00	0.00	0.00	0.00
78.42	121.97	2.00	0.00	0.00	0.00	78.58	114.85	2.00	0.00	0.00	0.00
78.74	131.77	2.00	0.00	0.00	0.00	78.91	140.01	2.00	0.00	0.00	0.00
79.07	136.41	2.00	0.00	0.00	0.00	79.24	118.14	2.00	0.00	0.00	0.00
79.40	100.07	2.00	0.00	0.00	0.00	79.56	90.41	2.00	0.00	0.00	0.00
79.73	90.20	2.00	0.00	0.00	0.00	79.89	98.45	2.00	0.00	0.00	0.00
80.06	104.17	2.00	0.00	0.00	0.00						

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

Depth (ft)	$Q_{tn,cs}$	FS	e_v (%)	DF	Settlement (in)	Depth (ft)	$Q_{tn,cs}$	FS	e_v (%)	DF	Settlement (in)

Total estimated settlement: 0.49

Abbreviations

$Q_{tn,cs}$:	Equivalent dean sand normalized cone resistance
FS:	Factor of safety against liquefaction
e_v (%):	Post-liquefaction volumentric strain
DF:	e_v depth weighting factor
Settlement:	Calculated settlement

Geocon Incorporated
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San Diego, California 92121-2974
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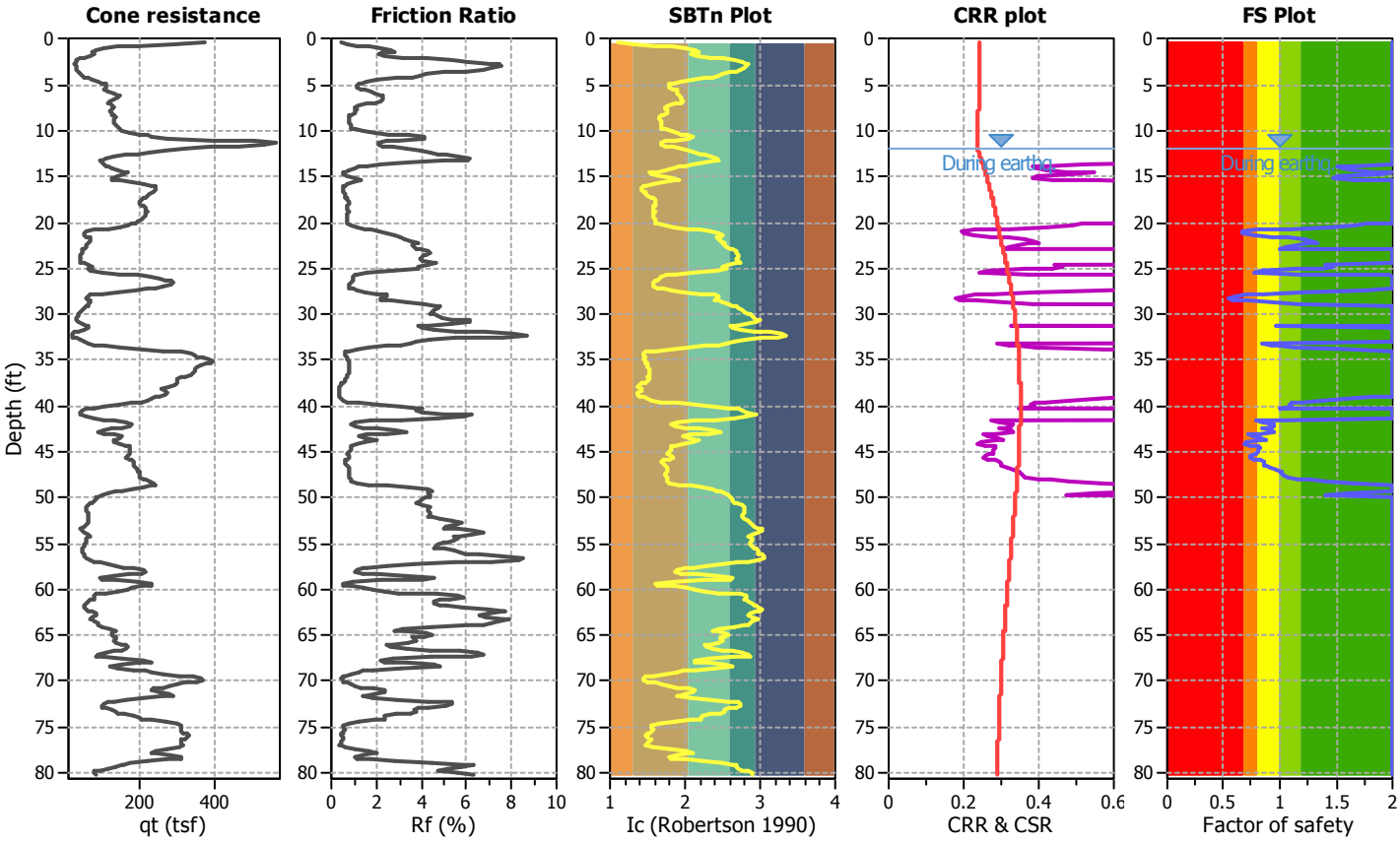
LIQUEFACTION ANALYSIS REPORT

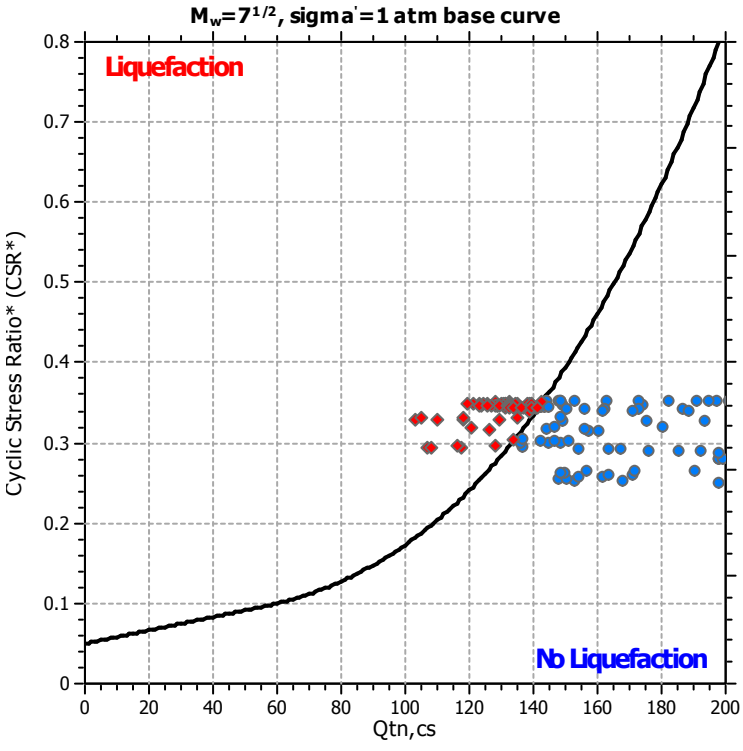
Project title : Collins Aerospace **Location : Parcel A**

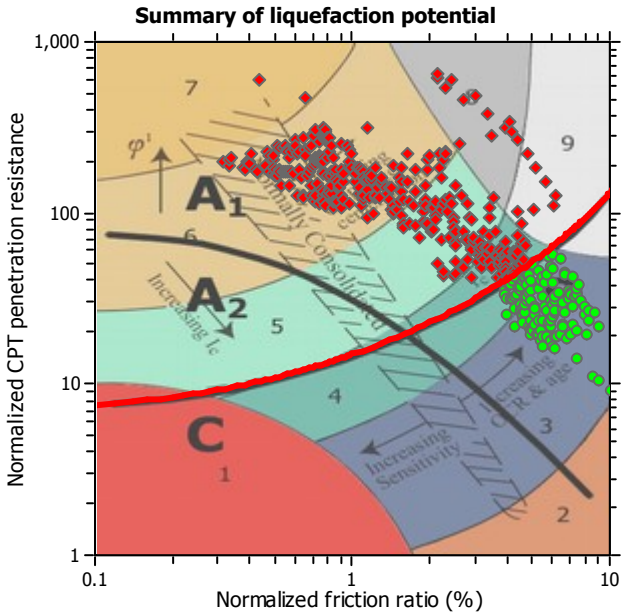
CPT file : CPT-02

Input parameters and analysis data

Analysis method:	NCEER (1998)	G.W.T. (in-situ):	12.00 ft	Use fill:	No	Clay like behavior applied:	Sands only
Fines correction method:	NCEER (1998)	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:	50.00 ft
Earthquake magnitude M_w:	6.12	Ic cut-off value:	2.60	Trans. detect. applied:	No	MSF method:	Method based
Peak ground acceleration:	0.63	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

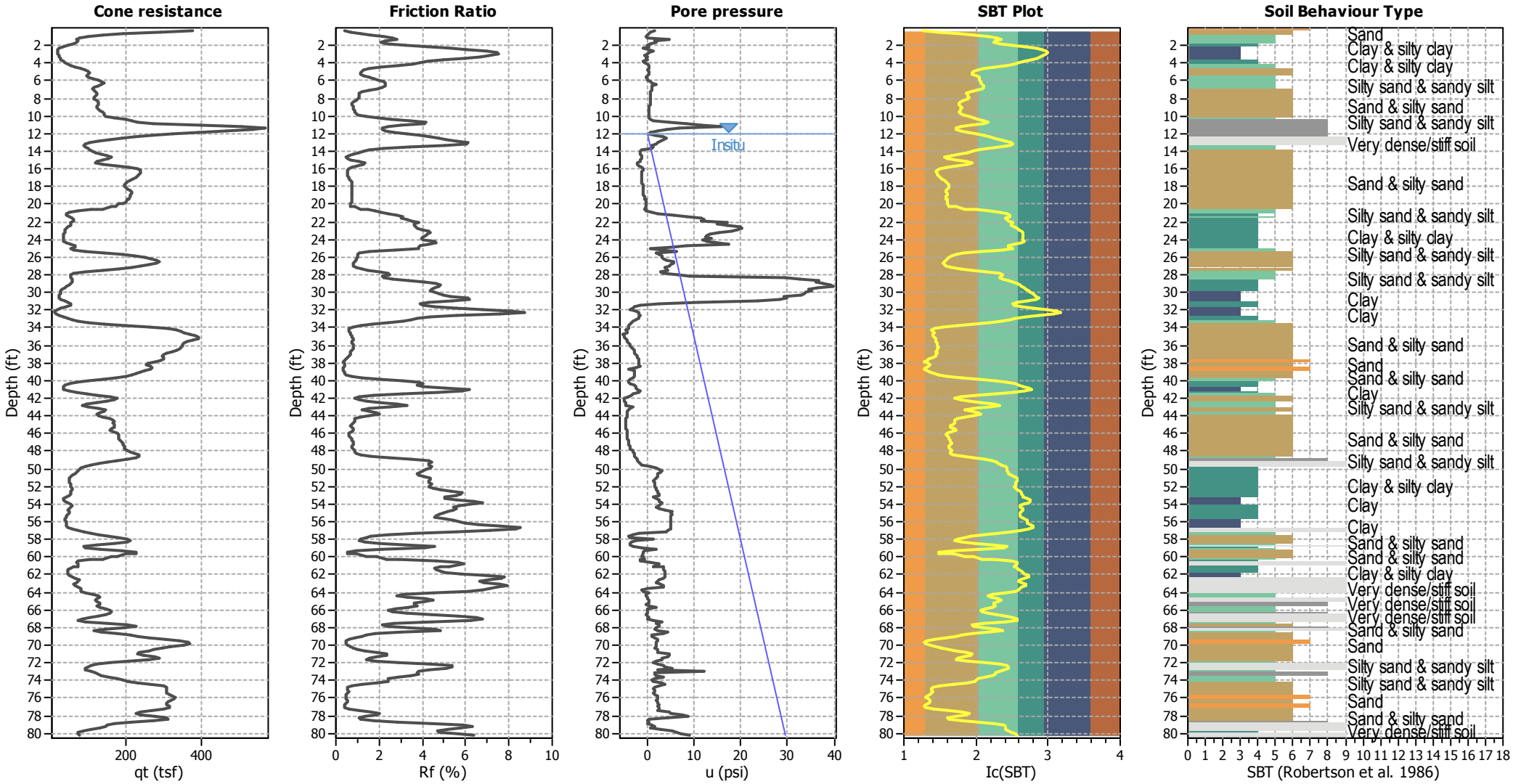






Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and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

CPT basic interpretation plots



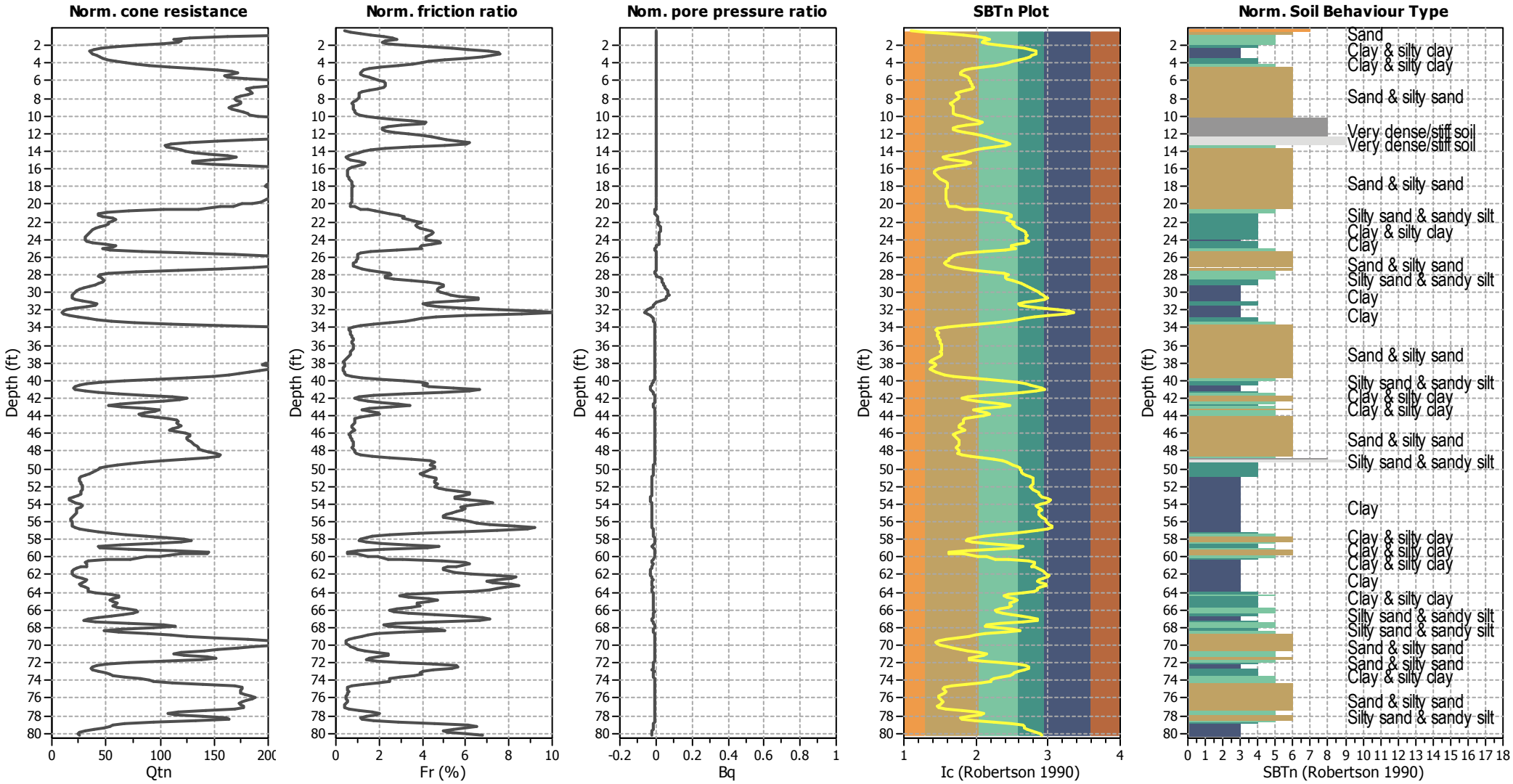
Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	12.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	6.12	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.63	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	12.00 ft	Fill height:	N/A	Limit depth:	50.00 ft

SBT legend

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

CPT basic interpretation plots (normalized)



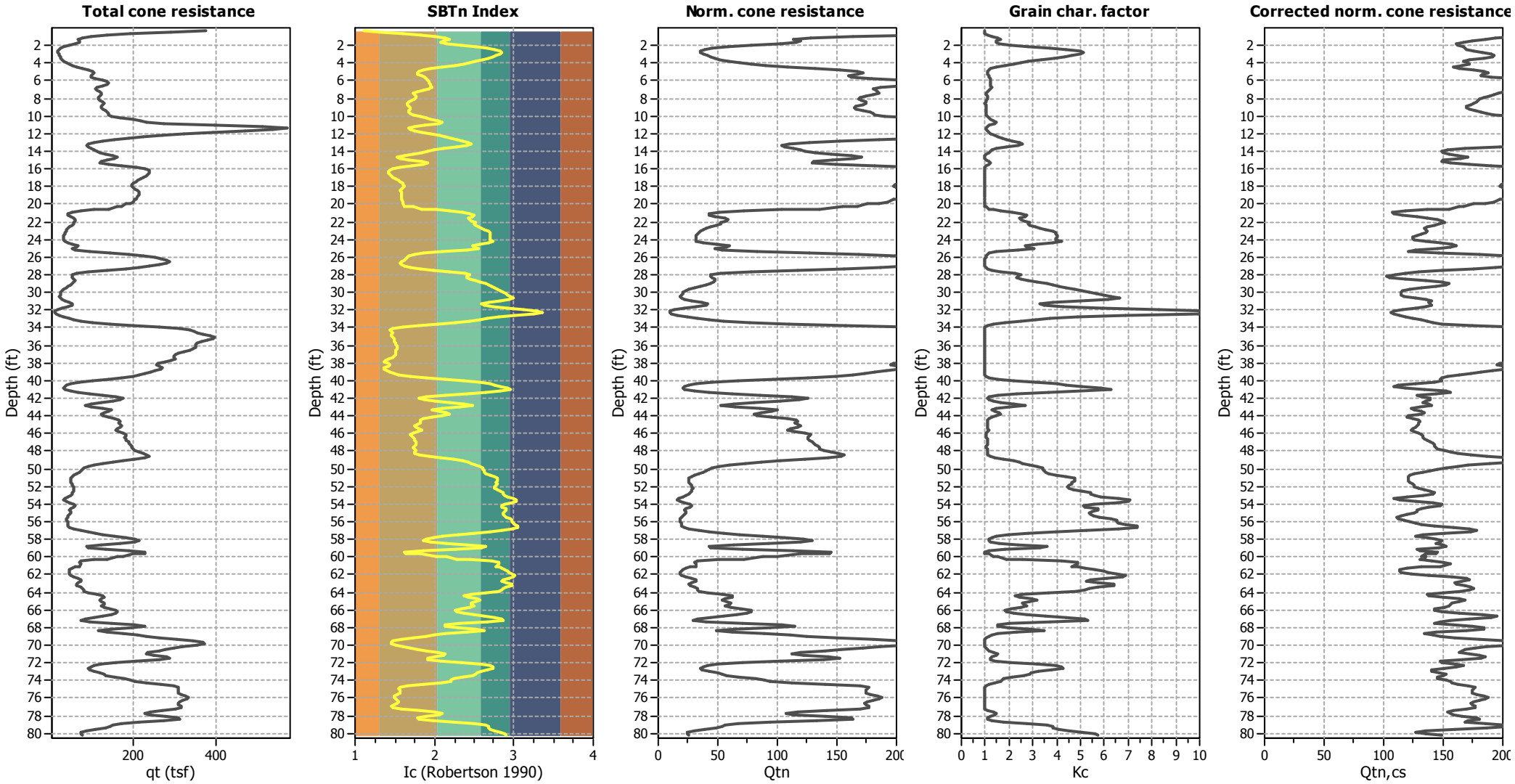
Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	12.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	6.12	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.63	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	12.00 ft	Fill height:	N/A	Limit depth:	50.00 ft

SBTn legend

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

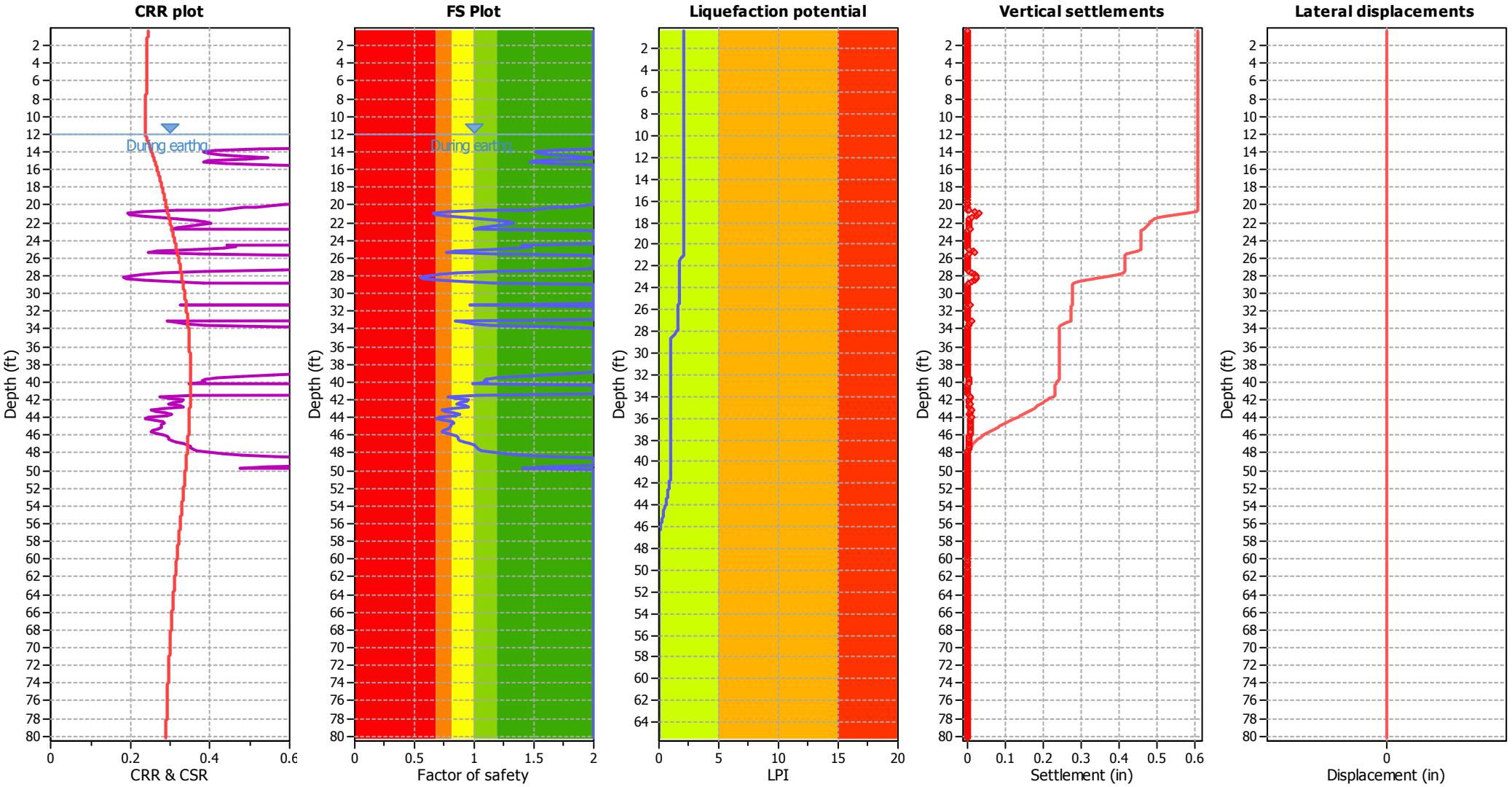
Liquefaction analysis overall plots (intermediate results)



Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	12.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	6.12	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.63	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	12.00 ft	Fill height:	N/A	Limit depth:	50.00 ft

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	12.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	6.12	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.63	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	12.00 ft	Fill height:	N/A	Limit depth:	50.00 ft

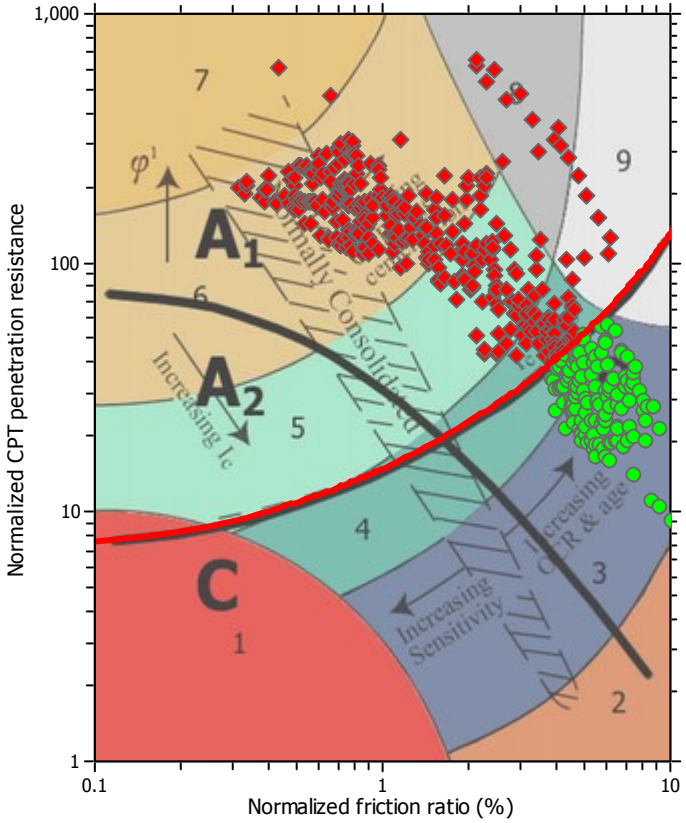
F.S. color scheme

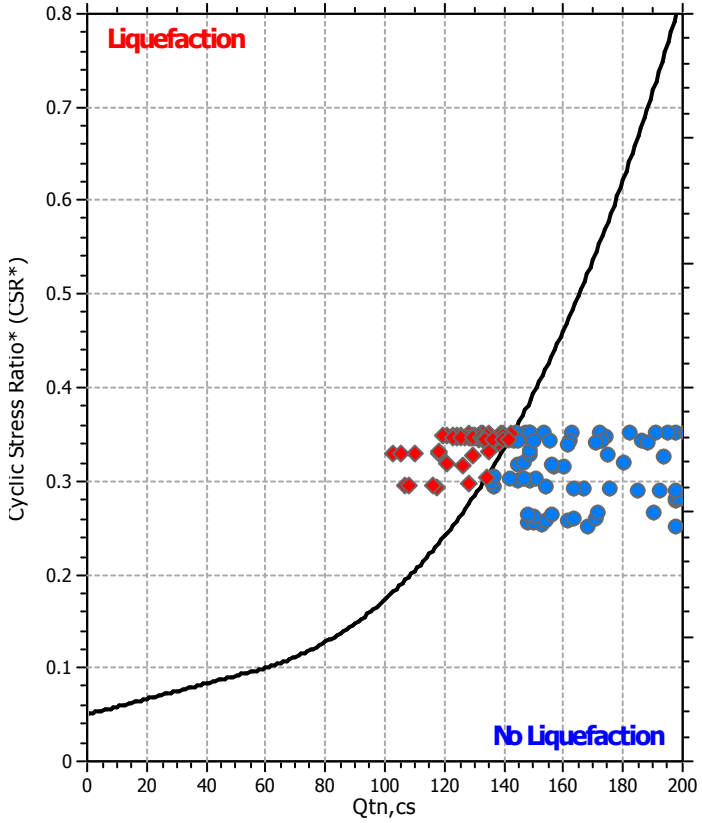
- Almost certain it will liquefy
- Very likely to liquefy
- Liquefaction and no liq. are equally likely
- Unlike to liquefy
- Almost certain it will not liquefy

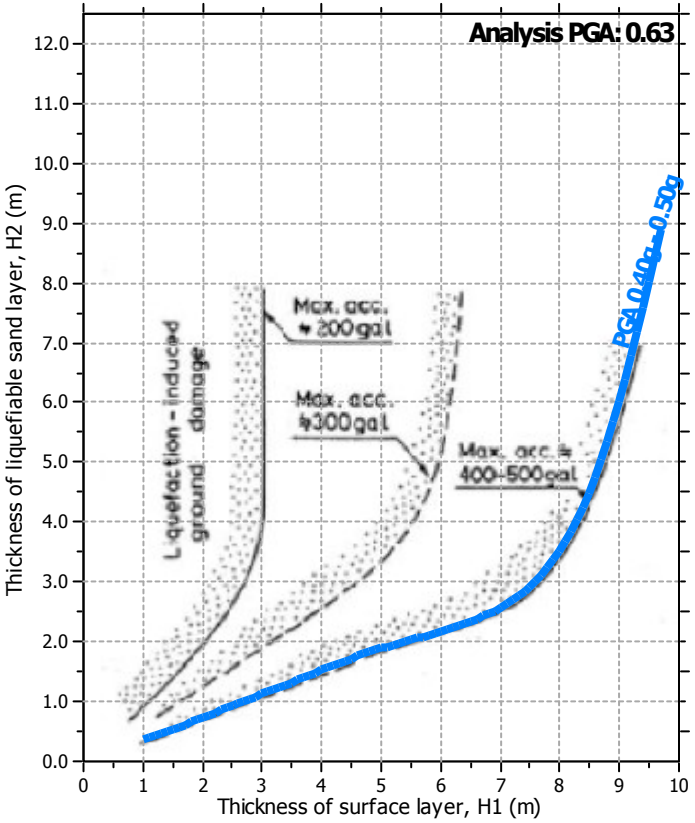
LPI color scheme

- Very high risk
- High risk
- Low risk

Liquefaction analysis summary plots



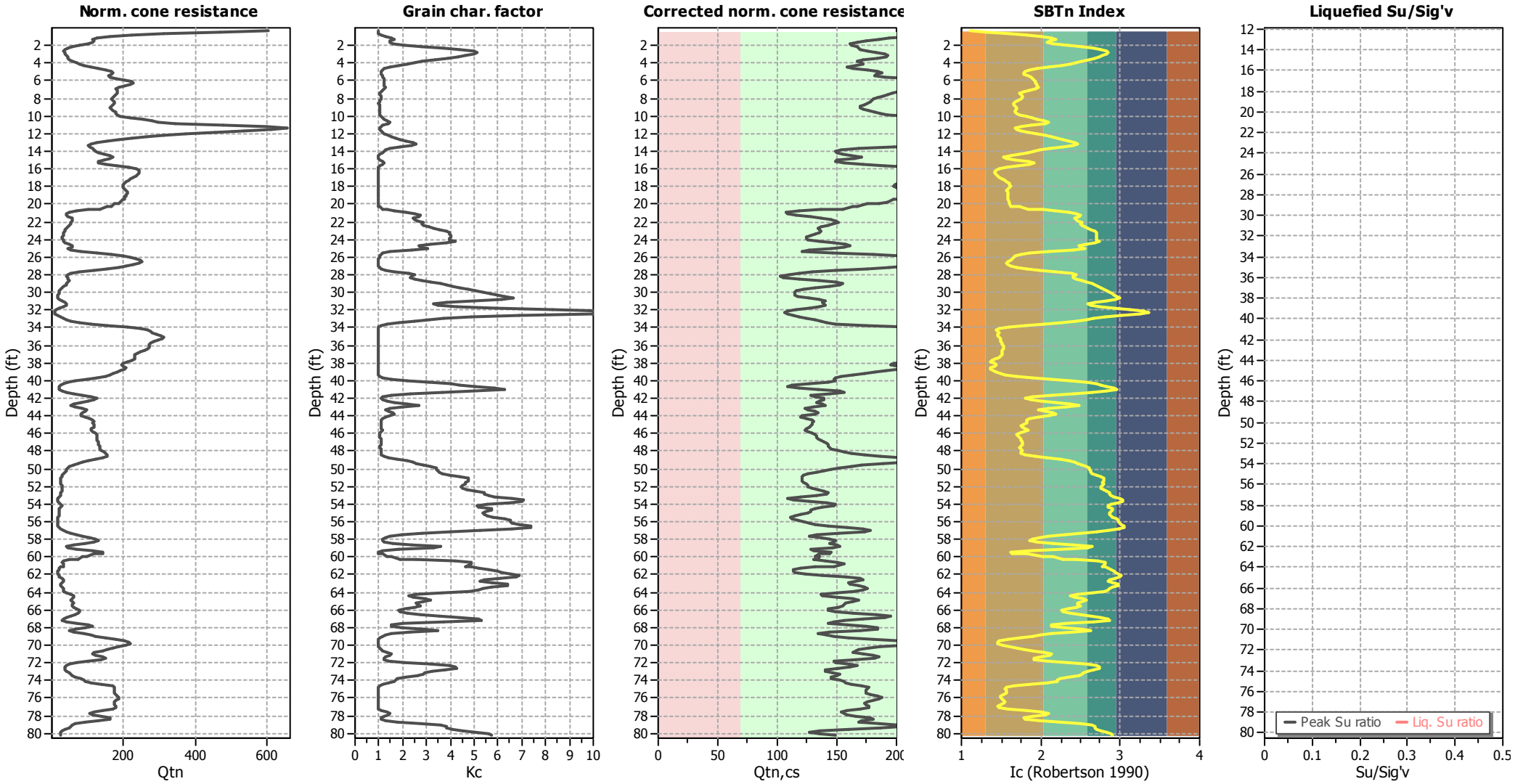




Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	12.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	6.12	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.63	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	12.00 ft	Fill height:	N/A	Limit depth:	50.00 ft

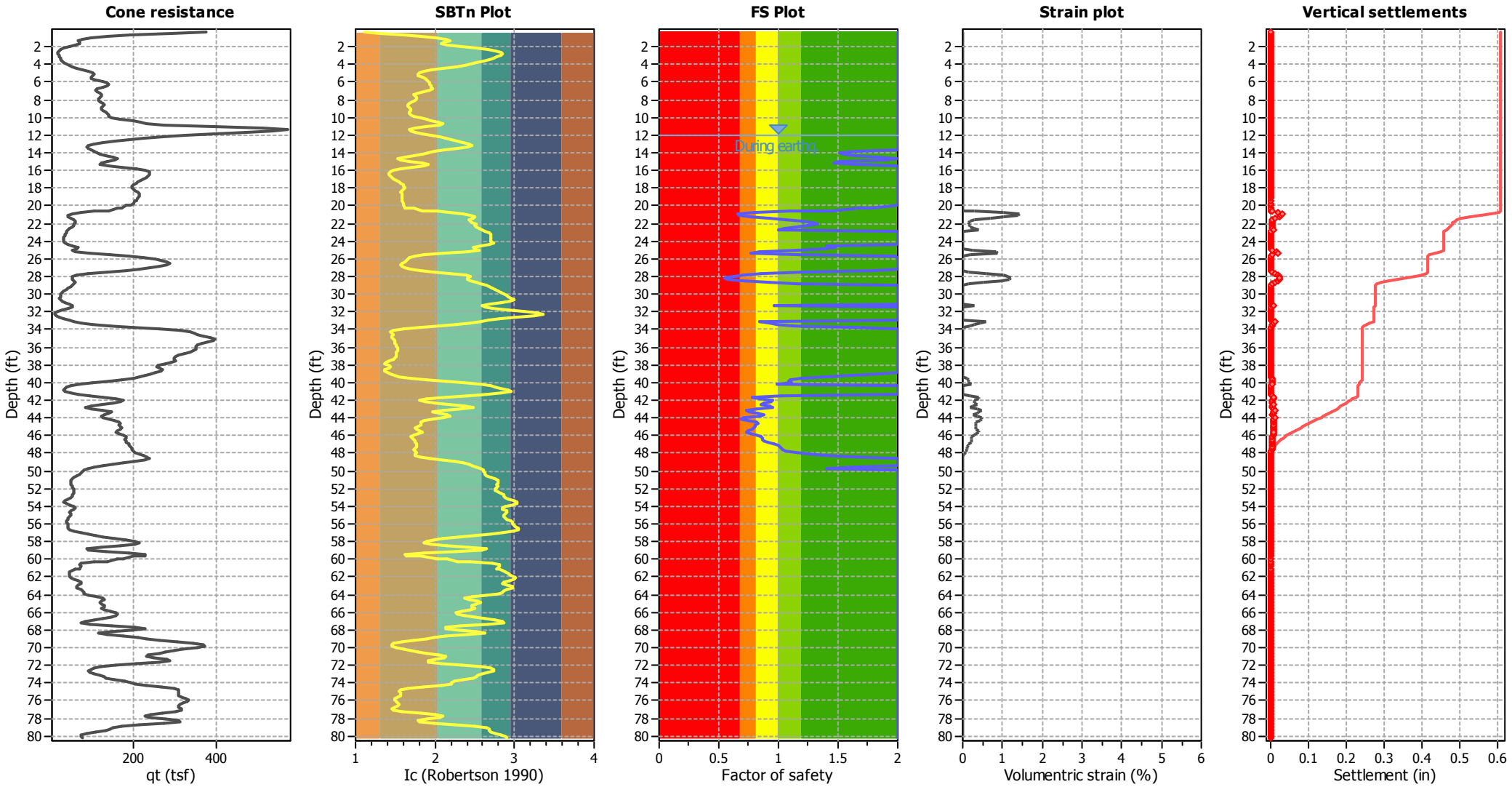
Check for strength loss plots (Robertson (2010))



Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	12.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	6.12	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.63	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	12.00 ft	Fill height:	N/A	Limit depth:	50.00 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

:: Post-earthquake settlement due to soil liquefaction ::

Depth (ft)	$Q_{tn,cs}$	FS	e_v (%)	DF	Settlement (in)	Depth (ft)	$Q_{tn,cs}$	FS	e_v (%)	DF	Settlement (in)
12.14	435.45	2.00	0.00	0.79	0.00	12.30	404.87	2.00	0.00	0.79	0.00
12.47	375.56	2.00	0.00	0.79	0.00	12.63	346.57	2.00	0.00	0.79	0.00
12.80	325.64	2.00	0.00	0.78	0.00	12.96	310.12	2.00	0.00	0.78	0.00
13.12	283.32	2.00	0.00	0.78	0.00	13.29	245.52	2.00	0.00	0.77	0.00
13.45	197.93	2.00	0.00	0.77	0.00	13.62	168.24	2.00	0.00	0.77	0.00
13.78	153.13	1.64	0.00	0.77	0.00	13.94	148.25	1.51	0.00	0.76	0.00
14.11	150.34	1.55	0.00	0.76	0.00	14.27	154.50	1.65	0.00	0.76	0.00
14.44	161.86	1.84	0.00	0.76	0.00	14.60	171.01	2.00	0.00	0.75	0.00
14.76	164.04	1.89	0.00	0.75	0.00	14.93	150.06	1.51	0.00	0.75	0.00
15.09	148.44	1.47	0.00	0.74	0.00	15.26	156.65	1.66	0.00	0.74	0.00
15.42	172.08	2.00	0.00	0.74	0.00	15.58	190.81	2.00	0.00	0.74	0.00
15.75	214.62	2.00	0.00	0.73	0.00	15.91	236.69	2.00	0.00	0.73	0.00
16.08	245.15	2.00	0.00	0.73	0.00	16.24	245.78	2.00	0.00	0.72	0.00
16.40	243.86	2.00	0.00	0.72	0.00	16.57	240.45	2.00	0.00	0.72	0.00
16.73	236.01	2.00	0.00	0.72	0.00	16.90	228.76	2.00	0.00	0.71	0.00
17.06	221.02	2.00	0.00	0.71	0.00	17.23	213.88	2.00	0.00	0.71	0.00
17.39	206.76	2.00	0.00	0.71	0.00	17.55	201.71	2.00	0.00	0.70	0.00
17.72	198.32	2.00	0.00	0.70	0.00	17.88	197.88	2.00	0.00	0.70	0.00
18.05	199.46	2.00	0.00	0.69	0.00	18.21	203.12	2.00	0.00	0.69	0.00
18.37	207.84	2.00	0.00	0.69	0.00	18.54	211.12	2.00	0.00	0.69	0.00
18.70	211.57	2.00	0.00	0.68	0.00	18.87	209.47	2.00	0.00	0.68	0.00
19.03	207.51	2.00	0.00	0.68	0.00	19.19	205.08	2.00	0.00	0.67	0.00
19.36	202.28	2.00	0.00	0.67	0.00	19.52	198.16	2.00	0.00	0.67	0.00
19.69	192.69	2.00	0.00	0.67	0.00	19.85	185.41	2.00	0.00	0.66	0.00
20.01	176.12	2.00	0.00	0.66	0.00	20.18	167.37	1.77	0.00	0.66	0.00
20.34	163.67	1.67	0.00	0.66	0.00	20.51	154.56	1.45	0.00	0.65	0.00
20.67	137.18	1.09	0.29	0.65	0.01	20.83	117.75	0.79	1.04	0.65	0.02
21.00	106.97	0.66	1.42	0.64	0.03	21.16	108.17	0.67	1.41	0.64	0.03
21.33	116.27	0.76	1.04	0.64	0.02	21.49	128.01	0.93	0.69	0.64	0.01
21.65	136.54	1.06	0.29	0.63	0.01	21.82	144.80	1.21	0.20	0.63	0.00
21.98	148.76	1.29	0.14	0.63	0.00	22.15	151.11	1.33	0.13	0.62	0.00
22.31	146.85	1.24	0.19	0.62	0.00	22.47	142.40	1.15	0.20	0.62	0.00
22.64	137.06	1.05	0.28	0.62	0.01	22.80	133.98	1.00	0.41	0.61	0.01
22.97	134.85	2.00	0.00	0.61	0.00	23.13	136.94	2.00	0.00	0.61	0.00
23.30	135.81	2.00	0.00	0.61	0.00	23.46	131.80	2.00	0.00	0.60	0.00
23.62	127.71	2.00	0.00	0.60	0.00	23.79	124.67	2.00	0.00	0.60	0.00
23.95	124.35	2.00	0.00	0.59	0.00	24.12	125.53	2.00	0.00	0.59	0.00
24.28	135.14	2.00	0.00	0.59	0.00	24.44	147.14	2.00	0.00	0.59	0.00
24.61	157.19	1.41	0.00	0.58	0.00	24.77	160.56	1.48	0.00	0.58	0.00
24.94	156.32	1.38	0.00	0.58	0.00	25.10	144.66	1.14	0.25	0.57	0.00
25.26	126.24	0.84	0.83	0.57	0.02	25.43	120.93	0.77	0.88	0.57	0.02
25.59	146.75	1.17	0.18	0.57	0.00	25.76	180.81	1.97	0.00	0.56	0.00
25.92	204.08	2.00	0.00	0.56	0.00	26.08	222.78	2.00	0.00	0.56	0.00
26.25	235.15	2.00	0.00	0.56	0.00	26.41	247.36	2.00	0.00	0.55	0.00
26.58	251.60	2.00	0.00	0.55	0.00	26.74	245.46	2.00	0.00	0.55	0.00
26.90	229.49	2.00	0.00	0.54	0.00	27.07	208.54	2.00	0.00	0.54	0.00
27.23	194.00	2.00	0.00	0.54	0.00	27.40	175.32	1.78	0.00	0.54	0.00
27.56	149.28	1.19	0.16	0.53	0.00	27.72	129.22	0.86	0.57	0.53	0.01

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

Depth (ft)	$Q_{tn,cs}$	FS	e_v (%)	DF	Settlement (in)	Depth (ft)	$Q_{tn,cs}$	FS	e_v (%)	DF	Settlement (in)
27.89	117.89	0.71	1.03	0.53	0.02	28.05	109.94	0.62	1.13	0.52	0.02
28.22	102.95	0.55	1.19	0.52	0.02	28.38	105.31	0.57	1.16	0.52	0.02
28.54	117.88	0.70	1.00	0.52	0.02	28.71	134.76	0.93	0.52	0.51	0.01
28.87	148.73	1.16	0.16	0.51	0.00	29.04	155.04	2.00	0.00	0.51	0.00
29.20	152.78	2.00	0.00	0.51	0.00	29.36	143.95	2.00	0.00	0.50	0.00
29.53	132.20	2.00	0.00	0.50	0.00	29.69	121.91	2.00	0.00	0.50	0.00
29.86	115.77	2.00	0.00	0.49	0.00	30.02	114.58	2.00	0.00	0.49	0.00
30.19	114.59	2.00	0.00	0.49	0.00	30.35	114.52	2.00	0.00	0.49	0.00
30.51	117.03	2.00	0.00	0.48	0.00	30.68	126.89	2.00	0.00	0.48	0.00
30.84	135.73	2.00	0.00	0.48	0.00	31.01	140.13	2.00	0.00	0.47	0.00
31.17	138.41	2.00	0.00	0.47	0.00	31.33	138.48	0.96	0.31	0.47	0.01
31.50	139.86	2.00	0.00	0.47	0.00	31.66	135.67	2.00	0.00	0.46	0.00
31.83	127.39	2.00	0.00	0.46	0.00	31.99	116.24	2.00	0.00	0.46	0.00
32.15	108.73	2.00	0.00	0.46	0.00	32.32	105.82	2.00	0.00	0.45	0.00
32.48	109.13	2.00	0.00	0.45	0.00	32.65	113.40	2.00	0.00	0.45	0.00
32.81	118.38	2.00	0.00	0.44	0.00	32.97	124.09	2.00	0.00	0.44	0.00
33.14	131.52	0.85	0.60	0.44	0.01	33.30	137.00	0.93	0.43	0.44	0.01
33.47	140.90	0.99	0.28	0.43	0.01	33.63	149.30	1.13	0.18	0.43	0.00
33.79	174.22	1.65	0.00	0.43	0.00	33.96	209.72	2.00	0.00	0.42	0.00
34.12	248.89	2.00	0.00	0.42	0.00	34.29	268.79	2.00	0.00	0.42	0.00
34.45	274.96	2.00	0.00	0.42	0.00	34.61	280.25	2.00	0.00	0.41	0.00
34.78	291.87	2.00	0.00	0.41	0.00	34.94	303.62	2.00	0.00	0.41	0.00
35.11	311.09	2.00	0.00	0.40	0.00	35.27	308.51	2.00	0.00	0.40	0.00
35.43	297.47	2.00	0.00	0.40	0.00	35.60	284.88	2.00	0.00	0.40	0.00
35.76	276.64	2.00	0.00	0.39	0.00	35.93	273.89	2.00	0.00	0.39	0.00
36.09	273.29	2.00	0.00	0.39	0.00	36.26	271.65	2.00	0.00	0.39	0.00
36.42	267.81	2.00	0.00	0.38	0.00	36.58	260.03	2.00	0.00	0.38	0.00
36.75	249.76	2.00	0.00	0.38	0.00	36.91	239.50	2.00	0.00	0.37	0.00
37.08	232.73	2.00	0.00	0.37	0.00	37.24	229.87	2.00	0.00	0.37	0.00
37.40	230.13	2.00	0.00	0.37	0.00	37.57	230.42	2.00	0.00	0.36	0.00
37.73	224.56	2.00	0.00	0.36	0.00	37.90	212.10	2.00	0.00	0.36	0.00
38.06	197.69	2.00	0.00	0.35	0.00	38.22	195.13	2.00	0.00	0.35	0.00
38.39	201.33	2.00	0.00	0.35	0.00	38.55	206.14	2.00	0.00	0.35	0.00
38.72	201.97	2.00	0.00	0.34	0.00	38.88	191.32	2.00	0.00	0.34	0.00
39.04	182.26	1.83	0.00	0.34	0.00	39.21	172.82	1.60	0.00	0.34	0.00
39.37	163.22	1.38	0.00	0.33	0.00	39.54	153.40	1.18	0.10	0.33	0.00
39.70	148.91	1.10	0.14	0.33	0.00	39.86	147.89	1.09	0.14	0.32	0.00
40.03	149.06	1.11	0.14	0.32	0.00	40.19	142.37	0.99	0.20	0.32	0.00
40.36	126.38	2.00	0.00	0.32	0.00	40.52	111.74	2.00	0.00	0.31	0.00
40.68	108.90	2.00	0.00	0.31	0.00	40.85	118.50	2.00	0.00	0.31	0.00
41.01	134.66	2.00	0.00	0.30	0.00	41.18	152.43	2.00	0.00	0.30	0.00
41.34	156.32	2.00	0.00	0.30	0.00	41.50	144.35	1.03	0.19	0.30	0.00
41.67	127.90	0.78	0.42	0.29	0.01	41.83	132.25	0.84	0.39	0.29	0.01
42.00	139.32	0.95	0.28	0.29	0.01	42.16	138.83	0.94	0.28	0.29	0.01
42.32	134.94	0.88	0.28	0.28	0.01	42.49	132.59	0.85	0.38	0.28	0.01
42.65	138.14	0.93	0.27	0.28	0.01	42.82	139.65	0.95	0.18	0.27	0.00
42.98	130.44	0.82	0.37	0.27	0.01	43.15	123.13	0.73	0.49	0.27	0.01
43.31	125.71	0.76	0.39	0.27	0.01	43.47	131.30	0.83	0.36	0.26	0.01

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

Depth (ft)	$Q_{tn,cs}$	FS	e_v (%)	DF	Settlement (in)	Depth (ft)	$Q_{tn,cs}$	FS	e_v (%)	DF	Settlement (in)
43.64	134.12	0.87	0.26	0.26	0.01	43.80	131.49	0.84	0.35	0.26	0.01
43.97	121.08	0.70	0.48	0.25	0.01	44.13	119.51	0.69	0.48	0.25	0.01
44.29	124.22	0.74	0.45	0.25	0.01	44.46	129.76	0.81	0.34	0.25	0.01
44.62	130.39	0.82	0.34	0.24	0.01	44.79	128.90	0.80	0.34	0.24	0.01
44.95	128.80	0.80	0.33	0.24	0.01	45.11	128.32	0.80	0.33	0.24	0.01
45.28	127.07	0.78	0.33	0.23	0.01	45.44	123.91	0.74	0.42	0.23	0.01
45.61	123.10	0.73	0.42	0.23	0.01	45.77	125.81	0.77	0.33	0.22	0.01
45.93	129.63	0.82	0.31	0.22	0.01	46.10	132.06	0.85	0.23	0.22	0.00
46.26	132.76	0.86	0.22	0.22	0.00	46.43	132.81	0.86	0.22	0.21	0.00
46.59	133.72	0.88	0.21	0.21	0.00	46.75	136.49	0.92	0.21	0.21	0.00
46.92	139.62	0.97	0.13	0.20	0.00	47.08	141.53	1.00	0.13	0.20	0.00
47.25	142.64	1.02	0.13	0.20	0.00	47.41	142.72	1.02	0.12	0.20	0.00
47.57	143.95	1.04	0.12	0.19	0.00	47.74	145.18	1.06	0.08	0.19	0.00
47.90	150.65	1.16	0.06	0.19	0.00	48.07	156.04	1.27	0.04	0.19	0.00
48.23	162.38	1.40	0.00	0.18	0.00	48.39	173.03	1.64	0.00	0.18	0.00
48.56	186.90	2.00	0.00	0.18	0.00	48.72	204.31	2.00	0.00	0.17	0.00
48.89	218.45	2.00	0.00	0.17	0.00	49.05	222.67	2.00	0.00	0.17	0.00
49.22	208.35	2.00	0.00	0.17	0.00	49.38	188.59	2.00	0.00	0.16	0.00
49.54	171.06	1.61	0.00	0.16	0.00	49.71	161.87	1.40	0.00	0.16	0.00
49.87	152.68	2.00	0.00	0.15	0.00	50.04	145.39	2.00	0.00	0.15	0.00
50.20	139.46	2.00	0.00	0.15	0.00	50.36	133.38	2.00	0.00	0.15	0.00
50.53	125.50	2.00	0.00	0.14	0.00	50.69	121.70	2.00	0.00	0.14	0.00
50.86	120.34	2.00	0.00	0.14	0.00	51.02	121.29	2.00	0.00	0.14	0.00
51.18	120.32	2.00	0.00	0.13	0.00	51.35	120.16	2.00	0.00	0.13	0.00
51.51	121.64	2.00	0.00	0.13	0.00	51.68	123.97	2.00	0.00	0.12	0.00
51.84	125.38	2.00	0.00	0.12	0.00	52.00	125.97	2.00	0.00	0.12	0.00
52.17	129.02	2.00	0.00	0.12	0.00	52.33	133.63	2.00	0.00	0.11	0.00
52.50	138.78	2.00	0.00	0.11	0.00	52.66	142.93	2.00	0.00	0.11	0.00
52.82	142.04	2.00	0.00	0.10	0.00	52.99	132.98	2.00	0.00	0.10	0.00
53.15	119.36	2.00	0.00	0.10	0.00	53.32	108.90	2.00	0.00	0.10	0.00
53.48	113.21	2.00	0.00	0.09	0.00	53.64	126.91	2.00	0.00	0.09	0.00
53.81	142.06	2.00	0.00	0.09	0.00	53.97	148.42	2.00	0.00	0.09	0.00
54.14	146.99	2.00	0.00	0.08	0.00	54.30	138.41	2.00	0.00	0.08	0.00
54.46	132.25	2.00	0.00	0.08	0.00	54.63	128.33	2.00	0.00	0.07	0.00
54.79	127.53	2.00	0.00	0.07	0.00	54.96	125.12	2.00	0.00	0.07	0.00
55.12	119.48	2.00	0.00	0.07	0.00	55.28	114.43	2.00	0.00	0.06	0.00
55.45	110.84	2.00	0.00	0.06	0.00	55.61	112.16	2.00	0.00	0.06	0.00
55.78	117.03	2.00	0.00	0.05	0.00	55.94	122.40	2.00	0.00	0.05	0.00
56.11	126.81	2.00	0.00	0.05	0.00	56.27	131.88	2.00	0.00	0.05	0.00
56.43	142.16	2.00	0.00	0.04	0.00	56.60	158.10	2.00	0.00	0.04	0.00
56.76	171.55	2.00	0.00	0.04	0.00	56.93	178.35	2.00	0.00	0.04	0.00
57.09	172.60	2.00	0.00	0.03	0.00	57.25	151.11	2.00	0.00	0.03	0.00
57.42	133.50	2.00	0.00	0.03	0.00	57.58	127.20	2.00	0.00	0.02	0.00
57.75	136.90	2.00	0.00	0.02	0.00	57.91	144.40	2.00	0.00	0.02	0.00
58.07	148.20	2.00	0.00	0.02	0.00	58.24	148.05	2.00	0.00	0.01	0.00
58.40	144.24	2.00	0.00	0.01	0.00	58.57	149.45	2.00	0.00	0.01	0.00
58.73	152.83	2.00	0.00	0.00	0.00	58.89	145.99	2.00	0.00	0.00	0.00
59.06	128.20	2.00	0.00	0.00	0.00	59.22	130.97	2.00	0.00	0.00	0.00

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

Depth (ft)	$Q_{tn,cs}$	FS	e_v (%)	DF	Settlement (in)	Depth (ft)	$Q_{tn,cs}$	FS	e_v (%)	DF	Settlement (in)
59.39	144.54	2.00	0.00	0.00	0.00	59.55	143.73	2.00	0.00	0.00	0.00
59.71	134.96	2.00	0.00	0.00	0.00	59.88	132.28	2.00	0.00	0.00	0.00
60.04	135.01	2.00	0.00	0.00	0.00	60.21	134.04	2.00	0.00	0.00	0.00
60.37	130.52	2.00	0.00	0.00	0.00	60.53	140.30	2.00	0.00	0.00	0.00
60.70	150.41	2.00	0.00	0.00	0.00	60.86	156.27	2.00	0.00	0.00	0.00
61.03	146.97	2.00	0.00	0.00	0.00	61.19	131.26	2.00	0.00	0.00	0.00
61.35	119.80	2.00	0.00	0.00	0.00	61.52	113.52	2.00	0.00	0.00	0.00
61.68	113.14	2.00	0.00	0.00	0.00	61.85	115.11	2.00	0.00	0.00	0.00
62.01	123.01	2.00	0.00	0.00	0.00	62.17	138.29	2.00	0.00	0.00	0.00
62.34	156.73	2.00	0.00	0.00	0.00	62.50	169.17	2.00	0.00	0.00	0.00
62.67	171.98	2.00	0.00	0.00	0.00	62.83	165.94	2.00	0.00	0.00	0.00
63.00	160.30	2.00	0.00	0.00	0.00	63.16	161.21	2.00	0.00	0.00	0.00
63.32	168.08	2.00	0.00	0.00	0.00	63.49	173.25	2.00	0.00	0.00	0.00
63.65	176.10	2.00	0.00	0.00	0.00	63.82	172.34	2.00	0.00	0.00	0.00
63.98	164.27	2.00	0.00	0.00	0.00	64.14	149.49	2.00	0.00	0.00	0.00
64.31	136.60	2.00	0.00	0.00	0.00	64.47	137.83	2.00	0.00	0.00	0.00
64.64	149.57	2.00	0.00	0.00	0.00	64.80	163.82	2.00	0.00	0.00	0.00
64.96	167.70	2.00	0.00	0.00	0.00	65.13	163.97	2.00	0.00	0.00	0.00
65.29	156.97	2.00	0.00	0.00	0.00	65.46	156.26	2.00	0.00	0.00	0.00
65.62	155.08	2.00	0.00	0.00	0.00	65.78	150.85	2.00	0.00	0.00	0.00
65.95	143.28	2.00	0.00	0.00	0.00	66.11	142.23	2.00	0.00	0.00	0.00
66.28	148.25	2.00	0.00	0.00	0.00	66.44	163.39	2.00	0.00	0.00	0.00
66.60	182.94	2.00	0.00	0.00	0.00	66.77	195.03	2.00	0.00	0.00	0.00
66.93	190.30	2.00	0.00	0.00	0.00	67.10	172.50	2.00	0.00	0.00	0.00
67.26	155.96	2.00	0.00	0.00	0.00	67.42	147.03	2.00	0.00	0.00	0.00
67.59	142.73	2.00	0.00	0.00	0.00	67.75	158.11	2.00	0.00	0.00	0.00
67.92	174.55	2.00	0.00	0.00	0.00	68.08	184.29	2.00	0.00	0.00	0.00
68.24	183.57	2.00	0.00	0.00	0.00	68.41	169.02	2.00	0.00	0.00	0.00
68.57	143.45	2.00	0.00	0.00	0.00	68.74	134.68	2.00	0.00	0.00	0.00
68.90	141.59	2.00	0.00	0.00	0.00	69.07	147.52	2.00	0.00	0.00	0.00
69.23	159.97	2.00	0.00	0.00	0.00	69.39	180.85	2.00	0.00	0.00	0.00
69.56	202.90	2.00	0.00	0.00	0.00	69.72	216.21	2.00	0.00	0.00	0.00
69.89	218.14	2.00	0.00	0.00	0.00	70.05	208.69	2.00	0.00	0.00	0.00
70.21	186.97	2.00	0.00	0.00	0.00	70.38	176.76	2.00	0.00	0.00	0.00
70.54	167.72	2.00	0.00	0.00	0.00	70.71	166.04	2.00	0.00	0.00	0.00
70.87	162.93	2.00	0.00	0.00	0.00	71.03	172.32	2.00	0.00	0.00	0.00
71.20	180.86	2.00	0.00	0.00	0.00	71.36	185.91	2.00	0.00	0.00	0.00
71.53	182.08	2.00	0.00	0.00	0.00	71.69	166.14	2.00	0.00	0.00	0.00
71.85	147.53	2.00	0.00	0.00	0.00	72.02	148.75	2.00	0.00	0.00	0.00
72.18	160.07	2.00	0.00	0.00	0.00	72.35	166.73	2.00	0.00	0.00	0.00
72.51	161.12	2.00	0.00	0.00	0.00	72.67	151.22	2.00	0.00	0.00	0.00
72.84	140.24	2.00	0.00	0.00	0.00	73.00	139.79	2.00	0.00	0.00	0.00
73.17	146.01	2.00	0.00	0.00	0.00	73.33	152.19	2.00	0.00	0.00	0.00
73.49	149.91	2.00	0.00	0.00	0.00	73.66	144.60	2.00	0.00	0.00	0.00
73.82	145.02	2.00	0.00	0.00	0.00	73.99	152.40	2.00	0.00	0.00	0.00
74.15	156.38	2.00	0.00	0.00	0.00	74.31	156.88	2.00	0.00	0.00	0.00
74.48	161.90	2.00	0.00	0.00	0.00	74.64	171.29	2.00	0.00	0.00	0.00
74.81	176.24	2.00	0.00	0.00	0.00	74.97	175.95	2.00	0.00	0.00	0.00

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

Depth (ft)	$Q_{tn,cs}$	FS	e_v (%)	DF	Settlement (in)	Depth (ft)	$Q_{tn,cs}$	FS	e_v (%)	DF	Settlement (in)
75.13	175.00	2.00	0.00	0.00	0.00	75.30	174.59	2.00	0.00	0.00	0.00
75.46	174.92	2.00	0.00	0.00	0.00	75.63	178.41	2.00	0.00	0.00	0.00
75.79	184.22	2.00	0.00	0.00	0.00	75.96	187.60	2.00	0.00	0.00	0.00
76.12	185.59	2.00	0.00	0.00	0.00	76.28	180.29	2.00	0.00	0.00	0.00
76.45	175.22	2.00	0.00	0.00	0.00	76.61	173.29	2.00	0.00	0.00	0.00
76.78	174.09	2.00	0.00	0.00	0.00	76.94	177.27	2.00	0.00	0.00	0.00
77.10	177.31	2.00	0.00	0.00	0.00	77.27	169.42	2.00	0.00	0.00	0.00
77.43	158.35	2.00	0.00	0.00	0.00	77.60	153.64	2.00	0.00	0.00	0.00
77.76	155.89	2.00	0.00	0.00	0.00	77.92	158.07	2.00	0.00	0.00	0.00
78.09	166.31	2.00	0.00	0.00	0.00	78.25	177.51	2.00	0.00	0.00	0.00
78.42	181.08	2.00	0.00	0.00	0.00	78.58	170.45	2.00	0.00	0.00	0.00
78.74	168.76	2.00	0.00	0.00	0.00	78.91	185.89	2.00	0.00	0.00	0.00
79.07	201.76	2.00	0.00	0.00	0.00	79.24	204.65	2.00	0.00	0.00	0.00
79.40	186.08	2.00	0.00	0.00	0.00	79.56	159.62	2.00	0.00	0.00	0.00
79.73	135.55	2.00	0.00	0.00	0.00	79.89	126.41	2.00	0.00	0.00	0.00
80.06	135.88	2.00	0.00	0.00	0.00	80.22	148.39	2.00	0.00	0.00	0.00

Total estimated settlement: 0.61

Abbreviations

$Q_{tn,cs}$:	Equivalent dean sand normalized cone resistance
FS:	Factor of safety against liquefaction
e_v (%):	Post-liquefaction volumentric strain
DF:	e_v depth weighting factor
Settlement:	Calculated settlement

Geocon Incorporated
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San Diego, California 92121-2974
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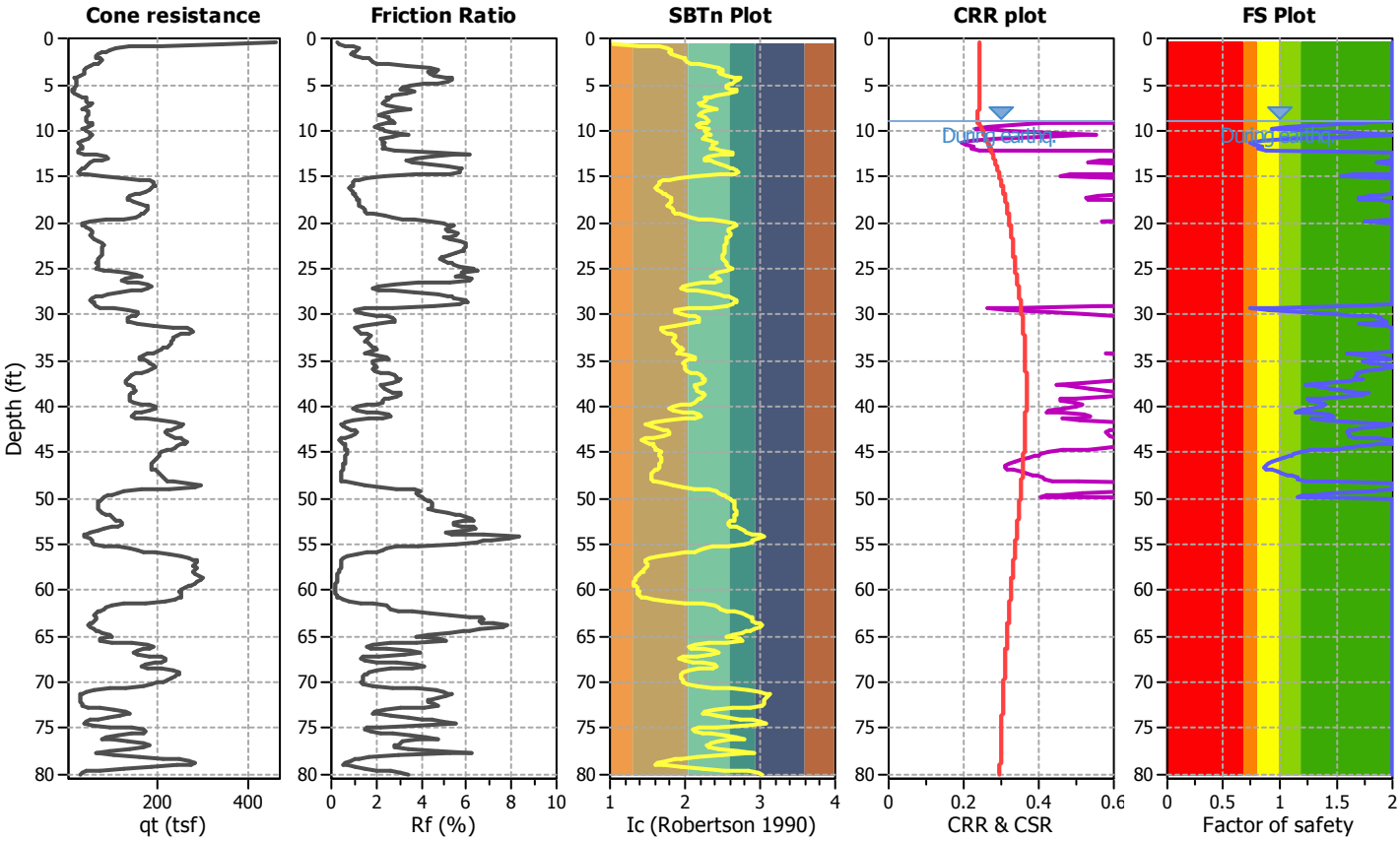
LIQUEFACTION ANALYSIS REPORT

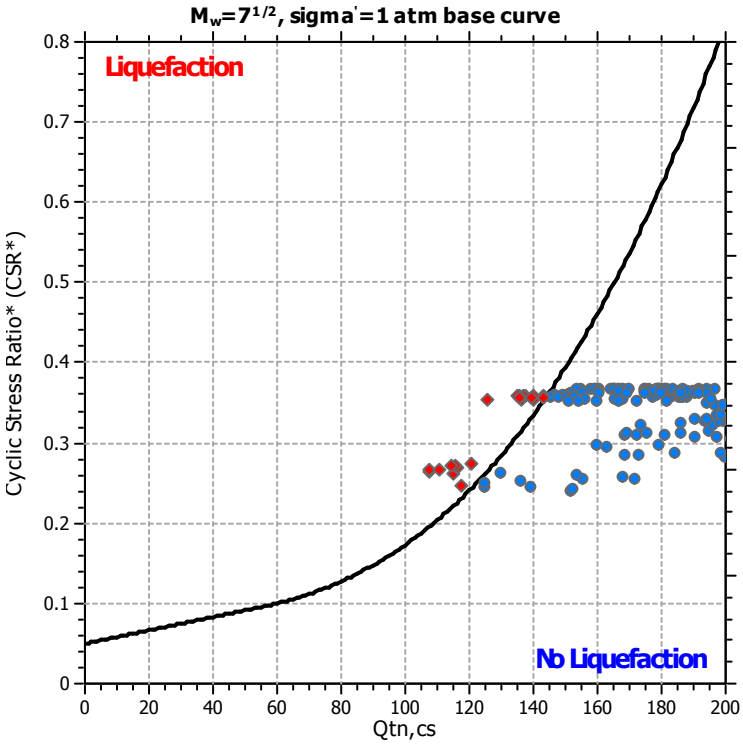
Project title : Collins Aerospace **Location : Parcel A**

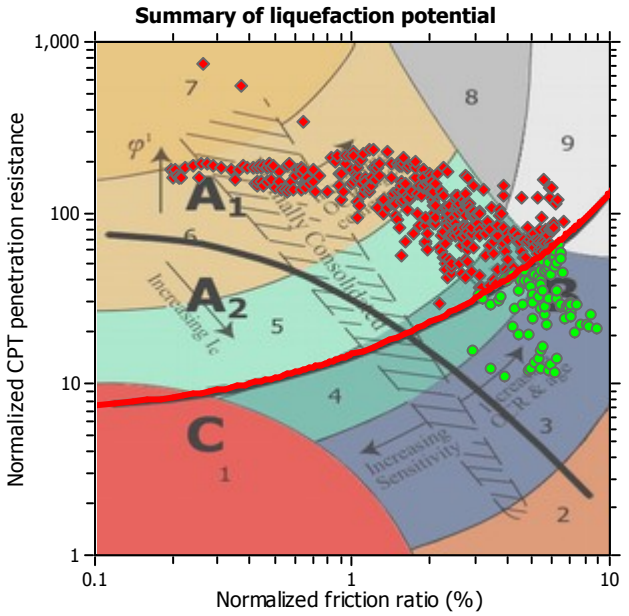
CPT file : CPT-04

Input parameters and analysis data

Analysis method:	NCEER (1998)	G.W.T. (in-situ):	9.00 ft	Use fill:	No	Clay like behavior applied:	Sands only
Fines correction method:	NCEER (1998)	G.W.T. (earthq.):	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:	50.00 ft
Earthquake magnitude M_w:	6.12	Ic cut-off value:	2.60	Trans. detect. applied:	No	MSF method:	Method based
Peak ground acceleration:	0.63	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

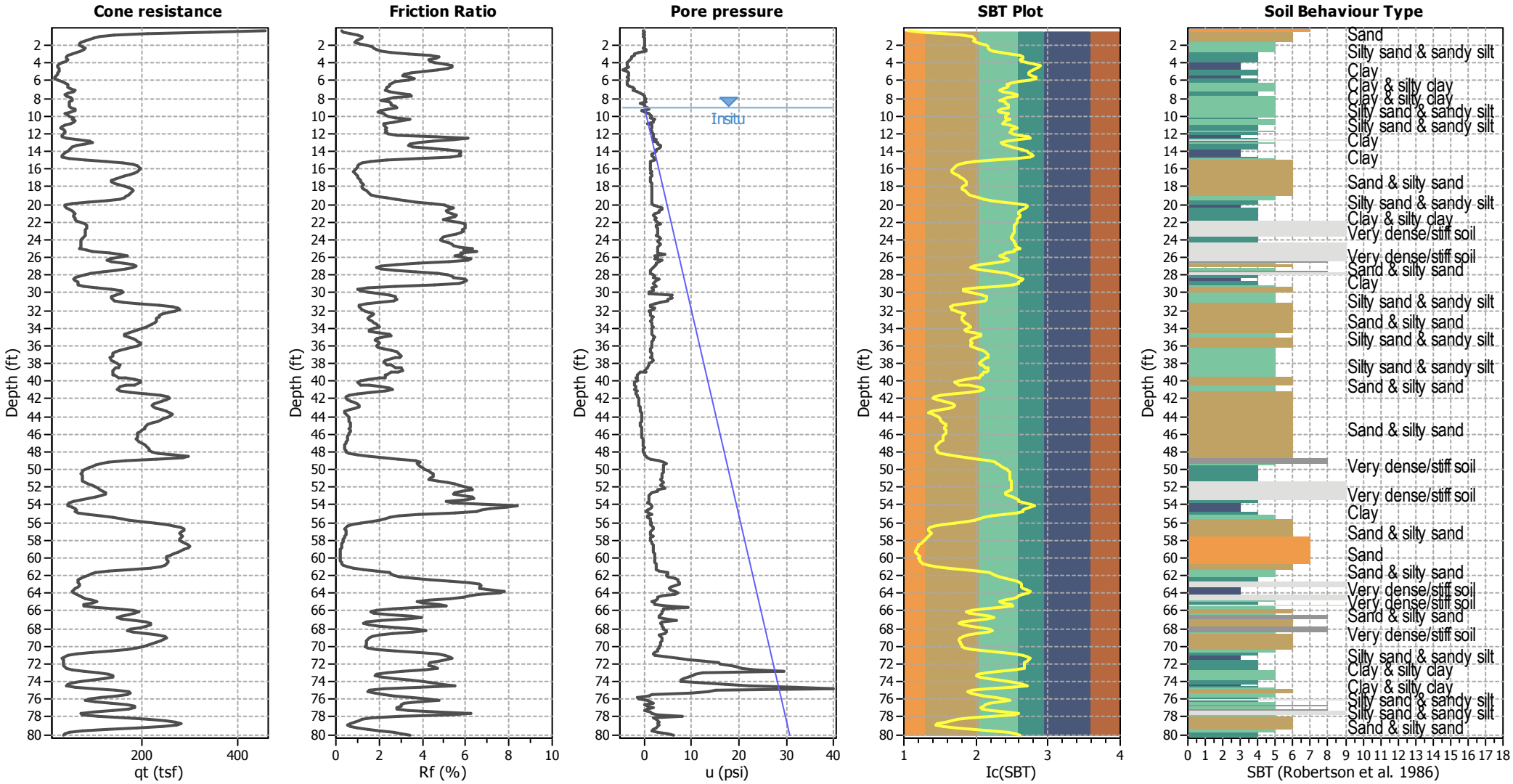






Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and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

CPT basic interpretation plots



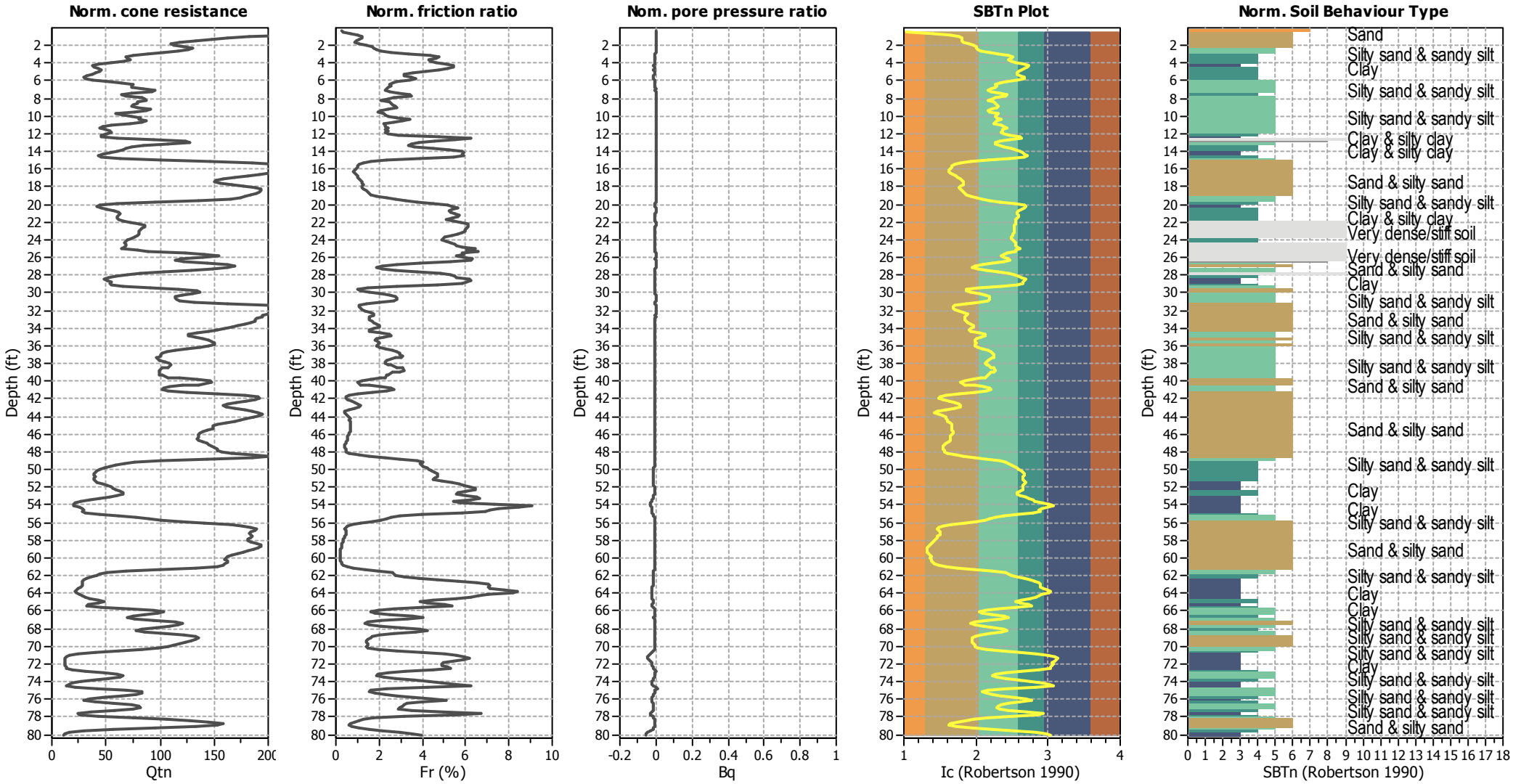
Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	9.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	6.12	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.63	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	9.00 ft	Fill height:	N/A	Limit depth:	50.00 ft

SBT legend

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

CPT basic interpretation plots (normalized)



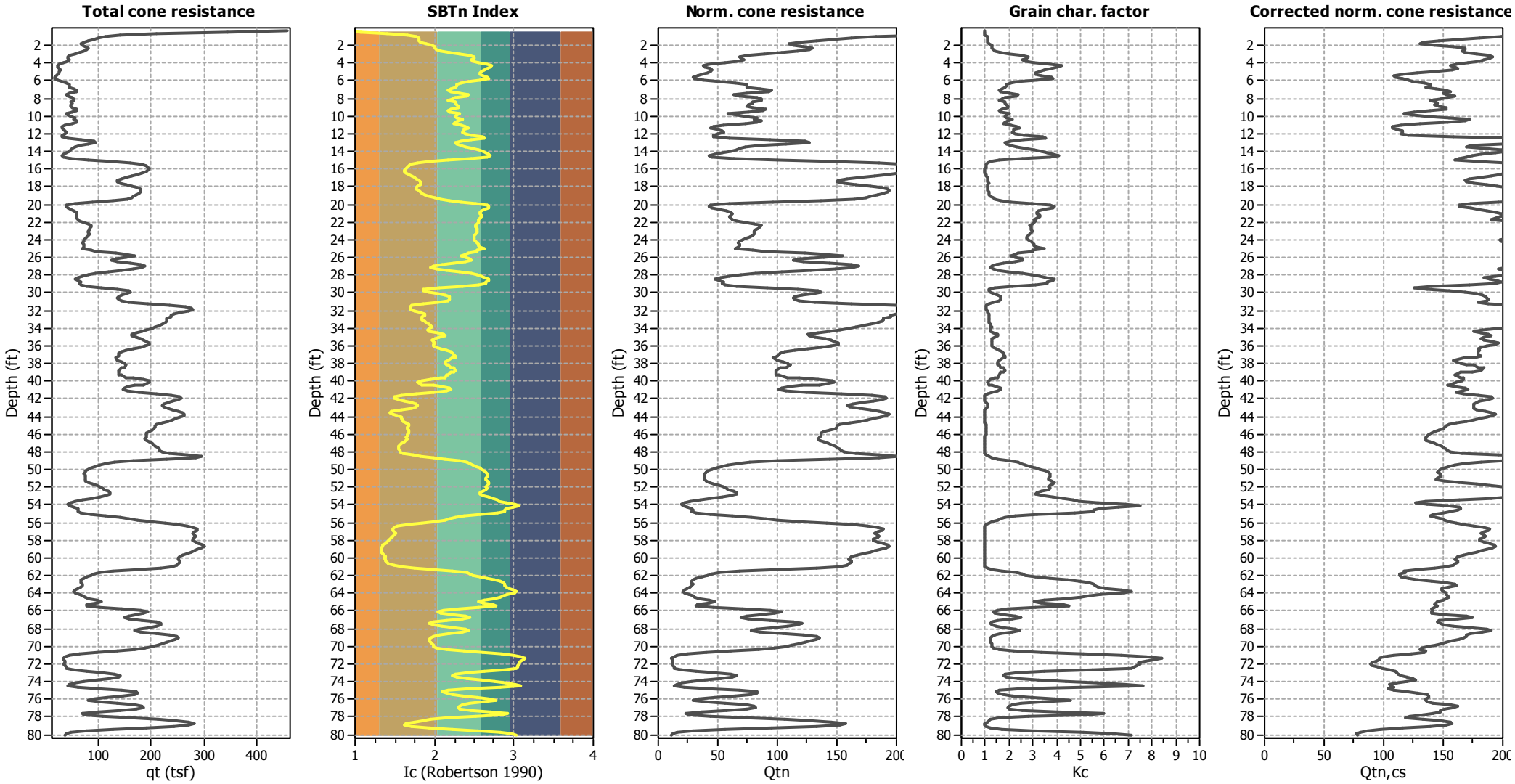
Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	9.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	6.12	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.63	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	9.00 ft	Fill height:	N/A	Limit depth:	50.00 ft

SBTn legend

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

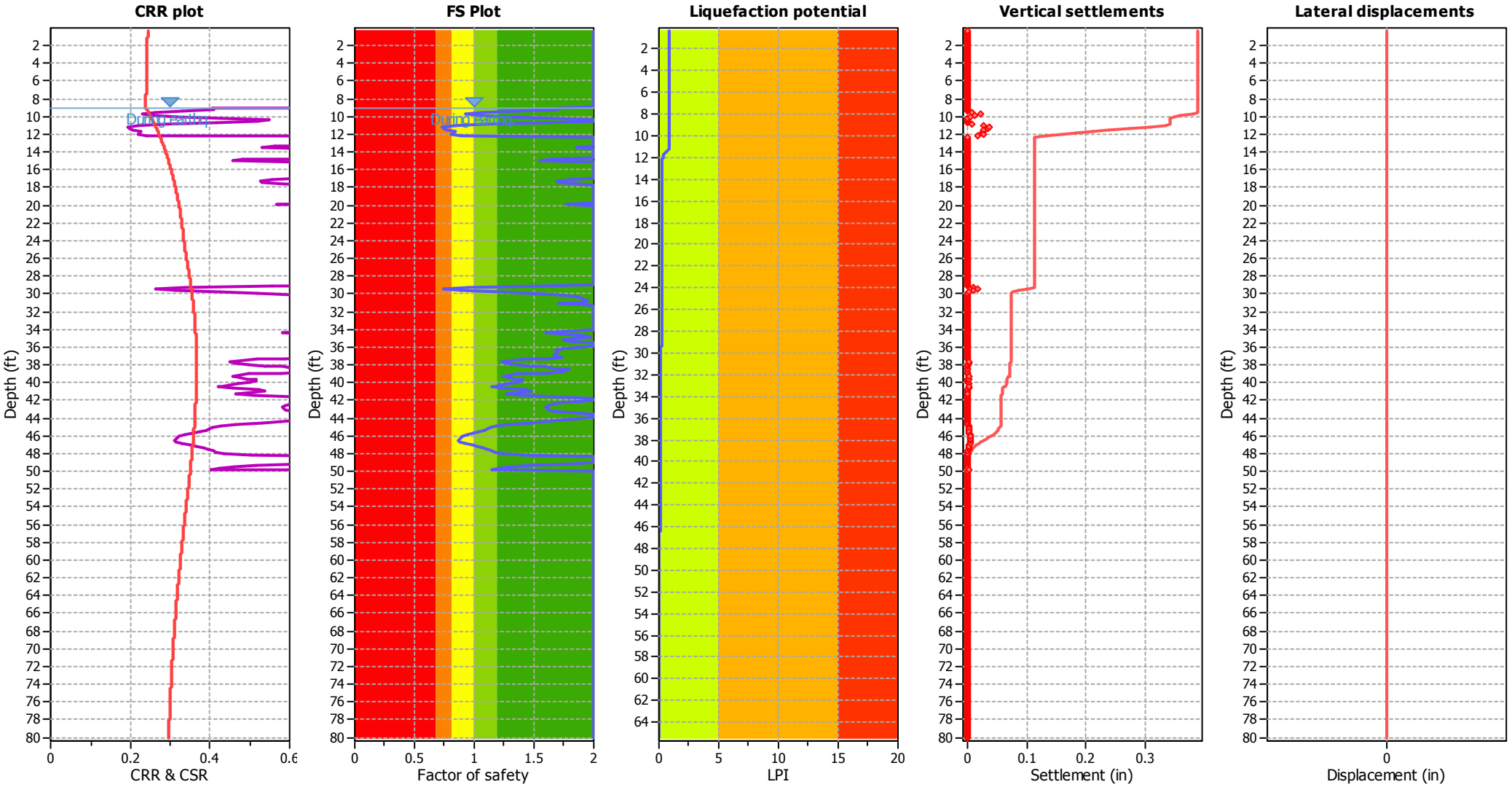
Liquefaction analysis overall plots (intermediate results)



Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	9.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	6.12	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.63	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	9.00 ft	Fill height:	N/A	Limit depth:	50.00 ft

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	9.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	6.12	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.63	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	9.00 ft	Fill height:	N/A	Limit depth:	50.00 ft

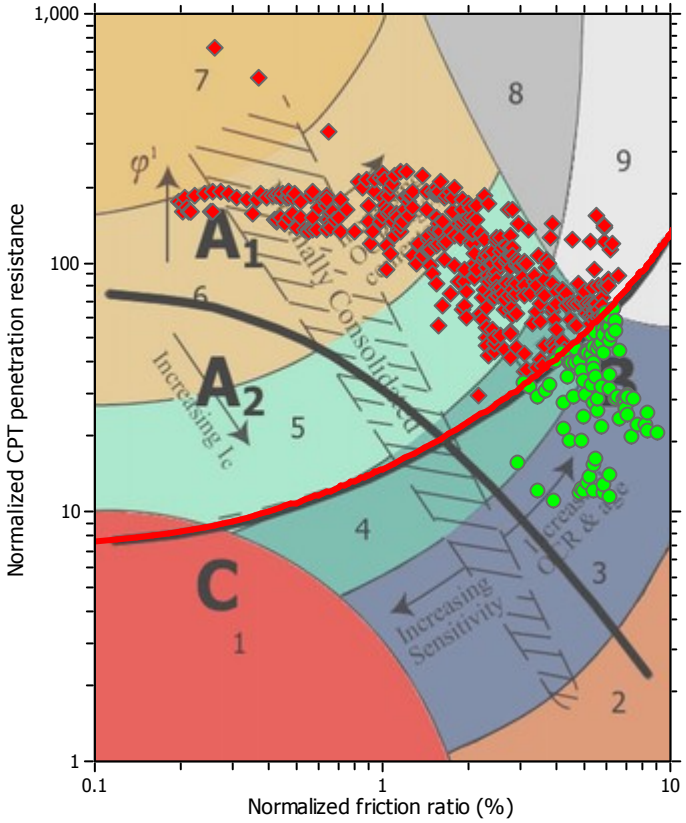
F.S. color scheme

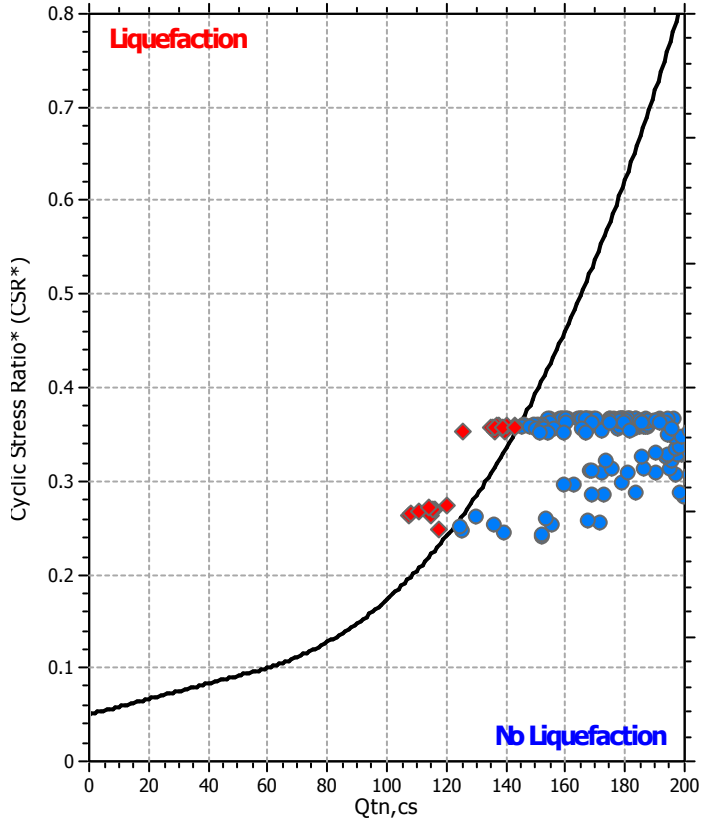
- Almost certain it will liquefy
- Very likely to liquefy
- Liquefaction and no liq. are equally likely
- Unlike to liquefy
- Almost certain it will not liquefy

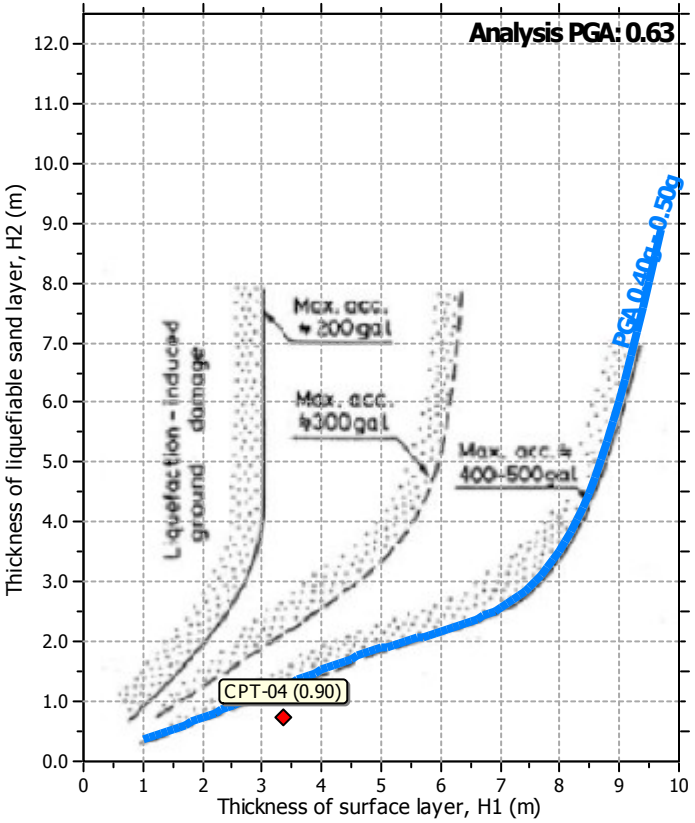
LPI color scheme

- Very high risk
- High risk
- Low risk

Liquefaction analysis summary plots



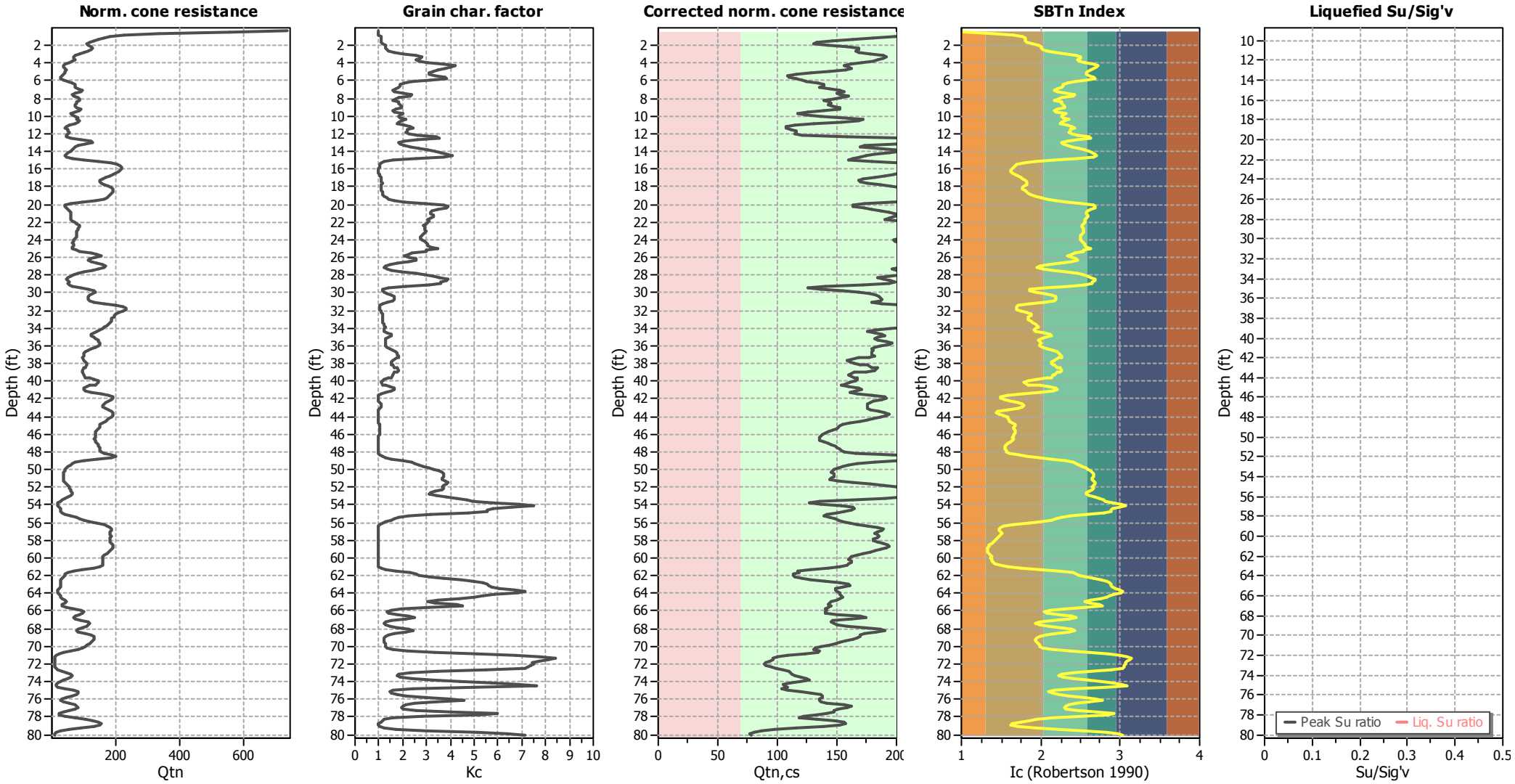




Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	9.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	6.12	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.63	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	9.00 ft	Fill height:	N/A	Limit depth:	50.00 ft

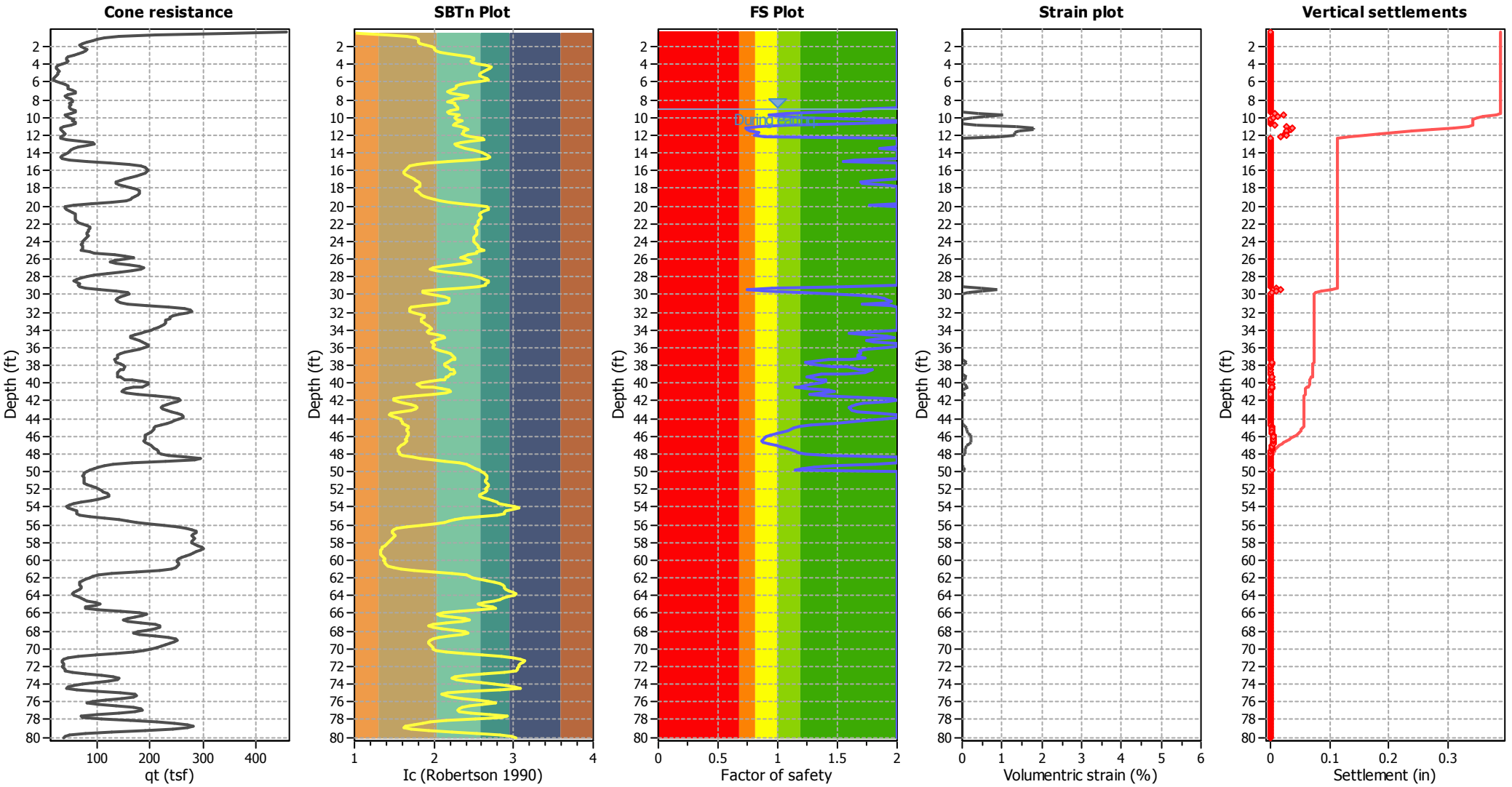
Check for strength loss plots (Robertson (2010))



Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	9.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	6.12	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.63	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	9.00 ft	Fill height:	N/A	Limit depth:	50.00 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

:: Post-earthquake settlement due to soil liquefaction ::

Depth (ft)	$Q_{tn,cs}$	FS	e_v (%)	DF	Settlement (in)	Depth (ft)	$Q_{tn,cs}$	FS	e_v (%)	DF	Settlement (in)
9.02	152.18	1.71	0.00	0.85	0.00	9.19	152.60	1.70	0.00	0.84	0.00
9.35	139.60	1.37	0.00	0.84	0.00	9.51	125.24	1.07	0.40	0.84	0.01
9.68	117.28	0.93	1.04	0.84	0.02	9.84	124.89	1.05	0.60	0.83	0.01
10.01	136.00	1.25	0.27	0.83	0.01	10.17	155.40	1.69	0.00	0.83	0.00
10.34	171.62	2.00	0.00	0.82	0.00	10.50	167.85	2.00	0.00	0.82	0.00
10.66	153.68	1.61	0.00	0.82	0.00	10.83	129.94	1.09	0.38	0.82	0.01
10.99	114.97	0.84	1.35	0.81	0.03	11.16	107.20	0.74	1.79	0.81	0.04
11.32	107.80	0.74	1.78	0.81	0.03	11.48	110.50	0.77	1.41	0.81	0.03
11.65	116.28	0.84	1.31	0.80	0.03	11.81	115.61	0.83	1.32	0.80	0.03
11.98	114.20	0.80	1.33	0.80	0.03	12.14	120.41	0.89	0.95	0.79	0.02
12.30	158.99	2.00	0.00	0.79	0.00	12.47	210.95	2.00	0.00	0.79	0.00
12.63	243.89	2.00	0.00	0.79	0.00	12.80	252.49	2.00	0.00	0.78	0.00
12.96	233.40	2.00	0.00	0.78	0.00	13.12	200.20	2.00	0.00	0.78	0.00
13.29	173.36	1.99	0.00	0.77	0.00	13.45	169.05	1.86	0.00	0.77	0.00
13.62	184.08	2.00	0.00	0.77	0.00	13.78	198.47	2.00	0.00	0.77	0.00
13.94	204.04	2.00	0.00	0.76	0.00	14.11	193.76	2.00	0.00	0.76	0.00
14.27	181.28	2.00	0.00	0.76	0.00	14.44	174.32	2.00	0.00	0.76	0.00
14.60	170.08	2.00	0.00	0.75	0.00	14.76	163.14	1.64	0.00	0.75	0.00
14.93	159.72	1.55	0.00	0.75	0.00	15.09	179.44	2.00	0.00	0.74	0.00
15.26	202.75	2.00	0.00	0.74	0.00	15.42	215.70	2.00	0.00	0.74	0.00
15.58	219.57	2.00	0.00	0.74	0.00	15.75	219.87	2.00	0.00	0.73	0.00
15.91	217.75	2.00	0.00	0.73	0.00	16.08	215.58	2.00	0.00	0.73	0.00
16.24	210.64	2.00	0.00	0.72	0.00	16.40	201.98	2.00	0.00	0.72	0.00
16.57	197.30	2.00	0.00	0.72	0.00	16.73	190.52	2.00	0.00	0.72	0.00
16.90	181.32	2.00	0.00	0.71	0.00	17.06	172.48	1.80	0.00	0.71	0.00
17.23	168.52	1.69	0.00	0.71	0.00	17.39	169.16	1.71	0.00	0.71	0.00
17.55	175.65	1.87	0.00	0.70	0.00	17.72	186.51	2.00	0.00	0.70	0.00
17.88	195.22	2.00	0.00	0.70	0.00	18.05	204.13	2.00	0.00	0.69	0.00
18.21	210.31	2.00	0.00	0.69	0.00	18.37	215.63	2.00	0.00	0.69	0.00
18.54	217.20	2.00	0.00	0.69	0.00	18.70	215.25	2.00	0.00	0.68	0.00
18.87	214.23	2.00	0.00	0.68	0.00	19.03	217.11	2.00	0.00	0.68	0.00
19.19	228.59	2.00	0.00	0.67	0.00	19.36	234.36	2.00	0.00	0.67	0.00
19.52	221.83	2.00	0.00	0.67	0.00	19.69	196.31	2.00	0.00	0.67	0.00
19.85	173.68	1.76	0.00	0.66	0.00	20.01	163.30	2.00	0.00	0.66	0.00
20.18	163.70	2.00	0.00	0.66	0.00	20.34	173.57	2.00	0.00	0.66	0.00
20.51	179.84	2.00	0.00	0.65	0.00	20.67	185.98	2.00	0.00	0.65	0.00
20.83	193.97	2.00	0.00	0.65	0.00	21.00	199.28	2.00	0.00	0.64	0.00
21.16	201.89	2.00	0.00	0.64	0.00	21.33	198.03	2.00	0.00	0.64	0.00
21.49	194.51	2.00	0.00	0.64	0.00	21.65	190.68	2.00	0.00	0.63	0.00
21.82	202.34	2.00	0.00	0.63	0.00	21.98	221.99	2.00	0.00	0.63	0.00
22.15	242.04	2.00	0.00	0.62	0.00	22.31	249.63	2.00	0.00	0.62	0.00
22.47	249.05	2.00	0.00	0.62	0.00	22.64	245.01	2.00	0.00	0.62	0.00
22.80	239.65	2.00	0.00	0.61	0.00	22.97	238.41	2.00	0.00	0.61	0.00
23.13	235.59	2.00	0.00	0.61	0.00	23.30	230.62	2.00	0.00	0.61	0.00
23.46	221.00	2.00	0.00	0.60	0.00	23.62	209.57	2.00	0.00	0.60	0.00
23.79	202.53	2.00	0.00	0.60	0.00	23.95	197.44	2.00	0.00	0.59	0.00
24.12	198.70	2.00	0.00	0.59	0.00	24.28	202.92	2.00	0.00	0.59	0.00
24.44	208.51	2.00	0.00	0.59	0.00	24.61	210.16	2.00	0.00	0.58	0.00

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

Depth (ft)	$Q_{tn,cs}$	FS	e_v (%)	DF	Settlement (in)	Depth (ft)	$Q_{tn,cs}$	FS	e_v (%)	DF	Settlement (in)
24.77	214.35	2.00	0.00	0.58	0.00	24.94	223.16	2.00	0.00	0.58	0.00
25.10	237.83	2.00	0.00	0.57	0.00	25.26	265.94	2.00	0.00	0.57	0.00
25.43	294.53	2.00	0.00	0.57	0.00	25.59	320.53	2.00	0.00	0.57	0.00
25.76	325.06	2.00	0.00	0.56	0.00	25.92	316.67	2.00	0.00	0.56	0.00
26.08	305.21	2.00	0.00	0.56	0.00	26.25	292.96	2.00	0.00	0.56	0.00
26.41	275.52	2.00	0.00	0.55	0.00	26.58	252.72	2.00	0.00	0.55	0.00
26.74	234.18	2.00	0.00	0.55	0.00	26.90	216.10	2.00	0.00	0.54	0.00
27.07	202.74	2.00	0.00	0.54	0.00	27.23	196.83	2.00	0.00	0.54	0.00
27.40	199.41	2.00	0.00	0.54	0.00	27.56	204.45	2.00	0.00	0.53	0.00
27.72	210.18	2.00	0.00	0.53	0.00	27.89	204.59	2.00	0.00	0.53	0.00
28.05	194.50	2.00	0.00	0.52	0.00	28.22	184.35	2.00	0.00	0.52	0.00
28.38	188.65	2.00	0.00	0.52	0.00	28.54	195.38	2.00	0.00	0.52	0.00
28.71	199.36	2.00	0.00	0.51	0.00	28.87	193.29	2.00	0.00	0.51	0.00
29.04	172.28	1.58	0.00	0.51	0.00	29.20	139.93	0.95	0.48	0.51	0.01
29.36	125.39	0.75	0.90	0.50	0.02	29.53	136.07	0.89	0.50	0.50	0.01
29.69	154.93	1.20	0.15	0.50	0.00	29.86	167.94	1.47	0.00	0.49	0.00
30.02	177.54	1.69	0.00	0.49	0.00	30.19	182.94	1.83	0.00	0.49	0.00
30.35	185.38	1.89	0.00	0.49	0.00	30.51	186.52	1.92	0.00	0.48	0.00
30.68	187.96	1.95	0.00	0.48	0.00	30.84	187.05	1.93	0.00	0.48	0.00
31.01	178.74	1.71	0.00	0.47	0.00	31.17	188.04	1.95	0.00	0.47	0.00
31.33	208.72	2.00	0.00	0.47	0.00	31.50	230.87	2.00	0.00	0.47	0.00
31.66	240.59	2.00	0.00	0.46	0.00	31.83	244.01	2.00	0.00	0.46	0.00
31.99	242.84	2.00	0.00	0.46	0.00	32.15	236.94	2.00	0.00	0.46	0.00
32.32	233.35	2.00	0.00	0.45	0.00	32.48	226.93	2.00	0.00	0.45	0.00
32.65	222.10	2.00	0.00	0.45	0.00	32.81	215.11	2.00	0.00	0.44	0.00
32.97	215.93	2.00	0.00	0.44	0.00	33.14	218.36	2.00	0.00	0.44	0.00
33.30	217.68	2.00	0.00	0.44	0.00	33.47	216.75	2.00	0.00	0.43	0.00
33.63	214.42	2.00	0.00	0.43	0.00	33.79	210.17	2.00	0.00	0.43	0.00
33.96	195.55	2.00	0.00	0.42	0.00	34.12	182.78	1.78	0.00	0.42	0.00
34.29	175.30	1.60	0.00	0.42	0.00	34.45	181.45	1.75	0.00	0.42	0.00
34.61	187.90	1.91	0.00	0.41	0.00	34.78	190.41	1.98	0.00	0.41	0.00
34.94	184.43	1.82	0.00	0.41	0.00	35.11	181.58	1.75	0.00	0.40	0.00
35.27	183.99	1.81	0.00	0.40	0.00	35.43	191.67	2.00	0.00	0.40	0.00
35.60	196.76	2.00	0.00	0.40	0.00	35.76	194.34	2.00	0.00	0.39	0.00
35.93	187.14	1.89	0.00	0.39	0.00	36.09	181.83	1.75	0.00	0.39	0.00
36.26	179.35	1.69	0.00	0.39	0.00	36.42	179.94	1.70	0.00	0.38	0.00
36.58	179.64	1.69	0.00	0.38	0.00	36.75	178.67	1.67	0.00	0.38	0.00
36.91	178.95	1.67	0.00	0.37	0.00	37.08	181.39	1.73	0.00	0.37	0.00
37.24	176.43	1.61	0.00	0.37	0.00	37.40	168.01	1.42	0.00	0.37	0.00
37.57	158.40	1.23	0.11	0.36	0.00	37.73	160.49	1.27	0.07	0.36	0.00
37.90	165.05	1.36	0.00	0.36	0.00	38.06	169.98	1.46	0.00	0.35	0.00
38.22	175.18	1.58	0.00	0.35	0.00	38.39	179.46	1.69	0.00	0.35	0.00
38.55	183.65	1.79	0.00	0.35	0.00	38.72	181.53	1.74	0.00	0.34	0.00
38.88	174.99	1.58	0.00	0.34	0.00	39.04	165.11	1.36	0.00	0.34	0.00
39.21	159.37	1.25	0.10	0.34	0.00	39.37	159.84	1.26	0.07	0.33	0.00
39.54	164.40	1.35	0.07	0.33	0.00	39.70	167.17	1.41	0.00	0.33	0.00
39.86	167.13	1.40	0.00	0.32	0.00	40.03	165.47	1.37	0.00	0.32	0.00
40.19	160.86	1.28	0.07	0.32	0.00	40.36	155.14	1.17	0.09	0.32	0.00

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

Depth (ft)	$Q_{tn,cs}$	FS	e_v (%)	DF	Settlement (in)	Depth (ft)	$Q_{tn,cs}$	FS	e_v (%)	DF	Settlement (in)
40.52	154.05	1.15	0.13	0.31	0.00	40.68	159.34	1.25	0.09	0.31	0.00
40.85	168.25	1.43	0.00	0.31	0.00	41.01	170.18	1.47	0.00	0.30	0.00
41.18	165.85	1.38	0.00	0.30	0.00	41.34	160.48	1.27	0.06	0.30	0.00
41.50	166.80	1.40	0.00	0.30	0.00	41.67	178.70	1.67	0.00	0.29	0.00
41.83	190.01	1.97	0.00	0.29	0.00	42.00	191.96	2.00	0.00	0.29	0.00
42.16	187.86	1.91	0.00	0.29	0.00	42.32	180.47	1.72	0.00	0.28	0.00
42.49	177.87	1.66	0.00	0.28	0.00	42.65	176.17	1.62	0.00	0.28	0.00
42.82	175.24	1.60	0.00	0.27	0.00	42.98	175.78	1.61	0.00	0.27	0.00
43.15	176.07	1.62	0.00	0.27	0.00	43.31	178.22	1.67	0.00	0.27	0.00
43.47	185.56	1.86	0.00	0.26	0.00	43.64	190.58	2.00	0.00	0.26	0.00
43.80	194.18	2.00	0.00	0.26	0.00	43.97	191.88	2.00	0.00	0.25	0.00
44.13	186.06	1.88	0.00	0.25	0.00	44.29	180.05	1.72	0.00	0.25	0.00
44.46	175.05	1.60	0.00	0.25	0.00	44.62	169.33	1.47	0.00	0.24	0.00
44.79	160.46	1.29	0.05	0.24	0.00	44.95	155.33	1.19	0.07	0.24	0.00
45.11	152.17	1.13	0.10	0.24	0.00	45.28	150.80	1.11	0.10	0.23	0.00
45.44	149.42	1.08	0.10	0.23	0.00	45.61	146.62	1.04	0.14	0.23	0.00
45.77	143.21	0.98	0.14	0.22	0.00	45.93	140.04	0.93	0.21	0.22	0.00
46.10	137.66	0.90	0.21	0.22	0.00	46.26	136.89	0.89	0.21	0.22	0.00
46.43	135.78	0.87	0.21	0.21	0.00	46.59	135.16	0.87	0.21	0.21	0.00
46.75	135.92	0.88	0.21	0.21	0.00	46.92	139.21	0.93	0.20	0.20	0.00
47.08	142.99	0.99	0.13	0.20	0.00	47.25	145.40	1.03	0.12	0.20	0.00
47.41	148.20	1.07	0.08	0.20	0.00	47.57	150.40	1.11	0.08	0.19	0.00
47.74	152.38	1.15	0.06	0.19	0.00	47.90	153.20	1.17	0.06	0.19	0.00
48.07	156.48	1.23	0.05	0.19	0.00	48.23	165.79	1.42	0.00	0.18	0.00
48.39	195.80	2.00	0.00	0.18	0.00	48.56	226.72	2.00	0.00	0.18	0.00
48.72	236.62	2.00	0.00	0.17	0.00	48.89	220.33	2.00	0.00	0.17	0.00
49.05	201.79	2.00	0.00	0.17	0.00	49.22	182.08	1.82	0.00	0.17	0.00
49.38	167.15	1.46	0.00	0.16	0.00	49.54	159.93	1.31	0.03	0.16	0.00
49.71	154.59	1.21	0.05	0.16	0.00	49.87	151.45	1.15	0.07	0.15	0.00
50.04	147.33	2.00	0.00	0.15	0.00	50.20	146.17	2.00	0.00	0.15	0.00
50.36	145.55	2.00	0.00	0.15	0.00	50.53	147.02	2.00	0.00	0.14	0.00
50.69	147.54	2.00	0.00	0.14	0.00	50.86	147.32	2.00	0.00	0.14	0.00
51.02	144.85	2.00	0.00	0.14	0.00	51.18	143.91	2.00	0.00	0.13	0.00
51.35	151.24	2.00	0.00	0.13	0.00	51.51	163.65	2.00	0.00	0.13	0.00
51.68	177.65	2.00	0.00	0.12	0.00	51.84	189.46	2.00	0.00	0.12	0.00
52.00	200.35	2.00	0.00	0.12	0.00	52.17	210.32	2.00	0.00	0.12	0.00
52.33	213.79	2.00	0.00	0.11	0.00	52.50	211.70	2.00	0.00	0.11	0.00
52.66	207.00	2.00	0.00	0.11	0.00	52.82	205.54	2.00	0.00	0.10	0.00
52.99	207.08	2.00	0.00	0.10	0.00	53.15	204.93	2.00	0.00	0.10	0.00
53.32	189.76	2.00	0.00	0.10	0.00	53.48	163.80	2.00	0.00	0.09	0.00
53.64	135.71	2.00	0.00	0.09	0.00	53.81	126.92	2.00	0.00	0.09	0.00
53.97	136.71	2.00	0.00	0.09	0.00	54.14	154.15	2.00	0.00	0.08	0.00
54.30	163.71	2.00	0.00	0.08	0.00	54.46	164.33	2.00	0.00	0.08	0.00
54.63	161.68	2.00	0.00	0.07	0.00	54.79	156.23	2.00	0.00	0.07	0.00
54.96	150.01	2.00	0.00	0.07	0.00	55.12	140.94	2.00	0.00	0.07	0.00
55.28	138.66	2.00	0.00	0.06	0.00	55.45	143.44	2.00	0.00	0.06	0.00
55.61	148.42	2.00	0.00	0.06	0.00	55.78	150.69	2.00	0.00	0.05	0.00
55.94	154.98	2.00	0.00	0.05	0.00	56.11	161.14	2.00	0.00	0.05	0.00

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

Depth (ft)	$Q_{tn,cs}$	FS	e_v (%)	DF	Settlement (in)	Depth (ft)	$Q_{tn,cs}$	FS	e_v (%)	DF	Settlement (in)
56.27	166.88	2.00	0.00	0.05	0.00	56.43	176.09	2.00	0.00	0.04	0.00
56.60	184.04	2.00	0.00	0.04	0.00	56.76	188.62	2.00	0.00	0.04	0.00
56.93	188.08	2.00	0.00	0.04	0.00	57.09	183.83	2.00	0.00	0.03	0.00
57.25	181.91	2.00	0.00	0.03	0.00	57.42	183.86	2.00	0.00	0.03	0.00
57.58	185.80	2.00	0.00	0.02	0.00	57.75	184.16	2.00	0.00	0.02	0.00
57.91	180.89	2.00	0.00	0.02	0.00	58.07	180.86	2.00	0.00	0.02	0.00
58.24	183.99	2.00	0.00	0.01	0.00	58.40	188.61	2.00	0.00	0.01	0.00
58.57	192.98	2.00	0.00	0.01	0.00	58.73	193.90	2.00	0.00	0.00	0.00
58.89	190.89	2.00	0.00	0.00	0.00	59.06	186.01	2.00	0.00	0.00	0.00
59.22	181.22	2.00	0.00	0.00	0.00	59.39	177.46	2.00	0.00	0.00	0.00
59.55	171.99	2.00	0.00	0.00	0.00	59.71	166.74	2.00	0.00	0.00	0.00
59.88	162.00	2.00	0.00	0.00	0.00	60.04	160.56	2.00	0.00	0.00	0.00
60.21	160.06	2.00	0.00	0.00	0.00	60.37	161.90	2.00	0.00	0.00	0.00
60.53	162.05	2.00	0.00	0.00	0.00	60.70	159.93	2.00	0.00	0.00	0.00
60.86	158.24	2.00	0.00	0.00	0.00	61.03	152.91	2.00	0.00	0.00	0.00
61.19	142.91	2.00	0.00	0.00	0.00	61.35	127.53	2.00	0.00	0.00	0.00
61.52	117.68	2.00	0.00	0.00	0.00	61.68	118.31	2.00	0.00	0.00	0.00
61.85	113.80	2.00	0.00	0.00	0.00	62.01	113.10	2.00	0.00	0.00	0.00
62.17	114.31	2.00	0.00	0.00	0.00	62.34	120.19	2.00	0.00	0.00	0.00
62.50	128.47	2.00	0.00	0.00	0.00	62.67	140.51	2.00	0.00	0.00	0.00
62.83	152.09	2.00	0.00	0.00	0.00	63.00	159.49	2.00	0.00	0.00	0.00
63.16	160.40	2.00	0.00	0.00	0.00	63.32	155.46	2.00	0.00	0.00	0.00
63.49	148.88	2.00	0.00	0.00	0.00	63.65	148.17	2.00	0.00	0.00	0.00
63.82	150.47	2.00	0.00	0.00	0.00	63.98	152.64	2.00	0.00	0.00	0.00
64.14	152.02	2.00	0.00	0.00	0.00	64.31	153.50	2.00	0.00	0.00	0.00
64.47	154.68	2.00	0.00	0.00	0.00	64.64	152.75	2.00	0.00	0.00	0.00
64.80	149.49	2.00	0.00	0.00	0.00	64.96	144.52	2.00	0.00	0.00	0.00
65.13	143.56	2.00	0.00	0.00	0.00	65.29	142.37	2.00	0.00	0.00	0.00
65.46	144.74	2.00	0.00	0.00	0.00	65.62	142.81	2.00	0.00	0.00	0.00
65.78	140.54	2.00	0.00	0.00	0.00	65.95	140.94	2.00	0.00	0.00	0.00
66.11	140.74	2.00	0.00	0.00	0.00	66.28	140.47	2.00	0.00	0.00	0.00
66.44	150.28	2.00	0.00	0.00	0.00	66.60	168.90	2.00	0.00	0.00	0.00
66.77	174.34	2.00	0.00	0.00	0.00	66.93	162.36	2.00	0.00	0.00	0.00
67.10	146.27	2.00	0.00	0.00	0.00	67.26	145.14	2.00	0.00	0.00	0.00
67.42	147.19	2.00	0.00	0.00	0.00	67.59	150.33	2.00	0.00	0.00	0.00
67.75	159.00	2.00	0.00	0.00	0.00	67.92	173.08	2.00	0.00	0.00	0.00
68.08	186.01	2.00	0.00	0.00	0.00	68.24	189.89	2.00	0.00	0.00	0.00
68.41	182.99	2.00	0.00	0.00	0.00	68.57	173.32	2.00	0.00	0.00	0.00
68.74	169.32	2.00	0.00	0.00	0.00	68.90	169.17	2.00	0.00	0.00	0.00
69.07	167.65	2.00	0.00	0.00	0.00	69.23	163.20	2.00	0.00	0.00	0.00
69.39	157.44	2.00	0.00	0.00	0.00	69.56	152.58	2.00	0.00	0.00	0.00
69.72	148.35	2.00	0.00	0.00	0.00	69.89	143.59	2.00	0.00	0.00	0.00
70.05	136.30	2.00	0.00	0.00	0.00	70.21	131.12	2.00	0.00	0.00	0.00
70.38	131.02	2.00	0.00	0.00	0.00	70.54	134.96	2.00	0.00	0.00	0.00
70.71	134.60	2.00	0.00	0.00	0.00	70.87	122.98	2.00	0.00	0.00	0.00
71.03	108.58	2.00	0.00	0.00	0.00	71.20	100.27	2.00	0.00	0.00	0.00
71.36	96.78	2.00	0.00	0.00	0.00	71.53	96.06	2.00	0.00	0.00	0.00
71.69	93.73	2.00	0.00	0.00	0.00	71.85	90.44	2.00	0.00	0.00	0.00

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

Depth (ft)	$Q_{tn,cs}$	FS	e_v (%)	DF	Settlement (in)	Depth (ft)	$Q_{tn,cs}$	FS	e_v (%)	DF	Settlement (in)
72.02	88.65	2.00	0.00	0.00	0.00	72.18	90.30	2.00	0.00	0.00	0.00
72.35	95.14	2.00	0.00	0.00	0.00	72.51	98.96	2.00	0.00	0.00	0.00
72.67	105.29	2.00	0.00	0.00	0.00	72.84	109.50	2.00	0.00	0.00	0.00
73.00	111.57	2.00	0.00	0.00	0.00	73.17	111.72	2.00	0.00	0.00	0.00
73.33	114.66	2.00	0.00	0.00	0.00	73.49	119.95	2.00	0.00	0.00	0.00
73.66	124.85	2.00	0.00	0.00	0.00	73.82	126.38	2.00	0.00	0.00	0.00
73.99	119.83	2.00	0.00	0.00	0.00	74.15	110.50	2.00	0.00	0.00	0.00
74.31	105.25	2.00	0.00	0.00	0.00	74.48	106.47	2.00	0.00	0.00	0.00
74.64	107.97	2.00	0.00	0.00	0.00	74.81	103.63	2.00	0.00	0.00	0.00
74.97	108.89	2.00	0.00	0.00	0.00	75.13	119.88	2.00	0.00	0.00	0.00
75.30	128.50	2.00	0.00	0.00	0.00	75.46	136.21	2.00	0.00	0.00	0.00
75.63	137.23	2.00	0.00	0.00	0.00	75.79	137.72	2.00	0.00	0.00	0.00
75.96	135.34	2.00	0.00	0.00	0.00	76.12	135.17	2.00	0.00	0.00	0.00
76.28	136.00	2.00	0.00	0.00	0.00	76.45	141.59	2.00	0.00	0.00	0.00
76.61	155.63	2.00	0.00	0.00	0.00	76.78	162.26	2.00	0.00	0.00	0.00
76.94	158.66	2.00	0.00	0.00	0.00	77.10	151.04	2.00	0.00	0.00	0.00
77.27	147.91	2.00	0.00	0.00	0.00	77.43	147.20	2.00	0.00	0.00	0.00
77.60	141.78	2.00	0.00	0.00	0.00	77.76	133.47	2.00	0.00	0.00	0.00
77.92	122.28	2.00	0.00	0.00	0.00	78.09	117.98	2.00	0.00	0.00	0.00
78.25	132.66	2.00	0.00	0.00	0.00	78.42	147.41	2.00	0.00	0.00	0.00
78.58	156.45	2.00	0.00	0.00	0.00	78.74	157.67	2.00	0.00	0.00	0.00
78.91	153.03	2.00	0.00	0.00	0.00	79.07	139.40	2.00	0.00	0.00	0.00
79.24	116.29	2.00	0.00	0.00	0.00	79.40	97.67	2.00	0.00	0.00	0.00
79.56	86.62	2.00	0.00	0.00	0.00	79.73	80.00	2.00	0.00	0.00	0.00
79.89	77.43	2.00	0.00	0.00	0.00	80.06	78.28	2.00	0.00	0.00	0.00

Total estimated settlement: 0.39

Abbreviations

$Q_{tn,cs}$: Equivalent dean sand normalized cone resistance
FS: Factor of safety against liquefaction
e_v (%): Post-liquefaction volumentric strain
DF: e_v depth weighting factor
Settlement: Calculated settlement

Geocon Incorporated
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San Diego, California 92121-2974
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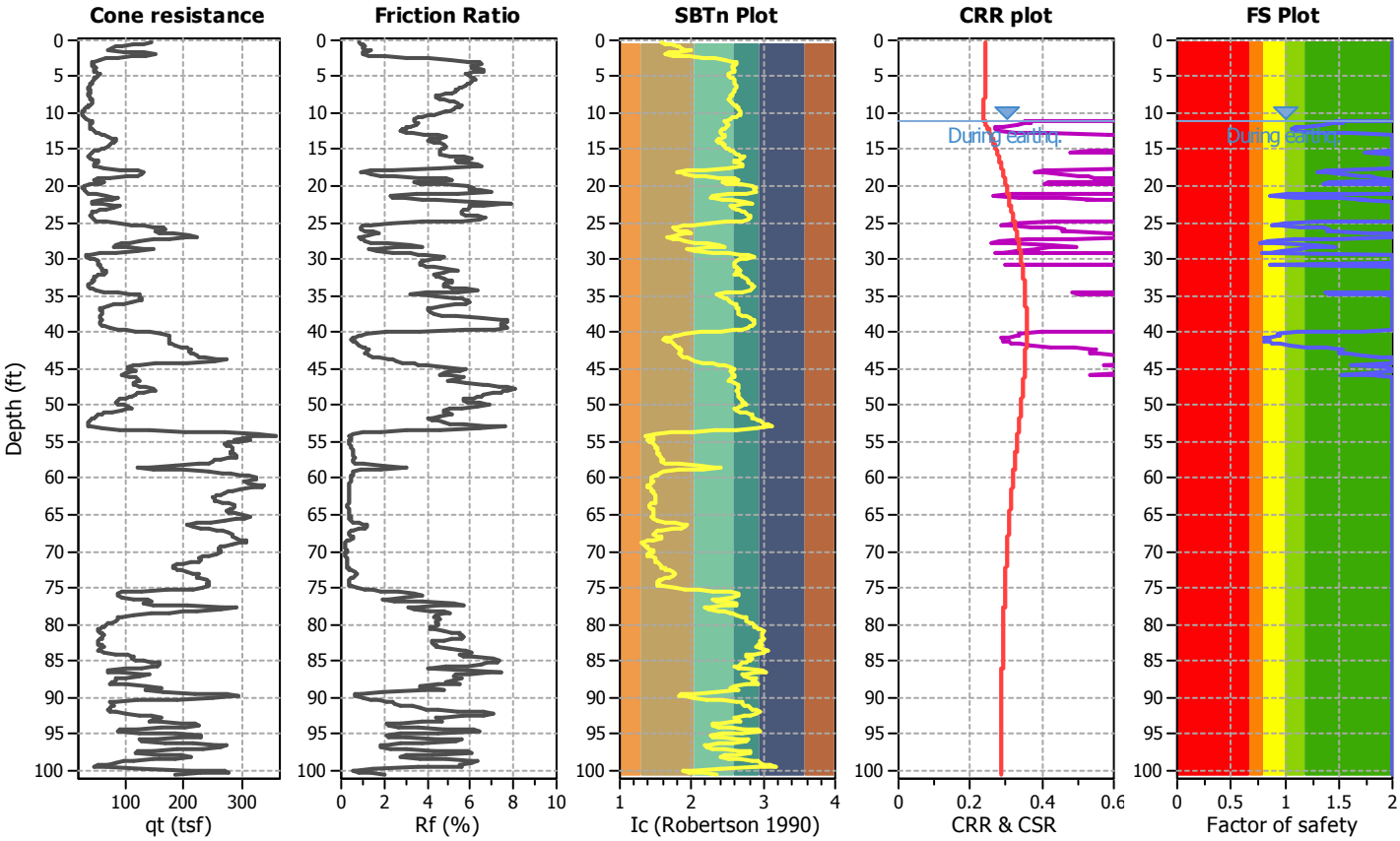
LIQUEFACTION ANALYSIS REPORT

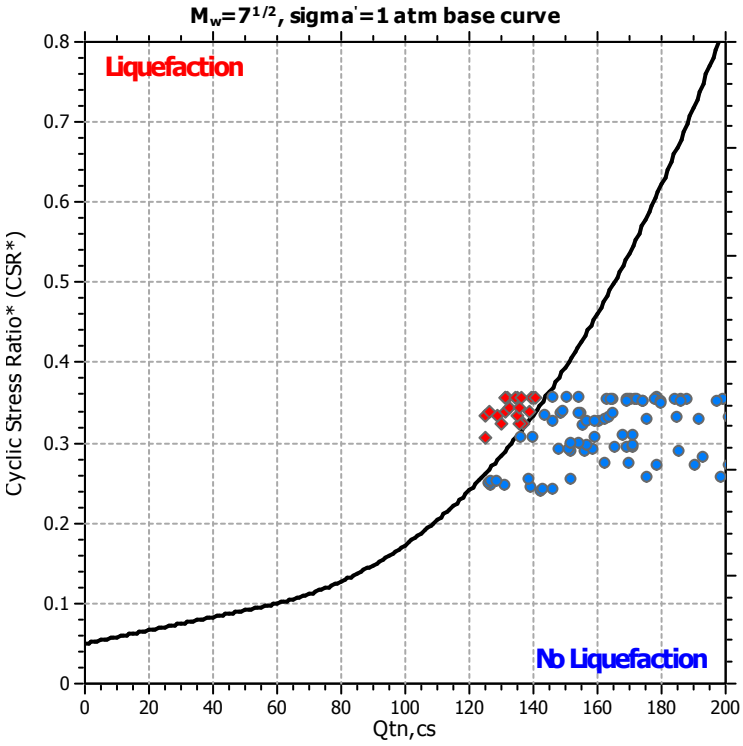
Project title : Collins Aerospace **Location : Parcel A**

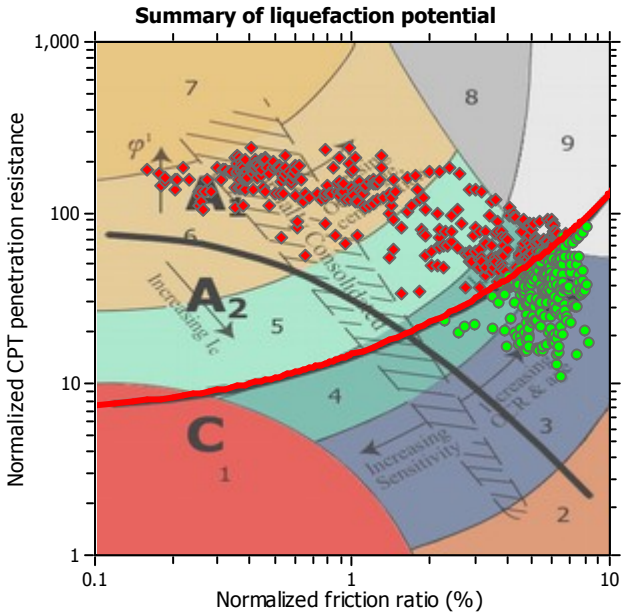
CPT file : CPT-05

Input parameters and analysis data

Analysis method:	NCEER (1998)	G.W.T. (in-situ):	11.00 ft	Use fill:	No	Clay like behavior applied:	Sands only
Fines correction method:	NCEER (1998)	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:	50.00 ft
Earthquake magnitude M_w:	6.12	Ic cut-off value:	2.60	Trans. detect. applied:	No	MSF method:	Method based
Peak ground acceleration:	0.63	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

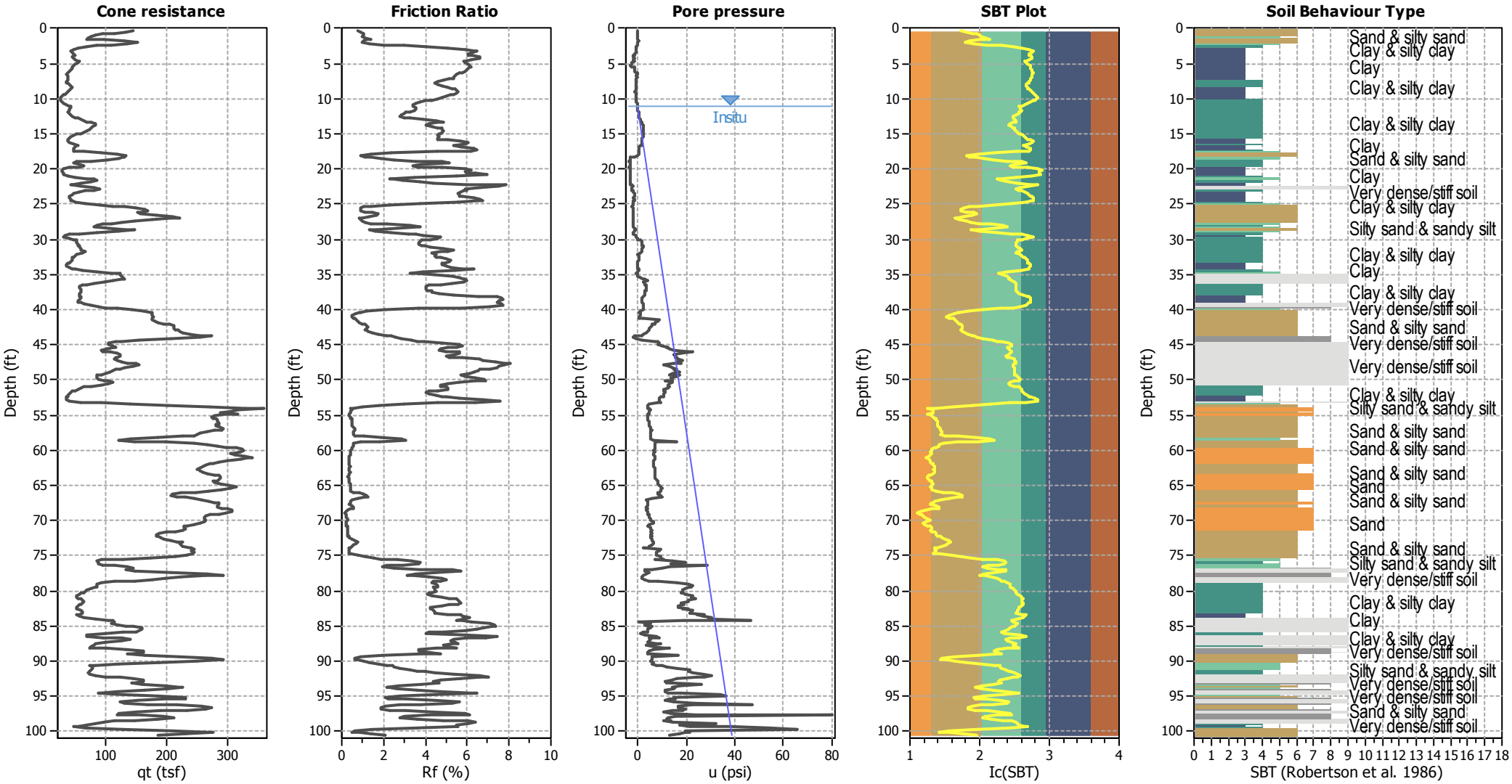






Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and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

CPT basic interpretation plots



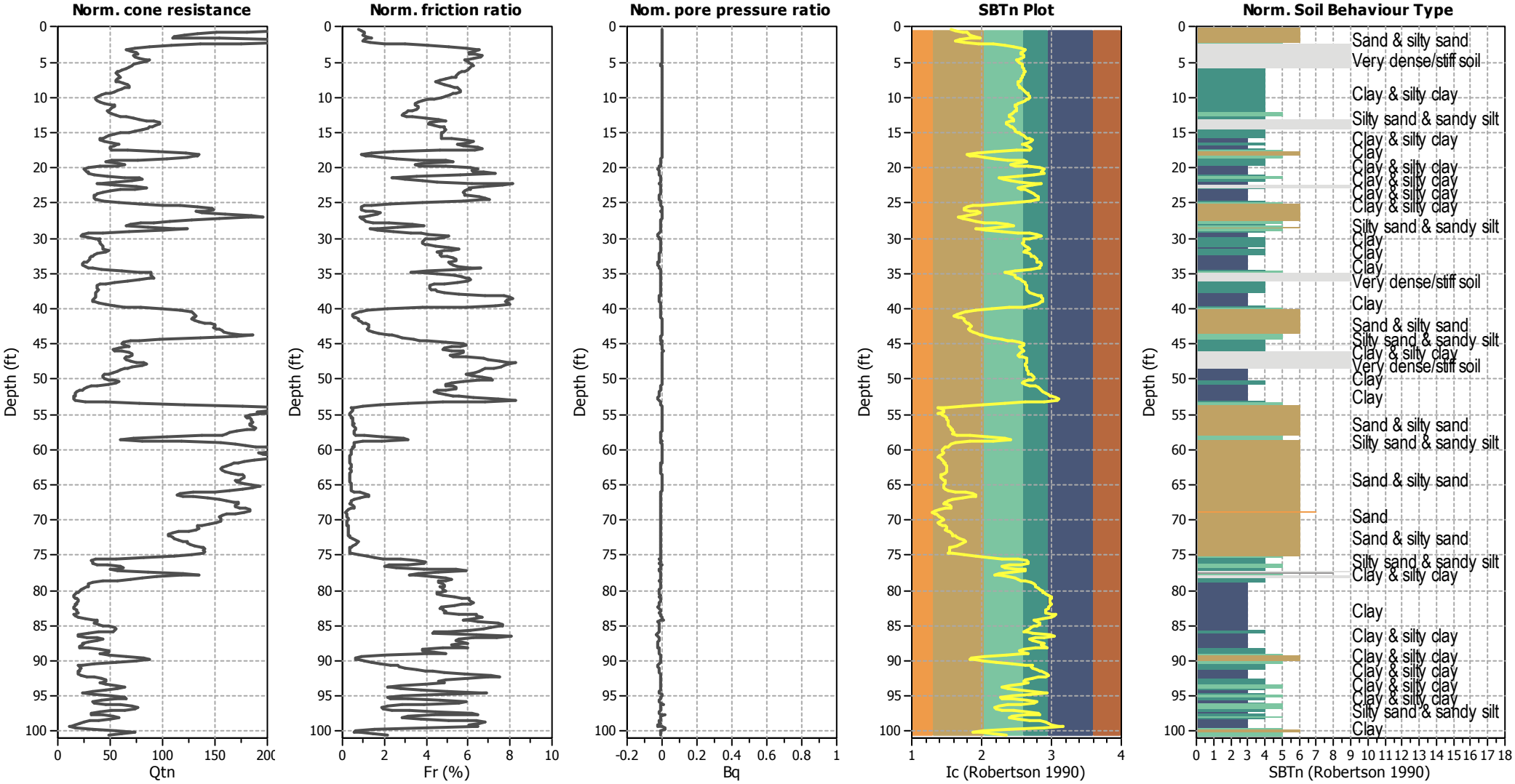
Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	11.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_o applied:	Yes
Earthquake magnitude M_w:	6.12	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.63	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	11.00 ft	Fill height:	N/A	Limit depth:	50.00 ft

SBT legend

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

CPT basic interpretation plots (normalized)



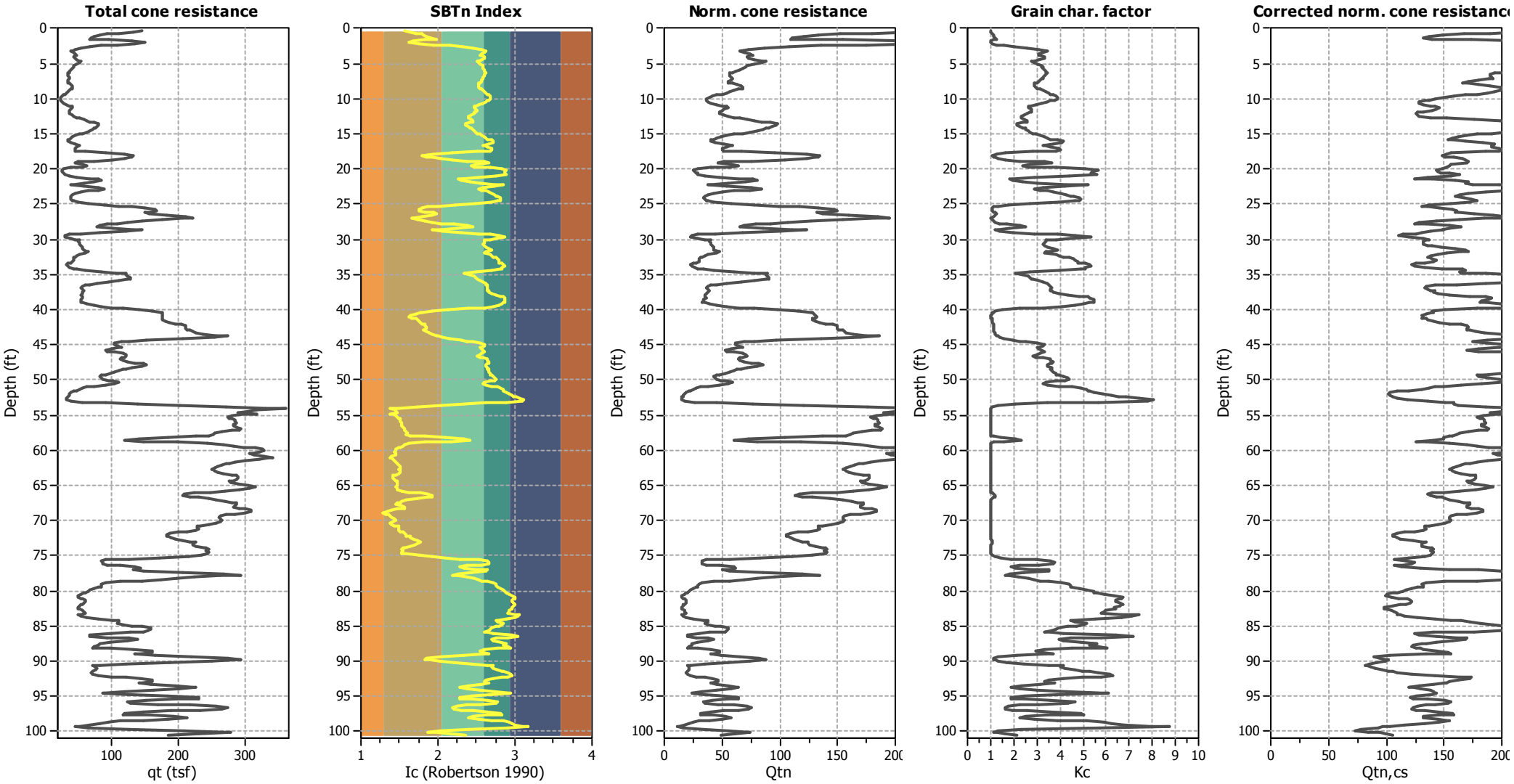
Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	11.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_o applied:	Yes
Earthquake magnitude M_w:	6.12	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.63	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	11.00 ft	Fill height:	N/A	Limit depth:	50.00 ft

SBTn legend

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

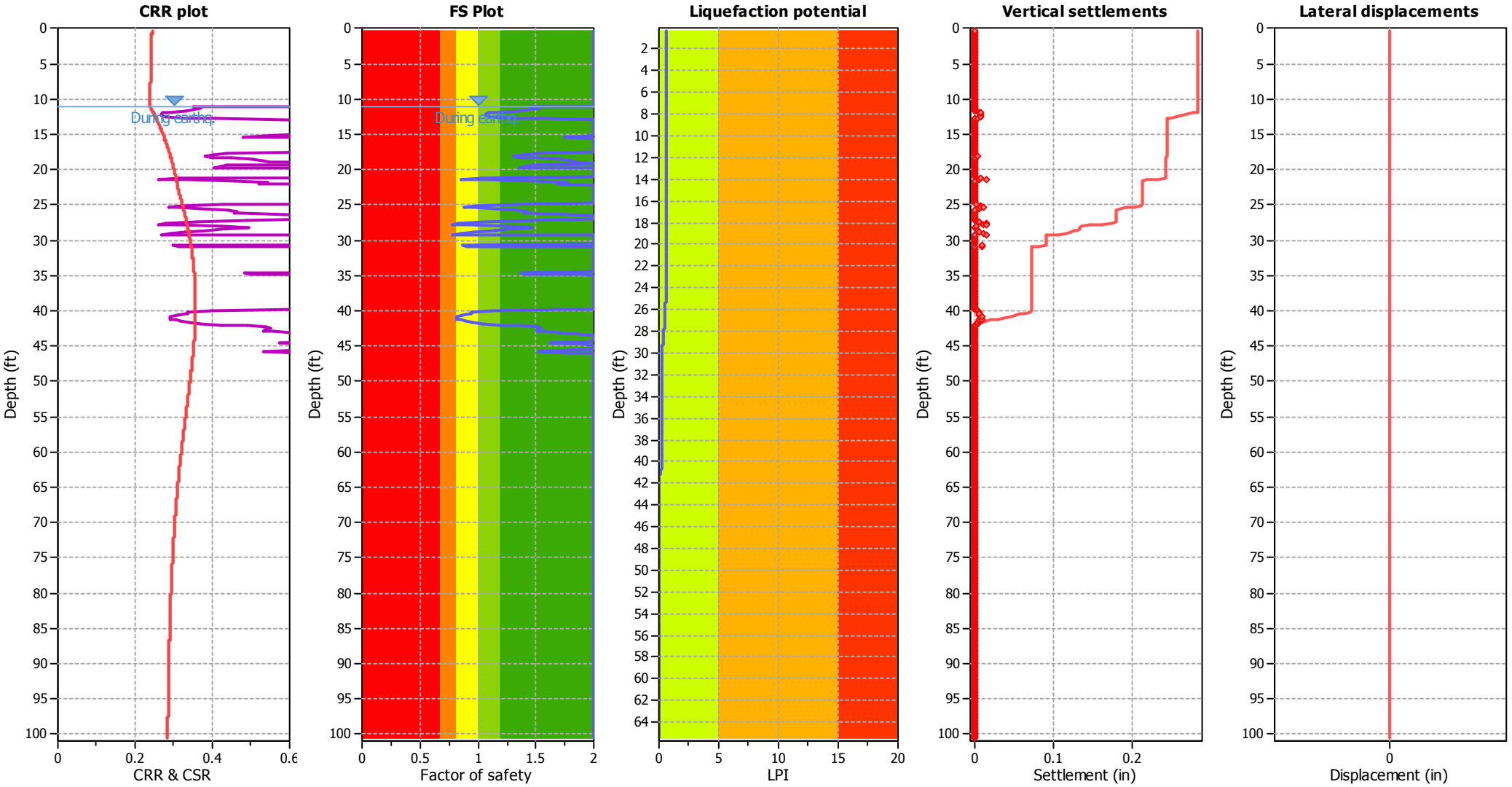
Liquefaction analysis overall plots (intermediate results)



Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	11.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	6.12	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.63	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	11.00 ft	Fill height:	N/A	Limit depth:	50.00 ft

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	11.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	6.12	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.63	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	11.00 ft	Fill height:	N/A	Limit depth:	50.00 ft

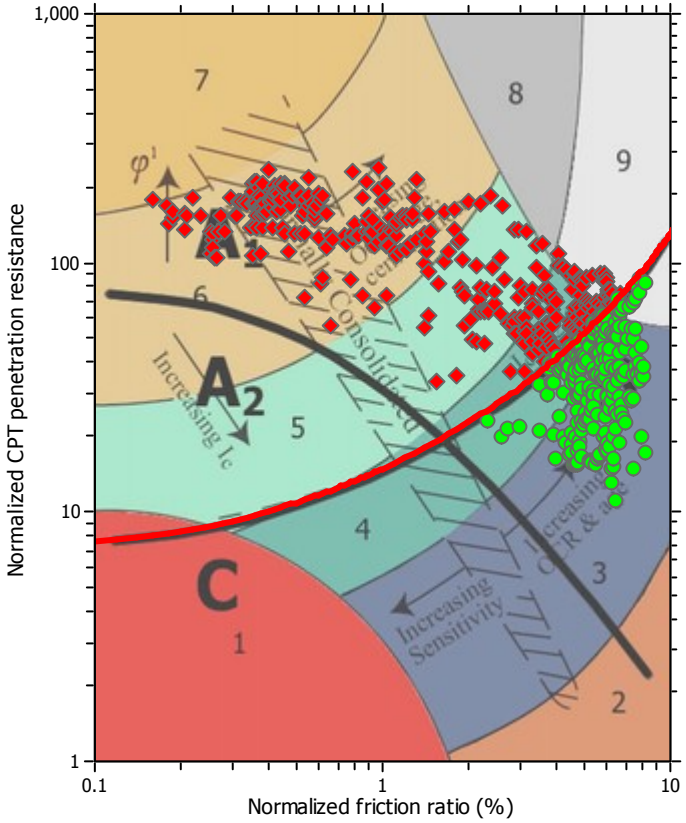
F.S. color scheme

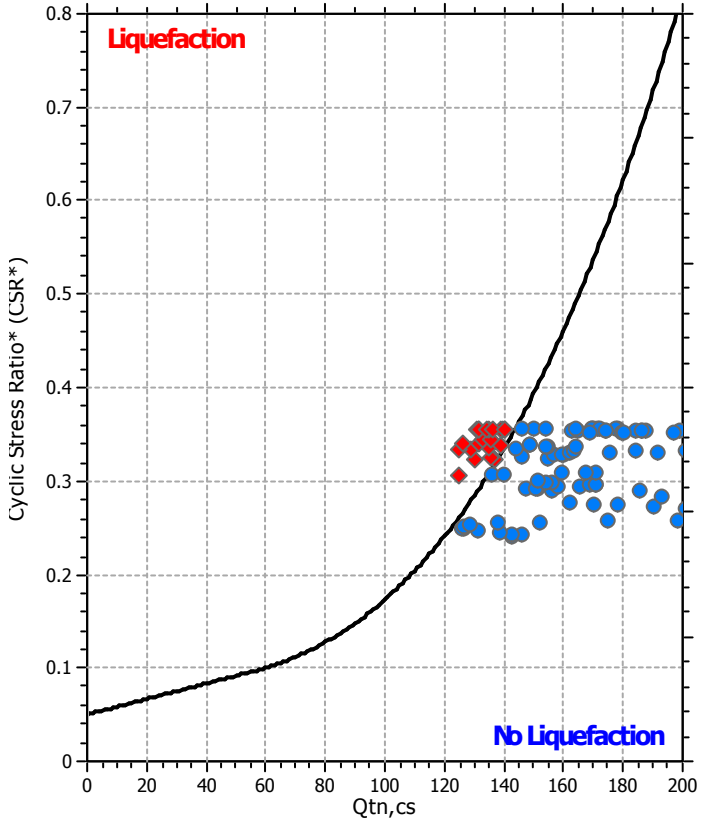
- Almost certain it will liquefy
- Very likely to liquefy
- Liquefaction and no liq. are equally likely
- Unlike to liquefy
- Almost certain it will not liquefy

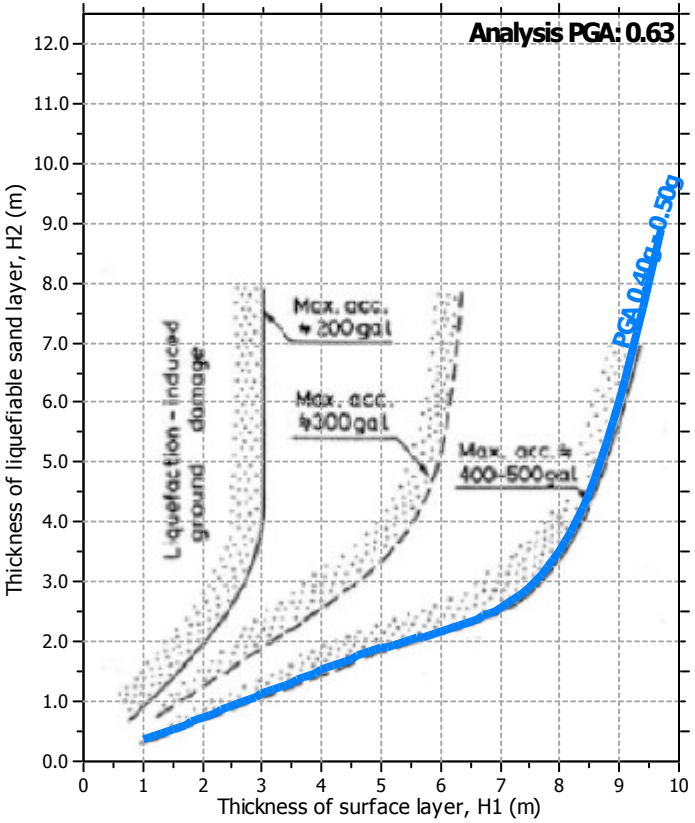
LPI color scheme

- Very high risk
- High risk
- Low risk

Liquefaction analysis summary plots



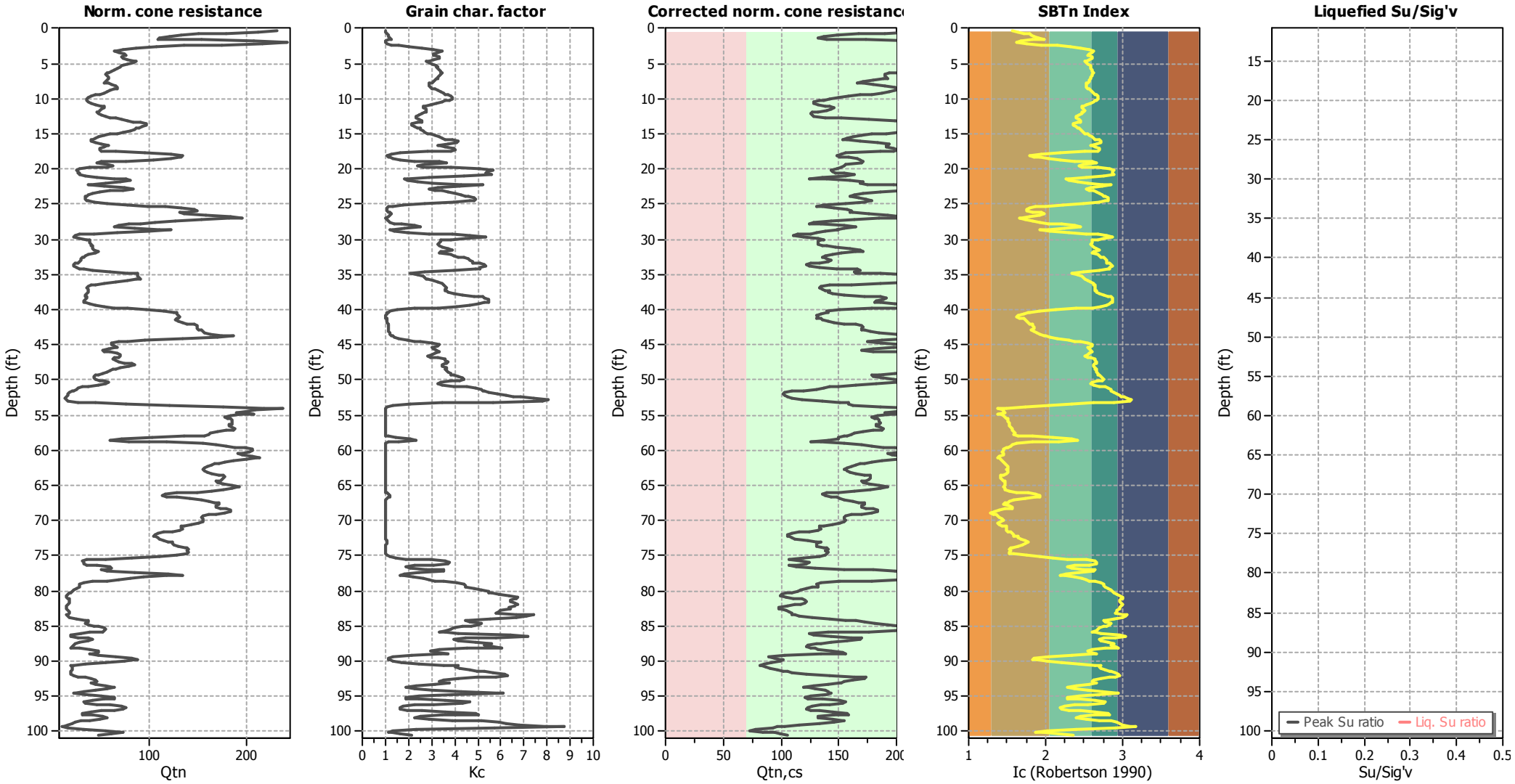




Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	11.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	6.12	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.63	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	11.00 ft	Fill height:	N/A	Limit depth:	50.00 ft

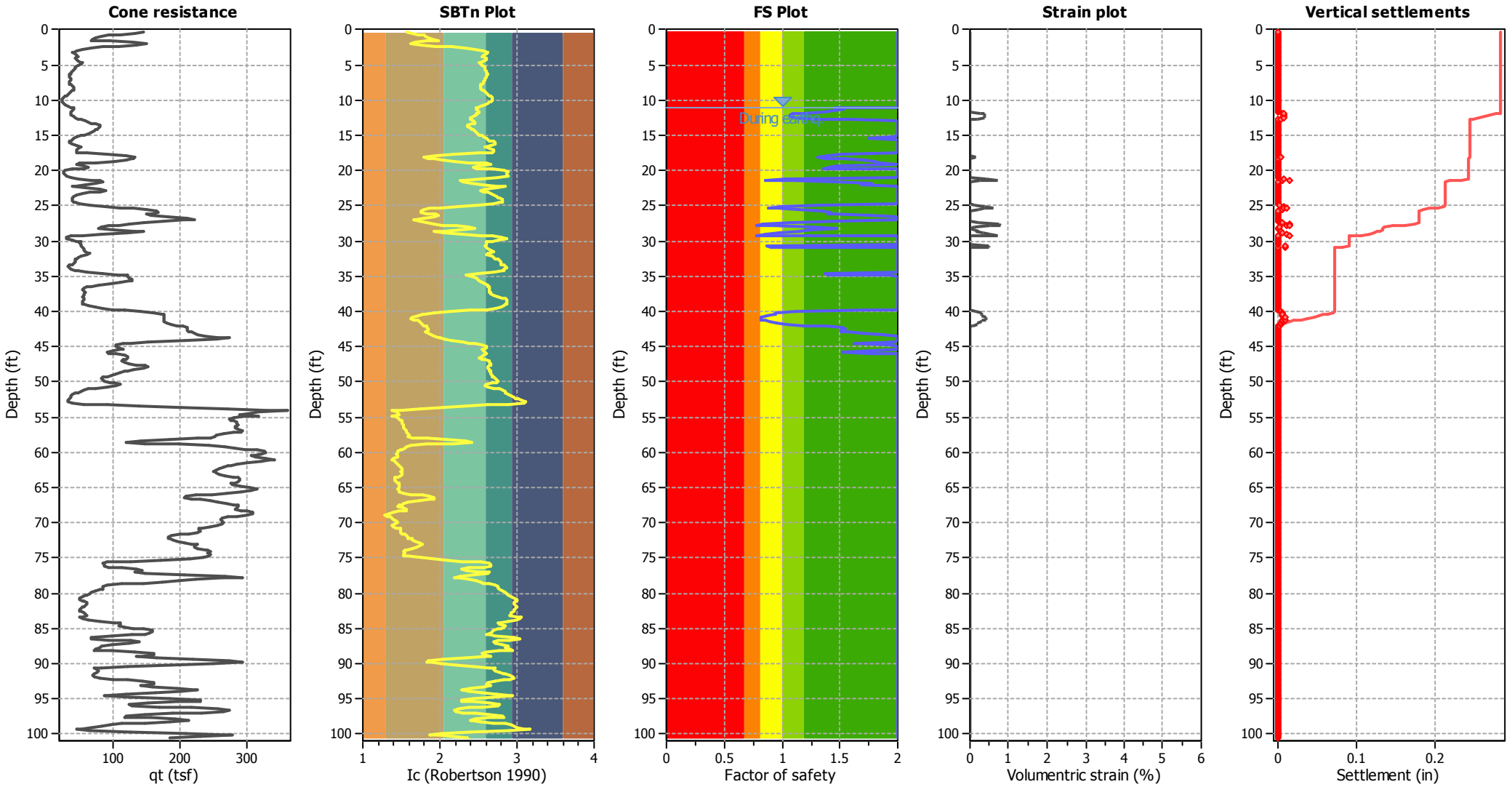
Check for strength loss plots (Robertson (2010))



Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	11.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	6.12	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.63	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	11.00 ft	Fill height:	N/A	Limit depth:	50.00 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

:: Post-earthquake settlement due to soil liquefaction ::

Depth (ft)	$Q_{tn,cs}$	FS	e_v (%)	DF	Settlement (in)	Depth (ft)	$Q_{tn,cs}$	FS	e_v (%)	DF	Settlement (in)
11.16	142.63	1.46	0.00	0.81	0.00	11.32	145.99	1.53	0.00	0.81	0.00
11.48	142.88	1.45	0.00	0.81	0.00	11.65	139.18	1.35	0.00	0.80	0.00
11.81	131.50	1.19	0.27	0.80	0.01	11.98	127.05	1.09	0.38	0.80	0.01
12.14	126.27	1.07	0.38	0.79	0.01	12.30	126.67	1.07	0.37	0.79	0.01
12.47	128.87	1.11	0.37	0.79	0.01	12.63	138.52	1.29	0.18	0.79	0.00
12.80	152.05	1.60	0.00	0.78	0.00	12.96	175.48	2.00	0.00	0.78	0.00
13.12	198.56	2.00	0.00	0.78	0.00	13.29	216.32	2.00	0.00	0.77	0.00
13.45	218.42	2.00	0.00	0.77	0.00	13.62	212.04	2.00	0.00	0.77	0.00
13.78	208.87	2.00	0.00	0.77	0.00	13.94	211.61	2.00	0.00	0.76	0.00
14.11	215.75	2.00	0.00	0.76	0.00	14.27	218.42	2.00	0.00	0.76	0.00
14.44	215.75	2.00	0.00	0.76	0.00	14.60	211.56	2.00	0.00	0.75	0.00
14.76	201.22	2.00	0.00	0.75	0.00	14.93	190.65	2.00	0.00	0.75	0.00
15.09	178.64	2.00	0.00	0.74	0.00	15.26	170.18	1.97	0.00	0.74	0.00
15.42	162.73	1.75	0.00	0.74	0.00	15.58	157.28	2.00	0.00	0.74	0.00
15.75	153.33	2.00	0.00	0.73	0.00	15.91	157.75	2.00	0.00	0.73	0.00
16.08	168.81	2.00	0.00	0.73	0.00	16.24	183.17	2.00	0.00	0.72	0.00
16.40	193.17	2.00	0.00	0.72	0.00	16.57	192.95	2.00	0.00	0.72	0.00
16.73	191.60	2.00	0.00	0.72	0.00	16.90	191.62	2.00	0.00	0.71	0.00
17.06	197.32	2.00	0.00	0.71	0.00	17.23	200.80	2.00	0.00	0.71	0.00
17.39	197.99	2.00	0.00	0.71	0.00	17.55	185.87	2.00	0.00	0.70	0.00
17.72	156.47	1.51	0.00	0.70	0.00	17.88	151.73	1.40	0.00	0.70	0.00
18.05	147.86	1.31	0.15	0.69	0.00	18.21	151.19	1.38	0.00	0.69	0.00
18.37	158.45	1.54	0.00	0.69	0.00	18.54	165.70	1.71	0.00	0.69	0.00
18.70	169.07	1.80	0.00	0.68	0.00	18.87	171.14	1.85	0.00	0.68	0.00
19.03	171.20	1.85	0.00	0.68	0.00	19.19	169.22	2.00	0.00	0.67	0.00
19.36	156.57	1.47	0.00	0.67	0.00	19.52	154.20	1.41	0.00	0.67	0.00
19.69	151.70	1.35	0.00	0.67	0.00	19.85	151.61	2.00	0.00	0.66	0.00
20.01	148.89	2.00	0.00	0.66	0.00	20.18	143.77	2.00	0.00	0.66	0.00
20.34	144.42	2.00	0.00	0.66	0.00	20.51	146.85	2.00	0.00	0.65	0.00
20.67	155.09	2.00	0.00	0.65	0.00	20.83	163.12	2.00	0.00	0.65	0.00
21.00	155.57	2.00	0.00	0.64	0.00	21.16	136.14	1.03	0.43	0.64	0.01
21.33	125.10	0.86	0.72	0.64	0.01	21.49	140.14	1.09	0.28	0.64	0.01
21.65	159.54	1.49	0.00	0.63	0.00	21.82	171.00	1.77	0.00	0.63	0.00
21.98	168.01	1.69	0.00	0.63	0.00	22.15	174.50	2.00	0.00	0.62	0.00
22.31	197.38	2.00	0.00	0.62	0.00	22.47	228.43	2.00	0.00	0.62	0.00
22.64	247.21	2.00	0.00	0.62	0.00	22.80	245.04	2.00	0.00	0.61	0.00
22.97	231.25	2.00	0.00	0.61	0.00	23.13	206.18	2.00	0.00	0.61	0.00
23.30	186.19	2.00	0.00	0.61	0.00	23.46	171.02	2.00	0.00	0.60	0.00
23.62	163.79	2.00	0.00	0.60	0.00	23.79	159.27	2.00	0.00	0.60	0.00
23.95	159.27	2.00	0.00	0.59	0.00	24.12	166.70	2.00	0.00	0.59	0.00
24.28	173.23	2.00	0.00	0.59	0.00	24.44	178.29	2.00	0.00	0.59	0.00
24.61	177.18	2.00	0.00	0.58	0.00	24.77	172.23	2.00	0.00	0.58	0.00
24.94	155.36	1.33	0.12	0.58	0.00	25.10	137.13	0.99	0.38	0.57	0.01
25.26	130.21	0.88	0.61	0.57	0.01	25.43	135.39	0.96	0.38	0.57	0.01
25.59	146.30	1.14	0.24	0.57	0.00	25.76	157.14	1.35	0.00	0.56	0.00
25.92	160.55	1.42	0.00	0.56	0.00	26.08	159.50	1.40	0.00	0.56	0.00
26.25	162.21	1.45	0.00	0.56	0.00	26.41	175.73	1.78	0.00	0.55	0.00
26.58	191.84	2.00	0.00	0.55	0.00	26.74	203.69	2.00	0.00	0.55	0.00

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

Depth (ft)	$Q_{tn,cs}$	FS	e_v (%)	DF	Settlement (in)	Depth (ft)	$Q_{tn,cs}$	FS	e_v (%)	DF	Settlement (in)
26.90	201.22	2.00	0.00	0.54	0.00	27.07	184.84	2.00	0.00	0.54	0.00
27.23	164.00	1.47	0.00	0.54	0.00	27.40	144.00	1.07	0.23	0.54	0.00
27.56	128.85	0.84	0.75	0.53	0.01	27.72	124.79	0.78	0.78	0.53	0.01
27.89	134.81	0.92	0.53	0.53	0.01	28.05	154.97	1.27	0.11	0.52	0.00
28.22	164.70	1.47	0.00	0.52	0.00	28.38	154.25	1.25	0.11	0.52	0.00
28.54	148.87	1.15	0.22	0.52	0.00	28.71	149.28	1.15	0.16	0.51	0.00
28.87	138.83	0.97	0.33	0.51	0.01	29.04	131.35	0.86	0.53	0.51	0.01
29.20	126.24	0.79	0.73	0.51	0.01	29.36	114.67	2.00	0.00	0.50	0.00
29.53	110.60	2.00	0.00	0.50	0.00	29.69	119.46	2.00	0.00	0.50	0.00
29.86	131.65	2.00	0.00	0.49	0.00	30.02	136.66	2.00	0.00	0.49	0.00
30.19	134.87	2.00	0.00	0.49	0.00	30.35	132.44	2.00	0.00	0.49	0.00
30.51	131.98	2.00	0.00	0.48	0.00	30.68	132.68	0.86	0.50	0.48	0.01
30.84	135.84	0.91	0.48	0.48	0.01	31.01	140.03	2.00	0.00	0.47	0.00
31.17	147.45	2.00	0.00	0.47	0.00	31.33	159.18	2.00	0.00	0.47	0.00
31.50	169.00	2.00	0.00	0.47	0.00	31.66	171.00	2.00	0.00	0.46	0.00
31.83	164.60	2.00	0.00	0.46	0.00	31.99	152.71	2.00	0.00	0.46	0.00
32.15	144.18	2.00	0.00	0.46	0.00	32.32	138.10	2.00	0.00	0.45	0.00
32.48	136.11	2.00	0.00	0.45	0.00	32.65	137.56	2.00	0.00	0.45	0.00
32.81	139.84	2.00	0.00	0.44	0.00	32.97	142.90	2.00	0.00	0.44	0.00
33.14	140.71	2.00	0.00	0.44	0.00	33.30	133.01	2.00	0.00	0.44	0.00
33.47	125.25	2.00	0.00	0.43	0.00	33.63	121.76	2.00	0.00	0.43	0.00
33.79	125.10	2.00	0.00	0.43	0.00	33.96	133.64	2.00	0.00	0.42	0.00
34.12	148.91	2.00	0.00	0.42	0.00	34.29	165.52	2.00	0.00	0.42	0.00
34.45	168.46	2.00	0.00	0.42	0.00	34.61	162.97	1.37	0.00	0.41	0.00
34.78	165.05	1.41	0.00	0.41	0.00	34.94	186.31	1.93	0.00	0.41	0.00
35.11	210.19	2.00	0.00	0.40	0.00	35.27	233.72	2.00	0.00	0.40	0.00
35.43	246.21	2.00	0.00	0.40	0.00	35.60	252.45	2.00	0.00	0.40	0.00
35.76	249.86	2.00	0.00	0.39	0.00	35.93	236.83	2.00	0.00	0.39	0.00
36.09	215.62	2.00	0.00	0.39	0.00	36.26	185.85	2.00	0.00	0.39	0.00
36.42	160.70	2.00	0.00	0.38	0.00	36.58	142.58	2.00	0.00	0.38	0.00
36.75	134.93	2.00	0.00	0.38	0.00	36.91	133.83	2.00	0.00	0.37	0.00
37.08	135.46	2.00	0.00	0.37	0.00	37.24	138.08	2.00	0.00	0.37	0.00
37.40	141.92	2.00	0.00	0.37	0.00	37.57	140.90	2.00	0.00	0.36	0.00
37.73	145.00	2.00	0.00	0.36	0.00	37.90	154.62	2.00	0.00	0.36	0.00
38.06	172.92	2.00	0.00	0.35	0.00	38.22	186.42	2.00	0.00	0.35	0.00
38.39	190.70	2.00	0.00	0.35	0.00	38.55	188.18	2.00	0.00	0.35	0.00
38.72	182.48	2.00	0.00	0.34	0.00	38.88	181.39	2.00	0.00	0.34	0.00
39.04	185.56	2.00	0.00	0.34	0.00	39.21	198.30	2.00	0.00	0.34	0.00
39.37	214.90	2.00	0.00	0.33	0.00	39.54	221.84	2.00	0.00	0.33	0.00
39.70	211.36	2.00	0.00	0.33	0.00	39.86	178.85	1.72	0.00	0.32	0.00
40.03	150.44	1.11	0.14	0.32	0.00	40.19	139.93	0.94	0.30	0.32	0.01
40.36	140.28	0.95	0.30	0.32	0.01	40.52	139.11	0.93	0.30	0.31	0.01
40.68	135.17	0.87	0.31	0.31	0.01	40.85	130.96	0.81	0.42	0.31	0.01
41.01	131.65	0.82	0.41	0.30	0.01	41.18	131.27	0.82	0.41	0.30	0.01
41.34	134.38	0.86	0.30	0.30	0.01	41.50	136.46	0.89	0.29	0.30	0.01
41.67	140.53	0.95	0.19	0.29	0.00	41.83	146.17	1.04	0.18	0.29	0.00
42.00	154.50	1.19	0.09	0.29	0.00	42.16	164.17	1.38	0.00	0.29	0.00
42.32	170.39	1.52	0.00	0.28	0.00	42.49	171.62	1.55	0.00	0.28	0.00

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

Depth (ft)	$Q_{tn,cs}$	FS	e_v (%)	DF	Settlement (in)	Depth (ft)	$Q_{tn,cs}$	FS	e_v (%)	DF	Settlement (in)
42.65	169.71	1.51	0.00	0.28	0.00	42.82	169.56	1.50	0.00	0.27	0.00
42.98	172.53	1.57	0.00	0.27	0.00	43.15	177.89	1.70	0.00	0.27	0.00
43.31	184.34	1.87	0.00	0.27	0.00	43.47	199.66	2.00	0.00	0.26	0.00
43.64	223.70	2.00	0.00	0.26	0.00	43.80	241.35	2.00	0.00	0.26	0.00
43.97	234.89	2.00	0.00	0.25	0.00	44.13	209.08	2.00	0.00	0.25	0.00
44.29	187.82	1.97	0.00	0.25	0.00	44.46	174.25	1.62	0.00	0.25	0.00
44.62	174.46	1.63	0.00	0.24	0.00	44.79	186.44	1.94	0.00	0.24	0.00
44.95	203.90	2.00	0.00	0.24	0.00	45.11	211.45	2.00	0.00	0.24	0.00
45.28	210.99	2.00	0.00	0.23	0.00	45.44	197.48	2.00	0.00	0.23	0.00
45.61	180.06	1.78	0.00	0.23	0.00	45.77	169.34	1.52	0.00	0.22	0.00
45.93	180.30	1.79	0.00	0.22	0.00	46.10	202.40	2.00	0.00	0.22	0.00
46.26	214.67	2.00	0.00	0.22	0.00	46.43	213.31	2.00	0.00	0.21	0.00
46.59	203.53	2.00	0.00	0.21	0.00	46.75	203.62	2.00	0.00	0.21	0.00
46.92	213.17	2.00	0.00	0.20	0.00	47.08	228.62	2.00	0.00	0.20	0.00
47.25	236.03	2.00	0.00	0.20	0.00	47.41	254.62	2.00	0.00	0.20	0.00
47.57	275.04	2.00	0.00	0.19	0.00	47.74	295.33	2.00	0.00	0.19	0.00
47.90	293.01	2.00	0.00	0.19	0.00	48.07	279.10	2.00	0.00	0.19	0.00
48.23	260.18	2.00	0.00	0.18	0.00	48.39	243.78	2.00	0.00	0.18	0.00
48.56	228.75	2.00	0.00	0.18	0.00	48.72	221.40	2.00	0.00	0.17	0.00
48.89	211.04	2.00	0.00	0.17	0.00	49.05	199.29	2.00	0.00	0.17	0.00
49.22	184.44	2.00	0.00	0.17	0.00	49.38	178.21	2.00	0.00	0.16	0.00
49.54	179.47	2.00	0.00	0.16	0.00	49.71	188.18	2.00	0.00	0.16	0.00
49.87	197.62	2.00	0.00	0.15	0.00	50.04	208.09	2.00	0.00	0.15	0.00
50.20	207.14	2.00	0.00	0.15	0.00	50.36	199.56	2.00	0.00	0.15	0.00
50.53	182.41	2.00	0.00	0.14	0.00	50.69	164.87	2.00	0.00	0.14	0.00
50.86	149.27	2.00	0.00	0.14	0.00	51.02	141.80	2.00	0.00	0.14	0.00
51.18	136.59	2.00	0.00	0.13	0.00	51.35	131.05	2.00	0.00	0.13	0.00
51.51	119.49	2.00	0.00	0.13	0.00	51.68	109.69	2.00	0.00	0.12	0.00
51.84	102.99	2.00	0.00	0.12	0.00	52.00	101.80	2.00	0.00	0.12	0.00
52.17	103.43	2.00	0.00	0.12	0.00	52.33	105.32	2.00	0.00	0.11	0.00
52.50	106.18	2.00	0.00	0.11	0.00	52.66	109.68	2.00	0.00	0.11	0.00
52.82	118.83	2.00	0.00	0.10	0.00	52.99	135.27	2.00	0.00	0.10	0.00
53.15	151.00	2.00	0.00	0.10	0.00	53.32	158.69	2.00	0.00	0.10	0.00
53.48	158.10	2.00	0.00	0.09	0.00	53.64	162.26	2.00	0.00	0.09	0.00
53.81	185.82	2.00	0.00	0.09	0.00	53.97	218.31	2.00	0.00	0.09	0.00
54.14	238.51	2.00	0.00	0.08	0.00	54.30	209.67	2.00	0.00	0.08	0.00
54.46	202.19	2.00	0.00	0.08	0.00	54.63	190.47	2.00	0.00	0.07	0.00
54.79	208.68	2.00	0.00	0.07	0.00	54.96	194.41	2.00	0.00	0.07	0.00
55.12	183.36	2.00	0.00	0.07	0.00	55.28	178.53	2.00	0.00	0.06	0.00
55.45	180.53	2.00	0.00	0.06	0.00	55.61	183.45	2.00	0.00	0.06	0.00
55.78	185.13	2.00	0.00	0.05	0.00	55.94	185.41	2.00	0.00	0.05	0.00
56.11	185.97	2.00	0.00	0.05	0.00	56.27	185.19	2.00	0.00	0.05	0.00
56.43	182.93	2.00	0.00	0.04	0.00	56.60	182.98	2.00	0.00	0.04	0.00
56.76	186.04	2.00	0.00	0.04	0.00	56.93	188.97	2.00	0.00	0.04	0.00
57.09	187.45	2.00	0.00	0.03	0.00	57.25	180.32	2.00	0.00	0.03	0.00
57.42	170.98	2.00	0.00	0.03	0.00	57.58	163.88	2.00	0.00	0.02	0.00
57.75	161.02	2.00	0.00	0.02	0.00	57.91	156.63	2.00	0.00	0.02	0.00
58.07	154.20	2.00	0.00	0.02	0.00	58.24	149.10	2.00	0.00	0.01	0.00

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

Depth (ft)	$Q_{tn,cs}$	FS	e_v (%)	DF	Settlement (in)	Depth (ft)	$Q_{tn,cs}$	FS	e_v (%)	DF	Settlement (in)
58.40	149.76	2.00	0.00	0.01	0.00	58.57	141.45	2.00	0.00	0.01	0.00
58.73	126.19	2.00	0.00	0.00	0.00	58.89	134.48	2.00	0.00	0.00	0.00
59.06	155.00	2.00	0.00	0.00	0.00	59.22	169.46	2.00	0.00	0.00	0.00
59.39	179.17	2.00	0.00	0.00	0.00	59.55	189.26	2.00	0.00	0.00	0.00
59.71	198.94	2.00	0.00	0.00	0.00	59.88	205.71	2.00	0.00	0.00	0.00
60.04	206.99	2.00	0.00	0.00	0.00	60.21	203.53	2.00	0.00	0.00	0.00
60.37	195.58	2.00	0.00	0.00	0.00	60.53	192.16	2.00	0.00	0.00	0.00
60.70	196.12	2.00	0.00	0.00	0.00	60.86	206.75	2.00	0.00	0.00	0.00
61.03	213.74	2.00	0.00	0.00	0.00	61.19	210.28	2.00	0.00	0.00	0.00
61.35	200.98	2.00	0.00	0.00	0.00	61.52	187.49	2.00	0.00	0.00	0.00
61.68	178.24	2.00	0.00	0.00	0.00	61.85	172.29	2.00	0.00	0.00	0.00
62.01	168.39	2.00	0.00	0.00	0.00	62.17	164.79	2.00	0.00	0.00	0.00
62.34	160.73	2.00	0.00	0.00	0.00	62.50	157.57	2.00	0.00	0.00	0.00
62.67	155.25	2.00	0.00	0.00	0.00	62.83	156.10	2.00	0.00	0.00	0.00
63.00	157.45	2.00	0.00	0.00	0.00	63.16	159.90	2.00	0.00	0.00	0.00
63.32	165.07	2.00	0.00	0.00	0.00	63.49	172.37	2.00	0.00	0.00	0.00
63.65	176.74	2.00	0.00	0.00	0.00	63.82	177.81	2.00	0.00	0.00	0.00
63.98	177.11	2.00	0.00	0.00	0.00	64.14	175.55	2.00	0.00	0.00	0.00
64.31	173.55	2.00	0.00	0.00	0.00	64.47	169.22	2.00	0.00	0.00	0.00
64.64	170.54	2.00	0.00	0.00	0.00	64.80	176.68	2.00	0.00	0.00	0.00
64.96	185.38	2.00	0.00	0.00	0.00	65.13	192.84	2.00	0.00	0.00	0.00
65.29	192.02	2.00	0.00	0.00	0.00	65.46	186.21	2.00	0.00	0.00	0.00
65.62	176.88	2.00	0.00	0.00	0.00	65.78	163.97	2.00	0.00	0.00	0.00
65.95	149.56	2.00	0.00	0.00	0.00	66.11	140.02	2.00	0.00	0.00	0.00
66.28	135.75	2.00	0.00	0.00	0.00	66.44	137.89	2.00	0.00	0.00	0.00
66.60	143.74	2.00	0.00	0.00	0.00	66.77	148.05	2.00	0.00	0.00	0.00
66.93	151.34	2.00	0.00	0.00	0.00	67.10	154.26	2.00	0.00	0.00	0.00
67.26	161.66	2.00	0.00	0.00	0.00	67.42	167.69	2.00	0.00	0.00	0.00
67.59	172.01	2.00	0.00	0.00	0.00	67.75	171.86	2.00	0.00	0.00	0.00
67.92	169.88	2.00	0.00	0.00	0.00	68.08	169.45	2.00	0.00	0.00	0.00
68.24	173.67	2.00	0.00	0.00	0.00	68.41	179.42	2.00	0.00	0.00	0.00
68.57	183.77	2.00	0.00	0.00	0.00	68.74	183.51	2.00	0.00	0.00	0.00
68.90	178.15	2.00	0.00	0.00	0.00	69.07	169.43	2.00	0.00	0.00	0.00
69.23	161.17	2.00	0.00	0.00	0.00	69.39	156.29	2.00	0.00	0.00	0.00
69.56	154.76	2.00	0.00	0.00	0.00	69.72	155.21	2.00	0.00	0.00	0.00
69.89	155.74	2.00	0.00	0.00	0.00	70.05	156.20	2.00	0.00	0.00	0.00
70.21	155.20	2.00	0.00	0.00	0.00	70.38	150.76	2.00	0.00	0.00	0.00
70.54	144.12	2.00	0.00	0.00	0.00	70.71	136.98	2.00	0.00	0.00	0.00
70.87	133.46	2.00	0.00	0.00	0.00	71.03	133.86	2.00	0.00	0.00	0.00
71.20	134.63	2.00	0.00	0.00	0.00	71.36	131.92	2.00	0.00	0.00	0.00
71.53	124.57	2.00	0.00	0.00	0.00	71.69	115.79	2.00	0.00	0.00	0.00
71.85	109.21	2.00	0.00	0.00	0.00	72.02	105.93	2.00	0.00	0.00	0.00
72.18	105.50	2.00	0.00	0.00	0.00	72.35	106.92	2.00	0.00	0.00	0.00
72.51	109.38	2.00	0.00	0.00	0.00	72.67	111.54	2.00	0.00	0.00	0.00
72.84	123.32	2.00	0.00	0.00	0.00	73.00	130.32	2.00	0.00	0.00	0.00
73.17	134.89	2.00	0.00	0.00	0.00	73.33	131.44	2.00	0.00	0.00	0.00
73.49	130.24	2.00	0.00	0.00	0.00	73.66	130.20	2.00	0.00	0.00	0.00
73.82	137.71	2.00	0.00	0.00	0.00	73.99	139.22	2.00	0.00	0.00	0.00

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

Depth (ft)	$Q_{tn,cs}$	FS	e_v (%)	DF	Settlement (in)	Depth (ft)	$Q_{tn,cs}$	FS	e_v (%)	DF	Settlement (in)
74.15	140.85	2.00	0.00	0.00	0.00	74.31	138.61	2.00	0.00	0.00	0.00
74.48	140.67	2.00	0.00	0.00	0.00	74.64	139.56	2.00	0.00	0.00	0.00
74.81	139.24	2.00	0.00	0.00	0.00	74.97	138.46	2.00	0.00	0.00	0.00
75.13	133.89	2.00	0.00	0.00	0.00	75.30	119.99	2.00	0.00	0.00	0.00
75.46	106.63	2.00	0.00	0.00	0.00	75.63	106.76	2.00	0.00	0.00	0.00
75.79	116.43	2.00	0.00	0.00	0.00	75.96	123.91	2.00	0.00	0.00	0.00
76.12	122.57	2.00	0.00	0.00	0.00	76.28	113.88	2.00	0.00	0.00	0.00
76.45	107.07	2.00	0.00	0.00	0.00	76.61	113.06	2.00	0.00	0.00	0.00
76.78	129.52	2.00	0.00	0.00	0.00	76.94	154.71	2.00	0.00	0.00	0.00
77.10	179.82	2.00	0.00	0.00	0.00	77.27	199.33	2.00	0.00	0.00	0.00
77.43	209.64	2.00	0.00	0.00	0.00	77.60	216.72	2.00	0.00	0.00	0.00
77.76	218.54	2.00	0.00	0.00	0.00	77.92	210.79	2.00	0.00	0.00	0.00
78.09	210.18	2.00	0.00	0.00	0.00	78.25	211.57	2.00	0.00	0.00	0.00
78.42	202.50	2.00	0.00	0.00	0.00	78.58	178.11	2.00	0.00	0.00	0.00
78.74	150.45	2.00	0.00	0.00	0.00	78.91	133.98	2.00	0.00	0.00	0.00
79.07	131.05	2.00	0.00	0.00	0.00	79.24	132.04	2.00	0.00	0.00	0.00
79.40	131.92	2.00	0.00	0.00	0.00	79.56	126.74	2.00	0.00	0.00	0.00
79.73	122.43	2.00	0.00	0.00	0.00	79.89	117.35	2.00	0.00	0.00	0.00
80.06	114.55	2.00	0.00	0.00	0.00	80.22	109.45	2.00	0.00	0.00	0.00
80.38	104.70	2.00	0.00	0.00	0.00	80.55	100.32	2.00	0.00	0.00	0.00
80.71	99.92	2.00	0.00	0.00	0.00	80.88	104.59	2.00	0.00	0.00	0.00
81.04	110.83	2.00	0.00	0.00	0.00	81.20	117.90	2.00	0.00	0.00	0.00
81.37	121.17	2.00	0.00	0.00	0.00	81.53	122.20	2.00	0.00	0.00	0.00
81.70	121.03	2.00	0.00	0.00	0.00	81.86	117.53	2.00	0.00	0.00	0.00
82.02	111.48	2.00	0.00	0.00	0.00	82.19	105.79	2.00	0.00	0.00	0.00
82.35	98.43	2.00	0.00	0.00	0.00	82.52	97.67	2.00	0.00	0.00	0.00
82.68	98.96	2.00	0.00	0.00	0.00	82.85	104.95	2.00	0.00	0.00	0.00
83.01	107.51	2.00	0.00	0.00	0.00	83.17	108.82	2.00	0.00	0.00	0.00
83.34	108.94	2.00	0.00	0.00	0.00	83.50	111.87	2.00	0.00	0.00	0.00
83.67	115.91	2.00	0.00	0.00	0.00	83.83	127.35	2.00	0.00	0.00	0.00
83.99	141.87	2.00	0.00	0.00	0.00	84.16	155.68	2.00	0.00	0.00	0.00
84.32	165.12	2.00	0.00	0.00	0.00	84.49	172.18	2.00	0.00	0.00	0.00
84.65	181.29	2.00	0.00	0.00	0.00	84.81	192.14	2.00	0.00	0.00	0.00
84.98	204.37	2.00	0.00	0.00	0.00	85.14	213.96	2.00	0.00	0.00	0.00
85.31	218.23	2.00	0.00	0.00	0.00	85.47	212.41	2.00	0.00	0.00	0.00
85.63	198.28	2.00	0.00	0.00	0.00	85.80	175.51	2.00	0.00	0.00	0.00
85.96	140.55	2.00	0.00	0.00	0.00	86.13	123.97	2.00	0.00	0.00	0.00
86.29	128.06	2.00	0.00	0.00	0.00	86.45	143.70	2.00	0.00	0.00	0.00
86.62	160.82	2.00	0.00	0.00	0.00	86.78	170.18	2.00	0.00	0.00	0.00
86.95	167.92	2.00	0.00	0.00	0.00	87.11	156.75	2.00	0.00	0.00	0.00
87.27	143.91	2.00	0.00	0.00	0.00	87.44	134.86	2.00	0.00	0.00	0.00
87.60	131.10	2.00	0.00	0.00	0.00	87.77	123.87	2.00	0.00	0.00	0.00
87.93	122.24	2.00	0.00	0.00	0.00	88.09	125.59	2.00	0.00	0.00	0.00
88.26	129.76	2.00	0.00	0.00	0.00	88.42	131.83	2.00	0.00	0.00	0.00
88.59	143.00	2.00	0.00	0.00	0.00	88.75	153.90	2.00	0.00	0.00	0.00
88.92	156.37	2.00	0.00	0.00	0.00	89.08	135.12	2.00	0.00	0.00	0.00
89.24	103.08	2.00	0.00	0.00	0.00	89.41	88.83	2.00	0.00	0.00	0.00
89.57	94.05	2.00	0.00	0.00	0.00	89.74	99.34	2.00	0.00	0.00	0.00

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

Depth (ft)	$Q_{tn,cs}$	FS	e_v (%)	DF	Settlement (in)	Depth (ft)	$Q_{tn,cs}$	FS	e_v (%)	DF	Settlement (in)
89.90	102.07	2.00	0.00	0.00	0.00	90.06	98.85	2.00	0.00	0.00	0.00
90.23	92.36	2.00	0.00	0.00	0.00	90.39	85.28	2.00	0.00	0.00	0.00
90.56	82.18	2.00	0.00	0.00	0.00	90.72	82.72	2.00	0.00	0.00	0.00
90.88	86.46	2.00	0.00	0.00	0.00	91.05	91.18	2.00	0.00	0.00	0.00
91.21	97.43	2.00	0.00	0.00	0.00	91.38	101.47	2.00	0.00	0.00	0.00
91.54	105.19	2.00	0.00	0.00	0.00	91.70	110.04	2.00	0.00	0.00	0.00
91.87	121.83	2.00	0.00	0.00	0.00	92.03	142.43	2.00	0.00	0.00	0.00
92.20	162.95	2.00	0.00	0.00	0.00	92.36	173.70	2.00	0.00	0.00	0.00
92.52	172.27	2.00	0.00	0.00	0.00	92.69	162.16	2.00	0.00	0.00	0.00
92.85	155.29	2.00	0.00	0.00	0.00	93.02	152.03	2.00	0.00	0.00	0.00
93.18	151.23	2.00	0.00	0.00	0.00	93.34	141.47	2.00	0.00	0.00	0.00
93.51	128.84	2.00	0.00	0.00	0.00	93.67	120.07	2.00	0.00	0.00	0.00
93.84	123.22	2.00	0.00	0.00	0.00	94.00	129.05	2.00	0.00	0.00	0.00
94.16	137.89	2.00	0.00	0.00	0.00	94.33	140.73	2.00	0.00	0.00	0.00
94.49	142.73	2.00	0.00	0.00	0.00	94.66	143.30	2.00	0.00	0.00	0.00
94.82	139.13	2.00	0.00	0.00	0.00	94.98	126.04	2.00	0.00	0.00	0.00
95.15	120.81	2.00	0.00	0.00	0.00	95.31	123.49	2.00	0.00	0.00	0.00
95.48	136.01	2.00	0.00	0.00	0.00	95.64	150.77	2.00	0.00	0.00	0.00
95.81	156.54	2.00	0.00	0.00	0.00	95.97	153.65	2.00	0.00	0.00	0.00
96.13	142.47	2.00	0.00	0.00	0.00	96.30	134.33	2.00	0.00	0.00	0.00
96.46	127.22	2.00	0.00	0.00	0.00	96.63	123.47	2.00	0.00	0.00	0.00
96.79	122.22	2.00	0.00	0.00	0.00	96.95	125.18	2.00	0.00	0.00	0.00
97.12	133.02	2.00	0.00	0.00	0.00	97.28	144.20	2.00	0.00	0.00	0.00
97.45	156.65	2.00	0.00	0.00	0.00	97.61	158.72	2.00	0.00	0.00	0.00
97.77	145.74	2.00	0.00	0.00	0.00	97.94	132.60	2.00	0.00	0.00	0.00
98.10	132.17	2.00	0.00	0.00	0.00	98.27	144.28	2.00	0.00	0.00	0.00
98.43	154.02	2.00	0.00	0.00	0.00	98.59	154.81	2.00	0.00	0.00	0.00
98.76	146.17	2.00	0.00	0.00	0.00	98.92	133.09	2.00	0.00	0.00	0.00
99.09	115.81	2.00	0.00	0.00	0.00	99.25	103.23	2.00	0.00	0.00	0.00
99.41	96.56	2.00	0.00	0.00	0.00	99.58	93.24	2.00	0.00	0.00	0.00
99.74	77.57	2.00	0.00	0.00	0.00	99.91	73.50	2.00	0.00	0.00	0.00
100.07	83.98	2.00	0.00	0.00	0.00	100.23	93.78	2.00	0.00	0.00	0.00
100.40	98.76	2.00	0.00	0.00	0.00	100.56	105.41	2.00	0.00	0.00	0.00

Total estimated settlement: 0.28

Abbreviations

$Q_{tn,cs}$: Equivalent clean sand normalized cone resistance
FS: Factor of safety against liquefaction
e_v (%): Post-liquefaction volumentric strain
DF: e_v depth weighting factor
Settlement: Calculated settlement

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San Diego, California 92121-2974
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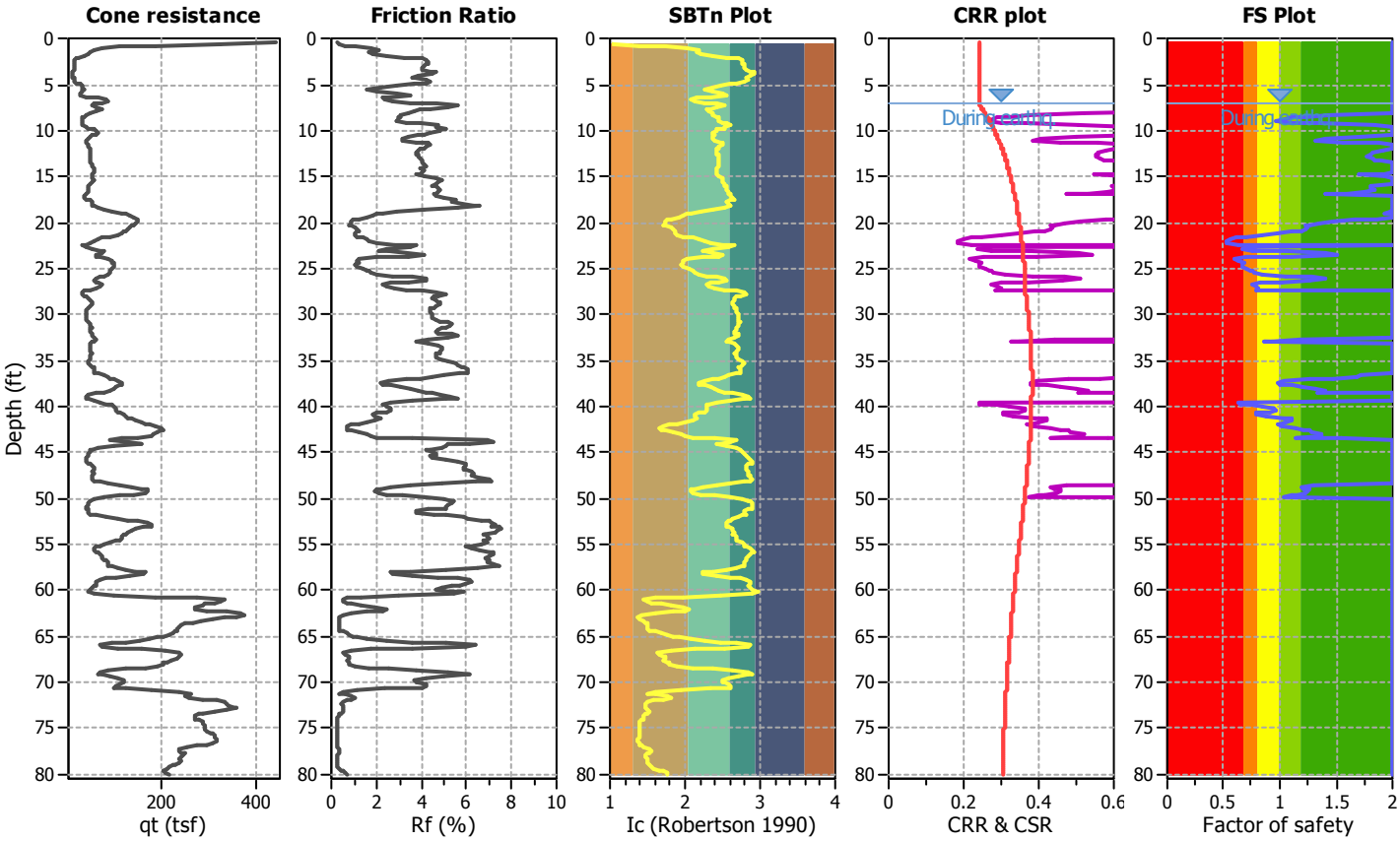
LIQUEFACTION ANALYSIS REPORT

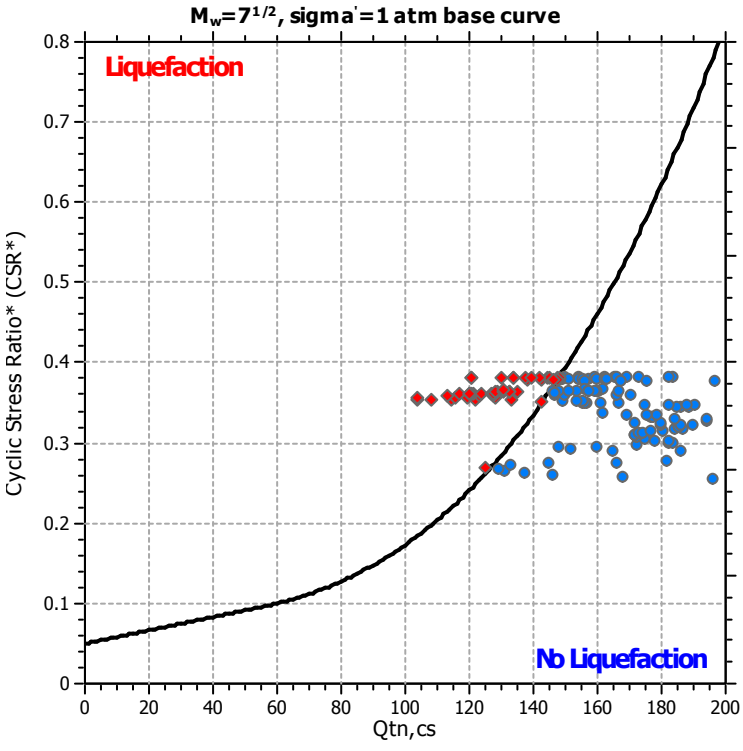
Project title : Collins Aerospace **Location : Parcel A**

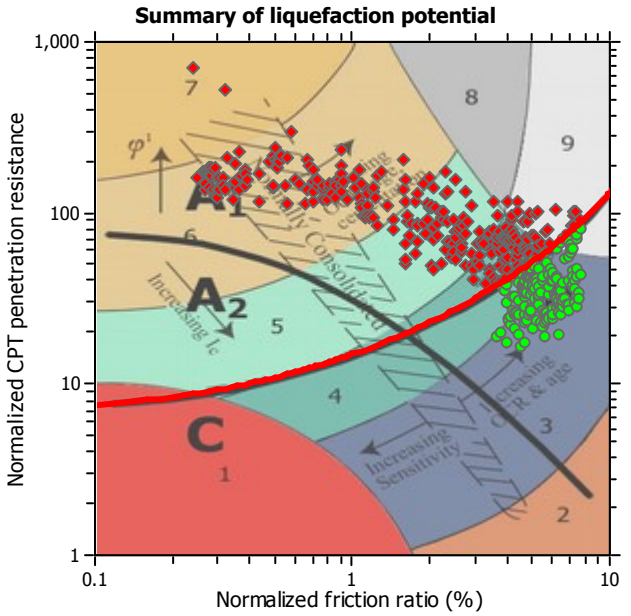
CPT file : CPT-06

Input parameters and analysis data

Analysis method:	NCEER (1998)	G.W.T. (in-situ):	7.00 ft	Use fill:	No	Clay like behavior applied:	Sands only
Fines correction method:	NCEER (1998)	G.W.T. (earthq.):	7.00 ft	Fill height:	N/A	Limit depth applied:	Yes
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	50.00 ft
Earthquake magnitude M_w:	6.12	Ic cut-off value:	2.60	Trans. detect. applied:	No	MSF method:	Method based
Peak ground acceleration:	0.63	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

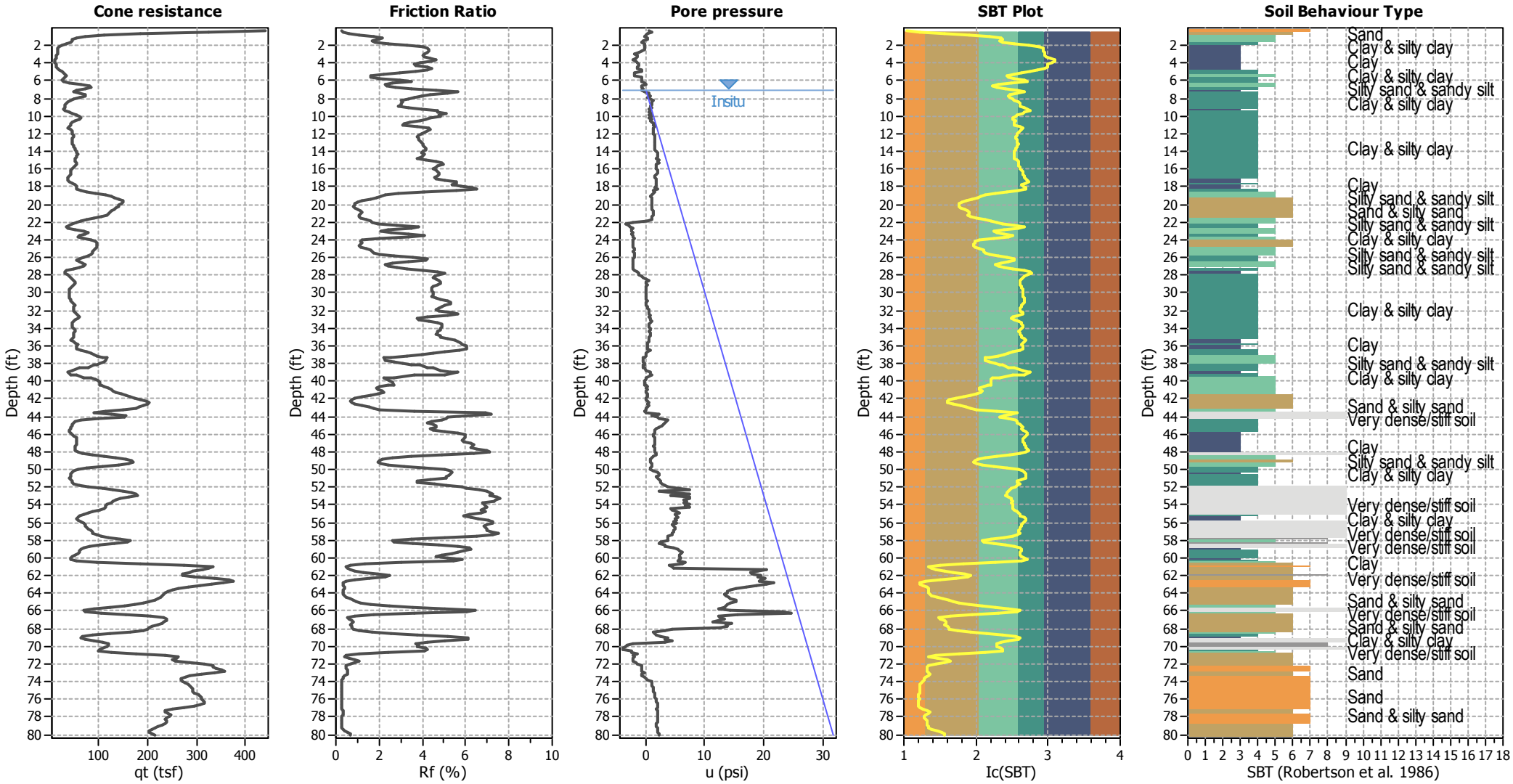






Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and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

CPT basic interpretation plots



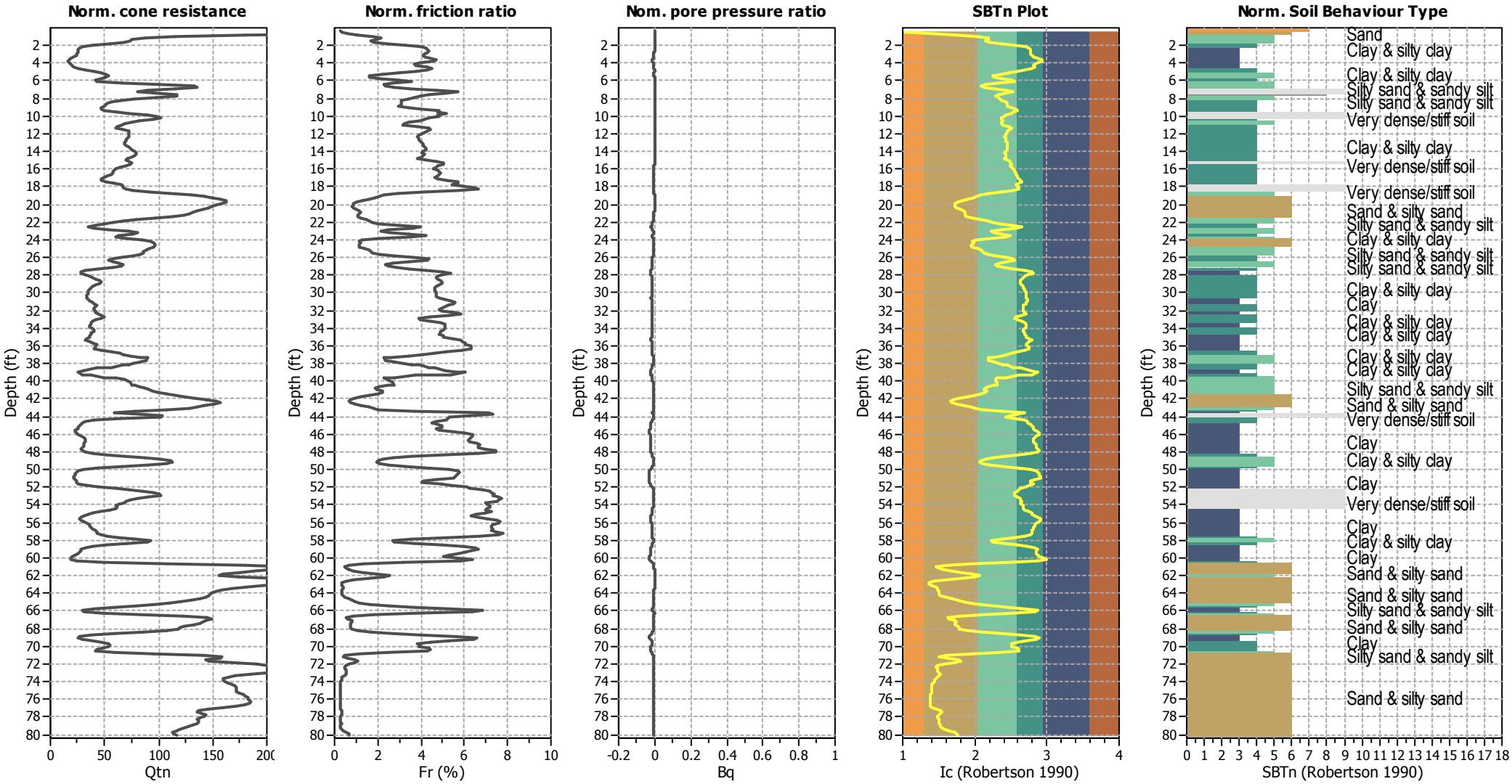
Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	7.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_o applied:	Yes
Earthquake magnitude M_w:	6.12	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.63	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	7.00 ft	Fill height:	N/A	Limit depth:	50.00 ft

SBT legend

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

CPT basic interpretation plots (normalized)



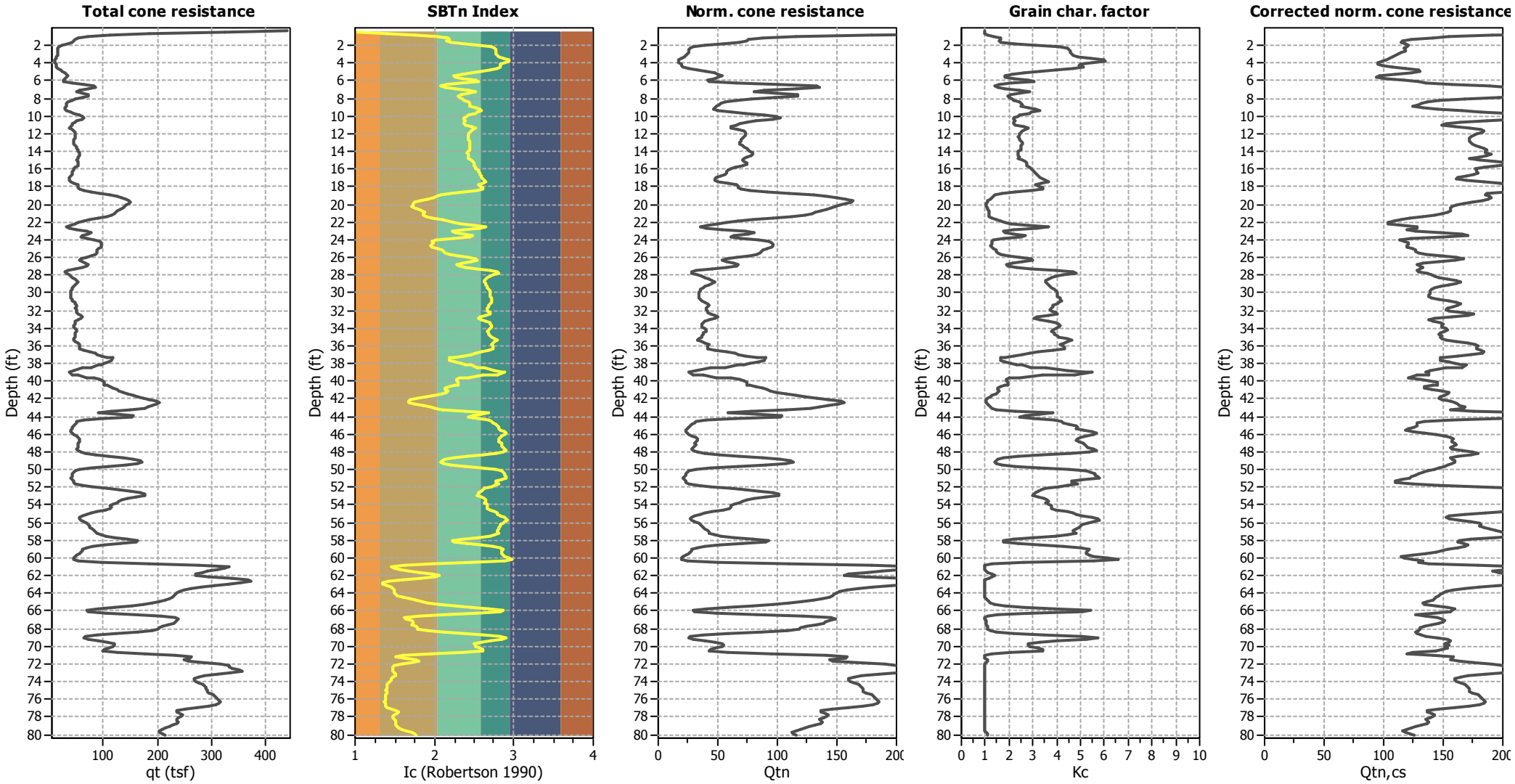
Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	7.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	6.12	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.63	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	7.00 ft	Fill height:	N/A	Limit depth:	50.00 ft

SBTn legend

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

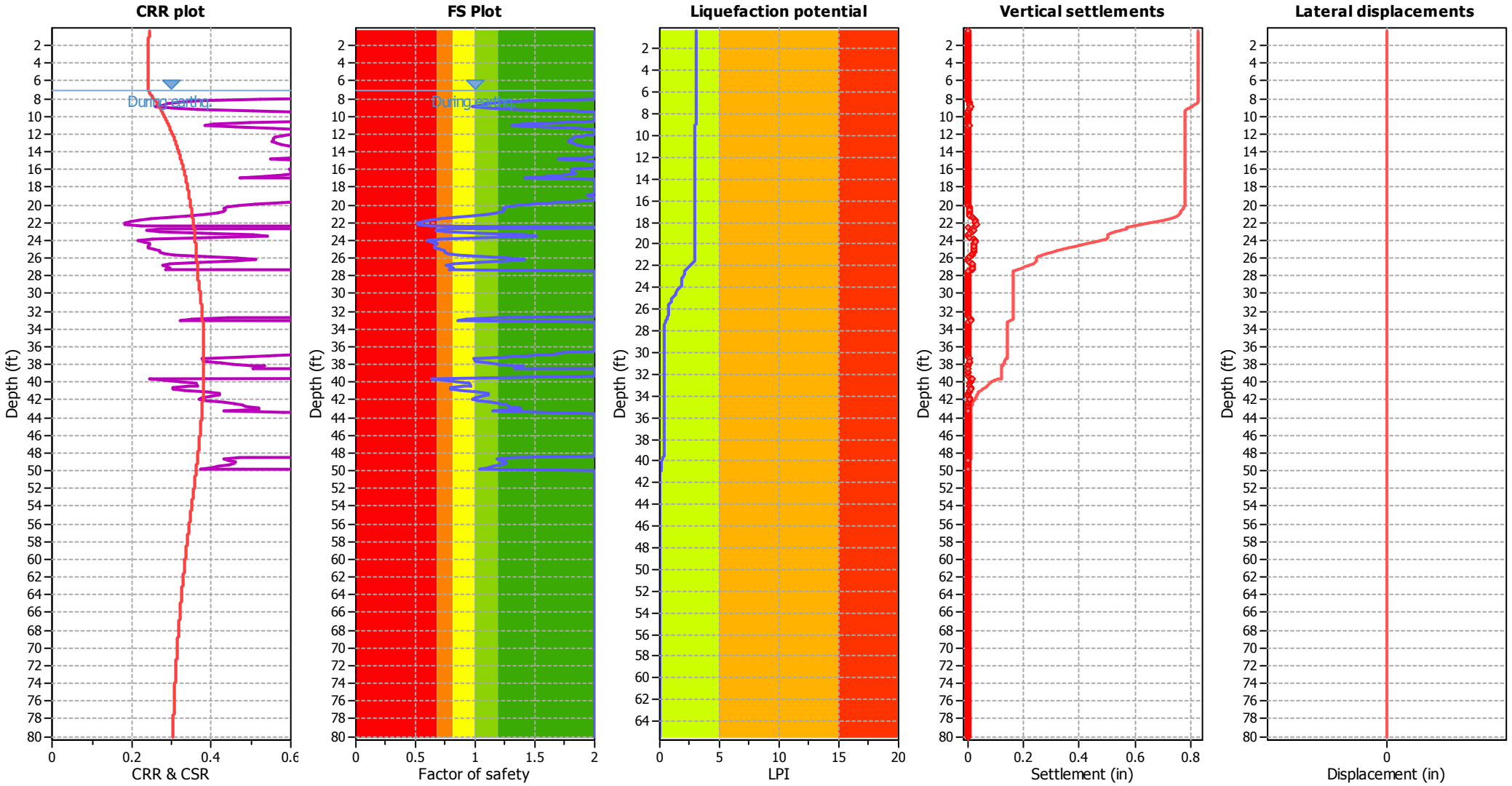
Liquefaction analysis overall plots (intermediate results)



Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	7.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	6.12	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.63	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	7.00 ft	Fill height:	N/A	Limit depth:	50.00 ft

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	7.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	6.12	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.63	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	7.00 ft	Fill height:	N/A	Limit depth:	50.00 ft

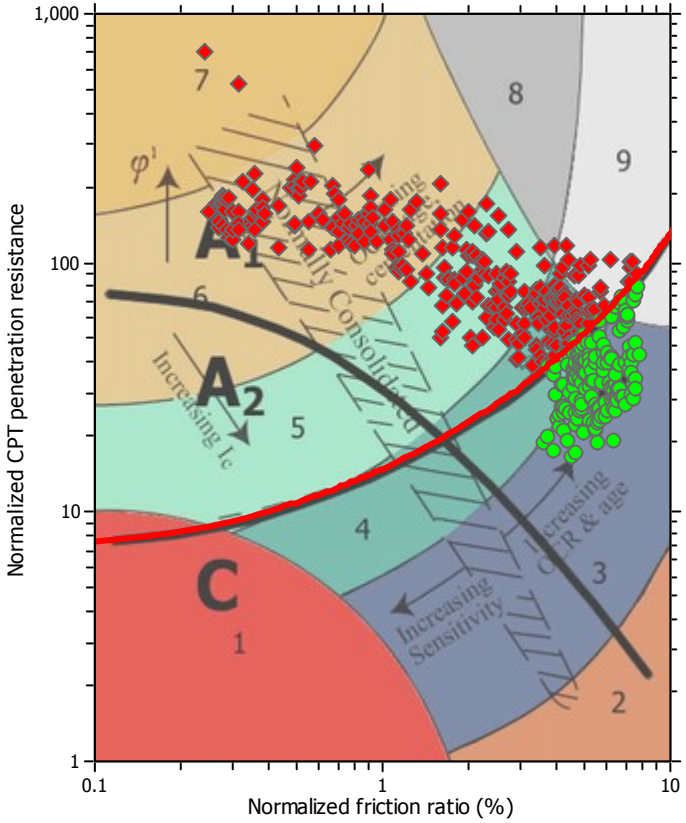
F.S. color scheme

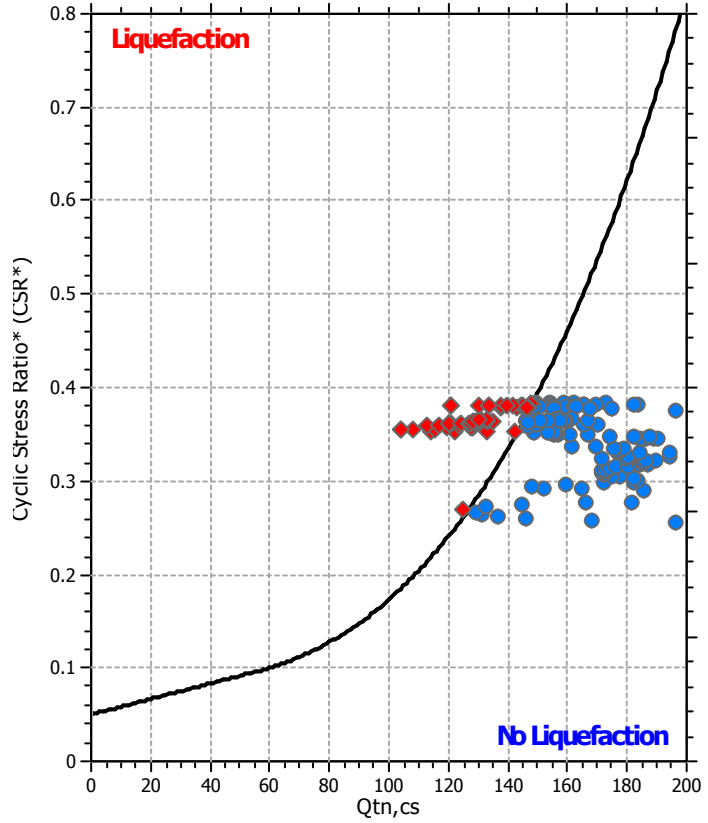
- Almost certain it will liquefy
- Very likely to liquefy
- Liquefaction and no liq. are equally likely
- Unlike to liquefy
- Almost certain it will not liquefy

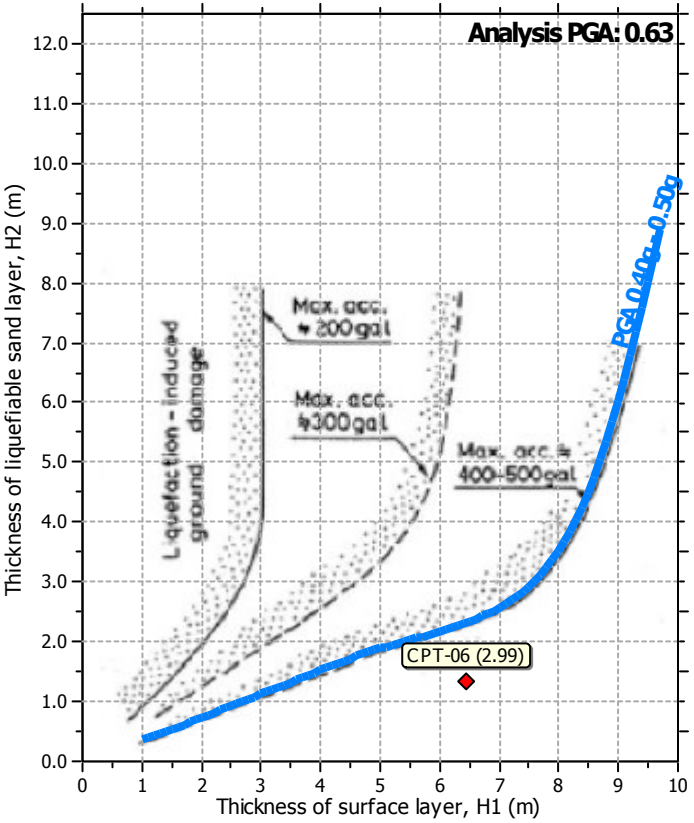
LPI color scheme

- Very high risk
- High risk
- Low risk

Liquefaction analysis summary plots



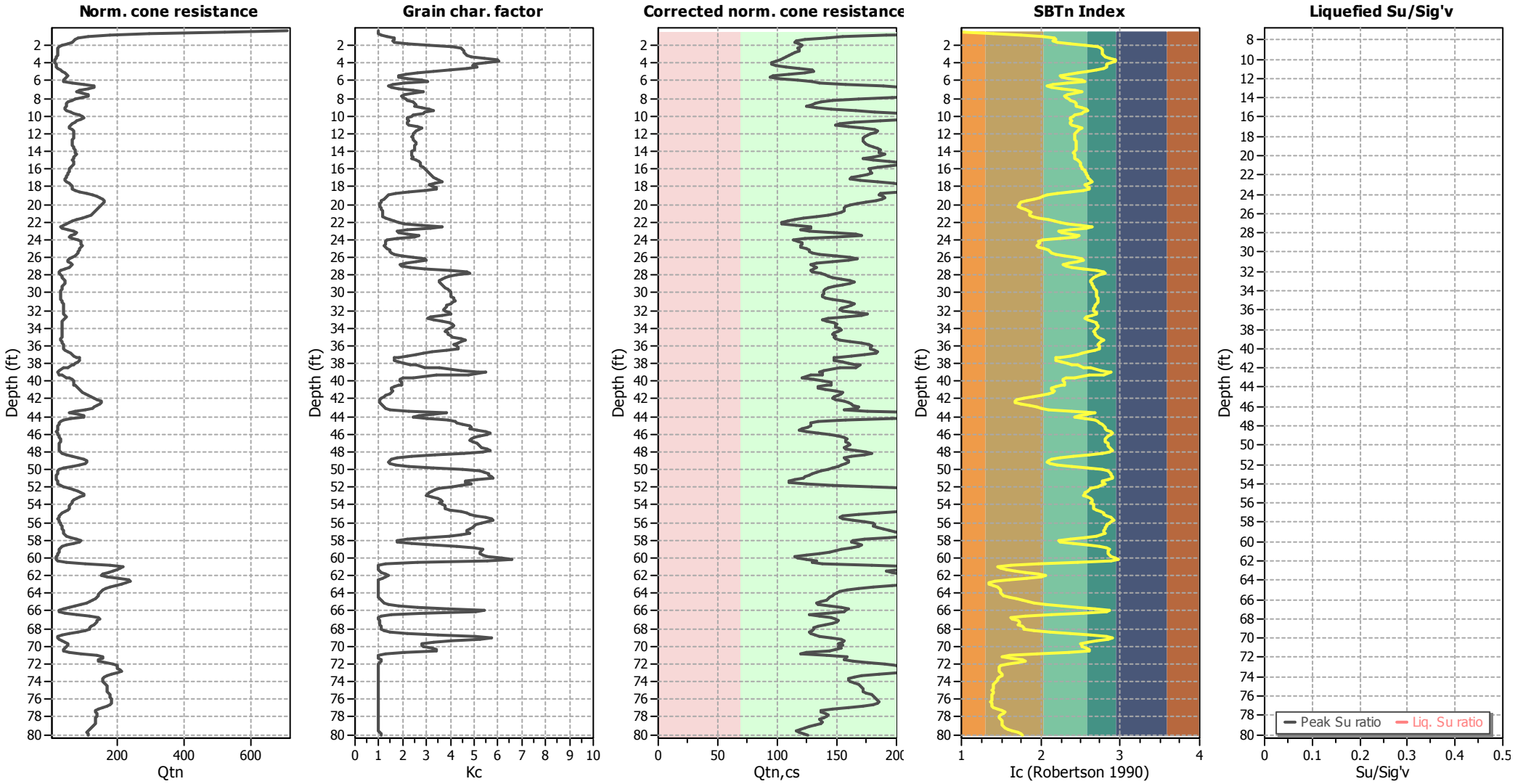




Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	7.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_o applied:	Yes
Earthquake magnitude M_w:	6.12	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.63	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	7.00 ft	Fill height:	N/A	Limit depth:	50.00 ft

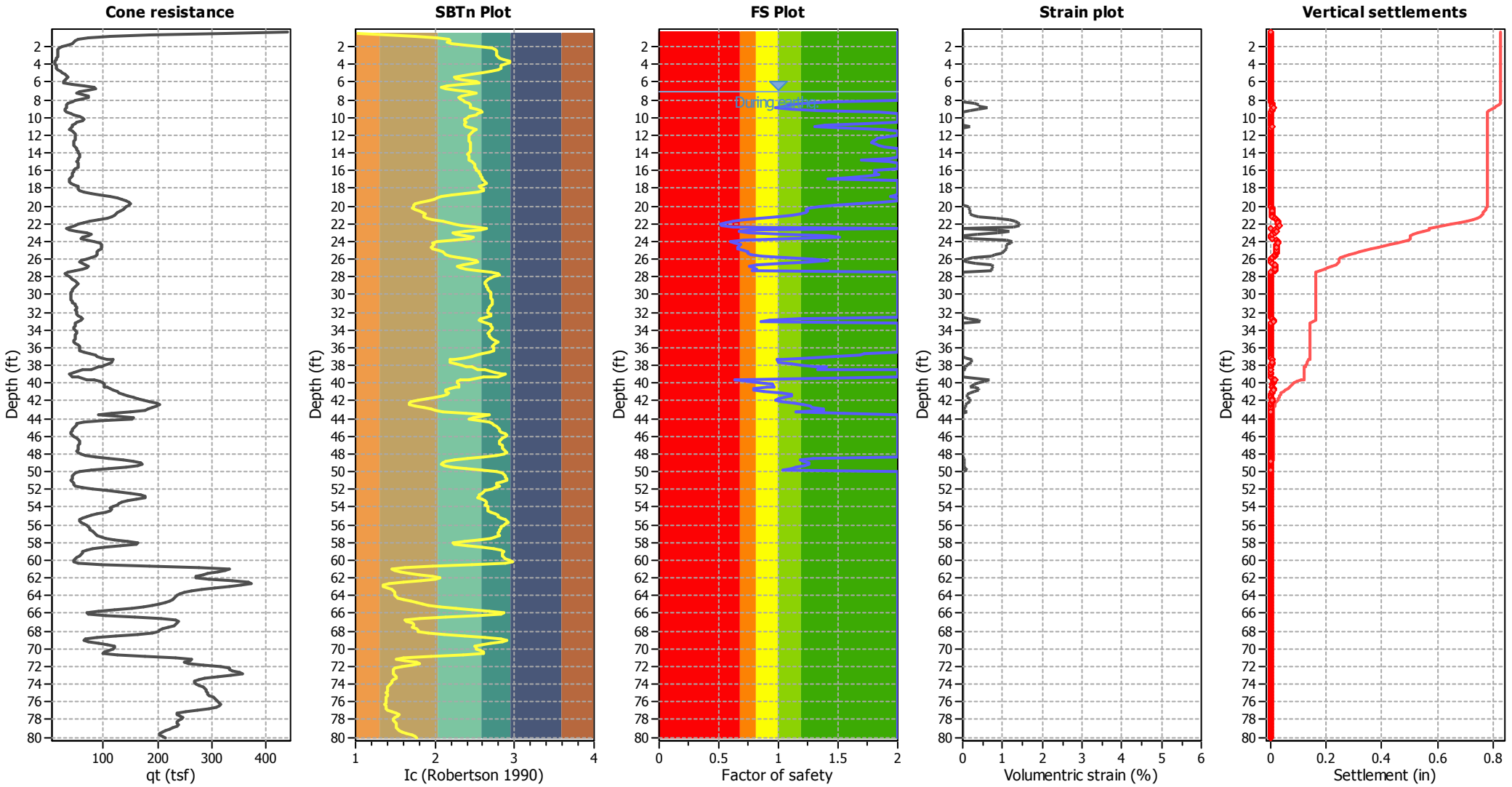
Check for strength loss plots (Robertson (2010))



Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	7.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	6.12	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.63	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	7.00 ft	Fill height:	N/A	Limit depth:	50.00 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

:: Post-earthquake settlement due to soil liquefaction ::

Depth (ft)	$Q_{tn,cs}$	FS	e_v (%)	DF	Settlement (in)	Depth (ft)	$Q_{tn,cs}$	FS	e_v (%)	DF	Settlement (in)
7.05	215.78	2.00	0.00	0.88	0.00	7.22	230.25	2.00	0.00	0.88	0.00
7.38	241.38	2.00	0.00	0.87	0.00	7.55	240.25	2.00	0.00	0.87	0.00
7.71	227.02	2.00	0.00	0.87	0.00	7.87	196.44	2.00	0.00	0.87	0.00
8.04	168.32	2.00	0.00	0.86	0.00	8.20	146.28	1.43	0.00	0.86	0.00
8.37	137.19	1.22	0.28	0.86	0.01	8.53	131.29	1.10	0.40	0.86	0.01
8.69	129.27	1.06	0.40	0.85	0.01	8.86	124.75	0.97	0.61	0.85	0.01
9.02	132.90	1.10	0.39	0.85	0.01	9.19	145.11	1.33	0.19	0.84	0.00
9.35	166.13	1.84	0.00	0.84	0.00	9.51	182.02	2.00	0.00	0.84	0.00
9.68	206.59	2.00	0.00	0.84	0.00	9.84	219.12	2.00	0.00	0.83	0.00
10.01	231.91	2.00	0.00	0.83	0.00	10.17	223.34	2.00	0.00	0.83	0.00
10.34	209.72	2.00	0.00	0.82	0.00	10.50	186.18	2.00	0.00	0.82	0.00
10.66	165.00	1.72	0.00	0.82	0.00	10.83	152.10	1.40	0.00	0.82	0.00
10.99	148.40	1.31	0.18	0.81	0.00	11.16	159.89	1.56	0.00	0.81	0.00
11.32	172.42	1.88	0.00	0.81	0.00	11.48	182.23	2.00	0.00	0.81	0.00
11.65	184.05	2.00	0.00	0.80	0.00	11.81	182.65	2.00	0.00	0.80	0.00
11.98	178.02	2.00	0.00	0.80	0.00	12.14	175.24	1.91	0.00	0.79	0.00
12.30	172.65	1.83	0.00	0.79	0.00	12.47	172.32	1.81	0.00	0.79	0.00
12.63	172.14	1.80	0.00	0.79	0.00	12.80	171.74	1.78	0.00	0.78	0.00
12.96	173.37	1.82	0.00	0.78	0.00	13.12	174.53	1.84	0.00	0.78	0.00
13.29	176.84	1.90	0.00	0.77	0.00	13.45	180.78	2.00	0.00	0.77	0.00
13.62	184.62	2.00	0.00	0.77	0.00	13.78	187.09	2.00	0.00	0.77	0.00
13.94	185.42	2.00	0.00	0.76	0.00	14.11	185.78	2.00	0.00	0.76	0.00
14.27	189.94	2.00	0.00	0.76	0.00	14.44	186.33	2.00	0.00	0.76	0.00
14.60	179.93	1.93	0.00	0.75	0.00	14.76	171.58	1.70	0.00	0.75	0.00
14.93	180.29	1.92	0.00	0.75	0.00	15.09	194.45	2.00	0.00	0.74	0.00
15.26	205.62	2.00	0.00	0.74	0.00	15.42	205.05	2.00	0.00	0.74	0.00
15.58	194.52	2.00	0.00	0.74	0.00	15.75	184.67	2.00	0.00	0.73	0.00
15.91	177.16	1.81	0.00	0.73	0.00	16.08	177.63	1.81	0.00	0.73	0.00
16.24	177.51	1.81	0.00	0.72	0.00	16.40	178.91	1.84	0.00	0.72	0.00
16.57	175.58	1.75	0.00	0.72	0.00	16.73	169.59	1.59	0.00	0.72	0.00
16.90	161.72	1.41	0.00	0.71	0.00	17.06	160.43	2.00	0.00	0.71	0.00
17.23	168.99	2.00	0.00	0.71	0.00	17.39	184.30	2.00	0.00	0.71	0.00
17.55	197.01	2.00	0.00	0.70	0.00	17.72	203.14	2.00	0.00	0.70	0.00
17.88	215.17	2.00	0.00	0.70	0.00	18.05	227.58	2.00	0.00	0.69	0.00
18.21	236.56	2.00	0.00	0.69	0.00	18.37	225.80	2.00	0.00	0.69	0.00
18.54	203.40	2.00	0.00	0.69	0.00	18.70	186.32	1.98	0.00	0.68	0.00
18.87	184.82	1.94	0.00	0.68	0.00	19.03	189.01	2.00	0.00	0.68	0.00
19.19	190.68	2.00	0.00	0.67	0.00	19.36	188.04	2.00	0.00	0.67	0.00
19.52	182.71	1.87	0.00	0.67	0.00	19.69	174.79	1.66	0.00	0.67	0.00
19.85	166.95	1.47	0.00	0.66	0.00	20.01	161.08	1.35	0.14	0.66	0.00
20.18	157.04	1.26	0.14	0.66	0.00	20.34	155.57	1.23	0.20	0.66	0.00
20.51	156.55	1.25	0.19	0.65	0.00	20.67	155.56	1.23	0.19	0.65	0.00
20.83	153.62	1.19	0.19	0.65	0.00	21.00	149.10	1.10	0.27	0.64	0.01
21.16	142.33	0.99	0.41	0.64	0.01	21.33	132.95	0.85	0.86	0.64	0.02
21.49	122.00	0.70	1.18	0.64	0.02	21.65	114.20	0.62	1.33	0.63	0.03
21.82	108.08	0.56	1.38	0.63	0.03	21.98	103.75	0.52	1.42	0.63	0.03
22.15	103.91	0.52	1.41	0.62	0.03	22.31	115.45	0.63	1.29	0.62	0.02
22.47	127.49	2.00	0.00	0.62	0.00	22.64	128.21	0.77	0.87	0.62	0.02

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

Depth (ft)	$Q_{tn,cs}$	FS	e_v (%)	DF	Settlement (in)	Depth (ft)	$Q_{tn,cs}$	FS	e_v (%)	DF	Settlement (in)
22.80	119.61	0.67	1.17	0.61	0.02	22.97	127.33	0.76	0.87	0.61	0.02
23.13	146.98	1.05	0.38	0.61	0.01	23.30	165.98	1.41	0.00	0.61	0.00
23.46	170.47	1.51	0.00	0.60	0.00	23.62	149.99	1.10	0.25	0.60	0.00
23.79	123.19	0.71	1.09	0.60	0.02	23.95	113.07	0.60	1.26	0.59	0.02
24.12	117.11	0.64	1.21	0.59	0.02	24.28	121.10	0.68	1.10	0.59	0.02
24.44	120.74	0.68	1.10	0.59	0.02	24.61	119.84	0.66	1.11	0.58	0.02
24.77	119.89	0.66	1.10	0.58	0.02	24.94	123.86	0.71	1.05	0.58	0.02
25.10	126.81	0.74	1.01	0.57	0.02	25.26	127.26	0.75	1.00	0.57	0.02
25.43	129.06	0.77	0.80	0.57	0.02	25.59	134.93	0.85	0.74	0.57	0.01
25.76	148.40	1.06	0.24	0.56	0.00	25.92	160.70	1.28	0.12	0.56	0.00
26.08	166.90	1.41	0.00	0.56	0.00	26.25	160.22	1.27	0.11	0.56	0.00
26.41	146.34	1.02	0.34	0.55	0.01	26.58	132.71	0.82	0.74	0.55	0.02
26.74	128.27	0.76	0.77	0.55	0.01	26.90	130.65	0.79	0.75	0.54	0.01
27.07	132.76	0.82	0.73	0.54	0.01	27.23	130.42	0.78	0.74	0.54	0.01
27.40	127.73	2.00	0.00	0.54	0.00	27.56	129.66	2.00	0.00	0.53	0.00
27.72	136.78	2.00	0.00	0.53	0.00	27.89	140.46	2.00	0.00	0.53	0.00
28.05	143.00	2.00	0.00	0.52	0.00	28.22	145.81	2.00	0.00	0.52	0.00
28.38	153.47	2.00	0.00	0.52	0.00	28.54	160.91	2.00	0.00	0.52	0.00
28.71	164.83	2.00	0.00	0.51	0.00	28.87	161.49	2.00	0.00	0.51	0.00
29.04	154.60	2.00	0.00	0.51	0.00	29.20	147.49	2.00	0.00	0.51	0.00
29.36	142.51	2.00	0.00	0.50	0.00	29.53	140.05	2.00	0.00	0.50	0.00
29.69	138.76	2.00	0.00	0.50	0.00	29.86	138.66	2.00	0.00	0.49	0.00
30.02	138.45	2.00	0.00	0.49	0.00	30.19	138.16	2.00	0.00	0.49	0.00
30.35	137.92	2.00	0.00	0.49	0.00	30.51	140.40	2.00	0.00	0.48	0.00
30.68	146.35	2.00	0.00	0.48	0.00	30.84	154.35	2.00	0.00	0.48	0.00
31.01	161.58	2.00	0.00	0.47	0.00	31.17	164.16	2.00	0.00	0.47	0.00
31.33	161.99	2.00	0.00	0.47	0.00	31.50	158.37	2.00	0.00	0.47	0.00
31.66	153.56	2.00	0.00	0.46	0.00	31.83	151.89	2.00	0.00	0.46	0.00
31.99	154.98	2.00	0.00	0.46	0.00	32.15	166.25	2.00	0.00	0.46	0.00
32.32	175.21	2.00	0.00	0.45	0.00	32.48	171.25	2.00	0.00	0.45	0.00
32.65	157.41	1.17	0.13	0.45	0.00	32.81	142.63	0.93	0.41	0.44	0.01
32.97	137.86	0.86	0.43	0.44	0.01	33.14	141.48	2.00	0.00	0.44	0.00
33.30	147.80	2.00	0.00	0.44	0.00	33.47	150.09	2.00	0.00	0.43	0.00
33.63	148.91	2.00	0.00	0.43	0.00	33.79	148.57	2.00	0.00	0.43	0.00
33.96	152.14	2.00	0.00	0.42	0.00	34.12	153.62	2.00	0.00	0.42	0.00
34.29	150.97	2.00	0.00	0.42	0.00	34.45	147.92	2.00	0.00	0.42	0.00
34.61	146.57	2.00	0.00	0.41	0.00	34.78	148.89	2.00	0.00	0.41	0.00
34.94	147.65	2.00	0.00	0.41	0.00	35.11	149.39	2.00	0.00	0.40	0.00
35.27	152.83	2.00	0.00	0.40	0.00	35.43	161.27	2.00	0.00	0.40	0.00
35.60	170.35	2.00	0.00	0.40	0.00	35.76	177.01	2.00	0.00	0.39	0.00
35.93	178.94	2.00	0.00	0.39	0.00	36.09	177.78	2.00	0.00	0.39	0.00
36.26	177.48	2.00	0.00	0.39	0.00	36.42	181.85	2.00	0.00	0.38	0.00
36.58	183.90	1.72	0.00	0.38	0.00	36.75	182.33	1.69	0.00	0.38	0.00
36.91	172.92	1.47	0.00	0.37	0.00	37.08	162.54	1.26	0.08	0.37	0.00
37.24	149.86	1.03	0.22	0.37	0.00	37.40	147.50	0.99	0.23	0.37	0.00
37.57	147.90	1.00	0.22	0.36	0.00	37.73	154.51	1.11	0.15	0.36	0.00
37.90	159.23	1.19	0.10	0.36	0.00	38.06	165.55	1.31	0.07	0.35	0.00
38.22	169.64	1.40	0.00	0.35	0.00	38.39	166.05	1.33	0.07	0.35	0.00

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

Depth (ft)	$Q_{tn,cs}$	FS	e_v (%)	DF	Settlement (in)	Depth (ft)	$Q_{tn,cs}$	FS	e_v (%)	DF	Settlement (in)
38.55	152.81	2.00	0.00	0.35	0.00	38.72	139.32	2.00	0.00	0.34	0.00
38.88	134.85	2.00	0.00	0.34	0.00	39.04	138.09	2.00	0.00	0.34	0.00
39.21	138.09	2.00	0.00	0.34	0.00	39.37	128.29	2.00	0.00	0.33	0.00
39.54	120.68	0.64	0.66	0.33	0.01	39.70	120.86	0.64	0.65	0.33	0.01
39.86	129.94	0.75	0.55	0.32	0.01	40.03	137.47	0.84	0.41	0.32	0.01
40.19	144.61	0.95	0.29	0.32	0.01	40.36	145.29	0.96	0.20	0.32	0.00
40.52	141.83	0.91	0.29	0.31	0.01	40.68	133.88	0.80	0.41	0.31	0.01
40.85	133.83	0.80	0.41	0.31	0.01	41.01	139.66	0.88	0.29	0.30	0.01
41.18	149.38	1.03	0.18	0.30	0.00	41.34	154.34	1.11	0.12	0.30	0.00
41.50	154.07	1.11	0.12	0.30	0.00	41.67	150.95	1.05	0.12	0.29	0.00
41.83	147.30	1.00	0.18	0.29	0.00	42.00	146.15	0.98	0.18	0.29	0.00
42.16	148.82	1.02	0.17	0.29	0.00	42.32	155.76	1.14	0.12	0.28	0.00
42.49	159.72	1.21	0.08	0.28	0.00	42.65	162.42	1.27	0.06	0.28	0.00
42.82	163.30	1.28	0.06	0.27	0.00	42.98	167.81	1.38	0.00	0.27	0.00
43.15	167.68	1.37	0.00	0.27	0.00	43.31	155.97	1.15	0.11	0.27	0.00
43.47	175.37	1.54	0.00	0.26	0.00	43.64	226.85	2.00	0.00	0.26	0.00
43.80	275.70	2.00	0.00	0.26	0.00	43.97	278.37	2.00	0.00	0.25	0.00
44.13	249.43	2.00	0.00	0.25	0.00	44.29	196.95	2.00	0.00	0.25	0.00
44.46	157.12	2.00	0.00	0.25	0.00	44.62	133.70	2.00	0.00	0.24	0.00
44.79	127.81	2.00	0.00	0.24	0.00	44.95	128.06	2.00	0.00	0.24	0.00
45.11	128.18	2.00	0.00	0.24	0.00	45.28	126.08	2.00	0.00	0.23	0.00
45.44	120.82	2.00	0.00	0.23	0.00	45.61	118.77	2.00	0.00	0.23	0.00
45.77	124.93	2.00	0.00	0.22	0.00	45.93	134.45	2.00	0.00	0.22	0.00
46.10	144.22	2.00	0.00	0.22	0.00	46.26	150.82	2.00	0.00	0.22	0.00
46.43	156.24	2.00	0.00	0.21	0.00	46.59	158.30	2.00	0.00	0.21	0.00
46.75	157.23	2.00	0.00	0.21	0.00	46.92	157.07	2.00	0.00	0.20	0.00
47.08	159.40	2.00	0.00	0.20	0.00	47.25	161.56	2.00	0.00	0.20	0.00
47.41	158.96	2.00	0.00	0.20	0.00	47.57	156.35	2.00	0.00	0.19	0.00
47.74	157.76	2.00	0.00	0.19	0.00	47.90	166.11	2.00	0.00	0.19	0.00
48.07	174.77	2.00	0.00	0.19	0.00	48.23	178.94	2.00	0.00	0.18	0.00
48.39	173.00	2.00	0.00	0.18	0.00	48.56	161.67	1.29	0.04	0.18	0.00
48.72	156.05	1.19	0.05	0.17	0.00	48.89	157.23	1.21	0.05	0.17	0.00
49.05	159.81	1.26	0.03	0.17	0.00	49.22	159.29	1.25	0.03	0.17	0.00
49.38	157.79	1.22	0.05	0.16	0.00	49.54	153.74	1.15	0.05	0.16	0.00
49.71	151.22	1.11	0.07	0.16	0.00	49.87	146.76	1.03	0.10	0.15	0.00
50.04	142.53	2.00	0.00	0.15	0.00	50.20	136.14	2.00	0.00	0.15	0.00
50.36	133.42	2.00	0.00	0.15	0.00	50.53	128.85	2.00	0.00	0.14	0.00
50.69	126.89	2.00	0.00	0.14	0.00	50.86	123.06	2.00	0.00	0.14	0.00
51.02	121.97	2.00	0.00	0.14	0.00	51.18	115.15	2.00	0.00	0.13	0.00
51.35	109.79	2.00	0.00	0.13	0.00	51.51	109.65	2.00	0.00	0.13	0.00
51.68	123.92	2.00	0.00	0.12	0.00	51.84	146.72	2.00	0.00	0.12	0.00
52.00	179.07	2.00	0.00	0.12	0.00	52.17	212.45	2.00	0.00	0.12	0.00
52.33	246.46	2.00	0.00	0.11	0.00	52.50	274.08	2.00	0.00	0.11	0.00
52.66	295.68	2.00	0.00	0.11	0.00	52.82	306.94	2.00	0.00	0.10	0.00
52.99	305.37	2.00	0.00	0.10	0.00	53.15	294.34	2.00	0.00	0.10	0.00
53.32	280.04	2.00	0.00	0.10	0.00	53.48	265.43	2.00	0.00	0.09	0.00
53.64	256.07	2.00	0.00	0.09	0.00	53.81	241.81	2.00	0.00	0.09	0.00
53.97	234.89	2.00	0.00	0.09	0.00	54.14	231.55	2.00	0.00	0.08	0.00

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

Depth (ft)	$Q_{tn,cs}$	FS	e_v (%)	DF	Settlement (in)	Depth (ft)	$Q_{tn,cs}$	FS	e_v (%)	DF	Settlement (in)
54.30	233.35	2.00	0.00	0.08	0.00	54.46	228.14	2.00	0.00	0.08	0.00
54.63	215.93	2.00	0.00	0.07	0.00	54.79	202.00	2.00	0.00	0.07	0.00
54.96	185.02	2.00	0.00	0.07	0.00	55.12	168.14	2.00	0.00	0.07	0.00
55.28	155.03	2.00	0.00	0.06	0.00	55.45	151.98	2.00	0.00	0.06	0.00
55.61	154.50	2.00	0.00	0.06	0.00	55.78	163.13	2.00	0.00	0.05	0.00
55.94	172.85	2.00	0.00	0.05	0.00	56.11	180.24	2.00	0.00	0.05	0.00
56.27	181.25	2.00	0.00	0.05	0.00	56.43	180.98	2.00	0.00	0.04	0.00
56.60	183.76	2.00	0.00	0.04	0.00	56.76	189.48	2.00	0.00	0.04	0.00
56.93	193.83	2.00	0.00	0.04	0.00	57.09	198.76	2.00	0.00	0.03	0.00
57.25	204.72	2.00	0.00	0.03	0.00	57.42	210.87	2.00	0.00	0.03	0.00
57.58	208.31	2.00	0.00	0.02	0.00	57.75	194.49	2.00	0.00	0.02	0.00
57.91	173.66	2.00	0.00	0.02	0.00	58.07	162.94	2.00	0.00	0.02	0.00
58.24	162.17	2.00	0.00	0.01	0.00	58.40	166.83	2.00	0.00	0.01	0.00
58.57	170.85	2.00	0.00	0.01	0.00	58.73	167.84	2.00	0.00	0.00	0.00
58.89	161.65	2.00	0.00	0.00	0.00	59.06	154.20	2.00	0.00	0.00	0.00
59.22	149.34	2.00	0.00	0.00	0.00	59.39	143.65	2.00	0.00	0.00	0.00
59.55	135.63	2.00	0.00	0.00	0.00	59.71	124.13	2.00	0.00	0.00	0.00
59.88	115.04	2.00	0.00	0.00	0.00	60.04	117.04	2.00	0.00	0.00	0.00
60.21	124.93	2.00	0.00	0.00	0.00	60.37	133.31	2.00	0.00	0.00	0.00
60.53	129.76	2.00	0.00	0.00	0.00	60.70	138.15	2.00	0.00	0.00	0.00
60.86	179.66	2.00	0.00	0.00	0.00	61.03	217.46	2.00	0.00	0.00	0.00
61.19	212.24	2.00	0.00	0.00	0.00	61.35	203.41	2.00	0.00	0.00	0.00
61.52	191.89	2.00	0.00	0.00	0.00	61.68	196.46	2.00	0.00	0.00	0.00
61.85	202.33	2.00	0.00	0.00	0.00	62.01	216.92	2.00	0.00	0.00	0.00
62.17	225.89	2.00	0.00	0.00	0.00	62.34	233.43	2.00	0.00	0.00	0.00
62.50	236.76	2.00	0.00	0.00	0.00	62.67	241.13	2.00	0.00	0.00	0.00
62.83	228.62	2.00	0.00	0.00	0.00	63.00	213.18	2.00	0.00	0.00	0.00
63.16	196.09	2.00	0.00	0.00	0.00	63.32	180.70	2.00	0.00	0.00	0.00
63.49	168.15	2.00	0.00	0.00	0.00	63.65	158.94	2.00	0.00	0.00	0.00
63.82	152.80	2.00	0.00	0.00	0.00	63.98	149.57	2.00	0.00	0.00	0.00
64.14	147.25	2.00	0.00	0.00	0.00	64.31	145.94	2.00	0.00	0.00	0.00
64.47	143.76	2.00	0.00	0.00	0.00	64.64	142.59	2.00	0.00	0.00	0.00
64.80	141.03	2.00	0.00	0.00	0.00	64.96	136.94	2.00	0.00	0.00	0.00
65.13	132.80	2.00	0.00	0.00	0.00	65.29	134.45	2.00	0.00	0.00	0.00
65.46	143.80	2.00	0.00	0.00	0.00	65.62	153.64	2.00	0.00	0.00	0.00
65.78	159.99	2.00	0.00	0.00	0.00	65.95	157.56	2.00	0.00	0.00	0.00
66.11	155.81	2.00	0.00	0.00	0.00	66.28	142.35	2.00	0.00	0.00	0.00
66.44	127.29	2.00	0.00	0.00	0.00	66.60	134.81	2.00	0.00	0.00	0.00
66.77	145.56	2.00	0.00	0.00	0.00	66.93	148.89	2.00	0.00	0.00	0.00
67.10	150.91	2.00	0.00	0.00	0.00	67.26	149.76	2.00	0.00	0.00	0.00
67.42	146.46	2.00	0.00	0.00	0.00	67.59	139.93	2.00	0.00	0.00	0.00
67.75	133.95	2.00	0.00	0.00	0.00	67.92	130.77	2.00	0.00	0.00	0.00
68.08	129.92	2.00	0.00	0.00	0.00	68.24	129.26	2.00	0.00	0.00	0.00
68.41	127.02	2.00	0.00	0.00	0.00	68.57	128.65	2.00	0.00	0.00	0.00
68.74	132.14	2.00	0.00	0.00	0.00	68.90	135.87	2.00	0.00	0.00	0.00
69.07	144.60	2.00	0.00	0.00	0.00	69.23	153.07	2.00	0.00	0.00	0.00
69.39	155.84	2.00	0.00	0.00	0.00	69.56	154.37	2.00	0.00	0.00	0.00
69.72	151.32	2.00	0.00	0.00	0.00	69.89	154.65	2.00	0.00	0.00	0.00

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

Depth (ft)	$Q_{tn,cs}$	FS	e_v (%)	DF	Settlement (in)	Depth (ft)	$Q_{tn,cs}$	FS	e_v (%)	DF	Settlement (in)
70.05	151.66	2.00	0.00	0.00	0.00	70.21	153.68	2.00	0.00	0.00	0.00
70.38	148.55	2.00	0.00	0.00	0.00	70.54	143.67	2.00	0.00	0.00	0.00
70.71	124.03	2.00	0.00	0.00	0.00	70.87	119.14	2.00	0.00	0.00	0.00
71.03	141.44	2.00	0.00	0.00	0.00	71.20	158.33	2.00	0.00	0.00	0.00
71.36	156.99	2.00	0.00	0.00	0.00	71.53	155.76	2.00	0.00	0.00	0.00
71.69	163.23	2.00	0.00	0.00	0.00	71.85	175.66	2.00	0.00	0.00	0.00
72.02	190.83	2.00	0.00	0.00	0.00	72.18	200.19	2.00	0.00	0.00	0.00
72.35	200.88	2.00	0.00	0.00	0.00	72.51	203.65	2.00	0.00	0.00	0.00
72.67	211.19	2.00	0.00	0.00	0.00	72.84	213.46	2.00	0.00	0.00	0.00
73.00	201.53	2.00	0.00	0.00	0.00	73.17	185.80	2.00	0.00	0.00	0.00
73.33	170.90	2.00	0.00	0.00	0.00	73.49	165.06	2.00	0.00	0.00	0.00
73.66	160.18	2.00	0.00	0.00	0.00	73.82	159.40	2.00	0.00	0.00	0.00
73.99	160.53	2.00	0.00	0.00	0.00	74.15	164.30	2.00	0.00	0.00	0.00
74.31	168.20	2.00	0.00	0.00	0.00	74.48	169.94	2.00	0.00	0.00	0.00
74.64	171.20	2.00	0.00	0.00	0.00	74.81	171.93	2.00	0.00	0.00	0.00
74.97	172.21	2.00	0.00	0.00	0.00	75.13	172.00	2.00	0.00	0.00	0.00
75.30	174.27	2.00	0.00	0.00	0.00	75.46	178.79	2.00	0.00	0.00	0.00
75.63	180.41	2.00	0.00	0.00	0.00	75.79	182.03	2.00	0.00	0.00	0.00
75.96	182.70	2.00	0.00	0.00	0.00	76.12	184.18	2.00	0.00	0.00	0.00
76.28	185.31	2.00	0.00	0.00	0.00	76.45	184.43	2.00	0.00	0.00	0.00
76.61	180.04	2.00	0.00	0.00	0.00	76.78	172.18	2.00	0.00	0.00	0.00
76.94	159.24	2.00	0.00	0.00	0.00	77.10	146.44	2.00	0.00	0.00	0.00
77.27	136.50	2.00	0.00	0.00	0.00	77.43	136.21	2.00	0.00	0.00	0.00
77.60	140.22	2.00	0.00	0.00	0.00	77.76	143.07	2.00	0.00	0.00	0.00
77.92	141.66	2.00	0.00	0.00	0.00	78.09	138.48	2.00	0.00	0.00	0.00
78.25	135.91	2.00	0.00	0.00	0.00	78.42	136.77	2.00	0.00	0.00	0.00
78.58	137.23	2.00	0.00	0.00	0.00	78.74	136.17	2.00	0.00	0.00	0.00
78.91	131.28	2.00	0.00	0.00	0.00	79.07	127.13	2.00	0.00	0.00	0.00
79.24	123.54	2.00	0.00	0.00	0.00	79.40	120.07	2.00	0.00	0.00	0.00
79.56	116.21	2.00	0.00	0.00	0.00	79.73	118.07	2.00	0.00	0.00	0.00
79.89	122.07	2.00	0.00	0.00	0.00	80.06	125.81	2.00	0.00	0.00	0.00

Total estimated settlement: 0.83

Abbreviations

$Q_{tn,cs}$:	Equivalent dean sand normalized cone resistance
FS:	Factor of safety against liquefaction
e_v (%):	Post-liquefaction volumentric strain
DF:	e_v depth weighting factor
Settlement:	Calculated settlement

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